2012 $12

Digest 176

Global Specialist in Energy Management

The only good watt is a negawatt.

Due to intrinsic inefficiencies, 33 units of energy consumed at the point of use require 100 units of primary energy.

What's a negawatt? The one you didn't use.

Energy saved is money saved.

Yes, the smart grid is coming and we are actively implementing intelligence and innovations to help make it a reality. But we need a solution that will save energy and drive efficiency today as we are building the smarter grids of tomorrow.

Introducing EcoStruxure: Active Energy Management Architecture from Power Plant to Plug™.

Right now, EcoStruxure™ solutions from Schneider Electric™ can reduce your energy use by up to 30% while cutting capital and operational costs. End-use efficiency is where our focus needs to be! The percentage of revenue spent on energy by companies could reach 30% by 2020. And there is an urgent need to reduce CO_2 emissions, especially as energy demand escalates. Energy management is the key – the fastest and most effective solution to curb greenhouse gas emissions while improving business performance. In fact, by 2030, energy efficiency and behavior change will offset more CO_2 than all the new wind, solar, and other alternative energy generation methods combined.*

EcoStruxure™

EcoStruxure solutions cut energy costs today.

As energy prices continue to climb, every unit of energy you save matters. One unit saved at the point of use means three units of primary energy not consumed. Today, only EcoStruxure Active Energy Management architecture can deliver up to 30% energy savings across your buildings, industrial plants, and data centers. You deserve an Efficient Enterprise™!

Get smarter about energy

Download this White Paper, "Growing a Green Corporation," a $199 value, for FREE.

Visit www.SEreply.com Key Code b653v

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*Source: World Energy Outlook 2009, IEA/OECD

How to Use Digest 176

Welcome to the first full color version of the Schneider Electric Digest!

Digest 176 is organized into 29 product sections listed at the right, with color-coded tabs to help you quickly find major product categories. We've added two new sections: Section 28 Universal Enclosures, and Section 29 Advanced Products, with new product offerings that include: Electric Vehicle Charging Stations, Efficient Homes, and Residential Solar Power Solutions.

To aid navigation, a detailed Table of Contents is provided for each section, as well as two indexes in the back of the book: an alphabetical listing and an alphanumeric listing.

The first 32 pages of this Digest highlight a winning lineup of Schneider Electric products, services, and solutions, followed by a two page listing of What's New in each product section.

For the most up-to-date Product Information, visit:

www.schneider-electric.us

Customer Services

Customer Literature Center

To obtain literature for product or application needs, contact the Schneider Electric Customer Literature Center. When requesting additional technical catalog information, refer to the catalog section listed at the top of the Digest pages.

1-800-392-8781

Customer Training

Schneider Electric offers performance-based training for Square D™ and Telemecanique™ products. Whether you have purchased equipment to modernize an operation, or are equipping a new site with the most advanced automation solutions, distribution and power equipment, we have the training to meet your needs.

For more information, select Customer Training from the Support and Resources area:

www.schneider-electric.us

1-866-507-0894

Have questions?
Need technical support or onsite service?

Now there's one toll-free number to get all the information you need.

1-888-778-2733

The **Customer Care Center** (CCC) is a single point of contact where qualified personnel answer your customer service and technical support questions. Serving all Schneider Electric authorized distributors and customers anywhere in the United States.

Schneider Electric Services provides you with power, automation and control, and energy management services to support the lifecycle of your system, process or installation. Our solutions help you get the most out of your investment and keep your facility at peak operational performance. Any brand. Any industry. Any time.

Schneider Mobile

Access a mobile-friendly version of our website, from the web browser on your mobile device. We have developed a specially formatted version of our most popular web content, including the Digest, for mobile devices.

A mobile version of Schneider Electric's MYSE for distributors is also available

mobile.schneider-electric.us

Energy Efficiency

Leading the way in Energy Efficiency:

Schneider Electric provides integrated solutions for residential market, buildings, industry and infrastructure, and data centers. Now, you can build a long lasting energy strategy for a growing performance while preserving the environment.

SolutionOne

Coming Soon!!

An internet based tool that will allow communications with multiple product configurators within Schneider Electric North America to create a "Customer Solution" project bill of material.

Questions?
Send an email to: SolutionOne@Schneider-Electric.com

Seismic Qualification and Capabilities

Seismic Equipment Ratings

Schneider Electric self certifies seismic equipment ratings to meet the most stringent requirements.

Please contact your local field sales engineer for assistance.

Selective Coordination

NEC Requirements for Selective Coordination

Schneider Electric is providing our customers with valuable selective coordination solutions. Contact your local sales office to learn more.

Product Index
Section Listing

1 Load Centers
2 Metering Equipment
3 Safety Switches
4 Power Monitoring and Control
5 Lighting Control and Integrated Home Systems
6 Surge Protective Devices
7 Miniature and Molded Case Circuit Breakers
8 Operator Mechanisms and Disconnect Switches
9 Panelboards
10 Integrated Power and Control Solutions (IPaCS) Equipment
11 Switchboards and Switchgear
12 Busway
13 Wire Management
14 Transformers
15 Medical Products
16 NEMA Contactors and Starters
17 Motor Control Centers
18 IEC Contactors and Starters
19 Push Buttons and Operator Interface
20 Electronic Sensors and Machine Cabling
21 Limit Switches
22 Pressure, Vacuum, and Float Switches
23 Relays and Timers
24 Terminal Blocks
25 Machine Safeguarding Products
26 AC Drives and Soft Starts
27 Automation Products
28 Enclosures
29 Advanced Products

Product Locator Index

Schneider Electric brands that deliver the solutions you demand.

Square D power solutions – ready for the future.

Stamped steel version of the enclosed safety switch with the Detroit Fuse and Manufacturing Company's new trademark – the capital "D" in a square (circa 1915).

Square D™ by Schneider Electric brand NEMA power and control solutions have been trusted over 100 years for performance, reliability, and energy saving design. From residential load centers and metering products to commercial panelboards, energy conserving transformers and safety switches, Square D brand products provide you with quality solutions for distributing and monitoring electrical power. It's more than an electrical system. It's the backbone of today's energy demanding homes and businesses.

SQUARE D™ by Schneider Electric

Taking lighting technology to a new level.

Juno™ by Schneider Electric is a leading manufacturer of energy-efficient commercial and residential lighting solutions and advanced system controls. Since 1976, we have been serving customers throughout North America, including electrical distributors, lighting showrooms, contractors, architects, engineers, lighting designers, and commercial establishments, offering them high-quality, innovative products, designed and engineered in the United States. The Juno Lighting Group product family includes over 50,000 items for commercial and residential construction, and includes a rapidly expanding line of eco-friendly LED fixtures for outdoor, recessed, track, decorative, and under cabinet applications.

JUNO LIGHTING GROUP™ by Schneider Electric

Delivering the best image quality in video security.

Pelco™ by Schneider Electric is a world leader in the design, development, and manufacture of video and security systems ideal for any industry. From megapixel cameras to video management and recording to display, Pelco solutions deliver the best image quality in video security.

> www.pelco.com

PELCO™ by Schneider Electric

Committed to data center critical power and cooling.

APC by Schneider Electric™ is a global leader in critical power and cooling, providing industry leading hardware, software, and services designed to ensure availability and higher energy efficiency across the residential, business network, data center, and manufacturing environments. The position of APC on the cutting edge of Data Center thought leadership for over two decades has changed the way the world designs, installs, operates, and maintains data centers. APC has unparalleled commitment to innovation and the world's leading R&D investment (more than $90 million annually) dedicated to critical power and cooling issues.

APC™ by Schneider Electric

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PowerPact with Micrologic molded case circuit breakers

Direct access to energy management

PowerPact™ with Micrologic 15-3000 A

New-generation circuit breakers with industry leading performance and protection.

- Smart – A meter in every breaker
- Safe – Combines safety and performance with Micrologic™ reliability
- Simple – Easy to select, install, and use

- Increased energy availability
- Safety and protection
- Energy measurement and control

SQUARE D™

by Schneider Electric

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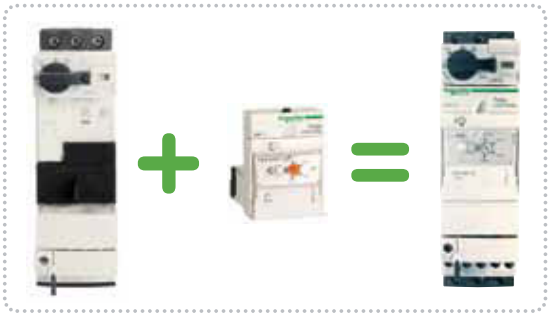
TeSys

Motor starters and IEC contactors

TeSys™ U self-protected combination motor starters

Used in a single combination, two power bases and five separate control modules cover all motor control applications from 0.15 A through 32 A; 1/4 hp to 20 hp at 480 V



- NEMA® rated for motor control
- UL 508 Type E certified
- 65 kA SCCR rating at 480 V
- Incredible energy savings!
  - » 75 percent less than traditional NEMA motor starters
  - » 50 percent less then traditional IEC

TeSys D IEC contactors

The best-selling line of contactors and starters in the world, offering high reliability with long mechanical and electrical life. Available in 11 contactor ratings from 9 A up to 150 full-load amps for inductive loads and up to 200 A resistive loads.

- Component high-fault short circuit current ratings (available mid-2012):
  - » 9 A to 32 A: 65 kA
  - » 40 A to 150 A: 100 kA
- Energy efficient
  - » 50 percent less than traditional NEMA motor starters
- Dual mounting options: panel and DIN-rail
- IP20 finger-safe screw connections terminals
- Wiring connection flexibility, including spring, ring tongue, slip-on, and screw clamp terminals
- Everlink® termination technology (on 40-65 A products)
- Easy-to-install accessories are common for entire line

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Engineering Services

Schneider Electric Engineering Services offers power system design and upgrade, as well as studies and assessments to promote safety and to help ensure reliable and continuous power.

With over 40 years of experience and over 100 professional engineers strategically located throughout the U.S., the Engineering Services team has the knowledge and experience to get the job done.

Power system design and upgrade projects

- Turnkey Solutions, including Solar and Brownfield Projects
- Electrical Design for Relay Upgrades
- Design for Generator and Synchronous Motor Exciter Packages
- Grounding System Evaluation and Design

Power system studies and assessments

- Power System Assessments and Code Audits
- Arc Flash Analysis
- Circuit Loading Study
- Harmonics Assessment
- Power Factor Analysis
- Power Quality Analysis
- Short Circuit Study
- Time-current Coordination Study

Industrial Repair Services

Schneider Electric Industrial Repair Services is the leader in industrial electronic repair management, repairing over 120,000 different products from more than 2,500 manufacturers.

With over 30 years of industry experience and over 70 highly-trained technicians, the Industrial Repair Services team provides dependable, cost-effective repairs.

Testing and repair services

- PLCs
- I/O Modules
- AC and DC Drives
- Stepper Drives
- Servo Motors and Amplifiers
- HMI/Operator Interfaces
- Clutch Controls
- Power Supplies
- Counters and Timers
- Machine-specific Controls

And more!

- Certified, Remanufactured Electronics for sale or exchange
- Engineered Replacement Boards
- Integrated Manufacturing Service Solutions (IMSS)
- Schneider Electric™ Automation Product Upgrades

>> For more information on Schneider Electric Services, visit: **www.schneider-electric.us/go/services**

Electrical Distribution Services

Schneider Electric offers a broad range of electrical distribution services to support the life cycle of any manufacturer's equipment.

Whether you are concerned with providing a safe workplace, increasing electrical reliability, boosting productivity, or reducing operating costs, **you can count on our nationwide network of professional engineers and qualified service representatives** to address your specific requirements.

Our full-range of electrical distribution services include:

Engineering Services

The power system engineering team from Schneider Electric™ has the knowledge and experience to help facilities manage their energy and solve complex power system issues that may involve equipment, automation, the electrical system, or the utility.

Our engineering services include:

- Power System Assessment and Design Services
- Power Quality Correction
- Power System Analysis including Arc Flash Studies (NFPA 70E Compliance)

New Installation Services

Reduce risk and help ensure reliable installation and equipment performance.

Our new equipment services include:

- Start-up and Commissioning
- Turnkey Solutions
- Extended Warranty
- Customer Training

Modernization and Upgrade

Modernization solutions from Schneider Electric Services will upgrade your existing switchgear or motor control centers to current technology. These engineered solutions are available for most major brands and are designed to minimize downtime, improve reliability, and extend the life of your equipment.

Our modernization and upgrade solutions include:

- Direct Replacement and Retrofill Solutions for LV and MV Switchgear
- Direct Replacement Units for LV Motor Control Centers
- Circuit Breaker Reconditioning

Want to extend the life of your existing switchgear?

Register to download our FREE white paper to discover the right solution for your application! Visit **www.SEreply.com** and enter key code **b653v**.

emergency services → **24** hours a day → **7** days a week

Maintenance and Testing

If your power system isn't performing, your facility isn't performing. To help ensure the reliable operation of your electrical equipment, periodic maintenance, cleaning, and lubrication is needed. Failure to do so could result in costly downtime.

Our maintenance and testing services include:

- Preventive Maintenance
- Maintenance Record Services
- Service Agreements

Is your maintenance program meeting your expectations?

Register to download our FREE White Paper "Understanding Maintenance Contracts and Requirements for Low Voltage Power Distribution Equipment." Visit **www.SEreply.com** and enter key code **b653v**.

Substation Solutions

Schneider Electric sets the standard in quality for the electric industry and serves utilities with highly-reliable products and services.

Our substation solutions include:

- Design and Construction Services to 765 kV
- PowerSub™ MV Vacuum Substation Breakers
- Substation Service & Repair

Custom Solutions

Do you have unique product requirements or complex power issues? Regardless of the application or location, our engineering, manufacturing, field service, and project management teams can evaluate your situation and propose a cost-effective solution that minimizes downtime or lead-times.

Our custom solutions include:

- Special Application Switchgear
- Solar Power Systems
- Turnkey Installations

Additional Schneider Electric service teams include:

Automation and Control Services

Our services support the latest innovations in industrial automation. In addition, they ensure our legacy products function at modern performance levels.

Building Lifecycle and Energy Services

Our focused approach integrates multiple systems to achieve enterprise-wide facilities management that uses less energy, tightens security, speeds response times, and maintains optimal occupant comfort while reducing overall operating costs.

Critical Power & Cooling Services

Whether you are planning, building, or operating a data center, we have the expertise and services to support you through the many phases of the data center lifecycle and keep your mission-critical applications operating at optimum performance.

Energy Sustainability Consultation Services

Our energy experts work on-site with knowledgeable plant personnel to develop a long-term "Energy Action Plan" that serves as the blueprint for ongoing energy savings.

Power Monitoring Services

Our power monitoring services increase the reliability and efficiency of your installation by providing detailed reporting, testing, and analysis capabilities for your systems and related components.

Projects and Engineering Center

Our Projects and Engineering Center provides full-service contract and project management capabilities to assist with complex or high-risk projects, resulting in a streamlined, reliable project solution.

For more information call 1-888-778-2733 or visit www.schneider-electric.us/go/services

Energy and Sustainability Consultation

Our experts develop your blueprint for energy savings.

Energy Monitoring

Gain visibility to analysis of your facility's energy performance — even when you're off-site.

Energy Savings Projects

Realize energy savings and reduce utility bills by up to 30%.

Your building's energy: See it, manage it, and save it with our life cycle services.

Why spend tomorrow what you can save today?

How much did you spend on your building's energy today?

As regulations tighten and rates rise, businesses are learning that wasted energy is wasted money. Fortunately, the right partner will show you how much energy your building consumes, and more importantly, where energy — and money — can be saved.

Our energy services deliver immediate value to your business.

Efficiency improvements reduce the total cost of energy per square foot over the life cycle of your facility. And only we provide the expertise of a Certified Energy Architect, scalable EcoStruxure Active Energy Management™ architecture, and much more that can deliver energy savings of up to 30%, starting today.

30% energy savings is just the beginning.

As The Global Specialist in Energy Management™, we are the only provider of comprehensive services and open system architecture that guarantee compatibility among the energy management domains of Power, IT Room, Process & Machine, Building, and Security, allowing businesses to scale up the savings and efficiency from the building to the enterprise level.

It is no wonder that about 75% of *Fortune* 500 companies choose Schneider Electric™ to meet their energy needs. With a savings opportunity like this, future-ready companies know that efficiency initiatives they couldn't afford to implement in the past are projects they can't afford to put off another day.

Schneider Electric is your ideal energy manager, energy expert, and green partner with specialized services for these facilities and more:

Healthcare
Provide superior patient care while controlling costs, eliminating waste, and doing more with less.

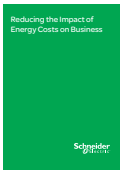
Hotels
Maximize guest delight while reducing OpEx, improving your carbon footprint, and offering a safe hotel stay.

Retail
Reduce costs and keep customers safe and comfortable while complying with environmental efforts and regulations.

Office Buildings
Provide a flexible and productive atmosphere while retaining long-term income and asset value under tightening environmental regulations.

Education
Make buildings and campuses safe and efficient while providing a greener, more productive learning environment.

Life Sciences
Create a sustainable business while meeting regulations, reducing time to market, and enhancing the security of employees and assets.



Download this **FREE** white paper today for insight on improving facility performance and finding permanent savings

Visit www.SEreply.com Key Code b653v

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30%* off your building's energy bill is just the beginning.

Imagine what we could do for the rest of your enterprise.

Managing complex building environments while meeting your energy efficiency targets is no small task. Our EcoStruxure™ energy management architecture achieves this elegantly through intelligent integration of building systems on a single IP platform.

The savings go far beyond buildings.

Today, only EcoStruxure energy management architecture by Schneider Electric™ delivers up to 30% energy savings, uniting energy-intensive systems like HVAC, access control, video security management, and lighting control across your entire enterprise. Saving up to 30% of a building's energy is a great beginning, and thanks to EcoStruxure energy management architecture, the savings don't have to end there.

Learn about saving energy from the experts!

Download this white paper, a $200 value, for FREE!

Visit www.SEreply.com Key Code b653v Call 800-274-5551

EcoStruxure™

Active Energy Management Architecture from Power Plant to Plug™

Data centers

From the rack to the row to the room to the building, energy use and availability of these interconnected environments are closely monitored and adjusted in real time.

Industrial plants

Open standard protocols allow for system-wide management of automated processes with minimized downtime, increased throughput, and maximized energy efficiency.

Buildings

Intelligent integration of security, power, lighting, electrical distribution, fire safety, HVAC, IT, and telecommunications across the enterprise allows for reduced training, operating, maintenance, and energy costs.

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*EcoStruxure architecture reduces energy consumption by up to 30%.

There's more than the "tip of the iceberg"

Typically, we think of them as huge peaks rising above the water. In reality, the majority of an iceberg is actually under the water, out of view. Utility savings at most facilities can be thought of in much the same way.

Think of your utility bills as being the peak, easy to see every month. By simply installing different light bulbs or a PowerLogic™ power monitoring system, you can realize 1 – 4 percent savings — but that's just the "tip of the iceberg" in terms of your potential savings.

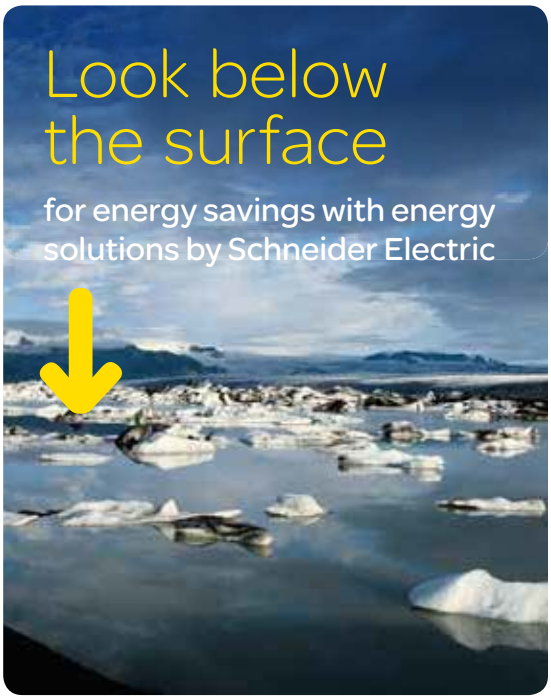
The majority of savings, using Schneider Electric™ energy solutions, can be derived by looking beyond a utility bill — or below the surface. An additional 2 – 5 percent can be saved through better equipment utilization and energy monitoring tools. Another 10 percent can be found by improving power system reliability, and the savings that derive can be utilized towards the capital purchase with a performance contract.

At Schneider Electric, we pride ourselves on reliable Square D™ by Schneider Electric products, innovative solutions, expert engineering services, and our ability to provide single-source power management solutions. It's not just a concept to us, it's a legacy and a promise. We are the Energy Management specialists, striving to help you Make the Most of Your Energy℠. For more information contact your representative or go to www.schneider-electric.com.

Square D PowerLogic systems offer end-to-end advanced solutions for a high return on investment in achieved energy savings.

Commercial/retail centers

- Attract high-quality, long-term tenants
- Implement in a nationwide chain or one site
- Allocate costs according to actual energy used



Medical complexes

- Experience outstanding quality and reliability
- Verify utility bills and eliminate errors
- Improve power system uptime

Education campuses

- Reduce expenses
- Provide environmental leadership
- Gain insights into how to reduce energy use in common areas

Upgrade payback

Average payback period and ROI of single-technology projects

Technology	Average Payback Period	Average ROI
Meters and Monitors	.5	200%
Lighting	2.2	45%
Controls	2.3	43%
Motors and Drives	2.4	42%
HVAC	3.6	28%
Onsite Power	4.3	23%
Building Automation	5.9	17%

Three dimensions of energy and power management savings

Reduce energy costs

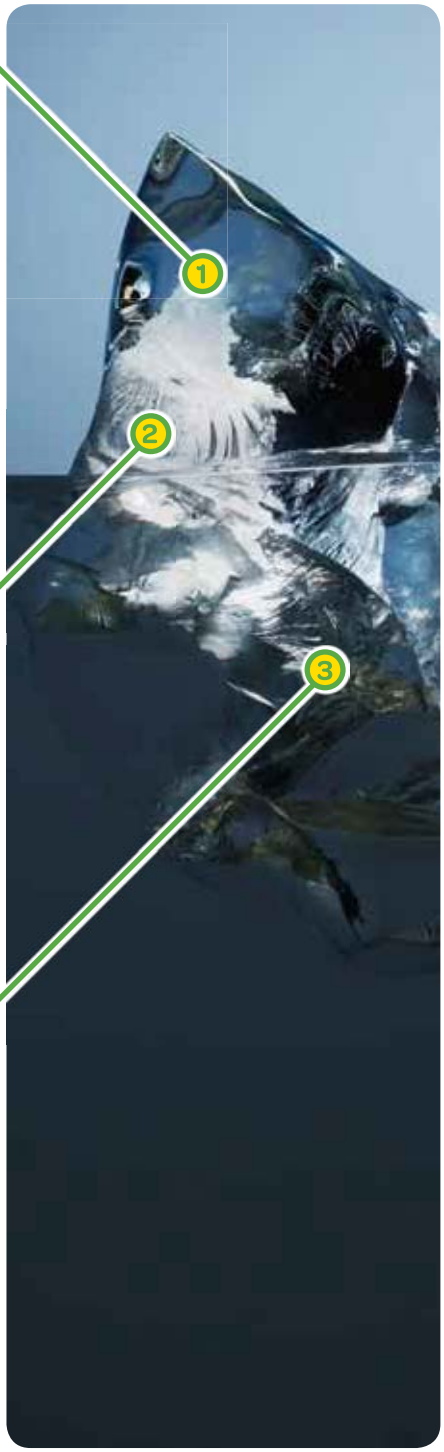
- Access automatic meter reading from revenue, piped utility pulses, and sub-metering
- Verify and reconcile utility bills to catch errors
- Reveal energy inefficiencies and waste
- Allocate or sub-bill energy costs
- Optimize procurement through forecasting, load aggregation, and rate analysis
- Implement power factor correction, lighting control, and fact-based reduction strategies
- Reduce demand through load scheduling, load control, or generator control
- Respond to utility curtailment signals
- Make smart energy efficiency decisions by combining your experience with ours for Total Energy Control strategies that result in an actionable energy plan with quick payback

Optimize equipment utilization

- Maximize use of existing equipment capacity to defer capital expenses
- Benchmark, profile, and compare the performance of facilities or processes
- Document emergency power system testing results
- Prolong equipment life by identifying transformer and other equipment stresses
- Balance loads on substations, panelboards, and other power equipment
- Perform proactive equipment maintenance and equipment monitoring of transformers, MCCs, switchgear, switchboards, circuit breaker status, protective equipment, capacitors, generators, panelboards, PDU, UPS, and other piped utilities

Improve reliability and uptime

- Get early warning and remote alarm notification of impending problems
- Isolate problem sources quickly using real-time, historical, and event data
- Pinpoint root cause with precise GPS time and event sequence recording
- Verify reliable equipment operation and identify vulnerabilities
- Diagnose transients, disturbances, power quality, and harmonics
- Determine appropriate corrective measures based on accurate data
- Automate power system throw over and load preservation schemes
- Leverage Energy Solutions' Engineering Services as your single source energy and power management solution provider — product, implementation, consulting, assessment, and support services



Our energy expertise will help sustain America's bright future.

Together, we will meet your facility's energy management challenges of today and tomorrow.

Your energy expert and green partner

Our experience with government facilities and campuses allows you to realize customized, integrated solutions with up to 30% energy savings, starting today.

Schneider Electric™ specializes in these critical domains of government facilities:

- > Power Management: Experience efficient power use, reliable power supply, low equipment failure rates, and minimized downtime with our proven solutions.
- > IT Room Management: Optimize data center availability and efficiency through monitoring, automation, planning, and implementation.
- > Building Management: Leverage existing investments to achieve reduced energy costs, improved comfort, and increased productivity with our integrated building systems.
- > Process and Machine Management: Eliminate downtime and optimize your systems' performance with our specialized solutions.
- > Security Management: Reduce risks with our integrated security solutions that create the most secure environment possible.

EcoStruxure: Active Energy Management Architecture from Power Plant to Plug™

EcoStruxure architecture, our approach to integration, saves CapEx and OpEx over your facility's life cycle, from streamlined procurement through long-term maintenance and support. This innovation optimizes energy measurement, management, reliability, efficiency, and security across your entire enterprise.

The global specialist in energy management™

Schneider Electric has a proven, 100-year long record of supporting government facilities and helps make them more secure, productive, and sustainable. We take the lessons of the past century to help you meet your responsibilities to mandates, missions, and taxpayers throughout the next one.

We combine the expertise of brands you know and trust to make your energy safe, reliable, efficient, productive, and green.

APC™ by Schneider Electric

PELCO by Schneider Electric

SQUARE D™ by Schneider Electric

Juno Lighting Group™ by Schneider Electric

Make the most of your energy℠

Visit our NEW Government Knowledge Portal for FREE white papers, like this one: "Enacting a Life Cycle Approach in Federal Facilities."

Go to www.SEreply.com • Key Code b653v • Call 866-822-4636

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Flexible Machine Control:
100 percent flexibility of your machines with a single software suite, SoMachine, plus multiple hardware control platforms.

Tested, Validated Architectures and Functions:
Predefined and dedicated to your specific needs for optimum results.

Co-Engineering Services:
Design optimal machine solutions with innovative help from our experts.

MachineStruxure™ cuts time to market by up to 50 percent.

New integrated machine building solution features single software, proven architectures, and design experts.

Machines today need to be faster, more flexible, and must be able to solve more complex automation functions than ever before. As a machine builder you must constantly look at innovative ways to build more energy-efficient machines, reduce development costs, and get your machines to market much faster.

Our new MachineStruxure™ solution is designed to answer these challenges and to help you take complexity out of the business through use of:

- **Flexible Machine Control:** SoMachine™ is a single software suite that runs on multiple hardware control platforms to achieve 100 percent machine flexibility: HMI, motion, drive, and logic controllers. With SoMachine, you need only one software, one cable, and one download to design, commission, and service your machines from a single point.
- **Tested, Validated Architectures and Functions:** Build a strong automation platform through the use of our ready-to-use, proven, and fully transparent automation architectures and application function libraries implemented with FDT/DTM technology. Our architectures are predefined and dedicated to your specific needs for optimum results.
- **Co-engineering Services:** Design the optimal solutions for your customers with innovative help from our experts! We implement the latest technological evolutions and provide a unique hands-on industry application knowledge that helps you stay ahead of the competition.

"SoMachine offers optimal flexibility when implemented on a standard machine, and it has huge potential in terms of system implementation."

Fabrizio Ghiro, software designer and machine developer at Costa Levigatrici in Italy

Make the most of your energy℠

Download our "On the road to green machines" White Paper today – it's FREE and available right now!

Visit www.SEreply.com Key Code h903v

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A lighting control solution for every need...

Powerlink intelligent panelboards, Relay Panels, C-Bus network lighting control, and Occupancy Sensors from Schneider Electric create one of the most comprehensive energy-saving offers in the industry. They combine automated and web-enabled control with occupancy-based solutions and dimming capabilities.

Powerlink Intelligent Lighting Panel

Relay Panels

C-Bus Lighting Control

Occupancy Sensors

Powerlink

It takes more than just energy-efficient lighting to significantly reduce your energy costs. Powerlink™ lighting control systems reduce energy costs as much as 30 percent by automatically turning off lighting during unoccupied periods. Retrofit is also easy with Powerlink lighting control systems, with payback periods often less than two years. Compared with other energy savings technologies, a Powerlink control system can provide both a lower initial capital outlay and greater energy savings.

- Eliminate unnecessary energy consumption by switching lights off during non-occupied periods
- Reduce demand by shedding lights during peak demand periods
- Improve productivity by controlling and monitoring panels from remote locations
- Reduce potential lost time and liability by receiving instant alerts to important occurrences with remote email alarming
- Gain important insights into lighting system performance with integral metering

Relay panel

The Lighting Control Relay Panel family offers both standalone and integrated customized solutions that combines ease of use, versatility, and durability. Each system offers an energy saving solution as unique as your needs.

- LPS Standalone panel
- LPB panel with BACnet capabilities
- LPL LonWorks console-operated panel

Three solutions that adapt to your particular configuration needs.

C-Bus

C-Bus™ Network Lighting and Whole Home Controls provide a vast array of capabilities, scalable for virtually any size job, from a single room to an entire network. Eliminate wall clutter with programmable multi-function touch screens and keypads. Dim lights, control lighting scenes, HVAC, and audio, while integrating with third party devices using the same touch screen or keypad.

Occupancy sensors

Occupancy sensors help building owners achieve energy savings and energy code compliance with sensors that are easy to select, install, and commission. Automatically turn lights on/off based on occupancy. Use sensors for Daylight Harvesting to adjust light levels based on natural lighting in areas with large windows or skylights. Use either passive infrared (PIR), ultrasonic, or dual-technology models for ultimate detection capability.

Service and support

Reliable lighting control systems deserve reliable support to match. With Schneider Electric™ lighting controls, you can always count on our Schneider Electric field sales engineers and factory-trained experts for help when you need it — before, during, or after installation. Whether that means local support, troubleshooting, or on-site commissioning.

From smaller residential lighting control installations, to entire facility-wide control, Schneider Electric Lighting and Whole Home Controls has the precise solution to meet your needs.

>> For more information visit **www.SEreply.com** and enter key code **b653v**.

Diversify your offer with the EcoXpert certification program.

Developed specifically for electrical contractors to grow their business and increase revenue. The Schneider Electric EcoXpert™ program helps you to **advise, sell,** and **install** a broad range of pre-engineered energy solutions across commercial, industrial, and high-end residential applications.

Program benefits:

- **Accreditation:** gain knowledge and skills to improve your professional recognition and marketability
- **Specialized training:** access to ongoing technical, installation, and best practices curriculum courses
- **Marketing collateral:** enhance your ability to market your business with customizable materials
- **Communication strategies:** includes: how to sell, who to speak to, key questions to ask, and much more
- **Technical expertise:** 24/7 access to tools that help facilitate site assessments and ROI estimates
- **Pre-engineered solutions:** ability to sell a broad range of energy efficient and renewable energy solutions

EcoXpert™

Certification Paths:

Energy Efficiency

- Lighting and Lighting Controls
- Power Distribution
- Secure Power
- HVAC Controls
- Energy Monitoring

Renewable Energy

- Electric Vehicle Charging
- Solar

Get started!

Become our energy partner today, visit: **www.SEreply.com and enter key code e595v.**

Driving energy efficient solutions from Power Plant to Plug™.

Schneider Electric™ is committed to developing energy efficient solutions that support sustainable development, and our electric vehicle (EV) chargers are no exception. EVlink™ charging solutions promote a greener, more economical transportation option while helping to reduce the world's global footprint. Schneider Electric offers a wide range of EVlink charging stations that allow users to recharge where they live, work, and play.

The total package from one provider

- **Compatibility:** UL listed and SAE J1772 compliance ensures compatibility with any plug-in hybrid or electric vehicle entering the market.
- **Support:** Installation and maintenance provided by certified EcoXpert™ contractors, who have been trained to install EVlink solutions and are able to offer an extended warranty option.
- **Efficiency:** Smart-grid connectivity allows for maximum energy management capabilities, assisting with energy control and efficiency.
- **User friendly:** Status indicator lights identify when the charger is ready to charge, if the vehicle is charging, or if the charger requires attention.
- **Safety:** An integral ground fault interrupter set at 5mA provides protection if a fault is detected from a power outage or lost connectivity. Automatic recovery and restart functionality ensures charging will resume following a power loss or ground fault detection.

Learn more about the global impact of EVs

Visit www.SEreply.com and enter key code b653v.

Exclusive for US electrical contractors

Empower your operations with the Schneider Electric Advantage.

Get FREE business, marketing, training, and product resources developed exclusively for electrical contractors.

Now more than ever, you need real-world solutions to grow your business and meet customer needs. You need a partner who can help you tap into market-leading business, marketing, and electrical industry expertise to enhance your operations.

The Schneider Electric Advantage gives you access to:

Marketing tools

Market your business and improve customer relations with new tools including radio scripts, customizable collateral, and promotional items.

Training and education

Get ahead with a broad range of educational courses designed specifically for electrical contractors through web-based curriculum and instructor-led training.

Product information

Find the latest product, service, and solution information for Schneider Electric™ brands including troubleshooting, technical documents, and online tools.

Access our **FREE online training** when you register for

The Schneider Electric

Advantage

Visit: **advantage.schneider-electric.us/**

Make the most of your energy℠

Schneider Electric™

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Building a smarter grid with reliable, efficient energy

How Schneider Electric smart grid-ready products and solutions help balance your grid equation

The electricity market is changing. And every day, end-users' expectations increase in terms of reliability and quality, and they gain greater awareness of energy's environmental impact.

It's an evolution. But as our reliance on electricity grows globally, the ways in which we produce, distribute, and use energy must also evolve. The solution will not only involve smarter demand, but also smarter supply — and as such, a smarter grid is at the heart of the issue.

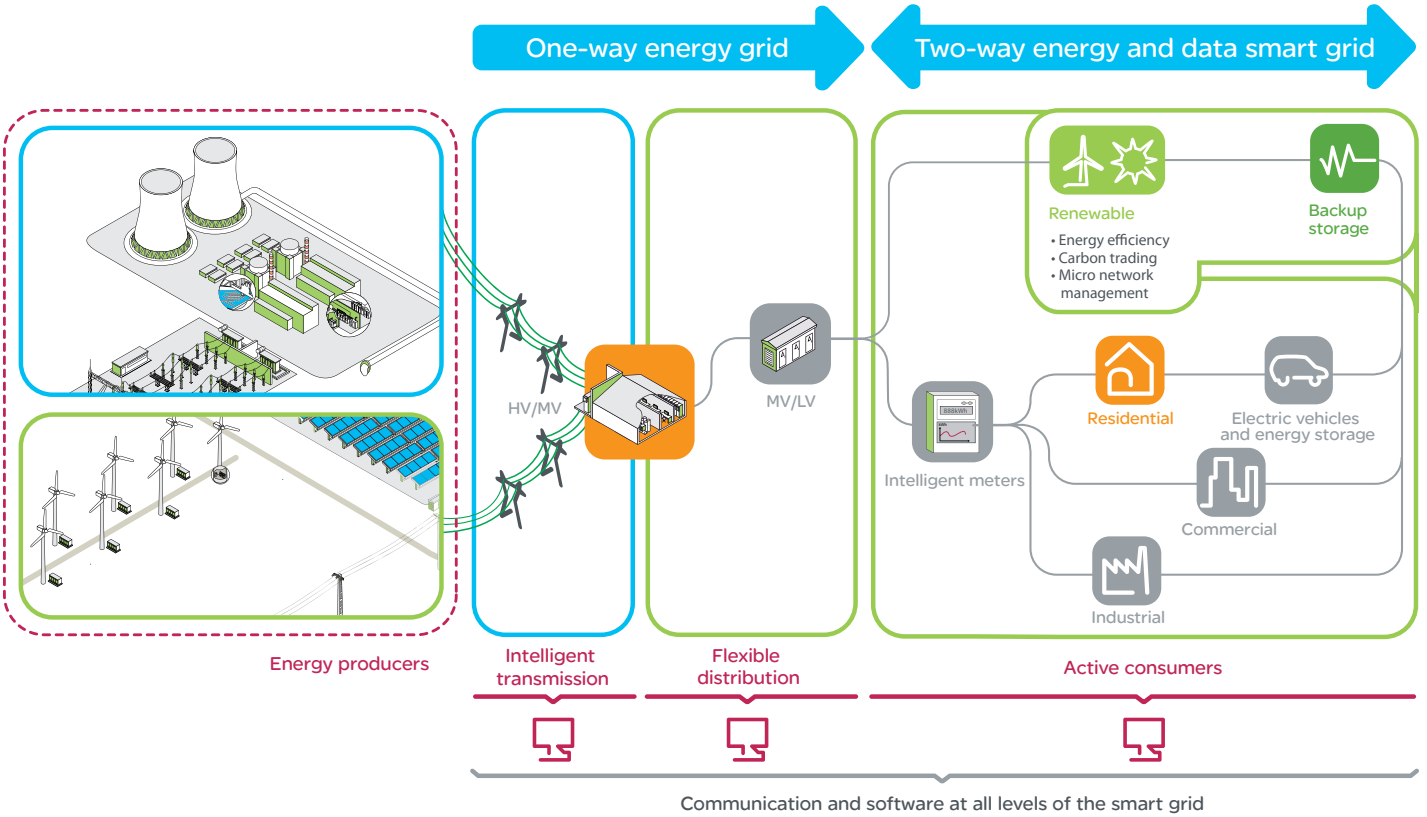
As The Global Specialist in Energy Management,™ **Schneider Electric™ is smart grid-ready**, enabling the products and solutions that support and connect the five key domains of a smarter grid:

- Flexible distribution
- Smart generation
- Demand-side management
- Efficient Home™ (including electric vehicles)
- Efficient Enterprise™ (buildings, industrial facilities, and data centers)

Our vision isn't just to connect our customers to the smart grid — but also to connect them with each other, facilitating smarter interactions and leading to increased energy management capabilities.

Our smart grid solutions include:

- **HV/MV Substations**
  - » Substation automation and protection systems compliant with IEC 61850
  - » Gas-insulated switchgear
  - » Station breakers from 15 kV to 38 kV
  - » Capacitor banks and control
  - » Power quality and grid revenue metering
  - » Phasor measurement units
- **Feeder Automation**
  - » Volt/Var management
  - » Automated load break switches
  - » Reclosers and sectionalizers
  - » Communicating faulted circuit indicators
  - » Private license and public mesh network radios
- **Renewable Energy Connectivity**
  - » Switchgear
  - » Protection and control
  - » Power quality and revenue metering
  - » Harmonic filtering
  - » Grid-tie substations
  - » Turnkey project design and management
  - » Smart solar inverters for residential through utility scale projects
  - » Pre-fabricated inverter and transformer stations
  - » Remote SCADA software
- **Electric vehicle load management**
  - » Smart charging stations for residential and commercial applications
  - » Charging station infrastructure management software and services
  - » Communications and integration with other systems
- **Demand Response Consulting**
- **Energy Management Services**
  - » Power system assessments
  - » Equipment upgrades and retrofits
  - » Maintenance and testing
  - » Asset management
  - » Design services
  - » Project management



HV/MV substations

Complete grid-connection turnkey project management including design, engineering, installation, and maintenance to increase service continuity through trouble-free and reliable operations.

Demand response programs

Energy auditing services and consultation to assess the best load reduction strategy, including estimating the financial opportunity of Demand Response activities. Comprehensive offer including energy meters and software tools for control, metering, and data management.

Renewable energy connectivity

Solar and Wind solutions compliant with local regulations enabling uninterrupted connectivity of intermittent sources through end-to-end electrical operation (conversion, transformers, MV network, grid connection, control, supervision, monitoring, and security). Packaged solutions allow for maximum return on investment, driving the cost of renewable energy to grid parity.

SCADA distribution management systems

Efficient solutions for underground and overhead network management through status updates, complex switching assistance, multitasking control, monitoring functions, and network evolution planning.

Feeder automation

Flexible, scalable, and simple solutions to reduce outage duration and operate distribution networks more efficiently.

Energy management services

Prevention- and prediction-focused asset productivity management based on maintenance and retrofitting solutions, system assessments, and uptime audits as well as network planning and demand response consulting.

Welcome to the 2020 home.

It might have been built in 1925, but it's the most contemporary home in the neighborhood. Thanks to the Wiser™ energy management system from Schneider Electric™, any home can be brought into the Twenty-First Century.

The addition of a Wiser energy management system not only improves a home's energy efficiency, but adds up to significant savings on utility bills that can even offset the cost of other remodeling upgrades. The Wiser system helps homes use less power and lower utility bills by employing user-friendly technology that's easy for homeowners to understand, manage, and control, even remotely, anytime from anywhere. The Wiser systems' smart thermostat, in-home display, and energy dashboard provide real-time energy information to homeowners, alerting them when a home's energy usage is high, so adjustments can be made accordingly, saving them from paying higher rates during peak demand times.

The great news is that any home, no matter its age or architectural style, can be retrofitted and benefit from the Wiser energy management system. Just knowing a home is environmentally friendly and energy efficient is not only a major attraction to today's homeowners, but adds great equity in a home.

The **Wiser energy management system** enables innovative energy conservation that helps homeowners use less power while significantly lowering utility bills.

Green: Low (least expensive)

Blue: Medium

Orange: High

Red: Warning, extremely high (most expensive)

Control your HVAC system-based on the pricing you program into Wiser EMS' smart thermostat. The backlit feature visibly displays real-time energy output and costs incurred, then alerts you with unique color-coded warning screens when energy output is high and needs to be adjusted.

Find out just how **simple and cost effective** installing the Wiser energy management system can be, and how it will continue to significantly impact energy bills in the years ahead.

Visit www.SEreply.com and enter key code j566v for more information.

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A home is more than rooms of a house.

It is a refuge, a place of comfort designed to provide an environment where memories can be made, relationships built, lives nurtured, and dreams realized. Additionally, a home is an investment vehicle where the returns are counted as appreciation in value, but also in the monthly energy savings you generate. At Schneider Electric™ we help you create quality, efficient, and productive homes with smart, next generation residential energy technology that takes a home to an unprecedented level.

Adding energy efficient solutions through installing Juno™ by Schneider Electric LED fixtures, reliable Square D™ by Schneider Electric power distribution products, advanced APC by Schneider Electric™ power protection devices, state-of-the art solar inverters, or electric vehicle charging stations, couldn't be easier and comes without sacrificing comfort or convenience.

Our active energy monitoring technology empowers you to minimize wasted energy and take control of your home's energy usage and output without sacrificing comfort or convenience. From the home office to the bedroom, from the kitchen to the home theater and garage, Schneider Electric transforms every room of a house into the type of efficient, model environment homeowners seek today.

Looking to upgrade a residential service while saving time and effort?

Make your life easier with the Square D Service Upgrade Load Centers. Its inventive design makes challenging flush-mount service upgrade jobs faster, easier, and cleaner.

The uniquely designed load center end-plate features four removable end plates with four feed-through points, which allow the enclosure to be positioned in the wall in as little as five minutes. The lengthier cover and door eliminate any need for drywall repairs.

"Thanks Schneider Electric! The Square D Service Upgrade Load Center is a fantastic product! It makes my life easier and reduces installation time!"

– Mike Fletcher,
Residential Wireman West Side Electric,
Portland, Oregon Member of IBEW Local 48

Learn about the complete residential solutions of Schneider Electric, visit **www.SEreply.com** and enter key code **j562v** for more information.

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How can Schneider Electric help your designs meet today's demands?

Smart intelligent designs

Make your designs smart from the very beginning of conception, to the final design.

Design solutions

The task of designing has never been more difficult — new codes, standards, and evolving technology, such as Building Information Management (BIM), all impact a building's design, speed, and efficiency. With teams of on-staff professional engineers and regulatory experts, Schneider Electric™ provides the support you need to accomplish your projects on-time, with intelligence included.

Energy management solutions

As The Global Specialist in Energy Management™, Schneider Electric focuses heavily on solutions and strategies around sustainable design and energy management. Codes and standards such as NEC® 2011 and ASHRAE 90.1 are under continuous maintenance, as well as the constant evolution of federal and state energy regulations. Our energy experts can help you stay up-to-date. Today project designs require more focus on energy efficiency. Schneider Electric can provide the insight to help your next design exceed its energy goals.

Safety solutions

Safety is a critical component of any design, and safety regulations must be kept in order to maintain maximum protection against dangerous hazards. Our experts can provide the design information and recommendations you need to understand the dangers of arc flash and how to mitigate risks while complying with current guidelines. Your designs need to be safe and reliable in order to protect and save lives for years to come. Get Schneider Electric involved early in the design process to insure ongoing safety is built-in.

New web site

Schneider Electric is committed to providing consulting engineers access to comprehensive engineering information that can help you throughout your design process. The consulting engineer website of Schneider Electric is built for you.

Easy access to:

- Design/application guides
- Product specifications
- Technical white papers
- Codes and standards
- Product data bulletins
- Calculators and online tools

Evaluating system through-fault protection designs?

Register to download our "LV Transformer Through-fault Protection" White Paper.

Visit www.SEreply.com and enter key code b653v.

Make the most of your energy℠

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Square D Integrated Power and Control Solutions (IPaCS)

Innovative solutions that save space, labor and time

For over 30 years, Square D by Schneider Electric™ IPaCS™ business has been providing integrated electrical solutions for retail construction, commercial, and industrial projects.

The Square D IPaCS family combines electrical distribution equipment, building controls and automation into a single factory-assembled and pre-wired enclosure. These innovative solutions save valuable floor space, shorten construction cycle times, and reduce installation and material handling costs.

Why specify solutions from Square D IPaCS?

Minimize space requirements.
Electrical panels and transformers are stacked in a modular line-up, which saves valuable floor and wall space.

Reduce contractor labor risks.
Because the contractor is swapping a variable cost (labor) for a fixed cost (product), their risk on the overall project is reduced.

Reduce material handling.
Fewer items to receive, inventory, and move around the jobsite because components are factory-installed and pre-wired into a single lineup or enclosure.

Save design time.
For designs with multiple locations, standardized designs can be created to provide consistency between sites.

Shorten construction cycle times.
Pre-assembled construction means less time required on-site to install, reducing the overall construction cycle.

Single point of responsibility.
Third-party controls/components can be installed, wired, and tested in IPaCS integrated equipment at the factory to assure it works like it's supposed to when it gets to the jobsite.

Integrated power center with third-party controls

Solutions available from Square D IPaCS

Modular Panel System (MPS)
Tailored to customer specifications and typically includes panels, lighting control, and equipment spaces.

Integrated Power Center (IPC™)
For more complex applications, including HVAC controls, lighting controls, power quality and power conditioning products, TVSS, building management systems, and power metering/monitoring solutions, as well as electrical distribution equipment.

Integrated Power Center 2 (IPC2™)
Features include those found in the IPC and are provided in a free-standing enclosure that can be front and rear aligned when transformers are included. IPC2 is seismically qualified. Enclosure options include NEMA® 1, NEMA 1 with driphood and NEMA 3R.

Standby Power Connection Solutions (SPQ)
Provides the ability to quickly connect to a portable standby power generator. Suitable for N-3R (outdoor) installations.

MPS

IPC2

IPC2 transformer combo

SPQ

Are you overlooking an enormous market?

With the demand for energy skyrocketing, customers will require more sustainable energy solutions. Schneider Electric™ EVlink™ charging stations were developed with this key factor in mind, providing a greener, more economical transportation option while helping to reduce the world's global footprint. EVlink electric vehicle (EV) charging solutions are designed to meet the needs of any customer, while providing the safety you demand from a partner you trust.

- All charging stations are designed and manufactured in-house by Schneider Electric
- UL listed and SAE J1772 compliant to ensure compatibility with any EV entering the market today
- An integral ground fault interrupter set at 5 mA provides superior protection to users if a fault is detected

Learn more!

EVs are now a part of everyday transportation. Download a **FREE** EV fact sheet to learn how you can get involved today. Visit **www.SEreply.com** and enter key code **b653v**.

Make the most of your energy℠

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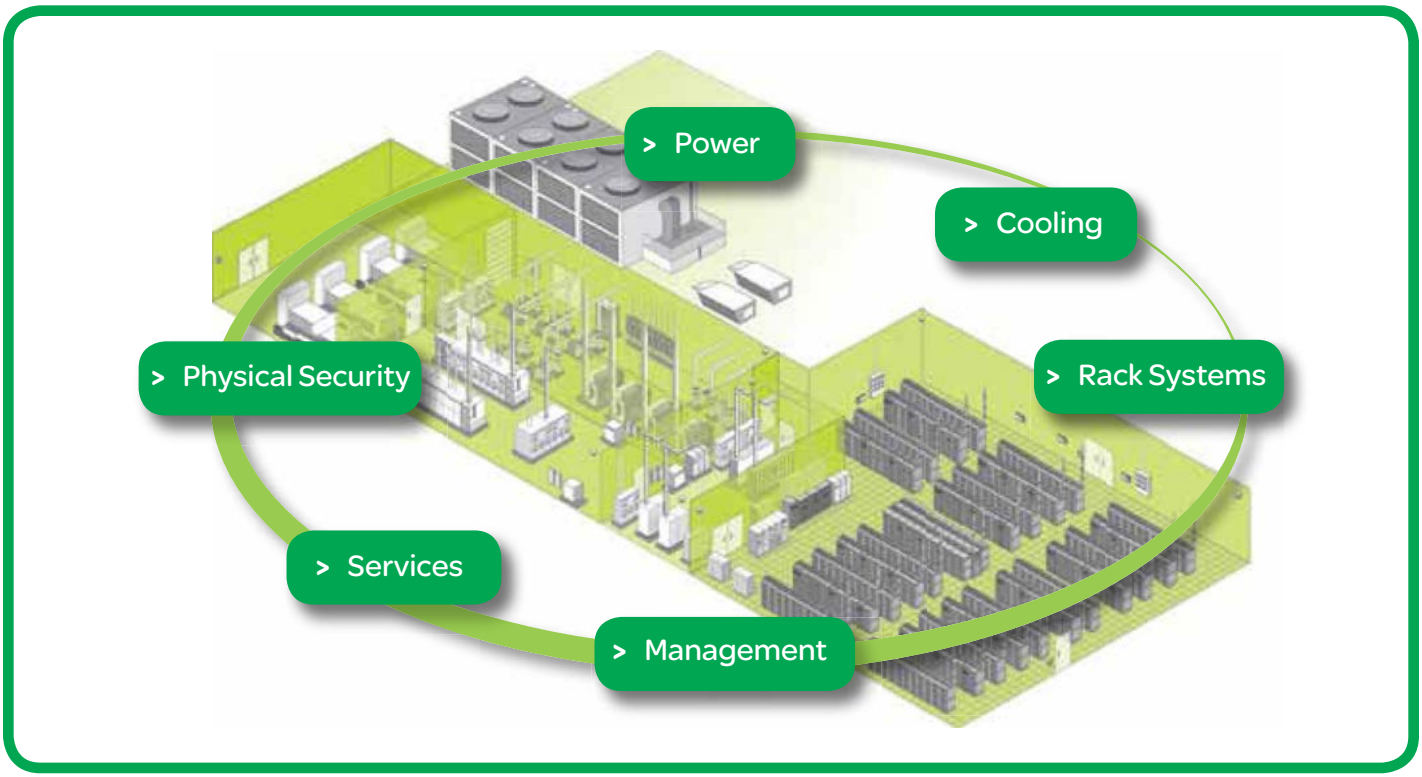
Schneider Electric makes the connections.



Maximum efficiency and availability from rack to row to room to building

Making the connection between IT and facilities

With today's technology challenges, Schneider Electric™ understands that data centers must be viewed as interconnected environments — from rack to row to room to building. We call this integration the data center physical infrastructure or DCPI. The only clear path to the highest availability and maximum efficiency, DCPI comprises power, cooling, physical security, and rack systems and is monitored and managed via software solutions and professional services.

Making the connection between efficiency and availability

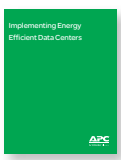
Today, maximized energy efficiency and guaranteed availability must work hand in hand. So Schneider Electric offers integrated cooling strategies across the DCPI. This hybrid approach delivers true energy savings — but never at the expense of availability. And we further optimize availability and efficiency with an integrated software platform that enables end-to-end monitoring and management of all DCPI domains. This holistic solution provides visibility and interoperability across the DCPI.

Making the connection with key industry partners

Data centers can't be built without constant communication and coordination with vendors and other key players. Only Schneider Electric has the consulting and services network, personal relationships, and real-world experience to give you the single point of contact you need to take your integrated data center from envisioned to online.

Integrated architectures for Active Energy Management™

- **> Power** The power domain connects it all – from generators to UPSs to PDUs – for cross-vendor interoperability.
- **> Cooling** Our highly efficient integrated solutions combine chillers, perimeter cooling, hot aisle containment, and row-based options to maximize efficiency and guarantee availability.
- **> Physical Security** Our single-pane view includes access control and surveillance across one or multiple facilities.
- **> Rack Systems** Interconnected, any-IT, vendor-compatible rack enclosures, accessories, and air containment solutions support HD processing needs.
- **> Services** The professional services of Schneider Electric provide provide one point of contact for data center planning, building, and operation.
- **> Management** Our exclusive integrated software architecture removes management "silos" for greater energy awareness and efficiency and higher availability across the entire DCPI.



Download the FREE White Paper,

"Tackling Today's Data Center Energy Efficiency Challenges."

Visit www.SEreply.com and enter key code j754v Call 888-778-2733

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Seeing is believing

When you're trying to solve a business or engineering challenge, you need a team of industry experts with extensive knowledge of your industry, as well as the willingness to go anywhere, work with any supplier, to find the most cost-effective, complete solution for you.

As The Global Specialist in Energy Management™ and sustainable manufacturing, we're always coming up with new ways to help businesses work better, faster, more efficiently, and profitably.

That's why we have developed the Schneider Electric™ Centers of Excellence and Innovation Centers. To simplify your understanding of the broadest range of power, control, automation, safety, security, and energy management solutions, and how they can benefit your business.

These facilities give you the ability to see and touch live demonstrations of the innovative solutions for both OEM manufacturers and industrial facilities. You also get access to the multi-disciplined teams that can configure and customize your solutions to meet your specific needs and further minimize your future risk. These experts have access to fully-equipped laboratories, numerous technical experts and the resources of the global Schneider Electric organization all with the sole purpose of demonstrating to you the commitment of Schneider Electric to delivering best-in-class solutions to your business challenges.

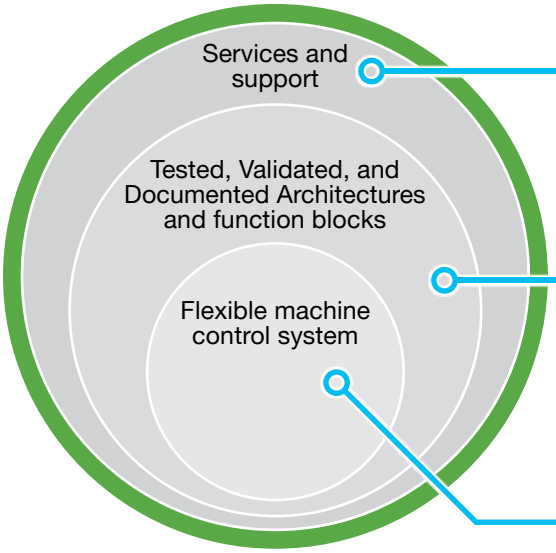
Visit Schneider Electric Center of Excellence

Want to know more? Be our guest at one of Schneider Electric Centers of Excellence located on the East Coast, West Coast, and in the Midwest. For more information, contact your local Schneider Electric representative or Square D™ by Schneider Electric distributor and ask to schedule a visit.

MachineStruxure solutions

Automation solutions for industrial machines that can save you up to 50% of design and implementation time.

MachineStruxure™ helps you design integrated, energy-efficient, and cost-effective machines, while maximizing performance and reducing design time and time to market. Based on Tested, Validated, and Documented Architectures (TVDA), MachineStruxure incorporates flexible and scalable hardware platforms with SoMachine,™ a comprehensive single software suite with application function block libraries. Plus, our hardware control platforms optimize control through embedded intelligence in drives, HMI, motion, and logic controllers.



Stay one step ahead.

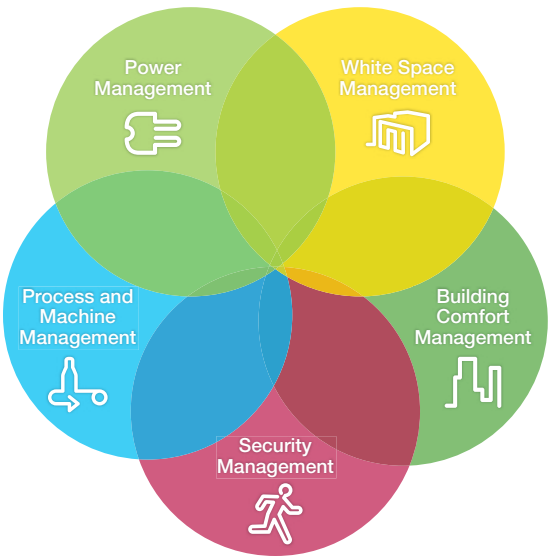
However complex your machine, you can rely on our team of dedicated experts and our international presence to assist you and achieve excellence at every stage of the machine's lifecycle.

Save up to 50% of design and implementation time.

Use the solid base of Tested, Validated, and Documented Architectures and function blocks to quickly build your automation solutions. Optimized cost, footprint, and performance — all you need to do is adapt them to your applications.

100% flexibility and optimization of your machines.

Our different machine control platforms include embedded intelligence. Now you can integrate control that is perfectly suited for your machine requirements. By utilizing SoMachine software, you can move from one application to another capitalizing on your developments.



MachineStruxure, one of the mainstays of EcoStruxure

EcoStruxure™ is a system based on Active Energy Management™ architectures, from an electrical power plant to a single electrical socket. EcoStruxure enables you to benefit from intelligent and simplified energy management systems, to reduce your investment and operational costs, and reduce waste resulting in energy savings up to 30%.

>> Learn more about MachineStruxure, visit **www.SEreply.com** and enter key code j546v.

Plantstruxture solutions

As the foundation of the Schneider Electric™ EcoStruxure Active Energy Management™ architecture for industrial customers, the PlantStruxure™ collaborative automation solution enables the achievement of both energy and productivity objectives.

This scalable solution delivers a single environment to measure energy use, process data, asset utilization, and machine performance by:

- Reducing engineering, operations, and maintenance costs
- Maximizing plant and production efficiency
- Improving production quality
- Protecting people, plant assets, and the environment
- Supporting production and business decisions

PlantStruxure™

What makes PlantStruxure unique?

Scalable for changing times

From tens of I/O to hundreds of thousands, the scalability of our system means that you can start out small and grow as your requirements change.

Flexible because your process is unique

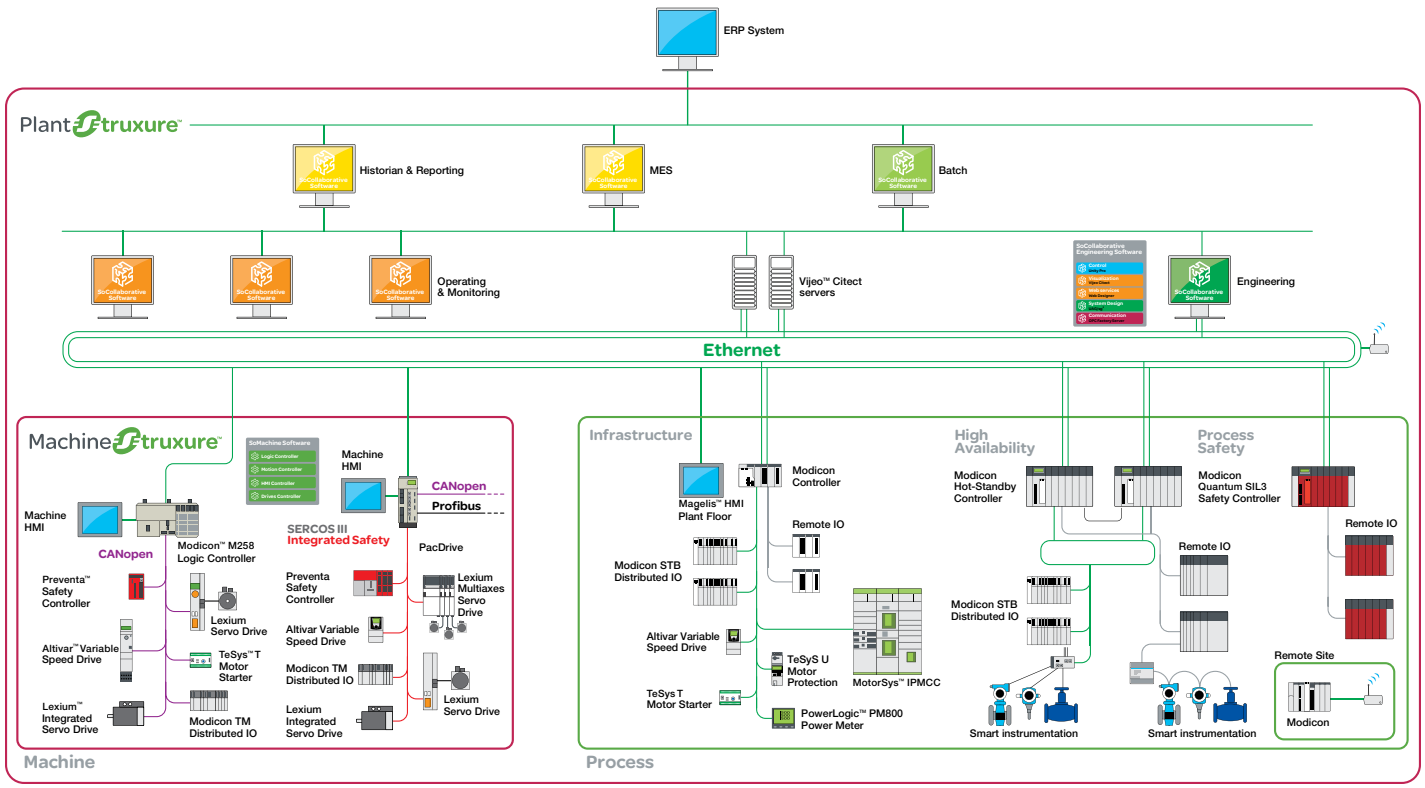
Our system supports the architectures that you need for your application. Single site, multiple sites, distributed control, local control, discrete, process, safety, and batch all within one system.

Integrated to reduce risk

The entire system, from the manufacturing execution system (MES) to component devices to functionality, are designed to work together with your chosen technology partners.

Collaborative to increase efficiency

Our system is open to exchange information with other plant and business software, and fosters an environment of collaboration by delivering the process information you need in the way that you like to see it.



Simplify your machine designs

with Schneider Electric 2-D and 3-D CAD library.

Schneider Electric™ has simplified the design and development of your machines and applications by publishing a growing list of 2-D and 3-D CAD files for your use. With a broad line of power, control and automation products, Schneider Electric 3-D Library is the perfect place to find detailed product models and specifications.

Built with compatibility to your design tools in mind, the 2-D and 3-D CAD library allows you to simply pick your format, download the file, and insert it into your design. The catalog delivers advanced 2-D and 3-D viewing technology that enables users to pan, zoom, and rotate.

>> Learn more about 2D and 3D CAD library, visit **www.SEreply.com** and enter key code **j564v**.

Automation & Control Excellence (ACE)

Need help developing a solution and improving the performance of your facility?

Your Local Schneider Electric™ ACE Distributor is there to provide the answers and deliver the solutions you need. This exclusive group of Schneider Electric distributors has distinguished themselves as Schneider Electric best source of service and support for the unique challenges of the automation and control markets. They specialize in offering:

The right inventory – when and where you need it

ACE distributors have a wider array of available automation and control inventory on their shelves in your local market. They are your fastest and best source for Schneider Electric products to meet your automation and control needs.

Unparalleled technical capability

ACE distributors set the standard for Automation & Control Excellence. They offer decades of experience working with leading-edge automation and control solutions.

A thorough understanding of your business

You can count on our ACE distributors to keep pulse of advancing technology and best practices. ACE distributors have access to Schneider Electric vast array of product, segment, and solution specialists who assist them in understanding which products and solutions are tailored to your business.

Become an ACE distributor

The ACE program provides its members with a number of exclusive joint market development activities, including local trade shows, sales support tools and resources, marketing programs, and advertising campaigns to help you reach out to customers and prospects in your local market.

Becoming an automation and control expert requires a significant investment in training and resources by knowledgeable personnel. The Automation & Control Excellence program not only promotes development of these capabilities, but also provides a number of resources to make it simple.

For more information on becoming an Automation & Control Excellence Distributor, visit **www.schneider-electric.us/go/ACE** or email **se-ace@schneider-electric.com**.

ACE Automation & Control Excellence

>> Register to win a free trip to the Innovation Center in Raleigh, NC. Visit **www.SEreply.com** and enter key code **j565v**.

Tested, validated, documented architectures

Improving your machine and business performance.

Our new MachineStruxure™ solution is designed to help you achieve faster, lower risk, and more energy-efficient and cost-effective designs and installations through the use of proven and innovative tested, validated, documented architectures that shorten time to market. MachineStruxure incorporates flexible and scalable hardware platforms and a comprehensive software suite with application function libraries.

Increase machine performance and innovation

- Speed up machine concept to design and adapt them to your needs using our best-in-class product offer, predefined machine architectures and application function blocks.

Reduce total cost of ownership

- Using our international offers, experience, presence, and international post sales support.

Shorten time to market

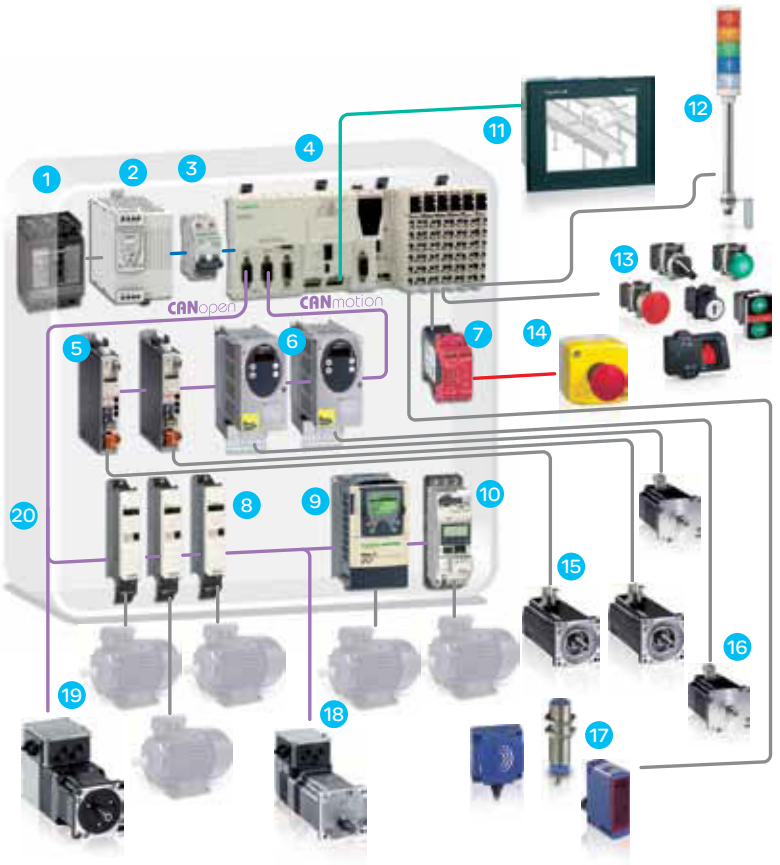
- Save up to 50 percent in control system design and installation time with tested, validated, and documented architectures, ready-to-use function blocks, predefined CAD panel designs and wiring diagrams, fully-documented system user guides.
- Select the control solution to meet your machine requirements with our flexible and scalable machine control platform.
- Choose the appropriate controller with embedded intelligence in drives, HMI displays, motion and logic control products.
- Simplify and speed up control system programming and commissioning with an easy-to-use, single software suite, providing one tool, one connection, one project file and one download with complete openness and transparency.

Performance automation tested, validated, documented architecture

An excellent solution using simple controls architecture dedicated to machines requiring performance and robustness. This architecture combines the new Modicon™ M258 logic controller, SoMachine™ software, Altivar™ 312 variable speed drive, TeSys™ U motor starters, Lexium™ 32 servo drive, and a Magelis™ XBTGT/GK/GH display unit, with traditional hardwired cabling.

Compact/Hardwired/Logic Controller/Modicon™ M258

1. Circuit breaker **PowerPact™**
2. Switch mode power supply **Phaseo™ ABL 8**
3. Modular circuit breaker **Compact Multi 9™**
4. Motion controller **Modicon LMC058**
5. Servo drive **Lexium 32**
6. Stepper drive **Lexium SD328**
7. Machine safety **Preventa™ XPS**
8. Variable speed drive **Altivar 32**
9. Variable speed drive **Altivar 71**
10. Motor starter **TeSys U**
11. Display unit Magelis **XBTGT/GK/GH**
12. Tower light **Harmony™ XVM**
13. Push buttons and switches **Harmony XB4/5**
14. Emergency stop **Harmony XALK**
15. Servo motor **BSH**
16. Stepper motor **BRS 3**
17. Sensors **OsiSense™ XC/XS/XU/XM/XX**
18. Integrated drive **Lexium ILE**
19. Integrated drive **Lexium ILA**
20. Enclosure **Himel™**



OEM Technology and Solutions Center

OEM Technology and Solutions Center

Complete Development and Support Services Throughout Your Project Lifecycle

Machines today are characterized by a growing need to perform faster and have greater flexibility to solve more complex automation challenges than ever before. In addition, engineering costs have an increasingly important impact across the lifecycle of the machine, from concept and design to installation, maintenance, and service. The ability to reduce the time to market and the total cost of the machine, while achieving innovation and increased performance, is a machine builder's continuous challenge.

What's more, we take it one step further with our OEM Technology and Solutions Center — removing the complexity of machine building by offering start-to-finish project lifecycle expertise, including project management, electrical panel design, application co-design, joint marketing, testing, training, and services resources.

At Schneider Electric, we are more than a component supplier. We are your partner for a full range of technical and support solutions.

Dedicated support for your success

OEM Knowledge Base – Dedicated support for your success

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Engineered Panel Solutions

Expand your engineering services without the additional cost through the OEM Technology and Solutions Center. This includes Schneider Electric Engineered Panel Solutions business line that provides original equipment panel design and manufacturing process services for application-based solutions. We serve as an extension of your engineering arm without the overhead costs, thereby freeing up your engineering resources and allowing you to focus on your market offering. We offer application consulting, turn-key engineered solutions, specialized enclosure manufacturing, and turn-key motor control machine solutions.

OEM Solutions Testing and Training Center

Solutions Testing and Training Center

Learn how to simply and easily build and commission flexible machines that reduce costs and time to market — all by the time you complete training. We offer basic and advanced training classes, hands-on testing, and demonstration offered through the OEM Technology and Solutions Center. We also offer on-demand training, schedule at your request and customized to your specific machine and application needs.

>> Learn more about the OEM Technology and Solutions Center, visit **www.SEreply.com** and enter key code **j554v**.

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QO Plug-On Circuit Breakers

Class **730, 731, 733** / Refer to Catalog: **0730CT9801**

Square D brand QO miniature circuit breakers are plug-on products for use in QO load centers, NQOD and NQ panelboards, NQOD and NQ OEM interiors or Speed-D™ switchboard distribution panels. Bolt-on QOB circuit breakers are for use in NQOD and NQ panelboards or interiors.▲
The Square D exclusive Qwik-Open™ mechanism, with a trip reaction within 1/60th of a second, is standard on all 1P 15 A and 20 A QO circuit breakers.

QO 1P
1 Space Required

QOT 1P Tandem
1 Space Required

QO 2P
2 Spaces Required

QO2200 2P 200 A
4 Spaces Required

QO 3P
3 Spaces Required

Table 1.1: Plug-On Circuit Breakers

Amperes Rating ■	1P—120/240 Vac		2P—120/240 Vac Common Trip		2P—240 Vac ♦ Common Trip		3P—240 Vac Common Trip	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
10 k AIR								
10 A	QO110	**29.10**	QO210	**67.00**	—	—	QO310	**248.00**
15 A	QO115★▼	**29.10**	QO215★	**67.00**	QO215H	**200.00**	QO315★	**248.00**
20 A	QO120★▼	**29.10**	QO220★	**67.00**	QO220H	**200.00**	QO320★	**248.00**
25 A	QO125★	**29.10**	QO225★	**67.00**	QO225H	**200.00**	QO325★	**248.00**
30 A	QO130★	**29.10**	QO230★	**67.00**	QO230H	**200.00**	QO330★	**248.00**
35 A	QO135 ★	**29.10**	QO235★	**67.00**	—	—	QO335★	**248.00**
40 A	QO140 ★	**29.10**	QO240★	**67.00**	QO240H	**200.00**	QO340★	**248.00**
45 A	QO145 ★	**29.10**	QO245★	**67.00**	—	—	QO345★	**248.00**
50 A	QO150 ★	**29.10**	QO250★	**67.00**	QO250H	**200.00**	QO350★	**248.00**
60 A	QO160 ★	**29.10**	QO260★	**67.00**	QO260H	**200.00**	QO360★	**248.00**
70 A	QO170 ★	**67.00**	QO270★	**134.00**	QO270H	**224.00**	QO370★	**315.00**
80 A	—	—	QO280★	**189.00**	QO280H	**315.00**	QO380★	**366.00**
90 A	—	—	QO290★	**189.00**	QO290H	**315.00**	QO390★	**366.00**
100 A	—	—	QO2100★	**189.00**	QO2100H	**315.00**	QO3100★	**366.00**
110 A	—	—	QO2110★	**428.00**	—	—	—	—
125 A	—	—	QO2125★	**428.00**	—	—	—	—
150 A	—	—	QO2150★△◒	**491.00**	—	—	—	—
175 A	—	—	QO2175★△◒	**491.00**	—	—	—	—
200 A	—	—	QO2200★△◒	**491.00**	—	—	—	—
Molded Case Switch 60 A max.–240 Vac			—	—	QO200	**70.00**	QO300	**248.00**
Molded Case Switch 100 A max.–240 Vac			—	—	QO2000☆	**200.00**	QO3000☆	**366.00**
22 k AIR★								
15 A	QO115VH ▼	**63.00**	QO215VH□	**146.00**	—	—	QO315VH□	**371.00**
20 A	QO120VH ▼	**63.00**	QO220VH□	**146.00**	—	—	QO320VH□	**371.00**
25 A	QO125VH	**73.00**	QO225VH□	**146.00**	—	—	QO325VH□	**371.00**
30 A	QO130VH	**73.00**	QO230VH□	**146.00**	—	—	QO330VH□	**371.00**
40 A	QO140VH	**73.00**	QO240VH□	**146.00**	—	—	QO340VH□	**371.00**
50 A	QO150VH	**73.00**	QO250VH□	**146.00**	—	—	QO350VH□	**371.00**
60 A	QO160VH	**73.00**	QO260VH□	**146.00**	—	—	QO360VH□	**371.00**
70 A	QO170VH	**112.00**	QO270VH□	**224.00**	—	—	QO370VH□	**477.00**
80 A	—	—	QO280VH□	**315.00**	—	—	QO380VH□	**530.00**
90 A	—	—	QO290VH□	**315.00**	—	—	QO390VH□	**530.00**
100 A	—	—	QO2100VH□◊	**315.00**	—	—	QO3100VH□	**530.00**
110 A	—	—	QO2110VH□◊	**1034.00**	—	—	—	—
125 A	—	—	QO2125VH□◊	**1034.00**	—	—	—	—
150 A	—	—	QO2150VH△□◒	**1061.00**	—	—	—	—
175 A	—	—	QO2175VH△□◒	**1061.00**	—	—	—	—
200 A	—	—	QO2200VH△□◒	**1061.00**	—	—	—	—
42 k AIR★								
40 A	—	—	QOH240☆	**317.00**	—	—	—	—
45 A	—	—	QOH245☆	**317.00**	—	—	—	—
50 A	—	—	QOH250☆	**317.00**	—	—	—	—
60 A	—	—	QOH260☆	**317.00**	—	—	—	—
70 A	—	—	QOH270	**528.00**	—	—	—	—
80 A	—	—	QOH280	**651.00**	—	—	—	—
90 A	—	—	QOH290	**651.00**	—	—	—	—
100 A	—	—	QOH2100	**651.00**	—	—	—	—
110 A	—	—	QOH2110☆	**1389.00**	—	—	—	—
125 A	—	—	QOH2125	**1389.00**	—	—	—	—
65 k AIR★								
15 A	QH115▼	**117.00**	QH215	**293.00**	—	—	QH315★	**507.00**
20 A	QH120▼	**117.00**	QH220	**293.00**	—	—	QH320	**507.00**
25 A	QH125☆	**117.00**	QH225☆	**293.00**	—	—	QH325☆	**507.00**
30 A	QH130	**117.00**	QH230	**293.00**	—	—	QH330	**507.00**

▲ See Digest Section 1 for load centers, and Section 9 for panelboards and interiors.
■ 10–30 A circuit breakers are suitable for use with 60oC or 75oC conductors. 35–125 A circuit breakers are suitable for use with 75oC conductors.
♦ UL Listed 5 k AIR on corner grounded Delta systems.
★ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment haing motor group combinations and marked for use with HACR type circuit breakers.
▼ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
△ Requires four spaces (1 AWG–300 kcmil Al/Cu.) Suitable for switching 120 Vac fluorescent lighting loads.
□ UL Listed for use ahead of QO, QO-GFI, QO-EPD, QOT, QO-AFI, and QO-PL 10 k AIR circuit breakers to permit their application at 22 kA fault level.
◊ 100 A maximum branch mounted opposite.
☆ Order only. Contact your local Field Office.
▽ Includes two circuit breakers (one QO2030 and one QO3020) and handle tie QOTHT.
◒ Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.

Table 1.2: QO/QOB Ring Terminal

(20% $ Price Adder)—Factory-installed only

Ampere Rating	Poles	Suffix
10–30 A	1, 2, 3	5237
35–60 A	1,2	5238
35–50 A	3	
70–110 A	2	5273
60–100 A	3	

Table 1.3: Wire Sizes■

Circuit Breaker Type	Ampere Rating	Wire Size (AWG/kcmil)
QO 1P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
QO 2P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
	150–200 A	4–300 Al/Cu
QO 3P	10–30 A	14–8 Al/Cu, (2) 14-10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
QOB-VH	110–150 A	4–300 Al/Cu
QOT	15–20 A	12–8 Al 14–8 Cu
QO-AFI, QO-GFI or QO-EPD	15–30 A	12–8 Al 14–8 Cu
	40, 50, 60 A	12–4 Al 14–6 Cu
QO-PL	10–60 A	12–2 Al 14–2 Cu

Table 1.4: QOT Tandem Circuit Breakers

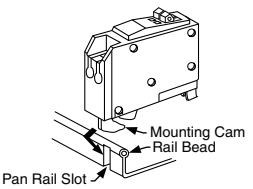
Ampere Rating■	Cat. No.★	$ Price
1P—120/240 Vac		
15 A and 15 A	QOT1515	**58.00**
15 A and 20 A	QOT1520	**58.00**
20 A and 20 A	QOT2020	**58.00**
2P—120/240 Vac Common Trip		
Order two QOT1515 or QOT2020 circuit breakers and handle tie QOTHT for common switching of center two poles.		

Table 1.5: Replacement Tandem Circuit Breakers

For use in Old Style Non-Class CTL QO Load Centers—10 k AIR

Ampere Rating■	Cat. No.★	$ Price
1P—120/240 Vac—1 Space Required		
15 A and 15 A	QO1515	**73.00**
15 A and 20 A	QO1520	**73.00**
20 A and 20 A	QO2020	**73.00**
20 A and 30 A	QO2030	**73.00**
30 A and 20 A	QO3020	**73.00**
Two 1P Individual Trip—120/240 Vac—2 Spaces Required		
15 A and 15 A	Order Two QO1515 or QO2020 circuit breakers and handle tie QOTHT	
15 A and 20 A		
20 A and 20 A	—	—
20 A and 30 A	QO20303020▽	**134.00**
30 A and 20 A	—	—

QOT Tandem



Current limiting QOT tandem circuit breakers have a mounting cam as shown. Installation into a QO load center can only be made in those positions having a mounting pan rail slot. Meets Paragraph 408.15 of the NEC®. UL Listed as Class CTL

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1P
QO-CAFI

1P
QO-DF

Three-wire
QO-SWN

Two-wire
QO-SWN

1P
QO-GFI

2P
QO-GFI

QO
1P
With Shunt Trip

QO Arc-Fault Circuit Breaker

QO arc-fault circuit breakers provide protection for Series and Parallel Type Arcing as required by the NEC and local code adoption, and comply with UL1699.

Table 1.6: QO Arc Fault Circuit Breakers▲

Circuit Breaker Type	Ampere Rating	One- Pole 1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price
Combination Arc-fault Interrupter (Pigtail Neutral)	15	QO115CAFI	282.00	QO115VHCAFI	534.00
	20	QO120CAFI	282.00	QO120VHCAFI	534.00
Plug-On Neutral Combination Arc-fault Interrupter	15	QO115PCAFI	282.00	QO115VHPCAFI	534.00
	20	QO120PCAFI	282.00	QO120VHPCAFI	534.00

Circuit Breaker Type	Ampere Rating	Two- Pole 2P 120/240 Vac 10 k AIR 2 Space Required Cat. No.	$ Price	2P 120/240 Vac 22 k AIR 2 Space Required Cat. No.	$ Price
Combination Arc-fault Interrupter (Pigtail Neutral)	15	QO215CAFI	636.00	QO215VHCAFI	1068.00
	20	QO220CAFI	636.00	QO220VHCAFI	1068.00

New! QO-Dual Function Circuit Breaker

QO Combination Arc Fault and Ground Fault Circuit Interrupters (Dual Function) provide overload and short circuit protection, plus arc fault and ground fault protection in accordance with the NEC, UL1699 and UL943.

Table 1.7: QO-Dual Function Arc Fault Circuit Breakers▲

Circuit Breaker Type	Ampere Rating	1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price
Combination Arc-fault and Ground Fault Circuit Interrupter (Pigtail Neutral)	15	QO115DF	326.00	QO115VHDF	578.00
	20	QO120DF	326.00	QO120VHDF	578.00
Plug-On Neutral Combination Arc-fault and Ground Fault Circuit Interrupter	15	QO115PDF	326.00	QO115VHPDF	578.00
	20	QO120PDF	326.00	QO120VHPDF	578.00

QO-GFI

Qwik-Gard™ circuit breakers provide overload and short circuit protection, combined with Class A ground fault protection. Class A denotes a ground fault circuit interrupter that will trip when a fault current to ground is 6 mA or more, for people protection. Do not connect to more than 250 feet of load conductor for the total one-way run to prevent nuisance tripping.

Table 1.8: QO-GFI Circuit Breakers New!

Ampere Rating♦	Qwik-Gard Circuit Breakers With Ground Fault Circuit Interrupter 1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 208Y/120 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
15	QO115GFI	233.	QO115VHGFI	482.	QO215GFI	413.	QO315GFI	791.
20	QO120GFI	233.	QO120VHGFI	482.	QO220GFI	413.	QO320GFI	791.
25	QO125GFI	233.	QO125VHGFI	482.	QO225GFI	413.	—	—
30	QO130GFI	233.	QO130VHGFI	482.	QO230GFI	413.	QO330GFI	791.
40	—	—	—	—	QO240GFI	413.	QO340GFI	791.
50	—	—	—	—	QO250GFI	413.	QO350GFI	791.
60	—	—	—	—	QO260GFI★	413.	—	—

QO-EPD/EPE

QO-EPD/EPE circuit breakers provide overload and short circuit protection combined with Class B ground fault protection. They are designed to provide ground fault protection of equipment at a 30 mA level (EPD) or 100 mA level (EPE). They are not designed to protect people from electrical shock.

Table 1.9: QO-EPD Circuit Breakers New!

Ampere Rating♦	1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price	Cat. No.	$ Price
15	QO115EPD	410.	QO215EPD	660.	QO315EPD▼	1077.	QO315EPE▼	1077.
20	QO120EPD	410.	QO220EPD	660.	QO320EPD▼	1077.	QO320EPE▼	1077.
25	QO125EPD	410.	QO225EPD	660.	—	—	—	—
30	QO130EPD	410.	QO230EPD	660.	QO330EPD▼	1077.	QO330EPE▼	1077.
40	—	—	QO240EPD	660.	QO340EPD▼	1077.	QO340EPE▼	1077.
50	—	—	QO250EPD	660.	QO350EPD▼	1077.	QO350EPE▼	1077.
60	—	—	QO260EPD★	660.	—	—	—	—

QO-SWN

Switch Neutral Common Trip 2008 NEC® 514.11

Table 1.10: QO-SWN Circuit Breakers

Ampere Rating♦	2 Wire 120 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3 Wire 120/240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
10	QO210SWN	95.00	QO310SWN	143.00
15	QO215SWN	95.00	QO315SWN	143.00
20	QO220SWN	95.00	QO320SWN	143.00
25	QO225SWN	95.00	QO325SWN	143.00
30	QO230SWN	95.00	QO330SWN	143.00
40	QO240SWN	95.00	QO340SWN	143.00
50	QO250SWN	95.00	QO350SWN	143.00

QO-HID

HID circuit breakers are for use on circuits feeding fluorescent and high intensity discharge (HID) lighting systems such as mercury vapor, metal halide, or high pressure sodium. These circuit breakers are physically interchangeable with QO circuit breakers.

Table 1.11: QO-HID Circuit Breakers

Ampere Rating♦	1P 120/240 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
15	QO115HID■	38.10	QO215HID	87.00	QO315HID	300.00
20	QO120HID■	38.10	QO220HID	87.00	QO320HID	300.00
25	QO125HID	38.10	QO225HID	87.00	QO325HID	300.00
30	QO130HID	38.10	QO230HID	87.00	QO330HID	300.00
40	QO140HID	38.10	QO240HID	87.00	—	—
50	QO150HID	38.10	QO250HID	87.00	—	—

NOTE: *QO-K Circuit Breakers are on page 1-27.*

QO-HM

High magnetic trip circuit breakers are recommended for applications where high initial inrush may occur and for individual dimmer applications.

Table 1.12: QO-HM Circuit Breakers

Ampere Rating♦	120 Vac—10 k AIR 1P Cat No	$ Price
15 A	QO115HM▲■	30.60
20 A	QO120HM▲■	30.60

Non-automatic (Standard) Miniature Switches

Miniature non-automatic switches have the same physical packaging as miniature circuit breakers, but open only when the handle is switched to the OFF position.

Non-automatic switches provide no overcurrent protection or short circuit protection. They must not be used on systems that have an available fault current greater than the values listed in the table.

Non-automatic switches are UL Listed per UL 1087 and are CSA certified.

Table 1.13: QO Non-Automatic Miniature Switches, 240 Vac 10 kA

Ampere Rating	2P Cat. No.	$ Price	3P Cat. No.	$ Price
60	QO200	70.00	QO300	248.00
100	QO2000	200.00	QO3000	366.00

▲ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.

■ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.

♦ 10–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 35–60 A circuit breakers are suitable for use with 75°C conductors.

★ Suitable only for feeding 240 Vac and 208 Vac two-wire loads. Does not contain load neutral connection.

▼ See note in Instruction Bulletin when using in an enclosure with a QO403 or QON prefix.

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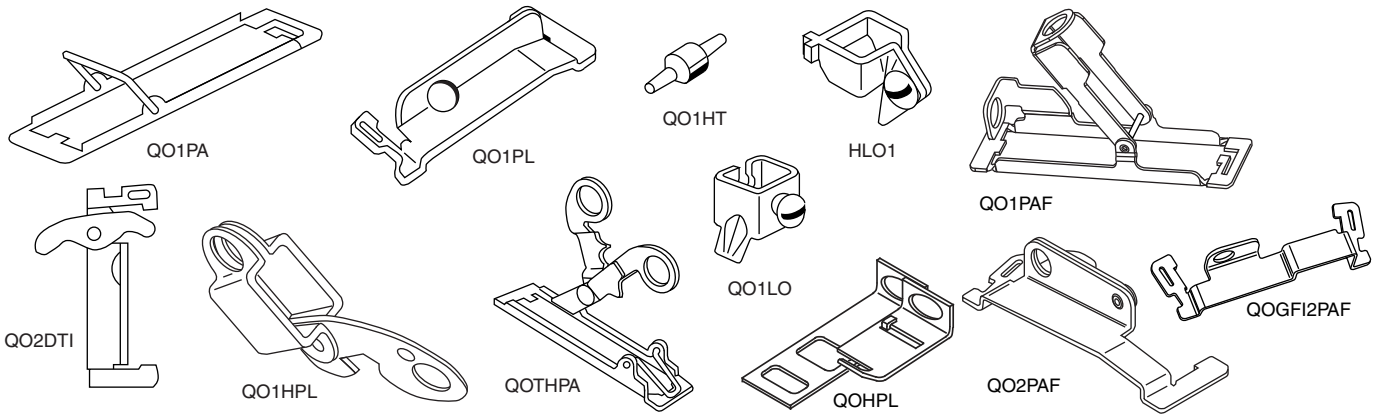
Table 1.14: Accessories for use with QO and QOB Miniature Circuit Breakers

Description		Cat. No.	$ Price	Schedule
Handle Attachments				
Handle Tie	Converts any two adjacent 120/240 Vac 1P QO circuit breakers to independent trip 2P	QO1HT	**3.80**	DE2E
	Converts any two adjacent 120/240 Vac1P side-by-side QOT circuit breakers to independent trip 2P	QOTHT	**3.80**	DE2E
Handle Clamp	Clamp for holding QO 1P handle in ON or OFF position	QO1LO	**3.80**	DE2E
	Clamp for holding QO or Q1 either 1P, 2P or 3P circuit breaker handles in ON or OFF position	HLO1	**9.90**	DE2E
Handle Padlock Attachment for Padlocking in ON or OFF position	For padlocking 1P QO circuit breaker in ON or OFF position			
	Loose attachment	QOHPL	**9.90**	DE2E
	Fixed attachment	QO1PA	**10.70**	DE2E
	For padlocking 1P side-by-side QOT circuit breaker in ON or OFF position	QOTHPA	**11.10**	DE2E
	For padlocking 2P QO-GFI circuit breakers in either ON or OFF position, fixed attachment.	GFI2PA	**9.20**	DE2A
	For 2P and 3P QO and Q1 standard circuit breakers which require padlocking in either ON or OFF position.			
	Loose attachment	QO1HPL	**10.70**	DE2E
	Fixed attachment	QO1PL	**10.70**	DE2E
Handle Padlock Attachment for Padlocking in OFF position	For padlocking 1P QO circuit breaker in OFF position only, fixed attachment.	QO1PAF	**43.50**	DE2E
	For padlocking 2P and 3P QO circuit breakers in OFF position only, fixed attachment.	QO2PAF	**25.80**	DE2E
	For padlocking 1P QO-GFI, QO-CAFI, QO-DF and QO-EPD circuit breakers in OFF position only, fixed attachment.	QOGFI1PAF	**51.00**	DE2E
	For padlocking 2P QO-GFI, QO-CAFI and QO-EPD circuit breakers in OFF position only, fixed attachment.	QOGFI2PAF	**38.40**	DE2E
Ring Terminal	Ring terminals are available as a factory-installed option.	See page 7-10	**+20% Price Adder**	DE2A
Sub-feed Lugs	60 A 2P plug-on – 2 spaces required (6–2 Al/Cu)	QO60SL	**47.10**	DE2A
	125 A 2P plug-on – 2 spaces required (12–2/0 Al/Cu)	QO2125SL	**137.00**	DE2A
	225 A 2P plug-on – 4 spaces required (4–300 Al/Cu)	QO2225SL▲	**308.00**	DE2A
	125 A 3P plug-on – 3 spaces required (12–2/0 Al/Cu)	QO3125SL	**137.00**	DE3
Mechanical Interlock Attachment	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time (Not QOU)	QO2DTI	**24.90**	DE2E
With Retaining Kit	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2Ps or (1) 2P and (1) 1P QO circuit breakers in QO816L100 load centers.	QO2DTIM	**63.00**	DE2E

▲ Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.



Factory-Installed Accessories for use with QO and QOB Miniature Circuit Breakers

Factory-installed electrical accessories take up an additional pole space on QO, QO-GFI, QO-EPD, QO-SWN and QOU circuit breakers. All AC electrical accessories shown below are rated for 50/60 Hz. Accessories are not available for QOB-VH (2P 150 A and 3P 110–150 A) circuit breakers or QO, QOU molded case switches. QO circuit breakers will accept only one accessory per circuit breaker. Undervoltage trip is not available on miniature circuit breakers. Factory-installed accessories are not available for QO-AFI or QO-CAFI Arc Fault Circuit Breakers or on QO2150, QO2175, or QO2200 circuit breakers.

Table 1.15: Factory-Installed Accessories

Accessory	Description	Rated Voltage	Coil Burden	Cat. No. Suffix	$ Price Adder
Shunt Trip	Trips the circuit breaker from a remote location by means of a trip coil energized from a separate circuit. A 120 Vac shunt trip will operate at 55% or more of rated voltage. All other shunt trips will operate at 75% or more of rated voltage. **Application** • For use with momentary or maintained push button. • Not available on QO-GFI, QO-EPD. • Shunt trip terminals accept (2) 0.14– 0.12 AWG Cu.	12 Vac/Vdc 24 Vac/Vdc	60 VA 168 VA	-1042	**189.00**
		120 Vac 208 Vac 240 Vax	72 VA 228 VA 288 VA	-1021	**189.00**

Accessory	Description	Contact Comb.	Max. Voltage	Max. Load	Cat. No. Suffix	$ Price Adder
Auxiliary Switches	Monitors circuit breaker contact status and provides a remote signal indicating the circuit breaker contacts are OPEN or CLOSED. **Application** • Auxiliary switch terminals accept (2) 14–12 AWG Cu leads. • Leads (EH): Yellow for "A", Blue for "B", Striped common 18 AWG Cu.	1A 1B	120 Vac 120 Vac	5 A 5 A	-1200 -1201	**132.00** **132.00**
Alarm Switches	Used with control circuits and is actuated only when the circuit breaker has tripped. Standard construction includes a normally-open contact. **Application** • Leads: Alarm switch terminals accept (2) 14–12 AWG Cu leads.	1A	120 Vac	5 A	-2100	**132.00**

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1Ø3W—120/240 Vac—UL Listed

Table 1.16: Main Lugs (Accepts Only QO Plug-On Circuit Breakers.)

INDOOR

Mains Rating	Spaces	Max. 1P Circuits▲	Max. Tandem Circuit Breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior Cat. No.	Load Center Box and Interior $ Price	Indoor Cover with Door (Order Separately) Flush Cat. No.	Indoor Cover with Door (Order Separately) Surface Cat. No.	Indoor Cover with Door (Order Separately) $ Price	Main Wire Size AWG/kcmil Al	Main Wire Size AWG/kcmil Cu	Equipment Ground Bar Kit (Order Separately) Cat. No.	Equipment Ground Bar Kit (Order Separately) $ Price	Box No. See Page 1-17
Fixed Mains—Factory-Installed Main Lugs—10 kA Short Circuit Current Rating■														
30 A	2	2	0	**41.70**	QO2L30S♦★	**41.70**	Cover Included—Without Door			12–10	14–10	PK3GTA1	**11.40**	1
70 A	2	4	2	**69.00**	QO24L70F/S▼△	**69.00**	Cover Included—Without Door			12–3	14–4	PK4GTA	**10.80**	2
100 A	6	12	6	**87.00**	QO612L100F/S▼□	**87.00**	Cover Included—Without Door			8–1		PK7GTA	**11.70**	4
	6	12	6	**90.00**	QO612L100DF/S▼□	**90.00**	Cover Included—With Door					PK7GTA	**11.70**	4
	8	16	8	**131.00**	QO816L100F/S▼□	**131.00**	Cover Included—Without Door					PK7GTA	**11.70**	4
	8	16	8	**143.00**	QO816L100DF/S▼□	**143.00**	Cover Included—With Door							
	6	12	6	**111.00**	QO612L100DFCU/SCU▼□◊	**111.00**	Cover Included—With Door					PK7GTA	**11.70**	4
	8	16	8	**174.00**	QO816L100DFCU/SCU▼□◊	**174.00**	Cover Included—With Door					PK7GTA	**11.70**	4
125 A	4	8	4	**93.00**	QO148L125GF/S▼☆	**93.00**	Cover Included—Without Door			12–2/0	14–2/0	PK7GTA✱		21
Convertible Mains—Factory-Installed Main Lugs—65 kA Short Circuit Current Rating QOM1 Main Frame Size—Convertible to Main Circuit Breaker—Cu Bus■▽														
125 A	12	12	0	**196.70**	QO112L125G	**159.00**	QOC16UF	QOC16US	**37.70**	6–2/0		PK9GTA✱		6
	12	24	12	**235.70**	QO11224L125G	**198.00**	QOC16UF	QOC16US	**37.70**			PK15GTA✱		6
	16	16	0	**255.70**	QO116L125G	**218.00**	QOC24UF	QOC24US	**37.70**			PK12GTA✱		7
	16	24	8	**300.70**	QO11624L125G	**263.00**	QOC24UF	QOC24US	**37.70**			PK15GTA✱		7
	20	20	0	**271.70**	QO120L125G	**234.00**	QOC24UF	QOC24US	**37.70**			PK15GTA✱		7
	20	24	4	**370.70**	QO12024L125G	**333.00**	QOC24UF	QOC24US	**37.70**			PK15GTA✱		7
	24	24	0	**381.70**	QO124L125G	**344.00**	QOC24UF	QOC24US	**37.70**			PK15GTA✱		7
	32	32	0	**434.60**	QO132L125G	**395.00**	QOC32UF	Use Flush	**39.60**			PK23GTA, LK100AN✱		8
Convertible Mains—Factory-Installed Main Lugs—65 kA Short Circuit Current Rating—Convertible To Main Circuit Breaker—Cu Bus■▽														
150 A	20	30	10	**419.00**	QO12030L150G	**332.00**	QOC30UF	QOC30US	**87.00**	6–250		PK23GTA, LK100AN✱		9
	24	24	0	**431.00**	QO124L150G	**344.00**	QOC30UF	QOC30US	**87.00**			PK15GTA✱		9
	30	30	0	**437.00**	QO130L150G	**350.00**	QOC30UF	QOC30US	**87.00**			PK23GTA, LK100AN✱		9
200 A	12	12	0	**353.00**	QO112L200G	**266.00**	QOC30UF	QOC30US	**87.00**	6–250		PK15GTA✱		9
	24	36	12	**819.00**	QO12436L200TFT◒	**732.00**	QOC40UF	QOC40US	**87.00**			PK23GTA, LK100AN✱		10
	30	30	0	**494.00**	QO130L200G	**407.00**	QOC30UF	QOC30US	**87.00**			PK23GTA, LK100AN✱		9
	30	40	10	**554.00**	QO13040L200G	**467.00**	QOC30UF	QOC30US	**87.00**			PK23GTA, LK100AN✱		9
	40	40	0	**746.00**	QO140L200G	**659.00**	QOC40UF	QOC40US	**87.00**			PK23GTA, LK100AN✱		10
	40	60	20	**944.00**	QO14060L200G	**857.00**	QOC40UF	QOC40US	**87.00**			(2) PK15GTA✱		10
	42	52	10	**921.00**	QO14252L200G	**810.00**	QOC42UF	QOC42US	**111.00**			(2) PK15GTA✱		11
225 A	42	42	0	**828.00**	QO142L225G	**717.00**	QOC42UF	QOC42US	**111.00**	6–300		PK23GTA, LK100AN✱		11
Fixed Mains—Factory-Installed Main Lugs—65 kA Short Circuit Current Rating■▽														
400 A	30	30	0	**1641.00**	QONQ30LS400 (Int)	**1080.00**	NC50NQVF	NC50NQVS	**486.00**	(1) 1/0–750 or (2) 1/0–300		PK27GTA◑ or PK15GTA6	**33.80**	15
					MH50 (box)✪	**75.00**							**53.00**	15
	42	42	0	**1746.00**	QONQ42LS400 (Int)♦	**1185.00**	NC50NQVF	NC50NQVS	**486.00**					
					MH50 (box)	**75.00**								

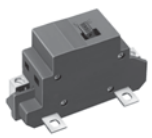
Above listings through 200 A mains rating meet Federal Specification W-P-115C as Type 1, Class 2.

- ▲ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.
- ■ UL short circuit current rating depends on lowest interrupting rating of circuit breaker installed.
- ♦ Will not accept QO-EPD or Qwik-Gard™ QO-GFI or QO-AFI circuit breakers.
- ★ Mains rated 25 A when Al wire is used.
- ▼ Order F for flush device or S for surface device.
- △ Use 10 AWG maximum size wire for GFI and AFI circuit breakers.
- □ 70 A Max. branch circuit breaker and 70 A max. back fed main circuit breaker.
- ◊ CU indicates copper bus.
- ☆ Copper bus.
- ▽ UL Listed 5000 A short circuit current rating for corner grounded Delta systems. Use QO-H circuit breakers only.
- ◒ Supplied with feed-thru lugs.
- ✱ Factory-included.
- ♦ Interior only, order box separately.
- ◑ PK27GTA includes a 6–2/0 AWG Al/Cu lug.
- ✪ PE1A Discount Schedule.

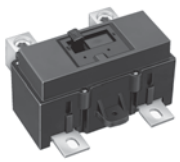
QO120L125G

QO816L100F or S without cover

1Ø, Field-Installed Main Circuit Breaker Kits



QOM1 Frame Size
50–125 Amperes



QOM2 Frame Size
100–225 Amperes

Table 1.17: Use with Convertible Main Load Centers Only

QOM1 Frame Size					QOM2 Frame Size †				
Main Circuit Breaker Rating◪	Convertible Load Center Mains Rating	22 k AIR♦ Main Circuit Breaker	22 k AIR♦ $ Price	Lug Wire Size ‡ AWG/kcmil	Main Circuit Breaker Rating◪	Convertible Load Center Mains Rating	22 k AIR♦ Main Circuit Breaker	22 k AIR♦ $ Price	Lug Wire Size ‡ AWG/kcmil
50 A	100–125	QOM50VH	**140.00**	12–2/0 Al or Cu	100 A	150–225	QOM2100VH	**468.00**	4–300 Al or Cu
60 A	100–125	QOM60VH	**140.00**		125 A	150–225	QOM2125VH	**468.00**	
70 A	100–125	QOM70VH	**140.00**		150 A	150–225	QOM2150VH	**468.00**	
80 A	100–125	QOM80VH	**201.00**		175 A	200–225	QOM2175VH	**468.00**	
90 A	100–125	QOM90VH	**201.00**		200 A	200–225	QOM2200VH	**468.00**	
100 A	100–125	QOM100VH	**201.00**		225 A	225	QOM2225VH	**468.00**	
110 A	125	QOM110VH	**468.00**		—	—	—	—	—
125 A	125	QOM125VH	**468.00**		—	—	—	—	—

- ◪ Do not exceed the load center mains rating.
- ♦ 22 k AIR main circuit breaker UL Listed for use ahead of QO, QOT and QO-PL 10 k AIR branch circuit breakers to permit their application on systems with up to 22 kA available fault current.
- ‡ Wire range listed for QOM circuit breaker kits is the wire range of that circuit breaker. To find out maximum wire size permitted in a particular load center per UL, see pages 1-5 through 1-11 under Main Wire Size.
- † Add suffix 1021 for 120, 208 or 240 Vac shunt trip.

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1Ø3W—120/240 Vac—UL Listed

Table 1.18: Main Circuit Breaker (Accepts Only QO Plug-On Circuit Breakers.)

INDOOR

Mains Rating	Spaces	Max. Single Pole Circuits▲	Max. Tandem Circuit Breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior Cat. No.	Load Center Box and Interior $ Price	Indoor Cover with Door (Order Separately) Flush Cat. No.	Indoor Cover with Door (Order Separately) Surface Cat. No.	Indoor Cover with Door (Order Separately) $ Price	Main Wire Size AWG/kcmil Al or Cu	Equipment Ground Bar Kit (Order Separately) Cat. No.	Equipment Ground Bar Kit (Order Separately) $ Price	Box No. See Page 1-17
Convertible Mains —Factory-installed Main Circuit Breaker, 22 kA Short Circuit Current Rating, Convertible to Main Lugs (see below) or Lower Amperage Main Circuit Breaker (See page 1-5),■ QOM1 Main Circuit Breaker Frame Size—Copper Bus													
100 A	12	12	0	**339.70**	QO112M100	**302.00**	QOC12UF	QOC12US	**37.70**	6–1	PK9GTA	**13.40**	5
	16	16	0	**379.70**	QO116M100	**342.00**	QOC20U100F	QOC20U100S	**37.70**		PK12GTA	**15.80**	6
	20	20	0	**433.70**	QO120M100	**396.00**	QOC20U100F	QOC20U100S	**37.70**		PK15GTA	**17.10**	6
	24	24	0	**553.70**	QO124M100	**516.00**	QOC24UF	QOC24US	**37.70**	6–2/0	PK15GTA	**17.10**	7
	32	32	0	**726.70**	QO132M100	**689.00**	QOC32UF	Use Flush	**37.70**		PK18GTA	**18.80**	8
125 A	24	24	0	**819.70**	QO124M125	**782.00**	QOC24UF	QOC24US	**37.70**	6–2/0	PK15GTA	**17.10**	7
	32	32	0	**1041.60**	QO132M125	**1002.00**	QOC32UF	Use Flush	**39.60**		PK18GTA	**18.80**	8
Convertible Mains —Factory-Installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs (see below) or Lower Amperage Main Circuit Breaker (See page 1-5) ■ QOM2 Main Circuit Breaker Frame Size—Copper Bus													
150 A	20	30	10	**821.00**	QO12030M150	**734.00**	QOC30UF	QOC30US	**87.00**	4–250	PK18GTA	**18.80**	9
	24	24	0	**849.00**	QO124M150	**762.00**	QOC30UF	QOC30US	**87.00**		PK15GTA	**17.10**	9
	30	30	0	**854.00**	QO130M150	**767.00**	QOC30UF	QOC30US	**87.00**		PK18GTA	**18.80**	9
	32	32	0	**969.00**	QO132M150	**882.00**	QOC40UF	QOC40US	**87.00**		PK18GTA	**18.80**	10
200 A	20	40	20	**821.00**	QO12040M200	**734.00**	QOC30UF	QOC30US	**87.00**	4–250	PK23GTA	**21.30**	9
	24	24	0	**866.00**	QO124M200	**779.00**	QOC30UF	QOC30US	**87.00**		PK15GTA	**17.10**	9
	24	36	12	**1287.00**	QO12436M200TFT◊	**1200.00**	QOC40UF	QOC40US	**87.00**		PK23GTA and LK100AN□		10
	30	30	0	**879.00**	QO130M200	**792.00**	QOC30UF	QOC30US	**87.00**		PK18GTA	**18.80**	9
	30	40	10	**957.00**	QO13040M200	**870.00**	QOC30UF	QOC30US	**87.00**		PK23GTA	**21.30**	9
	40	40	0	**1121.00**	QO140M200	**1034.00**	QOC40UF	QOC40US	**87.00**		PK23GTA	**21.30**	10
	40	60	20	**1431.00**	QO14060M200	**1344.00**	QOC40UF	QOC40US	**87.00**		PK23GTA	**21.30**	10
	42	42	0	**1220.00**	QO142M200	**1109.00**	QOC42UF	QOC42US	**111.00**	4–300	PK23GTA	**21.30**	11
	42	52	10	**1382.00**	QO14252M200	**1271.00**	QOC42UF	QOC42US	**111.00**		PK23GTA	**21.30**	11
225 A	40	40	0	**1196.00**	QO140M225	**1085.00**	QOC42UF	QOC42US	**111.00**		PK23GTA	**21.30**	11
	42	42	0	**1253.00**	QO142M225	**1142.00**	QOC42UF	QOC42US	**111.00**		PK23GTA	**21.30**	11
Fixed Mains—Factory-installed LAL Main Circuit Breaker, 42 kA Short Circuit Current Rating♦													
300 A	42	42	0	**4909.00**	QONQ42MS300 (int)★ MH62 (box)△	**4243.00** **75.00**	NC62NQVF	NC62NQVS	**591.00**	(1) 4–500 or (2) 4–3/0	PK27GTA▼ or PK15GTA6	**33.80** **53.00**	16
400 A	42	42	0	**4909.00**	QONQ42MS400 (int)★ MH62 (box)△	**4243.00** **75.00**	NC62NQVF	NC62NQVS	**591.00**	(1) 4–500 or (2) 4–250			16

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

- ▲ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.
- ■ 22 k AIR main circuit breaker UL Listed for use ahead of QO, QOT and QO-PL 10 k AIR branch circuit breakers to permit their application on systems with up to 22 kA available fault current.
- ♦ UL short circuit current rating depends on lowest interrupting rating of circuit breakers installed. Also, UL Listed 5000 A short circuit current for corner grounded Delta systems. Use QO-H circuit breakers only.
- ★ Interior only, order box separately.
- ▼ PK27GTA includes a 6–2/0 Al/Cu lug.
- △ PE1A Discount Schedule.
- □ Factory included.
- ◊ Supplied with feed-thru lugs.

QO140M200

1Ø, Field-Installed Main Lugs Kits

Table 1.19: Use with Convertible Main Load Centers Only

Main Lugs Rating☆	Use on Convertible Load Center with Mains Rating	Cat. No.	$ Price	Lug Wire Size▽ AWG/kcmil Al or Cu
125 A	100–125 A	QOL125◒	**44.10**	6–2/0
225 A	150–225 A	QOL225◒	**104.00**	6–300

- ☆ Do not exceed the load center mains rating.
- ▽ Wire range listed for QOL lug kits is the wire range of that lug. To find out maximum wire size permitted in a particular load center per UL, see pages 1-5 through 1-11 under main wire size.
- ◒ If main circuit breaker knockout has been removed from the load center's trim, order appropriate filler plate from page 1-13.

QOL125

QOL225

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1Ø3W—120/240 Vac—UL Listed

Table 1.20: Main Lugs (Accepts Only QO Plug-On Circuit Breakers.)

RAINPROOF

Mains Rating	Spaces	Max. Single Pole Circuits▲	Max. Tandem Circuit Breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior Cat. No.	Load Center Box and Interior $ Price	Main Wire Size AWG/kcmil Al	Main Wire Size AWG/kcmil Cu	Equipment Ground Bar Kit (Order Separately) Cat. No.	Equipment Ground Bar Kit (Order Separately) $ Price	Box No. See Page 1-18
Non-Metallic Enclosure											
Fixed Mains—Factory-installed Main Lugs—10 kA Short Circuit Current Rating											
60 A	2	4	2	**102.00**	QO24L60NRNM	**102.00**	14–4	14–4	Factory-installed	—	1NM
Metallic Enclosure											
Fixed Mains—Factory-installed Main Lugs—10 kA Short Circuit Current Rating											
40 A	2	2	0	**113.00**	QO2L40RB■	**113.00**	12–6	14–6	PK3GTA1	**11.40**	1R
70 A	2	4	2	**131.00**	QO24L70RB■	**131.00**	12–3	14–4	PK4GTA	**10.80**	1R
100 A	6	12	6	**143.00**	QO612L100RB♦	**143.00**	8–1		PK7GTA	**11.70**	2R
	6	12	6	**158.00**	QO612L100TRB♦	**158.00**			Factory-installed	—	2R
	8	16	8	**231.00**	QO816L100RB♦	**231.00**			PK7GTA	**11.70**	2R
	6	12	6	**174.00**	QO612L100RBCU♦★	**174.00**			PK7GTA	**11.70**	2R
	8	16	8	**279.00**	QO816L100RBCU♦★	**279.00**			PK7GTA	**11.70**	2R
125 A	4	8	4	**152.00**	QO148L125GRB★	**152.00**	12–2/0	14–2/0	PK7GTA Factory-included		15R
Convertible Mains—Factory-installed Main Lugs—65 kA Short Circuit Current▼△□ QOM1 Main Frame Size—Convertible to Main Circuit Breaker—Copper Bus											
125 A	12	12	0	**285.00**	QO112L125GRB	**285.00**	6–2/0		PK9GTA Factory-included	—	3R
	12	24	12	**365.00**	QO11224L125GRB	**365.00**			PK15GTA Factory-included	—	3R
	16	24	8	**435.00**	QO11624L125GRB	**435.00**			PK15GTA Factory-included	—	4R
	24	24	0	**522.00**	QO124L125GRB	**522.00**			PK15GTA Factory-included	—	4R
Convertible Mains—Factory-installed Main Lugs—65 kA Short Circuit Current▼△□ QOM2 Main Frame Size—Convertible to Main Circuit Breaker—Copper Bus											
150 A	30	30	0	**587.00**	QO130L150GRB	**587.00**	4–250		PK23GTA, LK100AN Factory-included		6R
200 A	12	12	0	**480.00**	QO112L200GRB	**480.00**	4–250		PK9GTA Factory-included		5R
	30	30	0	**666.00**	QO130L200GRB	**666.00**			PK23GTA, LK100AN Factory-included		6R
	30	40	10	**714.00**	QO13040L200GRB	**714.00**			PK23GTA, LK100AN Factory-included		6R
	40	40	0	**971.00**	QO140L200GRB	**971.00**			PK23GTA, LK100AN Factory-included		7R
	40	60	20	**1262.00**	QO14060L200GRB	**1262.00**			(2) PK15GTA, (1) LK100AN Factory-included		7R
	42	52	10	**1194.00**	QO14252L200GRB	**1194.00**			(2) PK15GTA, (1) LK100AN Factory-included		8R
225 A	42	42	0	**1310.00**	QO142L225GRB	**1310.00**	4–300		PK23GTA, LK100AN Factory-included		8R

Table 1.21: Main Circuit Breaker (Accepts Only QO Plug-On Circuit Breakers.)

RAINPROOF

Mains Rating	Spaces	Max. Single Pole Circuits ▲	Max. Tandem Circuit Breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior Cat. No.	Load Center Box and Interior $ Price	Main Wire Size AWG/kcmil Al or Cu	Equipment Ground Bar Kit (Order Separately) Cat. No.	Equipment Ground Bar Kit (Order Separately) $ Price	Box No. See Page 1-18
Convertible Mains —Factory-installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs (see page 1-6) or Lower Amperage Main Circuit Breaker (see page 1-5)◊□ QOM1 Main Circuit Breaker Frame Size—Copper Bus										
100 A	12	12	0	**461.00**	QO112M100RB	**461.00**	6–2/0	PK9GTA	**13.40**	3R
	16	16	0	**504.00**	QO116M100RB	**504.00**		PK12GTA	**15.80**	4R
	20	20	0	**552.00**	QO120M100RB	**552.00**		PK15GTA	**17.10**	4R
125 A	24	24	0	**954.00**	QO124M125RB	**954.00**	6–2/0	PK15GTA	**17.10**	4R
Convertible Mains —Factory-installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs (see page 1-6) or Lower Amperage Main Circuit Breaker (see page 1-5)◊□ QOM2 Main Circuit Breaker Frame Size—Copper Bus										
150 A	20	30	10	**953.00**	QO12030M150RB	**953.00**	4–250	PK18GTA	**18.80**	5R
	30	30	0	**1122.00**	QO130M150RB	**1122.00**		PK18GTA	**18.80**	6R
200 A	20	40	20	**954.00**	QO12040M200RB	**954.00**	4–250	PK23GTA	**21.30**	5R
	30	30	0	**1154.00**	QO130M200RB	**1154.00**		PK18GTA	**18.80**	6R
	30	40	10	**1179.00**	QO13040M200GRB	**1179.00**		PK23GTA	**21.30**	6R
	40	40	0	**1397.00**	QO140M200RB	**1397.00**		PK23GTA	**21.30**	7R
	40	60	20	**1815.00**	QO14060M200RB	**1815.00**		PK15GTA	**17.10**	7R
	42	42	0	**1469.00**	QO142M200RB	**1469.00**		PK23GTA	**21.30**	8R
	42	52	10	**1718.00**	QO14252M200RB	**1718.00**		PK15GTA	**17.10**	8R
225 A	42	42	0	**1631.00**	QO142M225RB	**1631.00**	4–300	PK23GTA	**21.30**	8R
Convertible Mains—Factory-installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs (see page 1-6) or Lower Amperage Main Circuit Breaker (see page 1-5) hg ◊ QOM1 or QOM2 Main Circuit Breaker Frame Size—Copper Bus										
125 A	6	12	6	**620.00**	QO1612M125FTRB☆	**620.00**	4–2/0	PK12GTA	**15.80**	3R
150 A	8	16	8	**863.00**	QO1816M150FTRB☆	**863.00**	4–250	PK15GTA-L	**35.00**	6R
200 A	8	16	8	**863.00**	QO1816M200FTRB☆	**863.00**	4–250	PK15GTA-L	**35.00**	6R

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

- ▲ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.
- ■ Use 10 AWG maximum size wire for AFI and GFI circuit breaker.
- ♦ 70 A max. branch circuit breaker and 70 A max. back fed main circuit breaker.
- ★ Copper bus.
- ▼ UL short circuit current rating depends on lowest interrupting rating of circuit breakers installed.
- △ UL Listed 5000 A short circuit current rating for corner grounded Delta systems. Use QO-H circuit breakers only.
- □ Side hinge door device; allow 1-1/4 in. on left side for door to open.
- ◊ 22 k AIR main circuit breaker UL Listed for use ahead of QO, QOT, QO-GFI, QO-AFI, QO-EPD and QOPL 10 k AIR branch circuit breakers to permit their application on systems up to 22 kA available fault current.
- ☆ QO1612M125FTRB provided with QOM1 frame main circuit breaker. QO1816M150FTRB and QO1816M200FTRB provided with QOM2 frame main circuit breaker.

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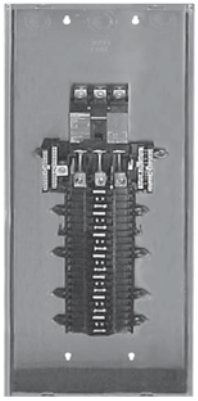
3Ø4W—208Y/120 Vac, 3Ø4W—240/120 Vac Delta and 3Ø3W—240 Vac Delta—UL Listed

Table 1.22: Main Lugs and Main Breakers (Accepts Only QO Plug-On Circuit Breakers)

	Mains Rating	Max. Number of 1P QO circuit breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior		Indoor Cover with Door (Order Separately)			Main Wire Size AWG/kcmil		Equipment Ground Bar Kit (Order Separately)		Box No. See Pages 1-17, 1-18
				Cat. No.	$ Price	Flush Cat. No.	Surface Cat. No.	$ Price	Al	Cu	Cat. No.	$ Price▽	
I	**Fixed Mains—Factory-installed Main Lugs—Copper Bus—65 kA Short Circuit Current Rating▲**												
	60 A	3	**107.00**	QO403L60NF/S	**107.00**	Cover Included With Load Center (No Door)			—	10–6	PK4GTA	**7.20**	13
	125 A	12	**369.70**	QO312L125G◊	**332.00**	QOC16UF	QOC16US	**37.70**☆	6–2/0	6–2/0	Factory-incl.□	—	6
		20	**508.70**	QO320L125G◊	**471.00**	QOC24UF	QOC24US	**37.70**☆			Factory-incl.□	—	7
		24	**577.70**	QO324L125G◊	**540.00**	QOC24UF	QOC24US	**37.70**☆			Factory-incl.□	—	7
	200 A	18	**530.00**	QO318L200G◊	**443.00**	QOC30UF	QOC30US	**87.00**☆	6–250	6–250	Factory-incl.△	—	9
		30	**707.00**	QO330L200G◊	**620.00**	QOC30UF	QOC30US	**87.00**☆			Factory-incl.△	—	9
	225 A	42	**953.00**	QO342L225G◊	**842.00**	QOC42UF	QOC42US	**111.00**☆	6–300	6–300	Factory-incl.△	—	11
	Convertible Mains—Factory-installed QDL Main Circuit Breaker—Copper Bus—25 kA Short Circuit Current Rating■												
	100 A	27	**1058.00**	QO327M100♦	**971.00**	QOC30UF	QOC30US	**87.00**☆	4–2/0	4–2/0	PK15GTA	**17.10**	9
	125 A	30	**1931.00**	QO330MQ125★◊	**1839.00**	QOC342MQF	QOC342MQS	**92.00**	4–300	4–300	PK18GTA	**18.80**	12
	150 A	30	**1931.00**	QO330MQ150★◊	**1839.00**	QOC342MQF	QOC342MQS	**92.00**	4–300	4–300	PK18GTA	**18.80**	12
		42	**2119.00**	QO342MQ150★◊	**2027.00**	QOC342MQF	QOC342MQS	**92.00**			PK23GTA	**21.30**	12
	200 A	30	**1931.00**	QO330MQ200★◊	**1839.00**	QOC342MQF	QOC342MQS	**92.00**	4–300	4–300	PK18GTA	**18.80**	12
		42	**2119.00**	QO342MQ200★◊	**2027.00**	QOC342MQF	QOC342MQS	**92.00**			PK23GTA	**21.30**	12
	225 A	42	**2119.00**	QO342MQ225★◊	**2027.00**	QOC342MQF	QOC342MQS	**92.00**	4–300	4–300	PK23GTA	**21.30**	12
RAINPROOF	**Fixed Mains—Factory-installed Main Lugs—Copper Bus—65 kA Short Circuit Current Rating▲▼**												
	60 A	3	**177.00**	QO403L60NRB	**177.00**	Cover Included			—	10–6	PK4GTA	**10.80**	10R
	125 A	12	**485.00**	QO312L125GRB	**485.00**				6–2/0	6–2/0	Factory Incl.□	—	3R
		20	**629.00**	QO320L125GRB	**629.00**						Factory Incl.□	—	4R
	200 A	18	**618.00**	QO318L200GRB	**618.00**				6–250	6–250	Factory Incl.△	—	6R
		30	**839.00**	QO330L200GRB	**839.00**						Factory Incl.△	—	6R
	225 A	42	**1494.00**	QO342L225GRB	**1494.00**				6–300	6–300	Factory Incl.△	—	8R
	Convertible Mains—Factory-installed QDL Main Circuit Breaker—Copper Bus—25 kA Short Circuit Current Rating■▼												
	100 A	27	**1185.00**	QO327M100RB♦	**1185.00**	Cover Included			4–2/0	4–2/0	PK15GTA	**17.10**	6R
	125 A	30	**2147.00**	QO330MQ125RB★	**2147.00**				4–300	4–300	PK18GTA	**18.80**	14R
	150 A	30	**2147.00**	QO330MQ150RB★	**2147.00**				4–300	4–300	PK18GTA	**18.80**	14R
	200 A	30	**2147.00**	QO330MQ200RB★	**2147.00**				4–300	4–300	PK18GTA	**18.80**	14R
		42	**2333.00**	QO342MQ200RB★	**2333.00**						PK23GTA	**21.30**	14R
	225 A	42	**2333.00**	QO342MQ225RB★	**2333.00**				4–300	4–300	PK23GTA	**21.30**	14R

Above listings through 200 A mains rating meet Federal Specification W-P-115C as Type 1, Class 2.

▲ UL short circuit current rating depends on lowest interrupting rating of circuit breaker installed.
■ 25 kA short circuit current rating SSCR maximum with Square D Type QDL main circuit breaker, or 22 kA SCCR maximum with back-fed Type QO-VH main circuit breaker, feeding QO 10 k AIR branch circuit breakers.
♦ Includes factory-installed back fed QO3100VH main circuit breaker.
★ 65 kA Short Circuit Current Rating maximum with field-installed Square D type QGL 65 k AIR minimum main circuit breaker feeding QO and Q1 10 k AIR minimum branch circuit breakers.
▼ Side hinge door device allow 1-1/4 in. on left side for door to open.
△ PK23GTA and LK100AN.
□ PK15GTA.
◊ For Certification to IEC 60439-1 contact the local Square D sales office; otherwise panels are **NOT** CE marked. (For use on 415Y/240 Vac 3-phase 4-wire, 3,000 Short Circuit Current Rating when QODX...branch circuit breakers are used and 10,000 Short Circuit Current Rating when QO...VS branch circuit breakers are used).
☆ DE3A Discount Schedule
▽ DE2 Discount Schedule



QO342MQ200

QO312L125G

Table 1.23: 3Ø, Main Circuit Breakers

Field-installed alternate main circuit breakers for QO 3Ø main circuit breaker load centers rated 70–225 A. Do not exceed the load center main rating.

Amperage	25 k AIR	65 k AIR	100 k AIR◒
70 A	QDL32070	QGL32070	QJL32070
80 A	QDL32080	QGL32080	QJL32080
90 A	QDL32090	QGL32090	QJL32090
100 A	QDL32100	QGL32100	QJL32100
110 A	QDL32110	QGL32110	QJL32110
125 A	QDL32125	QGL32125	QJL32125
150 A	QDL32150	QGL32150	QJL32150
175 A	QDL32175	QGL32175	QJL32175
200 A	QDL32200	QGL32200	QJL32200
225 A	QDL32225	QGL32225	QJL32225
$ Price (DE2)	**1784.00**	**2442.00**	**2796.00**

◒ When these 3P circuit breakers are used as the main circuit breaker of a 3Ø load center, the maximum AIR rating is 65 kA at 240 Vac and 100 kA at 208 Vac.

Table 1.24: 3Ø, Main Lugs Kits

Field-installed main lugs for convertible 3Ø main circuit breaker load centers.

Main Lugs Amperage Rating	Cat. No.	$ Price	Lug Wire Size AWG/kcmil
125 A	QOL3125	**67.00**	6–2/0 Cu/Al
225 A	QOL3225	**158.00**	6–300 Cu/Al

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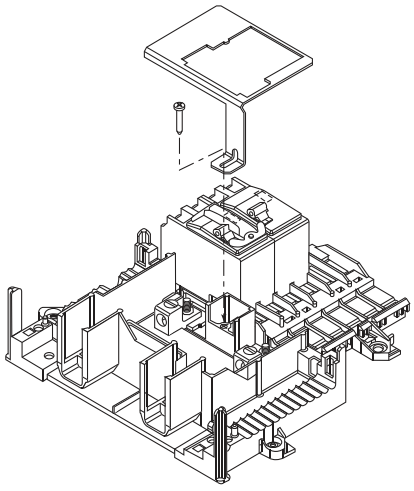
1Ø3W—120/240 Vac—UL Listed

Table 1.25: Backup Power Solutions (Accept Only QO Plug-On Circuit Breakers.)

	Mains Rating (A)	Spaces	Max. Single Pole Circuits ▲	Max. Tandem Circuit Breakers	Load Center Box, Interior and Cover		Equipment Grounding Bar Kit (Order Separately)		Main Wire Size AWG/kcmil		Box No. See Page 1-17, 1-18
					Cat. No.	$ Price	Cat. No.	$ Price	Al	Cu	
Generator Panels—Manual Transfer for Sub-Feed Applications NEMA 1 (Indoor)											
INDOOR	Factory-Installed Main Circuit Breakers with Mechanical Interlock—10 kA Short Circuit Current Rating										
	30	4	8	4	QO48M30DSGP	**563.00**	PK7GTA	**11.70**	14–8	14–8	4
	60	4	8	4	QO48M60DSGP	**563.00**			8–2	8–2	4
Generator Panels—Manual Transfer with Generator Power Inlet Plug for Sub-Feed Applications NEMA 3R (Outdoor)											
RAINPROOF	Factory-Installed Main Circuit Breakers with Mechanical Interlock—10 kA Short Circuit Current Rating										
	100	4	8	4	QO1DM10020TRBR	**848.00**	Factory-Installed		—	8–2	2R
		4	8	4	QO1DM10030TRBR	**848.00**			—		2R
		4	8	4	QO1DM10050TRBR	**1148.00**			—		2R
Generator Panel—Automatic Transfer Switch (Contact your local Square D Field Sales office for more information.) ■											
INDOOR	Factory- or Field-Installed Main Circuit Breaker—22 kA Short Circuit Current Rating										
	150	38	42	42	QO13842MX150	**1349.00**	PK23GTA	**21.30**	4–250	4–250	12
	200	38	42	42	QO13842MX200	**1499.00**	PK23GTA	**21.30**	4–250	4–250	12
	225	38	42	42	QO13842MX225	**1649.00**	PK23GTA	**21.30**	4–250	4–250	12
		38	42	42	QO13842UX225 ♦	**1199.00**			4–250	4–250	12
					QOC38MXUF (Cover)	**149.00**	—				
3R	150	14	28	28	QO11428MX150FTRB★▼	**1349.00**	PK23GTA	**21.30**	4–250	4–250	7R
	200	14	28	28	QO11428MX200FTRB★▼	**1499.00**	PK23GTA	**21.30**	4–250	4–250	7R
		14	28	28	QO11428UX200FTRB♦★▼	**1199.00**	PK23GTA	**21.30**	4–250	4–250	7R

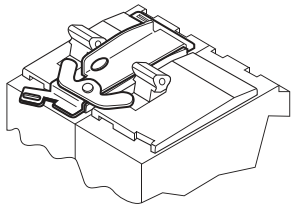
QO Load Center Manual Power Transfer Accessories		Cat. No.	$ Price	Schedule
Manual Transfer Equipment Kit	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be "ON" at a time.	QO2DTI	**24.90**	DE2E
	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2P or (1) 2P and (1) 1P QO circuit breakers in QO816L100 load centers.	QO2DTIM	**63.00**	DE2E
	Secures two 2P circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4LA	**102.00**	DE3A
	Secures two 2P circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 150–225 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4HA	**102.00**	DE3A
	Secures two 2P circuit breakers to left side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4LAL	**102.00**	DE3A
Generator Circuit Breaker Interlock Kit	For use on "G" and "S" Series NEMA 1 and "G", "S1" and "S2" Series NEMA 3R load centers. Interlocks a QOM1 2P main circuit breaker of a load center (100–125 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QOCRBGK1	**105.00**	DE3A
	For use on "G" and "S" Series NEMA 1 and "G" and "S1" Series NEMA 3R load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QOCGK2	**105.00**	DE3A
	For use on "S2" Series NEMA 3R load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QORBGK2	**105.00**	DE3A

▲ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.
■ One main circuit breaker is included with panel. NEMA 1 indoor device requires cover ordered separately. Alternate source main circuit breaker (QO 125 A max.) ordered separately. Automatic Transfer Switch and Generator for secondary power source are ordered through a Kohler authorized dealer or contractor.
♦ Universal mains – No factory-installed main circuit breaker or main lugs. QOM2 frame size, field-install 22 k AIR. Main circuit breaker or main lugs (see pages 1-5 or 1-6).
★ Supplied with feed-thru lugs.
▼ Device is rated NEMA 3R and can be used for indoor or outdoor applications.

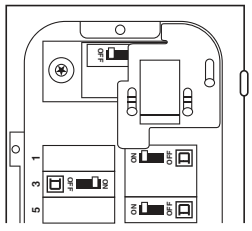


PK4DTIM4HA

QO2DTI



QO2DTI Installed



QOCGK2 Installed

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1Ø2W—120Vac—1Ø3W—120/240 Vac—UL Listed

Table 1.26: QO Special Application (Accepts Only QO Plug-On Circuit Breakers.)

INDOOR

Mains Rating	Short Circuit Current Rating	Spaces	Max. 1P Circuits ▲	Max. Tandem Circuit Breakers	Load Center ■ Box, Interior, and Cover		Equipment Ground Bar Kit (Order Separately)		Main Wire Size AWG/kcmil		Box No. See Page 1-17
					Cat. No.	$ Price	Cat. No.	$ Price	Al	Cu	
Manufactured Housing: 1Ø2W 120 Vac—Main Lugs Only—CSA Certified											
30 A♦	10 kA	2	2	0	QO2L30TTS★	**51.00**	Factory-installed		12–10	14–10	1
50 A	10 kA	2	4	2	QO24L50TTS▼	**78.00**			—	14–6	2
1Ø2W 120 Vac—Main Circuit Breaker—CSA Certified											
30 A	10 kA	3	5	2	QO35FM30TTF/S	**83.00**	Factory-installed		△		3
1Ø3W 120/240 Vac—Main Lugs Only—CSA Certified											
70 A	10 kA	2	4	2	QO24L70TS▼	**78.00**			12–3	14–4	2
100 A	10 kA	6	12	6	QO612L100TF/S□	**86.00**	Factory Installed		4–1		4
		6	12	6	QO612L100DTF/S□	**101.00**					4
		8	16	8	QO816L100TF/S□	**137.00**					4
		8	16	8	QO816L100DTF/S□	**159.00**					4
Load Center with Cover: 1Ø3W 120/240 Vac—UL Listed Complete QO Load Center—Box, Interior and Combination Cover in One Package											
Convertible Mains—Factory-Installed Main Lugs ☆—QOM1 Main Frame Size—Convertible to Main Circuit Breaker (See page 1-5)—Copper Bus											
125 A	65 kA	12	12	0	QO112L125GC	**188.00**	PK12GTA Incl.		6–2/0		6
	65 kA	12	24	12	QO11224L125GC	**249.00**	PK15GTA Incl.		6–2/0		6
	65 kA	20	20	0	QO120L125GC	**284.00**	PK15GTA Incl.		6–2/0		7
Convertible Mains—Factory-Installed Main Lugs ☆—QOM2 Main Frame Size—Convertible to Main Circuit Breaker (See page 1-5)—Copper Bus											
150 A	65 kA	30	30	0	QO130L150TC	**452.00**	PK23GTA, LK100AN Installed		6–250		9
200 A	65 kA	30	40	10	QO13040L200GC	**575.00**	PK23GTA, LK100AN Incl.		6–250		9
Convertible Mains—Factory-Installed Main Circuit Breaker— QOM1 Main Frame Size—Convertible to Main Lugs (See page 1-6) or Lower Amperage Main Circuit Breaker (See page 1-5)—Copper Bus ▽											
100 A	22 kA	12	12	0	QO112M100C	**351.00**	PK9GTA	**13.40**	4–1/0		5
	22 kA	12	20	8	QO11220M100C	**413.00**	PK15GTA	**17.10**	4–1/0		5
	22 kA	16	16	0	QO116M100C	**395.00**	PK12GTA	**15.80**	4–1/0		6
	22 kA	20	20	0	QO120M100C	**446.00**	PK15GTA	**17.10**	4–1/0		6
125 A	22 kA	32	32	0	QO132M125C	**1041.00**	PK18GTA	**18.80**	6–2/0		8
Convertible Mains—Factory-Installed Main Circuit Breaker— QOM2 Main Frame Size—Convertible to Main Lugs (See page 1-6) or Lower Amperage Main Circuit Breaker (See page 1-5)—Copper Bus ▽											
150 A	22 kA	20	30	10	QO12030M150C	**843.00**	PK18GTA	**18.80**	4–250		9
	22 kA	30	30	0	QO130M150C	**870.00**	PK18GTA	**18.80**	4–250		9
200 A	22 kA	20	40	20	QO12040M200C	**843.00**	PK23GTA	**21.30**	4–250		9
	22 kA	30	30	0	QO130M200C	**896.00**	PK18GTA	**18.80**	4–250		9
	22 kA	30	40	10	QO13040M200C	**974.00**	PK23GTA	**21.30**	4–250		9
	22 kA	40	40	0	QO140M200C	**1137.00**	PK23GTA	**21.30**	4–250		10

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

- ▲ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.
- ■ Order F for flush device or S for surface device.
- ♦ Mains rating 25 A when Al wire is used.
- ★ Will not accept Qwik-Gard™ QO-GFI or QO-AFI circuit breaker.
- ▼ Use 10 AWG maximum size wire for GFI and AFI circuit breakers.
- △ Main circuit breaker is a field-installed standard QO single pole circuit breaker. Order separately from page 1-2.
- □ 70 A max. branch circuit breaker and 70 A max. back fed main circuit breaker.
- ◊ UL short circuit current rating depends on lowest interrupting rating of circuit breaker installed.
- ☆ UL Listed 5000 A short circuit current rating for corner grounded Delta systems. Use QO-H circuit breakers only.
- ▽ 22 k AIR main circuit breaker UL Listed for use ahead of QO, QOT and QO-PL 10 k AIR branch circuit breakers to permit their application on systems with up to 22,000 A available fault current.

Table 1.27: Service Upgrade Load Centers: 1Ø3W 120/240Vac—UL Listed Load Center with Removable End Walls

Convertible Mains—Factory-Installed Main Breaker—22KA
QOM2 Main Frame Size—Convertible to Main Lugs (See page1-6) or Lower Amperage Main Circuit Breaker (See page 1-5)▽

INDOOR

Mains Rating		Spaces	Max. 1P Circuits▲	Max. Tandem Circuit Breakers	$ Price (Interior, Box and Cover)	Load Center Box and Interior		Extra Long Cover with Door (Order Separately)			Main Wire Size AWG / kcmil		Equipment Ground Bar Kit (Order Separately)		Box No. See Page 1–17
						Cat. No.	$ Price	Flush Cat. No.	Surface Cat. No.	$ Price	Al	Cu	Cat. No	$ Price	
New!	200 A	30	40	10	**959.00**	HOM3040M200CEP◒	**959.00**	HOMC30UFL	—	**111.00**	4-250		PK23GTA	**21.30**	10
		40	40	0	**1,137.00**	QO140M200EP♦	**1137.00**	QOC40UFL	—	**111.00**			PK23GTA	**21.30**	10

- ◒ Ships with standard length cover
- ✱ Blank Endwall Plates (4) Available Order: EWPLATE $36.00
- ♦ Copper Bus, order cover separately QOC40UF/S or QOC40UFL

Table 1.28: Auxiliary Gutter

UL Listed for use with standard 1Ø and 3Ø load centers for riser applications◑. For auxiliary gutter-load center compatibility, see catalog number **1100CT0501**

Cat. No.	$ Price	Cover	Conduit Riser Size	Width	Height	Depth
SDAG26	**338.00**	Flush	1-3/4, 2, 2-1/2 or ✪3	13.50	26.12	3.75

- ◑ One tap kit required for each riser wire.
- ✪ When used with B300 bolt-on hubs.

Table 1.29: Tap Kits 120/240 Vac—UL Listed for use with Auxiliary Gutter SDAG26

Cat. N0.	$ Price	Use with Auxiliary Gutter Cat. No.	Riser Wire		Tap Off Wire	
			Lug Type	Al/Cu Wire Size	Lug Type	Al/Cu Wire Size
SDGT30020	**81.00**	SDAG26	Mechanical (Included)	(2) 6 AWG–300 kcmil	Mechanical (Included)	(1) 6–2/0 AWG
SDGT300300	**120.00**	SDAG26	Mechanical (Included)	(2) 6 AWG–300 kcmil	Mechanical (Included)	(1) 6 AWG–300 kcmil
SDGT300C10C	**49.70**	SDAG26	Anderson VCEL030516H1 (Not included)	(2) 4 AWG–300 kcmil	Anderson VCEL02114S1 (Not Included)	(1) 8–1/0 AWG
SDGT300C300C	**70.00**	SDAG26	Anderson VCEL030516H1 (Not included)	(2) 4 AWG–300 kcmil	Anderson VCEL030516H1 (Not included)	(1) 4 AWG–300 kcmil
QOGL20 Grounding Terminals	**40.70**	SDAG26	Mechanical (Included)	(2) 6–2/0 AWG	—	—

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1Ø3W—120/240 Vac—UL Listed

Table 1.30: Value Packs Contains Complete Load Center (Box, Interior and Cover) with Selected Branch Circuit Breaker

	Mains Rating	Spaces	Max. 1P Circuits♦	Max. Tandem Circuit Breakers	Load Center Box, Interior, Cover and Branch Circuit Breakers			Equipment Ground Bar Kit (Order Separately)		Main Wire Size AWG/kcmil Al/Cu	Box No. See Pages 1-17, 1-18
					Cat. No.	Included Load Center/Circuit Breakers	$ Price	Cat. No.	$ Price		
INDOOR	**QO (Accepts Only QO Plug-On Circuit Breakers) QO—Copper Bus Convertible Mains—Factory-Installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible appropriate to Main Lugs (See page 1-6) or QOM Main Circuit Breaker (See page 1-5)**										
	100 A	32	32	0	QOVP2	(1) QO132M100C, (5) QO120	**839.00**	PK18GTA	**18.80**	4–2/0	8
	200 A	30	40	10	QOVP1	(1) QO13040M200C, (5) QO120	**1103.00**	PK23GTA	**21.30**	4–250	9
		30	40	10	QOVP10	(1) QO13040M200C, (10) QO120	**1328.00**	PK23GTA	**21.30**		9
	Homeline (Accepts Only HOM Plug-On Circuit Breakers) Convertible Mains—Factory-Installed Main Lugs, 10 kA Short Circuit Current Rating Convertible to appropriate QOM 22 kA Short Circuit Current Rating Main Circuit Breaker (See page 1-16)										
	125 A	12	24	12	HOMVPL2	(1) HOM1224L125TC, (5) HOM120	**353.00**	Included	—	6–2/0	6
	200 A	30	40	10	HOMVPL1	(1) HOM3040L200TC, (6) HOM115, (6) HOM120, (1) HOM230, (1) HOM250	**962.00**	Included	—	4–250	10
	Convertible Mains—Factory-Installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible appropriate to Main Lugs or Main Circuit Breaker (See page 1-16)										
	100 A	20	20	0	HOMVP4	(1) HOM20M100C, (5) HOM115	**528.00**	PK15GTA	**17.10**	4–2/0	7
		20	20	0	HOMVP5	(1) HOM20M100C, (5) HOM120	**528.00**	PK15GTA	**17.10**		7
	150 A	30	30	0	HOMVP12	(1) HOM30M150C, (5) HOM120, (1) HOM230	**983.00**	PK23GTA	**21.30**	4–250	10
	200 A	20	40	20	HOMVP16	(1) HOM2040M200TC, (5) HOM120, (1) HOM230	**965.00**	Included	—	4–250	9
		30	40	10	HOMVP1	(1) HOM3040M200TC, (5) HOM120, (1) HOM230	**1083.00**	Included	—		10
		30	40	10	HOMVP2	(1) HOM3040M200TC, (5) HOM115, (1) HOM230	**1083.00**	Included	—		10
		30	40	10	HOMVP9	(1) HOM3040M200TC, (6) HOM115, (6) HOM120, (1) HOM230, (1) HOM250	**1328.00**	Included	—		10
		30	40	10	HOMVP14	(1) HOM3040M200TC, (12) HOM120, (1) HOM230, (1) HOM250	**1328.00**	Included	—		10
		40	40	0	HOMVP15	(1) HOM40M200C, (10) HOM120	**1346.00**	PK23GTA	**21.30**		12
RAINPROOF	**Homeline (Accepts Only HOM Plug-On Circuit Breakers) Convertible Mains—Factory-Installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs or Lower Amperage QOM2 Main Circuit Breaker (See page 1-16)**										
	200 A	20	40	20	HOMVPRB1	(1) HOM2040M200RB, (6) HOM115, (6) HOM120, (1) HOM230, (1) HOM250	**1253.00**	PK23GTA	**21.30**	4–250	6R

QO Riser Panels

Table 1.31: Offset Interior for Wide Gutter—30 A Maximum Branch Circuit Breaker on left side of interior▲■ (Accepts Only QO Plug-On Circuit Breakers)

	Mains Rating	Spaces	Max. Single Pole Circuits♦	Max. Tandem Circuit Breakers	Load Center Box and Interior		Load Center Cover		Equipment Ground Bar Kit (Order Separately)		Main Wire Size AWG/kcmil		Box No. See Page 1-17
					Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Al	Cu	
INDOOR	**Convertible Mains—Factory-Installed Main Lugs, 65 kA Short Circuit Current Rating Convertible to QOM1 22 kA Short Circuit Current Rating Main Circuit Breaker (See page 1-5) when used with QOC cover below—Copper Bus**												
	125 A	12	24	12	QO11224L125WG	**338.00**	QOC20UFWG	**53.00**	PK15GTA	**17.10**	6–2/0		14
		20	30	10	QO12030L125WG	**465.00**	QOC20UFWG	**53.00**	PK15GTA	**17.10**			14
	Convertible Mains-Factory—Installed Main Lugs, 65 kA Short Circuit Current Rating Convertible to QOM2 22 kA Short Circuit Current Rating Main Circuit Breaker (See page 1-5) when used with QOC cover below—Copper Bus												
	200 A	30	40	10	QO13040L200WG	**701.00**	QOC30UFWG	**102.00**	PK23GTA	**21.30**	4–250		23
	Convertible Mains—Factory-Installed Main Circuit Breaker, 22 kA Short Circuit Current Rating Convertible to Main Lugs (See page 1-6) or Lower Amperage QOM2 Main Circuit Breaker (See page 1-5) when used with QOC cover below—Copper Bus												
	200 A	24	24	0	QO124M200WG125★	**683.00**	QOC30UFWG	**102.00**	PK23GTA	**21.30**	4–250		23

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

▲ UL short circuit current rating depends on lowest interrupting rating of circuit breaker installed.

■ UL Listed 5000 A short circuit current rating for corner grounded Delta systems. Use QO-H circuit breakers only.

♦ Maximum single pole branch circuits utilizing QO and/or QOT circuit breakers.

★ Comes with 125 A main circuit breaker factory installed.

Panelboard-style Covers for Riser Panels

Mono-Flat™ Front available for riser panels as an alternative to standard load center cover listed above. Provides a low-profile, aesthetically pleasing solution for high-traffic areas in upscale multi-family applications. Deadfront included. Lock kit not provided. Cover NQC30FWG CANNOT be used when panel has been converted to a main circuit breaker panel. ▼

Mains Rating of Load Center	Cat. No.	$ Price
125 A	NQC20FWG	**117.00**
200 A	NQC30FWG	**180.00**

▼ Order catalog number PK4FL for field-installed lock kit.

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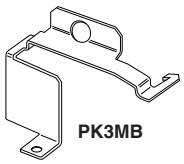
Table 1.32: QO Load Center Accessories

	Description	Cat. No.	$ Price	Schedule
Retaining Kit for Breakers Used as Back-fed Mains	Secures circuit breaker to interior when used as a back-fed main. For QO612L100F/S, RB, QO612L100DF/S, QO816L100F/S, RB, QO816L100DF/S and QO148L125GF/S, GRB load centers	PK2MB	**7.20**	DE3A
	Secures 3P circuit breaker without accessories to left side of interior when used as a back-fed main. For 3Ø load centers	PK3MB	**14.70**	DE3A
	Secures circuit breaker to interior when used as a back-fed main for 2P QO 150–200 A circuit breakers	PK5RK	**14.70**	DE3A
	Secures ONE circuit breaker with or without electrical accessories to right side of interior when used as a back-fed main For 1Ø 100–125 ampere convertible main load centers. Series S01 and S02	PK4MB2LA	**14.70**	DE3A
	Secures ONE circuit breaker with or without electrical accessories to right side of interior when used as a back-fed main For 1Ø 150–225 ampere convertible main load centers. Series S01 and S02	PK4MB2HA	**14.70**	DE3A
Cover Sealing Strap	Provides means of sealing trim mounting screws on QO load center covers	QO1SE	**3.60**	DE3A
Replacement Cover Directory Label	1 through 42 numbered universal replacement directory label for load center covers	LSDL	**0.54**	DE5
Circuit Identification Stickers	Circuit identification stickers for use on cover directory labels to identify branch circuits	PSDS	**0.75**	DE5
QO Load Center Manual Power Transfer Accessories				
Manual Transfer Equipment Kit	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be "ON" at a time.	QO2DTI	**24.90**	DE2E
	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2P or (1) 2P and (1) 1P QO circuit breakers in QO816L100 load centers.	QO2DTIM	**63.00**	DE2E
	Secures two 2P circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4LA	**102.00**	DE3A
	Secures two 2P circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 150–225 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4HA	**102.00**	DE3A
	Secures two 2P circuit breakers to left side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers. Series S01 and S02.	PK4DTIM4LAL	**102.00**	DE3A
Generator Circuit Breaker Interlock Kit	For use on "G" and "S" Series NEMA 1 and "G", "S1" and "S2" Series NEMA 3R load centers. Interlocks a QOM1 2P main circuit breaker of a load center (100–125 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QOCRBGK1	**105.00**	DE3A
	For use on "G" and "S" Series NEMA 1 and "G" and "S1" Series NEMA 3R load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QOCGK2	**105.00**	DE3A
	For use on "S2" Series NEMA 3R load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a QO 2P (15–125 A) branch circuit breaker. Includes a retaining kit.	QORBGK2	**105.00**	DE3A
	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be "ON" at a time.	QO2DTI	**24.90**	DE2E

Table 1.33: Load Center and CSED Surge Protection Devices

Surge Arresters	For use on 1Ø3W, 150 Vac maximum	SDSA1175	**92.00**	DE1B
	For use on 3Ø4W, 650 Vac maximum	SDSA3650	**248.00**	DE1B
	QO Surgebreaker $_{C}UL_{US}$ Listed Secondary Surge Arrester 150 Vac line-to-ground maximum	QO2175SB	**159.00**	DE1B
	Homeline Surgebreaker $_{C}UL_{US}$ Listed Secondary Surge Arrester 150 Vac line-to-ground maximum	HOM2175SB	**159.00**	DE1B
Surge Arrester Mounting Kit	UL Listed for mounting SDSA1175 surge arrester into ground bar mounting holes on 1Ø convertible main circuit breaker load centers	QOSAMK	**11.40**	DE3A



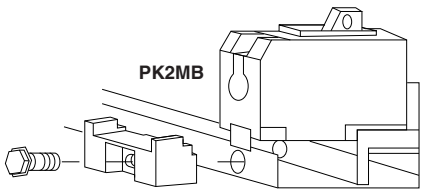


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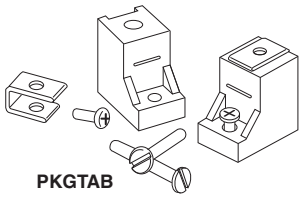
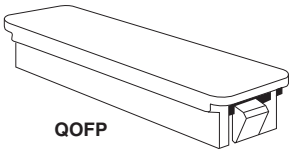
Table 1.34: QO Load Center Accessories

	Description		Cat. No.	$ Price	Schedule
Filler Plates	Fills opening in covers if twistout is removed in error		QOFP	**3.60**	DE3A
	Fills main circuit breaker opening in convertible load center covers100–125 A		QOM1FP	**20.30**	DE3A
	Fills main circuit breaker opening in convertible load center covers150–225 A		QOM2FP	**20.30**	DE3A
	Fills main circuit breaker opening in 3Ø load center covers (S01 and S02 Series)		KFP	**20.30**	DE3A
	Fills main circuit breaker opening in "Q" style 3Ø load center covers (S03 Series)		Q2FP	**20.30**	DE3A
Door Lock Kits	Use with QO612L100DF/S, QO612L100DFCU/SCU, QO612L100DTF/S, QO816L100DF/S, QO816L100DFCU/SCU, QO816L100DTF/S, QO48M30DSGP, or QO48M60DSGP		PK8FL▲	**98.00**	DE3A
	Use with convertible mains, 1Ø and 3Ø 100–225 A, and fixed mains, 3Ø 125–225 A indoor load centers		PK6FL	**93.00**	DE3A
	Use with 300 and 400 ampere indoor load centers		PK4FL	**90.00**	PE1A
Neutral / Ground Lugs	Field-installed for 12– 2 Al or 14–4 Cu AWG wire		LK70AN	**10.10**	DE3A
	Field-installed for 6–2/0 Al/Cu AWG wire		LK100AN	**10.80**	DE3A
	Field-installed for 14–2/0 Al/Cu AWG wire		LK125AN	**22.10**	DE3A
	Field-installed for 2–3/0 Al/Cu AWG wire		LK150AN	**32.40**	DE3A
	Field-installed for 4 AWG to 300 kcmil Al/Cu wire. Use in Series S, 150–225 A QO or HOM load center		LK225AN	**33.20**	DE3A
Ground Bar Kits	Standard PK15GTA with a 1–4/0 Al/Cu Lug		PK15GTAL	**35.00**	DE3A
	Standard PK18GTA with a 1–4/0 Al/Cu Lug		PK18GTAL	**37.80**	DE3A
	Standard PK23GTA with a 1–4/0 Al/Cu Lug		PK23GTAL	**40.70**	DE3A
	Insulator Kit for PK7GTA through PK27GTA		PKGTAB	**43.80**	DE3A
Handle Padlock Attachment	For padlocking main circuit breakers in convertible load centers OFF	50–125 A	QOM1PA	**11.00**	DE2E
		100–225 A	QOM2PA	**11.00**	DE2E

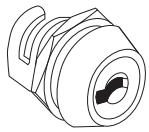
▲ QO403L60NF/S does not have provisions for a field-installed lock.



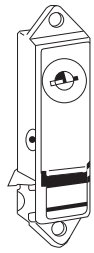
PKGTAB



QOFP



PK6FL and PK8FL



PK4FL

Table 1.35: Homeline Load Center Accessories

	Description		Cat. No.	$ Price	Schedule
Handle Padlock Attachment	For padlocking main circuit breakers in convertible load center, "OFF"	50–125 A	QOM1PA	**11.00**	DE2E
		100–225 A	QOM2PA	**11.00**	DE2E
Filler Plates	Fills opening in covers if twistout is removed in error		HOMFP	**3.20**	DE3C
	Fills main circuit breaker opening in convertible load centers	100–125 A	QOM1FP	**20.30**	DE3A
		150–225 A	QOM2FP	**20.30**	DE3A
Neutral Lugs	Field-installed for 14–2 AWG Al or 14–4 AWG Cu wire		LK70AN	**10.10**	DE3B
	Field-installed for 6–2/0 AWG Al/Cu wire		LK100AN	**10.80**	DE3B
	Field-installed for 14–2/0 AWG Al/Cu wire		LK125AN	**22.10**	DE3B
	Field-installed for 4 AWG–300 kcmil Al/Cu wire. Use in Series S, 150–225 A QO or HOM load center		LK225AN	**33.20**	DE3A
Retaining Kit for Breakers Used as Back-fed Mains	Secures circuit breaker to interior when used as a back-fed main. For HOM612L100F/S, RB and HOM48L125GC, GRB load centers		HOM1RK	**6.50**	DE3C
	Secures ONE circuit breaker right side of interior when used as a back-fed main For 100–125 A convertible main load centers, Series S01 and S02		HOM4RK2LA	**14.70**	DE3C
	Secures ONE circuit breaker right side of interior when used as a back-fed main For 150–225 A convertible main load centers, Series S01 and S02		HOM4RK2HA	**14.70**	DE3C
	Secures circuit breaker to interior when used as a back-fed main For 2P 150–200 A circuit breakers		HOM5RK	**14.70**	DE3C
Door Lock Kit	Use with convertible indoor load center covers (Series S-1)		PK6FL	**93.00**	DE3A
Replacement Cover Directory Label	1 through 42 numbered universal replacement directory label for load center covers		LSDL	**0.54**	DE5
Circuit Identification Stickers	Circuit identification stickers for use on cover directory labels to identify branch circuits		PSDS	**0.75**	DE5
Generator Circuit Breaker Interlock Kit	For use on "S" Series NEMA 1 and NEMA 3R load centers. Interlocks a QOM1 2P main circuit breaker of a load center (100–125 A) with a Homeline 2P (15–125 A) branch circuit breaker		HOMCRBGK1	**105.00**	DE3D
	For use on "S" Series NEMA 1 and "S1" Series NEMA 3R load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a Homeline 2P (15–125 A) branch circuit breaker		HOMCGK2	**105.00**	DE3D
	For use on "S2" and "S3" Series NEMA 3R QOM2 load centers. Interlocks a QOM2 2P main circuit breaker of a load center (150–225 A) with a Homeline 2P (15–125 A) branch circuit breaker		HOMRBGK2	**105.00**	DE3D

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HOM 1P
1 Space Required

HOM 2P
2 Spaces Required

HOMT 1P
1 Space Required

HOM2200BB
Branch Circuit Breaker
4 Spaces Required

HOMT Quad
Circuit Breaker
2 Spaces Required

HOM 1P CAFI

HOM 1P DF

HOM 1P GFI
(With Ground Fault
Circuit Interrupter)
1 Space Required

HOM 2P GFI
(With Ground Fault
Circuit Interrupter)
2 Spaces Required

The Square D Homeline circuit breakers are in a 1 in. wide format for 1-pole circuit breakers. They are designed to plug into Homeline load centers.

Table 1.36: HOM

Ampere Rating	AIR	1P—120/240 Vac		2P—120/240 Vac Common Trip	
		Cat. No.	$ Price	Cat. No.	$ Price
15 A	10 kA	HOM115▲■	**26.30**	HOM215■	**60.00**
20 A	10 kA	HOM120▲■	**26.30**	HOM220■	**60.00**
25 A	10 kA	HOM125■	**26.30**	HOM225■	**60.00**
30 A	10 kA	HOM130■	**26.30**	HOM230■	**60.00**
35 A	10 kA	—	—	HOM235■	**60.00**
40 A	10 kA	HOM140■	**26.30**	HOM240■	**60.00**
45 A	10 kA	—	—	HOM245■	**60.00**
50 A	10 kA	HOM150■	**26.30**	HOM250■	**60.00**
60 A	10 kA	—	—	HOM260■	**60.00**
70 A	10 kA	—	—	HOM270■	**123.00**
80 A	10 kA	—	—	HOM280■	**168.00**
90 A	10 kA	—	—	HOM290■	**168.00**
100 A	10 kA	—	—	HOM2100■	**168.00**
110 A	10 kA	—	—	HOM2110■	**369.00**
125 A	10 kA	—	—	HOM2125■	**369.00**
150 A	10 kA	—	—	HOM2150BB■♦	**428.00**
175 A	10 kA	—	—	HOM2175BB■♦	**428.00**
200 A	10 kA	—	—	HOM2200BB■♦	**428.00**

Table 1.37: HOM-HM

High magnetic trip circuit breakers are recommended for applications where high initial inrush current may occur.

Amperes	1P—120/240 Vac		2Ps
	Cat. No.	$ Price	—
15 A	HOM115HM■	**27.60**	—
20 A	HOM120HM■	**27.60**	—

Table 1.38: HOM-CAFI

Homeline Combination Arc Fault Circuit Interrupters—Provide overload and short circuit protection, plus arc fault protection in accordance with the NEC and UL1699.

Circuit Breaker Type	Ampere Rating	Poles 120 Vac	Cat. No.	$ Price
One-Pole				
Combination Arc-Fault Circuit Interrupter with Pigtail Neutral	15 A	1	HOM115CAFI■	**267.00**
	20 A	1	HOM120CAFI■	**267.00**
Plug-On Neutral Combination Arc-Fault Interrupter	15 A	1	HOM115PCAFI■	**267.00**
	20 A	1	HOM120PCAFI■	**267.00**
Two-Pole				
Combination Arc-Fault Circuit Interrupter with Pigtail Neutral	15 A	2	HOM215CAFI■	**595.00**
	20 A	2	HOM220CAFI■	**595.00**

Table 1.39: HOM-DF

Homeline Combination Arc Fault and Ground Fault Circuit Interrupters (Dual Function)—Provide overload and short circuit protection, plus arc fault and ground fault protection in a single device in accordance with the NEC, UL1699 and UL943.

Circuit Breaker Type	Ampere Rating	Poles 120 Vac	Cat. No.	$ Price
Combination Arc-Fault and Ground Fault Circuit Interrupter with Pigtail Neutral	15 A	1	HOM115DF■	**312.00**
	20 A	1	HOM120DF■	**312.00**
Plug-On Neutral Combination Arc-Fault and Ground Fault Circuit Interrupter	15 A	1	HOM115PDF■	**312.00**
	20 A	1	HOM120PDF■	**312.00**

Table 1.40: HOM-GFI

HOM-GFI circuit breakers provide overload and short circuit protection, combined with Class A ground fault protection. Class A denotes a ground fault circuit interrupter that will trip when a fault current to ground is 6 milliamperes or more.

Ampere Rating	AIR	1P—120 Vac		2P—120/240 Vac Common Trip	
		1 Space Required		2 Spaces Required	
		Cat. No.	$ Price	Cat. No.	$ Price
15 A	10 kA	HOM115GFI	**212.00**	HOM215GFI	**413.00**
20 A	10 kA	HOM120GFI	**212.00**	HOM220GFI	**413.00**
30 A	10 kA	—	—	HOM230GFI	**413.00**
40 A	10 kA	—	—	HOM240GFI	**413.00**
50 A	10 kA	—	—	HOM250GFI	**413.00**

Table 1.41: HOM-EPD—10 k AIR

Homeline Equipment Protection Device—Circuit Breakers with 30 mA Equipment Ground Fault Protection (UL Listed)

Amperes	1P—120 Vac		2P—120/240 Vac Common Trip	
	Cat. No.	$ Price	Cat. No.	$ Price
15 A	HOM115EPD	**374.00**	HOM215EPD	**660.00**
20 A	HOM120EPD	**374.00**	HOM220EPD	**660.00**
25 A	—	—	HOM225EPD	**660.00**
30 A	—	—	HOM230EPD	**660.00**
40 A	—	—	HOM240EPD	**660.00**
50 A	—	—	HOM250EPD	**660.00**

Table 1.42: HOMT Tandem Circuit Breakers

Ampere Rating★	AIR	1P Tandem—120/240 Vac (One Space Required)	
		Cat. No.	$ Price
15 and 15 A	10 kA	HOMT1515■	**52.00**
15 and 20 A	10 kA	HOMT1520■	**52.00**
20 and 20 A	10 kA	HOMT2020■	**52.00**
30 and 15 A	10 kA	HOMT3015■	**52.00**
30 and 20 A	10 kA	HOMT3020■	**52.00**

▲ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
■ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.

Table 1.43: HOMT Quad Tandem Circuit Breakers

Ampere Rating★		AIR	2P Tandem—120/240 Vac (Two Spaces Required)	
1P	2P		Cat. No.	$ Price
(2) 15 A	15 A	10 kA	HOMT1515215■	**120.00**
(2) 15 A	20 A	10 kA	HOMT1515220■	**120.00**
(2) 15 A	25 A	10 kA	HOMT1515225■	**120.00**
(2) 15 A	30 A	10 kA	HOMT1515230■	**120.00**
(2) 15 A	40 A	10 kA	HOMT1515240■	**120.00**
(2) 15 A	50 A	10 kA	HOMT1515250■	**120.00**
(2) 20 A	20 A	10 kA	HOMT2020220■	**120.00**
(2) 20 A	25 A	10 kA	HOMT2020225■	**120.00**
(2) 20 A	30 A	10 kA	HOMT2020230■	**120.00**
(2) 20 A	40 A	10 kA	HOMT2020240■	**120.00**
(2) 20 A	50 A	10 kA	HOMT2020250■	**120.00**

Note: Typical catalog number (e.g. HOMT 1515230) represents two 1P, outer poles (two 15 A 1P CBs) and one 2P inner circuit breaker with common trip (one 30 A 2P CB).

Table 1.44: Circuit Breaker Wire Sizes▼

Breaker Type	Ampere Rating	Wire Size (AWG/kcmil)	
		Aluminum	Copper
HOM 1P	15–30 A	14–8 AWG	14–8 AWG or (2) 14–10 AWG
	40–50 A	8–2 AWG	8–2 AWG
HOM 2P	15–30 A	14–8 AWG	14–8 AWG or (2) 14–10 AWG
	35–70 A	8–2 AWG	8–2 AWG
	80–125 A	4–2/0 AWG	4–2/0 AWG
	150–200 A	4 AWG–300 kcmil	4 AWG–300 kcmil
HOMT and Quad Quad Only	15–30 A	14–8 AWG	14–8 AWG
	40–50 A	6–12 AWG	6–14 AWG
HOM-GFI - 1P	15–20 A	14–10 AWG	14–10 AWG
HOM-GFI - 2P	15–50 A	12–4 AWG	14–6 AWG

Table 1.45: Accessories

Description		Cat. No.	$ Price
Handle Attachments			
Handle Tie: Converts any two adjacent 120/240 Vac single HOM circuit breakers to independent trip 2P		HOM1HT□	**3.50**
Handle Tie: Converts any two adjacent 120/240 Vac 1P side-by-side HOMT circuit breakers to independent trip 2P		HOMTHT□	**3.80**
Handle Clamp: Clamp for holding HOM 1P handle in the ON or OFF position		QO1LO◊	**3.80**
Handle Blocking Device: Attaches to standard HOM 2P circuit breakers for holding the handle in the OFF position		HOM2HBD□	**10.70**
Handle Padlock Attachment: For padlocking 1P Standard HOM breakers in the ON or OFF position		HOM1PA□	**9.90**
Handle Padlock Attachment: For padlocking 2P Standard HOM circuit breakers in ON or OFF position	15–70 A	HOM2PALA□	**9.90**
	80–125 A	HOM2PAHA□	**9.90**
	150–200 A	HOM2PAVHA□	**50.00**
Handle Padlock Attachment: For padlocking 1P CAFI, DF, GFI, and EPD HOM breakers in ON or OFF position		HOMELEC1PA	**9.90**
Handle Padlock Attachment: For padlocking 2P CAFI, GFI, and EPD HOM breakers in ON or OFF position		HOMELEC2PALA	**9.90**
Handle Padlock Attachment: For padlocking center poles of Homeline Quad breakers in the OFF position		HOMQPA	**9.90**
Handle Padlock Attachment: For padlocking main circuit breakers in convertible load center in OFF position	50–125 A	QOM1PA△◊	**11.00**
	100–225 A	QOM2PA△◊	**11.00**
Sub-Feed Lugs			
125 A 2P plug-on—2 spaces required		HOML2125	**47.60**
225 A 2P plug-on—4 spaces required		HOML2225♦	**296.00**

♦ Requires four spaces (1 AWG–300 kcmil Al/Cu). Use only in 1Ø panel rated 150 A or greater.
★ 15–20 A tandem or quad tandem circuit breakers are suitable for use with 60°C or 75°C conductors. 25–50 A tandem or quad tandem circuit breakers are suitable for use with 75°C conductors only.
▼ 15–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 40–125 A circuit breakers are suitable for use with 75°C conductors.
△ 50–125 A QOM1 frame size; 100–225 A QOM2 frame size.
□ DE3C Discount Schedule
◊ DE2E Discount Schedule

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1Ø3W—120/240 Vac—UL Listed

Table 1.46: Convertible Main Load Centers (Accepts Only HOM Plug-On Circuit Breakers.)

Mains Rating	Spaces	Max. Single Pole Circuits ▲	Max. Tandem Circuit Breakers	Load Center Box, Interior and Cover ■ Cat. No.	$ Price (DE3C)	Main Wire Size AWG/kcmil Al	Cu	Equipment Ground Bar Kit (Order Separately) Cat. No.	$ Price (DE3A)	Box No. See Page 1-17
Main Lugs—10 kA Short Circuit Current Rating Order HOM Circuit Breakers (See page 1-14) Factory-installed Fixed Main Lugs										
70 A	2	4	2	HOM24L70F/S★♦	**59.00**	12–3	14–4	PK3GTA1	**11.40**	2
100 A	6	12	6	HOM612L100F/S♦▼	**78.00**	8–1		PK7GTA	**11.70**	4
125 A	4	8	4	HOM48L125GC	**86.00**	12–2/0	14–2/0	PK7GTA Factory-included		21
Convertible Mains—Factory-installed Main Lugs QOM1 Main Frame Size—Convertible to Main Circuit Breaker (See page 1-16)										
125 A	8	16	8	HOM816L125C	**132.00**	6–2/0		PK15GTA	**17.10**	6
	8	16	8	HOM816L125TC	**150.00**			Factory-installed	—	6
	12	12	0	HOM12L125C	**174.00**			PK15GTA	**17.10**	6
	12	24	12	HOM1224L125TC	**204.00**			Factory-installed	—	6
	16	24	8	HOM1624L125C	**260.00**			PK15GTA	**17.10**	8
	20	20	0	HOM20L125C	**237.00**			PK15GTA	**17.10**	8
	20	24	4	HOM2024L125TC	**288.00**			Factory-installed	—	8
	24	24	0	HOM24L125TC	**344.00**			Factory-installed	—	8
Convertible Mains—Factory-installed Main Lugs QOM2 Main Frame Size—Convertible to Main Circuit Breaker (See page 1-16)										
150 A	30	30	0	HOM30L150C	**375.00**	4–250		PK23GTA	**21.30**	10
	30	30	0	HOM30L150TC	**396.00**			Factory-installed	—	10
200 A	16	32	16	HOM1632L200TC	**357.00**					9
	16	32	16	HOM1632L200TCFT△	**575.00**	4–250		Factory-installed	—	10
	20	40	20	HOM2040L200TC	**417.00**					9
200 A	30	30	0	HOM30L200C	**420.00**	4–250		PK23GTA	**21.30**	10
	30	30	0	HOM30L200TC	**464.00**			Factory-installed	—	10
	30	40	10	HOM3040L200TC	**479.00**			Factory-installed	—	10
	40	40	0	HOM40L200C	**618.00**			PK23GTA	**21.30**	12
	40	40	0	HOM40L200TC	**671.00**			Factory-installed	—	12
	40	60	20	HOM4060L200TC	**839.00**			Factory-installed	—	12
	42	52	10	HOM4252L200TC	**804.00**			Factory-installed	—	12
225 A	42	42	0	HOM42L225C	**732.00**	6–250		PK23GTA	**21.30**	12
Main Circuit Breaker—22 kA Short Circuit Current Rating **Convertible Mains—Factory-installed Main Circuit Breaker QOM1 Main Frame Size—Convertible to Main Lugs or Lower Amperage Main Circuit Breaker (See page 1-16)**										
100 A	8	16	8	HOM816M100C	**315.00**	6–1		PK15GTA	**17.10**	5
	8	16	8	HOM816M100TC	**333.00**			Factory-installed	—	5
	12	12	0	HOM12M100C	**294.00**	6–2/0		PK15GTA	**17.10**	6
	12	24	12	HOM1224M100TC	**384.00**			Factory-installed	—	6
	20	20	0	HOM20M100C	**396.00**	6–1		PK15GTA	**17.10**	7
	24	24	0	HOM24M100C	**513.00**	6–2/0		PK15GTA	**17.10**	8
	30	30	0	HOM30M100C	**672.00**			PK23GTA	**21.30**	10
125 A	12	24	12	HOM1224M125C	**606.00**	6–2/0		PK15GTA	**17.10**	6
	12	24	12	HOM1224M125TC	**620.00**			Factory-installed	—	6
	24	24	0	HOM24M125C	**710.00**			PK15GTA	**17.10**	8
	30	30	0	HOM30M125C	**812.00**			PK23GTA	**21.30**	10
Convertible Mains—Factory-installed Main Circuit Breaker QOM2 Main Frame Size—Convertible to Main Lugs or Lower Amperage Main Circuit Breaker (See page 1-16)										
150 A	16	32	16	HOM1632M150TC	**636.00**	4–250		Factory-installed	—	9
	20	30	10	HOM2030M150TC	**750.00**			Factory-installed	—	9
	30	30	0	HOM30M150C	**776.00**			PK23GTA	**21.30**	10
200 A	12	24	12	HOM1224M200TC	**572.00**	4–250		Factory-installed	—	9
	16	32	16	HOM1632M200TC	**675.00**			Factory-installed	—	9
	20	40	20	HOM2040M200C	**711.00**			PK23GTA	**21.30**	9
	20	40	20	HOM2040M200TC	**764.00**			Factory-installed	—	9
	30	30	0	HOM30M200C	**798.00**			PK23GTA	**21.30**	10
	30	40	10	HOM3040M200TC	**891.00**			Factory-installed	—	10
	40	40	0	HOM40M200C	**1019.00**			PK23GTA	**21.30**	12
	40	60	20	HOM4060M200C	**1367.00**			PK23GTA	**21.30**	12
	42	42	0	HOM42M200C	**1094.00**			PK23GTA	**21.30**	12
	42	52	10	HOM4252M200C	**1313.00**			PK23GTA	**21.30**	12
225 A	42	42	0	HOM42M225C	**1116.00**	4–250		PK23GTA	**21.30**	12
Universal Mains—No Factory-installed Main Circuit Breaker or Main Lugs **QOM2 Main Frame Size—Field-install Main Circuit Breaker or Main Lugs (See page 1-16)**										
200 A	16	32	16	HOM1632U200TC	**293.00**	4–250		Factory-installed	—	9
	20	40	20	HOM2040U200TC	**357.00**			Factory-installed	—	9
	30	40	10	HOM3040U200TC	**530.00**			Factory-installed	—	10

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

▲ Maximum single pole branch circuits utilizing HOM and/or HOMT circuit breakers.
■ C at end of catalog number indicates combination flush/surface cover included with device.
♦ F/S at end of catalog number indicates to order F for flush device or S for surface device. The cover does not have a door.
★ HOM-GFI and HOM-AFI branch circuit breakers are limited to number 10 maximum wire.
▼ 70 A maximum branch circuit breaker, 100 A maximum back feed main circuit breaker.
△ Supplied with feed-thru lugs.

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1Ø3W—120/240 Vac—UL Listed

Table 1.47: Convertible Main Load Centers (Accepts Only HOM Plug-On Circuit Breakers.)

	Mains Rating	Spaces	Max. Single Pole Circuits ▲	Max. Tandem Circuit Breakers	Load Center Box, Interior and Cover		Main Wire Size AWG/kcmil		Equipment Ground Bar Kit (Order Separately)		Box No. See Page 1-18
					Cat. No. (DE3C)	$ Price	Al	Cu	Cat. No. (DE3A)	$ Price	
RAINPROOF	**Main Lugs**—10 kA Short Circuit Current Rating Factory-installed Fixed Main Lugs, 10 kA Short Circuit Current Rating										
	70 A	2	4	2	HOM24L70RB■	**111.00**	12–3	14–4	PK4GTA	**10.80**	1R
	100 A	6	12	6	HOM612L100RB△	**129.00**	8–1		PK7GTA	**11.70**	2R
	125 A	4	8	4	HOM48L125GRB	**137.00**	12–2/0	14–2/0	PK7GTA Factory-included		15R
	Convertible Mains with Factory-installed Main Lugs ♦, QOM1 Main Frame Size—Convertible to Main Circuit Breaker (See Below)										
	125 A	8	16	8	HOM816L125RB	**248.00**	6–2/0		PK15GTA	**17.10**	3R
		12	12	0	HOM12L125RB	**234.00**			PK15GTA	**17.10**	3R
		12	24	12	HOM1224L125RB	**278.00**			PK15GTA	**17.10**	3R
		20	20	0	HOM20L125RB	**383.00**			PK15GTA	**17.10**	4R
	Convertible Mains with Factory-installed Main Lugs ♦, QOM2 Main Frame Size—Convertible to Main Circuit Breaker (See Below)										
	200 A	12	12	0	HOM12L200RB	**423.00**	4–250		PK23GTA	**21.30**	5R
		20	40	20	HOM2040L200RB	**560.00**			PK23GTA	**21.30**	6R
		30	30	0	HOM30L200RB	**587.00**			PK23GTA	**21.30**	7R
		30	40	10	HOM3040L200RB	**759.00**			—	—	—
		40	40	0	HOM40L200RB	**911.00**			PK23GTA	**21.30**	14R
		40	60	20	HOM4060L200RB	**1139.00**			PK23GTA	**21.30**	14R
		42	52	10	HOM4252L200RB	**1092.00**			PK23GTA	**21.30**	14R
RAINPROOF	**Main Circuit Breaker**—22 kA Short Circuit Current Rating Convertible Mains with Factory-Installed Main Circuit Breaker, QOM1 Main Frame Size—Convertible to Main Lugs or Lower Amperage Main Circuit Breaker (See Below) ★										
	100 A	8	16	8	HOM816M100RB	**429.00**	6–1		PK15GTA	**17.10**	3R
		12	12	0	HOM12M100RB	**416.00**			PK15GTA	**17.10**	3R
		20	20	0	HOM20M100RB	**531.00**	6–2/0		PK15GTA	**17.10**	4R
		24	24	0	HOM24M100RB	**606.00**			PK15GTA	**17.10**	6R
	125 A	8	16	8	HOM816M125RB	**716.00**	6–2/0		PK15GTA	**17.10**	3R
		24	24	0	HOM24M125RB	**858.00**			PK15GTA	**17.10**	6R
	Convertible Mains with Factory-installed Main Circuit Breaker, QOM2 Main Frame Size—Convertible to Main Lugs or Lower Amperage Main Circuit Breaker (See Below)										
	150 A	30	30	0	HOM30M150RB	**978.00**	4–250		PK23GTA	**21.30**	7R
	200 A	20	40	20	HOM2040M200RB	**872.00**	4–250		PK23GTA	**21.30**	6R
		30	30	0	HOM30M200RB	**1004.00**			PK23GTA	**21.30**	7R
		30	40	10	HOM3040M200RB	**1152.00**			PK23GTA	**21.30**	7R
		40	40	0	HOM40M200RB	**1277.00**			PK23GTA	**21.30**	14R
		40	60	20	HOM4060M200RB	**1596.00**			PK23GTA	**14.20**	14R
		42	52	10	HOM4252M200RB	**1532.00**			PK23GTA	**14.20**	14R
	225 A	16	24	8	HOM1624M225RB	**1182.00**	4–250		PK15GTA	**17.10**	7R
		42	42	0	HOM42M225RB	**1323.00**			PK23GTA	**21.30**	14R
	Convertible Mains with Factory-installed Main Circuit Breaker with Feed-thru Lugs, QOM2 Main Frame Size—Convertible to Main Lugs or Lower Amperage Main Circuit Breaker (See Below) ♦										
	150 A	8	16	8	HOM816M150FTRB	**785.00**	4–250		PK15GTAL	**35.00**	6R
	200 A▼	8	16	8	HOM816M200FTRB	**785.00**	4–250		PK15GTAL	**35.00**	6R
	Universal Main with Feed-thru Lugs—No Factory-installed Main Circuit Breaker or Main Lugs ♦ QOM2 Main Frame Size—Field-install Main Circuit Breaker or Main Lugs (See Kits Below)										
	200 A	8	16	8	HOM816U200FTRB	**446.00**	4–250		PK15GTAL	**35.00**	6R

Above listings through 200 A mains rating meet Federal Specification W-P-115c as Type 1, Class 2.

▲ Maximum single pole branch circuits utilizing HOM and/or HOMT circuit breakers.
■ HOM-GFI and HOM-AFI branch circuit breakers are limited to number 10 maximum wire.
♦ Side hinge door device allow 1-1/4 in. on left side for door to open.
★ 22 k AIR main circuit breaker UL Listed for use ahead of HOM and HOMT 10 k AIR branch circuit breakers to permit their application on systems with up to 22 kA available fault current.
▼ Rated 200 A when using copper wire. Reference NEC® Table 310.15(B)(6) when using Al wire.
△ 70 A maximum branch circuit breaker, 100 A maximum back feed main circuit breaker.

1Ø, Field-Installed Mains Kits

Main Lug Kit

QOL125

QOL225

Table 1.48: For Convertible Load Centers Only

Field-Installed Main Type	Frame Size	Main □ Ampere Rating	Use on Convertible Load Center with Mains Rating	Cat. No.	$ Price (DE3A)	Lug Wire Size ▽ AWG/kcmil
Main Lugs ◊	—	125 A	100–125 A	QOL125	**44.10**	6–2/0 Al or Cu
		225 A	150–225 A	QOL225	**104.00**	6–300 Al or Cu
Main Circuit Breaker ☆	QOM1	50 A	100–125 A	QOM50VH	**140.00**	12–2/0 Al or Cu
		60 A	100–125 A	QOM60VH	**140.00**	
		70 A	100–125 A	QOM70VH	**140.00**	
		80 A	100–125 A	QOM80VH	**201.00**	
		90 A	100–125 A	QOM90VH	**201.00**	
		100 A	100–125 A	QOM100VH	**201.00**	
		110 A	125 A	QOM110VH	**468.00**	
		125 A	125 A	QOM125VH	**468.00**	
	QOM2◒	100 A	150–225 A	QOM2100VH	**468.00**	4–300 Al or Cu
		125 A	150–225 A	QOM2125VH	**468.00**	
		150 A	150–225 A	QOM2150VH	**468.00**	
		175 A	200–225 A	QOM2175VH	**468.00**	
		200 A	200–225 A	QOM2200VH	**468.00**	
		225 A	225 A	QOM2225VH	**468.00**	

□ Do not exceed the load center mains rating.
◊ If main circuit breaker knockout has been removed from the load center's trim, order appropriate filler plate from page 1-13.
☆ 22 k AIR main circuit breaker UL Listed for use ahead of HOM and HOMT 10 k AIR branch circuit breakers to permit their application on systems with up to 22 kA available fault current.
▽ Wire range listed for main device kits is the wire range of that device. To find out maximum wire size permitted in a particular load center per UL, see pages 1-5 through 1-11 under Main Wire Size.
◒ Add suffix 1021 for 120, 208, 240 Vac shunt trip.

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Indoor Knockout Information and Enclosure Dimensions

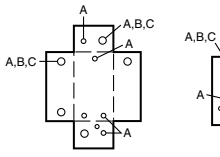
Table 1.49: Enclosure Dimensions

Box No.	Dimensions W in.	W mm	H in.	H mm	D in.	D mm
1	3.81	97	6.72	171	3.00	76
2	4.81	122	9.30	236	3.19	81
3	4.81	122	9.30	236	3.19	81
4	8.88	226	12.57	319	3.80	97
5	14.25	362	14.92	379	3.75	95
6	14.25	362	17.92	455	3.75	95
7	14.25	362	20.92	531	3.75	95
8	14.25	362	26.04	661	3.75	95
9	14.25	362	29.86	758	3.75	95
10	14.25	362	33.78	858	3.75	95
11	14.25	362	37.98	965	3.75	95
12	14.25	362	39.37	1000	3.75	95

Box No.	Dimensions W in.	W mm	H in.	H mm	D in.	D mm
13	5.88	149	13.12	333	3.38	86
14	14.25	362	20.92	531	3.75	95
15	20.00	508	50.00	1270	5.75	146
16	20.00	508	62.00	1727	5.75	146
17	20.00	508	53.00	1346	5.75	146
18	5.88	149	16.12	409	3.38	86
19	7.56	192	23.12	587	4.25	108
20	9.62	244	26.12	663	4.75	121
21	8.88	226	14.80	376	3.80	97
22	8.55	217	23.92	608	3.95	100
23	14.25	362	29.86	758	3.75	95

Table 1.50: Knockout Information

Knockouts									
Symbol	A	B	C	D	E	F	G	H	I
Conduit Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2



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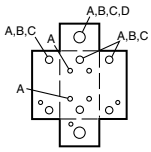

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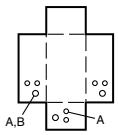

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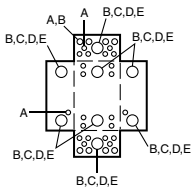

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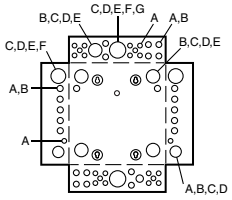

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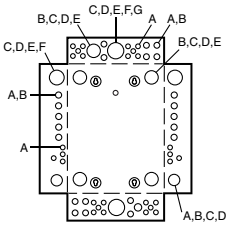

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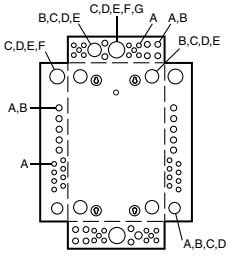

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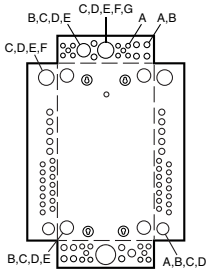

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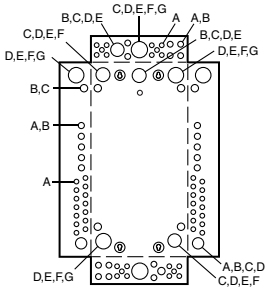

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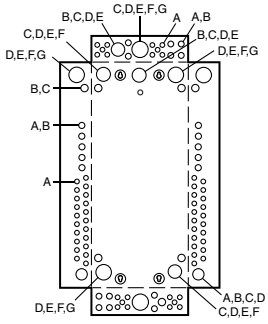

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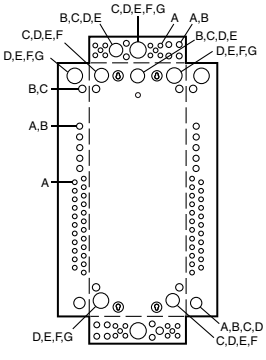

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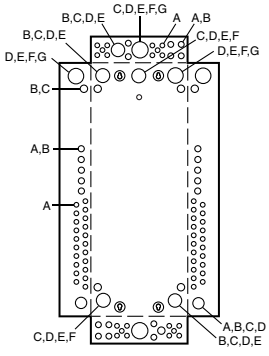

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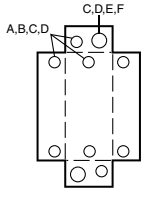

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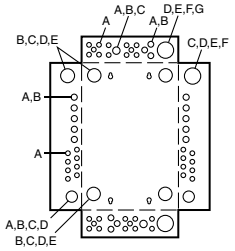

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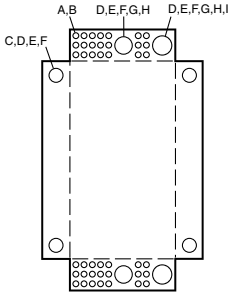

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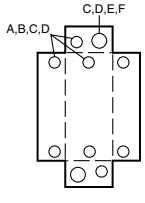

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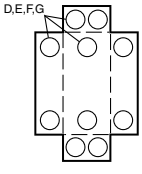

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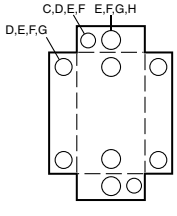

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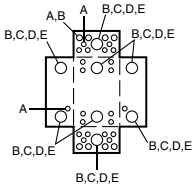

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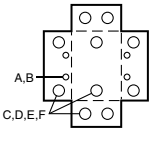

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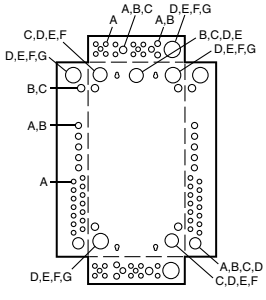

Box 23

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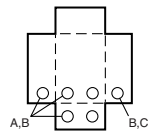

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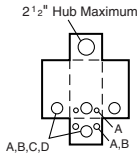

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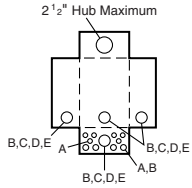

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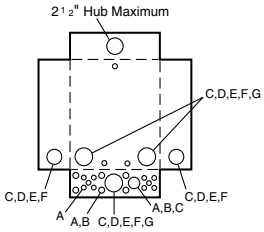

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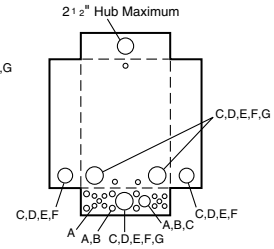

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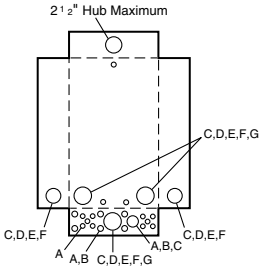

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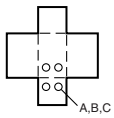

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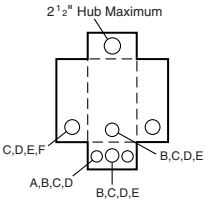

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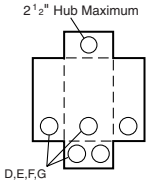
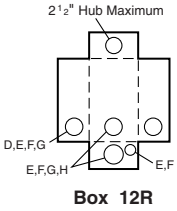
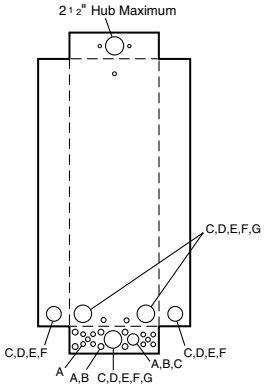


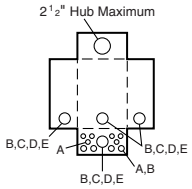
Box 11R



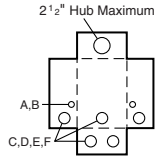
Box 12R



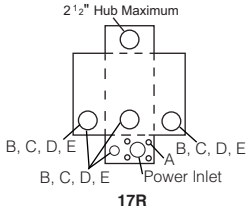
Box 14R



Box 15R



Box 16R



17R

Table 1.51: Enclosure Dimensions

Box No.	Dimensions					
	W		H		D	
	in.	mm	in.	mm	in.	mm
1NM	6.52	166	8.79	223	3.90	99
1R▲	4.88	124	9.38	238	4.00	102
2R	8.88	226	12.65	321	4.27	108
3R	14.75	375	18.92	481	4.52	115
4R	14.75	375	22.06	560	4.52	115
5R	14.75	375	26.04	661	4.52	115
6R	14.75	375	29.86	758	4.52	115
7R	14.75	375	33.78	858	4.52	115
8R	14.75	375	37.98	965	4.52	115
9R	4.56	116	6.50	165	3.88	99
10R	6.92	176	13.18	335	4.12	105
11R	7.56	192	23.24	590	4.75	121
12R	9.62	244	26.24	666	5.50	140
13R	6.92	176	16.18	411	4.12	105
14R	14.75	375	39.37	1000	4.52	115
15R	8.88	226	14.80	376	4.27	108
16R	8.55	217	24.75	629	4.16	106
17R	8.88	226	12.65	321	4.27	108

▲ HOME250SPA and QO260NATR top endwall has no hub opening.

Table 1.52: Knockout Information

Knockouts								
Symbol	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Conduit Size	1/2 in.	3/4 in.	1 in.	1-1/4 in.	1-1/2 in.	2 in.	2-1/2 in.	3 in.

"RB" Hub

Bolt-On Hubs

Square D equipment with "R" or "RB" suffix, designated NEMA 3R rainproof construction, utilizes bolt-on hubs listed below. "RB" devices will accept 3/4 in. through 2-1/2 in. bolt-on hubs without the use of reducers. Off-center conduit thread openings and elongated mounting holes provide quick and easy adjustment to eliminate costly conduit offsets and bends. Catalog suffix "R" devices require 3 in. through 4 in. field cut opening. Hubs are suitable for use with conduit having ANSI standard taper pipe thread.

Table 1.53: Bolt-On Hubs UL Listed for "RB" Devices■

Conduit Size	3/4 in.	1 in.	1-1/4 in.	1-1/2 in.	2 in.	2-1/2 in.
Hub Cat. No.	B075	B100	B125	B150	B200	B250
$ Price	**33.30**	**33.30**	**33.30**	**33.30**	**61.35**	**102.00**

■ Closing cap (Cat. No. BCAP) is provided factory-installed on each device having "RB" suffix. Price if ordered separately; $2.50

Table 1.54: Bolt-On Hubs UL Listed for Mounting in Field-Cut Opening

Conduit Size	3 in.	3-1/2 in.	4 in.	Designed for mounting in field cut opening. Includes gasket and four mounting bolts and nuts.
Hub Cat. No.	B300	B350	B400	
$ Price	**186.00**	**300.00**	**368.00**	

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Table 1.55: Meter Mains *New!*

Meets Federal Spec. W-P-115c as Type 1, Class 2, UL Listed, suitable only for use as service equipment, 120/240 Vac, 1Ø3W, NEMA 3R enclosure

		Ampere Rating	Bypass Type	Service (Type of Feed)		Short Circuit Current Rating	Cat. No.	$ Price	Service Disconnect(s)			Load Center and Branch Circuit Breakers (Order separately Pages 1-2, 1-3, 1-4)				Hub Type (Order separately from page 1-17)	Line Side Main Lugs AWG/ kcmil (Al/Cu)	Service Ground Lug AWG/ kcmil (Al/Cu)	Weight Each (Lbs) and Pallet Qty.
												Max. Quantity							
									2P Circuits (Max.)	Type (Order separately from page 1-22 except as noted)	Ampere Rating (Max.)	Spaces	1P Circuits	1P Tandems	Ampere Rating (Max.)				
				UL	UL and EUSERC														
Ring Type	QO™	**Surface Mount Only**																	
		125 A	None	OH/UG	—	10 kA	C125RB	**368.00**	1	QOM1-VH	125 A	—	—	—	—	B	4–1/0	8–1/0	15, 54
		200 A	None	OH/UG	—	22 kA	CM200S	**1022.00**	1	QOM2-VH	200 A	—	—	—	—	A	4–250	(2) 8–2/0	26, 24
				OH/UG	— —	22 kA	C2M200S	**1083.00**	1 1	QOM2-VH QO-VH	200 A 50 A	— —	— —	— —	— —	A	4–250	(2) 8–2/0	27, 20
				OH/UG	—	10 kA	C4L200S	**1143.00**	2	QO	100 A	—	—	—	—	A	4–250	(2) 8–2/0	27, 28
	Homeline™	**Surface Mount Only**																	
		125 A	None	OH/UG	OH/UG	10 kA	SC8L125S	**846.00**	4	HOM	125 A■	—	—	—	—	A	6–2/0	6–2/0	31, 24
		200 A	None	OH/UG	OH/UG	10 kA	SC12L200S	**1419.00**	6	HOM	200 A◆	—	—	—	—	A–L	4–250	8–2/0	40, 10
		Semiflush Mount only																	
		125 A	None	OH/UG	OH/UG	10 kA	SC8L125F	**846.00**	4	HOM	110 A	—	—	—	—	A or B300	6–2/0	6–2/0	37, 20
		200 A	None	OH★/UG	OH★/UG	10 kA	SC12L200F	**1419.00**	6	HOM	200 A▽	—	—	—	—	A–L	4–250	8–2/0	47, 10
			None	OH★/UG	OH★/UG	22 kA	SC816F200F▼	**1187.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽	A–L	4–250	8–2/0	51, 10
		Surface Mount—Supplied with Feed-Thru Lugs and provisions for Branch Circuit Breakers																	
		150 A	None	OH/UG	OH/UG	22 kA	SC816F150S▼	**1187.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◑	A–L	4–250	8–2/0	40, 10
					—	10 kA	SC816D150C▼△	**1250.00**	1	HOM2150▲	150 A	8	16	8	100 A✱	A or A–L	6–300	8–1/0	48, 18
					UG		SU816D150C▼△		1	HOM	50 A								
		200 A	None	OH/UG	OH/UG	22 kA	SC816F200S▼	**1187.00**	1	QOM2200VH▲	200 A	8	16	8	200 A◆	A–L	4–250	8–2/0	40, 10
					—	10 kA	SC816D200C▼△	**1250.00**	1	HOM2200▲	200 A	8	16	8	100 A✱	A or A–L	6–300	8–1/0	48, 18
					UG		SU816D200C ▼△	**1250.00**	1	HOM	50 A								
Ringless	QO	**Surface Mount Only**																	
		200 A	None	OH/UG	—	22 kA	RC200S□	**1022.00**	1	QOM2-VH	200 A	—	—	—	—	A	6–350	(2)8–2/0	26, 24
			Lever			10 kA	RCM200SL□☆	**1950.00**	1	QOM2-VH	200 A					A	6–350	8-1/0	60 / 14
			None			22 kA	RC2M200S□	**1083.00**	1	QOM2-VH	200 A					A	6–350	(2)8–2/0	27, 20
			Horn				RC2M200SH□	**1136.00**	1	QO-VH	50 A					A	6–350	(2)8–2/0	27, 20
			Lever			10 kA	RC2M200SL□☆	**2090.00**	1	QOM2-VH	200 A					A	6–350	8-1/0	60 / 14
									1	QO-VH	50 A							8-1/0	
			None			22 kA	QC12L200S◪□☆	**1562.00**	6	QO-VH	200 A					A	6–350	8–2/0	43, 21
			None			22 kA	QC12L200C□	**1562.00**	6	QO-VH	200 A▽					A	6–350	12-2/0	40, 21
		Surface Mount Only, Supplied with Feed-Thru Lugs and provisions for Branch Circuit Breakers																	
		100 A	Horn	OH/UG	—	22 kA	QC816F100SH◪▼□☆	**1356.00**	1	QOM2100VH▲	100 A	8	16	8	100	A	6–350	8–2/0	43, 21
		100 A	Horn	OH/UG	—	22 kA	QC816F100CH▼□☆	**1356.00**	1	QOM2100VH▲	100 A	8	16	8	100	A	6–350	12-2/0	40, 21
		125 A	None	OH/UG	—	22 kA	QC816F125S▼□☆	**1304.00**	1	QOM2125VH▲	125 A	8	16	8	100	A	6–350	8–2/0	43, 21
			None	OH/UG	—	22 kA	QC816F125C▼□	**1304.00**	1	QOM2125VH▲	125 A	8	16	8	100	A	6–350	12-2/0	40, 21
			Horn	OH/UG	—	22 kA	QC816F125SH◪▼□☆	**1356.00**	1	QOM2125VH▲	125 A	8	16	8	100	A	6–350	8–2/0	43, 21
		150 A	None	OH/UG	—	22 kA	QC816F150S◪▼□☆◪	**1304.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒	A	6–350	8–2/0	43, 21
			None	OH/UG	—	22 kA	QC816F150C▼□	**1304.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒	A	6–350	12-2/0	40, 21
			Horn	OH/UG	—	22 kA	QC816F150SH◪▼□☆	**1356.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒	A	6–350	8–2/0	43, 21
			Lever	OH/UG	—	22 kA	QC816F150SL◊☆□	**2690.00**	1	QOM2150-VH▲	200 A	8	16	8	150 A	A	6–350	8-2/0	74 / 12
		200 A	None	OH/UG	—	22 kA	QC816F200S◪▼□☆	**1356.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽	A	6–350	8–2/0	43, 21
			Horn	OH/UG	—	22 kA	QC816F200SH◪▼□☆	**1356.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽	A	6–350		
			Horn	OH/UG	—	22 kA	QC816F200CH▼□	**1356.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽	A	6–350	12-2/0	40, 21
			Lever	OH/UG	—	22 kA	QC816F200SL◊☆□	**2690.00**	1	QOM2200-VH▲	200 A	8	16	8	200 A	A	6–350	8–2/0	74 / 12
	Homeline	**Surface Mount Only**																	
		125 A	None	OH/UG	—	10 kA	RC8L125S✪	**846.00**	4	HOM	125 A■	—	—	—	—	A	6–2/0	6–2/0	27, 32
		200 A	None	OH/UG	—	10 kA	RC12L200S◪□☆	**1419.00**	6	HOM	200 A▽	—	—	—	—	A	6–350	8–2/0	43, 21
		200 A	None	OH/UG	—	22 kA	QC12L200C□	**1419.00**	6	HOM	200 A▽	—	—	—	—	A	6–350	12-2/0	40, 21
		Surface Mount Only, Supplied with Feed-Thru Lugs and provisions for Branch Circuit Breakers																	
		100 A	Horn	OH/UG	—	22 kA	RC816F100SH◪▼□☆	**1227.00**	1	QOM2100VH▲	100 A	8	16	8	100 A			8–2/0	43, 21
		100 A	Horn	OH/UG	—	22 kA	RC816F100CH▼□☆	**1227.00**	1	QOM2100VH▲	100 A	8	16	8	100 A			12-2/0	40, 21
		125 A	Horn	OH/UG	—	22 kA	RC816F125SH◪▼□☆	**1227.00**	1	QOM2125VH▲	125 A	8	16	8	100 A			8–2/0	43, 21
		125 A	Horn	OH/UG	—	22 kA	RC816F125CH▼□	**1227.00**	1	QOM2125VH▲	125 A	8	16	8	100 A			12-2/0	40, 21
		150 A	None	OH/UG	—	22 kA	RC816F150S◪▼□	**1187.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒			8–2/0	43, 21
			None	OH/UG	—	22 kA	RC816F150C▼□	**1187.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒			12-2/0	40, 21
			Horn	OH/UG	—	22 kA	RC816F150SH◪▼□☆	**1227.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒	A	6–350	8–2/0	43, 21
			Horn	OH/UG	—	22 kA	RC816F150CH▼□☆	**1227.00**	1	QOM2150VH▲	150 A	8	16	8	150 A◒			12-2/0	40, 21
			Lever	OH/UG	—	22 kA	RC816F150SL◊☆□	**2690.00**	1	QOM2150-VH▲	200 A	8	16	8	150 A			8-2/0	72 / 12
		200 A	None	OH/UG	—	22 kA	RC816F200S◪▼□☆	**1227.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽			8–2/0	43, 21
			None	OH/UG	—	22 kA	RC816F200C▼□	**1227.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽			12-2/0	40, 21
			Horn	OH/UG	—	22 kA	RC816F200SH◪▼□☆	**1227.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽			8–2/0	43, 21
			Horn	OH/UG	—	22 kA	RC816F200CH▼□☆	**1227.00**	1	QOM2200VH▲	200 A	8	16	8	200 A▽			12-2/0	40, 21
			Lever	OH/UG	—	22 kA	RC816F200SL◊☆□	**2690.00**	1	QOM2200-VH▲	200 A	8	16	8	200 A			8-2/0	72 / 12
		200 A	Horn	OH/UG	—	10 kA	RC816D200CH▼△✪☆	**1292.00**	1 1	HOM2200▲ HOM	200 A 50 A	8	16	8	100 A✱	A or B300	6–300	6–1/0	48, 18

▲ Service disconnect supplied factory-installed.
■ 125 A Homeline™ 2P circuit breaker can be installed in top position only. All other positions are limited to 100 A max.
◆ UL short circuit current rating is equal to the lowest interrupting rating of any circuit breaker installed.
★ Suitable for OH service with addition of tunnel kit SCTK20. Order separately.
▼ Supplied with load side feed-thru lugs, for 4 AWG–250 kcmil (Al/Cu) conductors.
△ Convertible to semiflush with SC200F flange kit (order separately).
□ Device supplied with barrel lock provisions factory-installed.
◊ —
☆ 5th jaw factory-installed.
▽ Use only 15–100 A and 150–200 A circuit breakers.
◒ Use only 15–100 A and 150 A circuit breakers.
✱ A 100 A circuit breaker can be installed in bottom position only, all other positions are limited to 70 A max.
◆ Use only 15–110 A and 150–200 A breakers.
◑ Use only 15–110 A and 150 A breakers.
✪ Knockout provided in cover for use with barrel lock kit SCBRLLOCK (see Accessories, page 1-22).
◪ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBS, see accessories p 1-22, check with local utility for approval.
◆ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBL, see accessories p 1-22, check with local utility for approval.

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Meter Mains and All-In-Ones

- Ring or ringless type meter socket designs available
- UL Listed, suitable only for use as service equipment
- Meets EUSERC standards
- Service disconnect(s) are supplied factory-installed, except where noted
- Semiflush-reverse design available, supplied with load center (indoor access)
- Supplied with 100% branch neutrals, all unused terminals may be used for equipment grounding wires.
- Meets Federal Specification W-P-115c as Type 1, Class 2

Table 1.56: All-In-One Combination Service Entrance Devices

		Ampere Rating	Bypass Type	Service (Type of Feed) UL and EUSERC	Short Circuit Current Rating	Cat. No. (DE3A)	List $ Price	Service Disconnect(s)			Load Center and Branch Circuit Breakers (Order Separately Pages 1-2, 1-3, 1-14)				Hub Type (Order Separately page 1-22)	Line Side Main Lugs AWG/ kcmil (Al/Cu)	Service Ground Lug AWG/ kcmil (Al/Cu)	Weight Each (Lbs) and Pallet Qty.
								2P Circuits (Max.)	Type (Factory Installed)	Ampere Rating (Max.)	Max. Quantity Spaces	1P Circuits	1P Tandems	Ampere Rating (Max.)				
Ring Type	Homeline™	**Surface Mount Only**																
		100 A	None	OH/UG	10 kA	SC1624M100S	**744.00**	1	HOM2100	100 A	16	24	8	100 A	A	6–2/0	6–2/0	32, 24
		125 A	None	OH/UG	10 kA	SC1624M125S	**1518.00**	1	HOM2125	125 A	16	24	8	125 A▲				
		200 A	None	OH/UG	22 kA	SC2040M200S	**1671.00**	1	QOM2200VH	200 A	20	40	20	200 A◒	A-L	4–250	6–2/0	45, 10
		200 A	None	OH/UG△	10 kA	SC2040M200C■	**1799.00**	1	HOM2200	200 A	20	40	20	100 A	A or A-L	6–300	8–1/0	47, 18
		200 A	None	UG	10 kA	SU2040M200C■	**1799.00**	1	HOM2200	200 A	20	40	20	100 A	A or A-L	6–300	8–1/0	47, 18
		Semiflush Mount Only																
		100 A	None	OH/UG	10 kA	SC1624M100F	**744.00**	1	HOM2100	100 A	16	24	8	100 A	A or B300	6–2/0	6–2/0	44, 20
		125 A	None	OH/UG	10 kA	SC1624M125F	**1518.00**	1	HOM2125	125 A	16	24	8	110 A				
				OH♦/UG	22 kA	SC2040M125F	**1671.00**	1	QOM2125VH	125 A	20	40	20	110 A	A-L	4–250	8–2/0	51, 10
		200 A	None	OH♦/UG	22 kA	SC2040M200F	**1671.00**	1	QOM2200VH	200 A	20	40	20	200 A◒				
				OH▼/UG	22 kA	SC2636M200FPV★	**2244.00**	1	QOM2200VH	200 A	26	36	10	100 A	A-L	4–250	8–2/0	56, 10
						SC3040M200F	**2064.00**	1	QOM2200VH	200 A	30	40	10	200 A				
		225 A	None	OH▼/UG	22 kA	SC3040M225F	**2280.00**	1	QOM2225VH	225 A	30	40	10	200 A				
						SC2636M225FPV★	**2520.00**	1	QOM2225VH	225 A	26	36	10	100 A				
		Surface Mount Only																
		100 A	None	OH△	10 kA	SO1020M100S	**443.00**	1	HOM2100	100 A	10	20	10	80 A	A	6–1	8–4	20, 42
		200 A	None	OH△	22 kA	SO2040M200S	**1161.00**	1	QOM2200VH	200 A	20	40	20	200 A	A	6–350	8–2/0	43, 21
		200 A	None	OH/UG	22 kA	SC3040M200S	**2010.00**	1	QOM2200VH	200 A	30	40	10	200 A	A-L	4–250	8–2/0	50, 10
						SC40M200S	**2432.00**	1	QOM2200VH	200 A	40	40	0	200 A		4–250	8–2/0	52, 10
		REVERSE All-In-One—Semiflush Mount with Service Disconnect (outdoor access) and Load Center (indoor access)																
		200 A	None	UG	10 kA	SU3040M200R	**2223.00**	1	QOM2200VH	200 A	30	40	10	200 A◒	A or B300	6–300	12–1/0	60, 15
		225 A	None	UG	10 kA	SU3040M225R	**2646.00**	1	QOM2225VH	225 A								
Ringless	Homeline	**Surface Mount Only**																
		100 A	None	OH/UG△	10 kA	RC1624M100S	**744.00**	1	HOM2100	100 A	16	24	8	100 A	A	6–2/0	6–2/0	32, 24
		125 A				RC1624M125S	**1518.00**	1	HOM2125	125 A				125 A▲				
		125 A	Horn	OH/UG△	22 kA	RC2040M125SH✱□	**1601.00**	1	QOM2125VH	125 A	20	40	20	125 A		6–350	8–2/0	43, 21
		125 A	Horn	OH/UG△	22 kA	RC2040M125CH□◊	**1601.00**	1	QOM2125VH	125 A	20	40	20	125 A				40, 21
		150 A	Horn	OH/UG△	22 kA	RC2040M150SH✱□	**1713.00**	1	QOM2150VH	150 A	20	40	20	150 A				43, 21
			Horn	OH/UG△	22 kA	RC2040M150CH□◊	**1713.00**	1	QOM2150VH	150 A	20	40	20	150 A				40, 21
			Lever	OH/UG	22 kA	RC3040M150SL⬨	**4900.00**	1	QOM2150VH▲	200 A	30	40	10	150 A				76 / 12
		200 A	None	OH/UG△	22 kA	RC2040M200S✱□	**1713.00**	1	QOM2200VH	200 A	20	40	20	200 A				43, 21
			None	OH/UG△	22 kA	RC2040M200C□	**1713.00**	1	QOM2200VH	200 A	20	40	20	200 A				40, 21
			Horn	OH/UG△	22 kA	RC2040M200SH✱□	**1713.00**	1	QOM2200VH	200 A	20	40	20	200 A				43, 21
			Horn	OH/UG△	22 kA	RC2040M200CH□	**1713.00**	1	QOM2200VH	200 A	20	40	20	200 A				40, 21
			Lever	OH/UG	22 kA	RC3040M200SL⬨	**4900.00**	1	QOM2200VH▲	200 A	30	40	10	200 A				76 / 12
			None	OH/UG△	22 kA	RC2040M200SGP	**2602.00**	1	QOM2200VH	200 A	20	40	20	200 A				48 / 21
	QO	**Surface Mount Only**																
		150 A	Horn	OH/UG△	22 kA	QC2442M150SH✱□	**1905.00**	1	QOM2150VH	150 A	24	42	18	150 A	A	6–350	8–2/0	43, 21
		200 A	None	OH/UG△	22 kA	QC2442M200S✱□	**1905.00**	1	QOM2200VH	200 A	24	42	18	200 A				43, 21
			None	OH/UG△	22 kA	QC2442M200C□	**1905.00**	1	QOM2200VH	200 A	24	42	18	200 A				40, 21
			Horn	OH/UG△	22 kA	QC2442M200SH✱□	**1905.00**	1	QOM2200VH	200 A	24	42	18	200 A				43, 21
			Horn	OH/UG△	22 kA	QC2442M200CH□◊	**1905.00**	1	QOM2200VH	200 A	24	42	18	200 A				40, 21
		200 A	Horn	OH/UG△	22 kA	QC3040M200SH✱	**2120.00**	1	QOM2200VH	200 A	30	40	10	200 A				40, 21

▲ 125 A Homeline™ 2P circuit breaker can be installed in top position only. All other positions are limited to 100 A max.
■ Convertible to semiflush with SC200F flange kit (order separately).
♦ Suitable for OH service with addition of tunnel kit (SCTK20). Order separately.
★ For use with Photovoltaic Systems. Provisions for field-installed CT. If required by adopted code, order retaining kit PK2SCPV separately. See page 1-22.
▼ Suitable for OH service with addition of tunnel kit (SCTK30). Order separately.
△ Device does not meet EUSERC Specifications.
□ Device supplied with barrel lock provisions factory-installed.
◊ 5th jaw factory-installed.
☆ Use only 15–100 A and 150 A circuit breakers.
▽ Use only 15–100 A and 150–200 A circuit breakers.
◒ Use only 15–110 A and 150–200 A circuit breakers.
✱ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBS, see accessories p 1-22, check with local utility for approval.
⬨ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBL, see accessories p 1-22, check with local utility for approval.

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Meter Mains and All-in-Ones

- Ring or ringless type meter socket designs available
- UL Listed, suitable **only** for use as service equipment
- Meets EUSERC standards where indicated.
- Service disconnects are supplied factory-installed, except where noted
- Supplied with 100% branch neutrals; all unused terminals may be used for equipment grounding wires
- Meets Federal Specification W-P-115c as Type 1, Class 2

Table 1.57: Meter Mains

Meets Federal Specification W-P-115c as Type 1, Class 2, UL Listed, suitable only for use as service equipment, 120/240 Vac, 1Ø3W, NEMA 3R Enclosure

		Ampere Rating	Bypass Type	Service (Type of Feed)		Short Circuit Current Rating	Cat. No.	List $ Price	Service Disconnect(s) ▲			Load Center and Branch Circuit Breakers (Order Separately Pages 1-2, 1-3, 1-14)				Hub Type (Order Separately page 1-22)	Line Side Main Lugs AWG/ kcmil (Al/Cu)	Service Ground Lug AWG/ kcmil (Al/Cu)	Weight Each (Lbs) and Pallet Qty.
												Max. Quantity							
													1P						
				UL	UL and EUSERC				2P Circuits (Max.)	Type (Order separately from page 1-22 except as noted)	Ampere Rating (Max.)	Spaces	Circuits	Tandems	Ampere Rating (Max.)				
Ring Type	QO™	**Surface and Semiflush Mount ■**																	
		400 A	None	UG	UG	25 kA	CU12L400CN ♦	**3810.00**	1	QDL22200 ★	200 A	—	—	—	—	A–L	(2) Studs	4–250	98, 4
							CU12L400FN ♦	**4007.00**	1	QDL, QGL, QJL▼	200 A	—	—	—	—				
									4	QO, QO-VH or QOH	125 A ◊	—	—	—	—				
		400 A	Class 320 Manual Bypass	UG	—	25 kA	CU12L400CB ♦◒	**3986.00**	1	QDL22200 ★	200 A	—	—	—	—	A–L	(2) Studs	4–250	98, 4
							CU12L400FB ♦◒	**4182.00**	1	QDL, QGL, QJL▼	200 A	—	—	—	—				
									4	QO, QO-VH or QOH	125 A ◊	—	—	—	—				
		400 A	None	UG	UG	25 kA	CU816D400CN ♦☆	**3975.00**	1	QDL22200 ★	200 A	8	16	8	200 A	A–L	(2) Studs	4–250	98, 4
		400 A	Class 320 Manual Bypass	UG	—	25 kA	CU816D400CB ♦☆◒	**4151.00**	1	QDL22200 ★	200 A	8	16	8	200 A	A–L	(2) Studs	4–250	98, 4
		400 A	Class 320 Manual Bypass	UG	—	65 kA▲	CUM400CB ♦◒	**8688.00**	1	DGP36400E20LH★	400 A	—	2 △	—	200 A	A–L	(2) Studs	4–250	115, 4
Ringless Type		400 A	Class 320 Lever	UG	—	25 kA	QU12L400SL □◒	**3810.00**	1	QDL22200 ★	200 A	—	—	—	—	A–L	(2) Studs	4–250	98, 4
									1	QDL, QGL, QJL▼	200 A	—	—	—	—				
									4	QO, QO-VH or QOH⬙	125 A ◊	—	—	—	—				
		Surface Mount Only, Supplied with Feed-Thru Lugs and Provisions for Branch Circuit Breakers																	
		400 A	*	UG	—	25 kA	QU816D400SL☆□◒	**4065.00**	1	QDL22200 ★	200 A	8	16	8	200 A	A–L	(2) Studs	4–250	98, 4
							QU816D400CK ☆◒		1	QDL, QGL, QJL▼	200 A								
		Surface and Semiflush Mount ■																	
		400 A	Class 320 Lever	UG	—	25 kA	QU12L400CL□▽◒	**3810.00**	1	QDL22200 ★	200 A	—	—	—	—	A–L	(2) Studs	4–250	98, 4
									1	QDL, QGL, QJL▼	200 A	—	—	—	—				
							QU12L400FL□▽◒	**4007.00**	4	QO, QO-VH or QOH	125 A ◊	—	—	—	—				
		400 A		UG	—	25 kA	QU816D400CL□▽☆◒	**4065.00**	1	QDL22200★	200 A	8	16	8	200 A	A–L	(2) Studs	4–250	98, 4
							QU816D400FL□▽☆◒	**4262.00**	1	QDL, QGL, QJL▼	200 A								
		400 A	Class 320 Lever	UG	—	65 kA▲	QUM400CL□◒	**10000.00**	1	DGP36400E20LH★	400 A	—	2 △	—	200 A	A–L	(2) Studs	4–250	120, 4
		400 A	K-4 Bolt-None	UG	—	65kA▲	QUM400CK♦◒	**11175.00**	1	DGP36400E20LH★	400 A	—	2 △	—	200 A	A–L	(2) Studs	4–250	123, 4

Table 1.58: All-in-One Combination Service Entrance Devices

Ring Type	Homeline™	**Surface and Semiflush Mount ■**																	
		300 A	Class 320 Manual	UG	—	25 kA	SU3040D300CB ♦▽◒	**6600.00**	1	QDL22200 ★	200 A	30	40	10	200 A	A–L	(2) Studs	4–250	100, 4
							SU3040D300FB ♦▽◒	**6797.00**	1	QDL, QGL, QJL▼	100 A								
		400 A	None	UG	UG	25 kA	SU3040D400CN ♦▽	**7050.00**	1	QDL22200 ★	200 A	30	40	10	200 A	A–L	(2) Studs	4–250	100, 4
							SU3040D400FN ♦▽	**7247.00**	1	QDL, QGL, QJL▼	200 A								
		400 A	Class 320 Manual	UG	—	25 kA	SU3040D400CB♦▽◒	**7167.00**	1	QDL22200 ★	200 A	30	40	10	200 A	A–L	(2) Studs	4–250	100, 4
							SU3040D400FB ♦▽◒	**7364.00**	1	QDL, QGL, QJL▼	200 A								
Ringless		400 A	Class 320 Lever	UG	—	25 kA	RU3040D400CL □▽◒	**6993.00**	1	QDL22200 ★	200 A	30	40	10	200 A	A–L	(2) Studs	4–250	100, 4
							RU3040D400FL □▽◒	**7190.00**	1	QDL, QGL, QJL▼	200 A								
		400 A	K-4 Bolt-on	UG	—	25 kA	RU3040D400CK ▽◒	**6993.00**	1	QDL22200 ★	200 A	30	40	10	200 A	A–L	(2) Studs	4–250	100, 4
							RU3040D400FK ▽◒	**7190.00**	1	QDL, QGL, QJL▼	200 A								

- ▲ UL short circuit current rating is equal to the lowest interrupting rating of any circuit breaker installed.
- ■ For 400 A device with suffix CB, CK, CL, or CN, surface-mount convertible to semiflush with FK400 flange kit (order kit separately). Devices wtih suffix FB, FL, FN or FK are semiflush only, with the top endwall factory-installed and flanges factory-included.
- ♦ For use only on 120/240 Vac 1Ø3W system (4-jaw meter socket).
- ★ Service disconnect supplied factory-installed.
- ▼ Additional service disconnect for field-installation: order prefix QBL at 10 kA, QDL at 25 kA, QGL at 65 kA, or QJL at 100 kA. Order separately. For complete circuit breaker catalog number, see Section 7.
- △ Option for field installation of two Q-frame, 200 A max. 2-pole branch circuit breakers used as mains for two downstream load centers. Purchase installation kit BMK2Q400 and two Q-frame circuit breakers separately. Order QBL prefix at 10 kA, QDL prefix at 25 kA, or QGL prefix at 65 kA.
- □ Fifth jaw factory-installed.
- ◊ QO panel is rated 200 A maximum.
- ☆ Supplied with load side feed-thru lugs for 6 AWG–250 kcmil (Al/Cu) conductors.
- ▽ Knockout provided in cover for use with barrel lock kit SCBRLLOCK (see Accessories, page 1-22).
- ◒ Device configuration is not included in EUSERC standards. Consult applicable utility for acceptance.
- * Device with suffix L has Class 320 lever bypass and device with suffix K has a K-4 bolt-on, no bypass.
- ⬙ Order two pole circuit breakers for field installation: order catalog designation QO for 10 kA, QO-VH for 22 kA or QOH for 42 kA short circuit current rating. See page 1-22 or 1-2.

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Table 1.59: Circuit Breakers for use with Meter Mains and All-In-One Devices

Ampere Rating ▲	Type: HOM, 1P		Type: HOM, 2P		Type: QO, 1P		Type: QO, 2P		Type: QO-VH, 1P		Type: QO-VH, 2P	
	Cat. No. (DE3D)	$ Price	Cat. No. (DE3D)	$ Price	Cat. No. (DE2A)	$ Price	Cat. No. (DE2A)	$ Price	Cat. No. (DE2A)	$ Price	Cat. No. (DE2A)	$ Price
10	—	—	—	—	QO110	**29.10**	—	—	—	—	—	—
15	HOM115	**26.30**	—	—	QO115	**29.10**	—	—	QO115VH	**63.00**	—	—
20	HOM120	**26.30**	—	—	QO120	**29.10**	—	—	QO120VH	**63.00**	—	—
25	HOM125	**26.30**	—	—	QO125	**29.10**	—	—	QO125VH	**73.00**	—	—
30	HOM130	**26.30**	HOM230	**60.00**	QO130	**29.10**	QO230	**67.00**	QO130VH	**73.00**	QO230VH	**146.00**
35	—	—	HOM235	**60.00**	QO135	**29.10**	QO235	**67.00**	—	—	—	—
40	HOM140	**26.30**	HOM240	**60.00**	QO140	**29.10**	QO240	**67.00**	—	—	QO240VH	**146.00**
45	—	—	HOM245	**60.00**	QO145	**29.10**	QO245	**67.00**	—	—	—	—
50	HOM150	**26.30**	HOM250	**60.00**	QO150	**29.10**	QO250	**67.00**	—	—	QO250VH	**146.00**
60	—	—	HOM260	**60.00**	QO160	**29.10**	QO260	**67.00**	—	—	QO260VH	**146.00**
70	—	—	HOM270	**123.00**	QO170	**67.00**	QO270	**134.00**	—	—	QO270VH	**224.00**
80	—	—	HOM280	**168.00**	—	—	QO280	**189.00**	—	—	QO280VH	**315.00**
90	—	—	HOM290	**168.00**	—	—	QO290	**189.00**	—	—	QO290VH	**315.00**
100	—	—	HOM2100	**168.00**	—	—	QO2100	**189.00**	—	—	QO2100VH	**315.00**
110	—	—	HOM2110	**369.00**	—	—	QO2110	**428.00**	—	—	QO2110VH	**1034.00**
125	—	—	HOM2125	**369.00**	—	—	QO2125	**428.00**	—	—	QO2125VH	**1034.00**
150	—	—	HOM2150BB	**428.00**	—	—	QO2150	**491.00**	—	—	QO2150VH	**1061.00**
175	—	—	HOM2175BB	**428.00**	—	—	QO2175	**491.00**	—	—	QO2175VH	**1061.00**
200	—	—	HOM2200BB	**428.00**	—	—	QO2200	**491.00**	—	—	QO2200VH	**1061.00**

Ampere Rating ▲	Type: QOM1-VH, 2P		Type: QOM2-VH, 2P		Type: QDL, 2P ♦	
	Cat. No. (DE3D)	$ Price	Cat. No. (DE3D)	$ Price	Cat. No. (DE2A)	$ Price
50	QOM50VH■	**140.00**	—	—	—	—
60	QOM60VH	**140.00**	—	—	—	—
70	QOM70VH	**140.00**	—	—	QDL22070	**1143.00**
80	QOM80VH	**201.00**	—	—	QDL22080	**1143.00**
90	QOM90VH	**201.00**	—	—	QDL22090	**1143.00**
100	QOM100VH	**201.00**	QOM2100VH	**468.00**	QDL22100	**1143.00**
110	QOM110VH	**468.00**	—	—	QDL22110	**1143.00**
125	QOM125VH	**468.00**	QOM2125VH	**468.00**	QDL22125	**1143.00**
150	—	—	QOM2150VH	**468.00**	QDL22150	**1143.00**
175	—	—	QOM2175VH	**468.00**	QDL22175	**1143.00**
200	—	—	QOM2200VH	**468.00**	QDL22200	**1143.00**
225	—	—	QOM2225VH	**468.00**	—	—

▲ Do not exceed mains rating of device
■ Reference National Electrical Code Article 230-79.
♦ For additional interrupting rating circuit breakers, order circuit breaker prefix QBL at 10 kA, QGL at 65 kA or QJL at 100 kA.

Table 1.60: Accessories, Hubs and Closing Plates

Accessories

Description	Cat. No.	$ Price	Disc. Sch.
Generator Kit: Interlocks main service disconnect and generator circuit breaker (order separately). For :			
• Homeline™ CSED Devices RC816F-, RC2040M-, SO2040M-	RCGK2	**245.00**	DE4
• QO CSED Devices QC816F-, QC2442M-	QCGK3	**245.00**	DE4
Backfed inverter circuit breaker retaining kit for SC2636M200FPV and SC2636M225FPV	PK2SCPV	**47.40**	DE4
Fifth Jaw Kit for: Meter Main Types: C, RC, SC, QC All-In-One Types: SC, SU (100–225 A), QC, RC, SO	5J	**18.30**	DE4
Bypass (Horn Type) for Ringless Type Meter Mains and All-In-Ones (100–200 A) (except for RC8L125S, RC1624M100S and RC1624M125S–use RCHB).	MMHB	**16.70**	DE4
Lexan Meter Socket Cover Plate for: • Ring and Ringless Type Meter Mains • Ring and Ringless Type All-In-Ones	29007	**10.10**	DE4
Meter Socket Sealing Rings for Ring Type Meter Mains and All-In Ones:			
• Snap Type Aluminum (Std.)	2920910001	**7.95**	DE5
• Screw Type Aluminum	29008W	**20.10**	DE4
• Snap Type Stainless Steel	ARP00026	**16.70**	DE4
Anti-Inversion Kit . For use ONLY on 400 A Meter Mains and All-In-Ones with lever bypass.	MMLRK	**12.00**	DE4
Trim Kit for 2 in. X 6 in. stud wall, used with Reverse All-In-Ones, SU3040M200R, and SU3040M225R	SU2X6TRIM	**266.00**	DE4
Barrel Lock Kit (Barrel Lock not included), supplied with bracket and mounting screw, refer to listings for where used.	SCBRLLOCK	**53.00**	DE4
Semiflush Flange Kit for: Meter Mains: SC816D150/200C and RC816D200CH All-In-Ones: SC2040M200C	SC200F	**31.80**	DE4
Semiflush Flange Kit for ring- and ringless-type Meter Mains and All-In-Ones (400 A Only)	FK400	**197.00**	DE4
Ringless Type Utility Cover for RU3040D400CL/FL, QU12L400CL/FL, and QU816D400CL/FL. Includes one piece meter socket and pull box cover with handles and closing plate.	R400L	**266.00**	DE4
Lug Kit includes (4) lugs, for use with 2 AWG–600 kcmil Al/Cu conductors. Lugs are for standard 2-Hole mounting. Meter Main and All-In-One units supplied with (2) studs per phase and neutral will accept one lug per phase and neutral. Not for use on 400 A devices with "K" suffix.	CMELK4	**137.00**	DE4
Branch Circuit Breaker Field Installation Kit for two Q-Frame Circuit Breakers (QBL, QDL, or QGL, order separately). For CUM400CB, QUM400CL or QUM400CK - includes (2) mounting pans, (4) wires.	BMK2Q400	**153.00**	DE4
Overhead Feed Trough for 400 A ring- and ringless-type Meter Mains and All-In-Ones.	OCK400	**567.00**	DE4
Touch-Up Paint (ASA49 Gray)	PK49SP	**39.00**	DE1
Ground Bar Kit, Meter Mains and All-In-Ones QC, RC, and SC (100–225 A)	PK15GTA	**17.10**	DE3A
Filler Plate for: Meter Main Types: QC, CU All-In-One Types: QC	QOFP	**3.60**	DE3A
Filler Plate for: Meter Main Types: RC, SC All-In-One Types: SC, RC, SU	HOMFP	**3.20**	DE3A
Neutral Lug (6-2/0 AWG) for: Meter Main Types: RC, SC, QC All-In-One Types: SC, SU, QC, RC	LK100AN	**10.80**	DE3A
Overhead Barrier Tunnel Kit for Ringless & Horn Bypass in RC/QC Devices	OHBS	**86.00**	DE4
Overhead Barrier Tunnel Kit for Lever Bypass RC/QC Devices	OHBL	**94.00**	DE4

Hubs and Closing Plates

Hub Series	Conduit Size (inches)	Cat. No.	$ Price	Disc. Sch.
Closing Plate for "A" Hub opening		ACP	**13.40**	DE4
A	1.00	A100	**33.90**	DE4
	1.25	A125	**33.90**	DE4
	1.50	A150	**33.90**	DE4
	2.00	A200	**47.90**	DE4
	2.50	A250	**61.00**	DE4
Adapter plate to allow use of "A" Hubs on "A-L" size hub openings		AAP	**33.80**	DE4
Closing Plate for "A-L" Hub opening		ACPL	**18.30**	DE4
A-L	2.00	A200L★	**83.00**	DE4
	2.50	A250L	**87.00**	DE4
	3.00	A300L	**111.00**	DE4
	3.50	A350L	**114.00**	DE4
	4.00	A400L	**119.00**	DE4
Closing Plate for "B" Hub opening		BCAP	**3.80**	DE1A
B	0.75	B075	**33.30**	DE1A
	1.00	B100	**33.30**	DE1A
	1.25	B125	**33.30**	DE1A
	1.50	B150	**33.30**	DE1A
	2.00	B200	**61.35**	DE1A
	2.50	B250	**102.00**	DE1A
B300	3.00	B300	**186.00**	DE1A

★ Supplied with AAP adapter plate and "A" hub.

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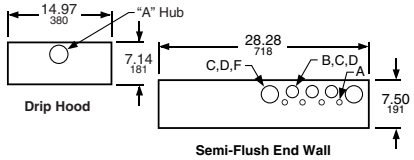


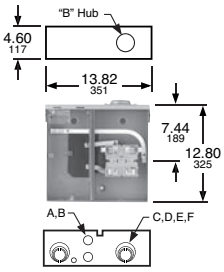
▲ Driphood supplied factory-installed and is required for surface mount installation.
For semi-flush installation, remove driphood and install flange kit SC200F (order separately).

■ Unit supplied with blank top endwall (factory-installed) for surface mount installation. For semi-flush installation, install flange kit FK400 (order separately). Kit includes replacement top endwall (with knockouts) and flanges.

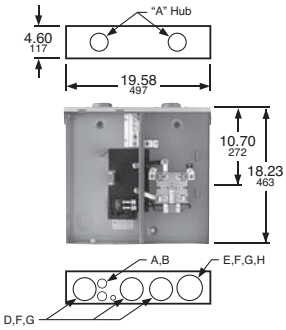
♦ Unit supplied with semi-flush top endwall factory installed and semi-flush flanges factory included.

Table 1.61: Knockouts

Symbol	A	B	C	D	E	F	G	H	I	J
Conduit Size (in.)	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4

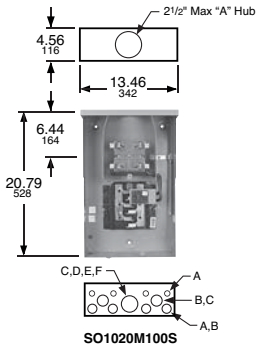


C125RB (Shown)
CQRB100

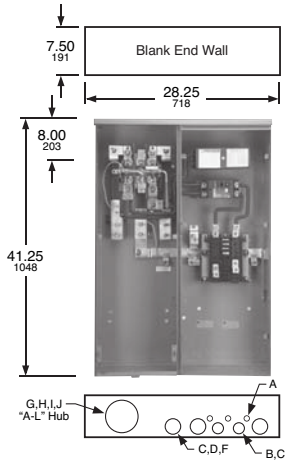


Ring Type:
CM200S
C2M200S (Shown)
C4L200S

Ringless Type:
RC200S
RC2M200S
RC2M200SH

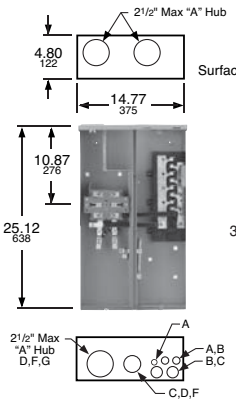


SO1020M100S

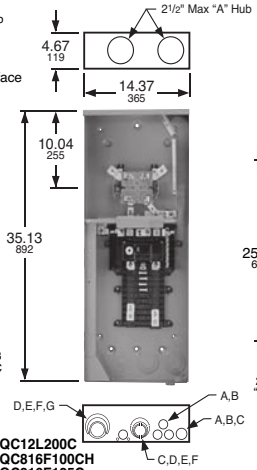


CU12L400CN■
CU12L400CB■
QU12L400CL■
QU12L400SL
CU12L400FN♦
CU12L400FB♦
CU816D400FN♦
CU816D400FB♦
QU816D400CK■
QU12L400FL♦
QU816D400FL♦

CU816D400CB■
CU816D400CN■
QU816D400CL■
QU816D400SL (Shown)

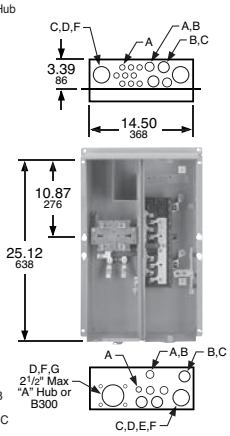


SC8L125S (Shown)
RC8L125S
SC1624M100S
SC1624M125S
RC1624M100S
RC1624M125S



QC12L200C
QC816F100CH
QC816F125C
QC816F150C
QC816F200C
QC816F200CH
RC12L200C
RC816F100CH
RC816F125CH
RC816F150C
RC816F150CH

RC816F200C
RC816F200CH
RC2040M125CH
RC2040M150CH
RC2040M200C
RC2040M200CH
QC2442M200C
QC2442M200CH



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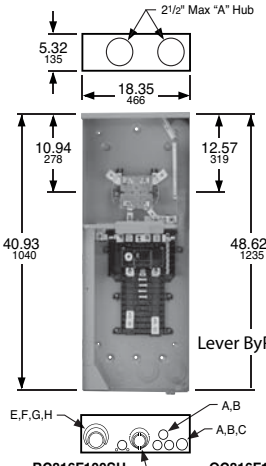
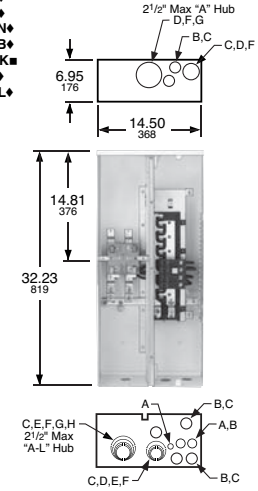
SC1624M100F
SC1624M125F



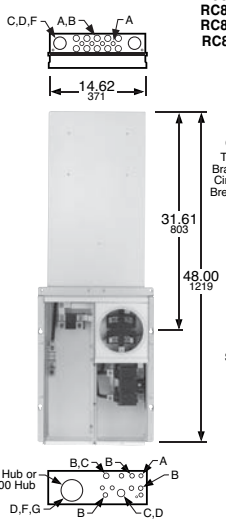
Lever ByPass Devices

RC816F100SH
RC816F125SH
RC816F150SL
RC816F150S,SH
RC816F200SL
RC816F200S,SH
RC12L200S
RC2040M125SH
RC2040M150SH
RC2040M200S,SH
RC3040M150SL
RC3040M200SL

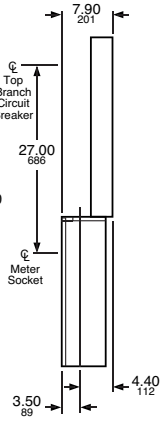
QC816F100SH
QC816F125SH
QC816F150S,SH (Shown)
QC816F150SL
QC816F200SL
QC816F200S,SH
QC12L200S
QC2442M150SH
QC2442M200S,SH
SO2040M200S
QC3040M200SH

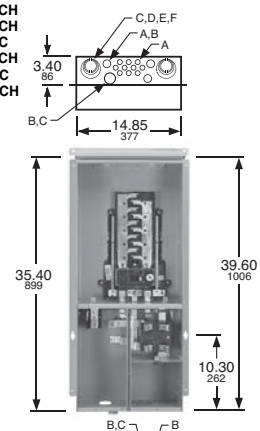


SU816D150C▲
SU816D200C▲
SU2040M200C▲
RC816D200CH▲
SC816D150C▲
SC816D200C▲(Shown)



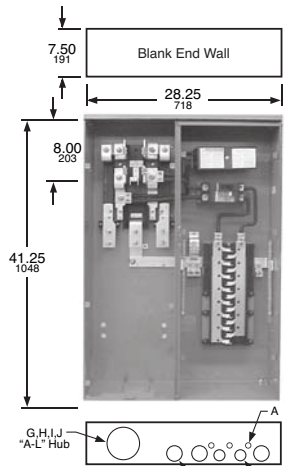
SU3040M200R (Shown)
SU3040M225R





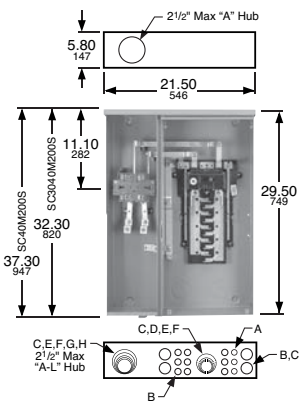
35.40 899 — **SC816F200F**, **SC12L200F**, **SC2040M125F**, **SC2040M200F (Shown)**

39.60 1006 — **SC3040M200F**, **SC3040M2225F**, **SC2636M200FPV**, **SC2636M225FPV**



SU3040D400CB■ (Shown)
RU3040D400CL■
RU3040D400CK■
SU3040D300FB♦
SU3040D400FB♦
SU3040D400FN♦

SU3040D300CB■
SU3040D400CN■
RU3040D400FL♦
RU3040D400FK♦
CUM400CB■
QUM400CL■
QUM400CK■



SC12L200S
SC816F150S
SC816F200S

SC40M200S
SC2040M200S (Shown)
SC3040M200S

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SC/SU SOLAR READY CSED Devices Coming Soon—See On-Line Digest Updates for Availability

Meter Mains and All-In-Ones

- Ringless Meter Sockets with barrel lock provisions factory installed except for Cat. No. SO2040M200SS which is a Ring Style meter socket with no provisions for barrel lock to secure the meter cover.
- UL Listed, suitable only for use as service equipment
- Service disconnect(s) are supplied factory-installed, except where noted
- Supplied with 100% branch neutrals, all unused terminals may be used for equipment grounding wires.
- Meets Federal Specification W-P-115c as Type 1, Class 2
- Solar Ready kit SR69064A fits All Devices Below, order from Table 1.70
- All devices have a 3" KO in the bottom endwall.
- Provisions for Field Installed CTs All Devices

Table 1.62: All-In-One Combination Service Entrance Devices

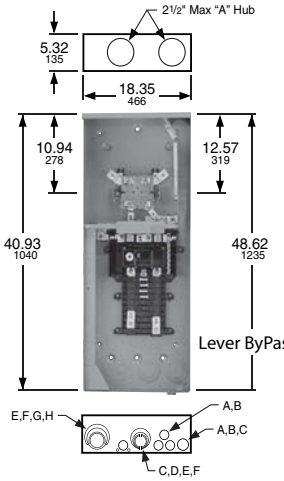
	Ampere Rating	Bypass Type	Service Type	Short Circuit Current Rating	Cat. No.	List $ Price	Service Disconnect(s)			Load Center and Branch Circuit Breakers (Order Separately Pages 1-2, 1-3, 1-14)				Hub Type (Order Separately page 1-18)	Line Side Main Lugs AWG/ kcmil (Al/Cu)	Service Ground Lug AWG/ kcmil (Al/Cu)
							2P Circuits (Max.)	Type (Factory Installed except where noted)	Ampere Rating	Max. Quantity Spaces	1P Circuits	1P Tandems	Ampere Rating (Max.)			
Meter Mains◊																
QO	**Surface Mount Only**															
	Surface Mount—Supplied with Feed-Thru Lugs and Provisions for Branch Circuit Breakers															
	150 A	None	OH/UG	22 kA	QC816F150SS■△	**1408.00**	1	QOM2150VH	150 A	8	16	8	150 A	A	350	8–2/0
		Lever	OH/UG	22 kA	QC816F150SLS■□	**2905.00**	1	QOM2150VH	150 A	8	16	8	150 A			
	200 A	None	OH/UG	22 kA	QC816F200SS■△	**1408.00**	1	QOM2200VH	200 A	8	16	8	200 A			
		Lever	OH/UG	22 kA	QC816F200SLS■□	**2905.00**	1	QOM2200VH	200 A	8	16	8	200 A			
Homeline	**Surface Mount—Supplied with Feed-Thru Lugs and provisions for Branch Circuit Breakers**															
	150 A	None	OH/UG	22 kA	RC816F150SS■△	**1270.00**	1	QOM2150VH	150 A	8	16	8	150 A	A	6-350	8–2/0
		Lever	OH/UG	22 kA	RC816F150SLS■□	**2878.00**	1	QOM2150VH	150 A		16	8	150 A	A	6-350	8–2/0
	200 A	None	OH/UG	22 kA	RC816F200SS■△	**1270.00**	1	QOM2200VH	200 A	8	16	8	200 A	A	6-350	8–2/0
		Horn	OH/UG	22 kA	RC816F200SHS■★△	**1313.00**	1	QOM2200VH	200 A	8	16	8	200 A	A	6-350	8–2/0
		Lever	OH/UG	22 kA	RC816F200SLS■□	**2878.00**	1	QOM2200VH	200 A		16	8	200 A	A	6-350	8–2/0
All-in-One Combination Service Entrance Devices◊																
QO	**Surface Mount Only**															
	200 A	None	OH/UG	22 kA	QC2442M200SS△	**2057.00**	1	QOM2200VH	200 A	24	42	18	200 A	A	6-350	8–2/0
		Horn	OH/UG	22 kA	QC2442M200SHS★△	**2057.00**	1	QOM2200VH	200 A	24	42	18	200 A	A	6-350	8–2/0
Homeline	150 A	Horn	OH/UG	22 kA	RC2040M150SHS★△	**1833.00**	1	QOM2150VH	150 A	20	40	20	150 A	A	6-350	8–2/0
		Lever	OH/UG	22 kA	RC3040M150SLS□	**2226.00**	1	QOM2150VH	150 A	30	40	10	150 A	A	6-350	8–2/0
	200 A	None	OH/UG	22 kA	RC2040M200SS△	**1833.00**	1	QOM2200VH	200 A	20	40	20	200 A	A	6-350	8–2/0
		Horn	OH/UG	22 kA	RC2040M200SHS★△	**1833.00**	1	QOM2200VH	200 A	20	40	20	200 A	A	6-350	8–2/0
		None	OH	22 kA	SO2040M200SS△	**1242.00**	1	QOM2200VH	200 A	20	40	20	200 A	A	6-350	8–2/0
		Lever	OH/UG	22 kA	RC3040M200SLS□	**2226.00**	1	QOM2200VH	200 A	30	40	10	200 A	A	6-350	8–2/0

* Kit is to be installed between meter socket and Main Disconnect. May be used with Solar PV, Wind, fuel generators, and other power generation sources up to 80% of Mains Rating Maximum 160 A.

▲ Order two pole QO, QO-VH or QOH circuit breakers separately from page 1-22 or 1-2. The short circuit current rating is equal to the lowest interrupting rating of any circuit breaker installed.
■ Supplied with load side feed-thru lugs, for 4AWG-250 kcmil Al/Cu conductors.
♦ Ring style device. Barrel lock provisions not provided.
★ Device supplied with horn bypass and 5th jaw factory installed
▼ Order two pole Homeline circuit breakers separately from page 1-22.
△ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBS. See accessories p 1-22, check with local utility for approval.
□ Suitable for load wires to exit top endwall with addition of Tunnel Kit OHBL. See accessories p 1-22, check with local utility for approval.
◊ **Solar Ready Kit Part Number SR69064A * (This Kit Fits All Solar Ready Devices) List Price: $78.00**

Table 1.63: Knockouts

Symbol	A	B	C	D	E	F	G	H	I	J
Conduit Size (in.)	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4



RC816F150SS
RC816F200SS
RC816F200SHS
QC816F150SS
QC816F200SS
RC2040M150SHS
RC2040M200SS
RC2040M200SHS
SO2040M200SS
QC2442M200SS
QC2442M200SHS
QC816F150SLS
RC816F150SLS
RC3040M150SLS
QC816F200SLS
RC816F200SLS
RC3040M200SLS

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1Ø3W—120/240 Vac—240 Vac—UL Listed

Table 1.64: Enclosed Molded Case Switch, Switch Included, Does NOT provide overcurrent protection

Service	Ampere Rating	General Purpose Cat. No.	General Purpose $ Price	Rainproof Cat. No.	Rainproof $ Price	Box. No. See Page 1-17
240 Vac G B	60 A▲■	QO260NATS	**161.00**	QO200TR	**161.00**	2, 9R♦
				QO200TRNM	**191.00**	1NM
				QO260NATR	**168.00**	1R
120/240 Vac S N	100 A★	QO2000NS	**276.00**	QO2000NRB	**338.00**	13, 10R

Table 1.65: Housing Bracket

Description	Cat. No.	$ Price
Bracket used with QO200TR for stucco, aluminum and vinyl siding. Order quantity multiples of 10.	PKHB	**6.30**

QO200TRNM

QO3100BNF
With Cover Removed

PKHB
Housing
Bracket

Table 1.66: Enclosed GFCI Circuit Breakers, GFCI Circuit Breaker Included—10 kA Short Circuit Current Rating

Service	Ampere Rating	Type 3R—Rainproof Cat. No.	Type 3R—Rainproof $ Price	Circuit Breaker Included	Box. No. See Page 1-17
120/240 Vac S N	50 A	QOE250GFINM HOME250SPA	**528.00** **473.00**	QO250GFI HOM250GFI	1NM (Non-metallic) 1R (Metallic)

Table 1.67: 2-Pole Circuit Circuit Breaker Enclosures—22 kA Short Circuit Current Rating

Not for use with one pole QO or QOVH breakers. Circuit breakers not included. Order QO™, QOVH, QO-GFI, QO-AFI, QO-EPD and QO-PL circuit breakers separately from pages 1-2 and 1-3. Accepts QO circuit breakers with factory-installed accessories. Order equipment ground bar PKOGTA2, if required.

Service	Ampere Rating	General Purpose▼ Cat. No.	General Purpose▼ $ Price	Rainproof Cat. No.	Rainproof $ Price	Box. No. See Page 1-17
120/240 Vac S N	100 A 125 A	QO2100BNF/S QO2125BNF/S	**83.00** **108.00**	QO2100BNRB QO2125BNRB	**135.00** **158.00**	13, 10R 18, 13R
240 Vac S N	100 A	QO3100BNF/S	**149.00**	QO3100BNRB	**207.00**	13, 10R

Table 1.68: 60A Max. Circuit Breaker Enclosures—10 kA Short Circuit Current Rating

Circuit breaker not included. Order separately from page 1-2. Will not accept QO-GFI circuit breaker nor QO circuit breakers with factory-installed accessories.

240 Vac G B	60 A▲	—	—	QO2TR	**95.00**	9R♦

Table 1.69: Q Frame Enclosures and Q Frame Circuit Breakers

Service	Enclosure Only □ Type 1—General Purpose▼ Cat. No.	Type 1 $ Price	Type 3R—Rainproof Cat. No.	Type 3R $ Price	Box No. See Page 1-17	Ampere Rating	Circuit Breaker (Order Separately) 10 k AIR Cat. No.	10 k AIR $ Price	25 k AIR Cat. No.	25 k AIR $ Price	65 k AIR Cat. No.	65 k AIR $ Price	100 k AIR Cat. No.	100 k AIR $ Price
2P 240 Vac Maximum	Q22200NS ◊ or Q23225NF/S	**176.00** **218.00**	Q22200NRB◊ or Q23225NRB	**380.00** **417.00**	19, 11R 20, 12R	70 A	QBL22070	**474.00**	QDL22070	**1143.00**	QGL22070	**1521.00**	QJL22070	**1890.00**
						80 A	QBL22080	**474.00**	QDL22080	**1143.00**	QGL22080	**1521.00**	QJL22080	**1890.00**
						90 A	QBL22090	**474.00**	QDL22090	**1143.00**	QGL22090	**1521.00**	QJL22090	**1890.00**
						100 A	QBL22100	**474.00**	QDL22100	**1143.00**	QGL22100	**1521.00**	QJL22100	**1890.00**
						110 A	QBL22110	**474.00**	QDL22110	**1143.00**	QGL22110	**1521.00**	QJL22110	**1890.00**
						125 A	QBL22125	**474.00**	QDL22125	**1143.00**	QGL22125	**1521.00**	QJL22125	**1890.00**
						150 A	QBL22150	**474.00**	QDL22150	**1143.00**	QGL22150	**1521.00**	QJL22150	**1890.00**
						175 A	QBL22175	**474.00**	QDL22175	**1143.00**	QGL22175	**1521.00**	QJL22175	**1890.00**
						200 A	QBL22200	**474.00**	QDL22200	**1143.00**	QGL22200	**1521.00**	QJL22200	**1890.00**
						225 A	QBL22225	**474.00**	QDL22225	**1143.00**	QGL22225	**1521.00**	QJL22225	**1890.00**
3P 240 Vac	Q23225NF/S	**218.00**	Q23225NRB	**278.00**	20, 12R	70 A	QBL32070	**1248.00**	QDL32070	**1784.00**	QGL32070	**2442.00**	QJL32070▽	**2796.00**
						80 A	QBL32080	**1248.00**	QDL32080	**1784.00**	QGL32080	**2442.00**	QJL32080▽	**2796.00**
						90 A	QBL32090	**1248.00**	QDL32090	**1784.00**	QGL32090	**2442.00**	QJL32090▽	**2796.00**
						100 A	QBL32100	**1248.00**	QDL32100	**1784.00**	QGL32100	**2442.00**	QJL32100▽	**2796.00**
						110 A	QBL32110	**1248.00**	QDL32110	**1784.00**	QGL32110	**2442.00**	QJL32110▽	**2796.00**
						125 A	QBL32125	**1248.00**	QDL32125	**1784.00**	QGL32125	**2442.00**	QJL32125▽	**2796.00**
						150 A	QBL32150	**1248.00**	QDL32150	**1784.00**	QGL32150	**2442.00**	QJL32150▽	**2796.00**
						175 A	QBL32175	**1248.00**	QDL32175	**1784.00**	QGL32175	**2442.00**	QJL32175▽	**2796.00**
						200 A	QBL32200	**1248.00**	QDL32200	**1784.00**	QGL32200	**2442.00**	QJL32200▽	**2796.00**
						225 A	QBL32225	**1248.00**	QDL32225	**1784.00**	QGL32225	**2442.00**	QJL32225▽	**2796.00**

Table 1.70: QOM2 Enclosures and QOM2 Circuit Breakers

QOM22225NS
With Cover Removed

Q22200NS
With Cover Removed

Q23225NF

(Order Q-Frame circuit breaker separately)

Service	Enclosure Only△ Type 1 General Purpose▼ Cat. No.	Type 1 $ Price	Type 3R Rainproof Cat. No.	Type 3R $ Price	Box No. See Pages 1-17	QOM2 Circuit Breaker (Order Separately) ☆ Ampere Rating	22 k AIR Cat. No.◒	22 k AIR $ Price
2P 240 Vac Maximum	QOM22225NF/S	**234.00**	QOM22225NRB	**440.00**	22, 16R	100 A	QOM2100VH	**468.00**
						125 A	QOM2125VH	**468.00**
						150 A	QOM2150VH	**468.00**
						175 A	QOM2175VH	**468.00**
						200 A	QOM2200VH	**468.00**
						225 A	QOM2225VH	**468.00**

▲ Not suitable for service equipment.
■ Maximum 10 hp 240 Vac.
♦ Top endwall has no hub opening.
★ Maximum 20 hp 240 Vac.
▼ Order F for flush, S for surface.
△ Equipment ground bar kit PKOGTA2 factory-included.
□ Factory-installed groundable neutral assembly includes (2) ground lugs and (2) neutral lugs. Equipment ground kit PKOGTA2 also included.
◊ Accepts 200 A max. 2P Q Frame circuit breakers.
☆ Add suffix 1021 for 120, 208 or 240 Vac shunt trip. Add $126.
▽ When these 3P circuit breakers are mounted in an enclosure, the maximum AIR rating is 65 kA at 240 Vac and 100 kA at 208 Vac.
◒ DE3A Discount Schedule.

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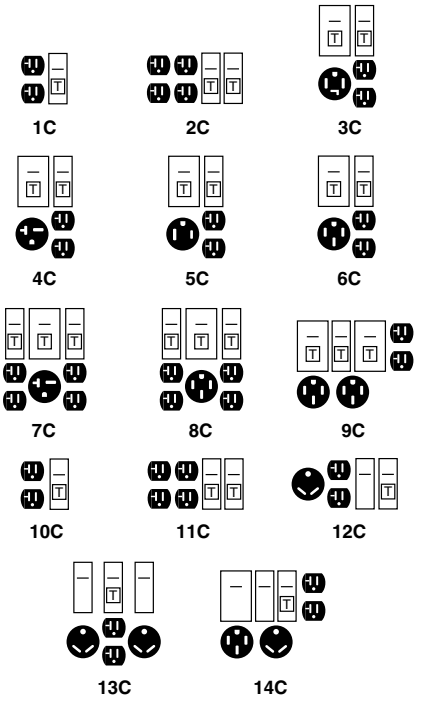
(For Dimensions/Drawings go to Supplemental Digest, hardcopy or on-line version.)



A		20 A 125 V 2W and Grd. NEMA 5-20R
B		30 A 125 V 2W and Grd ANSI 73.13
C		50 A 125/250 V 3W and Grd. NEMA 14-50R
D		20 A 250 V 2W and Grd. NEMA 6-20R
E		30 A 125/250 V 3W and Grd. NEMA 14-30R
F		50 A 250 V 2W and Grd. NEMA 6-50R

All non-pedestal devices have provisions to field-install a Type "B" hub on the bottom endwall for bottom feed from a conduit riser. Order Type "B" bolt-on hub (B250 Max.) and two mounting screws (Cat. No. 8002505501) and two hex nuts (Cat. No. 2340102000).

For Construction Sites

- Provide temporary power at construction sites.
- Each receptacle protected by QO-GFI circuit breaker in compliance with NEC® requirements.
- Each enclosure is rainproof.
- 10 kA short circuit current rating.
- UL Listed as suitable for use as temporary site service equipment.
- Provided with neutral bonding provisions.
- Boxes have provisions for type "B" hubs to be field-installed.

Table 1.71: Construction Site Panels

Power Outlet Configuration	Service ▲	Mains Ampere Rating	Circuit Breaker (Included)	Receptacles (Included) A	C	D	E	F	Cat. No. ♦	$ Price	Main Wire Size AWG ★ Cu	Al
1C	1Ø2W	40 A	(1) QO120GFI	1					PAK10C1	**441.00**	14–6	12–6
2C	1Ø2W	40 A	(2) QO120GFI	2					PAK11C ▼	**818.00**	14–6	12–6
2C	1Ø2W	40 A	(2) QO120GFI	2					PAK11C1	**818.00**	14–6	12–6
3C	1Ø3W	70 A	(1) QO120GFI (1) QO230GFI	1			1		PAK31CGFI	**974.00**	8–1	8–1
4C	1Ø3W	70 A	(1) QO120GFI (1) QO220GFI	1		1			PAK36C1GFI	**974.00**	8–1	8–1
5C	1Ø3W	70 A	(1) QO120GFI (1) QO250GFI	1				1	PAK51CGFI	**974.00**	8–1	8–1
6C	1Ø3W	70 A	(1) QO120GFI (1) QO250GFI	1	1				PAK55CGFI	**974.00**	8–1	8–1
7C	1Ø3W	70 A	(2) QO120GFI (1) QO220GFI	2		1			PAK72CGFI	**1323.00**	8–1	8–1
8C	1Ø3W	70 A	(2) QO120GFI (1) QO250GFI	2	1				PAK76CGFI	**1323.00**	8–1	8–1
9C	1Ø3W	100 A	(1) QO120GFI (2) QO250GFI	1	2				PAK1004CGFI	**1581.00**	14–1	12–1

For Recreational Vehicle Parks

- Provide electrical power to individual recreational vehicle park sites.
- Each receptacle protected by appropriate GFI or Standard QO™ circuit breaker.
- All receptacles and circuit breakers included.
- 10 kA short circuit current rating.
- UL Listed.
- All enclosures are rainproof.
- No neutral bonding provisions.
- Loop-feed provisions.

Table 1.72: Recreational Vehicle Park Panels

Power Outlet Configuration	Service ▲	Mains Ampere Rating	Circuit Breaker (Included)	Receptacles (Included) ■ A	B	C	Cat. No.	$ Price	Main Wire Size AWG/kcmil △ Phase and Neutral Cu	Al
Underground or Overhead Loop-Feed Terminals—Non-Pedestal ♦ □										
11C	1Ø2W	40 A	(2) QO120GFI	2			PAK11CTG	**795.00**	14–6	12–6
12C	1Ø2W	50 A	(1) QO120GFI (1) QO130	1	1		PAK41CTG ◊	**564.00**		
			(2) QO130							12–1
14C	1Ø3W	100 A	(1) QO120GFI (1) QO250 (1) QO130	1	1	1	PAK75CTG (Not Loop Feed) ◊	**669.00**	14–1	12–1
Pedestal Mounted—Underground Loop-Feed Terminals ☆▽										
11C	1Ø2W	40 A	(2) QO120GFI	2			PAK11PG	**1035.00**	(2)6–250	(2)6–250
12C	1Ø2W	50 A	(1) QO120GFI (1) QO130	1	1		PAK41PG ◊	**852.00**		
13C	1Ø2W	75 A	(1) QO120GFI (2) QO130	1	2		PAK61PG ◊	**914.00**		
14C	1Ø3W	100 A	(1) QO120GFI (1) QO250 (1) QO130	1	1	1	PAK75PG ◊	**1007.00**		

▲ (1Ø2W 120 Vac) (1Ø3W 120/240 Vac)
■ 20 A receptacles protected by 20 A GFI circuit breaker.
♦ Devices have a bolt-on factory-installed closing cap. Order type "B" bolt-on hub separately from page 1-18.
★ Equipment ground terminal suitable for (2) 14 or 12 AWG Cu or (2) 12 or 10 AWG Al.
▼ Receptacles in this device are in bottom endwall and are accessible with outer door padlocked. "Order Only" from Lexington—Minimum order quantity is 50 devices.
△ Two wires each per phase, neutral, and equipment ground—for loop feed (except PAK75CTG).
□ Equipment ground terminal suitable for (2) 14–12 AWG Cu or (2) 12–10 Al.
◊ GFI circuit breaker can be substituted for standard 30 A circuit breaker. For 30 ampere receptacles add $**140.00** per circuit breaker. Add suffix "FI" to catalog number. Example: PAK41CTGFI.
☆ Stabilizer foot available for use in unstable ground, order HNPSF $**27.50** list.
▽ Equipment ground terminals suitable for (2) 10–2/0 AWG Cu or (2) 6–2/0 AWG Al.

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QO154M200P

New!

QO Plug-on Neutral Load Centers and CAFI Breakers connect are engineered for a quick Plug-on Neutral connection on every unit.

Table 1.73: QO Plug-on Neutral CAFI Load Center (accepts QO Circuit Breakers only)

	Mains Rating	Spaces	Max. 1P Circuits	Max. Tandem Breakers	$ Price (Interior, Box & Cover)	Load Center Box and Interior		Indoor Cover with Door (Order Separately)			Main Wire Size AWG/kcmil	Equipment Ground Bar Kit (Order Separately If Priced)		Box No. See Page 1-17
						Cat. No.	$ Price	Flush Cat. No.	Surface Cat No.	$ Price	Al/Cu	Cat. No.	$ Price	
INDOOR	**Convertible Mains — Factory-Installed Main Lugs — 65 kA Short Circuit Current Rating — Copper Bus QOM1 Main Frame Size, Convertible to Main Circuit Breaker**													
	125 A	24	24	0	**572.00**	QO124L125PG	**534.00**	QOC24UF	QOC24US	**37.70**	6–2/0	PK15GTA		7
	Convertible Mains — Factory-Installed Main Lugs — 65 kA Short Circuit Current Rating — Copper Bus QOM2 Main Frame Size, Convertible to Main Circuit Breaker													
	200 A	30	30	0	**684.00**	QO130L200PG	**597.00**	QOC30UF	QOC30US	**87.00**	6–250	PK23GTA, LK100AN		9
	225 A	42	42	0	**1018.00**	QO142L225PG	**907.00**	QOC42UF	QOC42US	**111.00**	6–300	(2) PK15GTA		11
		54	54	0	**1356.00**	QO154L225PG	**1177.00**	QOC54UF	—	**179.00**		PK23GTA, LK100AN		12
	Convertible Mains — Factory-Installed Main Circuit Breaker — 22 kA Short Circuit Current Rating — Copper Bus QOM1 Main Circuit Breaker Frame Size, Convertible to Main Lugs or Lower Amperage Main Circuit Breaker													
	100 A	24	24	0	**743.70**	QO124M100P	**706.00**	QOC24UF	QOC24US	**37.70**	6–2/0	PK15GTA	**17.10**	7
	Convertible Mains — Factory-Installed Main Circuit Breaker — 22 kA Short Circuit Current Rating — Copper Bus QOM2 Main Circuit Breaker Frame Size, Convertible to Main Lugs or Lower Amperage Main Circuit Breaker													
	200 A	30	30	0	**1069.00**	QO130M200P	**982.00**	QOC30UF	QOC30US	**87.00**	4–250	PK18GTA	**18.80**	9
		42	42	0	**1410.00**	QO142M200P	**1299.00**	QOC42UF	QOC42US	**111.00**		PK23GTA	**21.30**	11
		54	54	0	**1720.00**	QO154M200P	**1541.00**	QOC54UF	—	**179.00**		PK23GTA	**21.30**	12
		60	60	0	**1956.00**	QO160M200PC▲	**1689.00**	QOC60UF▲	—	**267.00**		PK23GTA	**21.30**	24
OUTDOOR■	**Convertible Mains — Factory-Installed Main Lugs — 65 kA Short Circuit Current Rating — Cu Bus QOM1 Main Circuit Breaker Frame Size, Convertible to Main Circuit Breaker — Equipment Ground Bar Included**													
	125 A	24	24	0	**712.00**	QO124L125PGRB	**712.00**	—	—	—	6–2/0	PK15GTA		4R
	Convertible Mains — Factory-Installed Main Lugs — 65 kA Short Circuit Current Rating — Cu Bus QOM2 Main Circuit Breaker Frame Size, Convertible to Main Circuit Breaker — Equipment Ground Bar Included													
	200 A	30	30	0	**856.00**	QO130L200PGRB	**856.00**	—	—	—	6–250	PK23GTA, LK100AN		6R
	225 A	42	42	0	**1500.00**	QO142L225PGRB	**1500.00**	—	—	—	6–300	(2) PK15GTA		8R
	Convertible Mains — Factory-Installed Main Circuit Breaer — 22 kA Short Circuit Current Rating — Copper Bus Convertible to Main Lugs (see below) or Lower Amperage Main Circuit Breaker (See page 1-5), QOM1 Main Circuit Breaker Frame Size													
	100 A	24	24	0	**1144.00**	QO124M100PRB	**1144.00**	—	—	—	6–2/0	PK15GTA	**17.10**	4R
	Convertible Mains — Factory-Installed Main Circuit Breaer — 22 kA Short Circuit Current Rating — Copper Bus Convertible to Main Lugs (see below) or Lower Amperage Main Circuit Breaker (See page 1-5), QOM2 Main Circuit Breaker Frame Size													
	150 A	30	30	0	**1344.00**	QO130M150PRB	**1344.00**	—	—	—	4–250	PK18GTA	**18.80**	6R
	200 A	30	30	0	**1344.00**	QO130M200PRB	**1344.00**	—	—	—		PK18GTA	**21.30**	6R
		42	42	0	**1659.00**	QO142M200PRB	**1659.00**	—	—	—		PK23GTA	**21.30**	8R

▲ Door kit available separately Order QOCDK60 **$237.00**.
■ All OUTDOOR devices are available FACTORY ORDER only.

Table 1.74: QO Arc Fault Circuit Breakers

Circuit Breaker Type	Ampere Rating	1P 120 Vac 10 k AIR 1 Space Required		1P 120 Vac 22 k AIR 1 Space Required	
		Cat. No.	$ Price	Cat. No.	$ Price
Combination Arc-fault Interrupter (Pigtail Neutral)	15	QO115CAFI	**282.00**	QO115VHCAFI	**534.00**
	20	QO120CAFI	**282.00**	QO120VHCAFI	**534.00**
Plug-On Neutral Combination Arc-fault Interrupter	15	QO115PCAFI	**282.00**	QO115VHPCAFI	**534.00**
	20	QO120PCAFI	**282.00**	QO120VHPCAFI	**534.00**

QO-K

Key operated QO circuit breakers are available in single-pole construction and can be mounted in any single-pole space which will accept a standard QO. These circuit breakers can be turned ON or OFF or to RESET with a special key (catalog number QOK10) included with the circuit breaker. These circuit breakers are UL Listed and available as shown in the table.

Table 1.75: QO-K Circuit Breakers

120 Vac—10 k AIR (1 Space Required)		
Ampere Rating ♦	Cat. No.	$ Price
10	QO110K	**164.00**
15	QO115K	**164.00**
20	QO120K	**164.00**
25	QO125K	**164.00**
30	QO130K	**164.00**

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Section 2

Metering Equipment

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EZ Meter-Pak Meter Centers

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Ring and Ringless Type Individual Meter Sockets

Class **4131** / Refer to Catalog **4100CT0701**

UTRS101B

UTRS202B
(cover not shown)

UTH5203T
(cover not shown)

URTRS213B

- Available single or three phase, 600 Vac max., with and without horn or lever bypass, overhead and underground service feed.
- 10 kA short circuit current rating (or higher with utility approval).
- UL Listed, NEMA 3R enclosure.
- Units supplied with bonded neutral.
- Units supplied with hub opening in top endwall require the use of a bolt-on hub, or closing plate.
- Units supplied with solid top are for underground feed only.
- Accessories, refer to page 2-3.

This metering is generally utility specific. Always check with local utility company before installing. Contact your nearest Field Sales Office for additional catalog numbers, if required by utility.

Table 2.1: Individual Meter Sockets

Ampere Rating▽	Jaw Qty.	Service Type	Cat. No.▲	$ Price	Lug Wire Range (Al/Cu)			Enclosure Information			Box No. see page 2-4
					Line, Load, and Neutral (AWG/kcmil)	Wire Binding	Gnd. (AWG)	Material	Top Endwall Conf.		
									Hub Opening■	Closing Plate ■	
Ringless Type, 1Ø3W 600 Vac Max., Without Bypass or Jaw Release											
125	4	UG	UTZRS101A★	**123.00**	8–2/0	1/2 in. Hex	14–2	Steel	Solid Top★	—	1R
125	4	OH	UTRS101B	**123.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP	1R
125	4	OH	UATRS101B	**137.00**	8–2/0	Slotted	14–2	Aluminum	Series A	ACPA	1R
125	4	OH	URS101BCPL	**135.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP	1R
125	5	OH/UG	1003880A▼	**161.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP	1R
200	4	OH	UTRS202B	**177.00**	8–250	1/2 in. Hex	14–2	Steel	Series A	ACP	3R
200	4	OH	UATRS202B	**195.00**	8–250	1/2 in. Hex	14–2	Aluminum	Series A	ACPA	3R
200	4	UG	UTRS213A★	**212.00**	1/0–350	1/2 in. Hex	14–2	Steel	Solid Top★	—	5R
200	4	OH/UG	UTRS213B▼	**212.00**	1/0–350	1/2 in. Hex	14–2	Steel	Series A	ACP	5R
200	4	OH/UG	UATRS213B▼	**225.00**	1/0–350	1/2 in. Hex	14–2	Aluminum	Series A	ACPA	5R
200	4	OH/UG	U92197CCCPL□	**240.00**	1/0–350	1/2 in. Hex	14–2	Steel	(2)Series A	(2)ACP□	7R
Ringless Type, 1Ø3W 600 Vac Max., With Horn Bypass, Without Jaw Release											
125	4	OH/UG	UHTRS101B	**161.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP	1R
125	5	OH	UGHTRS101L♦	**161.00**	8–2/0	Slotted	14–2	Steel	A125 ♦	—	1R
125	4	OH	URS101BDQ◊	**138.00**	8–2/0	1/2 in. Hex	None	Steel	Series A	ACP	1R
125	5	OH/UG	UGHTRS111C△	**207.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP △	4R
200	4	OH/UG	UBHMRS212B▼	**210.00**	8–250	1/2 in. Hex	None	Steel	Series A	ACP	4R
200	4	OH	UHTRS202B	**206.00**	8–250	1/2 in. Hex	14–2	Steel	Series A	ACP	3R
200	4	OH/UG	UHTRS212B▼	**206.00**	8–250	1/2 in. Hex	14–2	Steel	Series A	ACP	4R
200	4	OH/UG	UHTRS213B▼	**213.00**	1/0–350	1/2 in. Hex	14–2	Steel	Series A	ACP	5R
200	4	UG	UHTRS223A★	**272.00**	1/0–350	1/2 in. Hex	14–2	Steel	Solid Top★	—	2R
200	4	UG	URS212ADQ★◊	**203.00**	8–250	1/2 in. Hex	None	Steel	Solid Top★	—	4R
Ringless Type, 1Ø3W 600 Vac Max., With Lever Bypass and Jaw Release											
200	4	OH	UTH4203T	**465.00**	6–350	1/2 in. Hex	14–2	Steel	Series A-L	ACPL	8R
200	4	OH/UG	UTH4213T▼	**479.00**	6–350	1/2 in. Hex	14–2	Steel	Series A-L	ACPL	9R
200	5	OH	UTH5203T	**494.00**	6–350	1/2 in. Hex	14–2	Steel	Series A-L	ACPL	8R
200	5	OH/UG	UTH5213T▼	**564.00**	6–350	1/2 in. Hex	14–2	Steel	Series A-L	ACPL	9R
320	4	OH/UG	UTH4330T▼☆	**749.00**	Studs Only	3/8 in. dia. studs	14–1/0	Steel	Series A-L	ACPL	11R
Ringless Type, 3Ø4W 600 Vac Max., With Lever Bypass and Jaw Release											
200	7	OH/UG	UTH7213T▼	**666.00**	6–350	1/2 in. Hex	14–2	Steel	Series A-L	ACPL	9R
320	7	OH	UTH7300T☆	**830.00**	Studs Only	3/8 in. dia. studs	14–1/0	Steel	Series A-L	ACPL	10R
Ringless Type, 3Ø4W 600 Vac Max., Bolt-On Socket Without Bypass											
400	7	OH/UG	UK7T▼☆	**2423.00**	Studs Only	1/2 in.–20 dia. studs	1/2 in.–20 dia. studs	Steel	Series A-L	ACPL	12R
400	7	OH/UG	UAK7T▼☆	**2678.00**	Studs Only	1/2 in.–20 dia. studs	1/2 in.–20 dia. studs	Aluminum	Series A-L	ACPLA	12R
Ring Type, 1Ø3W 600 Vac Max., Without Bypass or Jaw Release											
125	4	OH/UG	URTRS101B▼	**123.00**	8–2/0	Slotted	14–2	Steel	Series A	ACP	1R
200	4	OH/UG	URTRS213B▼	**212.00**	1/0–350	1/2 in. Hex	14–2	Steel	Series A	ACP	5R

▲ Device requires approval from the serving utility, consult your nearest Schneider Electric sales office.
■ Order appropriate bolt-on hub or closing plate separately and install on TOP endwall.
♦ Device supplied with 1-1/4 in. bolt-on hub (Cat.No. A125) mounted on TOP endwall.
★ Device supplied with solid top endwall (without hub opening).
▼ When unit is installed for underground feed, the appropriate closing plate must be ordered separately and installed over hub opening in TOP endwall of device.
△ Device supplied with closing plate ACP mounted on TOP endwall.
□ Device supplied with two closing plates ACP mounted in TOP endwall.
◊ Contains "Duquesne Light Co." approved label.
☆ Order lugs separately, refer to accessories, page 2-3.
▽ Rating is continuous.

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UT2R1121B

Horizontal Ganged Meter Sockets

- 1Ø, 600 Vac max., main lugs only, 2 through 6 meter positions, with and without horn or lever bypass, end or center feed, overhead and underground service feeds.
- 10 kA short circuit current rating (or higher with utility approval).
- UL Listed, NEMA 3R enclosure.
- Supplied with ground lugs.
- Supplied with hub opening in top endwall, requires the use of a bolt-on hub, or closing plate.

This metering is generally utility specific. Always check with local utility company before installing. Contact your nearest Field Sales Office for additional catalog numbers, if required by utility.

Table 2.2: Ringless Type, 1Ø3W, 600 Vac Max., Without Bypass or Jaw Release

Branch Ratings				Mains Rating (A)	Cat. No.	$ Price	Main Lugs Phase and Neutral Al/Cu (AWG/kcmil)	Branch Lugs Phase and Neutral Al/Cu (AWG)	Top Endwall▲		Box No. See Page 2-4
Amperes♦	No. of Positions	Socket Jaw Qty.■	Service Type						Hub Type (Order Separately)	Closing Plate (Order Separately)	
100 A	2	4	OH/UG	200	UT2R1121B	**453.00**	6–250	8–2/0	Series A	ACP	13R
	3			205	UT3R1121B	**560.00**	6–250				13R1
	4			205	UT4R1131B	**660.00**	6–350				14R
	5			250	UT5R1131B	**908.00**	6–350				15R
	6			300	UT6R1131B	**1157.00**	6–350				16R
200 A	2	4	OH/UG	205	UT2R2122B	**647.00**	6–250	8–250	Series A	ACP	17R
	4			360	UT4R2352T	**1106.00**	1/0–500		Series A-L	ACPL	18R
	5			500	UT5R2392TU	**1383.00**	1/0–500 or (2)1/0–350		Series A-L	ACPL	19R
	6			620	UT6R2392TU	**1548.00**	1/0–500 or (2)1/0–350		Series A-L	ACPL	20R

▲ For hubs and closing plates, see Accessories table below.
■ Fifth jaw kit available to convert 4-jaw socket to a 5-jaw socket. See Accessories table below.
♦ Rating is continuous.

EMT3225CB

Meter Mains with Test Block Bypass (Meets EUSERC Requirements)

Table 2.3: Ring Type, 1Ø3W and 3Ø4W, Meter Main with Test Block Bypass (Meets EUSERC Requirements)

Supplied with bondable neutral, suitable for use as service equipment. Suitable for overhead or underground service. UL Listed File E6294.

System (Incoming) and Service (Outgoing)	Meter Socket Type	Ampere Rating (Max.)	Short Circuit Current Rating	Cat. No.△	$ Price	Main Circuit Breaker Type (Order Separately)★
120/240 Vac 1Ø3W	5-Jaw	225 A	100 kA max.	EMT1225CB	**4095.00**	2P Type QB, QD, QG, QJ, QO▼, QO-VH▼ or QOH▼
208Y/120 Vac 3Ø4W□ or 240/120 Vac 3Ø4W Delta	7-Jaw	225 A	65 kA max.	EMT3225CB	**5355.00**	3P Type QB, QD, QG or QJ

★ Refer to page 2-15 to select main circuit breaker.
▼ Requires use of EZM125QOA adapter (order separately), when using QO (40 A–125 A, 2-pole) 10 kA max. SCCR, QO-VH (40 A–60 A, 2-pole) 22 kA max. SCCR, or QOH (40 A–60 A, 2-pole) 42 kA max. SCCR. Refer to page 2-15 for pricing.
△ Refer to page 2-4 for box dimensions.
□ 100 kA max.

EMT1225CB
Without Covers

Table 2.4: EMT Terminal Wire Size ◊

Line Phase Lug	Line Neutral Lug	Service Ground Lug	Equipment Ground Lug	Load Neutral Lug
6 AWG–300 kcmil Al/Cu	6 AWG–350 kcmil Al/Cu	4 AWG–300 kcmil Al/Cu	6 AWG–300 kcmil Al/Cu	4 AWG–300 kcmil Al/Cu

◊ Refer to circuit breaker listings for usable load lug wire sizes.

Meter Socket Accessories

Table 2.5: Meter Socket Accessories

Accessory		Description	Cat. No.	$ Price
Fifth-Jaw Kit		Converts a 4-jaw meter socket to a 5-jaw meter socket. For use on meter sockets supplied without lever bypass or jaw release only.	A5J	**14.90**
Closing Plates (to seal hub openings)		For Series A (steel)	ACP	**13.40**
		For Series A (aluminum)	ACPA	**11.90**
		For Series A-L (steel)	ACPL	**18.30**
		For Series A-L (aluminum)	ACPLA	**16.50**
Hubs (listed by conduit size)	**Series A**	1.00 inch	A100	**33.90**
		1.25 inch	A125	**33.90**
		1.50 inch	A150	**33.90**
		2.00 inch	A200	**47.90**
		2.50 inch	A250	**61.00**
	Series A-L	2.00 inch	A200L	**83.00**
		2.50 inch	A250L	**87.00**
		3.00 inch	A300L	**111.00**
		3.50 inch	A350L	**114.00**
		4.00 inch	A400L	**119.00**
	Series B	3.00 inch	B300☆	**186.00**
Adapter Plate		To allow the use of a Series A Hub on a device that is setup for a series A-L Hub.	AAP	**33.80**
Lug Kits		For use on meter sockets supplied with Line, Load, and Neutral Studs only. Be sure to order enough lugs for each device (a typical 1Ø device requires 6 lugs).		
		Includes one, two-barrel lug (6-250 kcmil)	ARP00118	**38.10**
		Includes one, single barrel lug (4-600 kcmil)	ARP00129	**55.00**
		Includes three, two-barrel lugs (6-350 kcmil)	ARP00427	**135.00**
Sealing Ring		Snap-on Aluminum (Standard)	2920910001	**8.00**
		Snap-on Stainless Steel (Non-standard)	ARP00026	**16.70**
		Screw Type Aluminum (Non-standard)	29008W	**20.10**

☆ DE1A Discount.

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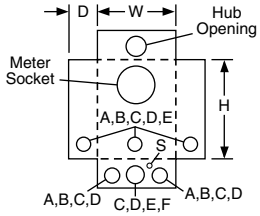
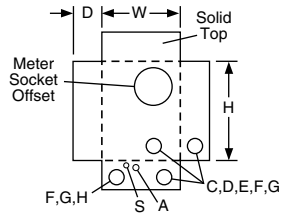


1R



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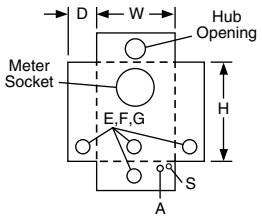

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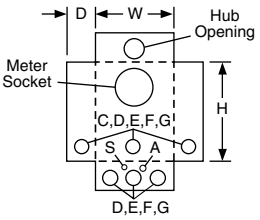

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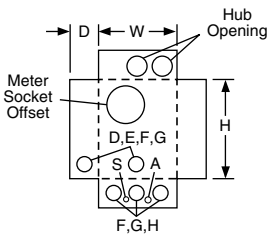

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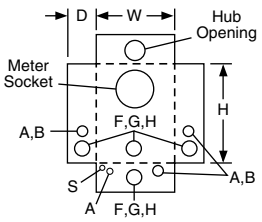

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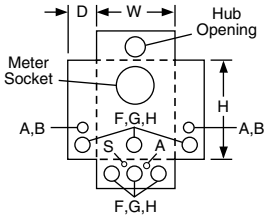
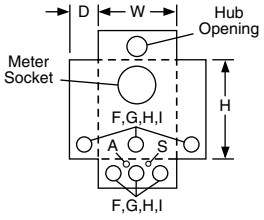


9R



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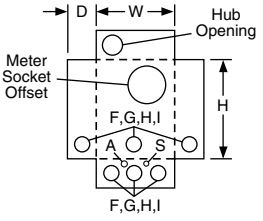


11R

Table 2.6: Enclosure Dimensions

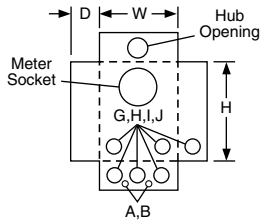
Dimensions (Inches)				
Box No.	**H**	**W**	**D**	**Hub Opening (Max. Conduit Size) ▲**
1R	10.88	8.00	3.50	Series A
2R	13.00	13.00	4.94	Solid Top
3R	14.00	8.00	4.38	Series A
4R	14.00	11.00	4.38	Series A
5R	15.00	11.00	4.38	Series A
6R	15.50	8.00	4.36	Series A
7R	17.13	13.00	4.94	(2) Series A
8R	19.00	10.50	4.94	Series A-L
9R	19.00	13.00	4.94	Series A-L
10R	34.50	15.00	5.68	Series A-L
11R	36.62	15.00	5.68	Series A-L
12R	43.00	20.25	6.00	Series A-L
13R	14.12	24.31	4.50	Series A
13R1	14.12	32.50	4.50	Series A
14R	14.12	40.62	4.50	Series A
15R	14.12	48.75	4.50	Series A
16R	14.12	57.00	4.50	Series A
17R	14.12	24.31	5.38	Series A
18R	14.12	40.62	5.38	Series A-L
19R	14.12	54.75	5.38	(2) Series A-L
20R	14.12	63.00	5.38	(2) Series A-L

▲Refer to page 2-3 for closing plates and hubs.

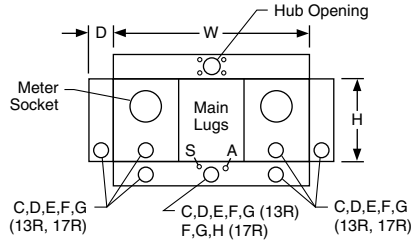
Table 2.7: Knockout Information

Knockouts											
Symbol	**S**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Conduit Size (in.)	5/16 ■	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4

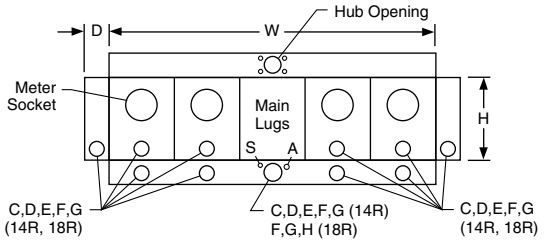
■Knockout for grounding conductor.



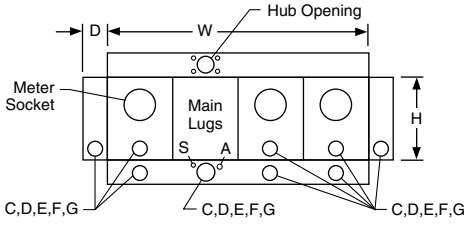
12R



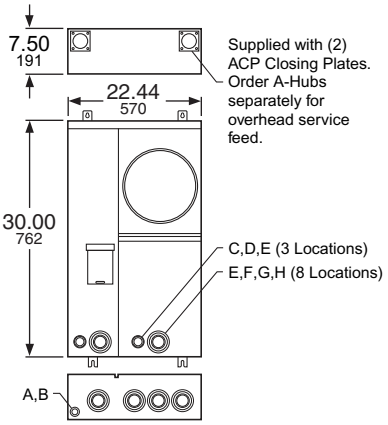
13R and 17R



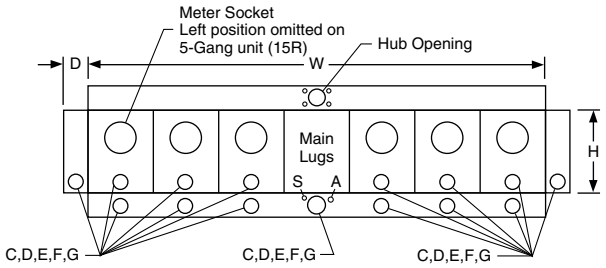
14R and 18R



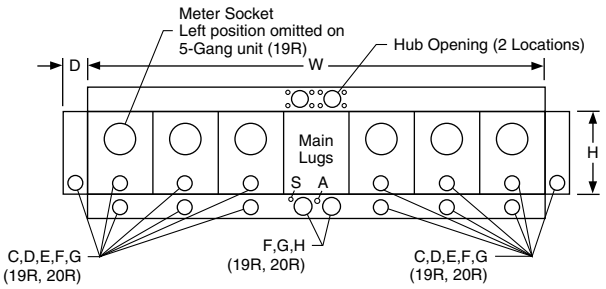
13R1



EMT1225CB and EMT3225CB



15R and 16R



19R and 20R

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Ring and Ringless Type Devices

MP44125

- Consult local utility for approval before installation.
- 120/240 Vac 1Ø3W.
- Main lugs only—two to six meter sockets.
- Enclosures are indoor/rainproof NEMA 3R construction.
- Suitable only for use as service equipment.
- Swingable mounting feet supplied at bottom of device.
- Factory-installed mechanical lugs, alternate lugs and NEMA/EUSERC lug landing kits available.
- Surface mount, convertible to semi-flush with field installed flange kit.
- Ring type devices supplied with 4-jaw meter sockets (5th jaw kits available, order separately).
- Ringless type devices supplied with 5-jaw meter sockets, available with and without horn or lever bypass.
- Provisions for mounting 2-pole circuit breaker for each meter socket position (order circuit breakers separately).
- Mounting channel supplied, except for box 1R (125 A, 2-position).
- Combination overhead/underground feed.

Table 2.8: Ring Type MP Meter-Pak Metering Equipment with 125 A (42 kA Maximum SCCR) or 200 A (22 kA Maximum SCCR) Meter Socket Positions

Amperes per Pole	No. of Poles	Factory-Installed Main Lug Ampacity (See page 2-6 for alternate lugs)	Main Bus Ampacity (A)	Cat. No.	$ Price	Line Lug Wire Size Al/Cu AWG/kcmil	Circuit Breaker Type (2P)	Hub Prov.▲	Semi-Flush Flange Kit	Wt Lbs	Box No.
125	2	200	200	MP22125 ■	**977.00**	(1) 4–250	QO, QO-VH, QOH	A/B300	MPSF12	46	1R
	3	300	300	MP33125 ♦	**1187.00**	(1) 1/0–600 or (2) 1/0–250		A-L	MPSF14	95	2R
	4	400	400	MP44125 ♦	**1730.00**	(1) 1/0–600 or (2) 1/0–250		A-L	MPSF14	97	2R
	5	400 Al 500 Cu	500	MP55125 ♦	**2079.00**	(1) 1/0–600 or (2) 1/0–250		(4) A-L	MPSF16	130	3R
	6	400 Al 500 Cu	600	MP66125 ♦	**2415.00**	(1) 1/0–600 or (2) 1/0–250		(4) A-L	MPSF16	132	3R
200	2	400	400	MP42200 ♦	**1274.00**	(1) 1/0–600 or (2) 1/0–250	QOM2-MM, QOM2-MVH	(4) A-L	MPSF23	99	4R
	3	400	400	MP43200 ♦	**2151.00**	(1) 1/0–600 or (2) 1/0–250			MPSF23	99	4R
	4	400	600	MP64200 ♦	**2814.00**	(1) 1/0–600 or (2) 1/0–250			MPSF24	135	5R
	5	600 Al, 750 Cu	800	MP85200 ♦	**3377.00**	(2) 3/0–500			MPSF26	173	6R
	6	600 Al, 750 Cu	800	MP86200 ♦	**4040.00**	(2) 3/0–500			MPSF26	173	6R

▲ For A and A-L Hubs see page 2-3, for B Hubs see page 3-9.
■ Meets EUSERC standards.
♦ Meets EUSERC standards with addition of lug landing kit, MMSK2.

Table 2.9: Ringless Type MP Meter-Pak Metering Equipment with 125 A (42 kAMaximum SCCR) or 200 A Type MPR, MPH (22 kA Maximum SCCR) or 225 A Type MPL (100 kA Maximum SCCR) Meter Socket Positions

Amperes Per Pos.	No. of Pos.	Factory-Installed Main Lugs Ampacity (See page 2-6 for alternate lugs)	Main Bus Ampacity	No. Bypass Cat. No.	$ Price	Horn Bypass Cat. No.	$ Price	Lever Bypass Cat. No.	$ Price	Line Lug Wire Size Al/Cu AWG/kcmil	Circuit Breaker Type (2P) (See page 2-6)	Hub Prov. ★	Semi-Flush Flange Kit	Wt Lbs	Box No.
125	2	200	200	MPR22125	**995.00**	MPH22125	**1002.00**	—	—	(1) 4–250	QO, QO-VH, QOH	A/B300	MPSF12	46	1R
	3	300	300	MPR33125	**1220.00**	MPH33125	**1253.00**	—	—	(1) 1/0–600 or (2) 1/0–250		A-L	MPSF14	95	2R
	4	400	400	MPR44125	**1781.00**	MPH44125	**1830.00**	—	—	(1) 1/0–600 or (2) 1/0–250			MPSF14	97	2R
	5	400 Al 500 Cu	500	MPR55125	**2246.00**	MPH55125	**2330.00**	—	—	(1) 1/0–600 or (2) 1/0–250		(2) A-L	MPSF16	130	3R
	6	400 Al 500 Cu	600	MPR66125	**2615.00**	MPH66125	**2715.00**	—	—	(1) 1/0–600 or (2) 1/0–250			MPSF16	132	3R
200	2	400	400	MPR42200	**1290.00**	MPH42200	**1299.00**	—	—	(1) 1/0–600 or (2) 1/0–250	QOM2-MM, QOM2-MVH	(2) A-L	MPSF23	99	4R
	3	400	400	MPR43200	**2186.00**	MPH43200	**2219.00**						MPSF23	99	4R
	4	400	600	MPR64200	**2865.00**	MPH64200	**2916.00**						MPSF24	135	5R
225	2	350	350	—	—	—	—	MPL32225	**1739.00**	(1) 1/0–600 or (2) 1/0–250	QBP-TM, QDP-TM, QGP-TM or QJ-TM QO▼, QO-VH▼ or QOH▼		N/A	105	7R
	3	400	500	—	—	—	—	MPL53225	**2741.00**				N/A	147	8R
	4	400	600	—	—	—	—	MPL64225	**3656.00**				N/A	200	9R
200	5	600 Al, 750 Cu	800	MPR85200	**3545.00**	MPH85200	**3627.00**	—	—	(2) 3/0–500	QOM2-MM, QOM2-MVH		MPSF26	173	6R
	6	600 Al, 750 Cu	800	MPR86200	**4241.00**	MPH86200	**4341.00**	—	—	(2) 3/0–500			MPSF26	173	6R

★ For A and A-L Hubs see page 2-3, for B Hubs see page 3-9.
▼ Requires use of EZM125QOA adapter (order separately). Refer to oage 2-15 for pricing.

UL Listed short circuit current rating depends on lowest interrupting rating of circuit breaker installed.

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QO2100VH
2P, Plug-on Type
Circuit Breaker

QDP22200TM
2P, Bolt-on Type
Circuit Breaker

QOM2200MVH

Tenant Circuit Breakers

UL Listed Short Circuit Current Rating depends on lowest interrupting rating of circuit breaker installed. (Refer to the table on the bottom of page 2-9 for Square D certified ratings for downstream panelboards and load centers.)

Table 2.10: Tenant Circuit Breakers

Amperes	10 k AIR 120/240 Vac	$ Price (DE2A)	22 k AIR 120/240 Vac	$ Price (DE2A)	42 k AIR 120/240 Vac	$ Price (DE2A)	100 k AIR 120/240 Vac	$ Price (DE2A)
For use in 125 A Max. Type MP, MPR and MPH Meter-Pak Metering Equipment								
40	QO240	**67.00**	QO240VH▲	**146.00**	QOH240	**317.00**	—	—
50	QO250	**67.00**	QO250VH▲	**146.00**	QOH250▲	**317.00**	—	—
60	QO260	**67.00**	QO260VH	**146.00**	QOH260▲	**317.00**	—	—
70	QO270	**134.00**	QO270VH	**224.00**	QOH270▲	**528.00**	—	—
80	QO280	**189.00**	QO280VH	**315.00**	QOH280▲	**651.00**	—	—
90	QO290	**189.00**	QO290VH	**315.00**	QOH290	**651.00**	—	—
100	QO2100	**189.00**	QO2100VH	**315.00**	QOH2100	**651.00**	—	—
125	QO2125	**428.00**	QO2125VH	**1034.00**	QOH2125	**1389.00**	—	—
For use in 200 A Max. Type MP, MPR and MPH Meter-Pak Metering Equipment								
100	QOM2100MM	**474.00**	QOM2100MVH	**1143.00**	—	—	—	—
125	QOM2125MM	**474.00**	QOM2125MVH	**1143.00**	—	—	—	—
150	QOM2150MM	**474.00**	QOM2150MVH	**1143.00**	—	—	—	—
175	QOM2175MM	**474.00**	QOM2175MVH	**1143.00**	—	—	—	—
200	QOM2200MM	**474.00**	QOM2200MVH	**1143.00**	—	—	—	—
Amperes	**10 k AIR 120/240 Vac**	**$ Price (DE2A)**	**25 k AIR 120/240 Vac**	**$ Price (DE2A)**	**65 k AIR 120/240 Vac**	**$ Price (DE2A)**	**100 k AIR 120/240 Vac**	**$ Price (DE2A)**
For use in 225 A MPL Lever Bypass Meter-Pak Metering Equipment								
40	QO240■	**67.00**	QO240VH▲♦■	**146.00**	QOH240■★	**317.00**	—	—
50	QO250■	**67.00**	QO250VH▲♦■	**146.00**	QOH250■★▲	**317.00**	—	—
60	QO260■	**67.00**	QO260VH▲♦■	**146.00**	QOH260■★▲	**317.00**	—	—
70	QBP22070TM	**474.00**	QDP22070TM	**1143.00**	QGP22070TM	**1521.00**	QJP22070TM	**1890.00**
80	QBP22080TM	**474.00**	QDP22080TM	**1143.00**	QGP22080TM	**1521.00**	QJP22080TM	**1890.00**
90	QBP22090TM	**474.00**	QDP22090TM	**1143.00**	QGP22090TM	**1521.00**	QJP22090TM	**1890.00**
100	QBP22100TM	**474.00**	QDP22100TM	**1143.00**	QGP22100TM	**1521.00**	QJP22100TM	**1890.00**
110	QBP22110TM	**474.00**	QDP22110TM	**1143.00**	QGP22110TM	**1521.00**	QJP22110TM	**1890.00**
125	QBP22125TM	**474.00**	QDP22125TM	**1143.00**	QGP22125TM	**1521.00**	QJP22125TM	**1890.00**
150	QBP22150TM	**474.00**	QDP22150TM	**1143.00**	QGP22150TM	**1521.00**	QJP22150TM	**1890.00**
175	QBP22175TM	**474.00**	QDP22175TM	**1143.00**	QGP22175TM	**1521.00**	QJP22175TM	**1890.00**
200	QBP22200TM	**474.00**	QDP22200TM	**1143.00**	QGP22200TM	**1521.00**	QJP22200TM	**1890.00**
225	QBP22225TM	**474.00**	QDP22225TM	**1143.00**	QGP22225TM	**1521.00**	QJP22225TM	**1890.00**

▲ Order only. Not stocked in PDS. Order Point: Lincoln.
■ Requires use of EZM125QOA adapter (order separately). Refer to page 2-15 for pricing.
♦ QO-VH tenant circuit breakers are rated 22 kAIR at 120/240 Vac.
★ QOH tenant circuit breakers are rated 42 k AIR at 120/240 Vac.

Accessories

MMLK500

Table 2.11: Accessories

Accessory	Description	Cat. No.	$ Price
Fifth Jaw Kit	Fifth Jaw Kit	5J	**18.30**
Horn Bypass Kit	For MPR and MPH only	MMHB	**16.70**
QO Adapter	For Bolt-on Q2M tenant circuit breakers (40–125 A, 2P)	EZM125QOA	**273.00**
Slider Type Manual Circuit Closing:	125 A Ring Style 2 Position Top Meter (Only)	MM125MB▼	**171.00**
	125 and 200 A Ring Style	MM200MB▼	**171.00**
Sealing Rings:	Snap-on Aluminum	2920910001	**8.00**
	Screw Type Aluminum	29008W	**20.10**
	Snap-on Type Stainless Steel	ARP00026	**16.70**
Meter Cover-Lexan™	Meter Cover-Lexan™	29007	**10.10**
Optional Lug Kits:	(1) 1/0–600 AWG/kcmil or (2) 1/0–250 AWG/kcmil per phase	MMLK250△□	**150.00**
	(2) 3/0–500 AWG/kcmil per phase	MMLK500□	**200.00**
	(2) 2–600 AWG/kcmil per phase	MMLK600□	**233.00**
Semiflush Kits:	125 A 2 Position	MPSF12	**101.00**
	125 A 3–4 Position	MPSF14	**134.00**
	125 A 5–6 Position	MPSF16	**218.00**
	200 A 2–3 Position	MPSF23	**144.00**
	200 A 4 Position	MPSF24	**171.00**
	200 A 5–6 Position	MPSF26	**255.00**
NEMA/EUSERC Lug Landing Kit:	For 3 through 6 position 125 A and 200 A devices. Each pad rated 600 A maximum and includes (2) 1/2-13 studs and mounting hardware.	MMSK2□	**185.00**
NEMA Lug Landing Kit:	For use ONLY on MPL43225, MPL53225 and MPL64225 with optional lugs. See wiring diagram of each device for optional lugs.	MMSK4	**276.00**
MP Meter-Pak Wireway: (Wall Mount Pedestal)	125 A 2 Position ONLY	MP43X8PED	**441.00**
	125 A 3–6 Position	MP43X11PED	**504.00**
	200 A 2–6 Position	MP43X11PED	**504.00**
	MPL32-225	MP35X11PED◊	**504.00**
	MPL53-225	MP43X11PED	**504.00**
	MPL64-225	MP35X11PED◊	**504.00**
MP Meter-Pak Wireway Extensions:	Used ONLY with MP43X8PED	MP12X8PEDEXT◊	**102.00**
	Used with MP43X11PED and MP35X11PED	MP12X11PEDEXT◊	**126.00**

▼ The meter center short circuit current rating is 10 kA when manual circuit closing is used. Not rated for continuous duty.
△ Standard lug for 3 through 6 position 125 A and 2 through 4 position 200 A devices.
□ Cannot be installed on 2 position 125 A device.
◊ Order only. Not stocked in PDS. Order point: Lexington.

For hubs and closing plates . . . . . Page 2-3

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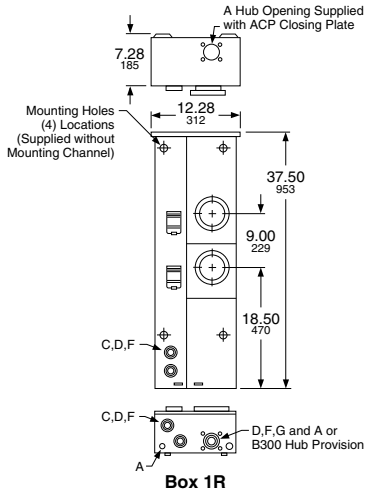
Dimensions and Knockouts



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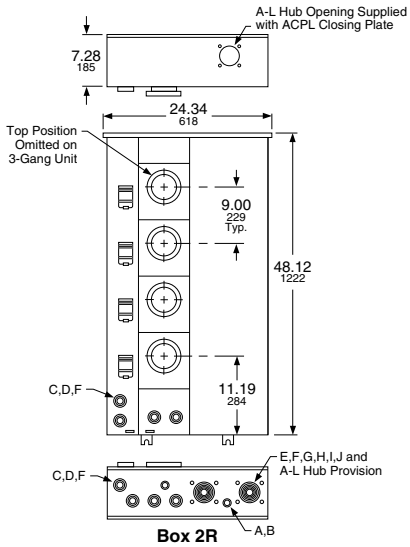
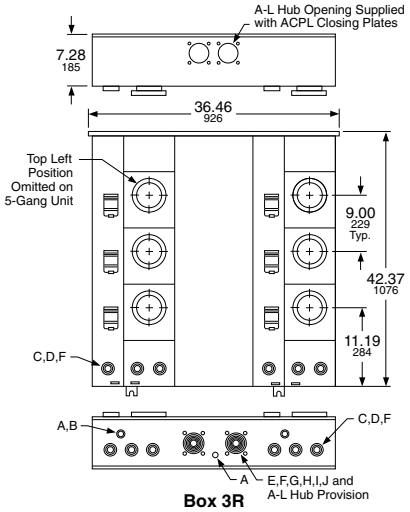
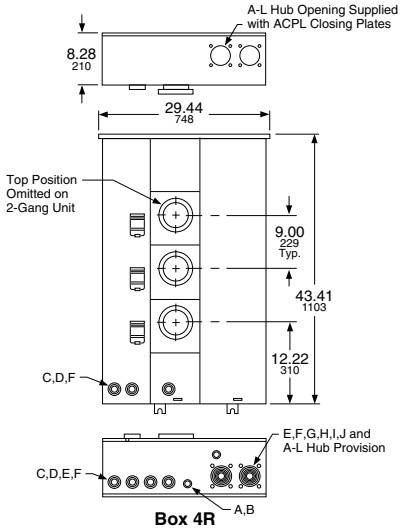


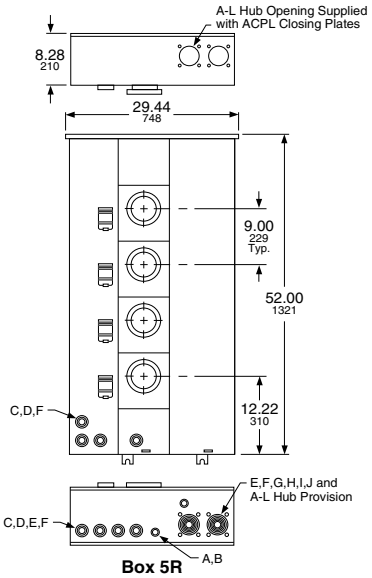
Box 2R



Box 3R



Box 4R



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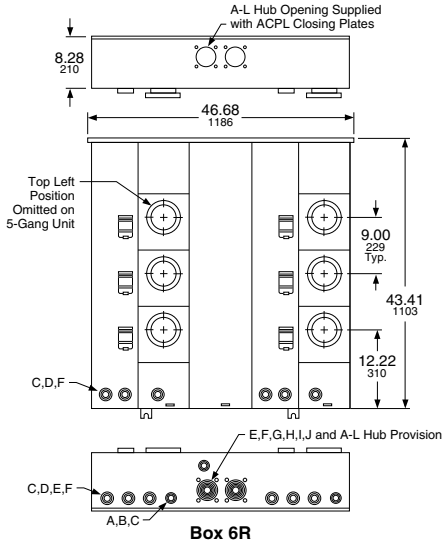

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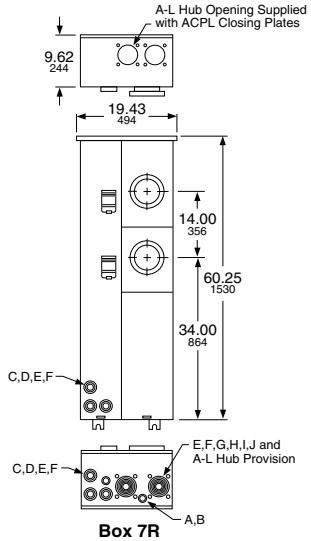

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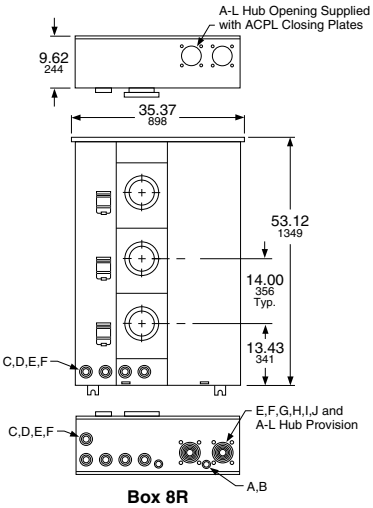
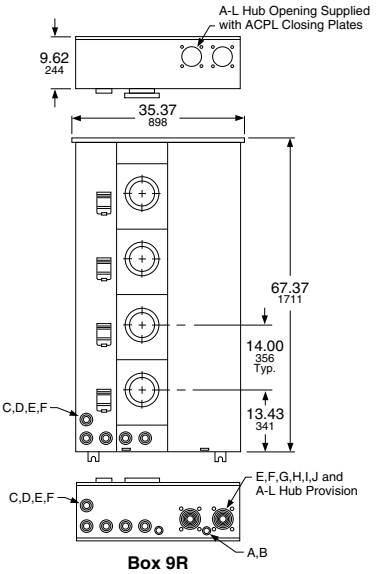


Box 8R



Box 9R

Knockouts										
Symbol	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Conduit Size (in.)	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4

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NEMA 3R Construction

240 Vac Maximum, for use on AC systems, suitable for use as Service Equipment.

Utility Company Requirements Review local utility requirements to ensure that metering equipment meets their standards.

EZ Meter-Pak meter center enclosures meet NEC wire bending requirements, and are designed for wall mounting only (not suitable for floor mounting). All unmetered conductor compartments may be sealed by the utility company.

EZ Meter-Pak meter centers have UL Listed short circuit current ratings up to 100 kA at 240 Vac when properly applied. For three-tier series ratings refer to Data Bulletin 4100DB0301 and Instruction Bulletin 80043-303-22.

Suitable incoming services for an EZM main device and available outgoing feeder(s) to downstream panelboards from EZM branch section(s)—

Incoming Service to Main Device 120/240 Vac, 1Ø3W

Available outgoing feeder(s) to downstream panelboards:

- 120/240 Vac, 1Ø3W
  (4-jaw ring type meter sockets, two-pole circuit breakers)
  (5-jaw ringless meter sockets, two-pole circuit breakers).

Incoming Service to Main Device 240/120 Vac, 3Ø4W Delta

Available outgoing feeder(s) to downstream panelboards:

- 120/240 Vac, 1Ø3W (Fed from transformer's "A-Phase" and "C-Phase" only.) NOTE: Connection to High-Leg "B-Phase" not permitted for this service
  (4-jaw ring type meter sockets, two-pole circuit breakers)
  (5-jaw ringless meter sockets, two-pole circuit breakers)
  Standard 3Ø IN/1Ø OUT branch units **are not suitable for use on this Delta System.** Special branch units are available for this System by adding suffix: **"CA"** to catalog number (Typical Examples: EZM313125CA, EZM313125XCA, EZM313125CUXCA, EZM314225CA, EZM314225XCA, EZM314225CUXCA, EZM315225CA, EZM314225CUCA, etc.).
- 240/120 Vac, 3Ø4W Delta (7-jaw meter sockets, three-pole circuit breakers).

Incoming Service to Main Device 208Y/120 Vac, 3Ø4W

Available outgoing feeder(s) to downstream panelboards:

- 120/208 Vac, 1Ø3W (5-jaw meter sockets, two-pole circuit breakers)
- 208Y/120 Vac, 3Ø4W (7-jaw meter sockets, three-pole circuit breakers).

Main Devices

- 400, 600 and 800 A main disconnects may be end mounted with branch units having 800 A or 1200 A continuous horizontal cross bus.
- 1000 and 1200 A main disconnect or terminal box **must be center mounted** when used with branch devices with main bus rated 800 A continuous.
- 1600 A main disconnect or terminal box **must be center mounted.**
- 2000 A main disconnect **must be center mounted** and requires use of branch units having 1200 A continuous horizontal cross bus.
- 400, 800 and 1200 A Type EZM-TBU terminal boxes supplied with lug landings to meet EUSERC requirements.

Main Circuit Breaker ratings: 400, 600, 800, 1000, 1200, 1600 and 2000 A

Main Fusible Switch ratings: 400, 600, 800, and 1200 A (1Ø3W only)

Main Lugs Terminal Box ratings:
225, 400, 600, 800, 1200, 1600, and 2000 A

Branch Units

- **125 A and 225 A residential branch units** are available in ring type or ringless type construction and are supplied with 800 A continuous aluminum horizontal cross bus as standard (Example: EZM314125). For optional 1200 A continuous copper horizontal cross bus with aluminum vertical connectors, add suffix **"X"** to catalog number (Example: EZM314125X). For optional 1200 A continuous all-copper bussing, add suffix **"CUX"** to catalog number (Example: EZM314125CUX). NOTE: 5-gang 225 A EZM, EZMR and EZMH residential branch units are supplied with 1200 A continuous Cross Bus as standard, do not add suffix "X" or "CUX" to these units (Examples: EZMR315225 or EZMR315225CU). Plug-in style residential meter sockets are available as ring type **EZM** without bypass, ringless type **EZMR** without bypass, and ringless type **EZMH** with horn bypass.

  Tenant circuit breakers must be ordered separately for these branch units. 125 A max. units make use of Type QO, QO-VH or QO-H two-pole tenant circuit breakers (40–125 A). 225 A max. units make use of Type QDP-TM, QBP-TM, QGP-TM and QJP-TM two-pole tenant circuit breakers (70–225 A), and may also make use of two-pole Type QO (40–125 A at 10 kA max.), two-pole Type QO-VH (40–60 A at 100 kA max.), or two-pole Type QO-H (40–60 A at 100 kA max.) tenant circuit breakers.
- **225 A commercial branch units** are available in ring type or ringless type construction and are supplied with 1200 A copper horizontal cross bus with aluminum vertical connectors as standard (Example: EZML314225). For optional 1200 A continuous all-copper bussing, add suffix **"CU"** to catalog number (Example: EZML314225CU). Plug-in style commercial meter sockets are available as ring type **EZMT** with test block bypass (meets EUSERC requirements), ringless type **EZMR** without bypass, and ringless type **EZML** with lever bypass.

  225 A max. units make use of type QDP-TM, QBP-TM, QGP-TM and QJP-TM two-pole or three-pole tenant circuit breakers (70– 225 A), and may also make use of two-pole type QO (40–125 A at 10 kA max.), two-pole type QO-VH (40–60 A at 100 kA max.), or two-pole type QO-H (40–60 A at 100 kA max.) tenant circuit breakers.

Note: QO, QO-VH and QO-H tenant circuit breakers used in 225 A branch units require the use of adapter **EZM125QOA** (purchased separately). Refer to page 2-15 for pricing.

- **400 A branch units** are available in ringless type construction only, and are supplied with 1200 A continuous all-copper bussing as standard (Example: EZML332400). These branch units are supplied with factory-installed type DJM tenant circuit breakers that have a field adjustable ampere rating trip setting from 160 A min. to 400 A max. A tamper-evident seal kit is available where needed, order seal kit **29375** (refer to NEC 240-6 [c]). 400 A branch units are available as Type **EZML** with plug-in style lever bypass type meter sockets, or Type **EZMK** with bolt-on style with manual bypass type meter sockets.
- Units having **800 A continuous horizontal cross bus** WILL CONNECT with units having **1200 A continuous horizontal cross bus**.
- **Single phase units** (three bus bars in horizontal cross bus) WILL NOT CONNECT with **three phase units** (four bus bars in horizontal cross bus).

For Load Center Three-Tiered Series Ratings used downstream from Metering Equipment, refer to Data Bulletins : 4100DB0301 and 2700DB9901.

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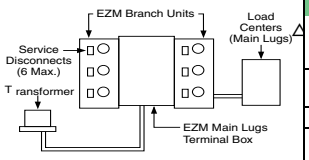
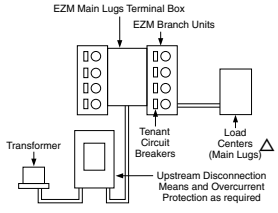
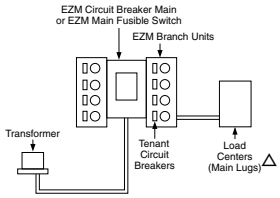
- Review local utility requirements to ensure that metering equipment meets their standards.
- Check local utility to determine available fault current at the meter center.
- Using the SCCR table:
  - Select meter center configuration, main lugs only (Six Disconnect Rule), or remote main, main circuit breaker, or main fusible switch.
  - Read down to select SCCR equal to, or greater than desired rating.
  - Read across to select branch unit tenant circuit breaker type.
  - Continue reading across to select EZM main device type.

Table 2.12: UL Listed Meter Center Short Circuit Current Ratings (SCCR)

Tenant circuit breakers of same frame size having higher AIR values may replace tenant circuit breakers as listed in tables below and maintain the series rating.

Figures	Short Circuit Current Rating (240 Vac Maximum)▲■	EZM Meter Center Overcurrent Protection Devices	
		EZM Branch Unit Tenant Circuit Breaker Types Available (Branch Unit Amperes max., Number of Poles, Tenant Circuit Breaker Amperes Rating Range)	EZM Main Device with Integral Mounted Main, Remote Mounted Main or without an Upstream Mounted Main (Six Disconnect Rule)
 Figure 1	**EZ Meter-Pak (Six Disconnect Rule Applications)—See Figure 1**		
	10 kA	QO (**125 A**, 2P, 40–125 A) QO (**225 A**, 2P, 40–125 A)★ QB (**225 A**, 2P or 3P, 70–225 A)	400–2000 A Main Lugs Terminal Box (Tenant Circuit Breakers used as Service Disconnects—6 maximum)
	22 kA	QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★	
	25 kA	QD (**225 A**, 2P or 3P, 70–225 A)	
	42 kA	QOH (**125 A**, 2P, 40–125 A) QOH (**225 A**, 2P, 40–60 A)★	
	65 kA	QG (**225 A**, 2P or 3P, 70–225 A)	
	100 kA	QJ (**225 A**, 2P or 3P, 70–225 A) ♦ DJM (**400 A**, 2P or 3P, 160–400 A)▼♦	
	EZ Meter-Pak 225–2000 A Main Lugs Terminal Box Applications Protected by Remote Main—See Figure 2		
	10 kA	QO (**125 A**, 2P, 40–125 A) QO (**225 A**, 2P, 40–125 A)★ QB (**225 A** 2P or 3P, 70–225 A) DJM (**400 A**, 2P or 3P 160–400 A)▼	Must be protected by an upstream disconnecting means rated 10 k AIR minimum
	22 kA	QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ DJM (**400 A**, 2P or 3P, 160–400 A)▼	Must be protected by an upstream disconnecting means rated 22 k AIR minimum
	25 kA	QD (**225 A** 2P or 3P, 70–225 A) DJM (**400 A**, 2P or 3P, 160–400 A)▼	Must be protected by an upstream disconnecting means rated 25 k AIR minimum
 Figure 2	42 kA	QOH (**125 A**, 2P, 40–125 A) QOH (**225 A**, 2P, 40–60 A)★ DJM (**400 A**, 2P or 3P, 160–400 A)▼	Must be protected by an upstream disconnecting means rated 42 k AIR minimum
		QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ QD (**225 A** 2P or 3P, 70–225 A)	Must be protected by a Square D circuit breaker Type LA (400 A max.) or MA (1000 A max.) Rated 42 k AIR minimum
	65 kA	QG (**225 A** 2P or 3P, 70–225 A) DJM (**400 A**, 2P or 3P, 160–400 A)▼	Must be protected by an upstream disconnecting means rated 65 k AIR minimum
		QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ QD (**225 A** 2P or 3P, 70–225 A) DJM (400 A, 2P or 3P, 160-400 A)▼	Must be protected by a Square D circuit breaker Type LH (400 A max.), MG (800 A max.), MH (1000 A max.), PG (1200 A max.) or RG (2000 A max.) rated 65 k AIR minimum.
	100 kA	QJ (**225 A** 2P or 3P, 70–225 A)♦ DJM (**400 A** 2P or 3P, 160–400 A)▼♦	Must be protected by an upstream disconnecting means rated 100 k AIR minimum
		QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★	Must be protected by an upstream disconnection means with Class R (600 A Max.); Class J (600 A Max); Class T6 (800 A Max.); Class T3 (1200 A Max.) or Class L (1200 A Max.).
		QD (**225 A** 2P only, 70–225 A) DJM (400 A, 2P or 3P, 160-400 A)▼ QD (**225 A** 3P only, 70–225 A)♦	Must be protected by an upstream disconnection means with Class R (600 A Max.); Class J (600 A Max); Class T6 (800 A Max.); Class T3 (1200 A Max.) or Class L (1200 A Max.) fuses or by a Square D circuit breaker Type MJ (800 A Max.); PJ (1200 A Max.); or RJ (2000 A Max.) rated 100 k AIR minimum.
	EZ Meter-Pak—Main Circuit Breaker Applications—See Figure 3		
	10 kA	QO (**125 A**, 2P, 40–125 A) QO (**225 A**, 2P, 40–125 A)★ QB (**225 A** 2P or 3P, 70–225 A)	400-2000 A EZM Main Device with Type LH (400 A Max.); MH (1000 A Max.); PG or PJ (1200 A Max.); RG or RJ (2000 A Max.)
	65 kA	QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ QD (**225 A** 2P or 3P, 70–225 A) DJM (**400 A**, 2P or 3P, 160–400 A)▼	
 Figure 3	100 kA	QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ QD (**225 A** 2P only, 70–225 A) QD (**225 A** 3P only, 70–225 A)♦ DJM (**400 A**, 2P or 3P, 160–400 A)▼	1000 A Main Device with catalog number suffix "CBU" supplied with Type MHF circuit breaker.
		QD (**225 A** 2P only, 70–225 A) QD (**225 A** 3P only, 70–225 A)♦ DJM (**400 A** 2P or 3P, 160–400 A)▼	1200–2000 A EZM Main Device with Type PJ (1200 A Max.) or RJ (2000 A Max.)
	EZ Meter-Pak—Main Fusible Switch Applications—See Figure 3		
	10 kA	QO (**125 A**, 2P, 40–125 A) QO (**225 A**, 2P, 40–125 A)★ QB (**225 A** 2P or 3P, 70–225 A)	400–1200 A EZM Main Device (1Ø or 3Ø) with Class T (300 Vac) fuses installed.
	100 kA	QO-VH (**125 A**, 2P, 40–125 A) QO-VH (**225 A**, 2P, 40–60 A)★ QD (**225 A** 2P, only, 70–225 A) QD (**225 A** 3P only, 70–225 A)♦ DJM (**400 A**, 2P or 3P, 160–400 A)▼	400–1200 A EZM Main Device (1Ø or 3Ø) with Class T (300 Vac) fuses installed.

▲ Meter center short circuit current rating is equal to the lowest short circuit current rating given in table for any circuit breaker installed in any meter panelboard in the meter center.
■ Short circuit current rating is measured at the LINE SIDE terminals of the integral mounted or remote mounted main providing overcurrent protection for the EZM metering equipment lineup.
♦ 3P only tenant circuit breaker(s) are limited to: 100 kA Max. at 208Y/120 Vac or 65 kA Max at 240/120 Vac.
★ Requires use of EZM125QOA adapter (order separately). Refer to page 2-15 for pricing.
▼ Supplied with factory-installed circuit breaker(s), with an adjustable trip range of 160–400 A.
△ For three-tier series ratings refer to Data Bulletin 4100DB0301 and Instruction Bulletin 80043-303-22.

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1Ø 3W 120/240 Vac EZ Meter-Pak Meter Centers—1Ø, Indoor/Rainproof, UL Listed

1200 A Main CB/Fusible Switch Devices come Standard with 2-STEP Removable Service Entrance Endwalls

EZM1800CB

EZM1800CBU

Select EZM meter center short circuit current rating from Table 2.12 on page 2-9. Using this table as a reference, make the following selections:

1. Select EZM 1Ø main device from Table 2.13 or 2.14, below, with an equal or higher short circuit rating than the application.
2. Select EZM 1Ø branch units from Tables 2.15, 2.16 or 2.17.
3. Select proper 2P type QO, QO-VH, QOH, QBP-TM, QDP-TM, QGP-TM or QJP-TM branch circuit breakers for use as tenant mains in branch unit from Table 2.24, page 2-15.
4. Select accessories as required from Table 2.25, page 2-15.
5. Dimensions; page 2-16.

Select Main Devices—NEMA 3R Construction

Table 2.13: Main Devices, Overhead/Underground Feed

Ampere Rating	Horizontal Cross Bus Rating and Bus Bar Material	Cat. No.△				Width (in.)	Factory-Installed Line Side Lug (Conductors per Phase and Neutral) Wire Size (AWG/kcmil)
Main Circuit Breaker (1Ø Incoming and 1Ø Outgoing)							
		65 kA	$ Price	100kA	$ Price		
400	400 A Al	EZM1400CB▲	**6180.00**	—	—	18.66	(1) 1–600 or (2) 1–250
600	600 A Al	EZM1600CB▲	**8573.00**	—	—	18.66	(3) 3/0–500
800	800 A Al	EZM1800CB▲	**11364.00**	—	—	18.66	(3) 3/0–500
1000	1000 A Al	EZM11000CB▲	**15767.00**	—	—	18.66	(3) 3/0–500
1200	1200 A Cu	EZM11200GCBT■▽	**20366.00**	EZM11200JCBT■▽	**23563.00**	23.69	(4) 3/0-500
1600	1200 A Al/Cu	EZM11600GCBC♦■	**29904.00**	EZM11600JCBC♦■	**34650.00**	30.19	(6) 1/0–750 or (12) 1/0–250
2000	1200 A Al/Cu	—	—	EZM12000CB♦	**54518.00**	30.19	(6) 1/0–750 or (12) 1/0–250
Main Fusible Switches (1Ø Incoming and 1Ø Outgoing) Requires 300 Vac Class T Fuses (Order Separately)							
400	400 A Al	—	—	EZM1400FS	**3989.00**	18.66	(1) 1–600 or (2) 1–250
600	600 A Al	—	—	EZM1600FS	**6978.00**	18.66	(3) 3/0–500
800	800 A Al	—	—	EZM1800FS	**8972.00**	18.66	(3) 3/0–500
1200	1200 A Cu	—	—	EZM11200FST▽	**11564.00**	23.69	(4) 3/0-500
Main Lug Terminal Boxes (1Ø Incoming and 1Ø Outgoing)							
225	800 A Al	—	—	EZM1225TB★	**798.00**	11.66	(1) 4–300
400	800 A Al	—	—	EZM1400TB□	**915.00**	17.15	(2) 3/0–500
600	800 A Al	—	—	EZM1600TB□	**998.00**	17.15	(2) 1/0–750 or (4) 1/0–300
800	800 A Al	—	—	EZM1800TB□	**1236.00**	18.66	(4) 3/0–500
800	800 A Cu	—	—	EZM1800TBCU◊□	**1658.00**	24.08	(4) 3/0–500
1600	1200 A Al/Cu	—	—	EZM11600TB♦◊□	**3588.00**	22.48	(6) 1/0-750 or (12) 1/0-300
2000	1200 A Cu	—	—	EZM12000TB□	**9600.00**	30.19	6 (Order Lugs Separately)

Table 2.14: Main Devices, Underground Feed Only

Ampere Rating	Horizontal Cross Bus Rating and Bus Bar Material	Cat. No.				Width (in.)	Factory-Installed Lug Landings for use with Crimp-Type Lugs (2-Hole Mounting) Qty. per Phase and Neutral, except non-EUSERC 1200A device. ▼
Main Circuit Breakers (1Ø Incoming and 1Ø Outgoing)▼							
		65 kA	$ Price	100 kA	$ Price		
400	400 A Al	EZM1400CBU▲	**6380.00**	—	—	20.46	1 (Order Lugs Separately)
600	600 A Al	EZM1600CBU▲	**9171.00**	—	—	26.19	2 (Order Lugs Separately)
800	800 A Al	EZM1800CBU▲	**11762.00**	—	—	26.19	2 (Order Lugs Separately)
1000	1000 A Al/Cu	—	—	EZM11000CBU♦	**16547.00**	34.19	3 (Order Lugs Separately)
1200	1200 A Cu	EZM11200GCBU☆△■	**17590.00**	EZM11200JCBU☆△■	**20372.00**	23.69	(4) 3/0-500
1200	1200 A Cu	EZM11200GCBE■	**18550.00**	EZM11200JCBE■	**21332.00**	32.39	3 (Order Lugs Separately)
1600	1200 A Al/Cu	EZM11600GCBU♦△■	**31658.00**	EZM11600JCBU♦△■	**36404.00**	30.19	6 (Order Lugs Separately)
2000	1200 A Al/Cu	—	—	EZM12000CBU△♦	**52755.00**	30.19	6 (Order Lugs Separately)
Main Fusible Switches (1Ø Incoming and 1Ø Outgoing)▼ Requires 300 Vac Class T Fuses (Order Separately)							
400	400 A Al	—	—	EZM1400FSU	**6180.00**	20.46	1 (Order Lugs Separately)
600	600 A Al	—	—	EZM1600FSU	**9369.00**	20.46	2 (Order Lugs Separately)
800	800 A Al	—	—	EZM1800FSU	**11564.00**	20.46	2 (Order Lugs Separately)
1200	1200 A Cu	—	—	EZM11200FSB☆	**13194.00**	23.69	(4) 3/0-500
1200	1200 A Cu	—	—	EZM11200FSE	**14154.00**	32.39	3 (Order Lugs Separately)
Main Lug Terminal Boxes (1Ø Incoming and 1Ø Outgoing)							
400	800 A Al	—	—	EZM1400TBU□	**1544.00**	17.16	1 (Order Lugs Separately)
800	800 A Al	—	—	EZM1800TBU□	**1827.00**	25.16	2 (Order Lugs Separately)
1200	1200 A Al/Cu	—	—	EZM11200TBU□	**3725.00**	33.16	3 (Order Lugs Separately)

▲ Available by special order with main circuit breaker supplied with other standard ampere ratings, consult local Field Office (allow 6 weeks for delivery).
■ Ampere rating of the circuit breaker supplied with this device can be changed to a LOWER value in the field by changing the setting on the circuit breaker.
♦ Supplied with copper horizontal bus bars and aluminum vertical bus bars.
★ 225 A terminal box supplied with isolated neutral that cannot be bonded Not suitable for use on the LINE side of service equipment.
▼ For mechanical lugs (3/0 AWG–600 kcmil) order kit CMELK4, Price $91.00. Kit includes 4 lugs only. Multiple kits may be required, consult factory. For crimp-type lugs refer to Anderson Electrical Connector Products Catalog AEC-40R.
△ Does not meet EUSERC Standards.
□ Terminal box is suitable for use on LINE or LOAD side of service equipment. Supplied with isolated neutral and provided with neutral bonding kit for use as required. Refer to page 2-9 for appropriate short circuit current ratings.
◊ Feed-thru lug kit available, see Accessories, page 2-15.
☆ For field installed Lug Landing Kit Order catalog number EZM1200ULL, List Price $460.00, order lugs separately.
▽ Top feed only.

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Branch Devices—NEMA 3R Construction

EZMH114125

Table 2.15: Branch Units—1Ø Incoming and 1Ø Outgoing

System Type	Width (in.)	Number of Meter Sockets	Horizontal Cross Bus Rating and Bus Bar Material	Ring Type 4-Jaw Meter Socketm without Bypass▲		Ringless Type 5-Jaw Meter Socket without Bypass		Ringless Type 5-Jaw Meter Socket with Horn Bypass	
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
125 A Maximum (Order Type QO, QO-VH or QOH Circuit Breakers Separately) ■									
1Ø3W 120/240 Vac 2P Branch Circuit Breakers	12.25	3	800 A Al	EZM113125♦	**1436.00**	EZMR113125♦	**1436.00**	EZMH113125♦	**1755.00**
			1200 A Cu	EZM113125CUX	**2282.00**	EZMR113125CUX	**2282.00**	EZMH113125CUX	**2282.00**
		4	800 A Al	EZM114125♦	**1914.00**	EZMR114125♦	**1914.00**	EZMH114125♦	**2153.00**
			1200 A Cu	EZM114125CUX	**3043.00**	EZMR114125CUX	**3043.00**	EZMH114125CUX	**3043.00**
		5	800 A Al	EZM115125♦	**2354.00**	EZMR115125♦	**2354.00**	EZMH115125♦	**2910.00**
			1200 A Cu	EZM115125CUX	**3742.00**	EZMR115125CUX	**3742.00**	EZMH115125CUX	**3742.00**
		6	800 A Al	EZM116125♦	**2792.00**	EZMR116125♦	**2792.00**	EZMH116125♦	**3549.00**
			1200 A Cu	EZM116125CUX	**4438.00**	EZMR116125CUX	**4438.00**	EZMH116125CUX	**4438.00**
225 A Maximum Branch Units (Order Type QBP-TM, QDP-TM, QGP-TM or QJP-TM Circuit Breakers Separately) ★									
1Ø3W 120/240 Vac 2P Branch Circuit Breakers	17.38	2	800 A Al	EZM112225♦	**2273.00**	EZMR112225♦	**2273.00**	EZMH112225♦	**2474.00**
			1200 A Cu	EZM112225CUX	**3615.00**	EZMR112225CUX	**3615.00**	EZMH112225CUX	**3615.00**
		3	800 A Al	EZM113225♦	**2792.00**	EZMR113225♦	**2792.00**	EZMH113225♦	**3069.00**
			1200 A Cu	EZM113225CUX	**4438.00**	EZMR113225CUX	**4438.00**	EZMH113225CUX	**4438.00**
		4	800 A Al	EZM114225♦	**3588.00**	EZMR114225♦	**3588.00**	EZMH114225♦	**4028.00**
			1200 A Cu	EZM114225CUX	**5705.00**	EZMR114225CUX	**5705.00**	EZMH114225CUX	**5705.00**
		5	1200 A Al/Cu	EZM115225	**4715.00**	EZMR115225	**4715.00**	EZMH115225	**4715.00**
			1200 A Cu	EZM115225CU	**7090.00**	EZMR115225CU	**7090.00**	EZMH115225CU	**7090.00**

▲ Snap-on aluminum sealing rings supplied as standard.
■ Supplied with removable drip hood and equipped with an indoor top endwall with knockouts provided.
♦ For 1200 A main cross bus add suffix "X" to catalog number (Example: EZM314125X). Add **3% adder to list** per device. Allow 6 weeks for delivery.
★ Type QO, QO-VH and QOH branch circuit breakers (40–60 A) may be installed with use of EZM125QOA adapter kits, refer to page 2-15.

EZML113225

Table 2.16: Branch Units—225 A Maximum Commercial (Order Type QBP-TM, QDP-TM, QGP-TM or QJP-TM Circuit Breakers Separately, see page 2-15)▼

System Type	Number of Meter Sockets	Horizontal Cross Bus Ratingand Bus Bar Material	Ringless Type 5-Jaw Meter Socket with Lever Bypass and Jaw Release			Ring Type 5-Jaw Meter Socket with Test Block Bypass. Meets EUSERC Requirements		
			Cat. No.	Width (in.)	$ Price	Cat. No.	Width (in.)	$ Price
1Ø3W 120/240 Vac 2P Branch Circuit Breakers	1	1200 A Al/Cu	EZML111225	19.44	**2453.00**	EZMT111225△	22.42	**3387.00**
		1200 A Cu	EZML111225CU		**3901.00**	—	—	—
		1200 A Al/Cu	EZML111225D□		**2576.00**	—	—	—
	2	1200 A Al/Cu	EZML112225	19.44	**4466.00**	EZMT112225△	22.42	**6143.00**
		1200 A Cu	EZML112225CU		**7101.00**	—	—	—
		1200 A Al/Cu	EZML112225D□		**4689.00**	—	—	—
	3	1200 A Al/Cu	EZML113225	19.44	**6579.00**	EZMT113225△◊	22.42	**9215.00**
		1200 A Cu	EZML113225CU		**10461.00**	—	—	—
		1200 A Al/Cu	EZML113225D□		**6908.00**	—	—	—
	4	1200 A Al/Cu	EZML114225	19.44	**8813.00**	—	—	—
		1200 A Cu	EZML114225CU		**14013.00**	—	—	—
		1200 A Al/Cu	EZML114225D□		**9254.00**	—	—	—

▼ 2P Type QO (40–125 A, 10 kA max. meter center SCCR) or QO-VH and QO-H (40–60 A, 100 kA max. meter center SCCR) may be installed using EZM125QOA adapter kit, refer to page 2-15.
△ Supplied with bondable neutral, suitable for use as service equipment. Use main lugs terminal box type EZM-TBU for Six Disconnect Rule applications to feed this device. Supplied with copper horizontal bus bars and aluminum vertical bus bars.
□ Supplied with removable drip hood and equipped with an indoor top endwall with knockouts provided.
◊ Does not meet EUSERC 48 in. minImum / 75 in. maximum meter height requirements for outdoor installations. The bottom meter socket is 37 inches above ground when the device is mounted with the top meter socket at 75 inches above ground. EUSERC indoor requirements are 36 in. minimum / 75 in. maximum.

EZMT111225

Table 2.17: Branch Units—400 A Maximum Commercial

System Type	Number of Meter Sockets	Main Cross Bus Rating and Bus Bar Material	Ringless Type 5-Jaw Meter Socket with Lever Bypass and Jaw Release. Includes Factory-Installed 400 A Type DJM Circuit Breaker ☆▽			Ringless Type K Bolt-on 4-Jaw Meter Socket with Manual Bypass. Includes Factory-Installed 400 A Type DJM Circuit Breaker ☆		
			Cat. No.	Width (in.)	$ Price	Cat. No.	Width (in.)	$ Price
1Ø3W 120/240 Vac 2P Branch Circuit Breakers	1	1200 A Cu	EZML111400	23.21	**5981.00**	EZMK111400	27.56	**7424.00**
	2	1200 A Cu	EZML112400	23.21	**11963.00**	EZMK112400	27.56	**14531.00**

☆ DJM circuit breaker has adjustable trip settings from 160–400 A. Use seal kit 29375, if required. DJM circuit breaker terminal lug kit 32508 factory-installed and accomodates (1) 2 AWG–500 kcmil Al or (1) 2 AWG–600 kcmil Cu per phase. Alternate lug kit 32510 for DJM circuit breaker is available, see Accessories, page 2-15. Additional field-installed DJ circuit breaker accessories are available, see page 7-35.
▽ Supplied with Class 320 lever bypass meter socket. Utilizes anti-inversion clip kit MMLRK, if required, refer to page 2-15.

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3Ø4W 208Y/120 Vac or 240/120 Vac Delta EZ Meter-Pak Meter Centers—3Ø Indoor/Rainproof, UL Listed

1200 A Main CB/Fusible Switch Devices come Standard with 2-STEP Removable Service Entrance Endwalls

Select EZM meter center short circuit current rating from Table 2.12 on page 2-9. Using this table as a reference, make the following selections:

1. Select 3Ø EZM main device below with an equal or higher short circuit rating than the application from Tables 2.18 and 2.19.
2. Select EZM 3Ø branch units from Tables 2.20, 2.21 and 2.22.
3. Select proper 2P type QO, QO-VH, QOH, QBP-TM, QDP-TM, QGP-TM or QJP-TM or 3P QBP-TM, QDP-TM, QGP-TM or QJP-TM branch circuit breakers for use as tenant mains in branch unit; from Table 2.24.
4. Select accessories as required, from Table 2.25.
5. Dimensions, page 2-16.

Main Devices—NEMA 3R Construction

EZM3600FS

EZM31600CB

Table 2.18: Main Device, Overhead/Underground Feed

Ampere Rating	Horizontal Cross Bus Rating and Bus Bar Material	Cat. No.△				Width (in.)	Factory-Installed Line Side Lug (Conductors per Phase and Neutral) Wire Size (AWG–kcmil)
Main Circuit Breakers (3Ø Incoming and 3Ø Outgoing) 65 kA Short Circuit Current Rating (400–1600 A Max.), 100 kA Short Circuit Current Rating (2000 A Max.)							
Short Circuit Rating		**65 kA**	**$Price**	**100 kA**	**$Price**		
400	400 A Al	EZM3400CB▲	**6620.00**	—	—	18.66	(1) 1–600 or (2) 1–250
600	600 A Al	EZM3600CB▲	**10247.00**	—	—	18.66	(3) 3/0–500
800	800 A Al	EZM3800CB▲	**13650.00**	—	—	18.66	(3) 3/0–500
1000	1000 A Al	EZM31000CB▲	**17027.00**	—	—	18.66	(3) 3/0–500
1200	1200 A Cu	EZM31200GCBT■◒	**23127.00**	EZM31200JCBT■◒	**26237.00**	23.69	(4) 3/0-500
1600	1200 A Al/Cu	EZM31600GCBC♦	**35288.00**	EZM31600JCBC♦	**40034.00**	30.19	(6) 1/0–750 or (12) 1/0–250
2000	1200 A Al/Cu	—	—	EZM32000CB♦	**57518.00**	30.19	(6) 1/0–750 or (12) 1/0–250
Main Fusible Switches (3Ø Incoming and 3Ø Outgoing) Requires 300 Vac Class T Fuses (Order Separately)							
400	400 A Al	—	—	EZM3400FS	**4466.00**	18.66	(1) 1–600 or (2)1–250
600	600 A Al	—	—	EZM3600FS	**8373.00**	18.66	(3) 3/0–500
800	800 A Al	—	—	EZM3800FS	**11565.00**	18.66	(3) 3/0–500
1200	1200 A Cu	—	—	EZM31200FST◒	**14906.00**	23.69	(4) 3/0-500
Main Lug Terminal Boxes (3Ø Incoming and 3Ø Outgoing)							
225	800 A Al	—	—	EZM3225TB★	**1013.00**	11.66	(1) 4–300
400	800 A Al	—	—	EZM3400TB□	**1113.00**	17.15	(2) 3/0–500
600	800 A Al	—	—	EZM3600TB□	**1196.00**	17.15	(2) 1/0–750 or (4) 1/0–300
800	800 A Al	—	—	EZM3800TB□	**1442.00**	18.66	(4) 3/0–500
800	800 A Cu	—	—	EZM3800TBCU◊□	**3545.00**	24.08	(4) 3/0–500
1600	1200 A Al/Cu	—	—	EZM31600TB♦◊□	**4028.00**	22.48	(6) 1/0-750 or (12) 1/0-300
2000	1200 A Cu	—	—	EZM32000TB□	**11820.00**	30.19	6 (Order Lugs Separately)

Table 2.19: Main Device, Underground Feed Only

Ampere Rating	Horizontal Cross Bus Rating and Bus Bar Material	Cat. No.				Width (in.)	Factory-Installed Lug Landings For use with Crimp-Type Lugs (2-Hole Mounting) Qty. per Phase and Neutral, except non-EUSERC 1200A device.▼
Main Circuit Breakers (3Ø Incoming and 3Ø Outgoing)							
Short Circuit Rating		**65 kA**	**$ Price**	**100 kA**	**$Price**		
400	400 A Al	EZM3400CBU▲	**7178.00**	—	—	20.46	1 (Order Lugs Separately)
600	600 A Al	EZM3600CBU▲	**10806.00**	—	—	26.19	2 (Order Lugs Separately)
800	800 A Al	EZM3800CBU▲	**14115.00**	—	—	26.19	2 (Order Lugs Separately)
1000	1000 A Al/Cu	—	—	EZM31000CBU♦	**17943.00**	34.19	3 (Order Lugs Separately)
1200	1200 A Cu	EZM31200GCBU☆△■	**20609.00**	EZM31200JCBU☆△■	**23363.00**	23.69	(4) 3/0-500
1200	1200 A Cu	EZM31200GCBE■	**21569.00**	EZM31200JCBE■	**24323.00**	32.39	3 (Order Lugs Separately)
1600	1200 A Al/Cu	EZM31600GCBU♦△■	**37170.00**	EZM31600JCBU♦△■	**41916.00**	30.19	6 (Order Lugs Separately)
2000	1200 A Al/Cu	—	—	EZM32000CBU♦△	**57255.00**	30.19	6 (Order Lugs Separately)
Main Fusible Switches (3Ø Incoming and 3Ø Outgoing) Requires 300 Vac Class T Fuses (Order Separately)							
400	400 A Al	—	—	EZM3400FSU	**6978.00**	20.46	1 (Order Lugs Separately)
600	600 A Al	—	—	EZM3600FSU	**11364.00**	26.19	2 (Order Lugs Separately)
800	800 A Al	—	—	EZM3800FSU	**15152.00**	26.19	2 (Order Lugs Separately)
1200	1200A Cu	—	—	EZM31200FSB☆△	**17586.00**	23.69	3 (Order Lugs Separately)
1200	1200A Cu	—	—	EZM31200FSE	**18546.00**	32.39	3 (Order Lugs Separately)
Main Lugs Terminal Boxes (3Ø Incoming and 3Ø Outgoing)							
400	400 A Al	—	—	EZM3400TBU□	**1838.00**	17.16	1 (Order Lugs Separately)
800	800 A Al	—	—	EZM3800TBU□	**2100.00**	25.16	2 (Order Lugs Separately)
1200	1200 A Cu	—	—	EZM31200TBU□	**4463.00**	33.16	3 (Order Lugs Separately)

▲ Available by special order with main circuit breaker supplied with other standard ampere ratings, consult your nearest Field Sales Office (allow 6 weeks for delivery).
■ Ampere rating of the circuit breaker supplied with this device can be changed to a LOWER value in the field by changing the setting on the circuit breaker.
♦ Supplied with copper horizontal bus bars and aluminum vertical bus bars.
★ 225 A terminal box supplied with isolated neutral that cannot be bonded.
▼ For mechanical lugs (3/0 AWG–600 kcmil) order kit CMELK4, Price **$91.00**. Kit includes 4 lugs only. Multiple kits may be required, consult factory. For crimp-type lugs refer to Anderson Electrical Connector Products Catalog AEC-40R.
△ Does not meet EUSERC requirements.
□ Terminal box is suitable for use on LINE or LOAD side of service equipment. Supplied with isolated neutral and provided with neutral bonding kit for use as required. Refer to page 2-9 for appropriate short circuit current ratings.
◊ Feed-thru lug kit available, see Accessories, page 2-15.
☆ For field installed Lug Landing Kit order catalog number EZM1200ULL, List Price $460.00, order lugs separately.
▽ Does not meet EUSERC requirements.
◒ Top feed only.

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Branch Devices—NEMA 3R Construction

EZML313225

EZMT311225

EZMT311225
Without Cover

Table 2.20: Branch Units—3Ø Incoming and 1Ø Outgoing

System Type	Width (in.)	Number of Meter Sockets	Horizontal Cross Bus Rating▲ and Bus Bar Material	Ring Type 5-Jaw Meter Socket without Bypass■		Ringless Type 5-Jaw Meter Socket without Bypass		Ringless Type 5-Jaw Meter Socket with Horn Bypass	
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
125 A Maximum (Order Type QO, QO-VH or QOH Circuit Breakers Separately)♦★									
3Ø4W 208Y/120 Vac 5-Jaw-Meter Socket 2P Branch Circuit Breakers	12.25	3	800 A Al	EZM313125▲	**1554.00**	EZMR313125▲	**1554.00**	EZMH313125▲	**1875.00**
			800 A Cu	EZM313125M10▼	**4253.00**	—	—	—	—
			1200 A Cu	EZM313125CUX	**2473.00**	EZMR313125CUX	**2473.00**	EZMH313125CUX	**2980.00**
		4	800 A Al	EZM314125▲	**2034.00**	EZMR314125▲	**2039.00**	EZMH314125▲	**2474.00**
			800 A Cu	EZM314125M10▼	**5670.00**	—	—	—	—
			1200 A Cu	EZM314125CUX	**3234.00**	EZMR314125CUX	**3234.00**	EZMH314125CUX	**3933.00**
		5	800 A Al	EZM315125▲	**2592.00**	EZMR315125▲	**2592.00**	EZMH315125▲	**3111.00**
			800 A Cu	EZM315125M10▼	**7088.00**	—	—	—	—
			1200 A Cu	EZM315125CUX	**4121.00**	EZMR315125CUX	**4121.00**	EZMH315125CUX	**4947.00**
		6	800 A Al	EZM316125▲	**2991.00**	EZMR316125▲	**2991.00**	EZMH316125▲	**3788.00**
			1200 A Cu	EZM316125CUX	**4756.00**	EZMR316125CUX	**4756.00**	EZMH316125CUX	**6023.00**
225 A Maximum (Order Type QBP-TM, QDP-TM,QGP-TM or QJP-TM Circuit Breakers Separately)♦△									
3Ø4W 208Y/120 Vac 5-Jaw-Meter Socket 2P Branch Circuit Breakers	17.38	2	800 A Al	EZM312225▲	**2273.00**	EZMR312225▲	**2273.00**	EZMH312225▲	**2474.00**
			1200 A Cu	EZM312225CUX	**3615.00**	EZMR312225CUX	**3615.00**	EZMH312225CUX	**2473.00**
		3	800 A Al	EZM313225▲	**2792.00**	EZMR313225▲	**2792.00**	EZMH313225▲	**3111.00**
			1200 A Cu	EZM313225CUX	**4438.00**	EZMR313225CUX	**4438.00**	EZMH313225CUX	**4947.00**
		4	800 A Al	EZM314225▲	**3749.00**	EZMR314225▲	**3749.00**	EZMH314225▲	**4148.00**
			1200 A Cu	EZM314225CUX	**5961.00**	EZMR314225CUX	**5961.00**	EZMH314225CUX	**6595.00**
		5	1200 A Al/Cu	EZM315225	**4920.00**	EZMR315225	**5457.00**	EZMH315225	**5718.00**
			1200 A Cu	EZM315225CU	**7409.00**	EZMR315225CU	**7409.00**	EZMH315225CU	**8154.00**

▲ For 1200 A main cross bus, add suffix "X" to catalog number. Example: EZMR313125X. Add **3% adder to list** per device. Allow 6 weeks for delivery.
■ Snap-On aluminum sealing rings supplied as standard.
♦ For 240/120 Vac Delta Systems add Suffix "CA" to catalog number (Example: EZM314125**CA**). All meter sockets are phased A and C only. Price remains the same as the base catalog number. Order only branch units, not stocked in PDS (6-week delivery).
★ Supplied with removable drip hood and equipped with an indoor top endwall with knockouts provided.
▼ Distance between meter sockets as measured from centerline to centerline is 10 inches.
△ 2P Type QO (40–125 A, 10 kA max. meter center SCCR) or QO-VH and QO-H (40–60 A, 100 kA max. meter center SCCR) may be installed using EZM125QOA adapter kit, refer to page 2-15.

Table 2.21: Branch Units—225 A Maximum Commercial

System Type	Number of Meter Sockets	Horizontal Cross Bus Rating and Bus Bar Material	Ringless Type Meter Socket without Bypass			Ringless Type Meter Socket with Lever Bypass and Jaw Release			Ring Type Meter Socket with Test Block Bypass. Meets EUSERC Requirements		
			Cat. No.	Width (in.)	$ Price	Cat. No.	Width (in.)	$ Price	Cat. No.	Width (in.)	$ Price
3Ø Incoming and 1Ø Outgoing □ (Order Type QBP-TM, QDP-TM,QGP-TM or QJP-TM circuit breakers separately) ◊											
3Ø4W 208Y/120 Vac 5-Jaw Meter Sockets 2P Branch Circuit Breakers	1	1200 A Al/Cu	—	—	—	—	—	—	EZMT311225☆	22.42	**3545.00**
	2	1200 A Al/Cu	—	—	—	EZML312225		**4266.00**	EZMT312225☆	22.42	**6695.00**
		1200 A Cu	—	—	—	EZML312225CU	19.44	**6785.00**	—	—	—
		1200 A Al/Cu	—	—	—	EZML312225D▽		**4479.00**	—	—	—
	3	1200 A Al/Cu	—	—	—	EZML313225		**6420.00**	EZMT313225☆◒	22.42	**10041.00**
		1200 A Cu	—	—	—	EZML313225CU	19.44	**10208.00**	—	—	—
		1200 A Al/Cu	—	—	—	EZML313225D▽		**6741.00**	—	—	—
	4	1200 A Al/Cu	—	—	—	EZML314225		**8732.00**	—		—
		1200 A Cu	—	—	—	EZML314225CU	19.44	**13884.00**	—	—	—
		1200 A Al/Cu	—	—	—	EZML314225D▽		**9168.00**	—		—
3Ø Incoming and 3Ø Outgoing (Order QBP-TM, QDP-TM, QGP-TM or QJP-TM circuit breakers separately, see page 2-15)											
3Ø4W 240/120 Vac Delta or 208Y/120 Vac 7-Jaw Meter Socket 3P Branch Circuit Breakers	1	1200 A Al/Cu	—	—	—	EZML331225		**2792.00**	EZMT331225☆	22.42	**3938.00**
		1200 A Cu	—	—	—	EZML331225CU	19.44	**4438.00**	—	—	—
		1200 A Al/Cu	—	—	—	EZML331225D▽		**2931.00**	—	—	—
	2	1200 A Al/Cu	EZMR332225		**4686.00**	EZML332225		**5105.00**	EZMT332225☆	22.42	**6957.00**
		1200 A Cu	EZMR332225CU	19.44	**7451.00**	EZML332225CU	19.44	**8117.00**	—	—	—
		1200 A Al/Cu	—		—	EZML332225D▽		**5360.00**	—	—	—
	3	1200 A Al/Cu	EZMR333225		**7337.00**	EZML333225		**7794.00**	EZMT333225☆◒	22.42	**10304.00**
		1200 A Cu	EZMR333225CU	19.44	**11664.00**	EZML333225CU	19.44	**12395.00**	—	—	—
		1200 A Al/Cu	—		—	EZML333225D▽		**8184.00**	—	—	—
	4	1200 A Al/Cu	EZMR334225		**10169.00**	EZML334225		**10667.00**	—		—
		1200 A Cu	EZMR334225CU	19.44	**16167.00**	EZML334225CU	19.44	**16959.00**	—	—	—
		1200 A Al/Cu	—		—	EZML334225D▽		**11214.00**	—		—

□ For 240/120 Vac Delta Systems add Suffix "CA" to catalog number (Example: EZM314125**CA**). All meter sockets are phased A and C only. Price remains the same as the base catalog number. Order only branch units, not stocked in PDS (6-week delivery).
◊ 2P Type QO (40–125 A, 10 kA max. meter center SCCR) or QO-VH and QO-H (40–60 A, 100 kA max. meter center SCCR) may be installed using EZM125QOA adapter kit, refer to page 2-15.
☆ Supplied with bondable neutral, suitable for use as service equipment. Use main lugs terminal box type EZM-TBU for Six Disconnect Rule applications to feed this device. Supplied with copper horizontal bus bars and aluminum vertical bus bars.
▽ Supplied with removable drip hood and equipped with an indoor top endwall with knockouts provided.
◒ Does not meet EUSERC 48 in. minImum / 75 in. maximum meter height requirements for outdoor installations. The bottom meter socket is 37 inches above ground when the device is mounted with the top meter socket at 75 inches above ground. EUSERC indoor requirements are 36 in. minimum / 75 in. maximum.

400 A maximum Commercial Branch Units . . . . . Page 2-14.

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Branch Devices—NEMA 3R Construction (Continued)

EZMK311400

Table 2.22: Branch Units—400 A Maximum Commercial

System Type	Number of Meter Sockets	Horizontal Cross Bus Rating	Ringless Type Meter Socket with Lever Bypass and Jaw Release—IncludesFactory-Installed 400 A Type DJM Circuit Breaker. ▲■			Ringless Type K Bolt-on Meter Socket with Manual Bypass—Includes Factory-Installed 400 A Type DJM Circuit Breaker. ▲		
			Cat. No.	Width (in.)	$ Price	Cat. No.	Width (in.)	$ Price
3Ø Incoming and 1Ø Outgoing ♦								
3Ø4W 208Y/120 Vac 5-Jaw Meter Socket 2P Branch Circuit Breakers	1	1200 A Cu	EZML311400	23.21	**5981.00**	EZMK311400	27.56	**8924.00**
	2	1200 A Cu	EZML312400	23.21	**11963.00**	EZMK312400	27.56	**17534.00**
3Ø Incoming and 3Ø Outgoing								
3Ø4W 240/120 Vac Delta or 208Y/120 Vac 7-Jaw Meter Socket 3P Branch Circuit Breakers	1	1200 A Cu	EZML331400	23.21	**6978.00**	EZMK331400	27.56	**10515.00**
	2	1200 A Cu	EZML332400	23.21	**13956.00**	EZMK332400	27.56	**20715.00**

▲ DJM circuit breaker has adjustable trip settings from 160–400 A. If required, order seal kit, catalog number 29375. DJM circuit breaker terminal lug kit 32508 factory-installed and accomodates (1) 2 AWG–500 kcmil Al or (1) 2 AWG–600 kcmil Cu per phase. Alternate lug kit 32510 for DJM circuit breaker is available, see Accessories, page 2-15. Additional field-installed DB circuit breaker accessories are available, see page 7-35.
■ Supplied with Class 320 lever bypass meter socket. Use anti-inversion clip kit, catalog number MMLRK, if required. Order from page 2-15.
♦ For 240/120 Vac Delta Systems add Suffix "CA" to catalog number (Example: EZML312400**CA**). All meter sockets are phased A and C only. Price remains the same as the base catalog number. "Order only" branch units, not stocked in PDS (4–6 week delivery). Order point Lexington.

EZM Main with Busway Tap

EZ Meter-Pak metering equipment is available for use in high rise applications for connection to 800–5000 A I-Line™ or I-Line II plug-in busway installed as a vertical riser. Three phase only EZM main devices in the form of a main circuit breaker or main fusible switch are available with an integral busway tap extending from the right or left side of the main device and phased to align with the busway for either neutral front or neutral back installations.

Busway Mains, 3Ø only (Indoor only) ordering instructions:

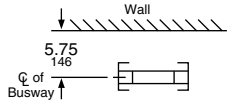
Step 1: Determine height to center line of busway plug-in opening, check local utility requirements for minimum and maximum meter socket heights.

Step 2: Determine side of EZM main section for busway tap to extend from (busway tap is an integral part of the main and extends to the left or right on the EZM device as viewed from the front).

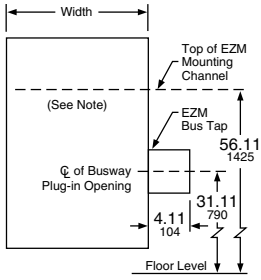
Step 3: Check phasing of busway riser to insure that it matches phasing of busway tap on main section (indicated as neutral front or neutral back as viewed from the front).

Step 4: Select Cat. No. from tables below.

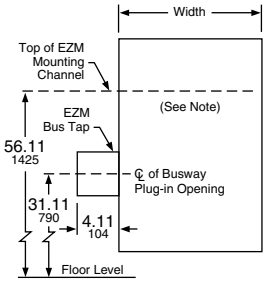
Step 5: Busway main devices are build to order specials and require 4 to 6 weeks for delivery (order point Lexington).



Plan View Detail



EZM3800CBNFBTR



EZM3800FSNBBTL

Table 2.23: 1200 A EZM Mains with Busway Tap (Three Phase Only—Note positioning left or right below)

Ampere Rating	Width (in.)	Horizontal Cross Bus Rating	Main Circuit Breaker with Busway Tap ★			Main Fusible Switch with Busway Tap ▼		
			Neutral Front	Neutral Back	$ Price	Neutral Front	Neutral Back	$ Price
Busway to Right of metering equipment lineup								
400	18.66	400 A Al	EZM3400CBNFBTR	EZM3400CBNBBTR	**8886.00**	EZM3400FSNFBTR	EZM3400FSNBBTR	**6732.00**
600	18.66	600 A Al	EZM3600CBNFBTR	EZM3600CBNBBTR	**12513.00**	EZM3600FSNFBTR	EZM3600FSNBBTR	**10640.00**
800	18.66	800 A Al	EZM3800CBNFBTR	EZM3800CBNBBTR	**15744.00**	EZM3800FSNFBTR	EZM3800FSNBBTR	**13830.00**
1000	18.66	1000 A Al	EZM31000CBNFBTR□	EZM31000CBNBBTR□	**19292.00**	—	—	—
Busway to Left of metering equipment lineup								
400	18.66	400 A Al	EZM3400CBNFBTL	EZM3400CBNBBTL	**8886.00**	EZM3400FSNFBTL	EZM3400FSNBBTL	**6732.00**
600	18.66	600 A Al	EZM3600CBNFBTL	EZM3600CBNBBTL	**12513.00**	EZM3600FSNFBTL	EZM3600FSNBBTL	**10640.00**
800	18.66	800 A Al	EZM3800CBNFBTL	EZM3800CBNBBTL	**15744.00**	EZM3800FSNFBTL	EZM3800FSNBBTL	**13830.00**
1000	18.66	1000 A Al	EZM31000CBNFBTL□	EZM31000CBNBBTL□	**19292.00**	—	—	—
Main Circuit Breaker with Busway Tap								
Busway to Right of Metering Equipment Lineup								
1200	23.36	1200 A Al/Cu	EZM31200GBNFTBR△□★	EZM31200GBNFBTR★△□	**25394.00**	EZM31200JBNFBTR◊△□	EZM31200JBNBBTR◊△□	**29108.00**
Busway to Left of Metering Equipment Lineup								
1200	23.36	1200 A Al/Cu	EZM31200GBNFTBL△□★	EZM31200GBNFBTL★△□	**25394.00**	EZM31200JBNFBTL◊△□	EZM31200JBNBBTL◊△□	**29108.00**
Main Fusible Switch with Busway Tap								
Busway to Right of Metering Equipment Lineup								
1200	23.36	1200 A Al/Cu	—	—	—	EZM31200FSNFBTR▼△□	EZM31200FSNBBTR▼△□	**23480.00**
Busway to Left of Metering Equipment Lineup								
1200	23.36	1200 A Al/Cu	—	—	—	EZM31200FSNFBTL▼△□	EZM31200FSNBBTL▼△□	**23480.00**

★ Has a maximum 65 kA short circuit current rating.
▼ Has a 100 kA short circuit current rating. Requires Class T (300 Vac) fuses, order separately.
△ Supplied with copper horizontal bus bars and aluminum vertical bus bars.
□ Requires use of branch units supplied with 1200 A horizontal cross bus.
◊ Has a 100 kA short circuit current rating.
Note: Dimensions shown will position the centerline of top meter socket of a 125 A, 5-Gang or 6-Gang branch unit at 72" above floor level. Check with utility to meet local requirements.

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Table 2.24: Tenant Circuit Breakers

QO2100VH
2P, Plug-on Type
Circuit Breaker

QDP22200TM

Poles	Ampere Rating	10 k AIR		22 k AIR		42 k AIR		100 k AIR	
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
125 A Max. EZM Branch Unit Tenant Circuit Breakers									
2	40	QO240	67.00	QO240VH	146.00	QOH240	317.00	—	—
	50	QO250	67.00	QO250VH	146.00	QOH250	317.00	—	—
	60	QO260	67.00	QO260VH	146.00	QOH260	317.00	—	—
	70	QO270	134.00	QO270VH	224.00	QOH270	528.00	—	—
	80	QO280	189.00	QO280VH	315.00	QOH280	651.00	—	—
	90	QO290	189.00	QO290VH	315.00	QOH290	651.00	—	—
	100	QO2100	189.00	QO2100VH	315.00	QOH2100	651.00	—	—
	110	QO2110	428.00	QO2110VH	1034.00	QOH2110	1389.00	—	—
	125	QO2125	428.00	QO2125VH	1034.00	QOH2125	1389.00	—	—
Poles	**Ampere Rating**	**10 k AIR**		**25 k AIR**		**65 k AIR**		**100 k AIR**	
225 A Max. EZM Branch Unit Tenant Circuit Breakers									
2	40	QO240▲	67.00	QO240VH■▲	146.00	QOH240♦▲	317.00	—	—
	50	QO250▲	67.00	QO250VH■▲	146.00	QOH250♦▲	317.00	—	—
	60	QO260▲	67.00	QO260VH■▲	146.00	QOH260♦▲	317.00	—	—
	70	QBP22070TM	474.00	QDP22070TM	1143.00	QGP22070TM	1521.00	QJP22070TM	1890.00
	80	QBP22080TM	474.00	QDP22080TM	1143.00	QGP22080TM	1521.00	QJP22080TM	1890.00
	90	QBP22090TM	474.00	QDP22090TM	1143.00	QGP22090TM	1521.00	QJP22090TM	1890.00
	100	QBP22100TM	474.00	QDP22100TM	1143.00	QGP22100TM	1521.00	QJP22100TM	1890.00
	110	QBP22110TM	474.00	QDP22110TM	1143.00	QGP22110TM	1521.00	QJP22110TM	1890.00
	125	QBP22125TM	474.00	QDP22125TM	1143.00	QGP22125TM	1521.00	QJP22125TM	1890.00
	150	QBP22150TM	474.00	QDP22150TM	1143.00	QGP22150TM	1521.00	QJP22150TM	1890.00
	175	QBP22175TM	474.00	QDP22175TM	1143.00	QGP22175TM	1521.00	QJP22175TM	1890.00
	200	QBP22200TM	474.00	QDP22200TM	1143.00	QGP22200TM	1521.00	QJP22200TM	1890.00
	225	QBP22225TM	474.00	QDP22225TM	1143.00	QGP22225TM	1521.00	QJP22225TM	1890.00
3	70	QBP32070TM	1248.00	QDP32070TM	1784.00	QGP32070TM	2442.00	QJP32070TM★	2796.00
	80	QBP32080TM	1248.00	QDP32080TM	1784.00	QGP32080TM	2442.00	QJP32080TM★	2796.00
	90	QBP32090TM	1248.00	QDP32090TM	1784.00	QGP32090TM	2442.00	QJP32090TM★	2796.00
	100	QBP32100TM	1248.00	QDP32100TM	1784.00	QGP32100TM	2442.00	QJP32100TM★	2796.00
	110	QBP32110TM	1248.00	QDP32110TM	1784.00	QGP32110TM	2442.00	QJP32110TM★	2796.00
	125	QBP32125TM	1248.00	QDP32125TM	1784.00	QGP32125TM	2442.00	QJP32125TM★	2796.00
	150	QBP32150TM	1248.00	QDP32150TM	1784.00	QGP32150TM	2442.00	QJP32150TM★	2796.00
	175	QBP32175TM	1248.00	QDP32175TM	1784.00	QGP32175TM	2442.00	QJP32175TM★	2796.00
	200	QBP32200TM	1248.00	QDP32200TM	1784.00	QGP32200TM	2442.00	QJP32200TM★	2796.00
	225	QBP32225TM	1248.00	QDP32225TM	1784.00	QGP32225TM	2442.00	QJP32225TM★	2796.00

▲ Must use EZM125QOA adapter.
■ QO-VH tenant circuit breaker is rated 22 k AIR max.
♦ QOH tenant circuit breaker is rated 42 k AIR max.
★ 3-pole QJP tenant circuit breaker is rated 65 k AIR max. at 240/120 Vac, 3Ø4W High Leg Delta, or 100 k AIR max. at 208Y/120 Vac, 3Ø4W.

Accessories

Table 2.25: Accessories

Accessory	Description	Cat. No.	$ Price
1200 A Bus Extension (Indoor/ Outdoor Cu bus)	1Ø3W Bus Extension (6 in.wide) 1Ø3W Bus Extension (12 in.wide) 3Ø4W Bus Extension (6 in. wide) 3Ø4W Bus Extension (12 in. wide)	EZM1EXT6 EZM1EXT EZM3EXT6 EZM3EXT	767.00 767.00 966.00 966.00
1200 A Bussed Corner Sections (Indoor Cu bus only)	1Ø3W Inside Corner (14.75 in. wide) 1Ø3W Outside Corner (6.20 in. wide) 3Ø4W Inside Corner (14.75 in. wide) 3Ø4W Outside Corner (6.20 in. wide)	EZM1CORNER EZM1ELBOW EZM3CORNER EZM3ELBOW	1788.00 1788.00 2217.00 2217.00
1200 A Transition Sections— Old to New (10.7 in. wide Cu bus)	Add right of old style 1Ø EZM lineup Add right of old style 3Ø EZM lineup Add left of old style 1Ø EZM lineup Add left of old style 3Ø EZM lineup	EZM1TRANR EZM3TRANR EZM1TRANL EZM3TRANL	237.00 252.00 315.00 332.00
Mounting Channel	72" long	EZM72MC	63.00
Secondary Surge Arrester Mounting kit	For use with 1 or 2-SDSA1175 or 1-SDSA3650 (order surge arrester separately)	MMSAMK▼	80.00
Stud Kit for EZM-TB 400–600 A terminal box	Includes (2) 1/2 in.-13 studs per pad and mounting hardware. Four pads per kit.	EZMSK2	246.00
Al/Cu Lug Kits (Each kit includes three, 2-barrel lugs.)	(1) 1/0–600 kcmil or (2) 1/0–250 kcmil per lug	MMLK250	150.00
	(2) 3/0–500 kcmil per lug	MMLK500	200.00
	(2) 2–600 kcmil per lug	MMLK600	233.00
Feed -Thru for EZM-TBCU 800 A Terminal Box	(4) 750 kcmil Al/Cu lugs per phase and neutral. Al wire 600 A max. Cu wire 800 A max.	EZM600FTLK3	480.00
Feed-Thru for EZM-TB 1600 A Terminal Box	(24) additional lugs, 600 kcmil Al/Cu, (6) per phase and neutral.	EZM1600FTLK3	915.00
Fifth jaw Kit	1 per kit	5J △	18.30
Horn Bypass Kit	Use with Type EZMR 1Ø meter socket only	MMHB	16.70
Slider Type Manual Circuit Closer	For (1) 125–225 A ring-type socket only—indoor/outdoor	MM200MB□◊	171.00
Anti-inversion Clip	Rejects 100 A and 200 A watt-hour meters in Class 320 meter sockets in Type EZML branch units.	MMLRK	12.00
QO Adapter for bolt-on Q-frame tenant circuit breakers	For 2P Type QO (40–125 A, 10 kA max. meter center SCCR) or QO-VH and QOH (40–60 A, 100 kA max. meter center SCCR)	EZM125QOA	273.00
DJM Circuit Breaker Alternate Lug (DE2)	Kit includes (3) 2-barrel lugs for (2) 2/0 AWG–350 kcmil AL/Cu or (2) 2/0 AWG–500 kcmil AL per lug.	32510	—
DJM Circuit Breaker Seal Kit	Tamper-evident kit to seal DJM trip dial cover, (1) per circuit breaker, if required. Meets NEC 240-6 [c]	29375	—
Meter Socket Closing Plates	Lexan Closing Plate—EZM, EZMR, EZMH, EZMT Metal Closing plate—EZMR, EZMH, EZML	29007 RSG4	10.10 122.00

Table 2.25: Accessories *(continued)*

Accessory	Description	Cat. No.	$ Price
Sealing Rings	Snap-on (Stainless Steel) Screw-Type (Aluminum) Latch-Type (Aluminum)-standard	ARP00026 29008W 2920910001	16.70 20.10 8.00
Barrel Lock Kit	For use on ringless EZM or MP branch unit covers, includes 6 each of head protectors, lock nuts and sealing caps. (Barrel lock not included.)	MMBLC	66.00
Tenant Circuit Breaker Filler Plates	125 A Branches—2P Type QO (2 per opening) 225 A Branches—2P and 3P Q-Frame	QOFP EZMPCP	3.60 26.00

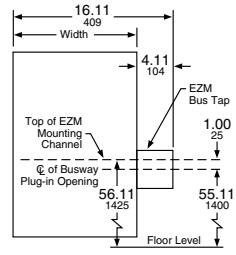
▼ Consult your nearest Schneider Electric sales office for details.
△ All sockets include 5th Jaw factory-installed except EZM11__ devices.
□ Meter center short circuit current rating is 10,000 RMS symmetrical amperes with manual circuit closers installed (bypass is not designed for use as continuous duty).
◊ For use on ring type meter sockets only.

Busway Transition Section

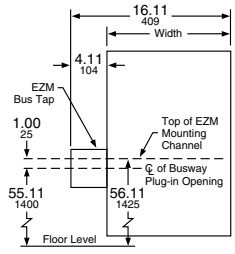
EZM busway transition section provides no overcurrent protection for the downstream EZM branch units. Tenant main circuit breakers in these branch units must be selected as "fully rated" equipment. (Examples: QO for 10 kA, QO-VH for 22 kA or QOH for 42 kA.)

Table 2.26: EZM Busway Transition Sections (3Ø only)

Ampere Rating	I-Line™ Busway location	Neutral Front	Neutral Back	Width (in.)	$ Price
1200	RIGHT of EZM Transition Section	EZM3BUSRF	EZM3BUSRB	12.00	2625.00
1200	LEFT of EZM Transition Section	EZM3BUSLF	EZM3BUSLB	12.00	2625.00



EZM3BUSRF and EZM3BUSRB



EZM3BUSLF and EZM3BUSLB

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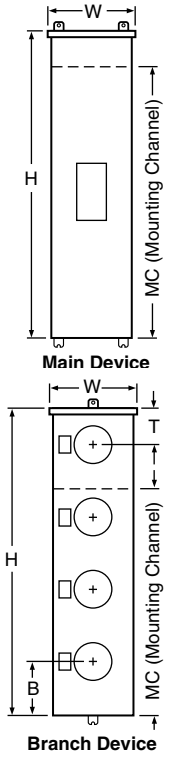

Dimensions

Table 2.27: Main Devices Dimensions (in.)

Cat. No.	Height	Width	Depth	MC
EZM11000CB	53.97	18.66	11.50	34.30
EZM11000CBU	70.05	34.19	18.33	46.99
EZM11200G/JCBT	46.90	23.69	13.69	13.75
EZM11200G/JCBE	66.20	32.39	13.69	50.09
EZM11200FST	46.90	23.69	13.69	13.75
EZM11200FSE	66.20	32.39	13.69	50.09
EZM11200G/JCBU	65.30	23.69	13.69	49.11
EZM11200FSB	65.30	23.69	13.69	49.11
EZM11200TBU	44.71	33.16	11.68	31.17
EZM11600G/JCBC	68.70	30.19	18.33	38.13
EZM11600G/JCBU	68.70	30.19	18.33	49.12
EZM11600TB	55.09	22.48	13.00	27.92
EZM12000CB	68.70	30.19	18.33	44.25
EZM12000CBU	68.70	30.19	18.33	44.25
EZM12000TB	71.09	30.19	21.46	37.62
EZM1225TB	21.81	11.66	6.37	13.00 ■
EZM1400CB	53.97	18.66	11.50	34.30
EZM1400CBU	69.03	20.46	11.50	49.37
EZM1400FS	53.97	18.66	11.50	34.30
EZM1400FSU	69.03	20.46	11.50	49.37
EZM1400TB	30.46	17.15	7.09	16.29
EZM1400TBU	35.71	17.16	8.00	27.17
EZM1600CB	53.97	18.66	11.50	34.30
EZM1600CBU	69.03	20.46	11.50	49.37
EZM1600FS	53.97	18.66	11.50	34.30
EZM1600FSU	69.03	20.46	11.50	49.37
EZM1600TB	30.46	17.15	7.09	16.29
EZM1800CB	53.97	18.66	11.50	34.30
EZM1800CBU	69.03	20.46	11.50	49.37
EZM1800FS	53.97	18.66	11.50	34.30
EZM1800FSU	69.03	20.46	11.50	49.37
EZM1800TB	53.97	18.66	11.50	34.30
EZM1800TBCU	51.76	22.48	7.09	28.01
EZM1800TBU	39.96	25.16	11.68	31.17
EZM1EXT	19.34	11.66	6.37	11.85 ■
EZM1EXT6	19.34	6.00	6.37	11.85 ■
EZM1CORNER (indoor only) ♦	19.50	14.40	8.02	11.85 ■
EZM1ELBOW (indoor only) ▲	19.50	14.52	8.01	11.85 ■
EZM31000CB	53.97	18.66	11.50	34.30
EZM31000CBU	70.05	34.19	18.33	46.99
EZM31200G/JCBT	46.90	23.69	13.69	13.75
EZM31200G/JCBE	66.20	32.39	13.69	50.09
EZM31200TBU	44.71	33.16	11.68	31.17
EZM31200G/JCBU	65.30	23.69	13.69	49.11
EZM31200FSB	65.30	23.69	13.69	49.11
EZM31200FST	46.90	23.69	13.69	13.75
EZM31200FSE	66.20	32.39	13.69	50.09
EZM31600G/JCBC	68.70	30.19	18.33	38.13
EZM31600G/JCBU	68.70	30.19	18.33	49.12
EZM31600TB	55.09	22.48	13.00	27.92
EZM32000CB	68.70	30.19	18.33	44.25
EZM32000CBU	68.70	30.19	18.33	44.25
EZM32000TB	71.09	30.19	21.46	37.62
EZM3225TB	21.81	11.66	6.37	13.00 ■
EZM3400CB	53.97	18.66	11.50	34.30
EZM3400CBU	69.03	20.46	11.50	49.37
EZM3400FS	53.97	18.66	11.50	34.30
EZM3400FSU	69.03	20.46	11.50	49.37
EZM3400TB	30.46	17.15	7.09	16.29
EZM3400TBU	35.71	17.16	8.00	27.17
EZM3600CB	53.97	18.66	11.50	34.30
EZM3600CBU	69.03	26.19	11.65	49.37
EZM3600FS	53.97	18.66	11.50	34.30
EZM3600FSU	69.03	26.19	11.65	49.37
EZM3600TB	30.46	17.15	7.09	16.29
EZM3800CB	53.97	18.66	11.50	34.30
EZM3800CBU	69.03	26.19	11.65	49.37
EZM3800FS	53.97	18.66	11.50	34.30
EZM3800FSU	69.03	26.19	11.65	49.37
EZM3800TB	53.97	18.66	11.50	34.30
EZM3800TBCU	51.76	22.48	7.09	28.01
EZM3800TBU	39.96	25.16	11.68	31.17
EZM3EXT	19.34	11.66	6.37	11.85 ■
EZM3EXT6	19.34	6.00	6.37	11.85 ■
EZM3CORNER (indoor only)	19.50	14.40	8.02	11.85 ■

▲ Each leg of elbow section measures 6.17 in. corner of wall to start of next enclosure.
■ Device supplied without mounting channel, secure to wall by use of swingable mounting feet.
♦ Each leg of this corner section measures 14.72 in. from wall to start of next enclosure.

Table 2.28: Branch Device Dimensions (in.)★

Cat. No.	Height	Width	Depth	MC	Top	Bottom
Single Phase						
EZM112225 [X, CUX]	43.41	17.38	8.09	32.34	22.18	12.23
EZM113125 [X, CUX]	42.37	12.25	7.09	31.30	13.18	11.19
EZM113225 [X, CUX]	43.41	17.38	8.09	32.34	13.18	12.23
EZM114125 [X, CUX]	48.12	12.25	7.09	31.30	9.93	11.19
EZM114225 [X, CUX]	52.00	17.38	8.09	32.34	12.77	12.23
EZM115125 [X, CUX]	57.12	12.25	7.09	31.30	9.93	11.19
EZM115225 [CU]	61.00	17.38	8.09	32.35	12.77	12.23
EZM116125 [X, CUX]	66.12	12.25	7.09	40.30	9.93	11.19
EZMH112225 [X, CUX]	43.41	17.38	8.09	32.34	22.18	12.23
EZMH113125 [X, CUX]	42.37	12.25	7.09	31.30	13.18	11.19
EZMH113225 [X, CUX]	43.41	17.38	8.09	32.34	13.18	12.23
EZMH114125 [X, CUX]	48.12	12.25	7.09	31.30	9.93	11.19
EZMH114225 [X, CUX]	52.00	17.38	8.09	32.34	12.77	12.23
EZMH115125 [X, CUX]	57.12	12.25	7.09	31.30	9.93	11.19
EZMH115225 [CU]	61.00	17.38	8.09	32.35	12.77	12.23
EZMH116125 [X, CUX]	66.12	12.25	7.09	40.30	9.93	11.19
EZMK111400	45.55	27.56	9.74	37.81	24.51	21.04
EZMK112400	72.99	27.56	9.74	37.81	22.26	21.04
EZML111225 [CU]	39.06	19.44	9.44	25.51	25.67	13.39
EZML111225D	39.06	19.44	9.44	25.51	25.67	13.39
Three Phase						
EZM312225 [X, CUX, CA, XCA, CUXCA]	43.41	17.38	8.09	32.34	22.18	12.23
EZM313125 [X, CUX, CA, XCA, CUXCA]	42.37	12.25	7.09	31.30	13.18	11.19
EZM313125M10	42.37	12.25	7.09	24.29	10.18	12.19
EZM313225 [X, CUX, CA, XCA, CUXCA]	43.41	17.38	8.09	32.34	13.18	12.23
EZM314125 [X, CUX, CA, XCA, CUXCA]	48.12	12.25	7.09	31.30	9.93	11.19
EZM314125M10	52.12	12.25	7.09	34.29	9.93	12.19
EZM314225 [X, CUX, CA, XCA, CUXCA]	52.00	17.38	8.09	32.34	12.77	12.23
EZM315125 [X, CUX, CA, XCA, CUXCA]	57.12	12.25	7.09	31.30	9.93	11.19
EZM315125M10	62.12	12.25	7.09	34.29	9.93	12.19
EZM315225 [CU, CA, CUCA]	61.00	17.38	8.09	32.35	12.77	12.23
EZM316125 [X, CUX, CA, XCA, CUXCA]	66.12	12.25	7.09	40.30	9.93	11.19
EZMH312225 [X, CUX, CA, XCA]	43.41	17.38	8.09	32.34	22.18	12.23
EZMH313125 [X, CUX, CA, XCA]	42.37	12.25	7.09	31.30	13.18	11.19
EZMH313225 [X, CUX, CA, XCA]	43.41	17.38	8.09	32.34	13.18	12.23
EZMH314125 [X, CUX, CA, XCA]	48.12	12.25	7.09	31.30	9.93	11.19
EZMH314225 [X, CUX, CA, XCA]	52.00	17.38	8.09	32.34	12.77	12.23
EZMH315125 [X, CUX, CA, XCA]	57.12	12.25	7.09	31.30	9.93	11.19
EZMH315225 [CU, CA, CUCA]	61.00	17.38	8.09	32.35	12.77	12.23
EZMH316125 [X, CUX, CA, XCA]	66.12	12.25	7.09	40.30	9.93	11.19
EZMK311400 [CA]	45.55	27.56	9.74	30.60	24.51	21.04
EZMK312400 [CA]	72.99	27.56	9.74	37.81	22.26	21.04
EZMK331400	45.55	27.56	9.74	30.60	24.51	21.04
EZMK332400	72.99	27.56	9.74	37.81	22.26	21.04
EZML311400 [CA]	45.55	23.21	9.44	37.81	24.02	21.53
EZML311225 [CU, CA, CUCA]	39.06	19.44	9.44	25.51	25.67	13.39
EZML312225 [CU, CA, CUCA]	39.06	19.44	9.44	25.51	11.67	13.39
EZML312225D [CA]	39.06	19.44	9.44	25.51	11.67	13.39
EZML312400 [CA]	69.61	23.21	9.44	37.82	20.64	21.53
EZML313225 [CU, CA, CUCA]	53.06	19.44	9.44	39.51	11.67	13.39
EZML313225D [CA]	53.06	19.44	9.44	39.51	11.67	13.39
EZML111400	44.55	23.21	9.44	37.81	24.02	21.53
EZML112225 [CU]	39.06	19.44	9.44	25.51	11.67	13.39
EZML112225D	39.06	19.44	9.44	25.51	11.67	13.39
EZML112400	69.61	23.21	9.44	37.81	20.64	21.53
EZML113225 [CU]	53.06	19.44	9.44	39.51	11.67	13.39
EZML113225D	53.06	19.44	9.44	39.51	11.67	13.39
EZML114225 [CU]	67.06	19.44	9.44	39.51	11.67	13.39
EZML114225D	67.06	19.44	9.44	39.51	11.67	13.39
EZMR112225 [X, CUX]	43.41	17.38	8.09	32.34	22.18	12.23
EZMR113125 [X, CUX]	42.37	12.25	7.09	31.30	13.18	11.19
EZMR113225 [X, CUX]	43.41	17.38	8.09	32.34	13.18	12.23
EZMR114125 [X, CUX]	48.12	12.25	7.09	31.30	9.93	11.19
EZMR114225 [X, CUX]	52.00	17.38	8.09	32.34	12.77	12.23
EZMR115125 [X, CUX]	57.12	12.25	7.09	31.30	9.93	11.19
EZMR115225 [CU]	61.00	17.38	8.09	32.35	12.77	12.23
EZMR116125 [X, CUX]	66.12	12.25	7.09	40.30	9.93	11.19
EZMT111225	25.45	22.42	9.38	16.19	4.67	20.45
EZMT112225	60.56	22.42	9.38	43.63	12.67	28.89
EZMT113225	79.56	22.42	9.38	48.25	12.67	28.89
EZML314225 [CU, CA, CUCA]	67.06	19.44	9.44	39.51	11.67	13.39
EZML314225D [CA]	67.06	19.44	9.44	39.51	11.67	13.39
EZML331225 [CU]	39.06	19.44	9.44	25.51	25.67	13.39
EZML331225D	39.06	19.44	9.44	25.51	25.67	13.39
EZML331400	45.55	23.21	9.44	37.81	24.02	21.53
EZML332225 [CU]	39.06	19.44	9.44	35.51	11.67	13.39
EZML332225D	39.06	19.44	9.44	35.51	11.67	13.39
EZML332400 [CU]	69.61	23.21	9.44	37.82	20.64	21.53
EZML333225 [CU]	53.06	19.44	9.44	39.51	11.67	13.39
EZML333225D	53.06	19.44	9.44	39.51	11.67	13.39
EZML334225 [CU]	67.06	19.44	9.44	39.51	11.67	13.39
EZML334225D	67.06	19.44	9.44	39.51	11.67	13.39
EZMR312225 [X, CUX, CA, XCA]	43.41	17.38	8.09	32.34	22.18	12.23
EZMR313125 [X, CUX, CA, XCA]	42.37	12.25	8.09	31.30	13.18	11.19
EZMR313225 [X, CUX, CA, XCA]	43.41	17.38	8.09	32.34	13.18	12.23
EZMR314125 [X, CUX, CA, XCA]	48.12	12.25	7.09	31.30	9.93	11.19
EZMR314225 [X, CUX, CA, XCA]	52.00	17.38	8.09	32.34	12.77	12.23
EZMR315125 [X, CUX, CA, XCA]	57.12	12.25	7.09	31.30	9.93	11.19
EZMR315225 [CU, CA, CUXCA]	61.00	17.38	8.09	32.35	12.77	12.23
EZMR316125 [X, CUX, CA, XCA]	66.12	12.25	7.09	40.30	9.93	11.19
EZMR332225 [CU]	39.06	19.44	9.44	25.51	11.67	13.39
EZMR333225 [CU]	53.06	19.44	9.44	39.51	11.67	13.39
EZMR334225 [CU]	67.06	19.44	9.44	39.51	11.67	13.39
EZMT311225 [CA]	25.45	22.42	9.38	16.19	4.67	20.45
EZMT312225 [CA]	60.56	22.42	9.38	43.63	12.67	28.89
EZMT313225 [CA]	79.56	22.42	9.38	48.25	12.67	28.89
EZMT331225	25.12	22.42	9.38	16.19	4.67	20.45
EZMT332225	60.56	22.42	9.38	43.63	12.67	28.89
EZMT333225	79.56	22.42	9.38	48.25	12.67	28.89

★ Standard branch units are available without suffix added.

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Section 3

Safety Switches

Light Duty, p. 3-2

General Duty, p. 3-2

Heavy Duty, p. 3-4

Stainless Steel Heavy Duty, p. 3-7

Light Duty

Fusible 3-2
Application Data and Dimensions 3-3

Standards:

- UL 98 Enclosed and Dead Front Switches.
  UL Listed under File E2875.
- NEMA Standards Publication KS1. Enclosed Switches.

General Duty

Fusible and Non-Fusible 3-2
Application Data and Dimensions 3-3

Standards:

- UL 98 Enclosed and Dead Front Switches.
  UL Listed under File E2875.
- NEMA Standards Publication KS1. Enclosed Switches.

Heavy Duty

Fusible 3-4
Non-Fusible 3-6
New! Special Application Enclosures 3-7
New! Motor Disconnect and Receptacle Switches 3-8
Accessories 3-11
Application Data and Dimensions 3-13

Standards:

- UL 98 Enclosed and Dead Front Switches.
  UL Listed under files E2875, E154828, E233505 and E317818.
- UL 508 Industrial Control Equipment, file E 164864.
- NEMA Standards Publication KS1 Enclosed Switches (UL98 Switches Only).

Double Throw

Fusible and Non-Fusible 3-15
Accessories 3-18

Standards:

- UL 98 Enclosed and Dead Front Switches.
  UL Listed under files E2875 (unless otherwise noted).
- NEMA Standards Publication KS1 Enclosed Switches (applies to Type DT and DTU series F only).

Application Data and Dimensions 3-19

New! 1000 Vdc Photovoltaic Heavy Duty Disconnect Switch

3-22

Standards:

- UL 98 Enclosed and Dead Front Switches
- UL Listed under file E343347
- IEC 60947 - 1 Electrical
- IEC 60947 - 3 Mechanical
- NEMA standard. Publication KS-1 Enclosed Switches
- IP 63 and NEMA 3 Enclosure

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L221N

D223N

Light Duty—Visible Blades 10 kA Short Circuit Current Rating

The Square D light duty enclosed switch is ideal for home applications in disconnecting power to workshops, hobby rooms, furnaces, and garages.

Table 3.1: Fusible

System	Amperes	Fuse	NEMA 1 Indoor Cat. No.	NEMA 1 Indoor $ Price	Horsepower Ratings Std.	Horsepower Ratings Max.
2 Wire (1 Blade and Fuseholder, 1 Neutral)—120 Vac						
	30	Plug	L111N	**$54.00**	1/2	2
3 Wire (2 Blades and Fuseholders, 1 Neutral)—120/240 Vac						
	30	Plug	L211N	**72.00**	1-1/2▲	3▲
	30	Cart.	L221N	**98.00**	1-1/2▲	3▲

▲ For single phase hp rating, use two switching poles.

General Duty—Up To 100 kA Short Circuit Current Rating With Proper Current Limiting Fusing

General duty safety switches are designed for residential and commercial applications where durability and economy are prime considerations. Typical loads are lighting, air conditioning, and appliances. They are suitable for use as service equipment when equipped with a factory- or field-installed neutral assembly or a field-installed service grounding kit, (see Table 3.6) as applicable.

General duty safety switches are UL Listed, File E2875, and meet or exceed the NEMA Standard KS1.

UL Listed Short Circuit Withstand Rating		
Switch Type	Fuse Class	Short Circuit Rating
Fusible	Plug	10 kA
	H	10 kA
	K	10 kA
	J	100 kA
	R	100 kA
	T	100 kA
Non-Fusible▲	H	10 kA
	K	10 kA
	J	100 kA
	R	100 kA■
	T	100 kA

▲ The UL Listed short-circuit current rating for Square D general duty, not fusible switches is based on the switch being used in conjunction with fuses. Evaluation of non-fusible switches in conjunction with molded case circuit breakers above 10,000 amps has not been performed. For applications requiring greater protection, consider using a heavy duty safety switch. Refer to UL Listed Maximum Short Circuit Current Ratings—AC only—on page 3-6. If a UL Listed short-circuit current rating is required, this non-fusible switch must be replaced with a Square D general duty fusible safety switch equipped with the appropriate class and size fusing. Consult the wiring diagram of the switch to verify the UL Listed short-circuit current rating.

■ 50 kA for 60 A non-fusible switch.

Table 3.2: Fusible

System	Amperes	Fuse	NEMA 1 Indoor Cat. No.	NEMA 1 Indoor $ Price	NEMA 3R▲ Rainproof Cat. No.	NEMA 3R▲ Rainproof $ Price	Class R Fuse Kits Field-Installed■ Cat. No.	Class R Fuse Kits Field-Installed■ $ Price	Horsepower Ratings Std. (Fast Acting One-Time Fuses) 1Ø	Horsepower Ratings Std. (Fast Acting One-Time Fuses) 3Ø	Horsepower Ratings Max. (Dual Element Time-Delay Fuses) 1Ø	Horsepower Ratings Max. (Dual Element Time-Delay Fuses) 3Ø
2 Wire (1 Blade and Fuseholder, 1 Neutral)—120 Vac												
	30	Plug	Use Light Duty Device for this Application (see below)						—	—	—	—
	30	Cart.	Use three-wire devices for this application.						—	—	—	—
3 Wire (2 Blades and Fuseholders, 1 Neutral)—120/240 Vac (Plug), 240 Vac (Cart.) Maximum												
	30	Plug	D211N	**90.00**	D211NRB	**177.00**	—	—	1-1/2	—	3	—
	30	Cart.	D221N	**122.00**	D221NRB	**188.00**	DRK30	**25.65**	1-1/2	3♦	3	7-1/2♦
	60	Cart.	D222N	**206.00**	D222NRB	**326.00**	RFK03H	**25.50**	3	7-1/2♦	10	15♦
	100	Cart.	D223N	**426.00**	D223NRB	**480.00**	RFK10	**47.70**	7-1/2	15♦	15	30♦
	200	Cart.	D224N▼	**884.00**	D224NRB▼	**1200.00**	HRK1020	**47.70**	15	25♦	—	60♦
	400	Cart.	D225N	**2555.00**	D225NR	**3459.00**	DRK40	**111.00**	—	—	—	—
	600□	Cart.	D226N	**5109.00**	D226NR	**6569.00**	DRK600	**111.00**	—	—	—	—
4 Wire (3 Blades and Fuseholders, 1 Neutral)—240 Vac Maximum												
	30	Cart.	D321N	**188.00**	D321NRB	**293.00**	DRK30	**25.65**	1-1/2	3	3	7-1/2
	60	Cart.	D322N	**326.00**	D322NRB	**441.00**	RFK03H	**25.50**	3	7-1/2★	10	15★
	100	Cart.	D323N	**564.00**	D323NRB	**816.00**	RFK10	**47.70**	7-1/2	15★	15	30★
	200	Cart.	D324N▼	**1202.00**	D324NRB▼	**1461.00**	HRK1020	**47.70**	15	25★	—	60★
	400	Cart.	D325N	**3113.00**	D325NR	**3893.00**	DRK40	**111.00**	—	50	—	125
	400△	Class T	D325NT	**2994.00**	D325NTR	**3741.00**	—	—	—	50	—	—
	600□	Cart.	D326N	**5823.00**	D326NR	**7877.00**	DRK600	**111.00**	—	75	—	150
	600△	Class T	D326NT	**5598.00**	D326NTR	**7569.00**	—	—	—	75	—	—
	800△	Class T	T327N	**9722.00**	T327NR	**12438.00**	—	—	—	100	—	—

▲ Bolt-on hubs—Refer to page 3-10.
■ When installed, this kit rejects all but Class R fuses.
♦ For corner grounded delta systems only. Use switching poles for ungrounded conductors. See data bulletin 2700DB0202 for additional information.
★ If corner grounded delta, use outer switching poles for ungrounded conductors.
▼ For 200% neutral, order (1) additional neutral kit SN20A and (1) neutral jumper kit SN20NI.
△ Class T 400–800 A general duty safety switches use 300 Vac Class T fuses and are UL Listed for use on systems with up to 100 kA available fault current.
□ Order Class J fuse kit: GDJK600 for Class J fuses.

Table 3.3: Non-Fusible

System	Amperes	NEMA 1 Indoor Cat. No.	NEMA 1 Indoor $ Price	NEMA 3R Rainproof ◊ Cat. No.	NEMA 3R Rainproof ◊ $ Price	Horsepower Ratings (Max.) 1Ø	Horsepower Ratings (Max.) 3Ø
2 Wire (2 Blades)—240 Vac Maximum							
	30	—	—	DU221RB	**177.00**	3	—
	60	—	—	DU222RB	**353.00**	10	—
	60	QO260NATS☆▽	**161.00**	QO200TR☆▽◒	**161.00**	10	—
	100	QO2000NS☆▽	**276.00**	QO2000NRB☆◒	**338.00**	20	—
	200	Use 3P Switch	—	Use 3P Switch	—	—	—
	400◪	Use 3P Switch	—	Use 3P Switch	—	—	—
	600	Use 3P Switch	—	Use 3P Switch	—	—	—
3 Wire (3 Blades)—240 Vac Maximum							
	30	DU321	**155.00**	DU321RB	**293.00**	3	7-1/2
	60	DU322	**206.00**	DU322RB	**443.00**	10	15
	100	DU323✱	**477.00**	DU323RB✱	**816.00**	15	30
	200	DU324♦	**884.00**	DU324RB♦	**1461.00**	15	60◑
	400◪	DU325	**2198.00**	—	—	—	125
	600	DU326◑	**4191.00**	—	—	—	150

◊ Bolt-on hubs—Refer to page 3-10.
☆ Enclosed molded case switch—Refer to page 1-24.
▽ Includes factory-installed grounding kit.
◒ Not service entrance rated—Refer to page 1-19 for more information.
✱ If a neutral assembly is required, order and field-install SN0610.
♦ If a neutral assembly is required, order and field install a SN20A Neutral Assembly Kit. For a 200% neutral application, order and field install (2) SN20A Neutral Assembly Kits and (1) SN20NI Neutral Jumper Kit.
◑ If a neutral assembly is required, order part number D600SN. Available for field-installation.
✪ For single phase hp rating, use two switching poles.
◪ To accept J class fuses, move fuse bases to the embossed guide inside of the switch.

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Table 3.4: Terminal Lug Data ▲

Amperes	Conductors Per Phase	Wire Range Wire Bending Space Per NEC Table 312.6 AWG/kcmil	Lug Wire Range AWG/kcmil
30	1	12–6 (Al) or 14–6 (Cu)	12–6 (Al) or 14–6 (Cu)
60	1	10–3 (Al) or 14–3 (Cu)	10–2 (Al) or 14–2 (Cu)
100	1	12–1 (Al) or 14–1 (Cu)	12–1/0 (Al) or 14–1/0 (Cu)
200	1	6 –250 (Al/Cu)	6 –300 (Al/Cu)
400 NEMA 1	1 or 2	1/0 –600 (Al/Cu) or 1/0 –300 (Al/Cu)	(1) 1/0 –750 (Al/Cu) or (2) 1/0 –300 (Al/Cu)
400 NEMA 3R	2	1/0–250 (Al/Cu)	(1) 1 –600 (Al/Cu) or (2) 1/0 –250 (Al/Cu)
600	2	4 –500 (Al/Cu)	4 –600 (Al/Cu)
800	3	3/0 –500 (Al/Cu)	3/0 –500 (Al/Cu)

▲ 30–100 A switches suitable for 60°C or 75°C conductors. 200–800 A switches suitable for 75°C conductors.

NOTE: *Field-installed lug kits are located in the Supplemental Digest page 2.2.*

Field-Installed Fuse Puller Kits

Kit consists of three fuse pullers as required for a 3P, fusible, 60 and 100 A general duty switch. Kits can be installed in 60 and 100 A Series F switches.

Table 3.5: Fuse Puller Kits

Description	Cat. No.	$ Price
Series F 60 A Fuse Puller Kit	FPK03	**30.00**
Series F 100 A Fuse Puller Kit	FPK0610	**42.60**

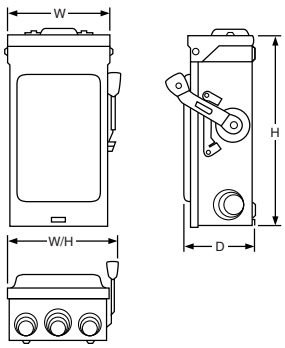

Table 3.6: Field-Installed Service Grounding Kits

Amperes	Cat. No.	$ Price	Wire Size (AWG)
30	PK3GTA1	**11.40**	(2) 12 Cu or (2) 10 Al or (1) 4 Al/Cu Max.
60▲	PK3GTA1	**11.40**	(2) 12 Cu or (2) 10 Al or (1) 4 Al/Cu Max.
60■	GTK03	**11.40**	(2) 12 Cu or (2) 10 Al or (1) 4 Al/Cu Max.
100	GTK0610	**18.90**	(2) 1/0 Al/Cu Max.
200	PKOGTA2	**55.00**	(2) 2/0 Al/Cu Max.
400 600	PKOGTA2 (Two Required)	**55.00**	(2) 2/0 Al/Cu Max. Per Lug
800	PKOGTA3	**123.00**	(6) 3/0 Al/Cu Max.

▲ Series E switch only.
■ Series F switch only.

Field-Installed Electrical Interlock Kits

Electrical interlocks for Series F 100–200 A general duty safety switches and Series F 60 A fusible general duty safety switches are available in kit form for field installation. Each kit contains instructions for proper field mounting. A pivot arm operates from switch mechanism, breaking the control circuit before the main switch blades break. Switches with electrical interlocks installed are UL Listed.

Table 3.7: Electrical Interlock Kit

Switch's Amperes Rating	Series	Electrical Interlock Kit Cat. No.▲	$ Price
60	F■	EIK031 or EIK032	**218.00**
100–200	F	EIK1 or EIK2	**311.00**

▲ Electrical interlock kit catalog numbers with -1 suffix indicates one normally open and one normally closed contact; -2 indicates two normally open and two normally closed contacts. Kits are UL Listed.
■ Fusible series.

Table 3.8: Approximate Dimensions

Cat. No.	Series	H		W		W/H		D		Std. Pack
		in.	mm	in.	mm	in.	mm	in.	mm	
L111N	E2	7.63	194	5.00	127	6.13	156	4.00	102	1
L211N	E2	7.63	194	5.00	127	6.13	156	4.00	102	1
L221N	E2	7.63	194	5.00	127	6.13	156	4.00	102	1
D211N♦	E3	9.25	235	6.75	171	7.25	184	3.63	92	5
D211NRB♦	E2	9.63	245	7.25	184	7.75	197	3.75	95	5
D221N♦	E3	9.25	235	6.75	171	7.25	184	3.63	92	5
D221NRB♦	E3	9.63	245	7.25	184	7.75	197	3.75	95	5
D222N	F1	14.63	372	6.50	165	7.45	189	4.88	124	1
D222NRB	F1	14.88	378	6.63	168	7.45	189	4.88	124	1
D223N	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
D223NRB	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
D224N	F1	29.00	737	17.25	438	19.00	483	8.25	210	1
D224NRB	F1	29.25	743	17.25	438	19.00	483	8.25	210	1
D225N	E3	45.12	1146	24.00	610	24.88	632	8.88	226	1
D225NR	E1	30.63	778	21.38	543	22.25	565	10.13	257	1
D226N♦	E3	49.13	1248	24.00	610	24.88	632	8.88	226	1
D226NR♦	E1	49.13	1248	24.75	629	25.13	638	8.88	226	1
D321N♦	E3	9.25	235	6.75	171	7.25	184	3.63	92	5
D321NRB♦	E3	9.63	245	7.25	184	7.75	197	3.75	95	5
D322N	F1	14.63	372	6.50	165	7.45	189	4.88	124	1
D322NRB	F1	14.88	378	6.63	168	7.45	189	4.88	124	1
D323N	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
D323NRB	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
D324N	F1	29.00	737	17.25	438	19.00	483	8.25	210	1
D324NRB	F1	29.25	743	17.25	438	19.00	483	8.25	210	1
D325N♦	E3	45.12	1146	24.00	610	24.88	632	8.88	226	1
D325NT♦	E3	45.12	1146	24.00	610	24.88	632	8.88	226	1
D325NR♦	E1	30.63	778	21.38	543	22.25	565	10.13	257	1
D325NTR♦	E1	30.63	778	21.38	543	22.25	565	10.13	257	1
D326N♦	E3	49.13	1248	24.00	610	24.88	632	8.88	226	1
D326NT♦	E3	49.13	1248	24.00	610	24.88	632	8.88	226	1
D326NR♦	E1	49.13	1248	24.75	629	25.13	638	8.88	226	1
D326NTR♦	E1	49.13	1246	24.75	629	25.13	638	8.88	226	1
DU221RB♦	E2	9.63	245	7.25	184	7.75	197	3.75	95	5
DU222RB♦	E1	9.63	245	7.25	184	7.75	197	3.75	95	5
DU321♦	E2	9.25	235	6.75	171	7.25	184	3.63	92	5
DU321RB♦	E2	9.63	245	7.25	184	7.75	197	3.75	95	5
DU322♦	E1	9.25	235	6.75	171	7.25	184	3.63	92	5
DU322RB♦	E1	9.63	245	7.25	184	7.75	197	3.75	95	5
DU323	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
DU323RB	F3	17.50	445	8.50	216	10.50	267	6.50	165	1
DU324	F1	29.00	737	17.25	438	19.00	483	8.25	210	1
DU324RB	F1	29.25	743	17.25	438	19.00	483	8.25	210	1
DU325♦	E3	45.12	1146	24.00	610	24.88	632	8.88	226	1
DU326♦	E3	49.13	1248	24.00	610	24.88	632	8.88	226	1
QO200TR♦	G3	6.50	165	4.63	118	—	—	3.88	99	5
QO260NATS♦	E2	9.25	235	4.88	124	—	—	3.25	83	1
QO2000NRB♦	E1	14.00	356	7.75	197	—	—	4.50	114	1
QO2000NS♦	E1	13.38	340	6.13	156	—	—	3.50	89	1
T327N♦	E1	49.13	1248	24.00	610	24.88	632	8.88	226	1
T327NR♦	E1	49.13	1248	24.75	629	25.13	638	8.88	226	1

♦ 30–100 A switches suitable for 60°C or 75°C conductors. 200–800 A switches suitable for 75°C conductors.

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NEMA 1 | NEMA 3R | NEMA 4, 4X and 5 Stainless Steel | NEMA 12

Visible blade heavy duty safety switches are designed for application where maximum performance and continuity of service are required. All heavy duty safety switches feature quick-make, quick-break operating mechanism, a dual cover interlock and a color coded indicator handle. They are suitable for use as service equipment when equipped with a field- or factory-installed neutral assembly or equipment grounding kit, unless a 600Y/347 V or 480 Y/277 V, 1000 A or greater, solidly grounded WYE system is used, per NEC 215-10. Heavy duty safety switches are UL Listed (except as noted), File E2875 and 154828 and meet or exceed the NEMA Standard KS1. For UL Listed short circuit current ratings, see page 3-6.

Table 3.9: 240 Volt—Single Throw Fusible

System	Amperes	NEMA 1 Indoor		NEMA 3R Rainproof (Bolt-on Hubs, page 3-10)		NEMA 4, 4X, 5, ▲ 304 Stainless Steel (for 316 stainless, see page 3-7) Dust tight, Watertight, Corrosion Resistant (Watertight Hubs, page 3-10)		NEMA 12K With Knockouts (Watertight Hubs, page 3-10)		NEMA 12, 3R ■ Without Knockouts (Watertight Hubs, page 3-10)		Horsepower Ratings 240 Vac Std. (Using Fast Acting, One Time Fuses)		Horsepower Ratings 240 Vac Max. (Using Dual Element, Time Delay Fuses)		250 Vdc ♦
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	1Ø	3Ø	1Ø	3Ø	
2-Wire (2 Blades and Fuseholders)—240 Vac, 250 Vdc																
	30	Use three-wire devices For two-wire applications				H221DS	1947.00	H221A	504.00	H221AWK	473.00	1-1/2	3 ★	3	7-1/2★	5
	30					—	—	—	—	H2212AWK▼	588.00	1-1/2	—	3	—	5
	60					H222DS	2337.00	—	—	H222AWK	647.00	3	7-1/2★	10	15 ★	10
	100					H223DS	5094.00	H223A	1008.00	H223AWK	948.00	7-1/2	15 ★	15	30 ★	20
	200					H224DS	6960.00	H224A	1737.00	H224AWK	1643.00	15	25 ★	—	60 ★	40
	400	H225	2729.00	H225R	3884.00	H225DS	14481.00	—	—	H225AWK	4163.00	—	—	—	—	50
	600	H226	5424.00	H226R	7281.00	H226DS	20772.00	—	—	H226AWK	6543.00	—	75 ★	—	200 ★	50
	800	H227	8459.00	H227R△	11483.00	—	—	—	—	H227AWK	10325.00	50	—	50	—	50
	1200	H228	11682.00	H228R△	15486.00	—	—	—	—	H228AWK	15815.00	50	—	50	—	50
3-Wire (2 Blades and Fuseholders, 1 Neutral)—240 Vac, 250 Vdc																
	30	H221N	236.00	H221NRB	447.00	Use two-wire devices, Field-installed solid neutral assemblies Order separately See page 3-11.						1-1/2	3 ★	3	7-1/2 ★	5
	60	H222N	471.00	H222NRB	842.00							3	7-1/2★	10	15 ★	10
	100	H223N	716.00	H223NRB	1086.00							7-1/2	15 ★	15	30 ★	20
	200	H224N	1289.00	H224NRB	1562.00							15	25 ★	—	60 ★	40
	400	H225N	3092.00	H225NR	4245.00	H225NDS	14787.00	—	—	H225NAWK	4304.00	—	50 ★	—	125 ★	50
	600	H226N	5819.00	H226NR	7677.00	H226NDS	21081.00	—	—	H226NAWK	6936.00	—	75 ★	—	200 ★	50
	800	H227N	10067.00	H227NR△	12216.00	—	—	—	—	H227NAWK	12338.00	50	—	50	—	50
	1200	H228N	12422.00	H228NR△	16665.00	—	—	—	—	H228NAWK	17184.00	50	—	50	—	50
3-Wire (3 Blades and Fuseholders)—240 Vac, 250 Vdc																
	30	Use four-wire devices For three-wire applications				H321DS	2049.00	H321A	639.00	H321AWK	639.00	1-1/2	3	3	7-1/2	5
	60					H322DS	2532.00	H322A	914.00	H322AWK	864.00	3	7-1/2	10	15	10
	100					H323DS	5346.00	H323A	1412.00	H323AWK	1331.00	7-1/2	15	15	30	20
	200					H324DS	7496.00	H324A	2040.00	H324AWK	1926.00	15	25	—	60	40
	400	H325	3425.00	H325R	3975.00	H325DS	14961.00	—	—	H325AWK	4253.00	—	50	—	125	50
	600	H326	6170.00	H326R	8286.00	H326DS	21399.00	—	—	H326AWK	7365.00	—	75	—	200	50
	800	H327	11456.00	H327R△	14849.00	—	—	—	—	H327AWK	14528.00	50	100	50	250	50
	1200	H328	14517.00	H328R△	18728.00	—	—	—	—	H328AWK	17450.00	50	100	50	250	50
4-Wire (3 Blades and Fuseholders, 1 Neutral)—240 Vac, 250 Vdc																
	30	H321N	314.00	H321NRB	555.00	Use three-wire devices, Field-installed solid neutral assemblies Order separately. See page 3-11						1-1/2	3	3	7-1/2	5
	60	H322N	528.00	H322NRB	891.00							3	7-1/2	10	15	10
	100	H323N	842.00	H323NRB	1278.00							7-1/2	15	15	30	20
	200	H324N	1451.00	H324NRB	1748.00							15	25	—	60	40
	400	H325N	3788.00	H325NR	4322.00	H325NDS	15321.00	—	—	H325NAWK	4635.00	—	50	—	125	50
	600	H326N	6519.00	H326NR	8622.00	H326NDS	21759.00	—	—	H326NAWK	7757.00	—	75	—	200	50
	800	H327N	12189.00	H327NR△	15563.00	—	—	—	—	H327NAWK	15879.00	50	100	50	250	50
	1200	H328N	15314.00	H328NR△	19709.00	—	—	—	—	H328NAWK	20015.00	50	100	50	250	50
4-Wire (4 Blades and Fuseholders)																
	30	Use 600 Vac devices. See page 3-5.														
	60															
	100															
	200															
	400															
	600															

▲ Complete rating is NEMA 3, 3R, 4, 4X, 5 and 12. For NEMA 3R applications, remove drain screw from bottom endwall.
■ Also suitable for NEMA 3R application by removing drain screw from bottom endwall.
♦ For switching dc, use two outside switching poles.
★ For corner grounded delta systems only and with neutral assembly installed. Use switching poles for ungrounded conductors.
▼ 60 ampere switch with 30 ampere fuse spacing and clips. Must use 60 A enclosure accessories including electrical interlocks.
△ Suitable for NEMA 5 applications with drain screw installed.

Accessories: . . . . . pages 3-10 through 3-12
Dimensions: NEMA 1 and 3R . . . . . page 3-13
Dimensions: NEMA 4, 4X and 5 Stainless and NEMA 12 . . . . . page 3-14

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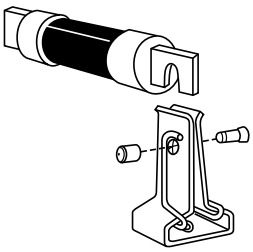
Table 3.10: 600 Volts—Single Throw Fusible

System	Amperes	NEMA 1 Indoor		NEMA 3R Rainproof (Bolt-on Hubs, page 3-10)		NEMA 4, 4X, 5▲ 304 Stainless Steel (for 316 stainless, see page 3-7) Dust tight, Watertight, Corrosion Resistant (Watertight Hubs, page 3-10)		NEMA 12K With Knockouts (Watertight Hubs, page 3-10)		NEMA 12, 3R■ Without Knockouts (Watertight Hubs, page 3-10)		Horsepower Ratings					
												480 Vac		600 Vac		dc★	
												Std. (Using Fast Acting, One Time Fuses)	Max. (Using Dual Element, Time Delay Fuses)	Std. (Using Fast Acting, One Time Fuses)	Max. (Using Dual Element, Time Delay Fuses)		
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	3Ø	3Ø	3Ø	3Ø	250	600
2-Wire (2 Blades and Fuseholders)—600 Vac, 600 Vdc																	
	30	Use three-wire devices for two-wire applications										—	—	—	—	—	—
	60											—	—	—	—	—	—
	100											—	—	—	—	—	—
	200											—	—	—	—	—	—
	400	H265	**4206.00**	H265R	**5424.00**	H265DS	**14961.00**	—	—	H265AWK	**5025.00**	100 ♦	250 ♦	—	—	50	50
	600	H266	**6653.00**	H266R	**10686.00**	H266DS	**21399.00**	—	—	H266AWK	**7341.00**	150 ♦	400 ♦	—	—	50	50
	800	H267	**10365.00**	H267R△	**16385.00**	—	—	—	—	H267AWK	**15276.00**	—	—	—	—	50	50
	1200	H268	**14570.00**	H268R△	**17991.00**	—	—	—	—	H268AWK	**18044.00**	—	—	—	—	50	50
3-Wire (3 Blades and Fuseholders)—600 Vac, 600 Vdc★																	
	30	H361	**528.00**	H361RB	**899.00**	H361DS	**2520.00**	H361A	**1014.00**	H361AWK	**956.00**	5	15	7-1/2	20	5	15
	30	H361-2△	**617.00**	H3612RB▼	**1049.00**	—	—	H361-2A▼	**1035.00**	H3612AWK▼	**977.00**	5	15	7-1/2	20	—	15
	60	H362	**638.00**	H362RB	**1055.00**	H362DS	**2771.00**	H362A	**1047.00**	H362AWK	**984.00**	15	30	15	50	—	30
	100	H363	**1188.00**	H363RB	**1644.00**	H363DS	**5493.00**	H363A	**1626.00**	H363AWK	**1539.00**	25	60	30	75	—	50
	200	H364	**1707.00**	H364RB	**2259.00**	H364DS	**7685.00**	H364A	**2544.00**	H364AWK	**2400.00**	50	125	60	150	40	50
	400	H365	**4551.00**	H365R	**5532.00**	H365DS	**15321.00**	—	—	H365AWK	**5462.00**	100	250	125	350	50	50
	600	H366	**7649.00**	H366R	**10899.00**	H366DS	**21084.00**	—	—	H366AWK	**9203.00**	150	400	200	500	50	50
	800	H367	**13319.00**	H367R △	**16500.00**	—	—	—	—	H367AWK	**16352.00**	200	500	250	500	50	50
	1200	H368	**17507.00**	H368R△	**20009.00**	—	—	—	—	H368AWK	**19706.00**	200	500	250	500	50	50
4-Wire (3 Blades and Fuseholders, 1 Neutral)—600 Vac, 600 Vdc★																	
	30	H361N	**617.00**	H361NRB	**986.00**	Use three-wire devices field-installed solid neutral assemblies. Order separately. See page 3-11.						5	15	7-1/2	20	—	15
	60	H362N	**710.00**	H362NRB	**1134.00**							15	30	15	50	—	30
	100	H363N	**1278.00**	H363NRB	**1737.00**							25	60	30	75	—	50
	200	H364N	**1869.00**	H364NRB	**2408.00**	H364NDS	**7871.00**	H364NA	**2715.00**	H364NAWK	**2558.00**	50	125	60	150	40	50
	400	H365N	**4898.00**	H365NR	**5765.00**	H365NDS	**15668.00**	—	—	H365NAWK	**5823.00**	100	250	125	350	50	50
	600	H366N	**8019.00**	H366NR	**11054.00**	H366NDS	**22122.00**	—	—	H366NAWK	**9600.00**	150	400	200	500	50	50
	800	H367N	**14043.00**	H367NR△	**17205.00**	—	—	—	—	H367NAWK	**17253.00**	200	500	250	500	50	50
	1200	H368N	**18114.00**	H368NR△	**20993.00**	—	—	—	—	H368NAWK	**20820.00**	200	500	250	500	50	50
4-Wire (4 Blades and Fuseholders)—600 Vac, 600 Vdc□												**2Ø**	**2Ø**	**2Ø**	**2Ø**		
	30	H461	**914.00**	—	—	H461DS	**2937.00**	—	—	H461AWK	**1115.00**	7-1/2	20	10	25	5	15
	60	H462	**1065.00**	—	—	H462DS	**3069.00**	—	—	H462AWK	**1257.00**	15	40	20	50	10	30
	100	H463	**1778.00**	—	—	H463DS	**8345.00**	—	—	H463AWK	**1932.00**	25	50	30	75	20	30
	200	H464	**2957.00**	—	—	H464DS	**12596.00**	—	—	H464AWK	**3222.00**	50	—	50	—	40	50
	400	H465	**6210.00**	—	—	—	—	—	—	H465AWK	**6807.00**	**100**	**250**	**125**	**350**	**50**	**50**
	600	H466	**10104.00**	—	—	—	—	—	—	—	—	**150**	**400**	**200**	**500**	**50**	**50**
6-Wire (6 Blades and Fuseholders)—600 Vac □												**3Ø**	**3Ø**	**3Ø**	**3Ø**		
	100	—	—	—	—	H663DS	**25964.00**	—	—	H663AWK	**5112.00**	25	60	30	75	—	—
	200	—	—	—	—	H664DS	**35393.00**	—	—	H664AWK	**12222.00**	For applications requiring motor disconnect capability, use electrical interlock. Refer to page 3-10.					

▲ Complete rating is NEMA 3, 3R, 4, 4X, 5 and 12.
■ Also suitable for NEMA 3R application by removing drain screw from bottom endwall.
♦ For corner grounded delta systems only and with neutral assembly installed. Use switching poles for ungrounded conductors.
★ For switching dc use two outside switching poles.
▼ 60 A switch with 30 A fuse spacing and clips. Must use 60 A enclosure accessories including electrical interlocks.
△ Suitable for NEMA 5 applications with drain screw installed.
□ Not suitable for use as service equipment.



Class R Fuse

Class H Fuse Provisions:

Fusible Square D 30 through 600 A heavy duty safety switches accept Class H fuses as standard. With Class H fuses installed, the switch is UL Listed for use on systems with up to 10 kA available fault current.

Class R Fuse Provisions:

Fusible Square D 30–600 A heavy duty safety switches will accept Class R fuses as standard. A field-installed rejection kit is available which, when installed, rejects all but Class R fuses. With the installation of the rejection kit and Class R fuses, the switch is UL Listed for use on systems with up to 200 kA available fault current. See Class R fuse kits on page 3-10.

Class J Fuse Provisions:

Provisions for installing Class J fuses are included in 30 through 400 A 600 Volt, and 100 through 400 A 240 Volt, fusible heavy duty safety switches. Conversion to Class J fuse spacing requires relocating the load side fuse base assembly from the standard Class H fuse location to an alternate position as marked in the enclosure. With Class J fuses installed, the switch is UL Listed for use on systems with up to 200 kA available fault current. Switches rated 600 A, 240 or 600 Volt, require the addition of an adapter kit, H600J at **$456.** One kit per 3P switch.

Class L Fuse Provisions:

Fusible 800 A and 1200 A safety switches use Class L bolt-in fuses and are rated for use on systems with up to 200 kA at 600 Vac maximum. 1200 A switches accept class L fuses from 601–1200 A, 800 A switches accept class L fuses from 601–800 A.

Accessories: . . . . . pages 3-10 through 3-12
Dimensions: NEMA 1 and 3R . . . . . page 3-13
Dimensions: NEMA 4, 4X and 5 . . . . . page 3-14

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Table 3.11: 600 Volt—Single Throw Non-Fusible

System	Amperes	NEMA 1 Indoor		NEMA 3R Rainproof (Bolt-on Hubs, page 3-10)		NEMA 4, 4X, 5 ▲ 304 Stainless Steel (for 316 stainless, see page 3-7) Dust tight, Watertight Corrosion Resistant (Watertight Hubs, page 3-10)		NEMA 12K With Knockouts (Watertight Hubs, page 3-10)		NEMA 12, 3R ■ Without Knockouts (Watertight Hubs, page 3-10)		Horsepower Ratings (Max.)							
												Volts ac						dc ♦	
												240		480		600			
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	250	600
2-Wire (2 Blades)—600 Vac, 600 Vdc																			
	30	Use three-wire devices for two-wire applications.										—	—	—	—	—	—	—	—
	60											—	—	—	—	—	—	—	—
	100											—	—	—	—	—	—	—	—
	200											—	—	—	—	—	—	—	—
	400	HU265	**2750.00**	HU265R	**3764.00**	HU265DS	**12812.00**	—	—	HU265AWK	**3212.00**	—	—	—	—	—	—	50	50
	600	HU266	**4896.00**	HU266R	**7533.00**	HU266DS	**18455.00**	—	—	HU266AWK	**5408.00**	—	—	—	—	—	—	50	50
	800	HU267	**7467.00**	HU267R★	**12884.00**	—	—	—	—	HU267AWK	**12957.00**	50	—	50	—	50	—	—	50
	1200	HU268	**10226.00**	HU268R★	**17393.00**	—	—	—	—	HU268AWK	**17522.00**	50	—	50	—	—	—	50	50
3-Wire (3 Blades)—600 Vac, 600 Vdc																			
	30	HU361	**279.00**	HU361RB	**488.00**	HU361DS	**2120.00**	HU361A	**689.00**	HU361AWK	**647.00**	5	10	7-1/2	20	10	30	5	15
	30	HU361EI▼	**638.00**	HU361RBEI▼	**846.00**	HU361DSEI▼	**2480.00**	HU361AEI▼	**1047.00**	HU361AWKEI▼	**1007.00**	5	10	7-1/2	20	10	30	5	15
	30	HU3612△	**369.00**	HU3612RB△	**638.00**	—	—	HU3612A△	**710.00**	HU3612AWK△	**666.00**	5	10	7-1/2	20	10	30	5	15
	60	HU362	**488.00**	HU362RB	**876.00**	HU362DS	**2520.00**	HU362A	**875.00**	HU362AWK	**833.00**	10	20	25	50	30	60	10	30
	60	—	—	—	—	HU362DSEI▼	**2972.00**	—	—	—	—	10	20	25	50	30	60	10	30
	100	HU363	**783.00**	HU363RB	**1226.00**	HU363DS	**5102.00**	HU363A	**1265.00**	HU363AWK	**1194.00**	20	40	40	75	40	100	20	50
	200	HU364	**1209.00**	HU364RB	**1485.00**	HU364DS	**6960.00**	HU364A	**1697.00**	HU364AWK	**1604.00**	15	60	50	125	50	150	40	50
	400	HU365	**2804.00**	HU365R	**3840.00**	HU365DS	**14294.00**	—	—	HU365AWK	**4023.00**	—	125	—	250	—	350	50	50
	600	HU366	**4992.00**	HU366R	**7683.00**	HU366DS	**19062.00**	—	—	HU366AWK	**6711.00**	—	200	—	400	—	500	50	50
	800	HU367	**9978.00**	HU367R★	**13050.00**	—	—	—	—	HU367AWK	**13097.00**	50	250	50	500	50	500	50	50
	1200	HU368	**13421.00**	HU368R★	**17867.00**	—	—	—	—	HU368AWK	**17940.00**	50	250	50	500	50	500	50	50
4-Wire (4 Blades)—600 Vac, 600 Vdc ▽												**2Ø**	**3Ø**	**2Ø**	**3Ø**	**2Ø**	**3Ø**		
	30	HU461□	**827.00**	—	—	HU461DS	**2586.00**	—	—	HU461AWK◊	**915.00**	10	10	20	20	25	30	10☆	15☆
	60	HU462□	**914.00**	—	—	HU462DS	**3027.00**	—	—	HU462AWK	**1008.00**	20	20	40	50	50	60	10	30
	100	HU463□	**1647.00**	—	—	HU463DS	**7401.00**	—	—	HU463AWK	**1791.00**	30	40	50	75	50	75	20	30
	200	HU464□	**2399.00**	—	—	HU464DS	**11244.00**	—	—	HU464AWK	**2832.00**	50	60	50	125	50	150	40	50
	400	HU465	**5201.00**	—	—	—	—	—	—	HU465AWK	**5672.00**	—	**125**	—	**250**	—	350	50	50
	600	HU466	**9072.00**	—	—	—	—	—	—	—	—	—	**200**	—	**400**	—	**500**	50	50
6-Wire (6 Blades)—600 Vac ▽													**3Ø**		**3Ø**		**3Ø**		
	30	—	—	—	—	HU661DS	**11903.00**	—	—	HU661AWK◒	**3357.00**	—	10	—	20	—	30	—	—
	60	—	—	—	—	HU662DS	**13254.00**	—	—	HU662AWK◒	**3884.00**	—	20	—	50	—	60	—	—
	100	—	—	—	—	HU663DS	**20643.00**	—	—	HU663AWK◒	**4793.00**	—	40	—	75	—	75	—	—
	200	—	—	—	—	HU664DS	**28316.00**	—	—	HU664AWK◒	**10538.00**	—	60	—	125	—	150	—	—

▲ Complete rating is NEMA 3, 3R, 4, 4X, 5 and 12.
■ Also suitable for NEMA 3R application by removing drain screw from bottom endwall.
♦ For switching dc, use two outside switching poles.
★ Suitable for NEMA 5 applications with drain screw installed.
▼ Switches with EI suffix are stocked with factory-installed electrical interlocks with one normally-open and one normally-closed contact.
△ Use 60 A enclosure accessories, including electrical interlocks.
□ No knockouts are provided.
◊ Requires 60 A accessories. See page 3-14 for series rating..
☆ HU461AWK (Series F6) is rated 5 hp@250 Vdc, 10 hp@600 Vdc.
▽ Not suitable for use as service equipment.
◒ One enclosure for NEMA 1, 3, 3R or 12 applications. UL Listed.

UL Listed Maximum Short Circuit Current Ratings—AC only

NOTE: *Consult the wiring diagram of the switch to verify the UL Listed short circuit current rating.*

Table 3.12: Fusible Safety Switches

For the short circuit current rating, refer to the table below.

Heavy Duty Safety Switch Type	UL Listed Fuse Class	UL Listed Short Circuit Current Ratings
Fusible	H, K	10 kA
	R, J, L	200 kA✱

✱ On 600 V, 200 A switches, 100,000 A max. on corner grounded delta when protected by Class J or R fuses.

Non-Fusible Safety Switches

Any brand of circuit breaker or fuse not exceeding the ampere rating of the switch may be used in conjunction with an non-fusible safety switch when there is up to 10 kA short circuit current available (see table below).

Above 10 kA—When applied on systems with greater than 10 kA short circuit current available, the UL Listed short circuit current rating for Square D non-fusible switches is based upon the switch being used in conjunction with fuses or Square D circuit breakers or Mag-Gard motor circuit protectors.

Table 3.13: Non-Fusible Safety Switches

Heavy Duty Safety Switch Type	Switch Rating (A) ♦	Fuse or Circuit Breaker Type◑	3-Phase		
			240 Vac	480 Vac	600 Vac
Non-Fusible Switches	All	Any brand circuit breaker	Up to 10 kA		
		H, K			
		R,T,J.L	200 kA	200 kA	200 kA
	30–100	H ✪	65 kA	35 kA	35 kA
	30–100	FA	14 kA	14 kA	14 kA
	30–100	FH	18 kA	18 kA	18 kA
	200	H, J ✪	65 kA	35 kA	35 kA
	400	LA	22 kA	22 kA	22 kA
	400	LH	25 kA	25 kA	25 kA

♦ Applies to NEMA 1, 3R, 4X stainless, 12 switches.
◑ Ampere rating of fuse or circuit breaker not to exceed switch ampere rating.
✪ All H and J circuit breakers are acceptable, but will only support the noted Short Circuit Current Ratings.

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316 Grade Stainless Steel—NEMA 3, 3R, 4, 4X, 5, 12

H361SS

Type 316 stainless steel enclosure safety switches offer superior corrosion resistance to a wider range of chemicals than Type 304 stainless switches. Type 316 better resists chloride and is often used in marine, waste treatment and transportation applications. Use watertight hubs from page 3-10. Equipment grounding lugs are supplied as standard.
(For Type 304 stainless switches see pages 3-4–3-6.)

Table 3.14: 3P 600 Vac, 600 Vdc

Amperes	Cat. No	$ Price	Horsepower Ratings– 3Ø▲				
			480 Vac		600 Vac		600 Vdc■
			Std.	Max.	Std.	Max.	Max.
Fusible							
30	H361SS	**3444.00**	5	15	7-1/2	20	15
60	H362SS	**3792.00**	15	30	15	50	30
100	H363SS	**7562.00**	25	60	30	75	50
200	H364SS	**10592.00**	50	125	60	150	50
400	H365SS	**21622.00**	100	250	125	350	50
600	H366SS	**30528.00**	150	400	200	500	50
Non-Fusible							
30	HU361SS	**2898.00**	—	20	—	30	15
60	HU362SS	**3444.00**	—	50	—	60	30
100	HU363SS	**7029.00**	—	75	—	100	50
200	HU364SS	**9623.00**	—	125	—	150	50
400	HU365SS	**17758.00**	—	250	—	350	50
600	HU366SS	**26306.00**	—	400	—	500	50

Fiberglass Reinforced Polyester Enclosures—NEMA 4X

H363DF

Fiberglass reinforced polyester enclosures are watertight, corrosion resistant, and impervious to windblown dust, rain, and splashing liquid. The molded fiberglass is extremely stable in a wide range of operating temperatures and can withstand heavy impact. Switches are furnished with hubs (page 3-14) and equipment grounding lugs. UL Listed.

Table 3.15: 3P 600 Vac, 600 Vdc

Amperes	Cat. No.	$ Price	Class R Fuse Kits		Electrical Interlock Kits Field-Installed Cat. No.		Horsepower Ratings– 3Ø▲				
							480 Vac		600 Vac		600 Vdc■
			Cat. No.	$ Price	1 NO/1 NC Contacts	2 NO/2 NC Contacts	Std.	Max.	Std.	Max.	Max.
Fusible											
30	H361DF	**3570.00**	RFK06	**25.50**	9999TC10	9999TC20	5	15	7-1/2	20	15
60	H362DF	**3968.00**	RFK06H	**25.50**	9999TC10	9999TC20	15	30	15	50	30
100	H363DF	**7613.00**	RFK10	**47.70**	9999TC10	9999TC20	25	60	30	75	50
200	H364DF	**9729.00**	HRK1020	**47.70**	9999R8	9999R9	50	125	60	150	50
Non-Fusible											
30	HU361DF	**3402.00**	—	—	9999TC10	9999TC20	—	20	—	30	15
60	HU362DF	**3782.00**	—	—	9999TC10	9999TC20	—	50	—	60	30
100	HU363DF	**7241.00**	—	—	9999TC10	9999TC20	—	75	—	100	50
200	HU364DF	**9695.00**	—	—	9999R8	9999R9	—	125	—	—	50

Krydon™ Enclosures—NEMA 4X

H361DX

Krydon enclosures are compression molded of fiberglass reinforced polyester, specially formulated to withstand attack from almost any corrosive atmosphere found in the toughest industrial application. Switches are furnished with hubs (page 3-14) and equipment grounding lugs. UL Listed.

Table 3.16: 3P, 600 Vac, 600 Vdc

Amperes	Cat. No.	$ Price	Class R Fuse Kits		Electrical Interlock Kits Field-Installed Cat. No.		Horsepower Ratings– 3Ø▲				
							480 Vac		600 Vac		600 Vdc■
			Cat. No.	$ Price	1 NO/1 NC Contact	2 NO/2 NC Contacts	Std.	Max.	Std.	Max.	Max.
Fusible											
30	H361DX	**4161.00**	RFK06	**25.50**	9999TC10	9999TC20	5	15	7-1/2	20	15
60	H362DX	**4626.00**	RFK06H	**25.50**	9999TC10	9999TC20	15	30	15	50	30
100	H363DX	**8858.00**	RFK10	**47.70**	9999TC10	9999TC20	25	60	30	75	50
Non-Fusible											
30	HU361DX	**3960.00**	—	—	9999TC10	9999TC20	—	20	—	30	15
60	HU362DX	**4406.00**	—	—	9999TC10	9999TC20	—	50	—	60	30
100	HU363DX	**8438.00**	—	—	9999TC10	9999TC20	—	75	—	100	50

NEMA 7 and 9

H60XFA

An enclosed automatic molded case switch for use in Divisions 1 and 2 of the following: Class I, Groups C and D; Class II, Groups E, F and G; or Class III, Hazardous Locations as defined in NEC™ Article 500. Furnished with threaded conduit openings in both top and bottom endwall (page 3-14). Suitable for use as service equipment and listed as "Raintight" for outdoor applications. cULus Listed. Equipment grounding lugs supplied as standard.

Table 3.17: 3 Pole Molded Case Switch, 600 Vac, 250 Vdc Maximum, Short Circuit Current Rating 10 kA AIR

Amperes	Enclosed Molded Case Switch★		Solid Neutral Assembly		Horsepower Ratings—3Ø		
	Cat. No.	$ Price	Cat. No.	$ Price	240 Vac	480 Vac	600 Vac■
60	H60XFA	**2571.00**	100SNA	**143.00**	15	30	50
60	H60XFA1212▼	**2886.00**	100SNA	**143.00**	15	30	50
100	H100XFA	**3045.00**	100SNA	**143.00**	30	60	75
100	H100XFA1212▼	**3287.00**	100SNA	**143.00**	30	60	75
New! 225	H225XJG□	**6387.00**	225SNA	**189.00**	60	125	150
225	H225XJGAA▼□	**6701.00**	225SNA	**189.00**	60	125	150

▲ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.
■ For switching dc use two switching poles.
♦ Electrical interlock not available. For auxiliary switches, refer to page 7-4 for catalog number suffix and price adder (e.g. H60XFA1212).
★ Includes PKDB1, breather and drain kit, required for rainproof application—NEMA 7 only.
▼ Includes auxiliary contacts.
△ For available options, contact customer service prior to placing an order.
□ Not UL listed or CSA Certified due to wire bending space.

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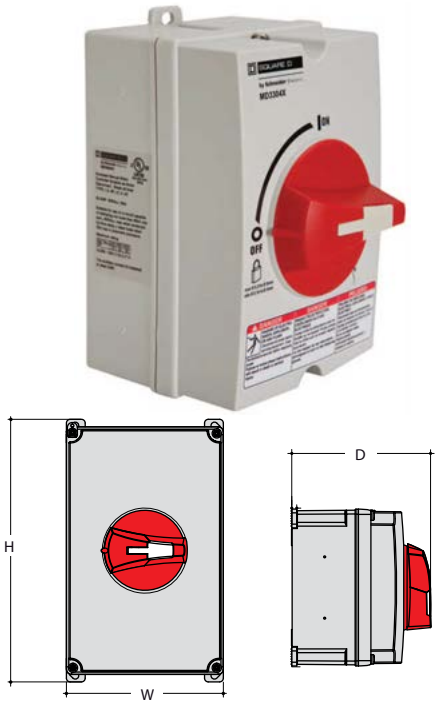
New! MD Motor Disconnect Switches

Class **3110** / Refer to Catalog **3100CT0901**



MD Motor Disconnect Switches

The MD motor disconnect switch is listed UL508 Suitable For Motor Control (UL File E164864). It is in a compact NEMA 4X enclosure suitable for use in NEMA Type 1, 3, 3R, 4, 4X and 12 applications. The MD's key benefits are an extremely small footprint, a more economically efficient NEMA 4X solution and a handle interlock preventing cover removal when the switch is in the ON position.

Table 3.18: MD Motor Disconnect Switch—Non Metallic NEMA 1, 3, 3R, 4, 4X and 12 Enclosure▲■♦

Amperes	Cat. No.	Maximum Horse Power Ratings Three Phase Vac			$ Price	Height (in.)	Width (in.)	Depth (in.)
		220–240	440–480	600				
30	MD3304X	7.5	20	25	**121.00**	6.38	3.9	4.37
60	MD3604X	20	40	40	**161.00**	8.27	4.94	4.37

▲ See table 8.9 for accessories.
■ Complies with OSHA lockout/tagout requirements—accepts up to three 8 mm padlocks.
♦ Suitable for NEMA 1, 3R, 4, 4X and 12 enclosure applications.

Table 3.19: MD Motor Disconnect Accessories

Cat. No.	Description	$ Price
MDSAN20	2 Normally open auxiliary contact module	**57.00**
MDSAN11	1 normally open and 1 normally closed auxiliary contact module	**27.00**
MDS30P	30 Amp Add on power pole	**35.00**

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Interlocked Receptacle Switches

Interlocked Receptacle Switches are furnished with a factory-installed three-phase four-wire Appleton Powertite™, Crouse-Hinds Style 2 Arktite™, or Hubbellock™ receptacle. The fourth wire is connected to the switch equipment grounding terminal and is not a neutral termination. Interlocking linkage between the receptacle and switch mechanism prevents insertion or removal of the plug while the switch is in the "ON" position or insertion of any plug other than specified. Grounding lugs are included.

H362AWA
Interlocked Receptacle Switch with Appleton Powertite Receptacle

Appleton Powertite Receptacle

- Devices are UL Listed and CSA Certified, suitable for use as service equipment.
- Receptacles are epoxy powder coated over copper-free cast aluminum and NEMA 3, 3R, 4, 4X and 12 rated. Appleton receptacles are UL Classified for use with the Crouse-Hinds plugs listed below.
- Short circuit rating: 10 kA when used in conjunction with Class H or K fuses; 200 kA when used in conjunction with Class R or J fuses.

Amperes	NEMA 1		NEMA 3, 3R, 4, 4X, 5, 12 304 Stainless Steel Enclosure		NEMA 12, 3R		Use with Plug ▲		Horsepower Ratings–3Ø■					
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	480 Vac		600 Vac		250 Vdc♦	
									Std.	Max.	Std.	Max.	Std.	Max.
Fusible—3P, 600 Vac, 250 Vdc														
30	H361WA	**2076.00**	H361DSWA	**4401.00**	H361AWA	**2289.00**	ACP3034BC	**1235.00**	5	15	7-1/2	20	5	—
60	H362WA	**2412.00**	H362DSWA	**4668.00**	H362AWA	**2508.00**	ACP6034BC	**1295.00**	15	30	15	50	10	—
100	H363WA	**3689.00**	H363DSWA	**8468.00**	H363AWA	**3758.00**	ACP1034CD	**1928.00**	25	60	30	75	20	—
Non-Fusible—3P, 600 Vac, 250 Vdc														
30	HU361WA	**1893.00**	HU361DSWA	**4001.00**	HU361AWA	**2076.00**	ACP3034BC	**1235.00**	—	20	—	30	—	5
60	HU362WA	**2306.00**	HU362DSWA	**4412.00**	HU362AWA	**2357.00**	ACP6034BC	**1295.00**	—	50	—	60	—	10
100	HU363WA	**3153.00**	HU363DSWA	**8010.00**	HU363AWA	**3347.00**	ACP1034CD	**1928.00**	—	75	—	100	—	20

▲ Receptacle UL Listed for use with "Appleton ACP or CPH" plugs; UL Classified for use with Crouse-Hinds "APJ" Arktite plugs listed on this page.
■ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.
♦ For switching dc, use two switching poles.

H362AWC
Interlocked Receptacle Switch with Crouse-Hinds Arktite Receptacle

Crouse-Hinds Arktite Receptacle

- UL Listed, suitable for use as service equipment.
- Short circuit ratings: 10 kA when used in conjunction with Class H or K fuses; 200 kA when used in conjunction with Class R or J fuses.

Table 3.20:

Amperes	NEMA 1		NEMA 3, 3R, 4, 4X, 5, 12 304 Stainless Steel Enclosure		NEMA 12, 3R		Use with Plug		Horsepower Ratings–3Ø★			
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	480 Vac		600 Vac	
									Std.	Max.	Std.	Max.
Fusible—3P, 600 Vac Maximum												
30	H361WC	**2139.00**	H361DSWC	**6377.00**	H361AWC	**2355.00**	APJ3485	**1235.00**	5	15	7-1/2	20
60	H362WC	**2751.00**	H362DSWC	**7749.00**	H362AWC	**2846.00**	APJ6485	**1295.00**	15	30	15	50
100	H363WC	**6005.00**	H363DSWC	**14826.00**	H363AWC	**6087.00**	APJ10487	**1928.00**	—	60	—	75
Non-Fusible—3P, 600 Vac Maximum												
30	HU361WC	**1952.00**	HU361DSWC	**5888.00**	HU361AWC	**2136.00**	APJ3485	**1235.00**	—	20	—	30
60	HU362WC	**2634.00**	HU362DSWC	**7374.00**	HU362AWC	**2678.00**	APJ6485	**1295.00**	—	50	—	60
100	HU363WC	**5249.00**	HU363DSWC	**14025.00**	HU363AWC	**5444.00**	APJ10487	**1928.00**	—	60	—	100

★ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.

Hubbellock Receptacle

- UL Listed, suitable for use as service equipment.
- Short circuit rating: 10 kA.

Note: The Hubbellock receptacle switch utilizes the Square D interlocked plug SD12781 available only from Square D.

H362AWH
Interlocked Receptacle Switch with Hubbell™ Hubbellock Receptacle

Table 3.21:

Amperes	NEMA 1		NEMA 12		Use with Plug		Horsepower Ratings—3Ø▼			
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	480 Vac		600 Vac	
							Std.	Max.	Std.	Max.
Fusible—3P, 600 Vac Maximum										
60	H362WH	**2351.00**	H362AWH	**2459.00**	SD12781△	**609.00**	15	30	15	50
Non-Fusible—3P, 600 Vac Maximum										
60	HU362WH	**2237.00**	HU362AWH	**2310.00**	SD12781△	**609.00**	—	50	—	60

▼ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.
△ Hubbell plug is furnished with a Kellems grip for 1-1/2 in. to 1-21/64 in. cable diameter.

Accessories . . . . . pages 3-10 through 3-12.

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RB Hub

Rainproof Bolt-On Hubs—for use on NEMA 3R Enclosure

Conduit Size	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4	Closing Cap
Hub Cat. No.	B075	B100	B125	B150	B200	B250	B300	B350	B400	BCAP
$ Price Each (DE1A)	33.30	33.30	33.30	33.30	61.00	102.00	186.00	300.00	368.00	3.80

Note: NEMA 3R rainproof enclosures with Cat. No. ending in RB have a bolt-on closing cap factory-installed. Order bolt-on hubs separately from table above. For more details see page 1-13. Hubs through size 2-$^1/_2$ can be directly installed on RB devices. Devices requiring three-inch or larger hubs must have holes cut in the field. Gaskets are provided on three-inch and larger hubs.

Note: All hubs are UL Listed for indoor and rainproof applications and suitable for use with conduit having ANSI standard taper pipe thread.

Watertight Hubs—for use on NEMA 4, 4X and 5 Stainless Steel and NEMA 12 Enclosures

Conduit Trade Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4
Standard-Zinc Hub Cat. No.	H050	H075	H100	H125	H150	H200	H250	H300	H350	H400
Zinc $ Price Each	31.10	45.00	47.10	54.00	83.00	120.00	138.00	177.00	282.00	381.00
Chrome Plated Hub Cat. No.	H050CP	H075CP	H100CP	H125CP	H150CP	H200CP	—	—	—	—
Chrome Plated $ Price Each	40.70	56.00	64.00	67.00	96.00	137.00	—	—	—	—

Electrical Interlock Kits

Electrical interlocks for heavy duty 30–1200 A safety switches are available factory-installed or in kit form for field installation. Each kit contains instructions for proper field mounting. A pivot arm operates from switch mechanism, breaking the control circuit before the main switch blades break. Switches with electrical interlocks installed are UL Listed. For factory-installed electrical interlocks add EI (for one contact) or EI2 (for two contacts) suffix to catalog number. See Supplemental Digest page 2-3 for electrical interlock contact ratings.

Table 3.22: Electrical Interlock Kit ▲

Switch's Amperes Rating	Series Number (See pages 3-13, 3-14)	Electrical Interlock Kit Cat. No. ■	$ Price	Factory-Installed $ Price
30	F1, F5–F7	EIK031♦ ★ EIK032♦ ★	218.00	359.00
	F3	EIK1 EIK2	311.00	452.00
60	F1-F3 F5–F7 (600 V)	EIK1 EIK2	311.00	452.00
	F4 F5–F6 (240 V)	EIK031▼ EIK032▼	218.00	359.00
100–200	F2–F7	EIK1 EIK2	311.00	452.00
400–1200	E1–E4	EIK40601 EIK40602	533.00	674.00

▲ See page 3-7 for electrical interlocks on NEMA 4X fiberglass reinforced polyester and Krydon™.

■ Electrical interlock kit catalog numbers with 1 suffix indicates one normally open and one normally closed contact; 2 indicates two normally open and two normally closed contacts. Kits are UL Listed.

♦ HU461AWK uses EK3061 or EK3062.

★ The following Series F5–F7 devices use EIK-1, 2: H3612, H3612A, H3612AWK, H3612RB, H461, H461DS, H461AWK, HU461, HU461DS, HU661DS, HU661AWK, H361AWA, H361AWC, HU361AWA and HU361AWC.

▼ H362WA, HU362WA, H362WC, H362AWA, HU362AWA, H362AWC, HU362AWC, and H2212AWK use EIK1 or EIK2 electric interlock.

△ Single-pole single-throw interlock kits are rated 1/2 hp @ 110 and 220 Vac.

Class R Fuse Kits

When installed, this kit rejects all but Class R fuses. Kits are available for field installation. For factory installation, add "CLR" suffix to catalog number.

Table 3.23: Class R Fuse Kits—240 V (one kit per 3P switch)

Amperes	Series Number (See pages 3-13, 3-14)	Class R Fuse Kit Cat. No.	$ Price	Factory-Installed $ Price
30	F5–F7	RFK03L□	25.50	195.00
60	F1, F2, F3	RFK06	25.50	195.00
60	F4–F7	RFK03H	25.50	195.00
100	F2–F7	RFK10	47.70	231.00
200	F5–F6	HRK1020	47.70	231.00
400–600	E	HRK4060	111.00	360.00

□ H221-2AWK uses RFK06 Class R fuse kit.

Table 3.24: Class R Fuse Kits—600 V (one kit per 3P switch)

Amperes	Series Number (See pages 3-13, 3-14)	Class R Fuse Kit Cat. No.	$ Price	Factory-Installed $ Price
30 ◊	F1, F5–F7	RFK03H☆	25.50	293.00
30 ◊	F3	RFK06	25.50	293.00
60 ◊	F1–F7	RFK06H ☆	25.50	293.00
100 ◊	F2–F7	RFK10	47.70	231.00
200	F5–F6	HRK1020	47.70	231.00
400–600	E2–E4	HRK4060	111.00	360.00

◊ See page 3-7 for Class R Fuse Kits in NEMA 4X Fiberglass Reinforced Polyester and Krydon switches.

☆ The following Series F5–F7 devices use RFK06: H3612, H3612A, H3612AWK, H3612RB, H461, H461DS, H461AWK, H361AWA and H361AWC.

Internal Barrier Kits

Internal Barrier Kits provide an additional barrier that helps prevent accidental contact with live parts. Field-installed transparent barriers do not restrict visual inspection of the switch. Barriers provide IEC529 IP2X "finger safe" protection when door of enclosed disconnect switch is open. Convenient door allows use of test probes without accessing fuses and replacement of fuses without removing barrier. Barrier can also be used with the skirt kit to enclose a panel mounted Type 9422 disconnect.

Cat. No.	Description	Safety Switch Application (F Series Only)	9422 Type T Disconnect Application	$ Price
SS03	Interior Barrier for 30 A Safety Switch▽	240 / 600 Vac – 30 A 240 Vac – 60 A	NA	150.
SS06	Interior Barrier for 60 A Safety Switch, 30 or 60 A 9422 Switch	600 Vac – 60 A	600 Vac – 30 A 600 Vac – 60 A	165.
SS10	Interior Barrier for 100 A Safety Switch or 100 A 9422 Switch	240 / 600 Vac – 100 A	600 Vac – 100 A	195.
SS20	Interior Barrier for 200 A Safety Switch	240 / 600 Vac – 200 A	NA	225.
SS0306SK	Skirt Kit to Enclose 30 or 60 A 9422 Switch (requires SS06)	NA	600 Vac – 30 A 600 Vac – 60 A	225.
SS10SK	Skirt Kit to Enclose 100 A 9422 Switch (requires SS10)	NA	600 Vac – 100 A	255.

▽ Requires arc shield on 240 V switches be changed to 600 V arc suppressor.

Fuse Puller Kits

Kit consists of three fuse pullers as required for a 3-pole fusible 240 V or 600 V heavy duty switch. Kits can be installed in switches manufactured after February, 1980. Fuse pullers supplied as standard equipment on NEMA 12, 12K, NEMA 4, 4X, 5 stainless steel, NEMA 4X fiberglass reinforced polyester and KRYDON switches through 100 A.

Amperes	Series Number	Fuse Puller Kit Cat. No.	$ Price
30 30	F1, F5–F7 F3	FPK03 ◒ FPK0610	30.00 42.60
60 60 ✱	F1, F2, F3, F5–F7 (600 V) F4 ✱, F5–F7 (240 V)	FPK0610 FPK03 ✱	42.60 30.00
100	F2–F7	FPK0610	42.60

◒ 30 A 4- and 6-pole, H361-2 and H361-2RB Series F5 use FPK0610.

✱ H362WA, H362WC, H362AWA, H362AWC, H362WH and H362AWH use FPK0610 fuse puller kit.

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Neutral Assemblies—Field-Installed Neutral Assemblies for Fusible and Non-Fusible 240 and 600 Volt Safety Switches

Amperes	Series Number (See pages 3-13, 3-14)	Standard Neutral Kit Cat. No.	Terminal Data AWG/kcmil	$ Price	Optional Copper Only Neutral Kit Cat. No.	Terminal Data AWG/kcmil	$ Price
30	F1, F5–F6	SN03▲	(3) 2 Max. Al/Cu	**83.00**	SN03C▲	(3) 6 Max. Cu	**102.00**
60	F1–F3, F5–F6 (600 V)	SN0610	(2) 1/0 Max. Al/Cu (2) 6 Max. Al/Cu	**107.00**	SN0610C	(2) 1/0 Max. Cu (2) 6 Max. Cu	**114.00**
	F4, F5–F6 (240 V)	SN03▲	(3) 2 Max. Al/Cu	**83.00**	SN03C▲	(3) 6 Max. Cu	**102.00**
100	F2–F6	SN0610	(2) 1/0 Max. Al/Cu (2) 6 Max. Al/Cu	**107.00**	SN0610C	(2) 1/0 Max. Cu (2) 6 Max. Cu	**114.00**
200■	F5–F6	SN20A	(2) 250 Max. Al/Cu (1) 1/0 Max. Al/Cu	**200.00**	SN20C	(2) 250 Max. Cu (1) 1/0 Max. Cu	**246.00**
400 and 600	E1–E4	H600SN	(4) 750 Max. Al/Cu (1) 300 Max. Al/Cu	**327.00**	H600SNC	(2) 600 Max. Cu (2) 350 Max. Cu (1) 250 Max. Cu	**452.00**
800	E2–E4	H800SNE4	(6) 750 Max. Al/Cu (2) 350 Max. Al/Cu	**753.00**	—	—	—
1200	E2–E4	H1200SNE4	(8) 750 Max. Al/Cu (2) 350 Max. Al/Cu	**1034.00**	—	—	—

Note: Neutrals cannot be installed in 4P, 6P, or 200 A NEMA 4X fiberglass reinforced polyester safety switches.

▲ The following Series F5–F6 devices use SN0610(C): H-361-2, H-361-2RB, H-361-2A and H-361-2AWK.

■ For 200% neutral, order (2) neutral kits and (1) SN20NI neutral jumper kit. (2) 350 Max. Al/Cu.

Equipment Grounding Kits□

Equipment grounding kits are field-installed and UL Listed in 30–1200 A heavy duty switches. For factory installation of equipment grounding kit, add suffix GL to standard Cat. No. (Example: H361GL).
Price = Switch + Kit Price.

Equipment Grounding Kits—Field- or Factory-Installed Equipment Grounding Kits–240 and 600 V

Amperes	Series Number (See pages 3-13, 3-14)	Standard Cat. No.	Terminal Data AWG/kcmil	$ Price	Optional Copper Only Cat. No.	Terminal Data AWG/kcmil	$ Price
30	F1, F5–F7	GTK03♦	(2) 12 Cu or (2) 10 Al or (1) 4 Max. Al/Cu	**11.40**	GTK03C♦	(1) 6 Max. Cu	**13.40**
60★	F1–F3★, F5–F7 (600 V)	GTK0610★	(2) 1/0 Max. Al/Cu	**18.90**	GTK0610C★	(2) 4 Max. Cu	**22.70**
60	F4, F5–F6 (240 V)	GTK03	(2) 12 Cu or (2) 10 Al or (1) 4 Max. Al/Cu	**11.40**	GTK03C	(1) 6 Max. Cu	**13.40**
100	F2–F7	GTK0610	(2) 1/0 Max. Al/Cu	**18.90**	GTK0610C	(2) 4 Max. Cu	**22.70**
200	F5–F7	PKOGTA2	(2) 2/0 Max. Al/Cu	**55.00**	PKOGTC2	(2) 4 Max. Cu	**58.00**
400 and 600	E2–E4	PKOGTA2▼ (2 Required)	(2) 2/0 Max. Al/Cu	**55.00**	PKOGTC3	(3) 1/0 Max. Cu	**107.00**△
800	E2–E4	PKOGTA7	(4) 350 Max. Al/Cu	**198.00**△	—	—	—
1200	E2–E4	PKOGTA8	(8) 350 Max. Al/Cu	**203.00**△	—	—	—

♦ The following Series F5–F6 devices use GTK0610(C): H-361-2 and H-361-2RB.

★ 4- and 6-pole 30 A F Series.

▼ Two required if grounding conductors are run in parallel.

△ PE1A Discount Schedule

□ Equipment Ground Kits are factory-installed standard in 30–200 A series F NEMA 4-4X-5 (stainless) and 12. Equipment Ground Kits are standard on all NEMA Types, Series F 30–200 A 4 and 6 pole switches.

Table 3.25: Square D Gray Paint

Description	Cat. No.	$ Price
16 oz. Aerosol Paint Can, Square D Gray Paint	PK49SP	**39.00 ea.**

Note: Shipped in quantities of 6.

Special Paint

UL Listed heavy duty switches are available painted with special safety colors. To order safety colored switches add suffixes as noted in Table 3.26 to the standard switch commercial reference number.

All colors comply with OSHA Standard 1910.144 and ANSI Specification Z535.1 for marking physical hazards.

Table 3.26: Safety Colors

Safety Color	Suffix
Black	SP0
Red	SP2
Orange	SP3
Yellow	SP4
Green	SP5
Blue	SP6
Purple	SP7
Gray	SP8
Gray ANSI 61	SP861▲
White	SP9

▲ Standard Square D ANSI 49 grey paint, when selecting this suffix, switches will receive additional coat of paint.

A minimum quantity of 10 is required. Not available for NEMA Type 7/9 or stainless steel products.

Price Adder Each Switch

Quantity	$ Price							
	30 A	60 A	100 A	200 A	400 A	600 A	800 A	1200 A
10	**242.00**	**278.00**	**434.00**	**479.00**	**1137.00**	**2801.00**	**3501.00**	**4376.00**

Lock-Off Guard Kits★

Available factory- or field-installed the lock-off guard works by covering the lockout/tagout opening whenever the switch is in the ON position. This prevents a padlock from being inadvertantly inserted into the switch lockplate. The device is designed to help prevent accidental misapplication of a lockout device. These kits are marked cURus (UL Component Recognized) for field or factory installation.

Amperes♦	Kit Cat. No.	Field-Installed $ Price	Factory-Installed $ Price
30 A 60 A 240 V	LOGK1	**44.30**	**146.00**
60 A 600 V 100 and 200 A	LOGK2	**45.00**	**177.00**

■ For factory installation, add suffix "LOG" to the switch catalog number.

♦ For use with 30–200 Ampere Series F NEMA 1, 3R, 12 and 12K switches only.

★ Factory install and kits are available for NEMA 1, 3R, 12 and 12K switch enclosures only.

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Key Interlock Systems

Factory-installed only on heavy duty safety switches and double throw safety switches.

Interlocks are used to prevent the authorized operator from making an unauthorized operation. Not available on hazardous location devices (NEMA 7/9) or fiberglass reinforced polyester (NEMA 4X).

The key interlock system is a simple and easy method of applying individual key interlock units and assemblies to the above equipment so as to require operation in a predetermined sequence. UL Listed.

Quoting:

Contact Schneider Electric for catalog number, availability, and pricing prior to quoting a job.

Detailed information is required before an order can be processed. Please see Supplemental Digest Section 2 for further information.

Use these suffixes on switch catalog numbers:

- KI = 1 lock per switch
- KI2 = 1 lock with 2 cylinders (2 keys) per switch
- KIKI = 2 separate locks per switch

Table 3.27: Price Adder Per Lock ▲

Switch Type	$ Price
30–1200 A Heavy Duty	2055.00
30–600 A Double Throw	1988.00

▲ Prices do not apply when more than three devices are interlocked, as these schemes normally require more than one key assembly per device.

Lock-On Provisions

Lock-off provisions are standard on all heavy duty safety switches. Provision for one $\frac{3}{8}$-inch hasp padlock is available factory-installed on NEMA 1, 3R, 4-4X-5 stainless steel and 12 switches. This modification will allow the switch to be locked in the "ON" position. UL Listed.

Table 3.28: Price Adder Per Each Switch

Safety Switch Rating	$ Price
30–1200 A	155.00

To order, add suffix SPLO to standard catalog number. Example: H364-SPLO

Cover Viewing Window

Optional cover viewing window is positioned over the blades to allow visual verification of "ON-OFF" status. Available on 30 through 1200 A heavy duty switches, all NEMA Types. (Not available on NEMA 4X fiberglass reinforced polyester, Krydon™ enclosures, or NEMA 7 and 9 devices.)

Factory-installed only: add "VW" suffix to the Cat. No. See table below for price adder.

Table 3.29: Price Adder Per Switch—UL Listed

Class	Amperes	2- and 3-Pole	4- and 6-Pole
Heavy Duty	30–100 A	38.00	75.00
Heavy Duty	400–1200 A	2297.00	—
Double Throw	30–100 A	255.00	510.00

Switch Lubricant

Field maintenance lubricant is available for servicing blade and jaw components in switches 600 V and below. Catalog number SWLUB (list price $24.14) consists of one tube of BG20 High Performance Synthetic Grease manufactured by Dow Corning®. SWLUB is available in warehouse stock, shipped individually or in multiples of 12 units per carton.

Copper Only Lug Kits

Heavy duty safety switches are supplied standard with Al lugs, which accept both Cu and Al wires. For field installation of copper-only lug kits, order kits below. For factory installation of copper only lugs, add suffix SLC to standard Cat. No. Note: 30 through 200 Amperes NEMA 12, 12K and stainless steel switches with factory-installed lugs bear the UL Marine Listed manifest for use on vessels over 65 feet long. 30 through 200 Amperes NEMA 12, 12K and stainless steel switches using field-installed copper only lug kits are UL Marine Listed, but do not bear the marine manifest.

Al/Cu to Cu Only

Table 3.30: Kits–Wire size (pp 3-13)

Amperes	Lug Kit Cat. No.■	Kit $ Price	Factory-Installed Adder per Switch
30	CL0306F	69.00	224.00
60	CL0306F	69.00	224.00
100	CL10F	159.00	431.00
200	CL20F	264.00	717.00
400	CL40F	549.00	1490.00
600	CL60F	893.00	2426.00
800	—	—	—
1200	—	—	—

■One kit includes all phase line/load lugs for a 3-pole switch.

Double Lug Kits

200 A heavy duty F-series switches are supplied standard with lugs listed on page 3-13 (one wire per phase). For lugs that accept two wires per phase and neutral, order the following kit:

Amperes	Lug Kit♦ Cat. No.	Kit $ Price★	Lug wire range per phase and neutral AWG/kcmil	Switch wire range per phase and neutral AWG/kcmil
200	AL20DTF	159.00	(2) 6 –300 Cu/Al	(2) 6 –250 Cu/Al

♦ Not UL Listed.
★ Kit contains 3 lugs. For double lugs for line and load, order 2 kits.

Table 3.31: 800 and 1200 A Compression Lug Kits–Field- Installed (See page 3-13 for 100–600 A Switches)

Series E4 800 and 1200 A safety switches are equipped as standard with mechanical lugs. Alternate compression lug kits are available for field installation and are UL Listed. Each kit consists of VCEL07512H1 Versa-Crimp™ Compression Lugs and lug landing connectors capable of converting line and load side of one switch pole or neutral.

Order one field-installed kit per pole or neutral per table below. Example: Three-pole three-wire requires three kits; three-pole, four-wire requires four kits.

Amperes	Lug Kit Cat. No.	$ Price Per Pole or Neutral
800	H8LKE2	893.00
1200	H12LKE2	1109.00

Note: For terminal lug data, refer to table below.

Table 3.32: Factory-Installed

Series E4 800 and 1200 A safety switches are available with factory-installed VCEL-075-12H1 Versa-Crimp compression lug kits (above). For factory installation, add suffix LK to standard Cat. No. (Example: H367LK) and use price adder from table below based on system type.

Amperes	System	Factory-Installed $ Price Adder Per Switch
800	2 Wire	2106.00
	3 Wire	2972.00
	4 Wire	3839.00
1200	2 Wire	2591.00
	3 Wire	3696.00
	4 Wire	4806.00

Note: For terminal Lug data refer to table below.

Table 3.33: Terminal Lug Data—800 and 1200 A Compression Lugs

Amperes	Conductors Per Phase	Compression Lug (VCEL-075-12H1) Wire Range
800	(3) Line and (3) Load	500–750 kcmil (Al) or 500 kcmil (Cu)
1200	(4) Line and (4) Load	500–750 kcmil (Al) or 500 kcmil (Cu)

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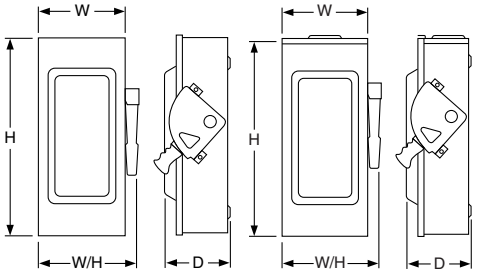

Typical NEMA 1 Typical NEMA 3R

Table 3.34: Terminal Lug Data (NEMA 1, 3R, 4, 4X, 5, 7, 9, 12)▲

Rating (A)	Conductors Per Phase and Neutral	Wire Range Wire Bending Space Per NEC Table 312.6 AWG/kcmil	Lug Wire Range AWG/kcmil	Optional Versa-Crimp™ Compression Lug Field-Installed■
30♦	1	12–6 (Al) or 14–6 (Cu)	12–2 (Al) or 14–2 (Cu)	—
	2	14–10 (Cu) solid or 14–10 (Cu) stranded		
60★	1	14–3 (Al) or 14–3 (Cu)	12–2 (Al) or 14–2 (Cu)	—
100	1	12–1/0 (Al) or 14–1/0 (Cu)	12–1/0 (Al) or 14–1/0 (Cu)	VCEL02114S1
200▼	1	6–250 (Al/Cu)	6–300 (Al/Cu)	VCEL030516H1
400	1 or 2	1/0–750 (Al/Cu)△ or 1/0–300 (Al/Cu)	1/0–750 (Al/Cu) and 1/0–300 (Al/Cu)	VCEL07512H1 or VCEL030516H1□ and VCEL05012H1
600	2	3/0–500 (Al/Cu)	3/0–500 (Al/Cu)	VCEL05012H1
800	3	3/0–750 (Al/Cu)	3/0–750 (Al/Cu)	H8LKE2◊
1200	4	3/0–750 (Al/Cu)	3/0–750 (Al/Cu)	H12LKE2◊

▲ 30–100 A switches suitable for 60°C or 75°C conductors. 200–1200 A switches suitable for 75°C conductors.
■ For NEMA 1 and 3R only.
♦ HU461AWK— 14–3 AWG (Al or Cu).
★ H60XFA— 14–6 AWG (Cu).
▼ H225XKA— 4 AWG–300 kcmil (Cu).
△ Max. wire range is (1) 600 kcmil or (2) 300 kcmil Al/Cu on NEMA 4X Stainless and NEMA 12.
□ Order two PK516KN mounting kits when installing VCEL030516H1 lugs. Only one kit is required on 2-Pole switches.
◊ See page 3-12, 800 and 1200 A compression lug kits for additional information.

Cat. No.	Series	Approximate Dimensions H in.	H mm	W in.	W mm	D in.	D mm	W/H in.	W/H mm
H221N	F5	14.60	371	6.50	165	4.88	124	7.55	192
H221NRB	F5	14.88	378	6.63	168	4.88	124	7.55	192
H222N	F5	14.60	371	6.50	165	4.88	124	7.55	192
H222NRB	F5	14.88	378	6.63	168	4.88	124	7.55	192
H223N	F5	21.25	540	8.50	216	6.38	162	10.50	267
H223NRB	F5	21.25	540	8.50	216	6.38	162	10.50	267
H224N	F5	29.00	737	17.13	435	8.25	210	18.50	470
H224NRB	F5	29.25	743	17.25	438	8.50	216	18.63	473
H225, N	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H225NR, R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H226, N	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H226NR, R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H227, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H227NR, R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H228, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H228NR, R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H265	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H265R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H266	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H266R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H267	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H267R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H268	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H268R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H321N	F5	14.60	371	6.50	165	4.88	124	7.55	192
H321NRB	F5	14.88	378	6.63	168	4.88	124	7.55	192
H322N	F5	14.60	371	6.50	165	4.88	124	7.55	192
H322NRB	F5	14.88	378	6.63	168	4.88	124	7.55	192
H323N	F5	21.25	540	8.50	216	6.38	162	10.50	267
H323NRB	F5	21.25	540	8.50	216	6.38	162	10.50	267
H324N	F5	29.00	737	17.13	435	8.25	210	18.50	470
H324NRB	F5	29.25	743	17.25	438	8.50	216	18.63	473
H325, N	E4	50.25	1276	27.88	708	10.13	257	27.88	708
H325R, NR	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H326, N	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H326R, NR	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H327, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H327R, NR	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H328, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H328R, NR	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H361, N	F5	14.60	371	6.50	165	4.88	124	7.55	192
H361-2	F5	17.50	445	9.00	229	6.38	162	10.50	267
H361NRB, RB	F5	14.88	378	6.63	168	4.88	124	7.55	192
H361WA	F6	18.19	462	9.00	229	6.81	173	10.50	267
H361WC	F6	18.19	462	9.00	229	6.81	173	10.50	267
H362, N	F5	17.50	445	9.00	229	6.38	162	10.50	267
H362NRB, RB	F5	17.50	445	9.00	229	6.38	162	10.50	267
H362WA	F6	18.19	462	9.00	229	6.81	173	10.50	267
H362WC	F6	16.75	425	9.00	229	7.00	178	10.50	267
H362WH	F5	18.19	462	9.00	229	6.81	173	10.50	267
H363, N	F5	21.25	540	8.50	216	6.38	162	10.50	267
H363NRB, RB	F5	21.25	540	8.50	216	6.38	162	10.50	267
H363WA	F6	21.85	462	9.00	229	6.81	173	10.50	267
H363WC	F6	21.85	555	9.00	229	6.81	173	10.50	267

Cat. No.	Series	Approximate Dimensions H in.	H mm	W in.	W mm	D in.	D mm	W/H in.	W/H mm
H364, N	F5	29.00	737	17.13	435	8.25	210	18.50	470
H364RB, NRB	F5	29.25	743	17.25	438	8.50	216	18.63	473
H365, N	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H365R, NR	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H366, N	E4	50.25	1276	27.63	702	10.13	257	27.63	702
H366NR, R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
H367, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H367NR, R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H368, N	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H368NR, R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H461	F5	20.50	521	14.75	375	6.85	174	16.13	410
H462	F5	20.50	521	14.75	375	6.85	174	16.13	410
H463	F5	20.50	521	14.75	375	6.85	174	16.13	410
H464	F5	29.00	737	23.25	591	8.75	222	24.88	632
H465	E4	50.25	1276	33.88	861	10.13	257	33.88	861
H466	E4	50.25	1276	33.88	861	10.13	257	33.88	861
HU265	E4	50.25	1276	27.63	702	10.13	257	27.63	702
HU265R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
HU266	E4	50.25	1276	27.63	702	10.13	257	27.63	702
HU266R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
HU267	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU267R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU268	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU268R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU361	F5	14.60	371	6.50	165	4.88	124	7.55	192
HU361RB	F5	14.88	378	6.63	168	4.88	124	7.55	192
HU361WA	F6	18.19	462	9.00	229	6.81	173	10.50	267
HU361WC	F6	18.19	462	9.00	229	6.81	173	10.50	267
HU362	F5	17.50	445	9.00	229	6.38	162	10.50	267
HU362RB	F5	17.50	445	9.00	229	6.38	162	10.50	267
HU362WA	F6	18.19	462	9.00	229	6.81	173	10.50	267
HU362WC	F6	16.75	425	9.00	229	7.00	178	10.50	267
HU362WH	F5	18.19	462	9.00	229	6.81	173	10.50	267
HU363	F5	21.25	540	8.50	216	6.38	162	10.50	267
HU363RB	F5	21.25	540	8.50	216	6.38	162	10.50	267
HU363WA	F6	21.85	462	9.00	229	6.81	173	10.50	267
HU363WC	F6	21.85	555	9.00	229	6.81	173	10.50	267
HU364	F5	29.00	737	17.13	435	8.25	210	18.50	470
HU364RB	F5	29.25	743	17.25	438	8.50	216	18.63	473
HU365	E4	50.25	1276	27.63	702	10.13	257	27.63	702
HU365R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
HU366	E4	50.25	1276	27.63	702	10.13	257	27.63	702
HU366R	E5	50.31	1278	27.76	705	9.53	242	27.88	708
HU367	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU367R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU368	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU368R	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU461	F5	20.50	521	14.75	375	6.85	174	16.13	410
HU462	F5	20.50	521	14.75	375	6.85	174	16.13	410
HU463	F5	20.50	521	14.75	375	6.85	174	16.13	410
HU464	F5	29.00	737	23.25	591	8.75	222	24.88	632
HU465	E4	50.25	1276	33.88	861	10.13	257	33.88	861
HU466	E4	50.25	1276	33.88	861	10.13	257	33.88	861

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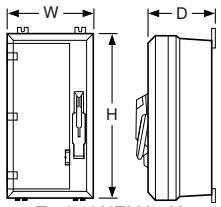
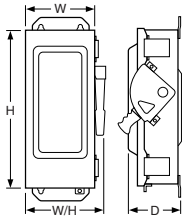
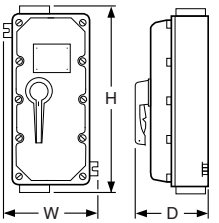
NEMA Type 4, 4X, 5, 7, 9 and 12



Typical NEMA 4X Fiberglass Reinforced Polyester and Krydon™



Typical NEMA 4, 4X, 5, 12, 12K (Stainless has flat front)



Typical NEMA 7, 9

Table 3.35: Optional Copper Only Lug Kits

(See page 3-12 for pricing. See page 3-13 for terminal lug data for the series switches listed in the dimension table below.**)**

Amperes	Optional Lug Kit Cat. No.▲	Lug Wire Range Per Phase AWG/kcmil
30–60	CL0306F	(1) 14–8 Cu solid or 14–4 Cu strand
100	CL10F	(1) 14–8 Cu solid or 14–1/0 Cu strand
200	CL20F	(1) 6–250 Cu
400	CL40F	(1) 1–600 Cu plus (1) 6–250 Cu
600	CL60F	(2) 4–350 Cu

▲ One kit includes all phase line/load lugs for a 3-pole switch.

Table 3.36: Conduit Provisions

(NEMA 4X Fiberglass Reinforced Polyester and Krydon, NEMA 7 and 9.)

Amperes	Top and Bottom Endwall	
	NEMA 4X Fiberglass Reinforced Polyester and Krydon■	NEMA 7 and 9♦
30	3/4 in.	—
60	1-1/4 in.	3/4 in.
100	2 in.	1-1/4 in.
200	2-1/2 in.	2-1/2 in.

■ Hubs and hub drilling templates are provided for field-installation.
♦ Threaded conduit opening.

Cat. No.	Series	Approximate Dimensions							
		H		W		D		W/H	
		in.	mm	in.	mm	in.	mm	in.	mm
H60XFA	E1	15.93	405	9.87	251	6.96	177	9.87	251
H100XFA	E1	15.93	405	9.87	251	6.96	177	9.87	251
H221AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
H221DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H221-2AWK	F6	16.50	419	9.00	229	7.00	178	10.50	267
H222AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
H222DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H223AWK, A	F6	20.50	521	9.00	229	7.00	178	10.50	267
H223DS	F6	20.82	529	9.36	238	6.97	177	11.25	286
H224A,AWK	F6	29.00	737	17.25	438	8.75	216	18.63	473
H224DS	F6	29.00	737	17.75	451	8.88	226	19.25	489
H225AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H225NAWK, NDS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H225XJG	C2	22.56	573	10.88	276	7.75	197	10.88	276
H226AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H226NAWK, NDS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H227AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H228AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H265AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H266AWK, A, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H267AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H268AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H321AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
H321DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H322AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
H322DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H323AWK, A	F6	20.50	521	9.00	229	7.00	178	10.50	267
H323DS	F6	20.82	529	9.36	238	6.97	177	11.25	286
H324A,AWK	F6	29.00	737	17.25	438	8.75	216	18.63	473
H324DS	F6	29.00	737	17.75	451	8.88	226	19.25	489
H325AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H325NAWK, NDS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H326AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H326NAWK, NDS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H327AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H328AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H361AWA	F7	16.50	419	9.00	229	7.00	178	10.50	267
H361AWC	F7	16.50	419	9.00	229	7.00	178	10.50	267
H361AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
H361DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H361DSWA	F7	16.87	428	8.92	227	5.11	130	10.81	275
H361DSWC	F7	16.87	428	8.92	227	5.11	130	10.79	274
H361DF	F1	16.50	419	11.00	279	8.80	224	11.00	279
H361DX	F1	19.40	493	11.40	290	8.60	218	11.40	290
H361SS	F6	14.93	379	7.22	183	5.11	130	8.67	220
H361-2AWK, A	F6	16.50	419	9.00	229	7.00	178	10.50	267
H362AWA	F7	16.50	419	9.00	229	7.00	178	10.50	267
H362AWC	F7	16.50	419	9.00	229	7.00	178	10.50	267
H362AWH	F6	16.50	419	9.00	229	7.00	178	10.50	267
H362AWK, A	F6	16.50	419	9.00	229	7.00	178	10.50	267
H362DS	F6	16.87	428	8.92	227	6.97	177	10.81	275
H362DSWA	F7	16.87	428	8.92	227	5.11	130	10.81	275
H362DSWC	F7	16.87	428	8.92	227	5.11	130	10.79	274
H362DF	F1	16.50	419	11.00	279	8.80	224	11.00	279
H362DX	F1	19.40	493	11.40	290	8.60	218	11.40	290
H362SS	F6	16.87	428	8.92	227	6.97	177	10.81	275
H363AWA	F7	20.50	521	9.00	229	7.00	178	10.50	267
H363AWC	F7	20.50	521	9.00	229	7.00	178	10.50	267
H363AWK, A	F6	20.50	521	9.00	229	7.00	178	10.50	267
H363DS	F6	20.82	529	9.36	238	6.97	177	11.25	286
H363DSWA	F7	20.82	529	9.36	238	6.97	177	11.25	286
H363DSWC	F7	20.82	529	9.36	238	6.97	177	11.25	286
H363DF	F1	24.80	630	13.70	348	12.00	305	13.70	348
H363DX	F1	25.25	641	11.40	290	8.60	218	11.40	290
H363SS	F6	20.82	529	9.36	238	6.97	177	11.25	286
H364A,AWK	F6	29.00	737	17.25	438	8.75	216	18.63	473
H364DS,NDS	F6	29.00	737	17.75	451	8.88	226	19.25	489
H364NA,NAWK	F6	29.00	737	17.25	438	8.75	216	18.63	473
H364DF	E1	31.30	795	26.30	668	11.80	300	26.30	668
H364SS	F6	29.00	737	17.75	451	8.88	226	19.25	489
H365AWK, DS, SS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H365NAWK, NDS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H366AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H366NAWK, NDS, SS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
H367AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H368AWK, NAWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
H461AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
H461DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
H462AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
H462DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
H463AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
H463 DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
H464AWK	F6	29.00	737	23.25	591	8.75	222	24.88	632
H464DS	F6	29.00	737	23.75	603	8.88	226	25.25	641
H465AWK	E4	46.25	1175	32.50	826	10.13	259	32.50	826
H663AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
H663DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
H664AWK	F6	29.00	737	23.25	591	8.75	222	24.88	632
H664DS	F6	29.00	737	23.75	603	8.88	226	25.25	641
HU265AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
HU266AWK, DS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
HU267AWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU268AWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU361AWA	F7	16.50	419	9.00	229	7.00	178	10.50	267
HU361AWC	F7	16.50	419	9.00	229	7.00	178	10.50	267
HU361AWK, A	F6	14.60	371	6.63	168	4.96	125	7.55	192
HU361DS	F6	14.93	379	7.22	183	5.11	130	8.67	220
HU361DSWA	F7	16.87	428	8.92	227	5.11	130	10.81	275
HU361DSWC	F7	16.87	428	8.92	227	5.11	130	10.79	274
HU361DF	F1	16.50	419	11.00	279	8.80	224	11.00	279
HU361DX	F1	19.40	493	11.40	290	8.60	218	11.40	290
HU361SS	F6	14.93	379	7.22	183	5.11	130	8.67	220
HU362AWA	F7	16.50	419	9.00	229	7.00	178	10.50	267
HU362AWC	F7	16.50	419	9.00	229	7.00	178	10.50	267
HU362AWH	F6	16.50	419	9.00	229	7.00	178	10.50	267
HU362AWK, A	F6	16.50	419	9.00	229	7.00	178	10.50	267
HU362DS	F6	16.87	428	8.92	227	6.97	177	10.81	275
HU362DSWA	F7	16.87	428	8.92	227	5.11	130	10.81	275
HU362DSWC	F7	16.87	428	8.92	227	5.11	130	10.79	274
HU362DF	F1	16.50	419	11.00	279	8.80	224	11.00	279
HU362DX	F1	19.40	493	11.40	290	8.60	218	11.40	290
HU362SS	F6	16.87	428	8.92	227	6.97	177	10.81	275
HU363AWA	F7	20.50	521	9.00	229	7.00	178	10.50	267
HU363AWC	F7	20.50	521	9.00	229	7.00	178	10.50	267
HU363AWK, A	F6	20.50	521	9.00	229	7.00	178	10.50	267
HU363DS	F6	20.82	529	9.36	238	6.97	177	11.25	286
HU363DSWA	F7	20.82	529	9.36	238	6.97	177	11.25	286
HU363DSWC	F7	20.82	529	9.36	238	6.97	177	11.25	286
HU363DF	F1	24.80	630	13.70	348	12.00	305	13.70	348
HU363DX	F1	25.25	641	11.40	290	8.60	218	11.40	290
HU363SS	F6	20.82	529	9.36	238	6.97	177	11.25	286
HU364A,AWK	F6	29.00	737	17.25	438	8.75	216	18.63	473
HU364DF	E1	31.30	795	26.30	668	11.80	300	26.30	668
HU364DS	F6	29.00	737	17.75	451	8.88	226	19.25	489
HU364SS	F6	29.00	737	17.75	451	8.88	226	19.25	489
HU365AWK, DS, SS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
HU366AWK, DS, SS	E4	46.25	1175	26.25	667	10.13	259	26.25	667
HU367AWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU368AWK	E4	69.13	1756	36.62	930	17.75	451	36.62	930
HU461AWK	F6	20.50	521	14.75	375	6.80	173	16.13	411
HU461DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU462AWK	F6	21.25	540	16.13	410	6.80	173	16.13	410
HU462DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU463AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
HU463DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU464AWK	F6	29.00	737	23.25	591	8.75	222	24.88	632
HU464DS	F6	29.00	737	23.75	603	8.88	226	25.25	641
HU465AWK	E4	46.25	1175	32.50	826	10.13	259	32.50	826
HU661AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
HU661DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU662AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
HU662DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU663AWK	F6	20.50	521	14.75	375	6.80	173	16.13	410
HU663DS	F6	20.82	529	15.08	383	6.97	177	16.85	428
HU664AWK	F6	29.00	737	23.25	591	8.75	222	24.88	632
HU664DS	F6	29.00	737	23.75	603	8.88	226	25.25	641

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30–100 A Types DT, DTU (Series F)

- Fusible (DT) and non-fusible (DTU) switches available
- Manually-operated switch suitable for use in accordance with article 702 of the NEC, ANSI/NFPA 70
- Standards: UL 98, NEMA KS1, CSA, and NOM
- Modular design—switch handle, lock-plate, switch mechanism; line and load bases are field replaceable
- UL Listed short circuit current ratings up to 200 kA (using Class R, J, or T fuses—see table for rating)
- Load make/break rated
- Meets NEMA hp ratings
- Dual cover interlock
- May be padlocked ON (I) or OFF (O)
- Lock-off accepts up to three padlocks
- Side-opening door
- Quick make / quick break mechanism
- Meets NEMA requirements as heavy duty switch
- Field-installed electrical interlock kits
- Field-installed neutral assembly kits (2P and 3P switches)
- UL Listed as suitable for use as service equipment
- Supplied as standard for switching one load between two power sources, and may be field-converted to switch on power source between two loads.

30–100 A DT, DTU (Series F)
NEMA 1

30 (Series T4), 200–600 A Types 82,000 and 200 A DTU (Series E, A)

- Non-fusible
- Designed for manual transfer of loads from one supply to another
- UL Listed switches are suitable for use in accordance with Article 702 of the National Electrical Code, ANSI / NFPA 70
- All 82,000 and DTU double throw switches are continuous duty rated for their nameplate ampere rating
- The 82,000 and DTU (Series E, A) switches are load make/break rated
- UL Listed as suitable for use as service equipment
- Horsepower rated only as footnoted.

Field-Installed Accessories:

—Neutral
—Electrical Interlock
—Grounding Terminals

82,000 Line
NEMA 1

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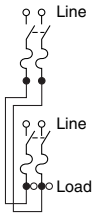
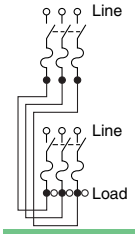
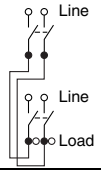
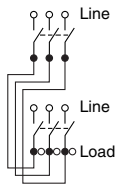
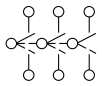
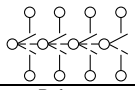
Table 3.37: 240 V Double Throw Safety Switches

System	Amperes	Current Series	NEMA 1		NEMA 3R		NEMA 4,4X,5 304 Stainless Steel		NEMA 12 Gasketed		Horsepower Ratings ▲■ 240 Vac Std. 1Ø	240 Vac Std. 3Ø	240 Vac Max. 1Ø	240 Vac Max. 3Ø	250 Vdc♦
			Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price					
Fusible—2P, 240 Vac—250 Vdc															
	100	F	DT223	**2379.00**	DT223RB	**3056.00**	—	—	—	—	7.5	15 ★	15	30 ★	20
Fusible—3P, 240 Vac—250 Vdc															
	30	F	DT321	**1646.00**	DT321RB	**2216.00**	—	—	—	—	1.5 ▼	3 ★	3 ▼	7.5 ★	5
	60	F	DT322	**1970.00**	DT322RB	**2612.00**	—	—	—	—	3 ▼	7.5 ★	10 ▼	15 ★	10
	100	F	DT323	**3104.00**	DT323RB	**3725.00**	—	—	—	—	7.5 ▼	15 ★	15 ▼	30 ★	20
Non-Fusible—2P, 240 Vac—250 Vdc															
	60	F	DTU222	**962.00**	—	—	—	—	—	—	—	—	10	—	10 △
	100	F	DTU223	**1371.00**	DTU223RB	**1347.00**	—	—	—	—	—	—	15	—	20 △
	30	T4	92251 □	**585.00**	—	—	—	—	—	—	—	—	—	—	—
	200	E	82254 ◒	**1815.00**	DTU224NRB □ ◊ ◒	**2177.00**	—	—	H82254	**4671.00**	15	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	15	—	—	—	—
	400	A	82255 □	**5850.00**	82255R □	**8715.00**	—	—	H82255 □	**10335.00**	—	—	—	—	—
Non-Fusible—3P, 240 Vac—250 Vdc															
	30	F	DTU321	**804.00**	—	—	—	—	—	—	—	3 ★	5 ▼	10 ★	5 △
	60	F	DTU322	**1119.00**	—	—	—	—	—	—	—	—	10 ▼	15 ★	10 △
	100	F	DTU323	**1764.00**	DTU323RB	**1953.00**	—	—	—	—	—	—	15 ▼	30 ★	20 △
	30	T4	92351 □	**687.00**	—	—	—	—	—	—	—	—	—	—	—
	200	E	82354 □	**2564.00**	DTU324NRB □ ◊	**3005.00**	—	—	H82354 □ ☆	**5408.00**	—	15	—	—	—
	200	E	DTU324N □ ◊	**2798.00**	—	—	—	—	—	—	—	15	—	—	—
	400	A	82355 □	**8040.00**	82355R □	**13038.00**	—	—	H82355 □	**11715.00**	—	—	—	—	—
	600	A	DTU326	**12555.00**	DTU326R	**13890.00**	—	—	—	—	—	125	—	—	50
Non-Fusible—4P, 240 Vac															
	30	T4	92451	**953.00**	—	—	—	—	—	—	—	—	—	—	—
	200	E	82454 ◒	**5184.00**	82454R ◒	**7517.00**	—	—	H82454 ▽	**6779.00**	—	15 ▽	—	—	—
	400	A	82455	**11505.00**	82455R	**16200.00**	—	—	H82455	**15975.00**	—	—	—	—	—
	600	A	DTU426	**20355.00**	DTU426R	**20595.00**	—	—	—	—	—	125	—	—	50

▲ Refer to page 7-31 for additional motor application data. The starting current of motors or more than standard horsepower may require the use of fuses with appropriate time delay characteristics.
■ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.
♦ For switching dc, use two switching poles.
★ If used on corner grounded delta systems, install neutral and use outer switching pole for ungrounded conductors.
▼ Use outer switching poles.
△ Maximum rating.
□ 240 Vac only.
◊ Neutral included with device.
☆ Suitable for use as service equipment.
▽ Hp rating applies only to H82454.
◒ 250 V dc rated.

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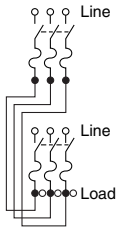
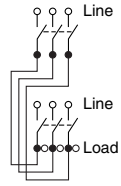
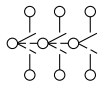
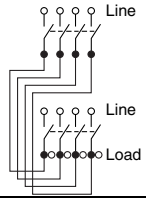
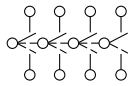
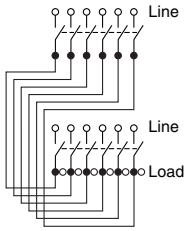
Table 3.38: 600 V Double Throw Safety Switches

System	Amperes	Current Series	NEMA 1		NEMA 3R		NEMA 4,4X,5 304 Stainless Steel		NEMA 12 Gasketed		Horsepower Ratings ▲✪							
											240 Vac		480 Vac		600 Vac		Vdc■	
											std	max	std	max	std	max	250	600
			Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	3Ø	3Ø	3Ø ■	3Ø■	3Ø	3Ø		
Fusible 3P, 600 Vac—600 Vdc																		
	30	F	DT361	**2016.00**	DT361RB	**2678.00**	—	—	—	—	—	—	5	15	7.5	20	5	15
	60	F	DT362	**2111.00**	DT362RB	**3135.00**	—	—	—	—	—	—	15	30	15	50	—	30
	100	F	DT363	**3686.00**	DT363RB	**4427.00**	—	—	—	—	—	—	25	60	30	75	—	50
Non-Fusible 3P, 600 Vac—600 Vdc											1Ø ★	3Ø ■	1Ø ★	3Ø ■	1Ø ★	3Ø		
	30	F	DTU361	**879.00**	DTU361RB	**1544.00**	—	—	—	—	5	10	7.5	20	10	30	5	15
	60	F	DTU362	**1254.00**	DTU362RB	**2045.00**	DTU362DS	**6306.00**	DTU362AWK ◪	**3635.00**	10	20▼	25	50 □	30	60 □	10	30
	100	F	DTU363	**2036.00**	DTU363RB	**3425.00**	DTU363DS	**9414.00**	DTU363AWK ◪	**3894.00**	20	40◊	40	75 ◊☆	40	75 ◊	20	50
	200	E	82344▽◑	**2783.00**	82344RB ▽◑	**5868.00**	82344DS▽‡	**11415.00**	H82344 ✱▽◊	**7503.00**	—	—	—	15 ◒	—	—	—	—
	400	A	82345 ◑	**8213.00**	82345R ◑	**13140.00**	82345DS ◑	**15675.00**	H82345 ◑	**12105.00**	—	—	—	—	—	—	—	—
	600	A	DTU366 ◑†	**13890.00**	DTU366R ◑†	**19800.00**	—	—	DTU366AWK◑†	**21675.00**	—	125	—	250	—	350	50	—
Non-Fusible 4P, 600 Vac—600 Vdc											2Ø	3Ø	2Ø	3Ø	2Ø	3Ø		
	60	F	DTU462	**3035.00**	Use NEMA 12	—	DTU462DS	**6683.00**	DTU462AWK ◪	**4184.00**	20	20	40	50	50	60	10	30
	100	F	DTU463	**3851.00**		—	DTU463DS	**9978.00**	DTU463AWK ◪	**6123.00**	30	40	50	75	50	75	20	30
	200	E	82444 ◑	**6143.00**	82444R ◑	**8130.00**	82444DS ◑	**15105.00**	H82444 ✱▽◑	**7143.00**	—	—	—	—	—	—	—	—
	400	A	82445 ◑	**12578.00**	82445R◑	**16800.00**	—	—	H82445◑	**16845.00**	—	—	—	—	—	—	—	—
	600	A	DTU466 ◑	**20355.00**	DTU466R ◑	**23475.00**	—	—	—	—	—	125	—	250	—	350	50	—
Non-Fusible 6P, 600 Vac—600 Vdc											1Ø	3Ø	1Ø	3Ø	1Ø	3Ø		
	60	F	—	—	—	—	—	—	DTU662AWK ◪	**8474.00**	—	20	—	50	—	60	10	30
	100	F	—	—	—	—	—	—	DTU663AWK ◪	**12735.00**	—	40	—	75	—	75	20	50

▲ Refer to page 7-31 for additional motor application data. The starting current of motors or more than standard horsepower may require the use of fuses with appropriate time delay characteristics.
■ If used on corner grounded delta systems, install neutral and use outer switching pole for ungrounded conductors.
♦ For switching dc, use two switching poles.
★ Use outer switching poles.
▼ Maximum Hp is 15 for corner grounded delta systems.
△ Maximum Hp is 30 for corner grounded delta systems.
□ Use 75°C #4 Cu or #2 Al conductors only.
◊ Use 75°C #1 Cu conductors only.
☆ Maximum Hp is 60 for corner grounded delta systems.
▽ 480 Vac maximum only, 250Vdc.
◒ Standard Hp rating.
✱ Not suitable for use as service equipment.
◊ 600 Vac max.
◑ 250 V dc rated.
✪ Std.—Using fast acting one time fuses. Max.—Using dual element time delay fuses.
(Non-fusible switches have max rating unless noted.)
◪ Complete rating on switch is NEMA 3R or 12.
For 3R applications, remove drain screw from bottom endwall.
◊ H82 ... and H92 ... devices are NEMA 12 only, intended for use indoors only.
‡ Not UL Listed.
† Copper lugs not listed or available.

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Table 3.38: Neutral Assembly

Switch	Field-Installed Standard Neutral Kit Cat. No.	Terminal Data AWG/kcmil	$ Price	Field-Installed Copper only Neutral Kit Cat. No.	Terminal Data AWG/kcmil	$ Price
30–100 A Type DT, DTU (Series F) (2- and 3-pole switches only)	SN0310	14–1/0 Al/Cu	**114.00**	SN0310C	14–1/0 Cu	**120.00**
30 A (Series T4) (2- and 3-pole switches only)	▲	▲	**908.00**	—	—	—
200 A Type 82000 and DTU (Series E) ■	▲	▲	**1110.00**	—	—	—
400 A Type 82000	DT400N	(1) 4–600kcmil or (2) 1/0–250kcmil	**105.00**	—	—	—
600 A Type DTU (Series A)	DT600NKD	250–500kcmil	**452.00**	—	—	—

▲ For Type 82,000 switches, neutral is available factory-installed on 2P and 3P double throw switches. Not UL Listed. To order, add suffix N to the standard catalog number and add the above price to the list price of the switch. For DTU switches, neutral is factory-installed in standard device and is UL Listed.

■ Neutral assembly catalog number DT200N can be added to 4P Type 82000 switches in the field.

Table 3.39: Electrical Interlocks (For Electrical Interlock Contact Ratings, see Supplemental Digest page 2-4.)

Switch	Field-Installed Electrical Interlock Kit Cat. No. ♦	$ Price	Factory-Installed $ Price Adder Per Switch
30–100 A Type DT, DTU (Series F)	EIK1, EIK2 ★◊	**311.00**	**905.00▼**
200 A Type 82000 and DTU (Series E) △	□	—	**1113.00▼**
400 A Type 82000	EK400DTU2	**260.00**	**1533.00**
600 A Type DTU (Series A)	DS200EK2D	**438.00**	—

♦ Electrical interlock kit catalog numbers with "1" suffix indicate one normally open and normally closed contact; "2" indicates two normally open and two normally closed contacts. See page 3-10 for electrical interlock ratings.

★ 30–100 A Type DT, DTU (Series F) switches contain (2) separate switching mechanisms. Each mechanism will accept an electrical interlock. Some applications may therefore require (2) electrical interlocks.

▼ 30–100 A Type DT, DTU (Series F) switches with factory-installed electrical interlocks installed are UL Listed and interlocks are furnished with 2 N.O. /2 N.C. contacts installed in both "ON" positions. To order, add suffix EI to standard catalog number.

△ Electrical interlock EK400DTU2 can be added to 4-pole Type 82000 switches in the field.

□ Type 82000 and DTU switches are available with electrical interlock factory-installed only. Not UL listed. Electrical interlocks are furnished with 2 N.O./N.C. contacts and are installed in both "ON" positions. To order, add suffix EI to standard switch catalog number.

◊ Double throw switches 92251, 92351, and 92451 are not available with factory or field installed electrical interlocks.

Table 3.40: Service Grounding Kit (Required for service equipment use.)

Switch	Field-Installed Service Grounding Lug Kit Cat. No.	Terminal Data AWG/kcmil	$ Price
30–100 A Type DT, DTU (Series F)	Included	Included	**std.**
30 A Type 92,000	DT30SG	(4) 14–4 Cu/Al	**29.40**
200 A Type 82000 and DTU (Series E)	DT100SG	(3) 14–1/0 Cu/Al	**30.00**
400 A Type 82000	PKOGTA2 (2 required)	(4) 10–2/0 Cu or (4) 6–2/0 Al	**55.00**
600 A Type 82000 (Series A)	DS468GKD	6–250kcmil	**309.00**

Table 3.41: Class R Fuse Kits

When installed, this kit rejects all but Class R fuses. Kits are available for field installation. For factory installation, add "CLR" suffix to catalog number.

Switch	Series Number	Class R Fuse Kit Cat. No.	$ Price	Factory-Installed	$ Price
Class R Fuse Kits—240 V (two kits per 3P switch)					
30 A	F5	RFK03	**24.50**		**390.00**
60 A	F5	RFK06	**25.50**		**390.00**
100 A	F5	RFK10	**47.70**		**390.00**
Class R Fuse Kits—600 V (two kits per 3P switch)					
30 A	F5	RFK06	**25.50**		**390.00**
60 A	F5	RFK06H	**25.50**		**390.00**
100 A	F5	RFK10	**47.70**		**390.00**

Viewing Windows

See Table 3.29 for list price. Accessory available on 30–100 A DTU switches only.

Key Interlock Systems

For factory-installed key interlocks, refer to page 3-12.

Phenolic Legend Plate

For factory-installed phenolic legend plates, refer to Supplemental Digest page 2.3.

Lock-On Provisions—UL Listed

Standard and feature on 30–100 A type DT and DTU (Series F), 82,000 (400 A only) and type 92,000 switches.

Feature available as facatory installed option for Type 82,000 (200 A only) and 200 A DTU (Series E) switches. Add the suffix SPLO to the catalog number and add **$410.** to the switches list price.

"RB Hub"

Table 3.42: Rainproof Bolt-On Hubs—for use on NEMA 3R Enclosures

Conduit Size	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4	Closing Cap
Hub Cat. No.	B075	B100	B125	B150	B200	B250	B300	B350	B400	BCAP
$ Price Each☆	**33.30**	**33.30**	**33.30**	**33.30**	**61.00**	**102.00**	**186.00**	**300.00**	**368.00**	**3.80**

Note: NEMA 3R rainproof enclosures with catalog number ending in RB have a bolt-on closing cap factory-installed. Order bolt-on hubs separately from table above. For more details see page 1-13. Hubs through size 2-1/2 in. can be directly installed on RB devices. Devices requiring 3 in. or larger hubs must have holes cut in the field. Gaskets are provided on 3 in. and larger hubs.

Note: All hubs are UL Listed for indoor and rainproof applications and suitable for use with conduit having ANSI standard taper pipe thread.

☆ See Discount Schedule.

Table 3.43: Watertight Hubs—for use on NEMA 4, 4X and 5 Stainless Steel and NEMA 12 Enclosures

Conduit Trade Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	3-1/2	4
Standard-Zinc Hub Cat. No.	H050	H075	H100	H125	H150	H200	H250	H300	H350	H400
Zinc $ Price Each	**31.10**	**45.00**	**47.10**	**54.00**	**83.00**	**120.00**	**138.00**	**177.00**	**282.00**	**381.00**
Chrome Plated Hub Cat. No.	H050CP	H075CP	H100CP	H125CP	H150CP	H200CP	—	—	—	—
Chrome Plated $ Price Each	**40.70**	**56.00**	**64.00**	**67.00**	**96.00**	**137.00**	—	—	—	—

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Situations Requiring Fuses

30–100 A Type DT (Series F):

Select DT switches from pages 3-16, 3-17, which have provisions for accepting fuses.

30 A, 200–600 A Type 82,000 (Series E, T4, A), all DTU devices:

Use the non-fusible double throw switches from pages 3-16, 3-17 in conjunction with standard fusible devices, and install them according to diagram 1 or 2, below.

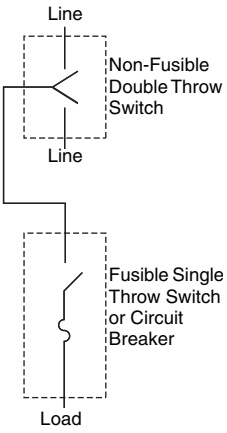

Diagram 1

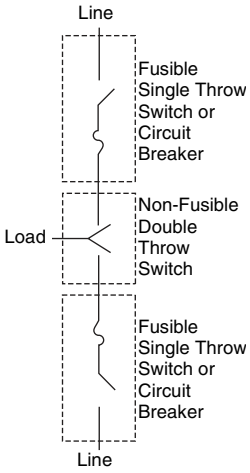

Diagram 2

Table 3.44: UL Listed Short Circuit Current Ratings

Switch Type	Amperes	Voltage Rating	UL Listed Fuse Class	Short Circuit Current Rating ▲ (A)
Type DT (Series F)	30–100 A	240 V or 600 V	H, K	10,000
			R, J	200,000
Type DTU ■ (Series F)	30–100 A	240 V or 600 V	H or K	10,000 ♦
			R, J or T	200,000
DTU224NRB and DTU324NRB (Series E)	200 A	240 V	H, K	10,000 ♦
DTU324N (Series E)	200 A	240 V	H, K	10,000 ♦
			R, J	100,000
Type 82,000	all	240 V	H, K	10,000 ♦
			R, J	100,000 ★
		600 V	H, K	10,000 ♦
Type DTU (A series)	600 A	240 V or 600 V	H, K	10,000
			R, J, T	100,000

▲ Rating applies to AC only. The UL Listed short circuit current rating for non-fusible switches is based on the switch being used in conjunction with the corresponding fuse type. Evaluation of non-fusible switches in conjunction with molded case circuit breakers has not been performed.

■ The DTU361 and DTU361RB are also suitable for use on a circuit capable of delivering not more than
(A) 18 kA, 600 Vac maximum when protected by Type FH circuit breaker rated 30 A maximum or
(B) 14 kA, 600 Vac maximum when protected by Type FA circuit breaker rated 30 A maximum.

♦ Any brand of circuit breaker or fuse not exceeding the ampere rating of the switch may be used ahead of a non-fusible safety switch when there is up to 10 kA short circuit current available.

★ 400 A 82,000 switch is only 10 kA.

Table 3.45: Terminal Lug Data for Type DT, DTU (Series F) Double Throw Safety Switches

Switch Type	Wires per Phase	NEMA 1, 3R, 4, 4X, 12			Optional Copper Only Lug
		Wire Range Wire Bending Space Per NEC Table 373-6 AWG/kcmil	Standard Lug Wire Range AWG/kcmil	Optional Compression Lug Field-Installed	
30–60 A Type DT, DTU (Series F)	1	12–2 Al or 14–2 Cu	12–2 Al or 14–2 Cu	C10-14, D8-14, or E6-14 ▼	See pages 3-12 and 3-14 for appropriate kit. Order two kits per switch.
100 A Type DT, DTU (Series F)	1	12–1/0 Al or 14–1/0 Cu	12–1/0 Al or 14–1/0 Cu	VCEL02114S1 △	

▼ Thomas and Betts catalog numbers.

△ Hubbell Versa-Crimp™ catalog numbers.

Table 3.46: Terminal Lug Data for Types 82,000 and for A and E-Series DTU devices □

Amperes	Wires per Phase	Wire Range Wire Bending Space Per NEC Table 373-6 AWG/kcmil	Lug Wire Range AWG/kcmil	Optional Compression Lugs Field-Installed
30 A (Series T4) ◊	1	14–8 Al/Cu	12–2 Al or 14–2 Cu	—
200	1	6–300 Al/Cu	6–300 Al/Cu	VCEL030516H1 ☆
400	1 or 2	1/0–600 Al/Cu or 1/0–300 Al/Cu	1/0–600 Al/Cu	—
600	2	250–500 Al/Cu	250–500 Al/Cu	—

□ 200–600 A switches suitable for 75°C conductors.

◊ 30 A switches suitable for 60°C or 75°C conductors.

☆ Hubbell Versa-Crimp™ catalog numbers.

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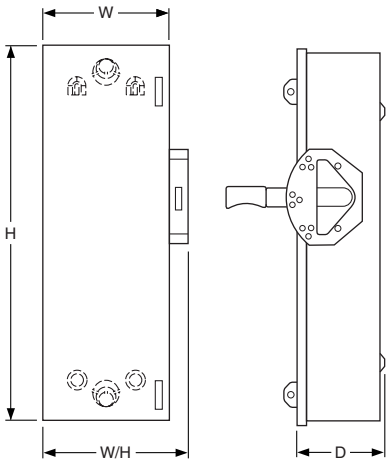
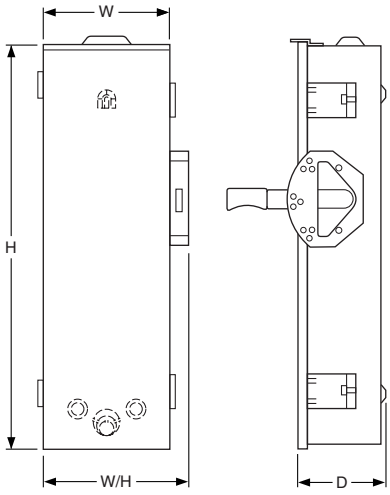
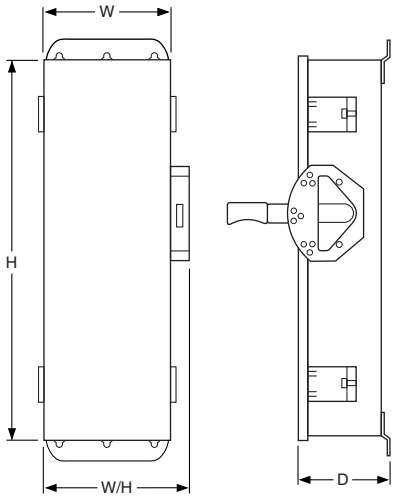


NEMA 1



NEMA 3R



NEMA 4, 4X, 5 and 12

Table 3.47: 30–100 A Type DT, DTU (Series F)—Approximate Dimensions

Cat. No.	Series	H		W		W/H		D	
		in.	mm	in.	mm	in.	mm	in.	mm
DT223	F5	38.00	965	9.88	251	11.13	283	6.75	171
DT223RB	F5	38.00	965	6.87	174	8.12	206	6.60	168
DT321	F5	38.00	965	10.25	260	11.50	292	6.75	171
DT321RB	F5	38.00	965	10.25	260	11.80	300	6.60	168
DT322	F5	38.00	965	10.25	260	11.50	292	6.75	171
DT322RB	F5	38.00	965	10.25	260	11.80	300	6.60	168
DT323	F5	38.00	965	9.88	251	11.13	283	6.75	171
DT323RB	F5	38.00	965	6.87	174	8.12	206	6.60	168
DT361	F5	38.00	965	10.25	260	11.50	292	6.75	171
DT361RB	F5	38.00	965	10.25	260	11.80	300	6.60	168
DT362	F5	38.00	965	10.25	260	11.50	292	6.75	171
DT362RB	F5	38.00	965	10.25	260	11.80	300	6.60	168
DT363	F5	38.00	965	9.88	251	11.13	283	6.75	171
DT363RB	F5	38.00	965	6.87	174	8.12	206	6.60	168
DTU222	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU223	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU223RB	F5	30.50	775	10.25	260	11.96	304	6.93	176
DTU321	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU322	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU323	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU323RB	F5	30.50	775	10.25	260	11.96	304	6.93	176
DTU361	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU361RB	F5	30.50	775	10.25	260	11.96	304	6.93	176
DTU362	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU362AWK	F6	29.94	760	10.25	260	11.96	304	6.93	176
DTU362DS	F6	30.26	769	10.25	260	11.50	292	7.12	181
DTU362RB	F5	30.50	775	10.25	260	11.96	304	6.93	176
DTU363	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU363AWK	F6	29.94	760	10.25	260	11.96	304	6.93	176
DTU363DS	F6	30.26	769	10.25	260	11.50	292	7.12	181
DTU363RB	F5	30.50	775	10.25	260	11.96	304	6.93	176
DTU462	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU462AWK	F6	30.26	769	15.50	394	16.75	425	7.12	181
DTU462DS	F6	30.26	769	15.50	394	16.75	425	7.12	181
DTU463	F5	29.94	760	10.25	260	11.96	304	6.93	176
DTU463AWK	F6	30.26	769	15.50	394	16.75	425	7.12	181
DTU463DS	F6	30.26	769	15.50	394	16.75	425	7.12	181
DTU662AWK	F6	30.26	769	15.50	394	16.75	425	7.12	181
DTU663AWK	F6	30.26	769	15.50	394	16.75	425	7.12	181

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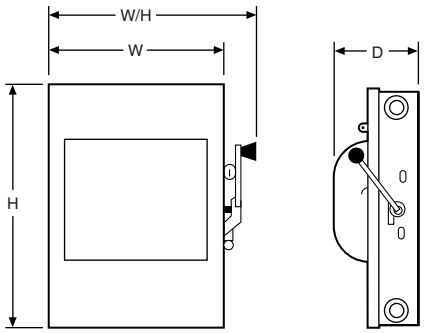
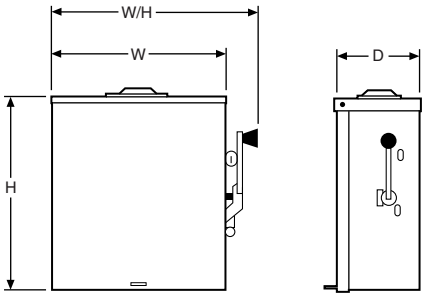


NEMA 1



DTU—200 A
NEMA 3R

Table 3.48: 30, 200–600 A Types 82,000 and E-Series DTU devices, NEMA 1 and 3R—Approximate Dimensions

Cat. No.	Series	H		W		W/H		D	
		in.	mm	in.	mm	in.	mm	in.	mm
DTU224NRB ▲	E1	32.50	826	20.63	524	24.00	610	10.63	270
82254 ▲	E1	30.88	784	15.75	400	19.63	499	9.75	248
82254NW ▲	E1	30.88	784	20.00	508	23.88	607	11.75	298
82344 ▲	E2	30.88	784	20.00	508	23.88	607	11.75	298
82344RB ▲	E1	32.50	826	20.63	524	24.00	610	10.63	270
82354	E1	30.88	784	20.00	508	23.88	607	11.75	298
92251	T4	10.00	254	8.00	203	9.75	248	4.75	121
82344DS	E1	30.88	784	20.00	508	23.88	607	11.75	298
DTU324N	E1	32.50	826	24.50	622	26.25	667	10.63	270
DTU324NRB	E1	32.50	826	24.50	622	26.25	667	10.63	270
H82344	E2	32.50	826	24.50	622	26.25	667	10.63	270
H82444 ▲	E2	32.50	826	30.21	767	33.61	854	10.63	270
H82454	E3	32.50	826	30.21	767	33.61	854	10.63	270
82454	E3	38.00	965	29.62	753	33.02	839	10.63	270
82444	E3	38.00	965	29.62	753	33.02	839	10.63	270
82454R ▲	E3	38.00	965	29.62	753	33.02	839	10.63	270
82444R	E3	38.00	965	29.62	753	33.02	839	10.63	270
H82254	E3	32.50	826	24.50	622	26.25	667	10.63	270
H82354	E3	32.50	826	24.50	622	26.25	667	10.63	270
82444DS ▲	E3	38.00	965	29.62	753	33.02	839	10.63	270
82255 ▲	A1	38.50	978	26.10	663	29.51	750	10.63	270
82255R	A1	39.00	991	26.62	676	30.02	763	10.63	270
82345▲	A1	38.50	978	26.10	663	29.51	750	10.63	270
82345DS▲	A1	39.00	991	26.62	676	30.02	763	10.63	270
82345R▲	A1	39.00	991	26.62	676	30.02	763	10.63	270
82355 ▲	A1	38.50	978	26.10	663	29.51	750	10.63	270
82355R ▲	A1	39.00	991	26.62	676	30.02	763	10.63	270
82445	A1	38.50	978	30.10	765	33.50	851	10.63	270
82445R	A1	39.00	991	30.21	767	33.61	854	10.63	270
82455 ▲	A1	38.50	978	30.10	765	33.50	851	10.63	270
82455R	A1	39.00	991	30.21	767	33.61	854	10.63	270
H82255	A1	39.00	991	26.62	676	30.02	763	10.63	270
H82345	A1	39.00	991	26.62	676	30.02	763	10.63	270
H82355	A1	39.00	991	26.62	676	30.02	763	10.63	270
H82445	A1	39.00	991	30.21	767	33.61	854	10.63	270
H82455	A1	39.00	991	30.21	767	33.61	854	10.63	270
DTU326	A1	63.31	1608	23.66	601	24.46	621	8.88	226
DTU426	A1	63.31	1608	27.00	686	27.80	706	8.88	226
DTU366	A1	63.31	1608	23.66	601	24.46	621	8.88	226
DTU466	A1	63.31	1608	27.00	686	27.80	706	8.88	226
DTU326R	A1	63.76	1619	23.66	601	24.46	621	8.88	226
DTU426R	A1	63.76	1619	27.00	686	27.80	706	8.88	226
DTU366R	A1	63.76	1619	23.66	601	24.46	621	8.88	226
DTU466R	A1	63.76	1619	27.00	686	27.80	706	8.88	226
DTU366AWK	A1	63.76	1619	23.66	601	24.46	621	8.88	226

▲ 250 V dc rated.

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Put over 100 years of Schneider Electric's experience as a global specialist in energy management to work on your photovoltaic (PV) project. The Square D™ 1000 Vdc disconnect switch is the perfect solution for your 1000 Vdc PV disconnect applications. It is compact and available in both a 100 and 200 amp non-fusible versions. IEC 60947-1 and 3 certified (file 136861) and UL 98 certified (file E343341).

Extended Life Expectancy

Exceeds IEC 60947-3 mechanical endurance requirements by factor of 18

Exceeds IEC 60947-1 electrical endurance requirements by factor of 10

Exceeds NEMA KS-1 mechanical endurance requirements by factor of 3.

Designed for Harsh PV Environments

NEMA Type 3 and IP63 enclosure

- Resists windblown dirt/dust
- Exceeds NEMA Type 1, 3R and 12

Operating range of -37°C to 50°C

Specially designed PV paint reduces solar gain up to 35% over standard grey enclosures

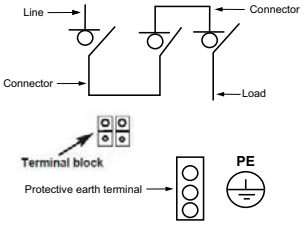
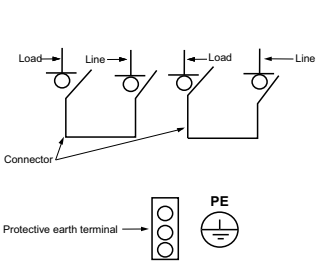
Easy to Install

Preconfigured solar solution

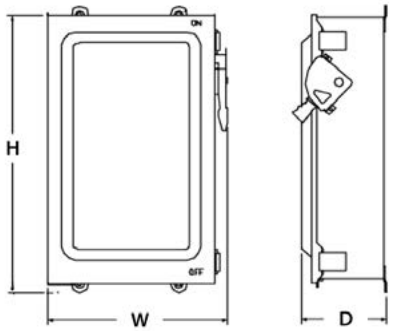
Familiar enclosed safety switch design

Suitable for both grounded and ungrounded PV

Table 3.49: 1000 Vdc Photovoltaic Heavy Duty Disconnect Switch Pricing and Accessories

System	NEMA 1, 3R, 12, 3 and IP63			Factory Installed Accessories										Height (in.)	Width (in.)	Depth (in.)
				Electrical Interlock Single Contact▲		Electrical Interlock Two Contacts■		Viewing Windows		Terminal Blocks (Copper)♦		3 Wire Ground Lug★				
	Amperes	Cat. No.	$ Price	No. Suffix	$ Price Adder	No. Suffix	$ Price Adder	No. Suffix	$ Price Adder	No. Suffix	$ Price Adder	No. Suffix	$ Price Adder			
3 Pole Grounded▼																
Three-Pole (Grounded System) 	100	REHU393IP	**1672.00**	EI	**452.00**	EI2	**496.00**	VW	**150.00**	TBC	**409.00**	GL	**263.00**	**22.13**	**18.63**	**8.75**
	200	REHU394IP	**2246.00**	EI	**452.00**	EI2	**496.00**	VW	**175.00**	TBC	**409.00**	GL	**263.00**	**22.13**	**18.63**	**8.75**
4 Pole Ungrounded																
Four-Pole (Ungrounded System) 	100	REHU493IP	**2507.00**	EI	**452.00**	EI2	**496.00**	VW	**150.00**	—	—	GL	**263.00**	**29.00**	**18.63**	**8.75**
	200	REHU494IP	**3965.00**	EI	**452.00**	EI2	**496.00**	VW	**175.00**	—	—	GL	**263.00**	**29.00**	**18.63**	**8.75**

▲ Order EIK1PV for single contact field-installed kit **$311.00**.
■ Order EIK2PV for double contact field-installed kit **$355.00**.
♦ Accommodates (2) 250 max Cu or (1) 1/0 max Cu wiring; Order SN20CPV for field-installed kit **$246.00**.
★ Order REHGND KIT for field installable kit **$100.00**.
▼ Terminal blocks standard with 3 pole switches; accommodates (2) 1/0 max Al/Cu or (2) 6 max Al/Cu wiring.



200 A Enclosed Switch Dimensions (inches)

Schneider Electric gives the Photovoltaic market place the most comprehensive one stop shop for Residential and Light Commercial Photovoltaic Balance of System components. Schneider Electric's Inverters, and Square D brand DC and AC disconnect switches and Load Centers are ideal solutions to your Balance of Systems requirements. See the Balance of System solution chart below for your single phase PV system.

Table 3.50: PV Balance of System Solution Package—Grid Tie

System Voltage	Kilowatts	Amps	DC Disconnect	Inverter	AC Disconnect	Load Center Product
250 Vdc	2.8	30	HU361RB	878-2801	D221NRB	QO130M200
250 Vdc	3.3	60	HU362RB	878-3301	D222NRB	QO140M225
250 Vdc	3.3	100	HU363RB	878-3301	D223NRB	QONQ42MS400
600 Vdc	3.8	30	HU361RB	878-3801	D221NRB	QO130M200
600 Vdc	5.0	60	HU362RB	878-5001	D222NRB	QO140M225
600 Vdc	5.0	100	HU363RB	878-5001	D223NRB	QONQ42MS400

For internal 600 Vdc PV combiner box switches please see our offering of 9422 switches 600 Vdc UL98 listed in digest pages 8-14.

For our 600 Vdc PV switch offering please see digest pages 3-5–3-6.

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Square D PV string combiner boxes are used to integrate multiple PV strings into one output circuit. Its tough exterior and safety features protect wiring from weather and overcurrent. The exterior coating ensures low operating temperatures and longer life of internal components. The specially engineered enclosure is designed to provide dust tight and rain tight protection; it meets or exceeds NEMA® 3R, 12, and 4 requirements. Traditional Square D visible blade switch architecture confirms disconnection, while touch-safe interior shielding protects against accidental contact with live components.

Features

Flexible

- Vertical, horizontal, and angled mounting options
- Flexible installation with top, bottom, and side entry
- Substantial wire-bending space

Robust

- Dust tight and rain tight engineered enclosure for outdoor use
- UV-resistant white exterior coating to reduce solar gain by 35%
- Meets or exceeds NEMA 3R, 12, and 4 requirements

Safe

- Square D traditional visible blade switch architecture for confirmation of disconnect
- Touch-safe interior shielding guards against accidental contact with current-carrying components
- Seismic-certified 100–400 amp string combiner boxes for earthquake safety
- Optional integrated 2.5 kV surge arrestor to protect PV electronics from lightning strikes

Listings

- UL 1741
- Switches tested to UL98B
- CSA C22.2 Spec 107.1

Table 3.51: 600 Vdc Photovoltaic Combiner Boxes

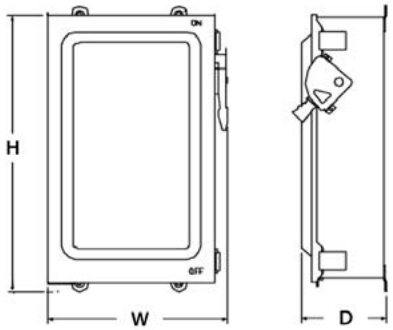
Catalog Number▲	Number Input Circuits (Max.)	Continuous DC Output Current (Max.)	Maximum PV Module Isc Rating (Amps)	Maximum Continuous Input Current Per String (Amps)	List Price $	Wire Range (AWG/kcmil—Copper Only)					Outside Dimmensions					
						Input Circuit (+ and -)	Output Circuit (+ and -)	Output Number of Conductors (+ or -)	Ground In	Ground Out	Height		Width		Depth	
											in.	mm	in.	mm	in.	mm
REHSC126100	12	100	10.4	13	**838.00**	#12–#6	#6–1/0	1	#14–4 Or 2X #14–#12	#6–2/0	20.78	528	14.50	368	6.13	156
REHSC166200	16	200			**1067.00**	#12–#6	#6–300 MCM	1		#6–2/0	27.78	706	20.25	514	6.13	156
REHSC246300	24	300			**1378.00**	#12–#6	1/0–300	2		#6–2/0	35.78	909	20.25	514	6.13	156
REHSC326400	32	400			**2226.00**	#12–#6	1/0–300	2		#6–2/0	35.78	909	20.25	514	6.13	156

▲ For factory installed surge protection device add the suffix “S” to the catalog number.

Table 3.52: 600 Vdc Photovoltaic Combiner Boxes With Disconnects

Catalog Number▲	Number Input Circuits (Max.)	Continuous DC Output Current (Max.)	Maximum PV Module Isc Rating (Amps)	Maximum Continuous Input Current Per String (Amps)	List Price $	Wire Range (AWG/kcmil—Copper Only)					Outside Dimmensions					
						Input Circuit (+ and -)	Output Circuit (+ and -)	Output Number of Conductors (+ or -)	Ground In	Ground Out	Height		Width		Depth	
											in.	mm	in.	mm	in.	mm
REHSC126100DU	12	100	10.4	13	**1438.00**	#12–#6	#6–1/0	1	#14–4 Or 2X #14–#12	#6–2/0	31.00	787	19.00	483	9.00	229
REHSC166200DU	16	200			**1899.00**	#12–#6	#6–300 MCM	1		#6–2/0	31.00	787	25.00	635	9.00	229
REHSC246300DU	24	300			**3035.00**	#12–#6	1/0–300	2		#6–2/0	41.00	1041	25.00	635	10.50	267
REHSC326400DU	32	400			**3883.00**	#12–#6	1/0–300	2		#6–2/0	41.00	1041	25.00	635	10.50	267

▲ For factory installed surge protection device add the suffix “S” to the catalog number.



Typical String Combination Box Dimensions

Surge Protection Device

The 600 Vdc Type 2 Surge Protection Device (SPD) is for medium risk PV applications. The SPD when installed in a Square D combiner box protects solar modules, power tracking and blocking diodes from physical damage resulting from lightning induced transients. The SPD device uses Metal Oxide Varistor (MOV)/Gas-Filled Spark Gap (GSP) protection circuits for longer life and no current leakage. The devices are UL1449 ed 2 compliant Low Voltage TVSS. The SP are available as factory installed by adding the suffix “S” to the combiner box catalog number or as kits a kit: REHTYPE2SP.

Table 3.53: 600 Vdc Type 2 Surge Protection Device

Catalog Number	Network Voltage	Nominal Discharge Current per 20 micro sec	Maximum Discharge Current per 20 micro sec	Operating Current	Operating Temperature; Celsius	List Price $	
						Kit	Factory Installed
REHTYPE2SP	600 Vdc	20kA	40kA	<0.1nA	-40 to +85	**337.00**	**490.00**

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Section 4

Power Monitoring and Control

Remote Energy Management

ION-E software

CM4000

ION7650

HDM4 Panel

Sepam series 80

Low Voltage Automatic Capacitor Bank

Active Harmonic Filter

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Three dimensions of energy and power management savings

Volatile energy prices and stringent emissions standards have made it more challenging to control operational costs thus putting profits at risk. Square D PowerLogic™ energy and power management systems will help you make the most of your energy by:

Reducing Utility Costs & Increasing Energy Efficiency

Achieve significantly reduced direct consumption-related costs through improved efficiency, lower emissions and more accountability. And if you're a property manager, you can increase the accuracy of energy settlements that can help attract or retain tenants. By simply installing a PowerLogic™ power monitoring system, our customers over the past twenty years have reported realizing a 2–4% savings in utility costs-but that's just the “tip of the iceberg” in terms of your potential savings.

Optimizing Equipment Utilization

Avoid or defer capital costs by better utilizing existing electrical infrastructure typically results in another 2–5% savings. By monitoring key points and collecting system loading information, engineering is able to make decisions on a plant's capacity to handle new production lines or to determine if additional distribution equipment is required for a building expansion.

Improving System Reliability & Safety

Typically, another 10% can be found by discovering power system reliability improvements with powerful PowerLogic™ metering that offers extremely accurate and high speed event capture information. Once detected, future power disturbances are often correctable and can help facilities avoid expensive and often hidden risks to productivity. As an added benefit, PowerLogic monitoring system information is accessible from the safety of your personal computer. This offers improved worker safety since it is not necessary to suit up in personal protective equipment to access energized equipment over the network.

PowerLogic™ systems give you the power to achieve this kind of savings, resulting in a quick return on your investment. We pride ourselves on reliable products, innovative systems, expert engineering services, and our ability to provide single-source energy and power management solutions. It's not just a concept to us, it's a legacy and a promise-for companies that seek an edge in productivity. That's why leaders turn to Schneider Electric.

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Table 4.1:

		Data Presentment & Management		Data Acquisition, Alarms & Monitoring		
		Enterprise	Online Energy Analysis	Supervisory Control & Data Acquisition	Power Monitoring System	Tenant Submetering
		Data Centers; Industrial Buildings, Property Management, Utilities	Utilities	Water/Wastewater, Heavy Process Industry, Data Centers, Critical Power	Industrial, large commercial buildings, Military Bases, Healthcare	Commercial Buildings, Government Buildings, Military Bases
	For products see DIGEST section:	4–6	4–17	4–5	4–4 thru 4–12	4–13 thru 4–16
	For services see DIGEST section:	4–20	4–20	4–21	4–21	4–22
Reduce Energy Costs & Energy Efficiency	**Meter Application**					
	Automatic Meter Reading			•	••••	••
	Revenue Metering			•	••••	••
	WAGES Utility Pulses				•••	
	Sub-billing	•••	•••			••••
	Measurement & Verification	••••	••		•••	
	Cost Allocation & Utility Billing					
	Energy Usage Analysis	••••	•••	•	••	•
	Procurement Optimization	••	•••	•	•	
	Allocate Energy Costs	•			•	
	Interval Benchmarking & Profiling	••••	•••	•	••	
	Total Load Aggregation	••••				
	Energy Efficiency					
	Emissions Tracking	••	•••			
	Power Factor Correction	•	•		•••	
	Peak Demand Reduction	••	•	•••	•••	
	Demand Response & Curtailment			•••	•••	
Optimize Equipment Utilization	**Improve Maintenance Practices**					
	Commissioning & Troubleshooting			•••	••••	
	Equipment Monitoring: transformers, MCCs, switchgear, switchboards, circuit breaker status, protective equipment, capacitors, generators, panelboards, PDU, UPS, etc.			•••	••••	
	Facility Planning					
	Identify Equipment Capacity				•••	
	Determine Transformer Stress				•••	
	Equipment Asset Optimization	••		••	•••	
	Improve Efficiency					
	Balance Circuit Loading				•••	
	Balance Generator Usage				•••	
	Optimize Chiller & Mechanical Equipment				•	
Improve Reliability & Safety	**System Monitoring & Analysis**					
	Transient Voltage Detection				••••	
	Sag/Swell Disturbance Monitoring				••••	
	Power Quality & Harmonic Analysis				••••	
	Power Quality Compliance	••••		•	•••	
	Alarm & System Diagnositics					
	Electrical Distribution Alarm & Event Analysis	•		•••	••••	
	Waveform capture viewing				••••	
	Remote alarm notification			••••	•••	
Engineering Services	**Energy Services**					
	Total Energy Control Services	••••	see section 4–20 for Engineering Services		•••	see section 4–20 for Engineering Services
	Peak Shaving/Generator Control	see section 4–20 for Engineering Services		••••	••	
	Load Management/Shedding			••••	••	
	WAGES				•••	
	Advanced Reliability Services					
	Auto Throw Over (ATO)	see section 4–20 for Engineering Services		••••	••	see section 4–20 for Engineering Services
	Emergency Power Supply System Test Reporting				••••	
	Sequence of Events Recording (1ms time/stamp)			••••	•••	
	GPS Time Stamping			••••	•••	
	Power System Control			••••	•	
	Network Protection			••••	••	
	Consulting Services					
	System Studies (SC/TCC/Arc Flash)	see section 4–20 for Engineering Services				
	Power System Assessments					

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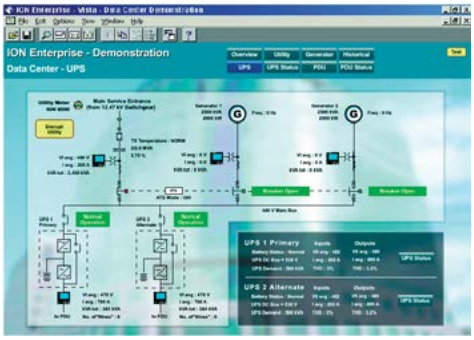
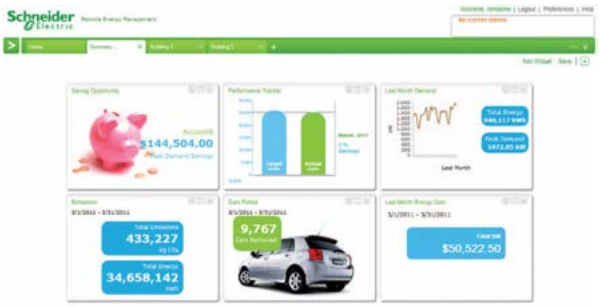


ION Enterprise Software



Remote Energy Management

PowerLogic ION Enterprise Software

PowerLogic ION Enterprise software is an all-in-one package for operational power system monitoring, analysis and control that helps you reduce energy-related costs. It offers control capabilities, comprehensive power quality and reliability analysis and helps reduce energy related costs. The software is a suite of applications that allows you to collect, process, analyze, store, and share data across your entire enterprise. PowerLogic ION Enterprise software is designed to give you the information and analysis tools you need to make sound decisions. Its cutting-edge flexibility and compatibility allow you to extend your energy management system at your own pace, adding newer components as they become available, without interrupting or impacting existing functions. PowerLogic ION Enterprise collects data through serial, wireless, modem or Ethernet links and can manage a single site or, through the Internet, connect a global network of devices.

Table 4.2: PowerLogic ION Enterprise Software Ordering Information

Description	Catalog No.	$ Price
Core Software Products▲		
ION Enterprise Base software	IE60BASEENG	**1079.00**
ION Enterprise Device license (For 100+ devices, please call the factory for volume pricing)	IE60DLS	**252.00**
ION Enterprise Client license	IE60CL	**1079.00**
ION Enterprise Quantity 50 Pack Device licenses	IE60DLS50	**10080.00**
ION Enterprise v6.0 Device licenses	IE60DLUNLTD	**24750.00**
OPC Server support for ION Enterprise	IONEOPCV1	**3055.00**
SQL Server 2005 bundle option (CD and 1-CPU license)	IONESQL2005	**3509.00**
SQL Server 2005 additional CPU license	IONESQL2005CPU	**2157.00**
PQDIF Exporter for ION Enterprise	IONEPQDIFV1	**3660.00**
Upgrades to PowerLogic ION Enterprise 6.0		
ION Enterprise Base Upgrade from v5.5 or later	IE60BASEENGUPG	**288.00**
ION Enterprise Single Device License Upgrade	IE60DLSUPG	**126.00**
ION Enterprise Quantity 50 Pack Device Licenses Upgrade	IE60DLS50UPG	**5040.00**
ION Enterprise v6.0 Unlimited Device License Upgrade	IE60DLUNLTDUPG	**12375.00**
ION Enterprise Client license upgrade	IE60CLUPG	**520.00**
Related Items		
ION Enterprise Replacement CD	IONE60REPCD	**215.00**

▲ Every new system must be ordered with 1 IONE56-Base software and a minimum of 5 IONE56-DL device licenses.

Note: Software versions may have upgraded since release of this digest. Please check with your Schneider Electric Sales Rep or local distributor for latest ION Enterprise version.

New!

Remote Energy Management Web-Hosted Service

Schneider Electric Remote Energy Management (REM) is a web-hosted service that easily turns energy usage data into actionable information, accessible via any standard web browser. With REM, users can easily identify energy waste, reduce energy consumption, save on utility bills, and measure, report on and implement energy and emission reduction initiatives...all easily made available through predefined reports and customizable dashboards

- Compare energy usage among similar facilities to establish benchmarks and identify poorly performing facilities.
- Normalize consumption against weather, production, hours of operation, sq footage, and occupancy.
- Measure the effectiveness of various energy efficiency efforts.
- View carbon emissions reports.
- Easily view all monitored sites around the globe on a single screen through the Enterprise Map View.
- Optimize equipment run hours and setting to avoid setting costly new demand peaks.
- Compare consumption data between different meters or a group of meters.
- Identify exceptional usage patterns.
- Track, report, and analyze information from all utility sources including water, gas, electric, and steam.
- Compare usage to utility bills to verify correct billing from the utility.
- Use “what if” analysis tools to make accurate assessments of what utility costs would be on different utility rates.

Contact your local Schneider Electric sales office for pricing and availability.

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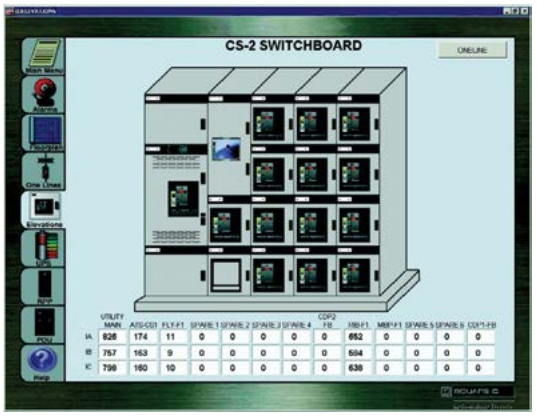

PowerLogic Scada Software

PowerLogic SCADA

PowerLogic™ SCADA software was created to meet the requirement for real-time monitoring and control of electrical distribution systems, including fast response times and high reliability through redundancy. PowerLogic SCADA is powered by Citect™ SCADA technology but is specifically designed for electrical power systems applications. The complete PowerLogic supervisory control and data acquisition (SCADA) solution includes a dynamic graphical user interface, enhanced alarm management, one second response times for control operation and status, transparent redundancy, and reliable communications (through hardware components and network topology). The system also features Sequence of Events Recorder (SER) logs with time stamps of 1ms resolution. PowerLogic SCADA software includes a web-based client for remote viewing capability. The graphical user interface consists of animated objects which change according to status information. The flexible graphics editor includes both ANSI and IEC electrical symbols to facilitate easy one-line diagram creation. Real-time and historical trending is also supported.

For pricing information, please contact your local PowerLogic representative.

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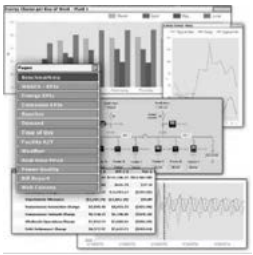


Personalized dashboards help management and operations personnel monitor all aspects of energy use and respond to opportunities or threats.

PowerLogic ION EEM is a complete enterprise energy management solution that unites business and energy strategies across your entire enterprise by unifying and extending the benefits of your existing energy-related data resources. Stakeholders from management to operations will be empowered by actionable energy intelligence to reveal opportunities, isolate problems and drive cost and risk reduction strategies.

PowerLogic ION EEM automatically acquires data from power monitoring and control systems, building and process automation systems, utility information systems, weather services, spot-market energy pricing feeds, and enterprise business applications, cleanses and warehouses it. Personalized, browser-based dashboards and innovative visualization and modeling tools then make the information available to whomever needs it, so you can accurately monitor, validate, predict and control energy-related expenses.

Produce aggregate billing, load profile, cost allocation, power quality, forecasting or budget reports to help inform stakeholders and track results against goals.

From operational cost reductions to procurement support through cost allocation, benchmarking and budgeting, key performance indicators and advanced analytics, PowerLogic ION EEM helps you manage energy in financial terms. It also helps you gain unique insight into the impacts of power quality on your business and all energy assets. From the service entrance to the boardroom, PowerLogic ION EEM software allows energy to be managed as a variable cost.

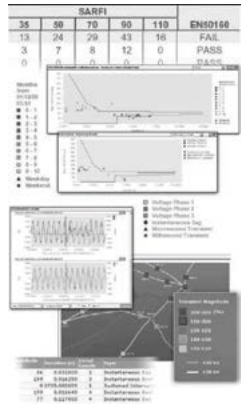
Key features

- True enterprise-level software architecture: data quality assurance, data warehouse, web framework
- Web portal: personalized dashboards, key performance indicators, charts, trends, real-time conditions
- Reporting: rich and customized content, support for complex data and graphics, scheduled distribution
- Trending: advanced visualization, dimensional analysis, prediction, statistical rollups
- Modeling: regression analysis, normalization, correlation, integration of all relevant drivers and contextual data
- Billing: built-in rate engine and rate wizard
- Power quality analysis: wide-area event monitoring, classification, filtering, correlation
- Alarms and events: triggering on complex conditions, notification, logging
- Integration: data acquisition systems, weather and pricing feeds, other enterprise applications (e.g. BAC, ERP)
- CO^2 Report

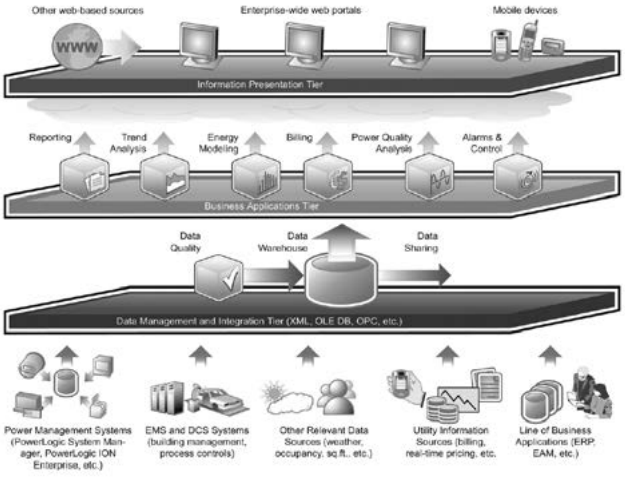
Use advanced billing functions to support energy procurement and manage load or generation assets in response to curtailment or pricing signals.

Typical applications

- Manage all utilities (electricity, gas, water, etc.) and emissions through a single, unified interface
- Benchmark facility performance across an entire enterprise to identify energy inefficiencies
- Measure and verify savings from energy conservation projects or performance contracts
- Reduce operational costs, improve processes, and prolong asset life
- Meet corporate environmental stewardship goals or mandated impact targets
- Manage demand control schemes, load shedding, peak shaving, base loading or on-site generation
- Enable participation in real-time pricing and load curtailment programs
- Optimize procurement by forecasting and budgeting for energy needs and comparing utility rates
- Identify utility billing errors and validate contract compliance
- Allocate and recover utilities costs from tenants, departments, processes, etc.
- Maximize the use of existing infrastructure capacity and avoid overbuilding
- Identify and reduce risks to uptime



Monitor power quality risk factors, benchmark performance, determine impacts, validate contract compliance, isolate problem sources, and confirm your return-on-investment.



Data presentation tier

Web portal delivers enterprise-wide access through personalized dashboards, reports, detailed analytics, and integration of views from third-party systems. Schedule information and report distribution to the people who need it, for use on their desktop or mobile devices.

Business applications tier

Standard and optional modules tailor functionality to specific needs. Advanced analytics and reporting on every driver and relationship affecting energy cost and reliability.

Data management tier

Integration of data from many sources: power monitoring and control systems (PowerLogic or third party), utility metering systems (water, air, gas etc.), Internet weather, real-time energy pricing feeds, manual input, energy assets (power distribution and reliability equipment, generators), line-of-business systems (BAC, DCS, ERP, EAM, accounting). Data quality module assures complete and reliable data from all inputs.

For price and ordering information, contact your local PowerLogic Sales Specialist or PowerLogic Inside Sales at 615-287-3535.

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ION8650/7550/7650 Power and Energy Meters

The web-enabled PowerLogic ION8650 is used to monitor electric distribution networks, service entrances and substations. It enables businesses to manage complex energy supply contracts that include power quality guarantees. Low-range current accuracy makes it ideal for independent power producers and cogeneration applications that require the accurate bi-directional measurement of energy. It is well suited to load curtailment, equipment monitoring and control and energy pulsing and totalization applications. Integrate it with PowerLogic ION EEM enterprise energy management software, PowerLogic ION Enterprise operations software or other energy management and SCADA systems.

PowerLogic ION8650 Power and Energy Meter Features

Feature set C includes:

- 9S, 35S, 36S socket and switchboard cases
- True RMS 3-phase voltage, current, power and meets stringent ANSI revenue metering standards including ANSI C12.20 0.2 and Class 2, 10, & 20
- Power quality: sag/swell, individual, even, odd, total harmonics to the 31st and symmetrical components
- 32MB log/event memory, min/max for any parameter, historical logs up to 64 channels, timestamp resolution to 0.001 seconds and GPS time synchronization
- Transformer/line loss compensation and Instrument transformer correction
- Communications: Ethernet, Serial, Modem, Internet and Ethernet to serial gateway and ION, DNP 3.0, Modbus RTU, Modbus TCP, MV-90 protocols, IEC 61850
- Dial-out capability when memory is near full
- Multi-user, multi-level security with control and customized access to sensitive data for up to 16 users
- Data push capability through SMTP (email)
- 65 setpoints — math, logic, trig, log, linearization formulas
- Password protection and anti-tamper seal protection
- Built-in I/O: 4 KYZ digital outs and 3 form A digital ins, 4 KYZ digital outs and 1 form A digital out and 1 form A digital in, an optional external I/O expander provides additional I/O

Feature set B adds the following to feature set C:

- Harmonics—individual, total even, total odd up to the 63rd
- 64MB standard memory
- Historical logs up to 320 channels
- Modbus RTU Master on serial ports
- Cycle setpoint minimum response time

Feature set A adds the following to feature sets C and B:

- Waveform capture up to 1024 samples/cycle, PQ compliance monitoring, flicker to EN50160, IEC 61000-4-7/4-15 (also configurable to IEEE 519-1992, IEEE159, SEMI) CBEMA/ITIC
- Transient detection to 6517µs at 60Hz;
- Harmonics: magnitude, phase and inter-harmonics to the 50th
- 128MB standard memory
- Max 96 cycles of waveform logs and 800 channels of historical logs

Table 4.3: Typical PowerLogic ION8650 Power and Energy Meter Ordering Configurations

Description	Catalog No.	$ Price
ION8650, feature set A, 9S socket base, 5 A nominal current inputs, 10MB memory, 127–177 Vac, 60 Hz, communications card with: 10BaseT, RS-232/485, RS-485, Optical port, 4 Digital Outputs, 3 Digital Inputs	S8650A0C0E6E0B0A	**7077.00**
ION8650, feature set A, 35S socket base, 5 A nominal current inputs, 10MB memory, 120–480 Vac, 60 Hz, communications card with: 10Base T, RS-232/485, RS-485, Optical port, 4 Digital Outputs, 3 Digital Inputs	S8650A1C0E6E0B0A	**7077.00**
ION8650, feature set C, 9S socket base, 5 A nominal current inputs, 2MB memory, 120–277 Vac, 60 Hz, communications card with: RS-232/485, RS-485, Optical port, 4 Digital Outputs, 3 Digital Inputs	S8650C0C0E6A0B0A	**2889.00**
ION8650, feature set C, 35S socket base, 5 A nominal current inputs, 2MB memory, 120–277 Vac, 60 Hz, communications card with: RS-232/485, RS-485, Optical port, 4 Digital Outputs, 3 Digital Inputs	S8650C1C0E6A0B0A	**2889.00**

PowerLogic ION7550 and ION7650 Power and Energy Meters

Used at key distribution points and sensitive loads, the web-enabled PowerLogic ION7550 and PowerLogic ION7650 meters combine a wealth of advanced features from power quality analysis capabilities, revenue accuracy and multiple communications options, through web compatibility, and control capabilities. Both are compatible with PowerLogic ION EEM enterprise energy management software, PowerLogic ION Enterprise operations software can be integrated with other energy management or building control systems through multiple communication channels and protocols.

The meters are ideal for compliance monitoring, disturbance analysis, cost allocation and billing, demand and power factor control and equipment monitoring and control. The meters have a high visibility, adjustable front panel display that can depict TOU, harmonics, event logs, phasers, and instantaneous power parameters. They meet stringent ANSI C12.20 0.2, Class 10 & 20 revenue metering standards.

PowerLogic ION7550 and ION7650 Power and Energy Meter Features

The PowerLogic ION7550 includes:

- 3.5" x 4.5" (87 x 112 mm) backlit LCD display
- True RMS 3-phase voltage, current, and power that meets stringent ANSI C12.20 0.2, Class 2, 10, & 20
- Power quality: sag/swell, harmonics - individual, even, odd, total to the 63rd, waveform capture at 256 samples/cycle
- 5MB log/event memory (10MB optional), waveform logging up to 96 cycles, up to 800 channels historical, min/max, timestamp resolution to 0.001 seconds, GPS time synchronization and historical trends through front panel
- Communications: fiber, Ethernet, serial, internal modem, optical port, and a gateway functionality, ION, DNP 3.0, Modbus RTU - master & slave, Modbus TCP, MV-90, and IEC 61850. IEC 61850 only available with 5MB memory and Ethernet options
- Dial-out capability when memory is near full
- Data push capability through SMTP (email)
- Multi-user, multi-level security with control and customized access to sensitive data for up to 16 users
- 65 configurable 1/2 cycle setpoints for single, multi-condition and dial out on alarm and math, logic, trig, log, linearization formulas
- Password protection and anti-tamper seal protection enhance meter security
- Extensive standard I/O includes: 8 digital inputs, 4 digital outputs and 3 onboard relays

The ION7650 has all the features of the ION7550 and adds:

- Waveform capture up to 1024 samples/cycle
- Transient detection to 17µs at 60Hz
- Harmonics: magnitude, phase and inter-harmonics to the 40th
- Flicker to EN50160 and IEC 61000-4-7/4-15 (also configurable for IEEE 519-1992, IEEE159, SEMI), plus CBEMA/ITIC
- Symmetrical components
- Power quality measurements per IEC 61000-4-30 Class A, Ed. 2

Table 4.4: Typical PowerLogic ION7550/7650 Power and Energy Meter Ordering Configurations

Description	Catalog No.	$ Price
Typical PowerLogic ION7550 Power and Energy Meter Ordering Configurations		
Integrated display, with 256 samples/cycle, 5 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port) plus Ethernet, standard I/O	S7550A0C0B6E0A0A	**6318.00**
Integrated display, with 256 samples/cycle, 5 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port), standard I/O	S7550A0C0B6A0A0A	**5589.00**
Typical PowerLogic ION7650 Power and Energy Meter Ordering Configurations		
Integrated display, with 1024 samples/cycle, 10 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port) plus Ethernet, standard I/O, EN50160 compliance monitoring	S7650B1C0B6E0A0E	**9279.00**
Integrated display, with 512 samples/cycle, 5 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port) plus Ethernet, standard I/O	S7650A0C0B6E0A0A	**7869.00**
Integrated display, with 512 samples/cycle, 5 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port) plus Ethernet and 56k modem, standard I/O	S7650A0C0B6C1A0A	**8409.00**
Integrated display, with 512 samples/cycle, 5 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port), standard I/O	S7650A0C0B6A0A0A	**7140.00**
Integrated display, with 1024 samples/cycle, 10 MB logging memory, 5 A inputs, standard power supply, standard comms. (1 RS232/RS485 port, 1 RS485, 1 Type 2 optical port) plus Ethernet, standard I/O	S7650B1C0B6E0A0A	**9279.00**

Note: Please refer to powerlogic.com for the most complete and up-to-date list of feature availability. Some features are optional.

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Used in diverse applications such as feeder monitoring and sub-metering, the PowerLogic ION7300 series meters are also suitable for high-accuracy power and energy metering, bill verification, cost allocation and billing, demand and power factor control, load studies, circuit optimization, equipment monitoring and control and preventative maintenance. They are ideal replacements for analog meters, with a multitude of power and energy measurements, analog and digital I/O, communication ports and industry-standard protocols. The ION7330 meter adds on-board data storage, emails of logged data and an optional modem. The ION7350 meter is further augmented by more sophisticated power quality analysis, alarms and a call-back-on-alarm feature. They are compatible with PowerLogic ION EEM enterprise energy management software, PowerLogic ION Enterprise operations software or can be integrated with other energy management or building control systems through multiple communication channels and protocols.

PowerLogic ION7350, ION7330 and ION7300 Power and Energy Meter Features

The PowerLogic ION7300 includes:

- Multiple form factors: transducer integrated and remote display models
- True RMS 3-phase voltage, current, and power that meets stringent ANSI C12.16, Class 10
- Power quality: harmonics—individual, even, odd, total to the 15th, maximum 32 samples/cycle
- Communications: 1 RS-485 port, 1 optional Ethernet port, 1 ANSI Type 2 infrared optical port, 1 PROFIBUS DP port (ION7300 only), onboard web server
- Supported protocols include : ION, Modbus RTU slave on serial, modem, I/R ports, Modbus TCP through Ethernet
- Extensive standard I/O includes: 4 analog inputs, 4 analog outputs, 4 digital relay outputs
- Minimum/maximum recording

The ION7330 adds the following features:

- Time of use - multi-year scheduling, hourly activity profiles
- 4 digital inputs for status monitoring and pulse counting
- Communications: a second RS-485 port, internal modem, DNP 3.0 through serial, modem and I/R ports, EtherGate and ModemGate, data/alarms via e-mail and MV-90 on serial and Ethernet ports
- 12, one second setpoints for single, multi-condition alarms, plus math, logic, trig, log, and linearization formulas
- Non-volatile onboard memory capacity of 300kb, min/max logging, min/max logging, up to 32 channels of historical logs, timestamp resolution to 0.001 seconds

The ION7350 includes the following additional features:

- Power Quality: sag/swell, individual, even, odd, total harmonics up to 31st , maximum 64 samples/cycle
- Up to 96 channels of logs and up to 48 cycles of waveform logs
- Alarm notifications via e-mail

Table 4.5: Typical PowerLogic ION7350/7330/7300 Power and Energy Ordering Configurations

Description	Catalog No.	$ Price
Typical PowerLogic ION7350 Power and Energy Meter Ordering Configurations		
Integrated display with optical port, 5 A inputs, standard power supply, standard comms, (two RS-485 ports) plus 10BaseT Ethernet	S7350A0B0B0E0A0A	**3567.00**
Integrated display with optical port, 5 A inputs, standard power supply, standard comms, (two RS-485 ports)	S7350A0B0B0A0A0A	**2906.00**
Typical PowerLogic ION7330 Power and Energy Meter Ordering Configurations		
Integrated display with optical port, 5 A inputs, standard power supply, standard comms, (two RS-485 ports) plus 10BaseT Ethernet	S7330A0B0B0E0A0A	**2800.00**
Integrated display with optical port, 5 A inputs, standard power supply, standard comms, (two RS-485 ports)	S7330A0B0B0A0A0A	**2159.00**
Typical PowerLogic ION7300 Power and Energy Meter Ordering Configurations		
Integrated display with optical port, 5 A inputs, standard power supply, standard comms, (one RS-485 port)	S7300A0B0B0A0A0A	**1436.00**

The modular PowerLogic ION6200 is a low-cost, ultra-compact meter that offers outstanding versatility and functionality. It is simple to use, and has a big, bright LED display. It offers four-quadrant power, demand, energy, power factor and frequency measurements, and is available in a variety of flexible configurations. It is available as a low-cost base model to which enhanced functionality can be added over the long term. The PowerLogic ION6200 is ideal for customers who need revenue-accurate and/or certified measurements and want easy integration with power distribution assemblies and building automation systems. A Megawatt version is available for applications requiring readings in megawatts and kilovolts. It is well suited for sub-metering, energy cost tracking load profiling, and substation panel metering and is an ideal replacement for analog meters. It can be used for stand-alone metering in custom panels, switchboards, switchgear, gensets, motor control centers and UPS systems.

The meter consists of a base unit with options card and a power supply pack, with a remote display being optional.

PowerLogic ION6200 Power and Energy Meter Features

- Only two inches deep, and fits a standard ANSI four-inch switchboard cutout, or as a TRAN model with no display and can be fastened to a flat surface with a 4" (10cm) ANSI bolt pattern or mounted to a DIN rail. A remote display module (RMD) can be ordered for the TRAN and mounted through an ANSI 4" (10cm) and DIN 96 cutout.
- LED display with twelve 3/4" (19mm) high digits that display all basic power parameters
- Pulse Outputs: optional kWh, kVARh and/or kVAh pulsing
- Via two Form A outputs
- Communications: optional RS-485 port with Modbus RTU and ION compatible
- 64 samples per cycle true RMS
- 3-phase voltage and current inputs

The standard ION6200 is available with the following parameters:

Voltage L-N average and per phase, Voltage L-L average and per phase, Current average and per phase

Option EP#1, includes the standard measurements and provides the following additional parameters:

I4, kW/mW total, kWh/mWh total, kW/mW peak, Current demand average and per phase, Current peak demand average and per phase, Power factor total

Optional Enhanced Package, includes the standard measurements and provides the following additional parameters:

kW/mW per phase, kVAR/mVAR total and per phase, kVA/mVA total and per phase, kWh/mWh and del/rec per phase, kVARh/mVARh total and del/rec per phase, kVAh/mVAh total and per phase, kW/mW demand, kVAR/mVAR demand and peak, kVA/mVA demand and peak, Power Factor per phase, Voltage THD per phase, Current THD per phase

Table 4.6: Typical PowerLogic ION6200 Power and Energy Meter Ordering Configurations

Description	Catalog No.	$ Price
Integrated display, 10 A inputs, standard 100–240 Vac power supply, RS485 port (Modbus RTU), 2 pulse outputs, Enhanced Package #2	S6200A0A0B0A0B0R	**1021.00**
TRAN Model, with remote display, 10 A inputs, standard 100–240 Vac power supply, RS485 port (Modbus RTU), 2 pulse outputs, Enhanced Package #2	S6200R1A0B0A0B0R	**1055.00**
TRAN Model, (no display), 10 A inputs, standard 100–240 Vac power supply, RS485 port (Modbus RTU), 2 pulse outputs, Enhanced Package #2	S6200T1A0B0A0B0R	**831.00**

Note: Please refer to powerlogic.com for the most complete and up-to-date list of feature availability. Some features are optional.

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Table 4.7: PowerLogic ION Power and Energy Meter Selection

Features■	ION8650			ION7650	ION7550	ION7350	ION7330	ION7300	ION6200
	A	B	C						
Inputs, outputs and control power									
3-phase / single-phase	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/•
Digital in and out / analog in and out	8,8 / 3,4	8,8 / 3,4	8,8 / 3,4	16,4 / 4,4	16,4 / 4,4	4,4 / 4,4	4,4 / 4,4	4,4 / 4,4	0,2 /
Power supply options	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC
Power and energy measurements									
V, I, F, PF	•	•	•	•	•	•	•	•	
Power, demand	•	•	•	•	•	•	•	•	•
Energy / time-of-use (energy per shift)	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/	•/
ANSI energy accuracy class (% of reading)	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5
Measurement Canada Approval	•			•	•	•	•	•	•
Loss compensation	•	•	•	•	•				
Power quality analysis									
Compliance monitoring (e.g. EN50160)	•	•		•					
Flicker measurement	•	•		•					
Transient disturbance capture	•			•					
Sag and swell monitoring	•	•	•	•	•	•			
Disturbance direction detection				•	•				
Harmonics measurement	63 rd	63 rd	31st	63 rd	63 rd	31st	15th	15th	THD
Waveform capture	•			•	•	•			
Data and event logging									
Trend / snapshot	•/•	•/•	•/•	•/•	•/•	•	•		
Min/max	•	•	•	•	•	•	•		
Events	•	•	•	•	•	•	•		
Timestamp resolution (seconds)	0.001	0.001	0.001	0.001	0.001	0.001	0.001		
GPS sync	•	•	•	•	•				
Setpoints, alarms and control									
Annunciation / call out on alarm	•/•	•/•	•/•	•/•	•/•	•/•	•/		
Trigger logging	•	•	•	•	•	•	•		
Trigger relay or digital output control	•	•	•	•	•	•	•		
Special features									
Custom programming: arithmetic, boolean, object-oriented	•	•	•	•	•	•	•		
Downloadable firmware	•	•	•	•	•	•	•	•	•
Communications									
Ethernet port / web / email	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/•/	•/ /
Telephone modem port	•	•	•	•	•	•	•		
Infrared port	•	•	•	•	•	•	•	•	
RS485 / RS232 ports	•/•	•/•	•/•	•/•	•/•	•/	•/	•/	•/
Modbus / DNP / MV-90 protocols	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•	•/ /	•/ /
IEC 61850 protocol	•	•	•	•	•				

■ Specifications represent maximum capabilities with all options installed. Some options are not available concurrently. This is not a complete feature list, please refer to detailed product specifications.

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PowerLogic DM6200 Panel Meter and PowerLogic PM1200 Multifunction Power Meter

New!

DM6200 Panel Meter

The PowerLogic DM6200 digital panel meter and the PM1200 multifunction power meter provide all the basic features needed to monitor an electrical panel or circuit affordably. Rugged enough to withstand industrial and commercial environments, these meters will help save on energy and installation costs, are easy to use, and adapts to various circuit requirements onsite.

DM6200 Features

- Measures basic measurements (V, A, Hz & PF).
- Used for equipment monitoring, preventative maintenance scheduling, monitoring load locally, and replacing multiple analog meters.
- Onsite configuration of CT and PT ratios and various other set points.
- Configurable analog bar for at-a-glance check of lad on feeders.
- Standard modbus output fo remote monitoring and data logging.

PM1200 Features

- Measures basic measurements (V, A, Hz & PF) PLUS energy, power, demand, and THD.
- Used for energy and power monitoring, demand monitoring, load studies and circuit optimization, energy balancing and optimization, etc.

New!

PM1200 Multifunction Power Meter

Table 4.8:

Description	Catalog No.	$ Price
Basic V, A, F, PF meter w/display, Modbus RS 485 comm port	METSEDM6200	**400.00**
Power Meter w/display basic readings, THD, demand, Modbus RS 485 comm port	METSEPM1200	**550.00**

PowerLogic Series 700 Power Meter

Series 700 Power Meter

The PowerLogic PM700 series power meters offer all of the measurement capabilities required to monitor an electrical installation in a single 96 x 96 mm unit extending only 50 mm behind the mounting surface (less than 2 inches).

With its large display, you can monitor all three phases and neutral at the same time. The anti-glare display features large 11 mm high characters and powerful backlighting for easy reading, even in extreme lighting conditions and viewing angles.

- Panel instrumentation (OEMs)
- Sub-billing and cost allocation
- Remote monitoring of an electrical installation
- Harmonic monitoring (THD)

Power and current demand, THD and min/max reading in basic version

A high-performance solution for trouble-free monitoring of your electrical installation.

Energy IEC 62053-22 Class 0.5S (PM750 Only) and IEC62053-21 Class 1 (PM710)

Suitable for sub-billing and cost-allocation applications.

Alarms and Digital I/O

The PM750 adds alarming functionality (no RTC) and two digital inputs and one output.

Table 4.9:

Description	Catalog No.	$ Price
Series 700 Power Meters		
PM710 Class 1 (IEC62053-21) Power Meter with integrated display and RS-485 communications port	PM710	**710.00**
PM750 Class 0.5S (IEC 62053-22) Power Meter with integraded display, alarms (no RTC), (2) digital inputs, (1) digital output and RS-485 communications port	PM750	**950.00**

PowerLogic Series 800 Power Meters

Series 800 Power Meter

The PowerLogic PM800 series Power Meter is a high-performance power-monitoring unit able to provide advanced power measurement capabilities in a compact 96x96 mm unit. Its large, easy to read display allows you to monitor all three phases and neutral simultaneously. With its easy to use intuitive interface and self guiding menus, the large anti-glare and back lit display makes this meter the easiest yet to navigate and use. The modular design allows for flexibility with an easy upgrade path to grow the meter's capabilities with the addition of Communication and I/O Modules.

- Monitor current, voltage, power and energy simultaneously
- Trending/Forecasting Curves functionality (PM850/870)
- 128 samples/cycle-zero blind metering
- Waveform capture (PM850), configurable waveform capture (PM870)
- Onboard logging (80k in PM820, 800k in PM850/PM870)
- Detection of sub-cycle sags/swells on both voltage and current (PM870 Only)
- V & I individual harmonics up to 31st (PM820) or up to the 63rd for the PM850 and PM870.
- Five input metering channels WAGES
- PQ Advanced Evaluation (EN50160, ITI/CBEMA, SEMI F-47) for the PM850 and PM870
- Type 12 Remote Display Compliant
- Complies with ANSI C37.90 for Surge Withstand Capability (SWC) and IEC 61000-4-12 for Surge Immunity
- Available with 2 standard Digital I/O
- Field installable Digital and Analog I/O
- THD measurement
- Meets ANSI 12.20 Class 0.2 and IEC 62053-22 Class 0.5S accuracy for active energy.
- Optional field installable Ethernet communications card with standard and custom web pages
- GPS Time Synchronization

Table 4.10:

Description	Catalog No.	$ Price
Series 800 Power Meters		
PM820 Power Meter with integrated display, THD, Alarming, 80 kb Logging	PM820	**2390.00**
PM850 Power Meter with integrated display, THD, Alarming, 800 kb Logging, Waveform Capture	PM850	**3889.00**
PM870 Power Meter with integrated display, THD, Alarming, 800 kb Logging, configurable Waveform Capture, Sag/Swell Detection	PM870	**4799.00**
PM820RD Power Meter with remote display, THD, Alarming, 80 kb Logging	PM820RD	**2550.00**
PM850RD Power Meter with remote display, THD, Alarming, 800 kb Logging, Waveform Capture	PM850RD	**4058.00**
PM870RD Power Meter with remote display, THD, Alarming, 800 kb Logging, configurable Wafeform Capture, Sag/Swell Detection	PM870RD	**4958.00**
PM820 Meter unit only without display	PM820U	**2050.00**
PM850 Meter unit only without display	PM850U	**3529.00**
PM870 Meter unit only without display	PM870U	**4460.00**
Series 800 Power Meter Accessories		
PM800 Display for integrated meter unit	PM8D	**443.00**
PM800 remote display and adapter with 12' cable	PM8RD	**584.00**
PM800 remote display adapter only	PM8RDA	**428.00**
PM800 Module, 2 digital outputs (relays), 6 digital inputs	PM8M26	**635.00**
PM800 Module, 2 digital out, 2 digital in, 2 analog out, 2 analog in	PM8M2222	**856.00**
PM800 Mounting adapter for CM2000	PM8MA	**267.00**
PM8ECC Ethernet Communications Card; provides a 10/100 Base Tx UTP port, an RS-485 Modbus serial master port, Ethernet-to-serial line gateway functionality, and an embedded web server that is fully compliant with Transparent Ready—Level 1 (TRe1) systems. The PM8ECC supports a private host PM8ECC MIB. Use of this MIB allows the reading of Basic Metering Data, Configuration and Status of I/Os and Configuration and Status of Alarms, plus SNMP Trap generation in response to any PM8 on-board alarms.	PM8ECC	**1150.00**

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PowerLogic Series 4000 Circuit Monitor

CM4000T with VFD Display

The award winning, Web-enabled PowerLogic Series 4000 Circuit Monitor (CM4250) is the most advanced permanently mounted circuit monitor in the industry today. Designed for critical power and large energy users who cannot afford to be shut down, the CM4250 provides the ability to monitor, troubleshoot and preempt power quality problems. Transients (disturbances lasting less than one cycle) are particularly difficult to detect, due to their short duration. The CM4000T detects and captures oscillatory and impulsive transients (up to 10,000V peak, line-to-line at 5 MHz per channel) as short as one microsecond in duration. The CM4000T automatically performs a high-speed transient waveform capture and a longer disturbance capture to show the conditions surrounding an event. The CM4000T maintains a complete historical record of the number of transients per phase, along with the magnitude, duration and time of occurrence of each. It also performs a stress calculation to determine the circuits that have received the greatest stress from transient overvoltages.

- Waveform capture with up to 512 samples/cycle
- Built-in Trending and Forecasting functionality allows you to forecast energy usage up to 4 days in advance
- Sag/Swell disturbance monitoring
- Two option card slots for field installable cards
- Optional field installable Ethernet communications card with standard and custom web pages
- Alarm Setpoint Learning feature allowing optimum threshold setting (patent pending)
- Multiple alarms including standard, digital, Boolean, high-speed, and disturbance alarms
- Waveshape alarm monitoring
- High speed transient voltage detection at 5 MHz per channel with field installable CVMT current/voltage module
- True RMS Metering through the 255th harmonic
- Extended waveform capture (up to 110 seconds)
- Field installable Digital/Analog I/O cards and flexible I/O extender modules
- Harmonic powerflows up to the 40th harmonic
- Standard KYZ pulse output
- Standard 32 MB of non-volatile memory
- Integrated power quality standards including EN50160, IEC 61000-4-15 (Flicker)
- Sequence of events recording using GPS synchronization technology
- Oscillatory transient detection and recording
- UL Listed, CSA Approved, CE Marking, NOM Approved, FCC compliant

PowerLogic Series 4000 Circuit Monitor Optional Displays

ECC21

IOC44 I/O Card

- High visibility remote VF (vacuum fluorescence) display
- Displays metering data, min/max values, alarms, inputs
- Remote LC (liquid crystal) display with backlighting also available
- Optional user configurable display screens

Table 4.11: Series 4000 Circuit Monitors

Description	Catalog No.	$ Price
Series 4000 Circuit Monitors		
Instrumentation, On-board Data Logging, Waveform Capture, Disturbance Recording, Configurable I/O, 0.04% Accuracy	CM4250	**6386.00**
Same as CM4250 plus Impulsive Transient Detection and Flicker (IEC 61000-4-15)	CM4000T	**8474.00**
Series 4000 Circuit Monitor Accessories		
Field installable I/O card with 3 relay outputs, 1 pulse output (KYZ) and 4 status inputs	IOC44	**796.00**
I/O Extender module with 4 DC status inputs, 2 DC digital outputs, 1 analog input and 1 analog output	IOX2411	**1253.00**
I/O Extender module with 4 status inputs and 4 analog inputs (4–20 mA)	IOX0404	**1650.00**
I/O Extender module with 8 status inputs	IOX08	**703.00**
I/O Extender module with no pre-installed I/O ▲	IOX	**459.00**
Ethernet Communications Card; 100 MB Fiber or 10/100 MB UTP Ethernet port and 1 RS-485 master port	ECC21	**1948.00**
Current/Voltage module	CVM42	**2251.00**
Current/Voltage module with high speed transient detection■	CVMT	**5393.00**
4-line x 20—character liquid crystal display with backlighting	CMDLC	**688.00**
4-line x 20—character vacuum fluorescent display with proximity sensor	CMDVF	**1207.00**
4 foot display cable	CAB4	**53.00**
12 foot display cable	CAB12	**89.00**
30 foot display cable	CAB30	**161.00**

▲ Contact your nearest Square D/Schneider Electric sales office for additional I/O options.
■ CM4250 is field upgradeable to provide additional features of specified module.

Table 4.12: SER Time Synchronization

Description	Catalog No.	$ Price
PowerLogic Satellite Time System, Circuit Monitor and SEPAM GPS Time Synchronization, 100 microsecond accuracy	STS3000	**5348.00**
Satellite Time Reference Module	STRM	**2827.00**
CyTime Sequence of Events Recorder, 24 Vdc power / 24 Vdc inputs, 32 inputs, web server	9788SER3200	**2700.00**
SER 3200 EZ connector for IRIG-B signal	9788EZCIRIGB	**115.00**
Smart Antenna Module	SAM	**2292.00**
Smart Antenna Module Interface Cable—200 FT	SAIF200	**611.00**
Power Supply, 24DC/50W, DIN-mountable	PS080	**558.00**

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Table 4.13: PowerLogic Circuit Monitor and Power Meter Selection

Features	CM4000T	CM4250	PM870	PM850	PM820	PM750	PM710	PM1200	DM6200
Inputs, outputs and control power									
3-phase / single-phase	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/•
Digital in and out / analog in and out	24 / 4	24 / 4	18 / 8	18 / 8	18 / 8	3/			
Power supply options	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC
Power and energy measurements									
V, I, F, PF	•	•	•	•	•	•	•	•	•
Power, demand	•	•	•	•	•	•	•	•	
Energy / energy per shift (time-of-use)	•/•	•/•	•/•	•/•	•/•	•/	•/	•/	
Energy accuracy (%)	0.2	0.2	0.2	0.2	0.2	0.5	1.0	1.0	
Standards compliance to ANSI / IEC	•/•	•/•	•/•	•/•	•/•	•/•	•/•	•/	
Power quality analysis									
Compliance monitoring (e.g. EN50160)	•	•	•	•					
Flicker measurement	•								
High-speed transient disturbance capture (200 ns)	•								
Transient disturbance capture	•	•	sag/swell						
Disturbance direction detection	•	•							
Sag/swell monitoring	•	•	•						
Harmonics measurement	•	•	•	•	•	THD	THD	•	
Uptime (number of 9's) calculation	•	•							
Waveform capture	•	•	•	•					
Waveshape alarm	•	•							
Data and event logging									
Trend / billing	•/	•/	•/•	•/•	/•				
Minimum and maximum	•	•	•	•	•	•	•		
Events / maintenance	•/•	•/•	•/	•/	•/	•/	•/		
Timestamp resolution (seconds)	0.001	0.001	1	1	1				
GPS sync	•	•	•	•	•				
Setpoints, alarms and control									
Annunciation / call out on alarm	•/•	•/•	•/	•/	•/	•/			
Trigger logging	•	•	•	•	•				
Trigger relay or digital ouput control	•	•	•	•	•				
Special features									
Custom programming: arithmetic, boolean	•	•							
Downloadable firmware	•	•	•	•	•	•	•		
Communications									
Ethernet port / web / email	•/•/•	•/•/•	•/•/•	•/•/•	•/•/•				
RS485 / RS232 ports	•/•	•/•	•/•	•/•	•/•	•/	•/	•	•
Modbus protocol	•	•	•	•	•	•	•	•	•

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PowerLogic Submetering

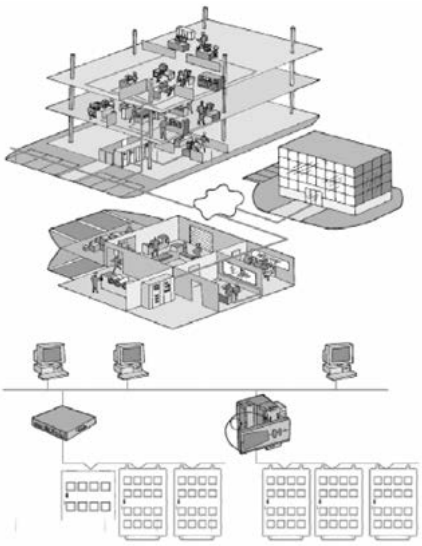
In today's increasingly competitive commercial property market, attracting and retaining high-quality, long-term tenants by offering exceptional value is the primary goal. Balancing these premium services and reliable infrastructure vs. the financial exposure to volatile utility costs is the challenge.

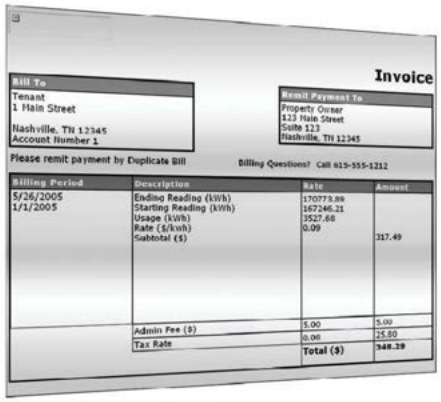
Minimizing energy costs requires information on how energy usage translates into money spent. PowerLogic energy sub-metering systems are specifically engineered to address the measurement, verification and billing needs of multi-tenant properties.

- Residential high-rise and low-rise
- Campuses
- Shopping centers
- Malls / food courts
- Offices
- Commercial buildings

PowerLogic energy management and metering systems are ideal for multi-tenant buildings providing:

- Metering & Verification tools to assure compliance to Energy Policy Act 2005
- Integrated approach from simple energy allocation requirements to high-end power quality
- Monitor energy usage and efficiency to accurately recover the costs while providing tenants with energy and a reliable infrastructure
- Implement energy efficiency initiatives essential to obtaining LEED certification





PowerLogic E5600 Socket Meter

PowerLogic E5600 Socket Meter

The E5600 is a cost effective socket meter that combines high accuracy, superior quality and wide-ranging capability in a device that is simple to install. The PowerLogic E5600 socket meter can help reduce electrical costs, increase property values and attract good tenants by providing the information needed to manage energy costs. Track and allocate costs by circuit or suite, accurately bill tenants for energy used, and verify energy conservation efforts. It is a foundational component for LEED and Energy Star certification as a part of green buildings. Green buildings enjoy higher tenant retention, higher tenant quality, and recognition by the community while typically allowing property managers to charge more for rent.

Unlike traditional sub-metering solutions, which must be manually read or may lack software for effective sub-billing or comprehensive energy management, the PowerLogic E5600 enables businesses to utilize their existing S-based socket infrastructure with a low-cost meter that is part of an end-to-end solution for tenant sub-metering.

- Real, reactive, and apparent energy values.
- Onboard interval data logging (load profiles).
- Revenue grade accuracy – ANSI C12.20 0.2% / 0.5%.
- Automatic configuration of service type and voltage.
- Onboard diagnostics continually monitors for equipment failures, improper installation wiring, poor load conditions, poor power quality conditions and tampering.
- S-base meter socket compatible.

Table 4.14:

Description	Catalog No.	$ Price
Form 2S, Single-Phase, Class 200, S Based Meter	E5600020SQD	**960.00**
Form 9S, 3-Phase, Class 20, S Based Meter	E5600090SQD	**1080.00**
Form 12S, 3-Phase, Class 200, S Based Meter	E5600120SQD	**1080.00**
Form 16S, 3-Phase, Class 200, S Based Meter	E5600160SQD	**1080.00**
Form 36S, 3-Phase, Class 20, S Based Meter	E5600360SQD	**1080.00**
Form 45S, 3-Phase, Class 20, S Based Meter	E5600450SQD	**1080.00**
Optional USB Optical Communications Probe	OPTICALPROBEUSB	**719.00**

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PowerLogic High Density Metering

High Density Metering (HDM) is engineered to answer the metering and billing needs of multi-tenant properties:

High Density Metering factory assembled enclosure for multi-tenant properties

Features and Benefits

- HDM comes standard with the PowerLogic PM210, PM750, PM820 or ION6200 meters.
- Lockable, 16 gauge NEMA Type 1 enclosure provides tamper-resistant security.
- NEMA Type 3R also availalbe. Please consult factory.
- Mounting channel and surface-mount flanges simplify installation.
- Factory installed cover plates are included to cover empty meter spaces.
- Factory installed wiring harness simplifies installation of additional meters and provides future system expansion.
- Each High Density Metering cabinet is provided with standard RS485 Modbus®, and optional Modbus Ethernet TCP communications are availalbe. For wireless communications, please consult factory.
- Available in the following configurations: 208 Y/120 V wye; 240 V delta, 48 = 480 Y/277 V wye (PM210, PM750, and PM820), and with provided 2.5:1 CPT (control power transformer) 480 Y/277 V wye (6200); 480 V delta (6200, PM210, PM750 or PM820).
- CTs required. Must select separately.

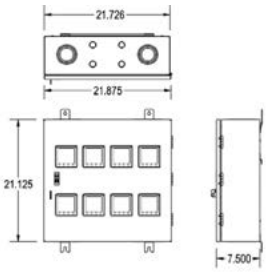
Table 4.15: High Density Metering Cabinet

Category	Meter Series	Voltage	Phasing	Enclosure Size	# Meters	Enclosure Rating	Description
HDM	ION6200	12, 4T▲	3	1 or 4	1-4■	R♦ or 1	1 or 4 High Density Meter Enclosure with ION6200 meters; ideal for outdoor as well as indoor applications at all voltage levels including 600V delta and 347/600 V wye systems
HDM	PM210	12, 48, 4T▲	1 or 3	1, 4, 8, or 16	1-16■	1	8 or 16 High Density Meter Enclosure with PM210 meters; ideal for single or three phase indoor commercial building applications
HDM	PM750	12, 48, 4T▲	3	1, 4, 8 or 16	1-16■	1	8 or 16 High Density Meter Enclosure with PM750 meters; ideal for 3 phase indoor commercial building applications
HDM	PM820	12, 48, 4T▲	3	1, 4, 8 or 16	1-16■	1	8 or 16 High Density Meter Enclosure with PM750 meters; ideal for 3 phase indoor commercial building applications

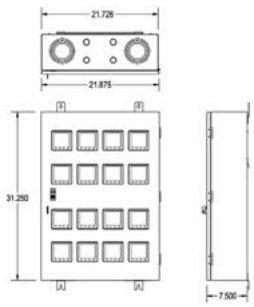
▲ Voltage Ordering Notes:
12 = 208 Y/120 V wye; 240 V delta. 48 = 480 Y/277 wye; (PM210/PM750)
4T = with provided 2.5:1 CPT (control power transformer); 480 Y/277 wye (6200); 480 V delta (6200, PM210 or PM750)

■ Meters Ordering Notes: Please indicate the number of meters to be pre-installed when placing your order. You may order any number of meters in the enclosure between one and the maximum number of meters each cabinet will hold.

♦ Please enter R as the last digit for Type 3R outdoor on 1 or 4 HDM enclosure with the 6200 series meter.



8 meter configuration



16 meter configuration

High Density Meter System includes:

- Enclosure
- Power Meters, installed
- Installation bulletin for Enclosure
- Wall hanging bracket
- Installation bulletin for Meters

Table 4.16: Accessories and Options

Description	Catalog No.	$ Price
Auxiliary Wiring Harness for installation of additional meters (includes connectors and shorting terminal blocks)	HDMPMHKIT27	221.00
Cover plate for empty meter base	HDMCVRPLT	5.90
Water and Gas Meters	Consult factory for details	
50 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT050S1	51.00
100 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT100S1	51.00
125 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT125S1	73.00
150 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT150S1	62.00
200 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT200S1	62.00
250 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT250S1	62.00
400 Amp HDM Solid Core Current Transformer, 1.13" window size	HDMCT400S1	62.00
Power Meter with display, basic readings, Modbus RS485 communications port▲	PM210	550.00

▲ To order all other loose meters, please visit metering sections within digest related to particular meter.

Multi Circuit Energy Meters

The PowerLogic EM4800 multi-circuit energy meter combines accurate electricity sub-metering with advanced communications technology. They are ideal for multi-tenant or departmental metering applications within office towers, condominiums, apartment buildings, shopping centers and other multi-point environments, metering up to 24 individual circuits from the same meter. The EM4800 series has an accuracy of Class 0.5% for power and energy. Each meter is available separately or as part of a Scquare D integrated power center (IPC) for use in building retrofits or new construction.

Table 4.17:

Description	Catalog No.	$ Price
Energy measurement for 24 (1CT) or 12 (2CT) single-phase circuits or 8 (3CT) 3-phase circuits; Ethernet; modem; onboard interval logging; compatible with 80mA low-power CTs (solid-core)	METSQEM488016	3980.00
Energy measurement for 24 (1CT) or 12 (2CT) single-phase circuits or 8 (3CT) 3-phase circuits; Ethernet; modem; onboard interval logging; compatible with 333mV low-power CTs (solid-core or split-core)	METSQEM483316	3980.00
Energy measurement for 24 (1CT) or 12 (2CT) single-phase circuits or 8 (3CT) 3-phase circuits; Ethernet; modem; onboard interval logging; compatible with standard 5A CTs (solid-core or split-core)	METSQEM480516	5350.00
200 A current transformer (CT), 80 mA secondary, solid-core (1 CT)	METSECT802000	38.00
50 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075050SC	90.00
100 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075100SC	90.00
150 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075150SC	90.00
200 A .333 V Split Core Current Transformer with 0.75 in Window Size	ECT075200SC	90.00
100 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125100SC	141.00
150 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125150SC	141.00
200 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125200SC	141.00
400 A .333 V Split Core Current Transformer with 1.25 in Window Size	ECT125400SC	141.00
200 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200200SC	171.00
400 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200400SC	171.00
600 A .333 V Split Core Current Transformer with 2.00 in Window Size	ECT200600SC	171.00
600 A .333 V Split Core Current Transformer with 3 x 5 in Window Size	ECT300600SC	241.00
800 A .333 V Split Core Current Transformer with 3 x 5 in Window Size	ECT300800SC	241.00

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Energy Meter

PowerLogic Energy Meter

The Energy Meter is ideal for stand-alone and systems-based submetering applications. It is easy to install and provides exceptional metering accuracy. Available in Basic and Extended Range models. The Basic model is designed for metering of 120/240 and 208Y/120 volt services. The Extended Range model will meter 120/240 volt up to 480 volt Wye connected services. Extended Range meters come with pulse output and phase loss output not available on the Basic unit. Optional Modbus™ RS-485 serial communications are provided with the Energy Meter Comms Board, EMCB. Optional kW demand is also provided by the EMCB.

Meter up to 3 individual services with one Energy Meter. The Energy Meter will allow the addition of up to 3 sets of parallel CTs for metering multiple electric loads. Additional sets of CTs can be ordered separately. Please refer to the multiple CT application notes in the Energy Meter instruction bulletin for the proper installation procedures.

Energy Meter

Table 4.18: Basic 120/240 V to 208Y/120 V

Catalog No.	Description	$ Price
EMB1010	Basic 100 A, .518"x1.28" ID, 1 CT	426.00
EMB1021	Basic 200 A, 0.75" x 1.10" ID, 1 CT	440.00
EMB1032	Basic 300 A, .90"x1.90" ID, 1 CT	482.00
EMB2010	Basic 100 A, .518"x1.28" ID, 2 CTs	438.00
EMB2021	Basic 200 A, 0.75" x 1.10" ID, 2 CTs	464.00
EMB2032	Basic 300 A, .90"x1.90" ID, 2 CTs	480.00
EMB2043	Basic 400 A, 2.45"x2.89" ID, 2 CTs	505.00
EMB2083	Basic 800 A, 2.45"x2.89" ID, 2 CTs	517.00
EMB3010	Basic 100 A, .518"x1.28" ID, 3 CTs	750.00
EMB3021	Basic 200 A, 0.75" x 1.10" ID, 3 CTs	766.00
EMB3032	Basic 300 A, .90"x1.90" ID, 3 CTs	799.00
EMB3043	Basic 400 A, 2.45"x2.89" ID, 3 CTs	825.00
EMB3083	Basic 800 A, 2.45"x2.89" ID, 3 CTs	855.00
EMB3084	Basic 800 A, 2.45"x5.50" ID, 3 CTs	903.00
EMB3164	Basic 1600 A, 2.45"x5.50" ID, 3 CTs	903.00

Table 4.19: Additional CT Sets

Catalog No.	Description	$ Price
EMCT010	100 A, .518" x 1.28" ID, 1 CT	92.00
EMCT021	200 A, 0.75" x 1.10" ID, 1 CT	99.00
EMCT032	300 A, .90" x 1.90" ID, 1 CT	106.00
EMCT043	400 A, 2.45" x 2.89" ID, 1 CT	106.00
EMCT083	800 A, 2.45" x 2.89" ID, 1 CT	123.00
EMCT084	800 A, 2.45" x 5.50" ID, 1 CT	130.00
EMCT164	1600 A, 2.45" x 5.50" ID, 1 CT	130.00

Note: CT quantity and amperage must match meter model. Total of combined loads must not exceed rating of meter. All additional CTs shipped with 6 ft. white and black color-coded wire leads.

Table 4.20: Extended Range 120/240 V to 480Y/277 V

Catalog No.	Description	$ Price
EME1010	Extended Range 100 A, .518"x1.28" ID, 1 CT	471.00
EME1021	Extended Range 200 A, 0.75" x 1.10" ID, 1 CT	483.00
EME1032	Extended Range 300 A, .90"x1.90" ID, 1 CT	518.00
EME2010	Extended Range 100 A, n.518"x1.28" ID, 2 CTs	511.00
EME2021	Extended Range 200 A, 0.75" x 1.10" ID, 2 CTs	536.00
EME2032	Extended Range 300 A, .90"x1.90" ID, 2 CTs	550.00
EME2043	Extended Range 400 A, 2.45"x2.89" ID, 2 CTs	567.00
EME2083	Extended Range 800 A, 2.45"x2.89" ID, 2 CTs	585.00
EME3010	Extended Range 100 A, .518"x1.28" ID, 3 CTs	811.00
EME3021	Extended Range 200 A, 0.75" x 1.10" ID, 3 CTs	829.00
EME3032	Extended Range 300 A, .90"x1.90" ID, 3 CTs	864.00
EME3043	Extended Range 400 A, 2.45"x2.89" ID, 3 CTs	880.00
EME3083	Extended Range 800 A, 2.45"x2.89" ID, 3 CTs	921.00
EME3084	Extended Range 800 A, 2.45"x5.50" ID, 3 CTs	971.00
EME3164	Extended Range 1600 A, 2.45"x5.50" ID, 3 CTs	971.00

Table 4.21: Energy Meter Accessories

Catalog No.	Description	$ Price
EMCB	Energy Meter Communication Board▲	267.00
EMFP1	Energy Meter Fuse Pack, Set of 1	47.00
EMFP2	Energy Meter Fuse Pack, Set of 2	94.00
EMFP3	Energy Meter Fuse Pack, Set of 3	142.00
EMBOND	Energy Meter Bonding Kit	117.00

▲ Energy Meter communication board (EMCB) can be used with all models of the Energy Meter. Order one EMCB for each Energy Meter where either kW demand and/or communication is specified.

PowerLogic Enercept™ Meter

Enercept Meter

The Enercept Meter is the ideal solution for submetering electric loads where space is at a premium. The compact design consists of three interconnected split-core CTs with the metering and communication electronics built into the CT housing. Simply snap on the CTs, connect the voltage inputs, the communication lines, and installation is complete. Both versions can be connected to either three-phase or single-phase circuits.

Enercept meters employ the Modbus™ RTU 2-wire communication protocol, and can utilize the same communication network and PowerLogic System Manager™ software as other PowerLogic devices. Data from the Enercept meters can be presented in tabular or graphical format, used for alarming and historical logging and trending, and to produce reports.

Optional Submeter display (SMD) acts as a stand-alone operator interface supporting up to 32 meters (63 with a repeater). In addition, the Submeter display (SMD) can act as a network adapter allowing Enercept meters to be incorporated into a network.

Table 4.22: Enercept Meter

Catalog No.	Description	$ Price
3020B012■	Basic 100 A, 1.25" x 1.51" ID	776.00
3020B032■	Basic 300 A, 1.25" x 1.51" ID	800.00
3020B043■	Basic 400 A, 2.45" x 2.89" ID	823.00
3020B083■	Basic 800 A, 2.45" x 2.89" ID	847.00
3020B084■	Basic 800 A, 2.45" x 5.50" ID	869.00
3020B164■	Basic 1600 A, 2.45" x 5.50" ID	893.00
3020B244■	Basic 2400 A, 2.45" x 5.50" ID	916.00
3020E012	Enhanced 100 A, 1.25" x 1.51" ID	1035.00
3020E032	Enhanced 300 A, 1.25" x 1.51" ID	1066.00
3020E043	Enhanced 400 A, 2.45" x 2.89" ID	1097.00
3020E083	Enhanced 800 A, 2.45" x 2.89" ID	1128.00
3020E084	Enhanced 800 A, 2.45" x 5.50" ID	1159.00
3020E164	Enhanced 1600 A, 2.45" x 5.50" ID	1190.00
3020E244	Enhanced 2400 A, 2.45" x 5.50" ID	1221.00

■ See Handout / Instruction Bulletin for derating properties.

Table 4.23: Accessories

Catalog No.	Description	$ Price
SMD	Submeter display mounted in enclosure	725.00
SMD OPN	Open style submeter display, no enclosure	595.00
2W485C	2-Wire 232–485 Conv	78.00
EMBK-3	Enercept Mounting Brackets (Set of 3)	75.00
PS24	24 Vdc Power Supply (for use with EDI or ENA)	157.00

Table 4.24: Enercept Metering Quantities

Basic■	Enhanced•
kWh, energy usage kW, real power	kWh, kW per phase and total, min kW, max kW, kWd, kVAR, kVA, PF per phase and total voltage- V, L-L, L-N per phase and avg. Current - A, per phase and average

PowerLogic Split Core Current Transformers-Instrument Grade 5 Amp Split-Core Current Transformers

SA Split-Core Current Transformers

The 3090 SCCT series of split-core current transformers provide secondary amperage proportional to the primary (sensed) current. For use with Circuit Monitors, Power Meters, data loggers, chart recorders and other instruments the 3090 SCCT series provides a cost-effective means to transform electrical service amperages to a 0–5A level compatible with monitoring equipment.

Table 4.25:

Catalog No.	Description	$ Price
3090SCCT022	Split Core CT—200 A (sz.2): 1.25" x 1.51	120.00
3090SCCT032	Split Core CT—300 A (sz.2): 1.25" x 1.51	120.00
3090SCCT043	Split Core CT—400 A (sz.3): 2.45" x 2.89	129.00
3090SCCT063	Split Core CT—600 A (sz.3): 2.45" x 2.89	129.00
3090SCCT083	Split Core CT—800 A (sz.3): 2.45" x 2.89	129.00
3090SCCT084	Split Core CT—800 A (sz.4): 2.45" x 5.05	137.00
3090SCCT124	Split Core CT—1200 A (sz.4): 2.45" x 5.50	160.00
3090SCCT164	Split Core CT—1600 A (sz.4): 2.45" x 5.50	165.00

Note: Max. Voltage without additional insulation 600 Vac. Do not apply 600 V Class current transformers to circuits having a phase-to-phase voltage greater than 600 V, unless adequate additional insulation is applied between the primary conductor and the current transformers. Square D assumes no responsibility for damage of equipment or personal injury caused by transformers operated on circuits above their published ratings.

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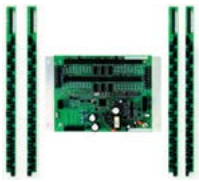

BCPM Solid Core CT Power Meter

PowerLogic Branch Circuit Power Meter

The Branch Circuit Power Meter (BCPM) is ideal for data center customers who are focused on eliminating costly downtime, managing existing capacity efficiently, and reducing energy cost. The BCPM helps data center managers by providing alarms that signify potential issues within the power system and supplying power and energy data down to the circuit level. This data can indicate areas wither over-used or under-used within the facility. It can also be used to effectively control energy cost.

The BCPM can monitor up to 84 circuits and fits any Power Distribution Unit (PDU) or Remote Power Panel (RPP) with minimal space requirements. It has a wide monitoring range allowing customers to monitor circuit current from 0.25 A to 100 A with high accuracy (3% for current 0.25 A to 2 A and 2% for current 2 A to 100 A. It can also measure power and energy readings at the circuit level as well as the incoming main. This eliminates the need for two different meters. The BCPM also has a flexible numbering scheme which allows customers to match that of the PDU or RPP and field configuration adds ease to either a new or a retrofit installation.

Key features:

- Full PDU monitoring
- Flexible configuration
- Split core version for retrofit installations
- Wide monitoring range
- Low current monitoring
- Advanced alarming
- Cost effective communications
- Easily integrates into a PowerLogic system or other existing networks using Modbus™ communications

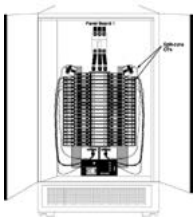
BCPM Split Core CT Power Meter

Table 4.26:

Catalog No.	Description	$ Price
BCPMA042D	Solid Core CT, 42 circuit power and energy meter. Includes 2 CT strips, 21 CTs per strip, 3/4" CT spacing.	3569.00
BCPMB042D	Solid Core CT, 42 circuit meter, measures power and energy on the mains, current per circuit. Includes 2 CT strips, 21 CTs per strip, 3/4" CT spacing.	2901.00
BCPMC042D	Solid Core CT, 42 circuit current meter. Includes 2 CT strips, 21 CTs per strip, 3/4" CT spacing.	2331.00
BCPMA142D	Solid Core CT, 42 circuit power and energy meter. Includes 2 CT strips, 21 CTs per strip, 1" CT spacing.	3569.00
BCPMB142D	Solid Core CT, 42 circuit meter, measures power and energy on the mains, current per circuit. Includes 2 CT strips, 21 CTs per strip, 1" CT spacing.	2901.00
BCPMC142D	Solid Core CT, 42 circuit current meter. Includes 2 CT strips, 21 CTs per strip, 1" CT spacing.	2331.00
BCPMA084D	Solid Core CT, 84 circuit power and energy meter. Includes 4 CT strips, 21 CTs per strip, 3/4" CT spacing.	5748.00
BCPMB084D	Solid Core CT, 84 circuit meter, measures power and energy on the mains, current per circuit. Includes 4 CT strips, 21 CTs per strip, 3/4" CT spacing.	4627.00
BCPMC084D	Solid Core CT, 84 circuit current meter. Includes 4 CT strips, 21 CTs per strip, 3/4" CT spacing.	3495.00
BCPMA184D	Solid Core CT, 84 circuit power and energy meter. Includes 4 CT strips, 21 CTs per strip, 1" CT spacing.	5748.00
BCPMB184D	Solid Core CT, 84 circuit meter, measures power and energy on the mains, current per circuit. Includes 4 CT strips, 21 CTs per strip, 1" CT spacing.	4627.00
BCPMC184D	Solid Core CT, 84 circuit current meter. Includes 4 CT strips, 21 CTs per strip, 1" CT spacing.	3495.00

Table 4.27:

Catalog No.	Description	$ Price
BCPMSCA42D	Split Core BCPM, Advanced Feature Set, 2 adapter boards, 42 50 A CTs, 2 mounting kits	4418.00
BCPMSCA84D	Split Core BCPM, Advanced Feature Set, 4 adapter boards, 42 50 A CTs, 4 mounting kits	6694.00
BCPMSCB42D	Split Core BCPM, Intermediate Feature Set, 2 adapter boards, 42 50 A CTs, 2 mounting kits	3592.00
BCPMSCB84D	Split Core BCPM, Intermediate Feature Set, 4 adapter boards, 84 50 A CTs, 4 mounting kits	5867.00
BCPMSCC42D	Split Core BCPM, Basic Feature Set, 2 adapter boards, 42 50 A CTs, 2 mounting kits	2887.00
BCPMSCC84D	Split Core BCPM, Basic Feature Set, 4 adapter boards, 84 50 A CTs, 4 mounting kits	5163.00
BCPMSCADPBDD	Adapter board for use with Split Core BCPM	897.00
BCPMSCCT0	Qty 6 x 50 A Split Core CTs for use with Split Core BCPM, 6 ft leads	197.00
BCPMSCCT0R20	Qty 6 x 50 A Split Core CTs for use wtih Split Core BCPM, 20 ft leads	240.00
BCPMSCCT2	Qty 6 x 100 A Split Core CTs for use with Split Core BCPM, 4 ft leads	431.00
BCPMSCA1D	Split Core BCPM meter, Advanced Feature Set plus 2 adapter boards	3260.00
BCPMSCA2D	Split Core BCPM meter, Advanced Feature Set plus 4 adapter boards	4270.00
BCPMSCB1D	Split Core BCPM meter, Intermediate Feature Set plus 2 adapter boards	2392.00
BCPMSCB2D	Split Core BCPM meter, Intermediate Feature Set plus 4 adapter boards	3402.00
BCPMSCC1D	Split Core BCPM meter, Basic Feature Set plus 2 adapter boards	1652.00
BCPMSCC2D	Split Core BCPM meter, Basic Feature Set plus 4 adapter boards	2662.00
BCPMCOVERD	Clear cover bor BCPM printed circuit board, compatible with Solid Core and Split Core versions	100.00

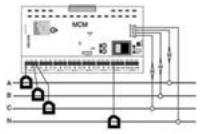

Typical BCPMSC panelboard installation

Note: CT hole size accommodates up to #6 THHN insulated conductor.

PowerLogic Multi-Circuit Meter

Designed for OEM style placement in electrical distribution equipment the MCM8364 is configurable to meter 1 or 3 phases of up to eight individual loads, six loads if neutral monitoring is required. The MCM will monitor up to 10,000 amps per service using standard 5 Amp CTs. All of the metered circuits must share a common voltage source. The MCM8364 is a great solution for monitoring critical power distribution equipment and provides 24 different electrical metering quantities plus an additional nine Modbus register alarms.

With one RS-485 connection, the multi-circuit meter provides Modbus RTU communications output that communicates to each individual metered circuit. Up to 30 multi-circuit meters can be addressed on the same Modbus network. The multi-circuit meter can provide warnings to the central monitoring computer via its Modbus output using the MNode software provided or can be integrated into PowerLogic SMS software. The MCM also works with the submeter display as shown below.


3-phase, 4-wire (with neutral current wiring)

Electrical Data:
Energy Consumption (kWHr), Real Power (kW), Reactive Power (kVAR), Apparent Power (kVA), Power Factor Total, Voltage, L-L, avg. of 3 phases, Voltage, L-N, avg. of 3 phases, Current, average of 3 phases, Real Power (kW) phase A, B, & C, Power Factor, phase A, B,&C, Line to Line Voltage, phase A-B, B-C, A-C, Line to Neutral Voltage, phase A-N, B-N, C-N, Current, phase A, B, & C, Frequency (measured from phase A) (Hz).

Modbus Alarms:
Over Voltage, Under Voltage, Over Current, Under Current, Over kVA, Under kVA, Phase Loss A, Phase Loss B, Phase Loss C

Table 4.28:

Catalog No.	Description	$ Price
MCM8364	Multi-Circuit Meter 8364	1863.00

PowerLogic Submeter Display

The PowerLogic Submeter Display (SMD) is a comprehensive electrical submetering display that provides a view of electrical parameters from multiple metering products with one networked LCD. In addition to viewing system data on the display itself, you can also view data on a remote PC via a network connection. Touch pad buttons provide a convenient way to view downstream devices on the power-monitoring network. The display is RS-485 Modbus RTU compatible. It has additional RS-485 and RS-232 Modbus ports for networking to additional displays or to a master PC. The submeter display is compatible with the following metering devices: BCM, MCM, & Enercept™ meters.

Submeter Display

Table 4.29:

Catalog No.	Description	$ Price
SMD	Submeter display mounted in enclosure	725.00
SMD OPN	Open style submeter display, no enclosure	595.00

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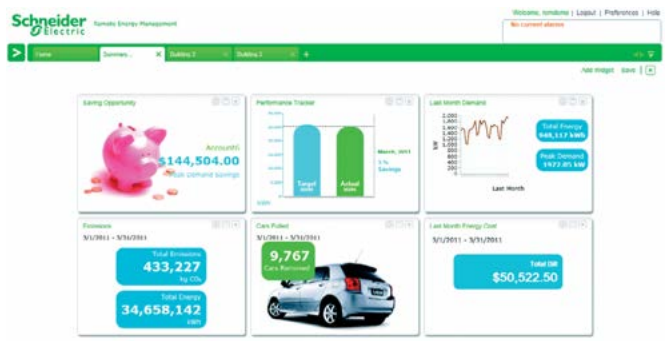
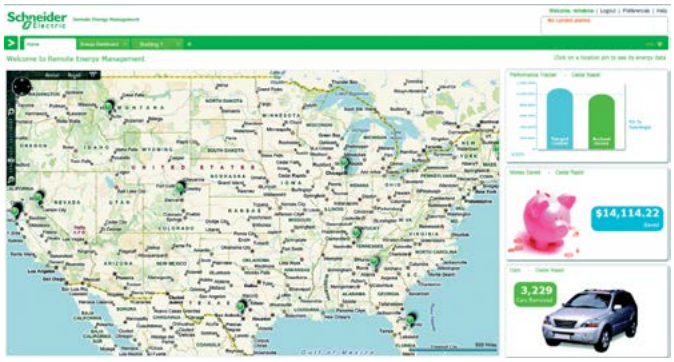


Easily view information that is most important to you through a customizable dashboard



View your environmental impact from a single screen to track emission reduction initiatives

Easily save reports and export them to a personal web-page for easy tracking and reporting

Web Hosted Solutions

Schneider Electric Remote Energy Management solutions are web-hosted, subscription based Software-As-A-Service (SaaS) offers. This means that all of our data is hosted at a secure Schneider Electric data center facility available for you to view from any web-enabled device, 365 days per year, 24 hours per day, 7 days per week. No additional servers, PCs, software or IT personnel are needed when utilizing a remote hosted solution. All data is easily obtained through standard communications methods (Ethernet) from multiple device types and sources such as meters, existing systems, and building management systems (BMS).

A remote energy management solution allows you to easily:

Identify energy waste

- View energy profiles to quickly identify energy waste in a single facility or across your enterprise
- Lower capital expenses with better utilization of current infrastructure (i.e. HVAC and Lighting)

Reduce energy consumption

- Use historical comparisons to determine profiles of day-to-day, month-to-month, and year-to-year energy consumption
- Compare energy usage around similar facilities to establish benchmarks and identify poor performing facilities
- Normalize facility consumption against weather, production, hours of operation, square footage, and occupancy to measure the true energy content
- Measure the effectiveness of various energy efficiency and conservation efforts

Save on utility bills

- Compare usage to utility bills to ensure the utility is billing correctly
- Optimize equipment run hours and setting to avoid setting new demand peaks
- Make accurate assessment of what utility costs would be on different utility rates

Measure, report on and implement energy and emission reduction initiatives

- Utilize emissions reporting to determine the CO_2 baseline, establish targets, and monitor improvements to help manage your carbon footprint

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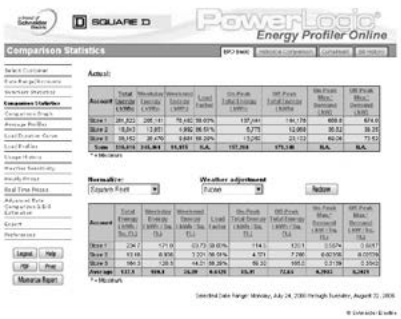
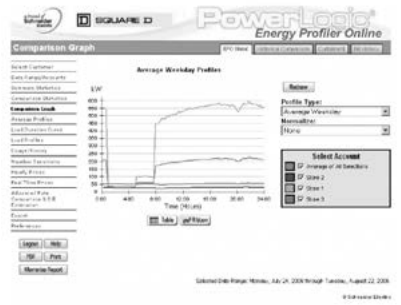
Bill estimates provide valuable information for budgeting and forecasting



Comparison statistics display



Typical comparison graph showing time of usage

PowerLogic Energy Profiler Online

PowerLogic Energy Profiler Online (EPO) is a web-hosted service that is the industry's foremost load data visualization and analysis application. This flexible, easy to use system turns customer usage data into actionable information, freely accessible to all customers and internal users. For commercial and industrial energy customers, managing energy costs is the primary objective, but they can't control what they can't measure. EPO enables energy customers to take control of their costs by providing the information they need to understand how their organization uses energy. They can then take steps to reduce costs by implementing conservation measures, investing in more efficient equipment, or participating in new pricing or load curtailment programs.

For the utility, EPO provides an intuitive, easy-to-maintain tool for better understanding customer usage patterns and meeting customers' growing need for information. It also provides a convenient platform from which to administer real-time pricing (RTP) or load curtailment programs. EPO's instinctive online functionality gives first-time users an extremely short learning curve, while its powerful configuration options address the needs of more sophisticated users. The service is available to users at their convenience, 24/7, and regular updates ensure that customers get the most current information.

Key features:

- Data access and analysis
- Automated reporting
- Estimated bills and rate comparisons
- Demand response and curtailment programs
- RTP programs
- Alarming
- Administration tool

Applications:

- Energy load analysis
- Energy budgeting and bill forecasting
- Demand response and load curtailment program management
- Real-time pricing program management
- EPO's Real-Time Pricing module lets users see interval data for accounts with future pricing information, and multiply that data against a price stream.

For price & ordering information, contact your local PowerLogic Sales Specialist or PowerLogic Inside Sales at 615-287-3535.

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Communications for high-speed access to critical information

From a single building to a multi-site enterprise, PowerLogic Web-Enabled Network Components provide fast, reliable serial to Ethernet connectivity in the most demanding applications:

- Energy management
- Power distribution
- Building automation
- Factory automation

PowerLogic Ethernet Gateways are available in two models-EGX100 and provide direct connection to Ethernet-Modbus™/TCP networks to make energy and power monitoring information available over local and wide area networks.

- The EGX100 provides low-cost, reliable, Ethernet to serial-line connectivity in a compact, DIN-rail mounted package. Enabled by Power over Ethernet (PoE IEEE 802.3af), the EGX100 simplifies installation by eliminating the need for power supplies plus provides a Web-based interface for configuration and diagnostics.
- The EGX300 is an integrated gateway-server that is web based with 1 serial port and has the ability to connect to an additional 32 devices remotely through Ethernet, plus log/trend historical data allowing electrical distribution systems to be better managed by utilizing Ethernet and Internet technologies.

EGX100 Ethernet Gateway

EGX100 lets the Administrator assign access to setup pages by user groups

Advantages

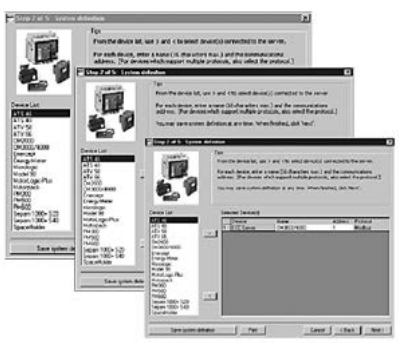
- Easy to install—easy DIN rail mounting solution.
- Easy to setup—No special software required. Configuration via Microsoft Internet Explorer or Hyperterminal.
- Easy to troubleshoot—Detailed diagnostics for communication ports through a Web interface.
- Easy to maintain—Field upgradable firmware lets you add new features while reducing costly downtime.
- Secure-Customizable, password-protected access to configuration.
- Cost-effective, high-speed communications—Use existing LAN infrastructure to reduce communications wiring and network management costs.
- Open platform provides broad connectivity—Modbus TCP/IP over Ethernet allows transparent access via intranet/internet. Each gateway supports up to 32 Modbus or PowerLogic protocol devices.
- Subnet initiated communications—The gateway supports a slave mode for connecting a serial-line based system to Ethernet. For example, a building management system with a Modbus serial interface can route to 16 remote Modbus TCP/IP interfaces supporting up to 128 serial-line devices.
- Extended temperature range— -25 to 70°C enables operation in harsh environments.

Built in tabs provide easy DIN rail mounting solution.

Table 4.30:

Type	Part No.	EGX100	EGX300
		$ Price	
		950.00	1895.00
Control Power			
24 Vdc / 7W DIN mount power supply (SOLD SEPARATE)	3090PS24	**157.00**	**157.00**
Power Over Ethernet Injector Kit (SOLD SEPARATE)	TCSEAV0100	**185.00**	**185.00**
Protocols			
Ethernet: HTTP, FTP, Modbus TCP/IP, SMTP, SNMP (MIB2), SNTP, TCP, UDP, ICMP, ARP		x	x
Serial: Modbus RTU, Modbus ASCII (EGX100 only), JBUS, PowerLogic (SY/MAX)		x	x
Ports			
Serial: RS485			1
Serial: RS232/485 configurable		1	1
Ethernet UTP (10/100)		1	1
Fiber (100 Mb)			1
Integral web server			
Web page generation tool			x
Maintenance/diagnostics		x	x
Gateway administration setup		x	x
Comprehensive meter reading			x
Interval logging/trends			32 devices
User defined custom pages			x
Historical Data Logging			
Interval data			x
Transfer files on an interval and periodic scheduled basis			email
Export to Excel via web query			x
Export files by e-mail, FTP, or HTTP			x

EGX300 Ethernet Gateway offers you a "window" into your power equipment



PowerLogic WebPageGenerator

The PowerLogic WebPageGenerator (WPG) creates and downloads application specific web pages to PowerLogic Ethernet gateways (EGX300, ECC21, PM8ECC) with minimal user intervention. The user simply identifies the serial devices connected to the Ethernet gateway in this wizard-based software utility. The utility takes care of the rest. This utility is available for download from www.powerlogic.com.

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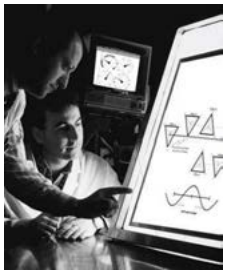


Consulting & Analysis

Power System Engineering

The Square D Power System Engineering team offers a wide range of engineering services to improve the safety, efficiency and reliability of your power distribution system. The team is comprised of registered professional engineers, safety trained and equipped, to perform a variety of engineering functions.

Power System Studies

The Square D Power System Engineering Team provides expertise for a variety of electrical power system studies. Some of the more common system studies include…

- Short-circuit analysis
- Time-current coordination
- Motor starting/voltage drop
- Motor starting/torque-speed
- Safe motor re-energization
- Harmonic analysis
- Transient analysis
- Power factor correction analysis
- Other system specific analysis

Arc Flash Analysis

Square D offers on-site services to perform arc flash analysis for a facility, complex, office, or campus. An Arc flash analysis is used to determine …

- Flash Protection Boundary
- Incident Energy Value
- Hazard/Risk Category
- Appropriate Personal Protective Equipment (PPE)
- Low cost arc flash reduction methods

Features of Square D arc flash analysis include…

- Time current coordination analysis showing both existing and recommended over/current device settings
- Short-circuit study to ensure adequacy of equipment
- Onsite verification and documentation of equipment
- Arc flash labels (populated with the results of the arc flash analysis)
- Arc flash label affixation
- NFPA 70E—Safe Workplace Practices Training provided by OSHA authorized outreach instructors
- Recommendations and solutions to reduce potential arc flash hazards

Power Quality Studies

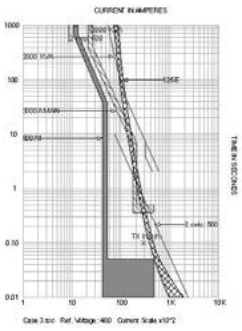
Square D offers onsite power quality engineering studies and solutions to eliminate process disruptions, power system shutdowns, and equipment damage due to electrical power system disturbances. A power quality study is used to...

- Determine compliance with the IEEE 519-Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems guidelines
- Identify most cost-effective solution to power quality problems
- Solve process disruptions due to power disturbances
- Reduce economic effects of poor power quality
- Identify disturbances originating on electric utility system and improvements to reduce the number and severity

Power System Assessment

Square D offers engineering services to meet a variety of power system needs …

- Basic codes and standards compliance
- Protective coordination assessment
- Maintenance program review
- Recommendations for power system optimization
- Power quality troubleshooting and analysis
- Power factor and harmonics analysis
- Electrical safety hazards
- Short-circuit withstand overview
- Single-line documentation of power system
- Power monitoring recommendations
- Loading measurements



Power System Improvement Projects

Square D offers engineering services for …

- New equipment installation
- Existing equipment modification
- Ground Fault Schemes for multiple source distribution systems
- High Resistance Grounding (HRG) Conversion
- Automatic Transfer Control Schemes & Generator Operations

Square D professional engineers - safety trained and equipped - will listen to your concerns and goals, define the problem or enhancement, and engineer the solution that best satisfies your needs.

For additional information on power system engineering services and pricing, contact your nearest Square D/Schneider Electric office.

Industrial Energy Efficiency

Schneider Electric Certified Energy Managers (CEM's) work on-site with knowledgeable plant personnel to develop a long-term, comprehensive, "Energy Action Plan", that serves as the blueprint for energy savings. Unlike performance contracts or one-time energy audits, the Total Energy Control^{SM} program offers a strategic partnership for energy-intensive industrials who want to improve energy efficiency.

- Total Energy Control – Comprehensive integration of all three areas affecting energy efficiency
  - — Procurement (electricity and gas)
  - — Demand management
  - — Optimization of process and plant utilities
- Program deliverables:
  - — Long-term Energy Action Plan
  - — Energy efficiency projects
  - — Ongoing accountability for results

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Engineered Solutions

Schneider Electric provides an engineered solution approach to your specific power system applications. Our total solutions for power monitoring and power system controls allow greater safety, reliability, and energy efficiency of your power systems. As a long standing industry leader in Power Monitoring and Control Systems, we understand your power system requirements and needs.

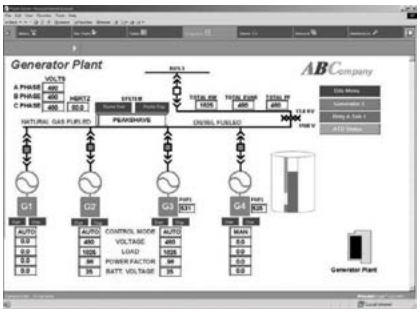
All of our Engineered Solutions are tailored to your specific system requirements. Schneider Electric is your total Solution provider.

Power Monitoring Applications

Increased Reliability and Energy Efficiency

Increased Reliability and Energy Efficiency are key results produced from our Power Monitoring Applications. Schneider Electric power monitoring applications provide detailed reporting, testing and analysis capabilities for your systems and related components.

- ***EPSS Emergency Power Supply Systems*** – The PowerLogic EPSS Test Report provides information regarding the health and status of the emergency power supply system, including automatic transfer switches and generators.
- ***SER Sequence of Events Recording*** – The PowerLogic Sequence of Events Recorder (SER) Module is a root-cause analysis tool for rapid response for problem resolution that is ideal for pinpointing the cause of a service disruption in very large complex power systems.
- ***WAGES Water, Air Gas, Electric, Steam*** – PowerLogic energy and power management systems can provide instantaneous readings, alarm notifications, and graphical diagrams for monitoring electrical and piped utilities (Water, Air, Gas, Electric, Steam).
- ***APM Active Pager Module*** – The PowerLogic Active Pager Module allows automatic paging to alphanumeric pagers, cell phones and PCs.



PowerLogic Engineers provide graphic solutions for realtime monitoring of power systems.

Power System Control Applications

Automated solutions for increased Reliability and Energy Efficiency

Schneider Electric engineers provide Power System Control Applications with automated solutions for addressing your system reliability and efficiency control needs. Our offer covers Automatic Throwover Schemes, Load Shedding/Peak Shaving, and Load Preservation.

- ***Automatic Throwover Systems*** – Automatic selection of available utility or generator sources to maintain service continuity to connected loads.
- ***Load Shedding/Peak Shaving*** – Control peak demand levels or ensure service continuity to critical load or operate breakers in accordance with user specified sequences and time delays such as bringing large motors online across several billing kw demand periods to avoid demand penalties.
- ***Load Preservation*** – Fast acting sophisticated control systems designed to stabilize critical power systems to the greatest extend possible by monitoring frequency and power sources from utility plus generator capacity versus total circuit load.

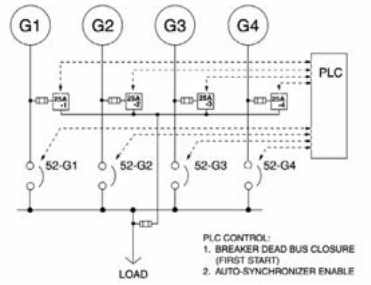
PowerLogic Engineers specialize in the design and setup of Emergency Power Supply Systems (EPSS).

System Integration

System Design and Engineering

Our Square D Engineering Services solution specialists can work with you to design or upgrade your existing system to best achieve your energy and power management objectives and informational needs. With expertise in electrical systems, communications, and automatic control systems, we can integrate, install, and commission your system for optimal performance.

- System Design and Bill of Material Recommendations
- Power Monitoring and Control
- WAGES (Water, Air, Gas, Electric, Steam)
- Enterprise web-based monitoring
- Specification development, drawings, documentation
- Enclosure panel design and build
- Metering Connection Verification/Testing
- Power distribution automation
- On-Site Installation Assistance, Component Configuration & Startup
- Turn-key project management
- Third Party Device and communication interfaces
- Configured Workstations, User Software Interfaces
- Interactive Graphic Design to mimic facility layout, one-lines, equipment status
- Custom Software, Reports & Applications – Billing and Paging



PowerLogic Engineers design power control systems that meet your operational requirements.

For additional information, contact your nearest Square D / Schneider Electric office.

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Factory Assembled Equipment

Square D™ PowerLogic™ Factory Assembled Equipment offers a wide range of designs for metering, communications, and control applications to simplify retrofit installations. Our equipment is designed to order as a free-standing or wallmounted system. With PowerLogic™ Factory Assembled Equipment, you'll receive professionally crafted, factory tested, pre-wired equipment that will greatly improve the speed of your system startup. All backed by the Square D™ quality standard of excellence.

- Assemblies include meters & devices wired to terminal blocks, disconnects, and shorting blocks or test switches
- Tailored to any system voltage :
  - 208/120 V, 480/277 V & 600/347 V Wye
  - 240 V, 480 V & 600 V Delta
  - Utilization of PT's required for higher voltage levels
- Wall mountable and easy to install using concealed holes in the back of the enclosure.
- Complete with necessary documentation and mounting hardware for quick and easy installation
- Carbon steel construction, with industry standard ANSI 61 gray powder coat finish
- Equipped with concealed hinged door, and universal pad-lockable latch.
- Custom engraved nameplates available for all units.

Table 4.31: Industrial Enclosure Types 1*, 12, & 4, UL & CUL 508A Listed

Available Meter Types	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
PM 810, 820, 850 & 870 CM 4250 & 4000T ION 6200	Up to 11 / Meter Up to 8 / Meter N/A	Up to 7 / Meter Up to 7 / Meter Up to 2 / Meter	Up to 2 / Meter Up to 1 / Meter N/A	Up to 2 / Meter Up to 1 / Meter N/A
ION 7300, 7330 & 7350 ION 7550 & 7650*	Up to 4 / Meter Up to 16 / Meter	Up to 4 / Meter Up to 7 / Meter	Up to 4 / Meter Up to 4 / Meter	Up to 4 / Meter Up to 4 / Meter

- Supports Single or Multiple Voltage Sources for Indoor (Typse 1 and 12) & Outdoor (Type 4) applications
- Available with 1–4 meters per panel. Serial & Ethernet Communications are options for all units
- EGX & ION RTU Communication Enclosures with 1–4 devices per panel also available

Light Industrial Enclosure Type 1, UL & CUL 508A Listed

- Available for the following meter types: PM820 (with ethernet), and ION6200
- Supports Single Voltage Source only for Indoor (Type 1) applications.
- Available with 1–12 meters per panel. Serial Communications are standard for all units.
- No Digital or Analog I/O is available for this option.

Service Entrance/Utility Socket Enclosure Type 3R, UL & CUL 508A Listed

- Available for ION8600 only, with up to 3 Digital Inputs and 4 Digital Outputs and ION5600 2 Digital Inputs and 2 Digital Outputs.
- Supports Single Voltage Source only for Indoor & Outdoor (Type 3R) applications.
- Units are Ring Type with removable cover.
- Available with 1 meter per panel. Serial & Ethernet Communications options available.
- Supports Form 9S, 35S, 36S, 39S and 76S configurations for ION8600 and forms 9S and 36S for ION5600.
- Options available for remote mounted CTs
- Options available for integrated, bar type CTs
- Optional Test Switch.

Additional engineered to order products are available for a wide variety of design solutions.

- Switchgear Transfer Control Panels
- Generator Control Panels
- Load Shed Control Panels
- Sequence of Events Recording (SER) Panels
- Control System Mimic Panels
- Lighting Control Interface Panels
- Programmable Logic Controller (PLC) Control Panels (Hot Standby, Relay Control, Data Concentration etc. ...)
- Emergency Power Supply Systems (EPSS) Control Panels
- Water, Air, Gas, Electrical, and Steam (WAGES) Monitoring Panels
- Input Status Monitoring & Alarming Panels
- Remote Annunciator Control Panels
- Remote Operator Control Panels
- Serial, Ethernet, and Cellular Wireless Systems
- Server Rack and Network Equipment (Servers, Switches, UPS's) for Energy Management Systems.
- Industrialized PC's, Touch Screens (Magelis), and Human Machine Interfaces (HMI's) with Custom System Graphics.
- Designed to fit any environment – Indoor (Type 1 & 12) & Outdoor (Type 3R & 4) applications

For additional information and pricing please contact your local PowerLogic sales specialist or PowerLogic Inside Sales Support at 615-287-3535. Equipment pricing and literature available for download on our website at www.powerlogic.com/products/enclosures.

To better serve you please have the following information on hand when calling.

- Enclosure type (Indoor or Outdoor) and Environment details (Corrosive or Non-Corrosive)
- Power System Voltage Level and Type (Direct Current (DC) or Alternating Current (AC))
- Digital & Analog Input and Output requirements
- Device Type and Quantity per enclosure
- Ethernet and Serial Communication Requirements
- For Drawout Retrofits, need existing cradle type (i.e. GE, Westinghouse, etc.)

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Technical Support

There are several ways to receive top quality support on PowerLogic products:

Priority Support: Excellent Service, Free Software Upgrades, Training Discounts & More!

- Latest PowerLogic SMS and ION software upgrades to ensure up-to-date systems
- Direct access to expertise for quick issue resolution
- More efficient PowerLogic SMS and ION system utilization
- Higher reliability
- Improved productivity and personal efficiency on the job

Priority Support: Tenant Metering

Now the great support provided to SMS and ION systems is now available for Tenant Metering systems. Support includes ...

- Direct email (4-hr response time) and toll-free 800 number support for prompt response to urgent or non-urgent requests from highly trained support engineers.
- Hours of service 7:30am to 7pm US Central time
- PowerLogic™ Tenant Metering software upgrades at no charge
- Proactive notification of software service packs and fixes
- Remote diagnostics support engineer can troubleshoot any issues of the TMS system remotely without the customer's help.

Premium Support: Priority + Proactive System Checks + Sr. Technician Assigned to your site

Choose Premium Support when you need to . . .

- Enhance your PowerLogic SMS and ION system's operation with single-sourced pro-active problem identification, solutions recommendations and change management skills
- Partner with technical experts who help coordinate support, provide hands-on assistance, and share knowledge and know-how with you
- Obtain personalized services tailored to your business environment and objectives
- Take advantage of remote software upgrade capabilities
- Anticipate and communicate necessary change

Additional Support Options:

7x24 Support Option

- PowerLogic 7x24 support provides 1-hour phone response by senior support engineer during off-hours.
- Additionally, 4-hour response (max) for remote connection to customer system for advanced troubleshooting.

On-Site Maintenance Option

On site maintenance includes pre-scheduled visits by PowerLogic system engineers who perform software upgrades, updates to custom graphic screens, device firmware upgrades, and system performance analysis and correction. Scope of work is determined by customer request.

Remote eServices

Let expert Square D technicians ensure high-quality performance in your PowerLogic SMS and ION system by performing remote, online services through our secure WEB EX Portal. Services include …

- Installations, upgrades, & software patches
- System device setup & configuration along with alarming & historical trending
- Graphical Screen Development
- Remote, Online System Maintenance
  - — Software Updates - Patches & Upgrades
  - — PC Checks - Hard Disk Space, Network & DB Configurations, Viruses, etc.
  - — PowerLogic or ION Software Checks - Communications, Data Logging, & Task Execution
  - — E-mailing system scorecard & maintenance recommendations
- One-on-one training on system software features
- Power Quality (PQ) & Energy Usage Analysis

Power Management University

Our training centers offer a variety of training courses designed to improve your total energy management skills. Our instructor led courses are 70% hands-on, with each student having their own lab workstation. We have two main training centers located in Nashville, TN and Victoria, BC and offer training at a variety of Square D sites across the US and Canada.

Table 4.32:

Course Description	New Course No.	US $ Tuition
Webinars and Online		
Webinar Training (for any webinar)	3000PLUCWEB	**500.00**
OnDemand Training (12 month access)	3000PMUDEMAND12	**1500.00**
OnDemand Training (6 month access)	3000PMUDEMAND6	**1000.00**
PowerLogic SMS Systems (Factory and Regional Courses)		
PowerLogic SMS Fundamentals Bundle (includes 3000PMUDEMAND12)	3000PLUC205	**2750.00**
PowerLogic System I&T	3000PLUC100	**2150.00**
PowerLogic SMS Administrator	3000PLUC300	**2150.00**
Regional SMS Overview	3000PLUC190	**1800.00**
Regional SMS Overview Bundle (includes 3000PMUDEMAND12)	3000PLUC195	**2400.00**
Power Monitoring with SMS	3000PLUC191	**1200.00**
Power Monitoring with SMS Bundle (includes 3000PMUDEMAND12)	3000PLUC192	**1800.00**
PowerLogic ION Systems (Factory and Regional Courses)		
PowerLogic ION Enterprise Fundamentals Bundle (includes 3000PMUDEMAND12)	3000PMUFUNDCR	**2750.00**
PowerLogic ION Enterprise Programmer	3000PMUPROG	**2150.00**
PowerLogic ION Enterprise Administrator	3000PMUADMIN	**2150.00**
Regional ION Overview 3 Day	3000PMUCION	**1800.00**
Regional ION Overview Bundle (includes 3000PMUDEMAND12)	3000PMUCIONCR	**2400.00**
PowerLogic ION Designer Intro	3000PMUCPROG	**1200.00**
Regional ION Utility Meter Programmer	3000PMUMTRPRG	**1200.00**
Regional ION Administrator Overview	3000PMUCADMIN	**1200.00**
Custom Onsite Training		
Customer Onsite Training	3000PMUSITE	**by Quote**

All classes bundled wtih the 3000PMUDEMAND12 can be ordered without the bundle at a discounted price. Please call 615-287-3304 for more info.

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Series 20, 40, 60 and 80

The Sepam family of protective relays, Series 20, 40 and 80, are the newest generation of Sepam relay, a time tested product with a 29-year worldwide history. Modular relay design allows quick and easy future upgrades to communications, digital I/O, analog output or temperature acquisition. The 64x128 bit, graphic LCD display and keypad permit relay setting of Series 20 and 40 without a PC. Comprehensive self-testing provides assurance of readiness to protect. The Sepam family also has exceptional withstand to environmental electromagnetic disturbances. An optional 128x240 LCD display for the Series 80 relay can show an animated one-line with front panel control. The Sepam Relays and remote modules come with a 10 year warranty and conformal coating for harsh environment as standard.

Sepam Series 60 and 80 Relay Features

- Standard footprint for enhanced protection of Mains/Feeders, Transformer, Motor, Generator, Capacitor, Bus Applications
- Differential protection of transformer or machine transformer units
- Differential protection of motors and generators
- Protection for mains and ties and important feeders including pre-programmed or customized ATS/ATO Schemes
- 42 programmable logic inputs and 23 relay outputs
- Increased accuracy metering capabilities, I, V, E, P, PF, THD, vector diagram
- Expanded logic equation capabilities (an option for Logipam PLC ladder logic)
- Setting Software (SF2841) with graphical assistance, optional mimic-based display
- Battery backup for historical and fault waveform data retention, 24–250 Vdc control power
- 2 independent RS485 (2 or 4 wire) communication ports: connection of each to port 1 or 2 S-LAN and/or E-LAN networks ModBus™ , ModBus TCP/IP, IEC60870-5-103, DNP3 and IEC61850 communication protocol with GOOSE messaging.
- Software tools: Sepam parameter and protection setting and control function customization programming of specific functions (Logipam-Series 80) recovery and display of disturbance recording data local or remote operation via an E-LAN
- Synch-check option
- Includes all Series 20 and Series 40 features

Sepam Series 40 Relay Features

- Compact standard footprint (< 4” deep) for enhanced protection of Mains/Feeders, Transformer, Motor, General Applications
- Directional overcurrent protection for dual mains and ties and closed loop feeders
- 10 programmable logic inputs and 8 relay outputs
- Current and voltage inputs I, V, E, P, PF
- Setting software with Boolean logic equation assistance for customized protections and ATS/ATO schemes
- CT/VT and Trip Circuit supervision
- Sixteen seconds of fault recording, last 5 trip reports, and last 200 time-tagged alarms
- Rear communication port connection to 1 or 2 S-LAN and/or E-LAN networks ModBus™, Modbus TCP/IP, IEC60870-5-103, DNP3 and IEC 61850 communication protocols TCP/IP redundancy RS 485 (2 or 4 wire) or fiber optic network
- Temperature data from 16 RTD’s, Pt100, Ni100, or Ni120
- Includes all Series 20 features

Sepam Series 20 Relay Features

- Backlit LCD graphic bitmap display
- Compact standard footprint (< 4” deep) for basic protection of Mains/Feeders, Transformer, Motor, Bus (Voltage) Applications
- Current or voltage inputs I, or V
- 10 programmable logic inputs and 8 relay outputs
- 16 inverse time overcurrent characteristic curves and customized protection curves (Series 80)
- Two 86 cycle records of fault recording, last trip fault values, and last 64 time-tagged alarms retained
- Provides trip diagnostic information for analysis of faults
- Self-test diagnostic ensures correct operation of relay and integrity of protection
- Wide range of control power inputs
- Application specific design for Main/Feeder, Transformer, Motor, Bus (Voltage) zones
- Zone selective interlocking (ZSI) improved protection coordination as a cost effective alternate to Buss Differential (87B) application
- Rear communication port connection to 1 or 2 S-LAN and/or E-LAN networks ModBus, ModBus TCP/IP, IEC60870-5-103, DNP3 and IEC 61850 communication protocols TCP/IP redundancy RS 485 (2 or 4 wire) or fiber optic network.
- Temperature data from 8 RTD’s, Pt100, Ni100 or Ni120.
- 1 programmable analog output, 0–1, 0–10 mA, 4–20 mA or 0–20 mA
- Modular architecture
- Breaker maintenance diagnostics
- Two groups of current protection settings (logic input selectable) with built in breaker failure (50BF) to allow reduced arc-flash hazard and PPE rating during maintenance operation

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Three relay series with increasing protection capabilities for six types of applications to provide all possible protection configurations

Table 4.33: Protection Configurations

	Series 20				Series 40				Series 60				Series 80				
Applications																	
Substations Transformers Motors Generators Busbars Capacitors	Current	Voltage	Frequency	Temperature	Current	Voltage	Frequency	Temperature	Current	Voltage	Frequency	Temperature	Current	Voltage	Frequency	Temperature	Rotation Speed
					+ directional protection				+ directional protection				+ directional protection				
Protection Functions																	
	26/63, 27/27S, 27D, 27R, 30, 37, 38/49T, 46, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 51LR, 59, 59N, 66, 68, 79, 81H, 81L, 81R, 86, 94/69, CPLU 50/51, CPLU 50N/51N				25, 26/63, 27/27S, 27D, 27R, 30, 32R, 32Q/40, 37, 38/49T, 46, 47, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51LR, 59, 59N, 60/60FL, 66, 67, 67N/67NC, 68, 79, 81H, 81L, 81R, 86, 94/69, 21FL, 46BC, CPLU 50/51, CPLU 50N/51N				25, 26/63, 27/27S, 27D, 27R, 30, 32P, 32Q/40, 37, 38/49T, 46, 47, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51LR, 59, 59N, 60/60FL, 66, 67, 67N/67NC, 68, 79, 81H, 81L, 81R, 86, 94/69				12, 14, 21B, 24, 25, 26/63, 27/27S, 27D, 27R, 30, 32P, 32Q/40, 37, 37P, 38/49T, 40, 46, 47, 48, 49RMS, 50/27, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51C, 51LR, 59, 59N, 60/60FL, 64G, 64REF, a 66, 67, 67N/67NC, 68, 74, 78PS, 79, 81H, 81L, 81R, 86, 87M, 87T, 94/96				
Characteristics																	
Logic input/outputs	Inputs 0–10				Inputs 0–10				Inputs 0–28				Inputs 0–42				
	Outputs 4–8				Outputs 4–8				Outputs 4–16				Outputs 5–23				
Temperature sensors	0–8				0–16				0–16				0–16				
Channels	Current 3I + Io				Current 3I + Io				Current 3I + Io				Current 2x 3I + 2x Io				
	Voltage 3 V + Vo				Voltage 3 V + Vo				Voltage 3 V + Vo				Voltage 2x 3 V + Vo				
	LPCT▲				LPCT▲				LPCT▲				LPCT▲				
Communication Ports	1–2				1–2				1–2				2–4				
	ModBus, IEC 103, DNP3, IEC 61850				ModBus, IEC 103, DNP3, IEC 61850				ModBus, IEC 103, DNP3, IEC 61850				ModBus, IEC 103, DNP3, IEC 61850				
					Redundancy				Redundancy				Redundancy				
									Goose Message				Goose Message				
Control	Matrix■				Matrix■				Matrix■				Matrix■				
					Logic equation editor				Logic equation editor				Logic equation editor				
													Logipam♦				
Other									Front memory cartridge with settings				Front memory cartridge with settings				
					Backup 48 hours (capacitor)				Backup lithium battery★				Backup lithium battery★				

▲ LPCT: low-power current transducer complying with standard IEC 60044-8.
■ Control matrix for simple assignment of information from th eprotection, control and monitoring functions.
♦ Logipam ladder language (PC programming environment) to make full use of Sepam Series 80 functions.
★ Standard lithium battery 1/2 AA format 3,6 V front face exchangeable.

Table 4.34: ANSI Codes

Code	Definition	Code	Definition
12	Overspeed (2 set points)	50N/51N	Ground fault
14	Underspeed (2 set points)	50V/51V	Voltage restrained overcurrent
21B	Underimpedance	51C	Capacitor bank unbalance
21FL	Fault Locator	51LR	Locked rotor
24	Overfluxing (V/Hz)	59	Overvoltage (L-L or L-N)
25	Synch-check	59	Overvoltage (L-L)
26/63	Thermostat / Buchholz	59N	Neutral voltage displacement
27/27S	Undervoltage (L-L/L-N)	60/60FL	CT/VT supervision
27D	Positive-sequence undervoltage	64G	100% stator earth fault
27R	Remanent undervoltage	64REF	Restricted earth fault
30	Annunciation	66	Starts per hour
32P	Directional real overpower	67	Directional phase overcurrent
32Q/40	Directional reactive overpower	67N/67NC	Directonal ground fault
37	Phase undercurrent	68	Logic discrimination / zone selective interlocking
37P	Directional active underpower	74	Circuit connnection supervision
38/49T	Temperature mounting	78PS	Pole slip
40	Field loss (underimpedance)	79	Recloser (4 cycles)
46	Unbalance/negative sequence	81H	Overfrequency
46BC	Broken conductor detection	81L	Underfrequency
47	Negative sequence overvoltage	81R	Rate of change of frequency (df/dt)
48	Excessive starting time	86	Latching / acknowledgement
49RMS	Thermal overload	87M	Machine differential
50/27	Inadvertent energization	87T	Two-winding transformer differential
50/51	Phase overcurrent	94/69	Circuit breaker / contactor control
50BF	Breaker failure	CLPU 50/51	Cold load pick-up with phase overcurrent protection
50G/51G	Ground sensitive	CLPU 50N/51N	Cold load pick-up with earth fault protection

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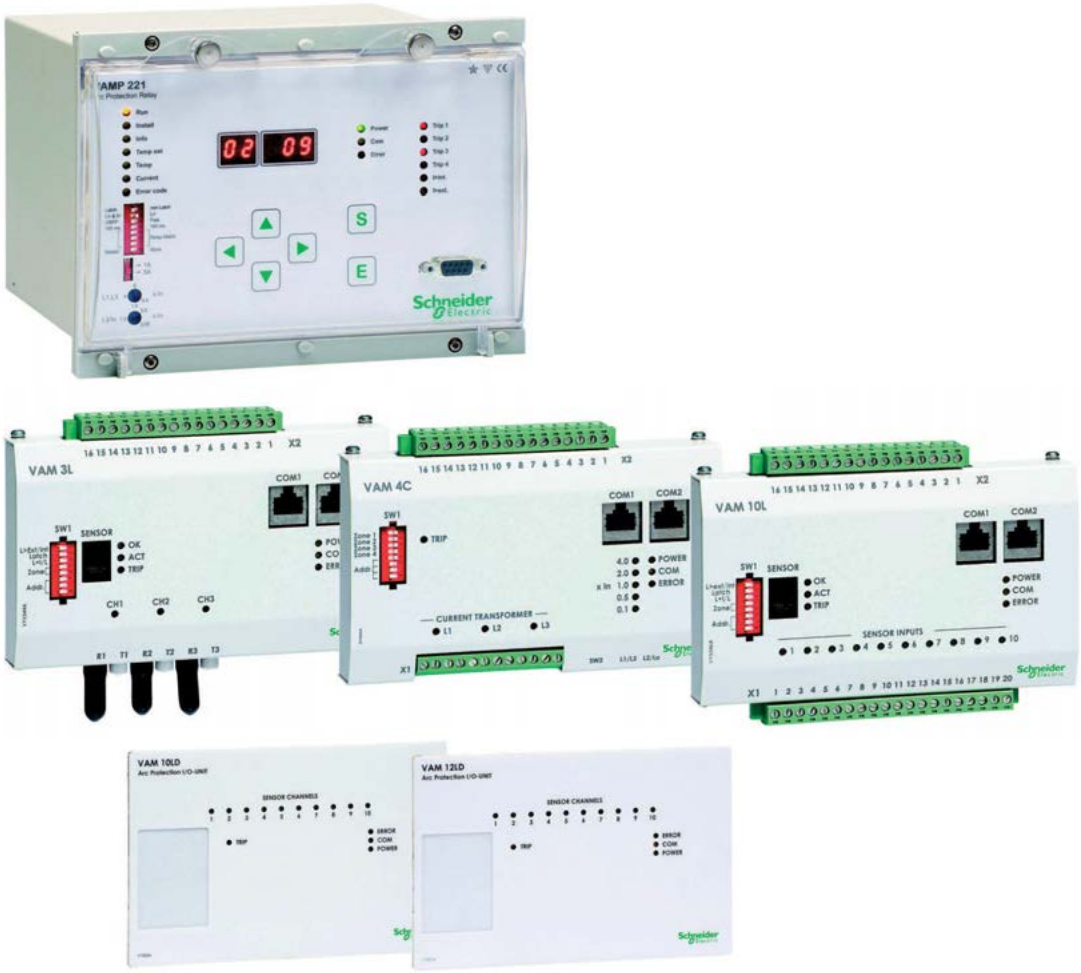
New!



VAMP 221 System Highlights

- VAMP 221 is a flexible and easily adaptable arc flash protection system for the protection of electrical distribution systems.
- VAMP 221 significantly reduces damage to electrical power equipment in the event of an arc fault and through this the risk of potential personal injury, and production losses.
- VAMP 221 is a modular system consisting of central units, I/O untis, arc sensors and contact multiplying relays. The system can be easily used from the simplest to the most complicated applications.
- The VAMP 221 arc flash protection system is suitable for both low and medium voltages in any metal enclosed, metal clad or arc resistant switchgear. It is applicable in any new or existing switchgear where an arch flash hazard exists and reduction of fault level is seen as beneficial.

System Features

- Current light tripping criteria (optional of tripping by light only)
- Operating time 7 ms or less (electromechanical contact)
- Accurate location of arc fault utilizing point sensors
- Four selective protection zones per central unit
- Can be used as an alternative to bus differential and ZSI schemes
- Self supervision of the entire system
- Easy interconnect utilizing prefabricated (CAT6) cables
- Phase current measuring
- Ground fault current measuring
- Personal protector option
- Panel or rail mount I/O units
- Circuit breaker fail protection (50BF)

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New!

VA1EH-x

Point sensor VA1EH-x (pipe)

Installed typically in the tube or next to the comartment windo.

VA1DA-x

Point sensor VA1DA-x (surface)

Compartment wall or mounting plate installation.

Arc SLm-x

Arc SLm-x

Used when a large number of compartments are to be monitored.

VA1DP

Point sensor VA1DP

The snap-in connection to the VAMP arc flash protection system improves work safety.

Device Track Record

- Schneider Electric's VAMP Range specializes in arc flash protection and mitigation relays for power system.
- Schneider Electric VAMP's arc flash fault protection functionality enhances the safety of both people and property and has made Schneider Electric VAMP a pioneer in the field of arc flash protection with more than 10,000 arc flash systems and units with over 150,000 arc detecting sensors inservice worldwide.
- All Schneider Electric VAMP products meet the latest international standards and regulations.
- Our success is based on competitive standard products, constant development by our designers possessing experience from arc flash relay generations.

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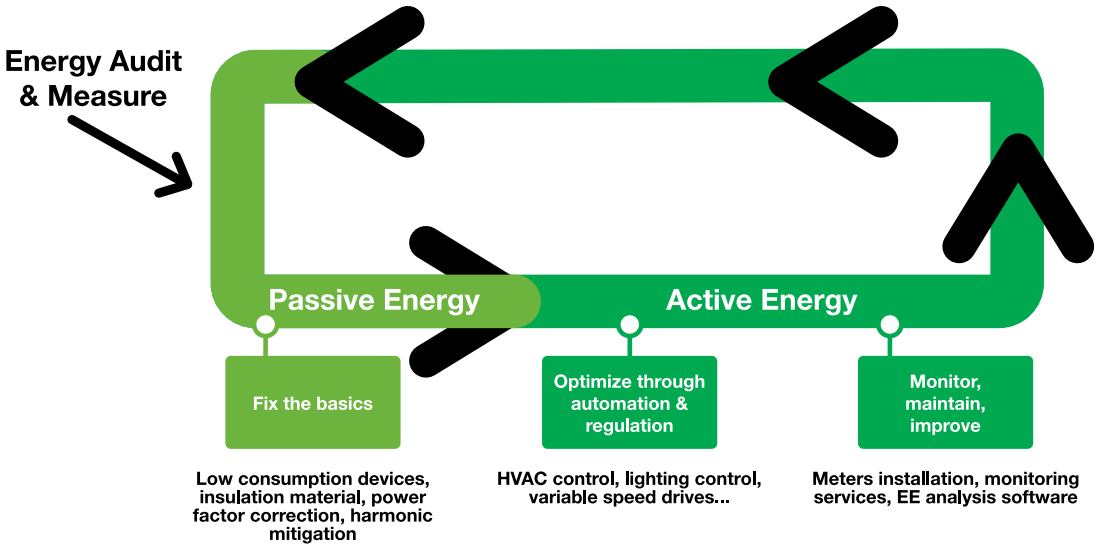
How can reactive power compensation and harmonic mitigation solutions be part of your energy efficiency programs?



Power factor is a measure of how efficiently you are using electricity. In an electric power system, a load with low power factor draws more current than a load with a high power factor for the same amount of real power transferred. Utility customers with a low power factor could realize an increase or penalty in their electric bill. Over time, these penalties may reach into thousands of dollars, depending upon the utility's rate structure.

Harmonics may disrupt normal operation of other devices and increase operating costs. Symptoms of problematic harmonic levels include overheating of transformers, motors and cables, thermal tripping of protective devices, logic faults of digital devices and drives.

Harmonics can cause vibrations and noise in electrical machines (motors, transformers, reactors).

The life span of many devices can be reduced by elevated operating temperature.

Schneider Electric provides different solutions to meet different application requirements.

Table 4.35:

Product Description	LV	MV	Application	Product Features
ReactiVar Fixed Power Factor Capacitors	X	X	Power Factor correction	Suited for applications where the load does not change or where the capacitor is switched with the load, such as on the load side of a motor contactor.
ReactiVar Standard Automatic Power Factor Capacitor Banks (AV5000/MV5000)	X	X	Power Factor correction	Suited for centralized power factor correction in applications where plant loading is constantly changing, resulting in the need for varying amounts of reactive power. Designed for electrical networks with little or no harmonic content.
ReactiVar Anti-Resonant Automatic Power Factor Capacitor Banks (AV6000/MV6000)	X	X	Power Factor Correction and Harmonics Filtering	Suited for centralized power factor correction in applications containing harmonic energies that would otherwise damage standard fixed or automatic capacitor banks.
ReactiVar Harmonic Filtering Automatic Power Factor Capacitor Banks (AV7000/MV7000)	X	X	Power Factor Correction and Harmonics Filtering	Provides power factor correction as well as harmonic filtering with specific harmonic order (5th) in industrial networks.
ReactiVar Transient Free Reactive Compensation Systems (AT6000/AT7000)	X		Power Factor Correction and Harmonics Filtering	Enhanced technology utilizing solid state switching elements that replace standard electromechanical contactors. Provides quicker response to load fluctuations with transient free capacitor switching.
AccuSine™ (PCS) Active Harmonic Filter	X	X▲	Active Harmonic Filtering	Monitors a distorted electrical signal and determines the frequency and magnitude of harmonics in the signal. Cancels the harmonic content with the dynamic injection of opposing phase current in the distribution system or individual load.
ReactiVar Hybrid VAR Compensator (HVC)	X	X▲	Reactive Power Compensation (Real-time)	Provides real-time reactive power compensation, and voltage support in networks with highly cyclical load profiles.

▲ With transformer.

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Low Voltage Fixed Capacitors

ReacatiVar low voltage fixed capacitors are ideally suited for power factor correction applications where the load does not change or where the capacitor is switched with the load, such as on the load side of a motor starter. ReactiVar fixed capacitors are best suited for applications where there are no harmonic currents or voltages present.

Features:

- Heavy edge, slope metallizations and wave-cut profile to ensure high inrush current capabilities.
- Special resistivity and profile metallization for better self-healing and enhanced life (up to 130,000 hours).
- Unique safety feature which disconnects the capacitors at the end of their useful life electrically.
- Less than 0.5w/kVAR losses, including discharage resistors.
- Constructed with a dry type metalized polypropylene capacitor element with no liquid dielectrics.
- Can be easily mounted inside panels or in a stand alone configuration.

Table 4.36: Unfused 208 V 3 phase/ 60Hz unit

kVAR rating	Regular duty Indoor NEMA 1 unit		Rated Current (A)	Recommended copper wire size▲	Recommended circuit protection device rating■	
@ 208 V	Catalog Number	$ Price	@ 208 V	AWG	Fuse	Circuit breaker
2	PFCD1002	**959.00**	6.3	14	15	15
5	PFCD1005	**1187.00**	13.6	10	30	20
6	PFCD1006	**1364.00**	17.7	10	40	25
7.5	PFCD1007	**1538.00**	20.9	8	45	30
10	PFCD1010	**1924.00**	27.1	8	60	40
13	PFCD1013	**2376.00**	35.4	6	75	50
15	PFCD1015	**2633.00**	41.7	4	90	60
17	PFCD1017	**2957.00**	48	4	100	70
21	PFCD1021	**3101.00**	59.4	3	125	90
25	PFCD1025	**5330.00**	68.8	2	150	100
27	PFCD1027	**5430.00**	75.1	2	150	110
30	PFCD1030	**6243.00**	83.4	1	175	125
34	PFCD1033	**7608.00**	93.8	1/0	200	150
37.5	PFCD1037	**9251.00**	104.3	2/0	225	150
41	PFCD1040	**9618.00**	114.7	2/0	250	175
45	PFCD1045	**9984.00**	125.1	3/0	250	175
49	PFCD1048	**10245.00**	135.5	4/0	300	200
53	PFCD1053	**10505.00**	147	4/0	300	225
60	PFCD1060	**11026.00**	168.9	300 kcmil	350	250
70	PFCD1070	**11786.00**	198.1	350 kcmil	450	300
80	PFCD1080	**12437.00**	222	500 kcmil	450	350

▲ Conductor should be copper and rated 90 °C min. Refer to local electrical codes for proper wire size
■ Consult local electrical codes for proper sizing of molded case circuit breaker frame or disconnect switch rating
Note: For fused unit, add suffix "F" to the existing part number. Consult Schneider Electric sales office for pricing.

Table 4.37: Unfused 240 V 3 phase/ 60Hz unit

kVAR rating	Regular duty Indoor NEMA 1 unit		Rated Current (A)	Recommended copper wire size▲	Recommended circuit protection device rating■	
@ 240 V	Catalog Number	$ Price	@ 240 V	AWG	Fuse	Circuit breaker
3	PFCD2003	**959**	7.2	14	15	15
6	PFCD2006	**1187.00**	15.6	10	35	25
8	PFCD2008	**1364.00**	20.5	8	45	30
10	PFCD2010	**1538.00**	24.1	8	50	35
13	PFCD2013	**1924.00**	31.3	6	70	45
15	PFCD2015	**2117.00**	36.1	6	75	50
17.5	PFCD2017	**2376.00**	40.9	6	90	60
20	PFCD2020	**2633.00**	48.1	4	100	70
22.5	PFCD2023	**2957.00**	55.3	3	125	80
25	PFCD2025	**3101.00**	61.4	3	125	90
27.5	PFCD2028	**4181.00**	68.6	2	150	100
30	PFCD2030	**5045.00**	72.2	2	150	100
32.5	PFCD2033	**5330.00**	79.4	1	175	110
37.5	PFCD2036	**5430.00**	86.6	1	175	125
40	PFCD2040	**6243.00**	96.2	1/0	200	150
45	PFCD2045	**7608.00**	108.3	2/0	225	150
50	PFCD2050	**9251.00**	120.3	2/0	250	175
60	PFCD2060	**9984.00**	144.4	4/0	300	200
70	PFCD2070	**10499.00**	169.6	300 kcmil	350	250
80	PFCD2080	**11026.00**	194.9	350 kcmil	400	300
90	PFCD2090	**11557.00**	218.9	400 kcmil	450	300
100	PFCD2100	**12072.00**	239.4	500 kcmil	500	350

▲ Conductor should be copper and rated 90 °C min. Refer to local electrical codes for proper wire size
■ Consult local electrical codes for proper sizing of molded case circuit breaker frame or disconnect switch rating
Note: For fused unit, add suffix "F" to the existing part number. Consult Schneider Electric sales office for pricing.

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Low Voltage Fixed Capacitors

Table 4.38: Unfused 480V 3 phase/ 60Hz unit

kVAR rating	Regular duty Indoor NEMA 1 unit		Rated Current (A)	Recommended copper wire size▲	Recommended circuit protection device rating■	
@ 480 V	Catalog Number	$ Price	@ 480 V	AWG	Fuse	Circuit breaker
6	PFCD4006	**929.00**	7.2	14	15	15
8	PFCD4008	**1022.00**	10.2	12	20	15
10	PFCD4010	**1077.00**	12	12	25	20
12.5	PFCD4012	**1215.00**	15	10	30	25
15	PFCD4015	**1329.00**	18	10	40	30
17	PFCD4017	**1374.00**	19.8	8	40	30
20	PFCD4020	**1479.00**	24	8	50	35
25	PFCD4025	**1655.00**	30	6	60	45
27.5	PFCD4027	**1754.00**	33	6	70	50
30	PFCD4030	**1851.00**	36	6	75	50
33	PFCD4033	**1953.00**	39.6	6	80	60
35	PFCD4035	**2102.00**	42	4	90	60
40	PFCD4040	**2358.00**	48	4	100	70
45	PFCD4045	**2519.00**	54	4	110	75
50	PFCD4050	**2676.00**	60	3	125	90
60	PFCD4060	**3975.00**	72	2	150	100
65	PFCD4065	**4200.00**	78	1	175	110
70	PFCD4070	**4280.00**	84	1	175	125
75	PFCD4075	**4434.00**	90	1/0	200	125
80	PFCD4080	**4695.00**	96	1/0	200	150
90	PFCD4090	**5217.00**	108	2/0	225	150
100	PFCD4100	**5738.00**	120	2/0	250	175
125	PFCD4125	**7148.00**	150	250	300	225
150	PFCD4150	**8556.00**	180	300	400	250
175	PFCD4175	**9561.00**	210	400	450	300
200	PFCD4200	**10565.00**	240	500	500	350

▲ Conductor should be copper and rated 90 °C min. Refer to local electrical codes for proper wire size
■ Consult local electrical codes for proper sizing of molded case circuit breaker frame or disconnect switch rating
Note: For fused unit, add suffix "F" to the existing part number. Consult Schneider Electric sales office for pricing.

Table 4.39: Unfused 600V 3 phase/ 60Hz unit

kVAR rating	Regular duty Indoor NEMA 1 unit		Rated Current (A)	Recommended copper wire size▲	Recommended circuit protection device rating■	
600 V	Catalog Number	$ Price	@ 600 V	AWG	Fuse	Circuit Breaker
10	PFCD6010	**1077.00**	9.6	12	20	15
15	PFCD6015	**1329.00**	14.4	10	30	20
20	PFCD6020	**1479.00**	19.2	10	40	30
23	PFCD6022	**1550.00**	22.1	8	50	35
25	PFCD6025	**1655.00**	24	8	50	35
27	PFCD6027	**1754.00**	26	8	50	40
30	PFCD6030	**1851.00**	28.8	8	60	45
35	PFCD6035	**2102.00**	33.6	6	70	50
40	PFCD6040	**2358.00**	38.4	6	80	60
45	PFCD6045	**2519.00**	43.2	4	90	60
50	PFCD6050	**2676.00**	48	4	100	70
60	PFCD6060	**3975.00**	57.6	3	125	80
70	PFCD6070	**4280.00**	67.2	3	150	100
75	PFCD6075	**4434.00**	72	2	150	100
80	PFCD6080	**4695.00**	76.8	1	150	110
90	PFCD6090	**5217.00**	86.4	1	175	125
100	PFCD6100	**5738.00**	96	1/0	200	150
125	PFCD6125	**7148.00**	120	3/0	250	175
150	PFCD6150	**8556.00**	144	4/0	300	200
175	PFCD6175	**9561.00**	168	300 kcmil	350	250

▲ Conductor should be copper and rated 90 °C min. Refer to local electrical codes for proper wire size
■ Consult local electrical codes for proper sizing of molded case circuit breaker frame or disconnect switch rating
Note: For fused unit, add suffix "F" to the existing part number. Consult Schneider Electric sales office for pricing.

Application Note: Capacitors are low impedance path for the harmonic currents produced by variable frequency drives, motor soft starters, welders, computers, PLCs, robotics and other electronic equipment. These harmonic currents can cause the capacitor to overheat, and shorten its life. Furthermore, the resonant circuit formed by shunt capacitors coupled with system inductances (motors and transformers) can amplify harmonic currents and voltages in the electrical network. This amplification can cause nuisance fuse operation and/or damage to electrical equipment including capacitors and other electronic devices. If power factor correction is required in the network where harmonic is present, please contact your nearest Square D/Schneider Electric sales office for assistance.

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The AV5000 is suitable for use where harmonic generating loads are less than 15% of the total connected load (AV5000 shown here).

Low Voltage Standard Automatic Capacitor Banks

The AV5000 standard automatic power factor correction banks are designed for centralized power factor correction to supply varying amounts of reactive power required to compensate for changing load conditions. The AV5000 banks are ideally suited for facility electrical distribution systems with TDD (total harmonic current distortion) < = 5% and THD(V) (total harmonic voltage distortion) < = 5%. An advanced power factor controller measures plant power factor via a single remote CT. Plus, it switches capacitor modules in and out of service to maintain a user selected target power factor.

Main Features:

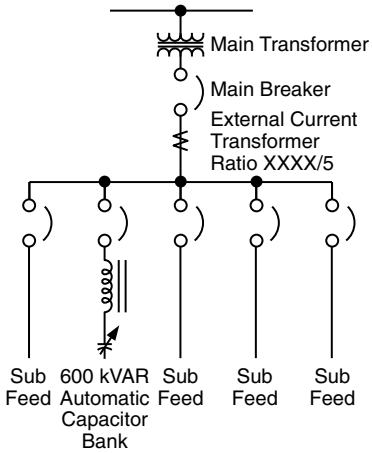
- Modular construction; free standing QED switchboard enclosures (30wx36dx90h) and allow for easy future expansion
- Rugged design — units are constructed with removable steel panels over heavy gauge steel frame
- Standard offering available up to 400 kVAR at 208 Vac, 1000 kVAR at 480 or 600 Vac
- Main lugs or main breaker section at your choice
- Dry capacitor element design eliminates risk of fluid leakage, environmental hazard and drip pans
- Capacitor rated contactors are designed specifically for the switching of capacitive currents and feature a patented capacitor precharge circuit that exceeds air-core reactor transient dampening
- Different power factor controller options provide a choice in functionality and control sophistication
- Backlit display on controller displays actual power factor (PF), alarms, number of steps energized and much more
- Available in NEMA 1 and NEMA 3R enclosures

AV6000 Capacitor Bank

Low Voltage Anti-Resonant and Filtering Automatic Capacitor Banks

ReactiVar AV6000 anti-resonant and AV7000 harmonic filtering automatic switched capacitor banks are specifically designed for networks containing harmonic energies which would otherwise damage standard fixed or automatic capacitor banks.

The problem: Harmonics are caused by non-linear loads such as variable frequency drives, motor soft starters, welders, uninterruptable power supplies, robotics, PLCs and other electronic devices. Harmonics are higher-than-60 Hz current and voltage components in the electrical distribution system. Capacitors are a low impedance path for these higher frequency components and thus will absorb these harmonic energies. Combinations of capacitors and system inductances (motors and transformers) can form series and parallel tuned circuits which can resonate at certain frequencies. The harmonics caused by non-linear loads can excite a standard capacitor bank into resonance. The resonance can magnify currents and voltages, causing system wide damage and equipment failure. This problem is growing in prevalence in today's distribution systems.



Single Line (Typical)
Diagram 1

The Solution:

Anti-Resonant Automatic Capacitor Banks

The AV6000 anti-resonance capacitor bank's primary function is power factor correction. Iron core reactors are added in series with the capacitor modules. The 3 phase reactors are custom designed and manufactured under tight tolerance specifically for the AV6000. The reactors tune the bank below the first dominant harmonic (usually the 5th, or 300 Hz). Below the tuning point, the system appears capacitive and thus corrects power factor. Above the tuning point, the system appears Inductive and thus resonance is minimized. The AV6000 design has the added advantage of removing up to 50% of the 5th harmonic to reduce overall voltage distortion.

Harmonic Filtering Automatic Capacitor Banks

Although the AV7000 looks identical to the AV6000, its primary function is harmonic mitigation, with power factor correction being a secondary benefit. The distinction between an AV6000 and an AV7000 is the tuning point. By definition, if the tuning point of the capacitor/reactor combination is within ±10% of the target harmonic it is intended to absorb, it is referred to as a filter. If the tuning point is outside the ±10% limit, it is referred to as an anti-resonant system. Schneider Electric power quality solution experts should be consulted prior to recommending AV7000 to customers.

Main Features:

- Standard offering available up to 480 kVAR at 208 V, 1200 kVAR at 480 or 600 Vac
- Capacitor modules are designed with higher than standard voltage and current ratings to provide long life on systems with high harmonic energies. Reactors are designed to operate at 115 °C rise over a maximum 40 °C ambient temperature.
- In addition to the standard features provided in the AV5000 systems, the reactors in the AV6000 and AV7000 have an embedded thermistor temperature detector. The stage will shut down and annunciate if the reactor is overheated, usually a result of excessive harmonic energies

Application Assistance:

Schneider Electric power quality experts can provide engineering assistance for the application of capacitors in harmonic rich environments. Specialists can assess the likelihood of application problems and arrange for more detailed study if required. Solutions can include computer modeling and system simulation. Our application engineers can arrange for systems studies, provide custom engineering proposal, perform installation and commissioning, as required by the application. Please contact Schneider Electric power quality experts or email us at pqc@squared.com.

CT Selection Table

The current transformer is located on a phase A bus or cable at the main service entrance as illustrated in Diagram 1.

CT catalog number: TRAI••••SC♦ ♦ where •••• is current rate code of bus/cable and ♦ ♦ is window size code. Codes are listed in table 4.42.

e.g. TRAI1000SC07 is a CT for 1000 A bus with 7"x4" window.

Table 4.40:

Current Rating of Bus/Cable		Window Size	
Amperes	Rating Code ••••	7" x 4" Size Code ♦ ♦	11" x 4" Size Code ♦ ♦
300	0300	07	11
400	0400	07	11
500	0500	07	11
600	0600	07	11
750	0750	07	11
800	0800	07	11
1000	1000	07	11
1200	1200	07	11
1500	1500	07	11
1600	1600	07	11
2000	2000	07	11
2500	2500	07	11
3000	3000	07	11
3500	3500	07	11
4000	4000	07	11
5000	5000	N/A	11
6000	6000	N/A	11

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AT6000 Transient Free Capacitor Bank

Low Voltage Transient Free Reactive Compensation Capacitor Banks

Square D™ ReactiVar Transient Free Reactive Compensation (TFRC) anti-resonant (AT/BT6000) systems and filtering system (AT/BT7000) are ideally suited for use on electrical systems where connected equipment is extremely sensitive to variations in the supply voltage.

The problem: Capacitor systems featuring electromechanical contactors could generate voltage transients on the electrical network when they switch capacitor stages on/off, even when current limiting or tuning reactors are employed. Transients can impair the operation of sensitive equipment, including programmable logic controllers, variable speed drives, computers and UPS systems. In sensitive networks such as hospitals, data processing centers, airports and many manufacturing environments, any transient, however slight, may not be acceptable.

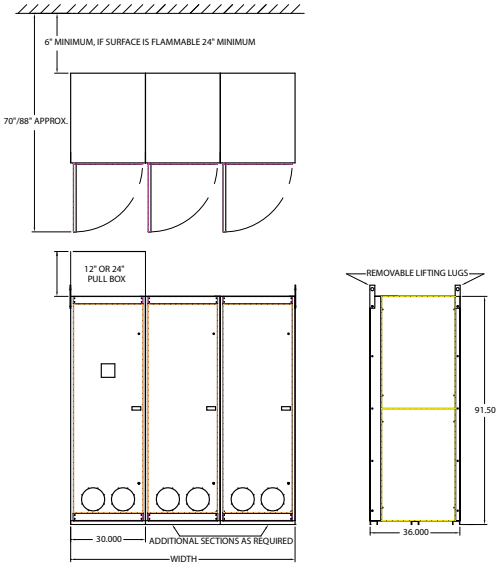
The solution: TFRC systems feature an advanced controller to precisely activate electronic switching elements to connect capacitor stages and avoid the creation of transients. Transient free switching also reduces wear on capacitors due to switching and will result in longer life for the overall capacitor system. With a response time of less than ten seconds to load changes, TFRC systems can reduce the kVAR or kVA demand quickly.

Main Features:

- Standard offering up to 1350 kVAR at 480 Vac
- Transient free switching of capacitor steps
- Electronic switching elements yield an unlimited number of switching operations
- Different power factor controller options provide a choice in functionality and control sophistication
- Backlit display on controller displays actual PF, alarms, number of steps energized and much more
- Heavy duty dry capacitor element design provides no risk of fluid leakage, no environmental pollution and no need for drip pans
- The reactors have an embedded thermistor temperature detector. The stage will shut down and annunciate if the reactor is overheated which is usually a result of excessive harmonic energies
- Units are constructed with removable heavy duty steel panels over heavy gauge steel frame.
- Available in NEMA 1 and NEMA 3R enclosures.

Low Voltage Capacitor Bank General Specification:

Voltage:	208, 240, 480, 600 Vac standard, other voltages available
Ambient temperature:	-5 °C to 40 °C
Average temperature limit:	<=40 °C within 24 hours, <35 °C over 1 year
Elevation:	<=1800 meter (6000 feet)
Humidity:	0–95% non-condensing
Overvoltage limit:	110% maximum (continuously)
Dielectric withstand test level:	2.15 times rated voltage or 1000 V, whichever is higher for 10s
Overcurrent limit:	135% maximum (continuously)
Incoming:	Top (standard), bottom.
Main lug:	Copper mechanical standard, compression optional
Main breaker (BT):	PowerPact™ with Micrologic™ trip unit. LI standard, LSI available
Enclosure rating:	NEMA 1 standard, N3R available
Color:	ANSI 49 standard, ANSI 61, ANSI 70 optional
Standards:	CSA C22.2 No. 190, UL810



Typical low voltage capacitor bank dimension
(reference only, subject to change without notice)

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MVC systems are suitable for power factor correction of steady and harmonic-free motor loads.

ReactiVar Medium Voltage Fixed Capacitors

The ReactiVar MVC fixed capacitors are ideally suited for power factor correction in applications where the load does not change or where the capacitor is switched with the load, such as the load side of a motor contactor. ReactiVar capacitor sizes are available up to 300 kVAR as individual units, and up to 900 kVAR in banks.

Main Features:

- Standard rating up to 900 kVAR, 4800 V (for specials, consult factory)
- Extra low dielectric loss (<0.15w/kVAR), including discharge resistors
- Internally mounted discharge resistors
- Internally delta connected capacitor elements
- Built to applicable NEMA, IEEE, and IEC standards
- Available in indoor (Type 1/12) and outdoor (Type 3R) enclosures
- Painted ASA 70 gray

Application Note:

Capacitors are low impedance path for the harmonic currents produced by variable frequency drives, motor soft starters, welders, computers, PLCs, robotics and other electronic equipment. These harmonic currents can cause the capacitor to overheat, and shorten its life. Furthermore, the resonant circuit formed by shunt capacitors coupled with system inductances (motors and transformers) can amplify harmonic currents and voltages in the electrical network. This amplification can cause nuisance fuse operation and/or damage to electrical equipment including capacitors and other electronic devices. If power factor correction is required in the network where harmonic is present, please contact your nearest Square D/Schneider Electric sales office for assistance.

MV5000 systems are suitable for use where harmonic generating loads are less than 15% of the total connected load.

MV6000 systems are suitable for use where harmonic generating loads are less than 50% of the total connected load.

MV7000 systems are suitable for use where harmonic generating loads exceed 50% of the total connected load.

MVHVC High-Speed compensation systems are designed for reactive power compensation of rapidly fluctuating loads

Medium Voltage Metal Enclosed Capacitor Systems

The medium voltage capacitor systems are ideally suited for centralized power factor correction and/or harmonic filtering in applications. Various equipment topologies are available, from fixed stage to fully automatic—to cover project specific application, load characteristic and installation needs. ReactiVar brand covers metal enclosed systems built in North America (5/15 kV class). Global =S= Brand can be used for expanded voltage range.

Main Features:

- Designed and built per applicable ANSI/NEMA/IEEE and/or IEC standards
- Standard metal enclosures available up to 20 mVAR, up to 34.5 kV, 50/60 Hz
- Steel or Aluminum based enclosure bays
- Externally or internally fused capacitors with excellent life due to high temperature withstand, small temperature rise, chemical stability, overvoltage and overcurrent withstand.
- Current limiting capacitor fuses with blown fuse pop-up indicators
- Inrush current limiting reactors or tuned (anti-resonant or filtered) iron core reactors
- Key interlocking system forces sequential operation of the controls,
- Fully rated three- or four-pole grounding switches
- Schneider Electric NRC12 Power factor controller provides user with friendly interface, superior performance, simplified installation and set-up procedure, and real time monitoring and protection features for the capacitor system.
- Available in Type 1 indoor and 3R outdoor enclosure types

High Voltage Reactive Power Compensation Systems

The high voltage reactive power compensation systems are ideally suited for installation at utility distribution and transmission grids. Various equipment topologies are available to cover project specific utility application, and installation needs. Typically these compensation systems are open style, rack mounted, installed in utility substation areas.

Main Features:

- Custom designed and built per requested applicable standards
- Systems rated up to 230 kV, 50/60 Hz
- Internally fused capacitors with excellent life due to high temperature withstand, small temperature rise, chemical stability, overvoltage and overcurrent withstand.
- Double wye ungrounded configuration with neutral CT protection
- Inrush current limiting or tuned (anti-resonant or filtered) air core, open style reactors

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AccuSine (PCS) Active Harmonic Filter (AHF) injects harmonic current to cancel harmonic current in the electrical distribution system. This reduced harmonic level results in improved electrical network reliability and reduced operating cost. AccuSine PCS is simple to size, install, set up and operate. In addition, AccuSine PCS eliminates the complex harmonic compliance limit calculations and removes nuisance harmonics from the electrical network.

The problem:

Power electronic devices that have rapid and frequent load variations have become abundant today due to their many process control related and energy saving benefits. However, they also bring a few major drawbacks to electrical distribution systems; harmonics and rapid change of reactive power requirement. Harmonics may disrupt normal operation of other devices and increase operating costs. Symptoms of problematic harmonic levels include overheating of transformers, motors, drives, cables, thermal tripping of protective devices and logic faults of digital devices. In addition, the life span of many devices can be reduced by elevated operating temperature.

The solution:

The AccuSine PCS AHF provides the simplest and most effective means to mitigate harmonics, to reduce process related voltage fluctuations. The AccuSine PCS AHF actively injects opposite harmonics current on the source side of the load and it:

- Decreases harmonic related overheating of cables, switchgear and transformers
- Reduces downtime caused by nuisance thermal tripping of protective devices
- Increases electrical network reliability and reduces operating costs
- Corrects to the 50th harmonic, reduce harmonics level to meet IEEE 519, IEC 61000 3-4, and UK G5/4-1 standards.
- Compensates entire network or specific loads depending on installation point

Standard features

- Real-time dynamic current injection for harmonic cancellation and VAR compensation (lead or lag power factor)
- Independent phase compensation
- Load balancing capability
- Parallel connection (up to 99 units) allows for easy retrofit and installation of multiple units for large networks
- Response to load fluctuations within 2 cycles
- Full color touch screen HMI (Human Machine Interface)
- NEMA 1, NEMA 12, IP30 AND IP54 enclosure
- Seismic rated per ICC IBC and ASCE 7
- UL, CE, ABS, and CSA certified

Accusine PCS Sizing

For proper sizing of AccuSine units, contact the Schneider Electric sales office or e-mail pqc@squared.com. To expedite the product selection process, please have a single line diagram and/or details of the application including sizes of transformers, non-linear and linear loads, and any existing filters and capacitors.

Table 4.41: AccuSine PCS 208–480 V, 50/60 Hz

Rated Current	Max Reactive Power output (kVAR)			Catalog Number	List Price (US$)	Enclosure Information		Exterior Dimensions						Weight lbs (kg)	Watts Losses (watts)	
						Rating	Style/Cable Entry	H		W		D				
A(ms)	208 V	400 V	480 V					In	mm	In	mm	In	mm		208/240 V	480 V
50	18	34.6	41.6	PCS050D5N1	**34904.00**	NEMA 1	Wall Mount▲■/Bottom	48	1219	20.7	526	18.5	470	250 (114)	900	1800
	N/A			PCS050D5N12	**53738.00**	NEMA 12	Floor Standing/Top or Bottom	75	1905	31.5	800	23.8	605	661 (300)		2250
				PCS050D5CE30♦	**59516.00**	IP30 (CE Certified)								705 (320)		2250
				PCS050D5CE54♦	**62770.00**	IP54 (CE Certified)										2250
				PCS050D5IP30	**54299.00**	IP30								661 (300)		2250
				PCS050D5IP54	**57553.00**	IP54										2250
100	36	69.2	83.1	PCS100D5N1	**55131.00**	NEMA 1	Wall Mount▲■/Bottom	64.9	1648	20.7	526	18.5	470	350 (159)	1500	3000
	N/A			PCS100D5N12	**66777.00**	NEMA 12	Floor Standing/Top or Bottom	75	1905	31.5	800	23.8	605	771 (350)		3750
				PCS100D5CE30♦	**74449.00**	IP30 (CE Certified)								849 (386)		3750
				PCS100D5CE54♦	**78679.00**	IP54 (CE Certified)										3750
				PCS100D5IP30	**67479.00**	IP30								771 (350)		3750
				PCS100D5IP54	**71585.00**	IP54										3750
300	108	207.8	249.4	PCS300D5N1	**110301.00**	NEMA 1	Floor Standing/Top or Bottom	75	1905	31.5	800	19.6	497	775 (352)	4500	9000
	N/A			PCS300D5N12	**132341.00**	NEMA 12				39.4	1000	31.7	806	1212 (550)		10000
				PCS300D5CE30♦	**144502.00**	IP30 (CE Certified)								1390 (632)		10000
				PCS300D5CE54♦	**161035.00**	IP54 (CE Certified)										10000
				PCS300D5IP30	**133670.00**	IP30								1212 (550)		10000
				PCS300D5IP54	**142628.00**	IP54										10000

▲ Floor stand available. order Catalog Number — FSPCS100D5N1
■ Wall mounted units do not include a power disconnect.
♦ CE Certified units meet EMC Directive 89/336 EEC.

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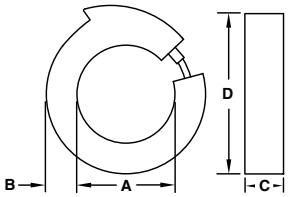
Table 4.42: AccuSine PCS 600 V■, 50/60 Hz

Rated Current	Max Reactive Power output (kVAR)	Catalog Number	List Price (US$)	Enclosure Information		Exterior Dimensions						Weight lbs (kg)	Watts Losses (watts)
				Rating	Style/Cable Entry	H		W		D			
						In	mm	In	mm	In	mm		
A(ms)	600 V												600 V
39	41	PCS039D6N1	**94423.00**	NEMA 1	Floor Standing/Top or Bottom	77.7	1972	55.1	1400	23.6	600	1322 (600)	2850
		PCS039D6N12	**100088.00**	NEMA 12								1366 (621)	
		PCS039D6CE30	**111199.00**	IP30 (CE Certified)▲									
		PCS039D6CE54	**117805.00**	IP54 (CE Certified)▲									
		PCS039D6IP30	**101090.00**	IP30								1322 (600)	
		PCS039D6IP54	**107096.00**	IP54									
78	81	PCS078D6N1	**115031.00**	NEMA 1	Floor Standing/Top or Bottom							1542 (700)	4610
		PCS078D6N12	**121933.00**	NEMA 12									
		PCS078D6CE30	**135469.00**	IP30 (CE Certified)▲								1620 (736)	
		PCS078D6CE54	**143517.00**	IP54 (CE Certified)▲									
		PCS078D6IP30	**123154.00**	IP30									
		PCS078D6IP54	**130470.00**	IP54								1542 (700)	
235	244	PCS235D6N1	**202406.00**	NEMA 1	Floor Standing/Top or Bottom			70.9	1800	31.5	800	2424 (1102)	12750
		PCS235D6N12	**214550.00**	NEMA 12									
		PCS235D6CE30	**238365.00**	IP30 (CE Certified)▲								2602 (1183)	
		PCS235D6CE54	**252525.00**	IP54 (CE Certified)▲									
		PCS235D6IP30	**216696.00**	IP30									
		PCS235D6IP54	**229569.00**	IP54								2424 (1102)	

▲ CE Certified units meet EMC Directive 89/336 EEC.
■ Contact Schneider Electric sales office for other voltage models.

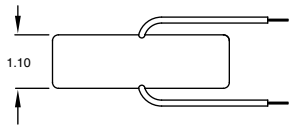


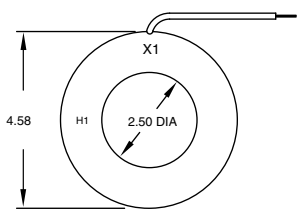
Round Split-Core Current Transformer (CT) Selection:

Two remote current transformers (CT) are required for three phase loads. Three CT's are required for networks with line to neutral loads.

Table 4.43: Round Split-Core CT—UL Recognized

Ampacity	Catalog Number	Dimensions								Weight		Accuracy Class	Burden Capacity (VA)	Secondary Current
		A		B		C		D						
		in	mm	in	mm	in	mm	in	mm	lbs	kg			
1000	CT1000SC	4	101	1.25	32	1.5	38	6.5	165	3.5	1.75	1	10	5
3000	CT3000SC	6	152	1.25	32	1.5	38	8.5	216	4.25	1.90	1	45	5
5000	CTFCL500058	8	203	1.25	32	1.5	38	10.5	267	5.5	2.50	1	45	5





Round Solid-Core Current Transformer (AUX CT) Selection:

For installations requiring parallel connection of multiple AccuSine units for increased capacity, additional auxiliary CT's may be required. Please contact Schneider Electric sales office for the correct AUX CT part number to use.

Table 4.44: Round Solid-Core Auxiliary CT—UL Recognized

Ampacity	Catalog Number	Dimensions				Weight (lb)		Accuracy Class	Burden Capacity (VA)	Secondary Current
		ID		OD						
		in	mm	in	mm	lbs	kg			
600	CT7RL6011	2.5	63	4.58	116	1.5	0.68	1	30	1
1000	CT7RL1021	2.5	63	4.58	116	1.5	0.68	1	35	1

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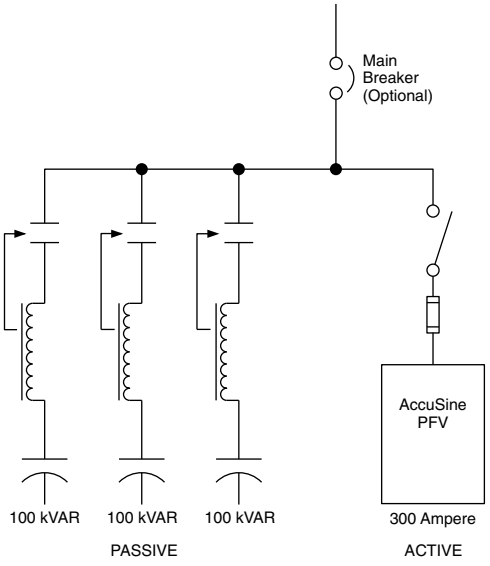

HVC Topology (Typical)

The Hybrid VAR Compensator (HVC) is ideally suited for industrial facilities with power quality or production problems caused by rapidly changing reactive power demands typically associating with highly cyclical loads such as welders, mining conveyors and heavy stamping machines.

The problem:

Rapid reactive power changes demand timely reactive power (VAR) compensation. Lack of timely and adequate VAR compensation can lead to voltage fluctuations in the electrical distribution system, impacting equipment operation, as well as product quality.

Traditional capacitor systems have a minimum response time of five to thirty seconds for load fluctuations. As a result of this limitation, uncompensated reactive power demand by cyclical loads can produce voltage instability, cause flicker, increase losses, and result poor power factor which reduces the electric supply capacity. Problems can include:

- Poor weld quality or reduced weld line productivity (due to restrikes or interlock weld controls)
- Failure to start motor loads (due to voltage sag on startup)
- Undervoltage tripping of sensitive loads (Robots, PLCs, VFDs)
- Lighting flicker and/or HID lighting shutdown
- Overloaded distribution equipment (cyclical current pulses may exceed the rated current of the distribution equipment)
- Poor power factor and associated utility demand charges

The Solution:

The Hybrid VAR Compensator is ideally suited for ultra fast reactive power compensation in many low and medium voltage distribution networks containing highly transient loads where conventional systems are not suitable.

The HVC employs a fixed or automatic capacitor bank to provide reactive power at all times, while AccuSine PFV adjusts the output to meet system reactive power requirement in timely manner. AccuSine PFV features a 100 microsecond response time to provide dynamic VAR injection to meet reactive power requirement within 1 cycle, reduce voltage sags created by inductive load switching, welding operation, etc.

Main Features:

- Real-time reactive power compensation for transient or cyclical loads
- Infinite VAR resolution
- Independently compensates each phase
- Transient free compensation
- Improves voltage stability, reduces flicker
- Constructed with 12 gauge steel frame

HVC systems can alleviate most of the problems created by cyclical loads that require large amount of reactive power for short duration. HVC system can be applied in the low voltage and medium voltage system from 480 V up to 33 kV.

Unique, cost-effective construction:

The ReactiVar HVC is a custom engineered product designed for specific reactive power compensation requirements. It consists of both passive and active components. The passive component may consist of capacitors only or include tuned reactors. Depending on the application, the passive portion may include contactor or solid state switching device to permit some adjustment of the passive elements. The active component is provided by Schneider Electric's AccuSine PFV unit. HVC systems also can prevent resonance by including custom designed iron core reactors in series with each three phase capacitor module when required. The series reactor/capacitor combinations prevent resonance by turning the network below the first dominant harmonic (usually the 5th and 300 Hz). In doing so, HVC can also reduce harmonic voltage distortion, which further improves overall network conditions.

The HVC employs a fixed capacitor bank to inject leading reactive current (leading kVAR) into the network at all times, and an AccuSine PFV unit to precisely adjust the total output of the HVC according to the load reactive power demand profile. When load reactive demand is zero, the AccuSine PFV injects lagging reactive current to cancel the leading reactive current of the fixed capacitor bank such that the total output of the HVC is minimized. As the load kVAR demand increases, the AccuSine PVF adjusts its output such that the total output of the HVC precisely matches the load demand. If load demand increases above the fixed capacitor bank capability, then the AccuSine PFV injects leading reactive current. This continues until the full leading kVAR capacity of the AccuSine PFV is met. Thus, the HVC total output provides leading kVAR compensation to match load demand.

To optimize system design, Schneider Electric expert will normally need to take real-time measurements on the network site. Please contact Schneider Electric power quality experts or email us at pqc@squared.com.

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Lighting Controls

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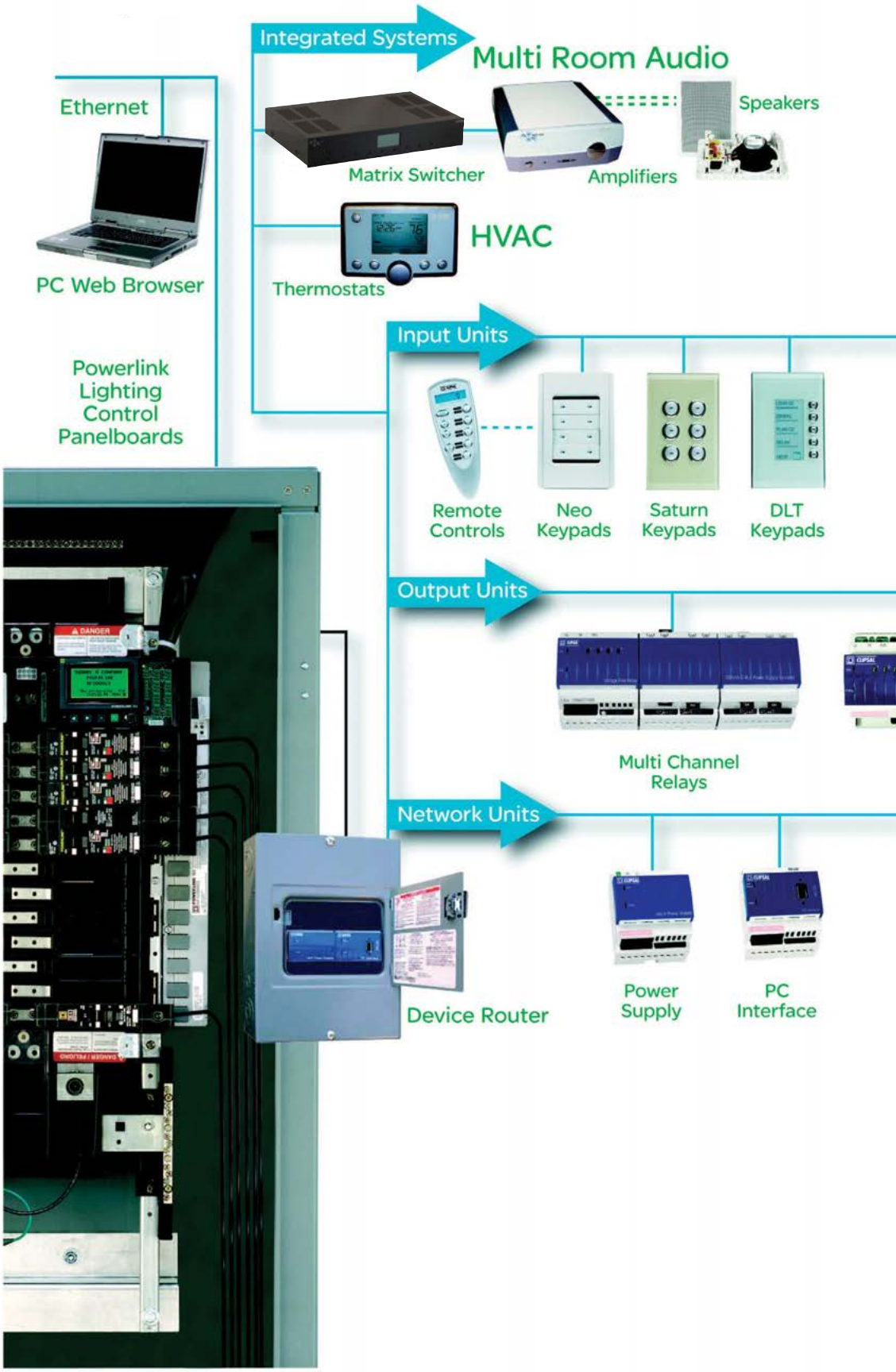
Schneider Electric Occupancy Sensors, Powerlink and C-Bus™ control systems can be used independently or combined to provide the optimal lighting control solution for your home or business



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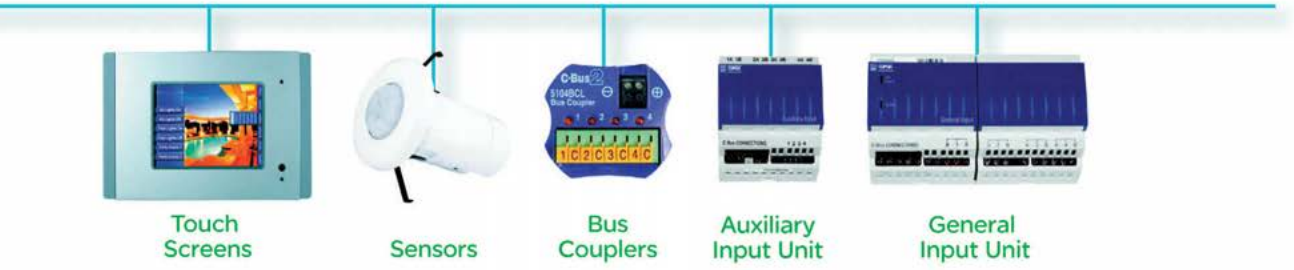

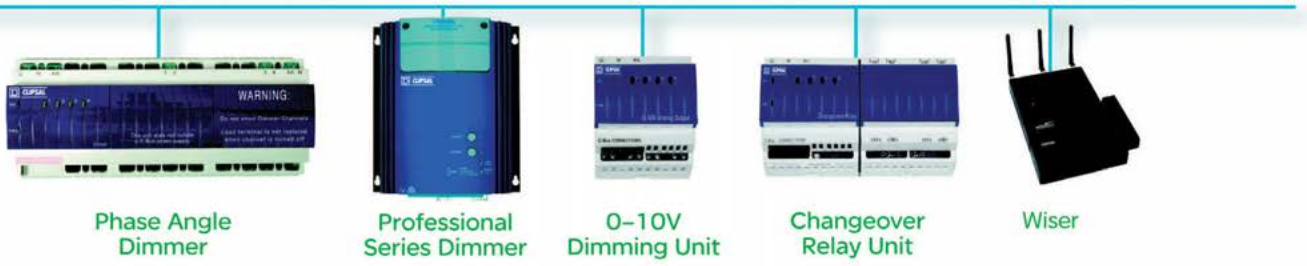

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Neo™ Keypads

Neo Keypads offer localized finger-tip control of lighting and other electrical devices. With over 1,000 custom color combinations available, these elegant keypads compliment any decor. Requires plaster mud ring or single gang box with minimum internal width of 2.05".

- Button configurations include multi-point switching and dimming, master ON/OFF switching, and scene settings
- Scene control includes up to forty group addresses per keypad. Larger scenes are possible by sharing memory among multiple keypads
- Independent timers available for each button
- Standard built-in infrared receiver permits keypad control at a distance with an optional infrared handheld remote
- Dual-color LED windows on each button can glow in cool blue, orange, or combinations of both, indicating when a controlled device is ON or OFF
- Auto "fallback" can dim button LEDs at a set time after the last key press
- Locator LEDs can illuminate the top and bottom of the button area in cool blue, helping a user find the keypad in dim light or help the installer find the correct keypad when commissioning
- Clean-lined low-profile keypads are wall mounted without external fittings
- Optional button covers have ID windows, enabling quick identification of lighting scenes or controlled devices
- Distinctively designed multi-layer cover plate consists of button covers, an outer surround, and an inner surround
- Color schemes are easily customized and modified to suit personal taste or the décor

Standard Neo Keypads

Includes keypad, button covers, inner and outer surrounds.

White: SLC505( )NLWE
Cream: SLC505( )NLCM
Brushed Aluminum w/Slate: SLC505( )NLGB

( ) designates space for button configuration

Table 5.1: Standard Neo Keypad Assemblies

Catalog No.	Catalog Description	$ Price
SLC5052NLGB	Neo, 2 button key input brushed aluminum	**460.00**
SLC5052NLWE	Neo, 2 button key input solid white	**460.00**
SLC5052NLCM	Neo, 2 button key input solid cream	**460.00**
SLC5054NLGB	Neo, 4 button key input brushed aluminum	**500.00**
SLC5054NLWE	Neo, 4 button key input solid white	**500.00**
SLC5054NLCM	Neo, 4 button key input solid cream	**500.00**
SLC5058NLGB	Neo, 8 button key input brushed aluminum	**560.00**
SLC5058NLWE	Neo, 8 button key input solid white	**560.00**
SLC5058NLCM	Neo, 8 button key input solid cream	**560.00**

2 Button Keypad
Brushed Aluminum w/Slate: SLC505(2)NLGB

4 Button Keypad
Cream: SLC505(4)NLCM

8 Button Keypad
White: SLC505(8)NLWE

Custom Neo Keypad Assemblies

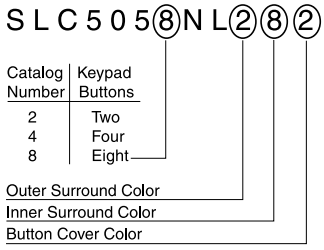
To order custom Neo Keypad assemblies indicate the number of buttons desired on the keypad and the color of each customizable component (inner surround, outer surround, and botton cover).

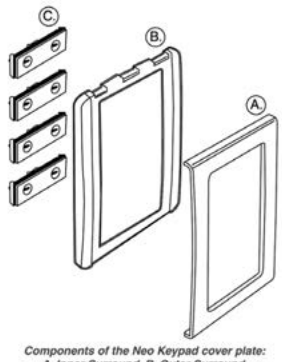
For example, in the diagram below, SLC505(8)NL(2)(8)(2) represents a Neo Keypad with eight buttons, a white (#2) outer surround, a brushed aluminum (#8) inner surround, and white (#2) button covers.

Table 5.2: Color Chart

Name	Color Number
Slate	1
White	2
Cream	3
Soft Gray	4
Desert Sand	5
Black	6
Brown	7
Brushed Aluminum▲	8
Gold▲	9

▲ Only the inner surround is available in Brushed Aluminum and Gold.





Components of the Neo Keypad cover plate:
A. Inner Surround, B. Outer Surround,
C. Button Covers

Table 5.3: Neo Keypad Accessories

Catalog No.	Catalog Description	$ Price
SLC5050IS( )	Neo, inner surround, (5pk)	**152.00**
SLC5050OS( )	Neo, outer surround, (5pk)	**46.00**
SLC5052NRP( )	Neo, button covers, 5052L, (5pk)	**60.00**
SLC5054NRP( )	Neo, button covers, 5054L, (5pk)	**60.00**
SLC5058NRP( )	Neo, button covers, 5058L, (5pk)	**60.00**
SLC5052NRI( )	Neo, button covers, with ID window, (10pk)	**82.00**

Note: Accessories have unique catalog numbers. To specify colors for them, (see Table 5.1) add the color number to the end of the catalog number (Table 5.3). For example, SLC5052NR2 is the catalog number for a white button cover.

Neo button cover with ID window

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Saturn 2 Button Keypad

Saturn 4 Button Keypad

Saturn 6 Button Keypad

Saturn Style Keypad

Neo Style Keypad

Saturn™ Keypads

Saturn Keypads incorporate a unique glass cover plate that creates a distinctive appearance. By virtue of the variety of button configurations available, one compact Saturn keypad can take the place of many single operation switches, ON/OFF toggles, dimmers, and timers. Available in two-, four-, or six-button keypads, Saturn's modern style is complemented by orange and blue LEDs that can instantly show the status of controlled devices. Requires plaster mud ring or single gang box with minimum internal width of 2.05".

- Button configurations include multi-point switching and dimming, master ON/OFF switching, and scene settings
- Scene control includes up to forty group addresses per keypad. Larger scenes are possible by sharing memory among multiple keypads
- Independent timers available for each button
- Dual-color LED windows on each button can glow in cool blue, orange, or combinations of both, indicating when a controlled device is ON or OFF
- Auto "fallback" can dim button LEDs at a set time after the last button press
- Locator LED can illuminate the keypad, helping a user find it in dim light
- Clean-lined keypads are wall mounted without external fittings
- Low-profile design extends only 0.5 in. out from the wall
- Optional button covers with labels, enabling quick identification of lighting scenes or controlled devices

Saturn Keypads

Table 5.4: Complete Saturn Keypads

Catalog No.	Catalog Description	$ Price
SLC5082NL( )	Saturn Full Plate, 2 button	**634.00**
SLC5084NL( )	Saturn Full Plate, 4 button	**668.00**
SLC5086NL( )	Saturn Full Plate, 6 button	**700.00**

Note: Color codes are: White (WE), Black (BK), Mocha (BR), Cream (CM). The catalog number for a two-button keypad in mocha would be SLC5082NLBR

Table 5.5: Saturn Keypad Accessories

Catalog No.	Catalog Description	$ Price
SLC5080LC8	Saturn Button Labels	**74.00**
SLC5082NLFSS	Saturn Cover Plate Stainless Steel, 2 button	**96.00**
SLC5084NLFSS	Saturn Cover Plate Stainless Steel, 4 button	**112.00**
SLC5086NLFSS	Saturn Cover Plate Stainless Steel, 6 button	**128.00**
SLC5082FGF	Saturn Cover Plate White, 2 button	**96.00**
SLC5084FGF	Saturn Cover Plate White, 4 button	**112.00**
SLC5086FGF	Saturn Cover Plate White, 6 button	**128.00**
SLC5082F30	Saturn Cover Plate Cream, 2 button	**96.00**
SLC5084F30	Saturn Cover Plate Cream, 4 button	**112.00**
SLC5086F30	Saturn Cover Plate Cream, 6 button	**128.00**
SLC5082F60	Saturn Cover Plate Black, 2 button	**96.00**
SLC5084F60	Saturn Cover Plate Black, 4 button	**112.00**
SLC5086F60	Saturn Cover Plate Black, 6 button	**128.00**
SLC5082F70	Saturn Cover Plate Brown, 2 button	**96.00**
SLC5084F70	Saturn Cover Plate Brown, 4 button	**112.00**
SLC5086F70	Saturn Cover Plate Brown, 6 button	**128.00**

Note: Color options for faceplates: Pure White (PW).

DLT Keypads

Saturn™ Dynamic Labeling Technology™ (DLT) Keypads combine a programmable keypad button, and easily customized labels on a backlit LCD screen that eliminates the need for custom labels. By virtue of the variety of button configurations available, one compact DLT keypad can take the place of many single-operation switches, ON/OFF toggles, dimmers, and timers. The five keypad buttons incorporate blue LEDs which complements the keypad's sleek lines while showing the status of controlled devices.

- Button configurations include multi-point switching and dimming, master ON/OFF switching, and scene settings
- Keypads have five physical buttons—four control buttons, and one scroll/page button—combined with two screens of labels, for a total of eight control buttons and two scroll/page buttons
- Scene control includes up to forty addresses per keypad. Larger scenes are possible by sharing memory among multiple keypads.
- Independent timers available for each button
- Button LEDs can be used as locator lights in the dark
- 64 x 128 pixel LCD screen with a white backlight
- Editable LCD labels, available for each button or control group, can display text, symbols, and graphics.
- Dynamic graphic displays, such as bar graphs, can be enabled or disabled
- Bitmaps can be downloaded for each group address or scene
- Low-profile design, wall mounted without external fittings

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Table 5.6: Saturn and Neo Style DLT Keypads

Catalog No.	Catalog Description	$ Price
SLC5085DLWE	Saturn DLT White	966.00
SLC5085DLBK	Saturn DLT Black	966.00
SLC5085DLCM	Saturn DLT Cream	966.00
SLC5085DLBR	Saturn DLT Mocha	966.00
SLC5055DLGB	Neo DLT Brushed Aluminum	898.00
SLC5055DLWE	Neo DLT White	898.00
SLC5055DLBK	Neo DLT Black	898.00
SLC5055DLSG	Neo DLT Soft Grey	898.00
SLC5055DLCM	Neo DLT Cream	898.00
SLC5055DLDS	Neo DLT Desert Sand	898.00

Table 5.7: DLT Keypad Accessories

Catalog No.	Catalog Description	$ Price
SLC5085DLFSS	Saturn DLT cover plate, Stainless Steel	110.00
SLC5085DLFCM	Saturn DLT cover plate, Cream	110.00
SLC5085DLFBK	Saturn DLT cover plate, Black	110.00
SLC5085DLFBR	Saturn DLT cover plate, Mocha	110.00
SLC5085DLFWE	Saturn DLT cover plate, White	110.00
SLC5055DLFGB	Neo DLT cover plate, Brushed Aluminum and Slate	12.00
SLC5055DLFBR	Neo DLT cover plate, Brown	12.00
SLC5055DLFCM	Neo DLT cover plate, Cream	12.00
SLC5055DLFBK	Neo DLT cover plate, Black	12.00
SLC5055DLFSG	Neo DLT cover plate, Soft Gray	12.00
SLC5055DLFDS	Neo DLT cover plate, Desert Sand	12.00
SLC5055DLFWE	Neo DLT cover plate, White	12.00

Note: Color options for faceplates: Pure White (PW).

Neo™ Decorator Keypads

Neo Decorator Keypad

Neo Style Decorator Keypads provide the same features of a standard C-Bus keypad in a format designed to conserve horizontal wall space.

- Button configurations include multi-point switching, dimming, and scene control
- LED indicator reflects status of each button
- Built-in infrared receiver to allow operation from C-Bus handheld remote control
- Distinctive Neo styling designed to match standard Neo keypads and touchscreens
- Custom color combinations available on request
- Meets NEMA Standards WD-1, WD-6

Table 5.8: Neo Decorator Keypad Assembly (order face plates separately)

Catalog No.	Description	$ Price
Neo Decorator 1 button keypad (XX) Designates Color. (order cover plate separately)		
SLC5051NLM(XX)	1 button decorator keypad	386.00
Neo Decorator 2 button keypad (order cover plate separately)		
SLC5052NLM(XX)	2 button decorator keypad brushed aluminum	408.00
Neo Decorator 3 button keypad (order cover plate separately)		
SLC5053NLM(XX)	3 button decorator keypad brushed aluminum	430.00
Neo Decorator 4 button keypad (order cover plate separately)		
SLC5054NLM(XX)	4 button decorator keypad brushed aluminum	452.00
Neo Decorator Blanking Plate (order cover plate separately)		
SLC5850BP(XX)	Neo blanking plate	14.00

Note: Designate colors (XX), when placing order for Neo style decorator keypads.
GB – Brushed, WE – White, CM – Cream, SG – Soft Grey, DS – Desert Sand, BK – Black, BR – Brown, LA – Light Almond, VY – Ivory.

Saturn™ Decorator Keypads

Saturn Decorator Keypad

Saturn Style Decorator Keypads provide the same features of a standard C-Bus keypad in a format designed to conserve horizontal wall space.

- Button configurations include multi-point switching, dimming, and scene control
- LED indicator reflect status of each button
- Built-in infrared receiver to allow operation from C-Bus remote controllers
- Distinctive Saturn styling designed to match standard Saturn keypads and touchscreens
- Meets NEMA Standards WD-1, WD-6

Table 5.9: Saturn Decorator Keypad Assembly (order face plates separately)

Catalog No.	Description	$ Price
Saturn Decorator 1 button keypad (XX) Designates Color. (order cover plate separately)		
SLC5081NLM(XX)	1 button deco Saturn keypad, White	526.00
Saturn Decorator 2 button keypad (XX) Designates Color. (order cover plate separately)		
SLC5082NLM(XX)	2 button deco Saturn keypad, White	538.00
Saturn Decorator 3 button keypad (XX) Designates Color. (order cover plate separately)		
SLC5083NLM(XX)	3 button deco Saturn keypad, White	548.00
Saturn Decorator 4 button keypad (XX) Designates Color. (order cover plate separately)		
SLC5084NLM(XX)	4 button deco Saturn keypad, White	556.00
Blanking Plates		
SLC5880BPPG(XX)	Saturn Blanking Plate	24.00

Note: Designate colors (XX), when placing order for Saturn style decorator keypads.
WE – White, PW – Pure White, CM – Cream, BK – Black, BR – Brown.

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Neo Decorator Style Cover Plate

Neo and Saturn Style Decorator Face Plates

C-Bus decorator style wall plates add a touch of flair to any décor. Available in either Neo or Saturn styling.

- Sleek, smooth contemporary architectural styling enhances fine decor
- Screwless design for easy placement
- Two piece kit allows easy retrofit
- Meets NEMA Standards WD-1, WD-6

Table 5.10: Neo Decorator Style Cover Plates (order keypad assemblies separately)

Catalog No.	Description	$ Price
Neo Decorator Cover Plate 1 gang▲		
SLC5051GA(XX)	1 gang wallplate	**14.00**
Neo Decorator Cover Plate 2 gang▲		
SLC5052GA(XX)	2 gang wallplate	**18.00**
Neo Decorator Cover Plate 3 gang▲		
SLC5053GA(XX)	3 gang wallplate	**22.00**
Neo Decorator Cover Plate 4 gang▲		
SLC5054GA(XX)	4 gang wallplate	**26.00**

▲ Cover plate assembly includes inner and outer surrounds. Wall plate ordering (Order keypads separately). Order numbers for the Neo decorator style wall plates indicate the gang number desired on the wall plate and the color of the wall plate itself. Color codes are: Slate (1), White (2), Cream (3), Soft gray (4), Desert sand (5), Black (6), Brown (7), Brushed aluminum (8), and Gold (9). For example, SLC505(1)GA(51) represents an order fo a Neo decorator style wall plate in one gang configuration, with a Desert sand outer surround and a slate inner surround.

2 Gang Saturn Decorator Style Cover Plate

Table 5.11: Saturn Decorator Style Cover Plates (order keypad assemblies separately)

Catalog No.	Description	$ Price
Saturn Decorator Cover Plate 1 gang■		
SLC5081GAPG(XX)	1 gang wallplate	**24.00**
Saturn Decorator Cover Plate 2 gang■		
SLC5082GAPG(XX)	2 gang wallplate	**28.00**
Saturn Decorator Cover Plate 3 gang■		
SLC5083GAPG(XX)	3 gang wallplate	**38.00**
Saturn Decorator Cover Plate 4 gang■		
SLC5084GAPG(XX)	4 gang wallplate	**45.00**

■ To specify color, add corresponding alpha codes. Black = BK, White = WE, Cream = CM, Mocha = BR. Example SLC5081GAPG(WE) = Saturn Decorator 1 gang, White

Mark II Black and White and Spectrum Color touch screen with Cream Saturn style cover plate

Touch screens

C-Bus Touch screens are unified wall-mounted panels for controlling lighting systems and accessories with the touch of a finger. They come in both monochromatic (Mark II) and color screen versions. Compact yet powerful, touch screens offer an attractive alternative to multiple single operation switches, ON/OFF toggles, dimmers, and timers which can clutter up even the nicest wall.

Mark II Black and White and Spectrum Color touch screen

- Control screens support multi-point switching and dimming, master ON/OFF switching, scheduling, and scenes with multiple loads.
- Preset scenes and functions automate the task of adjusting lighting levels to different lamps and fixtures.
- RS-232 port for third party device integration through the built in Logic Engine
- Standard real-time and astronomical clock permits time scheduling of lighting and other tasks
- Variable dimming fade rates can be configured according to load or lighting zone
- Locator option can be configured to help users find the screen in dim light
- Clean-lined low-profile touch screen can be wall-mounted without external fittings
- Infrared receiver for remote control
- Stores up to 250 scenes with 100 group addresses each. Scenes can be triggered directly from the touch screen or any other device on C-Bus

Mark II Black and White and Spectrum Color touch screen desktop model

Mark II Black and White and Spectrum Color touch screen (desktop model)

- Screen swivels and pivots for optimal viewing
- Control screens support multi-point switching and dimming, master ON/OFF switching, scheduling, and scenes wtih multiple loads.
- Preset screens and functions automate the task of adjusting lighting levels to different lamps and fixtures.
- Standard real-time and astronomical clock permits time scheduling of lighting and other tasks
- Variable dimming fade rates can be configured according to load or lighting zone
- Locator option can be configured to help users find the screen in dim light
- Infrared receiver for remote control

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Table 5.12:

Catalog No.	Catalog Description	$ Price
Mark II B/W Touch Screen		
SLC5050CTL2xx	Mark II w/Neo Style Cover Plate	2439.00
SLC5080CTL2xx	Mark II w/Saturn Style Cover Plate	2499.00
SLC5000CTL2SS	Mark II w/Stainless Steel Cover Plate	2499.00
Mark II Touch Screen Desktop Model		
SLC5000CTD2xx	Mark II Desktop Touch Screen	1920.00
xx = color code / WE–White, BK–Black		
Spectrum Touch Screen		
SLC5000CTCL2	Spectrum Base Unit Only	2106.47
SLC5000CTCL2xx	Spectrum w/non-stylized plastic Cover Plate	2374.45
SLC5050CTCL2xx	Spectrum w/Neo Style Cover Plate	2341.17
SLC5080CTCL2xx	Spectrum w/Saturn Style Cover Plate	2386.69
SLCBS5000CTCL2	Spectrum w/Stainless Steel Cover Plate	2232.47
SLCBB5000CTCL2	Spectrum w/Brass Cover Plate	2265.22
xx = color code / GB – Brushed Aluminum and Slate▲, WE – White, BK – Black, CM – Cream, BR – Mocha■, PW – Pure White■.		
Spectrum Desktop Model		
SLC5000CTCD2xx	Spectrum Desktop Touch Screen	2365.61
xx = color code / WE–White, BK–Black		
Accessories		
Mark II / Spectrum Accessories		
SLC5000CT2WB	Wall box for Mark II / Spectrum Touch Screen	68.00
SLC5080CT2Fxx	Replacement Cover Plate, Saturn style	280.22
SLC5000CT2FSS	Replacement Cover Plate, Stainless Steel	126.00
SLC5050CT2Fxx	Replacement Cover Plate, Neo style	187.76
xx = color code / GB – Brushed Aluminum and Slate▲, WE – White, BK – Black, CM – Cream, BR – Mocha■, PW – Pure White■.		

▲ Neo only.
■ Saturn only.

Color touchscreen in Neo style Brushed Aluminum and Slate

Color touch screen

- Built-in RJ-45 Ethernet and C-Bus network, RS-232, and USB terminals
- Touch sensitive 6.4 inch (640 x 480) color LCD panel
- Control screens support multi-point switching
- Standard real-time and astronomical clock permits time scheduling of lighting and other tasks
- Variable dimming fade rates can be configured according to load or lighting zone
- Locator option can be configured to help users find the screen in dim light
- Clean-lined low-profile touch screen can be wall-mounted without external fittings
- Infrared receiver for remote control

Table 5.13:

Catalog No.	Catalog Description	$ Price
Color Touch Screen		
SLC5050CTCxx	Color touch screen w/Neo style Cover Plate	8480.00
SLC5080CTC2xx	Color Touch Screen w/Saturn style Cover Plate	8480.00
Color Touch Screen Accessories		
SLC5000CTCRM	Plasterboard Bracket for Color Touch Screen	90.00
SLC5000CTCNA	Nail Bracket for Color Touch Screen	60.00
SLC5000CTCWB	Wall box for Color Touch Screen	68.00
SLC5000CTCPS	Power supply for Color Touch Screen	263.00
SLC5080CTCFxx	Replacement Cover Plate, Saturn style	356.00
SLC5050CTCFxx	Replacement Cover Plate, Neo style	29.00
xx = color code / GB – Brushed Aluminum and Slate▲, WE – White, BK – Black, CM – Cream, BR – Mocha■.		

▲ Neo only.
■ Saturn only.

Wiser Home Controller

Wiser™ Home Controller

The Wiser Home Controller is the missing piece of the smart home puzzle, enhancing the capabilities and connectivity of the C-Bus network. Its easy-to-use graphical user interface (GUI) provides access to the home C-Bus network and all of your electrical, multimedia, and telecommunication needs. This same GUI can be installed across multiple control devices, such as mobile phones, TVs with Microsoft® Windows® Media® Center, personal computers, and web tablets, in addition to the C-Bus range of touch screens and keypads. No matter where you are, the Wiser Home Controller allows you to monitor and control your home environment locally or remotely over the internet.

Features

- Ethernet and Wi-Fi based controller for your C-Bus system
- Built-in Ethernet router and Wi-Fi access point
- Support for lighting, air-conditioning, multi-room audio, alarms, cameras, and other equipment
- Built-in scene, scheduling, and logic programming modules
- Allows remote reprogramming from outside the home/building by installers
- Common, intuitive interface for all devices
- Mobile phone and web-enabled device control

Table 5.14: Order Information

Description	Catalog Number	$ Price
Wiser Home Controller	WHC-5918	1505.00

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C-Bus Multi Room Audio

Extend the capabilities of a C-Bus system by incorporating award winning multi-room audio into your next project. Multi-room audio augments a C-Bus lighting control system, providing high quality sound throughout a home or business.

C-Bus multi-room audio readily integrates with other C-Bus controls, providing a single source for audio and lighting from a single keypad or touch screen. Sound is distributed throughout the home through the Matrix Switcher and routed to local amplifiers.

A typical C-Bus Multi Room Audio system distributes up to four analog audio inputs, five if an Audio Distribution Unit is used, and one optical input. These inputs are distributed up to 8 zones, each consisting of one or more amplifier. Additionally, each amplifier is capable of accepting a local analog audio input, providing up to six stereo audio channels for each amplifier.

Matrix Switcher

Low Power Amplifier

Matrix Switcher

The C-Bus™ Audio Matrix Switcher provides a revolutionary means for distributing audio throughout a home. This Matrix Switcher provides up to eight zones of audio output from four source inputs. The C-Bus Matrix Switcher allows you to send streaming audio programs to the audio zones from a variety of sources, including a local area network (LAN), or a USB memory stick (Model: SLC5608842E). In addition, it will also allow connection of a portable music player directly to the Matrix Switcher's front audio panel. Audio sources can be selected from the front panel or by any C-Bus™ input device such as touch screens or keypads. The Matrix Switcher is ideally suited for multi-room audio and structured wiring systems. Keypads and other C-Bus™ devices connect to the Matrix Switcher via CAT-5 modular jacks. Outputs to remote and desktop amplifiers are made with low voltage wiring. In addition to the six source inputs, two mono broadcast annunciation inputs are provided for connection to intercoms or other systems. Broadcast annunciation input can be given priority over other source inputs and features fully adjustment volume and over-stepping mute features.

- Suitable for 19" Rack Mount with rack mount ears provided.
- Each Matrix Switcher can distribute digital audio to up to 8 MRA amplifiers. You can install up to 3 Matrix Switchers on a C-Bus network.
- The Matrix Switcher can provide power for the attached amplifiers via the Digital Audio cables. You can connect an external power supply to an amplifier to increase its audio power output.
- The choice of the audio program for an amplifier can be made at the Matrix Switcher or in the audio zone. You can use C-Bus input devices to choose the source and to adjust volume, tone and muting.
- The Dual AM/FM tuners inside the Matrix Switcher can distribute preset station choices to any of the audio zones.
- Distributes streaming audio from several sources using the C-Bus Ripple software application running on a networked PC.
- You can connect up to 4 stereo analogue line-level inputs to the Matrix Switcher. If you need to add another source input, you can install an MRA Distribution Unit and power supply.
- Compatible with C-Bus devices.

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Desktop Amplifier

Remote Amplifiers

C-Bus Multi Room Amplifiers provide efficient, high fidelity audio to individual rooms. Available in either desktop or remote mount versions, these amplifiers are specifically designed to operate on the C-Bus network as an extension of a lighting control system, without third party gateways or custom integration. This means the ability to control amplifiers with the same keypad or touch screen used to control lighting levels.

When combined with the C-Bus Matrix Switcher, these amplifiers deliver excellent stereo sound. Connections are provided for up to two sets of 8 ohm speakers. Both desktop and remote amplifiers provide a local input connection for attaching to CD or mp3 players, etc. In addition, the desktop amplifier will accept remote commands via its infrared receiver. Infrared remote included.

- 10 Watt digital efficient stereo amplifier, 25 Watts when connected to local power supply (optional)
- Super quiet design
- On board 8 ohm loudspeaker connections
- Local source input — RCA jack
- C-Bus connection (connects with CAT-5 cable)
- Volume control (desktop model)
- On-board IR receiver (desktop model)
- Stereo headphone connection (desktop model)
- Infrared remote included (desktop model only)

Audio Distribution Unit

Audio Distribution Unit

The C-Bus Audio Distribution Unit is an optional device that can be used in conjunction with the C-Bus Multi Room Audio System to further enhance C-Bus enabled audio product family.

The C-Bus Audio Distribution Unit distributes a single digitized stereo audio input source to multiple locations via amplifiers wired in a parallel format. Functions such as Volume, Bass, Treble and Balance can be adjusted from a C-Bus input device at any of the audio output locations. The C-Bus Audio Distribution Unit converts a single analog stereo audio input to a digital audio output. That output can then be connected to the Matrix Switcher as an additional input or to the C-Bus Desktop or Remote Amplifier as a stand-alone configuration.

- Distributes a single stereo audio source to C-Bus Audio Amplifiers via a digitized signal over Cat-5 cable
- Does not require any C-Bus programming (hardware only)
- One stereo analog audio source input (2 X RCA)
- One digital audio output
- Output can be looped between C-Bus Audio Amplifiers
- IR emitter port

Table 5.15: C-Bus Multi Room Audio Components

Catalog No.	Catalog Description	$ Price
SLC560110R	Low Power Amplifier, rack mountable	TBD
SLC5608842	Matrix Switcher w/4 stereo analog inputs, 2 internal AM/FM tuners, IR input and target connections. Up to 8 MRA Zones.	4599.00
SLC5608842E	Matrix Switcher w/4 stereo analog inputs, 2 internal AM/FM tuners, IR input and target connections. Audio streaming using a LAN or USB source. Up to 8 MRA Zones.	4274.10
SLC560125D	Desktop Amplifier	1908.15
SLC560125R	Remote Amplifier	1609.79
SLC560011	Audio Distribution Unit	790.41
SLC5600P24500S	Amp External Power Supply (only needed if Audio distribution unit is used to provide an additional digital input for the Matrix Switcher)	53.22
Accessories		
SLC5600P241250	Low Power Amplifier Power Supply	TBD
SLC560110E	Low Power Amplifier Enclosure (used for linking up to 4 amplifiers/enclosures together for mounting in a 19" rack)	TBD
SLC560110MB	Low Power Amplifier Wall Mounting Bracket	TBD
SLC5600P243750T	Audio Amplifier Power Supply	445.93
SLC560125MB	Remote Amplifier Mounting Bracket	42.24

Indoor Ceiling Mount Speakers

Indoor Wall Mount Speakers

Audio Speakers

C-Bus Audio Speakers are available as indoor or outdoor models and are designed to be used with home theater, multi-room, and outdoor audio applications.

The indoor speakers come in wall or ceiling mount versions that are installed with the front of the speaker flush with the mounting surface.

The indoor/outdoor speakers are available in black or white and can be placed on a shelf or hung on a surface by using the included bracket.

- Flush-mount, shelf-mount, and surface-mount models
- Indoor and outdoor models
- High-impact plastic components and powder coated metal grills produce a long-lasting unit suitable for indoor and outdoor use
- 8 ohm impedance
- Available with Kevlar™ (indoor units only) or polypropylene drivers (indoor and outdoor units) for high-quality sound in all applications
- All models are off the floor, saving floor space
- Indoor/Outdoor Speakers have a pre-installed, removable mounting bracket
- Indoor/Outdoor Speakers can be placed on a shelf or hung from a surface by their bracket (included)
- Tracing/painting template included

Indoor/Outdoor Speakers

Table 5.16: Multi-Room Audio Speakers

Catalog No.	Catalog Description	$ Price
SLC5600IWP	In-Wall Polypropylene speakers	429.58
SLC5600IWK	In-Wall Kevlar speakers	560.00
SLC5600ICP	In-Ceiling Polypropylene speakers	408.53
SLC5600ICK	In-Ceiling Kevlar speakers	521.09
SLC5600ODPBK	Outdoor Black speakers	468.30
SLC5600ODPWE	Outdoor White speakers	468.30

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8 button
remote control

Universal
remote control

Hand Held Remote Controls

C-Bus remote controls are designed for use with C-Bus keypads, multi-sensors, and touch screens. available in both four and eight button versions, these remotes have a range up to 50 feet (line of sight).

The universal remote control unit allows a single remote control unit to replace various other remotes including VCRs, CD players, DVRs, and TVs. Up to sixteen remote control codes are supported.

Table 5.17: Handheld Remote Controls

Catalog No.	Catalog Description	$ Price
SLC5084TX	Handheld infrared remote 4 button	**200.00**
SLC5088TX	Handheld infrared remote 8 button	**400.00**
SLC5030URC	Handheld universal remote control	**440.00**

4 Zone Thermostat

Single and 4 Zone Network Thermostats

C-Bus Thermostats are used to regulate the air temperature of zones by controlling heating-ventilation-air conditioning (HVAC) equipment. The air temperature is monitored by the unit's temperature sensor or optionally via an external C-Bus temperature sensor.

C-Bus single and programmable 4 Zone Thermostats may operate as stand alone devices, or be controlled via other C-Bus devices such as wall switches or touch screens.

Programmable 4 Zone Thermostats can schedule up to four set points during a day, and unique schedules can be programmed for each day of the week.

Both models include setback mode, (saves power by using a wider acceptable temperature range within which heating or cooling is not performed) and temperature guard, (ensures the temperature is maintained within a specified temperature range).

- Easy to read, large LCD display
- Control by keypads and other devices on the C-Bus network
- Available in black, white and stainless steel fascias
- Setback mode
- Temperature guard mode
- Internal Timer
- Daily schedule set points (4 Zone model)
- Display temperature in Celsius or Fahrenheit
- RWG interface (relay models only)
- Easily configured by using the Clipsal Toolkit software program

Single Zone Thermostat

Table 5.18: Single and 4 Zone Network Thermostats

Catalog No.	Catalog Description	$ Price
SLC5070THBWE	Single Zone, White, no relay	**649.00**
SLC5070THPWE	4 Zone, White, no relay	**799.00**
SLC5070THBBK	Single Zone, Black, no relay	**649.00**
SLC5070THPBK	4 Zone, Black, no relay	**799.00**
SLC5070THBSS	Single Zone, Stainless, no relay	**649.00**
SLC5070THPSS	4 Zone, Stainless, no relay	**799.00**
SLC5070THBRWE	Single Zone w/relay, White	**724.00**
SLC5070THPRWE	4 Zone w/relay, White	**899.00**
SLC5070THBRBK	Single Zone w/relay, Black	**724.00**
SLC5070THPRBK	4 Zone w/relay, Black	**899.00**
SLC5070THBRSS	Single Zone w/relay, Stainless	**724.00**
SLC5070THPRSS	4 Zone w/relay, Stainless	**899.00**
SLC5031RDTSL	Remote Temperature Sensor	**298.00**

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Light Level Sensor

360° Indoor PIR Sensor

Light Level Sensor

The C-Bus Light-Level Sensor measures ambient light levels and automatically issues ON, OFF, or ramp commands over a C-Bus network. The light-level sensor can control relays, dimmers, or remotely operated circuit breakers, changing their status according to pre-set ambient lighting targets. The C-Bus light-level sensor has a dynamic range between 5-150 foot candles, and compensates for noise and rapid light intensity fluctuations.

Outdoor Light Level Sensor

C-Bus Outdoor Light-Level Sensor measures ambient light levels and automatically issues ON/OFF or ramp commands over a C-Bus network to maintain outdoor lighting levels. Primarily designed for outdoor use, this light-level sensor is also suitable for indoor setting in which a water resistant casing is desirable.

The light-level sensor can control up to two C-Bus group addresses: one address controls ON/OFF switching of a lamp circuit according to a pre-determined ambient light level, while the other is used to continuously regulate the light-level output of any number of lampsl

The target light level, the margin, and other sensor options are easily configured by using the C-Bus Toolkit software.

- Outdoor use, wall- and ceiling-mounted low-profile unit
- Can maintain a constant illumination level of 5-150 footcandles
- Adjustable lumin setpoint
- Control of up two C-Bus group addresses
- Sensors receive data and power over a single C-Bus twisted-pair cable, so they do not require power packs or line-voltage connections
- 180° field of view

Table 5.19: C-Bus Light Level Sensor

Catalog No.	Catalog Description	$ Price
SLC5031PE	Light level sensor, 0–150 Foot-candles, Indoor	208.00
SLC5031PEWP	Light Level Sensor, 5–150 Foot-candles, Outdoor	278.00

Outdoor PIR Sensor

90° Indoor PIR Sensor

360° PIR Multi Sensor

Occupancy Sensors

C-Bus occupancy sensors are available for both indoor and outdoor applications. All C-Bus sensors incorporate reliable passive infrared detection (PIR) circuits for occupancy detection along with integral light level sensors to prevent switching of lights if sufficient ambient light is present. Sensors feature programmable adjustments for sensitivity and time delay, walk test LED for commissioning and optical bandpass filtering with dual element detectors to minimize false triggering.

- 90° Indoor sensors are intended for wall or ceiling mounting. These sensors have a continuous detection field of 400 square feet and a 90° field of view.
- 360° Indoor sensors are intended for flush mounting in drop ceilings. They have a minor motion detection field of 800 square feet making them ideal for use in offices, copier rooms, closets, and restrooms where it can be mounted in the center of the detection area.
- 360° Multi-Sensors combine a passive infrared receiver (PIR) for occupancy sensing, a light-level sensor, and an infrared remote receiver into a small, highly versatile unit. The multi-sensor's 2.8 inch face diameter makes it unobtrusive and ideally suited for flush mounting on the ceiling with effective IR coverage up to 800 square feet. The built-in IR receiver accepts commands from an optional handheld remote controller, making the sensor ideal for classrooms and conference room areas.
- Outdoor PIR Motion Sensor combines reliable thermal-radiation-based control of lighting with rugged construction suitable for outdoor requirements. The unit's advanced circuits and flat multi-segmented lens provide coverage of up to 3000 square feet in a 110° field of view.

Table 5.20: C-Bus Occupancy Sensors

Catalog No.	Catalog Description	$ Price
SLC5750WPL	Occupancy sensor, multi, outdoor, 110 deg	283.00
SLC5751L	Occupancy sensor, PIR, indoor, 90 deg	227.00
SLC5753L	Occupancy sensor, PIR, indoor, 360 deg	213.00
SLC5753PEIRL	Occupancy sensor, multi, indoor, 360 deg	268.00

Four-Channel Auxiliary Input unit

Auxiliary Input Unit

C-Bus Four-Channel Auxiliary Input Units increase the versatility of the C-Bus network by facilitating remote access with any dry-contact switch mechanism. DIN-rail mounted for quick installation, the auxiliary unit can be configured with standard C-Bus control functions such as remote scene triggering, ON/OFF, toggle, dimmer, or timer.

- Provides four isolated inputs for external voltage-free mechanical switches
- Control options include remote scene triggering, ON/OFF, toggle, dimmer, or timer operations
- LEDs indicate operational status of each channel
- Standard built-in C-Bus network connectors: (2) RJ-45
- Non-volatile memory stores operating status for recovery from a power outage
- DIN style construction 4M wide: 3.4"(L) x 2.8"(W) x 2.6"(H)
- Compatible with all Clipsal devices and the Square D Powerlink™ NF3000G3C controller

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General Input unit

General Input Unit

Four-Channel General Input Units measure TTL digital and real-world analog quantities and generate messages about the measurements to the C-Bus network. By acting as an interface with various external sensors, the general input unit enables integration of the C-Bus network with a variety of system types, such as those for HVAC and for power monitoring. Configuration options include selectable input types, eight adjustable decision thresholds per channel, definable actions, selectable filtering, broadcast rates, and a separate hysteresis value per channel.

- Measures TTL digital quantities including voltage, current, or resistance from external sensors such as light level, pressure, and temperature
- Four channels of input, each with an adjustable hysteresis value, eight decision thresholds, and a software-selectable input value transformation in the form y =ax +b
- Input channels are compatible with a range of third-party sensors
- Control functions include load switching, dimming, trigger applications, enable control applications, and measurement applications
- Includes 120 V/24 Vdc power pack
- Dimensions: 5.67 in. (144mm) wide x 2.60 in. (66mm) deep x 3.35 in. (85mm) tall
- Compatible with all Clipsal devices and the Square D Powerlink NF3000G3C controller

Four-Channel Bus Coupler

Bus Couplers

Bus Couplers provide an interface between dry-contact mechanical switches and the C-Bus network. Available in two-and four-channel models, the bus coupler is small enough to be used in restricted spaces such as wall boxes with existing switches. Configuration options include standard control functions such as ON/OFF, toggle, dimmers, and timers.

- Provides two or four non-isolated inputs for external voltage-free mechanical switches. Two-channel units feature independent remote LED outputs
- Two-way removable terminal block for the C-Bus connection
- Receives data and power over a network, so it does not require power packs or line voltage connections
- Scene capabilities
- 2.2”(L) x 1.9”(W) x 0.7”(H)
- Compatible with all Clipsal devices and the Square D Powerlink NF3000G3C controller

Table 5.21: Input Units

Catalog No.	Catalog Description	$ Price
SLCLE5504AUX	4 Channel auxiliary input unit	**544.00**
SLCE5504TGI	4 Channel general input unit	**1194.00**
SLC5102BCLEDL	2 Channel bus coupler	**212.00**
SLC5104BCL	4 Channel bus coupler	**243.00**

Relays

C-Bus Relay Units are intended for switching resistive, inductive, fluorescent and incandescent low-voltage loads. Relay units are designed to be mounted in suitable DIN style enclosures. Relay units feature:

- Local toggle buttons to allow individual channels to be toggled
- Remote ON and OFF facilities permitting all channels to be turned ON or OFF without C-Bus Network communications
- Two (2) Convenient built-in C-Bus network connectors (RJ-45)
- LED Indicators to show the status of the network and the unit
- Units available both with and without a 200ma power supply on-board.
- Compatible with all Clipsal devices and the Square D Powerlink™ NF3000G3C controller

Changeover Relay

Changeover Relay

C-Bus 2A Changeover Relays are designed to operate three-speed motors and two-way motor control devices. Some of their most common applications include operating motorized blinds, shutters, curtains and skylights (open/closed) where they provide a much simpler alternative to traditional and obtrusive relay interlocking systems.

- Four (4) isolated independently operating relay channels
- 120 Vac and 277 Vac units
- 2A motor rating
- Dimensions: 5.67 in. (144mm) wide x 2.60 in. (66mm) deep x 3.35 in. (85mm) tall

Table 5.22: Changeover Relays

Catalog No.	Catalog Description	$ Price
SLC5504TRVFC	4 Channel Changeover Relay, 125 V, with power supply	**1100.00**
SLC5504TRVFCP	4 Channel Changeover Relay, 125 V, without power supply	**1010.00**
SLC5504HRVFC	4 Channel Changeover Relay, 277 V, with power supply	**1100.00**
SLC5504HRVFCP	4 Channel Changeover Relay, 277 V, without power supply	**1010.00**

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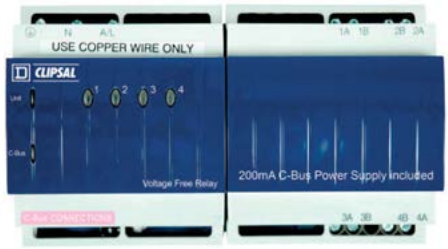

4-Channel 10 A Relay

10 Amp Relay

C-Bus 10A Relays feature a zero crossing magnetically latching relay designed for switching the harsh electrical loads associated with today's high efficiency lighting systems.

- Four (4) or twelve (12) independently operating voltage free relay contacts
- 120 Vac and 277 Vac units
- 10 A rating
- Dimensions: 5.67 in. (144 mm) wide x 2.60 in. (66 mm) deep x 3.35 in. (85 mm) tall

Table 5.23: 10 Amp Relay

Catalog No.	Catalog Description	$ Price
SLC5512TRVF	12 Channel Relay, 120 V, 10 A with power supply	**2168.00**
SLC5512TRVFP	12 Channel Relay, 120 V, 10 A without power supply	**1973.00**
SLC5504TRVF	4 Channel Relay, 120 V,10 A with power supply	**1043.00**
SLC5504TRVFP	4 Channel Relay, 120 V, 10 A without power supply	**843.00**
SLC5512HRVF	12 Channel Relay, 277 V, 10 A with power supply	**2168.00**
SLC5512HRVFP	12 Channel Relay, 277 V, 10 A without power supply	**1973.00**
SLC5504HRVF	4 Channel Relay, 277 V,10 A with power supply	**1043.00**
SLC5504HRVFP	4 Channel Relay, 277 V, 10 A without power supply	**843.00**

4-Channel 20 A Relay

20 Amp Relay

C-Bus 20 A Relays feature a zero crossing magnetically latching relay designed for switching the harsh electrical loads associated with today's high efficiency lighting systems.

- Four (4) independently operating voltage free relay contacts
- 120 Vac and 277 Vac units
- 20 A rating
- Dimensions: 8.46 in. (215 mm) wide x 2.60 in. (66 mm) deep x 3.35 in. (85 mm) tall

Table 5.24: 20 Amp Relay

Catalog No.	Catalog Description	$ Price
SLC5504TRVF20	4 Channel Relay, 120 V, 20 A with power supply	**1320.00**
SLC5504TRVF20P	4 Channel Relay, 120 V, 20 A without power supply	**1142.00**
SLC5504HRVF20	4 Channel Relay, 277 V, 20 A with power supply	**1320.00**
SLC5504HRVF20P	4 Channel Relay, 277 V, 20 A without power supply	**1142.00**

8-Channel Low Voltage Relay

8-Channel Low Voltage Relay

The C-Bus 8-Channel Low Voltage Relay is a C-Bus output device that controls up to eight low voltage relay channels. The unit is powered from C-Bus and requires no other power source. The 8-Channel Low Voltage Relay can be used in many low voltage applications including controlling irrigation solenoids and low voltage damper solenoids for HVAC control. The unit can also be used in integrating 3rd party equipment through pulse signal controls.

- 8 channels of 2 A switched loads @ 30 Vac/dc
- 8 channels are all isolated change over relays
- Control of 3rd party products

Table 5.25: 8-Channel Low Voltage Relay

Catalog No.	Catalog Description	$ Price
SLC5108RELVP	8-Channel Low Voltage Relay	**298.00**

Phase Angle Dimmer
with Power Supply

Phase Angle Dimmers

C-Bus Phase Angle Dimmers are intended for controlling incandescent and compatible low-voltage and florescent lighting. Each of the unit's channels can independently control loads to create dynamic lighting scenes. These dimmer units automatically compensate for voltage and frequency fluctuations and employ advanced phase-control techniques to reduce flicker and increase lamp life.

- Four (4) independent channels supporting up to 4 A continuous load per channel, eight (8) independent channels supporting up to 2 A continuous load per channel
- Units available both with and without a 200 mA power supply on-board.
- 120 Vac
- Dimensions: 8.46 in. (215 mm) wide x 2.60 in. (66 mm) deep x 3.35 in. (85 mm) tall

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Professional Dimmer

Professional Dimmer

C-Bus Professional Dimmers can control incandescent and compatible low-voltage and florescent lighting. These dimmers are ideal for larger heavily loaded circuits. Each channel provides independent dimming and incorporates thermal overload and over-current protection. These dimmer units automatically compensate for voltage and frequency fluctuations and employ advanced phase-control techniques to reduce flicker and increase lamp life.

An optional terminal box is available for conduit connections. Configuration options include network monitoring of the channel load and network voltages, adjustable delays for dimming levels, and master override.

- Specialized dimming modes—soft turn on/off and linear brightness control
- Built-in power supply sources 60 mA to the C-Bus network
- Individual channels can be turned On/Off at the unit or via C-Bus commands
- LEDs indicate the status of the network at the unit and the status of the unit's load and power
- Optional terminal box for connecting conduit
- 120 Vac
- Dimensions: 7.5 in. (190 mm) wide x 3.0 in. (75 mm) deep x 7.7 in. (195 mm) tall

Table 5.26: C-Bus Dimmers

Catalog No.	Catalog Description	$ Price
SLC5504TD4A	4 x 4 A dimmer, incan/mag,125 V, 4 A, with power supply	**1024.00**
SLC5504TD4AP	4 x 4 A dimmer, incan/mag,125 V, 4 A, without power supply	**800.00**
SLC5508TD2A	8 x 2 A dimmer, incan/mag,125 V, 2 A, with power supply	**1024.00**
SLC5508TD2AP	8 x 2 A dimmer, incan/mag,125 V, 2 A, without power supply	**800.00**
SLC5104TD5	4 x 5 A dimmer, incan/mag,125 V, with power supply	**1926.00**
SLC5102TD10	2 x 10 A dimmer, incan/mag,125 V, with power supply	**1926.00**
SLC5101TD20	1 x 20 A dimmer, incan/mag,125 V, with power supply	**1926.00**
SLCU5100TB	Termination box for SLCLU510X Series dimmer units	**78.00**

4 Channel
0–10 V Dimmer Unit

0–10 V Dimming Unit

The C-Bus Analog Output Unit provides four channels of analog 0–10 Vdc for controlling electronically dimmable fluorescent lighting ballasts.

- Produces four independently controllable channels of 0–10 Vdc for controlling dimmable flourescent lighting ballasts, or other 0–10 V controllable loads
- Individual channels can be turned ON/OFF at unit, via C-Bus commands, and through a remote override option
- 120 V or 277 Vac models available
- DIN style construction 4M wide: 3.4"(L) x 2.8"(W) x 2.6"(H)

Table 5.27:

Catalog No.	Catalog Description	$ Price
SLCLE5504TAMP	4 Channel 0–10 V Output, 120 V	**624.00**
SLCLE5504HAMP	4 Channel 0–10 V Output, 277 V	**624.00**

DALI Gateway

DALI Gateway

The C-Bus Digital Addressable Lighting Interface (DALI) Gateway provides an isolated two-way communications path between a C-Bus network and two DALI networks, making it possible to use C-Bus devices to control DALI ballasts.

- Provides two-way communications between C-Bus and DALI networks, routing selected messages from one to the other
- Unit is transparent and invisible to DALI ballasts
- Receives data and power over the network, so the unit does not require power packs or line-voltage connections
- DIN style construction 4M wide: 3.4"(L) x 2.8"(W) x 2.6"(H)

Table 5.28:

Catalog No.	Catalog Description	$ Price
SLC5502DAL	2 Channel DALI Gateway	**1014.00**

DMX Gateway

The C-Bus DMX Gateway is a DIN rail mounted unit that maps C-Bus Group Addresses and levels to a DMX-512 A interface.

The C-Bus DMX Gateway is a one way device. It permits C-Bus input devices such as keypads, DLTs and PIRs to control lighting devices with DMX interface capabilities. These include many manufacturers of LED fixtures and theatrical lighting equipment.

- Includes DMX interface (bootlace connnectors to 5-pin female XLR)
- DMX Master device
- Receives data and power over the C-Bus network, so the unit does not require a line voltage connection
- DIN style construction 4M wide: 3.4" (L) x 2.8" (W) x 2.6" (H)

Table 5.29:

Catalog No.	Catalog Description	$ Price
SLC5500DMX	C-Bus to DMX Gateway	**936.00**

Network Bridge

Network Bridge

The C-Bus Network Bridge provides a communication channel between C-Bus units on separate networks, expanding the total number of units that can be configured, controlled, and monitored.

- Increases transmission distances by acting as a repeater station for data transmission
- Expands the total number of C-Bus devices that can operate on the system by isolating devices to individual networks
- Indicates each network's status level
- Uses built-in connectors to connect to a C-Bus network
- Compatible with Powerlink G3 3000C controller and all C-Bus components, including keypads, sensors, and dimmers
- DIN style construction 4M wide: 3.4"(L) x 2.8"(W) x 2.6"(H)

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Power Supply

Power Supply

The C-Bus Power Supply is specifically designed to operate with the C-Bus network as a power source for passive C-Bus devices. Up to five power supplies can be connected to a single C-Bus network.

- Available in 120 and 277 Vac models
- Regulating power supply compensates for line voltage and frequency variations, so there is constant output
- Sources up to 350 mA to the C-Bus network
- UL listed to operate in parallel with other Clipsal power supplies, up to five on a single C-Bus network
- Incorporates short circuit and reverse polarity protection
- DIN style construction 4M wide: 3.4”(L) x 2.8”(W) x 2.6”(H)

PC Interface

PC Interface

The C-Bus PC Interface (PCI) expands options for configuring, controlling, and monitoring C-Bus networks by providing an interface between the network and a personal computer (PC). The C-Bus PCI module easily mounts to a DIN rail and connects to the C-Bus network. Power to the unit is provided through the C-Bus network.

Serial

- Unit/Comms LED shows the status of the unit’s power and of any data transmissions
- Three RS-232 serial connectors for connecting to a PC or to external devices: (1) 9-pin D-type serial connector (female) and (2) 8-pin RJ-45 connectors
- Two C-Bus network connector ports: RJ-45 sockets
- Data cable for connecting PCI and personal computer, including DB9 connectors

USB

- Unit/Comms LED shows the status of the unit’s power and of any data transmissions
- Two C-Bus network connector ports: RJ-45 sockets
- USB PC connection
- Data cable for connecting PCI and personal computer

Pascal Automation Controller

C-Bus Pascal Automation Controller (PAC) provides extended conditional and real-time event programming to C-Bus systems. The PAC supports a full range of programming commands including conditional logic, flow control variables and scheduling.

Systems integrators will appreciate the built-in scheduling tools, scene tools, and wizards for creating basic logic programs. Full programming capabilities can be achieved utilizing the free-form script editor based off the pascal programming language.

- Connects directly to C-Bus network
- Powered from the C-Bus network
- USB port for connection to personal computer
- (2) RS232 ports for third party device control
- Real time, astronomical and C-Bus system clock included with 24 hour internal capacitor backup and external 12 Vdc battery terminals

Programming capabilities including: i.e. Conditional logic (if, then, and, or, not, etc.), Flow Control (for, repeat, while), Variables (integer, real, Boolean, character, string), Control and monitoring of group addresses, Control and monitoring of scenes.

Ethernet Network Interface

Ethernet Network Interface

The C-Bus Ethernet Network Interface unit is a C-Bus system device designed to provide an isolated communications path between an Ethernet 10Base-T Network and a C-Bus Network. This allows high-speed control and monitoring of a C-Bus installation via the TCP/IP protocols used in computer networks and by the Internet. System integrators and installers will also benefit from having remote access to the system. With the C-Bus Ethernet Network Interface unit, access to a single or multiple networks can be as close as the nearest Ethernet connection.

- Remote access to Clipsal systems
- Bridge multiple C-Bus networks together over LAN or WAN
- Fully supports all Clipsal commands
- Small size, mounts in standard DIN enclosure (4M wide)
- Includes 12 Vdc power supply

Telephone Interface Unit

Telephone Interface Unit

C-Bus Telephone Interface Unit offers a dial-in and dial-out capability for control of a C-Bus system. Remote location override, monitoring, diagnostics and configuration of a C-Bus system is possible with this unit. The C-Bus Telephone Interface Unit is programmed using a connection to a PC running TICA (Telephone Interface Commissioning Application) configuration software. The interface can also act as a C-Bus PC Interface. The Telephone Interface Unit can be installed in a C-Bus 36 or 60M enclosure or as a wall mountable stand-alone item with connection to C-Bus.

- Remote location override
- Voice prompts and confirmation
- Password protected
- 32 supported devices
- Automatic dial out on present conditions
- Local or remote site access to C-Bus system
- Audio Out

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Bar Code Reader

The C-Bus Bar Code Reader allows installers and integrators to quickly scan C-Bus devices with serial numbers and import them into C-Bus Toolkit software. Using a USB connection to a PC, users can easily identify and track C-Bus Unit locations on a floorplan/network.

Network Analyzer

The C-Bus Analyzer is a C-Bus device designed to help an installer quickly analyze, detect, and troubleshoot potential problems on a C-Bus network. The device analyzes the network parameters and prompts the user for appropriate actions via its front LED (Light Emitting Diode) indicators.

Table 5.30: System Units

Catalog No.	Catalog Description	$ Price
SLC5500NB	Network bridge	**663.00**
SLC5500TPS	120 V Power supply, 350 mA	**500.00**
SLC5500HPS	277 V Power supply, 350 mA	**500.00**
SLC5500PC	RS-232 PC Interface	**488.00**
SLC5500PCU	USB PC Interface	**488.00**
SLC5500PACA	Pascal Automation Controller	**586.00**
SLC5500CN	Ethernet Network Interface	**664.00**
SLC5100TUS	Telephone Interface Unit	**898.00**
Accessories		
SLC5100BCS	Bar Code Reader	**604.00**
SLC5100NA	C-Bus Network Analyzer	**328.00**

8M Enclosure

8M Enclosure

The 8M enclosure is specifically designed for distributed applications. Suitable for surface mounting, the 8M enclosure consists of a box with a cover and a DIN rail for mounting one 8M or two 4M C-Bus units. The enclosure also has provisions for mounting neutral and ground bars.

- Surface-mount NEMA 1 enclosure
- Welded sheet steel with knockouts
- Gray baked enamel, electrodeposited over cleaned, phosphatized steel
- Triple-lead cover screws for fast installation of cover
- DIN rail, suitable for mounting one 8M or two 4M C-Bus DIN modules

12M Enclosure

12M Enclosure

The 12M enclosure is specifically designed for distributed applications that require physical proximity between DIN units and keypads, sensors or controlled loads. Suitable for surface mounting, the 12M enclosure consists of a box with a cover and a DIN rail for mounting three 4M C-Bus units, one 8M unit plus one 4M unit or one 12M unit. The enclosure also has factory mounted neutral and ground bars.

- Surface-mount NEMA 1 enclosure
- Welded sheet steel with knockouts
- Gray baked enamel, electrodeposited over cleaned, phosphatized steel
- Triple-lead cover screws for fast installation of cover
- DIN rail, suitable for mounting one 12M or three 4M C-Bus DIN modules

24M Enclosure

24M Enclosure

The 24M enclosure is specifically designed for distributed applications that require physical proximity between DIN units and keypads, sensors or controlled loads. Suitable for surface mounting, the 24M enclosure consists of a box with a cover and two rows for mounting C-Bus DIN-mounted C-Bus units. Each row can hold one 12M unit, one 8M unit plus one 4M unit, or three 4M untis. The enclosure also has provisions for additional neutral and ground bars.

- Surface-mount NEMA 1 enclosure
- Welded sheet steel with knockouts
- Gray baked enamel, electrodeposited over cleaned, phosphatized steel
- Triple-lead cover screws for fast installation of cover
- DIN rail, suitable for mounting Clipsal DIN-mounted C-Bus units. Each row can hold one 12M unit, one 8M unit plus one 4M unit, or three 4M units

36M Enclosure

36M and 36MS Enclosure

The 36M and 36MS enclosures provide a multi-purpose means for housing various C-Bus DIN-mounted devices. Suitable for flush or surface mounting, the enclosure consists of a mounting pan assembly, and a cover assembly. The box is to be ordered separately, allowing for its installation with the rough-in of field wiring. Enclosures feature:

- NEMA 1 enclosure suitable for flush or surface mounting
- Welded sheet steel with knockouts
- Gray baked enamel paint, electrodeposited over cleaned, phosphatized steel
- Triple-lead cover screws for fast installation of cover
- 3 DIN mounting rails, each accommodating up to one 12M unit, one 8M unit with one 4M unit, or three 4M units
- Complete with barriers for separation of Class 2 circuits from line voltage (36M only)
- The 36MS offers a reduced footprint than the 36M

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60M Enclosure

The 60M enclosure provides a means for housing DIN style relays and dimmers. Suitable for flush or surface mounting, the enclosure consists of a mounting pan assembly, and a cover assembly. The box is to be ordered separately, allowing for its installation with the rough-in of field wiring. Enclosures feature:

- NEMA 1 enclosure suitable for flush or surface mounting
- Welded sheet steel with knockouts
- Gray baked enamel paint, electrodeposited over cleaned, phosphatized steel
- Triple-lead cover screws for fast installation of cover
- 5 DIN mounting rails, each accommodating up to one 12M unit, one 8M unit with one 4M unit, or three 4M units
- Complete with barriers for separation of Class 2 circuits from line voltage

Table 5.31: Enclosures and Accessories

Catalog No.	Catalog Description	$ Price
8M Enclosure		
SLC8M	C-Bus single row enclosure, surface mount	110.00
12M Enclosure		
SLC12MSG	C-Bus single row enclosure, surface mount	120.00
24M Enclosure		
SLC24MSG	C-Bus dual row enclosure, surface mount	240.00
36MS Enclosure		
SLC36SC	C-Bus box for small three row interior	120.00
SLC36MSFG	C-Bus small three row interior with flush gray cover	690.00
SLC36MSFW	C-Bus small three row interior with flush white cover	690.00
SLC36MSSG	C-Bus small three row interior surface mount gray cover	690.00
36M Enclosure		
SLC36C	C-Bus box for three and five row interiors	136.00
SLC36MFG	C-Bus three row interior with gray cover, flush mount	740.00
SLC36MFW	C-Bus three row interior with white cover, flush mount	740.00
SLC36MSG	C-Bus three row interior surface gray	740.00
60M Enclosure		
SLC36C	C-Bus box for three and five row interiors	136.00
SLC60MFG	C-Bus five row interior with gray cover, flush mount	1233.00
SLC60MFW	C-Bus five row interior with white cover, flush mount	1233.00
SLC60MSG	C-Bus five row interior surface gray	1233.00
Accessories		
PK7GTA	Ground/Neutral Bar	7.80
PKGTAB	Neutral Insulator Kit	29.20
SLC4CSF8	Filler Plate, 4M	18.00

Area Lighting Panels

Area Lighting Panel

C-Bus Area lighting Panels are ideally suited to meet lighting control energy code requirements in classrooms, offices and other small spaces. Area Lighting Panels are designed to be used with C-Bus input units, including: keypads, sensors (occupancy and light level detection) and touch screens. A simple CAT-5 cable is all that is required for connecting of these devices.

C-Bus Area Lighting Panels provide on/off switching, stepped dimming or continuous dimming. All relays feature rugged 20 A rated contacts for switching electronic ballast loads. Models with continuous dimming capabilities are available with phase angle or 0–10 V control. C-Bus Area Lighting Panels can operate independently or as part of an entire facility wide lighting control system. Enclosures can easily be mounted in electrical closets or in ceiling spaces. They include all necessary connections and are UL® Listed. Area Lighting Panels can also be used in conjunction with Powerlink™ panels.

- Relay models: Four (4) or Eight (8) channel relay outputs, rated 20 A
- Phase Angle Dimmer Model: Four (4) channels of 4 A outputs for incandescent lighting loads.
- 0–10 V outputs available for control of compatible 0–10 V dimmable fluorescent ballasts, or LED drivers
- Integral neutral and ground bar terminal strips
- Meets NEC 300.22 requirements to be installed above ceilings and other spaces that handle environmental air
- Bypass mode to facilitate quick start up
- Meets NEC Article 409
- UL Listed 508 A

Table 5.32: C-Bus Area Lighting Panels

Catalog No.	Description	$ Price
4 Channel 20 A Relay Models		
SLCZ042000T	4 Channel 20 A Relay @ 120 V with power supply▲	1769.00
SLCZ042000H	4 Channel 20 A Relay @ 277 V with power supply▲	1769.00
SLCZ042000TP	4 Channel 20 A Relay @ 120 V without power supply	1675.00
SLCZ042000HP	4 Channel 20 A Relay @ 277 V without power supply	1675.00
8 Channel 20 A Relay Models		
SLCZ082000T	8 Channel 20 A Relay @ 120 V with power supply▲	2646.00
SLCZ082000H	8 Channel 20 A Relay @ 277 V with power supply▲	2646.00
SLCZ082000TP	8 Channel 20 A Relay @ 120 V without power supply	2462.00
SLCZ082000HP	8 Channel 20 A Relay @ 277 V without power supply	2462.00
4 Channel 20 A Relay Models with 0-10 V Output Units		
SLCZ04204AT	4 Channel 20 A Relay @ 120 V with power supply and 4 Channel 0–10 V Output Unit▲	2492.00
SLCZ04204AH	4 Channel 20 A Relay @ 277 V with power supply and 4 Channel 0–10 V Output Unit▲	2492.00
SLCZ04204ATP	4 Channel 20 A Relay @ 120 V without power supply and 4 Channel 0–10 V Output Unit	2308.00
SLCZ04204AHP	4 Channel 20 A Relay @ 277 V without power supply and 4 Channel 0–10 V Output Unit	2308.00
4 Channel 20 A Phase Angle Dimmer Models		
SLCZ00004DT	4 Channel 20 A Phase Angle Dimmer @ 120 V with C-Bus power supply▲	1144.00
SLCZ00004DTP	4 Channel 20 A Phase Angle Dimmer @ 120 V without C-Bus power supply	920.00
4 Channel 20 A Relay Models with Phase Angle Dimmer Units		
SLCZ04204DT	4 Channel 20 A Relay @ 120 V with C-Bus power supply and 4 Ch. Phase Angle Dimmer Unit▲	2630.00
SLCZ04204DTP	4 Channel 20 A Relay @ 120 V without C-Bus power supply and 4 Ch. Phase Angle Dimmer Unit	2182.00

▲ For stand-alone applications order unit with power supply.

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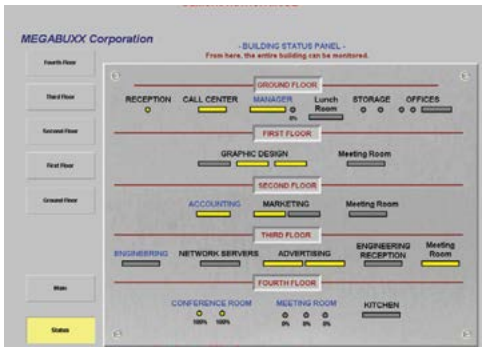
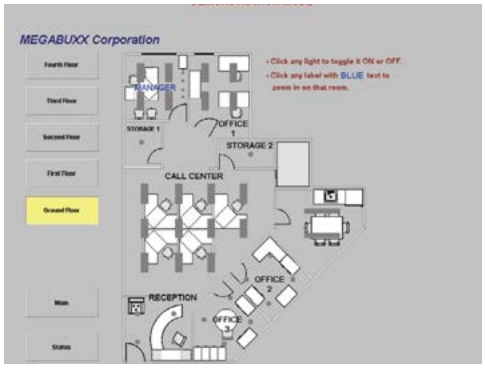


C-Bus Toolkit Software

The C-Bus Toolkit Software includes the C-Bus Installation and programming Software, Project Manager, and C-Bus Calculator. The software works under Windows™ 98, ME, 2000 and XP and supports a unique barcode scanning feature. This allows the installer to scan the C-Bus packaging of each new unit to add the unit to the database. The software prints adhesive labels that can be affixed to building plans. These labels include the Unit Address and the physical location that the unit is to be installed. Labels are duplicated so that one label can be affixed to the unit and one to the electrical plan for the installation. The labels have barcodes on them so that units can be easily re-identified if required.

NOTE: *C-Bus Toolkit Software is a free download from http://www.schneider-electric.us/solutions/lighting-and-whole-home-control/*



Schedule Plus Software Screen Captures

Schedule Plus Software V.4

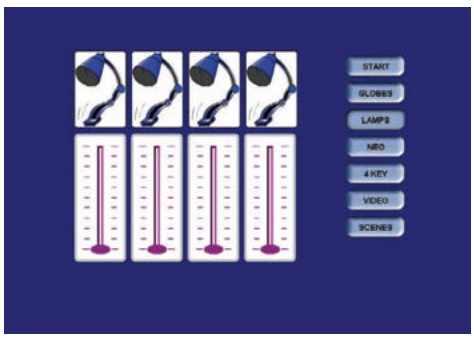
C-Bus Schedule Plus Version 4 includes a number of major features, including enhanced scheduling features, support for monitoring load run times, load power and energy consumed, support for fully customizable multilevel, password protected, access level control, support for sunrise and sunset times, support for daylight saving times, support for 128 bit encrypted secure Internet connectivity allowing control and monitoring via any Web Browser. The software also includes a graphic display as well as a fully featured programmable logic engine. The USB Code Key works under Windows XP Home, XP Professional, Server 2003, Vista Ultimate, Vista Business and Vista Enterprise.

NOTE: *An evaluation version of Schedule Plus is available for download by going to http://www.schneider-electric.us/solutions/lighting-and-whole-home-control/ and clicking Software Downloads in the far-left column.*

HomeGate Software V.4

Residential application PC control of a C-Bus Control System. C-Bus HomeGate Version 4 includes a number of major features, including support for 128 bit encrypted secure Internet connectivity allowing control and monitoring via any Web Browser, irrigation system control feature, enhanced scheduling features, support for sunrise and sunset times, support for daylight saving times. The software also includes a fully featured programmable logic engine. The C-Bus USB Key works under Windows XP Home, XP Professional, Server 2003, Vista Ultimate, Vista Business and Vista Enterprise.

NOTE: *An evaluation version of HomeGate is available for download by going to http://www.schneider-electric.us/solutions/lighting-and-whole-home-control/ and clicking Software Downloads in the far-left column.*



HomeGate Software Screen Captures

Installer License Key

The C-Bus Software Installer License Key is a valuable tool for installers to create/commission projects using C-Bus Version 4 Schedule Plus & HomeGate software. This code key is time restricted and allows the software to operate in 'normal' mode for anywhere between 48 to 72 hours per use (the software then returns to evaluation/demo mode).

NOTE: *The installer code key will also be compatible with future software releases.*

Table 5.33:

Catalog No.	Catalog Description	$ Price
Schedule PlusV. 4		
SLC5000SDSP24	License Key for 2 Networks	**792.00**
SLC5000SDSP104	License Key for 10 Networks	**1680.00**
SLC5000SDSPU4	License Key for Unlimited Networks	**2665.00**
HomeGate V. 4		
SLC5000SDHG24	License Key for 2 Networks	**352.00**
SLC5000SDHG104	License Key for 10 Networks	**680.00**
SLC5000SDSP24	Installer key for Schedule Plus or Homegate (unlimited networks)	**389.00**

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Wall Switch Occupancy Sensor

Basic Wall Switch Occupancy Sensors

Wall Switch Occupancy Sensors are ideally used in commercial buildings to save energy that would otherwise be wasted to light unoccupied rooms or spaces. These Wall Switch Occupancy Sensors employ the latest in passive infrared (PIR) sensing technology to accurately sense when a room or space is occupied, then turn lights on. When the room is unoccupied, the sensor turns lights off after a time delay of up to 30 minutes as determined by the user. Auto-ON and Manual-ON models available with decorator wall plate in White, Ivory or Light Almond. Simply mount the sensor in place of existing single gang switch — no neutral connection required. Special multi-segmented lens creates a coverage pattern that accurately detects major motion in rooms up to 1000 sq. ft.

- Input: 120/277 Vac 60 Hz
- Output: 1000W Max. Load @ 120 V (1000 VA@120 V 1800 VA@277 V)
- 1/4 HP Max. Motor Load
- UL and cUL Listed
- For use with electronic and magnetic ballasts
- CEC Title 24 Certified

Commercial Grade Wall Switch

Commercial Grade Wall Switch Occupancy Sensors

Maximum energy savings in a format that will complement any decor. Low profile sensors are available in white, ivory, gray, light almond and black with color-matched segmented lens.

Light Level Sensor Mode: Each sensor includes an adjusatble light level sensor to hold off artificial lighting when adequate natural light is present.

Walk-Through Mode: To maximize energy savings, the sensor detects when areas are briefly occupied as a result of a person walking through and turns off lighting based on a shorter time delay. Walk-Through Mode is available on single and dual circuit units.

Lamp Saver Mode: When the lamp saver feature is enabled, the sensor automatically alternates which load responds to motion. The result is more predictable lamp life and reduced maintenance. (Dual circuit only)

Adaptive Technology: Commercial Grade dual technology and ultrasonic wall switch occupancy sensors feature a patented adaptive technology that significantly reduces the learning period typically associated with adaptive sensors. Adaptive Sensors from Schneider Electric reduce the occurrence of nuisance on and nuisance off while at the same time extending lamp life and reducing maintenance.

Blank Cover Plate with decorator style opening

- Available in white, ivory, gray, light almond and black with matching cover plate (included)
- Color matching multi-segmented lens
- Audible alert
- Selectable auto-on and manual-on modes
- Red LED motion indicator
- For use with electronic and magnetic ballasts
- 1000 VA@120 V, 1800 VA@277 V
- User adjustable light level, time delay, and sensitivity
- 30 second grace period in the manual-on mode

Toggle Cover Plate with decorator style opening

Residential Wall Switch Vacancy Sensors

The Residential Vacancy Sensor directly replaces standard light switches in bathrooms, garages, laundry rooms and utility rooms in accordance with Title 24 2005 requirements for residential lighting (Sections 119(d) and 150 (k)). Vacancy Sensors from Schneider Electric operate just like a standard light switch, requiring a button press to turn lights on. Lights may be turned off with a button press or the sensor will turn off lighting automatically when the area is unoccupied.

- No user time delay and sensitivity adjustments necessary
- Available in White, Ivory or Light Almond
- Furnished with cover plate
- Manual On/Manual Off or Automatic Off operation
- No neutral or minimum load required
- Rated for both 120 V incandescent and fluorescent lighting
- Title 24 2005 Residential Lighting requirements, Sec. 150(k)
- No override on
- Manual-on only (no auto-on mode)
- 30 minute time delay

Table 5.34:

Catalog No.	Catalog Description	$ Price
Basic Wall Switch Occupancy Sensors		
Auto-ON/Auto-OFF		
SLSPWS1277AL	Light Almond Wall Switch Occupancy Sensor	81.00
SLSPWS1277AW	White Wall Switch Occupancy Sensor	81.00
SLSPWS1277AI	Ivory Wall Switch Occupancy Sensor	81.00
Manual-ON/Auto-OFF		
SLSPWS1277ML	Light Almond Wall Switch Occupancy Sensor	62.00
SLSPWS1277MW	White Wall Switch Occupancy Sensor	62.00
SLSPWS1277MI	Ivory Wall Switch Occupancy Sensor	62.00
Residential Vacancy Sensor		
SLSPWS120VL	Wall switch vacancy sensor, light almond	42.00
SLSPWS120VI	Wall switch vacancy sensor, ivory	42.00
SLSPWS120VW	Wall switch vacancy sensor, white	42.00
Commercial Grade Wall Switch Occupancy Sensors		
Single Circuit PIR		
SLSPWS1277UW	White	90.00
SLSPWS1277UI	Ivory	90.00
SLSPWS1277UG	Gray	90.00
SLSPWS1277UL	Light Almond	90.00
SLSPWS1277UB	Black	90.00
Dual Circuit PIR		
SLSPWD1277UW	White	117.00
SLSPWD1277UI	Ivory	117.00
SLSPWD1277UG	Gray	117.00
SLSPWD1277UL	Light Almond	117.00
SLSPWD1277UB	Black	117.00
Single Circuit Ultrasonic		
SLSUWS1277UW	White	142.00
SLSUWS1277UI	Ivory	142.00
SLSUWS1277UG	Gray	142.00
SLSUWS1277UL	Light Almond	142.00
SLSUWS1277UB	Black	142.00
Dual Circuit Ultrasonic		
SLSUWD1277UW	White	165.00
SLSUWD1277UI	Ivory	165.00
SLSUWD1277UG	Gray	165.00
SLSUWD1277UL	Light Almond	165.00
SLSUWD1277UB	Black	165.00
Single Circuit Dual Technology		
SLSDWS1277UW	White	187.00
SLSDWS1277UI	Ivory	187.00
SLSDWS1277UG	Gray	187.00
SLSDWS1277UL	Light Almond	187.00
SLSDWS1277UB	Black	187.00
Dual Circuit Dual Technology		
SLSDWD1277UW	White	210.00
SLSDWD1277UI	Ivory	210.00
SLSDWD1277UG	Gray	210.00
SLSDWD1277UL	Light Almond	210.00
SLSDWD1277UB	Black	210.00
Blank Cover Plates		
SLSWP2DBW	White	7.50
SLSWP2DBI	Ivory	7.50
SLSWP2DBG	Gray	7.50
SLSWP2DBL	Light Almond	7.50
SLSWP2DBB	Black	7.50
Toggle Cover Plates		
SLSWP2DTW	White	7.50
SLSWP2DTI	Ivory	7.50
SLSWP2DTG	Gray	7.50
SLSWP2DTL	Light Almond	7.50
SLSWP2DTB	Black	7.50
Buttonless Cover Plates		
SLSBCW	Buttonless Adjustment Access Covers, White	15.00
SLSBCI	Buttonless Adjustment Access Covers, Ivory	15.00
SLSBCG	Buttonless Adjustment Access Covers, Gray	15.00
SLSBCL	Buttonless Adjustment Access Covers, Light Almond	15.00
SLSBCB	Buttonless Adjustment Access Covers, Black	15.00

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Dual Technology Wall Mount

Wall Mount Occupancy Sensors

Wall Mount Occupancy Sensors from Schneider Electric accurately detect occupancy and automatically switch lighting on and off as needed. These sensors are wall or ceiling mounted for superior motion detection. Sensors employ Passive Infrared (PIR) and Ultrasonic technology. Dual Technology model features combined PIR and Ultrasonic detection for the ultimate performance. The PIR Occupancy Sensor has 3 interchangeable lenses for custom coverage patterns. Wide Angle, Long Range and High Bay. Wall mount sensors also incorporate an integral light level sensor, and features an isolated relay for use with building automation, security and HVAC systems.

- Adjustable Sensitivity
- Adjustable time delay
- UL and cUL Listed
- CEC Title 24 Certified
- FCC Part 15, Class B
- ASHRAE/IES 90.1

Table 5.35: Wall Mount Occupancy Sensors

Catalog No.	Catalog Description	$ Price
SLSWPS1500	PIR occupancy sensor	161.00
SLSWUS1500	Ultrasonic occupancy sensor	191.00
SLSWDS1500	Dual Technology occupancy sensor	221.00

Dual Technology Ceiling Mount

Ceiling Mount Occupancy Sensors

Ceiling Mount Occupancy Sensors are ideal for offices, conference rooms, class rooms and other shared areas to automatically turn lights on and off based on occupancy. Sensors employ Passive Infrared (PIR) and Ultrasonic technology. Dual Technology model features combined PIR and Ultrasonic detection for the ultimate performance. Requires power pack. Set of normally closed and normally opened auxiliary contacts for use with building automation and security systems.

- Input: 24 Vdc
- Output: +24 Vdc
- Adjustable Sensitivity
- Low Profile Housing
- Adjustable Light Level Sensor
- UL and cUL Listed
- CEC Title 24 Certified
- FCC Part 15, Class B
- ASHRAE/IES 90.1

Table 5.36: Ceiling Mount Occupancy Sensors

Catalog No.	Catalog Description	$ Price
SLSCPS1000	PIR occupancy sensor	134.00
SLSCUS2000	Ultrasonic occupancy sensor	197.00
SLSCDS2000	Dual Technology occupancy sensor	231.00
SLSCUS800	180 Degree Ultrasonic sensor	129.54
SLSCDS800	180 Degree Dual Technology Sensor (PIR and Ultrasonic Sensors combined)	141.76

Power Pack

Power Pack

For use with wall and ceiling mount sensors to supply power to sensor and switch the load when the sensor detects occupancy. May supply power to multiple sensors and auxiliary relays up to 100 mA nominal load.

- Input: 120/277 Vac 50/60 Hz
- Output: 24 Vdc/100 mA Nom.
- Relay rating: 20 A Max. Ballast Load at 120 Vac (20 A Max. at 277 V)
- UL cUL Listed

In Canada:

- Input: 347 Vac60 Hz
- Output: 24 Vdc/150 mA Nominal
- Relay rating: 15 A Max. Ballast Load at 347 Vac (15 A Max. at 5200 watts)
- UL cUL Listed

Auxiliary Relay

For use with wall and ceiling mount sensors to turn lights on when an area is occupied or off when it is not. Requires power pack to supply input power to operate relay.

- Input: 24 Vdc/36 mA Nom.
- Relay rating: 20 A Max. Ballast Load at 120 Vac (20 A Max. at 277 V)
- UL cUL Listed

In Canada:

- Input: 24 Vdc/2 mA Nominal
- Relay rating: 15 A Max. Ballast Load at 347 Vac

Table 5.37: Power Pack and Auxiliary Relay

Catalog No.	Catalog Description	$ Price
SLSPP1277	120–277 Vac Power Pack	46.50
SLSSP24	120–277 Vac Auxiliary Relay	36.00
SLSPP1347	347 Vac Power Pack	47.50
SLSSP24347	347 Vac Auxiliary Relay	36.00

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Indoor Occupancy Sensor

Fixture Mounted Sensors and Controls

Schneider Electric extends its occupancy-sensing capability with a range of line voltage sensors based on passive infrared (PIR) technology. These sensors feature rugged housings that resist moisture and dust typical of manufacturing and shipping dock areas. Sensors incorporate universal power supply, relay and PIR element in a single housing ready for direct attachment to popular high-bay and low-bay luminaires.

Sensors are available either as stand alone sensor-per-fixture devices or equipped with connectors for low-cost plastic optical fiber cable. Plastic optical fiber connectivity between sensors allows implementation of control zones within aisles and work areas without back-pulling signaling wire in conduit. Each sensor acts as a network repeater, allowing 200 foot spacing between sensors. Plastic fiber can be cut and terminated without special tools or installer training.

- All sensors feature oversized Fresnel lenses and premium, low-noise pyroelectric elements for reliable PIR sensing at mounting heights up to 45 feet.
- Both area- and aisle-sensing Fresnel lenses ship with each sensor. Color-coded snap-out lenses can be swapped in the field.
- Switch packs open and close based on fiber optic commands from fiber sensors
- Universal power supply design adapts to 120–480 Vac, 50/60 Hz without jumpers or taps.
- Single-pole/close-on-motion relays sized for switching dry contact, magnetic HID or electronic ballast loads.
- Mounts directly to reflector with included pinch bracket or to ballast housing with ” NPT threaded pipe nipple.
- Built-in manual override test switch and diagnostic LED to assist in installation. Diagnostic LED can be seen at distance to assist in walk test.
- Fifteen minute power ON warm-up timer assures rated lamp life even if the fiber network is broken.
- User adjustable sensitivity and delay time settings (0–15 minutes)

Table 5.38: Table Line Voltage Occupancy Sensors

Catalog No.	Catalog Description	$ Price
SLSPIP210	Occupancy sensor, indoor PIR, no fiber connectivity	141.00
SLSPIP210CT	Occupancy sensor, indoor PIR, no fiber, cold temperature	174.00
SLSPIP210EB	Occupancy sensor, indoor PIR, no fiber, electronic ballast	141.00
SLSPIP210EBCT	Occupancy sensor, indoor PIR, no fiber, electronic ballast cold temperature	174.00
SLSPIP211	Occupancy sensor, indoor PIR, one fiber input, one fiber output	166.00
SLSPIP212	Occupancy sensor, indoor PIR, two fiber inputs	166.00
SLSPSP101	Fiber optic switch pack, indoor, one fiber in, one fiber output	141.00
SLSPSP102	Fiber optic switch pack, indoor, two fiber inputs	141.00
SLSPCW001	Fixture-mounted counterweight for HID	13.00
SLSPIPBRACKET	Bracket for off-fixture mounting	11.00

New!

Fluorescent High Bay Sensor

Fluorescent High Bay Sensors

The SLSFPS1347 and SLSFPS1480 Occupancy Sensors are Class 1, fixture mounted, 360° high bay occupancy sensors. They are designed to operate directly with T5 and T8 fluorescent fixtures that use single or multiple electronic ballasts. Motion is detected using passive infrared technology (PIR). The operation voltage range for the SLSFPS1347 Sensor is 120–347 V. The SLSFPS1480 Sensor operates at 480 V.

Features

- Includes a user-adjustable time dial to set the length of time the luminaires stay on from 15 seconds to 30 minutes.
- Includes a user-adjustable range dial to customize PIR sensitivity.
- Includes a user-adjustable time dial to set the length of time the luminaires stay on from 15 seconds to 30 minutes.
- Includes a user-adjustable range dial to customize PIR sensitivity.
- 90 degree rotating lens for a variety of aisle-way applications.
- High bay area, low bay area, and high bay aisle lenses provided.
- 18 minutes time-out preset for maximum energy to lamp life savings.

Table 5.39: Specifications

Catalog No.	Catalog Description	$ Price
SLSFPS1347	120–347 Vac High bay Occupancy Sensor	78.00
SLSFPS1480	480 Vac High Bay Occupancy Sensor	89.00

New!

UL 924 Emergency Control Device

UL 924 Emergency Control Devices

Schneider Electric UL 924 Emergency Lighting Control Devices provide the ability to use and control standard fixtures for emergency and standard lighting. The use of UL 924 emergency lighting control device, under normal operating power the devices turn on and off emergency lighting along with standard lighting in an area. In the event of normal power loss the UL 924 emergency lighting control devices detect the power loss, and will automatically transfer emergency power to the fixtures. This provides emergency lighting through standard fixtures. Schneider Electric provides a wide selection of UL 924 emergency lighting control devices that work with occupancy and dimming based lighting control.

Features

- Saves energy by controlling Emergency Lighting
- Multiple mounting methods
- Convenient test switch
- Works with occupancy or dimmer controls
- Visible Power LED
- Easy to install

Table 5.40: Specificiations

Catalog No.	Catalog Description	$ Price
SLSEDC120	UL 924 Emergency Lighting Dimmer Control 120 Vac	700.00
SLSEDC277	UL 924 Emergency Lighting Dimmer Control 277 Vac	700.00
SLSEPMC120	UL 924 Emergency Lighting Control Relay Panel Mount 120 Vac	300.00
SLSEPMC277	UL 924 Emergency Lighting Control Relay Panel Mount 277 Vac	300.00
SLSERC1277	UL 924 Emergency Lighting Control Relay 120/277 Vac	300.00

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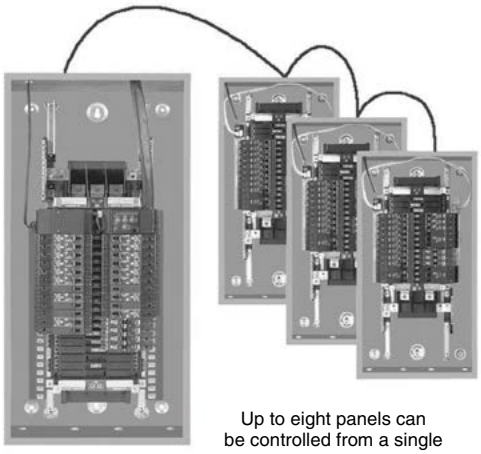
Powerlink available in column width design



Up to eight panels can be controlled from a single controller.

Powerlink G3 systems are ideally suited for controlling lighting and other loads in commercial, institutional, and industrial facilities. Such systems are typically used to lower utility cost by switching branch circuits OFF during non-occupied periods when lighting is unnecessary or during peak demand periods when a partial reduction in load can save significant money.

These systems utilize remotely operated circuit breakers to switch branch circuits ON and OFF via a time schedule or by an externally generated signal (typically a low voltage wall switch, photocell, access system, fire alarm or building management system). All Powerlink components mount inside a standard lighting panelboard to provide a compact, space saving installation.

Powerlink G3 systems feature a powerful microprocessor based controller that provides system intelligence for 168 remotely operated branch circuits. Master panelboards contain the control electronics, power supply, and control bus strips for up to 42 branch circuit breakers. Slave panels extend the capability of the system by allowing remotely operated branch circuit breakers to be operated from the master controller via a simple, 4-wire, sub-net connection.

All Powerlink G3 systems have the capability of being networked together and operated from a central workstation or via a remote modem connection. Powerlink software allows users to remotely configure the system, change time schedules, monitor circuit breaker or input status, and override zones and breakers.

BACnet Capability

The Building Automation and Control network (BACnet) communication protocol is incorporated into the Powerlink™ G3 controller design. The addition of the BACnet protocol allows Powerlink panels to be easily integrated into a Building Automation System (BAS) employing this open communication standard without the need for communication bridges or gateways.

Controller Models

The following Powerlink G3 controller models support 'native' BACnet communications:

- NF2000G3 — Ethernet communications, shared remote inputs, network time synchronization
- NF3000G3 — Email upon alarm, onboard web pages for status/control/configuration
- NF3000G3C — C-Bus communications (ability to interface with a Clipsal™ lighting control network)

Factory Assembled System

The following factory engineered pricing procedure may be used to price either 240 V or 480Y/277 V Powerlink G3 systems:

- Select system type and interior size from Table 5.43 on 5-24. All Powerlink G3 panels are furnished with either 1 or 2 control bus strips.
- Select panelboard base price from Table 5.44. All Powerlink G3 panels use NF type panelboard interiors, boxes, and trims and are suitable for either 240 V or 480Y/277 V systems.
- Select branch circuit breaker requirements from Table 5.45. Powerlink G3 panels can accommodate both ECB-G3 remotely operated circuit breakers and EDB, EGB and EJB standard branch circuit breakers.
- Refer to panelboard section for additional panelboard accessories.
- For complete price, order by description.
- Apply appropriate discount schedule.

240 V Factory Assembled System Example:

500 level system with 225 A MLO panelboard rated for 208Y/120 V, 3Ø4W, 10kAIR, Type 1, surface mount with ground bar and (12) 20 A 1-pole bolt-on remote operated circuit breakers.

Table 5.41:

Item	Page No.	$ Price
System Type: 500 controller with 12 ckt bus	5-24	**5074.00**
Panel type: 250 A MLO	5-26	**864.00**
Branch circuit breakers: (12) 20 A 1-pole	5-26	**2628.00**
Ground bar	5-26	**28.50**
Total price		**8594.50**

Table 5.42:

Feature	System Level			
	500	1000	2000	3000
Inputs				
2 - wire	8	16	16	16
2 - wire with status feedback	8	8	8	8
3 - wire	8	8	8	8
Time Scheduler				
7 day, each configurable	—	16	16	16
Daily on/off periods	—	24	24	24
Holiday events	—	32	32	32
Automatic daylight savings	—	X	X	X
Sunrise/sunset tracking	—	X	X	X
Networking				
Modbus™ ASCII/RTU	X	X	X	X
Modbus TCP	—	—	X	X
Johnson Controls N2	—	X▲	—	—
DMX	—	X	X	X
C-Bus	—	—	—	X■
BACnet MSTP/IP	—	—	X	X

▲ Specify N2 suffix
■ Specify C suffix

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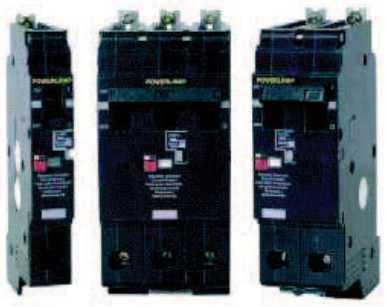
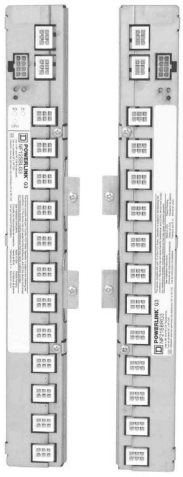


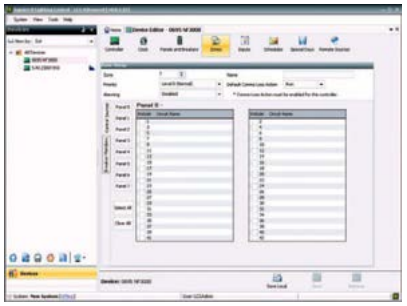
ECB-G3 Circuit Breaker



Control Bus

Power Supply

NF3000G3 Controller



Powerlink Software

Table 5.43: ECB-G3 Circuit Breakers Bolt-On Remotely Operated

Ampere Rating	One-Pole 27 7 Vac – 14,000 AIR 120 Vac – 65,000 AIR		Two-Pole 480Y/277 Vac – 14,000 AIR 120/240 Vac – 65,000 AIR 240 Vac – 14,000 AIR Ground B Phase		Three-Pole 480Y/277 Vac – 14,000 AIR 240 Vac – 42,000 AIR	
	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
15 20 30	ECB14015G3♦ ECB14020G3♦ ECB14030G3	**237.00**	ECB24015G3♦ ECB24020G3♦ ECB24030G3	**558.00**	ECB34015G3♦ ECB34020G3♦ ECB32030G3★	**890.00**

Table 5.44: ECB-G3 Circuit Breakers for Emergency Lighting (requires 2-pole spaces)

Ampere Rating	One-Pole 480 Y/277 – 14,000 AIR 240 V – 65,000 AIR	
	Catalog No.	$ Price
20	ECB142020G3EL	**558.00**

Note: All are listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers. UL listed as HID rated for use with high intensity discharge lighting systems. (1) #12–8 Al or (1) #10–8 Cu. Suitable for use with 75°C conductors.

♦ UL listed as SWD (switching duty) rated.
★ Rated for 240 Vac only – 42,000 AIR

Table 5.45: Control Bus

Max. No. of Control Circuits	Required Interior Size	Panel Orientation	Catalog No.	$ Price
12 12	30 30	Left Right	NF12SBLG3 NF12SBRG3	**851.00**
18 18	42 42	Left Right	NF18SBLG3 NF18SBRG3	**1065.00**
21 21	54 54	Left Right	NF21SBLG3 NF21SBRG3	**1163.00**

Table 5.46: Power Supply

Voltage	Primary Source	Catalog No.	$ Price
120 V 240 V 277 V	Panel Bus Panel Bus Panel Bus	NF120PSG3 NF240PSG3 NF277PSG3	**791.00**
120 V 240 V 277 V	External External External	NF120PSG3L NF240PSG3L NF277PSG3L	**899.00**

Table 5.47: Controller

Description	Catalog No.	$ Price
500	NF500G3	**1946.00**
1000	NF1000G3	**3968.00**
1000N2 (N2 protocol)	NF1000G3N2	**8288.00**
2000	NF2000G3	**7107.00**
3000	NF3000G3	**9741.00**
3000C (C-bus	NF3000G3C	**9741.00**

Table 5.48: Remote Source Controller (for additional inputs)—

Includes NEMA 1 enclosure, source controller and power supply

Voltage	Catalog No.	$ Price
120 V	RSC16G3120	**3045.00**
240 V	RSC16G3240	**3045.00**
277 V	RSC16G3277	**3045.00**

Table 5.49: Cables & Accessories

Description	Catalog No.	$ Price
Control bus cables		
Harness standard panel	NF2HG3	**89.00**
Sub-net accessories & cables		
Slave address selector▼	NFSELG3	**173.00**
6' sub-net cable	NFSN06	**75.00**
10' sub-net cable	NFSN10	**105.00**
25' sub-net cable	NFSN25	**234.00**
50' sub-net cable	NFSN50	**405.00**
Serial cables		
Controller front panel cable	NFFPCG3	**102.00**

▼ One slave address selector required for each slave panel.

Table 5.50: Miscellaneous Hardware

Description	Catalog No.	$ Price
Circuit Breaker Handle Padlock (Lock On or Off)	HPAFD△	**25.50**
Fixed Barrier	NFASBKG3	**177.00**
Remote Mounting Adapter	NFADAPTERG3	**102.00**

△ DE2 Discount

Table 5.51: Software

Description	Catalog No.	$ Price
LCSAdvanced Software	LCSADVANCED	**4000.00**
LCSBasic Software	LCSBasic	**1500.00**
Powerlink Controller Software□	PCS101	**1523.00**

□ N2 supported controllers. All other controllers use LCSAdvanced or LCSBasic.

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Remote Mount Controller

Device Power Supply

Powerlink Device Router

Table 5.52: Remote Mount Controller (for externally mounted electronics Includes NEMA 1 enclosure, controller, and power supply

Voltage	Catalog No.	Controller Type	$ Price
120 V	RMC500G3120	NF500G3	**4272.00**
240 V	RMC500G3240	NF500G3	**4272.00**
277 V	RMC500G3277	NF500G3	**4272.00**
120 V	RMC1000N2G3120	NF1000N2G3	**10615.00**
240 V	RMC1000N2G3240	NF1000N2G3	**10615.00**
277 V	RMC1000N2G3277	NF1000N2G3	**10615.00**
120 V	RMC1000G3120	NF1000G3	**6990.00**
240 V	RMC1000G3240	NF1000G3	**6990.00**
277 V	RMC1000G3277	NF1000G3	**6990.00**
120 V	RMC2000G3120	NF2000G3	**9860.00**
240 V	RMC2000G3240	NF2000G3	**9860.00**
277 V	RMC2000G3277	NF2000G3	**9860.00**
120 V	RMC3000G3120	NF3000G3	**12680.00**
240 V	RMC3000G3240	NF3000G3	**12680.00**
277 V	RMC3000G3277	NF3000G3	**12680.00**
120 V	RMC3000G3C120	NF3000G3C	**12680.00**
240 V	RMC3000G3C240	NF3000G3C	**12680.00**
277 V	RMC3000G3C277	NF3000G3C	**12680.00**

Device Power Supply

The Powerlink Device Power Supply is used to distribute power on a C-Bus™ network. Placed at critical points on the network, device power supplies will provide the current necessary for operating a variety of passive C-Bus devices. A Powerlink Device Power Supply consists of an 8M enclosure containing one or two 4M Power Supplies (120 or 277 Vac).

- Surface-mount NEMA 1 enclosure, with cover
- Unit and C-Bus LEDs indicate the status of the line voltage and the network
- Sources up to 700 mA (dual power supplies) to the C-Bus network
- 120 V or 277 Vac models available
- Dimensions: 8.9 in. (226mm) wide x 3.8 in. (97mm) deep x 12.57 (319mm) tall

Device Router

The Powerlink Device Router allows the exchange of data between a Powerlink NF3000G3C controller and C-Bus devices. This device router receives data from C-Bus input devices such as keypads and touchscreens and sends data to the Powerlink system and isa versa. The device router consists of a C-Bus 8M enclosure containing a C-Bus PC Interface and a C-Bus Power Supply (120 Vac or 277 Vac). Communication between the device router and the NF3000G3C controller is made with the included 50-foot serial cable.

- Surface-mount NEMA 1 enclosure, with cover
- Unit, Unit/Comms, and C-Bus LEDs indicate the status of data transmission and power to the unit and the network
- System network clock for synchronizing communications data
- Network power source, supplying up to 350 mA
- 120 Vac or 277 Vac models available
- Dimensions: 8.9 in. (226mm) wide x 3.8 in. (97mm) deep x 12.57 in. (319mm) tall

Table 5.53: Powerlink Device Routers▲

Description	Catalog No.	$ Price
120 V Device Router	NFDR120G3C■	**1632.00**
277 V Device Router	NFDR277G3C■	**1632.00**

▲ Required for interface to Clipsal units.
■ DE-8 Discount.

Table 5.54: Powerlink Device Power Supplies♦

Description	Catalog No.	$ Price
Single Supply 120 V	NFDP1120G3C★	**900.00**
Dual Supply 120 V	NFDP2120G3C★	**1650.00**
Single Supply 277 V	NFDP1277G3C★	**900.00**
Dual Supply 277 V	NFDP2277G3C★	**1650.00**
Filler Plate	SLC4CSF8	**27.00**

♦ Extends C-Bus power to Clipsal devices.
★ DE-8 Discount.

Powerlink Network Accessories

Table 5.55: Powerlink Network Accessories

Description	Catalog No.	$ Price
RS232/485 Converter	6382RS485G3KIT	**526.50**

Table 5.56: Powerlink Remote Modem Support▼

Description	Catalog No.	$ Price
Modem Kit (for G3 Controllers)	6382G3MODEM	**876.00**

▼ Requires 2000 and 3000 controller and either Analog or Ethernet modem connection to each master panel.

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G3 NF Panelboards 240 V and 480 Y/277 V Factory Assembled Systems

Maximum Voltage 480 Y/277 Vac

Table 5.57: Powerlink G3 System Price

List System Type	30 ckt Interior		42 ckt Interior		54 ckt Interior	
	12 ckt bus	24 ckt bus	18 ckt bus	36 ckt bus	21 ckt bus	42 ckt bus
Slave Panel	1650.00	3450.00	2025.00	4200.00	2370.00	4890.00
NF500G3	6753.00	8553.00	7128.00	9303.00	7473.00	10143.00
NF1000G3★	10728.00	12528.00	11103.00	13278.00	11448.00	14118.00
NF2000G3	17298.00	19098.00	17673.00	19848.00	18018.00	20688.00
NF3000G3	21072.00	22872.00	21447.00	23622.00	21792.00	24462.00

NOTE: *Powerlink EM option BCPM list price adder.*

Table 5.58: Panelboard Base Price (including solid neutral)

Mains Rating	Main Lugs		Main Circuit Breaker (Circuit Breaker Interrupting Rating—6-2 through 6-8)▲▼											
			Standard IC			HIC			Extra HIC			I-Limiter™		
	2-pole	3-pole	Circuit Bkr.	2-pole	3-pole	Circuit Bkr.	2-pole	3-pole	Circuit Bkr.	2-pole	3-pole	Circuit Bkr.	2-pole	3-pole
100 A	—	—	ED■	2454.00	2823.00	EG■	3150.00	3624.00	HJ	4872.00	5397.00	FI	6375.00	7326.00
125 A	1269.00	1458.00	ED■	5058.00	5643.00	EG■	6486.00	7464.00	—	—	—	—	—	—
150 A	—	—	HD	4905.00	5430.00	HG	6072.00	6597.00	HJ	6105.00	6630.00	—	—	—
225 A	—	—	JD	6180.00	6570.00	JG	7605.00	8100.00	JJ	9930.00	10995.00	KI	10899.00	12528.00
250 A	1503.00	1728.00	JD	6750.00	7710.00	JG	8985.00	9270.00	JJ	10785.00	12675.00	KI	13731.00	15783.00
400 A	1989.00	2286.00	LA	7995.00	9189.00	LH	11568.00	13296.00	LC	12759.00	14664.00	LI	14025.00	16119.00
600 A♦	3549.00	3933.00	—	—	—	—	—	—	LC	14331.00	16326.00	LI	20460.00	23517.00
800 A♦	5325.00	5850.00	—	—	—	—	—	—	—	—	—	—	—	—

▲ HL and JL frame circuit breakers are also available as main circuit breakers.
■ Backfed Main Circuit Breaker—54 circuit only.
♦ Copper Bus Only.
★ For N2 protocol, add **$3819.**
▼ Contact your nearest Square D/Schneider Electric sales office for MICROLOGIC™ trip main circuit breakers

Table 5.59: Branch Circuit Breaker – Price Per Circuit Breaker

Powerlink G3—ECB Bolt-On 65 kA AIR@240 Vac, 14 kA AIR@480 Y/277					Standard Breakers—EDB Bolt-On 18 kA AIR 1-pole, 25 kA AIR 2 & 3-pole @ 240 V, 18 kA AIR@480 Y/277					Standard Breakers HIC—EGB Bolt-On 65 kA AIR@240 Vac, 35 kA AIR@480 Y/277					Standard Breakers Extra HIC—EJB Bolt-On 100 kA AIR@240 Vac, 65 kA AIR@480 Y/277				
Voltage	Ampere Rating	1-pole	2-pole	3-pole	Voltage	Ampere Rating	1-pole	2-pole	3-pole	Voltage	Ampere Rating	1-pole	2-pole	3-pole	Voltage	Ampere Rating	1-pole	2-pole	3-pole
240 Vac	15–20	438.	1215.	1929.	480Y/277 Vac	15–60	288.	663.	1122.	480Y/277 Vac	15–60	486.	1119.	1896.	480Y/277 Vac	15–60	777.	1767.	3036.
	30	438.	1215.	1929.		70	513.	1308.	1569.		70	867.	2211.	2565.		70	1386.	3540.	4245.
480Y/277 Vac	15–20	438.	1215.	1929.		80–100	—	1308.	1569.		80–100	—	2211.	2655.		80–100	—	3540.	4245.
	30	438.	1215.	—		110–125	—	3825.	4845.		110–125	—	6171.	7131.		110–125	—	7950.	9450.
Space Only		63.	126.	189.		Space Only	63.	126.	189.		Space Only	63.	126.	189.		Space Only	63.	126.	189.

Note: All EC, ED, EG and EJ branch circuit breakers are UL Listed as HACR type.

Sub-Feed Circuit Breaker

- Available on 1Ø or 3Ø, 125–800 A main lugs or 125–600 A main circuit breaker interiors
- One sub-feed JD, JG, JJ or JL circuit breaker per 250 A panelboard
- Two sub-feed JD, JG, JJ or JL circuit breakers per 400 A panelboard△

△ LC and JJ may not be combined.

Table 5.60: Sub-Feed Circuit Breaker (150–400 A)

No. of Poles	JD	JG	JJ□	JL	LA	LH	LC□	Space
2	2265.00	3165.00	3844.50	4230.00	2985.00	4150.50	6475.50	619.50
3	2527.50	3825.00	4665.00	5296.50	3687.00	4882.50	7617.00	619.50

□ JJ and LC sub-feed circuit breakers cannot be used together.

Table 5.61: Sub-Feed Breaker Cabinet Data

Max. No. of Branch Spaces (Does not include sub-feed breaker spaces)	Box Height (20" W x 5.75" D)						
	250 A		400 A LA/LH		600 A		800 A
	Main Lugs	Main Circuit Breaker	Main Lugs	Main Circuit Breaker	Main Lugs▽	Main Circuit Breaker ☆	Main Lugs◒
30	56	68	68	80	68	80◊	68
42	62	74	74	86	74	86◊	74
54	68	80	80	92	80	92◊	80

◊ Dimensions also for 400 A LC/LI main circuit breaker panels.
☆ 600 A main lug panelboards require an 8" deep, 26" wide box.
▽ 600 A main lug panelboards require an 8.75" deep box.
◒ 800 A main lug panelboards require an 8.75" deep, 26" wide box.

To obtain pricing for the following Special Features please refer to the Supplemental Digest.

- PowerLogic™ metering
- Customer equipment space
- Increased box depth
- Box extensions top, bottom and side
- Drip hoods
- Non-standard paint
- NEMA 1 gasketed
- NEMA 4 Stainless steel enclosure
- NEMA 4X Fiberglass enclosure (NQOD and NF)
- Stainless steel trim front (NQOD, NF and I-LINE)
- Padlockable hasp
- Special locks (Corbin, Yale, Best)
- Equal height boxes
- Common trip to cover two equal height boxes
- Panelboard skirthides conduits feeding a panelboard
- Panelboard wireway for terminating conduit in wireway endwall
- Panelboard interiors and special fronts to fit existing boxes

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Powerlink Energy Management (EM) Lighting Control System

The Powerlink Energy Management (EM) Lighting Control System incorporates the same features found in the Powerlink G3 3000 level system, in addition to integral branch circuit and optional main metering for energy monitoring and verification of the lighting system. Integral metering is accomplished using the PowerLogic™ Branch Circuit Power Meter (BCPM), which is a highly accurate, full-featured multi-branch circuit power meter that provides unrivalled low-current monitoring.

The Powerlink G3 system reduces electrical energy consumption associated with lighting and other loads by automatically switching loads off during non-occupied periods. The Powerlink G3 system is often ideal for reducing th epeak demand by switching unnecessary lights off in response to an automated response signal or when high time-of-day energy tariffs occur.

Features

- Integral individual and optional mains metering to provide utmost flexibility in assurng a sustainable metering and verification program
- Monitors current, voltage, energy consumption, demand, and power factor for complete energy profiling
- Accumulated metering information transmitted via Modbus communications interface
- Data updates occurring within seconds to provide timely preventative maintenance information
- Optional EGX web interface for storing and reporting data via standard web browser (suggested for applications without Energy Management System [EMS] software)
- Alarm indication when parameters approach user-configured thresholds
- 16 hard-wired inputs available for connection to devices with physical dry-contacts
- 64 communication inputs available for network connection
- 16 independent time schedules, each can be configured into 24 distinct periods
- 7-day repeating clock with changeable automatic daylight savings time
- Automatic sunrise/sunset tracking with offsets
- 32 special event periods
- 32 remote sources for sharing input status, time schedules, or zone status between controllers
- Full custom logic capabilities, including full Boolean functions and synchronization services
- RS232 and RS485
- Serial communications using Modbus ASCII/RTU, BACnet MS/TP and DMX512 protocols (metering Modbus only)
- Ethernet 10BaseT communications using Modbus TCP and BACnet/IP protocols

Table 5.62:

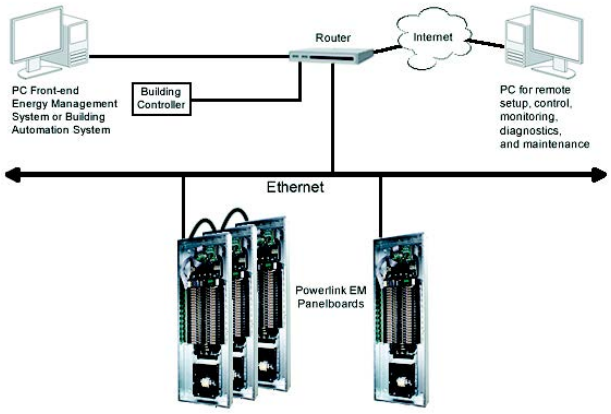
Characteristics	
Operating Temperature	-5° to 40°C (23° to 104°F) (95%RH, non-condensing)
Storage Temperature	-20° to 85°C (-4° to 185°F) (<95%RH, non-condensing)

Regulatory/Standards Compliance

- UL Listed 916, Energy Management Equip
- FCC Part 15, Class A
- NEC Class 1 and Class 2 Control Circuits
- ESD Immunity: IEC 1000, level 4
- RF Susceptibility: IEC 1000, level 3
- Electrical Fast Transient Susceptibility: IEC 1000, level 3
- Electrical Surge Susceptibility: IEC 1000, level 4 (power line)
- Electrical Fast Transient Susceptibility: IEC 1000, level 3 (interconnection lines)

BCPM Specifications	
General	
Control Power	90–277 Vac
Frequency	50/60 Hz
Sampling Frequency	2560 Hz
Update Rate	1.6 seconds per panelboard
Overload Capability	10 kAIC
Ribbon Cable Support	Up to 20 ft.
Operating Temperature	0° to 60°C (32°C to 122°F) (<95%RH, non-condensing)
Storage Temperature	-40° to 70°C (-40° to 158°F)
Accurancy	
Current Monitoring	0.25 A to 100A: 3% of reading from 0.25 A to 2 A; 2% of reading from 2 A to 100 A
Auxiliary Inputs	2% of reading from 1% to 10% of rated current; 1% of reading from 10% to 100% of rated current (0 to 0.333 Vac)
Voltage Input	90–277 Vac; 1% of reading from 90–277 L-N (models BCPMA and BCPMB only)
Power	4% of reading from 0.25 A to 2 A; 3% of reading 2 A to 100 A▲ (models BCPMA and BCPM only)
Network Communications	
Serial	Modbus™ RTU
Ethernet	TCP/IP

▲ Recommended for application where EMS software monitoring is not provided.



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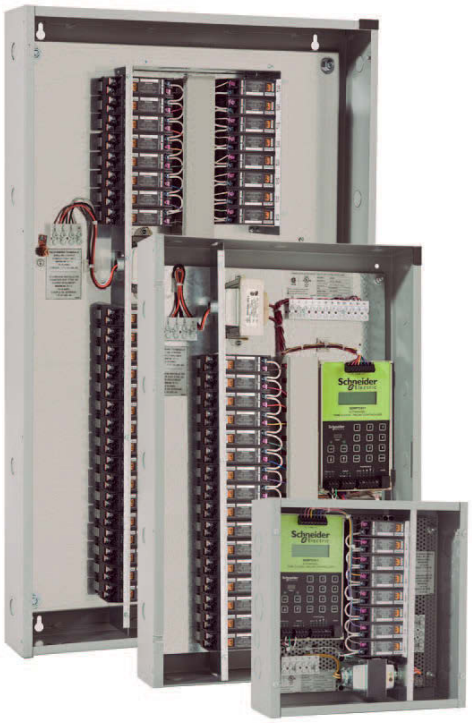

Relay Panels Family

Schneider Electric LPS Lighting Control Relay Panels offer a practical design for meeting energy codes requirements in smaller commercial spaces. Panels are available pre-assembled with 8, 16, or 32 relays. They consist of relays, time scheduler, panel controller, power supply, and NEMA 1 cabinet and cover.

Schneider Electric LPS Lighting Control Relay Panels offer a practical design for meeting energy codes requirements in smaller commercial spaces. Panels are available pre-assembled with 8, 16, or 32 relays. They consist of relays, time scheduler, panel controller, power supply, and NEMA 1 cabinet and cover.

LPS-Standalone Relay Panel

LPS reduces energy use by automatically shutting off lights in response to a scheduled time event from its built-in time controller or in response to an external control device, such as a keypad switch, occupancy sensor, or photocell. These panels are ideal for use in smaller commercial applications, such as small strip retail and office spaces, where a centralized building management system is not practical.

Features

- Stand-alone lighting control system meets ASHRAE90.1 and CA Title 24
- Individual heavy duty, mechanically latching, 20A relays
- Built-in time controller supports 8 independent zones
- Time retained during power outages for up to 30 days; nonvolatile program memory
- Two universal switch inputs
- Individual relay overrides can directly control each relay
- Easy to program interface
- 2-wire relay used for monitoring and control
- Manual operation lever with ON/OFF indicator built-in for easy maintenance
- Screw terminals on load and control sides
- UL 916 listed
- Full 365-day, 7-day repeating clock with event priorities
- Multi-group relay assignment
- Inegral power supply (120 / 277 / 347 Vac)
- Standard sizes: (LPS) 8, 16, 32; (LPB/LPL) 8, 16, 32, 48, or 64

LPB Additional Features

- Application controller with the BACnet protocol
- Heavy duty plug-in relays and electronic cards
- Movable protection plate between high and low voltage sections

LPL Additional Features

- Application controller with the LonWorks protocol

Available options include:

- Multi-voltage separator (120/277/347 VAC)

Software provides a graphic interface that is simple and intuitive, providing the following:

- System configuration, programming, and operation: Scheduler and Data logger

LPB-Bacnet Protocol

The Schneider Electric LPB Lighting Control Relay Panel with Native BACnet Protocol offers cost effective and code compliant lighting control. Panels are pre-packaged for ease of ordering and installation. Standard configurations are available with 8, 16, 32, 48, or 64 relays.

Relays come in a heavy duty, high intensity discharge (HID) version that carries up to 20A full load and are rated for over 120,000 mechanical operations. Heavy duty relays are recommended for high inrush loads or where higher short circuit current ratings are required.

LPBs are designed to operate on a BACnet network where control intelligence is provided through a BACnet building automation system. These panels are ideal for smaller commercial or retail spaces where a low cost way to achieve automatic shut-off is required. These simple to install and commission panels include full feature schedule control. Switch overrides and photocells are easily added for complete control.

LPL-LonWorks Protocol

The Schneider Electric LPL Lighting Control Relay Panel with LonWorks® Protocol offers cost effective and code compliant lighting control. The LPL is pre-packaged for ease of ordering and installation. Standard configurations are available with 8, 16, 32, or 64 relays.

Whether from a stand-alone system, a soft-wired networked panels system, or a fully programmable network system, the LPL offers engineers and facilities managers all the flexibility they need to meet their lighting control requirements. LPL software scheduling and event programming capabilities easily support all common sequences encountered in lighting control.

The LPL was developed using open LonWorks technology from the Echelon® Corporation. By adopting LonTalk® communication protocols and incorporating Neuron® microprocessors, the LPL panel complies with LonMark(tm) Interoperability Guidelines and is ready to interoperate in highly functional, flexible, and open building systems.

The Schneider Electric Lighting Control Relay Switches provide manual ON/OFF operation of lighting in zones. The switches are equipped with a switch based device using reversible polarity pulse technology. The switches are fully compatible with Lighting Control Relay Panels by Schneider Electric.

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Key Switch (SERPKWS)

- Wall mountable to any standard wall box
- Key operated (ON—turn right; OFF—turn left)
- Operates up to 4 relays per switch
- 6 switches per relay
- 3 Amp, 24 Vdc, Reversible polarity Impulse

Rocker Switch (SERPRWS)

- Wall mountable to any standard wall box (1-gang requires mounting bracket (SERPWSMB)
- LED ON/OFF indication
- Operates up to 8 relays per switch
- 6 LED switches per relay
- Optional filler plate (SERPWSFP)
- 3 Amp, 24 Vdc, Reversible polarity Impulse

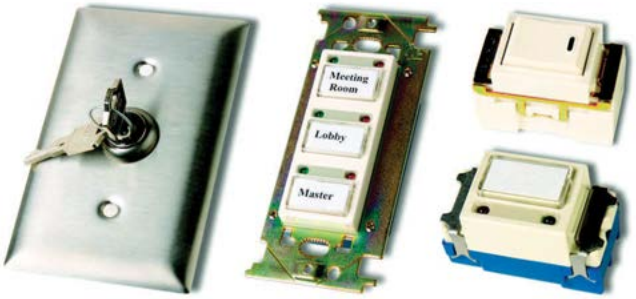
Push Button Switch (SERPWS) (Individual switch)

- Wall mountable to any standard wall box (1-gang requires mounting bracket SERPWSMB; 3-gang comes ready to mount)
- Switch input from common terminal
- LED ON/OFF indication
- Clear plastic labeling cap
- Operates up to 4 relays per switch
- 6 LED switches per relay
- Optional filler plate (SERPWSFP) may be required
- 1.5 Amp, 24 Vdc, Reversible polarity Impulse

Push Button Switch (SERPWS) (Assembled switch)

- Factory assembled
- Includes mounting bracket, switch(es), cover plate
- LED ON/OFF indication
- Clear plastic labeling cap
- Operates up to 4 relays per switch
- 6 LED switches per relay

NOTE: *Refer to 1290HO1101 Relay Switches handout for cover plate dimension*



Relay Switches
SERPKWS, SERPWS, SERPRWS, SERPWS

Table 5.63: Relay Panels, Switches and Plates

Cat. No.	Description	Price
SERP8NHS	SE SERIES RELAY PANEL 8 NON-HID RELAYS	1556.13
SERP16NHS	SE SERIES RELAY PANEL 16 NON-HID RELAYS	3334.58
SERP32NHS	SE SERIES RELAY PANEL 32 NON-HID RELAYS	6545.67
SERP8HS	SE SERIES RELAY PANEL 8 HID RELAYS	2726.58
SERP16HS	SE SERIES RELAY PANEL 16 HID RELAYS	4829.59
SERP32HS	SE SERIES RELAY PANEL 32 HID RELAYS	8385.48
SERPB8HS	SE SERIES BACnet RELAY PANEL 8 HID RELAYS	4559.36
SERPB16HS	SE SERIES BACnet RELAY PANEL 16 HID RELAYS	5322.60
SERPB32HS	SE SERIES BACnet RELAY PANEL 32 HID RELAYS	9521.71
SERPB48HS	SE SERIES BACnet RELAY PANEL 48 HID RELAYS	13078.59
SERPB64HS	SE SERIES BACnet RELAY PANEL 64 HID RELAYS	16684.88
SERPL8HS	SE SERIES LonWorks RELAY PANEL 8 HID RELAYS	3555.23
SERPL16HS	SE SERIES LonWorks RELAY PANEL 16 HID RELAYS	4897.76
SERPL32HS	SE SERIES LonWorks RELAY PANEL 32 HID RELAYS	8785.62
SERPL48HS	SE SERIES LonWorks RELAY PANEL 48 HID RELAYS	11932.49
SERPL64HS	SE SERIES LonWorks RELAY PANEL 64 HID RELAYS	15800.60
SERPFLC16	SE SERIES FLUSH COVER FOR 16 RELAY PANELS	239.00
SERPFLC32	SE SERIES FLUSH COVER FOR 32 RELAY PANELS	325.00
SERPFLC48	SE SERIES FLUSH COVER FOR 48 AND 64 RELAY PANELS	415.00
SERPR1	SE SERIES 1 POLE 20A HID RELAY 120–347 V	255.95
SERPR2	SE SERIES 2 POLE 20A HID RELAY 208–480 V	389.00
SERPTC411	SE SERIES RELAY PANEL TIME CLOCK CONTROLLER MODULE	1037.42
SERPRC401	SE SERIES RELAY PANEL SEQUENCER MODULE	1025.08
SERPBC601	SE SERIES RELAY PANEL BACnet Controller	1051.16
SERPTC811	SE SERIES RELAY PANEL TIME CLOCK CONTROLLER LonWorks MODULE	730.00
SERPLIC	SE SERIES RELAY PANEL INPUT CONTROLLER LonWorks MODULE	645.00
SERPLOC	SE SERIES RELAY PANEL OUTPUT CONTROLLER LonWorks MODULE	957.00
SERPLUSB	SE SERIES FT—10 NETWORK INTERFACE USB	950.00
SERPLS	SE SERIES Lon SOFTWARE	1050.00
SERPPBWS	SE SERIES RELAY PANEL WALL SWITCH WITH BRACKET	85.90
SERPKWS	SE SERIES RELAY PANEL LOW VOLTAGE KEY OPERATED SWITCH	85.57
SERPRWS	SE SERIES RELAY PANEL LOW VOLTAGE ROCKER WALL SWITCH	50.40
SERPWSMB	SE SERIES RELAY PANEL WALL SWITCH MOUNTING BRACKET	9.69
SERPWS1G1B	SE SERIES RELAY PANEL WALL SWITCH 1 GANG 1 BUTTON	95.57
SERPWS1G2B	SE SERIES RELAY PANEL WALL SWITCH 1 GANG 2 BUTTON	149.88
SERPWS1G3B	SE SERIES RELAY PANEL WALL SWITCH 1 GANG 3 BUTTON	194.29
SERPWS2G4B	SE SERIES RELAY PANEL WALL SWITCH 2 GANG 4 BUTTON	259.14
SERPWS2G6B	SE SERIES RELAY PANEL WALL SWITCH 2 GANG 6 BUTTON	367.97
SERPWS3G9B	SE SERIES RELAY PANEL WALL SWITCH 3 GANG 9 BUTTON	531.64
SERPWS3G12B	SE SERIES RELAY PANEL WALL SWITCH 4 GANG 12 BUTTON	695.31
SERPWS5G15B	SE SERIES RELAY PANEL WALL SWITCH 5 GANG 15 BUTTON	859.42
SERPWS6G18B	SE SERIES RELAY PANEL WALL SWITCH 6 GANG 18 BUTTON	1003.53
SERPWSFP	SE SERIES RELAY PANEL WALL SWITCH FILER PLATE	8.07
SERPWP1G1B	SE SERIES RELAY PANEL WALL PLATE 1 GANG 1 BUTTON	30.00
SERPWP1G2B	SE SERIES RELAY PANEL WALL PLATE 1 GANG 2 BUTTON	30.00
SERPWP1G3B	SE SERIES RELAY PANEL WALL PLATE 1 GANG 3 BUTTON	30.00
SERPWP2G4B	SE SERIES RELAY PANEL WALL PLATE 2 GANG 4 BUTTON	45.00
SERPWP2G6B	SE SERIES RELAY PANEL WALL PLATE 2 GANG 6 BUTTON	45.00
SERPWP3G9B	SE SERIES RELAY PANEL WALL PLATE 3 GANG 9 BUTTON	60.00
SERPWP3G12B	SE SERIES RELAY PANEL WALL PLATE 4 GANG 12 BUTTON	70.00
SERPWP5G15B	SE SERIES RELAY PANEL WALL PLATE 5 GANG 15 BUTTON	80.00
SERPWP6G18B	SE SERIES RELAY PANEL WALL GANG 6 GANG 18 BUTTON	90.00

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Cassia System Components

The Cassia energy management system (EMS) from Schneider Electric is a revolutionary wireless in-room solution that can have a dramatic impact on all key aspects contributing to your bottom line, from delighting your guests and reducing your carbon footprint, to enjoying a rapid return on investment and helping to maximize energy savings.

Thermostat

The Cassia thermostat controls heating and cooling equipment in guest rooms. Each thermostat uses two independent Zigbee radios for the local Room Area Network (RAN) within the room and the Hotel Area Network (HAN).

Motion Sensor (PIR)

The Cassia wireless motion sensor uses a Passive Infrared (PIR) sensor to detect heat patterns in the room. Motion will be signaled to the thermostat if the heat pattern changes.

Door Sensor

The Cassia wireless door sensor consists of a base and magnet. It sends a signal to the RAN indicating when the door is opened or closed.

Lighting Control

The Cassia Lighting Control System, including switches (1000 W), dimmers (800 W), and plug modules (Leading Edge Dimmer and Relay types), uses ZigBee wireless technology that provides dimming and/or on/off functions.

Wall switches and dimmers are available in black, white, cream or light almond, with one and three button options.

Plug Modules

Leading Edge Dimmer and Relay Plug Modules are designed to work as part of a Cassia EMS network installation and can be controlled by other devices on a Cassia EMS network. The modules may be placed into any standard 120 V wall outlet.

Plug modules are available in white.

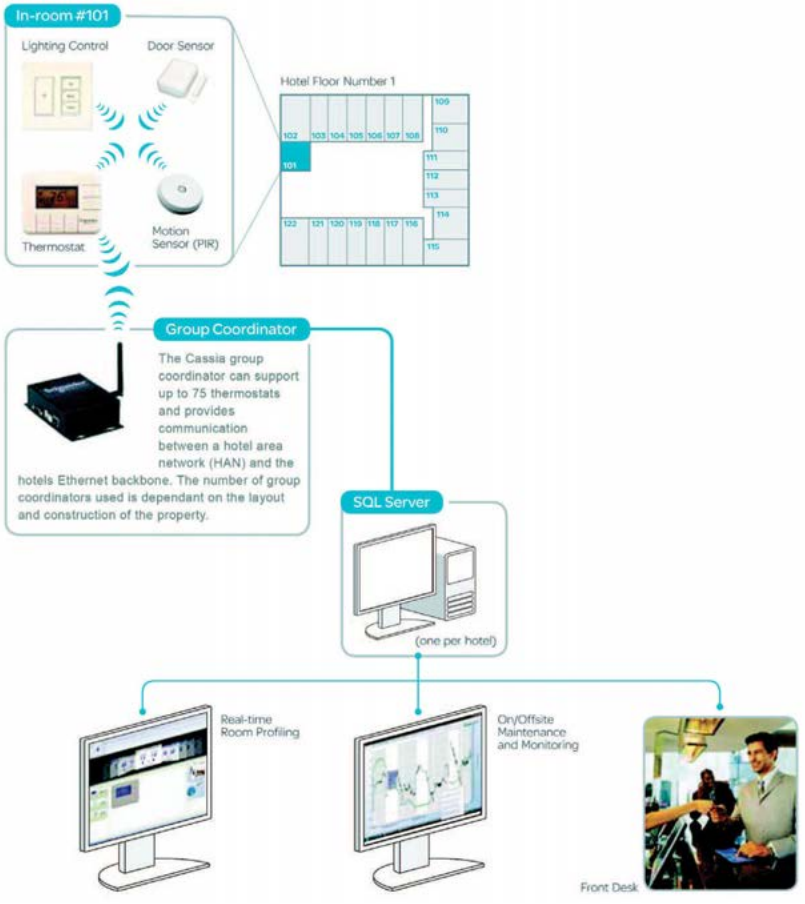
Group Coordinator (GC)

The Cassia EMS Group Coordinator is a Zigbee® wireless gateway that can support up to 75 thermostats and provides communication between a Room Area Network (RAN) Hotel Area Network (HAN) as well as a Property Management System (PMS).

Server

The EMS Server receives temperature, door events, motion events, and other data from the rooms. Data flows across the Ethernet network between the Thermostats, Group Coordinators and the EMS server.

Contact your Schneider Electric representative for more information about the Cassia Energy Management System.



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Externally Mounted Surge Protective Devices

Surgelogic™ offers a full range of externally mounted SPDs. These units are designed to provide surge suppression from service entrance panels to point-of-use equipment.

US and Canadian UL® Listed to UL 1449 3rd Edition and UL 1283 5th Edition. Complies with requirements of NEC® Article 285 and CSA 22.2 No. 8-M1986 as appropriate. Complies with UL 96A 12th Edition Master Label requirements for Lightning Protection Systems.

- 10 year product warranty
- 10 modes of protection
- 200 kA SCCR
- EMI/RFI filtering
- Audible alarm with enable/disable switch, dry contacts, and surge counter standard
- Indicator LEDs; normal (green) and fault condition (red) for each phase
- UL 1449 Type 2 (or Type 1 with optional suffix in catalog number)

External SPD Options:

- **Sine Wave Tracking Module**. Sine Wave Tracking (SWT) circuitry provides enhanced EMI/RFI filtering of -54 dB at 100 kHz and establishes the power surge clamping window relative to the sine wave voltage to increase performance at distribution and branch panel applications.
- **Type 1**. UL 1449 Type 1 SPDs can be located at any point in the electrical system, on the line or load side of the equipment overcurrent device.
- **Integral Switch**. The integral switch provides a mechanical means to electrically isolate the entire surge suppressor before opening the enclosure door to facilitate servicing of the unit's components.
- **Remote Monitor**. This option displays the alarm status of the surge protective device up to 1000 feet from the unit.
- **Flush Mount Kits**. Flush mounting kits can be used on 120–240 kA EMA and EBA series devices. Devices with integral switch require a 20 inch flush mounting collar.

External Modular Assembly (EMA) SPDs

EMA SPD products feature a design based on individual phase modules for a flexible, cost effective way to achieve superior surge suppression at every level of the electrical distribution system. Modularity results in lower life cycle costs and fast, easy service or replacement.

External Modular SPD
with Integral Switch

External Modular SPD
with Sine Wave Tracking Module

External Modular
High-Resistance Ground SPD

Table 6.1: EMA SPDs

	Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 3R Cat. No.	$ Price	NEMA 4X Stainless Steel Cat. No.	$ Price
	120/240 V, 1-phase, 3-wire + ground	120	TVS1EMA12A( )	**4547.00**	TVS1EMA12S( )	**5964.00**
		160	TVS1EMA16A( )	**4997.00**	TVS1EMA16S( )	**6414.00**
		240	TVS1EMA24A( )	**7421.00**	TVS1EMA24S( )	**8838.00**
		320	TVS1EMA32A( )	**9962.00**	TVS1EMA32S( )	**11379.00**
		480	TVS1EMA48A( )	**14798.00**	TVS1EMA48S( )	**16215.00**
	208Y/120 V, 3-phase, 4-wire + ground ▲■ Wye	120	TVS2EMA12A( )	**4760.00**	TVS2EMA12S( )	**6177.00**
		160	TVS2EMA16A( )	**5231.00**	TVS2EMA16S( )	**6648.00**
		240	TVS2EMA24A( )	**7782.00**	TVS2EMA24S( )	**9200.00**
		320	TVS2EMA32A( )	**10431.00**	TVS2EMA32S( )	**11849.00**
		480	TVS2EMA48A( )	**15522.00**	TVS2EMA48S( )	**16940.00**
	240/120 V, 3-phase, 4-wire + ground High-leg Delta	120	TVS3EMA12A( )	**4760.00**	TVS3EMA12S( )	**6177.00**
		160	TVS3EMA16A( )	**5231.00**	TVS3EMA16S( )	**6648.00**
		240	TVS3EMA24A( )	**7782.00**	TVS3EMA24S( )	**9200.00**
		320	TVS3EMA32A( )	**10431.00**	—	—
		480	TVS3EMA48A( )	**15522.00**	—	—
New!	240 V, 3-phase, 3-wire + ground Delta	120	TVS6EMA12A( )	**4760.00**	TVS6EMA12S( )	**6177.00**
		160	TVS6EMA16A( )	**5231.00**	TVS6EMA16S( )	**6648.00**
		240	TVS6EMA24A( )	**7782.00**	TVS6EMA24S( )	**9200.00**
		320	TVS6EMA32A( )	**10431.00**	TVS6EMA32S( )	**11849.00**
		480	TVS6EMA48A( )	**15522.00**	TVS6EMA48S( )	**16940.00**
	480Y/277 V, 3-phase, 4-wire + ground ■♦ Wye	120	TVS4EMA12A( )	**4973.00**	TVS4EMA12S( )	**6390.00**
		160	TVS4EMA16A( )	**5468.00**	TVS4EMA16S( )	**6885.00**
		240	TVS4EMA24A( )	**8147.00**	TVS4EMA24S( )	**9564.00**
		320	TVS4EMA32A( )	**10904.00**	TVS4EMA32S( )	**12321.00**
		480	TVS4EMA48A( )	**16250.00**	TVS4EMA48S( )	**17667.00**
New!	480Y/277 V, 3-phase, 3-wire + ground High-Resistance Ground	120	TVS4HEMA12A( )	**4973.00**	TVS4HEMA12S( )	**6390.00**
		160	TVS4HEMA16A( )	**5468.00**	TVS4HEMA16S( )	**6885.00**
		240	TVS4HEMA24A( )	**8147.00**	TVS4HEMA24S( )	**9564.00**
		320	TVS4HEMA32A( )	**10904.00**	TVS4HEMA32S( )	**12321.00**
		480	TVS4HEMA48A( )	**16250.00**	TVS4HEMA48S( )	**17667.00**
New!	480 V, 3-phase, 3-wire + ground, Delta	120	TVS5EMA12A( )	**4973.00**	TVS5EMA12S( )	**6390.00**
		160	TVS5EMA16A( )	**5468.00**	TVS5EMA16S( )	**6885.00**
		240	TVS5EMA24A( )	**8147.00**	TVS5EMA24S( )	**9564.00**
		320	TVS5EMA32A( )	**10904.00**	TVS5EMA32S( )	**12321.00**
		480	TVS5EMA48A( )	**16250.00**	TVS5EMA48S( )	**17667.00**
	600Y/347 V, 3-phase, 4-wire + ground ■ Wye	120	TVS8EMA12A( )	**5220.00**	TVS8EMA12S( )	**6638.00**
		160	TVS8EMA16A( )	**5714.00**	TVS8EMA16S( )	**7131.00**
		240	TVS8EMA24A( )	**8528.00**	TVS8EMA24S( )	**9945.00**
		320	TVS8EMA32A( )	**11399.00**	TVS8EMA32S( )	**12816.00**
		480	TVS8EMA48A( )	**17012.00**	TVS8EMA48S( )	**18429.00**
New!	600Y/347 V, 3-phase, 3-wire + ground High-Resistance Ground	120	TVS8HEMA12A( )	**5220.00**	TVS8HEMA12S( )	**6638.00**
		160	TVS8HEMA16A( )	**5714.00**	TVS8HEMA16S( )	**7131.00**
		180	TVS8HEMA18A( )	**8528.00**	TVS8HEMA18S( )	**9945.00**
		240	TVS8HEMA24A( )	**11399.00**	TVS8HEMA24S( )	**12816.00**
		320	TVS8HEMA32A( )	**17012.00**	TVS8HEMA32S( )	**18429.00**
New!	600 V, 3-phase, 3-wire + ground, Delta	120	TVS9EMA12A( )	**5220.00**	TVS9EMA12S( )	**6638.00**
		160	TVS9EMA16A( )	**5714.00**	TVS9EMA16S( )	**7131.00**
		180	TVS9EMA18A( )	**8528.00**	TVS9EMA18S( )	**9945.00**
		240	TVS9EMA24A( )	**11399.00**	TVS9EMA24S( )	**12816.00**
		320	TVS9EMA32A( )	**17012.00**	TVS9EMA32S( )	**18429.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ Can be used on 4-wire or 3-wire grounded neutral system.
♦ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

New!	External Modular Options ( )	$ Price
	(1) UL 1449 Type 1	**0.00**
	(I) ★ Integral Switch	**738.00**
	(SWT) Sine Wave Tracking Module (not applicable for Delta or HRG)	**750.00**
	(I1) ★ UL 1449 Type 1 and Integral Switch	**738.00**
	(SWT1) UL 1449 Type 1 and Sine Wave Tracking Module (not applicable for Delta or HRG)	**750.00**
	(ISWT) ★ Integral Switch and Sine Wave Tracking Module (not applicable for Delta or HRG)	**1488.00**
	(ISWT1) ★ UL 1449 Type 1, Integral Switch and Sine Wave Tracking Module (not applicable for Delta or HRG)	**1488.00**

Accessory Description	Cat. No.	$ Price
Remote Monitor	TVS12RMU	**788.00**
12-inch Flush Mount Kit	TVS12FMK	**945.00**
20-inch Flush Mount Kit	TVS20FMK	**1103.00**

★ Not available in stainless steel for 320 and 480 kA

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External Modular L-L Enhanced SPD with Sine Wave Tracking Module

External Modular L-L Enhanced SPDs

External modular Line-to-Line (L-L) Enhanced SPDs are parallel systems that provide 10 modes of protection and enhanced, discrete L-L suppression paths.

Table 6.2: L-L Enhanced SPDs

Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 3R Cat. No.	$ Price	NEMA 4X Stainless Steel Cat. No.	$ Price
208Y/120 V, 3-phase, 4-wire + ground ▼ Wye	120	TVS2MEMA12A( )	**8810.00**	TVS2MEMA12S( )	**10010.00**
	180	TVS2MEMA18A( )	**10790.00**	TVS2MEMA18S( )	**12657.00**
	270	TVS2MEMA27A( )	**13760.00**	TVS2MEMA27S( )	**15627.00**
	360	TVS2MEMA36A( )	**16730.00**	TVS2MEMA36S( )	**18597.00**
480Y/277 V, 3-phase, 4-wire + ground △ Wye	120	TVS4MEMA12A( )	**9023.00**	TVS4MEMA12S( )	**10890.00**
	180	TVS4MEMA18A( )	**11003.00**	TVS4MEMA18S( )	**12870.00**
	270	TVS4MEMA27A( )	**13973.000**	TVS4MEMA27S( )	**15840.00**
	360	TVS4MEMA36A( )	**16943.00**	TVS4MEMA36S( )	**18810.00**

▼ 208Y/120 series also applies to the following voltage 220Y/127.
△ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

New!	External Modular L-L Enhanced Options ( )	$ Price
	(1) UL 1449 Type 1	**0.00**
	(SWT) Sine Wave Tracking Module	**750.00**
	(SWT1) UL 1449 Type 1 and Sine Wave Tracking Module	**750.00**

Accessory Description	Cat. No.	$ Price
Remote Monitor	TVS12RMU	**788.00**
20-inch Flush Mount Kit	TVS20FMK	**1103.00**

External Brick Assembly SPD with Integral Switch

External Brick Assembly SPDs

External Brick Assembly (EBA) SPD products consist of a consolidation of phase modules into one solid brick casting and offered at a competitive price for those who want superior surge suppression on a limited budget.

Table 6.3: EBA SPDs

Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 3R Cat. No.	$ Price	NEMA 4X Stainless Steel Cat. No.	$ Price
120/240 V,1-phase, 3-wire + ground Wye	120	TVS1EBA12A( )	**3467.00**	TVS1EBA12S( )	**4884.00**
	160	TVS1EBA16A( )	**4208.00**	TVS1EBA16S( )	**5625.00**
	240	TVS1EBA24A( )	**6290.00**	TVS1EBA24S( )	**7707.00**
208Y/120 V, 3-phase, 4-wire + ground ▲■ Wye	120	TVS2EBA12A( )	**3588.00**	TVS2EBA12S( )	**5006.00**
	160	TVS2EBA16A( )	**4388.00**	TVS2EBA16S( )	**5805.00**
	240	TVS2EBA24A( )	**6525.00**	TVS2EBA24S( )	**7943.00**
240/120 V, 3-phase, 4-wire + ground High-leg Delta	120	TVS3EBA12A( )	**3588.00**	TVS3EBA12S( )	**5006.00**
	160	TVS3EBA16A( )	**4388.00**	TVS3EBA16S( )	**5805.00**
	240	TVS3EBA24A( )	**6525.00**	TVS3EBA24S( )	**7943.00**
480Y/277 V, 3-phase, 4-wire + ground ■♦ Wye	120	TVS4EBA12A( )	**3743.00**	TVS4EBA12S( )	**5160.00**
	160	TVS4EBA16A( )	**4581.00**	TVS4EBA16S( )	**5999.00**
	240	TVS4EBA24A( )	**6827.00**	TVS4EBA24S( )	**8244.00**
600Y/347 V, 3-phase, 4-wire + ground ■ Wye	120	TVS8EBA12A( )	**3905.00**	TVS8EBA12S( )	**5322.00**
	160	TVS8EBA16A( )	**4787.00**	TVS8EBA16S( )	**6204.00**
	240	TVS8EBA24A( )	**7143.00**	TVS8EBA24S( )	**8561.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ Can be used on 4-wire or 3-wire grounded neutral system.
♦ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

New!	External Brick Assembly Options ( )	$ Price
	(1) UL 1449 Type 1	**0.00**
	(I) Integral Switch	**738.00**
	(SWT) Sine Wave Tracking Module (not applicable for Delta)	**750.00**
	(I1) UL 1449 Type 1 and Integral Switch	**738.00**
	(SWT1) UL 1449 Type 1 and Sine Wave Tracking Module (not applicable for Delta)	**750.00**
	(ISWT) Integral Switch and Sine Wave Tracking Module (not applicable for Delta)	**1,488.00**
	(ISWT1) UL 1449 Type 1, Integral Switch and Sine Wave Tracking Module (not applicable for Delta)	**1,488.00**

Accessory Description	Cat. No.	$ Price
Remote Monitor	TVS12RMU	**788.00**
12-inch Flush Mount Kit	TVS12FMK	**945.00**
20-inch Flush Mount Kit	TVS20FMK	**1103.00**

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Replacement Modules ★

All modules and brick assemblies are US and Canadian UL® Recognized to UL 1449 3rd Edition and UL 1283 5th Edition.

Complies with requirements of NEC® Article 285 and CSA C22.2 No. 8-M1986 as appropriate.

★ For UL 1449 Type 1 Modules, add suffix (1).
Example: MA1IMA121

MA Replacement Module

HRG Replacement Module

Delta Replacement Module

EBA Replacement Module

MA Replacement Module

L-L Enhanced Replacement Module

Table 6.4: EMA Replacement Modules

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers					
		Phase A	$ Price	Phase B	$ Price	Phase C	$ Price
120/240 V, 1-phase, 3-wire + ground	120	MA1IMA12	**906.00**	—	—	MA1IMA12	**906.00**
	160	MA1IMA16	**1064.00**	—	—	MA1IMA16	**1064.00**
	240	MA1IMA24	**1229.00**	—	—	MA1IMA24	**1229.00**
208Y/120 V, 3-phase, 4-wire + ground ▲ Wye	120	MA1IMA12	**906.00**	MA1IMA12	**906.00**	MA1IMA12	**906.00**
	160	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**
	240	MA1IMA24	**1229.00**	MA1IMA24	**1229.00**	MA1IMA24	**1229.00**
120/240 V, 3-phase, 4-wire + ground ■ High-Leg Delta	120	MA1IMA12	**906.00**	MA3IMA12	**906.00**	MA1IMA12	**906.00**
	160	MA1IMA16	**1064.00**	MA3IMA16	**1064.00**	MA1IMA16	**1064.00**
	240	MA1IMA24	**1229.00**	MA3IMA24	**1229.00**	MA1IMA24	**1229.00**
New! 240 V, 3-phase, 3-wire + ground Delta	120	MA6IMA12	**906.00**	MA6IMA12	**906.00**	MA6IMA12	**906.00**
	160	MA6IMA16	**1064.00**	MA6IMA16	**1064.00**	MA6IMA16	**1064.00**
	240	MA6IMA24	**1229.00**	MA6IMA24	**1229.00**	MA6IMA24	**1229.00**
480Y/277 V, 3-phase, 4-wire + ground ♦ Wye	120	MA4IMA12	**906.00**	MA4IMA12	**906.00**	MA4IMA12	**906.00**
	160	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**
	240	MA4IMA24	**1229.00**	MA4IMA24	**1229.00**	MA4IMA24	**1229.00**
New! 480Y/277 V, 3-phase, 3-wire + ground ♦ High-Resistance Ground	120	MA4IMA12H	**906.00**	MA4IMA12H	**906.00**	MA4IMA12H	**906.00**
	160	MA4IMA16H	**1064.00**	MA4IMA16H	**1064.00**	MA4IMA16H	**1064.00**
	240	MA4IMA24H	**1229.00**	MA4IMA24H	**1229.00**	MA4IMA24H	**1229.00**
New! 480 V, 3-phase, 3-wire + ground Delta	120	MA5IMA12	**906.00**	MA5IMA12	**906.00**	MA5IMA12	**906.00**
	160	MA5IMA16	**1064.00**	MA5IMA16	**1064.00**	MA5IMA16	**1064.00**
	240	MA5IMA24	**1229.00**	MA5IMA24	**1229.00**	MA5IMA24	**1229.00**
600Y/347 V, 3-phase, 4-wire + ground Wye	120	MA8IMA12	**906.00**	MA8IMA12	**906.00**	MA8IMA12	**906.00**
	160	MA8IMA16	**1064.00**	MA8IMA16	**1064.00**	MA8IMA16	**1064.00**
	240	MA8IMA24	**1229.00**	MA8IMA24	**1229.00**	MA8IMA24	**1229.00**
New! 600Y/347 V, 3-phase, 3-wire + ground High-Resistance Ground	120	MA8IMA12H	**906.00**	MA8IMA12H	**906.00**	MA8IMA12H	**906.00**
	160	MA8IMA16H	**1064.00**	MA8IMA16H	**1064.00**	MA8IMA16H	**1064.00**
	180	MA8IMA18H	**1229.00**	MA8IMA18H	**1229.00**	MA8IMA18H	**1229.00**
New! 600 V, 3-phase, 3-wire + ground Delta	120	MA9IMA12	**906.00**	MA9IMA12	**906.00**	MA9IMA12	**906.00**
	160	MA9IMA16	**1064.00**	MA9IMA16	**1064.00**	MA9IMA16	**1064.00**
	180	MA9IMA18	**1229.00**	MA9IMA18	**1229.00**	MA9IMA18	**1229.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ High-leg delta (Phase B modules are different than Phase A and Phase C modules).
♦ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Table 6.5: EBA Replacement Modules

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers	$ Price
120/240 V, 1-phase, 3-wire + ground	120	MA1IBA12	**2717.00**
	160	MA1IBA16	**3189.00**
	240	MA1IBA24	**3686.00**
208Y/120 V, 3-phase, 4-wire + ground ▲	120	MA2IBA12	**2717.00**
	160	MA2IBA16	**3189.00**
	240	MA2IBA24	**3686.00**
240/120 V, 3-phase, 4-wire + ground ■ High-leg Delta	120	MA3IBA12	**2717.00**
	160	MA3IBA16	**3189.00**
	240	MA3IBA24	**3686.00**
480Y/277 V, 3-phase, 4-wire + ground ♦ Wye	120	MA4IBA12	**2717.00**
	160	MA4IBA16	**3189.00**
	240	MA4IBA24	**3686.00**
600Y/347 V, 3-phase, 4-wire + ground Wye	120	MA8IBA12	**2717.00**
	160	MA8IBA16	**3189.00**
	240	MA8IBA24	**3686.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ High-leg delta (Phase B modules are different than Phase A and Phase C modules).
♦ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Table 6.6: L-L Enhanced MA (L-N, L-G) Replacement Modules

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers					
		Phase A	$ Price	Phase B	$ Price	Phase C	$ Price
208Y/120 V, 3-phase, 4-wire + ground ▲ Wye	120	MA1IMA12	**906.00**	MA1IMA12	**906.00**	MA1IMA12	**906.00**
	180	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**
	270	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**	MA1IMA16	**1064.00**
	360	MA1IMA24	**1229.00**	MA1IMA24	**1229.00**	MA1IMA24	**1229.00**
480Y/277 V, 3-phase, 4-wire + ground ■ Wye	120	MA4IMA12	**906.00**	MA4IMA12	**906.00**	MA4IMA12	**906.00**
	180	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**
	270	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**	MA4IMA16	**1064.00**
	360	MA4IMA24	**1229.00**	MA4IMA24	**1229.00**	MA4IMA24	**1229.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Table 6.7: L-L Enhanced (L-L) Replacement Modules

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers					
		Phase A	$ Price	Phase B	$ Price	Phase C	$ Price
208Y/120 V, 3-phase, 4-wire + ground ▲ Wye	120	MA2IMA40LL	**604.00**	MA2IMA40LL	**604.00**	MA2IMA40LL	**604.00**
	180	MA2IMA60LL	**709.00**	MA2IMA60LL	**709.00**	MA2IMA60LL	**709.00**
	270	MA2IMA90LL	**819.00**	MA2IMA90LL	**819.00**	MA2IMA90LL	**819.00**
	360	MA2IMA12LL	**946.00**	MA2IMA12LL	**946.00**	MA2IMA12LL	**946.00**
480Y/277 V, 3-phase, 4-wire + ground ■ Wye	120	MA4IMA40LL	**604.00**	MA4IMA40LL	**604.00**	MA4IMA40LL	**604.00**
	180	MA4IMA60LL	**709.00**	MA4IMA60LL	**709.00**	MA4IMA60LL	**709.00**
	270	MA4IMA90LL	**819.00**	MA4IMA90LL	**819.00**	MA4IMA90LL	**819.00**
	360	MA4IMA12LL	**946.00**	MA4IMA12LL	**946.00**	MA4IMA12LL	**946.00**

▲ 208Y/120 series also applies to the following voltage 220Y/127.
■ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

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Internally Mounted Surge Protective Devices

Internally mounted surge protective devices are installed integrally to systems for service entrance and branch panel surge suppression. Internally mounted SPDs installed next to supply busses provide maximum performance inside Square D™ systems. Built-in performance is the best way to ensure cost effective power quality (especially important for critical power facilities).

US and Canadian UL® Recognized as a Type 2 (or 1 with optional suffix in catalog number) SPD Component Assembly to UL 1449 3rd Edition and UL 1283 5th Edition. Complies with requirements of NEC® Article 285 and CSA C22.2 No. 8-M1986 as appropriate. Complies with UL 96A 12th Edition Master Label requirements for Lightning Protection Systems.

Internally Mounted—New Construction

Factory installed integral/internal Surgelogic™ SPD products make adding surge suppression to new construction projects easy. Refer to the sections listed below to identify the correct product for your application or contact Surgelogic™ TAG at 1-800-577-7353 for assistance.

Panelboards
Refer to Section 9

NF NQ

Switchboards and Switchgear
Refer to Section 11

PZ4 QED

Motor Control Centers
Refer to Section 17

MCC

Integrated Power and Control Centers
Refer to Section 10

IPAC2

Busway—**Refer to Section 12**

Internally Mounted—Retrofit

To ensure high-performance surge suppression at critical power locations, a variety of Surgelogic™ products have been designed specifically for retrofitting into commonly used Square D™ systems. The QMB fusible switch, 6 in. MCC bucket, I-Line and Busway plug-on units come with the SPD factory-installed. Retrofitting SPD units into I-Line, QMB, MCC, and Busway applications is simple.

- Audible alarm with enable/disable switch, dry contacts, and surge counter standard.
- 200 kA SCCR
- Indicator LEDs
- EMI/RFI filtering

I-Line™ Surgelogic™ SPD Unit

QMB Surgelogic™ SPD Unit

Busway Surgelogic™ SPD Unit

MCC Surgelogic™ SPD Unit

Table 6.8: Internally Mounted—Retrofit

Voltage	Surge Current Rating	I-Line Branch Units ▲				QMB Branch Units ■		Busway Units		Model 6 MCC Units ♦	
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price▼	Cat. No.	$ Price★
120/240 V, 1-phase, 3-wire + ground	120 kA	HL1IMA12C( )	9518.00	FI1IMA12C( )	10185.00	QMB1IMA12	6663.00	—	—	—	—
	160 kA	HL1IMA16C( )	10455.00	FI1IMA16C( )	11199.00	QMB1IMA16	7340.00	—	—	—	—
	240 kA	HL1IMA24C( )	14100.00	FI1IMA24C( )	15525.00	QMB1IMA24	10055.00	—	—	—	—
208Y/120 V, 3-phase, 4-wire + ground △□ Wye	120 kA	HL2IMA12C( )	9893.00	FI2IMA12C( )	10562.00	QMB2IMA12	6899.00	—	—	MCC2IMA12	6700.00
	160 kA	HL2IMA16C( )	10872.00	FI2IMA16C( )	11616.00	QMB2IMA16	7602.00	PIU2IMA16	4472.00	MCC2IMA16	8700.00
	240 kA	HL2IMA24C( )	15423.00	FI2IMA24C( )	16170.00	QMB2IMA24	10460.00	PIU2IMA24	6407.00	MCC2IMA24	12200.00
240/120 V, 3-phase, 4-wire + ground High-leg Delta	120 kA	HL3IMA12C( )	9893.00	FI3IMA12C( )	10562.00	QMB3IMA12	6899.00	—	—	MCC3IMA12	6700.00
	160 kA	HL3IMA16C( )	10872.00	FI3IMA16C( )	11616.00	QMB3IMA16	7602.00	PIU3IMA16	4472.00	MCC3IMA16	8700.00
	240 kA	HL3IMA24C( )	15423.00	FI3IMA24C( )	16170.00	QMB3IMA24	10460.00	PIU3IMA24	6407.00	MCC3IMA24	12200.00
New! 240 V, 3-phase, 3-wire + ground, Delta	120 kA	HL6IMA12C( )	9893.00	FI6IMA12C( )	10562.00	—	—	—	—	—	—
	160 kA	HL6IMA16C( )	10872.00	FI6IMA16C( )	11616.00	—	—	—	—	—	—
	240 kA	HL6IMA24C( )	15423.00	FI6IMA24C( )	16170.00	—	—	—	—	—	—
480Y/277 V, 3-phase, 4-wire + ground △◊ Wye	120 kA	HL4IMA12C( )	10271.00	FI4IMA12C( )	10944.00	QMB4IMA12	7137.00	—	—	MCC4IMA12	7200.00
	160 kA	HL4IMA16C( )	11292.00	FI4IMA16C( )	12039.00	QMB4IMA16	7868.00	PIU4IMA16	4740.00	MCC4IMA16	9200.00
	240 kA	HL4IMA24C( )	16070.00	FI4IMA24C( )	16818.00	QMB4IMA24	10868.00	PIU4IMA24	6792.00	MCC4IMA24	13200.00
New! 480Y/277 V, 3-phase, 3-wire + ground ◊ High-Resistance Ground	120 kA	HL4HIMA12C( )	10271.00	FI4HIMA12C( )	10944.00	—	—	—	—	—	—
	160 kA	HL4HIMA16C( )	11292.00	FI4HIMA16C( )	12039.00	—	—	—	—	—	—
	240 kA	HL4HIMA24C( )	16070.00	FI4HIMA24C( )	16818.00	—	—	—	—	—	—
New! 480 V, 3-phase, 3-wire + ground, Delta	120 kA	HL5IMA12C( )	10271.00	FI5IMA12C( )	10944.00	—	—	—	—	—	—
	160 kA	HL5IMA16C( )	11292.00	FI5IMA16C( )	12039.00	—	—	—	—	—	—
	240 kA	HL5IMA24C( )	16070.00	FI5IMA24C( )	16818.00	—	—	—	—	—	—
600Y/347 V, 3-phase, 4-wire + ground △ Wye	120 kA	—	—	FI8IMA12C( )	11342.00	QMB8IMA12	7388.00	—	—	MCC8IMA12	7700.00
	160 kA	—	—	FI8IMA16C( )	12482.00	QMB8IMA16	8145.00	PIU8IMA16	4919.00	MCC8IMA16	9700.00
	240 kA	—	—	FI8IMA24C( )	16692.00	QMB8IMA24	11295.00	PIU8IMA24	7048.00	MCC8IMA24	14200.00
New! 600Y/347 V, 3-phase, 3-wire + ground, High-Resistance Ground	120 kA	—	—	FI8HIMA12C( )	11342.00	—	—	—	—	—	—
	160 kA	—	—	FI8HIMA16C( )	12482.00	—	—	—	—	—	—
	180 kA	—	—	FI8HIMA18C( )	16692.00	—	—	—	—	—	—
New! 600V, 3-phase, 3-wire + ground, Delta	120 kA	—	—	FI9IMA12C( )	11342.00	—	—	—	—	—	—
	160 kA	—	—	FI9IMA16C( )	12482.00	—	—	—	—	—	—
	180 kA	—	—	FI9IMA18C( )	16692.00	—	—	—	—	—	—

▲ Requires 13.5-inch mounting height.
■ Requires 9-inch mounting height.
♦ Requires 6-inch mounting height.
★ PE4 Discount Schedule.
▼ PE7 Discount Schedule.
△ Can be used on 4-wire or 3-wire grounded neutral system.
□ 208Y/120 series also applies to the following voltage 220Y/127.
◊ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

( ) For a Type 1 SPD, add a "1" suffix to the catalog number. New!

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OEM Kit

OEM/Assembler Kits

Surgelogic™ OEM/assembler kits allow manufacturers to add industry-leading surge suppression directly to customized equipment. Manufacturers benefit from shorter wire lengths that optimize the clamping voltage of the SPD. Products come with a backplane-mounted SPD, mounting hardware and diagnostic display with 36-inch cables. Audible alarm, silence switch, remote monitoring contacts, and surge counter are standard. Available as UL 1449 Type 2 (or 1 with optional suffix in catalog number).

US and Canadian UL® Recognized to UL 1449 3rd Edition and UL 1283 5th Edition. Complies with requirements of NEC® Article 285 and CSA 22.2 No. 8-M1986 as appropriate. Complies with UL 96A 12th Edition Master Label requirements for Lightning Protection Systems.

Table 6.9: OEM/Assembler Kits

	Service Voltage	Peak Surge Current Rating per Phase (kA)	Cat. No. ▲	$ Price
	120/240 V, 1-phase, 3-wire + ground	120	TVS1IMA12O( )	4137.00
		160	TVS1IMA16O( )	4547.00
		240	TVS1IMA24O( )	6753.00
	208Y/120 V, 3-phase, 4-wire + ground ■♦ Wye	120	TVS2IMA12O( )	4331.00
		160	TVS2IMA16O( )	4760.00
		240	TVS2IMA24O( )	7082.00
	240/120 V, 3-phase, 4-wire + ground High-leg Delta	120	TVS3IMA12O( )	4331.00
		160	TVS3IMA16O( )	4760.00
		240	TVS3IMA24O( )	7082.00
New!	240 V, 3-phase, 3-wire + ground ■★ Delta	120	TVS6IMA12O( )	4331.00
		160	TVS6IMA16O( )	4760.00
		240	TVS6IMA24O( )	7082.00
	480Y/277 V, 3-phase, 4-wire + ground ■★ Wye	120	TVS4IMA12O( )	4526.00
		160	TVS4IMA16O( )	4976.00
		240	TVS4IMA24O( )	7413.00
New!	480Y/277 V, 3-phase, 3-wire + ground ■★ High-Resistance Ground	120	TVS4HIMA12O( )	4526.00
		160	TVS4HIMA16O( )	4976.00
		240	TVS4HIMA24O( )	7413.00
New!	480 V, 3-phase, 3-wire + ground Delta	120	TVS5IMA12O( )	4526.00
		160	TVS5IMA16O( )	4976.00
		240	TVS5IMA24O( )	7413.00
	600Y/347 V, 3-phase, 4-wire + ground ■ Wye	120	TVS8IMA12O( )	4751.00
		160	TVS8IMA16O( )	5199.00
		240	TVS8IMA24O( )	7760.00
New!	600Y/347 V, 3-phase, 3-wire + ground ■ High Resistance Ground	120	TVS8HIMA12O( )	4751.00
		160	TVS8HIMA16O( )	5199.00
		180	TVS8HIMA18O( )	7760.00
New!	600 V, 3-phase, 3-wire + ground Delta	120	TVS9IMA12O( )	4751.00
		160	TVS9IMA16O( )	5199.00
		180	TVS9IMA18O( )	7760.00

( ) For a Type 1 SPD, add a "1" suffix to the catalog number.
▲ Note the last character of the catalog number is the letter "O", not a zero.
■ Can be used on 4-wire or 3-wire grounded neutral system.
♦ 208Y/120 series also applies to the following voltage 220Y/127.
★ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

Nipple-Mounted Surge Protective Devices

SDSA3650

SDSA3650D

SDSA3650 Surge Protective Devices

SDSA3650 SPDs are designed and listed for indoor or outdoor installation and surge suppression for three-phase grounded electrical services up to 600 Vac, including delta services (SDSA3650D). The SDSA3650 series is used extensively in service entrance panels to provide an efficient and economical means of surge suppression.

US and Canadian UL® Listed as a Type 1 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

- LEDs indicate operational status
- Short circuit current rating 200 kA
- Suitable for indoor and outdoor applications (NEMA Type 4X rated)
- Convenient back-nipple mounting

Table 6.10: SDSA3650 Surge Protective Devices

	Description	Peak Surge Current Rating per Phase (kA)	Cat. No.	$ Price
	600 Vac Maximum, 3-phase, 4-wire▼	40	SDSA3650 △	248.00
New!	600 Vac Maximum, 3-phase, 3-wire Delta	40	SDSA3650D △	248.00

▼ Do not use on ungrounded systems. Systems must be solidly grounded.
△ See Table 6.13 for QOSAMK mounting kit for installation in QO™ load centers.

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HWA Series

HWA Surge Protective Devices

Surgelogic™ HWA surge protective devices are compact, nipple-mounted parallel-connected surge suppressors that come in a variety of voltage configurations, including Delta. A surge suppression path is provided for each mode, and the product is rated NEMA Type 4X. Internal diagnostics continuously monitor the device status.

US and Canadian UL® Listed as a Type 2 SPD to UL 1449 3rd Edition and UL 1283 5th Edition. Complies with requirements of NEC® Article 285 and CSA C22.2 No. 8-M1986 as appropriate. Complies with UL 96A 12th Edition Master Label requirements for Lightning Protection Systems.

- LEDs indicate operational status
- Short circuit current rating 200 kA
- Suitable for indoor and outdoor applications (NEMA Type 4X rated)
- Convenient side-nipple mounting
- Compact design provides easy mounting inside or outside the equipment cabinets
- -54 dB EMI/RFI filtering
- Sine wave tracking
- Audible alarm indicates loss of suppression (does not contain alarm enable/disable switch)
- Dry contacts
- Optional flush-mount kit TVSHWAFMK

Table 6.11: HWA Surge Protective Devices

Service Voltage	Peak Surge Current Rating per Phase (kA)	NEMA 4X Cat. No.	$ Price
120/240 V, 1-phase, 3-wire + ground	50	TVS1HWA50X	2385.00
	80	TVS1HWA80X	2660.00
	100	TVS1HWA10X	3401.00
208Y/120 V, 3-phase, 4-wire + ground ▲■	50	TVS2HWA50X	2544.00
	80	TVS2HWA80X	2810.00
	100	TVS2HWA10X	3611.00
240/120 V, 3-phase, 4-wire + ground High-leg Delta	50	TVS3HWA50X	2544.00
	80	TVS3HWA80X	2810.00
	100	TVS3HWA10X	3611.00
New! 240 V, 3-phase, 3-wire + ground Delta	50	TVS6HWA50X	2583.00
	80	TVS6HWA80X	2924.00
	100	TVS6HWA10X	3606.00
480Y/277 V, 3-phase, 4-wire + ground ▲♦	50	TVS4HWA50X	2640.00
	80	TVS4HWA80X	2907.00
	100	TVS4HWA10X	3853.00
New! 480 V, 3-phase, 3-wire + ground Delta	50	TVS5HWA50X	3052.00
	80	TVS5HWA80X	3393.00
	100	TVS5HWA10X	4075.00
600Y/347 V, 3-phase, 4-wire + ground	50	TVS8HWA50X	2915.00
	80	TVS8HWA80X	3171.00
	100	TVS8HWA10X	3853.00
New! 600 V, 3-phase, 3-wire + ground Delta	50	TVS9HWA50X	3052.00
	80	TVS9HWA80X	3393.00
	100	TVS9HWA10X	4075.00

▲ Can be used on 4-wire or 3-wire grounded neutral system.
■ 208Y/120 series also applies to the following voltage 220Y/127.
♦ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230, and 415Y/240.

SDSA1175

SDSA1175 Surge Protective Devices

SDSA1175 SPDs are designed and listed for indoor or outdoor installation and surge suppression for single-phase three-wire 120/240 Vac or two-wire 120 Vac 60 Hz electrical services. This product is ideal for panel builders as well as manufacturers and integrators of instrumentation cabinets for industrial, commercial, and residential applications for single-phase power systems. Two SDSA1175 surge protection devices can be installed to provide suppression for 208Y/120 Vac three-phase four-wire services.

US and Canadian UL® Listed as Type 1 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

- LED indicates operational status
- Short circuit current rating 25 kA
- Suitable for indoor and outdoor applications (NEMA Type 4X rated)
- Convenient back-nipple mounting

Table 6.12: SDSA1175 Surge Protective Devices

System Voltage	Peak Surge Current Rating per Phase (kA)	Cat. No.	$ Price
120/240 V, 1-phase, 3-wire	36	SDSA1175 ▲	92.00
New! 120 V, 1-phase, 2-wire	36	SDSA1175T ▲	92.00

▲ See Table 6.13 for QOSAMK mounting kit for installation in QO™ load centers.

QOSAMK

Mounting Brackets and Flush Mount Kits

The nipple products shown in this catalog provide a convenient means of incorporating surge suppression within a new or existing cabinet. The mounting bracket and flush-mount kits are designed for easy mounting of nipple products.

Table 6.13: Mounting Bracket for Enclosures

Description	Cat. No.	$ Price
Mounting bracket for QO™ and Homeline™ load centers and other enclosures	QOSAMK	11.40
New! Flush-mount kit for XR SPDs	TVSXRFMK	58.00
Flush-mount kif for HWA SPDs	TVSHWAFMK	180.00

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XR Series

XR Surge Protective Devices

The XR SPD provides high-quality surge suppression in a compact and versatile package. This product is ideal for panel builders as well as manufacturers and integrators of instrumentation cabinets for industrial, commercial, and residential applications for single-phase power systems.

US and Canadian UL® Listed as Type 1 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

- LEDs indicate operational status
- Short circuit current rating 25 kA
- Convenient side nipple mounting
- Suitable for indoor and outdoor applications (NEMA Type 4X rated)
- Optional flush mount kit TVSXRFMK

Table 6.14: XR Nipple-Mounted Surge Protective Devices

New!	System Voltage	Peak Surge Current Rating per Phase (kA)	Cat. No.	$ Price
	120/240 V, 1-phase, 3-wire + ground	50	TVS120XR50S	**315.00**
		80	TVS120XR80S	**515.00**

Residential Surge Protective Devices

SDSB1175C

SDSB1175R

Whole House Surge Protective Devices

Whole House devices are designed to deliver surge suppression that addresses the entire home. AC modules are connected to the circuit breaker load center and provide suppression for all equipment connected to the power system. Whole House systems incorporate AC modules as well as modules for other metallic lines coming into the home including telephone/DSL and coaxial video/data.

US and Canadian UL® Listed as Type 2 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate. Telephone and coaxial video modules US and Canadian UL® Recognized to UL 497A 4th Edition and UL 497B 4th Edition.

- 120/240 Vac, 80 kA/phase AC surge suppression
- LED status indicators for AC surge suppression
- Telephone surge suppression module supports four lines with tool-less Insulation Displacement Connectors (IDC)
- Coaxial surge suppression module supports one line of video/data

Table 6.15: Whole House Surge Protective Devices

New!	Description	Included Modules	Cat. No.	$ Price
	Whole House NEMA 1 Basic	AC	SDSB1175CB	**439.00**
	Whole House NEMA 1	AC, Telephone, Coax (1)	SDSB1175C	**630.00**
	Whole House NEMA 3R Basic	AC	SDSB1175RB	**546.00**
	Whole House NEMA 3R	AC, Telephone, Coax (1)	SDSB1175R	**737.00**
	Home Electronics Protective Device	AC	HEPD80	**185.00**

HEPD80

SDSA2V

SDSA4P

HEPD80RK

Whole House Accessories

Add additional surge suppression or replace existing modules in Whole House products.

Coaxial and telephone modules: US and Canadian UL® Recognized to UL 497A 4th Edition and UL 497B 4th Edition.

AC Module: US and Canadian UL® Listed as Type 1 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

Table 6.16: Accessories

New!	Description	Cat. No.	$ Price
	4-Line telephone surge suppressor with tool-less IDC terminations	SDSA4P	**101.00**
	Coaxial video surge suppressor	SDSA2V	**90.00**
	Whole House AC Module (HEPD80) replacement kit	HEPD80RK	**204.00**

QO2175SB

HOM2175SB

QO™, NQ, and Homeline™ Load Center Surge Protective Devices

Square D™ load center surge protective devices are easy to install plug-in units that install as quickly as a standard circuit breaker. The surge suppressors use two pole spaces in a QO™ or Homeline™ load center, or NQ panelboard.

US and Canadian UL® Listed as Type 2 SPD to UL 1449 3rd Edition. Complies with requirements of NEC® Article 285, CSA 233.1-87, and CSA C22.2 No. 8-M1986 as appropriate.

- QO2175SB for QO™ load centers, combination devices, and NQ panelboards
- HOM2175SB for Homeline™ load centers and combination devices
- Plug-on design requires two pole spaces
- LED indicates operational status
- 22.5 kA per phase

Table 6.17: QO™, NQ, and Homeline™ Panelboard Surge Arresters

Description	Cat. No.	$ Price
QO™ Surgebreaker for QO and NQ	QO2175SB	**159.00**
Homeline™ Surgebreaker	HOM2175SB	**159.00**

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		HOM Circuit Breakers									QO™ Circuit Breakers																								
Circuit Breaker Type	**Plug-on**	HOM		HOM-CAFI	HOM-DF	HOM-GFI		HOM-EPD		HOMT	QO			QO-H	QO-VH					QH		QOT	QO-CAFI	QO-VHCAFI	QO-DF	QOVH-DF	QO-GFI			QO-VHGFI	QO-EPD QO-EPE		
	Bolt-on	—	—	—	—	—	—	—	—	—	QOB			QOB-H	—	—	—	QOB-VH		QHB		—	QOB-CAFI	QOB-VHCAFI	QOB-DF	QOB-VHDF	QOB-GFI			QOB-VHGFI	QOB-EPD QOB-EPE		
	Unit Mount	—	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Number of Poles		1	2	1, 2	1	1	2	1	2	1	1	2	3	2	1	2	3	1	2, 3 ▲	1,2	3	1	1, 2	1, 2	1	1	1	2	3	1	1	2	3
Current Range		15–50	15–200♦	15–20	15–20	15–20	15–50	15–20	15–50	15–50■	10–70	10–200♦	10–100	15–100	15–70	15–125	15–100	15–70	15–150	15–30	15–30	15–30	15–20	15–20	15–20	15–20	15–30	15–60	15–50	15–30	15–30	15–60	15–50
Interrupting Ratings																																			
UL/CSA Rating (kA) (50/60 Hz)	120 Vac	10	10	10	10	10	10	10	10	10	10	10	10	10	22	22	22	22	22	65	65	10	10	22	10	22	10	10	—	22	10	10	—
	120/240 Vac	10	10	—	—	—	10	—	10	10	10	10	10	10	22	22	22	22	22	65	65	10	—	—	—	—	—	10	—	—	—	10	—
	208Y/120	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	—	—	—	—
	240 Vac ★	—	—	—	—	—	—	—	—	—	—	—	10	10	—	—	22	—	22▼	—	65	—	—	—	—	—	—	—	—	—	—	—	—	10
	277 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	480Y/277 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DC Ratings	48 Vdc	—	—	—	—	—	—	—	—	—	5△	5 △	5 △	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	60 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	65 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	125 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz)□	IEC (Icu)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings																																			
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	X	—	—	—	X	—	—	—	—	X	—	X	X	—	X	X	X	—		—	X	—	
Other Standard		HACR ◊ NOM		HACR ◊							HACR☆ NOM			HACR ☆						—	—	—	HACR ☆	—	HACR ☆	HACR ☆	NOM			—	NOM		
Accessories and Modifications																																			
Shunt Trip ▽		—	—	—	—	—	—	—	—	—	X	X	X	X	X	X	X	X	X ◒	X	X	X	—	—	—	—	—	—	—	—	—	—	—	—
Undervoltage Trip		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Auxiliary Switches ▽		—	—	—	—	—	—	—	—	—	X	X	X	X	X	X	X	X	X ◒	X	X	X	—	X	—	—	X	X	X	X	X	X	X	X
Alarm Switch ▽		—	—	—	—	—	—	—	—	—	X	X	X	X	X	X	X	X	X ◒	X	X	X	—	X	—	—	X	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	—	—	—	—	X ✱	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type																																			
Thermal-magnetic		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Molded Case Switch		—	—	—	—	—	—	—	—	—	X	X	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (1P Unit Mount)																																			
Dimensions (1P Unit Mount) in. (mm)	Height	3.13 (79)									3.5 (89) ▲												4.75 (121)		4.75 (121)	4.75 (121)	4.12 (103)							
	Width	1.00 (25)									0.75 (19) ▲																								
	Depth	2.98 (76)									2.92 (74) ▲																								
Pages		Page 1-13									Pages 7-10, 7-11																								

▲ See page 7-54 for dimensions for: QOB2150VH, QOB3110VH, QOB3125VH and QOB3150VH.
■ HOMT tandem is 30 A maximum. HOMT quad tandem has 20 A maximum on outside poles, and 50 A maximum on the inside poles.
♦ AFI, EPD and GFI products are rated 60 Hz only.
★ See the Supplemental Digest Page 3-22 for 3Ø corner grounded systems.
▼ 22 kA @ 240 Vac for 3P only.
△ 1P and 2P, 10–70 A and 3P 10–60 A only.
□ See the Supplemental Digest Section 10 for circuit breakers with IEC ratings.
◊ HACR on HOM 1P 15–50 A and 2P 15–100 A
☆ HACR on QO, QOB 1P 10–70 A, 2P 15–100 A, 3P 10–100 A; QOB-VH 1P 15–70 A, 2P 15–125 A, 3P 15–100 A
▽ Factory-installed option only
◒ Factory-installed accessories are not available on QOB-VH 2P150 A and 3P 110–150 A
✱ Handle padlock attachment available for HOMT quad tandem only.
♦ 2P 150–200 A requires 4P width.

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		QOU Circuit Breakers				QOM1 and QOM2 Main Circuit Breakers		Multi 9™ Circuit Breakers and Supplementary Protectors								EDB Circuit Breakers					
Circuit Breaker Type	**Plug-on**	—			—	—	—	—			—					—		—		—	
	Bolt-on	—			—	QOM1-VH	QOM2-VH	—			—					EDB		EGB		EJB	
	Unit Mount	QOU			QYU▲	—	—	UL 489 C60			UL1077 C60■			C60H-DC		—		—		—	
Number of Poles		1	2	3	1	2	2	1	2	3	1	2	3,4	1	2	1	2, 3	1	2, 3	1	2, 3
Current Range		10–100	10–125	10–100	10–30	50–125	100–225	0.5–35	0.5–35	0.5–35	0.5–63	1–63	1–63	0.5–40	0.5–40	15–70	15–125	15–70	15–125	15–70	15–125
Interrupting Ratings																					
UL/CSA Rating (kA RMS) (50/60 Hz)	120 Vac	10	10	10	—	22	22	10	—	—	10	10	10	—	—	25	25	65	65	100	100
	120/240 Vac	10	10	10	—	22	22	5	10	10	10	10	10	—	—	18	25	35	65	65	100
	240 Vac♦	—	—	10	—	—	—	5	10	10	10	10	10	—	—	18	25	35	65	65	100
	277 Vac	—	—	—	5	—	—	—	—	—	5	5	5	—	—	18	18	35	35	65	65
	480Y/277 Vac	—	—	—	—	—	—	10	10	10	—	5	5	—	—	—	18	—	35	—	65
DC Ratings	48 Vdc	5★	5★	5★	—	—	—	—	—	—	10	10	—	5	5	—	—	—	—	—	—
	60 Vdc	5▼	5▼	5▼	—	—	—	10	10	—	—	—	—	5	5	—	—	—	—	—	—
	65 Vdc	—	—	—	—	—	—	—	—	—	10	10	—	5	5	—	—	—	—	—	—
	125 Vdc	—	—	—	—	—	—	—	10	—	—	10	—	5	5	—	—	—	—	—	—
	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	5	5	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—	5◒	—	—	—	—	—	—
IEC 60947-2 (50/60 Hz) Icu	240 Vac	—	—	—	—	—	—	20	20	20	10	10	10	20	10	20	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	10	10	—	5	5	—	—	10	—	—	—	—	—
Special Ratings																					
CCC		X✱	X✱	X✱	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	—	—	—	—	—	X	X	X	X	X	X
Other Standard		HACR △			—	—	—	—	—	—	□	—	—	—	—	HACR					
Accessories and Modifications																					
Shunt Trip		X◊	X◊	X◊	X◊	—	X ◊	X	X	X	X	X	X	X	X	X ◊	X ◊	X ◊	X ◊	X ◊	X ◊
Undervoltage Trip		—	—	—	—	—	—	X	X	X	X	X	X	X	X	—	—	—	—	—	—
Auxiliary Switches		X◊	X◊	X◊	X◊	—	—	X	X	X	X	X	X	X	X	X◊	X◊	X◊	X◊	X◊	X◊
Alarm Switch		X◊	X◊	X◊	X◊	—	—	X	X	X	X	X	X	X	X	X◊	X◊	X◊	X◊	X◊	X◊
Handle Operators		—	—	—	—	—	—	X	X	X	X	X	X	X	X	—	—	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type																					
Thermal-magnetic		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Molded Case Switch		—	X	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (1P Unit Mount)																					
Dimensions (1P Unit Mount) in. (mm)	Height	4.05 (103)				5.09 (129)☆	5.60 (142)☆	4.21 (107)▽			3.19 (81)			3.19 (81)		5.66 (144)					
	Width	0.75 (19)				5.00 (127)☆	5.07 (129)☆	0.71 (18)			0.71 (18)			0.71 (18)	1.42 (36)	0.98 (25)					
	Depth	2.92 (74)				3.47 (88)☆	3.60 (91)☆	2.76 (70)			2.76 (70)			2.56 (65)		4.05 (103)					
Pages		Pages 7-14				Pages 1-2		Pages 7-16 through 7-19								Page 9-17					

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

- ▲ QYU is a UL 1077 supplementary protector.
- ■ C60 are recognized components per UL 1077.
- ♦ For information regarding 3Ø corner grounded systems see the Supplemental Digest. Page 3-22
- ★ 1P and 2P, 10–70 A and 3P 10–60 A only.
- ▼ QOU is UL Listed for 60 Vdc per pole 80–100 A, 1P; 80–125 A, 2P; and 70–100 A, 3P.
- △ HACR on QOU 1P and 3P 15–100 A, 2P 15–125 A;
- □ UL 489A for DC Telecom applications (1-pole only).
- ◊ Factory-installed option only
- ☆ QOM1 and QOM2 dimensions are for 2-pole unit.
- ▽ 480 V C60 height is 5.56 in. (141 mm).
- ◒ 2 poles must be wired in series for 500 Vdc.
- ✱ 15–70 A 1P and 2P, 15–60 A 3P

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	PowerPact™ 150 A H-Frame					PowerPact 250 A J-Frame				
	New! Electronic Trip Version					New! Electronic Trip Version				
Circuit Breaker Type	HD	HG	HJ	HL	HR	JD	JG	JJ	JL	JR
Number of Poles	2, 3	2, 3	2, 3▲	2, 3▲	3	2, 3▲	2, 3▲	2, 3▲	2, 3▲	3
Current Range	15–150 A	15–150 A	15–150 A	15–150 A	15–150 A	70–250 A■	70–250 A■	70–250 A■	70–250 A■	70–250 A■
Interrupting Ratings										
UL/CSA/NOM Rating (kA RMS) (50/60 Hz) 240 Vac	25	65	100	125	200	25	65	100	125	200
480Y/277 Vac	18	35	65	100	200	18	35	65	100	200
480 Vac	18	35	65	100	200	18	35	65	100	200
600Y/347 Vac	14	18	25	50	100	14	18	25	50	100
600 Vac	14	18	25	50	100	14	18	25	50	100
DC Ratings 250 Vdc♦	20	20	20	20	—	20	20	20	20	—
500 Vdc♦	—	—	—	—	—	—	20	—	—	—
IEC Rating (kA RMS) Icu/Ics★ 240 Vac	25/25	65/65	100/100	125/125	125/125	25/25	65/65	100/100	125/125	125/125
415 Vac	18/18	35/35	65/65	100/100	100/100	18/18	35/35	65/65	100/100	100/100
IEC 50/60 Hz										
Special Ratings										
CCC	X	X	X	X	X	X	X	X	X	X
Fed. Specs W-C-375B/GEN	X	X	X	X	X	X	X	X	X	X
HACR (2P, 3P)	X	X	X	X	X	X	X	X	X	X
Connections/Terminations										
Unit Mount	X	X	X	X	X	X	X	X	X	X
I-Line™	X	X	X	X	X	X	X	X	X	X
Rear Connection	X▼	X▼	X	X	X	X	X	X	X	X
Drawout	X▼	X▼	X	X	X	X	X	X	X	X
Optional Lugs	X▼	X▼	X	X	X	X	X	X	X	X
Accessories and Modifications										
Shunt Trip	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches	X	X	X	X	X	X	X	X	X	X
Alarm Switch	X	X	X	X	X	X	X	X	X	X
Motor Operator	X▼	X▼	X	X	X	X	X	X	X	X
Handle Operators	X▼	X▼	X	X	X	X	X	X	X	X
Mechanical Interlocks (3P)	X	X	X	X	X	X	X	X	X	X
Handle Padlock Attachment	X▼	X▼	X	X	X	X	X	X	X	X
Cylinder Lock (3P)	—	—	—	—	—	—	—	—	—	—
Optional GF Protection	—	—	—	—	—	—	—	—	—	—
Trip System Type										
Thermal-magnetic	X	X	X	X	—	X	X	X	X	X
Instantaneous-only (MCP)	—	—	X△	X△	X△	—	X△	X△	X	X
Molded Case Switch (Automatic)	X	X	X	X	X	X	X	X	X	X
Electronic	X△	X△	X△	X△	X△	X△	X△	X△	X△	X△
Enclosures (Pages 7-56–7-58)										
General Purpose (NEMA 1)	X	X	X	X	—	X	X	X	—	—
Raintight (NEMA 3R)	X	X	X	X	—	X	X	X	—	—
Dust-tight (NEMA 12)	X	X	X	X	—	X	X	X	—	—
Watertight (NEMA 4, 4X, 5)	X	X	X	X	—	X	X	X	—	—
Explosion Proof (NEMA 7, 9)	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount) in. (mm) Height	6.4 (163)					7.5 (191)				
Width	4.1 (104)					4.1 (104)				
Depth	3.4 (86)					3.4 (86)				
Pages (Unit Mount)/(I-Line)	Pages 7-22, 7-23, 7-29, 7-34/9-25					Pages 7-22, 7-23, 7-29, 7-34, 7-35/9-25				

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.
▲ 2P in a 3P module.
■ 70–250 A with electronic trip system
♦ Not available with electronic trip units
★ Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest. Section 10
▼ Not available in HD and HG 2P rating (2P module).
△ 3P only.

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		PowerPact 250 A Q-Frame				PowerPact 600 A L-Frame				
						New!				
Circuit Breaker Type		QB	QD	QG	QJ	LD	LG	LJ	LL	LR
Number of Poles		2, 3	2, 3	2, 3	2, 3	3, 4	3, 4	3, 4	3, 4	3, 4
Current Range		70–250■	70–250■	70–250■	70–250■	70–600	70–600	70–600	70–600	70–600
Interrupting Ratings										
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	10	25	65	100	25	65	100	125	200
	480Y/277 Vac	—	—	—	—	18	35	65	100	200
	480 Vac	—	—	—	—	18	35	65	100	200
	600Y/347 Vac	—	—	—	—	14	18	25	50	100
	600 Vac	—	—	—	—	14	18	25	50	100
DC Ratings	250 Vdc☆	—	—	—	—	—	—	—	—	—
	500 Vdc♦☆	—	—	—	—	—	—	—	—	—
IEC Rating (kA RMS) Icu/Ics★	240 Vac	10/5	10/5	10/5	10/5	25/25	65/65	100/100	125/125	125/125
	415 Vac	10/5	10/5	10/5	10/5	18/18	35/35	65/65	100/100	100/100
IEC 50/60 Hz										
Special Ratings										
CCC		—	—	—	—	X	X	X	X	X
Fed. Specs W-C-375B/GEN		X	X	X	X	—	—	—	—	—
HACR (2P, 3P)		X	X	X	—	X	X	X	X	X
Connections/Terminations										
Unit Mount		X	X	X	X	X	X	X	X	X
I-Line™		X	X	X	X	X	X	X	X	X
Rear Connection		—	—	—	—	X	X	X	X	X
Drawout		—	—	—	—	X	X	X	X	X
Optional Lugs		—	—	—	—	X	X	X	X	X
Accessories and Modifications										
Shunt Trip		—	—	—	—	X	X	X	X	X
Undervoltage Trip		—	—	—	—	X	X	X	X	X
Auxiliary Switches		—	—	—	—	X	X	X	X	X
Alarm Switch		—	—	—	—	X	X	X	X	X
Motor Operator		—	—	—	—	X	X	X	X	X
Handle Operators		—	—	—	—	X	X	X	X	X
Mechanical Interlocks (3P)		X	X	X	X	X	X	X	X	X
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X
Cylinder Lock (3P△)		—	—	—	—	—	—	—	—	—
Optional GF Protection▼		—	—	—	—	X	X	X	X	X
Trip System Type										
Thermal-magnetic		X	X	X	X	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	X	X	X	X	X
Molded Case Switch (Automatic)		X	—	—	—	—	X	—	X	X
Electronic		—	—	—	—	X	X	X	X	X
Enclosures (Pages 7-56–7-58)										
General Purpose (NEMA 1)		X	X	X	X	—	—	—	—	—
Raintight (NEMA 3R)		X	X	X	X	—	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	—	—	—	—	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	6.47 (164)				13.38 (340)				
	Width	4.5 (114)				5.51 (140)				
	Depth	3.93 (100)				4.33 (110)				
Pages (Unit Mount)/(I-Line)		Pages 7-24/9-24				Pages 7-25/7-33				

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

▲ 2P in a 3P module
■ I-Line Q-frame circuit breakers are available 70–225 A only. 250 A Q-frame unit-mount circuit breakers are limited to Cu conductors only.
♦ Ungrounded UPS systems only. See page 7-35. Special DC J-Frame only.
★ Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
▼ Requires factory-installed "G" shunt trip and 3P module.
△ Factory-installed option only.
□ 3P only.
◊ 70–250 A with electronic trip system
☆ Not available with electronic trip units

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		PowerPact 800 A M-Frame		PowerPact 1200 A P-Frame				PowerPact 3000 A R-Frame			
Circuit Breaker Type		MG	MJ	PG	PJ	PK	PL	RG	RJ	RK	RL
Number of Poles		2, 3	2, 3	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
Current Range		300–800	300–800	100–1200	100–1200	100–1200	100–1200	240–3000	240–3000	240–3000	240–3000
Interrupting Ratings											
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	65	100	65	100	65	125	65	100	65	125
	480Y/277 Vac	35	65	35	65	50	100	35	65	65	100
	480 Vac	35	65	35	65	50	100	35	65	65	100
	600Y/347 Vac	18	25	18	25	50	25	18	25	65	50
	600 Vac	18	25	18	25	50	25	18	25	65	50
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—
	500 Vdc▲	—	—	—	—	—	—	—	—	—	—
IEC (kA RMS) Icu/Ics■	240 Vac	50/25	65/35	50/25	65/35	50/25	125/65	50/25	65/35	85/65	125/65
	415 Vac	35/20	50/25	35/20	50/25	50/25	85/45	35/20	50/25	70/55	85/45
IEC 50/60 Hz											
Special Ratings											
CCC		X	X	X	X	X	X	X	X	X	X
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	X	X	X
HACR (2P, 3P)		X	X	X	X	X	X	X	X	X	X
Connections/Terminations											
Unit Mount		X	X	X	X	X	X	X	X	X	X
I-Line™		X	X	X	X	X	X	X▼	X▼	X▼	X▼
Rear Connection		—	—	—	—	—	—	—	—	—	—
Drawout		—	—	X★	X★	X★	X★	—	—	—	—
Optional Lugs		X	X	X	X	X	X	X	X	X	X
Accessories and Modifications											
Shunt Trip		X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X
Motor Operator		—	—	X★	X★	X★	X★	—	—	—	—
Handle Operators		—	—	X★	X★	X★	X★	—	—	—	—
Mechanical Interlocks (3P)		—	—	X	X	X	X	—	—	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X	X	X
Cylinder Lock (3P)		—	—	—	—	—	—	—	—	—	—
Optional GF Protection		—	—	X	X	X	X	X	X	X	X
Trip System Type											
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	X	X	—	—	—	—	—
Molded Case Switch (Automatic)		—	—	X	X	X	X	X	X	X	X
Electronic		X	X	X	X	X	X	X	X	X	X
Enclosures (Pages 7-56–7-58)											
General Purpose (NEMA 1)		X	X	X	X	X	X	—	—	—	—
Raintight (NEMA 3R)		X	X	X	X	X	X	—	—	—	—
Dust-tight (NEMA 12)		X	X	X	X	X	X	—	—	—	—
Watertight (NEMA 4, 4X, 5)		X	X	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount)	Height–in. (mm)	12.80 (325)		16.20 (413)				15 (381)			
	Width—in. (mm)	8.30 (210)		8.30 (210)				16.50 (420)			
	Depth—in. (mm)	8.10 (205)		8.10 (205)				14.40 (366)			
Pages (Unit Mount)/(I-Line)		Page 7-26/9-28		Page 7-27, 7-31, 7-34/9-29				Page 7-28, 7-34/9-30			

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

▲ Ungrounded UPS systems only. See page 7-35.
■ Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
♦ Requires breaker with WB suffix
★ 65/50 kA Icu/Ics for 450–600 A ratings.
▼ 1000 A and 1200 A only..

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		Masterpact 1200 A					Masterpact 6000 A							
Circuit Breaker Type		NT-N	NT-H	NT-L1	NT-L	NT-LF ▲	NW-N	NW-H	NW-L	NW-LF ▲	NW-H	NW-L	NW-H	NW-L
Number of Poles		3, 4	3, 4	3	3	3	3, 4	3, 4	3	3	3, 4	3	3, 4	3
Current Range		100–1200	100–1200	100–1200	100–1200	100–1200	100–2000	100–2000	100–2000	100–2000	640–3000	640–3000	1200–6000	1200–6000
Interrupting Ratings														
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	50	65	100	200	200	65	100	200	200	100	200	100	200
	480Y/277 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	480 Vac	50	50	65	100	100	65	100	150	150	100	150	100	150
	600Y/347 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
	600 Vac	35	50	—	—	—	50	85	100	100	85	100	85	100
DC Ratings	250 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
	500 Vdc	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC■ (kA RMS) Icu/Ics	240 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
	415 Vac	—	—	—	—	—	—	—	—	—	—	—	—	—
Special Ratings														
CCC		—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		—	—	—	—	—	—	—	—	—	—	—	—	—
HACR (2P, 3P)		—	—	—	—	—	—	—	—	—	—	—	—	—
Connections/Terminations														
Unit Mount		X	X	X	X	X	X	X	X	X	X	X	X	X
I-Line™		—	—	—	—	—	—	—	—	—	—	—	—	—
Rear Connection		X	X	X	X	X	X	X	X	X	X	X	X	X
Drawout		X	X	X	X	X	X	X	X	X	X	X	X	X
Optional Lugs		—	—	—	—	—	—	—	—	—	—	—	—	—
Accessories and Modifications														
Shunt Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Undervoltage Trip		X	X	X	X	X	X	X	X	X	X	X	X	X
Auxiliary Switches		X	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Switch		X	X	X	X	X	X	X	X	X	X	X	X	X
Motor Operator		X	X	X	X	X	X	X	X	X	X	X	X	X
Handle Operators		—	—	—	—	—	—	—	—	—	—	—	—	—
Mechanical Interlocks		X	X	X	X	X	X	X	X	X	X	X	X	X
Padlock Attachment		X	X	X	X	X	X	X	X	X	X	X	X	X
Cylinder Lock		—	—	—	—	—	—	—	—	—	—	—	—	—
Optional GF Protection		X	X	X	X	X	X	X	X	X	X	X	X	X
Trip System Type														
Thermal-magnetic		—	—	—	—	—	—	—	—	—	—	—	—	—
Instantaneous-only (MCP)		—	—	—	—	—	—	—	—	—	—	—	—	—
Molded Case Switch (Automatic)		X	X	X	X	X	X	X	X	X	X	X	X	X
Electronic		X	X	X	X	X	X	X	X	X	X	X	X	X
Enclosures														
General Purpose (NEMA 1)		—	—	—	—	—	—	—	—	—	—	—	—	—
Raintight (NEMA 3R)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dust-tight (NEMA 12)		—	—	—	—	—	—	—	—	—	—	—	—	—
Watertight (NEMA 4, 4X, 5)		—	—	—	—	—	—	—	—	—	—	—	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—	—	—	—	—	—	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	12.67 (322)					17.28 (439)				17.28 (439)		17.28 (439)	
	Width	11.25 (286)					17.74 (450)				17.74 (450)		30.94 (786)	
	Depth	13.00 (331)					18.38 (467)				18.38 (467)		18.38 (467)	
Pages		Page 7-50 and Catalog 0613CT0001					Page 7-50 and Catalog 0613CT0001							

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

▲ Tested to show arc flash hazard risk category as reference by NFPA70E.

■ See Catalog 0613CT0001 for additional ratings and other information.

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		100 A Frame						100 A F-Frame	
Circuit Breaker Type		FA (240 V)	FA		FH	FH■	FH	FI	FY
Number of Poles		1, 2, 3	1	2, 3	1	1	2, 3	2, 3	1
Current Range		15–100	15–100	15–100	15–30	35–100	15–100	20–100	15–30
Interrupting Ratings									
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	10◒	25◒	25	65	25	65	200	14
	480Y/277 Vac	—	18	18	65	25	25	200	14
	480 Vac	—	—	18	—	—	25	200	—
	600Y/347 Vac	—	—	14	—	—	18	100	—
	600 Vac	—	—	14	—	—	18	100	—
DC Ratings	250 Vdc✱	5♦	10♦	10	10♦	10♦	50	—	—
	500 Vdc▲✱	—	—	—	—	—	20	—	—
IEC Rating (kA RMS) Icu/Ics★	240 Vac	—	18/9	—	18/9	—	—	—	—
	415 Vac	10/2.5	10/2.5	10/2.5	10/2.5	10/2.5	10/2.5	6/1.5	—
IEC 50/60 Hz		For additional IEC ratings, see the Supplemental Digest, Section 10.						For additional IEC ratings, see the	
Special Ratings									
CCC		—	—	—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X	X	—
HACR (2P, 3P)		X	—	X	—	—	—	—	—
Connections/Terminations									
Unit Mount		X	X	X	X	X	X	X	—
I-Line™		X	X	X	X	X	X	X	X
Rear Connection		X	X	X	—	—	—	—	—
Drawout		—	—	—	—	—	—	—	—
Optional Lugs		X	X	X	X	X	X	X	—
Accessories and Modifications									
Shunt Trip		X△▼	—	X△	—	—	X△	X△	—
Undervoltage Trip		X△▼	—	X△	—	—	X△	X△	—
Auxiliary Switches		X△▼	—	X△	—	—	X△	X△	—
Alarm Switch		X△▼	X △	X△	X△	X△	X△	X△	—
Motor Operator		—	—	X	—	—	X	X	—
Handle Operators		X	—	X	X	X	X	—	—
Mechanical Interlocks (3P)		—	—	X	—	—	X	—	—
Handle Padlock Attachment		X	X	X	X	X	X	X	X
Cylinder Lock (3P△)		—	—	X	—	—	X	—	—
Optional GF Protection□		—	—	X	—	—	X	X	—
Trip System Type									
Thermal-magnetic		X	X	X	X	X	X	X	X
Instantaneous-only (MCP)		—	—	X	—	—	X	—	—
Molded Case Switch (Automatic)		—	—	—	—	—	X	—	—
Electronic		—	—	—	—	—	—	—	—
Enclosures (Pages 7-56–7-58)									
General Purpose (NEMA 1)		X	X	X	X	X	X	X	—
Raintight (NEMA 3R)		X	X	X	X	X	X	X	—
Dust-tight (NEMA 12)		X	X	X	X	X	X	X	—
Watertight (NEMA 4, 4X, 5)		X	X	X	X	X	X	X	—
Explosion Proof (NEMA 7, 9)		X	X	X	X	X	X	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	6 (152)	6 (152)					8 (203)	
	Width	4.5 (114)	4.5 (114)					4.5 (114)	
	Depth	4.13 (105)	4.13 (105)					4.75 (121)	
Pages (Unit Mount)/(I-Line)		Supplemental Digest Section 3 / Pages 9-23	Supplemental Digest Section 3/Page 9-24					Supplemental Digest Section 3/Pages 9-24	

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

▲ Ungrounded UPS systems only. See page 7-35.
■ 65 kA @120 Vac
♦ 1Ø 125 Vdc rating only.
★ Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest. Section 10
▼ Not available on 1P FA (240 V).
△ Factory-installed option only.
□ Requires factory-installed "G" Shunt trip and 3P module.
◊ Not available in HD and HG 2P rating (2P module).
☆ 2P in a 3P module.
▽ 3P only.
◒ 1P FA is 120 Vac.
✱ Not available with electronic trip units

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		250 A K-Frame	400 A L-Frame			600 A L-Frame	
Circuit Breaker Type		KI	Q4	LA	LH	LI	LXI
Number of Poles		2, 3	2, 3	2, 3	2, 3	2, 3	3
Current Range		110–250	250–400	125–400	125–400	300–600	100–600
Interrupting Ratings							
UL/CSA/NOM Rating (kA RMS) (50/60 Hz)	240 Vac	200	25	42	65	200	200
	480Y/277 Vac	200	—	30	35	200	200
	480 Vac	200	—	30	35	200	200
	600Y/347 Vac	100	—	22	25	100	100
	600 Vac	100	—	22	25	100	100
DC Ratings	250 Vdc	—	—	10	50	—	—
	500 Vdc▲	—	—	—	20	—	—
IEC 60947-2 (kA RMS) Icu/Ics■	240 Vac	—	—	—	—	—	—
	415 Vac	130/65	—	20/5	20/5	—	—
IEC 50/60 Hz		For additional IEC ratings, see the Supplemental Digest Section 10.					
Special Ratings							
CCC		—	—	—	—	—	—
Fed. Specs W-C-375B/GEN		X	X	X	X	X	X
HACR (2P, 3P)		—	—	X	X	—	—
Connections/Terminations							
Unit Mount		X	X	X	X	X	X
I-Line™		X	X	X	X	X	X
Rear Connection		—	X	X	X	—	—
Drawout		—	—	—	—	—	—
Optional Lugs		X	X	X	X	X	X
Accessories and Modifications							
Shunt Trip		X♦	X	X	X	X	
Undervoltage Trip		X♦	X	X	X	X	X
Auxiliary Switches		X♦	X	X	X	X	X
Alarm Switch		X♦	X	X	X	X	X
Motor Operator		X	X	X	X	—	—
Handle Operators		—	X	X	X	—	—
Mechanical Interlocks (3P)		—	—	X★	X★	—	—
Handle Padlock Attachment		X	X	X	X	X	X
Cylinder Lock (3P)		—	X	X	X	—	—
Optional GF Protection		X▼♦	—	—	—	—	X★
Trip System Type							
Thermal-magnetic		X	X	X	X	X	
Instantaneous-only (MCP)		—	—	X	X	—	—
Molded Case Switch (Automatic)		—	—	—	X	—	—
Electronic		—	—	—	—	—	X
Enclosures (Pages 7-56–7-58)							
General Purpose (NEMA 1)		—	X	X	X	—	
Raintight (NEMA 3R)		X	X	X	X	—	—
Dust-tight (NEMA 12)		X	X	X	X	X	X
Watertight (NEMA 4, 4X, 5)		X	X	X	X	—	—
Explosion Proof (NEMA 7, 9)		—	—	—	—	—	—
Dimensions (3P Unit Mount) in. (mm)	Height	8 (203)	11 (279)			11.86 (301)	
	Width	4.5 (114)	6 (152)			7.5 (190)	
	Depth	4.75 (121)	5.84 (148)			6.74 (171)	
Pages (Unit Mount)/(I-Line)		Supplemental Digest Section 3 / Pages 9-26	Supplemental Digest Section 3 / Pages 9-27			Supplemental Digest Section 3 / Pages 9-27	

Note: All circuit breakers on this chart are UL Listed and CSA Certified unless otherwise noted.

▲ Ungrounded UPS systems only. See page 7-35.
■ Dual UL and IEC ratings and CE markings on circuit breakers. For additional IEC ratings, see the Supplemental Digest, Section 10.
♦ Factory-installed option only.
★ Requires circuit breaker with WB suffix .
▼ Requires factory-installed "G" Shunt trip. Available only for 3P.
△ 65/50 kA Icu/Ics for 450 A–600 A ratings

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QO™ miniature circuit breakers are plug-on products for use in QO load centers, NQOD panelboards, NQOD OEM interiors or Speed-D™ switchboard distribution panels. Bolt-on QOB circuit breakers are for use in NQOD panelboards or interiors.▲
The QO exclusive Qwik-Open™ mechanism, with a trip reaction within 1/60th of a second, is standard on all 1P 15 A and 20 A QO circuit breakers.

QO 1P
1 Space Required

QOT 1P Tandem
1 Space Required

QO 2P
2 Spaces Required

QO2200 2P 200 A
4 Spaces Required

QO 3P
3 Spaces Required

Table 7.1: Plug-On Circuit Breakers

Amperes Rating ■	1P—120/240 Vac		2P—120/240 Vac Common Trip		2P—240 Vac ♦ Common Trip		3P—240 Vac Common Trip	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
10 k AIR								
10 A	QO110	**29.10**	QO210	**67.00**	—	—	QO310	**248.00**
15 A	QO115★▼	**29.10**	QO215★	**67.00**	QO215H	**200.00**	QO315★	**248.00**
20 A	QO120★▼	**29.10**	QO220★	**67.00**	QO220H	**200.00**	QO320★	**248.00**
25 A	QO125★	**29.10**	QO225★	**67.00**	QO225H	**200.00**	QO325★	**248.00**
30 A	QO130★	**29.10**	QO230★	**67.00**	QO230H	**200.00**	QO330★	**248.00**
35 A	QO135★	**29.10**	QO235★	**67.00**	—	—	QO335★	**248.00**
40 A	QO140★	**29.10**	QO240★	**67.00**	QO240H	**200.00**	QO340★	**248.00**
45 A	QO145★	**29.10**	QO245★	**67.00**	—	—	QO345★	**248.00**
50 A	QO150★	**29.10**	QO250★	**67.00**	QO250H	**200.00**	QO350★	**248.00**
60 A	QO160★	**29.10**	QO260★	**67.00**	QO260H	**200.00**	QO360★	**248.00**
70 A	QO170★	**67.00**	QO270★	**134.00**	QO270H	**224.00**	QO370★	**315.00**
80 A	—	—	QO280★	**189.00**	QO280H	**315.00**	QO380★	**366.00**
90 A	—	—	QO290★	**189.00**	QO290H	**315.00**	QO390★	**366.00**
100 A	—	—	QO2100★	**189.00**	QO2100H	**315.00**	QO3100★	**366.00**
110 A	—	—	QO2110★	**428.00**	—	—	—	—
125 A	—	—	QO2125★	**428.00**	—	—	—	—
150 A	—	—	QO2150★△◒	**491.00**	—	—	—	—
175 A	—	—	QO2175★△◒	**491.00**	—	—	—	—
200 A	—	—	QO2200★△◒	**491.00**	—	—	—	—
Molded Case Switch 60 A max.–240 Vac			—	—	QO200	**70.00**	QO300	**248.00**
Molded Case Switch 100 A max.–240 Vac			—	—	QO2000☆	**200.00**	QO3000☆	**366.00**
22 k AIR★								
15 A	QO115VH▼	**63.00**	QO215VH□	**146.00**	—	—	QO315VH□	**371.00**
20 A	QO120VH▼	**63.00**	QO220VH□	**146.00**	—	—	QO320VH□	**371.00**
25 A	QO125VH	**73.00**	QO225VH□	**146.00**	—	—	QO325VH□	**371.00**
30 A	QO130VH	**73.00**	QO230VH□	**146.00**	—	—	QO330VH□	**371.00**
40 A	QO140VH	**73.00**	QO240VH□	**146.00**	—	—	QO340VH□	**371.00**
50 A	QO150VH	**73.00**	QO250VH□	**146.00**	—	—	QO350VH□	**371.00**
60 A	QO160VH	**73.00**	QO260VH□	**146.00**	—	—	QO360VH□	**371.00**
70 A	QO170VH	**112.00**	QO270VH□	**224.00**	—	—	QO370VH□	**477.00**
80 A	—	—	QO280VH□	**315.00**	—	—	QO380VH□	**530.00**
90 A	—	—	QO290VH□	**315.00**	—	—	QO390VH□	**530.00**
100 A	—	—	QO2100VH□◊	**315.00**	—	—	QO3100VH□	**530.00**
110 A	—	—	QO2110VH□◊	**1034.00**	—	—	—	—
125 A	—	—	QO2125VH□◊	**1034.00**	—	—	—	—
150 A	—	—	QO2150VH△□◒	**1061.00**	—	—	—	—
175 A	—	—	QO2175VH△□◒	**1061.00**	—	—	—	—
200 A	—	—	QO2200VH△□◒	**1061.00**	—	—	—	—
42 k AIR★								
40 A	—	—	QOH240☆	**317.00**	—	—	—	—
45 A	—	—	QOH245☆	**317.00**	—	—	—	—
50 A	—	—	QOH250☆	**317.00**	—	—	—	—
60 A	—	—	QOH260☆	**317.00**	—	—	—	—
70 A	—	—	QOH270	**528.00**	—	—	—	—
80 A	—	—	QOH280	**651.00**	—	—	—	—
90 A	—	—	QOH290	**651.00**	—	—	—	—
100 A	—	—	QOH2100	**651.00**	—	—	—	—
110 A	—	—	QOH2110☆	**1389.00**	—	—	—	—
125 A	—	—	QOH2125	**1389.00**	—	—	—	—
65 k AIR★								
15 A	QH115▼	**117.00**	QH215	**293.00**	—	—	QH315★	**507.00**
20 A	QH120▼	**117.00**	QH220	**293.00**	—	—	QH320	**507.00**
25 A	QH125☆	**117.00**	QH225☆	**293.00**	—	—	QH325☆	**507.00**
30 A	QH130	**117.00**	QH230	**293.00**	—	—	QH330	**507.00**

▲ See Digest Section 1 for load centers, and Section 9 for panelboards and interiors.
■ 10–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 35–125 A circuit breakers are suitable for use with 75°C conductors.
♦ UL Listed 5 k AIR on corner grounded Delta systems.
★ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.
▼ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
△ Requires four spaces (1 AWG–300 kcmil Al/Cu.) Suitable for switching 120 Vac fluorescent lighting loads.
□ UL Listed for use ahead of QO, QO-GFI, QO-EPD, QO-AFI, QOT,QOCAFI, and QO-PL 10 k AIR circuit breakers to permit their application at 22 kA fault level.
◊ 100 A maximum branch mounted opposite.
☆ Order only. Contact your local Field Office.
▽ Includes two circuit breakers (one QO2030 and one QO3020) and handle tie QOTHT.
◒ Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.

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Table 7.2: QO-QOB Ring Terminal (20% $ Price Adder)—Factory Installed Only

Ampere Rating	Poles	Suffix
10–30 A	1, 2, 3	5237
35–60 A	1,2	5238
35–50 A	3	
70–110 A	2	5273
60–100 A	3	

Table 7.3: Wire Sizes■

Circuit Breaker Type	Ampere Rating	Wire Size (AWG/kcmil)
QO 1P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
QO 2P	10–30 A	14–8 Al/Cu
	10–30 A	(2) 14–10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
	150–200 A	4–300 Al/Cu
QO 3P	10–30 A	14–8 Al/Cu, (2) 14-10 Cu
	35–70 A	8–2 Al/Cu
	80–125 A	4–2/0 Al/Cu
QOB-VH	110–150 A	4–300 Al/Cu
QOT	15–20 A	12–8 Al 14–8 Cu
QO-AFI, QO-GFI & QO-EPD	15–30 A	12–8 Al 14–8 Cu
	40, 50, 60 A	12–4 Al 14–6 Cu
QO-PL	10–60 A	12–2 Al 14–2 Cu

Table 7.4: QOT Tandem Circuit Breakers

Ampere Rating■	Cat. No.★	$ Price
1P—120/240 Vac		
15 A & 15 A	QOT1515	**58.00**
15 A & 20 A	QOT1520	**58.00**
20 A & 20 A	QOT2020	**58.00**
2P—120/240 Vac		

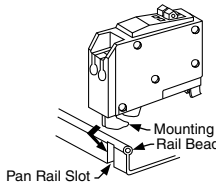
Order two QOT1515 or QOT2020 circuit breakers and handle tie QOTHT for common switching of center two poles.

Table 7.5: Replacement Tandem Circuit Breakers

For Use in Old Style Non-Class CTL QO Load Centers—10 k AIR

Ampere Rating■	Cat. No.★	$ Price
1P—120/240 Vac—1 Space Required		
15 &A 15 A	QO1515	**73.00**
15 A & 20 A	QO1520	**73.00**
20 A & 20 A	QO2020	**73.00**
20 A & 30 A	QO2030	**73.00**
30 A & 20 A	QO3020	**73.00**
Two 1P Individual Trip—120/240 Vac—2 Spaces Required		
15 A & 15 A	Order Two QO1515 or QO2020 circuit breakers and handle tie QOTHT for common switching of center two poles.	
15 A & 20 A		
20 A & 20 A	—	—
20 A & 30 A	QO20303020▽	**134.00**
30 A & 20 A	—	—

QOT Tandem



Circuit limiting QOT tandem circuit breakers have a mounting cam as shown. Installation into a QO load center can only be made in those positions having a mounting pan rail slot. Meets Paragraph 408.15 of the NEC®. UL Listed as Class CTL

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1P
QO-CAFI

1P
QO-PCAFI

New! QO™ Arc-Fault Circuit Breaker (Pigtail and Plug-On Neutral)

QO arc-fault circuit breakers provide protection for Series and Parallel Type Arcing as required by the NEC and local code adoption, and comply with UL1699.

Table 7.6: QO Arc Fault Circuit Breakers▲

Circuit Breaker Type	Ampere Rating	One-Pole 1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price
Combination Arc-fault Interrupter (Pigtail Neutral)	15 A	QO115CAFI	282.00	QO115VHCAFI	534.00
	20 A	QO120CAFI	282.00	QO120VHCAFI	534.00
Plug-On Neutral Arc-Fault Interrupter	15 A	QO115PCAFI	282.00	QO115VHPCAFI	534.00
	20 A	QO120PCAFI	282.00	QO120VHPCAFI	534.00

Circuit Breaker Type	Ampere Rating	Two-Pole 2P 120/240 Vac 10 k AIR 2 Space Required Cat. No.	$ Price	2P 120/240 Vac 22 k AIR 2 Space Required Cat. No.	$ Price
Combination Arc-Fault Interrupter (Pigtail Neutral)	15 A	QO215CAFI	636.00	QO215VHCAFI	1068.00
	20 A	QO220CAFI	636.00	QO220VHCAFI	1068.00

1P
QO-DF

1P
QO-PDF

New! QO™ Dual Function Circuit Breaker

QO Combination Arc Fault and Ground Fault Circuit Interrupters (Dual Function) provide overload and short circuit protection, plus arc fault and ground fault protection in a single device in accordance with the NEC, UL1699 and UL943.

Table 7.7: QO Dual Function Circuit Breakers

Circuit Breaker Type	Ampere Rating	1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price
Combination Arc-fault and Ground Fault Circuit Interrupter with Pigtail Neutral	15 A	QO115DF	326.00	QO115VHDF	578.00
	20 A	QO120DF	326.00	QO120VHDF	578.00
Plug-On Neutral Combination Arc-fault and Ground Fault Circuit Interrupter	15 A	QO115PDF	326.00	QO115VHPDF	578.00
	20 A	QO120PDF	326.00	QO120VHPDF	578.00

Two-wire
QO-SWN

Three-wire
QO-SWN

QO-GFI

Qwik-Gard™ circuit breakers provide overload and short circuit protection, combined with Class A ground fault protection. Class A denotes a ground fault circuit interrupter that will trip when a fault current to ground is 6 mA or more, for people protection. Do not connect to more than 250 feet of load conductor for the total one-way run to prevent nuisance tripping.

Table 7.8: QO-GFI Circuit Breakers

Ampere Rating♦ (A)	Qwik-Gard Circuit Breakers With Ground Fault Circuit Interrupter 1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	1P 120 Vac 22 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 208Y/120 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
15	QO115GFI	233.	QO115VHGFI	482.	QO215GFI	413.	QO315GFI	791.
20	QO120GFI	233.	QO120VHGFI	482.	QO220GFI	413.	QO320GFI	791.
25	QO125GFI	233.	QO125VHGFI	482.	QO225GFI	413.	—	—
30	QO130GFI	233.	QO130VHGFI	482.	QO230GFI	413.	QO330GFI	791.
40	—	—	—	—	QO240GFI	413.	QO340GFI	791.
50	—	—	—	—	QO250GFI	413.	QO350GFI	791.
60	—	—	—	—	QO260GFI★	413.	—	—

1P
QO-GFI

2P
QO-GFI

3P
QO-GFI

QO-EPD/EPE

QO-EPD/EPE circuit breakers provide overload and short circuit protection combined with Class B ground fault protection. They are designed to provide ground fault protection of equipment at a 30 milliampere level (EPD) or 100 milliamp level (EPE). They are not designed to protect people from electrical shock.

Table 7.9: QO-EPD Circuit Breakers

Ampere Rating♦ (A)	1P 120 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price	Cat. No.	$ Price
15	QO115EPD	410.	QO215EPD	660.	QO315EPD▼	1077.	QO315EPE▼	1077.
20	QO120EPD	410.	QO220EPD	660.	QO320EPD▼	1077.	QO320EPE▼	1077.
25	QO125EPD	410.	QO225EPD	660.	—	—	—	—
30	QO130EPD	410.	QO230EPD	660.	QO330EPD▼	1077.	QO330EPE▼	1077.
40	—	—	QO240EPD	660.	QO340EPD▼	1077.	QO340EPE▼	1077.
50	—	—	QO250EPD	660.	QO350EPD▼	1077.	QO350EPE▼	1077.
60	—	—	QO260EPD★	660.	—	—	—	—

QO 1P
With Shunt Trip

QO-SWN

Switch Neutral Common Trip 2008 NEC™ 514.11

Table 7.10: QO-SWN Circuit Breakers

Ampere Rating♦	2 Wire 120 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3 Wire 120/240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
10 A	QO210SWN	95.00	—	—
15 A	QO215SWN	95.00	QO315SWN	143.00
20 A	QO220SWN	95.00	QO320SWN	143.00
25 A	QO225SWN	95.00	—	—
30 A	QO230SWN	95.00	QO330SWN	143.00
40 A	QO240SWN	95.00	QO340SWN	143.00
50 A	QO250SWN	95.00	QO350SWN	143.00

QO-HID

HID circuit breakers are for use on circuits feeding fluorescent and high intensity discharge (HID) lighting systems such as mercury vapor, metal halide, or high pressure sodium. These circuit breakers are physically interchangeable with QO circuit breakers.

Table 7.11: QO-HID Circuit Breakers

Ampere Rating♦	1P 120/240 Vac 10 k AIR 1 Space Required Cat. No.	$ Price	2P Common Trip 120/240 Vac 10 k AIR 2 Spaces Required Cat. No.	$ Price	3P Common Trip 240 Vac 10 k AIR 3 Spaces Required Cat. No.	$ Price
15 A	QO115HID■	38.10	QO215HID	87.00	QO315HID	300.00
20 A	QO120HID■	38.10	QO220HID	87.00	QO320HID	300.00
25 A	QO125HID	38.10	QO225HID	87.00	QO325HID	300.00
30 A	QO130HID	38.10	QO230HID	87.00	QO330HID	300.00
40 A	QO140HID	38.10	QO240HID	87.00	—	—
50 A	QO150HID	38.10	QO250HID	87.00	—	—

NOTE: *QO-K Circuit Breakers are on page 7-63.*

QO-HM

High magnetic trip circuit breakers are recommended for applications where high initial inrush may occur and for individual dimmer applications.

Table 7.12: QO-HM Circuit Breakers

Ampere Rating♦	1P Cat. No	$ Price
120 Vac—10 k AIR		
15 A	QO115HM▲■	30.60
20 A	QO120HM▲■	30.60

Non-automatic (Standard) Miniature Switches

Miniature non-automatic switches have the same physical packaging as miniature circuit breakers, but open only when the handle is switched to the OFF position.

Non-automatic switches provide no overcurrent protection or short circuit protection. They must not be used on systems that have an available fault current greater than the values listed in the table.

Non-automatic switches are UL Listed per UL 1087 and are CSA certified.

Table 7.13: QO Non-Automatic Miniature Switches, 240 Vac 10 kA

Ampere Rating	2P Cat. No.	$ Price	3P Cat. No.	$ Price
60 A	QO200	70.00	QO300	248.00
100 A	QO2000	200.00	QO3000	366.00

▲ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.
■ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
♦ 10–30 A circuit breakers are suitable for use with 60° C or 75° C conductors. 35–60 A circuit breakers are suitable for use with 75° C conductors.
★ Suitable only for feeding 240 Vac and 208 Vac two-wire loads. Does not contain load neutral connection.
▼ See note in Instruction Bulletin when using in an enclosure with a QO403 or QON prefix.

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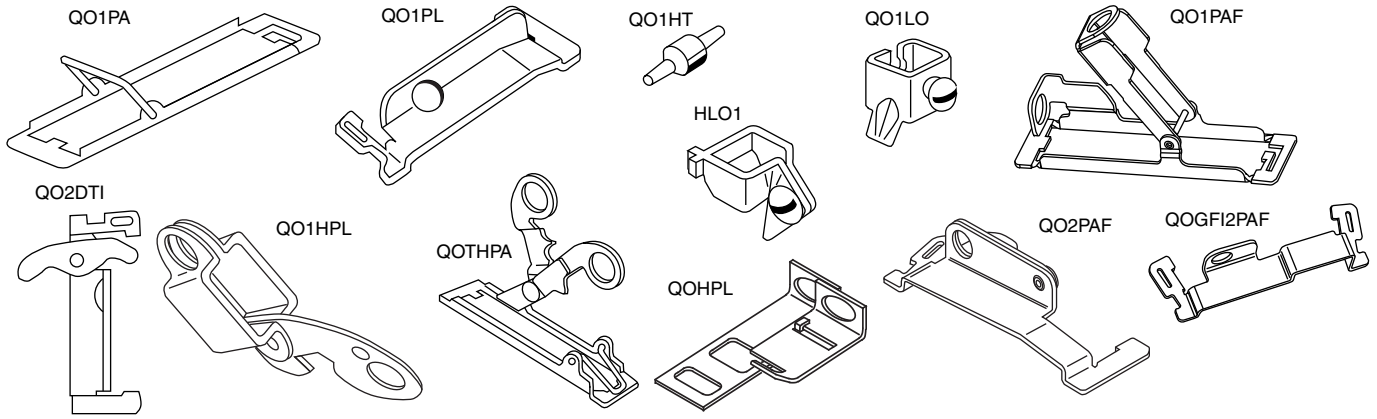
Table 7.14: Accessories for Use with QO™ and QOB Miniature Circuit Breakers

Handle Attachments	Description	Cat. No.	$ Price	Schedule
Handle Tie:	Converts any two adjacent 120/240 Vac 1P QO circuit breakers to independent trip 2P	QO1HT	**3.80**	DE2E
	Converts any two adjacent 120/240 Vac 1P side-by-side QOT circuit breakers to independent trip 2P	QOTHT	**3.80**	DE2E
	Handle tie and lock-off for three 1P QO, QOB circuit breakers	QO3HT	**13.40**	DE2E
Handle Clamp:	Clamp for holding QO 1P handle in ON or OFF position	QO1LO	**3.80**	DE2E
	Clamp for holding QO or Q1 1P, 2P or 3P circuit breaker handles in ON or OFF position	HLO1	**9.90**	DE2E
Handle Padlock Attachment: for Padlocking in ON or OFF position	For padlocking 1P QO circuit breaker in ON or OFF position			
	Loose attachment	QOHPL	**9.50**	DE2E
	Fixed attachment	QO1PA	**10.70**	DE2E
	For padlocking 1P side-by-side QOT circuit breaker in ON or OFF position	QOTHPA	**11.10**	DE2E
	For padlocking 2P and 3P QO-GFI, QO-EPD, and QO-EPE in either ON or OFF position, fixed attachment.	GFI2PA	**9.20**	DE2A
	For 2P and 3P QO and Q1 standard circuit breakers which require padlocking in either ON or OFF position.			
	Loose attachment	QO1HPL	**10.70**	DE2E
	Fixed attachment	QO1PL	**10.70**	DE2E
Handle Padlock Attachment: for Padlocking in OFF position	For padlocking 1P QO circuit breaker in OFF position only, fixed attachment.	QO1PAF	**43.50**	DE2E
	For padlocking 2P and 3P QO circuit breakers in OFF position only, fixed attachment.	QO2PAF	**25.80**	DE2E
	For padlocking 1P QO-GFI, QO-AFI, QO-CAFI, QO-PCAFI, and QO-EPD circuit breakers in OFF position only, fixed attachment.	QOGFI1PAF	**51.00**	DE2E
	For padlocking 2P and 3P QO-GFI, QO-EPD, and QO-EPE circuit breakers in OFF position only, fixed attachment.	QOGFI2PAF	**38.40**	DE2E
Ring Terminal	Ring terminals are available as a factory-installed option.	See Page 7-10	**+20% Price Adder**	DE2A
Sub-Feed Lugs	60 A 2P plug-on – 2 spaces required (6–2 Al/Cu)	QO60SL	**47.10**	DE2A
	125 A 2P plug-on – 2 spaces required (12–2/0 Al/Cu)	QO2125SL	**137.00**	DE2A
	225 A 2P plug-on – 4 spaces required (4–300 Al/Cu)	QO2225SL▲	**308.00**	DE2A
	125 A 3P plug-on – 3 spaces required (12–2/0 Al/Cu)	QO3125SL	**137.00**	DE3
Mechanical Interlock Attachment	For interlocking the handles of two 2P or one 2P and one 1P QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time (Not QOU)	QO2DTI	**24.90**	DE2E
With Retaining Kit:	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2Ps or (1) 2P and (1) 1P QO circuit breakers in QO816L100 load centers.	QO2DTIM	**63.00**	DE2E

▲ Not suitable for use in 3Ø panels. Use only in 1Ø panel rated 150 A or greater.



Factory-Installed Accessories for Use with QO and QOB Miniature Circuit Breakers

Factory-installed electrical accessories take up an additional pole space on QO™, QO-GFI, QO-EPD, QO-SWN and QOU circuit breakers. All AC electrical accessories shown below are rated for 50/60 Hz. Accessories are not available for QOB-VH (2P 150 A and 3P 110–150 A) circuit breakers or QO, QOU molded case switches. QO circuit breakers will accept only one accessory per circuit breaker. Undervoltage trip is not available on miniature circuit breakers. Factory-installed accessories are not available for QO-AFI, QO-CAFI or OQ-PCAFI Arc Fault Circuit Breakers or on QO2150, QO2175, or QO2200 circuit breakers.

Table 7.15: Factory-Installed Accessories

Accessory	Description	Rated Voltage		Coil Burden	Cat. No. Suffix	$ Price Adder
Shunt Trip	Trips the circuit breaker from a remote location by means of a trip coil energized from a separate circuit. A 120 Vac shunt trip will operate at 55% or more of rated voltage. All other shunt trips will operate at 75% or more of rated voltage. **Application** • For use with momentary or maintained push button. • Not available on QO-GFI, QO-EPD, QO-AFI, QO-CAFI, QO-PCAFI. • Shunt trip terminals accept (2) 14–12 AWG Cu.	AC/DC	12	60 VA	-1042	**189.00**
			24	168 VA		
		AC	120	72 VA	-1021	**189.00**
			208	228 VA		
			240	288 VA		

Accessory	Description	Contact Comb.	Max. Voltage	Max. Load	Cat. No. Suffix	$ Price Adder
Auxiliary Switches	Monitors circuit breaker contact status and provides a remote signal indicating the circuit breaker contacts are OPEN or CLOSED. **Application** • Auxiliary switch terminals accept (2) 14–12 AWG Cu leads.	1A	AC 120	5 A	-1200	**132.00**
		1B	AC 120	5 A	-1201	**132.00**
Alarm Switches	Used with control circuits and is actuated only when the circuit breaker has tripped. Standard construction includes a normally-open contact. **Application** • Alarm switch terminals accept (2) 14–12 AWG Cu leads.	1A	AC 120	5 A	-2100	**132.00**

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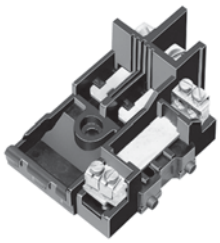

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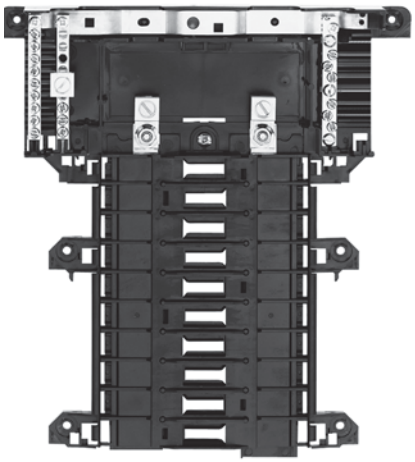


QON120L125I

Table 7.16: QO OEM Mounting Bases—UL Recognized Components

Voltage System	Main Lug Rating	1P Spaces	Max. No. 1P	Mounting Bases Cat. No.	Mounting Bases $ Price	Main Wire Size AWG/kcmil
QO Plug-On Mounting Bases—For unit mounting QO, QO-GFI, QO-AFI and QO-EPD circuit breakers						
1Ø2W 240 Vac Max. 10 k AIC (Without Neutral Assembly)	70 A	2	2	QON2L70	**27.30**	14–4 Cu, 12–3 Al
	125 A	4	4	SK9948BW	**75.00**	12–1/0 Cu/Al
	125 A	4	4	SK9842	**78.00**	12–1/0 Cu/Al
	125 A	6	6	SK9795	**84.00**	12–1/0 Cu/Al
	125 A	6	6	SK9801	**108.00**	12–1/0 Cu/Al
	150 A	6	6	SK9796BW	**131.00**	8–3/0 Cu/Al
	150 A	8	8	SK9797	**140.00**	8–3/0 Cu/Al
1Ø3W 240 Vac Max. 10 k AIC	40 A	2	2	QON2L40	**35.00**	14–6 Cu, 12–6 Al
	70 A	2	4	QON24L70	**50.00**	14–4 Cu, 12–3 Al
	100 A	6	12	QON612L100	**70.00**	8–1/0 Cu/Al
	100 A	8	16	QON816L100	**92.00**	8–1/0 Cu/Al
	100 A	12	12	QON12L100	**113.00**	12–2/0 Cu/Al
	100 A	12	12	QON12L100SF■	**161.00**	6–2/0 Cu/Al
	125 A	12	12	QON112L125I	**120.00**	4–2/0 Cu/Al
	125 A	12	24	QON11224L125I	**168.00**	4–2/0 Cu/Al
	125 A	16	16	QON116L125I	**131.00**	4–2/0 Cu/Al
	125 A	16	24	QON11624L125I	**191.00**	4–2/0 Cu/Al
	125 A	20	20	QON120L125I	**225.00**	4–2/0 Cu/Al
	125 A	24	24	QON124L125I	**263.00**	6–2/0 Cu/Al
	125 A	32	32	QON132L125I	**360.00**	4–2/0 Cu/Al
	125 A	20	24	QON12024L125I	**263.00**	4–2/0 Cu/Al
	150 A	24	24	QON124L150I	**263.00**	4–250 Cu/Al
	200 A	12	12	QON124L200I	**339.00**	4–250 Cu/Al
	200 A	12	12	QON12L200FTL♦	**500.00**	4–250 Cu/Al
	200 A	24	24	QON124L200I	**339.00**	4–250 Cu/Al
	200 A	24	24	QON124L200DL★	**500.00**	(2) 4–300 Cu/Al
	200 A	30	30	QON130L200I	**417.00**	4–250 Cu/Al
	225 A	42	42	QON142L225I	**599.00**	4–300 Cu/Al
3Ø3W 240 Vac Max. 10 k AIC (Without Neutral Assy.)	125 A	12	12	QON312L125	**251.00**	4–2/0 Cu/Al
	125 A	20	20	QON320L125	**380.00**	4–2/0 Cu/Al
	125 A	24	24	QON324L125	**395.00**	4–2/0 Cu/Al
	200 A	18	18	QON318L200	**327.00**	4–300 Cu/Al
	200 A	24	24	QON324L200	**402.00**	4–300 Cu/Al
	200 A	30	30	QON330L200	**477.00**	4–300 Cu/Al
	225 A	42	42	QON342L225	**674.00**	4–300 Cu/Al
3Ø4W 240 Vac Max. 10 k AIC	60 A	3	3	QON403L60N	**49.80**	12–6 Cu/Al
	125 A	12	12	QON312L125I	**281.00**	4–2/0 Cu/Al
	125 A	20	20	QON320L125I ▲	**441.00**	4–2/0 Cu/Al
	125 A	24	24	QON324L125I	**461.00**	4–2/0 Cu/Al
	200 A	18	18	QON318L200I	**426.00**	4–300 Cu/Al
	200 A	24	24	QON324L200I	**468.00**	4–300 Cu/Al
	200 A	30	30	QON330L200I ▲	**528.00**	4–300 Cu/Al
	225 A	42	42	QON342L225I	**716.00**	4–300 Cu/Al
QO Plug-On Mounting Bases—For unit mounting QO, QO-GFI and QO-EPD circuit breakers						
1Ø2W 240 Vac Max. 10 k AIC (Without Neutral Assembly)	70 A	1	1	QOMB1	**29.60**	14–4 Cu 12–2 Al
	70 A	2	2	QOMB2	**59.00**	14–4 Cu 12–2 Al
	70 A	3	3	QOMB3	**87.00**	14–4 Cu 12–2 Al
QOB Bolt-On Mounting Bases—For unit mounting QOB, QOB-GFI, QOB-EPD circuit breakers						
3Ø3W 240 Vac Max.10 k AIC (Without Neutral Assembly)	100 A	3	3	QON3B	**56.00**	12–1 Cu/Al

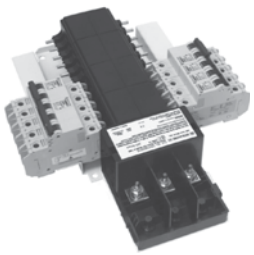
▲ Also IEC rated and CE marked for IEC 60439-1. Use only Square D brand Type QOXC, QOXD, QOHX and QOE circuit breakers for 415Y/240 Vac max. systems.
■ Device comes with factory-installed sub-feed lugs.
♦ Device comes with factory-installed feed-thru lugs.
★ Device comes with factory-installed dual-line lugs.

Table 7.17: Solid Neutral Assemblies

Main Lug Rating	Number of Branch Neutral Terminals	Cat. No.	$ Price	Main Neutral Lug Wire Size Cu/Al	Branch Neutral Terminal Wire Size Cu	Branch Neutral Terminal Wire Size Al
125 A	12	SN12125	**36.30**	4–2/0 AWG	14–4 AWG	12–4 AWG
125 A	20	SN20	**39.50**	4–2/0 AWG	14–4 AWG	12–4 AWG
200 A	12	SN12200	**40.70**	4 AWG–300 kcmil	14–4 AWG	12–4 AWG
200 A	30	SN30	**54.00**	4 AWG–300 kcmil	14–4 AWG	12–4 AWG
225 A	42	SN42	**63.00**	4 AWG–300 kcmil	14–4 AWG	12–4 AWG

Table 7.18: Multi-9 Mounting Bases for UL489 C60, 240 Vac max.

Description	Poles	Amperes	Length in.	Length mm	Cat. No.▼	$ Price
One-conductor Mounting Base	12	200 A	10.4	264	US11220018	**330.00**
	24		14.4	366	US12420018	**476.00**
	36		19	483	US13620018	**632.00**
	48		23	584	US14820018	**810.00**
	60		27.5	699	US16020018	**972.00**
Two-conductor Mounting Base	12	150 A	10.4	264	US21215018	**429.00**
	24	200 A	14.4	366	US22420018	**645.00**
	36		19	483	US23620018	**887.00**
	48		23	584	US24820018	**1140.00**
	60		27.5	699	US26020018	**1359.00**
Three-conductor Mounting Base	12	100 A	10.4	264	US31210018	**467.00**
	24	200 A	14.4	366	US32420018	**701.00**
	36		19	483	US33620018	**960.00**
	48		23	584	US34820018	**1245.00**
	60		27.5	699	US36020018	**1547.00**



US Mounting Base for UL489 C60 (3 conductor shown)

Table 7.19: Accessories for US Mounting Base for UL489 C60

Description	Cat. No.▼	$ Price
Main lug kit for US mounting bases, 1 lug per kit, for 6 AWG to 300 kcmil cable	USMBLK	**24.00**
Terminal cover for US mounting base; provides IP20 ingress protection per IEC 60529; suitable for jumper bars or cable	USMBTC	**49.50**

▼ DE2 Discount Schedule

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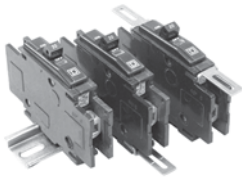

Low Ampere QOU

Low Ampere QOU Miniature Circuit Breakers

QOU unit mount miniature circuit breakers (cable-in/cable-out) are ideal for OEM applications. They have the Square D™ circuit breaker's unique Visi-Trip™ feature and can be DIN rail-mounted or surface- or flush-mounted using mounting feet.

General Specifications Common to All Low Ampere QOU Circuit Breakers

- For convenient flush mount, surface mount or DIN mount (symmetrical rail 35 x 7.5 DIN/EN 50 022)
- Single handle with internal common trip
- Terminal lug wire size (1) 14–2 AWG Cu or Al
- Reversible line and load lugs
- Field-installable quick connectors
- UL Listed 48 Vdc (5 k AIR)
- UL Listed as HACR Type: 10–70 A
- High magnetic trip circuit breakers (QOU-HM) are recommended for applications where high initial inrush may occur and for individual dimmer applications.
- For DIN mounting rails, see IEC Starters and Relays, Section 18.

Table 7.20: QOU Low Ampere Miniature Circuit Breakers

Ampere Rating	1P 120/240 Vac		2P 120/240 Vac		2P 240 Vac		3P 240 Vac	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.▲	$ Price	Cat. No.	$ Price
10 k AIR								
10 A	QOU110		QOU210		—		QOU310	
15 A	QOU115		QOU215		QOU215H		QOU315	
20 A	QOU120		QOU220		QOU220H	**168.00**	QOU320	
25 A	QOU125		QOU225		QOU225H		QOU325	
30 A	QOU130	**40.20**	QOU230	**87.00**	QOU230H		QOU330	**285.00**
35 A	QOU135		QOU235		—	—	QOU335	
40 A	QOU140		QOU240		—	—	QOU340	
45 A	QOU145		QOU245		—	—	QOU345	
50 A	QOU150		QOU250		—	—	QOU350	
60 A	QOU160		QOU260		—	—	QOU360	
70 A	QOU170	**78.00**	QOU270	**171.00**	—	—	QOU370	**363.00**
22 k AIR								
15 A	QOU115VH		QOU215VH		—	—	QOU315VH	
20 A	QOU120VH		QOU220VH		—	—	QOU320VH	**426.00**
25 A	QOU125VH		QOU225VH		—	—	QOU325VH	
30 A	QOU130VH		QOU230VH		—	—	QOU330VH	
35 A	QOU135VH	**101.00**	QOU235VH	**189.00**	—	—	—	—
40 A	QOU140VH		QOU240VH		—	—	—	—
45 A	QOU145VH		QOU245VH		—	—	—	—
50 A	QOU150VH		QOU250VH		—	—	—	—
60 A	QOU160VH		QOU260VH		—	—	—	—

▲ QOU-H interrupting rating is 10 kA at 240 Vac.

Table 7.21: QOU-HM Miniature Circuit Breakers (10 k AIR)

Ampere Rating	1P 120/240 Vac		2P 120/240 Vac		2P 240 Vac		3P 240 Vac	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
15 A	QOU115HM	**40.20**	—	—	—	—	—	—
20 A	QOU120HM		—	—	—	—	—	—

High Ampere QOU

Table 7.22: QYU UL1077 Recognized Supplementary Protectors (5 k AIR)

Ampere Rating	1P 277 Vac		2P 120/240 Vac		2P 240 Vac		3P 240 Vac	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
10 A	QYU110		—	—	—	—	—	—
15 A	QYU115		—	—	—	—	—	—
20 A	QYU120	**122.00**	—	—	—	—	—	—
25 A	QYU125		—	—	—	—	—	—
30 A	QYU130		—	—	—	—	—	—

High Ampere QOU Circuit Breakers

General Specifications Common to All High Ampere QOU Circuit Breakers

- Flush mount, surface mount, and DIN rail mount.
- Internal common trip.
- Non-reversible line and load lugs.
- Terminal lug wire size (1) 12– 2/0 AWG Cu or Al.
- UL Listed 60 Vdc per pole (5 k AIR). (**Note:** except switches)
- UL Listed as HACR type, 80–125 A.
- Non-automatic switches have the same physical packaging as miniature circuit breakers, but provide no overcurrent or short circuit protection. They are UL Listed per UL1087 and are CSA certified.

Table 7.23: QOU High Ampere Miniature Circuit Breakers (10 k AIR)

Ampere Rating	1P 120/240 Vac		2P 120/240 Vac		2P 240 Vac		3P 240 Vac	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
80 A	QOU180		QOU280		—	—	QOU380	
90 A	QOU190	**176.00**	QOU290	**246.00**	—	—	QOU390	**416.00**
100 A	QOU1100		QOU2100		—	—	QOU3100	
125 A	—	—	QOU2125	**452.00**	—	—	—	—

Table 7.24: QOU Non-Automatic Switches

Ampere Rating	1P 120 Vac	$ Price	2P 120/240 Vac	$ Price	2P 240 Vac	$ Price	3P 240 Vac	$ Price
	Cat. No.		Cat. No.		Cat. No.		Cat. No.	
60 A	—	—	—	—	QOU200	**87.00**	QOU300	**285.00**
100 A	—	—	—	—	QOU2000	**246.00**	QOU3000	**416.00**
125 A	—	—	—	—	QOU20001	**452.00**	QOU30001	**716.00**

Interrupting Ratings . . . . . Page 7-3
Accessories . . . . . Page 7-12, 7-15
Dimensions. . . . . Page 7-54

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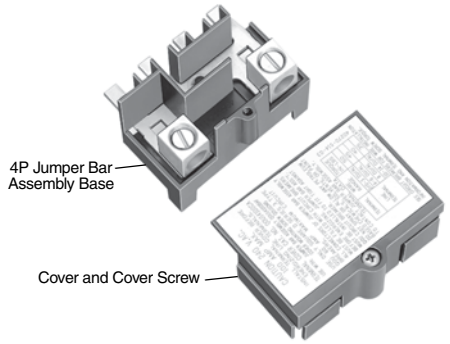
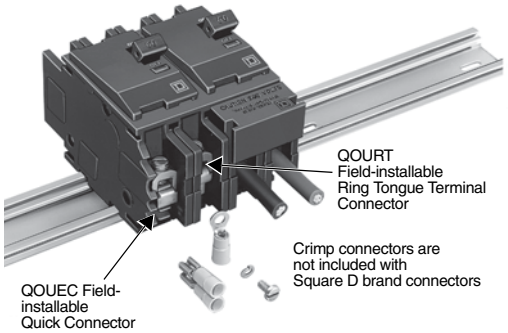
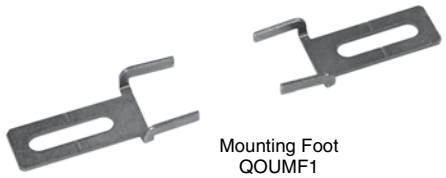


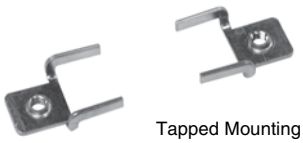
QOU14100JBAF



2P DIN Mounted QOU Circuit Breakers



Mounting Foot
QOUMF1



Tapped Mounting Foot
Suffix–3100

Table 7.25: Accessories for QOU Low Ampere Circuit Breakers (Except as Noted)

Description	Order Qty.	Cat. No.	Unit $ Price
Factory-installed ring tongue terminal, 10–32 screw, for 1P, 2P, 3P QOU, 10–60 A	—	Suffix -5283	**Add 20% to price**
Hex drive 5/32 in. wire binding screw for QOU	—	Suffix -5280	**Add 20% to price**
For padlocking 1P low ampere QOU circuit breaker in OFF or ON position	—	QOU1PA	**10.10**
For padlocking 2P and 3P low ampere QOU circuit breaker in OFF or ON position	—	QOU1PL	**10.10**
For padlocking 1P low ampere QOU circuit breaker in OFF position only	—	QOU1PAFLA♦	**43.50**
For padlocking 2P and 3P low ampere QOU circuit breaker in OFF position only	—	QOU2PAFLA♦	**25.80**
For padlocking 2P and 3P high ampere QOU circuit breaker in OFF position only	—	Suffix -7100	**Add 20% to price**
Handle lock-out, ON or OFF position	—	HLO1♦	**9.90**
4P 100 A Jumper bar assy. w/front wiring with base, cover and screw	1	QOU14100JBAF	**73.00**
4P 100 A Jumper bar assy. w/right side wiring with base, cover and screw	1	QOU14100JBAR	**73.00**
4P 100 A Jumper bar assy. w/left side wiring with base, cover and screw	1	QOU14100JBAL	**73.00**
1Ø, 4P, 100 A Jumper bar base with front wiring	40	QOU14100BAFB	**53.00**
1Ø, 4P, 100 A Jumper bar base with left side wiring	40	QOU14100BALB	**53.00**
1Ø, 4P, 100 A Jumper bar base with right side wiring	40	QOU14100BARB	**53.00**
4P Jumper bar cover	40	QOU14100CAB	**13.20**
Mounting screw for jumper bar cover	40	QOU1CMSB	**0.35**
6P 150 A Jumper bar assy. w/front wiring with base, cover and screw	1	QOU16150JBAF	**99.00**
1Ø, 6P, 150 A Jumper bar base with front wiring	40	QOU16150BAFB	**69.00**
1Ø, 6P, 150 A Jumper bar base with left side wiring	40	QOU16150BALB	**69.00**
1Ø, 6P, 150 A Jumper bar base with right side wiring	40	QOU16150BARB	**69.00**
6P jumper bar cover	40	QOU16150CAB	**17.10**
Vertical rainproof cover 2P and 3P QO, QOU, FA and KA	1 10	BCV▲♦ BCVB▲♦	**30.80** **30.80**
Horizontal rainproof cover 2P QO, QOU, and 3P Q2, EH	1 10	BCH▲♦ BCHB▲♦	**30.80** **30.80**
1P Fingersafe™ cover for high ampere QOU circuit breaker	1 40	QOUHFSC1 QOUHFSC1B	**2.60** **2.10**
1P Fingersafe cover for low ampere QOU circuit breaker	1 40	QOULFSC1 QOULFSC1B	**2.60** **2.10**
Cover plate for one 2P QOU circuit breaker	1 40	QOUCP2 QOUCP2B	**8.30** **6.60**
Cover plate for one 3P QOU circuit breaker	1 40	QOUCP3 QOUCP3B	**15.80** **12.80**
Cover plate for two 2P QOU circuit breakers	1 40	QOUCP4 QOUCP4B	**9.90** **7.90**
Cover plate for three 2P QOU circuit breakers	1 40	QOUCP6 QOUCP6B	**15.60** **12.20**
Field-installable ring tongue terminal adaptor	1 80	QOURT QOURTB	**5.70** **4.40**
Quick connector end connection wiring	1 40	QOUEC QOUECB	**5.70** **4.40**
Quick connector forward or reverse wiring	1 40	QOUFR QOUFRB	**5.70** **4.40**
1P QOU mounting foot	1 80	QOUMF1▲ QOUMF1B▲	**0.71** **0.54**
2P QOU mounting foot	1 40	QOUMF2▲ QOUMF2B▲	**1.40** **1.10**
3P QOU mounting foot	1 24	QOUMF3▲ QOUMF3B▲	**2.30** **1.70**
Tapped mounting foot for QOU, 1P and 2P 10–70 A, 3P 10–60 A			
Packaged with circuit breaker		Suffix -3100	**Add 20% to price**
Individually packaged	1	QOUMFS1	**2.40**
Bulk packed	80	QOUMFS1B	**2.30**
Mechanical interlock attachment: Used to interlock two circuit breakers mounted side-by-side so that only one circuit breaker can be ON at a time. A 1P or 2P circuit breaker can be mounted on the left and interlocked with a 2P or 3P circuit breaker on the right.	1	QOU2DTILA ■	**24.90**

▲ For use on low and high ampere QOU.
■ 10–70 A 1P and 2P, 10–60 A 3P.
♦ DE2E Discount Schedule

For QOUQ Low Ampere Circuit Breakers with Four-Point Quick-Connect Terminals

QOUQ low ampere circuit breakers with four-point quick-connect terminals are provided with permanent factory-installed terminals which are affixed to the Load or OFF end of the circuit breaker. This special terminal will accommodate up to four 1/4-inch insulated female quick connect wire terminations. Total ampacity of these connections must not exceed the rating of the circuit breaker.

Table 7.26: QOUQ Four-Point Quick-Connect Terminals

	Poles	Order Qty.	Cat. No.	Unit $ Price Adder
Four-Point Quick-Connect Terminals	1	1	Change QOU to QOUQ	**8.90**
	2	1		**17.70**
	3	1		**26.40**

Electrical Accessories for QOU . . . . . Page 7-12

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1P C60

2P C60

Multi 9 C60 UL 489 Listed 240 V Miniature Circuit Breakers

- UL 489 Listed and CSA 22.2 No. 5.1 for branch circuit protection
- Eliminates concerns and uncertainty of using a UL 1077 device where a UL 489 device is required
- Replaces fuses in low-ampere range; 17 ratings up to 35 A
- 10 k AIR (1P @ 120 Vac; 2P and 3P @ 240 Vac)
- 60 Vdc for 1P and 125 Vdc for 2P (on C-curve circuit breakers only, see table below)
- Increased installation flexibility with standard box lugs or optional ring terminals
- Allows easy front-mounting and rear wiring when using ring terminals
- A wide range of electrical and mechanical accessories
- Suitable for reverse feeding
- Trip-free mechanism
- Positive indication of contact disconnect

Trip Curve	Use	Magnetic Release
C	For typical loads	7–10 x ampere rating (7–14 for DC)
D	For high inrush	10–14 x ampere rating

3P C60

Box Lug C60

Ring Tongue C60

Box/Ring C60

Table 7.27: UL 489 Circuit Breakers (120/240 V)

Rating (A)	C Curve—7–10 Times Ampere Rating (7–14 DC)						D Curve—10–14 Times Ampere Rating					
	1P▲		2P■		3P		1P		2P		3P	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Box Lug/Box Lug												
0.5	60100	**125.00**	60134	**269.00**	—	—	60117	**125.00**	60151	**269.00**	—	—
1	60101	**125.00**	60135	**269.00**	60168	**387.00**	60118	**125.00**	60152	**269.00**	60184	**387.00**
1.5	60102	**125.00**	60136	**269.00**	60169	**387.00**	60119	**125.00**	60153	**269.00**	60185	**387.00**
2	60103	**125.00**	60137	**269.00**	60170	**387.00**	60120	**125.00**	60154	**269.00**	60186	**387.00**
3	60104	**125.00**	60138	**269.00**	60171	**387.00**	60121	**125.00**	60155	**269.00**	60187	**387.00**
4	60105	**125.00**	60139	**269.00**	60172	**387.00**	60122	**125.00**	60156	**269.00**	60188	**387.00**
5	60106	**125.00**	60140	**269.00**	60173	**387.00**	60123	**125.00**	60157	**269.00**	60189	**387.00**
6	60107	**114.00**	60141	**246.00**	60174	**356.00**	60124	**114.00**	60158	**246.00**	60190	**356.00**
7	60108	**114.00**	60142	**246.00**	60175	**356.00**	60125	**114.00**	60159	**246.00**	60191	**356.00**
8	60109	**114.00**	60143	**246.00**	60176	**356.00**	60126	**114.00**	60160	**246.00**	60192	**356.00**
10	60110	**114.00**	60144	**246.00**	60177	**356.00**	60127	**114.00**	60161	**246.00**	60193	**356.00**
13	60111	**114.00**	60145	**246.00**	60178	**356.00**	60128	**114.00**	60162	**246.00**	60194	**356.00**
15	60112	**114.00**	60146	**246.00**	60179	**356.00**	60129	**114.00**	60163	**246.00**	60195	**356.00**
20	60113	**114.00**	60147	**246.00**	60180	**356.00**	60130	**114.00**	60164	**246.00**	60196	**356.00**
25	60114	**114.00**	60148	**246.00**	60181	**356.00**	60131	**114.00**	60165	**246.00**	60197	**356.00**
30	60115	**120.00**	60149	**257.00**	60182	**372.00**	60132	**120.00**	60166	**257.00**	60198	**372.00**
35	60116	**120.00**	60150	**257.00**	60183	**372.00**	60133	**120.00**	60167	**257.00**	60199	**372.00**
Ring Tongue/Ring Tongue												
0.5	60200	**131.00**	60234	**282.00**	—	—	60217	**131.00**	60251	**282.00**	—	—
1	60201	**131.00**	60235	**282.00**	60268	**410.00**	60218	**131.00**	60252	**282.00**	60284	**410.00**
1.5	60202	**131.00**	60236	**282.00**	60269	**410.00**	60219	**131.00**	60253	**282.00**	60285	**410.00**
2	60203	**131.00**	60237	**282.00**	60270	**410.00**	60220	**131.00**	60254	**282.00**	60286	**410.00**
3	60204	**131.00**	60238	**282.00**	60271	**410.00**	60221	**131.00**	60255	**282.00**	60287	**410.00**
4	60205	**131.00**	60239	**282.00**	60272	**410.00**	60222	**131.00**	60256	**282.00**	60288	**410.00**
5	60206	**131.00**	60240	**282.00**	60273	**410.00**	60223	**131.00**	60257	**282.00**	60289	**410.00**
6	60207	**122.00**	60241	**261.00**	60274	**378.00**	60224	**122.00**	60258	**261.00**	60290	**378.00**
7	60208	**122.00**	60242	**261.00**	60275	**378.00**	60225	**122.00**	60259	**261.00**	60291	**378.00**
8	60209	**122.00**	60243	**261.00**	60276	**378.00**	60226	**122.00**	60260	**261.00**	60292	**378.00**
10	60210	**122.00**	60244	**261.00**	60277	**378.00**	60227	**122.00**	60261	**261.00**	60293	**378.00**
13	60211	**122.00**	60245	**261.00**	60278	**378.00**	60228	**122.00**	60262	**261.00**	60294	**378.00**
15	60212	**122.00**	60246	**261.00**	60279	**378.00**	60229	**122.00**	60263	**261.00**	60295	**378.00**
20	60213	**122.00**	60247	**261.00**	60280	**378.00**	60230	**122.00**	60264	**261.00**	60296	**378.00**
25	60214	**122.00**	60248	**261.00**	60281	**378.00**	60231	**122.00**	60265	**261.00**	60297	**378.00**
30	60215	**126.00**	60249	**273.00**	60282	**395.00**	60232	**126.00**	60266	**273.00**	60298	**395.00**
35	60216	**126.00**	60250	**273.00**	60283	**395.00**	60233	**126.00**	60267	**273.00**	60299	**395.00**

▲ 1P dual rated 120 Vac/60 Vdc.
■ 2P dual rated 240 Vac/125 Vdc.

Interrupting ratings . . . . . Page 7-3
Accessories . . . . . Page 7-20
Dimensions. . . . . Page 7-54
Mounting Bases . . . . . Page 7-13
DIN Mounting Rail . . . . . Section 18

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Multi 9 C60 UL 489 Listed 480V Miniature Circuit Breakers

- UL 489 Listed, CSA C22.2 No. 5.1; Also IEC 60947-2; CE marked
- 480Y/277 Vac @ 10 kA (2P and 3P), 277 Vac @ 10 kA (1P)
- 0.5 A through 20 A
- 1P, 2P, 3P, 18 mm wide per pole

1P
UL489 C60

Trip Curve	Use	Magnetic Release
C	For typical loads	7–10 x ampere rating (7–14 for DC)
D	For high inrush	10–14 x ampere rating

- UL 486B Listed single-barrel lug: (2) 18–10 AWG (1-25 mm^2) cables, Cu only
- Optional ring tongue terminals
- A wide range of electrical and mechanical accessories
- Suitable for reverse feeding
- Trip-free mechanism
- Positive indication of contact disconnect

2P
UL489 C60

3P
UL489 C60

Table 7.28: UL 489 Circuit Breakers (480Y/277 Vac)

Rating (A)	C Curve—7–10 Times Ampere Rating (7–14 DC)						D Curve—10–14 Times Ampere Rating					
	1P		2P		3P		1P		2P		3P	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Single-Barrel Wire Lug												
0.5	MGN61300	**168.00**	—	—	—	—	MGN61333	**168.00**	—	—	—	—
1	MGN61301	**168.00**	MGN61312	**357.00**	MGN61323	**519.00**	MGN61334	**168.00**	MGN61345	**357.00**	MGN61356	**519.00**
2	MGN61302	**168.00**	MGN61313	**357.00**	MGN61324	**519.00**	MGN61335	**168.00**	MGN61346	**357.00**	MGN61357	**519.00**
3	MGN61303	**168.00**	MGN61314	**357.00**	MGN61325	**519.00**	MGN61336	**168.00**	MGN61347	**357.00**	MGN61358	**519.00**
4	MGN61304	**168.00**	MGN61315	**357.00**	MGN61326	**519.00**	MGN61337	**168.00**	MGN61348	**357.00**	MGN61359	**519.00**
5	MGN61305	**168.00**	MGN61316	**357.00**	MGN61327	**519.00**	MGN61338	**168.00**	MGN61349	**357.00**	MGN61360	**519.00**
6	MGN61306	**168.00**	MGN61317	**357.00**	MGN61328	**519.00**	MGN61339	**168.00**	MGN61350	**357.00**	MGN61361	**519.00**
8	MGN61307	**168.00**	MGN61318	**357.00**	MGN61329	**519.00**	MGN61340	**168.00**	MGN61351	**357.00**	MGN61362	**519.00**
10	MGN61308	**168.00**	MGN61319	**357.00**	MGN61330	**519.00**	MGN61341	**168.00**	MGN61352	**357.00**	MGN61363	**519.00**
15	MGN61309	**168.00**	MGN61320	**357.00**	MGN61331	**519.00**	MGN61342	**168.00**	MGN61353	**357.00**	MGN61364	**519.00**
20	MGN61310	**168.00**	MGN61321	**357.00**	MGN61332	**519.00**	MGN61343	**168.00**	MGN61354	**357.00**	MGN61365	**519.00**
Ring Tongue Terminal												
0.5	MGN61366	**168.00**	—	—	—	—	MGN61399	**168.00**	—	—	—	—
1	MGN61367	**168.00**	MGN61378	**357.00**	MGN61389	**519.00**	MGN61400	**168.00**	MGN61411	**357.00**	MGN61422	**519.00**
2	MGN61368	**168.00**	MGN61379	**357.00**	MGN61390	**519.00**	MGN61401	**168.00**	MGN61412	**357.00**	MGN61423	**519.00**
3	MGN61369	**168.00**	MGN61380	**357.00**	MGN61391	**519.00**	MGN61402	**168.00**	MGN61413	**357.00**	MGN61424	**519.00**
4	MGN61370	**168.00**	MGN61381	**357.00**	MGN61392	**519.00**	MGN61403	**168.00**	MGN61414	**357.00**	MGN61425	**519.00**
5	MGN61371	**168.00**	MGN61382	**357.00**	MGN61393	**519.00**	MGN61404	**168.00**	MGN61415	**357.00**	MGN61426	**519.00**
6	MGN61372	**168.00**	MGN61383	**357.00**	MGN61394	**519.00**	MGN61405	**168.00**	MGN61416	**357.00**	MGN61427	**519.00**
8	MGN61373	**168.00**	MGN61384	**357.00**	MGN61395	**519.00**	MGN61406	**168.00**	MGN61417	**357.00**	MGN61428	**519.00**
10	MGN61374	**168.00**	MGN61385	**357.00**	MGN61396	**519.00**	MGN61407	**168.00**	MGN61418	**357.00**	MGN61429	**519.00**
15	MGN61375	**168.00**	MGN61386	**357.00**	MGN61397	**519.00**	MGN61408	**168.00**	MGN61419	**357.00**	MGN61430	**519.00**
20	MGN61376	**168.00**	MGN61387	**357.00**	MGN61398	**519.00**	MGN61409	**168.00**	MGN61420	**357.00**	MGN61431	**519.00**

Multi 9 C60 UL 489A Listed Miniature Circuit Breakers for DC Telecommunication Applications

A limited range of C60 products are UL Listed as UL 489A circuit breakers for protection of DC telecommunications circuits.

Table 7.29: UL 489A Circuit Breakers for DC Telecommunications Applications (1P, 2 Modules, C curve)

Rating (A)	Cat. No.	$ Price	Rating (A)	Cat. No.	$ Price
0.5	60406	**120.00**	10	60414	**101.00**
1	60407	**101.00**	13	60415	**101.00**
2	60408	**101.00**	15	60416	**101.00**
3	60409	**101.00**	20	60417	**101.00**
4	60410	**101.00**	30	60418	**101.00**
5	60411	**101.00**	40	60419	**111.00**
6	60412	**101.00**	50	60420	**117.00**
8	60413	**101.00**	60	60421	**123.00**

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1P C60H-DC

2P C60H-DC

Multi 9 C60H-DC UL 1077 Recognized Supplementary Protectors (250 and 500 Vdc)

The C60H-DC supplementary protectors are used in direct current circuits (industrial control and automation, transport, renewable energy, etc.). They provide overcurrent protection within appliances or electrical equipment.

- Range from 0.5–40 A
- 5 k AIR at 250 Vdc (1-pole) and 5 k AIR at 500 Vdc (2-pole, wired in series)
- Trip-free mechanism
- Positive indication of contact disconnect
- C-Curve: 7 to14 times ampere rating
- UL 1077, IEC 60947-2, EN 60947-2, GB 14048.2, CCC and CE mark

Table 7.30: Multi 9 C60H-DC UL 1077 Recognized Supplementary Protectors

	1-Pole 24–250 Vdc		2-Pole 24–500 Vdc	
Current (A)▲	Cat. No.	$ Price	Cat. No.	$ Price
0.5	MGN61500	**182.00**	MGN61520	**392.00**
1	MGN61501	**182.00**	MGN61521	**392.00**
2	MGN61502	**182.00**	MGN61522	**392.00**
3	MGN61503	**182.00**	MGN61523	**392.00**
4	MGN61504	**182.00**	MGN61524	**392.00**
5	MGN61505	**182.00**	MGN61525	**392.00**
6	MGN61506	**182.00**	MGN61526	**392.00**
10	MGN61508	**182.00**	MGN61528	**392.00**
13	MGN61509	**182.00**	MGN61529	**392.00**
15	MGN61510	**182.00**	MGN61530	**392.00**
16	MGN61511	**182.00**	MGN61531	**392.00**
20	MGN61512	**182.00**	MGN61532	**392.00**
25	MGN61513	**182.00**	MGN61533	**392.00**
30	MGN61514	**182.00**	MGN61534	**392.00**
32	MGN61515	**182.00**	MGN61535	**392.00**
40	MGN61517	**200.00**	MGN61537	**412.00**

▲ At 25°C/77°F, for other temperatures see temperature derating table in Multi 9 Catalog 0860CT0201R1/08

2P GFP

4P GFP (3- or 4-wire)

Multi 9 UL1053 Listed GFP Ground Fault Protectors

- Provides ground fault protection for electrical circuits.
- Available in 2P (2-wire) and 4P (3- or 4-wire) versions
- Provides no thermal or magnetic protection. The circuit must be protected by an upstream device.
- Contains Si Technology to increase immunity to noise and to minimize the potential for nuisance tripping in noisy electrical environments.
- Tripped condition due to a ground fault is displayed on the front face by a red mechanical indicator.
- DIN rail mounting for easy installation.

Table 7.31: Multi 9 UL 1053 Listed GFP Ground Fault Protectors

				2P				4P	
				UL1053 120/240 Vac, 240 Vac, 60 Hz IEC 61008 230 Vac, 240 Vac, 50 Hz		UL1053 277 Vac, 480Y/277 Vac, 60 Hz IEC 61008 230/400 Vac, 240/415 Vac, 50 Hz		UL1053 240 Vac, 480Y/277 Vac, 60 Hz IEC 61008 230/400 Vac, 240/415 Vac, 50 Hz	
Current (A)	Maximum Sensitivity (mA)	Tripping Range	Family	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
25	30	22.1 to 29.9 mA	GFP 30	60949	**633.00**	60969	**696.00**	60989	**720.00**
	100	73.1 to 98.9 mA	GFP 100	60950	**570.00**	60970	**627.00**	60990	**648.00**
	300	221 to 299 mA	GFP 300	60951	**444.00**	60971	**488.00**	60991	**504.00**
40	30	22.1 to 29.9 mA	GFP 30	60952	**666.00**	60972	**734.00**	60992	**758.00**
	100	73.1 to 98.9 mA	GFP 100	60953	**600.00**	60973	**660.00**	60993	**683.00**
	300	221 to 299 mA	GFP 300	60954	**467.00**	60974	**513.00**	60994	**531.00**
63	30	22.1 to 29.9 mA	GFP 30	60955	**1001.00**	60975	**1100.00**	60995	**1136.00**
	100	73.1 to 98.9 mA	GFP 100	60956	**900.00**	60976	**990.00**	60996	**1023.00**
	300	221 to 299 mA	GFP 300	60957	**701.00**	60977	**770.00**	60997	**795.00**
80	300	221 to 299 mA	GFP 300	60958	**933.00**	60978	**1026.00**	60998	**1272.00**
100	300	221 to 299 mA	GFP 300	60959	**1097.00**	60979	**1206.00**	60999	**1496.00**

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Multi 9™ Miniature Circuit Breakers

Intended for use within equipment where branch circuit protection is already provided or not needed

- Range from 0.5 to 63 A
- 10 k AIR @ 120/240 Vac; 5 k AIR at 480Y/277; 10 k AIR @ 60 Vdc (1P) and 125 Vdc (2P)
- Suitable for reverse feeding
- DIN mounting for easy installation
- Suitable for reverse feeding
- A wide range of electrical and mechanical accessories
- Trip-free mechanism
- Positive indication of contact disconnect

Trip Curve	Use	Magnetic Release
B	For sensitive equipment	3.2–4.8 x ampere rating
C	For typical loads	7–10 x ampere rating (7–14 for DC)
D	For high inrush	10–14 x ampere rating

1P
UL 1077 C60

2P
UL 1077 C60

3P
UL 1077 C60

4P
UL 1077 C60

Table 7.32: UL 1077 Supplementary Protectors

Rating (A)	1P	$ Price	2P	$ Price	3P	$ Price	4P	$ Price
B Curve—Magnetic Setting Between 3.2 and 4.8 Times Ampere Rating								
1	MG24110	**101.00**	MG24125	**218.00**	MG24140	**315.00**	MG24155	**416.00**
1.2	MG17402	**101.00**	MG17432	**218.00**	—	—	—	—
1.5	MG17403	**101.00**	MG17433	**218.00**	—	—	—	—
2	MG24111	**101.00**	MG24126	**218.00**	MG24141	**315.00**	MG24156	**416.00**
3	MG24112	**101.00**	MG24127	**218.00**	MG24142	**315.00**	MG24157	**416.00**
4	MG24113	**101.00**	MG24128	**218.00**	MG24143	**315.00**	MG24158	**416.00**
5	MG17404	**101.00**	MG17434	**218.00**	—	—	—	—
6	MG24114	**101.00**	MG24129	**218.00**	MG24144	**315.00**	MG24159	**416.00**
7	MG17405	**101.00**	MG17435	**218.00**	—	—	—	—
8	MG24115	**101.00**	MG24130	**218.00**	MG24145	**315.00**	MG24160	**416.00**
10	MG24116	**101.00**	MG24131	**218.00**	MG24146	**315.00**	MG24161	**416.00**
13	MG24117	**101.00**	MG24132	**218.00**	MG24147	**315.00**	MG24162	**416.00**
15	MG17406	**101.00**	MG17436	**218.00**	MG17461	**315.00**	—	—
16	MG24118	**101.00**	MG24133	**218.00**	MG24148	**315.00**	MG24163	**416.00**
20	MG24119	**101.00**	MG24134	**218.00**	MG24149	**315.00**	MG24164	**416.00**
25	MG24120	**101.00**	MG24135	**218.00**	MG24150	**315.00**	MG24165	**416.00**
30	MG17407	**101.00**	MG17437	**218.00**	MG17462	**315.00**	—	—
32	MG24121	**101.00**	MG24136	**218.00**	MG24151	**315.00**	MG24166	**416.00**
35	MG17408	**101.00**	MG17438	**218.00**	MG17463	**315.00**	—	—
40	MG24122	**111.00**	MG24137	**224.00**	MG24152	**324.00**	MG24167	**420.00**
50	MG24123	**117.00**	MG24138	**240.00**	MG24153	**338.00**	MG24168	**438.00**
60	MG17409	**123.00**	MG17439	**252.00**	MG17464	**353.00**	—	—
63	MG24124	**123.00**	MG24139	**252.00**	MG24154	**353.00**	MG24169	**450.00**
C Curve—Magnetic Setting Between 7 and 10 Times Ampere Rating								
0.5	MG17411	**120.00**	—	—	—	—	—	—
1	MG24425	**101.00**	MG24442	**218.00**	MG24459	**315.00**	MG24476	**416.00**
1.2	MG17412	**101.00**	MG17442	**218.00**	—	—	—	—
1.5	MG17413	**101.00**	MG17443	**218.00**	—	—	—	—
2	MG24426	**101.00**	MG24443	**218.00**	MG24460	**315.00**	MG24477	**416.00**
3	MG24427	**101.00**	MG24444	**218.00**	MG24461	**315.00**	MG24478	**416.00**
4	MG24428	**101.00**	MG24445	**218.00**	MG24462	**315.00**	MG24479	**416.00**
5	MG17414	**101.00**	MG17444	**218.00**	—	—	—	—
6	MG24430	**101.00**	MG24447	**218.00**	MG24464	**315.00**	MG24481	**416.00**
7	MG17415	**101.00**	MG17445	**218.00**	—	—	—	—
8	MG24431	**101.00**	MG24448	**218.00**	MG24465	**315.00**	MG24482	**416.00**
10	MG24432	**101.00**	MG24449	**218.00**	MG24466	**315.00**	MG24483	**416.00**
13	MG24433	**101.00**	MG24450	**218.00**	MG24467	**315.00**	MG24484	**416.00**
15	MG17416	**101.00**	MG17446	**218.00**	MG17466	**315.00**	—	—
16	MG24434	**101.00**	MG24451	**218.00**	MG24468	**315.00**	MG24485	**416.00**
20	MG24435	**101.00**	MG24452	**218.00**	MG24469	**315.00**	MG24486	**416.00**
25	MG24436	**101.00**	MG24453	**218.00**	MG24470	**315.00**	MG24487	**416.00**
30	MG17417	**101.00**	MG17447	**218.00**	MG17467	**315.00**	—	—
32	MG24437	**101.00**	MG24454	**218.00**	MG24471	**315.00**	MG24488	**416.00**
35	MG17418	**101.00**	MG17448	**218.00**	MG17468	**315.00**	—	—
40	MG24438	**111.00**	MG24455	**224.00**	MG24472	**324.00**	MG24489	**420.00**
50	MG24439	**117.00**	MG24456	**240.00**	MG24473	**338.00**	MG24490	**438.00**
60	MG17419	**123.00**	MG17449	**252.00**	MG17469	**353.00**	—	—
63	MG24440	**123.00**	MG24457	**252.00**	MG24474	**353.00**	MG24491	**450.00**
D Curve—Magnetic Setting Between 10 and 14 Times Ampere Rating								
0.5	MG17421	**120.00**	—	—	—	—	—	—
1	MG24500	**101.00**	MG24516	**218.00**	MG24532	**315.00**	MG24548	**416.00**
1.2	MG17422	**101.00**	MG17452	**218.00**	—	—	—	—
1.5	MG17423	**101.00**	MG17453	**218.00**	—	—	—	—
2	MG24501	**101.00**	MG24517	**218.00**	MG24533	**315.00**	MG24549	**416.00**
3	MG24502	**101.00**	MG24518	**218.00**	MG24534	**315.00**	MG24550	**416.00**
4	MG24503	**101.00**	MG24519	**218.00**	MG24535	**315.00**	MG24551	**416.00**
5	MG17424	**101.00**	MG17454	**218.00**	—	—	—	—
6	MG24504	**101.00**	MG24520	**218.00**	MG24536	**315.00**	MG24552	**416.00**
7	MG17425	**101.00**	MG17455	**218.00**	—	—	—	—
8	MG24505	**101.00**	MG24521	**218.00**	MG24537	**315.00**	MG24553	**416.00**
10	MG24506	**101.00**	MG24522	**218.00**	MG24538	**315.00**	MG24554	**416.00**
13	MG24507	**101.00**	MG24523	**218.00**	MG24539	**315.00**	MG24555	**416.00**
15	MG17426	**101.00**	MG17456	**218.00**	MG17471	**315.00**	—	—
16	MG24508	**101.00**	MG24524	**218.00**	MG24540	**315.00**	MG24556	**416.00**
20	MG24509	**101.00**	MG24525	**218.00**	MG24541	**315.00**	MG24557	**416.00**
25	MG24510	**101.00**	MG24526	**218.00**	MG24542	**315.00**	MG24558	**416.00**
30	MG17427	**101.00**	MG17457	**218.00**	MG17472	**315.00**	—	—
32	MG24511	**101.00**	MG24527	**218.00**	MG24543	**315.00**	MG24559	**416.00**
35	MG17428	**101.00**	MG17458	**218.00**	MG17473	**315.00**	—	—
40	MG24512	**111.00**	MG24528	**224.00**	MG24544	**324.00**	MG24560	**420.00**
50	MG24513	**117.00**	MG24529	**240.00**	MG24545	**338.00**	MG24561	**438.00**
60	MG17429	**123.00**	MG17459	**252.00**	MG17474	**353.00**	—	—
63	MG24514	**123.00**	MG24530	**252.00**	MG24546	**353.00**	MG24562	**450.00**

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Electrical Accessories for C60 Circuit Breakers and Supplementary Protectors

Ring Tongue Terminal Kit

Spacer

Terminal Screw Shield

C60 Padlock Attachment

Heavy-duty Padlock Attachment

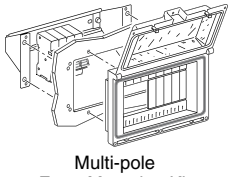
Rotary Handle

Label Holders for 2, 3 or 4P C60

Front Mounting Kit for C60 1P, 2P, 3P, 4P (1 per circuit breaker)

MGN26380 Locking Device Left Side Mount

MGN26381 Locking Device Right Side Mount



Multi-pole Front Mounting Kit

Comb Bus Bar

Possible Combinations

Mounted to the left of the circuit breaker with a maximum width of 54 mm.

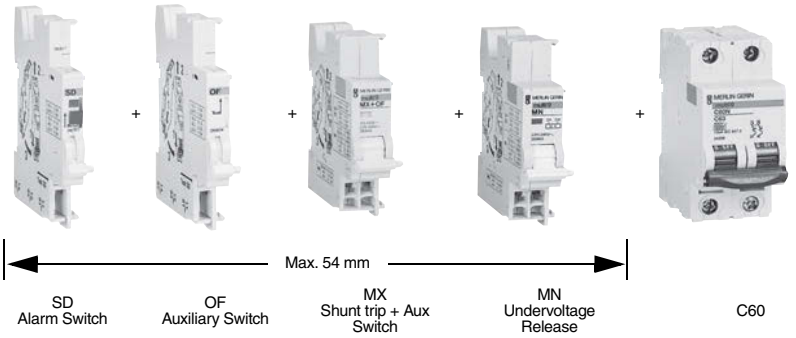


Table 7.33: Multi 9 C60 Electrical Accessories

Descriptions	Control Voltage		Width in 9 mm modules	C60 UL/IEC	
	Vac	Vdc		Cat. No.	$ Price
OF Auxiliary Switch (1a1b)	12–277	12–125	1	MG26925	**60.00**
SD Alarm Switch (1a1b)	12–277	12–125	1	MG26928	**60.00**
MX Shunt Trip + OF Auxiliary Switch (1a1b)	24	24	2	27118	**140.00**
	48	48	2	27110	
	110–240–277	125	2	27109	
MN Undervoltage Release	24	24	2	27108	**201.00**
	48	48	2	27106	
	120	—	2	27107	
	240	—	2	27105	
Multi-9 GFP UL 1053 Listed Ground Fault Protectors	120 to 480Y/277 Vac; 30, 100, and 300 mA; 2P and 4Ps. See page 7-18 Handout, **0860HO0602** or Catalog **0860CT0201**				

Table 7.34: Multi 9 C60 Mechanical Accessories

Descriptions		C60	
		Cat. No.	$ Price
Ring tongue terminal kit for UL1077 C60	For one pole	17400	**15.80**
Spacer for DIN rail, Not UL Recognized	9 mm wide	MG27062	**9.30**
Padlock Attachment (1 per for 1P, 2P, 3P or 4P)	2 per pack	MG26970	**33.20**
Heavy-duty Padlock Attachment for C60, Locks OFF only	2 per pack	M9PAF	**60.00**
Padlocking Device Left Side Mount, Locks OFF only▲	1 per pack	MGN26380	**37.50**
Padlocking Device Right Side Mount, Locks OFF only■		MGN26381	**37.50**
Front Mounting Kit	1P	MG26983	**16.80**
	2P	MG26984	**16.80**
	3P	MG26985	**16.80**
	4P	MG26989	**16.80**
Label holders for 2, 3 or 4P C60 (Not UL Recognized)	Bag of 10	MG27150	**51.00**
Terminal Screw Shield (Not UL Recognized)	Bag of two 4P shields	MG26981	**51.00**
Terminal cover (Not UL Recognized)	1P	MG26975	**26.10**
	2P	MG26976	**51.00**
	3P	MG26975+MG26976	
	4P	MG26978	**102.00**
Comb Bus Bar Kit for UL1077 C60, 12 poles, Fixed Length	1Ø	MG10285	**63.00**
	2Ø	MG10286	**69.00**
	3 Ø	MG10287	**80.00**
Tooth Caps for UL Comb Bus Bar, Bag of 20		60488	**37.80**
Rotary Handle for C60 (Non UL Recognized)			
Operating Subassembly	2P/3P/4P	MG27046	**129.00**
Door Interlock Handle		MG27047	**107.00**
Fixed Handle (Front or Lateral)		MG27048	**117.00**
Multi-pole Front Mounting Kit			
Rail Support (20 of 9 mm modules)		14211	**54.00**
Hinged Transparent Cover		14210	**158.00**

▲ Left-side mounted padlocking device cannot be used in conjunction with accessories SD, OF, MX or MN. Use right-side mounted padlocking device when accessories are required.

■ Right-side mounted padlocking device cannot be used in conjunction with VIGI module. Use left-side mounted padlocking device when VIGI Module is required..

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The PowerPact Advantage

- **Proven Performance:** Industry-leading circuit breaker innovation and protection for heavy-duty commercial and industrial applications.
- **Smart**: Integrated metering options provide a cost-effective solution to reduce energy consumption, optimize energy costs, and improve energy availablility for your facilities.
- **Flexible:** Full range of thermal-magnetic and electronic trip molded case circuit breakers from 15 A to 3000 A, delivering the ratings, configurations, and operators for your unique applications.
- **Simple:** Common catalog numbers, standardized ratings, and a full range of field-installable accessories make product selection, installation and maintenance easier than ever.
- **Common Design Features:** Mounting holes, door trim, and handle accessories

H-Frame 150 A	J-Frame 250 A	Q-Frame 250 A	L-Frame 600 A	M-Frame 800 A	P-Frame 1200 A	R-Frame 3000 A
New! Electronic Trip Version	New! Electronic Trip Version		New!			

Table 7.35: PowerPact Interrupting Ratings

Voltage	Interrupting Rating						
	B	D	G	J	K	L	R
240 Vac	10 kA	25 kA	65 kA	100 kA	65 kA	125 kA	200 kA
480 Vac		18 kA	35 kA	65 kA	65 kA ▲	100 kA	200 kA
600 Vac		14 kA	18 kA	25 kA	65 kA ▲	50 kA■	100 kA

▲ P-frame K interrupting is 50 kA at 480 and 600 Vac.
■ P-frame L interrupting is 25 kA at 600 Vac.

Table 7.36: Common Catalog Numbering System

Frame	Rating	Termination	Poles	Voltage	Amperage ♦			Suffix Code		Suffix Code	
H	G	L	3	6	1	5	0	A	B	S	A

110 Vac Shunt Trip
2A/2B Auxiliary Switch

Frame Designation
H 150 A Frame
J 250 A Frame
Q 250 A Frame
L 600 A Frame
M 800 A Frame
P 1200 A Frame
R 3000 A Frame

Interrupting Rating			
	240 Vac	480 Vac	600Vac
B	10 kA		
D	25 kA	18 kA	14 kA
G	65 kA	35 kA	18 kA
J	100 kA	65 kA	25 kA
K	65 kA	65 kA	65 kA
L	125 kA	100 kA	50 kA
R	200 kA	200 kA	100 kA

Terminations
A I-Line
L Lugs on Both Ends
F Bus Bar (No Lugs)
M Lugs Line Side Only
P Lugs Load End Only
N Plug-in
D Drawout
S Rear Connected Studs

♦ For amperage of M-, P- or R-frame circuit breakers, add a zero to the three amperage digits; for example, 120 = 1200 A.

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HD and HG 2P
Thermal-Magnetic Trip Unit
(2P HJ, HL in 3P module)

H-Frame
Thermal-Magnetic Trip Unit

New!

Table 7.37: H-Frame 150 A Thermal-Magnetic UL Current-Limiting★ Circuit Breakers(600 Vac, 250 Vdc) With Factory Sealed Trip Unit Suitable for Reverse Connection▲

Current Rating @ 40°C	Fixed AC Magnetic Trip		Cat. No.■♦	Interrupting Rating (2nd Letter of Catalog Number)								Terminal Wire Range
				D		G		J★		L★		
				$ Price								
	Hold	Trip		80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
H-Frame, 150A 2P, 600 Vac 50/60 Hz, 250 Vdc												
15 A	350 A	750 A	H( )L26015(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )L26020(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
25 A	350 A	750 A	H( )L26025(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
30 A	350 A	750 A	H( )L26030(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
35 A	400 A	850 A	H( )L26035(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
40 A	400 A	850 A	H( )L26040(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
45 A	400 A	850 A	H( )L26045(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
50 A	400 A	850 A	H( )L26050(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
60 A	800 A	1450 A	H( )L26060(C)	**870.00**	**1044.00**	**1269.00**	**1523.00**	**1559.00**	**1871.00**	**2364.00**	**2837.00**	
70 A	800 A	1450 A	H( )L26070(C)	**1062.00**	**1274.00**	**1497.00**	**1797.00**	**1721.00**	**2066.00**	**2613.00**	**3137.00**	
80 A	800 A	1450 A	H( )L26080(C)	**1062.00**	**1274.00**	**1497.00**	**1797.00**	**1721.00**	**2066.00**	**2613.00**	**3137.00**	
90 A	800 A	1450 A	H( )L26090(C)	**1062.00**	**1274.00**	**1497.00**	**1797.00**	**1721.00**	**2066.00**	**2613.00**	**3137.00**	
100 A	800 A	1700 A	H( )L26100(C)	**1062.00**	**1274.00**	**1497.00**	**1797.00**	**1721.00**	**2066.00**	**2613.00**	**3137.00**	
110 A	900 A	1700 A	H( )L26110(C)	**2072.00**	**2486.00**	**3059.00**	**3671.00**	**4449.00**	**5339.00**	**5534.00**	**6641.00**	
125 A	900 A	1700 A	H( )L26125(C)	**2072.00**	**2486.00**	**3059.00**	**3671.00**	**4449.00**	**5339.00**	**5534.00**	**6641.00**	
150 A	900 A	1700 A	H( )L26150(C)	**2072.00**	**2486.00**	**3059.00**	**3671.00**	**4449.00**	**5339.00**	**5534.00**	**6641.00**	
H-Frame 150A 3P, 600 Vac 50/60 Hz, 250 Vdc												
15 A	350 A	750 A	H( )L36015(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )L36020(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
25 A	350 A	750 A	H( )L36025(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
30 A	350 A	750 A	H( )L36030(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
35 A	400 A	850 A	H( )L36035(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
40 A	400 A	850 A	H( )L36040(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
45 A	400 A	850 A	H( )L36045(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
50 A	400 A	850 A	H( )L36050(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
60 A	800 A	1450 A	H( )L36060(C)	**1088.00**	**1305.00**	**1493.00**	**1791.00**	**1949.00**	**2339.00**	**2849.00**	**3419.00**	
70 A	800 A	1450 A	H( )L36070(C)	**1328.00**	**1592.00**	**1701.00**	**2042.00**	**2099.00**	**2519.00**	**3149.00**	**3779.00**	
80 A	800 A	1450 A	H( )L36080(C)	**1328.00**	**1592.00**	**1701.00**	**2042.00**	**2099.00**	**2519.00**	**3149.00**	**3779.00**	
90 A	800 A	1450 A	H( )L36090(C)	**1328.00**	**1592.00**	**1701.00**	**2042.00**	**2099.00**	**2519.00**	**3149.00**	**3779.00**	
100 A	800 A	1700 A	H( )L36100(C)	**1328.00**	**1592.00**	**1701.00**	**2042.00**	**2099.00**	**2519.00**	**3149.00**	**3779.00**	
110 A	900 A	1700 A	H( )L36110(C)	**2600.00**	**3120.00**	**3599.00**	**4319.00**	**5174.00**	**6209.00**	**6749.00**	**8099.00**	
125 A	900 A	1700 A	H( )L36125(C)	**2600.00**	**3120.00**	**3599.00**	**4319.00**	**5174.00**	**6209.00**	**6749.00**	**8099.00**	
150 A	900 A	1700 A	H( )L36150(C)	**2600.00**	**3120.00**	**3599.00**	**4319.00**	**5174.00**	**6209.00**	**6749.00**	**8099.00**	

New!

Table 7.38: J-Frame 250 A Thermal-Magnetic UL Current-Limiting★ Circuit Breakers (600 Vac, 250 Vdc) With Factory Sealed Trip Unit Suitable for Reverse Connection▲

Current Rating @ 40°C	Adjustable AC Magnetic Trip		Cat. No.■♦	Interrupting Rating (2nd Letter of Catalog Number)										Terminal Wire Range
				D		G		J★		L★		R★		
				$ Price										
	Low	High		80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
J-Frame 250A 2P, 600 Vac 50/60 Hz, 250 Vdc														
150 A	750 A	1500 A	J( )L26150(C)	**2175.00**	**2610.00**	**3212.00**	**3854.00**	**4671.00**	**5606.00**	**5811.00**	**6972.00**	—	—	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )L26175(C)	**2175.00**	**2610.00**	**3212.00**	**3854.00**	**4671.00**	**5606.00**	**5811.00**	**6972.00**	—	—	
200 A	1000 A	2000 A	J( )L26200(C)	**2175.00**	**2610.00**	**3212.00**	**3854.00**	**4671.00**	**5606.00**	**5811.00**	**6972.00**	—	—	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )L26225(C)	**2175.00**	**2610.00**	**3212.00**	**3854.00**	**4671.00**	**5606.00**	**5811.00**	**6972.00**	—	—	
250 A	1250 A	2500 A	J( )L26250(C)	**2988.00**	**3585.00**	**4251.00**	**5102.00**	**6225.00**	**7469.00**	**7194.00**	**8633.00**	—	—	
J-Frame 250A 3P, 600 Vac 50/60 Hz, 250 Vdc														
150 A	750 A	1500 A	J( )L36150(C)	**2730.00**	**3276.00**	**3779.00**	**4535.00**	**5432.00**	**6519.00**	**7086.00**	**8504.00**	**9212.00**	**11055.00**	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )L36175(C)	**2730.00**	**3276.00**	**3779.00**	**4535.00**	**5432.00**	**6519.00**	**7086.00**	**8504.00**	**9212.00**	**11055.00**	
200 A	1000 A	2000 A	J( )L36200(C)	**2730.00**	**3276.00**	**3779.00**	**4535.00**	**5432.00**	**6519.00**	**7086.00**	**8504.00**	**9212.00**	**11055.00**	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )L36225(C)	**2730.00**	**3276.00**	**3779.00**	**4535.00**	**5432.00**	**6519.00**	**7086.00**	**8504.00**	**9212.00**	**11055.00**	
250 A	1250 A	2500 A	J( )L36250(C)	**3749.00**	**4499.00**	**5001.00**	**6002.00**	**7238.00**	**8685.00**	**8993.00**	**10791.00**	**11169.00**	**13402.00**	

▲ See Supplemental Digest pages 3-2 and 3-3 for circuit breakers with field interchangeable trip units.
■ To complete catalog number, replace the blank with the appropriate rating (D, G, J, L).
♦ For 100% rated circuit breakers add a "C" in the 9th character place (for example, HDL26015**C** or JDL26150**C**).
100% rated H- and J-frame circuit breakers have copper lugs and can only be used with copper wire.
★ Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting..

Table 7.39: H- and J-Frame Termination Options

Termination Letter
A = I-Line (See Section 9)
F = No Lugs (includes terminal nut kit on both ends)
L = Lugs both ends
M = Lugs ON end Terminal Nut Kit OFF end
P = Lugs OFF end Terminal Nut Kit ON end
N = Plug-in ▼
D = Drawout ▼
S = Rear Connected ▼

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

H G L 3 6 1 0 0
└ Termination Letter

Plug-in

Drawout

Rear Connected

▼ For N and D pricing, add termination pricing on page 7-45 to price. For S pricing, add termination pricing on page 7-41 to price.

Table 7.40: H- and J-Frame Interrupting Ratings

Voltage	Interrupting Rating				
	D	G	J	L	R
240 Vac	25 kA	65 kA	100 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA	100 kA

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New! Electronic Trip Version

Table 7.41: H-Frame 150 A and J-Frame 250 A Electronic Trip UL Current-Limiting▲ Circuit Breakers (600 Vac) With Factory Sealed Trip Unit■ Suitable for Reverse Connection □

Electronic Trip Unit			Sensor Rating	Cat. No.♦	Interrupting Rating (2nd Letter of Catalog Number)										Terminal
					D		G		J▲		L▲		R▲		
					$ Price										
Type	Function	Trip Unit			80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
600 Vac, 50/60 Hz, 3P															
Micrologic Standard	LI	3.2△	60 A 100 A 150 A	H( )L36060(C)U31X H( )L36100(C)U31X H( )L36150(C)U31X	1247.00 1487.00 2759.00	1455.00 1735.00 3220.00	1652.00 1860.00 3758.00	1928.00 2171.00 4386.00	2108.00 2258.00 5333.00	2460.00 2635.00 6224.00	3008.00 3308.00 6908.00	3510.00 3860.00 8062.00	3971.00 4367.00 9119.00	4633.00 5095.00 10642.00	AL150HD★
			250 A	J( )L36250(C)U31X	2957.00	3451.00	4006.00	4675.00	5659.00	6604.00	7313.00	8534.00	9653.00	11265.00	AL250JD▼
Micrologic Standard	LSI	3.2S△	60 A 100 A 150 A	H( )L36060(C)U33X H( )L36100(C)U33X H( )L36150(C)U33X	1433.00 1673.00 2945.00	1641.00 1921.00 3405.00	1838.00 2046.00 3944.00	2113.00 2356.00 4571.00	2294.00 2444.00 5519.00	2646.00 2821.00 6409.00	3194.00 3494.00 7094.00	3696.00 4046.00 8247.00	4216.00 4612.00 9364.00	4879.00 5341.00 10886.00	AL150HD★
			250 A	J( )L36250(C)U33X	3221.00	3715.00	4270.00	4939.00	5923.00	6868.00	7577.00	8798.00	10002.00	11613.00	AL250JD▼
Micrologic Ammeter	LSI	5.2A	60 A 100 A 150 A	H( )L36060(C)U43X H( )L36100(C)U43X H( )L36150(C)U43X	2031.00 2271.00 3543.00	2240.00 2520.00 4004.00	2436.00 2644.00 4542.00	2712.00 2955.00 5170.00	2892.00 3042.00 6117.00	3244.00 3419.00 7008.00	3792.00 4092.00 7692.00	4295.00 4645.00 8846.00	5005.00 5401.00 10153.00	5669.00 6131.00 11677.00	AL150HD★
			250 A	J( )L36250(C)U43X	4075.00	4569.00	5124.00	5793.00	6777.00	7722.00	8431.00	9653.00	11129.00	12742.00	AL250JD▼
Micrologic Energy	LSI	5.2E	60 A 100 A 150 A	H( )L36060(C)U53X H( )L36100(C)U53X H( )L36150(C)U53X	2391.00 2631.00 3903.00	2599.00 2879.00 4363.00	2796.00 3004.00 4902.00	3072.00 3314.00 5529.00	3252.00 3402.00 6477.00	3604.00 3779.00 7367.00	4152.00 4452.00 8052.00	4654.00 5004.00 9205.00	5481.00 5877.00 10629.00	6143.00 6605.00 12151.00	AL150HD★
			250 A	J( )L36250(C)U53X	4588.00	5082.00	5637.00	6306.00	7290.00	8235.00	8944.00	10165.00	11806.00	13418.00	AL250JD▼
Micrologic Ammeter	LSIG	6.2A	60 A 100 A 150 A	H( )L36060(C)U44X H( )L36100(C)U44X H( )L36150(C)U44X	2751.00 2991.00 4263.00	2960.00 3240.00 4724.00	3156.00 3364.00 5262.00	3432.00 3675.00 5890.00	3612.00 3762.00 6837.00	3964.00 4139.00 7728.00	4512.00 4812.00 8412.00	5015.00 5365.00 9566.00	5956.00 6352.00 11104.00	6620.00 7082.00 12627.00	AL150HD★
			250 A	J( )L36250(C)U44X	5100.00	5594.00	6149.00	6818.00	7802.00	8747.00	9456.00	10678.00	12482.00	14095.00	AL250JD▼
Micrologic Energy	LSIG	6.2E	60 A 100 A 150 A	H( )L36060(C)U54X H( )L36100(C)U54X H( )L36150(C)U54X	3111.00 3351.00 4623.00	3319.00 3599.00 5083.00	3516.00 3724.00 5622.00	3792.00 4034.00 6249.00	3972.00 4122.00 7197.00	4324.00 4499.00 8087.00	4872.00 5172.00 8772.00	5374.00 5724.00 9925.00	6431.00 6827.00 11579.00	7094.00 7556.00 13101.00	AL150HD★
			250 A	J( )L36250(C)U54X	5613.00	6107.00	6662.00	7331.00	8315.00	9260.00	9969.00	11190.00	13159.00	14771.00	AL250JD▼

▲ Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
■ See Supplemental Digest page 3-2 for circuit breakers with field-interchangeable trip units
♦ For 100% rated circuit breakers, add a "C" in the 9th character place (for example, HGL36150CU31X, JGL36250CU43X) 100% rated H- and J-frame circuit breakers have copper lugs and can only be used with copper wire.
★ AL150HD wire range is 14–3/0 AWG Al or Cu.
▼ AL250JD wire range is 3/0 AWG–350 kcmil Al or Cu. For smaller wire range (4–4/0 AWG Al or Cu), replace the lug's wire binding screws with the larger binding screws provided.
△ 3P circuit breakers with this trip unit can be used for 2P applications.
□ For applications requiring communications see page 7-49.

H-Frame
Micrologic™ Trip Unit

Table 7.42: H- and J-Frame Termination Options

Termination Letter
A - I-Line (See Section 9)
F = No Lugs (includes terminal nut kit on both ends)
L = Lugs both ends
M = Lugs ON end Terminal Nut Kit OFF end
P = Lugs OFF end Terminal Nut Kit ON end
N = Plug-in ◊
D = Drawout ◊
S = Rear Connected ◊

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

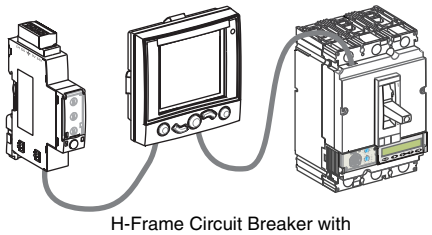
H D L 3 6 0 1 5 T
└ Termination Letter

◊ For N and D pricing, add termination pricing on page 7-45 to price. For S pricing, add termination pricing on page 7-41 to price.

J-Frame
Micrologic™ Trip Unit

Table 7.43: H- and J-Frame Interrupting Ratings

Voltage	Interrupting Rating				
	D	G	J	L	R
240 Vac	25 KA	65 kA	100 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA	100 kA



H-Frame Circuit Breaker with
Optional FDM and IFM Modules

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QBL 2P
70–250 A

QBL 3P
70–250 A

Table 7.44: PowerPact Q-Frame▲250 A Thermal-Magnetic Circuit Breaker (240 Vac)

Ampere Rating	Fixed AC Magnetic Trip		Interrupting Rating								Terminal Wire Range
			B		D		G		J		
	Hold	Trip	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	
2P, 240 Vac											
70 A	1000 A	1800 A	QBL22070	**474.00**	QDL22070	**1143.00**	QGL22070	**1521.00**	QJL22070	**1890.00**	
80 A	1000 A	1800 A	QBL22080	**474.00**	QDL22080	**1143.00**	QGL22080	**1521.00**	QJL22080	**1890.00**	
90 A	1000 A	1800 A	QBL22090	**474.00**	QDL22090	**1143.00**	QGL22090	**1521.00**	QJL22090	**1890.00**	
100 A	1200 A	2400 A	QBL22100	**474.00**	QDL22100	**1143.00**	QGL22100	**1521.00**	QJL22100	**1890.00**	
110 A	1200 A	2400 A	QBL22110	**474.00**	QDL22110	**1143.00**	QGL22110	**1521.00**	QJL22110	**1890.00**	
125 A	1200 A	2400 A	QBL22125	**474.00**	QDL22125	**1143.00**	QGL22125	**1521.00**	QJL22125	**1890.00**	#4 AWG - 300 kcmil Al/Cu
150 A	1200 A	2400 A	QBL22150	**474.00**	QDL22150	**1143.00**	QGL22150	**1521.00**	QJL22150	**1890.00**	
175 A	1200 A	2400 A	QBL22175	**474.00**	QDL22175	**1143.00**	QGL22175	**1521.00**	QJL22175	**1890.00**	
200 A	1200 A	2400 A	QBL22200	**474.00**	QDL22200	**1143.00**	QGL22200	**1521.00**	QJL22200	**1890.00**	
225 A	1200 A	2400 A	QBL22225	**474.00**	QDL22225	**1143.00**	QGL22225	**1521.00**	QJL22225	**1890.00**	
250 A■	1200 A	2400 A	QBL22250	**693.00**	QDL22250	**1544.00**	QGL22250	**1970.00**	QJL22250	**2348.00**	
3P, 240 Vac											
70 A	1000 A	1800 A	QBL32070	**1248.00**	QDL32070	**1784.00**	QGL32070	**2442.00**	QJL32070	**2796.00**	
80 A	1000 A	1800 A	QBL32080	**1248.00**	QDL32080	**1784.00**	QGL32080	**2442.00**	QJL32080	**2796.00**	
90 A	1000 A	1800 A	QBL32090	**1248.00**	QDL32090	**1784.00**	QGL32090	**2442.00**	QJL32090	**2796.00**	
100 A	1200 A	2400 A	QBL32100	**1248.00**	QDL32100	**1784.00**	QGL32100	**2442.00**	QJL32100	**2796.00**	
110 A	1200 A	2400 A	QBL32110	**1248.00**	QDL32110	**1784.00**	QGL32110	**2442.00**	QJL32110	**2796.00**	
125 A	1200 A	2400 A	QBL32125	**1248.00**	QDL32125	**1784.00**	QGL32125	**2442.00**	QJL32125	**2796.00**	#4 AWG - 300 kcmil Al/Cu
150 A	1200 A	2400 A	QBL32150	**1248.00**	QDL32150	**1784.00**	QGL32150	**2442.00**	QJL32150	**2796.00**	
175 A	1200 A	2400 A	QBL32175	**1248.00**	QDL32175	**1784.00**	QGL32175	**2442.00**	QJL32175	**2796.00**	
200 A	1200 A	2400 A	QBL32200	**1248.00**	QDL32200	**1784.00**	QGL32200	**2442.00**	QJL32200	**2796.00**	
225 A	1200 A	2400 A	QBL32225	**1248.00**	QDL32225	**1784.00**	QGL32225	**2442.00**	QJL32225	**2796.00**	
250 A■	1200 A	2400 A	QBL32250	**1812.00**	QDL32250	**2442.00**	QGL32250	**3150.00**	QJL32250	**3465.00**	

▲ Replacement lugs and electrical accessories are not available for PowerPact Q-frame circuit breakers.
■ 250 A requires the use of copper cables only.

Table 7.45: Q-Frame Termination Options

Termination Letter
A = I-Line (See Section 9)
E = Bolt-on I-Line (See Section 9)
F = No lugs
L = Lugs both ends
M = Lugs ON end, studs on OFF end
P = Lugs OFF end, studs on ON end

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

Q G L 3 2 2 0 0
└ Termination Letter

▼ Add TS suffix for studs on both ends without nuts and washers. See Catalog **0734CT0201** for additional information.

Table 7.46: Q-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	B	D	G	J
240 Vac♦	10 kA	25 kA	65 kA	100 kA★

♦ Q-frame circuit breakers are 240 Vac only.
★ 3P QJ circuit breakers are rated at 208Y/120 Vac only.

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New!

Table 7.47: L-Frame 600 A Circuit Breakers with Lugs and Factory-Sealed Electronic Trip Units Suitable for Reverse Connection△✱

Electronic Trip Unit			Sensor Rating	Cat. No.□	Interrupting Rating (2nd Letter of Catalog Number)										Terminal
					D		G		J ◊		L ◊		R ◊		
Type	Function	Trip Unit			$ Price										
					80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
600 Vac, 50/60 Hz, 3P															
Micrologic Standard	LI	3.3☆	250 A	L( )L36250(C)U31X	**4827.00**	**5648.00**	**5081.00**	**5945.00**	**8478.00**	**9919.00**	**9918.00**	**11604.00**	**11406.00**	**13345.00**	AL400L61K3▽
			400 A 600 A	L( )L36400(C)U31X L( )L36600U31X	**4827.00** **7109.00**	**5648.00** —	**5081.00** **7484.00**	**5945.00** —	**8478.00** **10541.00**	**9919.00** —	**9918.00** **11837.00**	**11604.00** —	**11406.00** **13613.00**	**13345.00** —	AL600LS52K3◒
Micrologic Standard	LSI	3.3S☆	250 A	L( )L36250(C)U33X	**5391.00**	**6211.00**	**5674.00**	**6538.00**	**9071.00**	**10513.00**	**10511.00**	**12198.00**	**12088.00**	**14028.00**	AL400L61K3▽
			400 A 600 A	L( )L36400(C)U33X L( )L36600U33X	**5391.00** **7673.00**	**6211.00** —	**5674.00** **8077.00**	**6538.00** —	**9071.00** **11134.00**	**10513.00** —	**10511.00** **12430.00**	**12198.00** —	**12088.00** **14295.00**	**14028.00** —	AL600LS52K3◒
Micrologic Ammeter	LSI	5.3A	400 A 600 A	L( )L36400(C)U43X L( )L36600U43X	**6253.00** **8535.00**	**7073.00** —	**6582.00** **8984.00**	**7445.00** —	**9979.00** **12041.00**	**11420.00** —	**11419.00** **13337.00**	**13105.00** —	**13132.00** **15338.00**	**15071.00** —	AL600LS52K3◒
Micrologic Energy	LSI	5.3E	400 A 600 A	L( )L36400(C)U53X L( )L36600U53X	**7200.00** **9483.00**	**8021.00** —	**7579.00** **9982.00**	**8443.00** —	**10976.00** **13039.00**	**12418.00** —	**12416.00** **14335.00**	**14103.00** —	**14278.00** **16485.00**	**16218.00** —	
Micrologic Ammeter	LSIG	6.3A	400 A 600 A	L( )L36400(C)U44X L( )L36600U44X	**8149.00** **10431.00**	**8969.00** —	**8578.00** **10980.00**	**9441.00** —	**11975.00** **14037.00**	**13416.00** —	**13415.00** **15333.00**	**15101.00** —	**15427.00** **17633.00**	**17366.00** —	
Micrologic Energy	LSIG	6.3E	400 A 600 A	L( )L36400(C)U54X L( )L36600U54X	**9097.00** **11379.00**	**9917.00** —	**9575.00** **11978.00**	**10439.00** —	**12972.00** **15035.00**	**14414.00** —	**14412.00** **16331.00**	**16099.00** —	**16574.00** **18781.00**	**18514.00** —	
600 Vac, 50/60 Hz, 4P															
Micrologic Standard	LI	3.3	250 A	L( )L46250(C)U31X	**5327.00**	**6233.00**	**5581.00**	**6530.00**	**8978.00**	**10501.00**	**10418.00**	**12189.00**	**11981.00**	**14017.00**	AL400L61K4▽
			400 A 600 A	L( )L46400(C)U31X L( )L46600U31X	**6227.00** **8509.00**	**6233.00** —	**6481.00** **8884.00**	**7583.00** —	**9878.00** **11941.00**	**11557.00** —	**11318.00** **13237.00**	**13242.00** —	**13016.00** **15223.00**	**15228.00** —	AL600LS52K4◒
Micrologic Standard	LSI	3.3S	250 A	L( )L46250(C)U33X	**5891.00**	**6796.00**	**6174.00**	**7123.00**	**9571.00**	**11098.00**	**11011.00**	**12783.00**	**12663.00**	**14700.00**	AL400L61K4▽
			400 A 600 A	L( )L46400(C)U33X L( )L46600U33X	**6791.00** **9073.00**	**7849.00** —	**7074.00** **9477.00**	**8176.00** —	**10471.00** **12534.00**	**12151.00** —	**11911.00** **13830.00**	**13836.00** —	**13698.00** **15905.00**	**15911.00** —	AL600LS52K4◒
Micrologic Ammeter	LSI	5.3A	400 A 600 A	L( )L46400(C)U43X L( )L46600U43X	**7653.00** **9935.00**	**8711.00** —	**7982.00** **10384.00**	**9083.00** —	**11379.00** **13441.00**	**13058.00** —	**12819.00** **14737.00**	**14743.00** —	**14742.00** **16948.00**	**16954.00** —	AL600LS52K4◒
Micrologic Energy	LSI	5.3E	400 A 600 A	L( )L46400(C)U53X L( )L46600U53X	**8600.00** **10883.00**	**9659.00** —	**8979.00** **11382.00**	**10081.00** —	**12376.00** **14439.00**	**14056.00** —	**13816.00** **15735.00**	**15741.00** —	**15888.00** **18095.00**	**18102.00** —	
Micrologic Ammeter	LSIG	6.3A	400 A 600 A	L( )L46400(C)U44X L( )L46600U44X	**9549.00** **11831.00**	**10607.00** —	**9978.00** **12380.00**	**11079.00** —	**13375.00** **15437.00**	**15054.00** —	**14815.00** **16733.00**	**16739.00** —	**17037.00** **19243.00**	**19250.00** —	
Micrologic Energy	LSIG	6.3E	400 A 600 A	L( )L46400(C)U54X L( )L46600U54X	**10497.00** **12779.00**	**11555.00** —	**10975.00** **13378.00**	**12077.00** —	**14372.00** **16435.00**	**16052.00** —	**15812.00** **17731.00**	**17791.00** —	**18184.00** **20391.00**	**20460.00** —	

△ See Supplemental Digest page 3-4 for circuit breakers with field-interchangeable trip units
□ For 100% rated circuit breakers (250 A and 400 A only), add a "C" in the 9th character place (for example, LGL36400CU31X)
◊ Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
☆ 3P circuit breakers with this trip unit can be used for 2P applications.
▽ AL400L61K3 terminal wire ranges are (1) 2 AWG–600 kcmil Cu or 1) 2 AWG–500 kcmil Al.
◒ AL600LS52K3 terminal wire range is (2) 2/0 AWG–500 kcmil Al/Cu.
✱ For applications requiring communicatins see page 7-49.

L-Frame Circuit Breaker

Table 7.48: Termination Options

Termination Letter	Termination Option
A	I-Line (See Section 9)
F	No lugs
L	Lugs both ends
M	Lugs ON end, terminal nut kit OFF end
P	Lugs OFF end, terminal nut kit ON end
N◆	Plug In
D◆	Drawout
S◆	Rear Connected

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

L G L 3 6 6 0 0 U 4 4 X
└ Termination Letter

◆ For N and D pricing, add termination pricing on page 7-45 to price. For S pricing, add termination pricing on page 7-41 to price.

Table 7.49: Interrupting Ratings

Voltage	Interrupting Rating				
	D	G	J	L	R
240 Vac	25 kA	65 kA	100 kA	125 kA	200 kA
480 Vac	18 kA	35 kA	65 kA	100 kA	200 kA
600 Vac	14 kA	18 kA	25 kA	50 kA	100 kA

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M-Frame Circuit Breaker

Table 7.50: M-Frame 800 A, Basic Electronic Trip System Type ET 1.0◑ Factory-Sealed Trip Unit

Electronic Trip Unit		Sensor Rating	Interrupting Rating				Terminal Wire Range (AWG/kcmil)
			G		J		
Type	Function		Cat. No.	$ Price	Cat. No.	$ Price	
2P, 600 Vac 50/60 Hz							
Basic	Fixed Long-time, Adjustable Instantaneous Trip	300 A	MGL26300	**5960.00**	MJL26300	**7829.00**	AL800M23K (3) 3/0–500 Al/Cu
		350 A	MGL26350	**5960.00**	MJL26350	**7829.00**	
		400 A	MGL26400	**5960.00**	MJL26400	**7829.00**	
		450 A	MGL26450	**5960.00**	MJL26450	**7829.00**	
		500 A	MGL26500	**5960.00**	MJL26500	**7829.00**	
		600 A	MGL26600	**5960.00**	MJL26600	**7829.00**	
		700 A	MGL26700	**7719.00**	MJL26700	**9657.00**	
		800 A	MGL26800	**7719.00**	MJL26800	**9657.00**	
3P, 600 Vac 50/60 Hz							
Basic	Fixed Long-time, Adjustable Instantaneous Trip	300 A	MGL36300	**7560.00**	MJL36300	**9456.00**	AL800M23K (3) 3/0–500 Al/Cu
		350 A	MGL36350	**7560.00**	MJL36350	**9456.00**	
		400 A	MGL36400	**7560.00**	MJL36400	**9456.00**	
		450 A	MGL36450	**7560.00**	MJL36450	**9456.00**	
		500 A	MGL36500	**7560.00**	MJL36500	**9456.00**	
		600 A	MGL36600	**7560.00**	MJL36600	**9456.00**	
		700 A	MGL36700	**9927.00**	MJL36700	**11882.00**	
		800 A	MGL36800	**9927.00**	MJL36800	**11882.00**	

◑ The ET 1.0 trip unit cannot be field replaced or have the long-time trip point setting adjusted. It is considered an electronic equivalent of a thermal-magnetic circuit breaker.

Table 7.51: Termination Options

Termination Letter	Termination Option
A	I-Line (See Section 9)
F	No lugs
L	Lugs both ends
M	Lugs ON end, terminal nut kit OFF end
P	Lugs OFF end, terminal nut kit ON end

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

M G L 3 6 4 0 0
└ Termination Letter

Table 7.52: Frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	L
240 Vac	25 kA	65 kA	100 kA	125 kA
480 Vac	18 kA	35 kA	65 kA	100 kA
600 Vac	14 kA	18 kA	25 kA	50 kA

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Table 7.53: P-Frame 1200 A (600 Vac, 50/60 Hz) 3P▲ Circuit Breaker with Electronic Trip Unit

Electronic Trip Unit			Sensor Rating	Cat. No.■♦	$ Price								Terminal Wire Range
					G■		J■		K■		L■★		
Type	Function	Trip Unit			80% Rated	100% Rated♦	80% Rated	100% Rated♦	80% Rated	100% Rated ♦	80% Rated	100% Rated♦	
Basic Electronic Trip Unit (Not Interchangeable)	Fixed long-time, Adjustable Instantaneous	ET1.0I	600 A	P( )L36060	13905.00	—	14783.00	—	14783.00	—	15660.00	—	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			800 A	P( )L36080		—		—		—		—	
			1000 A	P( )L36100	19049.00	—	20250.00	—	20250.00	—	21452.00	—	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120		—		—		—		—	
Micrologic Interchangeable Standard Trip Unit	LI	3.0	250 A	P( )L36025(C)U31A	14693.00	21510.00	15570.00	22868.00	15570.00	22868.00	16448.00	24224.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U31A									
			600 A	P( )L36060(C)U31A									
			800 A	P( )L36080(C)U31A									
			1000 A	P( )L36100(C)U31A	19836.00	30239.00	21038.00	32147.00	21038.00	32147.00	22239.00	34052.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U31A									
	LSI	5.0	250 A	P( )L36025(C)U33A	15032.00	21812.00	15909.00	23187.00	15909.00	23187.00	16787.00	24564.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U33A									
			600 A	P( )L36060(C)U33A									
			800 A	P( )L36080(C)U33A									
			1000 A	P( )L36100(C)U33A	20177.00	30540.00	21378.00	32466.00	21378.00	32466.00	22580.00	34392.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U33A									
Micrologic Interchangeable Ammeter Trip Unit	LI	3.0A	250 A	P( )L36025(C)U41A	15543.00	22266.00	16421.00	23670.00	16421.00	23670.00	17298.00	25076.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U41A									
			600 A	P( )L36060(C)U41A									
			800 A	P( )L36080(C)U41A									
			1000 A	P( )L36100(C)U41A	20688.00	30995.00	21890.00	32949.00	21890.00	32949.00	23091.00	34904.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U41A									
	LSI	5.0A	250 A	P( )L36025(C)U43A	17043.00	23597.00	17921.00	25085.00	17921.00	25085.00	18798.00	26574.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U43A									
			600 A	P( )L36060(C)U43A									
			800 A	P( )L36080(C)U43A									
			1000 A	P( )L36100(C)U43A	22185.00	32324.00	23387.00	34364.00	23387.00	34364.00	24590.00	36402.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U43A									
	LSIG	6.0A	250 A	P( )L36025(C)U44A	18909.00	25256.00	19787.00	26849.00	19787.00	26849.00	20664.00	28442.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U44A									
			600 A	P( )L36060(C)U44A									
			800 A	P( )L36080(C)U44A									
			1000 A	P( )L36100(C)U44A	24054.00	33983.00	25256.00	36128.00	25256.00	36128.00	26457.00	38270.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U44A									
Micrologic Interchangeable Power Trip Unit	LSI	5.0P	250 A	P( )L36025(C)U63AE1	21455.00	27516.00	22332.00	29252.00	22332.00	29252.00	23210.00	30986.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U63AE1									
			600 A	P( )L36060(C)U63AE1									
			800 A	P( )L36080(C)U63AE1									
			1000 A	P( )L36100(C)U63AE1	26597.00	36243.00	27800.00	38529.00	27800.00	38529.00	29001.00	40814.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U63AE1									
	LSIG	6.0P	250 A	P( )L36025(C)U64AE1	22536.00	28476.00	23414.00	30272.00	23414.00	30272.00	24291.00	32067.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U64AE1									
			600 A	P( )L36060(C)U64AE1									
			800 A	P( )L36080(C)U64AE1									
			1000 A	P( )L36100(C)U64AE1	27680.00	37203.00	28881.00	39551.00	28881.00	39551.00	30083.00	41895.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U64AE1									
Micrologic Interchangeable Harmonic Trip Unit	LSI	5.0H	250 A	P( )L36025(C)U73AE1	25538.00	31140.00	26415.00	33104.00	26415.00	33104.00	27291.00	35067.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U73AE1									
			600 A	P( )L36060(C)U73AE1									
			800 A	P( )L36080(C)U73AE1									
			1000 A	P( )L36100(C)U73AE1	30680.00	39867.00	31881.00	42381.00	31881.00	42381.00	33083.00	44895.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U73AE1									
	LSIG	6.0H	250 A	P( )L36025(C)U74AE1	26619.00	32100.00	27497.00	34125.00	27497.00	34125.00	28374.00	36150.00	AL800M23K (3) 3/0 AWG–500 kcmil Al or Cu
			400 A	P( )L36040(C)U74AE1									
			600 A	P( )L36060(C)U74AE1									
			800 A	P( )L36080(C)U74AE1									
			1000 A	P( )L36100(C)U74AE1	31761.00	40829.00	32963.00	43404.00	32963.00	43404.00	34166.00	45978.00	AL1200P25K (4) 3/0 AWG–500 kcmil Al or Cu
			1200 A	P( )L36120(C)U74AE1									

▲ For 2P and 4P information see Catalog 0612CT0101.
■ To complete the catalog number, replace the ( ) with the appropriate interrupting rating (G, J, K or L).
♦ For 100% rated circuit breakers add a "C" in the 9th character place. For example, the catalog number for a 100% trip unit with LI trip functions at 250A would be PGL36025**C**U31A.
★ For all L interrupting rating, change the 5th character (voltage rating) from a 6 (600V) to a 4 (480V); for example, PLL3**4**025U31A. The 480V AIR is standard 100 kA.

Table 7.54: P-Frame Termination Options

Termination Letter
F = No Lugs (Includes terminal nut kit on both ends)
L = Lugs both ends
M = Lugs ON end, terminal nut kit OFF end
P = Lugs OFF end, terminal nut kit ON end
D = Drawout▲
A = I-Line (See Section 9)

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

P G L 3 6 0 4 0 U 4 1 **A**
└ Termination Letter

▲ For D pricing add termination pricing on page 7-45.

Table 7.55: P-Frame and R-Frame Interrupting Ratings

Voltage	P-Frame Interrupting Rating				R-Frame Interrupting Rating			
	G	J	K	L	G	J	K	L
240 Vac	65 kA	100 kA	65 kA	125 kA	65 kA	100 kA	65 kA	125 kA
480 Vac	35 kA	65 kA	50 kA	100 kA	35 kA	65 kA	65 kA	100 kA
600 Vac	18 kA	25 kA	50 kA	25 kA	18 kA	25 kA	65 kA	50 kA

R-frame catalog numbers and pricing . . . . . Page 7-28
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Table 7.56: R-Frame 3000 A (600 Vac, 50/60 Hz) 3P▲ Circuit Breaker with Electronic Trip Unit

Electronic Trip Unit			Sensor Rating	Cat. No.■♦	$ Price							
					G■★		J■★		K■★		L■★	
Type	Function	Trip Unit			80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated
Basic Electronic Trip Unit (Not Interchangeable)	Fixed long-time, Adjustable Instantaneous	ET1.0I	1200 A	R( )F36120	22373.00	—	23549.00	—	23549.00	—	24723.00	—
			1600 A	R( )F36160		—		—		—		—
			2000 A	R( )F36200		—		—		—		—
			2500 A	R( )F36250	35639.00	—	37512.00	—	37512.00	—	39383.00	—
Micrologic Interchangeable Standard Trip Unit	LI	3.0	600 A	R( )F36060(C)U31A	23160.00	27759.00	24336.00	29301.00	24336.00	29301.00	25511.00	30843.00
			800 A	R( )F36080(C)U31A								
			1000 A	R( )F36100(C)U31A								
			1200 A	R( )F36120(C)U31A								
			1600 A	R( )F36160(C)U31A		29775.00		31430.00		31430.00		33083.00
			2000 A	R( )F36200(C)U31A		35042.00		36989.00		36989.00		38936.00
			2500 A	R( )F36250(C)U31A	36426.00	57075.00	38300.00	60248.00	38300.00	60248.00	40170.00	63417.00
			3000 A	R( )F36300(C)U31A	54027.00	62451.00	57236.00	65738.00	57236.00	65738.00	60246.00	69024.00
	LSI	5.0	600 A	R( )F36060(C)U33A	23501.00	28065.00	24675.00	29624.00	24675.00	29624.00	25851.00	31184.00
			800 A	R( )F36080(C)U33A								
			1000 A	R( )F36100(C)U33A								
			1200 A	R( )F36120(C)U33A								
			1600 A	R( )F36160(C)U33A		30081.00		31752.00		31752.00		33423.00
			2000 A	R( )F36200(C)U33A		35348.00		37313.00		37313.00		39276.00
			2500 A	R( )F36250(C)U33A	36767.00	57383.00	38640.00	60570.00	38640.00	60570.00	40511.00	63758.00
			3000 A	R( )F36300(C)U33A	54513.00	62757.00	57542.00	66060.00	57542.00	66060.00	60570.00	69363.00
Micrologic Interchangeable Ammeter Trip Unit	LI	3.0A	600 A	R( )F36060(C)U41A	24012.00	28493.00	25188.00	30075.00	25188.00	30075.00	26363.00	31658.00
			800 A	R( )F36080(C)U41A								
			1000 A	R( )F36100(C)U41A								
			1200 A	R( )F36120(C)U41A								
			1600 A	R( )F36160(C)U41A		30509.00		32202.00		32202.00		33897.00
			2000 A	R( )F36200(C)U41A		35775.00		37763.00		37763.00		39750.00
			2500 A	R( )F36250(C)U41A	37278.00	57809.00	39152.00	61020.00	39152.00	61020.00	41022.00	64232.00
			3000 A	R( )F36300(C)U41A	54918.00	63185.00	57969.00	66510.00	57969.00	66510.00	61020.00	69836.00
	LSI	5.0A	600 A	R( )F36060(C)U43A	25511.00	29874.00	26685.00	31533.00	26685.00	31533.00	27860.00	33194.00
			800 A	R( )F36080(C)U43A								
			1000 A	R( )F36100(C)U43A								
			1200 A	R( )F36120(C)U43A								
			1600 A	R( )F36160(C)U43A		31889.00		33662.00		33662.00		35433.00
			2000 A	R( )F36200(C)U43A		37158.00		39221.00		39221.00		41286.00
			2500 A	R( )F36250(C)U43A	38777.00	59190.00	40649.00	62478.00	40649.00	62478.00	42521.00	65768.00
			3000 A	R( )F36300(C)U43A	56231.00	64569.00	59354.00	67968.00	59354.00	67968.00	62480.00	71367.00
	LSIG	6.0A	600 A	R( )F36060(C)U44A	27378.00	31556.00	28553.00	33308.00	28553.00	33308.00	29729.00	35061.00
			800 A	R( )F36080(C)U44A								
			1000 A	R( )F36100(C)U44A								
			1200 A	R( )F36120(C)U44A								
			1600 A	R( )F36160(C)U44A		33570.00		35436.00		35436.00		37301.00
			2000 A	R( )F36200(C)U44A		38838.00		40995.00		40995.00		43154.00
			2500 A	R( )F36250(C)U44A	40644.00	60870.00	43368.00	64253.00	43368.00	64253.00	44388.00	67635.00
			3000 A	R( )F36300(C)U44A	57827.00	66255.00	60965.00	69743.00	60965.00	69743.00	64254.00	73230.00
Micrologic Interchangeable Power Trip Unit	LSI	5.0P	600 A	R( )F36060(C)U63AE1	29922.00	33845.00	31097.00	35724.00	31097.00	35724.00	32273.00	37605.00
			800 A	R( )F36080(C)U63AE1								
			1000 A	R( )F36100(C)U63AE1								
			1200 A	R( )F36120(C)U63AE1								
			1600 A	R( )F36160(C)U63AE1		35859.00		37853.00		37853.00		39845.00
			2000 A	R( )F36200(C)U63AE1		41129.00		43413.00		43413.00		45698.00
			2500 A	R( )F36250(C)U63AE1	43188.00	63161.00	45062.00	66671.00	45062.00	66671.00	46932.00	70179.00
			3000 A	R( )F36300(C)U63AE1	60003.00	68553.00	63338.00	72161.00	63338.00	72161.00	66671.00	75858.00
	LSIG	6.0P	600 A	R( )F36060(C)U64AE1	31004.00	34818.00	32180.00	36753.00	32180.00	36753.00	33354.00	38687.00
			800 A	R( )F36080(C)U64AE1								
			1000 A	R( )F36100(C)U64AE1								
			1200 A	R( )F36120(C)U64AE1								
			1600 A	R( )F36160(C)U64AE1		36834.00		38880.00		38880.00		40926.00
			2000 A	R( )F36200(C)U64AE1		42102.00		44441.00		44441.00		46779.00
			2500 A	R( )F36250(C)U64AE1	44270.00	64136.00	46143.00	67698.00	46143.00	67698.00	48014.00	71261.00
			3000 A	R( )F36300(C)U64AE1	60929.00	69528.00	64313.00	73188.00	64313.00	73188.00	67698.00	76848.00
Micrologic Interchangeable Harmonic Trip Unit	LSI	5.0H	600 A	R( )F36060(C)U73AE1	34005.00	37518.00	35180.00	39603.00	35180.00	39603.00	36354.00	41687.00
			800 A	R( )F36080(C)U73AE1								
			1000 A	R( )F36100(C)U73AE1								
			1200 A	R( )F36120(C)U73AE1								
			1600 A	R( )F36160(C)U73AE1		39534.00		41730.00		41730.00		43928.00
			2000 A	R( )F36200(C)U73AE1		44801.00		47291.00		47291.00		49779.00
			2500 A	R( )F36250(C)U73AE1	47271.00	66836.00	49143.00	70548.00	49143.00	70548.00	51015.00	74262.00
			3000 A	R( )F36300(C)U73AE1	63494.00	72236.00	67020.00	76038.00	67020.00	76038.00	70550.00	79841.00
	LSIG	6.0H	600 A	R( )F36060(C)U74AE1	35087.00	38493.00	36261.00	40631.00	36261.00	40631.00	37436.00	42770.00
			800 A	R( )F36080(C)U74AE1								
			1000 A	R( )F36100(C)U74AE1								
			1200 A	R( )F36120(C)U74AE1								
			1600 A	R( )F36160(C)U74AE1		40509.00		42758.00		42758.00		45009.00
			2000 A	R( )F36200(C)U74AE1		45776.00		48320.00		48320.00		50862.00
			2500 A	R( )F36250(C)U74AE1	48353.00	67809.00	50225.00	71576.00	50225.00	71576.00	52097.00	75344.00
			3000 A	R( )F36300(C)U74AE1	64419.00	73212.00	67997.00	77066.00	67997.00	77066.00	71577.00	80919.00

Note: R-frame circuit breakers can be bus- or cable-connected. For cable connections, optional terminal pad kit RLTB or equivalent bus structure is required. Each RLTB kit contains terminal pads for one end of the circuit breaker only and has provisions for mounting a maximum of 8 lugs per phase (9 lugs for 3000 A). RLTB kits are included with 2500 A 100% rated circuit breakers. The RL3TB kits are included with the 3000 A, 80% and 100% rated circuit breakers. For other circuit breakers, order terminal pad kit (RLTB) and optional lugs separately. See pages 7-42–7-44.

▲ For 2P and 4P information see Catalog **0612CT0101**.

■ To complete the catalog number, replace the blank ( ) with the appropriate interrupting rating (G, J, K or L).

♦ Listed catalog numbers are for 80% rated circuit breakers. For 100% rated circuit breakers add a "C" in the 9th character place. For example, the catalog number for a 100% standard trip unit with LI trip functions at 2500A would be RGF36250**C**U31A.

★ See page 7-27 for interrupting ratings table.

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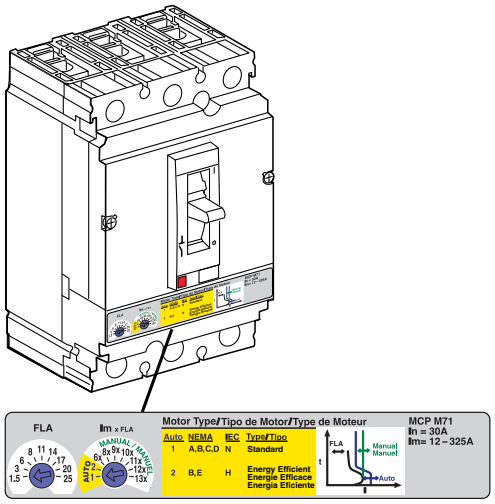

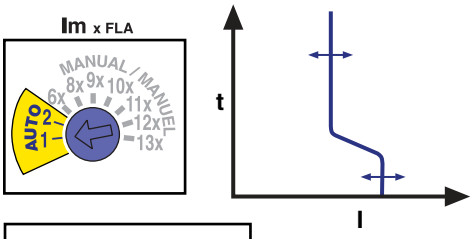

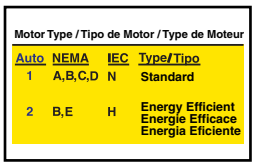

Motor Type / Tipo de Motor / Type de Moteur			
Auto	NEMA	IEC	Type/Tipo
1	A,B,C,D	N	Standard
2	B,E	H	Energy Efficient Energie Efficace Energia Eficiente

PowerPact H- and J-frame electronic Motor Circuit Protectors (MCP) are magnetic-only instantaneous-trip circuit breakers. They are designed to offer short circuit protection and are National Electrical Code (NEC) compliant when installed as part of a combination controller having motor overload protection. MCP circuit breakers accept the same accessories and terminals as the equivalent thermal-magnetic circuit breakers.

Determine the hp rating from the nameplate of the motor. Select a MCP with an ampere rating recommended for the hp and voltage involved. When using the automatic settings the MCP microprocessor automatically adjusts the trip settings for both current and time to align with the start-up characteristic for the motor type, whether it is a standard or energy-efficient motor. This includes a dampening means to accommodate a transient motor in-rush current without nuisance tripping of the circuit breaker.

Table 7.57: H- and J-Frame Electronic Motor Circuit Protectors (MCP)

Frame	Sensor Rating	Full Load Amperes Range	Adjustable Instantaneous Trip Range	Suffix	Interrupting Rating			
					J (See SCCR Table Below)		L (See SCCR Table Below)	
					Cat. No.	$ Price	Cat. No.	$ Price
H-Frame	30 A	1.5–25 A	9–325 A	M71	HJL36030M71	**1089.00**	HLL36030M71	**1223.00**
	50 A	14–42 A	84–546 A	M72	HJL36050M72	**1385.00**	HLL36050M72	**1553.00**
	100 A	30–80 A	180–1040 A	M73	HJL36100M73	**1646.00**	HLL36100M73	**1827.00**
	150 A	58–130 A	348–1690 A	M74	HJL36150M74	**2069.00**	HLL36150M74	**2306.00**
J-Frame	250 A	114–217 A	684–2500 A	M75	JJL36250M75	**2393.00**	JLL36250M75	**2673.00**

Table 7.58: Maximum Rating or Setting of Motor Protective Devices▲

Type of Motor		Percentage of Full-load Current	
		Setting	Not to Exceed■
A, B, C, D	Standard	800%	1300%
B, E	Energy Efficient	1100%	1700%

▲ Based on 2005 NEC Table 430.52.

■ See NEC Exception No. 1 to Table 430.52. The NEC 1300% maximum setting may be inadequate for instantaneous trip circuit breakers to withstand current surges typical of the magnetization current of autotransformer type reduced voltage starters, or open transition wye-delta starters during transfer from "start" to "run," constant hp multi-speed motors, and motors labeled "high efficiency."

Table 7.59: MCP Selection by HP Ratings♦ of Induction-type Squirrel-Cage and Wound-rotor Motors★

3Ø 60 Hz Voltages▼				Full-Load Amperes	Suffix
200 Vac	230 Vac	460 Vac	575 Vac		
.5–5	.5–7.5	.75–15	1–20	1.5–25	M71
5–10	5–15	10–30	15–40	14–42	M72
10–25	15–30	25–60	30–75	30–80	M73
20–40	25–50	50–100	60–125	58–130	M74
40–60	50–75	100–150	125–200	114–217	M75

♦ Based on 2005 NEC Table 430.250.

★ Per NEC 430.3, part-winding motors should select two circuit breakers, each at not more than one-half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means per NEC 430.103.

▼ Listed voltages are rated motor voltages. Corresponding system voltages are 200 Vac, 220–240 Vac, 440–480 Vac and 550–600 Vac. Select wire and circuit breakers based on horsepower rather than nameplate full-load current per NEC 430.6 (A) for general motor applications.

Short Circuit Current Rating (SCCR)

Tested to meet NEC and UL508A requirements for short circuit current ratings as part of an approved combination controller.

Table 7.60: Short Circuit Current Ratings (SCCR)

Contactor/Starter	Interrupting Rating					
	J			L		
	200–240 Vac	480 Vac	600 Vac	200–240 Vac	480 Vac	600 Vac
Tesys D-line and F-line	100 kA	65 kA	25 kA	125 kA	100 kA	50 kA
NEMA Type S	100 kA	65 kA	25 kA	125 kA	100 kA	50 kA

See www.us.schneider-electric.us for specific ratings and combination ID numbers.

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Optional Lugs . . . . . Page 7-42
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To select combination starters and motor controllers using MCP's meeting NEC Article 430, refer to pages 16-35—16-37.

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Table 7.61: Application of PowerPact™ H-Frame and J-Frame Electronic Motor Circuit Protectors (MCP)

Horsepower Rating of Induction-type Squirrel-cage and Wound-rotor Motors 3Ø 60 Hz					NEC Full Load Amperes	PowerPact H-Frame and J-Frame Electronic MCP	
Starter Size	200 Vac	230 Vac	480 Vac	575 Vac			
				1/2	0.9 A		
			1/2		1.1 A		
				3/4	1.3 A		
			3/4	1	1.7 A		
			1		2.1 A		
		1/2			2.2 A		
				1-1/2	2.4 A		
	1/2				2.5 A		
				2	2.7 A		
			1-1/2		3 A		
00		3/4			3.2 A		
			2		3.4 A		
	3/4				3.7 A		
				3	3.9 A		
		1			4.2 A		
	1				4.8 A	HJL36030M71 and HLL36030M71 1/2–10 hp	
			3		4.8 A		
		1-1/2			6 A		
				5	6.1 A		
		2			6.8 A		
	1-1/2				6.9 A		
			5		7.6 A		
	2				7.8 A		
0				7-1/2	9 A		
		3			9.6 A		
	3		7-1/2		11 A		
			10	10	14 A		
		5			15.2 A		
				15	17 A		
1	5				17.5 A		
			15		21 A		
		7-1/2		20	22 A		HJL36050M72 and HLL36050M72 10–25 hp
	7-1/2				25.3 A		
			20	25	27 A		
2		10			28 A		
	10			30	32 A	HJL36100M73 and HLL36100M73 15–50 hp	
			25		32.2 A		
					34 A		
			30		40 A		
				40	41 A		
		15			42 A		
	15				48.3 A		
3			40	50	52 A		
		20			54 A		
	20			60	62 A		
			50		65 A		
		25			68 A		
			60	75	77 A		
	25				78.2 A		
		30			80 A		HJL36150M74 and HLL36150M74 30–100 hp
	30				92 A		
4			75		96 A		
				100	99 A		
		40			104 A		
	40				120 A		
			100		124 A		
				125	125 A		
		50			130 A		
				150	144 A	JJL36250M75 and JLL36250M75 50–150 hp	
	50				150 A		
5		60			154 A		
			125		156 A		
	60				177.1 A		
			150		180 A		
		75		200	192 A		
	75				221 A		
			200		240 A		
		100			248 A		

Shaded area is not covered by J-frame electronic motor circuit protector.

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Motor Circuit Protector

Motor Protector Circuit Breaker

Motor Circuit Protectors

Mag-Gard™ Motor Circuit Protectors (MCP) are instantaneous-trip magnetic-only circuit breakers. They have a single adjustment which simultaneously sets the magnetic trip level of each individual pole. Mag-Gard™ circuit breakers comply with NEC requirements for providing motor circuit protection when installed as part of a UL Listed combination controller having motor overload protection. Interrupting ratings are established for these UL Recognized Components only when they are used in combination with motor starters with properly sized overload relays and contactors.

All Mag-Gard circuit breakers will accept the same lugs and accessories as equivalent circuit breakers. Mag-Gard circuit breakers are available with I-Line construction.☆ High-interruption (H) construction Mag-Gard circuit breakers (LHL) are also available.

Table 7.62: Magnetic Only 3 Pole, 600 Vac, 50/60 Hz☆—Three Device Solutions□

Ampere Rating		Trip Unit	Adjustable△ Trip Range (A)	24 Vdc Multiplier	Cat. No.	$ Price
LAL	400		500–1000 A	High = 1.2 Low = 1.4	LAL3640022M	4619.00
			750–1600 A		LAL3640028M	4619.00
			1000–2000 A		LAL3640030M	4619.00
			1125–2250 A		LAL3640031M	4619.00
			1250–2500 A		LAL3640032M	4619.00
			1500–3000 A		LAL3640033M	4619.00
			1750–3500 A		LAL3640035M	4619.00
			2000–4000 A		LAL3640036M	4619.00

For PowerPact L- and P-Frames, an instantaneous-only version of the electronic trip circuti breaker is also available for motor circuit protection. These MCPs comply with NEC® requirements for providing short-circuit protection when installed as part of a Listed combination controller having motor overload protection.

Table 7.63: Magnetic Only 3 Pole, 600 Vac, 50/60 Hz☆—Three Device Solutions□

Sensor Rating		Trip Unit	Adjustable△ Trip Range (A)	Interrupting Rating							
				G		J		L		R	
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
PowerPact L-Frame☆	400	1.3 M	500–1200%	LGL36400M37X	4619.00	LJL36400M37X	4727.00	LLL36400M37X	5007.00	LRL36400M37X	5307.00
	600		500–1200%	LGL36600M37X	6790.00	LJL36600M37X	6949.00	LLL36600M37X	7360.00	LRL36600M37X	7802.00
PowerPact PJL, PLL☆	600		1200–10000 A	—	—	PJL36060M68	7560.00	PLL34060M68	8006.00	—	—
	800		1200–10000 A	—	—	PJL36080M68	9927.00	PLL34080M68	10514.00	—	—
	1000		1500–10000 A	—	—	PJL36100M69	12705.00	PLL34100M69	13455.00	—	—
	1200		1800–10000 A	—	—	PJL36120M70	16517.00	PLL34120M70	17492.00	—	—

△ UL magnetic trip tolerances are -20%/+30% from the nominal values shown.
□ Three-device solutions are the traditional solutionss: motor circuit protector plus motor starter plus overload relay.
◊ 250 Vdc ratings are available. No UL component recognition
☆ These electronic magnetic only motor circuit protectors are available with I-Line constructions. Consult the factory.

Motor Protector Circuit Breakers

New!

Motor protection circuit breakers provide built-in thermal and magnetic protection. They are used in two-device motor feeder solutions to provide protection against short-circuits, overloads, and phase unbalance.

Table 7.64: H-Frame (150 A), J-Frame (250 A) and L-Frame (600 A) Electronic Motor Protector Circuit Breakers (UL Ratings)—Two Device Solutions▽

Electronic Trip Unit Type	Frame	Sensor Rating	Trip Unit	Full Load Amperes Range (FLA)	Isd (x FLA)	Interrupting Rating							
						G		J		L		R	
						Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Standard◒	H-Frame	30	2.2 M	14–25	5-13 x FLA	HGL36030M38X	1608.00	HJL36030M38X	1658.00	HLL36030M38X	1812.00	HRL36030M38X	1993.00
		50		14–42	5-13 x FLA	HGL36050M38X	1938.00	HJL36050M38X	1998.00	HLL36050M38X	2191.00	HRL36050M38X	2410.00
		100		30–80	5-13 x FLA	HGL36100M38X	2229.00	HJL36100M38X	2298.00	HLL36100M38X	2506.00	HRL36100M38X	2757.00
		150		58–130	5-13 x FLA	HGL36150M38X	2701.00	HJL36150M38X	2785.00	HLL36150M38X	3057.00	HRL36150M38X	3363.00
	J-Frame	250		114–217	5-13 x FLA	JGL36250M38X	3105.00	JJL36250M38X	3201.00	JLL36250M38X	3523.00	JRL36250M38X	3875.00
	L-Frame	400	2.3 M	190–348	5-13 x FLA	LGL36400M38X	6041.00	LJL36400M38X	6160.00	LLL36400M38X	6468.00	LRL36400M38X	7115.00
		600		312–520	5-13 x FLA	LGL36600M38X	8429.00	LJL36600M38X	8604.00	LLL36600M38X	9156.00	LRL36600M38X	10072.00

▽ Two-device solutions (these electronic motor protector circuit breakers include short circuit and overload protection)
—1 electronic motor circuit protector with a Micrologic 2.2 M plus
—1 contactor
◒ The standard trip unit offers Class 5, 10 and 20 and phase unbalance or phase loss protection.

Accessories . . . . . .Page 7-39 and Supplemental Digest Pages 3-24–3-31
Optional Lugs . . . . . .Page 7-42 and Supplemental Digest Pages 3-29–3-30
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Enclosures. . . . . Page 7-56

To select combination starters and motor controllers using MCP's meeting NEC Article 430, refer to pages 16-35—16-37.

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Adjustable instantaneous-trip circuit breakers are intended for use in combination with motor starters with overload relays for the protection of motor circuits from short circuits. Other specific applications include rectifiers and resistance welders. These circuit breakers contain a magnetic trip element in each pole with the trip point adjustable from the front. Interrupting ratings are determined by testing the instantaneous-trip circuit breakers in combination with a contactor and overload relay.

Select instantaneous-trip circuit breakers as follows:

This selection table is suitable for motors, other than NEMA Design E, with locked-rotor indicating code letters per NEC® Table 430.7 (b) as follows:

Table 7.65: Locked-Rotor Indicating Codes

Horsepower	Motor Code letter
1/2 or less	A–L
3/4 to 1-1/2	A–K
2 to 3	A–J
5 to 25	A–H
30 to 125	A–G
150 or more	A–F

1. For other motors order a special thermal-magnetic circuit breaker with magnetic trip settings for the specific motor—specify motor horsepower, voltage, frequency, full-load current and code letter or locked rotor current.
2. Determine motor hp rating from the motor nameplate.
3. Refer to the tables and select an instantaneous-trip circuit breaker with an ampere rating recommended for the hp and voltage involved.
4. Select an adjustable trip setting of at least 800%, not to exceed 1300%, of the motor full-load amperes (FLA) for other than Design E motors. For Design E motors, select an adjustable trip setting of at least 1100% not to exceed 1700% of FLA.
5. The NEC 1300% maximum setting may be inadequate for instantaneous-trip circuit breakers to withstand current surges typical of the magnetization current of autotransformer type reduced voltage starters, or open transition wye-delta starters during transfer from “start” to “run,” constant hp multi-speed motors, and motors labeled “high efficiency.” Select thermal-magnetic circuit breakers from page 7-33 for those applications.
6. Part-winding motors, per NEC 430.3, should have two circuit breakers selected from the above at not more than one half the allowable trip setting for the horsepower rating. The two circuit breakers should operate simultaneously as a disconnecting means per NEC 430.103.
7. Based on NEC 430.52 and NEC Table 430.150. See page 7-31 for available Adjustable Instantaneous-Trip Circuit Breakers.

Table 7.66: PowerPact H-Frame and L-Frame Motor Protector Circuit Breaker

Hp Ratings of Induction Type Squirrel-Cage and Wound Rotor Motors 3Ø 60 Hz				Full Load Amperes▲	PowerPact Family Motor Protector Circuit Breaker Cat. No.■	Magnetic Trip Settings♦	
200 Vac	230 Vac	460 Vac	575 Vac			MIN	MAX
		10		14	H( )L36030M38X		
	5			15..2	H( )L36030M38X		
			15	17	H( )L36030M38X		
5				17.5	H( )L36030M38X		
		15		21	H( )L36030M38X		
	7-1/2		20	22	H( )L36030M38X		
7-1/2				25.3	H( )L36030M38X		
		20	25	27	H( )L36050M38X		
	10			28	H( )L36050M38X		
			30	32	H( )L36050M38X		
10				32.2	H( )L36050M38X		
		25		34	H( )L36050M38X		
		30		40	H( )L36050M38X		
			40	41	H( )L36050M38X		
	15			42	H( )L36050M38X		
15				48.3	H( )L36100M38X		
		40	50	52	H( )L36100M38X		
	20			54	H( )L36100M38X		
20			60	62	H( )L36100M38X	500%	1300%
		50		65	H( )L36100M38X		
75				221	L( )L36400M38X		
		200		240	L( )L36400M38X		
			250	242	L( )L36400M38X		
	100			248	L( )L36400M38X		
100				285	L( )L36400M38X		
			300	289	L( )L36400M38X		
		250		302	L( )L36400M38X		
	125			312	L( )L36400M38X		
			350	336	L( )L36400M38X		
125				359	L( )L36600M38X		
	150			360	L( )L36600M38X		
		300		361	L( )L36600M38X		
			400	382	L( )L36600M38X		
150		350		414	L( )L36600M38X		
			500	472	L( )L36600M38X		
		400		477	L( )L36600M38X		
	200			480	L( )L36600M38X		

Table 7.67: LAL Adjustable Instantaneous-Trip Circuit Breakers for Single Motor Circuit Protection

Hp Ratings of Induction Type Squirrel-Cage and Wound Rotor Motors 3Ø 60 Hz				Full Load Amperes▲	Mag-Gard Circuit Breaker Cat. No.	Magnetic Trip Settings♦	
200 Vac	230 Vac	460 Vac	575 Vac			MIN	MAX
75				221	LAL3640033M	700%	1400%
		200		240	LAL3640035M	700%	1500%
			250	242	LAL3640035M	700%	1400%
	100			248	LAL3640035M	700%	1400%
100				285	LAL3640036M	700%	1400%
			300	289	LAL3640036M	700%	1400%
		250		302	LAL3640036M	700%	1300%
	125			312	LAL3640036M	600%	1300%

▲ Motor full-load currents are taken from NEC Table 430.150. Select wire and circuit breakers on basis of horsepower rather than nameplate full-load current per NEC 430.6 (A) for general motor applications. Do not use these values to select overload relay thermal units. See Digest pages 14-129–14-152 for selection of thermal units when actual full load current is not known. The voltages listed are rated motor voltages. Corresponding nominal system voltages are 200–208, 220–240, 440–480 and 550–600 V.

■ To complete catalog number, replace the blank with the appropriate rating (G, J, or L). M38X is for standard trip units. For advanced trip units (LCD display, metering and communication, replace with M58X).

♦ Only MIN and MAX settings are shown, intermediate settings are available on all circuit breakers.

★ See NEC 430.52(A) for circuit breaker settings above 800%.

▼ If due to motor starting characteristics, trip settings at the 1300% maximum permitted level are needed, the next size Mag-Gard circuit breaker should be chosen.

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Table 7.68: Selection Tables for Conductors, Safety Switches and Thermal-Magnetic Circuit Breakers Based on 2005 NEC® Tables 430.147, 430.148 & 430.150

Horsepower Ratings									Full Load Amperage△	Amperage of Thermal-Magnetic◊▽ Inverse Time Circuit Breaker			QMB and Heavy Duty Switch with Time Delay Fuses□	Minimum Size metallic Conduit 75° C, C Wire Field-Installed Sized for 125%FLA▼		
Squirrel-Cage and Wound-Rotor Motors with Norm. Torque Characteritics Operating at usual Speeds 3Ø 60 Hz				1Ø 10 Hz ac			Average Direct Current Motors Operating at Base Speed			For Motor Code Letter B to E		For Motor Code Letter F to V☆				
200 Vac■	230 Vac	460 Vac	575 Vac	115 Vac	200 Vac■	230 Vac	120 Vdc	240 Vdc		Ordinary Service♦	Heavy Service and Energy Efficient★			AWG kcmil	Conduit 3 W THHN THWN XHHW	Conduit 3 W THW
2		5		1/3	3/4	3/4 1	3.4	2	6.9 A 7.2 A 7.6 A 7.8 A 7.9 A 8.0 A 8.5 A 9.0 A 9.2 A 9.5 A	15 A	15 A	20 A	30 A	14	1/2 in.	N/A
			7-1/2		1		1				20 A	25 A				
3	3	7-1/2 10	10	1/2 3/4	1-1/2 2	1-1/2 2	1-1/2	3	9.6 A 9.8 A 10.0 A 11.0 A 11.5 A 12.0 A 12.2 A 13.2 A 13.8 A 14.0 A	20 A 25 A	25 A	30 A 35 A				
5	5 7-1/2	15	15	1 1-1/2 2	3	3	2 3	5	15.2 A 16.0 A 17.0 A 17.5 A 19.6 A 20.0 A 21.0 A 22.0 A 24.0 A 25.0 A	30 A 35 A 40 A 45 A	35 A 40 A 45 A 50 A	40 A 45 A 50 A 60 A		12	1/2 in.	N/A
7-1/2 10	10	20 25 30	25 30	3	5	7-1/2	5	7-1/2 10	25.3 A 27.0 A 28.0 A 29.0 A 32.0 A 32.2 A 34.0 A 38.0 A 40.0 A 41.0 A	50 A 60 A 70 A 80 A	60 A 70 A 80 A 90 A	70 A 80 A 90 A 100 A	60 A	10 8	1/2 in. 1/2 in.▲	N/A N/A
15	15 20	40	50	5	7-1/2 10	10	7-1/2	15	42.0 A 46.0 A 48.3 A 50.0 A 52.0 A 54.0 A 55.0 A 56.0 A 57.5 A 58.0 A	90 A 100 A	110 A 125 A 150 A	110 A 125 A 150 A		6 4	3/4 in. 1 in.	1 in. 1 in.
20 25 30	25 30	50 60	60 75	7-1/2			10	20 25	62.0 A 62.1 A 65.0 A 68.0 A 72.0 A 76.0 A 77.0 A 78.2 A 80.0 A 89.0 A 92.0 A	100 A 110 A 125 A 110 A 125 A	150 A 175 A	175 A 200 A 225 A	100 A	3 2	1 in. 1 in.	1-1/4 in. 1-1/4 in.
40	40 50	75 100	100 125	10				30 40	96.0 A 99.0 A 100.0 A 104.0 A 106.0 A 120.0 A 124.0 A 125.0 A 130.0 A 140.0 A	150 A 175 A 200 A 225 A	200 A 225 A 250 A 250 A 300 A	250 A 300 A 350 A 400 A	200 A	1 1/0 2/0	1-1/4 in. 1-1/4 in. 1-1/2 in.	1-1/2 in. 1-1/2 in. 1-1/2 in.
50 60 75	60 75	125 150 200	150 200					50	144.0 A 150.0 A 154.0 A 156.0 A 173.0 A 177.0 A 180.0 A 192.0 A 221.0 A 240.0 A	225 A 250 A 300 A	350 A 400 A 450 A	500 A 600 A	400 A	3/0 4/0 250 300	1-1/2 in. 2 in. 2 in. 2 in.	2 in. 2 in. 2 in. 2-1/2 in.
100 125	100 125 150	250 300	250 300 350						242.0 A 248.0 A 285.0 A 289.0 A 302.0 A 312.0 A 336.0 A 359.0 A 360.0 A 361.0 A	350 A 400 A 450 A 500 A 600 A	500 A 600 A 700 A 800 A 900 A	700 A 800 A 900 A 1000 A		350 500 (2) 3/0 (2) 4/0	2-1/2 in. 3 in. (2) 2-1/2 in. (2) 2 in.	2-1/2 in. 3 in. (2) 2 in. (2) 2 in.
150 200	250	350 200 500	400 400	500					382.0 A 414.0 A 472.0 A 477.0 A 480.0 A 552.0 A 590.0 A 602.0 A	600 A 800 A 900 A	800 A 900 A 1000 A 1200 A	1000 A 1200 A 1600 A	600 A —	(2)300 (2) 350 (3) 300	(2) 2 in. (2) 2-1/2 in. (3) 2 in.	(2) 2-1/2 in. (2) 2-1/2 in. (3) 2-1/2 in.

▲ 8 XHHW requires 3/4 in. conduit for 3W.

■ 200 V motors are commonly used on 208 V services.

♦ Ordinary service for normal starting duty only, acceleration time of 10 sec. or less.

★ Heavy service is jogging or plugging duty or cycling load with over 25 starts per hour or over 5 starts per minute. Energy efficient motors are polyphase motors defined in NEMA Standard MG1 and exhibit high starting current.

▼ NEC 430.22 for Single Motor, Smaller conductors may be permitted for light duty-cycle service per 430.22 (B) Exception No. 1. DC motors operating from rectified 1Ø power supply will require larger conductors per 430.22 (A) Exception No. 1. For motor-generator arc welders, see 630.11.

△ Motor full load currents thru 200 hp are taken from NEC Tables 430.147, 148 and 150. Above 200 hp from UL 98. Select wire size, circuit breakers, or fuses on basis of hp rather than nameplate full load current per NEC 430.6. **Do not use these values to select overload relay thermal units.** See Digest pages 16-129—16-152 for selection of thermal units when actual full load current is not known. Voltages listed are rated motor voltages. Corresponding nominal system voltages are 110–120 V, 200–208 V, 220–240 V, 440–480 V and 550–600 V.

□ Switch size only is shown in table. Selected fuses should not exceed maximum percent of full-load current as given in NEC Table 430.52. Above 50 hp dc switches are not hp rated by UL as Motor Circuit Switches, but as General Use Switches only and are not necessarily capable of interrupting the max. operating overload current of a motor. See NEC 100 for definition of General Use Switch. When protecting a 3Ø, Design E energy efficient motor, the switch is required by NEC 430.109 to have a hp rating of not less than 1.4 times that of a motor rated 3–100 hp, or not less than 1.3 times that of a motor rated over 100 hp. Switches shown in this table do not necessarily comply with that requirement.

◊ Thermal-magnetic circuit breaker ampere ratings recommended are approximate for average conditions, based on trip characteristics of Square D circuit breakers and NEC Table 430.52. Under some conditions, the next size larger switch or circuit breaker rating may be necessary to accommodate the motor starting current and is permitted by NEC 430.52(C)(1) Exception 2. High starting currents are anticipated with Design E and other energy efficient motors. For explanation of Code letter markings, see NEC 430.7(B). For Busway Plug-in units, see page 9-7.

☆ Thermal-magnetic breaker ampere ratings recommended are approximate for average conditions and based on trip characteristics of Square D circuit breakers and NEC Tables 430.7(B) and 430.52.

▽ Type LC, LI, LX, LXI, and LE circuit breakers are NOT recommended for use on single motor branch circuits.

Contact your local Field Office for circuit breaker selection on constant horsepower multi-speed motors.

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J-Frame Switch L-Frame Switch

Automatic molded case switches open instantaneously at a factory preset magnetic trip point, calibrated to protect only the molded case switch itself, when it is subjected to high fault currents. The trip point is nonadjustable and provides no overload or low level fault protection.

Molded case switches open when the handle is switched to the OFF position or in response to an auxiliary tripping device such as a shunt trip.

All molded case switches will accept the same lugs and accessories as equivalent thermal-magnetic circuit breakers, with the exception of Q-frame switches which do not have electrical accessories available.

Automatic molded case switches are UL Listed per UL 489 and are CSA Certified.

Table 7.69: H-Frame, J-Frame, and L-Frame PowerPact™ Automatic Molded Case Switches, 600 Vac

Circuit Breaker	Poles	Ampere Rating	G Withstand			L Withstand			R Withstand			Terminal	Wire Range
			Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point		
New! H-Frame J-Frame	2	150 A	HGL26000S15▲	**1349.00**	2250A	HLL26000S15	**1590.00**	2250 A	—	—	—	AL150HD	14 AWG–3/0 AWG Al/Cu
		175 A	JGL26000S17	**1827.00**	3125 A	JLL26000S17	**1980.00**	3125 A	—	—	—	AL175JD	4–4/0 AWG Al/Cu
		250 A	JGL26000S25	**1827.00**	3125 A	JLL26000S25	**1980.00**	3125 A	—	—	—	AL250JD	3/0 AWG–350 kcmil Al/Cu
	3	150 A	HGL36000S15	**1799.00**	2250 A	HLL36000S15	**1988.00**	2250 A	—	—	—	AL150HD	14 AWG–3/0 AWG Al/Cu
		175 A	JGL36000S17	**2286.00**	3125 A	JLL36000S17	**2475.00**	3125 A	JRL36000S17	**2673.00**	3125 A	AL175JD	4–4/0 AWG Al/Cu
		250 A	JGL36000S25	**2286.00**	3125 A	JLL36000S25	**2475.00**	3125 A	JRL36000S25	**2673.00**	3125 A	AL250JD	3/0 AWG–350 kcmil Al/Cu
L-Frame	3	400 A	LGL36000S40X	**4572.00**	4800 A	LLL36000S40X	**4972.00**	4800 A	LRL36000S40X	**5370.00**	4800 A	AL150HD	AL600LS52K3 (2) 2/0 AWG–500 kcmil Al/Cu
		600 A	LGL36000S60X	**5065.00**	6600A	LLL36000S60X	**5465.00**	6600 A	LRL36000S60X	**5902.00**	6600 A	AL250JD	
	4	400 A	LGL46000S40X	**5972.00**	4800 A	LLL46000S40X	**6372.00**	4800 A	LRL46000S40X	**6882.00**	4800 A	AL150HD	AL600LS52K4 (2) 2/0 AWG–500 kcmil Al/Cu
		600 A	LGL46000S60X	**6465.00**	6600A	LLL46000S60X	**6865.00**	6600 A	LRL46000S60X	**7414.00**	6600 A	AL250JD	

▲ True 2P device. Others are a 2P in a 3P module.

Table 7.70: Q-Frame (240 Vac) PowerPact™ Automatic Molded Case Switches

Circuit Breaker	Poles	Ampere Rating	J Withstand			Wire Range
			Cat. No.	$ Price	Trip Point	
Q-Frame■	2	225 A	QBL22000S22♦	**440.00**	4500 A	4 AWG–300 kcmil
	3	225 A	QBL32000S22♦	**1193.00**	4500 A	

■ Withstand rating of 10 kA at 240 Vac.
♦ DE2A discount schedule.

Table 7.71: P-Frame and R-Frame PowerPact™ Automatic Molded Case Switches▼, 600 Vac

Frame	Poles	Ampere Rating	J Withstand			K Withstand			L Withstand			Terminal	Wire Range
			Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point		
P	2	600 A	PJL26000S60	**5340.00**	10 kA	PKL26000S60	**5340.00**	24 kA	PLL24000S60★	**5715.00**	10 kA	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
		800 A	PJL26000S80	**5991.00**	10 kA	PKL26000S80	**5991.00**	24 kA	PLL24000S80★	**6414.00**	10 kA		
		1000 A	PJL26000S10	**7469.00**	10 kA	PKL26000S10	**7469.00**	24 kA	PLL24000S10★	**7995.00**	10 kA	AL1200P25K	(4) 3/0 AWG–500 kcmil Al or Cu
		1200 A	PJL26000S12	**11744.00**	10 kA	PKL26000S12	**11744.00**	24 kA	PLL24000S12★	**10887.00**	10 kA		
	3	600 A	PJL36000S60	**6584.00**	10 kA	PKL36000S60	**6584.00**	24 kA	PLL34000S60★	**6974.00**	10 kA	AL800M23K	(3) 3/0 AWG–500 kcmil Al or Cu
		800 A	PJL36000S80	**7236.00**	10 kA	PKL36000S80	**7236.00**	24 kA	PLL34000S80★	**7667.00**	10 kA		
		1000 A	PJL36000S10	**9287.00**	10 kA	PKL36000S10	**9287.00**	24 kA	PLL34000S10★	**9837.00**	10 kA	AL1200P25K	(4) 3/0 AWG–500 kcmil Al or Cu
		1200 A	PJL36000S12	**11867.00**	10 kA	PKL36000S12	**11867.00**	24 kA	PLL34000S12★	**12570.00**	10 kA		
R	2	1200 A	—	—	—	RKF26000S12	**12213.00**	57 kA	RLF26000S12	**12855.00**	48 kA	R-frame circuit breakers can be bus-connected or cable-connected. For cable connections, RLTB kit or equivalent bus structure is required. Kit is included with 3000 A switches. For all others, see page 7-44.	
		1600 A	—	—	—	RKF26000S16	**14685.00**	57 kA	RLF26000S16	**14825.00**	48 kA		
		2000 A	—	—	—	RKF26000S20	**15687.00**	57 kA	RLF26000S20	**15837.00**	48 kA		
		2500 A	—	—	—	RKF26000S25	**24948.00**	57 kA	RLF26000S25	**25185.00**	48 kA		
	3	1200 A	—	—	—	RKF36000S12	**13602.00**	57 kA	RLF36000S12	**14318.00**	48 kA		
		1600 A	—	—	—	RKF36000S16	**15911.00**	57 kA	RLF36000S16	**16062.00**	48 kA		
		2000 A	—	—	—	RKF36000S20	**19374.00**	57 kA	RLF36000S20	**19559.00**	48 kA		
		2500 A	—	—	—	RKF36000S25	**30836.00**	57 kA	RLF36000S25	**31130.00**	48 kA		
		3000 A	—	—	—	RKF36000S30	**41104.00**	57 kA	RLF36000S30	**41496.00**	48 kA		

★ P-frame L-interrupting is available in 480 Vac only.
▼ UL magnetic trip tolerances are -20% / +30% from the nominal values shown.

Table 7.72: H-, J-, L- P-, and R-Frame Withstand Ratings△

Voltage	Withstand				
	G	J	K	L	R
240 Vac	65 kA	100 kA	65 kA	125 kA	200 kA
480 Vac	35 kA	65 kA	50 kA□	100 kA	200 kA
600 Vac	18 kA	25 kA	50 kA□	50 kA	100 kA

△ The withstand rating is the fault current at rated voltage that the molded case switch will withstand without damage when protected by a circuit breaker with an equal continuous current rating.
□ R-frame withstand is 65 kA.

Accessories . . . . . Page 7-39 and Supplemental Digest Pages 3-24–3-31
Optional Lugs . . . . . Page 7-42 and Supplemental Digest Pages 3-29–3-30
Dimensions. . . . . Pages 7-54 and 7-55
Enclosures . . . . . Pages 7-56–7-58

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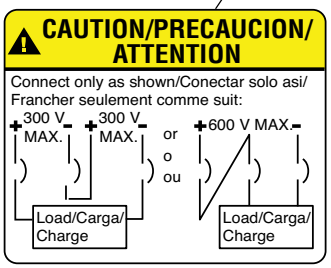
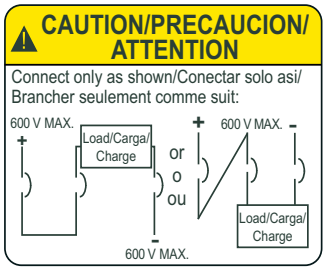


Source = 600 Vdc max. (floating)
500 Vdc max. (loaded)

DC Circuit Breaker Label



Source = 600 Vdc max. (floating)
500 Vdc max. (loaded)

MHL–DCH Breaker Only

The UL Listed thermal-magnetic molded case circuit breakers shown below are specifically designed for use on ungrounded dc systems having a maximum short-circuit voltage of 500 Vdc or a maximum floating (unloaded) voltage of 600 Vdc. The circuit breakers are suitable for use only with UPS (uninterruptable power supplies) and ungrounded systems.

This two-level voltage rating allows these circuit breakers to be applied to battery sources having a short-circuit availability of 20,000 amperes for LH, and MH circuit breakers and 25,000 amperes for PAF circuit breakers at 500 Vdc.

LH and MH circuit breakers are provided with an adjustable magnetic trip that is readily accessible by means of a single adjustment on the face of the circuit breaker. PAF circuit breakers have a fixed magnetic trip range.

These circuit breakers are UL Listed for the interrupting ratings shown only if applied with three poles connected in series (series connection is external to circuit breaker). See diagram below.

NOTE: *Due to external series connection, I-Line™ circuit breakers are not available for this application.*

Table 7.73: DC Molded Case Circuit Breakers

Ampere Rating	Circuit Breaker Cat. No.	Adjustable Magnetic Trip Range—DC Amperes▲		Interrupting Rating @ 500 Vdc	$ Price
		Low	High		
100 A	JGL37100D81	400	600	20 k AIR	**3779.00**
125 A	JGL37125D81	400	600		**3779.00**
150 A	JGL37150D81	400	600		**3779.00**
175 A	JGL37175D81	400	600		**3779.00**
200 A	JGL37200D82	500	850	20 k AIR	**3779.00**
225 A	JGL37225D82	500	850		**3779.00**
250 A	JGL37250D82	500	850		**5001.00**
250 A	LHL3625025DC	625	1250	20 k AIR	**7598.00**
300 A	LHL3630026DC	750	1500		**7598.00**
350 A	LHL3635029DC	875	1750		**7598.00**
400 A	LHL3640030DC	1000	2000		**7598.00**
450 A	MHL3645031DC	1125	2250	20 k AIR	**9456.00**
500 A	MHL3650032DC	1250	2500		**9456.00**
600 A	MHL3660033DC	1500	3000		**9456.00**
700 A	MHL3670035DC	1750	3500		**11882.00**
800 A	MHL3680036DC	2000	4000		**11882.00**
900 A	MHL3690039DC	2500	5000		**14078.00**
1000 A	MHL36100040DC	2500	5000		**14078.00**
1200 A	MHL36120040DC■	2500	5000	25 k AIR	**16758.00**
450 A	MHL3645031DCH	1125	2250	50 k AIR	**12506.00**
500 A	MHL3650032DCH	1250	2500		**12506.00**
600 A	MHL3660033DCH	1500	3000		**12506.00**
700 A	MHL3670035DCH	1750	3500		**14932.00**
800 A	MHL3680036DCH	2000	4000		**14932.00**
900 A	MHL3690039DCH	2500	5000		**17128.00**
1000 A	MHL36100040DCH	2500	5000		**17128.00**
1200 A	MHL36120040DCH■	2500	5000	50 k AIR	**19808.00**

▲ Magnetic trip tolerances are -20%/+30% from the nominal values shown.

■ Suitable for use only in a ventilated enclosure. Minimum enclosure dimensions are 38" h x 20" w x 7" d with a minimum of 300 square inches of ventilation near the top and bottom of the enclosure.

Ampere Rating	Circuit Breaker Cat. No.	Fixed Magnetic Trip Range—DC Amperes▲		Interrupting Rating @ 500 Vdc	$ Price
		Hold	Trip		
1200 A	PAF361200DC	1200	1620	25 k AIR	**24726.00**
1600 A	PAF361600DC	1600	2160		**24726.00**
2000 A	PAF362000DC	2000	2700		**24726.00**
2500 A	PCF362500DC	2500	3375	25 k AIR	**39365.00**

Accessories . . . . . Page 7-39 and Supplemental Digest Pages 3-24–3-31
Optional Lugs . . . . . Page 7-42 and Supplemental Digest Page 3-29
Dimensions . . . . . Page 7-55 and Supplemental Digest Page 3-33
Enclosures. . . . . Pages 7-56–7-58

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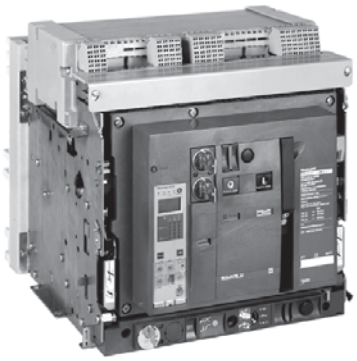

Masterpact NW DC Circuit Breaker

Table 7.74: Masterpact NW DC Circuit Breakers

Ampere Rating	Circuit Breaker Cat. No.	Interrupting Rating 500 Vdc (max 600 Vdc unloaded)	$ Price Fixed Circuit Breaker		$ Price Drawout Circuit Breaker		$ Price Cradle	
			Version C	Version C1	Version C	Version C1	Version C	Version C1
800 A	NW08NDC	35 kA	**42214.00**	**42746.00**	**39824.00**	**40888.00**	**11778.00**	**12842.00**
1200 A	NW12NDC	35 kA	**42214.00**	**42746.00**	**39824.00**	**40888.00**	**11778.00**	**12842.00**
1600 A	NW16NDC	35 kA	**42214.00**	**42746.00**	**39824.00**	**40888.00**	**11778.00**	**12842.00**
2000A	NW20NDC	35 kA	**42214.00**	**42746.00**	**39824.00**	**40888.00**	**11778.00**	**12842.00**
2500 A	NW25NDC	35 kA	**56158.00**	**56690.00**	**56662.00**	**57726.00**	**11778.00**	**12842.00**
3000 A	NW30NDC	35 kA	**70100.00**	**70632.00**	**73500.00**	**74564.00**	**11778.00**	**12842.00**
4000 A	NW40NDC	35 kA	**84044.00**	**84576.00**	**90338.00**	**90142.00**	**11778.00**	**12842.00**
800 A	NW08HDC	85 kA	**46858.00**	**47448.00**	**44205.00**	**45386.00**	**11778.00**	**12842.00**
1200 A	NW12HDC	85 kA	**46858.00**	**47448.00**	**44205.00**	**45386.00**	**11778.00**	**12842.00**
1600 A	NW16HDC	85 kA	**46858.00**	**47448.00**	**44205.00**	**45386.00**	**11778.00**	**12842.00**
2000A	NW20HDC	85 kA	**46858.00**	**47448.00**	**44205.00**	**45386.00**	**11778.00**	**12842.00**
2500 A	NW25HDC	85 kA	**62335.00**	**62926.00**	**64076.00**	**64076.00**	**11778.00**	**12842.00**
3000 A	NW30HDC	85 kA	**77811.00**	**78402.00**	**81585.00**	**82766.00**	**11778.00**	**12842.00**
4000 A	NW40HDC	85 kA	**93289.00**	**93879.00**	**100275.00**	**100058.00**	**11778.00**	**12842.00**

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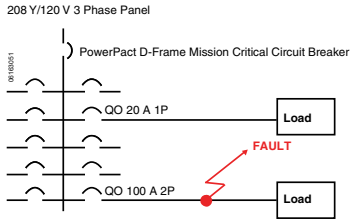

Designed for selectively coordinated systems, mission critical circuit breakers maximize continuity of the electrical service by allowing the branch circuit breaker to clear the fault.

Mission critical circuit breakers are engineered with technology that optimizes current, time and energy selectivity so the fault is cleared by the circuit breaker immediately upstream of the occurrence. This technology (see figure below) allows the remaining areas of the electrical system to continue operation without disruption. In addition to unique design attributes, Square D mission critical circuit breakers have also undergone rigorous testing procedures to certify the coordination with downstream circuit breakers—combining innovative engineering with validated test results.

Apply Square D mission critical circuit breakers in emergency power distribution systems, data centers, hospitals or anywhere continuity of service is desired.

The PowerPact™ J- and L-Frame Mission Critical circuit breakers deliver high levels of selective coordination in a flexible design that can be easily configured for a variety of applications. Tested to be selectively coordinated with the QO™ family of miniature circuit breakers and the ED, EG, and EJ circuit breakers, this solution provides peace of mind when power availability is critical.

An electronic trip unit provides adjustable long-time settings in four sensor sizes, allowing coverage from 70 A through 600 A on a 120–240, 208Y/120, 240, 480Y/277, and 480 V systems.

Table 7.75: PowerPact J- and L-Frame Mission Critical Circuit Breakers

Ratings	Available Configurations
UL 489 Listed CSA Certified Voltage: 480 V	I-Line mounting Main circuit breaker in NQ and NF panelboards Unit mount for OEM users Plug-in base for OEM users Drawout base ofr OEM users

Table 7.76: J-Frame 250 A Electronic Trip Mission Critical Circuit Breakers (480/277 Vac) with Factory Sealed Trip Units Suitable for Reverse Connection▲

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	D Interrupting		G Interrupting		J Interrupting		L Interrupting		Terminal
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	
Standard	LI	3.2 W	250	JDL34250WU31X	3489.	JGL34250WU31X	4727.	JJL34250WU31X	6678.	JLL34250WU31X	8629.	AL250JD■
Standard	LSI	3.2S-W	250	JDL34250WU33X	3801.	JGL34250WU33X	5039.	JJL34250WU33X	6989.	JLL34250WU33X	8941.	AL250JD■
High Perf. Ammerter	LSI	5.2A-W	250	JDL34250WU43X	4809.	JGL34250WU43X	6046.	JJL34250WU43X	7997.	JLL34250WU43X	9949.	AL250JD■
High Perf. Energy	LSI	5.2E-W	250	JDL34250WU53X	5414.	JGL34250WU53X	6652.	JJL34250WU53X	8602.	JLL34250WU53X	10554.	AL250JD■
High Perf. Ammerter	LSIG	6.2A-W	250	JDL34250WU44X	6018.	JGL34250WU44X	7256.	JJL34250WU44X	9206.	JLL34250WU44X	11158.	AL250JD■
High Perf. Energy	LSIG	6.2E-W	250	JDL34250WU54X	6623.	JGL34250WU54X	7861.	JJL34250WU54X	9812.	JLL34250WU54X	11763.	AL250JD■

▲ Standard rated (80%). Not available in 100% rated.
■ AL250JD terminal wire range is (1) 3/0 AWG–350 kcmil Al or Cu.

Table 7.77: L-Frame 600 A Electronic Trip Mission Critical Circuit Breakers (480/277 Vac) with Factory Sealed Trip Units Suitable for Reverse Connection▲

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	D Interrupting		G Interrupting		J Interrupting		L Interrupting		Terminal
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	
480/277 Vac, 50/60 Hz, 3P												
Standard	LI	3.3 W	250	LDL34250WU31X	5696.	LGL34250WU31X	5996.	LJL34250WU31X	10004.	LLL34250WU31X	11703.	AL400L61K3■
			400 600	LDL34400WU31X LDL34600WU31X	5696. 8389.	LGL34400WU31X LGL34600WU31X	5996. 8831.	LJL34400WU31X LJL34600WU31X	10004. 12438.	LLL34400WU31X LLL34300WU31X	11703. 13968.	AL600LS52K3♦
Standard	LSI	3.3S-W	250	LDL34250WU33X	6361.	LGL34250WU33X	6695.	LJL34250WU33X	10704.	LLL34250WU33X	12403.	AL400L61K3■
			400 600	LDL34400WU33X LDL34600WU33X	6361. 9054.	LGL34400WU33X LGL34600WU33X	6695. 9531.	LJL34400WU33X LJL34600WU33X	10704. 13138.	LLL34400WU33X LLL34300WU33X	12403. 14667.	AL600LS52K3♦
High Perf. Ammeter	LSI	5.3A-W	400 600	LDL34400WU43X LDL34600WU43X	7379. 10071.	LGL34400WU43X LGL34600WU43X	7767. 10601.	LJL34400WU43X LJL34600WU43X	11775. 14208.	LLL34400WU43X LLL34300WU43X	13474. 15738.	AL600LS52K3♦
High Perf. Energy	LSI	5.3E-W	400 600	LDL34400WU53X LDL34600WU53X	8496. 11190.	LGL34400WU53X LGL34600WU53X	8943. 11779.	LJL34400WU53X LJL34600WU53X	12952. 15386.	LLL34400WU53X LLL34300WU53X	14651. 16915.	AL600LS52K3♦
High Perf. Ammeter	LSIG	6.3A-W	400 600	LDL34400WU44X LDL34600WU44X	9616. 12309.	LGL34400WU44X LGL34600WU44X	10122. 12956.	LJL34400WU44X LJL34600WU44X	14131. 16844.	LLL34400WU44X LLL34300WU44X	15830. 18093.	AL600LS52K3♦
High Perf. Energy	LSIG	6.3E-W	400 600	LDL34400WU54X LDL34600WU54X	10734. 13427.	LGL34400WU54X LGL34600WU54X	11299. 14134.	LJL34400WU54X LJL34600WU54X	15307. 17741.	LLL34400WU54X LLL34300WU54X	17006. 19271.	AL600LS52K3♦
480/277 Vac, 50/60 Hz, 4P												
Standard	LI	3.3 W	250	LDL44250WU31X	6196.	LGL44250WU31X	6496.	LJL44250WU31X	10504.	LLL44250WU31X	12203.	AL400L61K4■
			400 600	LDL44400WU31X LDL44600WU31X	7096. 9789.	LGL44400WU31X LGL44600WU31X	7396. 10231.	LJL44400WU31X LJL44600WU31X	11404. 13838.	LLL44400WU31X LLL44300WU31X	13103. 15368.	AL600LS52K4♦
Standard	LSI	3.3S-W	250	LDL44250WU33X	6861.	LGL44250WU33X	7195.	LJL44250WU33X	11204.	LLL44250WU33X	12903.	AL400L61K4■
			400 600	LDL44400WU33X LDL44600WU33X	7761. 10454.	LGL44400WU33X LGL44600WU33X	8095. 10931.	LJL44400WU33X LJL44600WU33X	12104. 14538.	LLL44400WU33X LLL44300WU33X	13803. 16067.	AL600LS52K4♦
High Perf. Ammeter	LSI	5.3A-W	400 600	LDL44400WU43X LDL44600WU43X	8779. 11471.	LGL44400WU43X LGL44600WU43X	9167. 12001.	LJL44400WU43X LJL44600WU43X	13175. 15608.	LLL44400WU43X LLL44300WU43X	14874. 17138.	AL600LS52K4♦
High Perf. Energy	LSI	5.3E-W	400 600	LDL44400WU53X LDL44600WU53X	9896. 12590.	LGL44400WU53X LGL44600WU53X	10343. 13179.	LJL44400WU53X LJL44600WU53X	14352. 16786.	LLL44400WU53X LLL44300WU53X	16051. 18315.	AL600LS52K4♦
High Perf. Ammeter	LSIG	6.3A-W	400 600	LDL44400WU44X LDL44600WU44X	11016. 13709.	LGL44400WU44X LGL44600WU44X	11522. 14356.	LJL44400WU44X LJL44600WU44X	15531. 18244.	LLL44400WU44X LLL44300WU44X	17230. 19493.	AL600LS52K4♦
High Perf. Energy	LSIG	6.3E-W	400 600	LDL44400WU54X LDL44600WU54X	12134. 14827.	LGL44400WU54X LGL44600WU54X	12699. 15534.	LJL44400WU54X LJL44600WU54X	16707. 19141.	LLL44400WU54X LLL44300WU54X	18406. 20671.	AL600LS52K4♦

▲ Standard rated (80%). Not available in 100% rated.
■ AL400L61K3 terminal wire ranges are (1) #2 AWG–500 kcmil Al or (1) #2 AWG–600 kcmil Cu.
♦ AL600LS52K3 terminal wire ranges are (2) 2/0 AWG–500 kcmil Al or Cu.

Table 7.78: J-Frame Termination Options

Termination Letter
A = I-Line (See Section 9)
F = No Lugs (includes terminal nut kit on both ends)▲
L = Lugs both ends
M = Lugs ON end Terminal Nut Kit OFF end
P = Lugs OFF end Terminal Nut Kit ON end
N = Plug-in ■
D = Drawout ■
S = Rear Connected ■

For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

H G L 3 6 1 0 0
└Termination Letter

Plug-in

Drawout

Rear Connected

▲ Add TS suffix for circuit breaker without terminal nut kit.
■ For N and D pricing, add termination pricing on page 7-45 to price. For S pricing, add termination pricing on page 7-41 to price.

Table 7.79: H- and J-Frame Interrupting Ratings

Voltage	Interrupting Rating			
	D	G	J	L
240 Vac	25 kA	65 kA	100 kA	125 kA
480 Vac	18 kA	35 kA	65 kA	100 kA

Accessories ..... Page 7-39
Optional Lugs ..... Page 7-42
Dimensions ..... Page 7-55
Enclosures ..... Page 7-56

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LA Mission Critical Circuit Breakers

The LA High Magnetic Withstand MC Circuit Breakers are designed to trip at a higher magnetic trip level (18–20 times handle rating) than typical molded case circuit breakers (MCCBs) (which trip at 5–10 times the handle rating).

The high magnetic withstand value of these LA circuit breakers allow the downstream branch circuit breaker to clear the fault.

Table 7.80: L-Frame—400 A, Thermal-Magnetic, High Magnetic Withstand Circuit Breakers For Mission Critical Loads

Ampere Rating	AC Magnetic Level Factory Set		Standard Interrupting		High Interrupting		Terminal	
	Hold	Trip	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	Wire Range
LA/LH MC Circuit Breaker, 3P, 480 Vac								
200 A	3400 A	4000 A	LAL34200MC	**4962.00**	LHL34200MC	**7941.00**	AL250LAMC	(1) 250–350 kcmil Al (1) 3/0 AWG–350 kcmil Cu
225 A	3825 A	4500 A	LAL34225MC	**4962.00**	LHL34225MC	**7941.00**		
250 A	4250 A	5000 A	LAL34250MC	**5355.00**	LHL34250MC	**8336.00**		
400 A	6000 A	7200 A	LAL34400MC	**6615.00**	LHL34400MC	**9596.00**	AL400LA	(1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al

Table 7.81: L-Frame Interrupting Table

	LAL	LHL
240 Vac	42 kA	65 kA
480 Vac	30 kA	35 kA

PowerPact™ Circuit Breakers with Micrologic™ Electronic Trip Units

The advantages of being able to adjust the trip curve of a circuit breaker equipped with an electronic trip system are obvious. There are other advantages, such as being able to adjust or turn off the instantaneous trip function on some circuit beakers and models of trip units.

Accessories . . . . . Supplemental Digest Pages 3-29–3-30
Compression and PDC Lugs . . . . . Supplemental Digest Page 3-30
Dimensions . . . . . Page 7-54
Enclosures . . . . . Page 7-56

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Table 7.82: Electrical Accessories

New!

Accessory	Description		Rated Voltage		H-, J-, and L-Frame: Factory-Installed Cat. Suffix	H- and J-Frame: Field-Installable Cat. No.	H- and J-Frame: $ Price	L-Frame: Field-Installable Cat. No.	L-Frame: $ Price	M-, P-, and R-Frame: Factory Installed Cat. Suffix	M-, P-, and R-Frame: Field-Installable Cat. No.	M-, P-, and R-Frame: $ Price
Auxiliary and Alarm Switches (OF, SD, SDE) H-, J-, L-, M-, P, and R-Frame	Provides circuit breaker contact status. Note: The location of the accessory in the circuit breaker determines its function.	Standard Min Load = 10mA with 24V	1 auxiliary switch (OF) 1a1b		AA	S29450	**297.00**	S29450	**297.00**	AA	S29450	**297.00**
			2 auxiliary switch (OF) 2a2b		AB	2x S29450	**594.00**	2x S29450	**594.00**	AB	2x S29450	**594.00**
			3 auxiliary switch (OF) 3a3b		AC	—	—	3x S29450	**891.00**	AC	3x S29450	**891.00**
			Alarm Switch (SD) 1a1b		BC	S29450	**297.00**	S29450	**297.00**	BC	S29450	**297.00**
			Overcurrent trip switch (SDE) 1a1b		BD	—	**338.00**	S29450	**297.00**	BD	S29450	**297.00**
			Consisting of:	OF Switch	—	S29450	**297.00**	—	—	—	—	—
				SDE Adapter	—	S29451	**40.00**	—	—	—	—	—
			Alarm switch and Overcurrent trip switch		BE	—	**635.00**	2x S29450	**594.00**	BE	2x S29450	**594.00**
			Consisting of:	OF Switch	—	2x S29450	**594.00**	—	—	—	—	—
				SDE Adapter	—	S29451	**40.00**	—	—	—	—	—
			Auxiliary Switch/Alarm Switch/Adapter (OF/SD/SDE) Kit		—	—	—	—	—	—	S33801♦	**297.00**
		Low Level Min Load = 1mA with 24V	One auxiliary switch (OF) 1a1b		AE	S29452	**372.00**	S29452	**372.00**	AE	S29452	**372.00**
			Two auxiliary switches (OF) 2a2b		AF	2x S29452	**744.00**	2x S29452	**744.00**	AF	2x S29452	**744.00**
			3 auxiliary switches (OF) 3a3b		AG	—	—	3x S29452	**1116.00**	AG	3x S29452	**1116.00**
			Alarm Switch (SD) 1a1b		BH	S29452	**372.00**	S29452	**372.00**	BH	S29452	**372.00**
			Overcurrent trip switch (SDE) 1a1b		BJ	—	**413.00**	S29452	**372.00**	BJ ▼	S29452	**372.00**
			Consisting of:	OF Switch	—	S29452	**372.00**	—	—	—	—	—
				SDE Adapter	—	S29451	**40.00**	—	—	—	—	—
			Alarm switch and Overcurrent trip switch		BK	—	**785.00**	2x S29452	**744.00**	BK▼	2x S29452	**744.00**
			Consisting of:	OF Switch	—	2x S29452	**744.00**	—	—	—	—	—
				SDE Adapter★	—	S29451	**40.00**	—	—	—	—	—
Shunt Trip (MX) H-, J-, and L-Frame	Trips the circuit breaker from a remote location by means of a trip coil energized from a separate supply voltage circuit.		AC	24	SK	S29384		S29384		SK	S33659	
				48	SL	S29385		S29385		SL	S33660	
				110–130	SA	S29386		S29386		SA	S33661	
				220–240	—	—	**717.00**	—	**717.00**	SC	S33662	**755.00**
				208–277	SD	S29387		S29387		SD	S33663	
				380–480	SH	S29388		S29388		SH	S33664	
				525–600	SJ	S29389		S29389		—	—	
			DC	12	SN	S29382		S29382		SN	S33658	
				24	SO	S29390		S29390		SK	S33659	
				30	SU	S29391		S29391		SK	S33659	
				48	SP	S29392	**717.00**	S29392	**717.00**	SL	S33660	**755.00**
				60	SV	S29383		S29383		SL	S33660	
				125	SR	S29393		S29393		SA	S33661	
				250	SS	S29394		S29394		SC	S33662	
Undervoltage Trip (MN) H-, J-, and L-Frame	Instantaneously opens the circuit breaker when the under-voltage trip supply voltage drops to a value between 35% and 70% of its rated voltage. Closing is allowed when the supply voltage of the undervoltage trip reaches 85% of rated voltage.		AC	24	UK	S29404		S29404		UK	S33668	
				48	UL	S29405		S29405		UL	S33669	
				110–130	UA	S29406		S29406		UA	S33670	
				220–240	—	—	**717.00**	—	**717.00**	UC	S33671	**755.00**
				208–277	UD	S29407		S29407		—	—	
				380–480	UH	S29408		S29408		UH	S33673	
				525–600	UJ	S29409		S29409		—	—	
			DC	12	UN	S29402		S29402		—	—	
				24	UO	S29410		S29410		UK	S33668	
				30	UU	S29411		S29411		UK	S33668	
				48	UP	S29412	**717.00**	S29412	**717.00**	UL	S33669	**755.00**
				60	UV	S29403		S29403		UL	S33669	
				125	UR	S29413		S29413		UA	S33670	
				250	US	S29414		S29414		UC	S33671	
Time Delay Unit	Undervoltage trip with externally mounted adjustable time delay unit for UVR of 0.5, 0.9, 1.5, 3.0 seconds before circuit breaker trips		AC/DC	48	—	S33680		S33680		—	S33680▲■	
				100–130	—	S33681	**1140.00**	S33681	**1140.00**	—	S33681▲■	
				220–250	—	S33682		S33682		—	S33682▲■	**1140.00**
				380–480	—	—	—	—	—	—	S33683▲■	
	Undervoltage trip with externally mounted non-adjustable time delay unit of 0.25 sec before circuit breaker trips.		AC/DC	48	—	S29426	**930.00**	S29426	**930.00**	—	—	
				100–130	—	—	—	—	—	—	S33684▲■	**930.00**
				200–250	—	—	—	—	—	—	S33685▲■	
				220–240	—	S29427	**930.00**	S29427	**930.00**	—	—	

▲ Field-installable kit includes time delay module only. Order undervoltage trip separately.
■ Discount schedule DE2F.
♦ P-frame drawout circuit breaker only.
★ SDE Adapter used for H- and J-frame only.
▼ Not available on electrically operated P-frame.

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Table 7.83: Motor Operators for H-, J-, and L-Frame Circuit Breakers

Description		Rated Voltage		Factory Installed Cat. No. Suffix	Field--Installable Kit					
					H-Frame▲		J-Frame		L-Frame 600 A	
					Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Motor Operator	Standard motor for electrically-operated circuit breakers★	AC	48–60	ML	S29440		S31548		S432639	New!
			110–130	MA	S29433		S31540		S432640	
			208–277 220–240	MD	S29434	1161.00	S31541	3123.00	S432641	3395.00
			380–415	MF	—		—		S432642	
			440–480	MH	S29435		S31542		S432647	
		DC	24–30	MO	S29436		S31543		S432643	
			48–60	MV	S29437		S31544		S432644	
			110–130	MR	S29438	1161.00	S31545	3123.00	S432645	3545.00
			250	MS	S29439		S31546		S432646	
	Communicating motor for electrically-operated circuit breakers▼	AC	220–240	NC	S429441	1509.00	S431549	4060.00	S432652	4414.00
	Locking device	Mounting hardware		—	—	—	—	—	S32649	59.00
		Ronis lock		—	S41940	146.00	S41940	146.00	S41940	146.00
		Profalux lock		—	S42888	146.00	S42888	146.00	S42888	146.00
		Mounting hardware plus Ronis lock		—	S429449	155.00	S429449	155.00	—	—
	Operations counter			—	—	—	—	—	S32648	225.00
	Adapter for I-Line circuit breaker			—	S37420	119.00	S37420	119.00	—	—

Table 7.84: Spring-Charging Motors for Electrically-Operated P-Frame Circuit Breakers

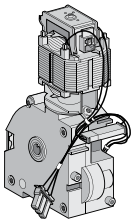
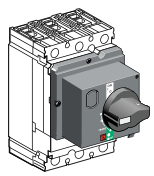
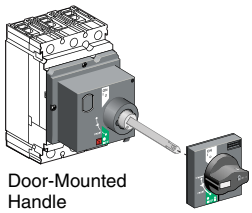
Description		Rated Voltage		Factory Installed		P-Frame (For Field-replacement Only)		Replacement Coils	
				Cat. No. Suffix	$ Price	Spring Charging Motor Cat. No.	$ Price ♦	Opening/Closing Coil Cat. No.	$ Price
 Spring-charging Motor	Standard motor for electrically-operated circuit breakers. Factory-installed includes motor and opening/closing coils.	AC	48	ML	5090.00	S47391	3580.00	S33660	755.00
			100–130	MA		S47395		S33661	
			220–240	MC		S47396		S33662	
			380–415	MF		S47398		S33664	
		DC	24–30	MO	5090.00	S47390	3580.00	S33659	755.00
			48–60	MV		S47391		S33660	
			110–130	MR		S47392		S33661	
			200–250	MS		S47393		S33662	
	Communicating motor mechanism for electrically operated circuit breakers. Factory-installed includes motor and opening/closing coils.	AC	48	NL	5090.00	S47391	3580.00	S33034	755.00
			100–130	NA		S47395		S33035	
			220–240	NC		S47396		S33036	
			380–415	NF		S47398		S33038	
		DC	24–30	NO	5090.00	S47390	3580.00	S33033	755.00
			48–60	NV		S47391		S33034	
			110–130	NR		S47392		S33035	
			200–250	NS		S47393		S33036	

Table 7.85: Rotary Operated Handles

Device		Description	H- and J-Frame▲			L-Frame			P-Frame	
			Factory Installed Cat. No. Suffix	Field Installable Cat. No.	$ Price	Factory Installed Cat. No. Suffix	Field Installable Cat. No.	$ Price	Factory Installed Cat. No. Suffix	$ Price
Direct Mounted	Standard black handle	Handle only	RD10	S29337	225.00	RD10	S32597	366.00	RD10	539.00
	Standard black handle with	Two early-break and two early make switches	—	—	—	—	—	—	RD16	822.00
		One early-break switch	RD12	S29337 + S29345	345.00	RD12	S32597 + S32605	486.00	—	—
		Two early-make switches	RD13	S29337 + S29346	404.00	RD13	S32597 + S29346	545.00	—	—
	Red handle on yellow bezel	Handle only	RD20	S29339	234.00	RD20	S32599	407.00	—	—
		One early-break switch	RD22	S29339 + S29345	354.00	RD22	S32599 + S32605	527.00	—	—
		Two early-make switches	RD23	S29339 + S29346	413.00	RD23	S32599 + S29346	586.00	—	—
	MCC conversion accessory		—	S429341	102.00	—	S32606	102.00	—	—
	CNOMO conversion accessory		—	—	—	—	S32602	102.00	—	—
Door Mounted	Standard black handle	Handle only	RE10	S29338	383.00	RE10	S32598	557.00	RE10	971.00
	Standard black handle with:	Two early-break and two early make switches	—	—	—	—	—	—	RE16	1268.00
		Two early make switches	RE13	S29338 + S29346	503.00	RE13	S32598 + S29346	736.00	—	—
	Red handle on yellow bezel	Handle only	RE20	S29340	399.00	RE20	S32600	597.00	—	—
Rotary Handle Replacement Kit			—	—	—	—	—	—	S33875	795.00
Telescoping			RT10	S29343	492.00	RT10	S32603	617.00	—	—
Accessories	Key lock adapter		—	S429344	58.00	—	S32604	58.00	—	—
	Key locks	Ronis 1351.500	—	S41940	146.00	—	S41940	146.00	—	—
		Profalux KS5 B24 D4Z	—	S42888	146.00	—	S42888	146.00	—	—
		2 Ronis keylocks with 1 key	—	S41950	185.00	—	S41950	185.00	—	—
		2 Profalux keylocks with 1 key	—	S42878	185.00	—	S42878	185.00	—	—
	Indication Auxiliary Switch	One early-break switch	—	S29445	120.00	—	S32605	120.00	—	—
		Two early-make switches	—	S29346	179.00	—	S29346	179.00	—	—


Direct-Mounted handle


Door-Mounted Handle

▲ Not available in H-frame 2P modules.
■ CP1 discount schedule.
♦ DE2F discount schedule.
★ Factory and field-installed standard motor operators for H- and J-frame circuit breakers require the SDE switch and SDE adapter (both included).
Factory and field-installed standard motor operators for L-frame circuit breakers require the SDE switch (included).
▼ Installation requires BSCM with NSX Cord. SeeTable 7.118, page 7-49 for ordering information.

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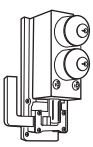
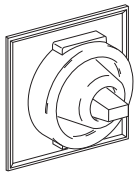
Table 7.86: Locks, Interlocking *New!*

Device	Description		H- and J-Frame			Q-Frame		L-Frame		M- and P-Frame			R-Frame		
			Factory Installed Cat. No. Suffix	Field-Installed Cat. No.	$ Price	Field-Installed Cat. No.	$ Price	Field-Installed Cat. No.	$ Price	Factory Installed Cat. No. Suffix	Field-Installed Cat. No.	$ Price	Factory Installed Cat. No. Suffix	Field-Installed Cat. No.	$ Price
Handle Padlocking Device	Removable (lock OFF only)		—	S29370	**50.00**			S29370	**50.00**	—	S44936	**50.00**	—	S33996	**50.00**
	Fixed (lock OFF or ON)		YP	S29371	**77.00**	QBPA	**77.00**	S32631	**122.00**	YP	S32631	**122.00**	YP	S32631	**122.00**
	Fixed (lock OFF only)▲		YQ	S37422	**122.00**	QBPAF	**77.00**	NJPAF	**122.00**	YQ	MPRPAF	**122.00**	YQ	MPRPAF	**122.00**
	Fixed (lock OFF only)–2P		YQ	H2PHLA	**122.00**	—	—	—	—	—	—	—	—	—	—
Interlocking (Not UL listed)	Mechanical for circuit breakers with rotary handles▲		—	S29369	**494.00**	—	—	S32621	**494.00**	—	S33890	**1220.00**	—	—	—
	Mechanical for circuit breakers with toggles▲		—	S29354	**494.00**	QBMIK	**90.00**	S32614	**494.00**	—	—	—	—	—	—
Key Locking	Provision only, vertical mount, 1 or 2 locks	Kirk	—	—	—	—	—	—	—	JA	—	**323.00**		—	
	Provisions only, vertical mounting one key interlock including padlock provision, open position only.	Kirk	—	—	—	—	—	—	—	JE■★	—	**445.00**	JE★	—	**445.00**
	Provision only, horizontal mount 1 lock, M- and P-frame 1 or 2 locks, R-frame	Kirk	—	—	—	—	—	—	—	JK	—	**323.00**	JK	—	**323.00**
		Ronis	—	—	—	—	—	—	—	JB♦	—	**323.00**	JB	—	**323.00**
		Profalux	—	—	—	—	—	—	—	JD♦	—	**323.00**	JD	—	**323.00**
	Provision and 1 lock, vertical mount	Kirk	—	—	—	—	—	—	—	JG	—	**1796.00**	—	—	—
	Provision and 1 lock, horizontal mount	Kirk	—	—	—	—	—	—	—	JL	—	**1796.00**	JL	—	**1796.00**
		Ronis	—	—	—	—	—	—	—	JC♦	—	**2285.00**	JC	—	**2285.00**
		Profalux	—	—	—	—	—	—	—	JF♦	—	**2285.00**	JF	—	**2285.00**
	Provision and 2 locks keyed alike	Kirk	—	—	—	—	—	—	—	JN	—	**2285.00**	JN	—	**2285.00**
	Provision and 2 locks keyed differently	Kirk	—	—	—	—	—	—	—	JP	—	**3269.00**	JP	—	**3269.00**

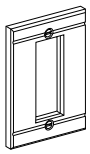


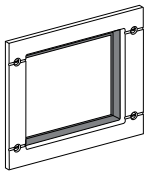
▲ Not available in M frame or HD and HG 2P modules.
■ Not available on M-frame.
♦ Not available for M, P or P frame drawout. Only available on P frame electronic.
★ Not available on I-Line.

New!

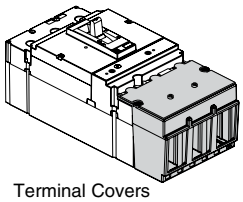


Handle Rubber Boot



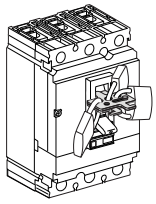


Door Escutcheon

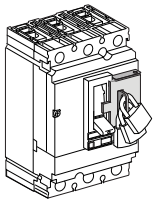


Terminal Covers

Rear Connection



Removable Padlock Attachment



Fixed Padlock Attachment

Table 7.87: Installation Accessories fo H-, J-, and L-Frame Circuit Breakers

Description	H- and J-Frame		L-Frame	
	Field-Installed Cat. No.	$ Price	Field-Installed Cat. No.	$ Price
Front Panel Escutcheon for Toggle Breakers	S29315	**48.00**	32556	**55.00**
Front Panel Escutcheon for Rotary Handle, Motor Operator, or extended escutcheon	S29317	**63.00**	S32558	**74.00**
Phase Barriers (set of 6)	S29329	**53.00**	32570	**72.00**
Handle Rubber Boot▼	S29319	**135.00**	S32560	**171.00**
Sealing Accessories (for front cover screws)	S29375	**42.00**	S29375	**42.00**
DIN rail mounting kit (requires 15 mm depth on a 35 mm DIN rail)▼	S29305	**188.00**	—	—
DIN rail adapter	—	—	—	—
Handle Extensions (set of 5)	S29313	**140.00**	S432553	**165.00**

▼ Not available in HD and HG 2P modules.

Table 7.88: Installation Accessories for M-, P-, and R-Frame Circuit Breakers

Description		Frame	Field-Installed Cat. No.	$ Price
Door Escutcheon	Accessory Cover	M-, P-Frame	S33718△	**176.00**
		R-Frame	S33929	**176.00**
	Toggle Handle	M-, P-Frame	S33717	**47.00**
	Drawout	P-Frame	S33857△	**308.00**
Terminal Covers	Short lug cover 3P	P-Frame	S33932	**165.00**
	Short lug cover 4P		S33933	**216.00**
	Long lug cover 3P		S33934	**216.00**
	Long lug cover 4P		S33935	**281.00**
Replacement Handle	Standard	R-Frame	S33997	**111.00**
	Standard Short	M-, P-Frame	S46998	**44.00**
	Long	M-, P-Frame	S46996	**44.00**

△ DE2F discount schedule.

New!

Table 7.89: Rear Connections

Device	Description	H-Frame				J-Frame				L-Frame			
		Poles	Factory-Installed Termination No.	Field-Installable Cat. No.	$ Price	Poles	Factory-Installed Termination No.	Field-Installed Cat. No.	$ Price	Poles	Factory-Installed Termination No.	Field-Installed Cat. No.	$ Price
Mixed Rear Connection Kit□		2	S	—	—	2	S	—	—	3	S	S32477	**1059.00**
		3	S	S37432	**381.00**	3	S	S37437	**381.00**	4	S	S32478	**1344.00**
Consisting of:	Short rear connections (set of 2)	2 or 3	—	2x S37433◊	**84.00**	2 or 3	—	2x S37438◊	**84.00**	3	—	2x S432475◊	**219.00**
	Long rear connections (set of 2)		—	S37434	**105.00**		—	S37439☆	**105.00**		—	2x S432476◊	**261.00**
	Short terminal cover (3P)	3	—	S37436	**119.00**	3	—	S37440	**119.00**	3	—	2x S32562◊	**149.00**
	Short terminal cover (4P)	4	—	—	—	—	—	—	—	4	—	2x S32563◊	**161.00**

□ Kit contains 4 short rear connections, 2 long rear connections (4 long rear connections for 4P), hardware, and 2 terminal covers..
◊ Price shown is for quantity one.
☆ For use with 3P circuit breakers only.

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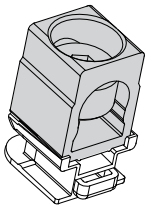


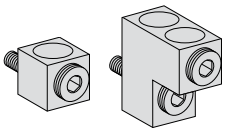
J-Frame Lug

Table 7.90: Mechanical Lug Kits for H-Frame and J-Frame Circuit Breakers▲

Description	Circuit Breaker Application			Ampere Rating	Number of Wires Per Lug and Wire Range	Kit Cat. No.	Qty Per Kit	$ Price Per Kit
	Standard	Ampere Rating	Optional					
Al Lugs for Use with Al or Cu Wire	HD, HG, HJ, HL	15–150 A			(1) 14–3/0 AWG Al or Cu	AL150HD	3	**75.00**
	JD, JG, JJ, JL	150–175 A			(1) 4-4/0 AWG Al or Cu	AL175JD	3	**113.00**
	JD, JG, JJ, JL	200–250 A	JD,JG,JJ,JL	150–175 A	(1) 3/0–350 kcmil Al or Cu	AL250JD	3	**113.00**
Cu Lugs for Use with Cu Wire Only			HD,HG,HJ,HL	15–150 A	(1) 14–2/0 AWG Cu	CU150HD	3	**156.00**
			JD,JG,JJ,JL	150–250 A	(1) 1/0–300 kcmil Cu	CU250JD	3	**314.00**
Control Wire Terminal for H-frame lug kit						S37423	2	**53.00**
Control Wire Terminal for J-frame lug kit						S37424	2	**53.00**

▲ See page 7-44 for terminal nuts/bus bar connections.

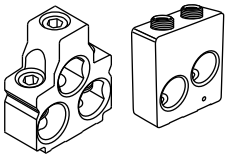
New!



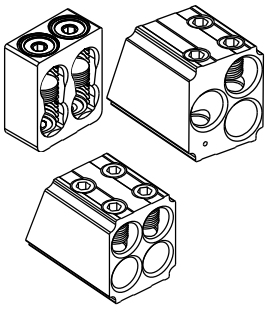
L-Frame Lugs

Table 7.91: Mechanical Lug Kits for L-Frame Circuit Breakers

Description	Circuit Breaker Application				Number of Wires Per Lug and Wire Range	Kit Cat. No.	Qty Per Kit	$ Price Per Kit
	Ampere Rating	Poles	Unit Mount	I-Line				
Al Lugs for Use with Al or Cu Wire	250	3	X	X	(1) 2 AWG–500 kcmil Al (1) 2 AWG–600 kcmil Cu	AL400L61K3	3	**143.00**
		4	X	—		AL400L61K4	4	**176.00**
	400/600	3	X	—	(2) 2/0 AWG–500 kcmil Al or Cu	AL600LS52K3	3	**341.00**
		4	X	—		AL600LS52K4	4	**449.00**
	400/600	3	X	X	(2) 3/0 AWG–500 kcmil Al or Cu	AL600LF52K3	3	**831.00**
Cu Lugs for Use with Cu Wire Only	250/400	3	X	X	(1) 2 AWG–600 kcmil Cu	CU400L61K3	3	**755.00**
		4	X	—		CU400L61K4	4	**983.00**
	400/600	3	X	—	(2) 2/0 AWG–500 kcmil Cu	CU600LS52K3	3	**1832.00**
		4	X	—		CU600LS52K4	4	**2385.00**
	400/600	3	X	X	(2) 3/0 AWG–500 kcmil Cu	CU600LF52K3	3	**2395.00**



M- and P-Frame Lugs (800 A and below)



P-Frame Lugs (Above 800 A)

Table 7.92: Mechanical Lug Kits for M-Frame, P-Frame and R-Frame Circuit Breakers▼

Description	Circuit Breaker Application				Wires per Lug and Wire Range	Cat. No.	Lugs Per Kit	$ Price Per Kit
	Standard	Rating	Optional	Ampere Rating				
Al Lugs for AL or Cu Wire	M-, P-Frame	800 A	—	800 A	(3) 3/0 AWG-500 kcmil	AL800M23K	3	**284.00**
						AL800M23K4	4	**378.00**
		1200 A	PG, PJ, PL, MG, MJ	800 A	(4) 3/0 AWG-500 kcmil	AL1200P24K■	1	**155.00**
		—	PG, PJ, PL, MG, MJ	800 A	(2) 3/0 AWG-600 kcmil	AL800P6K■	3	**416.00**
						AL800P6K4■	4	**554.00**
		—	PG, PJ, PL, MG, MJ	800 A	(2) 3/0 AWG-750 kcmil 750 kcmil: compact AL only	AL800P7K■	3	**464.00**
						AL800P7K4■	4	**602.00**
	P-Frame	1200 A	PG ,PJ, PL	800 A	(4) 3/0 AWG-500 kcmil	AL1200P25K♦	3	**378.00**
						AL1200P25K4♦	4	**504.00**
		—	PG, PJ,P L	800–1200 A	(3) 350-600 kcmil	AL1200P6KU♦	3	**786.00**
						AL1200P6KU4♦	4	**1038.00**
	PG,PJ,PL	—	PG, PJ, PL	1200 A	(3) 3/0 AWG-750 kcmil 750 kcmil: compact AL only	AL1200P7KU♦	3	**1233.00**
						AL1200P7KU4♦	4	**1635.00**
	R-Frame	1200 A	I-Line	—	(4) 3/0 AWG-600 kcmil	AL1200R53K	1	**215.00**
		2500 A	Unit Mount	—	(1) 3/0 AWG-750 kcmil	AL2500RK★	2	**132.00**
Cu Lugs for Cu Wire Only□	M-, P-Frame	—	PJ	100–150 A	(1) 1-1/0 AWG	CU250P1K△	3	**990.00**
		800 A	MG, MJ, PG, PJ, PL	—	(3) 3/0 AWG-500 kcmil	CU800M23K	3	**1647.00**
						CU800M23K4	4	**2190.00**
		1200 A	MG, MJ, PG, PJ, PL	800–1200 A	(4) 3/0 AWG-500 kcmil	CU1200P24K■	1	**569.00**
	P-Frame	1200 A	PG, PJ, PL	800–1200 A	(4) 3/0 AWG-500 kcmil	CU1200P25K♦	3	**4886.00**
						CU1200P25K4	4	**6503.00**
	R-Frame	1200 A	I-Line	—	(4) 3/0 AWG-500 kcmil	CU1200R53K	1	**548.00**

■ Does not fit onto ON end of unit-mount P-frame circuit breakers.
♦ For unit-mount circuit breaker only.
★ All unit-mount R-frame circuit breakers require terminal pads for mounting lugs of any type. See page 7-44.
▼ For lug with a tapped hole for control wire, add a "T" before the "K" in the catalog number (for example, AL800P6TK).
△ This lug can only be used on low amp PJ frame breakers where the Instantaneous setting must not be turned OFF. The cables must be laced with rope per lug instructions.
□ Not available with tapped hole for control wire.

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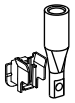
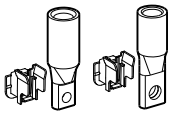




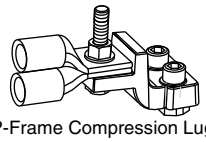
J-Frame Compression Lugs

Table 7.93: Compression Lug Kits for PowerPact™ Circuit Breakers

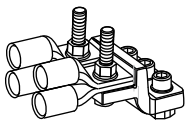
Description	Circuit Breaker Type	Ampere Rating	System Range	Mounting Type	Dimension A (in)	Max. Lugs per Terminal	Cat. No.	Qty. Per Kit	$ Price Per Kit
Compression Lug Kits for H-Frame and J-Frame Circuit Breakers									
Aluminum Compression Lug Kits	H-frame	60 A	6–2 AWG Al or Cu	Unit/I-line♦	1.2	1	YA060HD	3	**194.00**
		150 A	1/0–4/0 AWG Al or Cu		2.5	1	YA150HD	3	**294.00**
	J-frame	150 A	1–3/0 AWG Al or Cu		1.2	1	YA150JD	3	**237.00**
		250 A	3/0–350 kcmil Al or Cu		2.5	1	YA250J35	3	**305.00**
Copper Compression Lug Kits	H-frame	60 A	6–1/0 AWG Cu		1.0	1	CYA060HD	3	**194.00**
		150 A	4–2/0 AWG Cu		1.2	1	CYA150HD	3	**194.00**
	J-frame	150 A	6–1/0 AWG Cu		0.7	1	CYA150JD	3	**194.00**
		250 A	2/0–300 kcmil Cu		1.1	1	CYA250J3	3	**194.00**
Compression Lug Kits for L-Frame Circuit Breakers									
Aluminum Compression Lug Kits	L-frame	250 A	4-300 kcmil Al/Cu	Unit/I-line♦	1.2	1	YA400L31K3	3	**294.00**
		400 A	4-300 kcmil Al/Cu		2.5	2	YA600L32K3	6	**540.00**
		250 A	2/0-500 kcmil Al/Cu			1	YA400L51K3	3	**361.00**
		600 A	2/0-500 kcmil Al/Cu			2	YA600L52K3	6	**718.00**
		400 A	500-750 kcmil Al 500 kcmil Cu			1	YA400L71K3	3	**425.00**
		250 A	4-300 kcmil Al/Cu			1	YA400L31K4	4	**383.00**
		400 A	4-300 kcmil Al/Cu			2	YA600L32K4	8	**709.00**
		250 A	2/0-500 kcmil Al/Cu			1	YA400L51K4	4	**474.00**
		600 A	2/0-500 kcmil Al/Cu		1.2	2	YA600L52K4	8	**950.00**
		400 A	500-750 kcmil Al 500 kcmil Cu		2.5	1	YA400L71K4	4	**560.00**
Copper Compression Lug Kits	L-frame	250 A	2/0-300 kcmil Cu	Unit/I-line♦	1.2	1	CYA400L31K3	3	**461.00**
		400 A	2/0-300 kcmil Cu		2.5	2	CYA600L32K3	6	**873.00**
		250 A	250-500 kcmil Cu			1	CYA400L51K3	3	**384.00**
		600 A	250-500 kcmil Cu			2	CYA600L52K3	6	**764.00**
		250 A	2/0-300 kcmil Cu			1	CYA400L31K4	4	**606.00**
		400 A	2/0-300 kcmil Cu			2	CYA600L32K4	8	**1147.00**
		250 A	250-500 kcmil Cu			1	CYA400L51K4	4	**505.00**
		600 A	250-500 kcmil Cu			2	CYA600L52K4	8	**1011.00**
Compression Lug Kits for M-Frame, P-Frame, and R-Frame Circuit Breakers									
Aluminum Compression Lug Kits	M-, P-frame	250 A	2/0-300 kcmil	Unit/I-line♦	3.7	2	YA250P3	1	**663.00**
		300 A	4/0-500 kcmil		3.9	2	YA300P5	1	**519.00**
		400 A	2/0-300 kcmil		4.3	2	YA400P3	2	**542.00**
		400 A	500-750 kcmil		3.7	2	YA400P7	1	**747.00**
		600 A	4/0-500 kcmil		3.9	2	YA600P5	2	**788.00**
		800 A	500-750 kcmil		4.3	2	YA800P7	2	**845.00**
	R-frame▲	1200 A	2/0-300 kcmil	I-line♦	3.8	4	YA1200R3	4	**663.00**
		1200 A	4/0-500 kcmil		4.0	4	YA1200R5	4	**707.00**
		1200 A	500-750 kcmil		4.4	4	YA1200R7	4	**888.00**
		2000 A	2/0-300 kcmil	Unit♦	▲	8	YA2000R3	2	**317.00**
		2000 A	4/0-500 kcmil		▲	8	YA2000R5	2	**291.00**
		2500 A	500-750 kcmil		▲	8■	YA2500R7	2	**350.00**
Copper Compression Lug Kits	M-, P-frame	400 A	4/0-500 kcmil	Unit♦	3.3	2	CYA400P5	1	**651.00**
		600 A	4/0-500 kcmil		3.3	2	CYA600P5	2	**753.00**
		800 A	500-750 kcmil		3.6	2	CYA800P7	2	**554.00**
	R-frame	1200 A	4/0-500 kcmil	I-Line♦	3.5	4	CYA1200R5	4	**987.00**
		1200 A	500-750 kcmil		3.8	4	CYA1200R7	4	**920.00**

▲ All unit-mount R-frame circuit breakers require terminal pads for mounting lugs of any type. See page 7-44.
■ 9 lugs for 3000 A circuit breakers
♦ Not for use on I-Line™ circuit breakers unless wire bending space is adequate.

New!



P-Frame Compression Lug Kit



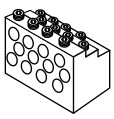
R-Frame Compression Lug Kit

PDC6HD6

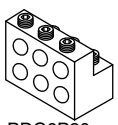
PDC6JD4

PDC3HD2

PDC3JD20



PDC12P4



PDC6P20

Crimp lug or PDC connectors extension past end or circuit breaker "A" See Table

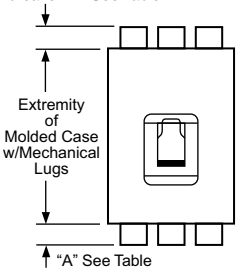


Table 7.94: Power Distribution Connectors for H-Frame, J-Frame and L-Frame Circuit Breakers

Use with Circuit Breaker Type	Circuit Breaker Ampere Rating	Wires Per Terminal & Wire Range	Dimension A (in.)	Cat. No.	Qty. Per Kit	$ Price Per Kit
HD, HG, HJ, HL★	15–150	(6) 14–6 AWG Cu	1.0	PDC6HD6	3	**443.00**
	15–150	(3) 14–2 AWG Cu	1.2	PDC3HD2	3	**434.00**
JD, JG, JJ, JL★	150–250	(6) 14–4 AWG Cu	1.0	PDC6JD4	3	**305.00**
	150–250	(2) 14–1 AWG and (1) 3–2/0 AWG Cu	1.5	PDC3JD20	3	**594.00**
LD, LG, LJ, LL	150–600	(3) 14–1 AWG and (2) 3–2/0 AWG	1.28△	PDC5DG20L3	3	**387.00**
	150–600	(12) 14–4 AWG	1.31△	PDC12DG4L3	3	**387.00**

★ OFF end only when OFF end is the load end.

Table 7.95: Power Distribution Connectors for M-Frame and P-Frame Circuit Breakers▼

Use for multiple load connections on one circuit breaker in place of standard distribution block to save space and time.
- Use on load end of circuit breaker only
- Use in UL508 Industrial Control applications only.
- Use in UL1995/CSA C22.2 No. 236 heating and cooling equipment.
- For Cu wire only.

Ampere Rating	(Wires Per Terminal) Wire Range	Cat. No.	Qty Per Kit	$ Price Per Kit
250–1200 A	(6) 12–2/0 AWG Cu	PDC6P20	3	**573.00**
	(6) 12–2/0 AWG Cu	PDC6P204	4	**756.00**
250–1200 A	(12) 10–4 AWG Cu	PDC12P4	3	**866.00**
		PDC12P44	4	**929.00**

▼ Not for use with I-Line™ circuit breakers.
△ Kit includes long terminal shield and cover, which adds 1.65 inches to standard lug with short terminal shield.

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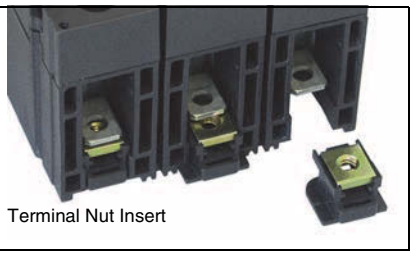
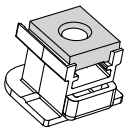
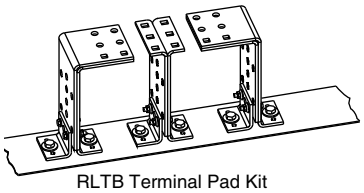


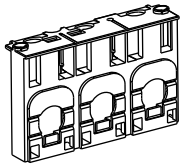
Terminal Nut Insert



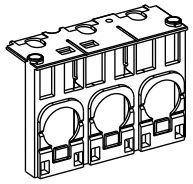
H-Frame Lug With Terminal Nut



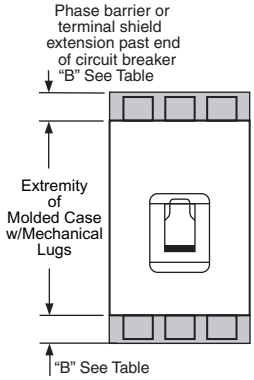
RLTB Terminal Pad Kit

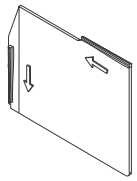


H-Frame Short Lug Shield



J-Frame Short Lug Shield





R-Frame Phase Barrier

Table 7.96: Terminal Nuts for Bus Bar Connection of H-Frame and J-Frame Circuit Breakers

Description	Frame	Tap	Cat. No.	Qty Per Kit	$ Price Per Kit
H-Frame Terminal Nut Insert–English	HD/HG/HJ/HL	1/4-20	S37425	2	**53.00**
H-Frame Terminal Nut Insert–English	HD/HG/HJ/HL	1/4-20	S37444	3	**75.00**
H-Frame Terminal Nut Insert–Metric	HD/HG/HJ/HL	M6	S37426	2	**53.00**
J-Frame Terminal Nut Insert–English	JD/JG/JJ/JL	1/4-20	S37427	2	**75.00**
J-Frame Terminal Nut Insert–English	JD/JG/JJ/JL	1/4-20	S37445	3	**113.00**
J-Frame Terminal Nut Insert–Metric	JD/JG/JJ/JL	M8	S37428	2	**75.00**
Control Wire Terminal for H-Frame Terminal Nut	HD/HG/HJ/HL		S37429	2	**53.00**
Control Wire Terminal for J-Frame Terminal Nut	JD/JG/JJ/JL		S37430	2	**53.00**

Table 7.97: Bus Bar Connections Hardware for L-Frame, M-Frame and P-Frame Circuit Breakers

New!

Frame	Description	Term. No.	Poles	Cat. No.	$ Price
L-Frame	Set of 4 terminal screws and washers for one side	F	4	S36967	**31.00**
M- and P-Frame	Bus Connector Kit for one pole, one end		1	S33928	**28.00**

Table 7.98: Terminal Pad Kits for R-Frame Circuit Breakers

R-Frame Circuit Breaker	Terminal Pad Kit		Field-Installable Kits			
	Usage	Lugs per Phase	3P Kit (One End Only)		4P Kit (One End Only)	
			Cat. No.	$ Price.	Cat. No.	$ Price
3000 A, 100% Rated	Required for cable or bus	9	RL3TB	**1440.00**	RL3TB4	**2016.00**
3000 A, Standard (80% Rated)	Required for cable or bus	8	RLTB	**914.00**	RLTB4	**1280.00**
2500 A, 100% Rated	Required for cable or bus					
2500 A, Standard (80% Rated)	Required for cable, optional for bus					
All Other R-Frame CIrcuit Breakers	Required for cable, optional for bus					

For cable connection to RLTB, use AL2500RK lug. See page 7-43.

Table 7.99: Terminal Shields and Phase Barriers

Used With	Description				Dimension B (in.)	Cat. No.	Qty Per Kit	$ Price
H- and J-Frame Mechanical Lugs	Short Lug Shield▲	Frame	Max. Wire Size					
		H-Frame 60 A	3 AWG		0.50	S37446	1	**149.00**
		H-Frame 150 A	3/0 AWG		0.50	S37447	1	**149.00**
		J-Frame	350 kcmil		0.24	S37448	1	**149.00**
H- and J-Frame Power Distribution Connectors and Compression Lugs		Compatible with:						
		PDC	Compression Lugs					
			Aluminum	Copper				
	H-Frame Long Lug Shield	PDC6HD6	YA060HD	CYA060HD	2.24	S37449	1	**209.00**
		PDC3HD2	YA150HD	CYA150HD				
	J-Frame Long Lug Shield	PDC6JD4	YA150JD	CYA150JD	1.68	S37450	1	**209.00**
		PDC3JD2	■	CYA250J3				
M-, P-Frame	Phase Barriers					S33646	3	**47.00**
R-Frame						S33998		**47.00**

New!

▲ Short lug shields provide IP20 protection for mechanical lugs and are compatible with control wire terminals.
■ J-frame terminal shield is not compatible with the YA250J35 compression terminal.

Table 7.100: Miscellaneous H-, J-, and L-Frame Circuit Breaker Accessories

Accessory	Description	Field-Installed Cat. No,	$ Price
Spare Parts	Bag of screws for accessory cover, L-frame	S432552	**63.00**
	1 spare toggle extension, L-frame	32595	**342.00**
	Set of 10 identification labels	LV429226	**82.00**

♦ DE5A Discount Schedule

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H-Frame and J-Frame Plug-in Mounting

H-Frame and J-Frame Drawout Mounting

Table 7.101: Plug-In and Drawout Mountings for H- and J-Frame Circuit Breakers (3P or 2P in a 3P module)

Description			Factory Installed Cat. No.	Field-Installed Cat. No.	$ Price
Complete Factory-Assembled Circuit Breakers	Plug-in base shipped with circuit breaker		N		638.00
	Drawout cradle shipped with circuit breaker		D		1419.00
Special Order Options for Plug-In and Drawout Circuit Breakers	Plug-In Base	Circuit breaker Only	HJ00		290.00
		Plug-in base kit		S29278	348.00
	Drawout Cradle	Circuit breaker only	HJ00		485.00
		Plug-in base kit		S29278	348.00
		Cradle side plates (fixed part of chassis)		S29282	587.00
		Circuit breaker side plates (moving part of chassis)		S29283	195.00
Accessories for Plug-In and Drawout	H-Frame Shutter Kit (set of two)			S37442	48.00
	J-Frame Shutter Kit (set of two)			S37443	48.00
	Secondary Disconnect Blocks	Fixed part 9-wire connector (mounted on base)		S29273	95.00
		Moving part 9-wire connector (mounted on circuit breaker)		S29274	60.00
		Support for 2-moving connectors		S29275	33.00
	Extended escutcheon with extended toggle handle			S29284	77.00
	Two position indicating switches (connected/disconnected)			S29287	207.00
	H-Frame Short Terminal Cover (3P			S37436	119.00
	J-Frame Short Terminal Cover (3P)			S37440	119.00

L-Frame Plug-In Mounting

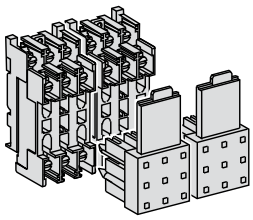
New!

L-Frame Drawout Mounting

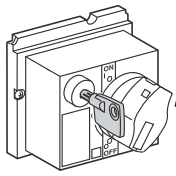
Table 7.102: Plug-In and Drawout Mountings for L-Frame Circuit Breakers

Description		Poles	Plug-in Mounting			Drawout Mounting		
			Factory Installed Cat. No.	Field-Installed Cat. No.	$ Price	Factory Installed Cat. No.	Field-Installed Cat. No.	$ Price
Kit (stationary and moving parts)		3	N		1542.00	D		2466.00
		4	N		2082.00	D		3281.00
Stationary Part	Plug-in base	3		S32514	1065.00		S32514	1065.00
		4		S32515	1439.00		S32515	1439.00
	Fixed part of chassis						S32532	693.00
Moving Part	Circuit breaker only		HJ00		710.00	HJ00		710.00
	Moving part of chassis						S32533	231.00
	Short terminal covers	3		2x S32562	149.00		2x S32562	149.00
		4		2x S32563	161.00		2x S32563	161.00

▲ Price shown is for quantity of 1.



L-Frame Disconnecting Blocks



New!

L-Frame Locking Device

Table 7.103: Plug-In and Drawout Accessories for L-Frame Circuit Breakers

Description			Field-Installed Cat. No.	$ Price
Secondary Disconnecting Blocks	Fixed Part	9-wire connector	S29273	95.00
	Moving Part	9-wire connector	S32523	60.00
		Support for 3 moving connectors	S32525	43.00
	Fixed + Moving	9-wire manual auxiliary connector	S29272	480.00
Shutters	Two shutters for plug-in base		32521	81.00
Chassis Accessories	Extended escutcheon for toggle		S32534	104.00
	Locking device (key lock is not included)		S29286	164.00
	Two position indicating switches (connected/disconnected)		29287	207.00

Table 7.104: Termination Options

Termination Letter
N = Plug-in
D = Drawout

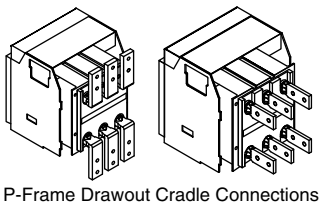
For factory-installed termination, place termination letter in the third block of the circuit breaker catalog number.

LGL36400U31X
└Termination No.

Table 7.105: Drawout Cradle and Accessories for P-Frame Circuit Breakers

Description		Cat. No.	$ Price
Drawout Cradle		Product Selector	6400.00
Cradle Connectors	Front Connected Flat (FCF)	SFCF12■♦	716.00
	Rear Connected T Horizontal/Vertical (RCTH/RCTV)	SRCTV12■♦	408.00
Cradle Accessories	Modbus™ cradle communication module	S33852	2237.00
	Safety shutters	S48933♦	342.00
	Secondary disconnects terminal shield	S33763♦	220.00
	Cradle position switch 1a/1b Form C— Connected/test/disconnected	S33170♦	148.00
	Low level cradle position switch 1a/1b Form C—Connected/test/disconnected	S33171♦	216.00
	Cell keying kit	S33767♦	97.00
	Disconnected position key locking—provision for Kirk or Federal Pioneer Lock	S33772♦	908.00
	Door interlock kit	S33786♦	330.00
	Racking interior kit	S33788♦	358.00
	Door escutcheon (for replacement only, included with circuit breaker)	S33857♦	308.00
	Transparent cover	S33859♦	1290.00
	Push-in terminal kit (3 wires)	S33098♦	120.00
	Push-in terminal kit (6 wires)	S33099♦	240.00
	Finger cluster	S33166♦	164.00
	Cluster grease (12 oz. tube)	S48899♦	132.00

■ Needs 2 kits per cradle.
♦ Discount Schedule DE2F



P-Frame Drawout Cradle Connections

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New!

PowerPact™ H-, J-, and L-Frame Micrologic™ Trip Units

Micrologic Standard Trip Unit

Micrologic Ammeter and Energy Trip Unit

PowerPact™ H-, J-, and L-frame molded case circuit breakers may be specified with any of the following Micrologic Electronic Trip Units.

Micrologic Standard 3.2/3.3 Trip Units

- True RMS sensing
- LI, LSI trip configurations
- Field-interchangeable trip units
- LED long-time pickup and trip indication
- Test kits available
- Thermal imaging

Micrologic Ammeter 5.2A/5.3A/6.2A/6.3A Trip Units

Includes all features listed for Micrologic standard trip unit, as well as:

- Advanced user interface
- Neutral protection
- Incremental fine tuning of settings
- Up to 12 alarms
- Digital ammeter—phase and neutral (4-pole only)
- Phase loading bar graph
- Maintenance indicators including contact wear, number of operations, operating hours, and load profiles
- Cause of trip information for troubleshooting assistance
- LCD Display
- Zone-selective interlocking (ZSI) (short-time & ground-fault)
- Optional Modbus™ communications—PowerLogic™ compatible

Micrologic Energy 5.2E/5.3E/6.2E/6.3E Trip Units

Includes all features listed for Micrologic ammeter trip unit, as well as:

- Ground-fault trip with programmable ground fault alarm (available on 6.2E/6.3E only)
- Power and energy measurement
- Power quality measurements
- Current demand and power demand measurements

Table 7.106: Micrologic Trip Units☆ for PowerPact H-, J-, and L-Frame Circuit breakers

x– Standard Feature o – Available Option

Features	Standard		Ammeter		Energy	
	3.2/3/3	3.2S/3.3S	5.2A/5.3A	6.2A/6.3A	5.2E/5.3E	6.2E/6.3E
LI	x					
LSI★		x	x		x	
LSIG / Ground-Fault Trip▼				x		x
Ground-Fault Alarm/Trip▼				x		x
Current Setting Directly in Amperes	x	x	x	x	x	x
True RMS Sensing	x	x	x	x	x	x
UL Listed	x	x	x	x	x	x
Thermal Imaging	x	x	x	x	x	x
LED for Long-time Pickup	x	x	x	x	x	x
LED for Trip Indication	x	x	x	x	x	x
LED for Green "Ready"	x	x	x	x	x	x
Up to 12 Alarms Used Together			x	x	x	x
Digital Ammeter			x	x	x	x
Zone-selective Interlocking△			x	x	x	x
Communications	o	o	o	o	o	o
LCD Display			x	x	x	x
Front Display Module FDM121			o	o	o	o
Advanced User Interface			x	x	x	x
Neutral Protection▼			x	x	x	x
Contact Wear Indication□			x	x	x	x
Incremental Fine Tuning of Settings			x	x	x	x
Load Profile□,◊			x	x	x	x
Power Measurement					x	x
Power Quality Measurements					x	x

★ The LSI with 3.2S/3.3S trip units have fixed short time and long time delays.
▼ Requires neutral current transformer on the three-phase four-wire loads
△ ZSI for H/J frames in only IN. for L-frame ZSI is In and OUT.
□ Indication available using the communication system only.
◊ % of hours in 4 current ranges: 0–49%, 50–79%, 80–89%, and >90% In.
☆ DC not available with electronic trip units.

Table 7.107: Micrologic Trip Unit Settings for H- and J-Frame

Model	Trip Function	Trip Unit	Ampere Setting
Standard	LI	3.2	15-20-25-30-35-40-45-50-60 35-40-45-50-60-70-80-90-100 50-60-70-80-90-100-110-125-150 70-80-100-125-150-175-200-225-250
	LSI	3.2S	15-20-25-30-35-40-45-50-60 35-40-45-50-60-70-80-90-100 50-60-70-80-90-100-110-125-150 70-80-100-125-150-175-200-225-250
Ammeter	LSI	5.2A	15–60 35–100 50–150 70–250
	LSIG	6.2A	15–60 35–100 50–150 70–250
Energy	LSI	5.2E	15–60 35–100 50–150 70–250
	LSIG	6.2E	15–60 35–100 50–150 70–250

Table 7.108: Micrologic Trip Unit Settings for L-Frame

Model	Trip Function	Trip Unit	Ampere Setting
Standard	LI	3.3	70-80-100-125-150-175-200-225-250 125-150-175-200-225-250-300-350-400 200-225-250-300-350-400-450-500-600
	LSI	3.3S	70-80-100-125-150-175-200-225-250 125-150-175-200-225-250-300-350-400 200-225-250-300-350-400-450-500-600
Ammeter	LSI	5.3A	125–400 200–600
	LSIG	6.3A	125–400 200–600
Energy	LSI	5.3E	125–400 200–600
	LSIG	6.3E	125–400 200–600

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PowerPact P- and R-Frame Micrologic Trip Units

Standard Trip Unit | Ammeter Trip Unit | Power Trip Unit | Harmonic Trip Unit | Adjustable Rating Plug

PowerPact™ P- and R-frame molded case circuit breakers may be specified with any of the following Micrologic Electronic Trip Units.

Micrologic (Standard) 3.0 and 5.0 Trip Units

- True RMS sensing
- LI, LSI trip configurations
- Field-interchangeable long-time rating plugs
- LED long-time pickup indication
- Test kits available
- Thermal imaging

Micrologic (Ammeter) 3.0A, 5.0A and 6.0A Trip Units

Includes all features listed for Micrologic standard trip unit, as well as:

- LSIG trip configurations
- Digital ammeter—phase and neutral (4-pole only)
- Phase loading bar graph
- LED trip indication
- Zone-selective interlocking (ZSI) (short-time & ground-fault)
- Optional Modbus™ communications—PowerLogic™ compatible

Micrologic (Power) 5.0P and 6.0P Trip Units

Power measurement and advanced protection features includes all features listed for Micrologic ammeter trip unit, as well as:

- LSI trip configuration with programmable ground fault alarm
- LSIG (Ground-fault trip) with programmable ground fault alarm
- Incremental “fine tuning” of L, S, I, and G pickup and delay settings
- LCD dot matrix display and LED trip indication
- Advanced user interface
- Advanced protection IDMTL—selectable long-time delay bands
- Neutral protection
- Power measurement
- Contact wear indication
- Modbus communications—PowerLogic compatible
- Local and remote settings

Micrologic (Harmonic) 5.0H and 6.0H Trip Units

Power quality measurement and advanced protection features. Includes all features listed for the Micrologic power trip unit, as well as:

- Enhanced power measurements functions
- Power quality measurements

Adjustable Rating Plugs for PowerPact™ P-Frame and R-Frame and Masterpact™ NT and NW Circuit Breakers—Selection

To provide maximum design flexibility, system protection, and field upgradeability, each Micrologic™ trip unit is equipped with an interchangeable long-time rating plug. Each trip unit requires an adjustable rating plug to determine the long-time pickup range of the circuit breaker. These plugs are factory installed on new trip units, or can be ordered separately for field-installable upgrades.

Adjustable rating plugs are offered in eight different ranges of long-time pickup adjustments. The following chart show the ranges of adjustments. Each adjustment times the sensor rating (Ir X In) of the circuit breaker sets the long-time pickup value of the circuit breaker.

Table 7.109: Long-time Pickup Settings

Rating Plug	Long-time Pickup Settings								
A	.40	.45	.50	.60	.63	.70	.80	.90	1.0
B	.40	.44	.50	.56	.63	.75	.88	.95	1.0
C	.42	.50	.53	.58	.67	.75	.83	.95	1.0
D	.40	.48	.64	.70	.80	.90	.93	.95	1.0
E	.60	.70	.75	.80	.85	.90	.93	.95	1.0
F	.84	.86	.88	.90	.92	.94	.96	.98	1.0
G	.66	.68	.70	.72	.74	.76	.78	.80	.82
H	.48	.50	.52	.54	.56	.58	.60	.62	.64

Table 7.110: Micrologic Trip Units

x– Standard Feature o – Available Option

Features	Standard		Ammeter			Power		Harmonic	
	3.0	5.0	3.0A	5.0A	6.0A	5.0P	6.0P	5.0H	6.0H
LI	x		x						
LSI (Instantaneous can be turned off)		x		x	x	x	x	x	x
LSIG / Ground-Fault Trip▲					x		x		x
Ground-Fault Alarm (No Trip) ▲■						x		x	
Ground-Fault Alarm and Trip ▲							x		x
Adjustable Rating Plugs	x	x	x	x	x	x	x	x	x
True RMS Sensing	x	x	x	x	x	x	x	x	x
UL Listed	x	x	x	x	x	x	x	x	x
Thermal Imaging	x	x	x	x	x	x	x	x	x
Phase Loading Bar Graph			x	x	x	x	x	x	x
LED for Long-time Pickup	x	x	x	x	x	x	x	x	x
LED for Trip Indication			x	x	x	x	x	x	x
Digital Ammeter			x	x	x	x	x	x	x
Zone-selective Interlocking			x	x	x	x	x	x	x
Communications			o	o	o	x	x	x	x
LCD Dot Matrix Display						x	x	x	x
Advanced User Interface						x	x	x	x
Protective Relay Functions						x	x	x	x
Neutral Protection						x	x	x	x
Contact Wear Indication						x	x	x	x
Incremental Fine Tuning of Settings						x	x	x	x
Selectable Long-time Delay Bands						x	x	x	x
Power Measurement						x	x	x	x
Power Quality Measurements								x	x
Waveform Capture								x	x

▲ Requires neutral current transformer in 3Ø4W systems.
■ Requires M2C or M6C Programmable Contact Module.

Table 7.111: Micrologic Trip Unit and Options

Model	Protection	Additional Features	Field-Installable Cat. No.♦	Kit $ Price / Circuit Breaker $ Price Adder
2.0 (IEC only)	LSO	None	S132R	**2920.00**
3.0 (UL/ANSI only)	LI		S131A	**2920.00**
5.0	LSI		S133A	**4176.00**
2.0A (IEC only)	LSO	Ammeter	S142R★	**4554.00**
3.0A (UL/ANSI only)	LI		S141A★	**4554.00**
5.0A	LSI		S143A★	**5812.00**
6.0A	LSIG		S144A★	**7418.00**
5.0P	LSI	Metering, Adv. Protection	S163A★▼	**8720.00**
6.0P	LSIG		S164A★▼	**10324.00**
5.0H	LSI	Metering, Adv. Protection & Harmonic Analysis	S173A★▼	**14770.00**
6.0H	LSIG		S174A★▼	**16374.00**

♦ The standard rating plug supplied with a trip unit will be the “A” rating plug. To specify an alternative adjustable rating plug, please add the letter designation to the end of the catalog number. Please refer to page 7-48 for a complete listing of adjustable settings available with each plug. (Example: S143B would specify a “B” rating plug instead of the standard "A" plug.) Use suffix “N” if no rating plug is required, deduct **$200.00** from the complete trip unit kit price.
★ When replacing a standard trip unit with Type A (Ammeter), P (Power metering) or H (Harmonic analysis) trip unit, order the 12-pin connector kit S33101 for the Masterpact NW and NT and the PowerPact P-frame drawout circuit breakers or kit S33100 for PowerPact P-frame and R-frame unit-mount and I-Line circuit breakers. See page 7-48.
▼ Requires Circuit Breaker Communications Module.
△ The LSI with 3.2S/3.3S trip units have fixed short time and long time delays.
□ Requires neutral current transformer on the three-phase four-wire loads
◊ ZSI for H/J frames in only IN. for L-frame ZSI is In and OUT.
☆ Indication available using the communication system only.
▽ % of hours in 4 current ranges: 0–49%, 50–79%, 80–89%, and >90% In.

Table 7.112: Special Options

Description	Factory-Installed Suffix	Field-Installable Cat. No.	$ Price
Ship circuit breaker in closed position	YK	N/A	**N/C**
CT Characterization (Calibrated trip system)	Q	N/A	**3308.00**

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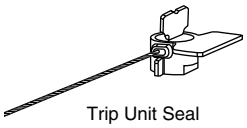
Full Function Test Kit



Trip Unit Seal

Sensor Plug

Adjustable rating plug "A" is installed as standard on all Micrologic trip unit orders. However, an alternative selection may be specified from the "Assembled" table below, and factory installed with your trip unit order at no additional charge. To order, please attach the appropriate catalog suffix to the end of the trip unit Cat. No. (after specifying trip unit options). Adjustable rating plugs may also be purchased as field-installable components from the table below.

Table 7.113: Rating Plugs

Rating Plug▲	Factory-Installed		Field-Installable	
	Cat. Suffix	$ Price Adder	Cat. No.■	$ Price
A	A (standard)	N/C	S48818	200.00
B	B	N/C	S48819	200.00
C	C	N/C	S48820	200.00
D	D	N/C	S48836	200.00
E	E	N/C	S48837	200.00
F	F	N/C	S48838	200.00
G	G	N/C	S48839	200.00
H	H	N/C	S48840	200.00

▲ Long-time pickup amperes (Ir) = Sensor Rating (In) X Setting of rating plug. "Fine adjustment tuning" is included on Micrologic Power and Harmonic trip units, allowing for incremental settings of 1 A between the plug setting and.40 X Sensor Rating.
■ DE2F Discount Schedule

Table 7.114: Neutral Current Transformers

For Use with Circuit Breaker	Cat. No.	Sensor	$ Price
H-Frame	S429521	60–100	588.00
	S430562	150	588.00
J-Frame	S430563	250	588.00
L-Frame	S432575	400–600	647.00
P-Frame	S33575♦,★	250	1914.00
	S33576♦,★	400–1600	1914.00
R-Frame	S48916♦,★	250	2014.00
	S34036♦,★	400–1600	2014.00
	S48896♦,★	2000	2044.00
	S48182♦,★	3000	2208.00
All	NCTWIRING	All	204.00

♦ DE2F Discount Schedule
★ Includes NCTWIRING kit.

Table 7.115: Trip Unit Accessories

Device	Frame	Cat. No.◊	$ Price
Pocket Tester	H/J/L	S434206	1000.00
UTA Tester		STRV00910	16365.00
Spare UTA Tester		STRV00911	6000.00
BLuetooth/Modbus for UTA Tester		SVW3A8114	2800.00
Spare Power Supply for UTA Tester 110–120 Vac		TRV00915	771.00
Micrologic Cord for UTA Tester		TRV00917	1210.00
Micrologic 5/6 Cover, Transparent	H/J	S429478	19.00
Micrologic 2/3 Cover, Transparent		S429481	41.00
Micrologic 5/6 Cover, Transparent	L	S432459	36.00
Micrologic 2/3 Cover, Transparent		S432461	156.00
LCD Display for Micrologic 5	H/J/L	S429483	575.00
LCD Display for Micrologic 6		S429484	575.00
Hand-held Test Kit	P/R	S33594	5386.00
Primary Injection Test Adaptor		S33937	252.00
Full-function Adapter Kit		S48981	19699.00
Full-function Test Kit		S33595	33792.00
Seven-pin Test Cable (for connection between test kit and trip unit)▼		S48907	1488.00
Two-pin Test Cable (for connection between test kit and trip unit)△		S48908	784.00
230 Vac Filtered Power Cord□	P/R	S48856	166.00
120 Vac Filtered Power Cord□		S48855	61.00
Trip Unit Battery for Trip Indicator Lights		S33593	438.00
Power supply with:	H/J/L/P/R		1130.00
24–30 Vdc input		685823	
48/60 Vdc input		685824	
125 Vdc input		685825	
110–130 Vac input		685826	
200–240 Vac input		685827	
380–415 Vac input		685829	
Micrologic A Trip Unit Cover, clear	P/R	S33592	16.00
Micrologic P/H Trip Unit Cover, opaque gray		S47067	16.00
Trip Unit Seal (6 pieces) for compliance with NEC 240.6(c)	H/J/L/P/R	MICROTUSEAL	60.00
12-pin Trip Unit Connector for NT/NW Masterpact Circuit Breakers	P/R	S33101	228.00
12-pin Trip Unit Connector for P- and R-Frame Circuit Breakers		S33100☆	255.00
Battery Back-up (12 Hours)		685831	3570.00

▼ Used for testing Micrologic trip units. Included in the price of the Hand-held/Full-function Test Kits. Kit for replacement only.
△ Used for testing STR trip units. Included in the price of the Hand-held/Full-function Test Kits. Kit for replacement only.
□ Included in the price of the Full-function Test Kit. Kit for replacement only.
◊ DE2F Discount Schedule.
☆ DE2 Discount Schedule.

Table 7.116: Sensor Plugs for P- and R-Frame Circuit Breakers▽♦

Circuit Breaker	Sensor Plug Range	Sensor Plug Catalog No.	Circuit Breaker Frames Accepting Sensor Plug									$ Price◒
P-Frame Circuit Breaker			250 A	400 A	600 A	630 A✱	800 A	1000 A	1200 A	1250 A✱	1600 A	
UL	250 A	S47052	X									1040.00
	400 A	S47053		X	X		X					1040.00
	600 A	S48823			X		X	X	X			1040.00
	800 A	S33092					X	X	X			1040.00
	1000 A	S33093						X	X			1040.00
	1200 A	S48824							X			1040.00
IEC	630 A	S33091				X	X	X		X	X	1040.00
	800 A	S33092					X	X		X	X	1040.00
	1000 A	S33093						X		X	X	1040.00
	1250 A	S33094								X	X	1040.00
	1600 A	S33095									X	1040.00
R-Frame Circuit Breaker			600 A	800 A	1000 A	1200 A	1600 A	2000 A	2500 A	3000 A	3200 A	
UL	600 A	S48823	X	X								1040.00
	800 A	S33092		X	X	X	X					1040.00
	1000 A	S33093			X	X	X	X				1040.00
	1200 A	S48824				X	X	X	X			1040.00
	1600 A	S33095					X	X	X	X		1040.00
	2000 A	S33982						X	X	X		1040.00
	2500 A	S33983							X	X		1040.00
	3000 A	S48825								X		1040.00
IEC	1600 A	S33095					X	X	X	X	X	1040.00
	2000 A	S33982						X	X	X	X	1040.00
	2500 A	S33983							X	X	X	1040.00
	3200 A	S33984									X	1040.00

▽ For use only with circuit breakers with date codes later than 07011.
◒ DE2F Discount Schedule.
✱ IEC Only.
♦ See rating plug for long-time pickup range on page 7-47.

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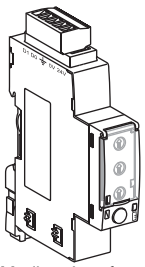
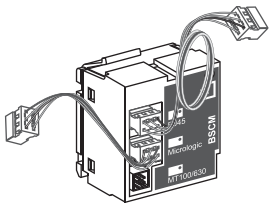
Table 7.117: Trip Unit Field-Installable Accessories for P- and R-Frame Circuit Breakers

Description	Factory-Installed		Field-Installable Kit Cat. No.							$ Price
			P-Frame					R-Frame		
	Cat. No. Suffix	$ Price Adder	Unit Mount	I-Line	Motor Operated	Drawout	With Rotary Handle	Unit Mount	I-Line	
Circuit Breaker Communication Module (BCM) (Modbus)	E1	**1778.00**	S64205	S64205	S64207	S64206	S64205	S64205	S64205	**2805.00**
Two Programmable Contacts Module (M2C)	V	**1248.00**	S64273	S64273	S64273	S64273	S64273	S64273	S64273	**1248.00**
Six Programmable Contacts Module (M6C)	W	**1599.00**	S64204	S64204	S64204	S64202	S64204	S64201	S64201	**1665.00**
External Voltage Sensing (EVS)	YV	**290.00**	S64203	S64203	S64210	S64209	S64210	S64208	S64208	**330.00**

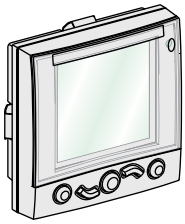
New!



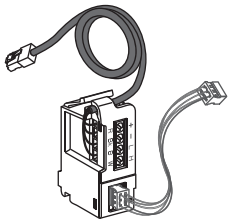
Modbus Interface Module (IFM)



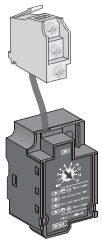
Breaker Status and Control Module (BSCM)



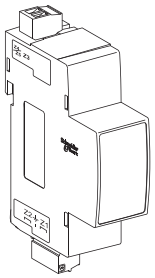
Front Display Module (FDM)



NSX Cord for Modbus Communications



SDTAM Module (Remote indication relay for motor applications)



ZSI Interface Module (Connects PowerPact H/J/L circuit breakers to PowerPact P/R and Masterpact NT/NW circuit breakers)

Table 7.118: Trip Unit Field-Installable Accessories for H-, J-, and L-Frame Circuit Breakers▼

Description		Factory-Installed		Field-Installable Kit Cat. No.	
		Cat. No. Suffix	$ Price Adder	Cat. No.	$ Price
External Accessories					
Modbus Interface Module IFM▲		—	—	STRV00210	**1000.00**
Stacking Connections for IFM (10)		—	—	TRV00217	**946.00**
Front Display Module FDM121▲		—	—	STRV00121	**1500.00**
FDM Mounting Accessory (Dia. 22 mm)		—	—	TRV00128	**26.00**
Isolated Modbus Repeater Module		—	—	STRV00211	**1508.00**
ZSI Interface Module		—	—	S434212	**975.00**
Internal Accessories					
NSX Cord ■ (for Modbus Communication)	L = 1.3 m	EA	**576.00**	S434201	**480.00**
	L = 3 m	EB	**600.00**	S434202	**500.00**
BSCM (Breaker Status and Control Module) with NSX Cord■	L = 1.3 m	EG△	**1776.00**	S434201BS	**1480.00**
	L = 3 m	EH△	**1800.00**	S434202BS	**1500.00**
Replacement BSCM		—	—	S434205	**1000.00**
NSX Cord for V > 480 Vac■	L = 1.3 m	ED	**2880.00**	S434204	**2400.00**
	L = 3 m	EE	**3000.00**	S434303	**2500.00**
BSCM with NSX Cord for V > 480 Vac■	L = 1.3 m	EK△	**4080.00**	S434204BS	**3400.00**
	L = 3 m	EL△	**4200.00**	S434303BS	**3500.00**
24 Vdc Terminal Block		EN	**480.00**	S434210	**400.00**
SDTAM 24/415 Vac/dc Module♦		V	**1114.00**	S429424	**928.00**
SDX Module 24/415 Vac/dc★		V	**1820.00**	S429532	**1517.00**

▲ Require NSX Cord
■ Installation requires IFM (STRV00210) for Modbus communication and/or FDM (STRV00121) for external display
♦ Remote indication relay for motor applications
★ Remote indication relay
▼ For proper selection, see catalog 0611CT1001.
△ If using with motor operator requires communicating motor operator (suffix NC).

Table 7.119: Wire Harness□ and ULP Cords for H-, J-, and L-Frame Circuit Breakers

Description		Factory-Installed		Field-Installable Kit Cat. No.	
		Cat. No. Suffix	$ Price Adder◊	Cat. No.	$ Price
ZSI Wire Harness, H/J Frame		YH3	**237.00**	S434300	**197.00**
ZSI Wire Harness, L-Frame		YH3	**237.00**	S434301	**197.00**
ENCT Wire Harness		YH2	**237.00**	S434302	**197.00**
OF Wire Harness		YH1	**237.00**	S434500	**197.00**
SD/SDE Wire Harness		YH1	**237.00**	S434501	**197.00**
SDx/SDTAM Wire Harness		YH1	**237.00**	S434502	**197.00**
MN Wire Harness		YH1	**237.00**	S434503	**197.00**
MX Wire Harness		YH1	**237.00**	S434504	**197.00**
24 Vdc Terminal Block Wire Harness☆		YH1	**237.00**	S434505	**197.00**
Motor Operator Wire Harness		YH1	**237.00**	S434506	**197.00**
Communicating Motor Operator Wire Harness		YH1	**237.00**	S434507	**197.00**
NSX Wire Harness☆		YH1	**237.00**	S434508	**197.00**
ENCT and ZSI Wire Harness		YH4	**237.00**	—	—
10 RJ45 Connectors female/female		—	—	TRV00870	**195.00**
10 ULP Line Terminations		—	—	TRV00880	**130.00**
10 RJ45/RJ45 Male Cords	L = 0.3 m	—	—	TRV00803	**200.00**
	L = 0.6 m	—	—	TRV00806	**320.00**
5 RJ45/RJ45 Male Cords	L = 1 m	—	—	TRV00810	**195.00**
	L = 2 m	—	—	TRV00820	**300.00**
	L = 3m	—	—	TRV00830	**500.00**
1 RJ45/RJ45 Male Cord	L = 5 m	—	—	TRV00850	**155.00**

□ Wire harness is required for I-Line applications, optional for unit-mount applications
YH1 = all installed accessories but ZSI and ENCT
YH2 = ENCT and all installed accessories
YH3 = ZSI and all installed accessories
YH4 = ZSI, ENCT and all installed accessories
◊ Price adder is for each accessory ordered.
☆ I-Line wire harness is included for communication network accessories.
Optional wire harness for unit mount requires YH1 suffix.

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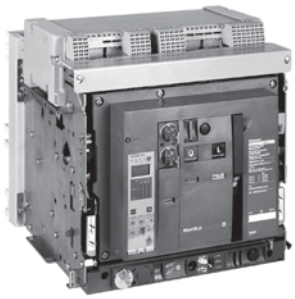
Masterpact™ NT/NW Circuit Breakers

Class **613** / Refer to Catalog **0613CT0001**

Masterpact NT



Masterpact NW

The Masterpact universal power circuit breaker offers a family of circuit protection products meeting the most common world standards, ANSI, UL and IEC. The basic design platform for each is common. The final result is UL, ANSI and IEC circuit breakers with the same basic external dimensions, features and accessories.

Full-Featured Performance

- Complete product offering up to 200 k AIR without fuses
- Circuit breakers tested to show arc flash hazard risk category as referenced by NFPA70E
- 800 A to 6000 A frames, fixed and draw-out
- Rated for AC voltage systems through 600 V (635 V ANSI)
- Short-time withstand ratings up to 100 kA
- Cradle position indicator: connected, test and disconnected
- Simple, visual contact wear indicators
- Full complement of field-installable accessories common to all standards
- Four interchangeable Micrologic trip units to choose from
- Available PowerLogic™ based power metering and monitoring capabilities
- Available protective relay functions as defined by ANSI C37.2 and C37.90

The following charts show the Masterpact NW and NT ratings for ANSI and UL 489. See Pricing Guide **0613PL0001** and Catalog **0613CT0001**.

Table 7.120: Masterpact NW Circuit Breaker Ratings

Standard		ANSI C37 Certified/UL 1066 Listed																		UL 489 Listed							
Frame Rating		800–1600 A						2000 A					3200/4000 A△				4000/5000 A			800/1200/1600/2000 A				2500/3000 A		4000/5000/6000 A	
Interrupting Code		N1	H1	H2	H3	L1□	L1F□	H1	H2	H3	L1□	L1F□	H1	H2	H3	L1□	H2	H3	L1□	N	H	L□	LF□	H	L□	H	L□
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	65	85	100	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	200	200	100	200	100	200
	480 Vac	42	65	85	100	200	200	65	85	100	200	200	65	85	100	200	85	100	200	65	100	150	150	100	150	100	150
	600 Vac	42	65	85	85	130	130	65	85	85	130	130	65	85	85	130	85	85	130	50	85	100	100	85	100	85	100
Short-time Withstand Current (kA RMS)		42	65	85	85	30	22	65	85	85	30	22	65	85	85	100	85	85	100	42▲	65▲	30▲■	22	65	65	85	100
Built-in Instantaneous Override (kA RMS ±10%)		♦	♦	♦	85	35♦	24	—	—	85	35	24	—	—	85	117	—	—	117	40	40	35▲■	24	65	65	75	75
Close and latch rating (kA RMS)		42	65	40	40	25	22	65	40	40	25	22	65	40	40	40	85	75	40	40	40	25★	22	40	40	40	40
Tested to show the arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—	—	—	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay (9 ms for L1, L1F, L and LF)																									
Closing time		70 ms																									
Sensor Rating		100–250 A 400–800 A 800–1600 A						1000–2000 A					1600–3200 A				2000–4000 A 2500–5000 A			100–250 A 400–800 A 600–1200 A 800–1600 A 1000–2000 A				1200–2500 A 1600–3000 A		2000–4000 A 2500–5000 A 3000–6000 A	
Endurance Rating (C/O Cycles) With No Maintenance	Mechanical	12,500						10,000					10,000			5k	5,000			12,500▼				10,000		5,000	
	Electrical	2800						1,000					1,000			1k	1,000			2800▼				1,000		1,000	

▲ 24 kA RMS for 800 A circuit breaker frame with 100 A or 250 A sensor.
■ 65 kA RMS for 2000 A.
♦ None except 24 kA RMS for 800 A circuit breaker frame with 100 A or 250 A sensor.
★ 40 kA RMS for 2000 A.
▼ The endurance rating for 2000 A, N/H/L/LF is 10,000 for mechanical and 1000 for electrical.
△ 4000 A standard width circuit breaker is not available in L1 interrupting rating code or drawout construction (fixed mounting only).
□ Drawout mounted only.

Table 7.121: Masterpact NT Circuit Breaker Ratings

Standard		ANSI C37 Certified/UL 1066 Listed	UL 489 Listed													
Frame Rating		800 A	800 A					1200 A					1600 A◊			
Interrupting Code		N1	N	H	L1	L	LF☆	N	H	L1	L	LF☆	N	H	L1	L
Interrupting Current (kA RMS) 50/60 Hz	240 Vac	42	50	65	100	200	200	50	65	100	200	200	50	65	100	200
	480 Vac	42	50	50	65	100	100	50	50	65	100	100	50	50	65	100
	600 Vac	—	35	50	—	—	—	35	50	—	—	—	35	50	N/A	N/A
Short-time Withstand Current (kA RMS)		42	35	35	10	10	10	35	35	10	10	10	35	35	10	10
Built-in Instantaneous Override (kA RMS ±10%)		—	40	40	10	10	10	40	40	10	10	10	40	40	10	10
Close and latch rating (kA RMS)		40	25	25	10	10	10	25	25	10	10	10	25	25	10	10
Tested to show the arc flash hazard risk category as referenced by NFPA70E		—	—	—	—	—	Yes	—	—	—	—	Yes	—	—	—	—
Breaking time		25–30 ms with no intentional delay	25–30 ms with no intentional delay (9 ms for L and LF)													
Closing time		< 50 ms														
Sensor Rating		100–250 A 400–800 A	100–250 A 400–800 A					600–1200 A —					800–1600 A			
Endurance Rating (C/O Cycles) With No Maintenance	Mechanical	12,500	12,500					12,500					12,500			
	Electrical	2800	2800					2800					2800			

◊ Fixed-mounted only.
☆ Drawout mounted only.

NWMPRRT

Table 7.122: Masterpact NW/NT Circuit Breaker Remote Racking

Description	Cat. No.	$ Price
Masterpact NW/NT Remote Racking Devices▽	NWNTMPRRT	**32000.00**
Masterpact NW Remote Racking Device▽	NWMPRRT	**21500.00**
Masterpact NT Remote Rackign Device▽	NTMPRRT	**21500.00**
Mounting Bracket Kit for NW Remote Racking (contains 10 mounting brackets)◒	S47100	**215.00**
Mounting Bracket Kit for NT Remove Racking (contains 10 mounting brackets)◒	S47104	**215.00**
Control Unit for NW Remote Racking◒	S47101	**3650.00**
30 ft Control Cable for NW Remote Racking◒	S47102	**620.00**
Drive Shaft for NW Remote Racking◒	S47103	**290.00**
Drive Shaft for NT Remote Racking◒	S47105	**290.00**

▽ Unit comes with 10 mounting brackets included.
◒ For replacement only.

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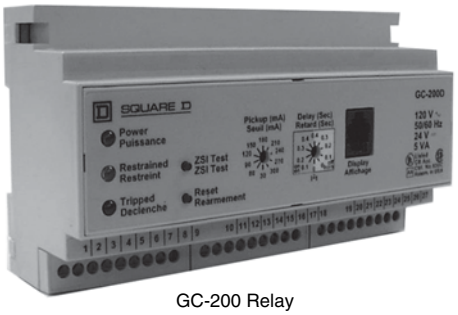
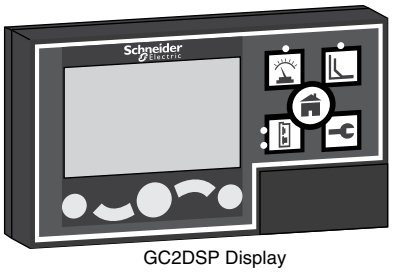


GC-200 Relay



GC2DSP Display

T3B Toroid Sensor

GT912 Rectangular Sensor

GC-200 Ground-Fault Relay System

The GC-200 Ground-fault relay system protects a grounded distribution system from low-level arcing ground faults. The system includes the GC-200 relay, a sensor (current transformer), and optional GC DSP display and is used with a bolted pressure switch or circuit breaker to open a circuit upon detection of a ground fault. (Replaces GC-100 relay.)

GC-200 Relay Features

- Five models with sensitivities suitable for main, feeder, or branch circuits
- Ten adjustable pickup settings for each model
- Small, non-metallic enclosure mounts on DIN rail
- 10 A and 5 A output contacts for trip and alarm
- Zone-selective interlocking (ZSI) to optimize coordinated systems
- I^2t inverse time characteristics

GC2DSP Display (Optional)

- Real-time display of ground-fault values
- Also recalls ground-fault at last trip or at maximum since reset
- Allows remote testing or resetting of the relay
- LCD back-lit display
- Surface mounts over panel meter cutout
- Fine adjust pickup settings (D and E versions only)

Sensors

- Zero sequence sensing current transformers for all phases and neutral
- Several sizes of toroids and rectangular CTs
- Many are split-core or open frame for ease of installation

Table 7.123: Ground-Fault Relay

Cat. No.	Description	Specifications	$ Price
GC200C	Ground-fault relay	3.0 A–30.0 A	2960.00
GC200D		30.0 A–300 A	2960.00
GC200E		120 A–1200 A	2960.00
GC2DSP	Display module		948.00
VW3A1104R10	Display cable ■	1 m	35.00
VW3A1104R30		3 m	35.00
VW3A1104R50		5m	35.00
VW3A1104R100		10 m	45.00
GC2ADAPTER	Adapter plate	To replace GSDSP with GC2DSP	59.00

▲ One GC12 twelve foot cable is included with GCDSP display modules.
■ Discount schedule CP4C

Table 7.124: GC-200 Relay Settings

Cat. No.	Adjustable Pickup Settings (in Amperes)									
GC200C	3	6	9	12	15	18	21	24	27	30
GC200D	30	90	90	120	150	180	210	240	270	300
GC200E	120	240	360	480	600	720	840	960	1080	1200

Table 7.125: GC-200 Sensors

Relay Cat. No.	Sensor Cat. No.	Type	CT Ratio	Window Dimensions		$ Price
				in	mm	
GC200C GC200D	T2A	Toroid	1000:1	1.875 dia.	48 dia.	704.00
	T3A	Toroid		2.75 dia.	70 dia.	774.00
	T6A	Toroid		5.75 dia.	146 dia.	774.00
	T6AS	Toroid, split-core		5.75 dia.	146 dia.	1326.00
	T9A	Toroid		8.75 dia.	222 dia.	1106.00
	R713A	Rectangular		7.5 x 13.5	191 x 343	3063.00
	R417A			4.25 x 17.625	108 x 448	3650.00
	R826A			8 x 26.5	203 x 674	4446.00
GC200E	All "A" type sensors above, plus:					
	RZ511	Rectangular, Open Frame	1000:1	4.5. x 11	114 x 280	1914.00
	RZ521		1000:1	4.5 x 21	114 x 534	2255.00
	RZ531		1000:1	4.5 x 31	114 x 788	2706.00
	RZ535		1000:1	4.5 x 35	114 x 890	2834.00
	RZ1011	Rectangular, Open Frame	1000:1	10.5 x 11	267 x 280	2450.00
	RZ1021		1000:1	10.5 x 21	267 x 514	3075.00
	RZ1031		1000:1	10.5 x 31	114 x 788	4233.00
	GT912	Rectangular, Open Frame	600:1	5.5 x 8.5	140 x 216	1769.00
	GT918		600:1	5.5 x 14.5	140 x 368	2058.00
	GT930		600:1	5.5 x 26.5	140 x 673	2766.00
	GT1218	Rectangular, Open Frame	600:1	8.5 x 14.5	216 x 368	2645.00
	GT1224		600:1	8.5 x 20.5	216 x 521	2901.00
	GT1230		600:1	8.5 x 26.5	292 x 673	3246.00
	GT1327	Rectangular, Open Frame	600:1	9.5 x 24	241 x 610	2844.00
	GT1330		600:1	9.5 x 27	241 x 686	3219.00
	GT1530	Rectangular, Open Frame	600:1	11.5 x 26.5	292 x 673	3726.00

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RH99M

RH99P

PA50

SA200

Vigirex™ Ground-Fault Relay System

The Vigirex ground-fault relays, with associated sensors (current transformers), measure the residual current in an electrical installation to detect levels which may be damaging. When used for protection, they cause an associated circuit breaker or switch to interrupt the supply of power to the protected system. They may also be used for monitoring only, with output to an alarm. The product line includes fixed sensitivities from 30 mA to 1 A and adjustable sensitivities up to 30 A.
The Vigirex relays may be easily mounted on DIN rail or may be panel mounted in a meter cutout. Sensors for conductors range from a little more than an inch diameter toroids, to large rectangular sensors measuring 6 x 18 inches. The compact size of the relay and its sensor make it ideal for protection of OEM equipment as well as branch circuits.

Table 7.126: Vigirex Ground-Fault Relays (UL 1053 Listed)

Model	Delay	Reset	Control Voltage	Sensitivity	Cat. No.	$ Price
DIN Rail Mounted						
RH10M	Instantaneous	Manual	12–24 Vac/12–48 Vdc	30 mA 100 mA 300 mA 500 mA 1 A	56300 56302 56305 56306 56307	**1988.00**
			110–130 Vac	30 mA 100 mA 300 mA 500 mA 1 A	56320 56322 56325 56326 56327	**1988.00**
			220–240 Vac	30 mA 100 mA 300 mA 500 mA 1 A	56330 56332 56335 56336 56337	**1988.00**
RH21M	Instantaneous or 60 msec (2 settings)	Manual	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac	30 mA▲ or 300 mA (2 settings)	56360 56362 56363	**2363.00**
RH99M	Adjustable (9 settings): 0, 0.06, 0.15, 0.23, 0.31, 0.5, 0.8, 1.0, 4.5 sec	Manual	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac	Adjustable, (9 settings): 0.03▲, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30 A	56370TD 56372TD 56373TD	**2700.00**
		Automatic	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac		56390TD 56392TD 56393TD	**2700.00**
Panel Mounted						
RH10P	Instantaneous	Manual	12–24 Vac/12–48 Vdc	30 mA 100 mA 300 mA 500 mA 1 Amp	56400 56402 56405 56406 56407	**2063.00**
			110–130 Vac	30 mA 100 mA 300 mA 500 mA 1 Amp	56420 56422 56425 56426 56427	**2063.00**
			220–240 Vac	30 mA 100 mA 300 mA 500 mA 1 A	56430 56432 56435 56436 56437	**2063.00**
RH21P	Instantaneous or 60 msec (2 settings)	Manual	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac	30 mA▲ or 300 mA (2 settings)	56460 56462 56463	**2438.00**
RH99P	Adjustable (9 settings): 0, 0.06, 0.15, 0.23, 0.31, 0.5, 0.8, 1.0, 4.5 sec	Manual	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac	Adjustable (9 settings): 0.03▲, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30 A	56470TD 56472TD 56473TD	**2813.00**
		Automatic	12–24 Vac/12–48 Vdc 110–130 Vac 220–240 Vac		56490TD 56492TD 56493TD	**2813.00**

▲ 30 mA is instantaneous only, except for RH99M and RH99P models. Their suffix TD indicates time delay at 30 mA. For models with no time delay (IEC compliant) consult catalog 0972CT0401.

Table 7.127: Sensors for Vigirex Ground-Fault Relays

Sensors	Type	Maximum Current♦	Inside Diameter		Cat. No.	$ Price
			in.	mm		
Closed Toroids, Type A	TA30 PA50 IA80 MA120 SA200 GA300	65 A 85 A 160 A 250 A 400 A 630 A	1.18 1.97 3.15 4.72 7.87 11.81	30 50 80 120 200 300	50437 50438 50439 50440 50441 50442	**375.00** **488.00** **615.00** **833.00** **1253.00** **2295.00**
Vigirex Sensor Iron Rings (Optional)	TA30 PA50 IA80 MA120	65 A 85 A 160 A 250 A	0.79 1.58 2.76 4.33	20 40 70 110	56055 56056 56057 56058	**56.00** **59.00** **62.00** **83.00**
Split toroids, Type OA	POA■ GOA■	85 A 250 A	1.81 4.33	46 110	50485 50486	**1718.00** **3015.00**
Rectangular Sensors	280 x 115 470 x 160	1600 A 3200 A	11.02 x 4.53 18.50 x 6.30	280 x 115 470 x 160	56053 56054	**5333.00** **7088.00**

■ POA and GOA are not UL recognized
♦ Use as a guideline for sizing wire through sensor.

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Optional GFM25CT

GFM250

Micrologic™ Add-on Ground-Fault Module (GFM)

The Micrologic Ground-Fault Module (GFM) is a UL Listed/CSA Certified circuit breaker accessory which protects equipment from damage caused by ground faults. It is an add-on module which, when connected to a PowerPact H- or J-frame thermal-magnetic circuit breaker only, provides ground-fault sensing and ground-fault relay functions.

HD/JD ground-fault modules feature:

- Adjustable ground-fault pickup levels
- Adjustable ground-fault time delays
- Integral ground fault push-to-test feature
- Ground-fault indicator (mechanical for local, contacts for remote)
- All GFMs are supplied for I-Line™ mounting as standard, easily convertible to unit mount by removing the I-Line bracket
- Fault-powered (through the sensing current transformer) for electronics, shunt trip, and integral test feature. Meets NEC 230.95(C)
- A 12 Vdc shunt trip module (Catalog No. S29382) is required in the circuit breaker. This may be field installed or factory installed when the circuit breaker is ordered with an -SN suffix.
- UL 1053 — Ground-fault Sensing and Relaying Equipment

The GFM system requires the following:

- H-frame (15–150 A) or J-frame (150–250 A) molded case circuit breaker
- Shunt trip is required for the function of the GFM (may be factory-installed or field-installed)
- Bus bar connection (terminal nut inserts) for OFF end of circuit breaker
- Optional neutral current transformer, catalog number GFM25CT (must be ordered for 4-wire applications)

NOTE: *Ground-fault modules cannot be used for alarming only.*

Table 7.128: Module/Enclosure Selection Chart▲

Companion Circuit Breaker Prefix	Cat. No.■	I-Line Switchboard	Ground-fault Pickup Adjustment Range	GFM $ Price
HD, HG, HJ, HL	GFM150HD	LA	20–100 A	**4250.00**
JD, JG, JJ, JL	GFM250JD	LA	40–200 A	**4250.00**
Accessories				
H & J	GFM25CT	Optional Neutral Current Transformer (required for 4-wire loads)		**375.00**

▲ At 250 A, the GFM250JD can be used with 80% rated circuit breakers only.
■ See Supplemental Digest page 3-37 for additional GFMs.

I-Line™ J-Frame with ELM installed

Earth Leakage Module (ELM) for PowerPact H- and J-Frame MCCBs

The Earth Leakage Module (ELM) is an add-on module which, when connected to a PowerPact H- or J-frame MCCB, provides low-level ground-fault sensing and ground-fault relay functions.

Because these ELMs are highly sensitive (30 mA to 3 A), they provide much greater protection than GFMs (20 Amps to 200 Amps sensitivity). The ELMs provide greater protection of control circuits and other sensitive equipment. The associated circuit breaker must have a 48 Vdc shunt trip, which may be field-installed (kit S29392) or factory-installed (suffix –SP) in the H- or J-Frame circuit breaker.

Add-on Earth Leakage Module (ELM) Features:

- Adjustable ground-fault pickup levels as low as 30 mA
- Adjustable ground-fault time delays from instantaneous to 500 msec (Time delay can be applied to the 30 mA setting)
- Integral ground fault push-to-test feature
- Ground-fault indicator (LED for local status; contacts for remote indication)
- All ELMs are supplied for I-Line™ mounting and are easily convertible to unit-mount by removing the I-Line brackets
- Three poles; 240 to 600 Vac maximum: 3-wire applications only (no neutral)
- Line-power obtained through internal bus to provide power for electronics, shunt trip, and integral test feature.
- A shunt trip is required in the circuit breaker; it may be field-installed or factory-installed in the PowerPact H and J circuit breakers.
- UL 1053 – Ground-fault Sensing and Relaying Equipment

Table 7.129: ELM Selection Chart♦

Companion Circuit Breaker★		Enclosure Space Required I-Line Switchboard	Pick-Up Adjustment Range	Catalog Number	$ Price
Prefix	Size				
HD, HG, HJ, HL	15–150 A	LA	30 mA–3 A	ELM150HD	**4500.00**
JD, JG, JJ, JL	150–250 A	LA	30 mA–3 A	ELM250JD	**4650.00**

♦ At 250 A, the ELM250JD can be used with 80% rated circuit breakers only.
★ For Factory Installation of ELM Module: For termination designation (3rd letter of catalog number) use ONLY "M". Add factory installed 48 Vdc shunt trip (suffix SP) to breaker plus suffix VL or VM.
SP – **$717.** adder.
Use VL for H frame – **$4736.** adder.
Use VM for J frame – **$4886.** adder.
Plus the List Price of the H or J breaker.

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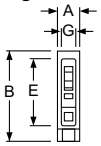
Figure 1



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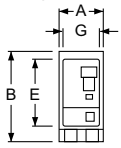

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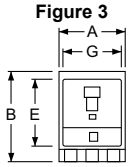
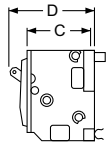


QO, QOB



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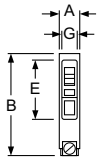

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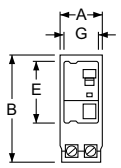
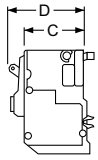


QO-GFI, QO-PL
QO-EPD



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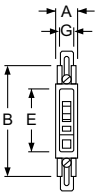

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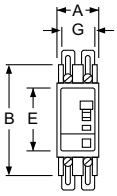

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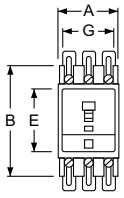
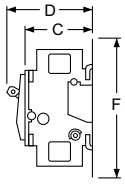


QOU, QYU
Low Ampere



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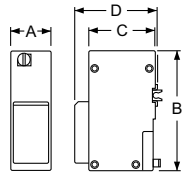
QO-PLPS



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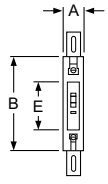

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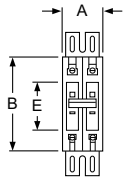

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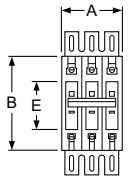
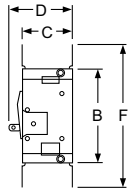


QOU
High Ampere



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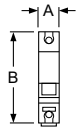

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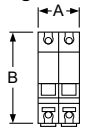

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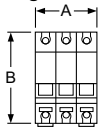

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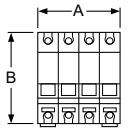

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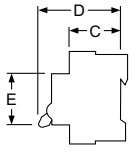

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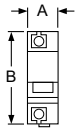

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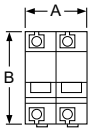

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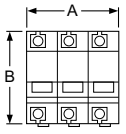

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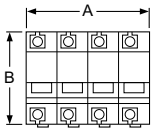

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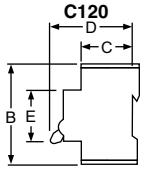

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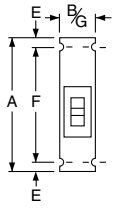

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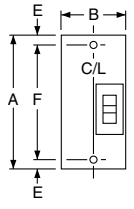

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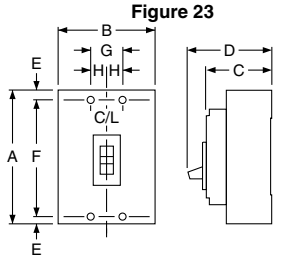

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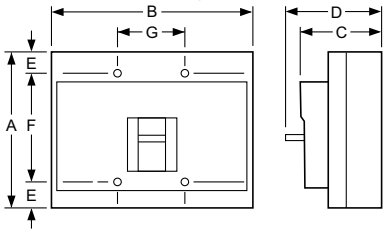

Table 7.130: QO™, QOU, Multi 9™ Circuit Breakers

Circuit Breaker Cat. No. Prefix	Poles	Fig. No.	Dimensions—Inches						
			A	B	C	D	E	F	G
QO, QOB	1	1	0.75	3.00▲	2.31	2.91	2.25	—	0.59
	2	2	1.50	3.00▲	2.31	2.91	2.25	—	1.34
	3	3	2.25	3.00▲	2.31	2.91	2.25	—	2.09
QOB-VH 150 A QOB-VH 110–150 A	2	2	3.0	5.72	2.53	4.90	3.78	—	2.85
	3	3	4.50	5.72	2.53	4.90	3.78	—	4.35
QO-PL QO-GFI QO-EPD	1	4	0.75	4.12■	2.31	2.91	2.25	—	0.59
	2	5	1.50	4.12■	2.31	2.91	2.25	—	1.34
	3	5	2.25	4.12■	2.31	2.91	2.25	—	2.09
QOU QYU Low Ampere	1	6	0.75	4.05♦	2.38	2.98	2.25	5.00★	0.62
	2	7	1.50	4.05♦	2.38	2.98	2.25	5.00★	1.37
	3	8	2.25	4.05★	2.38	2.98	2.25	5.00△	2.12
QOU High Ampere	1	10	0.75	4.45	2.37	2.96	2.25	6.78	—
	2	11	1.50	4.45	2.37	2.96	2.25	6.78	—
	3	12	2.25	4.45	2.37	2.96	2.25	6.78	—
Multi 9™ C60	1	13	0.71	3.19	1.73	2.76	1.77	—	—
	2	14	1.42	3.19	1.73	2.76	1.77	—	—
	3	15	2.13	3.19	1.73	2.76	1.77	—	—
	4	16	2.84	3.19	1.73	2.76	1.77	—	—
QO-PLPS Power Supply	2	9	1.45	4.35	2.42	3.11	—	—	—

▲ 35–70 A is 3.12 in; 80–100 A 2P and 70–100 A 3P are 3.50 in.
■ QO-PL is 4.55 in.
♦ 80–100 A 1P and 80–125 A 2P are 4.45 in
★ 80–100 A 1P and 80–125 A 2P are 6.78 in.
▼ 70–100 A 4.45 in.
△ 70–100 A is 6.78 in.

Table 7.131: QB, QD, QG, QJ, Q4, FA, FI, KI, LA, LI, LX, LXI Circuit Breakers

Circuit Breaker Cat. No. Prefix	Poles	Fig. No.	Dimensions—Inches							
			A	B	C	D	E	F	G	H
QB, QD, QG, QJ	2	22	6.47	3.00	3.02	3.93	□	4.25	—	—
	3	23	6.47	4.50	3.02	3.93	□	4.25	1.50	0.75
FAL, FHL	1	21	6.00	1.50	3.16	4.13	0.44	5.13	1.50	—
	2	22	6.00	3.00	3.16	4.13	0.44	5.13	—	—
	3	23	6.00	4.50	3.16	4.13	0.44	5.13	1.50	0.75
FIL, KIL	2 & 3	23	8.00	4.50	3.66	4.75	0.44	7.13	1.50	0.75
Q4L, LAL, LHL	2 & 3	23	11.00	6.00	4.06	5.84	0.88	9.25	2.00	1.00
LIL, LXIL	2 & 3	24	11.86	7.50	5.48	6.74	0.55	10.75	2.50	

□ Dimensions E are 1.59 in at ON end and 0.63 in at OFF end.

Table 7.132: Shipping Weights◊

Frame Size	Approx. Shipping Weight (Lbs.)	Frame Size	Approx. Shipping Weight (Lbs.)
FAL, FHL 1P	2	KIL	9
FAL, FHL 2P	3	LAL, LHL	15
FAL, FHL 3P	5	LIL LXIL	25
FIL	8	Q4L	15
QB, QD, QG, QJ	4		

◊ All weights are for 3P circuit breakers unless otherwise noted.

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Figure 25

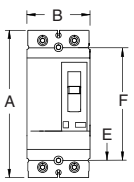
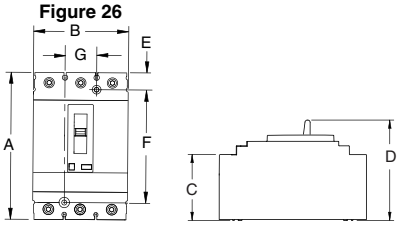


Figure 26



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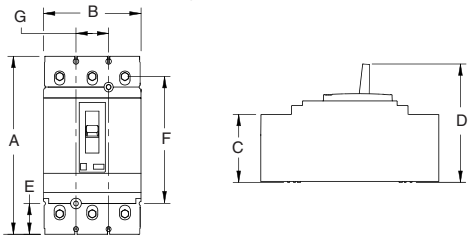

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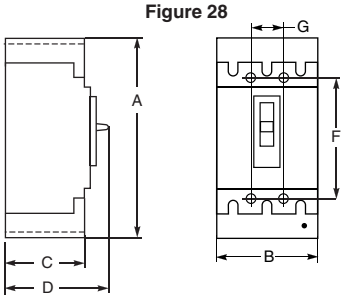

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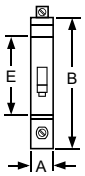
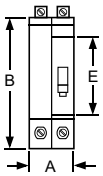


Figure 30



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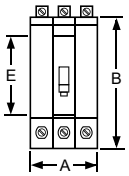


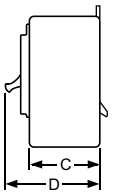
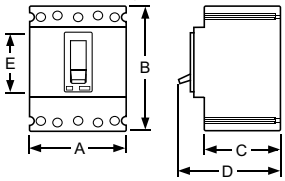


Figure 32



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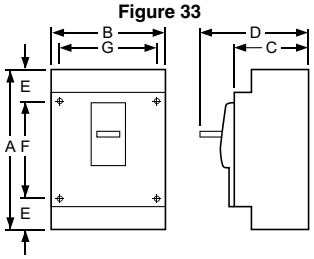

Figure 34

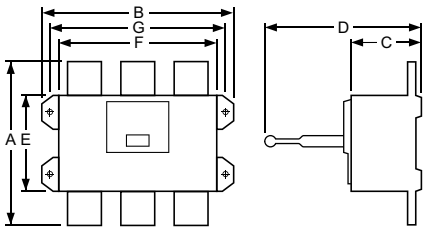

Table 7.133: HD, HG, HJ, HL, HR, JD, JG, JJ, JL, JR, LG, LJ, LL, and LR Circuit Breakers

Circuit Breaker Cat. No. Prefix	No. of Poles	Fig. No.	Dimensions — Inches						
			A	B	C	D	E	F	G
HD, HG, HJ, HL, HR	2▲	25	6.40	2.74	2.87	4.36	0.74	4.92	—
	3	26	6.40	4.12	2.87	4.36	0.74	4.92	1.38
JD, JG, JJ, JL, JR	3	27	7.52	4.12	2.87	5.00	1.30	4.92	1.38
LG, LJ, LL, LR	3	28	13.38	5.51	3.75	6.61	2.22	7.87	1.77

▲ Only HD and HG are in 2P module, HJ, HL and HR 2P are in 3P module.

Table 7.134: ED, EG, and EJ Circuit Breakers

Circuit Breaker Cat. No. Prefix	No. of Poles	Fig. No.	Dimensions — Inches				
			A	B	C	D	E
ED, EG, EJ	1	29	0.98	5.66	3.09	4.05	3.32
ED, EG, EJ	2	30	1.96	5.66	3.09	4.05	3.32
ED, EG, EJ	3	31	2.94	5.66	3.09	4.05	3.32
GJ	3	32	3.54	4.72	2.76	3.94	2.20

Table 7.135: MG, MJ, PG, PJ, PL, RG, RJ and RL Circuit Breakers

Circuit Breaker Cat. No. Prefix	No. of Poles	Fig. No.	Dimensions — Inches						
			A	B	C	D	E	F	G
MG, MJ (800 A and below)	2, 3	33	12.86	8.27	5.77	8.05	2.49	7.87	7.83
PG, PJ, PK, PL (1000–1200 A)	2, 3	33	16.16	8.27	5.77	8.05	4.19	7.87	7.83
RG, RJ, RL	2, 3	34	16.24	16.54	6.63	14.49	8.73	14.25	15.35

Table 7.136: Shipping Weights▲

Frame Size	Approx. Shipping Weight (Lbs.)	Frame Size	Approx. Shipping Weight (Lbs.)
HD, HG, HJ, HL 2P	4	JD, JG, JJ, JL, JR	5
HD, HG, HJ, HL, HR 3P	5	LD, LG, LJ, LL, LR	14
ED, EG, EJ 1P	2	MG, MJ	29
ED, EG, EJ 2P	3	PG, PJ, PK, PL	32
ED, EG, EJ 3P	4	RG, RJ, RK, RL (Without RLTB)	52

▲ All weights are for 3P circuit breakers unless otherwise noted.

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FA100S

FA100RB

FA100DS

- Circuit breaker enclosures are UL Listed, CSA Certified and are suitable for use as service equipment except as footnoted.
- The short circuit rating of an enclosed circuit breaker is equal to the rating of the circuit breaker installed, except as footnoted.
- Circuit breakers are ordered and shipped separately for field installation.
- For enclosure accessories and dimensions refer to page 7-58.
- See Supplemental Digest page 3-35 for NEMA 7 and 9 enclosures for FAL circuit breakers.

Table 7.137: Circuit Breaker Enclosures

Circuit Breaker			Enclosure					
Cat. No. Prefix	Rating	Poles	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
			NEMA 1 Flush		NEMA 1 Surface		NEMA 3R▲	
FAL, FHL, FCL	15–100 A	1, 2, 3	FA100F	189.00	FA100S	189.00	FA100RB	500.00
QBL, QDL, QGL, QJL	100–200 A	2	—	—	Q22200NS■	176.00	Q22200NRB■	380.00
	100–225 A	2, 3	Q23225NF■	218.00	Q23225NS■	218.00	Q23225NRB■	417.00
HDL, HGL, HJL, HLL	15–150 A	2, 3	J250F♦★▼	285.00	J250S♦★▼	285.00	J250R♦★▼	840.00
JDL, JGL, JJL, JLL	150–250 A	2, 3						
HDL	15–100 A	3	—	—	HD100S△□♦▼☆	285.00	—	—
JDL	150–250 A	3	—	—	JD250S☆□△♦▼	285.00	—	—
LAL, LHL, Q4L	125–400 A	2, 3	LA400F	356.00	LA400S	356.00	LA400R	1655.00
LAL	125–400 A	3	—	—	LA400LS□☆w	356.00	—	—
MGL, MJL, PGL, PJL, PKL, PLL	300–800 A	2, 3	—	—	M800S▽◒	783.00	M800R▽♦	2159.00
PGL, PJL, PKL, PLL✱	250–1200 A	2, 3	—	—	P1200S◒	1260.00	P1200R♦	2790.00
			NEMA 4, 4X, 5, 3, 3R Stainless Steel (Hubs—See page 3-9)		NEMA 12/3R, 12K (Hubs—See page 3-9)			
					With Knockouts (NEMA 12K)		Without Knockouts◑ (NEMA 12/3R, 5)	
FAL, FHL, FCL	15–100 A	1, 2, 3	FA100DS	1431.00	FA100A	351.00	FA100AWK	335.00
HDL, HGL, HJL, HLL	15–150 A	2, 3	J250DS♦★▼	3405.00	—	—	J250AWK♦★▼	582.00
JDL, JGL, JJL, JLL	150–250 A	2, 3						
KIL♦, KCL	110–250 A	2, 3	IK250DS	5238.00	—	—	IK250AWK	878.00
LAL, LHL, Q4L	125–400 A	2, 3	LA400DS	5673.00	—	—	LA400AWK	903.00
LDL, LGL, LJL, LLL, LRL	250–600 A	3	—	—	—	—	L600AWKx	3728.00
LDL, LGL, LJL, LLL, LRL	250–600 A	3	—	—	—	—	L600AWKVWy	3928.00
LGL, LLL, LRL	400–600 A	3	—	—	—	—	L600AWKMCz	3728.00
MGL, MJL, PGL, PJL, PKL, PLL	300–800	2, 3	M800DS✪	10125.00	—	—	M800AWK✪	2459.00
PGL, PJL, PKL, PLL✱	600–1200	2, 3	—	—	—	—	P1200AWK✪	5700.00
			Nema 7‡ Cast Aluminum		Nema 9u Cast Aluminum			
JDL, JGL†●v	150–250 A	2, 3	J225X	4083.00	J225Y	2834.00		

▲ Enclosures with NRB or RB suffix have provisions for 3/4 in. through 2-1/2 in. bolt-on hubs in top endwall. Enclosures with R suffix have blank endwalls and require field cut opening. For details and hub catalog numbers see page 3-9.
■ Not CSA Certified.
♦ Accepts standard rated 80% breakers. Not rated at 100%.
★ Maximum short circuit rating is 25 kAIR at 600 Vac, 65 kAIR at 480 Vac, 125 kAIR at 240 Vac.
▼ Earth Leakage Module and Ground Fault Module are not compatible with these enclosures.
△ Maximum short circuit rating is 25 kAIR, 240 Vac.
□ Order service ground kit PKOGTA2 if required.
◊ Maximum short circuit rating is 18 kAIR, 480 Vac and 240 Vac.
☆ Copper wire only.
▽ When using a CT in the M800S and R enclosure the unit will no longer accommodate a 200% neutral solution.
◒ CE certified per IEC60439-1, IP20D, PE type TN-C or TN-S
✱ Accepts MGL or MJL standard rated (80%) breakers. Accepts PGL, PJL or PLL circuit breakers rated 80% (1200 A maximum) or 100% rated breakers, (800A maximum).
⧫ CE certified per IEC60439-1, IP24D, PE type TN-C or TN-S
◑ Suitable for rainproof NEMA 3R application by removing drain screw from bottom endwall.
✪ CE certified per IEC60439-1, IP56, PE type TN-C or TN-S
◪ LEL 100% rated circuit breaker except for 600 A sensor.
◗ Short circuit rating is 100 k AIR at 480 Vac maximum.
‡ NEMA 7—Indoor Hazardous Locations—Division 1 and 2, Class I, Groups C and D; Class II, Groups E, F,and G; Class III.
† 80% rated circuit breakers only; SCCR 65 kA @ 240 Vac, 25 kA @ 480 Vac, 18 kA @ 600 Vac.
● Not UL Listed due to wire bending space.
u NEMA 9—Indoor Hazardous Locations—Division 1 and 2, Class II, Groups E, F,and G; Class III.
v Has a tapped 2-1/2 in. conduit opening on top and bottom end wall
w Short circuit current rating is 30 k AIR at 480 Vac.
x Product also accepts PowerPact L Frame Motor Protector Circuit Breakers with suffix M38X.
y Viewing Window factory installed.
z Product accepts PowerPact L-Frame Automatic Molded Case Switches.

316 Grade Stainless Steel Circuit Breaker Enclosures—NEMA 3, 3R, 4X, 5 and 12

Type 316 stainless steel circuit breaker enclosures offer superior corrosion resistance to a wider range of chemicals than Type 304 stainless steel enclosures. Type 316 better resists chloride and is often used in marine, waste treatment and transportation applications. Use watertight hubs from Section 3 page 10 of Digest 176. For other accessories reference Table 7.142 and Table 7.143. For dimensional information, reference Table 7.144.

Table 7.138: 316 Grade Stainless Steel CIrcuit Breaker Enclosures

Circuit Breaker▲■			NEMA 3, 3R, 4X, 5 and 12	
Cat. No. Prefix...Suffix	Ampere Rating	Poles	Enclosure Cat. No.	$ Price
HDL, HGL, HJL, HLL	15–150 A	2, 3	J250SS	4698.00
JDL, JGL, JJL, JLL	150–250 A	2, 3		
MGL, MJL, PGL, PJL PKL, PLL	300–800 A	2, 3	M800SS	13972.00

Table 7.139: DC CIrcuit Breaker Enclosures for MA and MH DC-Rated Circuit Breakers

Circuit Breaker▲■			NEMA 1 Surface Enclosure▲▲	
Cat. No. Prefix...Suffix	Ampere Rating	Poles	Enclosure Cat. No.	$ Price
MAL, MHL	125–1000 A	2, 3	MA1200S	1355.00

▲▲ UL Listed Only
▲■ Use 500 Vdc or 250 Vdc rated circuit breakers only.

Accessories . . . . . Page 7-58
Dimensions. . . . . Page 7-58

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Table 7.140: Enclosures for Walking Beam Manually Operated Mechanical Interlock Circuit Breakers (UL Listed)▲

Circuit Breaker			NEMA 1 Surface■		NEMA 3R ■♦	
Cat. No. Prefix...Suffix	Ampere Rating	Poles	Enclosure Cat. No.	$ Price	Enclosure Cat. No.	$ Price
FAL...WB, FHL...WB	15–250 A	2, 3	KA250SWB	**1040.00**	KA250RWB	**1827.00**

▲ Catalog number in table is enclosure only. For complete installation, the following must be ordered separately: WB Circuit Breakers (qty. 2, Supplemental Digest page 3-27), Walking Beam Assembly (Supplemental Digest page 3-27), Mounting Pan (Supplemental Digest) page 3-27, Neutral (page 7-56) and Service Ground Kit (page 7-58).
■ Enclosure has blank top endwall.
♦ For applications above 200 A requiring a neutral, use copper wire only.

Enclosed Motor-Operated Molded Case Circuit Breakers

For information on Enclosed Motor-Operated Molded Case Circuit Breakers see the Supplemental Digest page 3-35.

Enclosed Molded Case Switches

For ordering information on molded case switches see page 7-34. For ordering information on enclosed molded case switches, see Supplemental Digest 175 Section 3-36.

Enclosed Walking Beam Mechanical Interlock

NOTE: *Contact local Field Office for catalog number prior to quoting or placing an order.*

Industrial molded case circuit breakers with walking beam mechanical interlocks are available in NEMA 1 and 3R construction as completely enclosed device. Walking beam mechanical interlock is available manually operated or electrically operated using (2) 120 Vac motor operators. Not UL Listed.

Enclosed walking beam mechanically interlocked circuit breaker.

- Specify circuit breaker catalog numbers
- Specify manually or electrically operated (electrically operated factory installed only)
- Specify enclosure type (NEMA 1 or 3R)
- Specify if neutrals are required. (Same price)

Table 7.141: Enclosed Walking Beam Mechanical Interlock

Circuit Breaker Cat. No. Prefix (Standard Thermal-Magnetic Only)	$ Price▲			
	Manually Operated		Electrically Operated	
	NEMA 1	NEMA 3R	NEMA 1	NEMA 3R
FAL—240 V 100 A	—	—	**5783.00**	**3675.00**
FAL—480 V 100 A	—	—	**6311.00**	**6896.00**
FAL—600 V 100 A	—	—	**6879.00**	**7446.00**
FHL—600 V 100 A	—	—	**8691.00**	**9407.00**

▲ Price includes (2) walking beam 3P circuit breakers, walking beam operator and mounting pan, (2) neutrals (if specified), and (2) motor operators (if specified) factory assembled in specified enclosure.
■ Not available factory assembled. Refer to page 7-56 for merchandise enclosure.

NOTE: *Contact local Field Office for catalog number prior to quoting or placing an order.*

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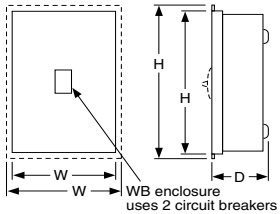
Table 7.142: Insulated Groundable Neutral Assembly

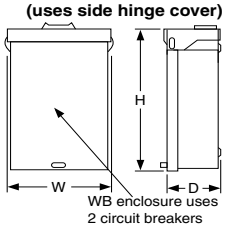
Circuit Breaker		Neutral Assembly For Use With						Terminal Lug Data—Total Available (Line plus Load) AWG/kcmil
Cat. No. Prefix	Ampere Rating	NEMA 1 & 3R		NEMA 4, 4X, 5, 12 & 12K		NEMA 7 & 9		
		Cat. No.	$ Price	Cat. No.	Price	Cat. No.	$ Price	
FAL, FHL, FCL	100	SN100FA	**72.00**	SN100FA	**72.00**	—	—	(4) 14–1/0 Cu or (4) 12–1/0 Al
FAL, FHL, FIL	100	—	—	—	—	100SNA	**150.00**	FA060X/Y—(1) 14– 6 Cu, plus (1) 14–4 Cu FA100X/Y—(1) 14– 3 Cu, plus (1) 14–4 Cu
HDL,HGL,HJL,HLL	15–100	SN100FA	**72.00**	SN100FA	**72.00**	—	—	(4) 14–1/0 Cu or (4) 12–1/0 Al
HDL,HGL,HJL,HLL	125-150	SN400LA	**251.00**	SN400LA	**251.00**	225SNA	**198.00**	(2) 1–600 or (4) 1–250 Al/Cu, plus (2) 4–300 Al/Cu
JDL,JGL,JJL,JLL	150–250	SN400LA	**251.00**	SN400LA	**251.00**	—	—	(2) 1–600 or (4) 1–250 Al/Cu, plus (2) 4–300 Al/Cu
FAL...WB, FHL...WB	200	Requires (2) SN20A plus (1) SN20NI link	**(2) @$200.00 ea plus (1) @$27.60 ea**	—	—	—	—	(4) 6–250 Al/Cu, plus (2) 14–1/0 Al/Cu
LDL, LGL, LJL, LLL, LRL	250–400	—	—	SN400LA	**251.00**	—	—	(2) 1–600 or (4) 1–250 Al/Cu, plus (2) 4–300 Al/Cu
				SNC400LX	**1152.00**			(2) 2–600 Cu, plus (2) 2–4/0 Cu
LDL, LGL, LJL, LLL, LRL	250–600	—	—	SN800LX	**1506.00**	—	—	(4) 2–600 Cu, plus (1) 2–4/0 Cu
				SN1000MA	**365.00**			(6) 3/0–500 Al/Cu, plus (1) 1–4/0 Al/Cu
LDL, LGL, LJL, LLL, LRL	250–600	—	—	SNC600LXCT	**2506.00**	—	—	(4) 2–600 Cu, plus (2) 2–4/0 Cu
				SN600LXCT	**1065.00**			(4) 3/0–500 Al/Cu, plus (2) 2–4/0 Al/Cu
LDL, LGL, LJL, LLL, LRL	250–600	—	—	SNC800LX♦	**1506.00**	—	—	(4) 2–600 Cu, plus (1) 2–4/0 Cu
MGL, MJL★	300–800	AL800SN	**365.00**	AL800SN	**365.00**	—	—	(6) 3/0–500 Al/Cu, plus (2) 6–250 Al/Cu
PGL, PJL, PKL, PLL▼	250–1200	SN1200	**1034.00**	SN1200	**1034.00**	—	—	(8) 3/0–500 Al/Cu, plus (2) 350 4–300 Al/Cu

♦ All Cu neutral assembly.
★ For NEMA 1 and 3R 200% neutral applications order Jumper kit SN800SNI and 2 of kit SN1200. (No 200% neutral is available for NEMA 4X or 12 devices.)
▼ For applications with integral ground fault protection order Neutral Mounting Kit S33576MK and Neutral CT S33576 (400–1200 A only).

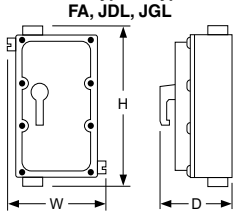
NEMA Type 1
Q2, FA, J, SWB
LA, MG, PG



NEMA Type 3R
Q2, FA, LA, MG, J, PG, RWB
(uses side hinge cover)



NEMA Type 7, Type 9
FA, JDL, JGL



NEMA Type 4, 4X, 5, 12, 12K
IK, FA, J, LA, LX, MG, PG

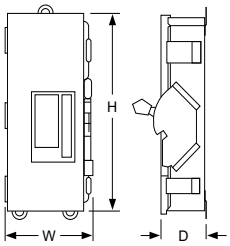


Table 7.143: Service Ground Kits

Circuit Breaker Cat. No. Prefix	Ground Bar Cat. No.	Number of Terminals	Conductors Per Terminal	Wire Range AWG/kcmil	$ Price	
					Field-Installable	Factory-Installed
QBL, QDL, QGL, QJL FAL, FHL, FCL, FIL, FAL...WB, FHL...WB KCL, KIL, LAL, LHL, Q4L	PKOGTA2△	2	1	10–2/0 Cu or 6–2/0 Al	**56.00**	**191.00**
HDL,HGL,HJL,HLL,JDL,JGL,JJL,JLL	PKOGTJ250	2	1	6–300 Al/Cu	**75.00**	**195.00**
LDL, LGL, LJL, LLL, LRL MGL, MJL PGL, PJL, PKL, PLL	PKOGTA4	4	1	6–250 Al or Cu	**213.00**	**263.00**

△ Quantity (2) required if ground wires are run in parallel.

Table 7.144: Dimensions

Cat. No.	Approximate Dimension							
	Series	H		W		D	
		in.	mm	in.	mm	in.	mm
FA100A, AWK	E2	19.50	495	9.13	232	4.88	124
FA100DS	E2	19.50	495	9.13	232	4.88	124
FA100F	E2	19.50	495	9.88	251	4.13	105
FA100RB	E2	18.00	457	8.88	226	4.88	124
FA100S	E2	18.13	461	8.63	219	4.13	105
IK250AWK	E2	42.25	1073	13.88	353	7.50	191
IK250DS	E2	42.25	1073	13.88	353	7.50	191
HD100S	A1	17.00	431.8	7.90	200.7	4.75	120.7
J250F	A01	32.40	823	15.40	391	6.00	152
J250S	A01	31.36	797	14.36	365	6.00	152
J250R	A01	31.05	789	14.47	368	6.28	160
J250DS	A01	32.26	819	9.72	247	7.94	202
J250SS	A01	32.26	819	9.72	247	7.94	202
J250AWK	A01	32.26	819	9.72	247	7.94	202
JD250S	A1	26.40	670.6	8.90	226.1	5.50	139.7
J225X	A1	22.70	577	10.93	278	7.70	196
J225Y	A1	22.70	577	10.93	278	7.70	196
KA250SWB	E2	20.00	508	19.00	483	5.63	143
KA250RWB	E2	20.25	514	19.00	483	7.12	181
L600AWK	A01	57.50	1461	20.38	518	8.25	210
L600AWKVW	A01	57.50	1461	20.38	518	8.25	210
L600AWKMC	A01	57.50	1461	20.38	518	8.25	210

Cat. No.	Approximate Dimension							
	Series	H		W		D	
		in.	mm	in.	mm	in.	mm
LA400AWK	E2	42.25	1073	13.75	349	7.25	184
LA400DS	E2	42.25	1073	13.75	349	7.25	184
LA400F	E2	45.63	1159	16.50	419	6.50	165
LA400R	E2	44.00	1118	15.38	391	7.88	200
LA400S	E2	44.50	1130	15.38	391	6.50	165
LA400LS	A1	27.40	696.0	15.40	391.2	6.625	168.3
M800S	A1	40-3/8	1025.52	21	533.4	9-3/4	247.65
M800R	A1	40-3/8	1025.52	21	533.4	9-3/4	247.65
M800DS	A1	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
M800SS	A1	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
M800AWK	A1	40-7/8	1036.96	20-3/4	527.05	9-1/2	241.3
P1200S	A1	52-1/8	1323.98	21	533.4	9-3/4	247.65
P1200R	A1	52-1/8	1323.98	21	533.4	9-3/4	247.65
P1200AWK	A1	53	1346.20	20-3/4	527.05	9-1/2	241.3
Q22200NRB	E3	23.38	594	7.63	194	4.75	121
Q22200NS	E3	23.13	588	7.63	194	4.25	108
Q23225NF	E3	26.25	667	9.88	251	4.75	121
Q23225NRB	E3	26.25	667	9.88	251	5.50	140
Q23225NS	E3	26.25	667	9.88	251	4.75	121

See Supplemental Digest 3-37 and 3-38 for:

- Special paint
- Stainlee steel fronts
- Pilot lights, push buttons
- Lock-on SPL0
- Key interlock systems
- Legend plates

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Photovoltaic Circuit Breakers and Switches

600 Vdc and 1000 Vdc PV Circuit Breakers and Switches

Class **611** / Refer to Catalog **0611CT1302**

The UL listed thermal-magnetic molded case circuit breakers and switches shown below are specifically designed for use in PV applications, rated at 50°C, offering grounded or ungrounded configurations.

The products are fully tested and calibrated under the PV UL489B standard.

The products come ready to install, including specially designed serial connectors for optimal thermal response, and adapted terminal covers for optimal isolation. Circuit Breakers come 100% rated for ease of use and selection.

These two new frames are fully compatible with the current line of PowerPact accessories, from aux contacts and shunt trips to motor operators and rotary handles.

Table 7.145: PV Molded Case Circuit Breakers

Ampere Rating	600 Vdc (3 poles)				1000 Vdc (4 poles)			
	Ungrounded		Grounded		Ungrounded		Grounded	
	Part Number	$ Price	Part Number	$ Price	Part Number	$ Price	Part Number	$ Price
50	TGL36050L	**911.00**	TGL36050K	**984.00**	TBL41050L	**1212.00**	TBL41050K	**1309.00**
60	TGL36060L	**911.00**	TGL36060K	**984.00**	TBL41060L	**1212.00**	TBL41060K	**1309.00**
70	TGL36070L	**1013.00**	TGL36070K	**1094.00**	TBL41070L	**1212.00**	TBL41070K	**1309.00**
80	TGL36080L	**1013.00**	TGL36080K	**1094.00**	TBL41080L	**1212.00**	TBL41080K	**1309.00**
100	TGL36100L	**1125.00**	TGL36100K	**1215.00**	TBL41100L	**1347.00**	TBL41100K	**1455.00**
125	TGL36125L	**1250.00**	TGL36125K	**1350.00**	TBL41125L	**1496.00**	TBL41125K	**1616.00**
150	TGL36150L	**1250.00**	TGL36150K	**1350.00**	TBL41150L	**1496.00**	TBL41150K	**1616.00**
175	TGL36175L	**1438.00**	TGL36175K	**1553.00**	TBL41175L	**1721.00**	TBL41175K	**1859.00**
200	TGL36200L	**1438.00**	TGL36200K	**1553.00**	TBL41200L	**1721.00**	TBL41200K	**1859.00**
225	UGL36225L	**1703.00**	UGL36225K	**1839.00**	UCL41225L	**2044.00**	UCL41225K	**2207.00**
250	UGL36250L	**1892.00**	UGL36250K	**2043.00**	UCL41250L	**2271.00**	UCL41250K	**2453.00**
300	UGL36300L	**2270.00**	UGL36300K	**2451.00**	UCL41300L	**2611.00**	UCL41300K	**2820.00**
350	UGL36350L	**2270.00**	UGL36350K	**2451.00**	UCL41350L	**2611.00**	UCL41350K	**2820.00**
400	UGL36400L	**2306.00**	UGL36400K	**2490.00**	UCL41400L	**2765.00**	UCL41400K	**2986.00**
450	UGL36450L	**2536.00**	UGL36450K	**2739.00**	UCL41450L	**3041.00**	UCL41450K	**3284.00**
500▲	N/A	. . .	UGL36500G	**2739.00**	UCL41500J	**3041.00**	UCL41500G	**3284.00**

▲ 500 A 80% rated.

Table 7.146: PV Circuit Breaker Max. Interrupting Ratings

Frame	600 Vdc	1000 Vdc
T-Frame	10 kA	3 kA
U-Frame	10 kA	5 kA

Table 7.147: Circuit Breaker Numbering

Brand	Frame	Rating	Termination	Poles	Voltage	Amperage			Grounding	Suffix Code		Suffix Code	
	T	G	L	3	6	0	5	0	G	A	B	S	A

Brand
Blank: Schneider Electric

Frame
T: T-Frame
U: U-Frame

Ratings
B: 3 kA
C: 5 kA
G: 10 kA

Terminations
L: Lugs Line/Load Side
F: Bus Bar
S: Rear Connected

Poles
3: 3P
4: 4P

Voltage
6: 600 Vdc
1: 1000 Vdc

Amperage
050: 50 A
060: 60 A
070: 70 A
080: 80 A
100: 100 A
125: 125 A
150: 150 A
175: 175 A
200: 200 A
225: 225 A
250: 250 A
300: 300 A
350: 350 A
400: 400 A
450: 450 A
500: 500 A

Grounding
G: Grounded, 80% rated (500 A Only)
J: Ungrounded, 80% rated (500 A Only)
K: Grounded, 100% rated
L: Ungrounded, 100% rated

Accessory Suffix Cells (See Table 7.151 to Table 7.155)

Accessory Suffix Cells (See Table 7.151 to Table 7.155)

Table 7.148: PV Molded Case Non-Automatic Switches

Ampere Rating	600 Vdc (3 poles)				1000 Vdc (4 poles)			
	Ungrounded		Grounded		Ungrounded		Grounded	
	Part Number	$ Price	Part Number	$ Price	Part Number	$ Price	Part Number	$ Price
100	TBL36000JZ10	**872.00**	TBL36000GZ10	**934.00**	TBL41000JZ10	**1048.00**	TBL41000GZ10	**1122.00**
150	TBL36000JZ15	**960.00**	TBL36000GZ15	**1028.00**	TBL41000JZ15	**1156.00**	TBL41000GZ15	**1237.00**
200	TBL36000JZ20	**1104.00**	TBL36000GZ20	**1182.00**	TBL41000JZ20	**1332.00**	TBL41000GZ20	**1426.00**
250	UDL36000JZ25	**1455.00**	UDL36000GZ25	**1557.00**	UDL41000JZ25	**1748.00**	UDL41000GZ25	**1870.00**
300	UDL36000JZ30	**1676.00**	UDL36000GZ30	**1794.00**	UDL41000JZ30	**2012.00**	UDL41000GZ30	**2153.00**
400	UDL36000JZ40	**1876.00**	UDL36000GZ40	**2007.00**	UDL41000JZ40	**2254.00**	UDL41000GZ40	**2412.00**
500	UDL36000JZ50	**2401.00**	UDL36000GZ50	**2569.00**	UDL41000JZ50	**2711.00**	UDL41000GZ50	**2901.00**

Table 7.149: PV Switches Withstand Ratings

Frame	600/1000 Vdc
T-Frame	3 kA
U-Frame	7.5 kA

Table 7.150: Switch Numbering

Brand	Frame	Rating	Termination	Poles	Voltage	Amperage			Grounding	Trip System			Suffix Code		Suffix Code	
	T	D	L	3	6	0	0	0	G	Z	1	0	A	B	S	A

Brand
Blank: Schneider Electric only

Frame
T: T-Frame
U: U-Frame

Ratings
B: 3 kA
D: 7.5 kA

Terminations
L: Lugs Line/Load Side
F: Bus Bar
S: Rear Connected

Poles
3: 3P
4: 4P

Voltage
6: 600 Vdc
1: 1000 Vdc

Amperage
000: Switch

Trip System—##
(Z: Non-Automatic Switch)
(##: Amerage Rating)
Z10: 100 A
Z15: 150 A
Z20: 200 A
Z25: 250 A
Z30: 300 A
Z40: 400 A
Z50: 500 A

Grounding
G: Grounded, 80% rated
J: Ungrounded, 80% rated

Accessory Suffix Cells (See Table 7.151 to Table 7.155)

Accessory Suffix Cells (See Table 7.151 to Table 7.155)

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Table 7.151: Auxiliary Switches

Contacts	Factory-Installed Suffix	Field-Installable Kit No.	Kit Qty.	$ Price
1A/1B Standard	AA	S29450	1	297.00
2A/2B Standard	AB	S29450	2	594.00
3A/3B Standard▲	AC	S29450	3	891.00
1A/1B Low-Level (Gold)	AE	S29452	1	372.00
2A/2B Low-Level (Gold)	AF	S29452	2	744.00
3A/3B Low-Level (Gold)▲	AG	S29452	3	1116.00

▲ U-Frame only.

Table 7.152: Alarm/Overcurrent Trip Switches

Suffix	Switch	Kit No.	Kit Qty.	$ Price
PowerPact T-Frame				
BC	Alarm Switch	S29450	1	297.00
BH	Alarm Switch, Low-Level	S29452	1	372.00
BD	Overcurrent Trip Switch, Standard	S29450	1	338.00
	SDE Actuator	S29451	1	
BJ	Overcurrent Trip Switch, Low-Level	S29452	1	413.00
	SDE Actuator	S29451	1	
BE	Alarm Switch and Overcurrent Trip Switch, Standard	S29450	2	635.00
	SDE Actuators	S29451	2	
BK	Alarm Switch and Overcurrent Trip Switch, Low-Level	S29452	2	785.00
	SDE Actuators	S29451	2	
PowerPact U-Frame				
BC	Alarm Switch	S29450	1	297.00
BH	Alarm Switch, Low-Level	S29452	1	372.00
BD	Overcurrent Trip Switch, Standard	S29450	1	297.00
BJ	Overcurrent Trip Switch, Low-Level	S29452	1	372.00
BE	Alarm Switch and Overcurrent Trip Switch, Standard	S29450	2	594.00
BK	Alarm Switch and Overcurrent Trip Switch, Low-Level	S29452	2	744.00

Table 7.153: Shunt Trips

Voltage	Shunt Trip (MX)		
	Factory-Installed Suffix	Field-Installable Kit No.	$ Price
120 Vac	SA	S29386	717.00
24 Vdc	SO	S29390	717.00
48 Vdc	SP	S29392	717.00
125 Vdc	SR	S29393	717.00

Table 7.154: Rotary Operated Handles

Device		Description	Factory Installed Suffix	T-Frame		U-Frame	
				Field Installable Kit No.	$ Price	Field Installable Kit No.	$ Price
Direct Mounted	Standard Handle Black	Handle Only	RD10	S29337	255.00	S32597	366.00
Door Mounted	Standard Black Handle	Handle Only	RE10	S29338	383.00	S32598	557.00

Table 7.155: Locks

Device	Description	Factory Installed Suffix	T-Frame		U-Frame	
			Field Installable Kit No.	$ Price	Field Installable Kit No.	$ Price
Handle Padlocking Device	Handle Padlock, ON or OFF	YP	S29371	77.00	S32631	122.00

NOTE: *For a complete list of Field installable accessories and details, including also motor operator (electrical only) and locks, refer to accessories information for the PowerPact, J-Frame (compatible with T-Frame) and L-Frame (Compatible with U-Frame). Or consult Photovoltaic offer catalog 0611CT1302.*

Table 7.156: PV Unit Mount Terminal Covers

Choose termination "L" for having the termination kit factory installed with the breaker (Lugs, Term Covers, Serial Connectors)

Frame	Description▲	Poles	Configuration				Field Installable Catalog No.	$ Price
			Ungrounded		Grounded			
			Top	Bottom	Top	Bottom		
T-Frame	Long Terminal Cover (3P)	3	X				S35175	145.00
	Long Terminal Cover (3P/1SC)	3		X	X	X	S35176	145.00
	Long Terminal Cover (4P)	4		X			S35177	162.00
	Long Terminal Cover (4P/2SC)	4	X		X		S35178	162.00
	Long Terminal Cover (4P/1SC)	4				X	S35179	162.00
U-Frame	Long Terminal Cover (3P)	3	X				S32593	185.00
	Extended Term Cover (3P/1SC)	3		X	X	X	S38291	205.00
	Long Terminal Cover (4P)	4		X			S32594	198.00
	Extended Term Cover (4P/2SC)	4	X		X		S38293	215.00
	Extended Term Cover (4P/1SC)	4				X	S38294	215.00

▲ P: Poles, SC: Serial connector.

Table 7.157: PV Rear Connection Terminal Covers and Connectors

Choose termination "S" for having the termination kit included with the breaker (Rear Connectors, Term Covers, Serial Connectors)

Frame	Description♦	Poles	Configuration				Field Installable Catalog No.	$ Price
			Ungrounded		Grounded			
			Top	Bottom	Top	Bottom		
T-Frame	Short Terminal Cover (3P)	3	X				S29515	121.00
	Long Terminal Cover (3P/1SC)	3		X	X	X	S35169	145.00
	Short Terminal Cover (4P)	4		X			S29516	141.00
	Long Terminal Cover (4P/1SC)	4				X	S35170	162.00
	Long Terminal Cover (4P/2SC)	4	X		X		S35178	162.00
	Short Rear Connector (set of 2)▲	3, 4	X		X		S29235	162.00
	Long Rear Connector (set of 2)▲	3, 4	X				S29236	206.00
U-Frame	Short Terminal Cover (3P)	3	X				S32562	149.00
	Extended Terminal Cover (3P/1SC)	3		X	X	X	S35171	205.00
	Short Terminal Cover (4P)	4		X			S32563	161.00
	Extended Term Cover (4P/1SC)	4				X	S35172	215.00
	Extended Term Cover (4P/2SC)	4	X		X		S38293	215.00
	Short Rear Connector (set of 2)▲■	3, 4	X		X		S432475	219.00
	Long Rear Connector (set of 2)▲■	3, 4	X				S432476	261.00

▲ The ungrounded configurations (3P or 4P) need 2 short and 2 long rear connectors. The grounded configurations only use 2 short rear connectors.
■ Parts only, no hardware is included. See Table 7.159 U-Frame, below.
♦ P: Poles, SC: Serial connector.

Table 7.158: PV T-Frame Bus Bar and Rear Connections Hardware

Choose termination "F" for having the termination kit included with the breaker (Terminal Nuts, Term Covers, Serial Connectors)

Description	Cat. No.	$ Price
T-Frame Term Nut Insert-Metric/M8 (12)	S30554	150.00

Table 7.159: PV U-Frame Bus Bar and Rear Connections Hardware

Choose termination "F" for having the termination kit included with the breaker (Screws and Washers, Term Covers, Serial Connectors)

Description	Cat. No.	$ Price
Set of 4 M10 x 25 terminal screws and washers for one side	S36967	31.00

Table 7.160: Mechancal Lug Kits for T- and U-Frame Circuit Breakers and Switches

Frame	Description	Conductor			Current	Cat. No.	Qty. Per Kit	$ Price
		Type	No. Per Lug	Size				
T-Frame	Lug(2) T-Frame, 12–4 AWG, Al/Cu	Al	1	#12–#4 AWG (4–25 mm²)	50–60 A	S35167	2	86.00
		Cu	1	#14–#4 AWG (2.5–25 mm²)				
	Lugs(2) T-Frame, 4–4/0 AWG, Al/Cu	Al/Cu	1	#4–#4/0 AWG (25–95 mm²)	70–150 A	S29255	2	86.00
	Lug(2) T-Frame, 250–350 kcmil, Al/Cu	Al	1	#250–350 AWG (120–185 mm²)	175–200 A	S35168	2	86.00
		Cu	1	#2/0–350 AWG (70–185 mm²)				
U-Frame	Lug(2) U-Frame, 2/0 AWG–500 kcmil, Al/Cu	Al	2	2/0 AWG–500 kcmil (70–240 mm²)	225–500 A	S35180	2	225.00
		Cu	2	2/0 AWG–500 kcmil (70–240 mm²)				

NOTE: *For availability dates of field installable accessories in Tables 7.156. 7.157, 7.158 and 7.160 contact Schneider Electric.*

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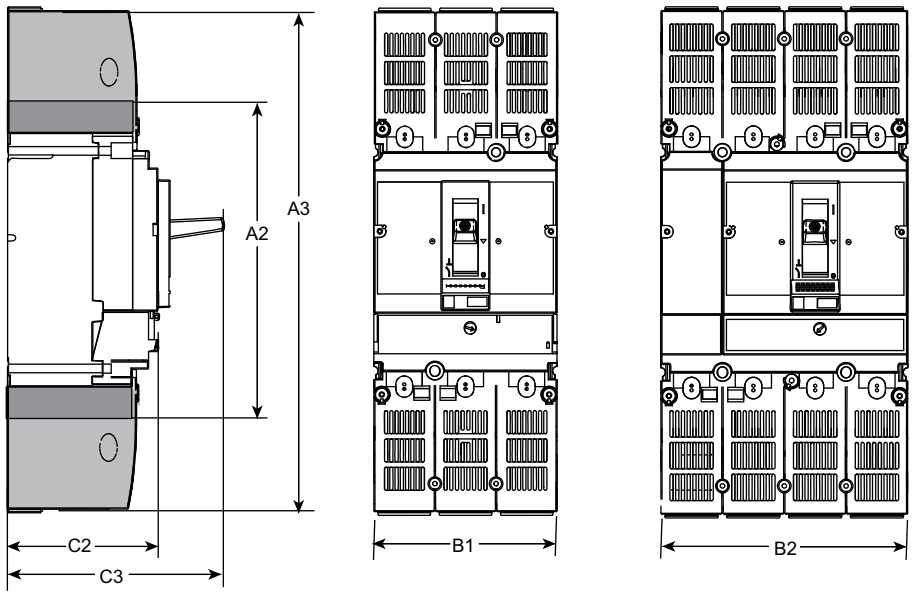
Table 7.161: PV T-Frame Circuit Breaker and Switches Dimensions

	A2	A3	B1	B2	C2	C3
in	7.40	11.42	4.13	5.51	3.39	4.96
mm	188	290	105	140	86	126



A2: Short
A3: Long

Table 7.162: Terminal Cover Configuration According to Wiring Configuration

Wiring Configuration	Connection Type		Terminal Cover Configuration	
	Unit Mount/Bus	Rear Connected	Top	Bottom
3P Ungrounded	X		Long	Long
		X	Short	Long
3P Grounded	X	X	Long	Long
4P Ungrounded	X		Long	Long
		X	Long	Short
4P Grounded	X	X	Long	Long

Table 7.163: Approximate Weights

T-Frames	Product Weight (lbs)	Shipping Weights (lbs)
3P Ungrounded	5	8
3P Grounded	5.5	8.5
4P Ungrounded	6.3	9.3
4P Grounded	6.7	9.7

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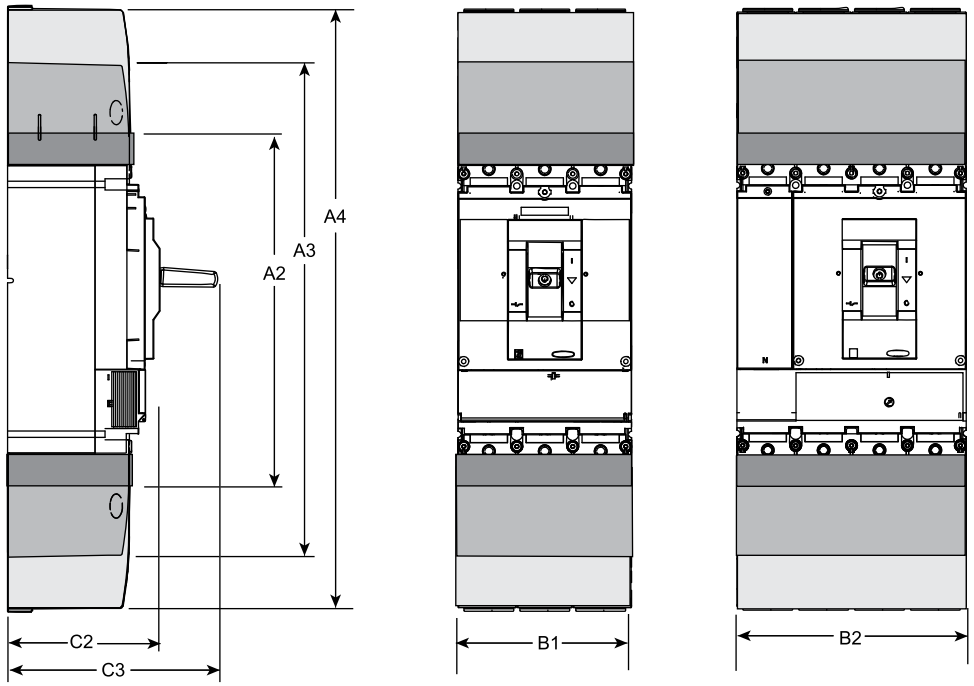
Table 7.164: PV U-Frame Circuit Breaker and Switches Dimensions

	A2	A3	A4	B1	B2	C2	C3
in	11.2	15.7	19.1	5.5	7.2	4.3	6.6
mm	285	400	484	140	183	110	168



A2: Short
A3: Long
A4: Extended

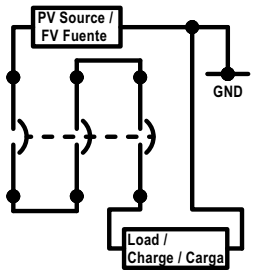
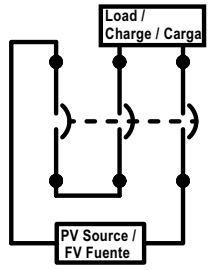
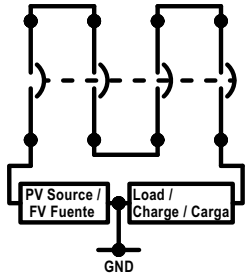
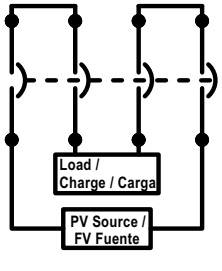
Table 7.165: Terminal Cover Configuration According to Wiring Configuration

Wiring Configuration	Connection Type		Terminal Cover Configuration	
	Unit Mount/Bus	Rear Connected	Top	Bottom
3P Ungrounded	X		Long	Extended
		X	Short	
3P Grounded	X	X	Extended	
4P Ungrounded	X			Long
		X		Short
4P Grounded	X	X		Extended

Table 7.166: Approximate Weights

U-Frames	Product Weight (lbs)	Shipping Weights (lbs)
3P Ungrounded	15	19.5
3P Grounded	17	21.5
4P Ungrounded	21	25.5
4P Grounded	23	27.5

Table 7.167: PV T- and U-Frame Circuit Breakers and Switches Wiring Configurations

600 Vdc (3 Poles)		1000 Vdc (3 Poles)	
Grounded	Ungrounded	Grounded	Ungrounded
			

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QO-K

Key operated QO circuit breakers are available in single-pole construction and can be mounted in any single-pole space which will accept a standard QO. These circuit breakers can be turned ON or OFF or to RESET with a special key (catalog number QOK10) included with the circuit breaker. These circuit breakers are UL Listed and available as shown in the table.

Table 7.168: QO-K Circuit Breakers

120 Vac—10 k AIR (1 Space Required)		
Ampere Rating ♦	Cat. No.	$ Price
10 A	QO110K	**164.00**
15 A	QO115K	**164.00**
20 A	QO120K	**164.00**
30 A	QO130K	**164.00**

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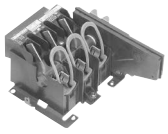

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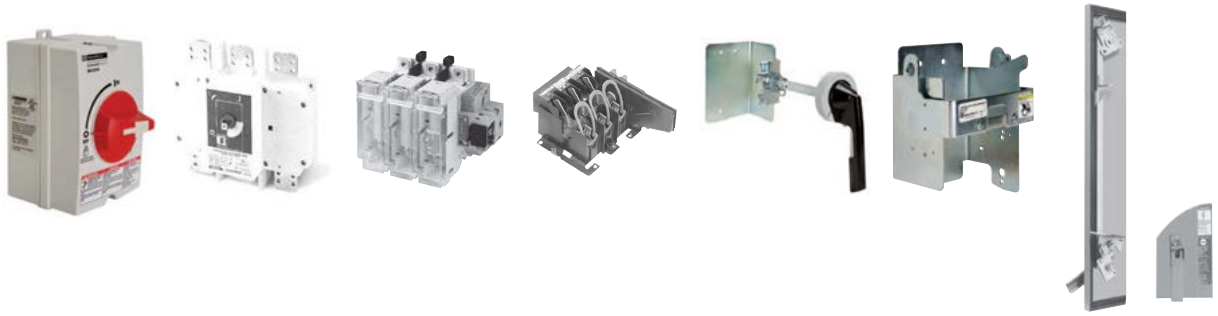

Class	Vario	LK4	GS2	9422	9421	9422	9423
Type	Manual motor control switches	Nonfusible IEC style disconnect switches	Fusible IEC style disconnect switches	NEMA style fused or nonfusible disconnect switches	Circuit breaker operating mechanisms	Circuit breaker operating mechanisms	Door closing mechanisms
UL Rating	UL508	UL98	UL98	UL98	—	—	—
Handle Type	Rotary	Rotary	Rotary	Flange Adjustable rod or cable mechanism	Rotary	Flange Adjustable rod or cable mechanism	Rotary, works in conjunction with 9422 handle mechanisms
Mounting	Door or panel	—	Flange with cable mechanism panel	Panel or bracket mount	Panel	Panel	—
Load Voltage (maximum)	600 Vac	600 Vac	600 Vac	600 Vac	600 Vac	600 Vac	—
Current Ratings	10–115	30–1200	30–800	30–400	Circuit breaker frame sizes 100–1200	Circuit breaker frame sizes 100–1200	—
Horsepower Ratings (maximum)	2–60	7.5–500	7.5–500	7.5–350	—	—	—
Enclosure Type	Metallic: NEMA Type 1, 12, 4, 4X Plastic: IP55, NEMA Type 4X	Handle ratings: NEMA Type 1, 3R, 4, 4X, 12	Handle ratings: NEMA Type 1, 3R, 4, 4X, 12	Handle ratings: NEMA Type 1, 3R, 4, 4X, 12	Handle ratings: NEMA Type 1, 3R, 4, 4X, 12	Handle ratings: NEMA Type 1, 3R, 4, 4X, 12	Handle ratings: NEMA Type 4 and 12 sheet steel or stainless
Accessories	Power poles and auxiliary contacts	Auxiliary contacts and power lugs	Auxiliary contacts and power lugs	Auxiliary contacts	Auxiliary contacts	Auxiliary contacts	Right or left-hand operation
Approvals	UL File E164864 NLRV CSA File LR 81630 Class 3211 05	UL File E191098 WP2X / WP2X7 CSA 703149 Class 4652 04	UL File E191098 WP2X / WP2X7 CSA 703149 Class 4652 04	UL File E52639 WHTY2 CSA LR44199 Class 4652-04	UL File E62922 DIHS2 CSA LR44199 Class 3211 07	UL File E62922 DIHS2 CSA LR44199 Class 3211 07	—
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The Mini-Vario and Vario motor disconnect switch catalog numbers can be identified as described in Table 8.1.

VCFN12GE

VN12

VN12/KCC1YZ

VBDN12

VCDN12

Table 8.1: Identification System

	V	CF	N12	GE
Model (V-Vario, K-Operator)				
Operator Type/ Accessory Designation				
Switch Type▲				
Enclosure Type (if applicable)				

Operator Type/ Accessory Designation

CD	Single hole Red & Yellow	**BD**	Single hole Black and Gray
CF	Four hole Red & Yellow	**BF**	Four hole Black and Gray
CCD	Single hole Red & Yellow w/extension shaft	**VE**	Switch with Red handle installed on unit (one padlock only)
CCF	Four hole Red & Yellow w/ extension shaft	**VD**	Switch with Black handle installed on unit (no padlock provision)
Blank	No operator or accessory	**Z**	Accessory, power pole, neutral or ground

Switch Type▲

Blank		**1**	Vario 20/32 A
N12	Mini-Vario 10/12 A	**2**	Vario 25/40 A
N20	Mini-Vario 16/20 A	**3**	Vario 45/63 A
02	Vario 10/12 A	**4**	Vario 63/80 A
01	Vario 16/20 A	**5**	Vario 100/125 A
0	Vario 20/25 A	**6**	Vario 115/175 A

Enclosure Type (if applicable)

Blank	No Enclosure	**G30, A30, W30**	Type 1/12/4/4X Metallic (Class 9421)
GE	Mini-Vario IP55 Non-Metallic	**GU**	Vario IP55 Non-Metallic

▲ Switches/contacts are dual rated (UL/IEC).

Mini-Vario

Table 8.2: Assembled Switches—Degree of Protection IP65, Type 1 and 12

Rating (A)		Complete Switches for Door Mounting (3-Padlock)				Complete Switches for Rear Mounting, Includes Extension Shaft (3-Padlock)	
		Red/Yellow (Single Hole)		Black/Gray (Single Hole)		Red/Yellow (Single Hole)	
UL	IEC	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
10	12	VCDN12	**90.00**	VBDN12	**90.00**	VCCDN12	**134.00**
16	20	VCDN20	**135.00**	VBDN20	**135.00**	VCCDN20	**161.00**

Table 8.3: Enclosed Switches

Complete Switches Mounted in IP55 Non-Metallic Enclosure	
Red/Yellow Mounted In Sealable Enclosure, Non-UL Listed, Non-NEMA Rated	
Catalog Number	$ Price
VCFN12GE	**179.00**
VCFN20GE	**189.00**

Table 8.4: Component Parts

Catalog Number	Description	$ Price
VN12▲	10/12 A switch only	**52.00**
VN20▲	16/20 A switch only	**63.00**
VZN12▲	Add on power pole for 10/12 A switch	**26.00**
VZN20▲	Add on power pole for 16/20 A switch	**31.50**
VZN11	Neutral Pole with early make, late break for VN12 or VN20 switch	**29.30**
VZN14	Grounding module for VN12 or VN20	**29.30**
VZN05	N.O. late make auxiliary contact■	**27.00**
VZN06	N.C. early break auxiliary contact■	**27.00**
VZN26	Single-pole shroud for auxiliary contacts	**5.90**
VZN08	Three-pole shroud for VN12 or VN20	**7.70**

▲ Switches/contacts are dual rated (UL/IEC).
■ Auxiliary contacts are dual rated (UL/IEC 10/12 A).

Table 8.5: Operators and Accessories

Catalog Number	Description	$ Price
KCC1YZ	45 x 45 mm Red & Yellow operator	**39.20**
KCD1PZ	60 x 60 mm Red & Yellow operator	**39.20**
KAD1PZ	60 x 60 mm Black & Gray operator	**39.20**
VZN17	300–340 mm shaft extension	**22.50**
VZN30	400–430 mm shaft extension	**27.00**
KZ32	Door interlocking plate for 45 or 60 mm operator	**20.30**
KZ83	Door mounting plate for 45 or 60 mm operator	**20.30**

VCCDN20

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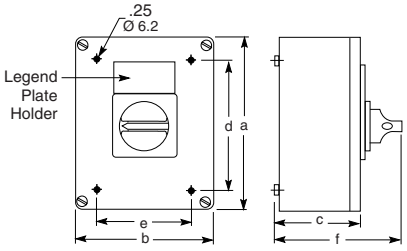
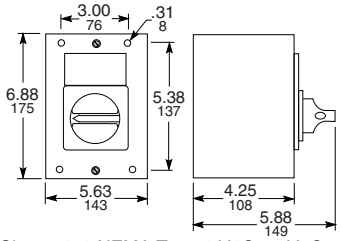


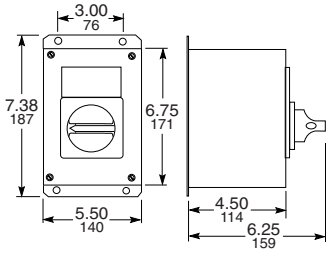
Non-Metallic Enclosure

Metallic Enclosure

Metallic Enclosed Switch Dimensions



Class 9421 NEMA Type 1 V1G30, V2G30



Class 9421 NEMA Type 4, 4X, 12
V1W30, V2W30, V1A30, V2A30

Vario

Table 8.6: NEMA Type 1 and 12 Assembled Switches for Door Mounting

Rating (A)		Complete Switches (Switch and Handle) for Door Mounting (3-padlock)							
		Red/Yellow (Four Hole)		Black/Gray (Four Hole)		Red/Yellow (Single Hole)		Black/Gray (Single Hole)	
UL	IEC	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
10	12	VCF02	**125.00**	VBF02	**125.00**	VCD02	**134.00**	VBD02	**134.00**
16	20	VCF01	**147.00**	VBF01	**147.00**	VCD01	**161.00**	VBD01	**161.00**
20	25	VCF0	**174.00**	VBF0	**174.00**	VCD0	**206.00**	VBD0	**206.00**
20	32	VCF1	**185.00**	VBF1	**185.00**	VCD1	**219.00**	VBD1	**219.00**
25	40	VCF2	**237.00**	VBF2	**237.00**	VCD2	**252.00**	VBD2	**252.00**
45	63	VCF3	**282.00**	VBF3	**282.00**	—	—	—	—
63	80	VCF4	**329.00**	VBF4	**329.00**	—	—	—	—
100	125	VCF5	**401.00**	VBF5	**401.00**	—	—	—	—
115	175	VCF6	**612.00**	VBF6	**612.00**	—	—	—	—

Table 8.7: NEMA Type 1 and 12 Assembled Switches for Rear Mounting

Rating (A)		Complete Switches for Rear Mounting with Extension Shaft (3-Padlock)▲				Switches with Handles Installed on Unit, DIN Rail Mount Only			
		Red/Yellow (Four Hole)		Red/Yellow (Single Hole)		Red/Yellow (1-Padlock)		Black/Gray (No-Padlock)	
UL	IEC	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
10	12	VCCF02	**162.00**	VCCD02	**162.00**	—	—	—	—
16	20	VCCF01	**185.00**	VCCD01	**185.00**	—	—	—	—
20	25	VCCF0	**197.00**	VCCD0	**197.00**	VVE0	**149.00**	VVD0	**149.00**
20	32	VCCF1	**206.00**	VCCD1	**206.00**	VVE1	**156.00**	VVD1	**156.00**
25	40	VCCF2	**252.00**	VCCD2	**252.00**	VVE2	**180.00**	VVD2	**180.00**
45	63	VCCF3	**320.00**	—	—	VVE3	**212.00**	VVD3	**212.00**
63	80	VCCF4	**356.00**	—	—	VVE4	**300.00**	VVD4	**300.00**
100	125	VCCF5	**464.00**	—	—	—	—	—	—
115	175	VCCF6	**606.00**	—	—	—	—	—	—

▲ Complete switch includes handle operator, shaft, door interlock plate, and line terminal shroud.

Non-Metallic Enclosed Switches

The Vario Motor Disconnect Switch is also offered as an enclosed switch. The 3-pole version makes the Vario switch ideal for manual motor control applications. They are compact, easy to wire and connect, and come undrilled to allow aable cable entry positions.

NOTE: *VCGUN enclosures are UL approved.*

Table 8.8: Non-Metallic Enclosed Switch▲■

Ampere Size UL/IEC	IP55-PVC 3-Pole, NEMA Type 1 & 12	
	Catalog No.	$ Price
20/32	VC1GUN	**239.00**
25/40	VC2GUN	**287.00**
45/63	VC3GUN	**345.00**
63/80	VC4GUN	**381.00**
100/125	VC5GUN	**548.00**
115/175	VC6GUN	**845.00**

▲ Assembled, includes switches mounted in enclosure with handle.
■ Refer to Table 8.11 and Table 8.12 for horsepower ratings.

Table 8.9: Dimensions

Type	No. of Poles	a	b	c	d	e	f
VC1GUN	3	6.5 (164)	4.8 (121)	3.4 (87)	5.6 (141)	3.9 (98)	5.2 (132)
VC2GUN							
VC3GUN	3	7.6 (193)	6.5 (164)	3.4 (87)	6.7 (170)	5.6 (141)	5.2 (132)
VC4GUN							
VC5GUN	3	11.5 (291)	9.5 (241)	5.0 (128)	10.6 (269)	8.6 (219)	7.5 (191)
VC6GUN							

The V1 and V2 come in metallic enclosures (NEMA Type 1, 4, 4X, and 12). The NEMA Type 1 comes with conduit knockouts top and bottom. To factory install a VZ7 auxiliary contact in these metallic enclosures, add Form X11 to the end of the catalog number (for example, 9421V1G30X11). To factory install a VZ20 auxiliary contact in these enclosures, add Form X20 to the end of the catalog number (for example, 9421V1W30X20). Price adder: **$42.00**

Table 8.10: Metallic Enclosed Switches ▲ ■

Rating (A)		Horsepower Ratings			NEMA Type 1		NEMA Type 12		NEMA Type 4/4X■	
UL	IEC	240 V	480 V	600 V	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
20	32	5	10	10	9421V1G30	**333.00**	9421V1A30	**548.00**	9421V1W30	**783.00**
25	40	5	10	15	9421V2G30	**381.00**	9421V2A30	**594.00**	9421V2W30	**831.00**

▲ Assembled, includes switches mounted in enclosure with handle.
■ For indoor use only. The NEMA Type 4/4X enclosure is made of #304 stainless steel with 3/4 in. T&B stainless steel hubs on the top and bottom.

Table 8.11: Vario Manual Motor Control Switches, IEC

Rating (A) IEC	kW Rating				3-Pole Switch Body	
	230 V	240 V	400 V	415 V	500 V	690 V
12	3	3	4	4	5.5	7.5
20	4	4	5.5	5.5	7.5	11
25	5.5	5.5	7.5	7.5	11	15
32	5.5	5.5	11	11	11	15
40	7.5	7.5	15	15	18.5	15
63	15	15	22	22	30	22
80	18.5	18.5	30	30	37	30
125	22	22	37	37	45	37
175	30	30	45	45	55	45

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Vario Manual Motor Control Switches

Vario switches meet UL508 requirements as open manual motor controllers. They are also marked "Suitable as Motor Disconnect" allowing installation on the load side of the motor branch circuit short-circuit and ground-fault protection. If motor branch circuit short-circuit and ground-fault protection is needed, use a GS1 or 9422 fusible switch or circuit breaker meeting NEC 430.52 requirements.

Manual Motor Control Switch

Table 8.12: Vario Manual Motor Control Switches

Rating (A)	Horsepower Rating			Shaft Size	3-Pole Switch Body
UL	240 V	480 V	600 V	mm	Type
10	2	5	5	6	V02
16	3	7.5	7.5	6	V01
20	5	10	10	6	V0
20	5	10	10	6	V1
25	5	10	15	6	V2
45	10	20	30	8	V3
63	15	30	40	8	V4
100	25	50	50	8	V5
115	30	50	60	8	V6

Table 8.13: Switch Body▲

Rating (A)		Shaft Size mm	3-Pole Switch Body	
UL	IEC		Type	$ Price
10	12	6	V02	**62.00**
16	20	6	V01	**74.00**
20	25	6	V0	**84.00**
20	32	6	V1	**95.00**
25	40	6	V2	**143.00**
45	63	8	V3	**179.00**
63	80	8	V4	**215.00**
100	125	8	V5	**287.00**
115	175	8	V6	**428.00**

▲ Refer to Table 8.10 and Table 8.12 for horsepower ratings.

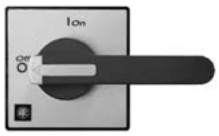
Single-Hole Operator

Four-Hole Operator (All except KDF3PZ and KBF3PZ)

Table 8.14: NEMA Type 1 and 12 Handle Operators: V02–V2 (6 mm Shaft), V3–V6 (8 mm Shaft) ▲

Operator Type		Red/Yellow Single Hole 45 x 45 mm		Red/Yellow Four Hole 45 x 45 mm		Black/Gray Single Hole 45 x 45 mm		Black/Gray Four Hole 45 x 45 mm	
Switches	No. of Padlocks	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
V02–V2	0	KCC1LZ	**39.20**	KCE1LZ	**39.20**	KAC1BZ	**39.20**	KAE1BZ	**39.20**
V02–V2	1	KCC1YZ	**39.20**	KCE1YZ	**39.20**	—	—	—	—
Operator Type		**Red/Yellow Single Hole 60 x 60 mm**		**Red/Yellow Four Hole 60 x 60 mm**		**Black/Gray Single Hole 60 x 60 mm**		**Black/Gray Four Hole 60 x 60 mm**	
V02–V2	0	KDD1PZ	**39.20**	KDF1PZ	**39.20**	KBD1PZ	**39.20**	KBF1PZ	**39.20**
V3–V4	0	—	—	KDF2PZ	**39.20**	—	—	KBF2PZ	**39.20**
V02–V2	3	KCD1PZ	**39.20**	KCF1PZ	**39.20**	KAD1PZ	**39.20**	KAF1PZ	**39.20**
V3–V4	3	—	—	KCF2PZ	**39.20**	—	—	KAF2PZ	**39.20**
Operator Type		**Red/Yellow Four Hole 90 x 90 mm**		**Black/Gray Four Hole 90 x 90 mm**					
V5–V6	0	KDF3PZ	**107.00**	KBF3PZ	**107.00**				
V5–V6	3	KCF3PZ	**107.00**	KAF3PZ	**107.00**				

▲ When using these handles for replacements on the non-metallic enclosed switches, the handle shaft that comes with the enclosure must be reused. See Section 17 of the Supplemental Digest.



Four-Hole Operator KDF3PZ and KBF3PZ

Table 8.15: Low Profile Handle Operators▲

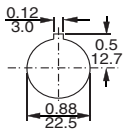
Operator Type		Red/Yellow Single Hole 60 x 60 mm		Red/Yellow Four Hole 60 x 60 mm		Black/Gray Single Hole 60 x 60		Black/Gray Four Hole 60 x 60 mm	
Switches	No. of Padlocks	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
V02–V2	3	KCD1YZ	**39.20**	KCF1YZ	**39.20**	KADIXZ	**39.20**	KAF1XZ	**39.20**
V3–V4	3	—	—	KCF2YZ	**39.20**	—	—	KAF2XZ	**39.20**
Operator Type		**Red/Yellow Four Hole 90 x 90 mm**		**Black/Gray Four Hole 90 x 90 mm**					
V5–V6	3	KCG2YZ	**72.00**	KAG2XZ	**72.00**				

▲ When using these handles for replacements on the non-metallic enclosed switches, the handle shaft that comes with the enclosure must be reused. See Section 17 of the Supplemental Digest.

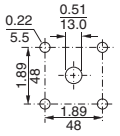
Low-Profile Handle KCD1YZ

Table 8.16: Gasket Kits

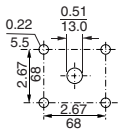
Catalog No.	Description	$ Price Each
KZ65	45 x 45 mm gasket for V02-V2 for 4-hole type handles (order in quantities of 5)—IP65	**5.90**
KZ66	60 x 60 mm gasket for V02-V2 for 4-hole type handles (order in quantities of 5)	**12.00**
KZ62	60 x 60 mm gasket for V3-V4 for 4-hole type handles (order in quantities of 5)	**12.00**
KZ67	90 x 90 mm gasket for V5-V6 for 4-hole type handles (order in quantities of 5)—IP65	**15.60**



Single-Hole Mounting Dimensions



Four-Hole 60 x 60 Mounting Dimensions ▲

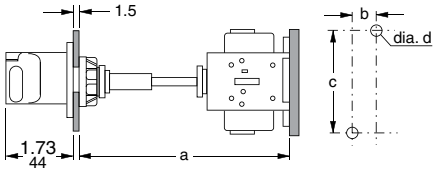


Four-Hole 90 x 90 Mounting Dimensions ▲

▲ The door interlock plate included with VCC Kits has the same drilling as the handle operators.

Table 8.17: Rear/Panel Mounting Switch Body Dimensions

Type	Shaft Extension	Dimensions							
		a		b		c		d	
		in.	mm	in.	mm	in.	mm	in.	mm
V02 to V2	VZ17 VZ30	5.5–13.0 5.5–16.9	140–330 140–430	0.60	15	2.4	60	0.17	4.2
V3 to V4	VZ18 VZ31	5.5–12.6 5.5–16.5	140–320 140–420	0.79	20	2.4	60	0.20	5.2
V5 to V6	VZ18 VZ31	6.5–13.8 6.5–17.7	165–350 165–450	1.20	30	3.9	100	0.28	7.0



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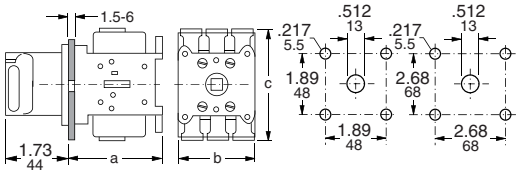
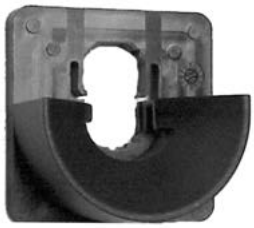


Table 8.18: Door Mounting Switch Body Dimensions

Switch Type	Dimensions						Weight Approx. lbs.
	a		b		c		
	in.	mm	in.	mm	in.	mm	
V02 to V2▲	2.83	72	2.17	55	2.91	74	0.44
V02 to V2	2.36	60	2.17	55	2.91	74	0.44
V3 to V4	2.56	65	2.36	60	3.27	83	1.10
V5 to V6	3.54	90	3.54	90	4.92	125	2.00

▲ Dimensions for single-hole mounting.

Shaft Extension Kit



Door Interlock Plate
KZ32

Table 8.19: Shaft Extension and Door Interlock

Switch Type	Maximum Panel Depth		Shaft Extension Kit	$ Price	Door Interlock Plate	$ Price	Door Mounting Plate	$ Price
	in.	mm						
V02 to V2	13.0	330	VZ17	**28.70**	KZ32	**20.30**	KZ83	**20.30**
V3, V4	12.6	320	VZ18	**35.60**	KZ74	**39.20**	KZ81	**39.20**
V5, V6	13.8	351	VZ18	**35.60**	KZ74	**39.20**	KZ81	**39.20**
V02 to V2	16.9	429	VZ30	**35.60**	KZ32	**20.30**	KZ83	**20.30**
V3, V4	16.5	419	VZ31	**42.80**	KZ74	**39.20**	KZ81	**39.20**
V5, V6	17.7	450	VZ31	**42.80**	KZ74	**39.20**	KZ81	**39.20**

Table 8.20: Accessories

Switch Type	Line Side Terminal Shroud For Main Switch	$ Price	Terminal Shroud for Add-on Power Pole	$ Price	Terminal Shroud for Auxiliary Contact	$ Price
V02 to V2	VZ8	**8.40**	VZ26	**5.90**	VZ29	**5.90**
V3, V4	VZ9	**8.40**	VZ27	**5.90**	VZ29	**5.90**
V5, V6	VZ10	**12.00**	VZ28	**9.50**	VZ29	**5.90**

Table 8.21: Add-On Contact Modules

Switch Type	Main Pole Module	Main Pole	Ampere Rating UL/IEC	$ Price	Auxiliary Contacts		$ Price
					1 N.O. & 1 N.C. ▲	2 N.O.	
V02	VZ02	VZ02	10/12	**31.50**			
V01	VZ01	VZ01	16/20	**32.90**			
V0	VZ0	VZ0	20/25	**34.20**			
V1	VZ1	VZ1	20/32	**35.60**			
V2	VZ2	VZ2	25/40	**55.00**	VZ7■	VZ20■	**42.80**
V3	VZ3	VZ3	45/63	**66.00**			
V4	VZ4	VZ4	63/80	**82.00**			
V5	—	—	—	—			
V6	—	—	—	—			

▲ Early Break, Late Make.
■ Auxiliary contacts are rated UL/IEC 10/12 A.

Add-On Contact Modules

Table 8.22: Add-On Contact Modules

Switch Type	Neutral Modules Early Make/Late Break		Grounding Module		Auxiliary Contacts		
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	Description	$ Price
V02–V2	VZ11	**42.80**	VZ14	**42.80**	VZ7	1 Late Make N.O. & 1 Early Break N.C.	**42.80**
V3–V4	VZ12	**54.00**	VZ15	**54.00**	VZ20	2 N.O. Contacts	**42.80**
V5–V6	VZ13	**70.00**	VZ16	**70.00**	—	—	—

Table 8.23: Labeling Accessories

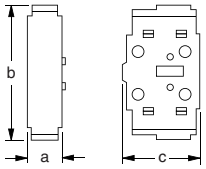
Nameplate Holder with Nameplate			Nameplate Holder Only		Nameplate Only		
Size	Catalog No.	$ Price	Catalog No.	$ Price	Use With	Catalog No.	$ Price
45 x 45 mm	KZ13	**4.80**	KZ14	**4.40**	KZ14	KZ76	**3.50**
60 x 60 mm	KZ15	**4.80**	KZ16	**4.40**	KZ16	KZ77	**3.50**
90 x 90 mm	KZ103	**7.80**	KZ101	**6.80**	KZ1010	KZ100	**3.50**

Terminal Shroud for
Main Switch
VZ8

Terminal Shroud
for Auxiliary Contact
VZ29

Table 8.24: Shrouds

Switch Type	3-Pole Shroud		Single-Pole Shroud		
	Catalog No.	$ Price	For Add-On Power Pole	Catalog No.	$ Price
V02–V2	VZ8	**8.40**	VZ02-VZ2, VZ11 & VZ14	VZ26	**5.90**
V3–V4	VZ9	**8.40**	VZ23, VZ4, VZ12 & VZ15	VZ27	**6.90**
V5–V6	VZ10	**12.00**	VZ13 & VZ16	VZ28	**9.50**
—	—	—	For 2-Pole Aux. Contact	VZ29	**5.90**



Main Pole Module

Table 8.25: Main Pole Module Dimensions

Switch Type	Dimensions						Weight Approx. lbs.
	a		b		c		
	in.	mm	in.	mm	in.	mm	
V02 to VZ2	0.63	16	2.9	74	1.38	35	0.10
VZ3 to VZ4	0.79	20	3.3	83	1.80	46	0.22

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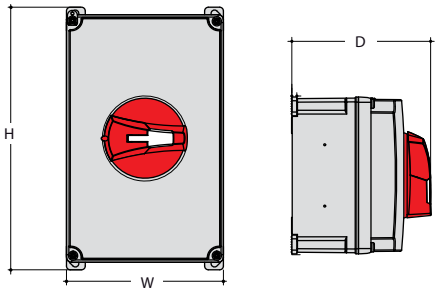

MD Motor Disconnect Switches

The MD motor disconnect switch is listed UL508 Suitable for Motor Control (UL File E164864) and conforms to IEC standard 60947-3. It is in a compact NEMA Type 4X enclosure suitable for use in NEMA Type 1, 3, 3R, 4, 4X, and 12 applications. The MD's key benefits are an extremely small footprint, a more economically efficient NEMA Type 4X solution and a handle interlock preventing cover removal when the switch is in the ON position.

Table 8.26: MD Motor Disconnect Switch—Non-Metallic NEMA Type 1, 3, 3R, 4, 4X, and 12 Enclosure▲■♦

Amperes	Cat. No.	Maximum Horsepower Ratings Three Phase Vac			$ Price	Height (in.)	Width (in.)	Depth (in.)
		220–240	440–480	600				
30	MD3304X	7.5	20	25	**121.00**	6.38	3.9	4.37
60	MD3604X	20	40	40	**161.00**	8.27	4.94	4.37

▲ See Table 8.20 for accessories.
■ Complies with OSHA lockout/tagout requirements—accepts up to three 8 mm padlocks.
♦ Suitable for NEMA Type 1, 3R, 4, 4X, and 12 enclosure applications.

Table 8.27: MD Motor Disconnect Accessories

Cat. No.	Description	$ Price
MDSAN20	2 N.O. auxiliary contact module	**57.00**
MDSAN11	1 N.O. and 1 N.C. auxiliary contact module	**27.00**
MDS30P	30 A add on power pole	**35.00**

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Example of the parts to order to build a complete GS or LK switch:

Choose a Switch + **Shaft** + **Handle Assembly** + **Lugs if needed**

600 A, LK4SU3N

Shaft 320 mm, GS2AE6

Black Handle, GS2AH150

Lugs Kit, GS1AW503

Example:
LK4SU3N (600 A nonfusible switch, use 15x12 shaft) + **GS2AE6** (320 mm Type S shaft) + **GS2AH150** (black/ black, lockable)

To add auxiliary contacts:
For front-mounted contacts order **LK4AD30N** (front-mounted auxiliary contact holder) + **GS2AM110**.

New!

30–100 A Compact

New!

100–400 A

GS2AH130

GS2AH150

GS2AH170

Table 8.28: LK Nonfusible IEC Style Disconnect Switches

Pole	Rating (A)	Catalog Number	$ Price	Maximum Horsepower Rating				Short Circuit Current Rating 600 Vac		Shaft Sty;e
				240 V	480 V	600 V	250 Vdc	Fuse	SCCR kA	
3	30	LK4DU3CN	**218.00**	10	20	30	—	J	100	AL
3	60	LK4GU3CN	**263.00**	20	40	50	—	J	100	AL
3	100	LK4JU3CN	**458.00**	20	50	50	N/A	J	100	AL
3	100	LK4JU3N	**458.00**	30	75	100	15	J	200	B
3	200	LK4MU3N	**1010.00**	75	150	200	15	J	200	B
3	400	LK4QU3N	**1910.00**	125	250	350	50	J	200	B
3	600	LK4SU3N	**2873.00**	200	400	350	50	J	200	D
3	800	LK4TU3N	**4301.00**	200	500	500	—	L	100	D
3	1000	LK4UU3N	**5372.00**	200	500	500	—	L	100	D
3	1200	LK4WU3N	**6450.00**	200	500	500	—	L	100	D

Table 8.29: Handles and Shafts for LK Switches

Rating (A)	Handle				Shaft: 12.6/320 in./mm		Shaft: 15.7/400 in./mm		Shaft Guide▲		Shaft Style
	Catalog No.	Type	Color	$ Price	Catalog No.	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	
30–100	LK4AH110CN■	1, 3R, 12	Black	**62.00**	LK4AE12CN	**18.60**	—	—	LK4AEAH12CN	**15.50**	AL
30–100	LK4AH120CN■	1, 3R, 12	Red/Yellow	**62.00**							
30–100	LK4AH410CN■	4, 4X	Black	**70.00**							
30–100	LK4AH420CN■	4, 4X	Red/Yellow	**70.00**							
100–400	GS2AH130	1, 3R, 12	Black	**70.00**	GS2AE2	**20.30**	GS2AE21	**25.00**	—	—	B
100–400	GS2AH140	1, 3R, 12	Red/Yellow	**70.00**							
100–400	GS2AH430	4, 4X	Black	**78.00**							
100–400	GS2AH440	4, 4X	Red/Yellow	**78.00**							
600	GS2AH150	4, 4X	Black	**263.00**	GS2AE6	**32.60**	GS2AE61	**40.40**	—	—	D
600	GS2AH160	4, 4X	Red/Yellow	**263.00**							
800–1200	GS2AH170	4, 4X	Black	**296.00**							
800–1200	GS2AH180	4, 4X	Red/Yellow	**296.00**							

▲ Optional on shafts for LK4DU3CN, LK4GU3CN and LK4JU3CN.
■ For use on switches ending with CN only.

Table 8.30: Auxiliary Contacts for LK Switches

Switch Amperes	Catalog Number	Description	$ Price
30–60	MDSAN11	Aux Contact 1 N.O. and 1 N.C.	**14.70**
30–60	MDSAN20	Aux Contact 2 N.O. and 2 N.C.	**27.50**
100–400	LK4AD10N	Aux Contact 1 N.O. and 1 N.C.	**14.70**
100–400	LK4AD20N	Aux Contact 2 N.O. and 2 N.C.	**14.70**
600–1200	LK4AD30N	Aux Contact Holder	**14.70**
600–1200	GS2AM110	Aux Contact 1 N.O.	**14.70**
600–1200	GS2AM101	Aux Contact 1 N.C.	**14.70**

Table 8.31: Terminal Shrouds for LK Switches

Switch Amperes	Catalog Number	Description	$ Price
30–60	LK4AP3CN	Shroud Top and Bottom, 3-Pole	**79.00**
100–200	LK4AP33TN	Shroud Top LK4, 3-Pole, 100/200 A	**101.00**
100–200	LK4AP33BN	Shroud Bottom LK4, 3-Pole, 100/200 A	**101.00**
400	LK4AP53TN	Shroud Top LK4, 3-Pole, 400 A	**140.00**
400	LK4AP53BN	Shroud Bottom LK4, 3-Pole, 400 A	**140.00**
600▲	LK4AP63N	Shroud Bottom LK4, 3-Pole, 600 A	**280.00**
800–1200▲	LK4AP83N	Shroud Bottom LK4, 3-Pole, 800–1200 A	**280.00**

▲ 600–1200 A standard with top shroud.

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New!

GS2GU3N

Table 8.32: GS Fusible IEC Style Disconnect Switches

Pole	Rating (A)	Catalog Number	$ Price	Maximum Horsepower Rating				Short Circuit Current Rating 600 Vac		Shaft Style
				240 V	480 V	600 V	250 Vdc	Fuse	SCCR kA	
3	30	GS1DDU3	**237.00**	7.5	15	20	5	CC	100	AG
3	30	GS1DU3	**260.00**	7.5	15	20	5	J	100	AG
3	30	GS2EEU3	**237.00**	7.5	15	20	5	CC	100	B
3	30	GS2EU3N	**260.00**	7.5	15	20	5	J	100	B
3	60	GS2GU3N	**336.00**	15	30	50	10	J	100	B
3	100	GS2JU3N	**536.00**	30	60	75	20	J	200	B
3	200	GS2MU3N	**1181.00**	60	125	150	40	J	200	B
3	400	GS2QU3N	**2252.00**	125	250	350	50	J	200	B
3	600	GS2SU3	**3378.00**	200	500	500	—	J	200	C
3	800	GS2TU3	**5061.00**	200	500	500	—	J	200	C

GS2AH110
Suggested for
30–60 A

GS2AH150

GS2AH130
100–400 A
Optional
30–60 A

Table 8.33: Handles and Shafts for GS Switches▲

Rating (A)	Handle				Shaft: 12.6 in. (320 mm)		Shaft: 15.7 in. (400 mm)		Shaft Guide		Shaft Style
	Catalog No.	Type	Color	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	
30–60	GS2AH110	1, 3R, 12	Black	**62.00**	GS2AE8	**18.60**	GS2AE81	**22.30**	LKN4AEAH12C	**15.50**	AG
30–60	GS2AH120	1, 3R, 12	Red/Yellow	**62.00**							
30–60	GS2AH410	4, 4X	Black	**70.00**							
30–60	GS2AH420	4, 4X	Red/Yellow	**70.00**							
30–400	GS2AH130	1, 3R, 12	Black	**70.00**	GS2AE2	**20.30**	GS2AE21	**25.00**	—	—	B
30–400	GS2AH140	1, 3R, 12	Red/Yellow	**70.00**							
30–400	GS2AH430	4, 4X	Black	**78.00**							
30–400	GS2AH440	4, 4X	Red/Yellow	**78.00**							
600–800	GS2AH150	4, 4X	Black	**263.00**	GS2AE5	**32.60**	GS2AE51	**40.40**	—	—	C
600–800	GS2AH160	4, 4X	Red/Yellow	**263.00**							

▲ GS2AH100TO200–GS1 to GS2 Handle Adapter if using GS1 holes.

NOTE: *Hole adapter kit for GS1 to GS2 Handles: GS2AH100TO200* ***$17.43****.*

Table 8.34: Auxiliary Contacts for GS Switches▲

Switch Amperes	Catalog Number	Description	$ Price
30–800	GS1AM110	Aux Contact 1 N.O.	**14.70**
30–800	GS1AM101	Aux Contact 1 N.C.	**14.70**
30	GS1AD10	Aux Contact Holder	**46.70**

▲ GS1DU3 and GS1DDU3 switches allow up to 4 auxiliary contacts without adding contact holder GS1AD10. For more than 4 contacts, GS1AD10 is required.

Auxiliary Contacts
GS1AD10 + GS2AM110

Table 8.35: Shorting Links

For use on	Shorting Links per Kit	Catalog No.	$ Price
GS2, 60 A	3	GS1AU203	**29.60**
GS2, 100 A	3	GS1AU303	**41.90**
GS2, 200 A	3	GS1AU403	**62.10**
GS2, 400 A	3	GS1AU503	**93.00**
GS2, 600–800 A	3	GS1AU803	**156.00**

Flange Handle
Cable Operator Kit

Table 8.36: Terminal Shrouds for GS Switches, Line or Load▲

Switch Amperes	Catalog Number	Description	$ Price
30–100	—	Standard on product	—
200	GS2AP43	GS2, 3-Pole, 200 A	**101.00**
400	GS2AP53	GS2, 3-Pole, 400 A	**101.00**
600–800	GS2AP73	GS2, 3-Pole, 600–800 A	**140.00**

▲ Order one terminal shroud per side. For example, order one terminal shroud for *either* the line side *or* load side; order two terminal shrouds for *both* the line side *and* load side.

Shorting Links

Table 8.37: Flange Handle Cable Operator Kits for GS2 Switches▲

Catalog Number	Description	$ Price
GS2AH36F	Flange Handle and 36 in. Cable Operator Kit	**417.00**
GS2AH60F	Flange Handle and 60 in. Cable Operator Kit	**432.00**
GS2AH120F	Flange Handle and 120 in. Cable Operator Kit	**476.00**

▲ Compatible with 30 through 200 Amp switches (Not GS100430, GS1063).

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Accessories

Terminal Lugs

Table 8.38: Terminal Lugs

For Use On	Rating	No. of Wires per Lug	No. of Lugs per Terminal	Lug Size (AWG)	Wire Type	Lugs per Kit	Lug Kit Catalog Number
LK4DU3CN	30	1	1	#12–2/0	Cu	—	Standard
LK4GU3CN	60	1	1	#12–2/0	Cu	—	Standard
LK4JU3N	100	1	1	6–300 kcmil	Cu/Al	6	GS1AW403
LK4MU3N	200	1	1	6–300 kcmil	Cu/Al	6	GS1AW403
LK4QU3N	400	2	1	350 MCM—6	Cu/Al	6	GS1AW603
		1	1	600 MCM—4	Cu/Al	6	GS1AW606
		2		250 MCM—1/0			
LK4SU3N	600	2	1	2 x 2–600 kcmil	Cu/Al	6	GS1AW503
LK4TU3N	800	2	2	2 x 2–600 kcmil	Cu/Al	12	GS1AW903
LK4UU3N	1000	2	2	2 x 2–600 kcmil	Cu/Al	12	GS1AW903
LK4WU3N	1200	2	2	2 x 2–600 kcmil	Cu/Al	12	GS1AW903
GS1DDU3	30	1	1	#14–#10	Cu	—	Standard
GS1DU3	30	1	1	#14–#10	Cu	—	Standard
GS2EEU3	30	1	1	#14–#10	Cu	—	Standard
GS2EU3N	30	1	1	#14–#6	Cu	—	Standard
GS2GU3N	60	1	1	#10–#6	Cu	—	Standard
GS2JU3N	100	1	1	#12–#1	Cu	—	Standard
GS2MU3N	200	1	1	6–300 kcmil	Cu/Al	6	GS1AW403
GS2QU3N	400	2	1	350 MCM—6	Cu/Al	6	GS1AW603
		1	1	600 MCM—4	Cu/Al	6	GS1AW606
		2		250 MCM—1/0			
GS2SU3	600	2	1	2 x 2–600 kcmil	Cu/Al	6	GS1AW503
GS2TU3	800	2	1	2 x 2–600 kcmil	Cu/Al	6	GS1AW503

Table 8.39: Power Distribution Lugs GS1 or GS2 Only

For Use On	Rating	No. of Wires per Lug	Lug Size (AWG)	Wire Type	Lugs per Kit	Lug Kit Catalog Number
GS1JU3	100	6	#14–#6	Cu	3	GS1AW306▲
GS2MU3N GS2QU3N	200 400	12	#14–#4	Cu	3	GS1AW406
GS2MU3N GS2QU3N	200 400	6	#12–2/0	Cu	3	GS1AW506

▲ Cannot be used on GS2JU3N.

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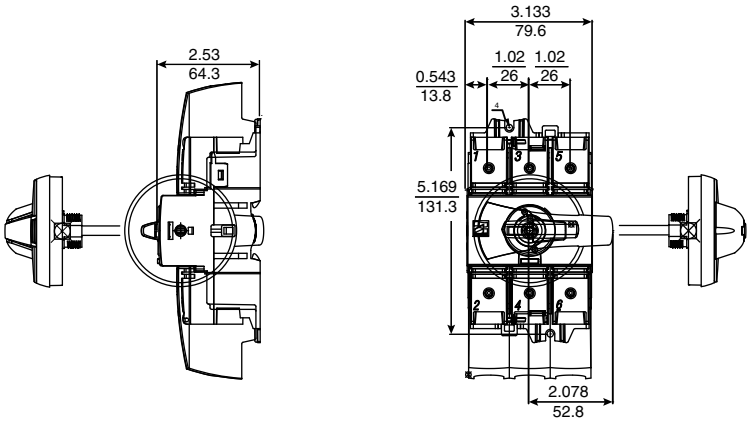
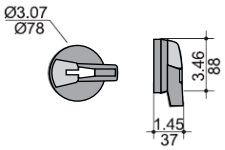
LK4DU3CN and LK4GU3CN, 30–100 A Compact Nonfusible Disconnect Switches



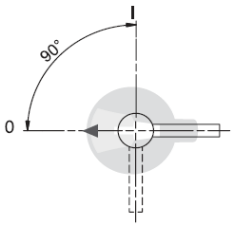
Handle for 30–100 A Compact Nonfusible Disconnect Switches

Handle Part No.

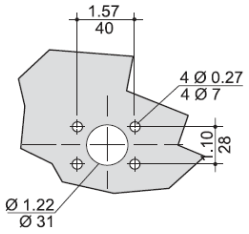
LK4AH110CN
LK4AH120CN
LK4AH410CN
LK4AH420CN



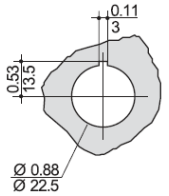
Right-side or front operation



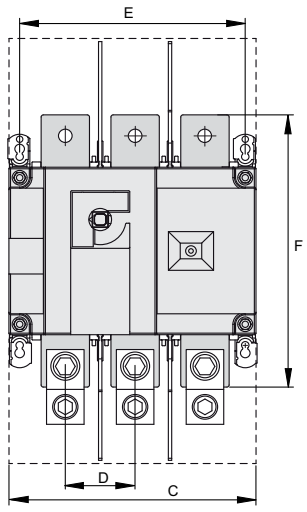
Door drilling with 4 fixing screws

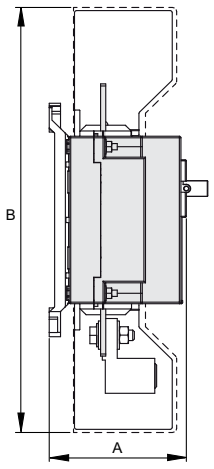


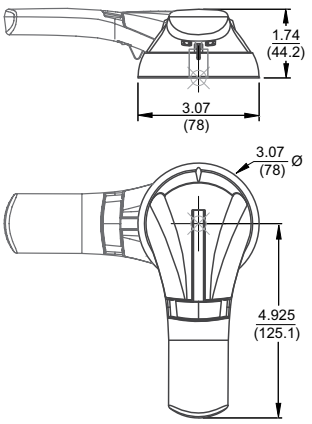
Door drilling with fixing nut



LK4JU3N / LK4MU3N / LK4QU3N, 100–400 A Nonfusible Disconnect Switches—Dimensions

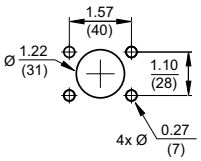






Handle Part No.

GS2AH130
GS2AH140
GS2AH430
GS2AH440



Rating (A)	Dimensions = in. (mm)					
	A	B	C	D	E	F
100–200	3.72 (94.6)	10.1 (256)	7.09 (1.80)	1.97 (50)	6.3 (160)	6.3 (160)
400	4.92 (128)	16 (406)	9.05 (230)	2.56 (65)	8.26 (210)	10.2 (260)

Dimensions: in. / mm

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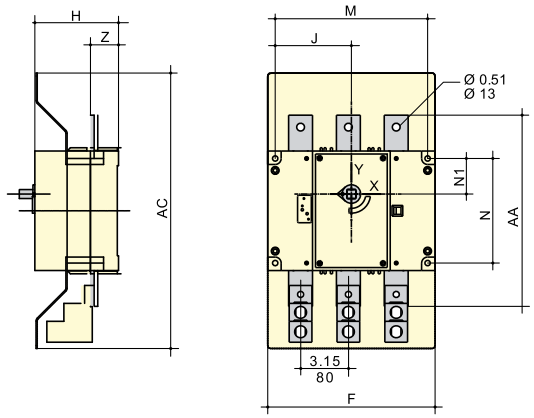
LK4SU3N, 600 A Nonfusible Disconnect Switches—Dimensions



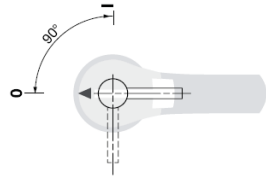
Rating (A)	Dimensions = in. (mm)								
	AC	F	H	J	M	N	N1	AA	Z
600	18.12 (460)	11 (280)	5.5 (140)	5.0 (127.5)	10.03 (255)	6.88 (175)	2.34 (59.5)	12.6 (320)	1.85 (47)

Handle for 600 A and 800 A Fusible Disconnect Switches

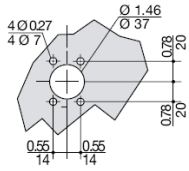
Handle Part No.
GS2AH150
GS2AH160

Front operation

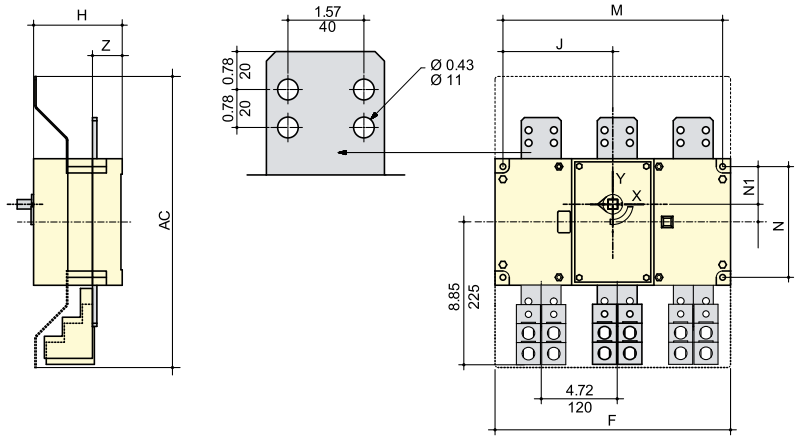
Direction of operation



Door drilling template



LK4TU3N / LK4UU3N / LK4WU3N, 800–1200 A Nonfusible Disconnect Switches—Dimensions



Rating (A)	Dimensions = in. (mm)							
	AC	F	H	J	M	N	N1	Z
800–1200	18.12 (460)	14.64 (372)	5.5 (140)	6.83 (173.5)	13.66 (347)	6.88 (175)	2.34 (59.5)	1.85 (47)

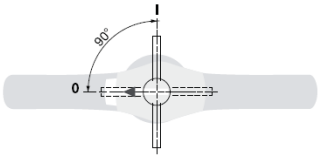
Handle for 800–1200 A Fusible Disconnect Switches

Handle Part No.
GS2AH170
GS2AH180

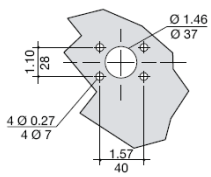
Dimensions: in. / mm

Front operation

Direction of operation



Door drilling template



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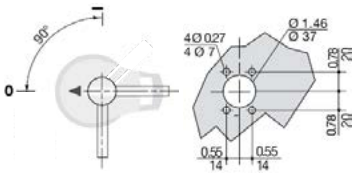
Handle for 30 A and 60 A Fusible Disconnect Switches

Handle Part No.

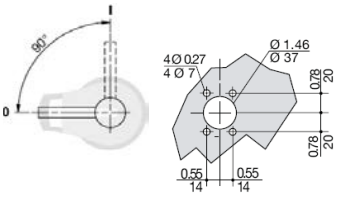
GS2AH110
GS2AH120
GS2AH410
GS2AH420



Front operation

Direction of operation

Door drilling template

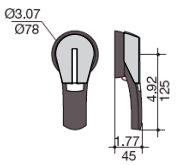


Side operation

Direction of operation

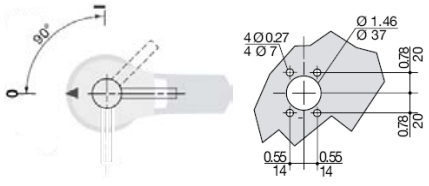
Door drilling template

Handle for 100 A, 200 A, and 400 A Fusible Disconnect Switches



Handle Part No.

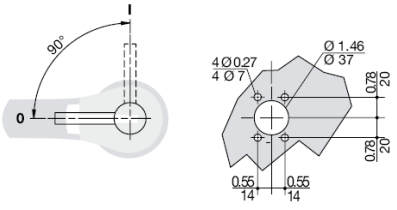
GS2AH130
GS2AH140
GS2AH430
GS2AH440



Front operation

Direction of operation

Door drilling template

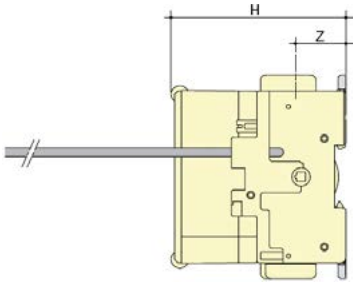


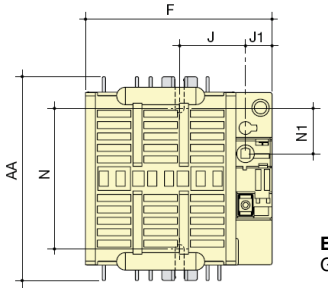
Side operation

Direction of operation

Door drilling template

GS1DDU3, 30 A Fusible Disconnect Switches, Class CC Fuses and GS1DU3, 30 A Fusible Disconnect Switches, Class J Fuses—Dimensions

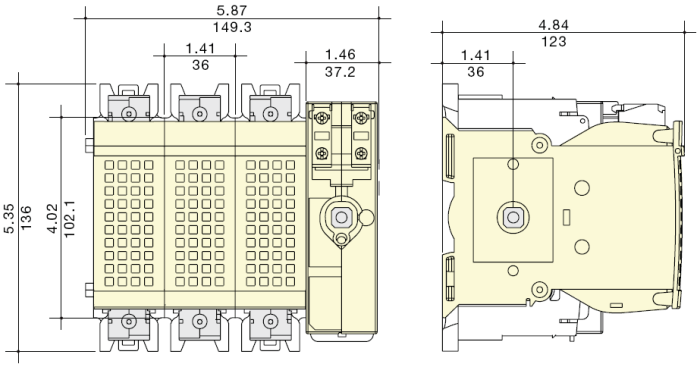




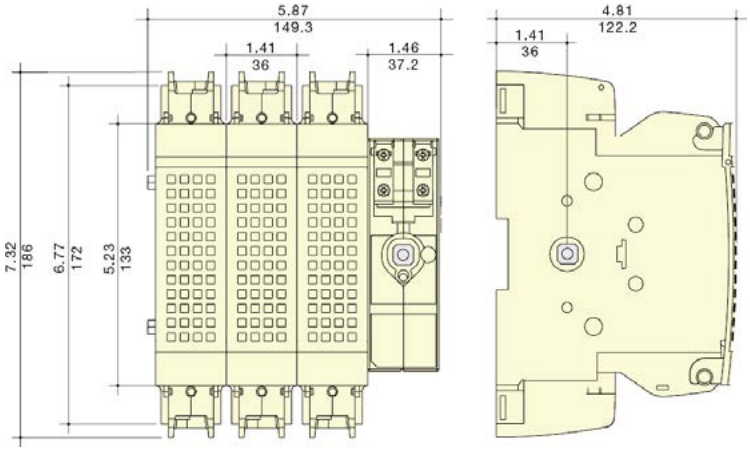
Example:
GS1DU3

Rating (A)	Dimensions = in. (mm)							
	F	H	J	J1	N	N1	AA	Z
30 / CC	3.78 (96)	3.28 (83.5)	1.47 (37.5)	0.59 (15)	3.13 (79.5)	1 (25.5)	4.56 (116)	1.12 (28.5)
30 / J	4.13 (105)	3.89 (99)	1.47 (37.5)	0.59 (15)	3.13 (79.5)	1 (25.5)	4.56 (116)	1.12 (28.5)

GS2GU3N, 60 A Fusible Disconnect Switches, Class J Fuses



GS2JU3N, 100 A Fusible Disconnect Switches, Class J Fuses



Dimensions: in. / mm

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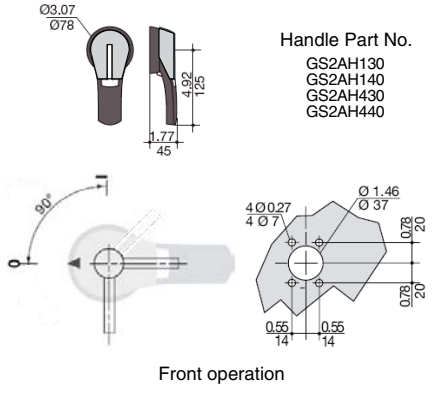
Handle for 100 A, 200 A, and 400 A Fusible Disconnect Switches

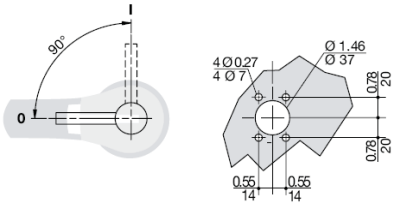


Handle Part No.
GS2AH130
GS2AH140
GS2AH430
GS2AH440

Front operation

Direction of operation

Door drilling template

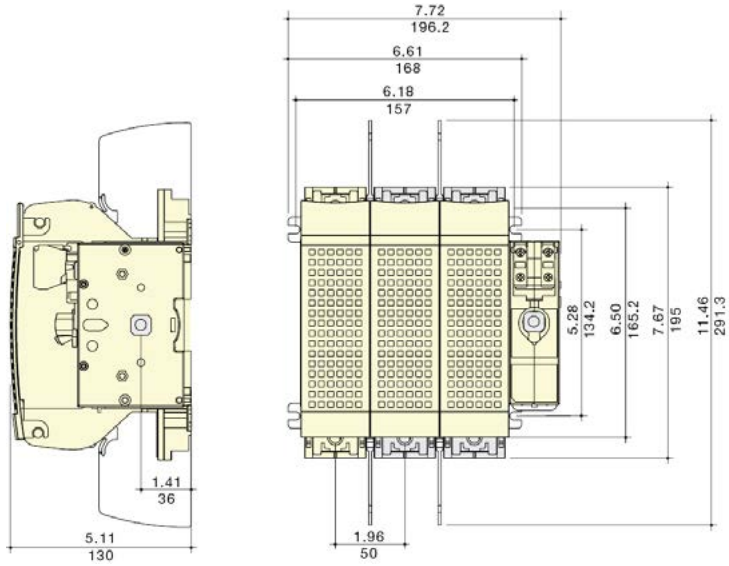


Side operation

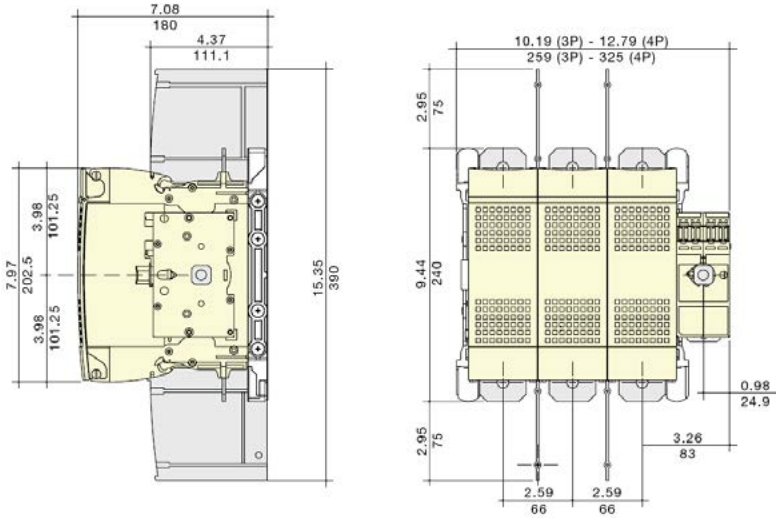
Direction of operation

Door drilling template

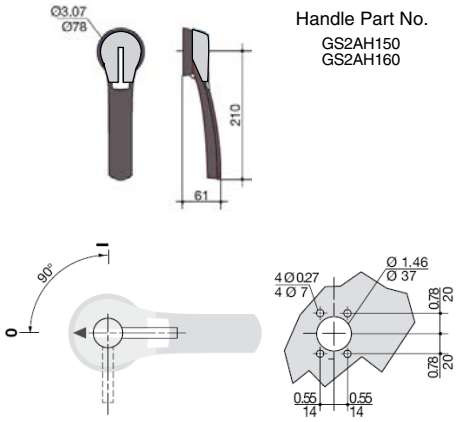
GS2MU3N, 200 A Fusible Disconnect Switches, Class J Fuses



GS2QU3N, 400 A Fusible Disconnect Switches, Class J Fuses



Handle for 600 A and 800 A Fusible Disconnect Switches



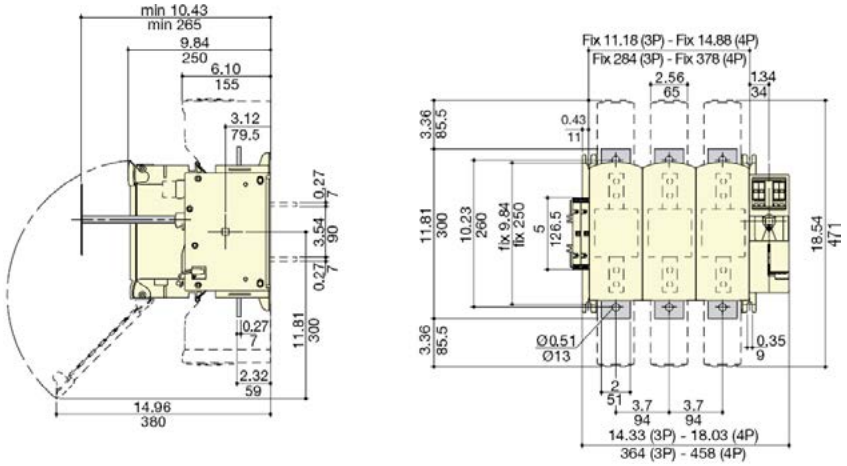
Handle Part No.
GS2AH150
GS2AH160

Front operation

Direction of operation

Door drilling template

GS2SU3, 600 A Fusible Disconnect Switches, Class J Fuses
GS2TU3, 800 A Fusible Disconnect Switches, Class J Fuses



Dimensions: in. / mm

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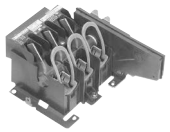
The 9422 disconnect switches are the ideal selections for the PV string combiner box's internal disconnect switch and control panel applications. These switches are designed for variable depth, flange mounting, traditional side mounting and bracket mounting applications providing complete flexibility in the PV string combiner box designs. The switches are compatible with 9422A handle operators and 9423 door mechanisms and are UL98 recognized (E52369 Vol. 1, Sec. 18) and CSA certified. See pages 8-16, 8-17, and 8-18 for dimensional information.

Table 8.40: 9422 Disconnect Switches, Flange Mounted and Variable Depth

Disconnect Switch Size	Variable Depth Min.–Max. (in.)	Maximum Horsepower Ratings						Fuse Type	Fuse Clip Rating (Amperes) Non-Interchangeable Type For Class H, J, K or R Fuses		Switch and Operating Mechanism Only— Does Not Include Handle Mechanism		Switch for Use With Cable Operators ONLY— Does Not Include Handle Mechanism or Cable Operator☆		Switch and Operating Mechanism and Handle Mechanism—Overpacked◊			
		AC Systems Volts (Motor Volts)				Vdc									Includes Type A1 Handle Mechanism		Includes Type A2 Handle Mechanism	
		208 (200)	240 (230)	480 (460)	600 (575)	250	600		250 V	600 V	Cat. No.♦	$ Price	Cat. No.♦	$ Price	Cat. No.♦	$ Price	Cat. No.♦	$ Price
30 A	6.625–18	7.5	7.5	15	20	5	15	None	—	—	TCN30	329.00	TCN30C	315.00	ATCN301	471.00	ATCN302	585.00
								H, J, K, R	30	—	TCF30	372.00	TCF30C	359.00	ATCF301	513.00	ATCF302	629.00
									60	30	TCF33	399.00	TCF33C	386.00	ATCF331	543.00	ATCF332	660.00
60 A	6.625–18	—	15	30	50	10	30	None	—	—	TDN60	386.00	TDN60C	372.00	ATDN601	527.00	ATDN602	642.00
								H, J, K, R	60	30	TDF60	458.00	TDF60C	444.00	ATDF601	599.00	ATDF602	714.00
									—	60	TDF63	485.00	TDF63C	471.00	ATDF631	629.00	ATDF632	741.00
100 A	6.625–18	25	30	60	75	20	50	None	—	—	TEN10	570.00	TEN10C	557.00	ATEN101	714.00	ATEN102	827.00
								H, J, K, R	100	100	TEF10	783.00	TEF10C	770.00	ATEF101	926.00	ATEF102	1040.00
200 A	9.12–19.25▲	40	60	125	150	40	50	None	—	—	TF1	1247.00	—	—	ATF11	1389.00	ATF21	1503.00
								H, J, K, R	200	200	TF2	1389.00	—	—	ATF12	1530.00	ATF22	1646.00
									—	400	TF3★	2052.00	—	—	ATF13★	2195.00	ATF23★	2307.00
400 A Fixed Depth■	11.38 (A5 or A6 Handle)	75	125	250	350	50	50	None	—	—	TG1△□	2672.00	—	—	For handle selection, see Table 8.42.			
400 A Variable Depth■	15.87–19 (A7 or A8 Handle)▼							H, J, K, R	400	400	TG2△□	3027.00	—	—				

▲ 9422 R2 will extend maximum mounting depth 7 inches, see page 8-17 for information.
■ Switches are fixed-depth or adjustable depending on handle selection.
♦ For ordering use the suffix 9422, e.g., order TCN30 using catalog number 9422TCN30.
★ Accommodates Class J fuses only.
▼ Variable in increments of 0.63 inches.
△ Commercially available enclosures may not accept 9422TG1 and 2 operating mechanisms. Contact enclosure manufacturer for availability of enclosures for use with these switches.
□ Right hand flange mounting only and requires a special enclosure.
◊ Variable depth only — no cable operator.
☆ See Table 8.46 for ordering information for the cable operator.



9422 TCN30

Bracket Mounted Disconnect Switch

The 9422 Bracket Mount Disconnect Switch is designed for combiner boxes and control panel applications. The Bracket Mount Disconnect Switch is shipped with the switch and external handle assembled to a bracket, ready for quick installation. A protective trim plate is provided to prevent any mounting screws from being accessible from the front. The trim plate also provides an attractive installation feature. The switches are fully compatible with the 9423 closing mechanisms.

Table 8.41: 9422 Bracket Mounted Disconnect Switches

Disconnect Switch Size	Maximum Horsepower Rating						Fuse Type	Fuse Clip Rating (Amperes) Non-Interchangeable Type For Class H, J, K or R Fuses		Switch and Operating Mechanism Only — Does Not Include Handle Mechanism	
	AC Systems Volts (Motor Volts)				Vdc						
	208 (200)	240 (230)	480 (460)	600 (575)	250	600		250 V	600 V	Catalog No.■	$ Price
30 A	7.5	7.5	15	20	5	15	None	—	—	BTCN30	471.00
							H, J, K, R	30	—	BTCF30	543.00
								60	30	BTCF33	543.00
							J▲	60	30	BTCF32	543.00
60 A	15	15	30	50	10	30	None	—	—	BTDN60	527.00
							H, J, K, R	60	30	BTDF60	585.00
								—	60	BTDF63	629.00
							J▲	—	60	BTDF62	629.00
100 A	25	30	60	75	20	50	None	—	—	BTEN10	714.00
							H, J, K, R	100	100	BTEF10	926.00
							J▲	100	100	BTEF11	926.00
200 A	40	60	125	150	40	50	None	—	—	TFB1	1488.00
							H, J, K, R	200	200	TFB2	1610.00
							J▲	—	400	TFB3	2264.00

▲ Space saving design—Type J fuses mounted on the non-fused bracket.
■ For ordering use the suffix 9422, e.g., order BTCN30 using catalog number 9422BTCN30.

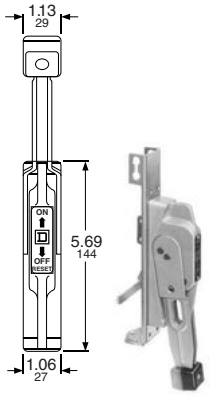
Handle Information

Table 8.42: 9422 Disconnect Switch and Circuit Breaker Handle Mechanisms

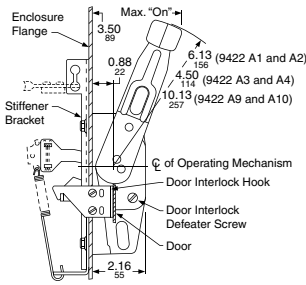
The Handle Mechanism kit contains all parts needed to mount the handle to the flange of the enclosure. Two flange mounting methods are offered. For right or left hand flange mounting use Types A1–A4 and Types A9–A10 kits. For right-hand mounting only, use Type A5–A8 handles. The type AP1 and AP2 handles are used exclusively on the PowerPact™ M and P operating mechanisms, 9422 RM1 and 9422 CMP. The dimensions are identical to 9422 A1.

Handle Depth (in.)	NEMA Type 1, 3, 3R, 4, 12 Enclosures		NEMA Type 4, 4X Stainless Steel Enclosures	
	Cat. No.♦	$ Price	Cat. No.♦	$ Price
4▲	A3	143.00	A4	257.00
6▲	A1	143.00	A2	257.00
6▲★	AP1	188.00	AP2	338.00
10■	A9	158.00	A10	270.00
12▼△	A7	300.00	A8	372.00

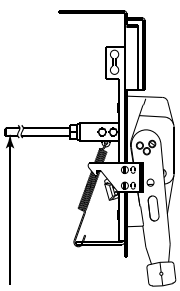
▲ Use with 30–200 A 9422 switches and all circuit breaker mechanisms.
■ Use with Type D2 remote or dual adapter kit listed on page 8-24.
♦ For ordering use the suffix 9422, e.g., order A2 using catalog number 9422A2.
★ Use only with 9422 RM1, 9422 CMP and PowerPact M and P operating mechanisms.
▼ Use only with 400 A 9422TG1 and 9422TG2 disconnect switch.
△ Adjustable depth.



Type A1



9422 A1, A2, A3, A4, A9, and A10 Handles



Rod used only on the variable-depth mechanism.

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Accessories

Class R Fuse Kits

When installed, this kit rejects all fuses except Class R. The kits are available for field installation. With rejection kit and Class R fuses installed, the switch is UL component recognized for use on systems with fault current up to 200,000 RMS symmetrical amperes.

Table 8.43: Class R Fuse Kits

Disconnect Switch Type	Switch Type	Fuse Clip Rating		Class R Kit	
		250 V▲	600 V	Cat No.	$ Price
30 A	TCF30	30	—	RFK03▲	**24.50**
	TCF33	60	30	RFK06▲	**25.50**
60 A	TDF60	60	30	RFK06▲	**25.50**
	TDF63	—	60	RFK06H▲	**25.50**
100 A	TEF10	100	100	RFK10▲	**47.70**
200 A	TF2	200	200	9999SR4	**47.60**
	TF3	200	200	9999SR4	**47.60**
400 A	TG2	400	400	9999SR5	**104.00**

▲ Use Discount Schedule DE1 for price, not CP1.

Table 8.44: Electrical Interlocks

Disconnect Switch Size	Switch Type	Electrical Interlocks	
		Cat No.♦	$ Price
30 A 60 A 100 A	TCF, TCN, TDF, TDN, TEF, TEN	TC10▲	**120.00**
		TC20■	**239.00**
	BTCF, BTCN, BTDF, BTDN, BTEF, BTEN	TC11▲	**120.00**
		TC21■	**239.00**
200 A	TF, ATF	R8▲	**83.00**
	TF, ATF	R9■	**243.00**
400 A	TG	R35▲	**275.00**
	TG	R36■	**521.00**

▲ 1 N.C. or N.O. Contact depending on wiring.
■ 2 N.C. or N.O. or 1 N.O. or 1 N.C. Contact depending on wiring.
♦ For ordering use the suffix 9999, e.g., order TC10 using catalog number 9999TC10.

Internal Barrier Kits

Provides an additional barrier that helps prevent accidental contact with live parts. Field-installed transparent barriers do not restrict visual inspection of the switch. Barriers provide IEC529 IP2X "finger safe" protection when door of enclosed disconnect switch is open. A convenient door allows use of test probes without accessing fuses and replacement of fuses without removing barrier. Barrier must be used with the skirt kit to enclose a panel mounted 9422 disconnect.

Table 8.45: Internal Barrier Kits

Disconnect Switch Size	Barrier		Skirt	
	Cat. No.	$ Price▲	Cat No.	$ Price▲
30 A	SS06	**165.00**	SS0306SK	**225.00**
60 A	SS06	**165.00**	SS0306SK	**225.00**
100 A	SS10	**195.00**	SS10SK	**255.00**

▲ Use Discount Schedule DE1 for price, not CP1.

Table 8.46: Cable Operators for 9422 Disconnect Switches

Switch Type	Cable Mechanisms▲			Cable Mechanisms with A1 Handle for NEMA Type 1, 3, 3R, 4, and 12 Enclosures	
	Cable Length (inches)	Cat. No.	$ Price	Cat. No.	$ Price
TCN30C, TCF30C, TCF33C, TDN60C, TDF60C, TDF63C, TEN10C, TEF10C	36	9422CFT30	**273.00**	9422CFT31	**417.00**
	48	9422CFT40	**291.00**	—	—
	60	9422CFT50	**291.00**	9422CFT51	**432.00**
	120	9422CFT10	**333.00**	9422CFT11	**476.00**

▲ Purchase handle mechanism separately (9422A1, A2, A3, or A4).

Table 8.47: Class 9422 Replacement/Refrofit Fuse Clip Kits

Disconnect Switch Size	Switch Type	Fuse Type	Fuse Clip Rating (Amperes)		Line and Load Fuse Clip Kit (includes load base and fuse pullers)	
			250 V	600 V	Type	$ Price
30 A	TCF30 TCN30 TCF33	H, K, J, R	30	—	TC30	**42.80**
			60	30	TC33	**71.00**
60 A	TDN60	H, K, J, R	60	30	TC33	**71.00**
			—	60	TD63	**99.00**

Table 8.48: Lug Data

Disconnect Switch Size	Wire Size (Min-Max)		Lug Kits Copper		Lug Kits Al	
	Cu	Al	Cat No.	$ Price	Cat No.	$ Price
30–60 A	#14–#2	#10–#2	CL0306F	**69.00**	AL0306F	**36.90**
100 A	#10–#0	#6–#0	CL10F	**159.00**	AL10F	**77.00**
200 A	#6–600 kcmil	#6–#600 kcmil	—	—	—	—
400 A	#4–500 kcmil	—	—	—	—	—

Table 8.49: Dimensions 30 A, 60 A, and 100 A Class 9422 Disconnect Switches

Switch Type	Maximum Voltage	Fuse Type	Dimension A	Dimension B
30 A 60 A	30 A, 250 V	H, K, R	1.625	—
	30 A, 600 V	H, K, R	4.25	
	30 A, 600 V	J	1.625	
	60 A, 250 V	H, K, R	2.25	
	60 A, 600 V	H, K, R	4.75	
	60 A, 600 V	J	1.625	
100 A	100 A, 250 V	H, K, R	—	3.25
	100 A, 600 V	H, K, R		5.25
	100 A, 600 V	J		3.25

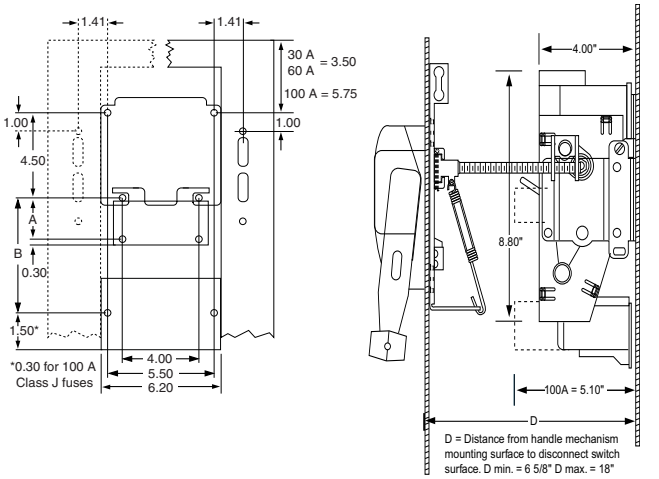
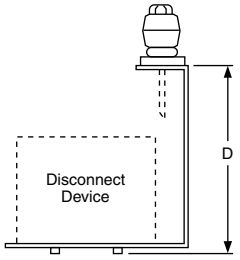
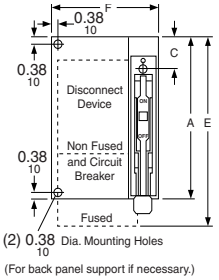


Table 8.50: Dimensions



Type	A in. (mm)	C in. (mm)	D in. (mm)	Min. Enclosure Depth▲ in. (mm)	Fusible Device E in. (mm)	F in. (mm)
BTCN, BTDN, BTEN	—	—	6.56 (167)	8.00 (203)	—	—
BTCF, BTDF, BTEF	9.50 (241)	1.88 (48)	8.56 (217)	10.00 (254)	11.88 (302)	6.38 (162)
TFB1	11.50 (292)	3.88 (99)	9.50 (241)	12.00 (305)	—	13.19 (335)
TFB2, TFB3	20.00 (508)				20.00■ (508)	

▲ The minimum enclosure depth is greater than Dimension D since additional space is needed when mounting the mechanism.
■ Fuses and fuse base assembly do not extend beyond bracket.
Note: Back panel support is recommended for Types TFB1, 2, & 3. Other devices may also require support if the flange is not sufficiently rigid.



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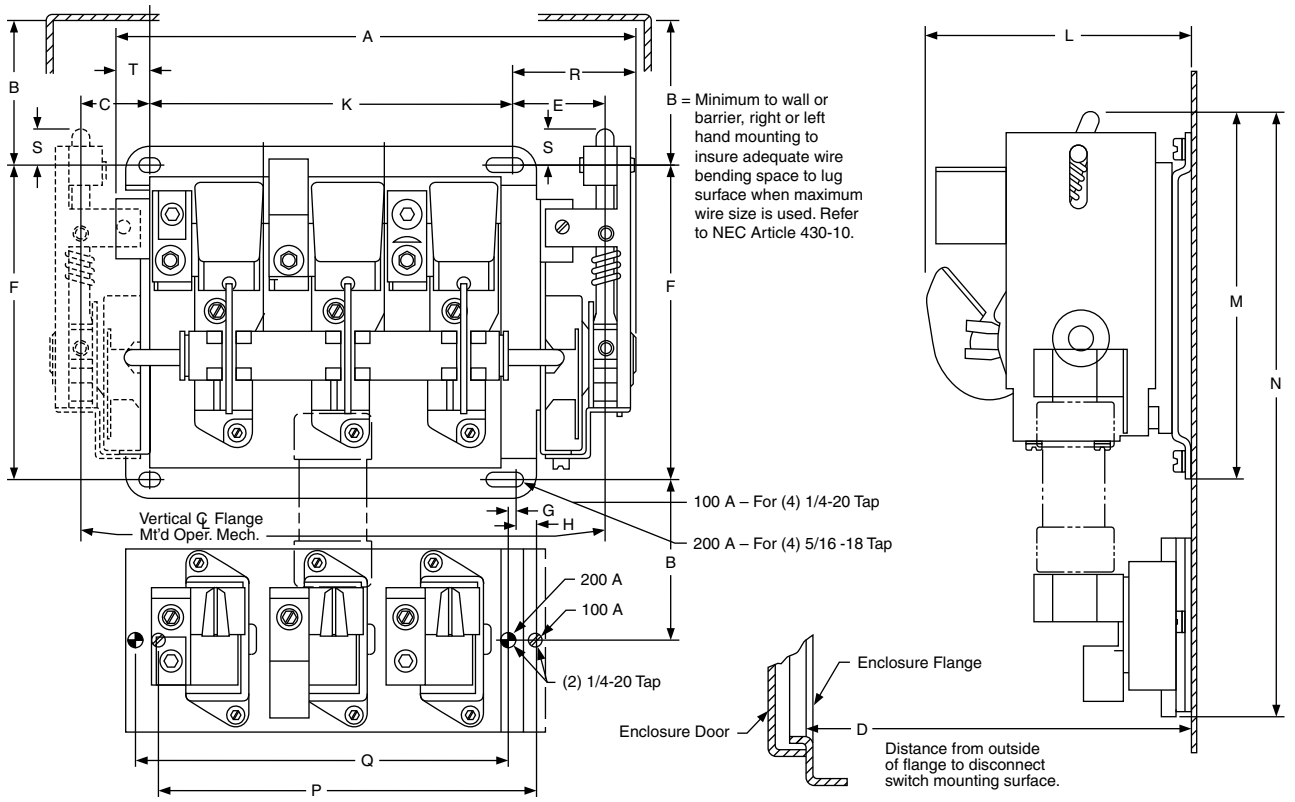
Dimensions

Table 8.51: Dimensions (in. / mm) for 200 A Type TF Disconnect Switches

Type	Switch Size		A	B	C	D▲	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
	(A)	Fuse Clips				Min.–Max.														
TF1	200	None	**13.33** 339	**9.38** 238	**1.64** 42	**9.12–19.25** 232 489	**2.33** 59	**8.00** 203	—	—	—	**9.44** 240	**6.50** 165	**9.53** 242	—	—	—	**3.14** 80	**1.03** 26	**0.75** 19
TF2	200	Class J 200 A 600 V	**13.33** 339	**9.38** 238	**1.64** 42	**9.12–19.25** 232 489	**2.33** 59	**8.00** 203	**0.09** 3	—	**2.77** 70	**9.44** 240	**6.50** 165	—	**14.11** 358	—	**9.63** 245	**3.14** 80	**1.03** 26	**0.75** 19
TF2	200	Class H, K, R 200 A 250 V	**13.33** 339	**9.38** 238	**1.64** 42	**9.12–19.25** 232 489	**2.33** 59	**8.00** 203	**0.09** 3	—	**4.14** 105	**9.44** 240	**6.50** 165	—	**15.48** 393	—	**9.63** 245	**3.14** 80	**1.03** 26	**0.75** 19
TF2	200	Class H, K, R 200 A 600 V	**13.33** 339	**9.38** 238	**1.64** 42	**9.12–19.25** 232 489	**2.33** 59	**8.00** 203	**0.09** 3	—	**6.64** 169	**9.44** 240	**6.50** 165	—	**17.98** 457	—	**9.63** 245	**3.14** 80	**1.03** 26	**0.75** 19
TF3	200	Class J 400 A 600 V	**13.33** 339	**9.38** 238	**1.64** 42	**9.12–19.25** 232 489	**2.33** 59	**8.00** 203	**0.09** 3	—	**2.77** 70	**9.44** 240	**6.50** 165	**9.53** 242	**18.53** 471	—	**9.63** 245	**3.14** 80	**1.03** 26	**0.75** 19

▲ The dimensions shown may be extended 7 in. by using 9422R2 (two required per switch).



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Disconnect Switches—400 A Type TG

Outline Dimensions and General Location
400 A Disconnect Switches Nonfusible and Non-Interchangeable Fuse Clip Type Fusible Switches

Table 8.52: Handle Mechanism—Type A7 and A8

NOTE: *Commercially available enclosures may not accept type TG operating mechanisms. Contact the enclosure manufacturer for availability of enclosures for use with these switches.*

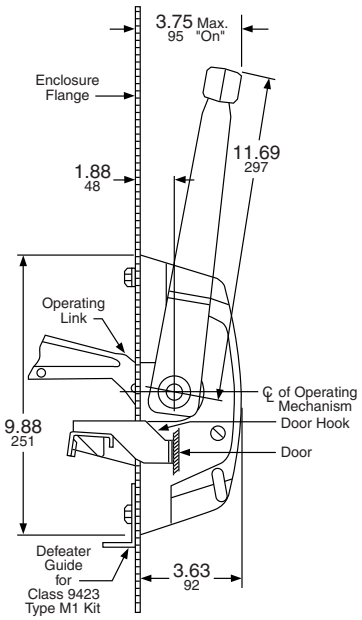

Figure 1

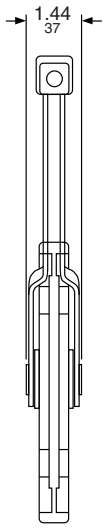

Figure 2

Switch Type	B	X
TG1, 2	**11.28** 286	**16.06** 408

Note: B and X = Minimum to wall or barrier to ensure adequate wire bending space to lug surface when maximum wire size is used.
Refer to NEC Article 430.10.

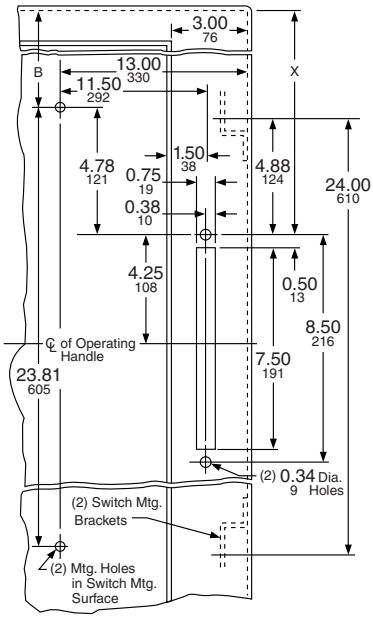

Figure 3

Table 8.53: Nonfusible and Fusible Switches

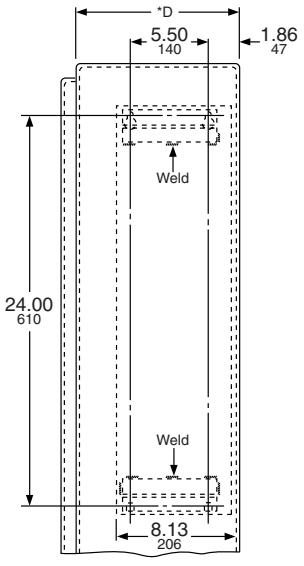

Figure 4

Dimension D = Distance from outside of flange to disconnect switch mounting surface.				
For Type TG1 or TG2 with:				
Type A7 or A8 adjustable depth handle mechanism	D =	**15.87** 403	to	**19** 483
In steps of		**0.63** 16		

Note: Copper lugs are standard on all Type TG disconnect switches.

* D = Mounting depth measured from the switch mounting surface to the surface of flange.

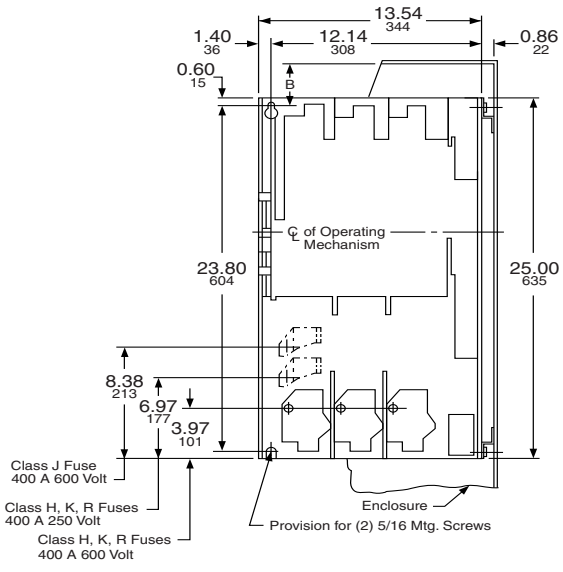

Figure 5

Dim. = in. / mm

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9421 Type L Circuit Breaker Mechanism

Type L Circuit Breaker Mechanisms

Type L door-mounted, variable depth operating mechanisms feature heavy duty, all metal construction with trip indication. All mechanisms can be padlocked in the "OFF" position when the enclosure door is open. Further, the handle assemblies can be locked "OFF" with up to three padlocks, which also locks the enclosure when the door is closed. (The 3" handle accepts one padlock.) Complete kits are rated for NEMA Type 1, 3R, and 12 enclosures. They include a handle assembly, operating mechanism, and shaft assembly.

Table 8.54: Complete Kits

Complete Kit Does Not Include Circuit Breaker			Includes: Operating Mechanism Standard 6 in. Handle Standard Shaft Kit			Includes: Operating Mechanism Standard 6 in. Handle Long Shaft Kit			Includes: Operating Mechanism Short 3 in. Handle Long Shaft Kit		
Use With											
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	$ Price	Mounting Depth ▲ Min. – Max.	Type	$ Price	Mounting Depth ▲ Min. – Max.	Type	$ Price	Mounting Depth ▲ Min. – Max.
NSF, PowerPact™ H and J	2–3	250	LJ1	**171.00**	5-1/2–10-3/4	LJ4	**189.00**	5-1/2–21-3/8	LJ3	**230.00**	5-1/2–21-3/8
PowerPact D and L	2–3	600	LD1	**242.00**	7-1/4–12-1/16	LD4	**255.00**	7-1/4–22-5/8	3 in. handles are not recommended for use with these circuit breakers.		
PowerPact M and P♦	3	1200	LW1■	**242.00**	9.00–12.50	LW4■	**255.00**	9.00–23.50			

▲ Mounting depth measured in inches from circuit breaker mounting surface (control panel) to outside of enclosure door.
■ Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
♦ These circuit breaker operating mechanisms must use the 9421LHP** or LCP** handles only.

Table 8.55: Component Parts

Use With			3 in. Handle Assemblies Type 1, 3R, 12		Standard Handle Assemblies Type 1, 3R, 12		Operating Mechanism Includes Lockout		Standard Shaft (Support Bracket Not Required)			Long Shaft (Support Bracket Included)		
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	Type	$ Price	Type	$ Price	Type	$ Price	Mounting Depth ▲ Min. – Max.	Type	$ Price	Mounting Depth ▲ Min. – Max.	Type	$ Price
NSF, PowerPact H & J	2–3	250	LH3▼	**90.00**	LH6▼	**50.00**	LJ7	**105.00**	5-1/2–10-1/4	LS8	**21.50**	5-1/2–21-3/8	LS13	**35.60**
PowerPact D & L	2–3	600	★	—	LH6▼	**50.00**	LD7	**170.00**	7-1/4–12-1/16	LS8	**21.50**	7-1/4–22-5/8	LS13	**35.60**
PowerPact M & P♦	3	1200	★	—	LHP8▼	**50.00**	LW7	**170.00**	7-3/16–11-5/8	LS8	**21.50**	7-3/16–22-1/4	LS10	**35.60**

▲ Mounting depth measured in inches from circuit breaker mounting surface (control panel) to outside of enclosure door.
■ Type LW1 and LW4 include an 8 in. handle (9421LHP8) rather than a 6 in. handle.
♦ These circuit breaker operating mechanisms must use the 9421LHP** or LCP** handles only.
★ 3 in. handles are not recommended for use with these circuit breakers.
▼ For a red handle and yellow bezel, add suffix RY to catalog number, e.g., 9421LH6RY.

New!

3 in. Handle Assembly

Table 8.56: NEMA Type 4 and 4X Handle Assemblies

Use With			Standard Handle Assemblies				Special 3 in. Version			
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (A)	NEMA Type 1, 3R, 4, 12 (Painted)		NEMA Type 1, 3R, 4, 4X, 12 (Chrome Plated)		NEMA Type 1, 3R, 4, 12 (Painted)		NEMA Type 1, 3R, 4, 4X, 12 (Chrome Plated)	
			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
NSF, PowerPact H and J	2–3	250	LH46	**90.00**	LC46	**149.00**	LH43	**165.00**	LC43	**233.00**
PowerPact D and L	2–3	600	LH46	**90.00**	LC46	**149.00**	3 in. handles are not recommended for use with these circuit breakers.			
PowerPact M and P	3	1200	LHP48	**90.00**	LCP48	**149.00**				

Standard Handle Assembly

Table 8.57: Auxiliary and Alarm Switches for PowerPact™ Circuit Breakers ▲

Description	H- and J-Frame	$ Price	D- and L-Frame	$ Price	D- and L-Frame	$ Price
1 Auxiliary Switch 1a 1b	S29450	**297.00**	S29450	**297.00**	S29450	**297.00**
2 Auxiliary Switch 2a 2b	2 x S29450	**594.00**	2 x S29450	**594.00**	2 x S29450	**594.00**
3 Auxiliary Switch 3a 3b	—	—	3 x S29450	**891.00**	3 x S29450	**891.00**

▲ Discount Schedule: DE2

NOTE: *The location of the accessory in the circuit breaker determines its function.*

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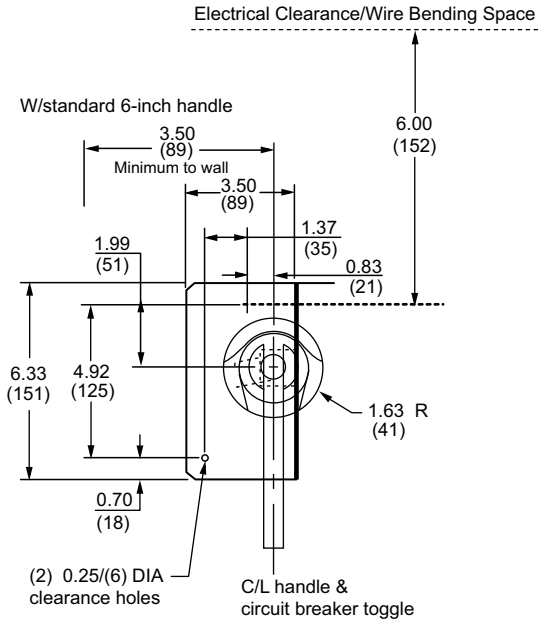
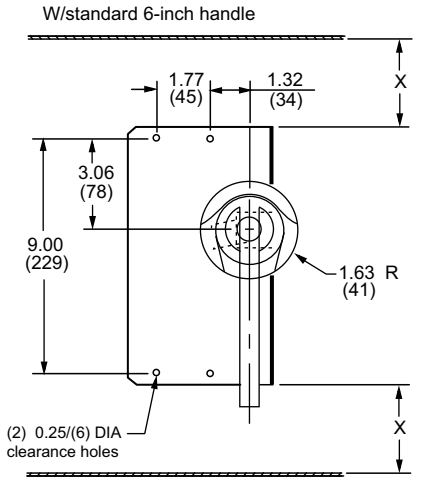
Panel Drilling for PowerPact™ H and J Circuit Breaker Operating Mechanisms: 9421LJ1, 9421LJ4, and 9421LJ7



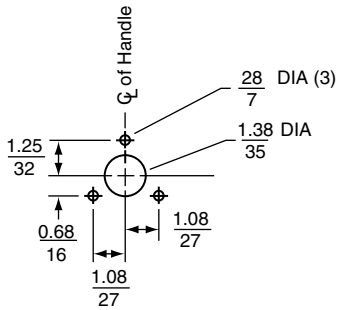
Panel Drilling for PowerPact D and L Circuit Breaker Operating Mechanisms: 9421LD1, 9421LD4, and 9421LD7



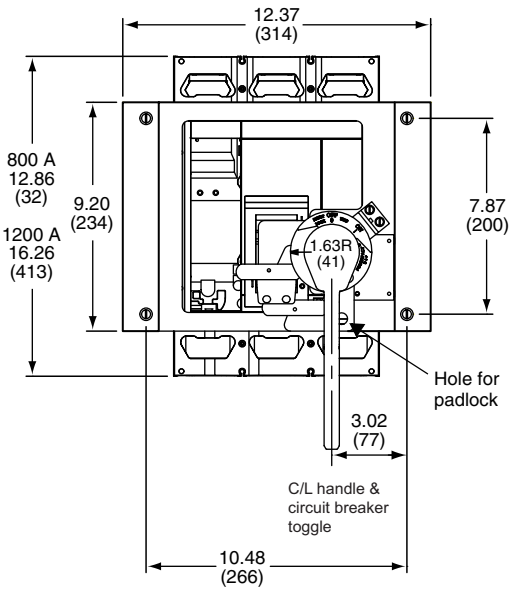
X: Minimum to wall or barrier to insure adequate wire bending space to lug surface when the maximum wire size is used. Refer to NEC 430-10.

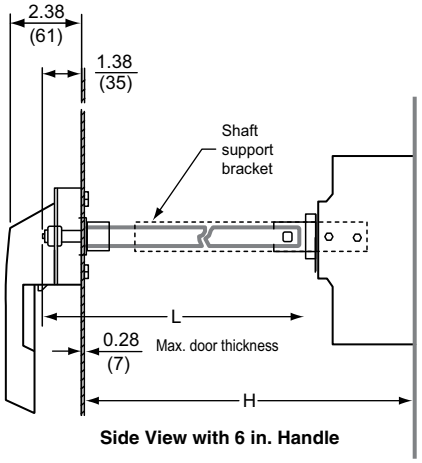
Dimensions: in. / mm

Panel Drilling for PowerPact M and P Circuit Breaker Operating Mechanisms: 9421LW1, 9421LW4, and 9421LW7



Door Drilling Dimensions





Side View with 6 in. Handle

Table 8.58: Shaft Cutting Dimensions

Class	Type	Shaft Length Formula	H = Standard Shaft		H = Long Shaft	
			Min.	Max.	Min.	Max.
9421	LJ1, LJ4, LJ7	L = H – 3.00 / 76	5.5 / 138	10.75 / 273	5.5 / 138	21.63 / 543
9421	LD1, LD4, LD7	L = H – 4.25 / 108	7.25 / 184	12.06 / 306	7.25 / 184	22.63 / 575
9421	LW1, LW4, LW7	L = H – 4.89 / 124	7.19 / 183	11.63 / 295	7.19 / 183	22.25 / 565

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Flexible Cable Mechanism 9422CSJ30

Table 8.59: Flexible Cable Mechanisms for Use with Schneider Electric™ (formerly Merlin Gerin™) Circuit Breakers and PowerPact™ 3-Pole Circuit Breakers

For use with Class 9422 A handle operators especially designed for tall, deep enclosures where placement flexibility is required.

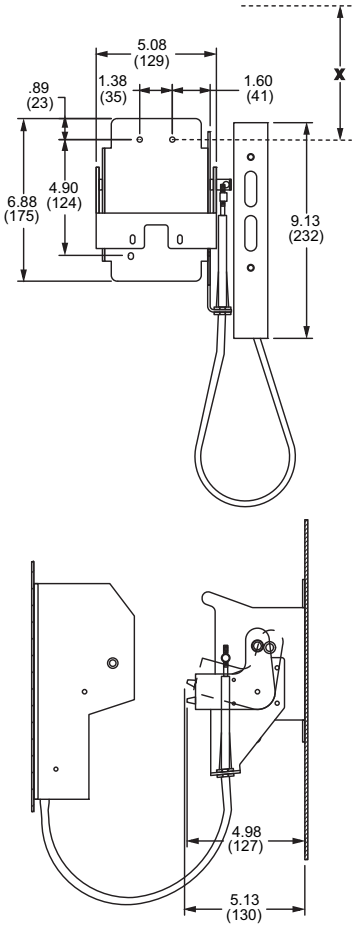
Circuit Breaker Type	No. of Poles	Frame Size A	Cable Mechanism		
			Length	Type	$ Price
MG-NSF PowerPact H- and J-Frame	2 - 3	250	36 in.	CSF30	**288.00**
			60 in.	CSF50	**305.00**
			84 in.	CSF70	**323.00**
			120 in.	CSF10	**347.00**
MG-NSF	4	250	36 in.	CSF304	**297.00**
			60 in.	CSF504	**314.00**
			120 in.	CSF104	**356.00**
MG-NSJ PowerPact D and L	3	600	36 in.	CSJ30	**486.00**
			60 in.	CSJ50	**504.00**
			120 in.	CSJ10	**548.00**
MG-NSJ PowerPact D and L	4	600	36 in.	CSJ304	**500.00**
			60 in.	CSJ504	**516.00**
			120 in.	CSJ104	**558.00**
PowerPact M- and P-Frame▲	3	1200	48 in.	CMP40	**759.00**
			50 in.	CMP50	**785.00**
			120 in.	CMP10	**857.00**

▲ Must use 9422AP1 or 9422AP2 Handle with this operating mechanism.

NOTE: *Refer to NEC Article 430-10 for minimum dimension X from circuit breaker top mounting hole to wall or barrier to ensure adequate wire bending space.*

NOTE: *Bend radius in cable must never be less than 6 inches. Electrical clearances must be maintained between cable and live electrical parts.*

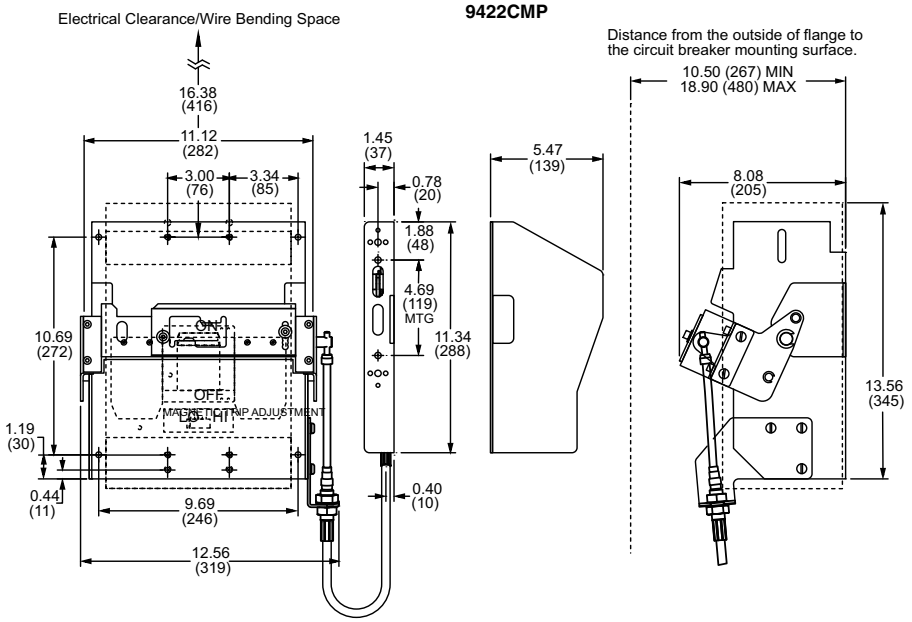
9422CSF 3-Pole



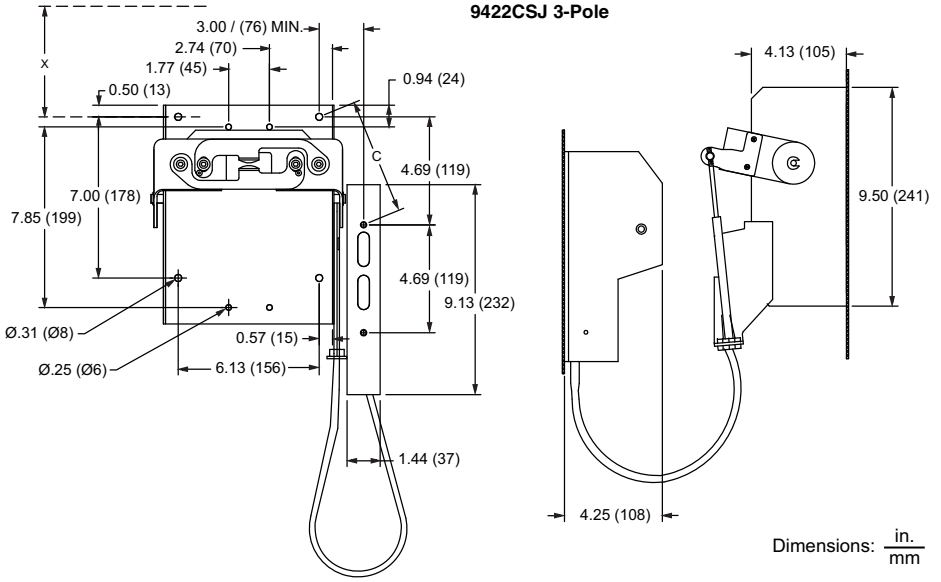
Electrical Clearance/Wire Bending Space

9422CMP

Distance from the outside of flange to the circuit breaker mounting surface.



9422CSJ 3-Pole



Dimensions: in. / mm

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Dual Cable Operating Mechanisms for Square D™ Circuit Breakers

Dual Cable Operating Mechanisms are designed for use with Square D brand PowerPact™ D, H, J, and L circuit breakers through 600 A frame sizes. The cable mechanisms allow for a single handle operator, Class 9422Ax, to operate both circuit breakers. The cable mechanism is designed especially for tall, deep enclosures where placement flexibility is required. There are numerous cable arrangements to choose from to accommodate many applications.

9422CSFD33

Features

- Separate cables for each circuit breaker
- Rugged metal flange handle operator
- Maximized flexibility of circuit breaker placement for existing and new applications
- Control panel can be fed from two separate supply voltages (if required)
- Dual mechanism allows both separate supply voltages to be controlled by a single handle to improve security features

Table 8.60: Dual Cable Operating Mechanisms Selection

Circuit Breaker Type	Cable Length in. / mm (quantity)	Catalog Number	Frame Size (max.)	$ Price
PowerPact H & J MG NSF	120 in. / 3048 mm (2)	9422CSFD1	250 A	**693.00**
	36 in. / 914 mm (1) 60 in. / 1524 mm (1)	9422CSFD35		**648.00**
	60 in. / 1524 mm (1-CSF 3 pole) 60 in. / 1524 mm (1-CSF 4 pole)	9422CSFD345		**672.00**
	36 in. / 914 mm (1) 120 in. / 3048 mm (1)	9422CSFD31		**680.00**
	36 in. / 914 mm (2)	9422CSFD33		**640.00**
	60 in. / 1524 mm (1) 120 in. / 3048 mm (1)	9422CSFD51		**687.00**
	60 in. / 1524 mm (2)	9422CSFD55		**656.00**
PowerPact D & L MG NSJ *New!*	60 in. / 1524 mm (2-CSJ)	9422CSJD50▲	600 A	**1008.00**
	120 in. / 3048 mm (2-CSJ)	9422CSJD10▲		**1096.00**
	60 in. / 1524 mm and 120 in. / 3048 mm (2-CSJ)	9422CSJD51▲		**1052.00**
	120 in. / 3048 mm (1-CSF) and 120 in. / 3048 mm (1-CSJ)	9422CSFJD10	250 A and 600 A	**894.00**
	60 in. / 1524 mm (1-CSF) 60 in. / 1524 mm (1-CSJ)	9422CSFJD50		**809.00**

▲ Must use the 9422AP1 or 9422AP2 operating handle with this operating mechanism.

Handle Mechanisms

These handle mechanism kits are used with the circuit breaker variable depth and cable operating mechanisms. The kits contain all parts necessary for mounting the handle to the flange of the enclosure. Types A1/AP1 to A4 are suitable for right or left-hand flange mounting.

9422Ax **9422APx**

Handle Mechanisms

Table 8.61: Handle Mechanisms

Type of Handle	NEMA Type Enclosure	Type	$ Price
6 in.	1, 3, 3R, 4 (sheet steel), 12	A1	**143.00**
	4, 4X (stainless)▲	A2	**257.00**
6 in.■	1, 3, 3R, 4 (sheet steel), 12	AP1	**188.00**
	4, 4X (stainless)▲	AP2	**338.00**
4 in.	1, 3, 3R, 4 (sheet steel), 12	A3	**143.00**
	4, 4X (stainless)▲	A4	**257.00**

▲ All external metal parts are either stainless steel or a chrome-plated non-ferrous die casting.
■ Must be used with 9422 RM1, 9422CMP, and 9422CSJD (dual cable mechanism) only.

NOTE: *See page 8-14 for dimensional information.*

Flange-Mounted, Variable-Depth Operating Mechanisms

Designed for installation in custom built control enclosures where main or branch circuit protective devices are required. All circuit breaker operating mechanisms are suitable for either right- or left-hand flange mounting, convertible on the job. Selection of a 9422Ax handle is required to complete the operating mechanism.

9422 Type R
Circuit Breaker Mechanism

Table 8.62: Variable-Depth Operating Mechanisms for Use with Schneider Electric™ (formerly Merlin Gerin™) Circuit Breakers

Use with				Operating Mechanism	
Circuit Breaker Frame Size	No. of Poles	Frame Size A	Variable Depth Mtg. Range Min.-Max. (Inches)▲	Operating Mechanism Only—Does Not Include Handle Mechanism	
				Type	$ Price
Schneider Electric (formerly Merlin Gerin) Circuit Breakers and PowerPact™ Frame 3-Pole Circuit Breakers					
MG-NSF PowerPact H- and J-Frame	2–3	250	5.88–17.75	RQ1	**185.00**
MG-NSJ PowerPact D and L	3	600	9.00–17.75	RS1	**383.00**
PowerPact M- and P-Frame■	3	1200	10.50–18.38	RM1	**513.00**

▲ Class 9422 Type R2 will extend mounting depth 7 inches—not recommended for use with the 9422RM1 operating mechanism (see page 8-15).
■ These circuit breaker operating mechanisms must use the 9422APx handles.

Table 8.63: Electrical Interlocks—Class 9999

Description	Class	Type	$ Price
Single Pole, Double Throw	9999	R26	**131.00**
Double Pole, Double Throw	9999	R27	**243.00**

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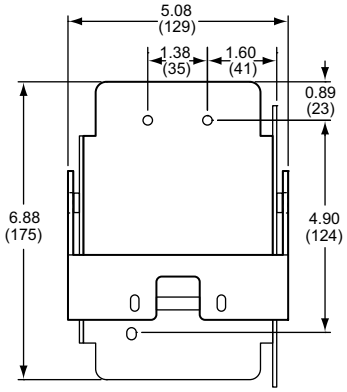
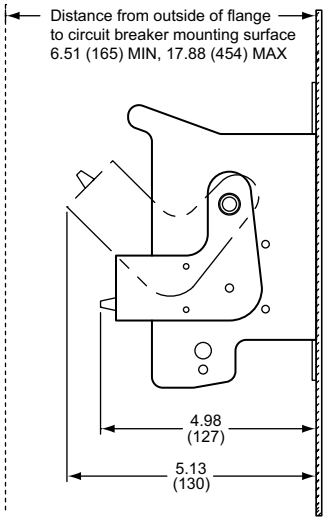
Minimum to wall or barrier to insure adequate wire bending space to lug surface when the maximum wire size is used with standard lugs. Refer to NEC 430-10.

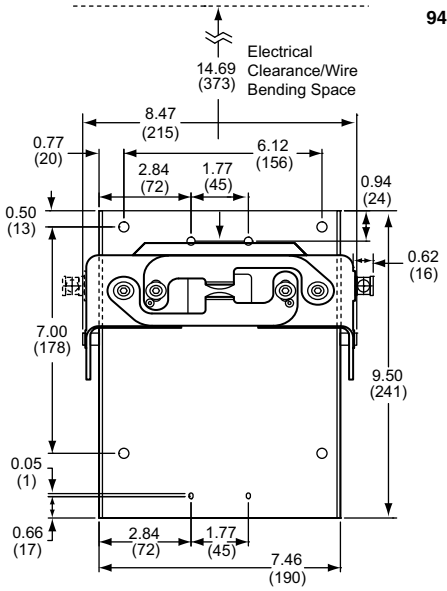
Dimensions: in. / mm

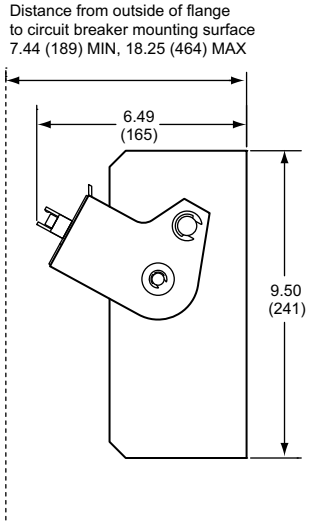
9422RQ1



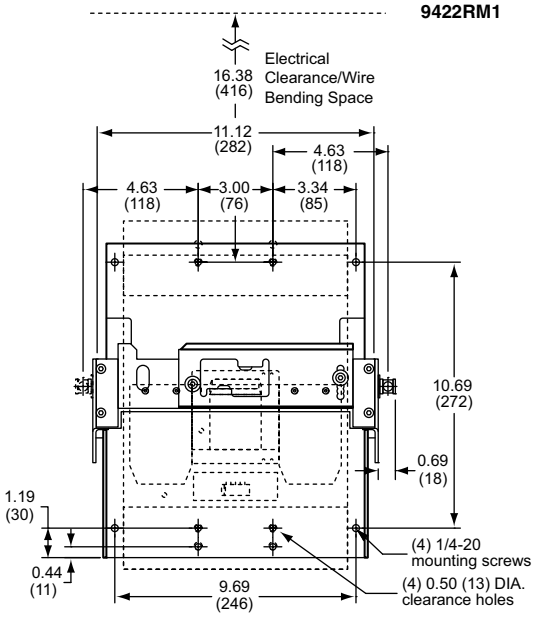


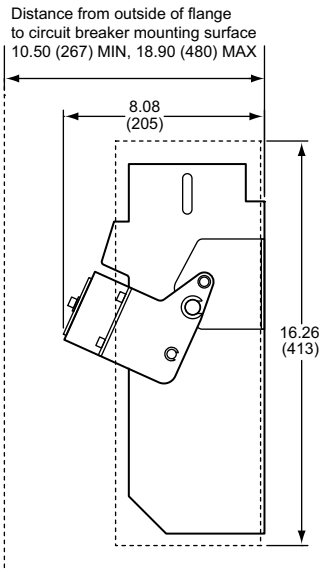
9422RS1





9422RM1





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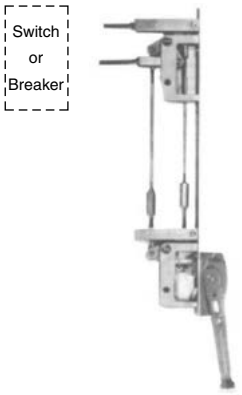


Remote operation shown (handle mechanism not included in kit)

Remote or Dual Adapter Kit

For the remote or dual operation of 30, 60, 100, and 200 A disconnect switches.

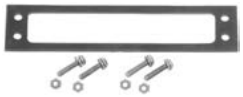
Remote Operation—permits mounting the Class 9422 Type A9 or A10 handle mechanism at a lower level than the disconnect device it controls. This arrangement is often required where the disconnect device is mounted too high for personnel to easily reach a conventional operator.

Dual Operation—permits controlling two disconnect devices, one in line with and one remote from a single Class 9422 Type A9 or A10 handle mechanism.

NOTE: *A Class 9422 Type A9 or A10 handle (page 8-15) and the preferred mounting method* ***must*** *be used.*

Table 8.64: Disconnect Device

Disconnect Device	Enclosure Mounting Depth		Type	$ Price
	Min.	Max.		
Disconnect Switch				
30 A Type TCF/TCN	10.63	19.50	D2	**251.00**
60 A Type TDF/TDN	10.63	19.50		
100 A Type TEF/TEN	12.13	20.25		
200 A Type TF	13.13	20.81		



Alternate Mounting Kit

Channel/Flange Support Kit

Auxiliary Lock Plate

Table 8.65: Other Accessories

Accessory	Description	Class	Type	$ Price
Alternate Mounting Kit	Permits mounting Class 9422 Type A1 or A2 handle mechanisms in enclosures with flange thickness of 16 gauge to 0.5 in.	9422	AM2	**14.30**
Channel/Flange Support Kit	Auxiliary kit recommended for use with 30 and 60 A disconnect switches and PowerPact™, NSF, and NSJ circuit breaker mechanisms when these devices are to be mounted on the center channel of a multi-door enclosure or when extra rigidity for the flange is required. Supplied as standard with 100 and 200 A disconnect switches.	9422	C1	**42.80**
Auxiliary Lock Plate	Auxiliary kit recommended for use with the Class 9422 Type A-1 flange handle to facilitate padlocking the handle in the "OFF" position. Primarily used when the handle is mounted on the center channel of a multi-door enclosure. Also in any case where the enclosure doors interfere with the normal padlock slot in the flange handle. Meets both the Automotive and NFPA 79 specifications.	9422	L1	**36.00**
Special Lugs for Disconnect Switches	Copper Lugs only—Specify Form Y157	—	—	**No Charge**
	Tin Plated Aluminum Lugs for 400 A Type TG Switch—Specify Form Y1572 (000–750 kcmil Cu/Al wire)	—	—	**No Charge**
	Anderson Type VCEL Compression Lugs—Specify Form Y1574 **Exceptions:** None of the 30 A or 60 A disconnect switches are available with compression lugs.	—	—	**No Charge**
Operating Rods	Standard operating rod for use with Class 9422 variable depth mechanisms. Included as standard in each kit.	9422	R1	**28.70**
	Extra long operating rod for use with Class 9422 variable depth mechanisms. Can be used as a substitute for the standard rod included in each kit to increase the maximum mounting depth 7 in. (Two are required for Types ARR, RR, ART, RT, ATE, TE, ATF, TF).	9422	R2	**50.00**

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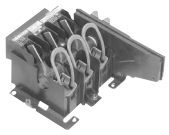


9422 TCN30

Class 9423 door closing mechanisms cover a range of enclosures with door openings up to a maximum of 91 in. high. The door closing mechanisms are designed to be used on control enclosures and interlocked with a Class 9422 disconnect device, although they all can be used independently. Three different systems are available, and their use is as recommended below. A complete system is available for interlocking all the doors of a multi-door enclosure with the master door when using the 6 in. or 8 in. vault handle mechanism.

Note that the "Master Door" is defined to be the door of a single or multi-door enclosure which is interlocked directly with the disconnect device. The master door can be hinged on either the right or left hand side. It can be located in any position on a multi-door enclosure. An "Auxiliary Door" is defined to be any remaining doors of a multi-door enclosure which are interlocked with the master door by means of the overhead interlocking system as illustrated on pages 8-26 and 8-27.

Selection Procedure

Step 1.
Determine enclosure construction (number of doors, door height, hinge location, etc.).

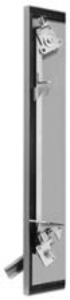
Step 2.
Determine Class 9422 disconnect device to be used—either a disconnect switch or a circuit breaker mechanism.

Step 3.
Determine the location of the disconnect device and handle mechanism (right- or left-hand flange or center channel).

Step 4.
Select the door closing mechanism required.

Step 5.
Select the auxiliary door closing mechanisms and multi-door interlocking hardware, if required. (A complete system for interlocking all auxiliary doors of a multi-door enclosure with center channel is available for the medium and large enclosures.)

Table 8.66: Door Closing Mechanism

60 in. Maximum Door Opening (Recommended)	46–60 in. Door Opening (Recommended)	61–91 in. Door Opening (Recommended)
 • 2 Point Locking is Standard • A Third Roller Latch Kit is Available for 3 Point Locking • For 3/4 in. Door Depths	• For use on Single or Multi-Door Enclosures • For use with Doors Hinged on Right or Left Side • Referred to as the 6 in. Vault Handle Mechanism • For 3/4 in. Door Depths	• For use on Single or Multi-Door Enclosures • For use with Doors Hinged on Right or Left Side • Referred to as the 8 in. Vault Handle Mechanism • For 1-1/8 in. Door Depths

Type M4
Latch bar not included, but most prepunched enclosures that accept Square D™ operating mechanisms supply a predrilled latch bar.

The door closing mechanisms listed below are for use on small to medium size single door control enclosures. They are designed to be used in conjunction with Class 9422 flange-mounted disconnect switches and circuit breaker operating mechanisms; however, they can be used independently as well. When used on properly designed and gasketed NEMA Type 12 enclosures, they meet NFPA 79 standards.

Table 8.67: Single Door Enclosures—NEMA Type 4 or 12 with 60 in. High Maximum Opening

Description	For Use On (Enclosure Type)	Use In Conjunction With	Door Latch Handle Length	Suggested Maximum Door Opening	Door Depth	Type	$ Price
Two point, roller latch, door closing mechanism for use on enclosures with doors hinged on the **left** hand side.	NEMA Type 4 and 12 Sheet Steel	Class 9422 Types A1, A3, A9	4 in.	Less than 39 in.	3/4	M4	**228.00**
			4 in.	Less than 39 in.	▲	M10	**314.00**
			6 in.	60 in.	3/4	M9	**243.00**
	NEMA Type 4 and 12 Stainless Steel	Class 9422 Types A2, A4, A10	4 in.	Less than 39 in.	3/4	M24	**300.00**
Two point, roller latch, door closing mechanism for use on enclosures with doors hinged on the **right** hand side.	NEMA Type 4 and 12 Sheet Steel	Class 9422 Types A1, A3, A9	4 in.	Less than 39 in.	3/4	M4L	**228.00**
			4 in.	Less than 39 in.	▲	M10L	**314.00**
			6 in.	60 in.	3/4	M9L	**243.00**
	NEMA Type 4 and 12 Stainless Steel	Class 9422 Types A2, A4, A10	4 in.	Less than 39 in.	3/4	M24L	**300.00**
Third roller latch kit for 3 point locking; for use where 3 point locking is desired or where the door opening is 39 in. or more.	NEMA Type 4 and 12 Sheet Steel	Class 9423 Types M4, M9, M4L, M9L	—	—	3/4	M3	**50.00**
	NEMA Type 4 and 12 Stainless Steel	Class 9423 Types M24, M24L	—	—	3/4	M23	**57.00**

▲ Suitable for door depths of 1-1/8 in., 1-1/4 in., 1-3/8 in. and 1-1/2 in.

Circuit Breaker Operating Mechanism

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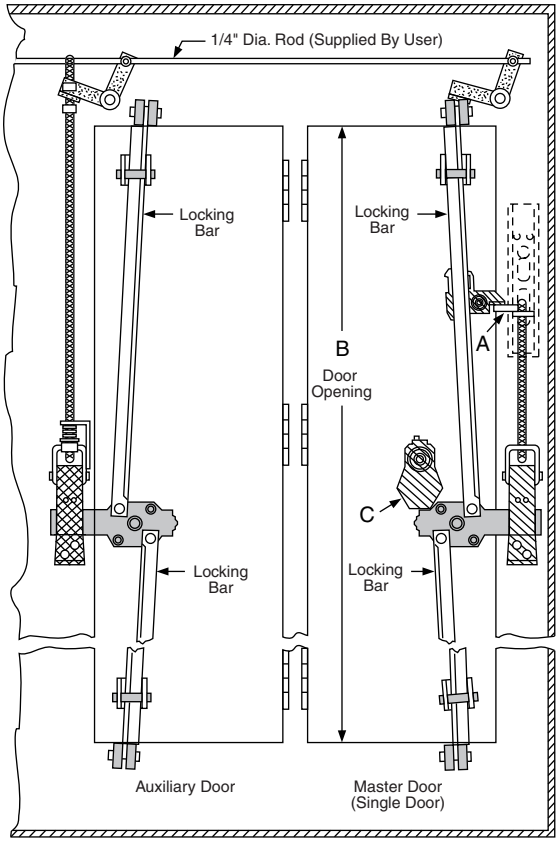
Vault Type for Single and Multi-Door Enclosures

Table 8.68 shows the requirements for the door closing mechanism, the locking bar kit, and the mechanical interlock kit, if used.

Table 8.68: Single or Multi-Door Enclosures—NEMA Type 12 with 40 in. to 60 in. Door Opening

Single-Door Enclosure		Multi-Door Enclosure		
Without Interlocking	**With Interlocking**	**Without Interlocking**	**With Interlocking**	
1—M6 door closing mechanism 1—Type M660 locking bar kit	1—M6 door closing mechanism 1—Type M660 locking bar kit 1—Type M5 (use with 9422A handles)	For *each* door: 1—M6 door closing mechanism 1—Type M660 locking bar kit	For *Master* door: 1—M6 door closing mechanism 1—Type M660 locking bar kit 1—Type M5 (for use with 9422A handles)	For each *Auxiliary* door: 1—M6 door closing mechanism 1—Type M660 locking bar kit Necessary quantities of Types M2 and M7 for each door (see below)

View from Inside the Enclosure



Note: A - Interlocking lever extension of the flange-mounted handle mechanism.

Note: B - Actual enclosure opening—not door height.

Note: C - Screwdriver interlock assembly can be ordered separately. Class 9423 Type **CEQ2493**. **$45.00**

NOTE: *All mechanisms listed on this page are suitable for either left or right hand mounting.*

Table 8.69: Door Interlocks

Type M6 Door Closing Mechanism	$ Price
The Class 9423 Type M6 door closing mechanism is designed to close and seal 0.75 in. deep doors of single or multi-door NEMA Type 12 enclosures. The Type M6 can be used on doors hinged on either the left or right hand side. Recommended door openings are from 40–60 in. Vault type handle length is 6 in.	**257.00**
Type M660 Locking Bar Kits	
The lock bar kit for the Type M6 door closing mechanism contains two lock bars and is available from stock. The bars can be cut to fit door openings through 60 in. One lock bar kit is required for each Type M6 ordered.	**86.00**
Type M5	
The Class 9423 Type M5 mechanical interlock kit is designed to interlock a Class 9422 handle mechanism with the Type M6 door closing mechanism. This kit prevents the opening of the master door (or single door) with the disconnect handle in the "ON" position, making it mandatory to use a screwdriver to gain entry to the enclosure at any time, regardless of the disconnect handle position.	**215.00**

Table 8.70: Required Accessories for Auxiliary Doors

Type M2	$ Price
One Type M2 kit is required for each auxiliary door. This kit is required to interlock any auxiliary door(s) with the master door.	**257.00**
Type M7	
The first auxiliary door requires 2 Type M7 kits. Additional auxiliary doors require only 1 Type M7 kit. The 0.25 in. diameter rod used to interconnect the M7 kits is furnished by the user. If the distance between any two Type M7 kits exceeds 36 in., an additional Type M7 kit should be installed to prevent the rod from buckling.	**71.00**

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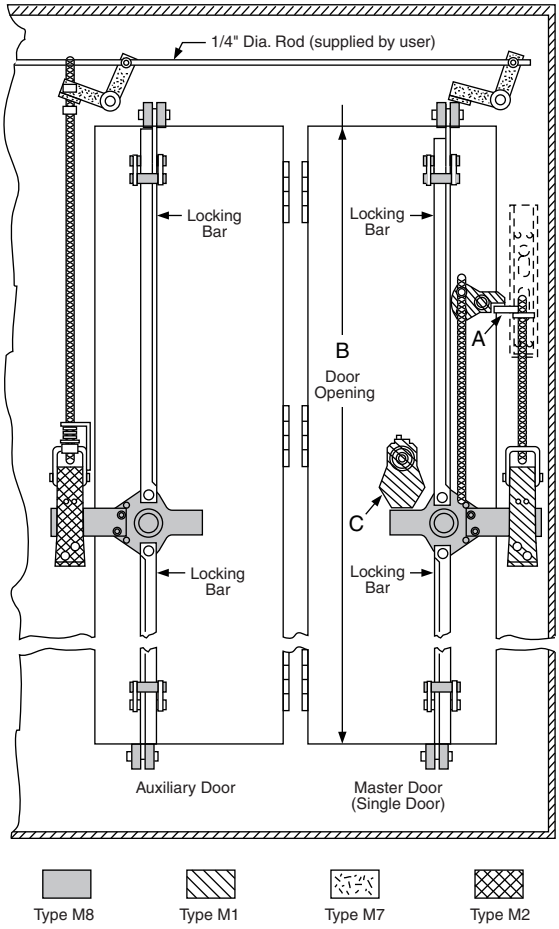
Vault Type for Single and Multi-Door Enclosures

Table 8.71 shows the requirements for the door closing mechanism, the locking bar kit, and the mechanical interlock kit, if used.

Table 8.71: Single Or Multi-Door Enclosures—NEMA Type 12 with 61 in. to 91 in. Door Openings

Single-Door Enclosure		Multi-Door Enclosure		
Without Interlocking	**With Interlocking**	**Without Interlocking**	**With Interlocking**	
1—M8 door closing mechanism 1—Type M891 locking bar kit	1—M8 door closing mechanism 1—Type M891 locking bar kit 1—Type M1 (for use with 9422A handles)	For *each* door: 1—M8 door closing mechanism 1—Type M891 locking bar kit	For *Master* door: 1—M8 door closing mechanism 1—Type M891 locking bar kit 1—Type M1 (for use with 9422A handles)	For each *Auxiliary* door: 1—M8 door closing mechanism 1—Type M891 locking bar kit Necessary quantities of Types M2 and M7 for each door (see below)

View from Inside the Enclosure



Note: A - Interlocking lever extension of the flange-mounted handle mechanism.

Note: B - Actual enclosure opening—not door height.

Note: C - Screwdriver interlock assembly can be ordered separately. Class 9423 Type CEQ2493. **$45.00**

NOTE: *All mechanisms listed on this page are suitable for either left or right hand mounting.*

Table 8.72: Door Interlocks

Type M8 Door Closing Mechanism	$ Price
The Class 9423 Type M8 door closing mechanism is designed to close and seal 1.125 in. deep doors of single or multi-door NEMA Type 12 enclosures. The Type M8 can be used on doors hinged on either the left or right hand side. Recommended door openings are from 61–91 in. Vault type handle length is 8 in.	**500.00**
Type M891 Locking Bar Kits	
The lock bar kit for the Type M8 door closing mechanism contains two lock bars and is available from stock. The bars can be cut to fit door openings through 91 in.. One lock bar kit is required for each Type M8 ordered.	**86.00**
Type M1	
The Class 9423 Type M1 mechanical interlock kit is designed to interlock a Class 9422 handle mechanism with the Type M8 door closing mechanism. This kit prevents the opening of the master door (or single door) with the disconnect handle in the "ON" position, making it mandatory to use a screwdriver to gain entry to the enclosure at any time, regardless of the disconnect handle position.	**428.00**

Table 8.73: Required Accessories for Auxiliary Doors

Type M2	$ Price
One Type M2 kit is required for each auxiliary door. This kit is required to interlock any auxiliary door(s) with the master door.	**257.00**
Type M7	
The first auxiliary door requires 2 Type M7 kits. Additional auxiliary doors require only 1 Type M7 kit. The 0.25 in. diameter rod used to interconnect the M7 kits is furnished by the user. If the distance between any two Type M7 kits exceeds 36 in., an additional Type M7 kit should be installed to prevent the rod from buckling.	**71.00**

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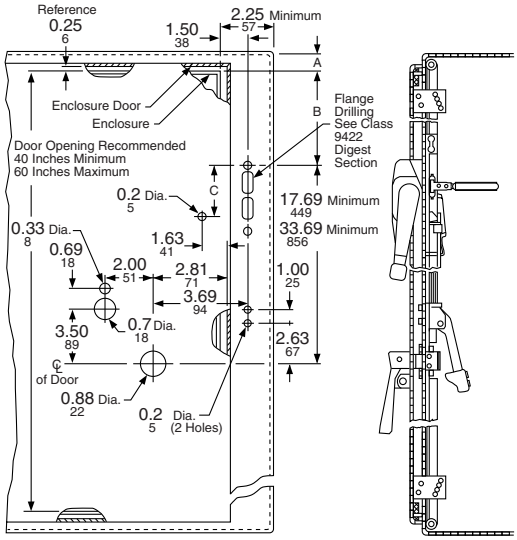


Enclosure Construction and General Location Information For Types M5 and M6

Drilling and location information below is complete for a single door enclosure with door hinged on left side, incorporating a Type M6, M5, and Class 9422 handle mechanism. Transpose all horizontal dimensions for doors hinged on right side.

Dimension A

Note: Single door enclosures: A minimum = 1 in.

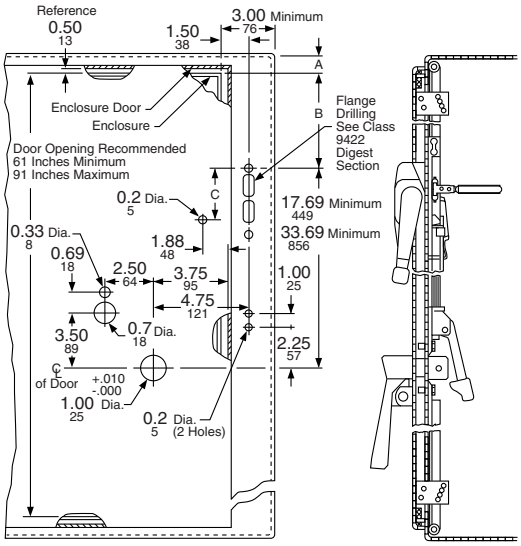
Note: Multi-Door enclosures without overhead interlocking system: A minimum = 1 in.

Note: Multi-Door enclosures with overhead interlocking system: A minimum = 4½ in.

Note: Overhead interlocking system consists of the required number of Class 9423 Type M2 and M7 kits for interlocking the auxiliary doors with the master door. See page 8-26.

Table 8.74: Dimension B (Minimums)

Type	Disconnect Device	If A = 1 Minimum B =	If A = 4½ Minimum B =	C
TCF, TCN, TDF, TDN, TD	60 A Disconnect Switch	3-/16	2-1/2	3-3/16
TE, TEF, TEN	100 A Disconnect Switch	5-1/4	2-1/2	3-3/16
TF	200 A Disconnect Switch	11-5/8	8-1/8	3-3/16
TG	400 A Disconnect Switch	15-1/16	11-9/16	6-3/4
RN1	FAL, FHL, Circuit Breaker	4-27/32	2-1/2	3-3/16
RP1	KAL, KHL Circuit Breaker	11-5/32	7-21/32	3-3/16
RR2	ILL Circuit Breaker	17-31/32	14-15/32	3-3/16
RT1	MAL, MHL, MEL, MXL Circuit Breaker	18-5/8	15-1/8	3-3/16



Enclosure Construction and General Location Information For Types M1 and M8

Drilling and location information below is complete for a single door enclosure with the door hinged on the left side, incorporating a Type M8, M1, and Class 9422 handle mechanism. Transpose all horizontal dimensions for doors hinged on the right side.

Dimension A

Note: Single door enclosures: A minimum = 1½ in.

Note: Multi-Door enclosures without overhead interlocking system: A minimum = 1½ in.

Note: Multi-Door enclosures with overhead interlocking system: A minimum = 4½ in.

Note: Overhead interlocking system consists of the required number of Class 9423 Type M2 and M7 kits for interlocking the auxiliary doors with the master door. See page 8-26.

Table 8.75: Dimension B (Minimums)

Type	Disconnect Device	If A = 1½ Minimum B =	If A = 4½ Minimum B =	C
TCF, TCN, TDF, TDN, TD	60 A Disconnect Switch	2-15/16	2-1/2	3-3/16
TE, TEF, TEN	100 A Disconnect Switch	4-3/4	2-1/2	3-3/16
TF	200 A Disconnect Switch	11-1/8	8-1/8	3-3/16
TG	400 A Disconnect Switch	14-9/16	11-9/16	5-7/8
RN1	FAL, FHL Circuit Breaker	4-11/32	2-1/2	3-3/16
RP1	KAL, KHL Circuit Breaker	10-21/32	7-21/32	3-3/16
RR2	ILL Circuit Breaker	17-15/32	14-15/32	3-3/16
RT1	MAL, MHL, MEL, MXL Circuit Breaker	18-1/8	15-1/8	3-3/16

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Section 9

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SQUARE D
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This page contains UL Tested and Certified series combination ratings for panelboards. These ratings apply to either an integral main located in the same enclosure or a remote main located in a separate enclosure.

Table 9.1: NQ Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲■	Maximum Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges ♦★▼△			
			Type	1 Pole	2 Pole	3 Pole

NOTE: *Table 9.1 NQ Series Connected Circuit Breaker Ratings table has moved to page 9-42 and page 9-43.*

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This page contains UL Tested and Certified series combination ratings for panelboards. These ratings apply to either an integral main located in the same enclosure or a remote main located in a separate enclosure.

Table 9.2: NF Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage, AC ▲	Max. Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges
120 120/240 240	65,000	EG, FH, FG, KH, LH, MH, MX, HG, JG, DG LG EG	EDB, EDB-EPD EDB ECB-G3
	100,000	EJ, FC, FJ, KC, LC, HJ, JJ DJ, LJ EJ, FC, KC, HJ, JJ	EDB, EDB-EPD, EGB EDB, EGB ECB-G3
	125,000	HL, JL	EDB, EDB-EPD, EGB, ECB-G3
	200,000	FI, KI, LI, LXI, HR, JR, LR FI, KI, HR, JR Class J or T (600 V) 200 A Max Fuses	EDB, EDB-EPD, EGB, EJB ECB-G3 ECB-G3
277 480Y/277	35,000	EG, FG, KH, LH, HG, JG, DG, LG EG, HG, JG	EDB, EDB-EPD ECB-G3
	65,000	EJ, FC, FJ, KC, LC, LX, HJ, JJ, DJ EJ, FC, KC, HJ, JJ	EDB, EDB-EPD, EGB ECB-G3
		LJ	EDB, EDB-EPD, EGB, EGB-EPD
		LL	EDB-EPD, EGB-EPD
	100,000	HL, JL DL, LL 400 A Max Fuses	EDB, EDB-EPD, EGB, EJB EDB, EGB, EJB EDB, EDB-EPD, EGB, EJB
	200,000	FI, KI, LI, LXI, HR, JR, LR FI, KI, HR, JR	EDB, EDB-EPD, EGB, EJB ECB-G3
		200 A Max Fuses	EDB, EDB-EPD, EGB, EJB, ECB-G3
600Y/347	18,000	HG, JG, MG, LG	EDB EDB (15–110 A)
	25,000	EJ, FI, KH, KI, LC, LE, LX, LI, LXI, HJ, JJ	EDB, EGB
		LJ	EDB (15–110 A), EGB (15–110 A)
		LH	(15–70 A) EDB, EGB
	35,000	LC, LE, LX	EDB, EGB, EJB
	50,000	HL, JL,	EDB, EGB, EJB
		LL	EDB (15–110 A), EGB (15–110 A),EJB (15–110 A)
	65,000	FI, KI, HR, JR LI, LXI, LR	EDB, EGB, EJB EJB
	200,000	Class J or T (600 V) 200 A Max Fuses	EDB, EGB, EJB

Table 9.3: I-Line Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲	Max. Short Circuit Current Rating (RMS Symm.)	Integral or Remote 2- or 3-pole Main Circuit Breaker	Square D™ Brand Branch Circuit Breakers	
			Designation	Poles
120	42k	MG	FY	1
	65k	QG, LH	FA, FD■	
	100k	FJ■, QJ QJ, LC LJ	FD■ FA FH	
	200k	LR	FH, FY	
208Y/120	100k	QJ QJ, PH, PJ, RJ	FA, FD■ QD, QG	2, 3
240	35k	MG	FA	1
	42k	KA LA, MA	FD■ HD, JD, QD	1, 2, 3 2, 3
	50k	MG MG	FA FA (25 A Max.)	1
	65k	HG, JG JG QG LH, MH, PA, PG, RG	FA, HD JD, QD FA, FD■, QD HD, JD, QD	2, 3
		FG■, FH, MH, MX, PJ FC, KC, KH, LC, LH LH	FD■ FD■, FG■ FA	1, 2, 3
		LH MG LG DG	LA HD, JD, KA HD, JD, KA, LA, LD, MA FH, HD, JD, KA, LA, MA	2, 3
	85k	RL	FH, KH	
	100k	FC, KC, LC, LX	FD■, FG■, FJ	1
		PH, PJ, RJ	QD, QG	2, 3
		QJ	FD■	2
		FJ■ FC, KC LC, LX KC, LC, LX KC, LC LC	FD■ FA, FH, FD■, FG■, FJ■ FH, FD■, FG■, FJ■ KA KH LA, LH, MG	2, 3
		LC	FA	1, 2, 3
		HJ, JJ JJ LC, LX, MJ, PJ, RJ MJ LJ DJ RL HL, JL	FA, FH, HD, HG JD, JG HD, HG, JD, JG LA, LH FH, HD, HG, JD, JG, KA, LA, LD, LG, MA, MG FH, HD, HG, JD, JG, KA, LA, MA, MG RG HD, HG, HJ, FA, H	2, 3
240	125k	JL PC, PH, PL, RL PC, PL, RL FI, KI, LI, LXI KI, LI, LXI	JD, JG, JJ HD, HG, JD, JG HH, JJ HD, HG, HJ JD, JG, JJ	2, 3

Table 9.3: I-Line Series Connected Circuit Breaker Ratings (RMS Symmetrical) *(continued)*

Maximum System Voltage AC ▲	Max. Short Circuit Current Rating (RMS Symm.)	Integral or Remote 2- or 3-pole Main Circuit Breaker	Square D™ Brand Branch Circuit Breakers	
			Designation	Poles
		FI, KI, LI, LXI	FD■, FG■, FJ	1
240	200k	FI, KI LI, LXI LI KI, LI, LXI LI LR	FA, FH, FC, FD■, FG■, FJ■ FH, FD■, FG■, FJ■ FC KA, QD, QG, QJ KC FH, HJ, HL, JJ, JL, LA, LH, QD, QG, QJ	2, 3
277	18k	LD	FY	1
	25k	FH, KA	FD■	
	35k	FG■, KH, LH DG LG	FD■ FH, FY FH, FY	
	65k	FJ■ FC, KC LC, LX (400 A Max.) LC, LX (600 A Max.) LJ DJ LL	FD■ FA, FH, FY, FD■, FG■ FH FY, FD■, FG■ FH, FY FH, FY FY	
	100k	DL LL	FH, FJ■ FH, FJ■	
	200k	FI, KI HR JR LI, LXI (400 A Max.) LI, LXI (600 A Max.) LR	FA, FH, FY, FD■, FG■, FJ■ FA, FJ■, FY FA, FJ■, FY FH FY, FD■, FG■, FJ■ FH, FY	
480	22k	MG	FA	2, 3
	30k	KH, LA, MA, MX, PA, PC, PX, PJ	FH	
		LA, MA, PA, PC, PX LA, MA, PA MG	KA HD, JD FA (25 A Max.), FH, KA	
	35k	MH, MX, PA HG, JG JG LH, MG, PG, RG LG DG	HD, JD FA, HD JD HD, JD FH, HD, JD, KA, LA, LD, MA FH, HD, JD, KA, LA, MA	
	42k	MJ RL	FH (25 A Max.) RG	
	50k	MJ	KA, KH	
	65k	FC, KC HJ, JJ JJ LC, LI, LX, LXI LC, LX (400 A Max.) KC, LC, LX LC, LX LJ DJ	FA, FH FA, FH, HD, HG JD, JG HD, HG, JD, JG FH KA LA FH, HD, HG, JD, JG, KA, LA, LD, LG, MA FH, HD, HG, JD, JG, KA, LA, MA	
	100k	HL, JL JL JR LI, LXI (600 A Max.)	FA, FH, HD, HG, HJ JD, JG, JJ FA KA	
		LL	FH, HD, HG, HJ, JD, JG, JJ, KA, LA, LD, LG, LJ, MA	
		DL PC, PH, PL, RL RL	FH, HD, HG, HJ, JD, JG, JJ, KA, LA, MA HJ, JJ RG	
	200k	FI, KI HR JR KI LI LR LXI	FA, FH, FC, HD, HG, HJ FA, HD, HG, HJ, HL HD, HG, HJ, HL, JD, JG, JJ, JL JD, JG, JJ, KA FC, KA, KC, LA, HJ, HL, JJ, JL FH, HJ, HL, JJ, JL, LA, LH KA, HJ, HL, JJ, JL	
480Y/277	25k	FH, KA	FD■	
	35k	FG■, KH, LH	FD■	
	65k	FJ■ FC, KC LC, LX (600 A Max.)	FD■ FD■, FG■ FD■, FG■	
	200k	FI, KI LI, LXI (600 A Max.)	FD■, FG■, FJ■ FD■, FG■, FJ■	
600	18k	HG, JG JG LG MG, PG, RG MG	FA, HD JD HD, JD, LD HD, JD FA	2, 3
	25k	HJ, JJ JJ LJ PJ, RJ	FA, HD, HG JD HD, HG, JD, JG, LD, LG, MA MG	
	35k	LC	FH, HD, HG, HJ, JD, JG, JJ, LA	
	50k	HL, JL JL LL PK	FA, HD, HG, HJ JD, JG, JJ HD, HG, HJ, JD, JG, JJ, LD, LG, LJ, MA HJ, JJ, MJ	
	100k	FI, KI HR JR KI KI, LI LI	HD, HG, HJ FA, HD, HG, HJ, HL FA, HD, HG, HJ, HL, JD, JG, JJ, JL JD, JG, JJ FH LA	
600Y/347	18k 25k 50k	MG MJ HL, JL	FA (25 A max.) FA (30 A max.) FJ	1

▲ Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

■ Obsolete. Contact your local Schneider Electric representative or distributor for the replacement circuit breaker.

NOTE: *LD, LG, LH, and LL breakers are only available in 3 pole configurations.*

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Table 9.4: Fuse/I-Line Circuit Breaker Series Connected Ratings

Maximum System Voltage AC	Max. Short Circuit Current Rating (RMS Symm.)	Remote Main Fuse		Square D™ Brand Branch Circuit Breakers
		Maximum Amperage	Fuse Class	Designation ▲
120/240 1Ø 208Y/120	100,000	1200 A	L, T (300 V)	QD, QG
		800 A	T (600 V)	QD, QG
		600 A	J, RK5	QD, QG
240	65,000	1200 A	L, T (300 V)	QD
		800 A	T (600 V)	QD
		600 A	J, RK5	QD
240	100,000	1200 A	L, T (300 V)	QD, QG (2-pole)
		800 A	T (600 V)	QD, QG (2-pole)
		600 A	J, RK5	QD, QG (2-pole)
			L, T (600 V)	FA, FH, KA, KH, KC, LA, LH, MA, MH, MX, PG
			RK5	FH, KA, KH, LA, LH, MA, MH, MX, PG, HD, HG, HJ, HL, JD, JG, JJ, JL
			J	HD, HG, HJ, HL, JD, JG, JJ, JL
		800 A	T (600 V)	FH, KA, KH, LA, LH, MA, MH, MX, PG
			T (300 V)	PG
			L	FH,KA,KH,LA,LH,MA,MH,MX,PG
		1200 A	L	FH, KH, LA, LH, MA, MH, MX, PG
			T (600 V)	HD, HG, HJ, HL, JD, JG, JJ, JL
		1600/2000 A	L	KH, MA, MH, MX, PG
		4000 A	L	HD, HG, HJ, HL, JD, JG, JJ, JL
240	200,000	600 A	J, T (600 V)	FA(3-pole only), FH, FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
			RK5	FH, FC, HD, HG, HJ, HL, JD, JG, JJ, JL KH, KC, LA, LH, LC, MA, MH, MX, NC, NX, PG, PJ, PL
			J	HD, HG, HJ, HL, JD, JG, JJ, JL
		800 A	T (600 V)	FH, FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
			T (300 V)	PG, PJ, PL
			L	FH,FC, KH, KC, LA, LH, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
		1200 A	L	FC, KH, KC, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
			T (600 V)	HD, HG, HJ, HL, JD, JG, JJ, JL
		1600/2000 A	L	NA, NC, NX, PJ, PL
		4000 A	L	HD, HG, HJ, HL, JD, JG, JJ, JL
480	100,000	400 A	J, T (600 V)	HD, HG, HJ, HL, JD, JG, JJ, JL
		600 A	J, RK5	HJ, HL, JJ, JL
			J, T (600 V)	FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, PG, PJ
			RK5	FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, PG, PJ
		800 A	L, T (600 V)	FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, PG, PJ
		1200 A	L	FC, KH, KC, LA, LH, LC, MA, MH, MX, NA, PG, PJ
			T (600 V)	HJ, HL, JJ, JL
		1600 A	L	KC, LC, MA, MH, MX, NA, PG, PJ
		2000 A	L	KC, LC, MH,MG, MJ, MX, NA, PG, PJ
		4000 A	L	HJ, HL, JJ, JL
480	200,000	200 A	RK5	HJ, HL
		400 A	J	FA, FH, FC, HJ, HL, JJ, JL, KA, KH, KC, LA, LH, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
			T(600V)	FA, FH, FC, HJ, HL, JJ, JL, KA, KH, KC, LA, LH, MA, MH, MX, NA, NC, NX
		600 A	J	FC, KA, KH, KC, LA, LH, LC, MA, MH, MX, MG, MJ, NA, NC, NX, PG, PJ, PL
			T (600V)	KA, KH, KC, LA, LH, MA, MH, MX, NA, NC, NX
			RK5	KC, LA, LH, LC, MA, MH, MX, MG, MJ, NC, NX, PG, PJ,
		800 A	T (300 V)	PG, PJ, PL
			T (600 V)	KA, KH, KC, LA, LH, MA, MH, MX, MG, MJ, NA, NC, NX, PG, PJ, PL
			L	KC, LA, LH, LC, MA, MH, MX, NA, NC, NX, PG, PJ, PL
		1200 A	L	KC, LC, MA, MH, MX, MG, MJ, NA, NC, NX, PG, PJ, PL
		1600/2000 A	L	NA, NC, NX
600	100,000	30 A	CC	HG, JG (molded case switches)
		200 A	J	HD, HG, HJ, HL, JD, JG, JJ, JL
		400 A	J, T (600 V)	HJ, HL, JJ, JL
		600 A	R	MG, MJ
		1200 A	L	MG, MJ
600	200,000	600 A	J	MG, MJ
		800 A	T (600 V)	MG, MJ

▲ Series rating valid for 2-pole or 3-pole circuit breakers.

Note:

- The fuse used in this UL test is an envelope (umbrella) fuse. This fuse is designed as a “worst case” fuse. Thus, no matter what manufacturer’s fuse is used, the Square D™ brand circuit breaker is protected.
- The line side fused switch may be in a separate enclosure or in the same enclosure as the loadside circuit breaker. A line side fused switch may be a submain, integral main, or remote main. A load side circuit breaker may be a branch, submain, or an integral main used on the load side of a remote main. This series combination short circuit current rating shall not exceed that of the line side fused switch. The charts apply to Square D™ brand load side circuit breakers only. However, the line side fuse ratings are independent of the fuse manufacturer.
- Not applicable to Corner Grounded Systems.
- Limiters used in Square D™ brand DSL and DSL II fused power circuit breakers are not class L fuses and do not have series ratings.

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NQ and NF Merchandised Pricing Procedure

1. List circuit breakers required, either plug-on or bolt-on. See the appropriate Digest pages for catalog numbers.
2. Determine equivalent number of pole spaces required.
3. Select proper main lug interior (from page 9-6) or main lug interior and main circuit breaker adapter kit (from page 9-7) based on equivalent number of poles and ampere rating. Interiors include solid neutral and are field convertible to top-feed.
4. Select enclosure from appropriate page.
   Type 1—Select box and front catalog number corresponding to interior catalog number.
   Type 3R, 5, 12—Select enclosure. Interior trim kit for Type 3R, 5, 12 is included with the enclosure.
5. For complete price, add the component prices. Include panelboard accessories.
6. Apply appropriate discount schedule.

NQ and NF Factory Assembled Pricing Procedure

1. Select **Base Price** for main lugs or main circuit breaker from the **Base Price Table**. Include equipment ground bar when required.
2. List **Branch Circuit Breakers** (either plug-on or bolt-on) and determine total spaces required. Select price from the **Branch Circuit Breakers Table**. Include space-only charge for future requirements.
3. If total spaces required exceeds the maximum listed, price as two or more panelboards and add price for sub-feed or feed-through lugs so installer can cable between sections.
4. Add price for special features from appropriate page. Contact your local Schneider Electric representative or distributor for additional special features.
5. For complete price, add all prices. Order by description.

NOTE: *Additional special price adders can be found in the Supplemental and Obsolescence Digest, Section 4.*

6. Apply appropriate discount schedule.

NQ Merchandised Pricing Example

Table 9.5: 208Y/120 Vac, 3Ø4W, 10 kA SCCR, 225 A, MLO, Type-1, surface-mount, bolt-on, branch circuit breakers, main sub-feed lugs

Branches	Page No.	Catalog Number	Spaces	$ Price
(20) 20/1	9-10	(20) **QOB120**	20	**795.**
two 40/2	9-10	two **QOB240**	4	**177.**
two 30/3	9-10	two **QOB330**	6	**585.**
			Total 30	
225 A MLO Interior	9-6	NQ430L2	–	**1215.**
Box	9-6	MH32	–	**113.**
Cover	9-6	NC32S	–	**527.**
Sub-feed Lugs	9-6	NQSFL2	–	**203.**
			Total Price	**3615.**

NQ Factory Assembled Pricing Example

Table 9.7: 208Y/120 Vac, 3Ø4W, 10 kA SCCR, 225 A, MLO, Type-1, surface-mount, bolt-on, branch circuit breakers, main sub-feed lugs

Item	Page No.	$ Price
225 A MLO Base Price	9-11	**928.**
(20) 20/1 Bolt-on	9-11	**1360.**
two 40/2 Bolt-on	9-11	**268.**
two 30/3 Bolt-on	9-11	**704.**
Sub-feed Lugs	9-12	**128.**
Total Price		**3388.**

NF Merchandised Pricing Example

Table 9.6: 480Y/277 Vac, 3Ø4W, 25 kA SCCR, fully rated, copper bus, 100 A, main circuit breaker, Type 1, flush-mount, bolt-on, branch circuit breakers

Branches	Page No.	Catalog No.	Spaces	$ Price
(13) 20/1	9-15	EGB14020	13	**3315.**
one 40/2	9-15	EGB24040	2	**776.**
one 50/3	9-15	EGB34050	3	**1131.**
			Total 18	
Main circuit breaker adapter kit (less circuit breaker)	9-13	N150MH	–	**780.**
Main circuit breaker	7-28	HGL36100	–	**1701.**
125 A MLO Cu Bus Int.	9-13	NF418L1C	–	**1838.**
Box	9-13	MH38	–	**113.**
Cover	9-13	NC38F	–	**549.**
			Total Price	**10203.**

NF Factory Assembled Pricing Example

Table 9.8: 480Y/277 Vac, 3Ø4W, 25 kA SCCR, fully rated, copper bus, 250 A, main circuit breaker, Type 1, flush-mount, bolt-on, branch circuit breakers

Item	Page No.	$ Price
250 A Main Circuit Breaker Base Price	9-16	**6180.**
Copper bus adder	9-17	**458.**
(13) 20/1	9-16	**4212.**
one 40/2	9-16	**746.**
one 50/3	9-16	**1264.**
Total Price		**12860.**

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Table 9.9: Main Lug Interiors—Accepts plug-on and bolt-on circuit breakers

Pole Spaces	Mains Rating	Total Price Interior Front and Enclosure		Interior Only (Order Branch Circuit Breakers Separately)		Type 1 Enclosure						Type 3R, 5, 12 Enclosure △		
						Box 20 in. W x 5.75 in. D ■		Mono-Flat™ Front ♦		Hinged Front		Enclosure 20 in. W x 6.5 in. D		Height (In.)
		Type 1	Type 3R, 5,12	Catalog No. ▲	$Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	
20-inch-wide Cabinet □—Single Phase 3-Wire														
18	100	**1395.**	**2977.**	NQ18L1	**785.**	MH26	**113.**	NC26 ( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		1474.	**3056.**	NQ18L1C	**864.**									
30		**1585.**	**3149.**	NQ30L1	**945.**	MH32		NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1675.	**3239.**	NQ30L1C	**1035.**									
30	225	**1744.**	**3308.**	NQ30L2	**1104.**	MH32	**113.**	NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1819.	**3383.**	NQ30L2C	**1179.**									
42		**2002.**	**3556.**	NQ42L2	**1340.**	MH38		NC38 ( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		2080.	**3634.**	NQ42L2C	**1418.**									
72★		**3073.**	**4900.**	NQ72L2	**2297.**	MH44		NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		3206.	**5033.**	NQ72L2C	**2430.**									
84★		**3521**	**5288.**	NQ84L2	**2679.**	MH50		NC50 ( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	50
		3677.	**5444.**	NQ84L2C	**2835.**									
30	400	**2462.**	**4229.**	NQ30L4	**1620.**	MH50	**113.**	NC50V ( )	**729.**	NC50V( )HR	**912.**	MH50WP	**2609.**	50
		2579.	**4346.**	NQ30L4C	**1737.**									
42		**2620.**	**4387.**	NQ42L4	**1778.**									
		2738.	**4505.**	NQ42L4C	**1896.**									
84★		**4853.**	**6534.**	NQ84L4C	**3792.**	MH68		NC68V ( )	**948.**	NC68V( )HR	**1185.**	MH68WP	**2742.**	68
30	600	**2705.**	**4548.**	NQ30L6C	**1863.**	MH50	**113.**	NC50V ( )	**729.**	NC50V( )HR	**912.**	MH62WP▼	**2685.**	50/62
42		**2861.**	**4704.**	NQ42L6C	**2019.**									
84★		**5099.**	**6873.**	NQ84L6C	**4038.**	MH68		NC68V ( )	**948.**	NC68V( )HR	**1185.**	MH80WP▼	**2835.**	68/80
20-inch-wide Cabinet □ —Three Phase 4-Wire														
18	100	**1486.**	**3068.**	NQ418L1	**876.**	MH26	**113.**	NC26 ( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		1561.	**3143.**	NQ418L1C	**951.**									
30		**1752.**	**3316.**	NQ430L1	**1112.**	MH32		NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1831.	**3395.**	NQ430L1C	**1191.**									
30	225	**1855.**	**3419.**	NQ430L2	**1215.**	MH32	**113.**	NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1932.	**3496.**	NQ430L2C	**1292.**									
42		**2138.**	**3692.**	NQ442L2	**1476.**	MH38		NC38 ( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		2213.	**3767.**	NQ442L2C	**1551.**									
54		**2559.**	**4113.**	NQ454L2	**1898.**									
		2655.	**4209.**	NQ454L2C	**1994.**									
72★		**3307.**	**5134.**	NQ472L2	**2531.**	MH44		NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		3436.	**5263.**	NQ472L2C	**2660.**									
84★		**3794.**	**5561.**	NQ484L2	**2952.**	MH50		NC50 ( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	50
		3944.	**5711.**	NQ484L2C	**3102.**									
30	400	**2704.**	**4471.**	NQ430L4	**1862.**	MH50	**113.**	NC50V ( )	**729.**	NC50V( )HR	**912.**	MH50WP	**2609.**	50
		2822.	**4589.**	NQ430L4C	**1980.**									
42		**2854.**	**4621.**	NQ442L4	**2012.**									
		2975.	**4742.**	NQ442L4C	**2133.**									
72★		**4449.**	**6134.**	NQ472L4	**3449.**	MH62		NC62V ( )	**887.**	NC62V( )HR	**1109.**	MH62WP	**2685.**	62
		4657.	**6342.**	NQ472L4C	**3657.**									
84★		**5327.**	**7008.**	NQ484L4C	**4266.**	MH68		NC68V ( )	**948.**	NC68V( )HR	**1185**	MH68WP	**2742.**	68
30	600	**2983.**	**4826.**	NQ430L6C	**2141.**	MH50	**113.**	NC50V ( )	**729.**	NC50V( )HR	**912.**	MH62WP▼	**2685.**	50/62
42		**3116.**	**4959.**	NQ442L6C	**2274.**									
84★		**5609.**	**7383.**	NQ484L6C	**4548.**	MH68		NC68V ( )	**948.**	NC68V( )HR	**1185.**	MH80WP▼	**2835.**	68/80

▲ "C" suffix indicates copper bussing.
■ Embossed mounting holes add a 0.25-inch standoff to back of MH box.
♦ Add "F" for flush mount, "S" for surface mount.
★ Use only if the Local Jurisdiction where this panelboard interior is being applied has adopted the 2008 NEC, which allows single panelboard interiors greater than 42 circuits.
▼ When NEMA 3R, 5, or 12 enclosures are selected, an NQ12RDE kit should also be selected. See Table 9.19.
△ Enclosure includes trim kit.
□ For the NQ14-inch-wide panelboard offer, See Digest page 9-8.

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Table 9.10: Main Circuit Breaker Interiors—Will accept plug-on and bolt-on circuit breakers

Pole Spaces	Mains Rating	Total $ Price Interior, Front, Box and Adapter Kit △		Interior Only (Order Branch Circuit Breakers Separately)		Main Circuit Breaker Adapter Kit (Less Circuit Breaker) △			Type 1 Enclosure						Type 3R, 5, 12 Enclosure ▼		
									Box 20 in. W x 5.75 in. D ■		Mono-Flat™ Front		Hinged Front		Enclosure 20 in. W x 6.5in. D		Height (In.)
		Type 1	Type 3R, 5, 12	Catalog No. ▲	$ Price	Catalog No.	$ Price	Circuit Breaker Frame Size □	Catalog No.	$ Price	Catalog No. ♦	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	
20-inch-wide Cabinet ◊—Single Phase 3-Wire																	
16◒	100 back-fed	**1395.**	**2977.**	NQ18L1	**785.**	—	—	Select QOB 2-pole or QOB-VH☆	MH26	**113.**	NC26 ( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		1474.	**3056.**	NQ18L1C	**864.**	—	—										
28◒		**1585.**	**3149.**	NQ30L1	**945.**	—	—		MH32	**113.**	NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1675.	**3239.**	NQ30L1C	**1035.**	—	—										
18	100	**2227.**	**3781.**	NQ18L1	**785.**	NQMB2HJ	**780.**	HD, HG, HJ, HL✱ 100A maximum	MH38	**113.**	NC38 ( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		2306.	**3860.**	NQ18L1C	**864.**												
30	100	**2501.**	**4328.**	NQ30L1	**945.**	NQMB2HJ	**780.**		MH44	**113.**	NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		2591.	**4418.**	NQ30L1C	**1035.**												
30	225	**2660.**	**4487.**	NQ30L2	**1104.**	NQMB2HJ NQMB2Q NQMB2KI	**780.**	HD, HG, HJ, HL✱ or JD, JG, JJ, JL QB,QD,QG,QJ KI	MH44	**113.**	NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		2735.	**4562.**	NQ30L2C	**1179.**												
42	225	**2962.**	**4729.**	NQ42L2	**1340.**		**780.**		MH50	**113.**	NC50 ( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	50
		3040.	**4807.**	NQ42L2C	**1418.**												
72★	225	**3976.**	**5729.**	NQ72L2	**2297.**		**780.**		MH56	**113.**	NC56 ( )	**786.**	NC56( )HR	**983.**	MH56WP	**2652.**	56
		4109.	**5862.**	NQ72L2C	**2430.**												
84★	225	**4459.**	**6144.**	NQ84L2	**2679.**		**780.**		MH62	**113.**	NC62 ( )	**887.**	NC62( )HR	**1109.**	MH62WP	**2685.**	62
		4615.	**6300.**	NQ84L2C	**2835.**												
30	400	**3400.**	**5085.**	NQ30L4	**1620.**	NQMB4LA	**780.**	LA/LH♦	MH62	**113.**	NC62V ( )	**887.**	NC62V( )HR	**1109.**	MH62WP	**2685.**	62
		3517.	**5202.**	NQ30L4C	**1737.**												
42	400	**3558.**	**5243.**	NQ42L4	**1778.**	NQMB4LA	**780.**	LA/LH♦	MH62	**113.**	NC62V ( )	**887.**	NC62V( )HR	**1109.**	MH62WP	**2685.**	62
		3676.	**5361.**	NQ42L4C	**1896.**												
84★	400	**5686.**	**7407.**	NQ84L4C	**3792.**	NQMB4LA	**780.**	LA/LH♦	MH80	**113.**	NC80V ( )	**1001.**	NC80V( )HR	**1245.**	MH80WP	**2835.**	80
20-inch-wide Cabinet ◊—Three Phase 4-Wire																	
15◒	100 back-fed	**1395.**	**2977.**	NQ418L1	**785.**	—	—	Select QOB 3-pole or QOB-VH▽	MH26	**113.**	NC26 ( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		1474.	**3056.**	NQ418L1C	**864.**	—	—										
27◒		**1585.**	**3149.**	NQ430L1	**945.**	—	—		MH32	**113.**	NC32 ( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		1675.	**3239.**	NQ430L1C	**1035.**	—	—										
18	100	**2318.**	**3872.**	NQ418L1	**876.**	NQMB2HJ	**780.**	HD, HG, HJ, HL 100A maximum	MH38	**113.**	NC38 ( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		2393.	**3947.**	NQ418L1C	**951.**												
30		**2668.**	**4495.**	NQ430L1	**1112.**				MH44	**113.**	NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		2747.	**4574.**	NQ430L1C	**1191.**												
30	225	**2771.**	**4598.**	NQ430L2	**1215.**	NQMB2HJ NQMB2Q NQMB2KI	**780.**	HD, HG, HJ, HL or JD, JG, JJ, JL QB,QD,QG,QJ KI	MH44	**113.**	NC44 ( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		2848.	**4675.**	NQ430L2C	**1292.**												
42		**3098.**	**4865.**	NQ442L2	**1476.**		**780.**		MH50	**113.**	NC50 ( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	50
		3173.	**4940.**	NQ442L2C	**1551.**												
54		**3519.**	**5286.**	NQ454L2	**1898.**												
		3615.	**5382.**	NQ454L2C	**1994.**												
72★		**4210.**	**5963.**	NQ472L2	**2531.**		**780.**		MH56	**113.**	NC56 ( )	**786.**	NC56( )HR	**983.**	MH56WP	**2652.**	56
		4339.	**6092.**	NQ472L2C	**2660.**												
84★		**4732.**	**6417.**	NQ484L2	**2952.**		**780.**		MH62	**113.**	NC62 ( )	**887.**	NC62( )HR	**1109.**	MH62WP	**2685.**	62
		4882.	**6567.**	NQ484L2C	**3102.**												
30	400	**3642.**	**5327.**	NQ430L4	**1862.**	NQMB4LA	**780.**	LA/LH♦	MH62	**113.**	NC62V ( )	**887.**	NC62V( )HR	**1109.**	MH62WP	**2685.**	62
		3760.	**5445.**	NQ430L4C	**1980.**												
42		**3792.**	**5477.**	NQ442L4	**2012.**												
		3913.	**5598.**	NQ442L4C	**2133.**												
72★		**5314.**	**6986.**	NQ472L4	**3449.**	NQMB4LA	**780.**	LA/LH♦	MH74	**113.**	NC74V ( )	**972.**	NC74V( )HR	**1215.**	MH74WP	**2757.**	74
		5522.	**7194.**	NQ472L4C	**3657.**												
84★		**6160.**	**7881.**	NQ484L4C	**4266.**	NQMB4LA	**780.**	LA/LH♦	MH80	**113.**	NC80V ( )	**1001.**	NC80V( )HR	**1245.**	MH80WP	**2835.**	80

▲ "C" suffix indicates copper bussing.
■ Embossed mounting holes add a 0.25 inch standoff to back of MH box.
♦ Add "F" for flush mount, "S" for surface mount.
★ Use only if the Local Jurisdiction where this panelboard interior is being applied has adopted the 2008 NEC, which allows single panelboard interiors greater than 42 circuits.
▼ Enclosure includes trim kit.
△ Select the appropriate main circuit breaker from the tables starting on Digest page 7-22 and add the circuit breaker price to the total price of the panelboard.
□ Circuit breaker interrupt ratings, See the tables starting on Digest page 7-22.
◊ For the NQ14-inch-wide panelboard offer, See Digest page 9-8.
☆ QOB2150VH takes four pole spaces; all other QOB two pole circuit breakers take two pole spaces.
▽ QOB3110VH to QOB3150VH take six pole spaces; all other QOB three pole circuit breakers take three pole spaces.
◒ Pole spaces shown are available for branch circuits, with spaces deducted for the back fed main breaker.
✱ For single phase applications, order a 3-pole breaker. Example: HDL36100.
♦ For 400A applications, order short handle circuit breaker (LAL36400MB).

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New!

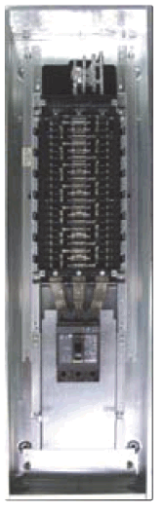
NQ 14-inch-wide—240 Vac, 48 Vdc

14-inch-wide NQ panelboards are now available for those customers whose equipment space is limited. Developed with customer input, Square D™ brand NQ panelboards are built to last, featuring innovations for ease of installation and durability.

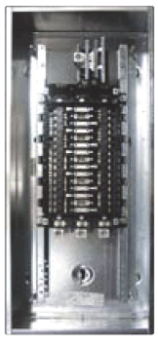
Features

- 240 Vac, 48 Vdc maximum
- 225 A maximum main circuit breaker or main lugs
- 60 A maximum branch circuit breakers
- Visi-Trip™ indication on branch circuit breakers
- 10,000–65,000 A Short Circuit Current Rating (SCCR)
- Interiors supplied with tin plated copper bus as standard
- Interiors accept bolt-on and plug-on branch circuit breakers
- Three-phase, four-wire, and single-phase, three-wire interiors available
- Panelboards available with Mono-Flat™ front
- Suitable for use as service entrance equipment
- Branch circuit filler plates provide fast and easy installation
- Both fully and series-rated systems are available

14-inch-wide NQ Panelboard Main Lug



Main Breaker Panelboard



Main Lug Panelboard

Table 9.11: Main Lug Interiors—Accepts Plug-On and Bolt-On Branch Breakers

Max. Number of Breakers	Main Ratings	Total $ Price Interior, Front, Box and Adapter Kit		Interior Only (Order Branch Circuit Breakers Seperately)		Type 1 Enclosure					
						Box 14"W x 5.75" Db		Mono Flat Front		Hinged Front	
		Type 1	Type 3R, 5, 12	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No. ■	$ Price	Cat. No.	$ Price
14-inch-wide Cabinet—Single Phase 3-Wire											
18	100 A	**1407.**	—	NQ18L1C14	**951.**	NQB532	**118.**	NQC32	**338.**	N/A	—
30		**1647.**	—	NQ30L1C14	**1191.**	NQB532	**118.**	NQC32	**338.**	N/A	—
30	225 A	**1748.**	—	NQ30L2C14	**1292.**	NQB532	**118.**	NQC32	**338.**	N/A	—
42		**2028.**	—	NQ42L2C14	**1151.**	NQB538	**118.**	NQC38	**338.**	N/A	—
14-inch-wide Cabinet—Three Phase 4-Wire											
18	100 A	**1407.**	—	NQ418L1C14	**951.**	NQB532	**118.**	NQC32	**338.**	N/A	—
30		**1647.**	—	NQ430L1C14	**1191.**	NQB532	**118.**	NQC32	**338.**	N/A	—
30	225 A	**1748.**	—	NQ430L2C14	**1292.**	NQB532	**118.**	NQC32	**338.**	N/A	—
42		**2028.**	—	NQ442L2C14	**1151.**	NQB538	**118.**	NQC38	**338.**	N/A	—

Table 9.12: Main Circuit Breaker Interiors—Accepts Plug-On and Bolt-On Branch Breakers

Max. Number of Breakers	Main Ratings	Total $ Price Interior, Front, Box and Adapter Kit		Interior Only (Order Branch Circuit Breakers Seperately)		Main Circuit Breaker Adapter Kit (Less Circuit Breaker)			Type 1 Enclosure					
									Box 14"W x 5.75" Db		Mono Flat Front		Hinged Front	
		Type 1	Type 3R, 5, 12	Cat. No.	$ Price	Cat. No	$ Price	Cat. No	Cat. No.♦	$ Price	Cat. No. ■	$ Price	Cat. No.	$ Price
14-inch-wide Cabinet—Single Phase 3-Wire														
16 ▲	100	**1407.**	—	NQ18L1C14	**951.**	—	—	Select QOB 2-pole or QOB-VH	NQB532	**118.**	NQC32	**338.**	N/A	—
28 ▲		**1647.**	—	NQ30L1C14	**1191.**	—	—		NQB532	**118.**	NQC32	**338.**	N/A	—
30	225	**1748.**	—	NQ30L2C14	**1292.**	NQMB2HJ14 or NQMB2Q14	**780.**	HD, HG, HJ, HL, OR JD, JG, JJ, JL, QB , QD, QG, QJ	NQB544	**118.**	NQC44	**338.**	N/A	—
42		**2028.**	—	NQ42L2C14	**1151.**		**78.**		NQB550	**118.**	NQC50	**359.**	N/A	—
14-inch-wide Cabinet—Three Phase 4-Wire														
15 ▲	100	**1407.**	—	NQ418L1C14	**951.**	—	—	Select QOB 3-pole or QOB-VH	NQB532	**118.**	NQC32	**338.**	N/A	—
27 ▲		**1647.**	—	NQ430L1C14	**1191.**	—	—		NQB532	**118.**	NQC32	**338.**	N/A	—
30	225	**1748.**	—	NQ430L2C14	**1292.**	NQMB2HJ14 or NQMB2Q14	**780.**	HD, HG, HJ, HL, OR JD, JG, JJ, JL, QB , QD, QG, QJ	NQB544	**118.**	NQC44	**338.**	N/A	—
42		**2028.**	—	NQ442L2C14	**1151.**		**78.**		NQB550	**118.**	NQC50	**359.**	N/A	—

▲ Pole spaces shown are available for branch circuits, with spaces deducted for the back-fed main breaker.
■ Add "F" for flush mount, "S" for surface mount.
♦ All 14" W boxes come with blank endwalls.

Table 9.13: NQ Accessories

Description	Catalog No.	$ Price	Schedule
Equipment Ground Bars			
Aluminum	PK27GTA	**33.80**	DE3A
PK23GTA+ #1 to #4/0 Al or Cu lug	PK23GTAL	**40.70**	
Copper	PK27GTACU	**84.00**	PE-1A
Ground Bar Insulator Kit	PKGTAB	**43.80**	DE3A
Filler plate (15 per package)	NQFP15★	**68.00**	PE1A
Handle Attachments—Branch Circuit Breakers			
Handle lock-off	HLO1	**9.90**	DE2A
Handle tie - (QO and QOB only)	QO1HT	**3.80**	
Handle padlock attachment—1-pole	QO1PA	**10.70**	
2- and 3-pole	QO1PL	**10.70**	
Handle tie and lock-off for three 1-pole (QO, QOB)	QO3HT	**13.40**	

★ Filler Plates are **$3.00** each and must be ordered in packages of 15.

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Table 9.14: NQ Merchandised Neutrals

Mains Ampacity	200% Neutral Kit				Copper 100% Neutral Kit			
	Catalog No.	$ Price	Box Add	Schedule	Catalog No.	$ Price	Box Add	Schedule
100	NQNL1	**315.**	no adder	PE-1A	NQN1CU	**192.**	no adder	PE-1A
225	NQNL2 or NQNL2ACCY■	**426.**			NQN2CU			
400	NQNL4▲	**639.**	no adder	PE-1A	NQN6CU	**585.**	no adder	PE-1A
600	Not Available				NQN6CU▲			

▲ Not to be used with SFL, FTL, or SFB. These combinations are factory assembled only.
■ For 225A panel with SFL, FTL, or SFB, use NQNL2ACCY (enclosure size increases by 6 inches). Otherwise, use NQNL2.

Table 9.15: NQ Merchandised Sub-feed Lugs, Feed-through Lugs and Sub-feed Breakers

Mains Ampacity	Sub-feed Lugs (N/A in MCB Interiors)			Feed-through Lugs			Sub-feed Circuit Breaker Kits (breaker not incl.)					
							Single SFB			Two SFB		
	Catalog No.	$ Price	Schedule	Catalog No.	$ Price	Schedule	Catalog No.	$ Price	Schedule	Catalog No.	$ Price	Schedule
100 A	NQSFL1	**155.**	PE-1A	100 A not available;	—	—	—	—	—	—	—	—
225 A	NQSFL2	**203.**	PE-1A	NQFTL2L♦ NQFTL2H★	**476.**	PE-1A	NQSFB2Q or NQSFB2HJ	**1029.**	PE-1A	—	—	—
400 A	NQSFL4	**260.**	PE-1A	NQFTL4L♦ NQFTL4H★	**507.**	PE-1A	Use the 2 SFB kit		—	NQSFB4Q or NQSFB4HJ	**1290.**	PE-1A
600 A	Use FTL			Factory Assembled Only								

Note: See Table 9.16 and Table 9.17 for box selection table.

♦ The final character L indicates the kit is used for Low circuit count interiors 30 and 42.
★ The final character H indicates the kit is used for High circuit count interiors 54, 72, and 84.

Table 9.16: Box Selection Table: Merchandised NQ Main Lug Panelboards with Accessories

Feature Circuits	Sub-feed Lugs				Feed-through Lugs				Sub-feed Circuit Breakers			
	100 A	225 A	400 A	600 A	100 A	225 A	400 A	600 A	100 A	225 A (one)	400 A (two)	600 A (two)
18	MH26	—	—	Use FTL	—	—	—	Factory Assembled Only	—	—	—	Factory Assembled Only
30	MH32	MH38	MH50	Use FTL	Use 225A Interior	MH38	MH50		—	MH50	MH74	
42	—	MH44	MH50	Use FTL		MH38	MH56		—	MH56	MH74	
72	—	MH50	MH62	Use FTL		MH50	MH68		—	MH62	MH86	
84	—	MH56	MH68	Use FTL		MH56	MH68		—	MH68	▼	

▼ (c) Requires box longer than available box offer.

Table 9.17: Box Selection Table: Merchandised NQ Vertically Mounted Main Breaker Panelboards w/ Accessories

Feature Circuits	Feed-through Lugs				Sub-feed Circuit Breakers			
	100 A	225 A	400 A	600 A	100 A	225 A (one)	400 A (two)	600 A (two)
18	—	—	—	Factory Assembled Only	—	—	—	Factory Assembled Only
30	—	MH50	MH62		—	MH62	MH86	
42	—		MH68		—	MH68	MH86	
72	—	MH62	MH80		—	MH74	△	
84	—	MH68	MH80		—	MH80	△	

△ (c) Requires box longer than available box offer.

NOTE: NQ SurgeLogic SurgeLoc Plug-on SPD appears on page 9-44.

Table 9.18: NQ Optional Lugs

Ampacity	AL Compression Lug Kit			CU Mechanical Lug Kit			CU Compression Kit		
	Catalog No.	Lug Wire Range	$ Price	Catalog No.	Lug Wire Range	$ Price	Catalog No.	Lug Wire Range	$ Price
100	NQALV1	one #8–1/0 AWG	**117.00**	NQCUM1	one #6–2/0 AWG	**347.00**	NQCUV1	one #6–1/0 AWG	**345.00**
225	NQALV2	one #4–300 kcmil	**33.00**	NQCUM2	one #6–250 kcmil		NCQUV2	one 2/0–300 kcmil	**417.00**
400	NQALV4	two 2/0–500 kcmil	**663.00**	NQCUM4	one 1/0–750 kcmil two 1/0–350 kcmil	**636.00**	NQCUV4	one 400–700 kcmil	**767.00**
600	NQALV6	two 2/0–500 kcmil	**1208.00**	NQCUM6	one 1/0–750 kcmil two 1/0–350 kcmil	**1139.00**	NQCUV6	two 250–500 kcmil	**1364.00**

Table 9.19: NQ Accessories

Description		Catalog No.	$ Price	Schedule
Sub-feed (Bolt-on)				
2-pole		QOB2125SL	**176.00**	DE2A
3-pole		QOB3125SL	**176.00**	
Equipment Ground Bars				
Aluminum		PK27GTA	**33.80**	DE3A
PK23GTA+ #1 to #4/0 Al or Cu lug		PK23GTAL	**40.70**	
Copper		PK27GTACU	**84.00**	PE-1A
Ground Bar Insulator Kit		PKGTAB	**43.80**	DE3A
Filler plate (15 per package)		NQFP15□	**68.00**	PE1A
Circuit I.D. Number Strips				
1–102 odd/even (left side numbered 1,3,5 ...101)		NQ102OE	**7.90**	PE1A
103–204 odd/even (left side numbered 103,105,107 ... 203)		NQ204OE	**7.90**	
1–102 sequential (left side numbered 1,2,3 ... 102)		NQ102S	**7.90**	
103–204 sequential (left side numbered 103,104,105 ... 204)		NQ204S	**7.90**	
Rail and Deadfront Extensions	6 in. Extension	NQ6RDE	**252.00**	
	12 in. Extension	NQ12RDE	**283.00**	
	18 in. Extension	NQ18RDE	**343.00**	
	24 in. Extension	NQ24RDE	**397.00**	
Touch-up paint USAS #49 Gray (Aerosol can)		PK49SP	**39.00**	DE1
Handle Attachments—Branch Circuit Breakers				
Handle lock-off		HLO1	**9.90**	DE2A
Handle tie - (QO and QOB only)		QO1HT	**3.80**	
Handle padlock attachment—1-pole		QO1PA	**10.70**	
2- and 3-pole		QO1PL	**10.70**	
Handle tie and lock-off for three 1-pole (QO, QOB)		QO3HT	**13.40**	
Handle tie for two 10–30 A single pole QO(B) circuit breaker		QOHT2	**10.90**	DE2
Handle tie for three 10–30 A single pole QO(B) circuit breaker		QOHT3	**12.80**	
Handle Padlock Attachment for Padlocking in OFF position				
For padlocking 1P QO circuit breaker in OFF position only, fixed attachment		QO1PAF	**43.50**	DE2E
For padlocking 2P and 3P QO circuit breaker in OFF position only, fixed attachment		QO2PAF	**25.80**	
For padlocking 1P QO-GFI, QO-AFI, QO-CAFI, and QO-EPD circuit breakers in OFF position only, fixed attachment		QOGFI1PAF	**51.00**	
For padlocking 2P QO-GFI and QO-EPD circuit breakers in OFF position only, fixed attachment		QOGFI2PAF	**38.40**	
Neutral or Ground Lugs				
#10 to #2 Al or #14 to #4 Cu		QO70AN	**9.90**	DE3A
#4 to #1/0 Al or Cu		Q1100AN	**11.10**	
#1 to #4/0 Al or Cu		Q1150AN	**32.40**	
Endwalls for MH Enclosures				
Blank (one per package)		8011010501	**41.10**	PE1A
With Knockouts (one per package)		8011010401	**41.10**	

□ Filler Plates are **$4.50** each and must be ordered in packages of 15.

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Table 9.20: QOB-GFI, QOB-EPD, and QOB-EPE Circuit Breakers

Ampere Rating ▲	One-pole		Two-pole—Common Trip		Three-pole—Common Trip			
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
QOB-GFI—QOB Qwik-Gard™ Circuit Breaker With Ground Fault Circuit Interrupter—UL Class A 4–6 mA People Protection. ■								
	120 Vac—10 k AIR		120/240 Vac—10 k AIR		208Y/120 Vac—10 k AIR			
15 A	QOB115GFI	248.	QOB215GFI	444.	QOB315GFI	791.		
20 A	QOB120GFI	248.	QOB220GFI	444.	QOB320GFI	791.		
25 A	QOB125GFI	248.	QOB225GFI	444.	—	—		
30 A	QOB130GFI	248.	QOB230GFI	444.	QOB330GFI	791.		
40 A	—	—	QOB240GFI	444.	QOB340GFI	791.		
50 A	—	—	QOB250GFI	444.	QOB350GFI	791.		
60 A	—	—	QOB260GFI ♦	444.	—	—		
QOB-VHGFI ★								
	120 Vac—22 k AIR							
15 A	QOB115VHGFI	497.						
20 A	QOB120VHGFI	497.						
25 A	QOB125VHGFI	497.						
30 A	QOB130VHGFI	497.						
QOB-EPD—QOB Equipment protection circuit breakers with UL Listed 30 mA (EPD) or 100 mA (EPE) equipment protection.								
	120 Vac—10 k AIR		120/240 Vac—10 k AIR		240 Vac—10 k AIR			
15 A	QOB115EPD	417.	QOB215EPD	671.	QOB315EPD ♦	1077.	QOB315EPE ♦	1077.
20 A	QOB120EPD	417.	QOB220EPD	671.	QOB320EPD ♦	1077.	QOB320EPE	1077.
25 A	QOB125EPD	417.	QOB225EPD	671.	—	—	—	—
30 A	QOB130EPD	417.	QOB230EPD	671.	QOB330EPD ♦	1077.	QOB330EPE ♦	1077.
40 A	—	—	QOB240EPD	671.	QOB340EPD ♦	1077.	QOB340EPE ♦	1077.
50 A	—	—	QOB250EPD	671.	QOB350EPD ♦	1077.	QOB350EPE ♦	1077.
60 A	—	—	QOB260EPD	671.	—	—	—	—
QOB-VHEPD								
	120 Vac—22 k AIR							
15 A	QOB115VHEPD	772.						
20 A	QOB120VHEPD	772.						
25 A	QOB125VHEPD	772.						
30 A	QOB130VHEPD	772.						
QOB-HM—High magnetic trip circuit breakers								
15 A	QOB115HM▼	39.80						
20 A	QOB120HM▼							
QOB-K—Key operated QOB circuit breakers △								
	120 Vac—10 k AIR							
10 A	QOB110K	168.						
15 A	QOB115K	168.						
20 A	QOB120K	168.						
25 A	QOB125K	168.						
30 A	QOB130K	168.						

Table 9.21: Standard Interrupting QOB 10,000 AIR Circuit Breakers

Ampere Rating ▲	One-pole		Two-pole—Common Trip		Two-pole—Common Trip ◊		Three-pole—Common Trip	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
QOB Bolt-On								
	120 Vac—10 k AIR 48 Vdc—5 k AIR		120/240 Vac—10 k AIR 48 Vdc—5 k AIR ▽		240 Vac—10 k AIR		240 Vac—10 k AIR 48 Vdc—5 k AIR ▽	
10 A	QOB110	39.80	QOB210	89.	—	—	QOB310	293.
15 A	QOB115☆▼	39.80	QOB215☆	89.	QOB215H	240.	QOB315☆	293.
20 A	QOB120☆▼	39.80	QOB220☆	89.	QOB220H	240.	QOB320☆	293.
25 A	QOB125☆	39.80	QOB225☆	89.	QOB225H	240.	QOB325☆	293.
30 A	QOB130☆	39.80	QOB230☆	89.	QOB230H	240.	QOB330☆	293.
35 A	QOB135☆	39.80	QOB235☆	89.	—	—	QOB335☆	293.
40 A	QOB140☆	39.80	QOB240☆	89.	QOB240H	240.	QOB340☆	293.
45 A	QOB145☆	39.80	QOB245☆	89.	—	—	QOB345☆	293.
50 A	QOB150☆	39.80	QOB250☆	89.	QOB250H	240.	QOB350☆	293.
60 A	QOB160☆	39.80	QOB260☆	89.	QOB260H	240.	QOB360☆	293.
70 A	QOB170☆	78.	QOB270☆	168.	QOB270H	308.	QOB370☆▽	369.
80 A	—	—	QOB280☆▽	240.	QOB280H	366.	QOB380☆▽	419.
90 A	—	—	QOB290☆▽	240.	QOB290H	366.	QOB390☆▽	419.
100 A	—	—	QOB2100☆▽	240.	QOB2100H	366.	QOB3100☆▽	419.
110 A	—	—	QOB2110☆▽	501.	—	—	—	—
125 A	—	—	QOB2125☆▽	501.	—	—	—	—
Molded Case Switch 60 A max—240 Vac			QOB200	89.	—	—	QOB300	293.
Molded Case Switch 100 A max—240 Vac			QOB2000	234.	—	—	QOB3000	507.

Table 9.22: High Interrupting QOB and Specialty Circuit Breakers

Ampere Rating ▲	One-pole		Two-pole—Common Trip		Three-pole—Common Trip	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
QOB-VH						
	120 Vac—22 k AIR		120/240 Vac —22 k AIR		240 Vac—22 k AIR	
15 A	QOB115VH☆▼	72.	QOB215VH☆	171.	QOB315VH☆	440.
20 A	QOB120VH☆▼	72.	QOB220VH☆	171.	QOB320VH☆	440.
25 A	QOB125VH☆	72.	QOB225VH☆	171.	QOB325VH☆	440.
30 A	QOB130VH☆	72.	QOB230VH☆	171.	QOB330VH☆	440.
40 A	QOB140VH	86.	QOB240VH☆	171.	QOB340VH☆	440.
50 A	QOB150VH	86.	QOB250VH☆	171.	QOB350VH☆	440.
60 A	QOB160VH	86.	QOB260VH☆	171.	QOB360VH☆	440.
70 A	QOB170VH	137.	QOB270VH☆	273.	QOB370VH☆	560.
80 A	—	—	QOB280VH☆	384.	QOB380VH☆	629.
90 A	—	—	QOB290VH☆	384.	QOB390VH☆	629.
100 A	—	—	QOB2100VH☆	384.	QOB3100VH☆	629.
110 A	—	—	QOB2110VH☆	1110.	QOB3110VH ◒	1809.
125 A	—	—	QOB2125VH☆	1110.	QOB3125VH ◒	1809.
150 A	—	—	QOB2150VH ◒	1223.	QOB3150VH ◒	1809.
QHB						
	120 Vac—65 k AIR		120 Vac/240 Vac—65 k AIR		240 Vac—65 k AIR	
15 A	QHB115☆▼	122.	QHB215☆	342.	QHB315☆	596.
20 A	QHB120☆▼	122.	QHB220☆	342.	QHB320☆	596.
25 A	QHB125☆	122.	QHB225☆	342.	QHB325☆	596.
30 A	QHB130☆	122.	QHB230☆	342.	QHB330☆	596.
QOB-HID—HID circuit breakers □						
	120 Vac—10 k AIR		120/240 Vac—10 k AIR		240 Vac—10 k AIR	
15 A	QOB115HID▼	49.50	QOB215HID	108.	QOB315HID	327.
20 A	QOB120HID▼	49.50	QOB220HID	108.	QOB320HID	327.
25 A	QOB125HID	49.50	QOB225HID	108.	QOB325HID	327.
30 A	QOB130HID	49.50	QOB230HID	108.	QOB330HID	327.
40 A	QOB140HID	49.50	QOB240HID	108.	—	—
50 A	QOB150HID	49.50	QOB250HID	108.	—	—
QOB-SWN—Switch Neutral—Common Trip—NEC 514.11						
			1-pole—2-Wire 2 Spaces —120 Vac		2-pole—3-Wire 3 Spaces—120/240 Vac	
10 A	—	—	QOB210SWN	116.	QOB310SWN	170.
15 A	—	—	QOB215SWN	116.	QOB315SWN	170.
20 A	—	—	QOB220SWN	116.	QOB320SWN	170.
25 A	—	—	QOB225SWN	116.	QOB325SWN	170.
30 A	—	—	QOB230SWN	116.	QOB330SWN	170.
40 A	—	—	QOB240SWN	116.	QOB340SWN	170.
50 A	—	—	QOB250SWN	116.	QOB350SWN	170.

(Footnotes for Tables 9.20, 9.21, and 9.22)

- ▲ 10–30 A circuit breakers are suitable for use with 60 °C or 75 °C conductors. 35–60 A circuit breakers are suitable for use with 75 °C conductors.
- ■ Do not connect to more than 250 feet of load conductor for the total one-way run to prevent nuisance tripping.
- ♦ Suitable only for feeding 240 Vac and 208 Vac two-wire loads. Does not contain load neutral connection.
- ★ Recommended for applications where high initial inrush may occur and for individual dimmer applications.
- ▼ UL Listed as SWD (switching duty) rated suitable for switching 120 Vac fluorescent lighting loads.
- △ Available in single pole construction and can be mounted in any single pole space which will accept a standard QOB. These circuit breakers can be turned ON or OFF or RESET with a special key (Catalog No. QOK10) included with the circuit breaker. These circuit breakers are UL Listed and available as shown in the table.
- □ UL Listed for use on circuit feeding fluorescent and High Intensity Discharge (HID) lighting systems such as mercury vapor, metal halide, or high pressure sodium. These circuit breakers are physically interchangeable with QOB circuit breakers.
- ◊ UL Listed 5,000 AIR on 3Ø corner grounded delta systems.
- ☆ UL Listed as HACR type for use with air conditioning, heating, and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.
- ▽ DC Rating is not available on indicated products.
- ◒ QOB2150VH uses 4 pole spaces. QOB3110VH, QOB3125VH, and QOB3150VH each use 6 pole spaces. 40A maximum circuit breaker mounted opposite. Use with 75 °C wire only.
- * For QO plug-on circuit breaker pricing, see the tables starting on Digest page 1–2.
- ♦ See note in Instruction Bulletin when using in an enclosure with a QO403 or QON prefix.

Table 9.23: QO/QOB Circuit Breaker Wire Sizes

Breaker Type	Ampere Rating ◑	Wire Size (AWG)	
		Al	Cu
QOB 1-pole	10–30 A	#14–8	#14–8
	10–30 A	—	two #14–10
	35–70 A	#8–2	#8–2
QOB 2-pole	10–30 A	#14–8	#14–8
	10–30 A	—	two #14–10
	35–70 A	#8–2	#8–2
	80–125 A	#4–2/0	#4–2/0
	150–200 A	#4–300 kcmil	#4–300 kcmil
QOB 3-pole	10–30 A	#14–8	#14–8
	35–70 A	#8–2	#8–2
	80–125 A	#4–2/0	#4–2/0
QOB-VH	110–150 A	#4–300 kcmil	#4–300 kcmil
QOB-GFI and QOB-EPD	15–30 A	#12–8	#14–8
	40, 50, or 60 A	#12–4	#14–6

◑ 10–30 A circuit breakers are suitable for use with 60 °C or 75 °C conductors. 35–60 A circuit breakers are suitable for use with 75 °C conductors.

Table 9.24: QO™ Arc-Fault Circuit Breakers ✪ ◪

Circuit Breaker Type	Ampere Rating ♦	1P 120 Vac 10 kAIR 1 Space Required		1P 120 Vac 22 kAIR 1 Space Required	
		Catalog Number	$ Price	Catalog Number	$ Price
Combination Arc-Fault Interupter	15 A	QOB115CAFI	306.	QOB115VHCAFI	612.
	20 A	QOB120CAFI	306.	QOB120VHCAFI	612.

Note: See Digest page 7-12 for accessories.

- ✪ UL Listed as HACR type for use with air conditioning, heating, and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.
- ◪ QO arc-fault circuit breakers provide branch feeder protection (for example, QO115AFI) or combination protection (for example, QO115CAFI) as required by the NEC and local code adoption, and comply with UL 1699.
- ♦ 10–30 A circuit breakers are suitable for use with 60 °C or 75 °C conductors. 35–60 A circuit breakers are suitable for use with 75 °C conductors.

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Table 9.25: Base Price (With Solid Neutral)

Mains Rating	Main Lugs		Main Circuit Breaker (Circuit Breaker Interrupt Rating—pages 6-2 through 6-8) ▲										
			Standard IC			HIC			Extra HIC			I-Limiter™	
	$ Price		Circuit Breaker	$ Price		Circuit Breaker	$ Price		Circuit Breaker	$ Price		Circuit Breaker	$ Price	
	2-pole	3-pole		2-pole	3-pole		2-pole	3-pole		2-pole	3-pole		2-pole	3-pole
60 A	—	—	QOB	1192.	1464.	QOB-VH	1258.	1586.	HJ▲	2950.	3300.	FI	4088.	4858.
100 A	720.	832.	QOB	1254.	1562.	QOB-VH	1382.	1712.	HJ▲	2950.	3300.	FI	4088.	4858.
	720.	832.								2950.	3300.	FI	4088.	4858.
	720.	832.	HD	2030.	2380.	HG	2700.	3050.		2950.	3300.	FI	4088.	4858.
150 A♦	—	—	HD	3180.	3530.	HG	3840.	4190.	HJ▲	4000.	4350.	—	—	—
225 A♦	772.	928.	QB JD QD	2450. 3980. 3084.	2800. 4300. 3434.	QG JG	3740. 4510.	4090. 5100.	QJ JJ▲	3970. 6450.	4320. 7280.	KI	7436.	8680.
250 A♦	—	—	JD	4390.	4640.	JG	5040.	6020.	JJ▲	7100.	8020.	KI	8264.	9672.
400 A♦	1422.	1634.	LA	5366.	6106.	LH	7708.	8834.	LJ	10624.	10624.	LR	13552.	13552.
600 A■♦	2082.	2326.	—	—	—	—	—	—	LJ	12930.	12930.	LR	16002.	16002.

Note: Equipment Ground Bar—**38.**

▲ QL, HJ, HL, JJ, and JL circuit breakers are also available.
■ Copper bus standard
♦ Prices are for 54-circuit and fewer interiors. See the Product Selector for 72- and 84-circuit interior pricing.

Table 9.26: Branch Circuit Breakers

Circuit Breaker Ampere Rating	Plug-On or Bolt-On				
	$ Price				
	1-pole 120 Vac	2-pole 120/240 Vac	2-pole 240 Vac	3-pole 240 Vac	3-pole 208Y/120 Vac
Space Only					
All Space Only except below	28.	58.	58.	86.	—
QOB–VH, Space Only (125–150 A)	—	116.	—	174.	—
10,000 AIR—Branch Circuit Breakers—QO™, QOB, QO-H, QOB-H					
15–60 A	68.	134.	260. ★	352.	—
70 A	100.	208.	296. ★	396.	—
80–100 A	—	262.	380. ★	458.	—
110–125 A	—	482.	—	—	—
10,000 AIR—Combination Arc Fault Circuit Interrupters—QO-CAFI, QOB-CAFI					
15–20 A	470.	—	—	—	—
10,000 AIR—Qwik–Gard™—Class A—QO-GFI, QOB-GFI Provided with a 5 mA setting on ground fault sensor					
15–30 A	272.	488.	—	—	920.
40–50 A	—	488.	—	—	920.
60 A	—	488.	—	—	—
10,000 AIR—Qwik–Gard—Class A—QO-EPD, QOB-EPD Provided with a 30 mA setting on ground fault sensor					
15–30 A	462.	828.	—	1210.	—
40–50 A	—	828.	—	1210.	—
60 A	—	828.	—	—	—
10,000 AIR—Qwik–Gard—Class A—QO-EPE, QOB-EPE Provided with a 100 mA setting on ground fault sensor					
15–30 A	—	—	—	1210.	—
40–50 A	—	—	—	1210.	
(High Interrupting Capacity) 22,000 AIR Branch Circuit Breakers—QO-VH, QOB-VH					
15–30 A	92.	212.	—	462.	—
35–60 A	—	212.	—	462.	—
70 A	—	292.	—	556.	—
80–100 A	—	378.	—	606.	—
110–125 A	—	1022.	—	1746.▼	—
150 A	—	1140. ▼	—		—
22,000 AIR—Combination Arc Fault Circuit Interrupters—QO-VHCAFI, QOB-VHCAFI					
15–20 A	680.	—	—	—	—
22,000 AIR—Qwik-Gard—Class A—QO-VHGFI, QOB-VHGFI					
15–30 A	575.	—	—	—	—
42,000 AIR Branch Circuit Breakers—QOH					
35–60 A	—	368. △	—	—	—
70 A	—	596. △	—	—	—
80–100 A	—	688. △	—	—	—
110–125 A	—	1402. △	—	—	—
65,000 AIR Branch Circuit Breakers—QH, QHB					
15–30 A	144.	348.	—	596.	—

Note: Shunt Trip, Auxiliary Switch, and Alarm Switch—accessories for circuit breakers—add $ Price from page 7-12.

★ UL Listed for use on 3Ø, grounded BØ systems, (5,000 AIR for this application).
▼ Bolt-on only; 2-pole requires 4 vertical spaces, 3-pole requires 6 vertical spaces.
△ Plug-on only.

Table 9.27: Specialty Branch Circuit Breakers

Circuit Breaker Ampere Rating	Plug-On or Bolt-On			
	$ Price			
	1-pole 120 Vac	2-pole 120/240 Vac	2-pole 240 Vac	3-pole 240 Vac
Specialty Branch Circuit Breakers (10,000 AIR)				
For High Intensity Discharge Lighting—QO-HID, QOB-HID				
15–30 A	78.	148.	—	376.
40–50 A	78.	148.	—	—
Switch Neutral—QO-SWN, QOB-SWN				
15–50 A	—	1-pole 2-wire (2 spaces)	—	2-pole 3-wire (3 spaces)
	—	154.	—	220.
High Magnetic Trip (For applications subject to high initial inrush)—QO-HM, QOB-HM				
15–20 A	68.	—	—	—

Sub-feed Circuit Breakers

Main lugs or main circuit breaker interior—1Ø or 3Ø. Maximum 1 circuit breaker per 225 A main lug or 250 A main circuit breaker panelboard, 2 circuit breakers per 400–600 A panelboard.

Table 9.28: Sub-feed Circuit Breaker (110–225 A)
(SeeTable 9.29 for correct box size.)

No. of Poles	Ampacity	QB	QD	QG	HD	HG	JD	JG
2	110–225 A	1218.	1762.	3812.	2456.	3500.	3020.	4220.
3	110–225 A	1848.	2296.	4608.	2872.	3798.	3370.	5100.
Space	110–225 A	826.	826.	826.	826.	826.	826.	826.

□ QJ, HJ, HL, JJ, and JL circuit breakers are also available.

Table 9.29: Sub-feed Circuit Breaker Cabinet Data

Max. No. of Branch Spaces (Does not include sub-feed circuit breaker spaces)	Box Height (20 in. W x 5.75 in. D)					
	225 A	250 A	400 A		600 A	
	Main Lug	Main Circuit Breaker	Main Lug	Main Circuit Breaker	Main Lug	Main Circuit Breaker
30	50	62	74	86	74	Not available with MCB
42	56	68	74	86	80	
54	56	68	80	—	80	
72	62	74	86	—	86	
84	68	80	—	—	—	

◊ Not Available in Type 3R, 5, 12 if subfeed breaker is over 150 A.

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Sub-feed Lugs

NOTE: *Available on main lug interiors only, 1Ø or 3Ø.*

Table 9.30: Sub-feed Wire Range Per Phase

Mains Rating	Incoming	Outgoing	Price per Panel
100	one #6-2/0 Al or Cu	one #6-2/0 Al or Cu	**$128.**
225	one 1/0-350 kcmil Al or Cu	one 1/0-350 kcmil Al or Cu	**$128.**
400	one 1/0-750 kcmil Cu only	one 1/0-750 kcmil Cu only	**$164.**

Table 9.31: Sub-feed Lug Cabinet Data

Max. No. of Branch Spaces	Box Height (20 in. W x 5.75 in. D)		
	100 A	225 A	400 A
18	MH26	—	—
30	MH32	MH38	MH50
42	—	MH44	MH50
54	—	MH44	MH50
72	—	MH50	MH62
84	—	MH56	MH68

Feed-through Lugs

Table 9.32: Feed-through Lugs

Mains Rating	Feed-Through Wire Range Per Phase	$ Price
100 A	one #6-2/0 Al or Cu	**344.**
225 A	one #6–350 kcmil Al or Cu	**344.**
400 A	one 1/0–750 kcmil or two 1/0–350 kcmil Al or Cu	**826.**
600 A	two 1/0–750 kcmil Al or Cu	**826.**

Table 9.33: Feed-through Lug Cabinet Data

Max. No. of Branch Spaces	Box Height (20 in. W x 5.75 in. D)					
	225 A	250 A	400 A		600 A	
	Main Lugs	Main Circuit Breaker	Main Lugs	Main Circuit Breaker	Main Lugs	Main Circuit Breaker ▲
30	38	50	50	62	62	68
42	38	50	56	68	62	80
72	50	62	68	80	74	—
84	56	68	68	80	80	—

▲ 8.75 in. deep box, ship fully assembled only.

Table 9.34: Ground Bars

Ground Bars	$ Price Adder
Equipment Ground Bar	**38.**
Copper Ground Bar (add to Equipment Ground Bar price)	**52.**
Insulated/Isolated Ground Bar (add to Equipment Ground Bar price)	**86.**

Table 9.35: Name Plates

Name Plates	$ Price Adder
Standard white face/black letter laminated bakelite, 1 in. x 3.5 in., adhesive backed or screw mountable with screws in a bag assembly (price includes engraving)	**78.**

Table 9.36: Copper Bus Bars

Copper Bus Bars	$ Price Adder
100 A, 225 A, 250 A	**128.**
400 A	**388.**
600 A	Standard

Table 9.37: Copper Neutrals

Copper Neutrals	$ Price Adder
100–600 A	**132.**

Table 9.38: 200% Rated Neutrals

Panelboards with 200% rated neutrals are not available with 250 A J- and K-frame main circuit breakers or integral lighting contactors		Add Per Panel $ Price
100 A▲	one #6-2/0 kcmil Al or Cu per lug	**586.**
225 A▲	one #6-350 kcmil Al or Cu per lug	**763.**
400 A▲	one #1/0-750 kcmil Al or Cu per lug or two 1/0-300 kcmil per lug	**950.**

▲ Two incoming neutral lugs per panel

Table 9.39: NQ Main Neutral Conductors—Required Size and Quantity

Panelboard Ampacity	Neutral Conductors Required	Actual Lug Wire Range
100/125	(2) 1/0 Cu or Al	(2) #4-300kcmil
225	(2) 4/0 Cu or (2) 300 kcmil Al	(2) #4-300 kcmil
400 A	(4) 3/0 Cu or (4) 250 kcmil Al (2) 600 kcmil Cu (2) 750 kcmil Al	(2) 1/0-300 kcmil or (1) 750 kcmil

Note: Neutral conductors must be of size and quantity per table above.

Table 9.40: Metal Directory Frames

Metal Directory Frame	$ Price Adder
Replaces standard plastic stick-on directory pouch	**140.**

Table 9.41: Hinged Door-in-Door Trims

Hinged Door-in-Door Trim	Add Per Panel $ Price
Hinged Door-in-Door Trim has piano hinge down one side. Inner door has a lock, outer door is retained with screws	**646.**
Hinged Door-in-Door with Outer Door Lock in place of screws	**836.**

Table 9.42: Weatherproof or Dusttight Cabinets—Type 3R, 5, 12

Weatherproof or Dusttight Cabinets	$ Price Adder
Note: 600 A L-Frame main circuit breaker NQ panelboards are not available with a weatherproof enclosure (Use I-Line) 400 and 600 A NQ panelboards with sub-feed circuit breakers are not available with a weatherproof enclosure (Use I-Line). 400 A NQ panelboards are available with a subfeed breaker up to 150 A. See Table 9.29 on page 9-11.	**1516.**

Table 9.43: Optional Factory Assembled Lugs for Main Lug Interiors

Main Lug Interiors:	Price Per Pole Adder			
	100A	225A	400A	600A
Aluminum Compression Lugs	**58.**	**58.**	**148.**	**148.**
Copper Mechanical Lugs	**70.**	**108.**	**148.**	**168.**
Copper Compression Lugs	**70.**	**108.**	**148.**	**168.**

Table 9.44: Optional Factory Assembled Lugs for Main Circuit Breaker Interiors

Main Circuit Breaker Interiors:	Price Per Pole Adder			
	H Frame	J Frame	LA Frame	LC Frame
Aluminum Compression Lugs	**58.**	**98.**	**148.**	**148.**
Copper Mechanical Lugs	**70.**	**108.**	**148.**	**168.**
Copper Compression Lugs	**70.**	**108.**	**148.**	**168.**

Note: Optional lugs are not available for Q frame main or QOB circuit breakers

Table 9.45: Surgelogic™ SurgeLoc Plug-On SPD ■

Surge Current Rating kA	Voltage		
	120 / 240 V	208 Y / 120 V	240 / 120 HLD
80 kA	**6170.**	**6540.**	**6540.**
100 kA	**6540.**	**7370.**	**7370.**
120 kA	**7370.**	**7870.**	**7870.**
160 kA	**8430.**	**8620.**	**8620.**
200 kA	**9720.**	**9770.**	**9770.**
240 kA	**10840.**	**12370.**	**12370.**

■ SurgeLogic units occupy 12 circuit positions (6 adjacent mounting spaces per side.)

Table 9.46: Surgelogic SPD Options

Description	$ Price
Surge Counter	Standard
Dry Contacts	Standard
Remote Monitor	**2588.**

Note: Additional factory modifications, See Digest page 9-38.

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Table 9.47: NF Main Lug Interiors—Use I-Line™ Panelboards on 480 V 3Ø3W Delta Applications

Max No. of Single Pole EDB Circuit Breakers	Mains Rating	$ Total Price ▲		Interior Only ■		NEMA 1 Enclosure						NEMA 3R, 5, 12 Enclosure △		
						Box 20 in. W x 5.75 in. D ★		Mono-Flat™ Front ▼		Hinged Front		Enclosure 20 in. W x 6.5 in. D		Height (In.)
		NEMA 1	NEMA 3R, 5, 12	Catalog No. ♦	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	
(Single Phase 3-Wire: Factory Assembled Only) Three Phase 4-Wire														
18	125	**2056.**	**3638.**	NF418L1	**1446.**	MH26	**113.**	NC26( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		2448.	**4030.**	NF418L1C	**1838.**	MH26		NC26( )		NC26( )HR		MH26WP		
30	125	**2406.**	**3970.**	NF430L1	**1766.**	MH32	**113.**	NC32( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		2802.	**4366.**	NF430L1C	**2162.**	MH32		NC32( )		NC32( )HR		MH32WP		
30	250	**2881.**	**4435.**	NF430L2	**2219.**	MH38	**113.**	NC38( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		3286.	**4840.**	NF430L2C	**2624.**	MH38		NC38( )		NC38( )HR		MH38WP		
42	250	**3194.**	**5021.**	NF442L2	**2418.**	MH44	**113.**	NC44( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		3602.	**5429.**	NF442L2C	**2826.**	MH44		NC44( )		NC44( )HR		MH44WP		
54	250	**4370.**	**6067.**	NF454L2	**2616.**	MH50	**113.**	NC50( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	56
		4775.	**6472.**	NF454L2C	**3021.**	MH50		NC50( )		NC50( )HR		MH50WP		
66□	250	**4800.**	**6485.**	NF466L2	**3800.**	MH62	**113.**	NC62( )	**887.**	NC62( )HR	**887.**	MH62WP	**2685.**	62
		5442.	**7127.**	NF466L2C	**4442.**	MH62		NC62( )		NC62( )HR		MH62WP		
30	400	**3308.**	**5075.**	NF430L4	**2466.**	MH50	**113.**	NC50V( )	**729.**	NC50V( )HR	**912.**	MH50WP	**2609.**	50
		3716.	**5483.**	NF430L4C	**2874.**	MH50		NC50V( )		NC50V( )HR		MH50WP		
42	400	**3572.**	**5325.**	NF442L4	**2673.**	MH56	**113.**	NC56V( )	**786.**	NC56V( )HR	**983.**	MH56WP	**2652.**	56
		3895.	**5648.**	NF442L4C	**2996.**	MH56		NC56V( )		NC56V( )HR		MH56WP		
66□	400	**5285.**	**6957.**	NF466L4	**4200.**	MH74	**113.**	NC74V( )	**972.**	NC74V( )HR	**1215.**	MH74WP	**2757.**	74
		5792.	**7464.**	NF466L4C	**4707.**	MH74		NC74V( )		NC74V( )HR		MH74WP		
84□	400	**6524.**	**8261.**	NF484L4	**5346.**	MH86	**113.**	NC86V( )	**1065.**	NC86V( )HR	**1430.**	MH86WP	**2915.**	86
		7169.	**8906.**	NF484L4C	**5991.**	MH86		NC86V( )		NC86V( )HR		MH86WP		
30	600	**3838.**	—	NF430L6C	**2996.**	MH50	**113.**	NC50V( )	**729.**	NC50V( )HR	**912.**	Factory Assembled Only		50
42	600	**4087.**	—	NF442L6C	**3188.**	MH56	**113.**	NC56V( )	**786.**	NC56V( )HR	**983.**			56
66□	600	**6094.**	—	NF466L6C	**5009.**	MH74	**113.**	NC74V( )	**972.**	NC74V( )HR	**1215.**			74
84□	600	**7553.**	—	NF484L6C	**6375.**	MH86	**113.**	NC86V( )	**1065.**	NC86V( )HR	**1430.**	—	—	—
	800	Factory Assembled Only												

Table 9.48: NF Main Circuit Breaker Interiors—Use I-Line Panelboards on 480 V 3Ø3W Delta Applications

Max. No. of One-pole EDB Circuit Breakers	Mains Rating	$ Total Price ▲		Main Circuit Breaker Adapter Kit		Main Circuit Breaker Frame	Interior Only ■		NEMA 1 Enclosure						NEMA 3R, 5, 12 Enclosure △		
									Box 20 in. W x 5.75in. D ★		Mono-Flat™ Front ▼		Hinged Front		Enclosure 20 in. W x 6.5 in. D		Height (In.)
		NEMA 1	NEMA 3R, 5, 12	Kit	$ Price		Catalog No. ♦	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	
(Single Phase 3-Wire: Factory Assembled Only) Three Phase 4-Wire																	
15	125	**2056.**	**3638.**	Back-fed Main Breaker◊	—	EDB, EGB or EJB	NF418L1	**1446.**	MH26	**113.**	NC26( )	**497.**	NC26( )HR	**620.**	MH26WP	**2192.**	26
		2448.	**4030.**				NF418L1C	**1838.**	MH26		NC26( )		NC26( )HR		MH26WP		
27	125	**2406.**	**3970.**		—		NF430L1	**1766.**	MH32	**113.**	NC32( )	**527.**	NC32( )HR	**657.**	MH32WP	**2204.**	32
		2802.	**4366.**				NF430L1C	**2162.**	MH32		NC32( )		NC32( )HR		MH32WP		
18	125	**2888.**	**4442.**	N150MH or N100MFI☆	**780.**	HD/HG/ HJ/HL or FI	NF418L1	**1446.**	MH38	**113.**	NC38( )	**549.**	NC38( )HR	**687.**	MH38WP	**2216.**	38
		3280.	**4834.**				NF418L1C	**1838.**	MH38		NC38( )		NC38( )HR		MH38WP		
30	125	**3322.**	**5149.**				NF430L1	**1766.**	MH44	**113.**	NC44( )	**663.**	NC44( )HR	**830.**	MH44WP	**2603.**	44
		3718.	**5545.**				NF430L1C	**2162.**	MH44		NC44( )		NC44( )HR		MH44WP		
30	250	**3841.**	**5608.**	N250MJ or N250MKC☆	**780.**	JD/JG/ JJ/JL or KI	NF430L2	**2219.**	MH50	**113.**	NC50( )	**729.**	NC50( )HR	**912.**	MH50WP	**2609.**	50
		4246.	**6013.**				NF430L2C	**2624.**	MH50		NC50( )		NC50( )HR		MH50WP		
42	250	**4097.**	**5850.**		**780.**		NF442L2	**2418.**	MH56	**113.**	NC56( )	**786.**	NC56( )HR	**983.**	MH56WP	**2652.**	56
		4505.	**6258.**				NF442L2C	**2826.**	MH56		NC56( )		NC56( )HR		MH56WP		
54	250	**5278.**	**6947.**		**780.**		NF454L2	**2616.**	MH62	**113.**	NC62( )	**786.**	NC62( )HR	**983.**	MH62WP	**2652.**	56
		5683.	**7352.**				NF454L2C	**3021.**	MH62		NC62( )		NC62( )HR		MH62WP		
66□	250	**5665.**	**7337.**		**780.**		NF466L2	**3800.**	MH74	**113.**	NC74( )	**972.**	NC74( )HR	**1215.**	MH74WP	**2757.**	74
		6307.	**7979.**				NF466L2C	**4442.**	MH74		NC74( )		NC74( )HR		MH74WP		
30	400	**4246.**	**5931.**	N400M☆	**780.**	LA/LH	NF430L4	**2466.**	MH62	**113.**	NC62V( )	**887.**	NC62V( )HR	**1109.**	MH62WP	**2685.**	62
		4654.	**6339.**				NF430L4C	**2874.**	MH62		NC62V( )		NC62V( )HR		MH62WP		
42	400	**4514.**	**6195.**	N400M☆	**780.**		NF442L4	**2673.**	MH68	**113.**	NC68V( )	**948.**	NC68V( )HR	**1185.**	MH68WP	**2742.**	68
		4837.	**6518.**				NF442L4C	**2996.**	MH68		NC68V( )		NC68V( )HR		MH68WP		
66□	400	**6158.**	**7895.**	N400M☆	**780.**		NF466L4	**4200.**	MH86	**113.**	NC86V( )	**1065.**	NC86V( )HR	**1430.**	MH86WP	**2915.**	86
		6665.	**8402.**				NF466L4C	**4707.**	MH86		NC86V( )		NC86V( )HR		MH86WP		

▲ Total Price includes: interior, front, main circuit breaker adapter kit, and enclosure.
■ Order branch circuit breakers separately.
♦ "C" suffix indicates copper bussing.
★ Embossed mounting holes add a 0.25-inch standoff to back of MH box.
▼ Add "F" for flush mount, "S" for surface mount.
△ Enclosure includes trim kit.
□ Use only if the Local Jurisdiction where this panelboard interior is being applied has adopted the 2008 NEC, which allows single panelboard interiors greater than 42 circuits.
◊ Back-fed EDB 125 A 3 pole main circuit breaker must be ordered separately and field installed. Maximum breaker rating opposite is 20A.
☆ Select the appropriate main circuit breaker from pages starting on 7-21 and add the circuit breaker Price to the total Price of the panelboard.

Table 9.49: NF Merchandised SPD Box Selection Table

Mains Rating	Max. Breaker Spaces	Main Lug Panelboard Box Requirements								Main Circuit Breaker Panelboard Box Requirements							
		NEMA 1 Enclosure						NEMA 3R, 5, 12 Enclosure		NEMA 1 Enclosure						NEMA 3R, 5, 12 Enclosure	
		Box	$ Price	Front	$ Price	Hinged	$ Price	Enclosure	$ Price	Box	$ Price	Front	$ Price	Hinged	$ Price	Enclosure	$ Price
250A	42	MH56	**113.**	NC56( )	**887.**	NC56( )HR	**1109.**	MH56WP	**2685.**	MH68	**113.**	NC68( )	**972.**	NC68( )HR	**1215.**	MH68WP	**2742.**
400 A	42	MH68		NC68V( )	**972.**	NC68V( )HR	**1215.**	MH68WP	**2757.**	MH80		NC80( )	**1722.**	M/B NC80V( )HR	**1430.**	MH80WP	**2915.**

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Table 9.50: NF Merchandised Neutrals

Mains Ampacity	200% Neutral Kit				Copper 100% Neutral Kit			
	Catalog No.	$ Price	Box Add	Schedule	Catalog No.	$ Price	Box Add	Schedule
125	NFNL1	**1029.**	No Adder	PE-1A	NFN1CU	**405.**	No Adder	PE-1A
250	NFNL2	**1277.**			NFN2CU			
400	NFNL4▲	**1914.**	No Adder	PE-1A	NFN6CU	**1148.**	No Adder	PE-1A
600	Factory Assembled Only				NFN6CU▲			

▲ Not to be used with SFL, FTL, or SFB. These combinations are factory assembled only.

Table 9.51: Modifications (Single- or Three-phase)

Mains Ampacity	Sub-feed Lugs ■ ♦			Feed-through Lugs ■ ♦		
	Catalog No.	$ Price	Schedule	Catalog No.	$ Price	Schedule
125	NF125SFL	**167.**	PE-1A	NF125FTL	**336.**	PE-1A
250	NF250SFL	**213.**	PE-1A	NF250FTL	**476.**	PE-1A
400	NF400SFL▼	**356.**	PE-1A	NF400FTL	**507.**	PE-1A
600	△	—	—	△	—	—
800		—	—		—	—

Mains Ampacity	Sub-feed Circuit Breaker Kits ■ (circuit breaker not included) ★					Schedule
	Single Sub-feed Circuit Breaker			Twin Sub-feed Circuit Breakers		
	Catalog No.	$ Price	Schedule	Catalog No.	$ Price	
250	NF250SFBH/NF250SFBJ	**1029.**	PE-1A	—	—	—
400	—	—	—	NF600SFBH	**1290.**	PE1A
	—	—	—	NF600SFBJ		
600	FACTORY ASSEMBLED ONLY					
800	FACTORY ASSEMBLED ONLY					

Note: NF250SFBH and NF600SFBH are for use with HDL, HGL, HJL, and HLL circuit breakers. NF600SFBJ are for use with JDL, JGL, JJL, and JLL circuit breakers.

■ Available factory assembled only on non-linear panelboards.
♦ Select box from the Box Selection Table.
★ Order appropriate circuit breaker.
▼ Use copper wire only.
△ Available factory assembled only.

Table 9.52: Special Features Box Selection Table—Standard Mechanical Lugs Only

	Main Lugs Only												
Feature	Sub-feed Lugs					Feed-through Lugs					Sub-feed Circuit Breaker		
No. of Circuits	18	30	42	66	84	18	30	42	66	84	30	42	66
Ampacity	Cat. No.	Cat. No.	Cat. No.	Cat No.	Cat No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
100/125	MH26	MH32	—	—	—	MH32	MH38	—	—	—	—	—	—
250	—	MH38	MH44	MH62	—	—	MH50	MH56	MH74	—	MH56	MH62	MH80
400	—	MH50	MH56	MH74	MH86	—	MH56	MH62	MH80	MH92	MH68	MH74	—
600	—	□	□	□	□	—	□	□	□	□	□	□	□
800													

□ Available factory assembled only.

Table 9.53: Special Features Box Selection Table—Standard Mechanical Lugs Only *(continued)*

	Vertical Main Circuit Breaker ◊						Back-fed Main Circuit Breaker	
Feature	Feed-through Lugs				Sub-feed Circuit Breaker		Feed-through Lugs	
No. of Circuits	18	30	42	66	30	42	18	30
Ampacity	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
100/125	MH44	MH50	—	—	—	—	MH32	MH38
250	—	MH62	MH68	MH86	MH68	MH74	MH38	MH44
400◊	—	MH68	MH74	MH92	MH80	MH86	—	—
600	Available factory assembled only.						—	—

◊ 400 A dimension for LA/LH main circuit breakers only.

Table 9.54: Optional Main Lug Kits for Main Lug Panelboards

Ampacity	AL Compression Lug Kit				CU Mechanical Lug Kit				CU Compression Lug Kit ☆			
	Catalog No.	Lug Wire Range	$ Price	Schedule	Catalog No.	Lug Wire Range	$ Price	Schedule	Catalog No.	Lug Wire Range	$ Price	Schedule
125	NFALV1▽	one #4–300 kcmil	**177.**	PE-1A	NFCUM1	#6–2/0 AWG	**347.**	PE-1A	NFCUV1◒	one #6–1/0	**345.**	PE-1A
250	NFALV2	one 250–350 kcmil	**333.**		NFCUM2	#6–250 kcmil			NFCUV2◒	one 2/0–300 kcmil	**417.**	
400	NFALV4	two 2/0–500 kcmil	**1122.**	PE-1A	NFCUM4	one 1/0–750 kcmil, two 1/0–350 kcmil	**987.**	PE-1A	NFCUV4	one 400–750 kcmil	**767.**	PE-1A
600	NFALV6	two 2/0–500 kcmil	**1206.**	PE-1A	NFCUM6	two 1/0–750 kcmil	**2236.**	PE-1A	NFCUV6	two 250–500 kcmil	**1364.**	PE-1A
800	Contact your local Schneider Electric representative or distributor											

☆ Use copper wire only.
▽ Use of this kit requires an additional 6 in. added to box height.
◒ Use of this kit to terminate larger than standard wire size requires an additional 6 in. added to box height.

Table 9.55: NF Accessories

Description	Catalog No.	$ Price	Schedule
Aluminum Equipment Ground Bar	PK27GTA	**33.80**	DE-3A
Copper Equipment Ground Bar	PK27GTACU	**84.00**	PE-1A
Large Aluminum Lug for Equipment Ground Bar	PK23GTAL	**40.70**	DE-3A
Equipment Ground Bar Insulator Kit	PKGTAB	**43.80**	
Circuit I.D. number strips			
1–102 odd/even (left side numbered 1, 3, 5...101)	NF102OE	**7.90**	PE-1A
103–204 odd/even (left side numbered 103, 105, 107...203)	NF204OE		
1–102 sequential (left side numbered 1, 2, 3 ...102)	NF102S		
103–204 sequential (left side numbered 103, 104, 105... 204)	NF204S		
Rail and Deadfront Extensions			
6 in. Extension	NF6RDE	**252.00**	PE-1A
12 in. Extension	NF12RDE	**284.00**	
18 in. Extension	NF18RDE	**344.00**	

Description	Catalog No.	$ Price	Schedule
Filler plate (15 per package)	NFFP15	**113.00**∗	PE-1A
EXB Fixed padlock attachment, Lock ON/OFF for ED, EG, and EJ Circuit Breakers 1, 2, or 3 poles	EDPA	**26.00**	DE-2
EXB Fixed padlock attachment, Lock OFF only for ED, EG, and EJ Circuit Breakers 1, 2, or 3 poles	EDPAF	**30.00**	DE-2
Oversized Lugs for Neutral or Ground Bar			
#10 to #2 Al or #14 to #4 Cu	QO70AN	**9.90**	DE-3A
#4 to #1/0 Al or Cu	Q1100AN	**11.10**	
#1 to #4/0 Al or Cu	Q1150AN	**32.40**	
Drip Hood for 20 in. wide enclosures	MHT2DH20	**315.00**	PE-1A

∗ Filler plates are $7.50 each and must be ordered in packages of 15.

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EDB-EPD
1-pole
with Alarm Switch

EDB, EGB, EJB
3-pole
15–125 A

EDB, EGB, EJB
1-pole
15–70 A

EDB, EGB, EJB
2-pole
15–125 A

Table 9.56: E-frame—125 A, Thermal-magnetic (480Y/277 Vac)

Ampere Rating	ED, EG, EJ (480Y/277 Vac)		"D" Interrupting Level 18 kA @ 480Y/277 Vac		"G" Interrupting Level 35 kA @ 480Y/277 Vac		"J" Interrupting Level 65 kA @ 480Y/277 Vac		Terminal Wire Range
	Hold	Trip	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	
1-pole, 277 Vac									
15 A	270	875	EDB14015▲■	150.	EGB14015▲■	255.	EJB14015▲■	408.	AL30FD #14–#6 Al or Cu
20 A			EDB14020▲■		EGB14020▲■		EJB14020▲■		
25 A			EDB14025■		EGB14025■		EJB14025■		
30 A			EDB14030■		EGB14030■		EJB14030■		
35 A	630	1800	EDB14035■	150.	EGB14035■	225.	EJB14035■	408.	AL100FD #14–2/0 Al or Cu
40 A			EDB14040■		EGB14040■		EJB14040■		
45 A			EDB14045■		EGB14045■		EJB14045■		
50 A			EDB14050■		EGB14050■		EJB14050■		
60 A			EDB14060		EGB14060		EJB14060		
70 A			EDB14070	302.	EGB14070	507.	EJB14070	812.	
2-pole, 480Y/277 Vac ♦									
15 A	270	875	EDB24015■	536.	EGB24015■	776.	EJB24015■	1241.	AL30FD #14–#6 Al or Cu
20 A			EDB24020■		EGB24020■		EJB24020■		
25 A			EDB24025■		EGB24025■		EJB24025■		
30 A			EDB24030■		EGB24030■		EJB24030■		
35 A	630	1800	EDB24035■	536.	EGB24035■	776.	EJB24035■	1241.	AL100FD #14–2/0 Al or Cu
40 A			EDB24040■		EGB24040■		EJB24040■		
45 A			EDB24045■		EGB24045■		EJB24045■		
50 A			EDB24050■		EGB24050■		EJB24050■		
60 A			EDB24060		EGB24060		EJB24060		
70 A			EDB24070	756.	EGB24070	1280.	EJB24070	2048.	
80 A	1000	2300	EDB24080	756.	EGB24080	1280.	EJB24080	2135.	AL100FD #14–2/0 Al or Cu
90 A			EDB24090		EGB24090		EJB24090		
100 A			EDB24100		EGB24100		EJB24100		
110 A			EDB24110	1946.	EGB24110	2586.	EJB24110	3879.	
125 A			EDB24125		EGB24125		EJB24125		
3-pole, 480Y/277 Vac									
15 A	270	875	EDB34015■	669.	EGB34015■	1131.	EJB34015■	1358.	AL30FD #14–#6 Al or Cu
20 A			EDB34020■		EGB34020■		EJB34020■		
25 A			EDB34025■		EGB34025■		EJB34025■		
30 A			EDB34030■		EGB34030■		EJB34030■		
35 A	630	1800	EDB34035■	669.	EGB34035■	1131.	EJB34035■	1358.	AL100FD #14–2/0 Al or Cu
40 A			EDB34040■		EGB34040■		EJB34040■		
45 A			EDB34045■		EGB34045■		EJB34045■		
50 A			EDB34050■		EGB34050■		EJB34050■		
60 A			EDB34060		EGB34060		EJB34060		
70 A			EDB34070	911.	EGB34070	1292.	EJB34070	2562.	
80 A	1000	2300	EDB34080	911.	EGB34080	1292.	EJB34080	2562.	AL100FD #14–2/0 Al or Cu
90 A			EDB34090		EGB34090		EJB34090		
100 A			EDB34100		EGB34100		EJB34100		
110 A			EDB34110	2421.	EGB34110	3216.	EJB34110	4826.	
125 A			EDB34125		EGB34125		EJB34125		
EPDs (Equipment Protection Devices), 1-pole, 277 Vac, Thermal-magnetic with 30 mA ground-fault protection★									
15 A	270	875	EDB14015EPD▲■	1151.	EGB14015EPD▲■	1256.	EJB14015EPD▲■	1409.	#14–#6 Cu or #12–#4 Al
20 A			EDB14020EPD▲■		EGB14020EPD▲■		EJB14020EPD▲■		
30 A			EDB14030EPD■		EGB14030EPD■		EJB14030EPD■		
40 A	630	1800	EDB14040EPD■	1151.	EGB14040EPD■	1256.	EJB14040EPD■	1409.	
50 A			EDB14050EPD■		EGB14050EPD■		EJB14050EPD■		

Note: All EDB, EGB, and EJB circuit breakers are UL Listed as HACR Type. For 50 °C calibration, use a CA suffix. NF branch circuit breakers are fungus proof as standard.

▲ UL Listed as SWD (Switching duty rated).
■ UL Listed as HID (High Intensity Discharge rated).
♦ UL Listed for use on 240 V Corner-grounded Delta Systems (Grounded B Phase). See data bulletin 2700DB0202.
★ All EPDs occupy two spaces, with or without Alarm Switch option. For alarm switch, add 158 list Price and the suffix BA.

Table 9.57: Factory installed Electrical Accessories

Auxiliary Switch (1A/1B)	Alarm Switch (NO)	Coil Burden Max. (VA)	Minimum Recommended Supply Transformer (VA)
		288	50
Monitors circuit breaker contact status and provides a remote signal indicating the circuit breaker contacts are OPEN or CLOSED. **Application** Max Load = 10 A @ 120 Vac 50/60 Hz Terminals for #14 AWG Cu wire	Used with control circuits and is actuated only when the circuit breaker has tripped. **Application** Max Load = 7 A @ 120 Vac 50/60 Hz Terminals for #14 AWG Cu wire.	Shunt Trip—Trips the circuit breaker from a remote location by means of a coil energized from a separate circuit. A 120 V shunt trip will operate at 55% or more of rated voltage. **Application** For use with momentary or maintained push button. 120 Vac 50/60 Hz Terminals for #14 AWG Cu wire.	

Table 9.58: Factory Installed Electrical Accessory Packages for ED, EG, EJ Circuit Breakers

Accessory Package	Suffix	$ Price
Auxiliary Switch/Alarm Switch Package▼△	AABA	312.
Shunt Trip Package▼△	SA	755.
Auxiliary Switch/Alarm Switch/Shunt Trip Package▼△	AABASA	1067.
Alarm Switch (N.O.) Package for EPDs only	BA	237.

▼ Accessory package takes an additional pole space.
△ Not available for EPD.

Table 9.59: Terminal Nut Insert Kit

Circuit Breaker Type	Qty. per Kit	Catalog No.	$ Price
ED, EG, EJ	3	TIKFD	17.40

Table 9.60: Handle Accessories

Circuit Breaker Type	No. of Poles	Catalog No.	$ Price
EXB Fixed Padlock Attachment, Lock ON/OFF			
ED, EG, EJ	1, 2, or 3	EDPA	39.00
EXB Fixed padlock attachment, Lock OFF only			
ED, EG, EJ	1, 2, or 3	EDPAF	45.00
EXB Removable padlock attachment, Lock OFF only			
ED, EG, EJ	1, 2, or 3	HPAFD	25.50
EXB Handle Ties			
ED, EG, EJ	Ties 2 – 1P	ECB2HT	16.80
	Ties 3 – 1P	ECB3HT	17.85

Table 9.61: Interrupt Ratings (kA)

	EDB	EGB	EJB
120 V	25	65	100
240 V	18 (1P), 25	35 (1P), 65	65 (1P), 100
480Y/277 V	18	35	65

Table 9.62: Mechanical Lug Kit Information (Al lugs for use with Al or Cu wire)

Circuit Breaker Application				Number of Wires Per Lug and Wire Range	Catalog Number	Lugs Per Kit	$ price Per Kit
Standard	Ampere Rating	Optional	Ampere Rating				
EDB, EGB, EJB	15–30 A	—	—	one #12—#6 AWG Al or one #14—#6 AWG Cu	AL30FD	3	41.30
	35–125 A	EDB, EGB, EJB	15–30 A □	one #12—2/0 AWG Al or one #14—2/0 AWG Cu	AL100FD	3	
—	—	EDB, EGB, EJB	15–125 A	one #14—1/0 AWG Cu	CU100FD	3	

□ Factory installed only. Use suffix "LH"

E-frame dimensions . . . . . Digest page 7-55

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Factory Assembled Pricing

▲ Use I-Line™ Panelboards on 480 V 3Ø3W Delta applications.

Table 9.63: Base $ Price (including solid neutral)

Mains Rating	Main Lugs		Main Circuit Breaker (Circuit Breaker Interrupt Rating—7-2 through 7-8) ▲ ■											
			Standard IC			HIC			Extra HIC			I-Limiter™		
	2-pole	3-pole	Circuit Breaker	2-pole	3-pole	Circuit Breaker	2-pole	3-pole	Circuit Breaker	2-pole	3-pole	Circuit Breaker	2-pole	3-pole
100 A	—	—	ED ♦	**1636.**	**1882.**	EG ♦	**2100.**	**2416.**	—	—	—	—	—	—
100 A	—	—	—	—	—	—	—	—	HJ	**3248.**	**3598.**	FI	**4250.**	**4884.**
125 A	**846.**	**972.**	ED ♦	**3372.**	**3762.**	EG ♦	**4324.**	**4976.**	—	—	—	—	—	—
150 A	—	—	HD	**3270.**	**3620.**	HG	**4048.**	**4398.**	HJ	**4070.**	**4420.**	—	—	—
225 A ★	—	—	JD	**4120.**	**4380.**	JG	**5070.**	**5400.**	JJ	**6620.**	**7330.**	KI	**7266.**	**8352.**
250 A ★	**1002**	**1152.**	JD	**4500.**	**5140.**	JG	**6180.**	**6180.**	JJ	**7190.**	**8450.**	KI	**9154.**	**10522.**
400 A ★	**1326.**	**1524.**	LA	**5330.**	**6126.**	LH	**7712.**	**8864.**	LC	**8506.**	**9776.**	LI	**9350.**	**10746.**
600 A ★▼	**2366.**	**2622.**	—	—	—	—	—	—	LC	**9554.**	**10884.**	LI	**13640.**	**15678.**
800 A ▼	**3550.**	**3900.**	—	—	—	—	—	—	—	—	—	—	—	—

▲ HL and JL frame circuit breakers are also available as main circuit breakers.
■ Contact your local Schneider Electric representative or distributor for Micrologic™ trip main circuit breaker pricing.
♦ Back-fed main circuit breaker.
★ Prices are for 54-circuit and fewer interiors. See the Product Selector for 66- and 84-circuit interior pricing.
▼ Copper bus only.

Table 9.64: Branch Circuit Breakers—$ Price per circuit breaker

Circuit Breaker Ampere Rating	Standard Interrupting 25,000 AIR @ 240 Vac, 18,000 AIR @ 480Y/277 Vac ED Bolt-on Branch			High Interrupting 65,000 AIR @ 240 Vac, 35,000 AIR @ 480Y/277 Vac EG Bolt-on Branch			Extra High Interrupting 100,000 AIR @ 240 Vac, 65,000 AIR @ 480Y/277 Vac EJ Bolt-on Branch		
	1-pole $ Price	2-pole $ Price	3-pole $ Price	1-pole $ Price	2-pole $ Price	3-pole $ Price	1-pole $ Price	2-pole $ Price	3-pole $ Price
15–60 A	**192.**	**442.**	**748.**	**324.**	**746.**	**1264.**	**518.**	**1196.**	**2024.**
70 A	**342.**	**872.**	**1046.**	**578.**	**1474.**	**1710.**	**924.**	**2120.**	**2540.**
80–100 A	—	**872.**	**1046.**	—	**1474.**	**1710.**	—	**2120.**	**2540.**
110–125 A	—	**2210.**	**2724.**	—	**4114.**	**4754.**	—	**5300.**	**6300.**
Space Only	**42.**	**84.**	**126.**	**42.**	**84.**	**126.**	**42.**	**84.**	**126.**

Note: All ED, EG, and EJ branch circuit breakers are UL Listed as HACR type.

Table 9.65: EDB-EPD Equipment Protection Device Branch Circuit Breakers △ □

Circuit Breaker Ampere Rating	Standard Interrupting 25,000 AIR @ 240 Vac, 18,000 AIR @ 480Y/277 Vac ED Bolt-on Branch			High Interrupting 65,000 AIR @ 240 Vac, 35,000 AIR @ 480Y/277 Vac EG Bolt-on Branch			Extra High Interrupting 100,000 AIR @ 240 Vac, 65,000 AIR @ 480Y/277 Vac EJ Bolt-on Branch		
	1-pole $ Price	2-pole $ Price	3-pole $ Price	1-pole $ Price	2-pole $ Price	3-pole $ Price	1-pole $ Price	2-pole $ Price	3-pole $ Price
15–60 A	**1472.**	—	—	**1596.**	—	—	**1788.**	—	—

△ All 1-pole EDB-EPD branches use 2 poles of mounting space.
□ For bell alarm in EDB-EPD branch breaker, add **158.** to branch breaker price.

Sub-feed Circuit Breaker

Available on 1Ø or 3Ø, 250–800 A main lugs or 250–600 A main circuit breaker interiors

- One sub-feed HD, HG, HJ, or HL or JD, JG, JJ, or JL circuit breaker per 250 A panelboard
- Two sub-feed HD, HG, HJ, or HL or two JD, JG, JJ, or JL circuit breakers per 400 A panelboard (do not mix H and J in a Panel)
- One sub-feed LA, LH, or LC circuit breaker (400 A max.) and one JD, JG, JJ, or JL circuit breaker or two sub-feed JD, JG, JJ, or JL circuit breakers per 600 A or 800 A panelboard (JJ and LC sub-feed circuit breakers cannot be used together).

Table 9.66: Sub-feed Circuit Breaker (150–400 A)

No. of Poles	HD	HG	JD	JG	LA	LH	LC ◊	Space
2	**2456.**	**3500.**	**3020.**	**4220.**	**3980.**	**5534.**	**8634.**	**826.**
3	**2872.**	**3798.**	**3370.**	**5100.**	**4916.**	**6510.**	**10156.**	**826.**

◊ JJ and LC sub-feed circuit breakers cannot be used together.

Table 9.67: Sub-feed Circuit Breaker Cabinet Data

Max. No. of Branch Spaces (Does not include sub-feed circuit breaker spaces)	Box Height (20 in. W x 5.75 in. D)						
	250 A		400 A LA/LH		600 A		800 A
	Main Lugs	Main Breaker	Main Lugs	Main Breaker	Main Lugs	Main Breaker ☆	Main Lugs ▽
30	56	68	68	80	74	80◒	68
42	62	74	74	86	80	86◒	74
54	68	80	80	92	86	92◒	80
66	80	N/A					
84	N/A						

☆ 600 A main circuit breaker panelboards require an 8.75 in. deep, 26 in. wide box.
▽ 800 A main lug panelboards require an 8.75 in. deep, 26 in. wide box.
◒ Dimensions also for 400 A LC/LI main circuit breaker panels.

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Table 9.68: Sub-feed (Double) Lugs (Standard Aluminum Mechanical Lugs)
An additional mains end termination point that can be used to feed out to another panelboard or device from the incoming service lines.

NOTE: *Available on main lug interiors only.*

Mains Rating	Sub-feed Wire Range Wire Bending Space per NEC Table 373-6	$ Price
125 A	two #6–2/0 Al or Cu	**128.**
250 A	two 1/0–350 kcmil Al or Cu	**128.**
400 A	two 1/0–600 kcmil Cu	**344.**
600 A	(4) 4/0–500 kcmil Al or Cu	**344.**
800 A	(6) 3/0–500 kcmil Al or Cu	**522.**

Table 9.69: Sub-feed Lug Cabinet Data (Standard Aluminum Mechanical Lugs)

Max. No. of Branch Spaces	Main Lugs Box Height in Inches (20 in. W x 5.75 in. D)				
	125 A	250 A	400 A	600 A	800 A ▲
18	26	—	—	—	—
30	32	38	50	74	74
42	—	44	56	80	80
54	—	50	62	86	86

▲ 800 A main lug panelboards require an 8.75 in. deep and 26 in. wide box.

Table 9.70: Feed-through Lugs (Standard Aluminum Mechanical Lugs)
A second set of lugs assembled at the opposite end from the mains of the panelboard. Often used to connect another panelboard or device to the incoming lines. Available on main lugs and main circuit breaker panelboards.

Mains Rating	Feed-through Wire Range Wire Bending Space per NEC Table 373-6	$ Price
125 A	one #6–2/0 kcmil Al or Cu	**344.**
250 A	one #6–350 kcmil Al or Cu	**344.**
400 A	one 1/0–750 kcmil or two 1/0–350 kcmil Al or Cu	**826.**
600 A	two 1/0–600 kcmil Al or Cu	**826.**

Table 9.71: Feed-through Lug Cabinet Data (Standard Aluminum Mechanical Lugs)

Max. No. of Branch Spaces	Box Height in Inches (20 in. W x 5.75 in. D)									
	125 A	100/125 A		250 A		400 A LA/LH		600 A		800 A
	Main Breaker (back-fed only)	Main Lugs	Main Breaker	Main Lugs	Main Breaker	Main Lugs	Main Breaker	Main Lugs	Main Breaker ■	Main Lugs ♦
18	38	32	44	—	—	—	—	—	—	—
30	44	38	50	50	62	56	68	62	74	56
42	50	—	—	56	68	62	74	68	80	62
54	—	—	—	62	74	68	80	74	86	68

■ 600 A main circuit breaker panelboards require an 8.75 in. deep, 26 in. wide box.
♦ 800 A main lug panelboards require an 8.75 in. deep, 26 in. wide box.

Table 9.72: Ground Bars

Ground Bars	$ Price Adder
Equipment Ground Bar	**38.**
Copper Ground Bar (Add to Equipment Ground Bar Price)	**52.**
Insulated/Isolated Ground Bar (Add to Equipment Ground Bar Price)	**86.**

Table 9.73: Name Plates

Name Plates	$ Price Adder
Standard white face/black letter laminated bakelite, 1 in. x 3.5 in., adhesive-backed or screw mountable with screws in a bag assembly (Price includes engraving)	**78.**

Table 9.74: Copper Bus Bars

Copper Bus Bars	$ Price Adder
100 A, 250 A	**458.**
400 A	**624.**
600 A, 800 A	Standard

Table 9.75: Copper Neutral

Copper Neutral	$ Price Adder
100–600 A	**132.**
800 A	**176.**

Table 9.76: 200% Rated Neutrals

Panelboards with 200% rated neutrals are available with sub-feed lugs, feed-through lugs, and main circuit breakers	Add Per Panel $ Price
250 A	**769.**
400 A	**950.**
600 A	**1262.**
800 A	**1894.**

Table 9.77: NF Main Neutral Conductors—Required Size and Quantity

Panelboard Ampacity	Neutral Conductors Required ♦	Actual Lug Wire Range
125	(2) 1/0 Cu or (2) 1/0 Al	(2) #6-2/0
250	(2) 4/0 Cu or (2) 300 kcmil Al	(2) #6-350 kcmil
400 A	(4) 250 kcmil Al or (4) 3/0 Cuor (2) 600 kcmil Al	(2) 1/0-300 kcmil or (1) 1/0-750 kcmil
600	(4) 500 kcmil Al or (4) 350 kcmil Cu	(2) 1/0-750 kcmil

Note: Neutral conductors must be of size and quantity per table above.

Table 9.78: Metal Directory Frame

Metal Directory Frame	$ Price Adder
Not available with LC/LI main circuit breaker (Replaces standard plastic stick-on directory pouch)	**140.**

Table 9.79: Hinged Door-in-Door Trim

Hinged Door-in-Door Trim	Add Per Panel $ Price
Hinged Door-in-Door Trim has piano hinge down one side. Inner door has a lock, outer door is retained with screws	**646.**
Hinged Door-in-Door with Outer Door Lock in place of screws	**836.**

Table 9.80: Weatherproof or Dusttight Cabinets (Type 3R, 5, 12)

Weatherproof or Dusttight Cabinets —Type 3R, 5, 12	$ Price Adder
(Not available with panelboards having LC/LE/LI/LX/LXI main circuit breakers)	**1516.**

Table 9.81: Optional Factory Assembled Lugs for Main Lug Interiors

Main Lug Interiors	$ Price Per Pole Adder				
	100 A	225 A	400 A	600 A	800 A
Aluminum Compression Lugs	**58.**	**58.**	**90.**	**118.**	**200.**
Copper Mechanical Lugs	**70.**	**108.**	**148.**	**168.**	**196.**
Copper Compression Lugs	**70.**	**108.**	**148.**	**168.**	**316.**

Table 9.82: Optional Factory Assembled Lugs for Main Circuit Breaker Interiors

Main Circuit Breaker Interiors	$ Price Per Pole Adder			
	H Frame	J Frame	LA Frame	LC Frame
Aluminum Compression Lugs	**59.**	**98.**	**128.**	**262.**
Copper Mechanical Lugs	**70.**	**108.**	**148.**	**168.**
Copper Compression Lugs	**70.**	**108.**	**148.**	**168.**

Table 9.83: Surgelogic™ Hard Bus SPD—Model IMA ★

Surge Current Rating kA	Voltage		
	208Y/120 V 3Ø4W	240/120 V 3Ø4W High Leg	480Y/277 V 3Ø4W
100	**11970.**	**11970.**	**12890.**
120	**12548.**	**15654.**	**13340.**
160	**13807.**	**13807.**	**14623.**
200	**17992.**	**17992.**	**20508.**
240	**20583.**	**20583.**	**23598.**

★ Panelboard box height with SPD unit—Contact your local Schneider Electric representative or distributor.

Table 9.84: Surgelogic SPD Options

Surgelogic SPD Options	$ Price
Surge Counter	Standard
Dry Contacts	Standard
Remote Monitor	**2588.**

NOTE: *For additional factory modifications, See Digest page 9-38.*

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NQ Single-Row (Column-width)—240 Vac Bolt-on

(60 A Max. Branch Circuit Breaker)

NQ Application Data

Application: For use on ac only. Meet Federal Specification W-P-115c, Type 1, Class 1. UL Listed.
Service: 1Ø3W, 3Ø3W, 3Ø4W,
3 Grd. "B" Ø—240 Vac max.
AIR: See the tables starting on Digest page 7-2.
Mains: Type NQ—Bolt-on main lugs: 100 A, 225 A

- Main circuit breaker: 100 A—QOU, 225 A—QB
- See the tables starting on Digest page 7-2 for main circuit breaker interrupt ratings. See catalog for terminal lug data.
- Main circuit breakers with higher interrupt ratings are available as factory assembled panelboards.

Branches: Bolt-on QOB, 60 A maximum. QOB 10-60 A 1-, 2- and 3-pole. See Digest page 9-10 for branch circuit breaker terminal data. QOB-VH and QHB branch circuit breakers are also available as factory assembled.
Cabinet: Front—Screw cover. Box—galvanized steel with removable endwalls.
Gutters:

- 100 A—4 in. min. mains end, 3 in. min. opposite mains
- 225 A—10 in. min. mains end, 5 in. min. opposite mains

NF Single-Row (Column-width)—480Y/277 Vac Bolt-on

(60 A Max. Branch Circuit Breaker)

NF Application Data

Application: For use on ac only. Meet Federal Specification W-P-115c, Type 1, Class 1. UL Listed.
Service: 480Y/277 Vac, 3Ø4W
AIR: See the tables starting on Digest page 7-2
Mains: Type NF–Bolt-on main lugs: 125 A, 225 A

- Main circuit breaker: 100 A—FA, 100 A—HD, 225 A—JD. See the tables starting on Digest page 7-2 for main circuit breaker interrupt rating. See the catalog section for terminal lug data.
- Main circuit breakers with higher interrupt ratings are available as factory assembled panelboards.

Branches: EDB, EDG, or EDJ, 60 A maximum. See Digest page 9-15 for branch circuit breaker catalog numbers, List Prices and terminal data.
Cabinet: Front—Screw cover. Box—galvanized steel with removable endwalls.
Gutters:

- 100 A—4 in. min. mains end, 3 in. min.opposite mains
- 225 A—10 in. min. mains end, 5 in. min. opposite mains

Table 9.85: NQ Single-Row (Column-width)—240 Vac Bolt-on ▲

Max. No. of Poles	Mains Rating	Total $ Price (Box Interior and Front)	Box and Interior with Solid Neutral (8.625 in. W. x 5 in. D.) (Order branch circuit breakers separately)			Front (Surface Mount)	
			Catalog Number	$ Price	Box Height (In.)	Catalog Number	$ Price
1 Phase 3-Wire Main Lugs Only							
30	225	**1669.**	NQ830L2C	**1298.**	45	LX45TS	**371.**
Main Circuit Breaker—2-pole							
20	100	**1818.**	NQ820B1C	**1452.**	40	LX40TS	**366.**
3 Phase 4-Wire Main Lugs Only							
30	100	**1608.**	NQ8430L1C	**1242.**	40	LX40TS	**366.**
42	225	**1938.**	NQ8442L2C	**1458.**	58	LX58TS	**480.**
Main Circuit Breaker—3-pole							
30	100	**2363.**	NQ8430B1C	**1992.**	45	LX45TS	**371.**
42	225	**4961.**	NQ8442B2C	**4416.**	62	LX62TS	**545.**

▲ 60 A Maximum Branch—Copper Bus Standard.

Table 9.86: Cable Troughs and Pull Boxes

Cable Troughs (L=Length) ■			Pull Boxes with Solid Neutral		
L (In.)	8.625 in. x 5 in. Catalog Number	$ Price	S/N Terminals	Catalog Number	$ Price
36	MTX836	**590.**	42	MPX81542	**479.**
48	MTX848	**651.**			
56	MTX856	**753.**			
66	MTX866	**753.**			

■ Cable troughs are standard with a trough barrier.

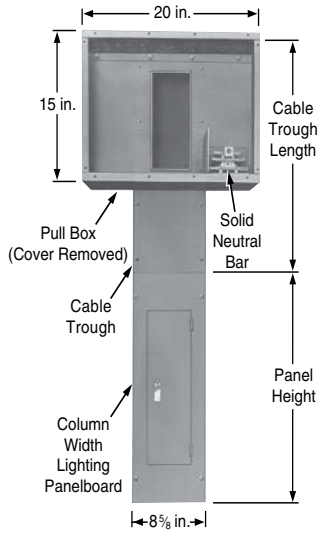
Table 9.87: NF Single-Row (Column-width)—480Y/277 Vac Bolt-on

Max. No. of Poles	Mains Rating	Total $ Price (Box Interior and Front)	Box and Interior with S/N (8.625 in. W. x 5.625 in. D.)			Front (Surface Mount)	
			Catalog Number	$ Price	Box Height (In.)	Catalog Number	$ Price
Main Lugs Only—3 Phase 4-Wire							
30	125	**2410.**	NF8430L1C	**2009.**	59	NC59TS	**401.**
42	225	**3281.**	NF8442L2C	**2759.**	71	NC71TS	**522.**
Main Circuit Breaker—3-pole							
30	100	**3767.**	NF8430M1C NF8430M1HDC	**3246.**	65	NC65TS	**521.**
42	225	**6660.**	NF8442M2JDC	**6042.**	85	NC85TS	**618.**

Table 9.88: Cable Troughs and Pull Boxes

Cable Troughs (L=Length) ♦			Pull Boxes with Solid Neutral		
L (In.)	8.625 in. x 5.625 in. Catalog Number ★	$ Price	S/N Terminals	Catalog Number	$ Price
36	NTX836	**590.**	42	MPX81542	**479.**
48	NTX848	**651.**			
56	NTX856	**753.**			
66	NTX866	**753.**			

♦ Cable troughs are standard with a trough barrier.
★ Box width = 8.625 in.; width at front, including flange, is 9.625 in..



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NQ Single Row (Column-Width)—240 Vac Bolt-On Factory Assembled Pricing

Table 9.89: Base Price with Solid Neutral

Mains Rating	$ Price							
	Main Lugs		Main Circuit Breaker (Circuit Breaker Interrupt Rating—see Digest pages 7-2 through 7-5					
	2-Pole	3-Pole	Circuit Breaker	2-Pole	3-Pole	Circuit Breaker	2-Pole	3-Pole
100 A	720.	832.	QOB	1254.	1562.	—	—	—
			QB	—	2800.	—	—	—
			QD	—	3434.	QG	—	4090.
225 A	772.	912.	QB	—	2800.	—	—	—
			QD	—	3434.	QG	—	4090.

Note: Copper bus —standard.
Equipment Ground Bar $ Price adder—$38.00.
Copper Equipment Ground Bar (Add to Equipment Ground Bar $ Price) $ Price adder—$52.00.

Table 9.90: Branch Circuit Breakers (price per breaker)

Circuit Breaker Ampere Rating	$ Price			
	1-Pole 120 Vac	2-Pole 120/240 Vac	2-Pole 240 Vac	3-Pole 240 Vac
Space Only				
All Space Only Except Below	28.	58.	58.	86.
10,000 AIR—Branch Circuit Breakers—QOB, QOB-H				
15–60 A	68.	134.	260.	352.
10,000 AIR—Qwik-Guard™—Class A—QOB-GFI				
15–30 A	272.	488.	—	—
40–60 A	—	488.	—	—
Specialty Branch Circuit Breakers (10,000 AIR) For High Intensity Discharge Lighting—QO-HID, QOB-HID				
15–30 A	78.	148.	—	376.
40–50 A	78.	148.	—	—
High Magnetic Trip (For applications subject to high initial inrush)—QO-HM, QOB-HN				
15–20 A	68.	—	—	—
Provides 30 mA Equipment Protection—QO-EPD, QOB-EPD				
15–30 A	462.	828.	—	—
(High Interrupting Capacity) 22,000 AIR Branch Circuit Breakers—QO-VH, QOB-VH				
15–30 A	92.	212.	—	462.
35–60 A	—	212.	—	462.
22,000 AIR—Qwik-Guard—Class A—QO-VHGFI, QOB-VHGFI				
15–30 A	294.	—	—	—

NF Single Row (Column-Width)—480Y/277 Vac 3Ø4W Bolt-on Factory Assembly Pricing

Table 9.91: Base Price with Solid Neutral

Mains Rating	Main Lugs		Main Circuit Breaker (Circuit Breaker Interrupt Rating —see Digest pages 7-3 through 7-4									
			Standard IC			HIC			Extra HIC			I-Limiter™		
			Circuit Breaker	$ Price		Circuit Breaker	$ Price		Circuit Breaker	$ Price		Circuit Breaker	$ Price	
	2-Pole	3-Pole		2-Pole	3-Pole		2-Pole	3-Pole		2-Pole	3-Pole		2-Pole	3-Pole
100 A	—	1074.	FA	—	2184.	FH	—	3044.	—	—	—	—	—	—
	—		HD	—	2842.	HG	—	3792.	HJ	—	4374.	FI	—	7392.
125 A	—			—	3222.		—	4172.		—	4754.	KI	—	13150.
150 A	—	1272.	HD	—	3222.	HG	—	4172.	HJ	—	4754.	KI	—	13150.
225 A	—		JD	—	4784.	JG	—	5982.	JJ	—	8902.		—	

Note: Copper bus—standard.
Copper Neutral $ Price adder—$132.00.
Equipment Ground Bar $ Price adder—$38.00.
Copper Equipment Ground Bar (Add to Equipment Ground Bar $ Price) $ Price adder—$52.00.

Table 9.92: Branch Circuit Breakers (price per breaker)

Circuit Breaker Ampere Rating	$ Price								
	Standard Interrupting 25,000 AIR @ 240 Vac, 18,000 AIR @480Y/277 Vac ED Bolt-on Branch			High Interrupting 65,000 AIR @ 240 Vac, 35,000 AIR @480Y/277 Vac EG Bolt-on Branch			Extra High Interrupting 100,000 AIR @ 65,000 AIR @ 480Y/277 Vac EJ Bolt-on Branch		
	1-Pole	2-Pole	3-Pole	1-Pole	2-Pole	3-Pole	1-Pole	2-Pole	3-Pole
15–60 A	192.	442.	748.	324.	746.	1264.	518.	1196.	2024.
Space Only	42.	84.	126.	42.	84.	126.	42.	84.	126.

Table 9.93: EDB-EPD Equipment Protection Device Branch Circuit Breakers

Circuit Breaker Ampere Rating	$ Price								
	Standard Interrupting 25,000 AIR @ 240 Vac, 18,000 AIR @480Y/277 Vac ED Bolt-on Branch			High Interrupting 65,000 AIR @ 240 Vac, 35,000 AIR @480Y/277 Vac EG Bolt-on Branch			Extra High Interrupting 100,000 AIR @ 65,000 AIR @ 480Y/277 Vac EJ Bolt-on Branch		
	1-Pole	2-Pole	3-Pole	1-Pole	2-Pole	3-Pole	1-Pole	2-Pole	3-Pole
15–60 A	1472.	—	—	1596.	—	—	1788.	—	—

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I-Line Merchandised Pricing Procedure

1. Select the appropriate branch circuit breakers and accessories based on the required ampacity and AIR ratings from Digest pages 9-24 through 9-30.
2. Determine the total mounting inches required by the branch circuit breakers. Pay close attention to the interior types and any branch mounting restrictions by referring to panel layouts on Digest pages 9-21 and 9-22. For example, larger frame circuit breakers may mount in only one side of the panel due to physical sizes. Therefore, for larger size branches, you may only be able to consider one half of the total mounting inches available.
3. Select proper main lug interior or main circuit breaker interior from Digest page 9-21 or 9-22 based on the mains ampacity and branch requirements from step 2.
4. Select blanks from the Accessories table on Digest page 9-23 as required to cover unused mounting space.
5. Select appropriate box and front from Digest page 9-21 or 9-22 to accommodate panel interior selected in step 3.
6. Apply appropriate discount schedule.

Table 9.94: I-Line Merchandised Pricing Example
600 Vac, 3Ø3W, 400 A, MLO, 14k AIR, Type 1 enclosure, 4 piece surface trim without door.

Description	Catalog No.	Digest Page No.	$ Price
400 Amp MLO Interior	HCM32734	9-21	**2408.**
4 Piece Surface Trim Without Door	HCM73TS	9-21	**699.**
Type 1 Enclosure	HC3273B	9-21	**243.**
(8) 60/3	FA36060	9-25	**7764.**
one 100/2	FA26100AC	9-25	**947.**
one 4.5 in. Blanks	HNM4BL	9-23	**126.**
one 1.5 in. Blank	HNM1BL	9-23	**44.**
		Total Price	**12231.**

I-Line Factory Assembled Pricing Procedure

1. Select price for main lugs or main circuit breaker from Base Price tables on Digest page 9-31. Include solid neutral and ground bar when required.
2. List branch circuit breakers and determine total mounting inches required. Include space only charge and mounting inches as required. Price branches from Digest page 9-32.
3. If total space required exceeds the maximum listed, price as two or more panels and add price for sub-feed lugs, so installer can cable between sections.
4. Add price for special features from Digest page 9-34.
5. For complete price, total all prices. Order panel by description.
6. Apply appropriate discount schedule.

Table 9.95: I-Line Factory Assembled Pricing Example
600 Vac, 3Ø3W, 400 A, MLO, 14k AIR, Type 1 enclosure, 4 piece surface trim without door.

Description	Digest Page No.	$ Price
400 A MLO Base Price	9-31	**2799.**
(8) 60/3	9-32	**12072.**
one 100/2	9-32	**1446.**
(3) 250/3	9-32	**17100.**
	Total Price	**33417.**

QMB Factory Assembled

QMB Panelboards—Method of Pricing

1. Make a sketch with main lugs or main switch at the top or bottom.
2. List required branch devices (switches and circuit breaker units). Include ampere rating, number of poles, and unit mounting height from the appropriate table on Digest pages 9-35 and 9-36.
3. 30–60 twin units are the same price as 600 V 60–60 twin units.
4. 30–100 and 60–100 twin units are the same price as 600 V 100–100 twin units.
5. List solid neutral from Digest page 9-36 if required. No unit mounting height is required.
6. List mains ampere rating, voltage, number of poles, and unit mounting space from the appropriate table on 9-36.
7. If total unit mounting height of branch devices exceeds maximum mounting space of the mains, price as two or more panelboards, adding sub-feed lugs or feed-thru lugs from the appropriate table on Digest page 9-36.
8. Insert at the right of each item the price from the appropriate table, including any accessories. The sum will be the complete panelboard price including the cabinet.
9. Specify H, R, or J fuse clips.

Table 9.96: QMB Factory Assembled Pricing Example
600 Vac, 3Ø3W, 400 A, Fusible 10k AIR, Type 1 Enclosure

Branches	Digest Page No.	$ Price
400 A MLO Base Price	9-36	**2016.**
(4) 60/3	9-36	**4338.**
one 100/3	9-36	**3411.**
one 30/3	—	—
	Total Price	**9765.**

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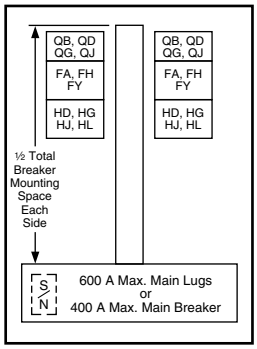
TYPE HCN

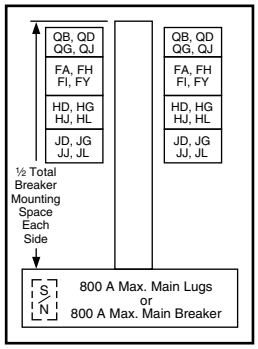
225 A max. (240 V max.) branch circuit breaker QB, QD, QG, QJ
150 A max. branch circuit breaker FA, FH, FY, HD, HG, HJ, HL ✱



Box Size:
26 in. Wide, 6.5 in. Deep

TYPE HCM

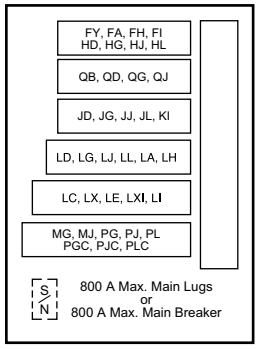
250 A max. branch circuit breaker
FA, FH, FY, FI, QB, QD, QG, QJ, HD, HG, HJ, HL, JD, JG, JJ, JL



Box Size:
32 in. Wide, 8.25 in. Deep

TYPE HCP-SU◊

800 A max. main circuit breaker
600 A max. branch circuit breaker
FY, FA, FH, FI, KI, LA, LD, LG, LJ, LL, LH, LC, LX, LI, LXI, LE, MG, MJ, PG, PJ, PL, PGC, PJC, PLC▽, QB, QD, QG, QJ, HD, HG, HJ, HL, JD, JG, JJ, JL



Box Size:
26 in. Wide, 9.5 in. Deep

Table 9.97: Interiors, Boxes and Fronts
(100 A and 225 A interiors include solid neutral, all others without solid neutral. Order solid neutral from 9-23)

Total Circuit Breaker Mounting Space (In.)	Mains Ampere Rating	Complete Surface $ Price (4 Piece Trim) (Less Branch Circuit Breakers)		Interior Assembly (Less Branch Circuit Breakers)		Front ▲				Box ♦				Box Height (In.)
						4 Piece Trim Without Door ■		Trim With Door		Type 1		NEMA 3R/5/12 ★ (Includes Front)		
		Type 1 $ Price	Type 3R/ 5/12 $ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	
HCN Main Lugs Only **3-pole—Suitable for use as service equipment when provided with a main circuit breaker. ☆**														
27	225 A	**2171.**	**4004.**	HCN14522N	**1593.**	HCN52T( )	**335.**	HCN52T( )D	**411.**	HC2652B	**243.**	HC2652WP	**2411.**	52
	400 A	**2195.**	**4028.**	HCN14524	**1617.**									
	600 A	**2392.**	**4225.**	HCN14526	**1814.**									
45	225 A	**2674.**	**4402.**	HCN23652N	**1991.**	HCN65T( )	**440.**	HCN65T( )D	**530.**	HC2665B	**243.**	HC2665WP	**2411.**	65
	400 A	**2702.**	**4430.**	HCN23654	**2019.**									
	600 A	**2960.**	**4688.**	HCN23656	**2277.**									
63	225 A	**3135.**	**4709.**	HCN32742N	**2298.**	HCN74T( )	**594.**	HCN74T( )D	**717.**	HC2674B	**243.**	HC2674WP	**2411.**	74
	400 A	**3156.**	**4730.**	HCN32744	**2319.**									
	600 A	**3396.**	**4970.**	HCN32746	**2559.**									
81	225 A	**3548.**	**6233.**	HCN41832N	**2552.**	HCN83T( )	**753.**	HCN83T( )D	**890.**	HC2683B	**243.**	HC2683WP	**3681.**	83
	400 A	**3564.**	**6249.**	HCN41834	**2568.**									
	600 A	**3824.**	**6509.**	HCN41836	**2828.**									
99	225 A	**4175.**	**6767.**	HCN50922N	**3086.**	HCN92T( )	**846.**	HCN92T( )D	**1001.**	HC2692B	**243.**	HC2692WP	**3681.**	92
	400 A	**4341.**	**6933.**	HCN50924	**3252.**									
	600 A	**4434.**	**7026.**	HCN50926	**3345.**									
HCN Main Circuit Breaker ▼ ◒ **Includes 3-pole, vertically mounted main circuit breaker—Suitable for use as service equipment**														
27	400 A	**6649.**	**8377.**	HCN14654M	**5966.**	HCN65T( )	**440.**	HCN65T( )D	**530.**	HC2665B	**243.**	HC2665WP	**2411.**	65
36	100 A	**3860.**	**5588.**	HCN18651MN	**3177.**									
	225 A	**5303.**	**7031.**	HCN18652MN	**4620.**									
45	400 A	**7287.**	**8861.**	HCN23744M	**6450.**	HCN74T( )	**594.**	HCN74T( )D	**717.**	HC2674B	**243.**	HC2674WP	**2411.**	74
54	100 A	**4323.**	**5897.**	HCN27741MN	**3486.**									
	225 A	**5759.**	**7333.**	HCN27742MN	**4922.**									
63	225 A	**6068.**	**8753.**	HCN32832MN	**5072.**	HCN83T( )	**753.**	HCN83T( )D	**890.**	HC2683B	**243.**	HC2683WP	**3681.**	83
	400 A	**7836.**	**10521.**	HCN32834M	**6840.**									
81	400 A	**8154.**	**10746.**	HCN41924M	**7065.**	HCN92T( )	**846.**	HCN92T( )D	**1001.**	HC2692B	**243.**	HC2692WP	**3681.**	92
90	225 A	**6590.**	**9182.**	HCN45922MN	**5501.**									
HCM Main Lugs Only **3-pole—Suitable for use as service equipment when provided with a main circuit breaker. ☆**														
27	225 A	**2279.**	**4566.**	HCM14482N	**1644.**	HCM48T( )	**392.**	HCM48T( )D	**483.**	HC3248B	**243.**	HC3248WP	**2922.**	48
	400 A	**2404.**	**4691.**	HCM14484	**1769.**									
	600 A	**3175.**	**5462.**	HCM14486	**2540.**									
	800 A	**3709.**	**5996.**	HCM14488	**3074.**									
45	225 A	**2795.**	**5717.**	HCM23642N	**2036.**	HCM64T( )	**516.**	HCM64T( )D	**633.**	HC3264B	**243.**	HC3264WP	**3681.**	64
	400 A	**2891.**	**5813.**	HCM23644	**2132.**									
	600 A	**3530.**	**6452.**	HCM23646	**2771.**									
	800 A	**4041.**	**6963.**	HCM23648	**3282.**									
63	225 A	**3263.**	**6002.**	HCM32732N	**2321.**	HCM73T( )	**699.**	HCM73T( )D	**864.**	HC3273B	**243.**	HC3273WP	**3681.**	73
	400 A	**3350.**	**6089.**	HCM32734	**2408.**									
	600 A	**3921.**	**6660.**	HCM32736	**2979.**									
	800 A	**4644.**	**7383.**	HCM32738	**3702.**									
99	225 A	**4205.**	**7918.**	HCM50912N	**2966.**	HCM91T( )	**996.**	HCM91T( )D	**1217.**	HC3291B	**243.**	HC3291WP	**4952.**	91
	400 A	**4281.**	**7994.**	HCM50914	**3042.**									
	600 A	**4586.**	**8299.**	HCM50916	**3347.**									
	800 A	**5321.**	**9034.**	HCM50918	**4082.**									
HCM Main Circuit Breaker ▼ ◒ **Includes 3-pole, vertically mounted main circuit breaker—Suitable for use as service equipment.**														
27	400 A	**7563.**	**10485.**	HCM14644M	**6804.**	HCM64T( )	**516.**	HCM64T( )D	**633.**	HC3264B	**243.**	HC3264WP	**3681.**	64
36	225 A	**5582.**	**8504.**	HCM18642MN	**4823.**	HCM73T( )	**699.**	HCM73T( )D	**864.**	HC3273DB9♦	**243.**	Use HCP	—	—
	600 A	**11648.**	**10706.**	HCM18736MP	**10706.**									
	800 A	**14549.**	**13607.**	HCM18738MP	**13607.**									
45	400 A	**8007.**	**10746.**	HCM23734M	**7065.**	HCM73T( )	**699.**	HCM73T( )D	**864.**	HC3273B	**243.**	HC3273WP	**3681.**	73
54	225 A	**5969.**	**8708.**	HCM27732MN	**5027.**									
72	600 A	**12377.**	**11138.**	HCM36916MP	**11138.**	HCM91T( )	**996.**	HCM91T( )D	**1217.**	HC3291DB9♦	**243.**	Use HCP	—	—
	800 A	**15431.**	**14192.**	HCM36918MP	**14192.**									
81	400 A	**9315.**	**13028.**	HCM41914M	**8076.**	HCM91T( )	**996.**	HCM91T( )D	**1217.**	HC3291B	**243.**	HC3291WP	**4952.**	91
HCP-SU □ Universal Single Row Main Lugs or Main Circuit Breaker ◒ **3-pole—Suitable for use as service equipment when provided with a main circuit breaker. ☆**														
54	800	**5858.**	**9466.**	HCP54868SU	**4514.**	**HC2686T( )4P**	**1101.**	**HC2686T( )HR△**	**1658.**	HC2686DB	**243.**	HC2886WP	**4952.**	86

▲ Add "F" for flush mount, "S" for surface mount.
■ Add-on door kit available from Peru. Example: For HCM48TS surface trim kit, order HCM48DS door kit.
♦ For Type 1 applications, order interior, front, and box. For Type 3R/5/12 applications, order interior and box only. The front is included with the box.
★ Remove drain screws for Type 3R rating.
▼ Bottom feed standard.
△ Hinged trim with door.
□ For main lugs panel, order sub-feed lug kit and back-feed as main lugs.
◊ For main circuit breaker panel, order plug-on I-Line type PG, PJ, PL, MG, or MJ circuit breakers from 9-28 through 9-30 and backfeed as the main breaker (order solid neutral from 9-22).
☆ Suitable for use as service equipment if equipped with an integral main circuit breaker or when not more than six main disconnecting means are provided and the panelboard is not used as a lighting and appliance branch circuit panelboard.
▽ PG, PJ, PL circuit breakers are available with both thermal-magnetic equivalent and Micrologic trip. The Micrologic circuit breakers are available 80% and 100% rated. "C" suffix denotes a 100% rating.
◒ Circuit breaker interrupt ratings, starting on Digest page 7-2.
✱ I-Line Surgelogic SPD not available.
♦ DB9 box is 9.5 inches deep.

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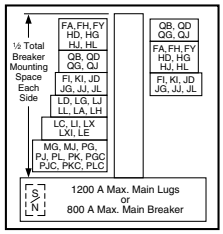
TYPE HCP

800 A max. branch circuit breaker
FA▲, FH, FI, FY, QB, QD, QG, QJ, HD, HG, HJ, HL, JD, JG, JJ, JL, KI, LA, LD, LG, LJ, LL, LH, LC, LI, LX, LXI, LE, MG, MJ, PG, PJ, PL, PGC, PJC, PLC■

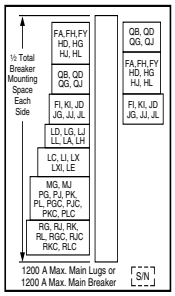


Box Size:
42 in. Wide, 9.5 in. Deep

- ▲ FA and JDA circuit breakers with field installable ground fault kits may be mounted in type HCP, HCP-SU, and HCR-U panelboards as shown, and require L-frame mounting space.
- ■ PG, PJ, and PL circuit breakers are available with both thermal-magnetic equivalent and Micrologic trip. The Micrologic circuit breakers are available 80% and 100% rated. "C" suffix denotes a 100% rating.

TYPE HCR-U Universal Mains

1200 A max. branch circuit breaker
FA♦, FH, FI, FY, QB, QD, QG, QJ, HD, HG, HJ, HL, JD, JG, JJ, JL, KI, LA, LD, LG, LJ, LL, LH, LC, LI, LX, LXI, LE, MG, MJ, PG, PJ, PL, PGC, PJC, PLC, RGC, RJC, RLC★▼



Box Size:
44 in. Wide, 9.5 in. Deep

- ♦ FA and JDA circuit breakers with field installable ground fault kits may be mounted in type HCP, HCP-SU, and HCR-U panelboards as shown, and require L-frame mounting space.
- ★ When RL main circuit breakers with equipment ground fault are applied on a 3Ø4W system, order solid neutral catalog number HCR12SNCT. The HCR12SNCT includes a neutral current transformer.
- ▼ PG, PJ, and PL circuit breakers are available with both thermal-magnetic equivalent and Micrologic trip. The Micrologic circuit breakers are available 80% and 100% rated. "C" suffix denotes a 100% rating.

Table 9.98: (1200 A Interiors Include solid neutral, all others without solid neutral. Order solid neutral from 9-23.)

Total Circuit Breaker Mtg. Space (In.)	Mains Amp. Rating	Max. No. of LC, MJ, PL, RL Circuit Breakers	Complete Surface $ Price (4 Piece Trim) (Less Branch Breakers)	Interior Assembly (Less Branch Circuit Breakers)		Front △				Box ◊		Box Height (In.)
						4 Piece Trim Without Door □		Trim With Door				
			Type 1	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	
HCP Main Lugs Only—3-pole Suitable for use as service equipment when provided with a main circuit breaker. ☆												
27	400	1PL	**2751.**	HCP14504	**1902.**	HCW50T( )	**606.**	HCW50T( )D	**743.**	HC4250DB	**243.**	50
	600		**3513.**	HCP14506	**2664.**							
	800		**4521.**	HCP14508	**3672.**							
	1200		**6365.**	HCP145012N	**5516.**							
45	400	2PL	**3212.**	HCP23594	**2298.**	HCW59T( )	**671.**	HCW59T( )D	**827.**	HC4259DB	**243.**	59
	600		**3860.**	HCP23596	**2946.**							
	800		**4874.**	HCP23598	**3960.**							
	1200		**7133.**	HCP235912N	**6219.**							
63	400	3PL	**3795.**	HCP32684	**2706.**	HCW68T( )	**846.**	HCW68T( )D	**1052.**	HC4268DB	**243.**	68
	600		**4476.**	HCP32686	**3387.**							
	800		**5309.**	HCP32688	**4220.**							
	1200		**7763.**	HCP326812N	**6674.**							
99	400	5PL	**4716.**	HCP50864	**3372.**	HCW86T( )	**1101.**	HCW86T( )D	**1344.**	HC4286DB	**243.**	86
	600		**5208.**	HCP50866	**3864.**							
	800		**6194.**	HCP50868	**4850.**							
	1200		**8529.**	HCP508612N	**7185.**							
HCP Main Circuit Breaker▽—Includes 3-pole Vertically mounted main circuit breaker—Suitable for use as service equipment.												
36	600	2LC	**12179.**	HCP18686M	**11090.**	HCW68T( )	**846.**	HCW68T( )D	**1052.**	HC4268DB	**243.**	68
	800		**15399.**	HCP18688M	**14310.**							
72	600	4LC	**12987.**	HCP36866M	**11643.**	HCW86T( )	**1101.**	HCW86T( )D	**1344.**	HC4286DB	**243.**	86
	800		**16296.**	HCP36868M	**14952.**							
HCR-U Universal Main Lugs or Main Circuit Breaker▽—3-pole Suitable for use as service equipment when provided with a main circuit breaker. For Main Lugs panel, order sub-feed lug kit catalog number S33930 and back feed as main lugs. For Main Circuit Breaker panel, order plug-on I-Line type PG, PJ, PL, RGC, RJC, or RLC◒ circuit breakers from pages 9-27 through 9-29, and back feed as the main circuit breaker. (Order solid neutral separately)												
108 ✱	1200	6PL or 3RLC	**12557.**	HCR548612U	**11213.**	HCR86T( )♦	**1101.**	HCR86T( )D	**1344.**	HC4486DB	**243.**	86

△ Add "F" for flush mount, "S" for surface mount.
□ Add-on door kit available. Example: For HCW50TS trim kit, order HCW50D door kit.
◊ See Digest page 9-23 for 42 in. wide weatherproof enclosures.
☆ Suitable for use as service equipment if equipped with an integral main circuit breaker or when not more than six main disconnecting means are provided and the panelboard is not used as a lighting and appliance branch circuit panelboard.
▽ Circuit breaker interrupt ratings, starting on Digest page 7-2.
◒ When RL main circuit breakers with equipment ground fault are applied on a 3Ø4W system, order solid neutral catalog number HCR12SNCT. The HCR12SNCT includes a neutral current transformer.
✱ 15 in. of mounting space is taken up by the back fed main lug kit or RG, RJ, RL main circuit breaker, leaving 93 in. of branch circuit breaker mounting space.
♦ Add-on door kit available. Example: For HCR86TS trim kit, order HCW86D door kit.

Table 9.99: Circuit Breaker / Sub-feed Lug Kit Mounting Space Requirement

Type of Circuit Breaker	Maximum Ampacity	No. of Poles	Inch Mounting Requirements	Type of Circuit Breaker	Maximum Ampacity	No. of Poles	Inch Mounting Requirements
FY	30 A	1	1.5	QB, QD, QG, QJ	225 A	3	4.5
FA, FH	100 A	1	1.5	JD, JG, JJ, JL, KI, SL250	250 A	2, 3	4.5
FA, FH		2	3	LA, LH, SL400	400 A		6
FA, FH, SL-100		3	4.5	LD, LG, LJ, LL	600 A		6
FI		2, 3	4.5	LC, LI, LXI	600 A		7.5
HD, HG	150 A	2	3	MG, MJ, MA, MH, SL800, PGC, PJC, PLC	800 A		9
HD, HG		3	4.5				
HJ, HL		2, 3	4.5	PG, PJ, PL, S33931	1200 A		
QB, QD, QG, QJ	225 A	2	3	RG, RJ, RL, RGC, RJC, RLC, S33930	1200 A		15

Table 9.100: Main Circuit Breaker Interiors —Standard Frame Types ◑

Main Circuit Breaker Ampacity	Panelboard Type	Factory Supplied Main Circuit Breaker
100	HCN	FA36100
225	HCN, HCM	JDA36225
400	HCN	LAP36400MB
	HCM	LAP36400MB
600 or 800	HCM, HCP	MGP36600 or MGP36800

◑ Circuit breaker interrupt ratings, starting on Digest page 7-2.

Table 9.101: Standard Copper Bus Interiors

Type	Main Ampacity
HCN	600
HCM, HCP-SU	800
HCP, HCR-U	800 and Above

Note: Merchandised copper interiors are not available in all ampacities. For example, if the application calls for a HCN 225 A copper bus interior, order an HCN 600 A interior .

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Blank Fillers

Equipment Ground Bar

Solid Neutral

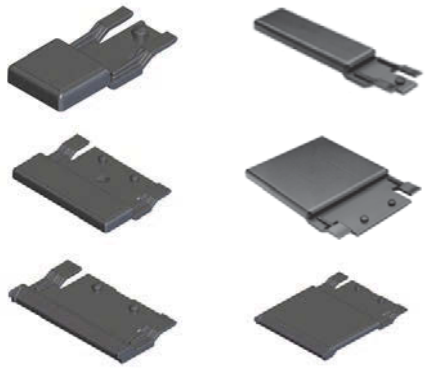
Table 9.102: I-Line Merchandised Panelboard Accessories

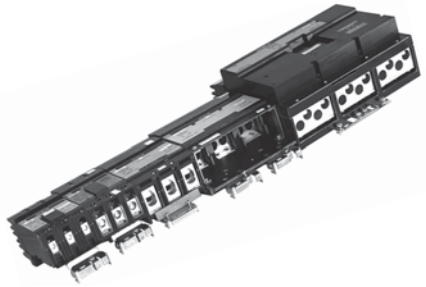
Description	Catalog No.	$ Price
Blank Fillers—1.5 in. (minimum order 3) ▼	HNM1BL	14.30
Blank Fillers—4.5 in. (minimum order 5) ▼	HNM4BL	25.20
Solid Neutral Assemblies		
225 A	HC2SN	252.00
400 A	HC4SN▲, HCW4SN■	333.00
600 A	HC6SN▲, HCW6SN■	464.00
800 A	HC8SN▲, HCW8SN■	717.00
	HCPSU8SN♦	1151.00
	HCPSU8SNCT♦	1269.00
1200 A	HCW12SN■	843.00
1200 A, for use with HCR-U universal panel only	HCWM12SN★	1151.00
1200 A, Including neutral CT for 3Ø4W systems	HCR12SNCT★	1269.00
Equipment Ground Bar Kits—HCN	PK27GTA	33.80
HCM, HCP, HCR-U	PK32DGTA	104.00
Blank Extensions (For replacement purposes)		
1.5 in. for mounting on wide side of I-Line panelboard (minimum order 3) ▼	HLW1BL	14.30
4.5 in. for mounting on wide side of I-Line panelboard (minimum order 5) ▼	HLW4BL	25.20
1.5 in. for mounting on narrow side of I-Line panelboard (minimum order 3) ▼	HLN1BL	14.30
4.5 in. for mounting on narrow side of I-Line panelboard (minimum order 5) ▼	HLN4BL	25.20
4.5 in. for mounting on wide side of I-Line panelboard (minimum order 5) ▼	HLW4EBL	25.20
4.5 in. for mounting on narrow side of I-Line panelboard (minimum order 5) ▼	HLN4EBL	25.20

▲ Used on Type HCN, HCM.
■ Used on 400 A, 600 A, 800 A, and 1200 A HCP (main lugs), and 600 A and 800 A (main circuit breaker).
♦ Used on Type HCP-SU.
★ Used on Type HCR-U.
▼ Blank extension pricing is per unit. Multiply the list price by the quantity ordered. Note minimum order quantity.

Table 9.103: Blank Extensions

Application	Circuit Breaker Mounting Ht.	Branch Circuit Side	Catalog Number
All applications, except Powerpact H/J with Micrologic trip unit 5/6	1.5 in.	Wide Side	HLW1BL
	4.5 in.		HLW4BL
All applications, except Powerpact H/J with Micrologic trip unit 5/6	1.5 in.	Narrow Side	HLN1BL
	4.5 in.		HLN4BL
Only Powerpact H/J circuit breakers with Micrologic trip unit 5/6	4.5 in.	Narrow Side	HLN4EBL
Only Powerpact H/J circuit breakers with Micrologic trip unit 5/6	4.5 in.	Wide Side	HLW4EBL


Blank Extensions


Sub-feed Lug Kits

For Surgelogic™ I-Line plug-on SPD unit pricing and information, see Digest pages 6-3 and 6-4.

For field-installable I-Line door kits, see the Supplemental and Obsolescence Digest, Section 4.

Table 9.104: Panelboard Adapter Kits

Crimp Lug Adapter Kits △	I-Line Panelboard Type			
	HCN	HCM	HCP, HCR-U □	$ Price
400 A	HCN400VCA	HCM400VCA	HCW400VCA	96.
600 A	HCN600VCA	HCM600VCA	HCW600VCA	197.
800 A	—	HCM800VCA	HCW800VCA	284.
1200 A	—	—	HCW1200VCA	491.

△ For use with MLO panel, order VCEL lugs seperately.
□ Not for use with P- or R-frame circuit breakers or sub-feed kits S33930 or S33931.

Table 9.105: Type 3R/5/12 Enclosures

Catalog Number	Interior Type	$ Price	Dimensions (In.)		
			H	W	D
HC4250WP	HCP	4952.	50	42	12.95
HC4259WP	HCP	4952.	59	42	12.95
HC4268WP	HCP	4952.	68	42	12.95
HC4286WP	HCP	4952.	86	42	12.95
HC4486WP	HCR-U	4952.	86	44	14.50

Table 9.106: Box Extensions

Catalog Number	Interior Type	Extension	$ Price
HC2609DEX (F or S)	HCP-SU	9 in.	552.
HC2609EX (F or S)	HCN	9 in.	552.
HC3209EX (F or S)	HCM	9 in.	552.
HC4212DEX (F or S)	HCP	12 in.	641.
HC4406DEX (F or S)	HCR-U	6 in.	552.
HC4412DEX (F or S)	HCR-U	12 in.	641.

Table 9.107: Sub-feed Lug Kits ◊☆

Ampere Rating	Height		Catalog Number	$ Price	Max. Short Circuit System Ratings RMS Symmetrical Amperes			Protected by Circuit Breaker	For Use in I-Line Panelboard Types
	In.	(mm)			240 Vac	480 Vac	600 Vac		
100 A	4.5	114	SL100	435.	65,000	25,000	18,000	FH	HCN, HCM, HCP, HCP-SU
250 A	4.5	114	SL250	435.	125,000	100,000	50,000	JL	HCM, HCP, HCP-SU
250 A	4.5	114	SL250	435.	200,000	200,000	100,000	KI	
400 A	6	152	SL400▽	585.	65,000	35,000	25,000	LH	HCP, HCP-SU
800 A	9	229	SL800	1731.	65,000	65,000	25,000	MJ	HCM, HCP, HCP-SU
				1731.	125,000	100,000	50,000	LL	
1200 A	9	229	S33931	3500.	100,000	65,000	25,000	MJ, PJ	HCP, HCP-SU, HCR-U
1200 A	15	381	S33930	3500.	125,000	100,000	50,000	RL	

◊ Plug-on in same manner as a branch circuit breaker
☆ For other ratings, See the I-Line Information Manual, #80043-309-xx.
▽ SL400 cannot be used in HCM panelboards due to inadequate wire bending space.

Table 9.108: Sub-feed Lug kit terminal data

Catalog No. (Prefix)	No. Poles	Ampere Rating	Std. Lug Kit Catalog No.	Standard Lug Wire Size ◒
SL100	3	100 A	AL100FA	#14–1/0 AWG Cu or #12–1/0 AWG Al
SL250	3	250 A	—	#4 AWG–300 kcmil
SL400	3	400 A	AL400LA	one #1 AWG–600 kcmil or two #1 AWG–250 kcmil
SL800	3	800 A	AL900MA	(3) #3/0 AWG–500 kcmil
S33931	3	1200 A	AL1200P24K	(4) #3/0 AWG–500 kcmil
S33930	3	1200 A	AL1200R53K	(4) #3/0 AWG–600 kcmil

◒ Unless otherwise specified, wire sizes apply to both aluminum and copper conductors.

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Table 9.109: QO™ Distribution Panel—240 Vac Max. Only Mounts in Type HCN, HCM, HCP, HCP-SU, or HCR-U I-Line panelboards, 30 A max. branch circuit breaker. Order QO plug-on circuit breakers from page 9-34.

Maximum No. 1-pole QO Circuit Breakers	Phase Connection	Mounting Height		2-pole Catalog Number	3-pole Catalog Number	$ Price ▲
		In.	mm			
6	AB	4.5	114	HQO206AB	—	369.
6	BC	4.5	114	HQO206BC	—	369.
6	AC	4.5	114	HQO206AC	—	369.
6	ABC	4.5	114	—	HQO306	369.

▲ Includes (5) QO1DB dummy circuit breakers.

FA/FH, 1-pole
1.5 in (38 mm)
Mounting Height

FA/FH, 2-pole
3 in (76 mm)
Mounting Height

FA/FH, 3-pole
4.5 in (114 mm)
Mounting Height

Table 9.110: Example: FJA, 20 A 1-pole, 277 Vac and 70 A 2- and 3-pole QB 240 Vac. Use phase option number for HD, HG, HJ, HL, JD, JG, JJ, JL, MG, and MJ.

Phase Option Number	Phase Connection	1-pole	2-pole	3-pole
1	A	FJA140201	—	—
3	B	FJA140203	—	—
5	C	FJA140205	—	—
1	AB	—	QBA220701	—
2	AC	—	QBA220702	—
3	BA	—	QBA220703	—
4	BC	—	QBA220704	—
5	CA	—	QBA220705	—
6	CB	—	QBA220706	—
Standard ■	ABC	—	—	QBA32070
6	CBA	—	—	QBA320706

■ The absence of a phase option number after a 3-pole catalog number will result in an ABC phase connection.

Table 9.111: Example: FA, 30 A, 480 Vac. Use phase option letters for FH, FI, KI, LA, LH, LC, and LI.

Phase Option Letter	1-pole	2-pole	3-pole
A	FA14035A	—	—
B	FA14035B	—	—
C	FA14035C	—	—
AB	—	FA24030AB	—
AC	—	FA24030AC	—
BC	—	FA24030BC	—
ABC	—	—	FA34030
CBA	—	—	FA34030CBA

Table 9.112: Interrupt Ratings (kA)

	FA (240 V)	FA (480 V)	FJ
240 V	10	18 (1P), 25 (2, 3P)	65
277 V	—	18	65
480 V	—	18	—
600 V	—	—	—

F-frame accessories . . . . . starting on Supplemental Digest page 3-24
F-frame dimensions . . . . . Digest page 7-54
F-frame optional lugs . . . . . Digest page 7-51

PowerPact™ D-frame Mission Critical Circuit Breakers

When the D-frame Mission Critical circuit breaker is used as a main circuit breaker with QO branch circuit breakers, the D-frame MC will remain closed during any fault that occurs downstream of the QO circuit breaker up to 30kA at 208Y/120 Vac.

Table 9.113: PowerPact D-frame, 150–600 A–Mission Critical

Circuit Breaker Cat.alog Number ♦	Continuous Current Rating	Terminal Wire Range (AWG/kcmil)	$ Price
DJA32150W	150 A	#2-600 Cu or #2-500 Al	10867.
DJA32250W	250 A		10867.
DJA32400W	400 A		10867.
DJA32600W	600 A	(2) 2/0-350 Cu or (2) 2/0-500Al	17148.

♦ D-frame circuit breakers 400 A and below are 100% rated.

D-frame accessories, lugs . . . . . starting on Supplemental Digest page 3-27
D-frame dimensions . . . . . Digest page 7-55

Table 9.114: F-frame—100 A, Thermal-magnetic (240 Vac)

Ampere Rating	AC Magnetic Trip Settings		Standard Interrupting		Terminal Wire Range
	Hold	Trip	Catalog Number	$ Price	
2-pole, 240 Vac ★					
15 A	275	600	FA22015( )	398.	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20 A			FA22020( )		
25 A			FA22025( )		
30 A			FA22030( )		
35 A	400	850	FA22035( )		AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40 A			FA22040( )		
45 A			FA22045( )		
50 A			FA22050( )		
60 A	800	1450	FA22060( )		
70 A			FA22070( )	617.	
80 A			FA22080( )		
90 A	900	1700	FA22090( )		
100 A			FA22100( )		
3-pole, 240 Vac					
15 A	275	600	FA32015	572.	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20 A			FA32020		
25 A			FA32025		
30 A			FA32030		
35 A	400	850	FA32035	572.	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40 A			FA32040		
45 A			FA32045		
50 A			FA32050		
60 A	800	1450	FA32060	572.	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
70 A			FA32070	780.	
80 A			FA32080		
90 A	900	1700	FA32090	780.	AL100FA #14–#1/0 AWG Cu
100 A			FA32100		

★ 1- and 2-pole circuit breaker catalog numbers are completed by adding the required phase connection letters as a suffix.

Table 9.115: F-frame—100 A, Thermal-magnetic (480 Vac)

Ampere Rating	AC Magnetic Trip Settings		Standard Interrupting		Extra High Interrupting		Terminal Wire Range	
	Hold	Trip	Catalog Number	$ Price	Catalog Number	$ Price	FY/FA Lugs	FJ/FC Lugs
1-pole, 277 Vac, 125 Vdc ▼								
15 A	275	600	FY14015( )△	149.	FJA14015( )	651.	AL50FA #14-#4 AWG Cu, or #12-#4 AWG Al	AL30FD #12–#6 AWG Al, or #14–#6 AWG Cu
20 A			FY14020( )△		FJA14020( )			
25 A			FY14025( )△		FJA14025( )			
30 A			FY14030( )△		FJA14030( )			
35 A	400	850	FA14035( )□	302.	FJA14035( )	651.	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	AL100FD #12–#2/0 AWG Al or #14–#2/0 AWG Cu
40 A			FA14040( )□		FJA14040( )			
45 A			FA14045( )□		FJA14045( )			
50 A			FA14050( )□		FJA14050( )			
60 A	800	1450	FA14060( )□	302.	FJA14060( )	651.		
70 A			FA14070( )□		FJA14070( )	720.		
80 A			FA14080( )□		—	—		
90 A	900	1700	FA14090( )□	302.	—	—		
100 A			FA14100( )□		—	—		
2-pole, 480 Vac, 250 Vdc ▼△□								
15 A	275	600	FA24015( )	651.	—	—	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al	CU30FA4 one #14–#10 AWG Cu only
20 A			FA24020( )		—	—		
25 A			FA24025( )		—	—		
30 A			FA24030( )		—	—		
35 A	400	850	FA24035( )	651.	—	—	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	AL100FA4 one #14–#3 AWG Cu or one #12–#1 AWG Al
40 A			FA24040( )		—	—		
45 A			FA24045( )		—	—		
50 A			FA24050( )		—	—		
60 A	800	1450	FA24060( )	651.	—	—		
70 A			FA24070( )	833.	—	—		
80 A			FA24080( )		—	—		
90 A	900	1700	FA24090( )	833.	—	—		
100 A			FA24100( )		—	—		
3-pole, 480 Vac, 250 Vdc ▼								
15 A	275	600	FA34015	833.	—	—	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al	CU30FA4 one #14–#10 AWG Cu only
20 A			FA34020		—	—		
25 A			FA34025		—	—		
30 A			FA34030		—	—		
35 A	400	850	FA34035	833.	—	—	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	AL100FA4 one #14–#3 AWG Cu or one #12–#1 AWG Al
40 A			FA34040		—	—		
45 A			FA34045		—	—		
50 A			FA34050		—	—		
60 A	800	1450	FA34060	833.	—	—		
70 A			FA34070	996.	—	—		
80 A			FA34080		—	—		
90 A	900	1700	FA34090	996.	—	—		
100 A			FA34100		—	—		

▼ 1- and 2-pole circuit breaker catalog numbers are completed by adding the required phase connection letters as a suffix.
△ Rated 277 Vac 15 and 20 A FY circuit breakers are rated for switching duty (SWD). 15, 20, 25, and 30 A FA I-Line circuit breakers are also available (no SWD rating).
□ Rated 277 Vac, 125 Vdc, except FY circuit breakers, which have no dc rating. 15–30 A circuit breakers suitable for use with 60 °C or 75 °C conductors. 35–100 A circuit breakers are suitable for use with 75 °C conductors.

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FI36100
2- and 3-pole
4.5 in (114 mm)
Mounting Height

QB/QD/QG/QJ
Mounting Height:
2-pole—3 in (76 mm)
3-pole—4.5 in (114 mm)

Table 9.116: F-frame—100 A, Thermal-magnetic (600 Vac)

Ampere Rating	AC Magnetic Trip Settings		Standard Interrupting		High Interrupting		Current Limiting		Terminal Wire Range
	Hold	Trip	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	
1-pole, 277 Vac, 125 Vdc ▲									
15 A	275	600	—	—	FH16015( )	**507.**	—	—	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20 A			—	—	FH16020( )		—	—	
25 A			—	—	FH16025( )		—	—	
30 A			—	—	FH16030( )		—	—	
35 A	400	850	—	—	FH16035( )	**507.**	—	—	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40 A			—	—	FH16040( )		—	—	
45 A			—	—	FH16045( )		—	—	
50 A			—	—	FH16050( )		—	—	
60 A	800	1450	—	—	FH16060( )	**507.**	—	—	
70 A			—	—	FH16070( )	**563.**	—	—	
80 A			—	—	FH16080( )		—	—	
90 A	900	1700	—	—	FH16090( )	**563.**	—	—	
100 A			—	—	FH16100( )		—	—	
2-pole, 600 Vac, 250 Vdc ▲									
15 A	275	600	FA26015( )	**780.**	FH26015( )	**1214.**	—	—	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20 A			FA26020( )		FH26020( )		FI26020( )	**2763.**	
25 A			FA26025( )		FH26025( )		—	—	
30 A			FA26030( )		FH26030( )		FI26030( )	**2763.**	
35 A	400	850	FA26035( )	**780.**	FH26035( )	**1214.**	—	—	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40 A			FA26040( )		FH26040( )		FI26040( )	**2763.**	
45 A			FA26045( )		FH26045( )		—	—	
50 A			FA26050( )		FH26050( )		FI26050( )	**2763.**	
60 A	800	1450	FA26060( )	**780.**	FH26060( )	**1214.**	FI26060( )	**2763.**	
70 A			FA26070( )	**947.**	FH26070( )	**1452.**	FI26070( )		
80 A			FA26080( )		FH26080( )		FI26080( )		
90 A	900	1700	FA26090( )	**947.**	FH26090( )	**1452.**	FI26090( )	**2763.**	
100 A			FA26100( )		FH26100( )		FI26100( )		
3-pole, 600 Vac, 250 Vdc									
15 A	275	600	FA36015	**971.**	FH36015	**1446.**	—	—	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20 A			FA36020		FH36020		FI36020	**3459.**	
25 A			FA36025		FH36025		—	—	
30 A			FA36030		FH36030		FI36030	**3459.**	
35 A	400	850	FA36035	**971.**	FH36035	**1446.**	—	—	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40 A			FA36040		FH36040		FI36040	**3459.**	
45 A			FA36045		FH36045		—	—	
50 A			FA36050		FH36050		FI36050	**3459.**	
60 A	800	1450	FA36060	**971.**	FH36060	**1446.**	FI36060	**3459.**	
70 A			FA36070	**1163.**	FH36070	**1632.**	FI36070		
80 A			FA36080		FH36080		FI36080		
90 A	900	1700	FA36090	**1163.**	FH36090	**1632.**	FI36090	**3459.**	
100 A			FA36100		FH36100		FI36100		

▲ 1- and 2-pole circuit breaker catalog numbers are completed by adding the required connection letters as a suffix, See Digest page 9-24.

NOTE: *As of January 1st, FI breakers will only fit on the wide side of I-Line panelboards.*

Table 9.117: PowerPact™ Q-frame ■— 225 A, Thermal-magnetic (240 Vac)

Ampere Rating	AC Magnetic Trip Settings		"B" Interrupting		"D" Interrupting		"G" Interrupting		"J" Interrupting	
	Hold	Trip	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
2-pole, 240 Vac ♦										
70 A	1000	1800	QBA22070( )	**600.**	QDA22070( )	**1202.**	QGA22070( )	**1593.**	QJA22070( )	**1992.**
80 A			QBA22080( )		QDA22080( )		QGA22080( )		QJA22080( )	
90 A			QBA22090( )		QDA22090( )		QGA22090( )		QJA22090( )	
100 A	1200	2400	QBA22100( )		QDA22100( )		QGA22100( )		QJA22100( )	
110 A			QBA22110( )		QDA22110( )		QGA22110( )		QJA22110( )	
125 A			QBA22125( )		QDA22125( )		QGA22125( )		QJA22125( )	
150 A			QBA22150( )		QDA22150( )		QGA22150( )		QJA22150( )	
175 A			QBA22175( )		QDA22175( )		QGA22175( )		QJA22175( )	
200 A			QBA22200( )		QDA22200( )		QGA22200( )		QJA22200( )	
225 A			QBA22225( )		QDA22225( )		QGA22225( )		QJA22225( )	
3-pole, 240 Vac ★										
70 A	1000	1800	QBA32070( )	**1913.**	QDA32070( )	**2069.**	QGA32070( )	**2835.**	QJA32070( )	**3245.**
80 A			QBA32080( )		QDA32080( )		QGA32080( )		QJA32080( )	
90 A			QBA32090( )		QDA32090( )		QGA32090( )		QJA32090( )	
100 A	1200	2400	QBA32100( )		QDA32100( )		QGA32100( )		QJA32100( )	
110 A			QBA32110( )		QDA32110( )		QGA32110( )		QJA32110( )	
125 A			QBA32125( )		QDA32125( )		QGA32125( )		QJA32125( )	
150 A			QBA32150( )		QDA32150( )		QGA32150( )		QJA32150( )	
175 A			QBA32175( )		QDA32175( )		QGA32175( )		QJA32175( )	
200 A			QBA32200( )		QDA32200( )		QGA32200( )		QJA32200( )	
225 A			QBA32225( )		QDA32225( )		QGA32225( )		QJA32225( )	

■ Replacement lugs are not available on QB, QD, QG, or QJ circuit breakers. Lugs for QB, QD, QG, or QJ circuit breakers accept one #4 AWG–300 kcmil. No accessories are available for PowerPact Q Frame breakers.

♦ 2-pole QB, QD, QG, and QJ circuit breakers are completed by adding the required phasing numbers as indicated in the parentheses, See Digest page 9-24.

★ 3-pole QB, QD, QG, and QJ circuit breakers for ABC phasing are complete without additional phasing number. For CBA phasing, complete the catalog number by inserting the number "6" in the parentheses.

Table 9.118: Interrupt Ratings (kA)

	FA	FH	FI	QB	QD	QG	QJ ▼
240 V	25	25 (1P 35–100 A), 65 (1P 15–30 A, 2P, 3P)	200	10	25	65	100
480 V	18	25 (2, 3P)		—	—	—	—
600 V	14	18 (2, 3P)	100	—	—	—	—

▼ 3-pole QJ circuit breakers are rated at 208Y/120 Vac only.

F-frame accessories . . . . . starting on Supplemental Digest page 3-24
F-frame dimensions . . . . . .Digest page 7-54
F-frame optional lugs . . . . . .Digest page 7-51

Q-frame accessories . . . . . Digest page 7-38
. . . . . .starting on Supplemental Digest page 3-24
Q-frame dimensions . . . . . .Digest page 7-54
Q-frame optional lugs . . . . . .Supplemental Digest page 3-29

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Table 9.119: H-frame 150 A Thermal-Magnetic UL Current-Limiting▲ Circuit Breakers (600 Vac, 250 Vdc) With Factory Sealed Trip Unit■ Suitable for Reverse Connection■

Current Rating @ 40°C	Fixed AC Magnetic Trip		Cat. No.♦	Interrupting Rating (2nd Letter of Catalog Number)				Terminal Wire Range
				D	G	J▲	L▲	
				$ Price				
	Hold	Trip		80% Rated	80% Rated	80% Rated	80% Rated	
H-frame, 150A 2P, 600 Vac 50/60 Hz, 250 Vdc▲								
15 A	350 A	750 A	H( )A26015( )	899.	1338.	1589.	2364.	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )A26020( )	899.	1338.	1589.	2483.	
25 A	350 A	750 A	H( )A26025( )	899.	1338.	1589.	2483.	
30 A	350 A	750 A	H( )A26030( )	899.	1338.	1589.	2483.	
35 A	400 A	850 A	H( )A26035( )	899.	1338.	1589.	2483.	
40 A	400 A	850 A	H( )A26040( )	899.	1338.	1589.	2483.	
45 A	400 A	850 A	H( )A26045( )	899.	1338.	1589.	2483.	
50 A	400 A	850 A	H( )A26050( )	899.	1338.	1589.	2483.	
60 A	800 A	1450 A	H( )A26060( )	899.	1338.	1589.	2483.	
70 A	800 A	1450 A	H( )A26070( )	1088.	1559.	1824.	2681.	
80 A	800 A	1450 A	H( )A26080( )	1088.	1559.	1824.	2681.	
90 A	800 A	1450 A	H( )A26090( )	1088.	1559.	1824.	2681.	
100 A	800 A	1700 A	H( )A26100( )	1088.	1559.	1824.	2681.	
110 A	900 A	1700 A	H( )A26110( )	2195.	3212.	4671.	5699.	
125 A	900 A	1700 A	H( )A26125( )	2195.	3212.	4671.	5699.	
150 A	900 A	1700 A	H( )A26150( )	2195.	3212.	4671.	5699.	
H-frame 150A 3P, 600 Vac 50/60 Hz, 250 Vdc								
15 A	350 A	750 A	H( )A36015	1124.	1575.	1988.	2993.	AL150HD 14–3/0 AWG Al or Cu
20 A	350 A	750 A	H( )A36020	1124.	1575.	1988.	2993.	
25 A	350 A	750 A	H( )A36025	1124.	1575.	1988.	2993.	
30 A	350 A	750 A	H( )A36030	1124.	1575.	1988.	2993.	
35 A	400 A	850 A	H( )A36035	1124.	1575.	1988.	2993.	
40 A	400 A	850 A	H( )A36040	1124.	1575.	1988.	2993.	
45 A	400 A	850 A	H( )A36045	1124.	1575.	1988.	2993.	
50 A	400 A	850 A	H( )A36050	1124.	1575.	1988.	2993.	
60 A	800 A	1450 A	H( )A36060	1124.	1575.	1988.	2993.	
70 A	800 A	1450 A	H( )A36070	1361.	1772.	2225.	3243.	
80 A	800 A	1450 A	H( )A36080	1361.	1772.	2225.	3243.	
90 A	800 A	1450 A	H( )A36090	1361.	1772.	2225.	3243.	
100 A	800 A	1700 A	H( )A36100	1361.	1772.	2225.	3243.	
110 A	900 A	1700 A	H( )A36110	2730.	3779.	5432.	6951.	
125 A	900 A	1700 A	H( )A36125	2730.	3779.	5432.	6951.	
150 A	900 A	1700 A	H( )A36150	2730.	3779.	5432.	6951.	

▲ 2 pole circuit breaker catalog numbers are completed by adding the required phase connection number as a suffix see Table 9.128.

Table 9.120: J-frame 250 A Thermal-Magnetic UL Current-Limiting▲ Circuit Breakers (600 Vac, 250 Vdc) With Factory Sealed Trip Unit■ Suitable for Reverse Connection■

Current Rating @ 40°C	Adjustable AC Magnetic Trip		Cat. No.♦	Interrupting Rating (2nd Letter of Catalog Number)					Terminal Wire Range
				D	G	J▲	L▲	R▲	
				$ Price					
	Low	High		80% Rated	80% Rated	80% Rated	80% Rated	80% Rated	
J-frame 250A 2P, 600 Vac 50/60 Hz, 250 Vdc▲									
150 A	750 A	1500 A	J( )A26150( )	2283.	3372.	4904.	5985.	—	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )A26175( )	2283.	3372.	4904.	5985.	—	
200 A	1000 A	2000 A	J( )A26200( )	2283.	3372.	4904.	5985.	—	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )A26225( )	2283.	3372.	4904.	5985.	—	
250 A	1250 A	2500 A	J( )A26250( )	3138.	4463.	6536.	7338.	—	
J-frame 250A 3P, 600 Vac 50/60 Hz, 250 Vdc									
150 A	750 A	1500 A	J( )A36150	2867.	3968.	5705.	7299.	9676.	AL175JD 4–4/0 AWG Al or Cu
175 A	875 A	1750 A	J( )A36175	2867.	3968.	5705.	7299.	9676.	
200 A	1000 A	2000 A	J( )A36200	2867.	3968.	5705.	7299.	9676.	AL250JD 3/0 AWG–350 kcmil Al or Cu
225 A	1125 A	2250 A	J( )A36225	2867.	3968.	5705.	7299.	9676.	
250 A	1250 A	2500 A	J( )A36250	3936.	5252.	7599.	9173.	11729.	

▲ 2 pole circuit breaker catalog numbers are completed by adding the required phase connection number as a suffix see Table 9.128.

Table 9.121: H-frame 150 A and J-frame 250 A Electronic Trip UL Current-Limiting▲ Circuit Breakers (600 Vac) With Factory Sealed Trip Unit■ Suitable for Reverse Connection ★

Electronic Trip Unit			Sensor Rating	Cat. No.♦	Interrupting Rating (2nd Letter of Catalog Number)					Terminal
					D	G	J▲	L▲	R▲	
					$ Price					
Type	Function	Trip Unit			80% Rated	80% Rated	80% Rated	80% Rated	80% Rated	
600 Vac, 50/60 Hz, 3P										
Micrologic Standard	LI	3.2□	60 A	H( )A36060U31X	1316.	1743.	2224.	3173.	4171.	AL150HD▼
			100 A	H( )A36100U31X	1569.	1962.	2382.	3490.	4591.	
			150 A	H( )A36150U31X	2911.	3965.	5626.	7288.	9631.	
			250 A	J( )A36250U31X	3120.	4226.	5970.	7715.	10102.	AL250JD△
	LSI	3.2S□	60 A	H( )A36060U33X	1512.	1939.	2420.	3370.	4393.	AL150HD▼
			100 A	H( )A36100U33X	1765.	2159.	2578.	3686.	4813.	
			150 A	H( )A36150U33X	3107.	4161.	5823.	7484.	9853.	
			250 A	J( )A36250U33X	3398.	4505.	6249.	7994.	10420.	AL250JD△
Micrologic Ammeter	LSI	5.2A	60 A	H( )A36060U43X	2143.	2570.	3051.	4001.	5185.	AL150HD▼
			100 A	H( )A36100U43X	2396.	2789.	3209.	4317.	5653.	
			150 A	H( )A36150U43X	3738.	4792.	6453.	8115.	10836.	
			250 A	J( )A36250U43X	4299.	5406.	7150.	8895.	11561.	AL250JD△
Micrologic Energy	LSI	5.2E	60 A	H( )A36060U53X	2523.	2950.	3431.	4380.	5883.	AL150HD▼
			100 A	H( )A36100U53X	2776.	3169.	3589.	4697.	6333.	
			150 A	H( )A36150U53X	4118.	5172.	6833.	8495.	11342.	
			250 A	J( )A36250U53X	4840.	5947.	7691.	9436.	12413.	AL250JD△
Micrologic Ammeter	LSIG	6.2A	60 A	H( )A36060U44X	2902.	3330.	3811.	4760.	6423.	AL150HD▼
			100 A	H( )A36100U44X	3156.	3549.	3969.	5077.	6873.	
			150 A	H( )A36150U44X	4497.	5551.	7213.	8875.	11864.	
			250 A	J( )A36250U44X	5381.	6487.	8231.	9976.	13157.	AL250JD△
Micrologic Energy	LSIG	6.2E	60 A	H( )A36060U54X	3282.	3709.	4190.	5140.	6963.	AL150HD▼
			100 A	H( )A36100U54X	3535.	3929.	4349.	5456.	7413.	
			150 A	H( )A36150U54X	4877.	5931.	7593.	9254.	12386.	
			250 A	J( )A36250U54X	5921.	7028.	8772.	10517.	13900.	AL250JD△

▲ Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
■ See Supplemental Digest pages 3-2 and 3-3 for circuit breakers with field-interchangeable trip units
♦ To complete catalog number, replace the blank with the appropriate rating (D, G, J, L).
★ For applications requiring communications, see Digest page 7-49.
▼ AL150HD wire range is 14–3/0 AWG Al or Cu.
△ AL250JD wire range is 3/0 AWG–350 kcmil Al or Cu. For smaller wire range (4–4/0 AWG Al or Cu), replace the lug's wire binding screws with the larger binding screws provided.
□ 3P circuit breakers with this trip unit can be used for 2P applications.

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Table 9.122: K-frame—250 A, Thermal-magnetic, Current Limiting (600 Vac)

KI36250
2- and 3-pole
4.5 in (114 mm)
Mounting Height

Ampere Rating	AC Magnetic Trip Settings		Current Limiting		Terminal Wire Range
	Low	High	Catalog Number	$ Price	
2-pole, 600 Vac, 250 Vdc ▲					
110 A	550	1100	KI26110( )	**6633.**	AL250KA
125 A	625	1250	KI26125( )	**6633.**	one #4 AWG–
150 A	750	1500	KI26150( )	**6633.**	350 kcmil
175 A	875	1750	KI26175( )	**6633.**	Al or Cu
200 A	1000	2000	KI26200( )	**6633.**	AL250KI
225 A	1125	2250	KI26225( )	**6633.**	one #1/0 AWG–
250 A	1250	2500	KI26250( )	**7704.**	350 kcmil Al or Cu
3-pole, 600 Vac, 250 Vdc					
110 A	550	1100	KI36110	**8375.**	AL250KA
125 A	625	1250	KI36125	**8375.**	one #4 AWG–
150 A	750	1500	KI36150	**8375.**	350 kcmil
175 A	875	1750	KI36175	**8375.**	Al or Cu
200 A	1000	2000	KI36200	**8375.**	AL250KI
225 A	1125	2250	KI36225	**8375.**	one #1/0 AWG–
250 A	1250	2500	KI36250	**9267.**	350 kcmil Al or Cu

▲ 2-pole circuit breaker catalog numbers are completed by adding required phase connection letters as suffix to catalog number. See Digest page 9-24.

J-Frame Mission Critical Circuit Breaker

Table 9.123: J-frame 250 A Electronic Trip Mission Critical Circuit Breakers (480/277 Vac) With Factory Sealted Trip Units Suitable for Reverse Connection▲

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	D Interrupting		G Interrupting		J Interrupting		L Interrupting		Terminal
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	
Standard	LI	3.2 W	250	JDA34250WU31X	**3619.**	JGA34250WU31X	**4857.**	JJA34250WU31X	**6808.**	JLA34250WU31X	**8759.**	AL250JD■
Standard	LSI	3.2S-W	250	JDA34250WU33X	**3931.**	JGA34250WU33X	**5169.**	JJA34250WU33X	**7119.**	JLA34250WU33X	**9071.**	AL250JD■
High Perf. Ammerter	LSI	5.2A-W	250	JDA34250WU43X	**4939.**	JGA34250WU43X	**6176.**	JJA34250WU43X	**8127.**	JLA34250WU43X	**10079.**	AL250JD■
High Perf. Energy	LSI	5.2E-W	250	JDA34250WU53X	**5544.**	JGA34250WU53X	**6782.**	JJA34250WU53X	**8732.**	JLA34250WU53X	**10684.**	AL250JD■
High perf. Ammerter	LSIG	6.2A-W	250	JDA34250WU44X	**6148.**	JGA34250WU44X	**7386.**	JJA34250WU44X	**9336.**	JLA34250WU44X	**11288.**	AL250JD■
High Perf. Energy	LSIG	6.2E-W	250	JDA34250WU54X	**6753.**	JGA34250WU54X	**7991.**	JJA34250WU54X	**9942.**	JLA34250WU54X	**11893.**	AL250JD■

▲ Standard rated (80%). Not available in 100% rated.
■ AL250JD terminal wire range is (1) 3/0 AWG–350 kcmil Al or Cu.

L-Frame Mission Critical Circuit Breaker

Table 9.124: L-frame 600 A Electronic Trip Mission Critical Circuit Breakers (480/277 Vac) With Factory Sealted Trip Units Suitable for Reverse Connection▲

Electronic Trip Unit Type	Trip Function	Trip Unit	Continuous Current	D Interrupting		G Interrupting		J Interrupting		L Interrupting		Terminal
				Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	
Standard	LI	3.3 W	250	LDA34250WU31X	**5991.**	LGA34250WU31X	**6291.**	LJA34250WU31X	**10299.**	LLA34250WU31X	**11998.**	AL400L61K3■
			400	LDA34400WU31X	**5991.**	LGA34400WU31X	**6291.**	LJA34400WU31X	**10299.**	LLA34400WU31X	**11998.**	AL600LF52K3♦
			600	LDA34600WU31X	**8684.**	LGA34600WU31X	**9126.**	LJA34600WU31X	**12733.**	LLA34600WU31X	**14263.**	
Standard	LSI	3.3S-W	250	LDA34250WU33X	**6656.**	LGA34250WU33X	**6990.**	LJA34250WU33X	**10999.**	LLA34250WU33X	**12698.**	AL400L61K3■
			400	LDA34400WU33X	**6656.**	LGA34400WU33X	**6990.**	LJA34400WU33X	**10999.**	LLA34400WU33X	**12698.**	AL600LF52K3♦
			600	LDA34600WU33X	**9349.**	LGA34600WU33X	**9826.**	LJA34600WU33X	**13433.**	LLA34600WU33X	**14962.**	
High Perf. Ammeter	LSI	5.3A-W	400	LDA34400WU43X	**7674.**	LGA34400WU43X	**8062.**	LJA34400WU43X	**12070.**	LLA34400WU43X	**13769.**	AL600LF52K3♦
			600	LDA34600WU43X	**10366.**	LGA34600WU43X	**10896.**	LJA34600WU43X	**14503.**	LLA34600WU43X	**16033.**	
High Perf. Energy	LSI	5.3E-W	400	LDA34400WU53X	**8791.**	LGA34400WU53X	**9238.**	LJA34400WU53X	**13247.**	LLA34400WU53X	**14946.**	AL600LF52K3♦
			600	LDA34600WU53X	**11485.**	LGA34600WU53X	**12074.**	LJA34600WU53X	**15681.**	LLA34600WU53X	**17210.**	
High Perf. Ammeter	LSIG	6.3A-W	400	LDA34400WU44X	**9911.**	LGA34400WU44X	**10417.**	LJA34400WU44X	**14426.**	LLA34400WU44X	**16125.**	AL600LF52K3♦
			600	LDA34600WU44X	**12604.**	LGA34600WU44X	**13251.**	LJA34600WU44X	**17139.**	LLA34600WU44X	**18388.**	
High Perf. Energy	LSIG	6.3E-W	400	LDA34400WU54X	**11029.**	LGA34400WU54X	**11594.**	LJA34400WU54X	**15602.**	LLA34400WU54X	**17301.**	AL600LF52K3♦
			600	LDA34600WU54X	**13722.**	LGA34600WU54X	**14429.**	LJA34600WU54X	**18036.**	LLA34600WU54X	**19566.**	

▲ Standard rated (80%). Not available in 100% rated.
■ AL400L61K3 terminal wire range is (1) #2 AWG–500 kcmil Al or #2 AWG–600 kcmil Cu..
♦ AL600LF52K3 terminal wire range is (2) #3/0 AWG–500 kcmil Al or Cu.

Table 9.125: PowerPact™ H-, J-, and L-frame Automatic Molded Case Switches, 600 Vac

Circuit Breaker	Poles	Ampere Rating	G Withstand			L Withstand			R Withstand			Terminal	Wire Range
			Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point	Cat. No.	$ Price	Trip Point		
H-frame J-frame	2▲	150 A	HGA26000S15( )	**1349.**	2250 A	HLA26000S15	**1590.**	2250 A	—	—	—	—	—
		175 A	JGA26000S17( )	**1827.**	3125 A	JLA26000S17	**1980.**	3125 A	—	—	—	—	—
		250 A	JGA26000S25( )	**1827.**	3125 A	JLA26000S25	**1980.**	3125 A	—	—	—	—	—
	3	150 A	HGA36000S15	**1799.**	2250 A	HLA36000S15	**1988.**	2250 A	HRA36000S15	**2295.**	2250 A	AL150HD	14 AWG–3/0 AWG Al/Cu
		175 A	JGA36000S17	**2286.**	3125 A	JLA36000S17	**2475.**	3125 A	JRA36000S17	**2860.**	3125 A	AL175JD	4–4/0 AWG Al/Cu
		250 A	JGA36000S25	**2286.**	3125 A	JLA36000S25	**2475.**	3125 A	JRA36000S25	**2860.**	3125 A	AL250JD	3/0 AWG–350 kcmil Al/Cu
L-frame	3	400 A	LGA36000S40X	**4572.**	4800 A	LLA36000S40X	**4972.**	4800 A	LRA36000S40X	**5688.**	4800 A	AL150HD	AL600LS52K3
		600 A	LGA36000S60X	**5065.**	6600A	LLA36000S60X	**5465.**	6600 A	LRA36000S60X	**6220.**	6600 A	AL250JD	(2) 2/0 AWG–500 kcmil Al/Cu

▲ 2-pole circuit breaker catalog numbers are completed by adding the required phase connection number as a suffix, see Table 9.128.

Table 9.126: KI Interrupt Ratings (kA)

V	KI
240	200
480	200
600	100

Table 9.127: Interrupt Ratings (kA)

	D	G	J	L
240 V	25	65	100	125
480 V	18	35	65	100

Table 9.128: Phase Options—Example HDA26150( )

Phase Option Number	Phase Connection	2-pole	3-pole
1	AB	HDA261501	—
2	AC	HDA261502	—
3	BA	HDA261503	—
4	BC	HDA261504	—
5	CA	HDA261505	—
6	CB	HDA261506	—
Standard	ABC	—	JDA34250WU31X
6	CBA	—	JDA34250WU31X6

K-frame accessories . . . . . starting on Supplemental Digest page 3-25
K-frame dimensions. . . . . Supplemental Digest page 3-33
K-frame optional lugs. . . . . Supplemental Digest page 3-28
H-, J-, and L-frame accessories . . . . . starting on Digest page 7-36
H-, J-, and L-frame dimensions. . . . . starting on Digest page 7-54
H-, J-, and L-frame optional lugs. . . . . Digest page 7-39

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LA Mission Critical Circuit Breakers

The LA High Magnetic Withstand MC Circuit Breakers are designed to trip at a higher magnetic trip level (18–20 times handle rating) than typical molded case circuit breakers (MCCBs) (which trip at 5–10 times the handle rating). The high magnetic withstand value of these LA circuit breakers allow the downstream branch circuit breaker to clear the fault.

LA/LH
2- and 3-pole
6 in (152 mm)
Mounting Height

Table 9.129: L-frame—400 A, I-Line™ LA/LH MC High Magnetic Withstand Circuit Breaker For Mission Critical Loads

Ampere Rating	AC Magnetic Level Factory Set ▲		Standard Interrupting		High Interrupting		Terminal	
	Hold	Trip	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	Wire Range
LA/LH MC Circuit Breaker, 3P, 480 Vac								
200 A	3400 A	4000 A	LA34200MC	**5571.**	LH34200MC	**8771.**	AL250LAMC	(1) 250–350 kcmil Al (1) 3/0 AWG–350 kcmil Cu
225 A	3825 A	4500 A	LA34225MC	**5571.**	LH34225MC	**8771.**		
250 A	4250 A	5000 A	LA34250MC	**5681.**	LH34250MC	**8882.**		
400 A	6000 A	7200 A	LA34400MC	**6941.**	LH34400MC	**10142.**	AL400LA	(1) 1 AWG–600 kcmil Al or (2) 1 AWG–250 kcmil Al

▲ AC magnetic setting tolerances are +0 -25% from maximum value shown.

LI
2- and 3-pole
7.5 in (190 mm)
Mounting Height

Table 9.130: L-frame—400 A, Thermal-magnetic (600 Vac)

Ampere Rating	AC Magnetic Trip Settings		Standard Interrupting		High Interrupting		Terminal Wire Range
	Low	High	Catalog Number	$ Price	Catalog Number	$ Price	
2-pole, 600 Vac, 250 Vdc ■							
125 A	625	1250	LA26125( )	**4053.**	LH26125( )	**6762.**	AL400LA one #1 AWG–600 kcmil or two #1 AWG–250 kcmil AL or Cu
150 A	750	1500	LA26150( )	**4053.**	LH26150( )	**6762.**	
175 A	875	1750	LA26175( )	**4053.**	LH26175( )	**6762.**	
200 A	1000	2000	LA26200( )	**4053.**	LH26200( )	**6762.**	
225 A	1125	2250	LA26225( )	**4053.**	LH26225( )	**6762.**	
250 A	1250	2500	LA26250( )	**4053.**	LH26250( )	**6762.**	
300 A	1500	3000	LA26300( )	**4053.**	LH26300( )	**6762.**	
350 A	1750	3500	LA26350( )	**4053.**	LH26350( )	**6762.**	
400 A	2000	4000	LA26400( )	**4053.**	LH26400( )	**6762.**	
3-pole, 600 Vac, 250 Vdc							
125 A	625	1250	LA36125	**4944.**	LH36125	**8145.**	AL400LA one #1 AWG–600 kcmil or two #1 AWG–250 kcmil AL or Cu
150 A	750	1500	LA36150	**4944.**	LH36150	**8145.**	
175 A	875	1750	LA36175	**4944.**	LH36175	**8145.**	
200 A	1000	2000	LA36200	**4944.**	LH36200	**8145.**	
225 A	1125	2250	LA36225	**4944.**	LH36225	**8145.**	
250 A	1250	2500	LA36250	**4944.**	LH36250	**8145.**	
300 A	1500	3000	LA36300	**4944.**	LH36300	**8145.**	
350 A	1750	3500	LA36350	**4944.**	LH36350	**8145.**	
400 A	2000	4000	LA36400	**4944.**	LH36400	**8145.**	

LC
2- and 3-pole
7.5 in (190 mm)
Mounting Height

Table 9.131: L-frame—600 A, Thermal-magnetic (600 Vac)♦

Ampere Rating	AC Magnetic Trip Settings		Extra High Interrupting		Current Limiting		Terminal Wire Range
	Low	High	Catalog Number	$ Price	Catalog Number	$ Price	
2-pole, 600 Vac ■							
300 A	1500	3200	LC26300( )	**8312.**	LI26300( )	**9563.**	AL600LI5 two #4/0 AWG–500 kcmil AL or Cu
350 A	1750		LC26350( )		LI26350( )		
400 A	2000		LC26400( )		LI26400( )		
450 A	2250	4200	LC26450( )	**8691.**	LI26450( )	**13949.**	
500 A	2500		LC26500( )		LI26500( )		
600 A	3000		LC26600( )		LI26600( )		
3-pole, 600 Vac							
300 A	1500	3200	LC36300	**9234.**	LI36300	**10673.**	AL600LI5 two #4/0 AWG–500 kcmil AL or Cu
350 A	1750		LC36350		LI36350		
400 A	2000		LC36400		LI36400		
450 A	2250	4200	LC36450	**9657.**	LI36450	**15498.**	
500 A	2500		LC36500		LI36500		
600 A	3000		LC36600		LI36600		

■ 2-pole circuit breaker catalog numbers are completed by adding required phase connection letters as suffix to catalog number. See Digest page 9-24.
♦ Type LC and LI circuit breakers are NOT recommended for use on single-motor branch circuits.

L-frame acccessories . . . . . starting on Supplemental Digest page 3-24
L-frame dimensions . . . . . Digest page 7-54
L-frame optional lugs . . . . . Digest page 7-53

Table 9.132: Interrupt Ratings (kA)

	LA	LH	LC	LI
240 V	42	65	100	200
480 V	30	35	65	200
600 V	22	25	35	100

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Table 9.133: L-frame 600 A Circuit Breakers with Lugs and Factory-Sealed Electronic Trip Units Suitable for Reverse Connection▲

Electronic Trip Unit			Sensor Rating	Catalog Number■	Interrupting Rating (2nd Letter of Catalog Number)										Terminal
					D		G		J ♦		L ♦		R ♦		
Type	Function	Trip Unit			$ Price										
					80%	100%	80%	100%	80%	100%	80%	100%	80%	100%	
600 Vac, 53/60 Hz, 3P															
Micrologic Standard	LI	3.3★	250 A	L( )A36250U31X	**5122.**	**5943.**	**5376.**	**6240.**	**8773.**	**10214.**	**10213.**	**11899.**	**11745.**	**13745.**	AL400L61K3▼
			400 A 600 A	L( )A36400U31X L( )A36600U31X	**5122.** **7404.**	**5943.** —	**5376.** **7779.**	**6240.** —	**8773.** **10836.**	**10214.** —	**10213.** **12132.**	**11899.** —	**11745.** **13952.**	**13745.** —	AL600LF52K3△
Micrologic Standard	LSI	3.3S★	250 A	L( )A36250U33X	**5686.**	**6506.**	**5969.**	**6833.**	**9366.**	**10808.**	**10806.**	**12493.**	**12427.**	**14449.**	AL400L61K3▼
			400 A 600 A	L( )A36400U33X L( )A36600U33X	**5686.** **7968.**	**6506.** —	**5969.** **8372.**	**6833.** —	**9366.** **11429.**	**10808.** —	**10806.** **12725.**	**12493.** —	**12427.** **14634.**	**14449.** —	
Micrologic Ammeter	LSI	5.3A	400 A 600 A	L( )A36400U43X L( )A36600U43X	**6548.** **8830.**	**7368.** —	**6877.** **9279.**	**7740.** —	**10274.** **12336.**	**11715.** —	**11714.** **13632.**	**13400.** —	**13471.** **15677.**	**15523.** —	
Micrologic Energy	LSI	5.3E	400 A 600 A	L( )A36400U53X L( )A36600U53X	**7495.** **9778.**	**8316.** —	**7874.** **10277.**	**8738.** —	**11271.** **13334.**	**12713.** —	**12711.** **14630.**	**14398.** —	**14618.** **16825.**	**16705.** —	AL600LF52K3△
Micrologic Ammeter	LSIG	6.3A	400 A 600 A	L( )A36400U44X L( )A36600U44X	**8444.** **10726.**	**9264.** —	**8873.** **11275.**	**9736.** —	**12270.** **14332.**	**13711.** —	**13710.** **15628.**	**15396.** —	**15767.** **17972.**	**17887.** —	
Micrologic Energy	LSIG	6.3E	400 A 600 A	L( )A36400U54X L( )A36600U54X	**9392.** **11674.**	**10212.** —	**9870.** **12273.**	**10734.** —	**13267.** **15329.**	**14709.** —	**14707.** **16626.**	**16394.** —	**16913.** **19120.**	**19069.** —	

▲ See Supplemental Digest page 3-4 for circuit breakers with field-interchangeable trip units.
■ For 100% rated circuit breakers (250 A and 400 A only), add a "C" in the 9th character place (for example, LRA36400CU31X).
♦ Circuit breakers with J, L, and R interrupting ratings are UL certified as current limiting.
★ 3P circuit breakers with this trip unit can be used for 2P applications.
▼ AL400L61K3 terminal wire ranges are (1) 2 AWG–600 kcmil Cu or (1) 2 AWG–500 kcmil Al.
△ AL600LFS52K3 terminal wire range is (2) 3/0 –500 kcmil.
□ For applications requiring communications, see Digest page 7-43.

Interrupt Ratings (kA)

	G	J	L ◊
240 V	65	100	125
480 V	35	65	100
600 V ☆	18	25	25

◊ L interrupting rating is not available in M-frame.
☆ 600 V interrupt ratings not available for D-frame.

Table 9.134: PowerPact M-frame: with ET1.0 Factory – sealed trip unit (not field adjustable)—800 A ▽

	Ampere Rating	Adjustable Instantaneous Trip Range ◒		G Interrupting		J Interrupting		Terminal Wire Range
		Low	High	Catalog Number ✱	$ Price	Catalog Number ✱	$ Price	
2-pole, 600 Vac, 50/60 Hz	300 A	600	3000	MGA26300( )	**6633.**	MJA26300( )	**8253.**	3–3/0 through 500 kcmil Al or Cu
	350 A	700	3500	MGA26350( )		MJA26350( )		
	400 A	800	4000	MGA26400( )		MJA26400( )		
	450 A	900	4500	MGA26450( )		MJA26450( )		
	500 A	1000	5000	MGA26500( )		MJA26500( )		
	600 A	1200	6000	MGA26600( )		MJA26600( )		
	700 A	1400	7000	MGA26700( )	**8370.**	MJA26700( )	**10104.**	
	800 A	1600	8000	MGA26800( )		MJA26800( )		
3-pole, 600 Vac, 50/60 Hz	300 A	600	3000	MGA36300	**8168.**	MJA36300	**9929.**	3–3/0 through 500 kcmil Al or Cu
	350 A	700	3500	MGA36350		MJA36350		
	400 A	800	4000	MGA36400		MJA36400		
	450 A	900	4500	MGA36450		MJA36450		
	500 A	1000	5000	MGA36500		MJA36500		
	600 A	1200	6000	MGA36600		MJA36600		
	700 A	1400	7000	MGA36700	**10608.**	MJA36700	**12630.**	
	800 A	1600	8000	MGA36800		MJA36800		

▽ The ET 1.0 trip unit cannot be field replaced, nor does it allow adjustment of the long-time trip point setting. It is considered an electronic equivalent of a thermal-magnet circuit breaker.
◒ UL magnetic trip setting tolerances are ±10% from the nominal values shown.
✱ Fill in parentheses with the following phase connection options: (2) for AC and (5) for CA.

L-frame accessories . . . . . starting on Supplemental Digest page 3-24
L-frame dimensions . . . . . starting on Digest page 7-54
L-frame optional lugs . . . . . Digest page 7-53
M-frame accessories . . . . . starting on Digest page 7-36
M-frame dimensions . . . . . Digest page 7-55
M-frame optional lugs . . . . . Digest page 7-39

Table 9.135: Automatic Molded Case Switches—600 Vac, 50/60 Hz

Ampere Rating	2-pole		3-pole		Withstand Rating ♦			Trip Point Amperes	Terminal Wire Range
	Catalog Number ◑	$ Price	Catalog Number	$ Price	240 Vac	480 Vac	600 Vac	AC	
600 A	PJA26000S60( )	**6675.**	PJA36000S60	**7263.**	100	65	25	10000	3–3/0 through 500 kcmil Al or Cu
800 A	PJA26000S80( )	**7347.**	PJA36000S80	**7938.**	100	65	25	10000	
1000 A	PJA26000S10( )	**8088.**	PJA36000S10	**8676.**	100	65	25	10000	4–3/0 through 500 kcmil Al or Cu
1200 A	PJA26000S12( )	**10895.**	PJA36000S12	**11766.**	100	65	25	10000	

♦ The withstand rating is the fault current, at rated voltage, that the molded case switch will withstand without damage when protected by a circuit breaker with an equal ampere rating.
◑ Fill in parentheses with the following phase connection options: (2) for AC or (5) for CA.

Table 9.136: PowerPact P- and R-frame Interrupt Ratings

Voltage	P-frame Interrupt Rating				R-frame Interrupt Rating			
	G	J	K	L	G	J	K	L
240 Vac	65 kA	100 kA	65 kA	125 kA	65 kA	100 kA	65 kA	125 kA
480 Vac	35 kA	65 kA	50 kA	100 kA	35 kA	65 kA	65 kA	100 kA
600 Vac	18 kA	25 kA	50 kA	25 kA	18 kA	25 kA	65 kA	50 kA

P- and R-frame accessories . . . . . starting on Digest page 7-36
P- and R-frame dimensions . . . . . Digest page 7-55
P- and R-frame optional lugs . . . . . Digest page 7-39

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Table 9.137: PowerPact P-frame 1200 A (600 Vac, 50/60 Hz) 3P Circuit Breaker with Electronic Trip Unit

Electronic Trip Unit			Sensor Rating	Cat. No.▲■	$ Price								Terminal Wire Range
					G Interrupting ▲		J Interrupting ▲		K Interrupting ▲		L Interrupting ▲♦		
Type	Function	Code			80% Rated	100% Rated ■	80% Rated	100% Rated ■	80% Rated	100% Rated ■	80% Rated	100% Rated ■	
Basic Electronic Trip Unit (Not Interchangeable)	Fixed long-time, Adjustable Instantaneous	ET1.0I	600 A	P( )A36060	14603.	—	15480.	—	15480.	—	16359.	—	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			800 A	P( )A36080									
			1000 A	P( )A36100	20003.	—	21207.	—	21207.	—	22410.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120									
Micrologic Interchangeable Standard Trip Unit	LI	3.0	250 A	P( )A36025(C)U31A	15390.	22479.	16268.	23897.	16268.	23897.	17147.	25314.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U31A									
			600 A	P( )A36060(C)U31A									
			800 A	P( )A36080(C)U31A									
			1000 A	P( )A36100U31A	20790.	—	21995.	—	21995.	—	23198.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U31A									
	LSI	5.0	250 A	P( )A36025(C)U33A	15729.	22794.	16608.	24231.	16608.	24231.	17487.	25668.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U33A									
			600 A	P( )A36060(C)U33A									
			800 A	P( )A36080(C)U33A									
			1000 A	P( )A36100U33A	21131.	—	22334.	—	22334.	—	23538.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U33A									
Micrologic Interchangeable Ammeter Trip Unit	LI	3.0A	250 A	P( )A36025(C)U41A	16242.	23270.	17121.	24737.	17121.	24737.	17999.	26204.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U41A									
			600 A	P( )A36060(C)U41A									
			800 A	P( )A36080(C)U41A									
			1000 A	P( )A36100U41A	21642.	—	22845.	—	22845.	—	24051.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U41A									
	LSI	5.0A	250 A	P( )A36025(C)U43A	17739.	24659.	18618.	26214.	18618.	26214.	19497.	27770.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U43A									
			600 A	P( )A36060(C)U43A									
			800 A	P( )A36080(C)U43A									
			1000 A	P( )A36100U43A	23141.	—	24345.	—	24345.	—	25548.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U43A									
	LSIG	6.0A	250 A	P( )A36025(C)U44A	19607.	26393.	20486.	28058.	20486.	28058.	21365.	29721.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U44A									
			600 A	P( )A36060(C)U44A									
			800 A	P( )A36080(C)U44A									
			1000 A	P( )A36100U44A	25008.	—	26211.	—	26211.	—	27416.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U44A									
Micrologic Interchangeable Power Trip Unit	LSI	5.0P	250 A	P( )A36025(C)U63AE1	22151.	28754.	23030.	30566.	23030.	30566	23909.	32379.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U63AE1									
			600 A	P( )A36060(C)U63AE1									
			800 A	P( )A36080(C)U63AE1									
			1000 A	P( )A36100U63AE1	27552.	—	28757.	—	28757.	—	29960.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U63AE1									
	LSIG	6.0P	250 A	P( )A36025(C)U64AE1	23234.	29757.	24111.	31634.	24111.	31634.	24990.	33510.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U64AE1									
			600 A	P( )A36060(C)U64AE1									
			800 A	P( )A36080(C)U64AE1									
			1000 A	P( )A36100U64AE1	28634.	—	29838.	—	29838.	—	31041.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U64AE1									
Micrologic Interchangeable Harmonic Trip Unit	LSI	5.0H	250 A	P( )A36025(C)U73AE1	26234.	32541.	27113.	34593.	27113.	34593.	27992.	36645	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U73AE1									
			600 A	P( )A36060(C)U73AE1									
			800 A	P( )A36080(C)U73AE1									
			1000 A	P( )A36100U73AE1	31634.	—	32837.	—	32837.	—	34043.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U73AE1									
	LSIG	6.0H	250 A	P( )A36025(C)U74AE1	27315.	33545.	28194.	35661.	28194.	35661.	29073.	37776.	(3) 3/0 AWG–500 kcmil Al or Cu AL800M23K
			400 A	P( )A36040(C)U74AE1									
			600 A	P( )A36060(C)U74AE1									
			800 A	P( )A36080(C)U74AE1									
			1000 A	P( )A36100U74AE1	32717.	—	33921.	—	33921.	—	35124.	—	(4) 3/0 AWG–500 kcmil Al or Cu AL1200P24K
			1200 A	P( )A36120U74AE1									

Table 9.138: PowerPact R-frame 1200 A (600 Vac, 50/60 Hz) 3P Circuit Breaker with Electronic Trip Unit

Electronic Trip Unit			Sensor Rating	Cat. No.	$ Price								Terminal Wire Range
					G Interrupting▲♦		J Interrupting▲♦		K Interrupting▲♦		L Interrupting▲♦★		
Type	Function	Code			80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	80% Rated	100% Rated	
Basic Electronic Trip Unit (Not Interchangeable)	Fixed Long-Time, Adjustable Instantaneous	ET1.01	1200 A	R( )A36120	27080.	—	28777.	—	28777.	—	30533.	—	AL1200R53K (4) 3/0-600 kcmil Al or Cu
Micrologic Interchangeable Standard Trip Unit	LI	3.0	1000 A	R( )A36100CU31A	—	33945.	—	36111.	—	36111.	—	38418.	
			1200 A	R( )A36120CU31A									
	LSI	5.0	1000 A	R( )A36100CU33A	—	34401.	—	36599.	—	36599.	—	38934.	
			1200 A	R( )A36120CU33A									
Micrologic Interchangeable Ammeter Trip Unit	LI	3.0A	1000 A	R( )A36100CU41A	—	35141.	—	37383.	—	37383.	—	39770.	
			1200 A	R( )A36120CU41A									
	LSI	5.0A	1000 A	R( )A36100CU43A	—	36581.	—	38916.	—	38916.	—	41400.	
			1200 A	R( )A36120CU43A									
	LSI	6.0A	1000 A	R( )A36100CU44A	—	38378.	—	40829.	—	40829.	—	43434.	
			1200 A	R( )A36120CU44A									
Micrologic Interchangeable Power Trip Unit	LSI	5.0P	1000 A	R( )A36100CU63AE1	—	40826.	—	43431.	—	43431.	—	46205.	
			1200 A	R( )A36120CU63AE1									
	LSIG	6.0P	1000 A	R( )A36100CU64AE1	—	41867.	—	44540.	—	44540.	—	47382.	
			1200 A	R( )A36120CU64AE1									
Micrologic Interchangeable Harmonic Trip Unit	LSI	5.0H	1000 A	R( )A36100CU73AE1	—	44754.	—	47610.	—	47610.	—	50649.	
			1200 A	R( )A36120CU73AE1									
	LSIG	6.0H	1000 A	R( )A36100CU74AE1	—	45795.	—	48719.	—	48719.	—	51827.	
			1200 A	R( )A36120CU74AE1									

▲ To complete the catalog number, replace the blank ( ) with the appropriate interrupt rating (G, J, K, or L).

■ For 100% rated circuit breakers add a "C" in the 9th character place. For example, the catalog number for a 100% standard-type trip unit with LI trip functions at 250 A would be PGA36025**C**U31A.

♦ The L interrupt rating is supplied in 480 V only. Change the 5th character (voltage rating) from a 6 (600 V) to a 4 (480 V); for example, PLA3**4**025U31A.

★ See Table 9.136 on Digest page 9-29 for interrupt ratings.

P- and R-frame accessories. . . . . starting on Digest page 7-36
P- and R-frame dimensions . . . . . Digest page 7-55
P- and R-frame trip unit options . . . . . Digest page 7-44
P- and R-frame optional lugs . . . . . Digest page 7-39
P- and R-frame alternate rating plugs . . . . . Digest page 7-45

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Table 9.139: Base $ Price—Main Lugs ▲

Panel Type	Main Lugs				
	225 A	400 A	600 A	800 A	1200 A
HCN	1356.	1866.	2276.	—	—
HCM	—	1866.	2276.	2512.	—
HCP-SU	—	—	2990.	3600.	—
HCP	—	—	2456.	3056.	3968.
HCR-U	—	—	—	—	4602.

▲ When required, add the $ Price of a solid neutral from Table 9.140.

Table 9.140: Standard Solid Neutral

Ampere Rating	$ Price
100/225 A	294.
400 A	384.
600 A	544.
800 A	764.
1200 A	1366.

Table 9.141: Base $ Price—Main Circuit Breaker ■

Panel Type	No. Poles	Main Circuit Breaker						
		100 A			150 A			
		FA	FH	FI ♦	HD ♦	HG ♦	HJ ♦	HL ♦
HCN	2	2100.	2100.	4642.	3360.	3860.	4540.	5550.
	3	2418.	2958.	5864.	3770.	4210.	4890.	5900.
HCM	2	—	—	—	3360.	3860.	4540.	5550.
	3	—	—	—	3770.	4210.	4890.	5900.

Panel Type	No. Poles	225 A					400 A								600 A							
		JD	JG	JJ	JL	KI ♦	LD	LG	LJ	LL	LA	LH	LC ♦	LI ♦	LD	LG	LJ	LL	LC ♦	LI ♦	MG	MJ
							Electronic 100%								Electronic 80%							
HCN	2	3956.	4146.	7126.	7356.	8356.	—	—	—	—	6132.	9126.	—	—	—	—	—	—	—	—	—	—
	3	4440.	5550.	7466.	8676.	10148.	—	—	—	—	7136.	10666	—	—	—	—	—	—	—	—	—	—
HCM	2	3956.	4146.	7126.	7356.	8356.	—	—	—	—	6132.	9126.	—	—	—	—	—	—	—	—	8880.	11260.
	3	4440.	5550.	7466.	8676.	10148.	—	—	—	—	7136.	10666.	—	—	—	—	—	—	—	—	10770.	13400.
HCP, HCP-SU	2	—	—	—	—	—	11865.	12470.	14795.	15940.	—	—	10366.	11610.	15425.	16215.	19235.	20725.	11176.	16504.	8880.	11260.
	3	—	—	—	—	—					—	—	11888.	13354.					12678.	18090.	10770.	13400.

Panel Type	No. Poles	800 A ★								
		MG	MJ	PL ■	PG ♦	PJ ♦	PL ♦	PGC ♦	PJC ♦	PLC ♦
					Micrologic™ 80%			Micrologic 100%		
HCN	2	—	—	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—	—	—
HCM	2	11846.	14778.	—	—	—	—	—	—	—
	3	14302.	17456.	—	—	—	—	—	—	—
HCP, HCP-SU	2	11846.	14778.	19346.	15830.	16830.	21090.	16542.	18510.	24250.
	3	14302.	17456.	23416.	18312.	20280.	24540.	20144.	22300.	28220.

Panel Type	No. Poles	1200 A ♦★▼								
		PG	PJ	PL	PG	PJ	PL	RGC	RJC	RLC
					Micrologic 80%			Micrologic 100%		
HCP, HCP-SU	2	22542.	24336.	26648.	22380.	24980.	27980.	24618.	24478.	32178.
	3	24568.	26560.	29128.	28710.	31310.	35570.	31582.	34442.	40906.
HCR-U	2	22542.	24336.	26648.	22380.	24980.	27980.	24618.	24478.	32178.
	3	24568.	26560.	29128.	28710.	31310.	35570.	31582.	34442.	40906.

■ When required, add the $ Price of a solid neutral from Table 9.140.
♦ Standard construction back-fed main.
★ PG, PJ, PL circuit breakers are available with both thermal-magnetic equivalent and Micrologic trip. The Micrologic circuit breakers are available 80% and 100% rated. The "C" suffix denotes a 100% rating.
▼ For 1200 A frame thermal magnetic circut breaker with 600 kcmil lugs, select an R-frame Thermal Magnetic circuit breaker in the Product Selector.

Table 9.142: Electronic Trip Units for H-frame Circuit Breakers

	Standard $ Price	Ammeter $ Price	Energy $ Price
LI (3.0)	Standard	—	—
LSI (5.0)	549.	2550.	3485.
LSIG (6.0) △	—	4577.	5979.

Table 9.143: Electronic Trip Units for J-frame Circuit Breakers

	Standard $ Price	Ammeter $ Price	Energy $ Price
LI (3.0)	Standard	—	—
LSI (5.0)	785.	3643.	4978.
LSIG (6.0) △	—	6538.	8542.

Table 9.144: Electronic Trip Units (L-, P-, and R-frame Circuit Breakers)

	$ Price				
	Standard	Ammeter	Energy N✪●▼⋮	Power	Harmonic
LI (3.0)	Standard	—	—	—	—
LSI (5.0)	1670.	4670.	7659.	21600.	32330.
LSIG (6.0) △	—	9340.	13777.	31000.	37000.

△ When adding G, requires current transformers and a box extension and is available factory assembled only.
Note: Energy trip unit available for L-frame circuit breakers only.
PowerPact circuit breakers come with a standard LI trip unit. Use the above $ Price adder for increase in trip functionality. See Digest page 7-43 for L- frame trip unit descriptions. See Digest page 7-44 for P- and R- frame trip unit descriptions.

Table 9.145: I-Line 200% Rated Neutral—Standard Terminal Configuration □

Panel Type	Ampacity	Type	Branch Space		Neutral Terminals Quantity and Size		Type 1 Enclosure					
			In.	mm	Main	Branch	H		W		D	
							In.	mm	In.	mm	In.	mm
HCM	600 A	MLO	72	1829	(8) 750 kcmil	(35) 350 kcmil, (9)#14-1/0, (17)#14-#4	91	2311	32	813	8.25	210
	600 A (MG, MJ)	M/B	72	1829	(8) 750 kcmil		91	2311	32	813	9.50	241
	800 A	MLO	72	1829	(8) 750 kcmil		91	2311	32	813	8.25	210
	800 A (MG, MJ)	M/B	72	1829	(8) 750 kcmil		91	2311	32	813	9.50	241
HCR-U◊	1200A	M/B, MLO	108	2743	(8) 750 kcmil	(8) 600 kcmil, (15) 350 kcmil (9) #14-1/0, (17)#14-#4	86	2184	44	1118	9.50	241
HCP	600A	M/B, MLO	63	1600	(8) 750 kcmil	(35) 350 kcmil, (9)#14-1/0, (17)#14-#4	68	1727	42	1067	9.50	241
	800A	M/B, MLO	99	2515	(8) 750 kcmil	(35) 350 kcmil, (9)#14-1/0, (17)#14-#4	86	2184	42	1067	9.50	241
HCP-SU☆	800A	M/B, MLO	54	1371	(8) 750 kcmil	(8) 750 kcmil, (21) 350 kcmil, (9) #14-1/0, (17) #14-#4	86	2184	26	660	9.5	241

□ Available in Type 1 enclosure only; for pricing, see Digest page 9-34.
◊ 6 in. enclosure extension is required for HCRU I-Line panelboard.
☆ 9 in. enclosure extension is required for HCP-SU I-Line panelboard.

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Table 9.146: **Branch Circuit Breakers—Thermal Magnetic Circuit Breakers** ▲
(See Digest pages 7-4 through 7-8 for interrupt rating, voltage ratings, Fed. Specs, etc.)

Circuit Breaker Ampere Rating	Circuit Breaker	3-pole ▼					2-pole ▼					1-pole ▼				
		240 V	480 Vac 250 Vdc	600 V	Space Only	H (In.)	240 Vac	480 Vac 250 Vdc	600 Vac	Space Only	H (In.)	120 V	277 V	277 Vac 125 Vdc	Space Only	H (In.)
15–60 A	FA (FY-1P)	**720.**	**882.**	**1006.**	**98.**	4.5	**520.**	**708.**	**786.**	**82.**	3	—	—	**270.** ♦	**72.**	1.5
70–100 A	FA	**832.**	**1142.** ■	**1218.**	**98.**	4.5	**632.**	**956.**	**964.**			**354.**	**384.**	**384.** ♦	**72.**	1.5
15–60 A	FH	**1100.**	—	**1442.**	**98.**	4.5	**1050.**	—	**1218.**	**98.**	3	—	—	**518.**	**72.**	1.5
70–100 A		**1300.**	—	**1940.**			**1250.**	—	**1620.**			—	—	**650.**	**72.**	1.5
15–60 A	FJ★	**1300.**	**2080.**	—	**98.**	3	**1250.**	**1660.**	—	**98.**	3	—	**664.**	—	**72.**	1.5
70–100 A		**1500.**	**2470.**	—			**1450.**	**1980.**	—			—	**832.**	—	**72.**	1.5
20–100 A	FI	—	—	**4254.**	**98.**	4.5	—	—	**3466.** ■	**98.**	4.5	—	—	—	—	—
15–60 A	HD	—	—	**1350.**	**98.**	4.5	—	—	**1150.**	**98.**	3	—	—	—	—	—
70–100 A		—	—	**1570.**			—	—	**1370.**			—	—	—	—	—
110–150 A		—	—	**2710.**			—	—	**2370.**			—	—	—	—	—
15–60 A	HG	—	—	**1710.**	**98.**	4.5	—	—	**1352.**	**98.**	3	—	—	—	—	—
70–100 A		—	—	**2198.**			—	—	**1508.**			—	—	—	—	—
110–150 A		—	—	**3310.**			—	—	**3110.**			—	—	—	—	—
15–60 A	HJ	—	—	**2380.**	**98.**	4.5	—	—	**2002.**	**98.**	4.5	—	—	—	—	—
70–100 A		—	—	**2700.**			—	—	**2364.**			—	—	—	—	—
110–150 A		—	—	**4500.**			—	—	**3980.**			—	—	—	—	—
15–60 A	HL	—	—	**3910.**	**98.**	4.5	—	—	**3250.**	**98.**	4.5	—	—	—	—	—
70–100 A		—	—	**4054.**			—	—	**3402.**			—	—	—	—	—
110–150 A		—	—	**5530.**			—	—	**4600.**			—	—	—	—	—
70–225 A	QB	**1696.**	—	—	**98.**	4.5	**560.**	—	—	**82.**	3	—	—	—	—	—
70–225 A	QD	**2208.**	—	—	**98.**	4.5	**1300.** ■	—	—	**82.**	3	—	—	—	—	—
70–225 A	QG	**2870.**	—	—	**98.**	4.5	**2800.**	—	—	**82.**	3	—	—	—	—	—
70–225 A	QJ	**3070.**	—	—	**98.**	4.5	**3000.**	—	—	**82.**	3	—	—	—	—	—
150–225 A	JD	—	—	**2820.**	**98.**	4.5	—	—	**2600.**	**98.**	4.5	—	—	—	—	—
250 A		—	—	**3800.**			**3600.**	—	**3430.**			—	—	—	—	—
150–225 A	JG	—	—	**3990.**	**98.**	4.5	**4600.**	—	**2790.**	**98.**	4.5	—	—	—	—	—
250 A		—	—	**4180.**			**3900.**	—	**3620.**			—	—	—	—	—
150–225 A	JJ	—	—	**6110.**	**98.**	4.5	**4000.**	**5434.**	**5770.**	**98.**	4.5	—	—	—	—	—
250 A		—	—	**6500.**			**4300.**	**6672.**	**6450.**			—	—	—	—	—
150–225 A	JL	—	—	**7320.**	**98.**	4.5	**4300.**	**5434.**	**6000.**	**98.**	4.5	—	—	—	—	—
250 A		—	—	**8900.**				**6672.**	**6800.**			—	—	—	—	—
150–225 A	KI	—	—	**7972.**	**98.**	4.5	—	—	**6216.** ■	**98.**	4.5	—	—	—	—	—
250 A		—	—	**9268.**			—	—	**7262.** ■			—	—	—	—	—
300–400 A	LA	—	—	**4916.**	**252.**	6	—	—	**3980.**	**252.**	6	—	—	—	—	—
300–400 A	LH	—	—	**5312.**			—	—	**4500.**			—	—	—	—	—
300–400 A	LC	**5460.**	—	**10156.**	**456.**	7.5	**4550.**	—	**8634.**	**456.**	7.5	—	—	—	—	—
450–600 A		—	—	**10422.**			—	—	**8920.**			—	—	—	—	—
300–400 A	LI	—	—	**11622.**	**456.**	7.5	—	—	**9878.** ■	**456.**	7.5	—	—	—	—	—
450–600 A		—	—	**15834.**			—	—	**14248.** ■			—	—	—	—	—
300–600 A	MG	—	—	**8152.**	**662.**	9	—	—	**6322.**	**662.**	9	—	—	—	—	—
700–800 A		—	—	**10600.**			—	—	**8180.**			—	—	—	—	—
300–600 A	MJ	—	—	**10126.**	**662.**	9	—	—	**8536.**	**662.**	9	—	—	—	—	—
700–800 A		—	—	**13306.**			—	—	**10944.**			—	—	—	—	—
600–800 A	PL	—	**20360.**	—	**662.**	9	—	**16290.**	—	**662.**	9	—	—	—	—	—
600–1200 A	PG	—	—	**19966.**	**662.**	9	—	—	**17940.**	**662.**	9	—	—	—	—	—
600–1200 A	PJ /PK	—	—	**21960.**	**662.**	9	—	—	**19724.**			—	—	—	—	—
1000–1200 A	PL	—	**24526.**	—	**662.**	9	—	**22046.**	—	**662.**	9	—	—	—	—	—
250–400 A	PLC (100%) ▼	—	**16940.**	—	**662.**	9	—	**13550.**	—	**662.**	9	—	—	—	—	—
450–600 A		—	**22620.**	—			—	**18100.**	—			—	—	—	—	—
700–800 A		—	**24440.**	—			—	**19560.**	—			—	—	—	—	—
1000–1200 A	RG (80%) ▼	—	—	**24460.**	**662.**	15	—	—	**24460.**	**662.**	15	—	—	—	—	—
	RJ (80%) ▼	—	—	**26710.**			—	—	**26710.**			—	—	—	—	—
	RL (80%) ▼	—	—	**32580.**			—	—	**32580.**			—	—	—	—	—

▲ See Digest pages 7-4 through 7-8 for additional dc ratings.
■ ac only.
♦ FA, 1P.
★ 480Y/277 Volt rated circuit breaker—Do not use on 480 Volt 3Ø3W Delta systems.
▼ See Table 9.144 on Digest page 9-31 for P- and R frame Micrologic trip unit price adders.

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Table 9.147: Branch Circuit Breakers—Electronic Trip Circuit Breakers ▲
(See Digest pages 7-4 through 7-8 for interrupt rating, voltage ratings, Fed. Specs, etc.)

Circuit Breaker Ampere Rating	Circuit Breaker	3-pole★					2-pole ★					1-pole ★				
		240 V	480 Vac 250 Vdc	600 V	Space Only	H	240 Vac	480 Vac 250 Vdc	600 Vac	Space Only	H	120 V	277 V	277 Vac 125 Vdc	Space Only	H
15–60 A	HD (80%) ■	—	—	**1790.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
35–100 A		—	—	**2102.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
50–150 A		—	—	**3756.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
70–250 A	JD (80%) ♦	—	—	**4013.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
15–60 A	HG (80%) ■	—	—	**2110.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
35–100 A		—	—	**2380.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
50–150 A		—	—	**4848.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
70–250 A	JG (80%) ♦	—	—	**5082.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
15–60 A	HJ (80%) ■	—	—	**2703.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
35–100 A		—	—	**2898.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
50–150 A		—	—	**6895.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
70–250 A	JJ (80%) ♦	—	—	**7231.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
15–60 A	HL (80%) ■	—	—	**4027.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
35–100 A		—	—	**4263.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
50–150 A		—	—	**8943.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
70–250 A	JL (80%) ♦	—	—	**9381.**	**98.**	4.5	—	—	—	—	—	—	—	—	—	—
70–250 A	LD (80%) ★	—	—	**5378.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**5378.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
200–600 A		—	—	**7775.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LG (80%) ★	—	—	**5645.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**5645.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
200–600 A		—	—	**8167.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LJ (80%) ★	—	—	**9212.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**9212.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
200–600 A		—	—	**11378.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LL (80%) ★	—	—	**10724.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**10724.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
200–600 A		—	—	**12738.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LDC (100%) ★	—	—	**6991.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**6991.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LLC (100%) ★	—	—	**13941.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**13941.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LGC (100%) ★	—	—	**7338.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**7338.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
70–250 A	LJC (100%) ★	—	—	**11975.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
125–400 A		—	—	**11975.**	**252.**	6	—	—	—	—	—	—	—	—	—	—
60–400 A	DG (100%) ▼	—	**5687.**	—	**252.**	6	—	**4550.**	—	**252.**	6	—	—	—	—	—
600 A	DG (80%) ▼	—	**8954.**	—	**252.**	6	—	**7163.**	—	**252.**	6	—	—	—	—	—
60–400 A	DJ (100%) ▼	—	**9118.**	—	**252.**	6	—	**7295.**	—	**252.**	6	—	—	—	—	—
600 A	DJ (80%) ▼	—	**12385.**	—	**252.**	6	—	**9908.**	—	**252.**	6	—	—	—	—	—
60–400 A	DL (100%) ▼	—	**10573.**	—	**252.**	6	—	**8458.**	—	**252.**	6	—	—	—	—	—
600 A	DL (80%) ▼	—	**13839.**	—	**252.**	6	—	**11071.**	—	**252.**	6	—	—	—	—	—
250–400 A	PG (80%) ★	—	—	**8900.**	**662.**	9	—	—	**7120.**	**662.**	9	—	—	—	—	—
450–600 A		—	—	**13310.**			—	—	**10648.**			—	—	—	—	—
700–800 A		—	—	**14730.**			—	—	**12402.**			—	—	—	—	—
1000–1200 A		—	—	**21240.**			—	—	**16992.**			—	—	—	—	—
250–400 A	PJ/PK (80%) ★	—	—	**10400.**	**662.**	9	—	—	**9240.**	**662.**	9	—	—	—	—	—
450–600 A		—	—	**15570.**			—	—	**12450.**			—	—	—	—	—
700–800 A		—	—	**17220.**			—	—	**13780.**			—	—	—	—	—
1000–1200 A		—	—	**24850.**			—	—	**19880.**			—	—	—	—	—
250–400 A	PL (80%) ★	—	**15400.**	—	**662.**	9	—	**12320.**	—	**662.**	9	—	—	—	—	—
450–600 A		—	**20570.**	—			—	**16450.**	—			—	—	—	—	—
700–800 A		—	**22220.**	—			—	**17780.**	—			—	—	—	—	—
1000–1200 A		—	**29850.**	—			—	**23880.**	—			—	—	—	—	—
250–400 A	PGC (100%) ★	—	—	**9790.**	**662.**	9	—	—	**7832.**	**662.**	9	—	—	—	—	—
450–600 A		—	—	**14642.**			—	—	**11714.**			—	—	—	—	—
700–800 A		—	—	**16200.**			—	—	**13642.**			—	—	—	—	—
250–400 A	PJC/PKC (100%) ★	—	—	**11960.**	**662.**	9	—	—	**9570.**	**662.**	9	—	—	—	—	—
450–600 A		—	—	**17900.**			—	—	**14330.**			—	—	—	—	—
700–800 A		—	—	**19800.**			—	—	**15840.**			—	—	—	—	—
250–400 A	PLC (100%)★	—	**16940.**	—	**662.**	9	—	**13550.**	—	**662.**	9	—	—	—	—	—
450–600 A		—	**22620.**	—			—	**18100.**	—			—	—	—	—	—
700–800 A		—	**24440.**	—			—	**19560.**	—			—	—	—	—	—
1000–1200 A	RG (100%) ★	—	—	**29317.**	**662.**	15	—	—	**29317.**	**662.**	15	—	—	—	—	—
	RJ (100%) ★	—	—	**32159.**			—	—	**32159.**			—	—	—	—	—
	RL (100%) ★	—	—	**39389.**			—	—	**39389.**			—	—	—	—	—

▲ See Digest pages 7-4 through 7-8 for additional dc ratings.
■ See Table 9.142 on Digest page 9-31 for H-frame electronic trip unit price adders.
♦ See Table 9.143 on Digest page 9-31 for J-frame electronic trip unit price adders.
★ See Table 9.144 on Digest page 9-31 for L-, P-, and R-frame electronic trip unit price adders.
▼ See the Supplemental Digest for D-frame electronic trip unit price adders.

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Table 9.148: QO Plug-On Branch Circuit Breakers

	$ Price
Transition Charge per 6 QO one-pole spaces (H=4.5 in. per 6 one-pole spaces)	328.
QO Branch circuit breakers	See Digest page 7-10

Table 9.149: Sub-feed/Feed-through Lugs ▲

Ampere Rating	$ Price
225 A	368.
400 A	600.
600 A	858.
800 A	1490.
1200 A	1890.

▲ 2 or 3-pole Branch Mounted; SL Kit used for both SFL and TFL.

Table 9.150: Ground Bars

	$ Price
Equipment Ground Bar	180.
Copper Ground Bar ■	148.
Insulated/Isolated Ground Bar	$ Price Additional Neutral Assembly

■ Add to equipment ground bar $ Price.

Table 9.151: Name Plates

	$ Price
Standard white face/black letter laminated bakelite, 1 in. x 3.5 in., adhesive backed or screw mountable with screws in a bag assembly ($ Price includes engraving)	78.

Table 9.152: Copper Bus Bars

Ampere Rating	Type	$ Price
225 A	HCN, HCM	528.
400 A	HCN, HCM, HCP	720.
600 A	HCN	720.
600 A	HCM, HCP, HCR-U	1274.
800-1200 A	HCP, HCR-U	1274.

Table 9.153: Neutrals

Ampere Rating	Type	$ Price Adder
100–400 A	Copper Neutral	868.
600 A	Copper Neutral	894.
800 A	Copper Neutral	1108.
1200 A	Copper Neutral	1352.

Table 9.154: 200% Rated Neutrals

Ampere Rating	Type	$ Price Adder
225 A	Aluminum	820.
400 A	Aluminum	940.
600 A	Aluminum	1340.
800 A	Aluminum	1350.
1200 A	Aluminum	2020.
225 A	Copper	1210.
400 A	Copper	1300.
600 A	Copper	1980.
800 A	Copper	2500.
1200 A	Copper	2900.

Table 9.155: Metal Directory Frame

Metal Directory Frame	$ Price Adder
Frame attached to trim (not available on four piece trim)	140.

Table 9.156: Door-in-Door Trim

Door-in-Door Trim	$ Price Adder
Trim has piano hinge down one side. Door opens by single latch; Entire trim opens by removing screws.	646.
Hinged Door-in-Door with Outer Door Lock Added	836.

Table 9.157: Weatherproof or Dusttight Cabinets—Type 3R, 5, 12

Weatherproof or Dusttight Cabinets	$ Price Adder
Maximum 26 in. wide box	2156.
Maximum 28 in. wide box	3312.
Maximum 32 in. wide box	3312.
Maximum 42 in. wide box	3312.
Maximum 44 in. wide box	3312.

Table 9.158: Copper Mechanical Lugs

Ampere Rating	Main Lug Interiors	Main Circuit Breaker Interiors
	$ Price per Pole	
100/125 A	70.	70.
250 A	108.	108.
400 A	148.	148.
600 A	168.	168.
800 A	196.	196.
1200 A	236.	236.

Table 9.159: Copper Compression Lugs

Ampere Rating	Main Lug Interiors	Main Circuit Breaker Interiors
	$ Price per Pole	
100/125 A	70.	70.
250 A	108.	108.
400 A	148.	148.
600 A	168.	168.
800 A	316.	316.
1200 A	836.	—

Table 9.160: Aluminum Compression Lugs VCEL

Ampere Rating	Main Lug Interiors	Main Circuit Breaker Interiors ♦
	$ Price Per Pole	
100 A	29.00	29.00
150 A	N/A	29.00
250 A	29.00	49.00
400 A	45.00	74.00
600 A	59.00	131.00
800 A	100.00	—
1200 A	118.00	—

Note: Additional factory modifications. See Digest page 9-38.

♦ Compression lugs are not available on LC, LI, LE, LX, and LXI circuit breakers.

Surgelogic™ SPD

Surgelogic SPD unit in I-Line plug-on construction: An integrally mounted surge protection solution that mounts on to an I-Line Panelboard bus stack just like a J-Frame circuit breaker. Requires 13.5 in. of mounting height. Available as factory assembled and merchandised. For SPD unit pricing and information, see Digest pages 6-3 and 6-44.

I-Line Plug-On Unit with Surgelogic SPD

Table 9.161: Surgelogic SPD Options

Surgelogic SPD Options	$ Price
Dry Contacts	Standard
Remote Monitor	2588.

Note: Requires HCM interior minimum.

Table 9.162: Surgelogic Branch Mounted I-Line SPD—Model IMA

Voltage	Surge Current Rating kA									
	100 kA		120 kA		160 kA		200 kA		240 kA	
	HL	FI	HL	FI	HL	FI	HL	FI	HL	FI
120/240 1P3W	18908.	20416.	20088.	21692.	23634.	25520.	29354.	30958.	34534.	36420.
208Y/120 3P4W	19750.	21260.	20984.	22588.	24688.	26574.	30740.	32342	36164.	38050.
240/120 3P4W	19750.	21260.	20984.	22588.	24688.	26574.	30740.	32342.	36164.	38050.
480Y/277 3P4W	20602.	22110.	21898.	23492.	25752.	27638.	32130.	33734.	37800.	39686.
600Y/347 3P4W	—	23000.	—	24438.	—	28750.	—	35198.	—	41400.

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Table 9.163: QMB Branch Switch Units

Unit Ampere Rating	Unit Height (In.)	Catalog Number	$ Price	Class R Fuse Kits			Electrical Interlock Kit		Horsepower Ratings☆												
				No. Kits Req'd.	Catalog Number	$ Price	Catalog Number▲	$ Price	240 Vac				480 Vac				600 Vac				250 Vdc
									Std.		Max.		Std.		Max.		Std.		Max.		
									1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	
2-pole, 240 Vac																					
30 A-30 A	4.5	QMB221TW	**608.**	2	HRK30	**25.50**	QMB300EK(1 or 2)	**357.**	1.5	3	3	7.5	—	—	—	—	—	—	—	—	5
30 A-Blank	4.5	QMB221HW■	**425.**	1									—	—	—	—	—	—	—	—	5
60 A-60 A	4.5	QMB222TW	**608.**	1	QMB36R	**48.90**	QMB300EK(1 or 2)	**357.**	3	7.5	10	15	—	—	—	—	—	—	—	—	10
60 A-Blank	4.5	QMB222HW■	**425.**										—	—	—	—	—	—	—	—	10
100 A-100 A	6	QMB223TW	**990.**	1	QMB100R	**95.00**	QMB610EK(1 or 2)	**357.**	7.5	15	15	30	—	—	—	—	—	—	—	—	20
100 A-Blank	6	QMB223HW■	**695.**										—	—	—	—	—	—	—	—	20
200 A	9	QMB224W	**1200.**	1	HRK1020	**47.70**	QMB200EK(1 or 2)	**357.**	—	25	15	60	—	—	—	—	—	—	—	—	40
400 A	15	QMB225W	**3072.**	1	QMB4060R	**111.00**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	9	QMB225WT3♦	**2981.**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
600 A	Use 3-pole devices for 2-pole application.						—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
								—	—	—	—	—	—	—	—	—	—	—	—	—	—
3-pole, 240 Vac																					
30 A-30 A	4.5	QMB321TW	**827.**	2	HRK30	**25.50**	QMB300EK(1 or 2)	**357.**	—	3	—	7.5	—	—	—	—	—	—	—	—	—
30 A-Blank	4.5	QMB321HW■	**587.**	1					—	3	—	7.5	—	—	—	—	—	—	—	—	—
60 A-60 A	4.5	QMB322TW	**827.**	1	QMB36R	**48.90**		**357.**	—	7.5	—	15	—	—	—	—	—	—	—	—	—
60 A-Blank	4.5	QMB322HW■	**587.**						—	7.5	—	15	—	—	—	—	—	—	—	—	—
100 A-100 A	6	QMB323TW	**1265.**	1	QMB100R	**95.00**	QMB610EK(1 or 2)	**357.**	—	15	—	30	—	—	—	—	—	—	—	—	—
100 A-Blank	6	QMB323HW■	**879.**						—	15	—	30	—	—	—	—	—	—	—	—	—
200 A	9	QMB324W	**1673.**	1	HRK1020	**47.70**	QMB200EK(1 or 2)	**357.**	—	25	—	60	—	—	—	—	—	—	—	—	—
400 A	15	QMB325W	**4277.**	1	QMB4060R	**111.00**	—	—	—	50	—	125	—	—	—	—	—	—	—	—	—
	9	QMB325WT3♦	**4143.**	—	—	—	—	—	—	50	—	—	—	—	—	—	—	—	—	—	—
600 A	15	QMB326W	**6249.**	1	QMB4060R	**111.00**	—	—	—	75	—	150	—	—	—	—	—	—	—	—	—
	15	QMB326WT3♦	**6249.**	—	—	—	—	—	—	75	—	—	—	—	—	—	—	—	—	—	—
800 A	15	QMB327WT3♦	**12140.**	—	—	—	—	—	—	75	—	—	—	—	—	—	—	—	—	—	—
2-pole, 600 Vac, 250 Vdc★																					
30 A-30 A	4.5	QMB261TW	**1050.**	1	QMB36R	**48.90**	QMB300EK(1 or 2)	**357.**	1.5	—	3	—	3	5	7.5	15	3	—	10	—	5
30 A-Blank	4.5	QMB261HW■	**702.**							—		—						—		—	
60 A-60 A	6	QMB262TW	**1050.**	1	QMB60R	**48.90**		**357.**	3	—	10	—	5	15	20	30	10	—	25	—	10
60 A-Blank	6	QMB262HW■	**738.**							—		—						—		—	
100 A-100 A	7.5	QMB263TW	**1536.**	2	HRK1020	**47.70**		**357.**	7.5	—	15	—	10	25	30	60	15	—	40	—	20
100 A-Blank	7.5	QMB263HW■	**1083.**	1						—		—						—		—	
200 A	9	QMB264W	**1791.**	1	HRK1020	**47.70**	QMB200EK(1 or 2)	**357.**	15	—	—	—	25	50	50	125	30	—	50	—	40
400 A	Use 3-pole devices for 2-pole application.						—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
600 A▼																					
3-pole, 600 Vac★																					
30 A-30 A	4.5	QMB361TW	**1241.**	1	QMB36R	**48.90**	QMB300EK(1 or 2)	**357.**	—	3	—	7.5	—	5	—	15	—	7.5	—	20	—
	4.5	QMJ361T	**1293.**	—	—	—			—	—	—	—	—	—	—	—	—	—	—	20	5
30 A-Blank	4.5	QMB361HW■	**861.**	1	QMB36R	**48.90**	QMB300EK(1 or 2)	**357.**	—	3	—	7.5	—	5	—	15	—	7.5	—	20	—
60 A-60 A	6	QMB362TW	**1241.**	1	QMB60R	**48.90**	QMB610EK(1 or 2)	**357.**	—	7.5	—	15	—	15	—	30	—	15	—	50	—
	6	QMJ362T	**1293.**	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	10
60 A-Blank	6	QMB362HW■	**861.**	1	QMB60R	**48.90**	QMB610EK(1 or 2)	**357.**	—	7.5	—	15	—	15	—	30	—	15	—	50	—
60 A-30 A	6	QMB362T21W	**1241.**	1 ea.	QMB60R and QMB36R	**48.90**	QMB610EK(1 or 2)	**357.**	—	—	—	—	—	—	—	—	—	—	—	—	—
	6					—			—	—	—	—	—	—	—	—	—	—	—	—	—
100 A-100 A	7.5	QMB363TW	**1961.**	2	HRK1020	**47.70**	QMB610EK(1 or 2)	**357.**	—	15	—	30	—	25	—	60	—	30	—	75	—
	6	QMJ363T	**2013.**	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	20
100 A-Blank	7.5	QMB363HW■	**1373.**	1	HRK1020	**47.70**	QMB610EK(1 or 2)	**357.**	—	15	—	30	—	25	—	60	—	30	—	75	—
	6	QMJ363H■	**1424.**	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	20
100 A-30 A	7.5	QMB363T31W	**1961.**	1 ea.	HRK1020 and QMB36R	**47.70**	QMB610EK(1 or 2)	**357.**	—	—	—	—	—	—	—	—	—	—	—	—	—
	7.5					**48.90**			—	—	—	—	—	—	—	—	—	—	—	—	—
100 A-60 A	7.5	QMB363T32W	**1961.**	1 ea.	HRK1020 and QMB60R	**47.70**	QMB610EK(1 or 2)	**357.**	—	—	—	—	—	—	—	—	—	—	—	—	—
	7.5					**48.90**			—	—	—	—	—	—	—	—	—	—	—	—	—
200 A	9	QMB364W	**2306.**	1	HRK1020	**47.70**	QMB200EK(1 or 2)	**357.**	—	25	—	60	—	50	—	125	—	60	—	150	—
200 A-200 A	7.5	QMJ364T	**4712.**	—	—	—	QMB610EK(1 or 2)	**357.**	—	25	—	60	—	50	—	125	—	60	—	150	40
200 A-Blank	7.5	QMJ364H■	**2357.**	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—	—
400 A△	15	QMB365W	**5445.**	1	QMB4060R	**111.00**	—	—	—	—	—	—	—	100	—	250	—	125	—	350	50
400 A	9	QMJ365	**5561.**	—	—	—	QMB200EK(1 or 2)	**357.**	—	50	—	125	—	100	—	250	—	125	—	350	50
400 A△	9	QMB365WT6◊	**5276.**	—	—	—	—		—	—	—	—	—	—	—	—	—	—	—	—	—
600 A▼△	15	QMB366W	**6735.**	1	QMB4060R	**111.00**	—	—	—	—	—	—	—	150	—	400	—	250	—	500	—
60 A0	15	QMJ366	**6704.**	—	—	—	—	—	—	75	—	150	—	—	—	—	—		—	—	—
800 A□	15	QMB367W	**12140.**	—	—	—	—	—	—	—	—	—	—	150	—	400	—	250	—	500	—

▲ "1" indicates one normally open and one normally closed contact.
"2" indicates two normally open and two normally closed contacts.
■ Blank units cannot be modified to accept a switch interior.
♦ Use 300 Vac Class T fuses only.
★ Class J fuse provisions—to field modify switch, move load side fuse base to position indicated in switch. Not available on 100-30, 100-60, or 800 A switch units.
▼ To adapt switch for 600 Vac Class T fuses, order kit Catalog Number **QMB600T6**, $ Price **194.** (Use T6 fuses with standard horsepower ratings only).
△ 250 Vdc rating.
□ To adapt switch for 600 Vac Class T fuses, order kit Catalog Number **QMB800T6**, $ Price **467.** (Use T6 fuses with standard horsepower ratings only).
◊ Use 600 Vac Class T fuses only.
☆ Horsepower rating applicable to 480Y/277 V system only.

Note: See the Supplemental Digest for merchandised motor starter units, QMB RTI panelboards, and replacement switches for Series 1–4 and D2 QMB panelboards.

Note: For series E1 and E2, QMJ switches may be used in 400 A–1200 A interiors in a NEMA 1 without door only. QMJ switches cannot be used in series E1 and E2, 225 A panelboards. QMJ switches cannot be used in NEMA 1 with door or any NEMA 3R/12 enclosure.

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Table 9.164: Base $ Price

Main Lugs			Main Switch ▲						Solid Neutral (Main Lugs and Main Switch)	
Mains Rating (Amperes)	Maximum Mounting Space (In.)	Base $ Price (2- or 3-pole)	Mains Rating (Amperes)	Maximum Mounting Space (In.)	240 Vac Base $ Price		600 Vac Base $ Price		Ampere Rating	$ Price
					2-pole	3-pole	2-pole	3-pole		
—	—	—	100	51	**2544.**	**3104.**	**3026.**	**3632.**	100 A	**294.**
—	—	—	200	51	**2544.**	**3104.**	**3026.**	**3632.**	200 A	**294.**
225	60	**1098.**	—	—	—	—	—	—	225 A	**294.**
400	60	**1344.**	400	45	**4840.**	**6158.**	**5906.**	**7300.**	400 A	**384.**
600	60	**2066.**	600	45	**7298.** ♦	**8758.** ♦	**7968.** ★▼	**9338.** ★	600 A	**556.**
800	60	**2550.**	800■	45	**11098.**	**13704.** ♦	**11128.** ★	**13724.** ★	800 A	**786.**
1200	45	**3550.**	—	—	—	—	—	—	1200 A	**912.**

▲ Pricing includes Class R or J Rejection Clips if requested at time of order. Class J fuses available only on 600 V switches.
■ 800 A switch unit with provision for UL Class L fuses.
♦ Switches for use with 300 V Class T fuses are also available at no additional cost.
★ For 600 Vac UL Class T fuse provision on main switch, add $ **321.00**
▼ 250 Vdc rating.

Table 9.165: Branch Switch $ Price △

Unit Ampere Rating	Switch Type	240 Vac				600 Vac			
		2-pole $ Price	3-pole $ Price	Space Only $ Price	Unit Mounting Height (In.)	2-pole $ Price	3-pole $ Price	Space Only $ Price	Unit Mounting Height (In.)
Twin Mounted Branch Switches □									
30 A-Blank	QMB	**592.**	**784.**	**294.**	4.5	**852.**	**1012.**	**294.**	4.5
60 A-Blank	QMB							**396.**	6
100 A-Blank	QMB	**898.**	**1104.**	**392.**	6	**1276.**	**1592.**	**462.**	7.5
	QMJ ◊ ⬙	—	—	—	—			**396.**	6
200 A-Blank	QMJ ◊ ⬙	—	—	—	—	**1984.**	**2576.**	**462.**	7.5
60 A-30 A	QMB	—	—	—	—	**1216.**	**1446.**	**396.**	6
100 A-30 A	QMB	**1822.**	**2274.**	**396.**	6	**1822.**	**2274.**	**462.**	7.5
100 A-60 A	QMB								
30 A-30 A	QMB	**826.**	**1120.**	**294.**	4.5	**1216.** ◊	**1446.**	**294.**	4.5
	QMJ ◊ ⬙	—	—	—	—	**1216.**			
60 A-60 A	QMB	**826.**	**1120.**	**294.**	4.5	**1216.** ◊	**1446.**	**396.**	6
	QMJ ◊ ⬙	—	—	—	—	**1216.**			
100 A-100 A	QMB	**1282.**	**1576.**	**396.**	6	**1822.** ▽	**2274.**	**462.**	7.5
	QMJ ◊ ⬙	—	—	—	—	**1822.**		**396.**	6
200 A-200 A		—	—	—	—	**3970.**	**5154.**	**462.**	7.5
Single Mounted Branch Switches									
200 A	QMB	**1484.**	**2034.**	**580.**	9	**1984.** ◊	**2576.**	**580.**	9
400 A	QMB	**3204.**	**4562.**	**878.**	15	**4300.** ◊	**5764.** ◊	**878.**	15
400 A ☆	QMB	**3040.** ☆	**4360.** ☆	**580.**	9	**4098.** ◊ ☆	**5552.** ◊ ☆	**580.**	9
400 A	QMJ ◊ ⬙	—	—	—	—	**4098.**	**5552.**		
600 A	QMB	**4888.** ▽	**6374.** ◊ ▽	**878.**	15	**5264.** ◊ ◒	**6962.** ◊ ◒	**878.**	15
600 A	QMJ ◊ ⬙	—	—	—	—	**5264.**	**6962.**		
800 A ✱	QMB	**10682.**	**10682.** ▽	**878.**	15	**10682.** ◒	**10682.** ◒		

△ Pricing includes Class R or J Rejection Clips if requested at time of order. Class J fuses available only on 600 V switches.
□ $ Price is per twin switch.
◊ 250 Vdc rating.
☆ For use with Class T fuses only. Use 300 V Class T fuses on 240 Vac max. systems and 600 V Class T fuses on 600 Vac max. systems.
▽ Switches for use with 300 V Class T fuses are also available at no additional cost.
◒ For 600 Vac UL Class T fuse provision on branch switch, add $ 307.00
✱ 800 A switch unit with provision for UL Class L fuses.
⬙ QMJ switches are available in NEMA 1 enclosures only.

Table 9.166: Accessories

Electrical Interlocks			Mains Ampere Rating	Sub-feed Lugs ◑ for Main Lugs Interior ◑	Feed-through Lugs for Main Switch Interior	Copper Bus Bars
Number of Contacts		Branch Switches 30–200 A $ Price				
Normally Open	Normally Closed					
1 2	1 2	**472.**	200 A	—	—	**488.**
			225 A	**282.**	—	**488.**
			400 A	**466.**	**872.** ✪	**720.**
			600 A	**856.**	**1268.** ✪	**1148.**
			800 A	**1150.**	**1512.** ✪	**1372.**
			1200 A	**1440.**	—	**1428.**

◑ No extra box height required.
✪ Box height increases 6 in. Not available in Type 3R/5/12 construction.

Table 9.167: Circuit Breakers, Twin Mounted H-frame— $ Price Per Twin Unit

Circuit Breaker Ampere Rating		Unit Mounting Height (In.)	$ Price—3-pole						
Left Unit	Right Unit		240 V		480 V		600 V		Space Only
			HD	HG	HD	HG	HD	HG	
15–150 A	15–150 A	6	**2914.**	**3572.**	**3324.**	**3814.**	**3674.**	**4018.**	**396.**

Note: See the Supplemental and Obsolescence Digest for merchandised motor starter units, QMB RTI panelboards, and replacement switches for Series 1-4 and D2 QMB panelboards.

Table 9.168: Circuit Breaker, Single Mounted JD-LA— $ Price Each

Circuit Breaker Ampere Rating	Unit Mounting Height (In.)	$ Price—3-pole			
		600 V			Space Only
		JD	JG	LA	
150–250 A	6	**3800.**	**5814.**	—	**396.**
225–400 A	7.5	—	—	**5664.**	**462.**

Table 9.169: UL Listed Short Circuit Ratings

Starter Size	Fusible Switch—600 V Max. (w/Class R or J Fuses) RMS Sym. Amps	Thermal-magnetic Circuit Breaker 600 V Max. RMS Sym. Amps
0	100,000	5,000
1	100,000	5,000
2	100,000	5,000
3	100,000	5,000

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Table 9.170: Ground Bar and Name Plates

Item	$ Price
Equipment Ground Bar	180.
Copper Ground Bar	148. ▲
Insulated/Isolated Ground Bar	▲■
Name Plates	78. ♦

▲ Add to Equipment Ground Bar $ Price.
■ $ Price an additional Neutral Assembly from Table 9.164 on Digest page 9-36 for Al insulated ground bar or from Table 9.171 for Cu insulated ground bar.
♦ Standard white face/black letter laminated bakelite, 1 in. x 3.5 in. adhesive backed or screw mountable with screws in a bag assembly. ($ Price includes engraving.)

Table 9.171: Copper Neutral

	$ Price
Copper Neutral	
125–400 A	868.
600 A	894.
800 A	1108.
1200 A	1352.
Hinged Trim	N/A
Weatherproof or Dusttight Cabinets—Type 3R, 5, 12; 800 A Max.	3054.
Mechanical Lugs 225 A–1200 A	Standard

Table 9.172: Copper Mechanical Lugs—Main Switch Interiors

Copper Mechanical Lugs	$ Price
200 A	108.
400 A	148.
600 A	168.
800 A	196.

Table 9.173: Copper Compression Lugs—Main Lug Interiors

Copper Compression Lugs	$ Price
225 A	108.
400 A	148.
600 A	168.
800 A	316.
1200 A	836.

Table 9.174: Aluminum Compression Lugs VCEL—Main Lug Interiors

Aluminum Compression Lugs VCEL	$ Price
225 A	58.
400 A	90.
600 A	118.
800 A	200.
1200 A	236.

Table 9.175: Aluminum Compression Lugs VCEL—Main or Branch Switches

Aluminum Compression Lugs VCEL	$ Price
100 A #8–1/0 Al or Cu	58.
200 A #4–300 kcmil Al or Cu	98.
400 A 2/0–500 kcmil Al or Cu	128.
600 A 2/0–500 kcmil Al or Cu	246.
800 A 2/0–500 kcmil Al or Cu or 500 kcmil Cu or 500–750kcmil Al.	262.

Table 9.176: Copper Compression Lugs—Main Switch Interiors

Copper Compression Lugs	$ Price
200 A	108.
400 A	148.
600 A	168.
800 A	196.

Table 9.177: Surgelogic™ SPD for QMB ★

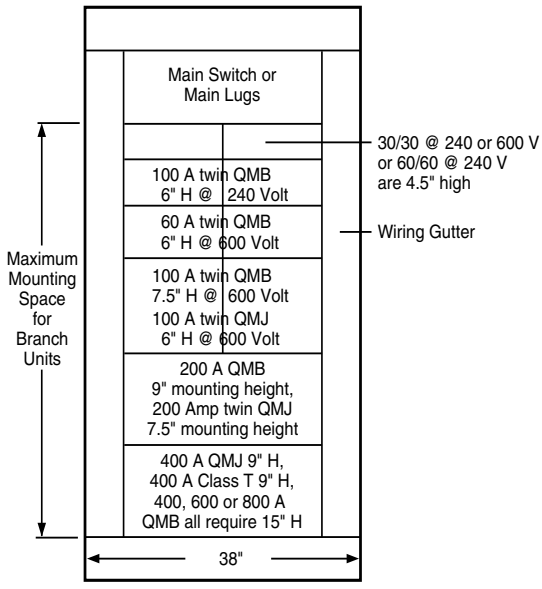
Surge Current Rating kA	Voltage				
	120/240 V	208Y/120 V	240/120 Vac	480Y/277 Vac	600Y/347 Vac
	1Ø3W	3Ø4W	3Ø4W High Leg	3Ø4W	3Ø4W
100	—	14310.	—	15410.	—
120	—	15654.	—	16754.	—
160	—	18586.	—	19686.	—
200	19196.	23596.	23596.	26896.	26896.
240	23760.	27440.	27440.	31460.	31460.

★ Requires 9 in. of mounting height.

Table 9.178: SPD Options

Surgelogic SPD Options	$ Price
Surge Counter	Standard
Dry Contacts	Standard
Remote Monitor	2588.

QMB Layout Information



To maximize the quantity of branch switches, use QMJ switches from Digest page 9-36. Class J fuses are available in time delay construction suitable for motor and transformer loads.

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Table 9.179: NQ and NF Lighting Contactors—Mechanically Held
(Furnish a one-line power and control voltage connection diagram.)

Ampacity	Mechanically Held		
	Type	$ Price	Minimum Additional Box Height Required ▲ H (In.)
Square D™ Brand PB ■			
30 A 2P	PBM10B	**3772.**	18
60 A 2P	PBP10B	**4634.**	18
75 A 2P	PBN10B	**4986.**	18
100 A 2P	PBQ10B	**5072.**	18
150 A 2P	PBR10B	**7156.**	18
200 A 2P	PBV10B	**8692.**	18
225 A 2P	PBW10B	**9830.**	18
30 A 3P	PBM11B	**3740.**	18
60 A 3P	PBP11B	**4754.**	18
75 A 3P	PBN11B	**5628.**	18
100 A 3P	PBQ11B	**6454.**	18
150 A 3P	PBR11B	**8078.**	18
200 A 3P	PBV11B	**8736.**	18
225 A 3P	PBW11B	**10062.**	18
ASCO Type 920 ♦			
30 A 2P	9202030	**4694.**	18
60 A 2P	9202060	**5954.**	18
75 A 2P	9202075	**5954.**	18
100 A 2P	9202100	**6194.**	18
150 A 2P	9202150	**9242.**	18
200 A 2P	9202200	**10882.**	18
225 A 2P	9202225	**11875.**	18
30 A 3P	9203030	**5436.**	18
60 A 3P	9203060	**7638.**	18
75 A 3P	9203075	**7638.**	18
100 A 3P	9203100	**9184.**	18
150 A 3P	9203150	**12998.**	18
200 A 3P	9203200	**14434.**	18
225 A 3P	9203225	**15750.**	18

▲ NF panels require 18 in. of additional box height regardless of contactor ampacity or manufacturer.
■ If two-wire control is required—Square D™ brand. Add **708.** (No additional width or depth required)
♦ If two-wire control is required—ASCO type. Add **1412.** (No additional width or depth required)

Table 9.180: Current Density Rated Panelboard Bus and Special Plating for Copper Bus

Ampacity	Copper Bus Special Plating $ List Price Adder ★	Current Density Rated Bus $ List Price Adder	
	Tin or Silver Plating	1000 A/in² Cu	750 A/in² Al
100 A	**1240.**	**510.** ▼	**340.** △
125 A			
225 A	**1240.**	**610.** ▼	
250 A			**456.** △
400 A	**2080.**	**830.**	**572.** △
600 A	**2080.**	**1050.** △	**1080.** △□
800 A	**2080.**	**1490.**	**1244.** □
1200 A	**2080.**	**1710.**	**1432.** □◊

★ Standard copper bus plating material
– NQ and NF: Silver plated bus/tin plated connectors
– I-Line and QMB: Tin.
▼ NQ available in 42 circuit only.
△ Not available in NQ.
□ HCN 600 A and all 800–1200 A I-Line interiors available with copper bus only.
◊ 1200 A QMB with current density-rated bussing not available.

Table 9.181: NQ and NF Panelboard Split Bus Bars

Maximum Ampacity MLO	$ List Price Adder		Maximum Number of Pole Spaces Available		Box Height (ft.)
	1-phase	3-phase	Main	Split	
NQ Panelboards—125 A Maximum Lugs on Split Bus Section ☆					
225 A	**600.**	**900.**	18	30	44
			30	18	
				30	
NF Panelboards—125 A Maximum Lugs on Split Bus Section ☆					
250 A	—	**900.**	18	30	56
			30	18	
				30	62

☆ When greater than 125 A lugs are required on the split section of the bus, contact your local Schneider Electric representative or distributor for the box height.

Table 9.182: I-Line™ Panelboard Split Bus Bars

Ampacity MLO	$ Price		Additional Mounting Height Required On Split Bus Section ▽
	2-pole	3-pole	Split Bus
225 A	**560.**	**662.**	7.5 in.
400 A	**662.**	**858.**	9 in.
600 A	**786.**	**858.**	12 in.
800 A	**1094.**	**1238.**	12 in.
1200 A	**1320.**	**1442.**	18 in.

Note: For applications with main circuit breaker panelboards, contact your local Schneider Electric representative or distributor.
▽ For I-Line panelboards, dimension includes height of "SL" sub-feed lug kit from Digest, plus 3 in. from available branch mounting space.

Main Circuit Breaker Without Overload Trip

(Automatic Molded Case Switch)

- (Not UL Listed)
  $ Price as standard main circuit breaker, no $ Price Adder.

Shunt Trip Circuit Breakers

- See Digest page 7-35 for pricing.

Note: For molded case switch and automatic molded case switch short circuit current ratings, See Digest page 7-33.

Special Features

For information on the following special features, please see the Supplemental and Obsolescence Digest.

- Powerlogic™ metering ◒
- Customer equipment space (NQ and NF) ◒
- Increased box depth ◒
- Increased gutters–top, bottom, and sides ◒
- Non-standard paint ◒
- Welded base channel ◒
- Type 1 gasketed ◒
- Type 2 drip hood ◒
- Type 3R/4/4X/5/12 stainless steel enclosure ◒
- Type 4X fiberglass enclosure ◒
- Stainless steel trim front ◒
- Padlockable hasp ◒
- Special locks (Corbin, Yale, Best) ◒
- Equal height boxes ◒
- Common trim to cover two equal height boxes ◒
- Panelboard skirt—hides conduits feeding a panelboard ◒
- Panelboard wireway—for terminating conduit in wireway endwall ◒
- Keyed mechanical interlocking of two or more circuit breakers (I-Line and QMB) ◒
- Motor operators (I-Line only)
- Panelboard interiors and special fronts to fit existing boxes
- A standard panelboard box has one blank endwall and one with knockouts. Blank endwalls or knockouts in both endwalls are also available ◒

◒ Supported by the Panelboard Product Selector.

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Table 9.183: NQ Standard Aluminum Mechanical Lugs—Main Lugs

Panel Type	Ampere Rating	Lug Wire Range
NQ	100 A	one #6-2/0 Al or Cu
	225 A	one #6-350 kcmil Al or Cu
	400 A	one 1/0-750 kcmil or two 1/0-350 kcmil Al or Cu
	600 A	two 1/0-750 kcmil Al or Cu

Table 9.184: NQ Standard Aluminum Mechanical Lugs—Main Circuit Breaker

Panel Type	Ampere Rating	Circuit Breaker Type	Lug Wire Range ▲
NQ	100 A	QOB	one #4–#2/0 Al or Cu
		FI	one #14–#1/0 Al or Cu
	150 A	HD, HG, HJ, HL	one #14–#3/0 Al or Cu
	225 A	QB, QD, QG, QJ	one #4-300 kcmil Al or Cu
	250 A	JD, JG, JJ, JL	one #3/0–350 kcmil Al or Cu ▲
		DJ	one #2–600 Cu or #2–500 Al
		KI	one #1/0–350 kcmil Al or Cu
	400 A	LA, LH	one #1–600 kcmil Al or Cu or two #1–250 kcmil Al or Cu
	600 A	LC	two #4/0-500 kcmil Al or Cu

▲ The lug range shown is for the highest amperage of the circuit breaker frame shown in the table.

Table 9.185: NF Standard Mechanical Lugs—Main Lugs

Panel Type	Ampere Rating	Lug Wire Range
NF	125 A	one #6–2/0 Al or Cu
	250 A	one #6–350 kcmil Al or Cu
	400 A	one #1/0–750 kcmil or two #1/0–350 kcmil Al or Cu
	600 A	two #1/0–600 kcmil Al or Cu
	800 A	three #4/0–500 kcmil Al or Cu

Table 9.186: NF Standard Mechanical Lugs—Main Circuit Breaker

Panel Type	Ampere Rating	Circuit Breaker Type	Lug Wire Range ■
NF	125 A	ED, EG, EJ	one #14–#2/0 Al or Cu
	100 A	FI	one #14–#1/0 Cu or one #12–#1/0 Al
	150 A	HD, HG, HJ, HL	one #14–#3/0 Al or Cu
	250 A	JD, JG, JJ, JL	one #3/0–350 kcmil Al or Cu ■
		DJ	one #2–600 Cu or #2–500 Al
		KI	one #1/0–350 kcmil Al or Cu
	400 A	LA, LH	one #1–600 kcmil or two #1–250 kcmil Al or Cu
	600 A	LC, LI, LE, LX, LXI	two #4/0–500 kcmil Al or Cu

■ The lug range shown is for the highest amperage of the circuit breaker frame shown in the table.

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Table 9.187: Standard Mechanical Lugs—Main Lugs

Panel Type	Ampere Rating	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
I-Line	100 A	—	—
	225 A	one #6–300 kcmil Al or Cu	one #6–300 kcmil Al or Cu
	400 A	two #2–600 kcmil Al or Cu	one #2–600 kcmil Al or Cu
	600 A	two #2–600 kcmil Al or Cu	two #2–500 kcmil Al or Cu
	800 A	(4) 3/0–750 kcmil Al or Cu	(3) 3/0–500 kcmil Al or Cu
	1200 A	(4) 3/0–750 kcmil Al or Cu	(4) 3/0–500 kcmil Al or Cu

Table 9.188: Standard Mechanical Lugs—Main Circuit Breaker

Panel Type	Ampere Rating	Circuit Breaker Type	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
I-Line	100 A	FA, FH, FI	one #14-1/0 Al or Cu	one #14-1/0 Al or Cu
	150 A	HD, HG, HJ, HL	one #14-3/0 Al or Cu	one #14-3/0 Al or Cu
	225 A	KI	one #4-300 kcmil Al or Cu	one #4-300 kcmil Al or Cu
	250 A	JD, JG, JJ, JL	one #1/0-#4/0 Al or Cu	one #1/0-300 kcmil Al or Cu
		LX, LXI, LE	two #1-350 kcmil Al or Cu	two #1-350 kcmil Al or Cu
	400 A	LA, LH	one #1-600 or two #1-250 kcmil Al or Cu	one #1-600 kcmil Al or Cu
	600 A	LC, LI, LX, LXI, LE	two 4/0-500kcmil Al or Cu	two 4/0-500kcmil Al or Cu
	800 A	MG, MJ, PG, PJ, PL	three 3/0-500 kcmil Al or Cu	three 3/0-500 kcmil Al or Cu
	1200 A	PG, PJ, PL, RGC, RJC, RLC	four 3/0-500 kcmil Al or Cu	four 3/0-500 kcmil Al or Cu

Table 9.189: Standard Mechanical Lugs—Main Lugs

Panel Type	Mains Ampere Rating	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
QMB	225 A	one #6–300 kcmil Al or Cu	one #6–300 kcmil Al or Cu
	400 A	one #6–300 kcmil Al or Cu and, one 3/0–750 kcmil Al or Cu	one #6–300 kcmil Al or Cu and, one 3/0–750 kcmil Al or Cu
	600 A	two 3/0–500 kcmil Al or Cu	two 3/0–500 kcmil Al or Cu
	800 A	(4) 3/0–750 kcmil Al or Cu	(3) 3/0–500 kcmil Al or Cu or two 3/0–750 kcmil Al or Cu
	1200 A	(4) 3/0–750 kcmil Al or Cu	(4) 3/0–500 kcmil Al or Cu or (4) 3/0–750 kcmil Al or Cu
	1600 A	VCEL compression lugs Standard.	

Table 9.190: Standard Mechanical Lugs—Main Switch

Panel Type	Mains Ampere Rating	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
QMB	200 A	#4–300 kcmil Al or Cu	one #4–300 kcmil Al or Cu
	400 A	3/0–600 kcmil Al or Cu	two 3/0–600 kcmil Al or Cu
	600 A	3/0–600 kcmil Al or Cu	two 3/0–600 kcmil Al or Cu
	800 A	3/0–600 kcmil Al or Cu	(3) 3/0–500 kcmil Al or Cu

Table 9.191: Standard Mechanical Lugs—QMB Branch Switch Units

Panel Type	Switch Ampere Rating	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
QMB	30 A	one #14–#2 Al or Cu	one #14–#2 Al or Cu
	60 A	one #14–#2 Al or Cu	one #14–#2 Al or Cu
	100 A	one #14–1/0 Al or Cu	one #14–1/0 Al or Cu
	200 A	one #4–300 kcmil Al or Cu	one #4–300 kcmil Al or Cu
	400 A	two 3/0–600 kcmil Al or Cu	two 3/0–500 kcmil Al or Cu
	600 A	two 3/0–600 kcmil Al or Cu	two 3/0–500 kcmil Al or Cu
	800 A	(3) 3/0–600 kcmil Al or Cu	(3) 3/0–500 kcmil Al or Cu

Table 9.192: Standard Mechanical Lugs—QMJ Branch Switch Units ■

Panel Type	Switch Ampere Rating	Lug Wire Range ▲	Wire Range Wire Bending Space per NEC Table 373-6 ▲
QMJ	30 A	one #14–#2 Al or Cu	one #14–#2 Al or Cu
	60 A	one #14–#2 Al or Cu	one #14–#2 Al or Cu
	100 A	one #14–1/0 Al or Cu	one #14–1/0 Al or Cu
	200 A	one #6–300 kcmil Al or Cu	one #6–300 kcmil Al or Cu
	400 A	one 1/0–750 kcmil Al or Cu	one 1/0–750 kcmil Al or Cu
	400 A	two 1/0–300 kcmil Al or Cu	two 1/0–300 kcmil Al or Cu
	600 A	two 3/0–600 kcmil Al or Cu	two 3/0–600 kcmil Al or Cu

▲ (#) = Number of conductors per phase.
■ Use only 90 °C insulated conductors based on an ampacity of 75 °C conductors.

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Table 9.193: Interior Boxes and Fronts — Includes Solid Neutral

I-Line Mounting Space	Part Number	Panelboard Ampacity	List $ Price	Single/ Duplex	Lighting Section Type	Lighting Section Amperage	Lighting Section Circuits	Busing	Ground Bar	Box	4 Piece Trim Without Door	Trim with Door	NEMA 3R/5/12 (Includes Fromnt)
18	CP18864N3Q2C	400	**10334.00**	S	NQ	225	30	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N3Q2	400	**7650.00**	S	NQ	225	30	Al	PK32DGTA	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N4Q2C	400	**10729.00**	S	NQ	225	42	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N4Q2	400	**8045.00**	S	NQ	225	42	Al	PK32DGTA	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N3F2C	400	**17549.00**	S	NF	250	30	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N3F2	400	**14749.00**	S	NF	250	30	Al	PK32DGTA	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N4F2C	400	**18147.00**	S	NF	250	42	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18864N4F2	400	**15388.00**	S	NF	250	42	Al	PK32DGTA	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18866N3Q4C	600	**15032.00**	S	NQ	400	30	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18866N4Q4C	600	**15428.00**	S	NQ	400	42	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18866N3F4C	600	**21270.00**	S	NF	400	30	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
18	CP18866N4F4C	600	**21863.00**	S	NF	400	42	Cu	PK32DGTACU	HC2686DB	HC2686T( )4P	HC2686T( )HR	HC2686WP
22.5	CP23734N3Q2C	400	**10686.00**	S	NQ	225	30	Cu	PK32DGTACU	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23734N3Q2	400	**7942.00**	S	NQ	225	30	AL	PK32DGTA	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23734N3F2C	400	**18065.00**	S	NF	250	30	Cu	PK32DGTACU	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23734N3F2	400	**15249.00**	S	NF	250	30	AL	PK32DGTA	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23736N3Q4C	600	**16159.00**	S	NQ	400	42	Cu	PK32DGTACU	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23736N3F4C	600	**22539.00**	S	NF	400	42	Cu	PK32DGTA	HC3273DB9	HCM73T( )V	HCM73T( )VD	N/A
22.5	CP23914N4Q2C	400	**11091.00**	S	NQ	225	42	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N4Q2	400	**8346.00**	S	NQ	225	42	Al	PK32DGTA	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N5Q2C	400	**11604.00**	S	NQ	225	54	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N5Q2	400	**8797.00**	S	NQ	225	54	Al	PK32DGTA	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N4F2C	400	**18672.00**	S	NF	250	42	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N4F2	400	**15855.00**	S	NF	250	42	Al	PK32DGTA	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N5F2C	400	**19341.00**	S	NF	250	54	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23914N5F2	400	**16508.00**	S	NF	250	54	Al	PK32DGTA	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N4Q4C	600	**16563.00**	S	NQ	400	42	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N5Q4C	600	**17076.00**	S	NQ	400	54	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N4F4C	600	**23145.00**	S	NF	400	42	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N5F4C	600	**23814.00**	S	NF	400	54	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N44Q4C	600	**26032.00**	D	NQ	400	42/42	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
22.5	CP23916N53Q4C	600	**26141.00**	D	NQ	400	54/30	Cu	PK32DGTACU	HC3291DB9	HCM91T( )V	HCM91T( )VD	N/A
31.5	CP32866N44Q4C	600	**26066.00**	D	NQ	400	42/42	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32866N53Q4C	600	**26170.00**	D	NQ	400	54/30	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32866N4BQ4C	600	**18362.00**	D	NQ	400	42/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32866N44F4C	600	**38703.00**	D	NF	400	42/42	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32866N53F4C	600	**38763.00**	D	NF	400	54/30	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32866N4BF4C	600	**24681.00**	D	NF	400	42/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N44Q6C	800	**36447.00**	D	NQ	600	42/42	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N53Q6C	800	**36552.00**	D	NQ	600	54/30	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N3BQ6C	800	**23026.00**	D	NQ	600	30/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N4BQ6C	800	**23415.00**	D	NQ	600	42/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N5BQ6C	800	**23300.00**	D	NQ	600	54/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N44F6C	800	**38744.00**	D	NF	600	42/42	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N53F6C	800	**38805.00**	D	NF	600	54/30	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N3BF6C	800	**23981.00**	D	NF	600	30/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N4BF6C	800	**24563.00**	D	NF	600	42/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP
31.5	CP32868N5BF6C	800	**24599.00**	D	NF	600	54/O	Cu	PK32DGTACU	HC4486DB	HCR86T( )	HCR86T( )D	HC4486WP

Table 9.194: RTI Cabled Lighting Section Kit for I-Line Combo Panelboard

Part Number	Description	MLO Panelboard Ampacity	List $ Price	Lighting Section Type	Lighting Section Circuits
NFICRT418L1C	NF Lighting Section Kit	125	**1528.00**	NF	18
NFICRT442L2C	NF Lighting Section Kit	250	**1763.00**	NF	42
NFICRT442L4C	NF Lighting Section Kit	400	**2353.00**	NF	42
NFICRT442L6C	NF Lighting Section Kit	600	**2008.00**	NF	42
NQICRT418L1C	NQ Lighting Section Kit	100	**1564.00**	NQ	18
NQICRT442L2C	NQ Lighting Section Kit	225	**1373.00**	NQ	42
NQICRT442L4C	NQ Lighting Section Kit	400	**2156.00**	NQ	42
NQICRT442L6C	NQ Lighting Section Kit	600	**2332.00**	NQ	42
NQICRT418C1C	Contactor with 18 Circuit NQ Lighting Section Kit	100	**1225.00**	NQ	18
NFICRT418C1C	Contactor with 18 Circuit NF Lighting Section Kit	125	**1440.00**	NF	18

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This page contains UL Tested and Certified series combination ratings for panelboards. These ratings apply to either an integral main located in the same enclosure or a remote main located in a separate enclosure.

Table 9.195: NQ Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲■	Maximum Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges ♦★▼△			
			Type	1 Pole	2 Pole	3 Pole
120/240 1P/3W	22,000	MG	QO (B)	15–30 A	—	—
	25,000	LD, HD, JD	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A 15–60 A — —	— — — — — — —
	65,000	HG, JG	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A 15–60 A — —	— — — — — — —
		LG	QO (B) QO (B) VH QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A — —	— — — — — —
		LJ	QO (B) GFI QO (B) EPD	15–30 A 15–30 A	40–60 A 40–60 A	— —
	100,000	HJ, JJ	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A 15–60 A — —	— — — — — — —
		LJ	QO (B) QO(B) VH QO (B) H QO (B) GFI QO (B) EPD QO(B) AFI QO(B) CAFI	15–70 A 15–70 A — — — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–30 A 15–60 A — —	— — — — — — —
		DJ 400 A	QO (B) QO (B) VH QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 150 A 15–60 A 15–60 A — —	— — — — — —
		QJ	QO (B) QO (B) AS QO (B) VH QO (B) PL QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A 15–30 A — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–30 A 150 A 15–60 A 15–60 A — —	— — — — — — —
	125,000	HL, JL	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A 15–60 A — —	— — — — — — —
208Y/120 3P/4W 240/120 V 3P/4W	18,000	LA/LH (L) 34200MC LA/LH (L) 34225MC LA/LH (L) 34250MC LA/LH (L) 34400MC	QO (B)	15–30 A	15–30 A	15–30 A
	25,000	LD	QO (B) QO (B) VH QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A 15–125 A 15–60 A 15–60 A — — —	— 15–150 A 15–30 A 15–30 A 15–30 A — —
	30,000	DJ–W 150 A MC	QO (B) QO (B) VH QO (B) GFI QO (B) AFI	15–70 A — 15–30 A 15–20 A	15–100 A 15–125 A 15–60 A —	— 15–150 A — —
		DJ–W 250 A MC	QO (B) QO (B) VH QO (B) GFI QO (B) AFI	15–70 A — 15–30 A 15–20 A	15–100 A — 15–60 A —	— 15–150 A — —
		DJ–W 600 A MC	QO (B) QO (B) VH QO (B) GFI QO (B) AFI	15–70 A — 15–30 A 15–20 A	15–100 A — 15–60 A —	— 15–150 A — —

Table 9.195: NQ Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲■	Maximum Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges ♦★▼△			
			Type	1 Pole	2 Pole	3 Pole
208Y/120 3P/4W 240/120 V 3P/4W	65,000	LG	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A 15–70 A — 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–60 A 15–60 A — — —	— 15–150 A — 15–30 A 15–30 A 15–30 A — —
		LJ	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A 15–70 A — 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–60 A 15–60 A — — —	— 15–150 A — 15–30 A 15–30 A 15–30 A — —
		LL	QO (B) GFI QO (B) EPD QO (B) EPE	— — —	— — —	15–30 A 15–30 A 15–30 A
	100,000	DJ 400 A	QO (B) QO (B) VH QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A — 15–60 A 15–60 A — —	— 15–150 A — — — —
		QJ	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A — 15–60 A 15–60 A 15–60 A 15–60 A — —	15–30 A 15–150 A 15–30 A 15–50 A 15–50 A 15–50 A — —
		LJ	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A — — — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–30 A 15–60 A — —	— 15–150 A — — — — —
240/120 V 3P/4W	22,000	QO (B) VH	QO (B) QO (B) GFI QO (B) EPD QO (B) EPE QO (B) PL QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–30 A — 15–30 A 15–20 A 15–20 A	15–125 A 15–60 A 15–60 A — 15–60 A — —	15–100 A 15–50 A 15–50 A 15–50 A — — —
240/120 V 3P/4W	25,000	QD	QO (B) QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A — 15–60 A 15–60 A 15–60 A — — —	15–30 A 35–150 A 15–30 A 15–50 A 15–50 A 15–50 A — —
		ED, FD	QO (B) QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–20 A 15–20 A	15–125 A 15–60 A — —	15–100 A 15–50 A — —
		KD	QO (B) QO (B) AS QO (B) GFI QO (B) AFI	15–70 A 15–30 A 15–30 A 15–20 A	15–125 A 15–30 A 15–60 A —	15–100 A 15–30 A — —
		HD, JD	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A — — 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A — 15–100 A 15–60 A 15–60 A — — —	15–100 A 35–150 A — 15–50 A 15–50 A 15–50 A — —
		LD	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A 15–30 A — 15–30 A 15–30 A — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–60 A 15–60 A — — —	— 15–150 A — 15–30 A 15–30 A 15–30 A — —

▲ For shown circuit breakers rated less than this maximum voltage, the indicated short circuit current rating also applies, but at the voltage rating of the circuit breaker

■ Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

♦ Suffixes HID, and SWD may also be applied to the applicable branch circuit breakers shown above. Suffix SWN may not be applied in combination with LC main breakers.

★ Where QO (B) circuit breakers are shown above, QO (B) H, QO (B) VH, and QOH (B) circuit breakers may also be used.

▼ Where QO (B) GFI circuit breakers are shown above, QO (B) EPD and/or QO (B) EPE circuit breakers may also be used. QO–EPE only comes in 3 pole construction.

△ Where QO (B) AFI circuit breakers are shown above, QO (B) CAFI circuit breakers may also be used.

□ To achieve selective coordination, the rating of the DJ main circuit breaker must be at least two times greater than the ampere rating of any branch circuit breaker.

◊ For complete series ratings for Delta Systems please reference NQ/NQM Panelboards Information Manual 80043–712–06.

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Table 9.196: NQ Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲■	Maximum Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges ♦★▼△			
			Type	1 Pole	2 Pole	3 Pole
240/120 V 3P/4W	42,000	LA, MA	Q2L–H QDL	— —	100–225 A 70–225 A	100–225 A 70–225 A
		LC400A	QO (B) QO (B) VH QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A 15–70 A 15–30 A 15–20 A 15–20 A	15–70 A 15–125A 15–60 A — —	— 15–100 A 15–30 A — —
		LC600A	QO (B) VH QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–20 A 15–20 A	15–125 A 15–60 A — —	15–100 A 15–30 A — —
		MG	QO (B) VH	15–30 A	15–30 A	15–30 A
	65,000	LC400A	QO (B) QO (B) VH QO (B) GFI QO (B) AFI QO (B) CAFI	15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–30 A 15–125 A 15–60 A — —	— 15–100 A — — —
		LC600A	QO (B) VH QO (B) GFI QO (B) AFI QO (B) CAFI	15–30 A — 15–20 A 15–20 A	15–125 A — — —	15–150 A 15–30 A — —
		DJ400A	QO (B) QO (B) VH QO (B) H	15–70 A — —	15–125 A — 15–100 A	— 15–150 A —
		DJ_W	QO (B) QO (B) VH QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–20 A 15–20 A	15–150 A 110–125 A 15–60 A — —	— 15–150 A — — —
		DJ, DG, DL 150–600 A	QO (B) EPD	—	—	15–30 A
		EG, FG, KG	QO (B) QO (B) GFI QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–20 A 15–20 A	15–125 A 15–60 A — —	15–100 A — — —
		QG	QO (B) QO (B) VH QO (B) GFI QO (B) PL QO (B) AFI QO (B) CAFI	15–70 A — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A — 15–60 A 15–60 A — —	15–30 A 35–150 A 15–50 A 15–30 A — —
		HG, JG	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) EPE QO (B) PL QO (B) AFI QO (B) CAFI	15–70 A — — 15–30 A 15–30 A — 15–30 A 15–20 A 15–20 A	15–125 A — 15–100 A 15–60 A 15–60 A — 15–60 A — —	15–100 A 35–150 A — 15–50 A 15–50 A 15–50 A 15–30 A — —
		FC_ or KC_22___ FC_ or KC_34___	QO (B) QO (B) AS	15–70 A 15–30 A	15–100 A 15–30 A	15–100 A 15–30 A
		LG	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–60 A 15–60 A — —	— 15–150 A — 15–30 A 15–30 A — —
		LJ	QO (B) QO (B) GFI QO (B) EPD QO (B) EPE	15–70 A 15–30 A 15–30 A —	15–125 A 40–60 A 40–60 A —	— — 15–30 A 15–30 A
		LL	QO (B) EPD QO (B) EPE	— —	— —	15–30 A 15–30 A
	100,000	FC_ or KC_22___ FC_ or KC_34___	QO (B) GFI QO (B) AFI	15–30 A 15–20 A	15–30 A —	— —
		DJ400A	QO (B) QO (B) H QO (B) VH QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A — — 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–100 A — 15–60 A 15–60 A — —	— — 15–150 A — — — —
		EJ	QO (B)	15–70 A	15–125 A	15–100 A
		LJ	QO (B) QO (B) VH QO (B) H QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–70 A — — — 15–20 A 15–20 A	15–125 A 15–125 A 15–100 A 15–30 A 15–60 A — —	— 15–150 A — — — — —
		HJ, JJ	QO (B) QO (B) H QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A — — 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–100 A — 15–60 A 15–60 A 15–60 A — —	15–100 A — 35–150 A 15–30 A 15–50 A 15–50 A — —

Table 9.196: NQ Series Connected Circuit Breaker Ratings (RMS Symmetrical)

Maximum System Voltage AC ▲■	Maximum Short Circuit Current Rating	Square D™ Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D™ Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges ♦★▼△			
			Type	1 Pole	2 Pole	3 Pole
240/120 V 3P/4	125,000	HL, JL	QO (B) QO (B) H QO (B) VH QO (B) PL QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A — — 15–30 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–100 A — 15–60 A 15–60 A 15–60 A — —	15–100 A — 35–150 A 15–30 A 15–50 A 15–50 A — —
	200,000	FI, KI, HR, JR	QO (B) QO (B) GFI QO (B) EPD QO (B) AFI QO (B) CAFI	15–70 A 15–30 A 15–30 A 15–20 A 15–20 A	15–125 A 15–60 A 15–60 A — —	15–100 A — — — —
208Y/120 3P/4W	200,000	200 A Max. Class T6, J Fuses	QO (B) QO (B) GFI QO (B) EPD	15–70 A — —	15–125 A — —	— 15–50 A 15–50 A
		400 A Max. Class T3 Fuses	QO (B) QO (B) GFI QO (B) EPE QO (B) EPD	15–70 A 15–30 A — 15–30 A	15–125 A 15–60 A — 15–60 A	15–100 A 15–50 A 15–50 A 15–50 A
240/120 V 3P/4W	42,000	400 A Max. Class T3 Fuses	QO (B) VH	15–30 A	15–125 A	—
	50,000	400 A Max. Class T3 Fuses	QO (B) VH	—	—	15–30 A
	65,000	400 A Max. Class J Fuses	QO (B) VH QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI	15–70 A — — 15–20 A 15–20 A	15–125 A — — — —	— 15–50 A 15–50 A — —
		400 A Max. Class T6 Fuses	QO (B) VH QO (B) AFI	15–70 A 15–20 A	15–125 A —	15–150 A —
	100,000	200 A Max. Class T3 Fuses	QO (B) QO (B) VH QO (B) GFI QO (B) EPD QO (B) EPE QO (B) AFI QO (B) CAFI QOT	15–70 A — 15–30 A 15–30 A — 15–20 A 15–20 A 15–30 A	15–125 A — 15–60 A 15–60 A — — — 15–30 A	15–100 A 15–30 A — 15–50 A 15–50 A — — —
	200,000	200 A Max. Class J or T6 Fuses	QO (B) EPD QO (B) EPE	— —	— —	15–50 A 15–50 A
		400 A Max. Class T3 Fuses	QO (B) QO (B) GFI QO (B) EPD QO (B) EPE	15–70 A 15–30 A 15–30 A —	15–125 A 15–60 A 15–60 A —	15–100 A — 15–50 A 15–50 A

▲ For shown circuit breakers rated less than this maximum voltage, the indicated short circuit current rating also applies, but at the voltage rating of the circuit breaker.

■ Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

♦ Suffixes HID, SWD, and SWN may also be applied to the applicable branch circuit breakers shown above. Suffix SWN may **not** be applied in combination with LC main breakers.

★ Where QO (B) circuit breakers are shown above, QO (B) H, QO (B) VH, and QH (B) circuit breakers may also be used.

▼ Where QO (B) GFI circuit breakers are shown above, QO (B) EPD circuit breakers may also be used.

△ To acheive selective coordiantion, the rating of the DJ main circuit breaker must be at least two times greater than the ampere rating of any branch circuit breaker.

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Table 9.197: NQ SurgeLogic SurgeLoc Plug-on SPD▲■

Voltage		Part Number	List $ Price	Poles Occupied
120 / 240 V	80 kA	SSP01BIA08PBQ1	**4200.**	12
	100 kA	SSP01BIA10PBQ1	**4500.**	
	120 kA	SSP01BIA12PBQ1	**4800.**	
	160 kA	SSP01BIA16PBQ1	**5300.**	
	200 kA	SSP01BIA20PBQ1	**6500.**	
	240 kA	SSP01BIA24PBQ1	**7900.**	
208 Y / 120 V	80 kA	SSP02BIA08PBQ1	**4400.**	12
	100 kA	SSP02BIA10PBQ1	**4700.**	
	120 kA	SSP02BIA12PBQ1	**5100.**	
	160 kA	SSP02BIA16PBQ1	**5550.**	
	200 kA	SSP02BIA20PBQ1	**7000.**	
	240 kA	SSP02BIA24PBQ1	**8250.**	
240 / 120 HLD	80 kA	SSP03BIA08PBQ1	**4400.**	12
	100 kA	SSP03BIA10PBQ1	**4700.**	
	120 kA	SSP03BIA12PBQ1	**5100.**	
	160 kA	SSP03BIA16PBQ1	**5550.**	
	200 kA	SSP03BIA20PBQ1	**7000.**	
	240 kA	SSP03BIA24PBQ1	**8250.**	

▲ When selecting a panelboard with SurgeLoc SPD, an additional 12 circuit positions (6 adjacent mounting spaces per side) are occupied. For example, if the desired number of circuits is 30, refer to Digest Table 9.9 on page 6 and Table 9.10 on page 7 to select the NQ442L2/NQ442L2C interior and corresponding Box and Trim.

■ SPD is only available up to 72 desired circuit counts.

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Section 10

Integrated Power and Control Solutions (IPaCS) Equipment

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IPC, see page **10-3**

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Integrated Power and Control Solutions Equipment Overview

For over 30 years, the Schneider Electric Integrated Power and Control Solutions (IPaCS™) business has been providing integrated equipment solutions for retail construction, commercial, and industrial projects. The Square D™ brand IPaCS family of integrated equipment combines electrical distribution, building controls, and automation into a single, factory-assembled and pre-wired enclosure/lineup. Our innovative, cost-effective, integrated solutions save valuable floor space, shorten construction cycle times, and reduce installation and material handling costs.

Modular Panelboard System—Pre-Engineered Solution

The Modular Panelboard System (MPS) is tailored to customer specifications and may include panels, transformers, and lighting control equipment. Special Powerlink™ lighting control and column-width panel interiors are available. Additional options include power and control cable wiring, contactors, terminal blocks, surge protective devices (SPDs), equipment spaces, and power metering/monitoring solutions. Seismically qualified MPS sections are also available.
Tailored to customer specifications, MPS sections are:

- 86 in. (2184 mm) high,
- 9.5 in. (241 mm) deep, and
- vary in width depending on customer specifications

Integrated Power Center—Custom-Designed Solution

For more complex applications, the Integrated Power Center (IPC) allows for the integration of a variety of components, including electrical distribution equipment, HVAC controls, lighting controls, power quality and power conditioning products, SPDs, building management systems and power metering/monitoring solutions. As with all IPaCS integrated solutions, the IPC is designed to meet applicable codes and standards and is available as seismically qualified. Factory-assembled, pre-wired (based on shipping splits), and tested in a controlled environment, IPC sections are:

- 84 in. (2134 mm) high,
- 10.5 in. (267 mm) deep, and
- vary in width depending on customer specifications

Standby Power Connection Solutions—UL Listed

The new family of Standby Power Connection Solutions are designed, tested, manufactured and listed to the UL standards providing you with a reliable solution to quickly and safely connect to a portable generator for standby power. The SPQ cam-lock (SPQCL) tap box design incorporates cam-lock receptacles for generator connection and the capabilities to be wired back to the standby power disconnect in the electrical distribution equipment. The SPQ lug-lug (SPQTB) tap box provides the capabilities to connect to a portable generator and the generator breaker cables using mechanical lugs in lieu of the cam-lock connectors.

The SPQ Cam-Lock Box is:

- 36 in. (915 mm) high
- 30 in. (762 mm) wide
- 16 in. (407 mm) deep

The SPQ Lug-Lug Box is:

- 36 in. (915 mm) high
- 30 in. (762 mm) wide
- 13 in. (330 mm) deep

Submetering Integrated Power Center

The Submetering Integrated Power Center (IPC) is an ideal solution for multi-tenant or departmental metering applications within office towers, condominiums, apartment buildings, shopping centers, and other multi-user environments. The Submetering IPC combines the panel with breakers, the PowerLogic E4800 multi-circuit energy meter and the associated CTs in a factory-assembled and pre-wired solution saving significant space and on-site installation time. Submetering IPC sections are:

- 10.5 in. (267 mm) deep, and
- vary in width and height depending on the application

Integrated Power Center 2

The newest addition to the family of Integrated solutions, the Integrated Power Center 2 (IPC2™) provides maximum flexibility to meet customers' specifications. Features include those found in the IPC and are provided in a free-standing enclosure that can be front and rear aligned when transformers are included. The IPC2 family is available as seismically-qualified. Enclosure options include NEMA 1, NEMA 1 with driphood and NEMA 3R. IPC2 sections are:

- 91.5 in. (2324 mm) high, and
- vary in width and depth depending on customer specifications

NOTE: *Additional depths are available. Contact the Schneider Electric Integrated Power and Control Solutions business (1-800-868-9662) for more information.)*

Integrated Power Center 2 Transformer Combo

Ideally suited for projects having both 480Y/277V and 208Y/120V requirements. Available as a stand-alone solution or can be incorporated into an MPS, IPC or IPC2 lineup. The standard 42" wide x 24" deep footprint will decrease space requirements by 40% or more. A typical IPC2 Transformer Combo includes two panels in the upper cells and a transformer in the bottom cell. Other upper cell options include contactors, individually mounted circuit breakers, ATS's, equipment spaces and power metering/monitoring solutions. The IPC2 Transformer Combo is available as seismically qualified.Enclosure options include NEMA 1, NEMA 1 with driphood and NEMA 3R. IPC2 Transformer Combo sections are:

- 91.5 in. (2324 mm) high, and
- vary in width and depth depending on the transformer kVA

Additional savings are realized on installation, material costs and material handling, as shown in the table below.

Table 10.1: IPC2 Transformer Combo—Estimated Savings ▲

	Stick-Built	Transformer Combo	Savings Realized
Estimated Installation Hours	26–32	3–6	23–26
Materials	Associated pipe, wire and fittings	—	Associated pipe, wire and fittings
No. of Pieces Handled	20–30	1	19–29

▲ Based on an NF 480 V panel, 75 kVA transformer, NQ 240 V panel installation.

The IPC2 Transformer Combo has been recognized by the electrical industry by winning the following awards:

- 2006 INNOVATION Award given by the *Electrical Contracting Products* magazine
- 2006 Product of the Year Gold Medal Award given by the *Consulting/Specifying Engineer* magazine

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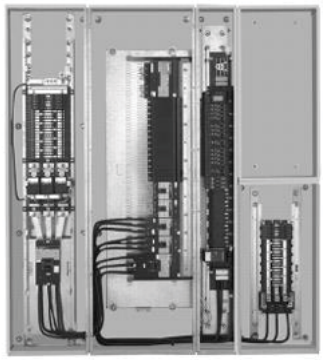
Modular Panelboard System



MPS Interior

Integrated Power Center

IPC Interior

Modular Panelboard System

The pre-engineered Modular Panelboard System (MPS) bundles electrical distribution equipment into a single factory-assembled and wired integrated system. This approach replaces the traditional method of independently mounting each panelboard and lighting control system. MPS allows for the integration of a variety of components including:

- Panelboards: I-Line, NF, NQ, and Column-width
- Surge Suppression: SPD integral to panel and/or separately mounted
- Lighting Controls: Powerlink™ or lighting contactors
- Monitoring/Metering: Powerlogic™ power meters, circuit monitors, branch circuit monitoring, and system display meters

Equipment spaces including factory-installed lighting contactors are available in three configurations:

1. Unwired: Mounted in cell only
2. Line side wired: Line side of each pole is wired to a branch circuit breaker
3. Fully wired: Line side of each pole is wired to a branch circuit breaker, load side of each pole is wired to a terminal block

Built on a panelboard platform, Modular Panelboard System sections are NEMA 1-rated and meet the requirements of UL 67. Individual MPS configurations include panel sections in full-height, stacked or side-by-side arrangements. Individual sections measure:

- 86 in. (2184 mm) high
- 10–44 in. (254–1118 mm) wide
- 9.5 in. (241 mm) deep

Typical applications for MPS equipment include:

- Restaurants / Food service
- Office buildings / Public buildings
- Warehouses
- Schools / Universities

Integrated Power Center

The custom-designed Integrated Power Center (IPC) combines electrical distribution equipment and building management controls into a single factory-assembled and wired integrated system. IPC has much greater design flexibility for producing a fully customized solution integrating a variety of distribution and control components, including:

- Panelboards: I-Line, NF, NQ, and Column-width
- Surge Suppression: SPD integral to panel and/or separately mounted
- Lighting Controls: Powerlink™ or lighting contactors
- Monitoring/Metering: Powerlogic™ power meters, circuit monitors, branch circuit monitoring, and system display meters
- Power quality and power conditioning
- Building automation
- HVAC controls

Equipment spaces including factory-installed lighting contactors are available in three configurations:

1. Unwired: Mounted in cell only
2. Line side wired: Line side of each pole is wired to a branch circuit breaker
3. Fully wired: Line side of each pole is wired to a branch circuit breaker, load side of each pole is wired to a terminal block

Integrated Power Centers are NEMA 1 rated and meet the requirements of UL 891. As with all integrated solutions, IPCs are shipped to the site fully assembled, completely pre-tested and ready-to-install. Individual IPC configurations include panel sections in full height, stacked, or side-by-side arrangements. IPC sections measure:

- 84 in. (2134 mm) High
- 10.25 (260 mm) Deep
- Widths vary, depending upon customer specifications

Typical applications for IPC equipment include:

- Retail stores / Grocery stores
- Office buildings / Public buildings
- Shopping malls / Strip malls
- Schools/Universities
- Restaurants / Food service
- Hotels/Motels
- Warehouses
- Equipment rooms

MPS and IPC Layout, Lead Time, and Pricing

Contact your local Schneider Electric representative or distributor.

MPS and IPC Shipping

MPS and IPC lineups are shipped factory-assembled and pre-wired. Customers may specify single- or multiple-section shipping splits (some limitations apply). In addition, lineups may be ordered with or without factory-installed power cables.

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SPQ Cam-Lock Tap Box

SPQ Lug-Lug Tap Box

Submetering Integrated Power Center

Integrated Power Center 2

New!

Standby Power Connection Solutions

The Standby Power Quick-Connect (SPQ) Tap Box provides a reliable solution to quickly and safely connect to a portable standby power generator. Two versions of the SPQ Tap Box have been designed and tested to the required UL standard and offer a wider range of solutions for our customers. All SPQ Tap Boxes are NEMA 3R-rated.

SPQ Cam-Lock Tap Box

- UL listed - UL 1008 SB
- NEMA Type 3R enclosure (can be used for NEMA Type 1 installations)
- Lockable door for safety and control access
- Mechanical lugs to standby power disconnect
- Color-coded cam-lock connectors for generator connection
- Hinged bottom access door for cam-lock connection
- Barriers over mechanical lugs for safety
- Application:
  - 400 A and 600 A available
  - 240 V and 480 V versions available
  - Three-phase + neutral + ground

- **SPQCL204RS** – 400 A, 208Y/120 V 3-phase, 4-wire + ground wire
- **SPQCL404RS** – 400 A, 480Y/277 V 3-phase, 4-wire + ground wire
- **SPQCL206RS** – 600 A, 208Y/120 V 3-phase, 4-wire + ground wire
- **SPQCL406RS** – 600 A, 480Y/277 V 3-phase, 4-wire + ground wire

SPQ Lug-Lug Tap Box

- UL listed—UL 1773 (cUL listed also)
- NEMA Type 3R enclosure (can be used for NEMA Type 1 installations)
- Lockable door for safety and control access
- Mechanical lugs to standby power disconnect
- Generator connection lugs rated for Type W cable
- Application:
  - 400 A and 800 A available
  - 600 V maximum
  - Three-phase + neutral + ground

- **SPQTB604RS** – 400 A, 600 V max. 3-phase, 4-wire + ground wire
- **SPQTB608RS** – 800 A, 600 V max. 3-phase, 4-wire + ground wire

New!

Submetering Integrated Power Center

The Submetering Integrated Power Center (IPC) is an ideal solution for multi-tenant or departmental metering applications. It combines the ability to meter multiple feeder breakers inside a pre-wired enclosure. The Submetering IPC offers significant space and labor savings by replacing individually enclosed, mounted, and wired panels and metering components and providing an integrated solution in one enclosure/lineup including:

- Panelboards
- PowerLogic™ E4800 Multi-Circuit Energy Meters and associated CTs
- Surge Suppression
- Factory-installed wiring between components

Submetering IPC width and height dimensions vary depending on the application. All sections are 10.5 in. (266.7 mm) deep.

Typical applications for Submetering IPC equipment include:

- Office towers
- Condominiums
- Apartment buildings
- Shopping centers
- Other multi-user environments
- Configurations with 2-PowerLogic E4800 meters plus Ethernet switch when required based on the number of metered points

Integrated Power Center 2

The Integrated Power Center 2 (IPC2™) provides maximum design flexibility. In addition to the features found in the Integrated Power Center (IPC), IPC2 lineups are free-standing enclosures that can be front and rear-aligned. IPC2 has the ability to incorporate:

- Panelboards: I-Line, NF, and NQ
- Transformers: 300 Kva (max), EE
  - K-rated and HMT also available; may limit max kVA size of transformer
- Individually mounted circuit breakers
- Surge Suppression: SPD integral to panel and/or separately mounted
- Automatic Transfer Switch: Open type 400 A 3-pole maximum including a variety of options
- Lighting Controls: Powerlink™ or lighting contactors
- PowerLogic™ Monitoring / Metering: power meters, circuit monitors, branch circuit monitoring, and system display meters
- Building Management Systems

As a stand-alone solution, the IPC2 family provides the flexibility to enter and/or exit the section from either the top or bottom. IPC2 is offered in a variety of widths and depths:

- 24–48 in. (610–1219 mm) Wide
- 24–36 in. (610–915 mm) Deep

Typical applications for IPC2 equipment include:

- Schools/Universities
- Office buildings
- Data centers
- Industrial facilities
- Casinos
- Hotels
- Any project with panels and transformers

ICP2 Layout, Lead Time, and Pricing

Contact your local Schneider Electric representative or distributor.

IPC2 Shipping

IPC2 lineups are shipped fully assembled and ready-to-install. Customers may specify single- or multiple-section shipping splits (some limitations apply). In addition, lineups may be ordered with or without factory-installed power cables.

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IPC2 Transformer Combo

Integrated Power Center 2 Transformer Combo

For projects having both 480Y/277 V and 208Y/120 V requirements, the Integrated Power Center 2 (IPC2) Transformer Combo is the perfect solution. One of the most popular members of the IPC2 product family, the IPC2 Transformer Combo has been recognized by the industry multiple times for its innovative design.

As a stand-alone solution, the IPC2 Transformer Combo is appropriate when panelboards and transformers are installed in close proximity to each other. It provides the flexibility to enter and/or exit the section from either the top or the bottom. Catalog numbers have been created for some of the more typical configurations (see Table 10.2).

All IPC2 sections can be close-coupled to QED switchboard, MPS, and IPC products. Enclosure options for IPC2 include NEMA 1, NEMA 1 with driphood, and NEMA 3R-rated, and all meet the requirements of UL 891. These sections are also seismically qualified to meet IBC and ASCE7 requirements.

Table 10.2: IPC2 Transformer Combo Merchandise Configuration Specifications

Catalog No. IPC2TC-1EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 225/3 MB 18 k AIC • 1–125/3 (Transformer) • 39-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 225/3 MB 10 k AIC • 42-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 75 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-2EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 400 A MLO 18 k AIC • 1–125/3 (Transformer) • 39-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 225/3 MB 10 k AIC • 42-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 75 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-3EE

NQ Panelboard	NQ Panelboard	Transformer
• 208Y/120 V 3Ø 4W • 225/3 MB 10 k AIC • 42-1PSO • Copper Bus / Ground Bus • FT Lugs	• 208Y/120 V 3Ø 4W • 225 A MLO 10 k AIC • 42-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 75 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-4EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 400 A MLO 18 k AIC • 1–175/3 (Transformer) • 30-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 400/3 MB 10 k AIC • 42-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 112½ kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-5EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277V 3Ø 4W • 400/3 MB 18k AIC • 1-125/3 (Transformer) • 27-1PSO • Copper Bus/Ground Bus • SUSE	• 208Y/120V 3Ø 4W • 225/3 MB 10k AIC • 42-1PSO • Copper Bus/Ground Bus	• 480V-208Y/120V 3Ø • 75kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-6EE

NF Panelboard	NQ Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 225/3 MB 18 k AIC • 1–125/3 (Transformer) • 39-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 225/3 MB 10 k AIC • 42-1PSO • Copper Bus / Ground Bus • FT Lugs	• 208Y/120 V 3Ø 4W • 225 A MLO 10k AIC • 42-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 75 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-7EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 125 A MLO 18 k AIC • 1–60/3 (Transformer) • 15-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 125/3 MB 10 k AIC • 12-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 45 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

Catalog No. IPC2TC-8EE

NF Panelboard	NQ Panelboard	Transformer
• 480Y/277 V 3Ø 4W • 125 A MLO 18 k AIC • 1–40/3 (Transformer) • 15-1PSO • Copper Bus / Ground Bus • SUSE	• 208Y/120 V 3Ø 4W • 100/3 MB 10 k AIC • 15-1PSO • Copper Bus / Ground Bus	• 480 V–208Y/120 V 3Ø • 30 kVA • Energy Efficient transformers in compliance with the 2005 Energy Act • 150 °C Temp Rise • Aluminum Windings • 6-2.5% Taps; 2+ 4-

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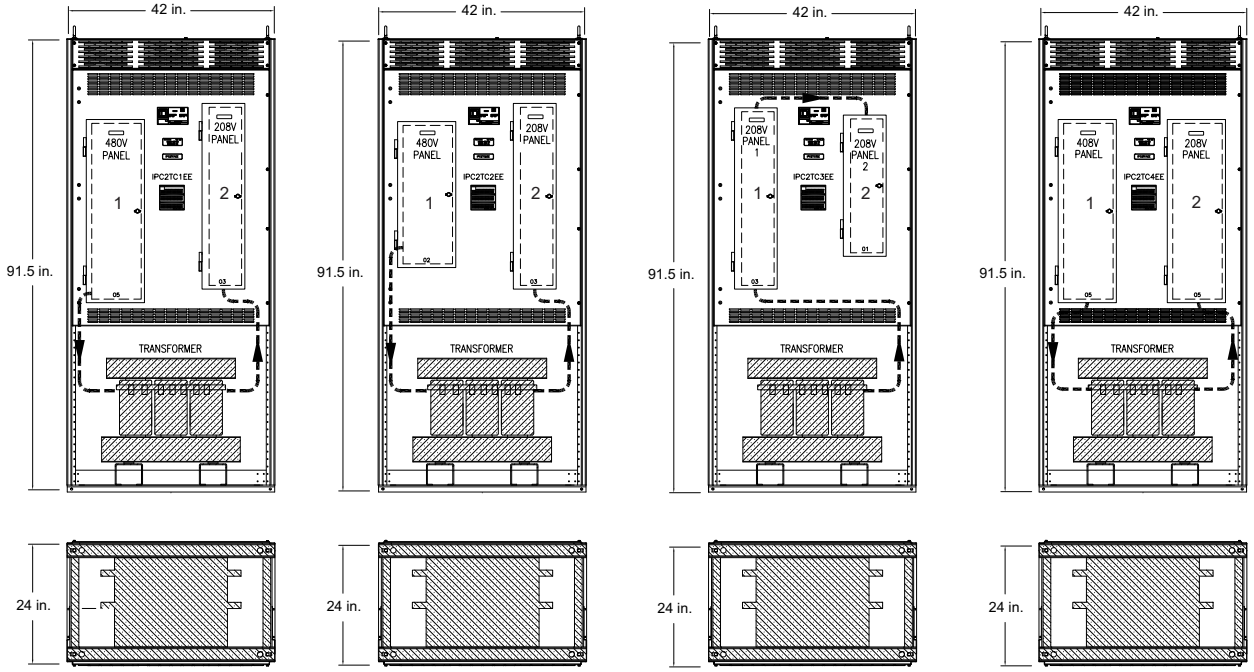
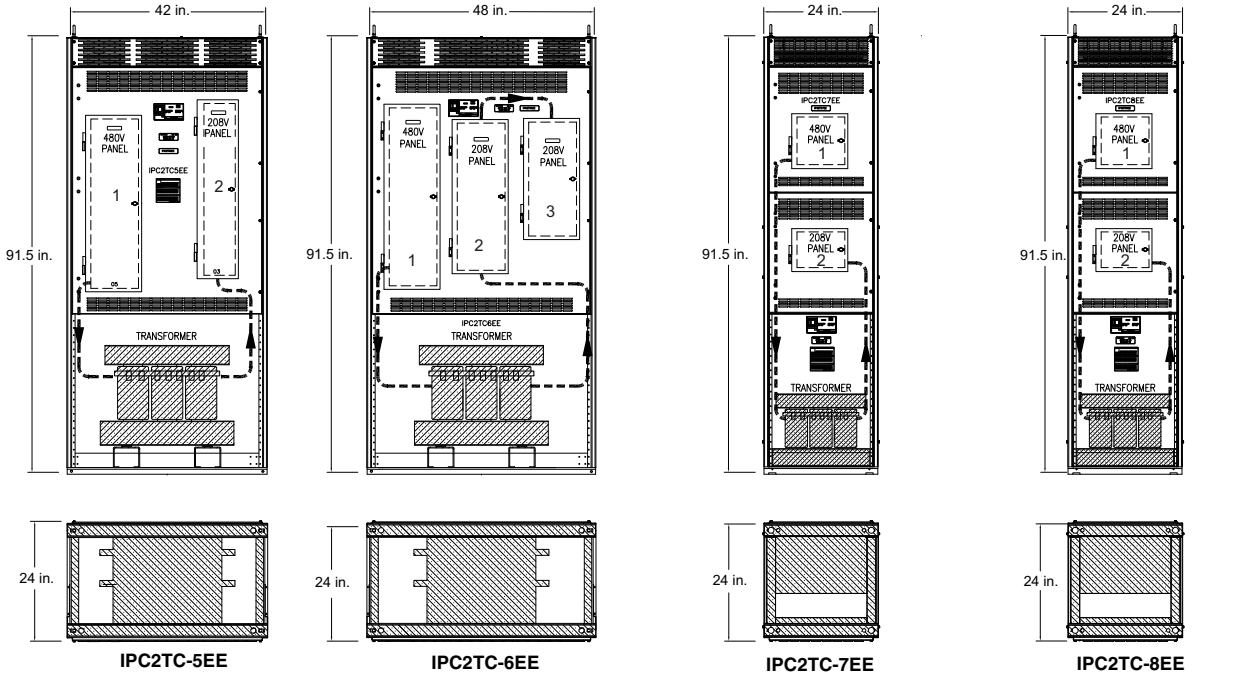
Integrated Power Center 2 Transformer Combo Standard Merchandise Configurations

The IPC2™ Transformer Combo is available in eight standard merchandise configurations, as shown below (additional configurations are available; contact your local Schneider Electric representative or distributor).



IPC2TC-1EE **IPC2TC-2EE** **IPC2TC-3EE** **IPC2TC-4EE**



IPC2TC-5EE **IPC2TC-6EE** **IPC2TC-7EE** **IPC2TC-8EE**

NOTE: *All sections have both top and bottom conduit entry/exit points.*

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Section 11

Switchboards and Switchgear

QED-2 Switchboard
see page 11-2

Metalclad and HVL/cc Switchgear
see pages11-8 and 11-16

Unit Substation
see page 11-17

Model III Package Unit Substation
see page 11-17

Power-Style™ Switchboards

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Speed-D™ Switchboards

	Speed-D SB/SF Switchboards (UL Listed)	**11-4, 11-5**

Low Voltage Switchgear

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Medium Voltage Switchgear

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MV Controllers and Substation Circuit Breakers

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MV Overhead Distribution

New!	Automatic Circuit Recloser	**11-20**
New!	Load Break Switch/Sectionalizer	**11-20**
New!	ADVC Controller Range	**11-20**

Transparent Ready™ Equipment

Switchboards and switchgear with Powerlogic™ circuit monitors and Web-enabled ethernet communication devices are part of the Transparent Ready power equipment family from Schneider Electric.

When specified as Transparent Ready, the power equipment is provided with a factory- configured “plug and play” communications system that allows the authorized user access to equipment status and monitoring information using only a standard Web browser. Ask your local Schneider Electric representative for details about Transparent Ready power distribution equipment.

Transparent Ready™
Web-enabled Power & Control

SQUARE D
by Schneider Electric

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Schneider Electric

QED-2 Switchboard

Power-Style QED-2 Switchboards (UL Listed)

For solutions that bring people, products, and information together, Square D™ brand Power-Style QED-2 low voltage switchboards from Schneider Electric are built to last and feature design innovations that make these products easier to install and maintain. Supported by one of the largest distributor, sales, and service organizations in the industry, QED-2 switchboards are readily available to meet the needs of contractors, consultants, and end-users.

Q = Quality—Built to Last

As one of the most trusted names in electrical distribution, Square D™ brand QED-2 switchboards are designed with the highest standards of quality. From sturdy frames, securely fastened thread-forming screws, and standard bolted, base channels, users will see the difference during installation, operation, maintenance, and expansion projects.

E = Efficient and Innovative Designs

In 2010, Schneider Electric launched QED-2, Series 2 switchboard designs. Series 2 designs represent the next generation of our QED-2 switchboard offering, with new features based on extensive customer feedback. From improved branch neutral and ground bar access, to enhanced instrument compartments, Series 2 designs provide easier access for performing equipment installation and maintenance procedures.

QED-2 switchboards feature Schneider Electric's unique I-Line™ plug-on connections in group-mounted construction. With the I-Line design, a screwdriver is the only tool required to firmly ratchet the line end of a molded-case circuit breaker directly onto the I-Line bus assembly. This plug-on design allows quick installation and mounting flexibility of circuit breakers up to 1200 A.

D = Delivery—Ready When You Are

To meet tight project schedules and budgets, our Square D™ brand QED-2 switchboard offering brings together standard designs for the most frequently requested ratings and options, providing immediate pricing for quick shipments from 11 to 30 business days.

Features

- QED-2 Switchboards are designed, listed, and built to UL 891
- Switchboard ratings through 6000 A, 200 kA; higher amperages available
- Front accessible load connections
- Front and rear alignment standard
- Cable, busway, transformer, or remote QED switchboard incoming fed
- Hot or cold sequence utility metering
- Thermal-magnetic, PowerPact™ electronic, or Masterpact™ NW stored energy fixed or drawout circuit breakers used as mains and feeders
- Group-mounted circuit breaker and fusible switch mains and feeders
- Fixed-mounted fusible swThe itch mains and feeders
- Powerlogic customer metering, including option for custom communications capability and interwiring
- Networked communications capabilities provide direct access to energy management at main and feeder level
- Internally-mounted Surgelogic™ surge protective devices
- Quick Connect Generator option available
- Main devices in six sub-division or single main configurations
- Main and branch devices in single section configuration
- Multiple individual devices in single section configurations
- Custom engineering, including main-tie-mains, multiple sets of thru-bus, reduced heights, and engineered houses

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Power-Style QED-6 Switchboards (UL Listed)

QED-6 Switchboard
(Class 2746)

Masterpact™ NW and NT, and PowerPact™ H, J, and D Circuit Breakers

The QED-6 switchboard is designed to provide excellent distribution, protection, and power quality management in commercial electrical equipment. The circuit protection components of the switchboard are the Masterpact NW circuit breakers in 800–6000 A frame sizes, Masterpact NT circuit breakers in 800–1200 A frame sizes, and PowerPact H, J, and D circuit breakers in 15–600 A frame sizes. These circuit breakers deliver maximum system uptime, system selectivity, ease of maintenance, and reliable circuit protection.

QED-6 switchboard features include: Masterpact NW UL 489 Listed circuit breakers for main and feeder devices, Masterpact NT UL 489 Listed circuit breakers for feeder devices, PowerPact H, J, and D UL 489 Listed circuit breakers for feeder devices, and a wide range of designs and options. Highly flexible drawout/plug-in circuit breakers can meet a wide variety of power distribution requirements. Choices include plug-in or drawout construction in PowerPact H, J, and D circuit breakers, and optional prepared drawout or plug-in spaces that are equipped with all specified control functions. This capability allows quick additions for load upgrades.

- QED-6 switchboards are designed, listed, and built to UL 891; Masterpact and PowerPact circuit breakers are designed, listed, and built to UL 489
- Circuit breakers are individually mounted, rear connected; Masterpact NW and NT circuit breakers are drawout; PowerPact H, J, and D breakers are plug-in as standard, drawout as an option
- Family of field installable and upgradeable Micrologic™ trip units with optional Powerlogic™ data communications features
- Switchboard ratings up to 150 kA short-circuit current rating for services 1600–6000 A at 480 V and 100 kA at 600 V
- Up to (12) 250 A PowerPact H and J circuit breakers in a single 30-inch wide section
- Up to (8) 600 A frame PowerPact D or (8) 1200 A frame Masterpact NT circuit breakers in a single 30-inch wide section
- Flexible branch circuit breaker locations: Masterpact NW and NT and PowerPact H, J, and D circuit breakers can be mixed in a single 30-inch wide section (15–2000 A)
- Compartmentalization: separate compartments for circuit breakers, bussing, and load cabling
- Available in 54-, 60-, 72-, and 80-inch deep construction
- Available in NEMA 3R outdoor walk-in enclosures
- Masterpact and PowerPact circuit breakers are field maintainable

QED-6 switchboards are reliable power protection equipment when working with telecommunication facilities, e-business servers, or mainframes that perform critical business transactions. These types of facilities cannot afford downtime.

Table 11.1: Circuit Breaker Selection

Rating (A) (Frame)	Circuit Breakers
150–250	PowerPact H, J
400–600	PowerPact D
800–1200	Masterpact NT
800–6000	Masterpact NW

QED-6 rear-connected switchboards are designed as standalone switchboards or as an integral part of the low voltage equipment lineup in a user's power unit substation.

Specify QED-6 Switchboards

When drawout construction is required for quick circuit breaker changeout; system requirements call for circuit breakers to close within five cycles; stored energy circuit breakers are required; front access to control wires is desired; ease of installation, maintenance, and upgrade of circuit breaker compartmentalization is required; system integrity and segregation of circuit breaker compartments from bus and cable compartments is required; equipment isolation is required.

Benefits/Values of Circuit Breaker Performance

Masterpact NW and NT circuit breakers are designed to provide maximum protection and reliable operation with a long service life. They exceed all UL 489 endurance testing requirements and are certified to a minimum of 10,000 operations through the 3000 A frame.

System Coordination

Short-time ratings are high, giving users excellent system coordination and selectivity with downstream breakers.

High Short-Circuit Current Ratings (SCCR)

Up to 200 k AIR at 240 V, 150 k AIR at 480 V, and 100 k AIR at 600 V, which allows customers to design systems with high fault current and paralleling schemes.

Arc Flash Limiting (LF) Feeder Breakers

High speed operation of Masterpact NW and NT circuit breakers (150 k AIR at 480 V) helps reduce arc flash incident energy (cal/cm2) on downstream equipment.

Ease of Installation and Maintenance

Thru-the-door construction, an easy to operate drawout mechanism, and front access to all control wiring make this equipment easy to install, maintain, and upgrade. Load connections in the cable compartment are easily accessible in the rear of the switchboard. Remote racking of the Masterpact NW circuit breaker is also available with the optional remote racking tool, which, if required, is field installable.

Ability to Upgrade

UL Listed, field-installable accessories include: motor operators, shunt trips, under voltage devices, trip units, and communication modules for trip units. Manually operated circuit breakers are field convertible to electrical operation.

Open Communication System

The Micrologic trip units in Masterpact NW and NT circuit breakers use the Modbus™ protocol. This is a widely accepted protocol, which allows QED-6 to be integrated into new or many existing communication systems.

Adaptable

Drawout and bolt-in circuit breakers, front access control wiring, and expandable lineups are quickly adaptable to changing load and control requirements.

Expandable

Masterpact NW and NT circuit breakers have many control termination points, giving the equipment extensive flexibility and expandability for sophisticated control schemes.

Power-Style Commercial Multi-Metering Switchboards (UL Listed)

- Designed, built, and listed to UL 891
- Lever bypass and EUSERC non-lever bypass
- Hot or cold sequence metering—EUSERC, NEMA, LOCAL
- Front and rear alignment standard
- Switchboard ratings through 4000 A, 100 kA
- Meter sections in either three- or six-socket section configuration
- Tenant mains either circuit breaker or fusible
- 60–200 A without lever bypass with self-contained meter sockets, 5- or 7-jaw, ring type and test block where required
- 60–200 A lever bypass with self-contained meter sockets, 7-jaw, ringless
- Factory-installed devices with completely wired from meter socket to disconnect
- Provisions for adding future tenants available, as well as future sections
- Sections in either NEMA 1 or NEMA 3R construction
- For use on 120/240 V, 120/208 V, and 277/480 V systems
- Integrated, front-accessible wireway for top exiting load cables
- Customer access area for top exiting load cables

Lever Bypass EUSERC

Classes 2755, 2756

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Speed-D SB/SF Switchboards (UL Listed)

- UL Listed
- Hot sequence utility compartment per EUSERC requirements
- Two types:
  - — Utility–Service disconnect–distribution
  - — Utility–Up to six service disconnects
- Single service disconnect, either circuit breaker or fusible rated 400, 600, or 800 A with either type of distribution interiors, NQ up to 240 Vac, I-Line™ through 480 Vac
- Six service disconnects, group-mounted fusible, QMB/QMJ, 30–400 A; utility compartment—400, 600, and 800 A
- Meter doors can be 15 inches high with one meter socket and test block, or 30 inches high with two meter sockets and test block
- Meter sockets can be 6-, 8-, 13-, or 15-jaw meter sockets with test block, based on application
- Accessories include:
  - — Underground pull sections with and without lug landing
  - — Loadside wireway
  - — Bus links for donut-type current transformers
  - — Double padlock hasp attachments
  - — Plug-on distribution panel
  - — Subfeed circuit breakers
- Full height add-on I-Line distribution section
- Stand-alone I-Line distribution section

EUSERC UCT,
Single Main Circuit Breaker with I-Line Distribution Panel

EUSERC UCT,
Fusible Multiple Mains

Application

Suitable for use as service entrance equipment on ac systems. Sections contain metering compartment, barriers, main disconnects, distribution panel, neutral bus, and grounding provisions.

Metering

C/T compartment with two 15-inch blank meter doors. (Order doors with meter socket from Table 11.6 on page 11-5.) Incoming cable lugs are for top feed with one twin conductor 2 AWG–600 kcmil lug per phase and neutral, suitable for aluminum or copper cables. Optional single conductor lug is available. Refer to Table 11.7 on page 11-5.

Mains

Main circuit breaker types are either LH or MJ. Main fusible device is supplied with Class T fuses. Multiple main devices use plug-on fusible switches.

Branches

NQ distribution bus is rated 400 A and provides mounting space for QO™/QOB Type (150 A maximum) circuit breakers. Panel provides space for mounting 42 single pole circuit breakers. One or two individually mounted 225 A maximum circuit breakers can be added with bus connectors. (Order subfeed circuit breakers from Table 11.8 on page 11-5.)

I-Line™ distribution bus is rated 400, 600, or 800 A and will accept 27 inches of I-Line circuit breakers on the left side with a maximum frame size of "J" . The right side will accept either a QO plug-on distribution panel (240 V only) or LA or LH I-Line circuit breaker.

Enclosure

Totally enclosed front accessible with ANSI 49 gray baked enamel finish. Dimensions are 90 in. (H) x 36 in. (W) x 14 in. (D) for indoor and 90 in. (H) x 36 in. (W) x 24.5 in. (D) for outdoor enclosures.

EUSERC Utility Metering, Main Disconnects and Distribution Panel (UL Listed)

Table 11.2: Single Main Circuit Breaker with Distribution (Series E4)

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V Max.	SCCR 480 V	Circuit Breaker			
						Indoor		Outdoor	
						Catalog No.	$ Price	Catalog No.	$ Price
1Ø3W	120/240	400	NQ	65	—	SB124QS	**7895.00**	SB124QR	**10645.00**
			I-Line	65	—	SB124IS	**8700.00**	SB124IR	**11450.00**
			None	65	—	SB124WS	**6680.00**	SB124WR	**9430.00**
		600	I-Line	65	—	SB126IS	**10975.00**	SB126IR	**13726.00**
			None	65	—	SB126WS	**8016.00**	SB126WR	**10766.00**
3Ø4W▲	208Y/120 240/120	400	NQ	65	—	SB324QS	**8651.00**	SB324QR	**11401.00**
3Ø4W▲	208Y/120 240/120	400	None	65	—	SB324WS	**7281.00**	SB324WR	**10031.00**
3Ø4W▲	208Y/120 240/120 480Y/277	400	I-Line	65	35	SB344IS	**9673.00**	SB344IR	**12423.00**
3Ø4W▲	208Y/120 240/120 480Y/277	400	None	65	35	SB344WS	**7653.00**	SB344WR	**10403.00**
3Ø4W▲	208Y/120 240/120 480Y/277	600	I-Line	65	50	SB346IS	**12820.00**	SB346IR	**15570.00**
3Ø4W▲	208Y/120 240/120 480Y/277	600	None	65	65	SB346WS	**9860.00**	SB346WR	**13229.00**
3Ø4W▲	208Y/120 240/120 480Y/277	800	I-Line	65	50	SB348IS	**19569.00**	SB348IR	**22038.00**
3Ø4W▲	208Y/120 240/120 480Y/277	800	None	65	65	SB348WS	**18669.00**	SB348WR	**21137.00**

▲ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

Table 11.3: Single Main Fusible Disconnect with Distribution (Series E4)

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V	SCCR 480 V	Fusible Disconnect			
						Indoor		Outdoor	
						Catalog No.	$ Price	Catalog No.	$ Price
1Ø3W	120/240	400	NQ	65	—	SF124QS	**8150.00**	SF124QR	**10900.00**
			I-Line	100	—	SF124IS	**8995.00**	SF124IR	**11705.00**
			None	200	—	SF124WS	**6935.00**	SF124WR	**9685.00**
		600	I-Line	100	—	SF126IS	**11906.00**	SF126IR	**14656.00**
			None	200	—	SF126WS	**8946.00**	SF126WR	**11696.00**
3Ø4W■	208Y/120 240/120	400	NQ	65	—	SF324QS	**8929.00**	SF324QR	**11679.00**
3Ø4W■	208Y/120 240/120	400	None	200	—	SF324WS	**7559.00**	SF324WR	**10309.00**
3Ø4W■	208Y/120 240/120 480Y/277	400	I-Line	100	65	SF344IS	**9682.00**	SF344IR	**12432.00**
3Ø4W■	208Y/120 240/120 480Y/277	400	None	200	200	SF344WS	**7662.00**	SF344WR	**10412.00**
3Ø4W■	208Y/120 240/120 480Y/277	600	I-Line	100	65	SF346IS	**14453.00**	SF346IR	**17203.00**
3Ø4W■	208Y/120 240/120 480Y/277	600	None	200	200	SF346WS	**11493.00**	SF346WR	**14243.00**
3Ø4W■	208Y/120 240/120 480Y/277	800	I-Line	100	65	SF348IS	**25401.00**	SF348IR	**28782.00**
3Ø4W■	208Y/120 240/120 480Y/277	800	None	200	200	SF348WS	**24501.00**	SF348WR	**27881.00**

■ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

Table 11.4: Multiple Mains—Fusible (Series E4)♦

System	Service Voltage	Mains Rating (A)	240 V or 480 V Max. ★	Multiple Mains (6) Fusible			
				Indoor		Outdoor	
				Catalog No.	$ Price	Catalog No.	$ Price
1Ø3W	120/240	400	200	SF124FS	**5565.00**	SF124FR	**8478.00**
1Ø3W	120/240	600	200	SF126FS	**6678.00**	SF126FR	**8966.00**
3Ø4W▼	208Y/120 240/120 408Y/277	400	200	SF344FS	**7025.00**	SF344FR	**10050.00**
3Ø4W▼	208Y/120 240/120 480Y/277	600	200	SF346FS	**7319.00**	SF346FR	**10233.00**
3Ø4W▼	208Y/120 240/120 480Y/277	800	200	SF348FS	**8283.00**	SF348FR	**11199.00**

♦ Multiple mains—provisions for mounting 30 inches of fusible devices. No more than six main devices permitted per NEC.

★ QMB/QMJ fusible switches, maximum 400 A, SCCR based on Class J, R, or T fuses. QMB plug-in circuit breaker rating is equal to the lowest rating of the circuit breaker.

▼ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

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Table 11.5: I-Line™ Distribution Section (Series E4)

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V Max.	SCCR 480 V Max.	Distribution Type	Indoor		Outdoor	
							Catalog No.	$ Price	Catalog No.	$ Price
3Ø4W	208Y/120 240/120 480Y/277	800	I-Line	65 k	65 k	Add-on distribution section, must be connected to an SB UCT and main section without distribution panel, such as SB348WS. An I-Line plug-on subfeed lug kit must be ordered to terminate the distribution section.	SBAD800	**10260.00**	SBAD800R	**13305.00**
3Ø4W	208Y/120 240/120 480Y/277	800	I-Line	125 k	100 k	Stand-alone distribution section not connected to an SB section. A back-fed main circuit breaker or I-Line plug-on subfeed lug kit must be ordered to terminate the distribution section. (Non-ULSE)	SBSAD800	**10620.00**	SBSAD800R	**13770.00**

Table 11.6: Meter Door Selection

Meter Socket Jaws	15-inch High Door With One Meter Socket and Test Block		30-inch High Door With Two Meter Sockets and Test Blocks	
	Catalog No.	$ Price	Catalog No.	$ Price
6▲	SBA15D6MS	**923.00**	—	—
8	SBA15D8MS	**984.00**	—	—
13	SBA15D13MS	**1230.00**	SBA30D13MS	**2093.00**
15	SBA15D15MS	**1358.00**	SBA30D15MS	**2217.00**
Blank	SBA15DBC	**495.00**	—	—
■	SBA15DMS	**617.00**	—	—

▲ 6-jaw meter socket can also be used on 4- and 5-jaw applications.
■ Door with provisions for mounting meter socket.
Note: To order structure with meter door factory-installed, add door catalog number as suffix to structure (e.g. SF344IS-15D13MS).

Table 11.7: Accessories

Description	System	Phase	Pole Spaces	Catalog No.	$ Price
Indoor underground pull section (w/o lug landing)—26-in. (W) Order separate SA8LL lug kit below if required.				SA26PS	**2217.00**
Outdoor (3R) underground pull section (w/o lug landing)—26 in. (W) x 24.5 in. (D) Order separate SA8LL lug landing kit below when required.				SA26PSR	**4559.00**
Lug landing kit—800 A max. For terminating utility service cables in indoor or outdoor underground pull sections.				SA8LL♦	**753.00**
Single barrel lug kit —Kit provides single barrel lugs and pad in lieu of twin barrel lug provided with service section. Mechanical lugs provided are sized to fit 1-3/0–750 kcmil cable. Two lugs per phase are supplied.				SA7PL	**395.00**
Loadside wireway—11.5 in. (W) x 14 in. (D)—indoor only				SA10LW	**1052.00**
Bus link kit—800 A max.—Order one kit per phase for 400, 600, and 800 A.				SA10BL	**246.00**
Double padlock hasp attachment—For mounting two padlocks on door handle of rainproof enclosure. Padlocks not included.				SS2PL	**113.00**
Plug-On Distribution Panel—mounts on right side of I-Line interior. Cannot be used with LA/LH branch circuit breaker. Panel rated 225 A for 240 V applications. For QO™ type plug-on circuit breakers only.	1Ø 3Ø 3Ø	AC ABC AB	12	SS212AC SS312 SS212AB★	**2339.00** **2957.00** **2339.00**

♦ All EUSERC Utilities (except Arizona Public Service and Salt River Project) require a lug landing kit SA8LL.
★ To be used on 120/240 V, 3Ø4W delta applications.

Table 11.8: Subfeed Circuit Breakers (Series E4) ▼

Description	Rating (A)	2-Pole△ Catalog No.		$ Price	3-Pole Catalog No.		$ Price
		Left	Right		Left	Right	
Subfeed Circuit Breaker Kit— Price includes circuit breaker, connectors and mounting hardware. The complete kit, mounting hardware, circuit breaker and connectors will be shipped direct from plant. Delivery is stock to three days.	100	SASFBH100L( )	SASFBH100R( )	**1480.00**	SASFBH100L	SASFBH100R	**1850.00**
	110	SASFBH110L( )	SASFBH110R( )	**1480.00**	SASFBH110L	SASFBH110R	**1850.00**
	125	SASFBH125L( )	SASFBH125R( )	**1480.00**	SASFBH125L	SASFBH125R	**1850.00**
	150	SASFBH150L( )	SASFBH150R( )	**1480.00**	SASFBH150L	SASFBH150R	**1850.00**
	175	SASFBJ175L( )	SASFBJ175R( )	**1644.00**	SASFBJ175L	SASFBJ175R	**2055.00**
	200	SASFBJ200L( )	SASFBJ200R( )	**1644.00**	SASFBJ200L	SASFBJ200R	**2055.00**
	225	SASFBJ225L( )	SASFBJ225R( )	**1644.00**	SASFBJ225L	SASFBJ225R	**2055.00**

▼ Cannot use subfeed circuit breaker kit with multiple mains service section switchboards.
△ Two pole circuit breaker catalog numbers are completed by adding required phase connection letters as suffix (for example, SASFBH100LAC).

Ordering Information

1. **Service section:** Order service section from either Table 11.2 on page 11-4 (single main circuit breaker with distribution), Table 11.3 on page 11-4 (single main fusible with distribution), or Table 11.4 on page 11-4 (multiple mains fusible), as determined by mains rating, voltage, and system.
2. **Meter doors:** Order meter door from Table 11.6 (meter door selection) as determined by the height and utility metering requirements.
3. **Accessories and subfeeds:** Order as required from Table 11.7 (accessories) and/or Table 11.8 (subfeed circuit breakers).
4. **Circuit breakers and switches:** Order devices from pages listed below as determined by voltage, trip rating, AIR, and mounting space.

Multiple Mains and Branch Devices

- QO, QOB, QO-VH, QOB-VH: pages 7-10 and 9-10
- I-Line: pages 9-24 to 9-30
- QMB Switches: page 9-35

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Power-Zone 4 Low Voltage Switchgear (Class 6037)

Power-Zone™ 4 Low Voltage Switchgear with Masterpact™ Circuit Breakers

Square D™ brand Power-Zone™ 4 low voltage, metal-enclosed, drawout switchgear is designed to provide superior electrical distribution, protection, and power quality management. The prime components of the switchgear are the Masterpact™ NW and NT ANSI rated circuit breaker. Power-Zone 4 switchgear is designed to maximize the functionality of the Masterpact circuit breakers, which, in turn, deliver maximum uptime, system selectivity, ease of maintenance, and reliable circuit protection. All of these features are packed into the smallest footprint available for low voltage drawout switchgear.

- Power-Zone 4 is designed and built to ANSI® C37.20.1 and is Listed to UL 1558
- Masterpact NW and NT drawout low voltage power circuit breakers are designed and built to ANSI C37.13 and C37.16. Listed to UL 1066
- Short-circuit current rating up to 200 kA at 240 V and 480 V without fuses
- High short-time withstand ratings up to 100 kA for 1 second, minimum
- Arc flash limiting (L1F) Masterpact NW feeder breakers available in 800, 1600, and 2000 A ratings
- Family of field installable and upgradeable Micrologic™ trip units with optional Powerlogic™ data communications features
- Power-Zone 4 switchgear can offer optional data communications capability
- Smallest equipment footprint available in this product class
- Front access to all control and communications wire connections
- Bolted copper bus provided as standard (up to 6000 A maximum)
- Large rear cable compartment pull area allowing maximum room for power cables
- Horizontal bus provision for future equipment expansion
- System designed for maximum uptime with low maintenance
- Modular circuit breaker designed for easy addition of control accessories
- Available in NEMA 3R outdoor walk-in enclosures

Masterpact NW circuit breakers are available in various levels of interrupting ratings from 42–200 kA at 480 V and 130 kA at 600 V.

The Masterpact NT circuit breaker is available in an 800 A frame size and 42 kA at 480 V interrupting rating. Up to 8 Masterpact NT circuit breakers can be mounted in a 30-inch wide section. (Not available for 600 V.)

Circuit breakers of like frame sizes and interrupting ratings are interchangeable.

Table 11.9: Masterpact Circuit Breaker Selection

Rating (A)	Catalog No.	Rating (A)	Catalog No.
Masterpact NW			
800	NW08N1 NW08H1 NW08H2 NW08H3 NW08L1 NW08L1F	4000	NW40H2 NW40H3 NW40L1
1600	NW16N1 NW16H1 NW16H2 NW16H3 NW16L1 NW16L1F	5000	NW50H2 NW50H3 NW50L1
2000	NW20H1 NW20H2 NW20H3 NW20L1 NW20L1F	6000	NW60H2 NW60H3 NW60L1
3200	NW32H1 NW32H2 NW32H3 NW32L1		
Masterpact NT			
800	NT08N1		

Micrologic™ Trip Units

A modern family of field-installable trip units is available with Masterpact NW and NT circuit breakers. The circuit breaker overcurrent protection consists of a microprocessor-based tripping device that requires no external power source. The complete tripping system has three main components: the air-core sensors, the trip device (with rating plug), and the trip actuator. The microprocessor-based trip unit uses true RMS current level sensing.

The Metering and Communications system is used in conjunction with Micrologic Type A, Type P, and Type H trip units (see Digest pages 7-47 and 7-48) for the Masterpact NW and NT circuit breakers. Modbus™ industry standard data communications allow this system to replace discrete meters, multiple transducers, analog wires, and analog-to-digital conversion equipment. Extensive information can be transmitted over a single communications cable to a Powerlogic system display, a personal computer, programmable logic controller, or other host system.

Basic circuit information, such as amperes, can be monitored using Micrologic Type A trip unit. Circuit breaker remote operation is available using the Micrologic Type P and Type H trip units with Powerlogic functionality. In addition to its metering capabilities, the Micrologic trip unit system is available with optional status inputs and relay outputs for monitoring discrete contacts and remote control of devices by way of the data communications channel.

Micrologic trip unit metering functions include:

- Amperes and volts
- Frequency
- Power
- Power demand
- Energy
- Energy demand
- Power factor
- Power quality measurements
- Communications
- Waveform capture
- Data logging
- Programmable contacts
- Current unbalance
- Over/under voltage
- Over/under frequency
- Voltage unbalance
- Phase sequence
- Reverse power
- Long time imaging
- Contact wear indicator
- Masterpact circuit breaker maintenance information

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MiniBreak™ Switch Enclosure with Door (Class 6042)

MiniBreak Switch Interior Showing Fuses (Class 6042)

Listed Metal-enclosed Interrupter Switchgear

MiniBreak™ Compact Height Switches—5.5 kV, 200 A

The Square D™ brand MiniBreak compact height switch enclosure is only 66-inches high and contains a single 3-pole load interrupter switch, rated 5.5 kV and 200 A. Enclosures are free-standing and suitable for both indoor (NEMA 1) and outdoor (NEMA 3R) applications. These switches are available unfused or with provisions for Square D™ brand current-limiting fuses rated from 10E A to 200E A. Factory-installed accessories include an auxiliary switch, strip heaters, and provisions for a "lock open" only key interlock. The door is mechanically interlocked with the switch operating handle. Set screw cable lugs for #14 solid—2/0 stranded aluminum or copper cable are provided for two line and one load connections. **Fuses are not furnished with this equipment. For fuse information and pricing, see Table 11.12. The Fused switches and many of the fuses listed in Table 11.12 are available from stock.**

Table 11.10: Ratings

Max. design voltage (kV)	5.5
BIL (kV)	60
Frequency (Hz)	60
Continuous amperes	200
Interrupting amperes	200
Momentary (amperes asymmetrical)	20,000
Fault close (amperes asymmetrical)	20,000
Capacitor switching (kVAR)	None
Short time, 2 seconds (amperes symmetrical)	12,500
Low frequency withstand (kV)	19
Fuse integrated (symmetrical)	63,000

NOTE: 1200 hp maximum.

Ordering Information

Table 11.11: 5 kV—200 A Switch

Type	Switch Catalog No.	$ Price
Unfused	HVMB305200U	**10274.00**
Fused	HVMB305200	**11844.00**

1. Select switch catalog number based on fused or unfused.
2. Select catalog numbers for modifications from Factory Modifications table.
3. If fused, select 5 kV, 200 A maximum current-limiting fuse from table below.
4. Price switch and fuses separately. Switches are furnished with provisions only for fuses.
5. Weight 450 lbs (204 kg).

Table 11.12: Current-Limiting Fuses, Non-Disconnect Type (Extended Travel Blown Fuse Indicator)

Continuous Current	Fuse Mounting Clip		Catalog Number▲	$ Price■
	Size	Centers		
5 kV Fuse				
10E 15E 20E 25E	D	12"	5GS010 5GS015 5GS020 5GS025	**954.00**
30E 40E 50E 65E 80E 100E	D	12"	5GS030 5GS040 5GS050 5GS065 5GS080 5GS100	**1980.00**
125E 150E 175E 200E	D	12"	5GS125 5GS150 5GS175 5GS200	**3326.00**

▲ Contact your Schneider Electric representative for current stock quantities.
■ Price includes one set of three fuses, packed in a single box.

Table 11.13: Factory Modifications

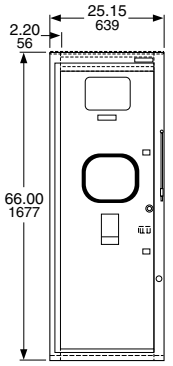
Catalog No.	Description	$ Price
HVMX1	Auxiliary switch, 1-N.O. and 1-N.C. contacts	**152.00**
HVMK1	Provisions for lock open only key interlock (does not include the key cylinder—order separately)	**341.00**
HVMH1	Strip heater 100 W @ 120 V	**1150.00**
HVMH2	Strip heater with thermostat 100 W @ 120 V	**1772.00**
HVMSA3	Distribution class surge arrester (set of three arresters) 3 kV, 2.55 MCOV♦	**1618.00**
HVMSA6	Distribution class surge arrester (set of three arresters) 6 kV, 5.10 MCOV♦	**1926.00**

♦ Arresters are line side connected.

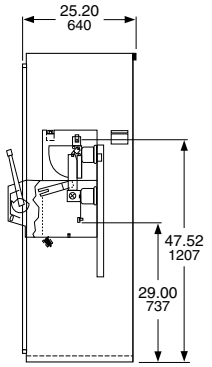
Pricing Example

Price one (1), 5 kV, 200 A switch with 65E current-limiting fuses. Provide one auxiliary switch with 1-N.O. and 1-N.C. contact and with provision for installing a "lock open" key interlock on the switch operating mechanism.

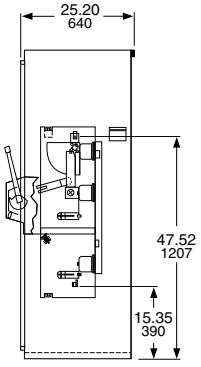
Order:	Catalog No.	$ Price
Switch with enclosure	HVMB305200	**11844.00**
Auxiliary switch	HVMX1	**152.00**
Key interlock adapter	HVMK1	**340.00**
Fuses (set of three, from page 11-14)	5GS065	**1980.00**
	Total Price	**14316.00**



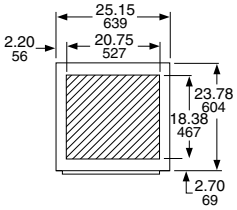
Front view



Section view (unfused)



Section view (fused)



Top view selected area recommended (bottom conduit entrance)

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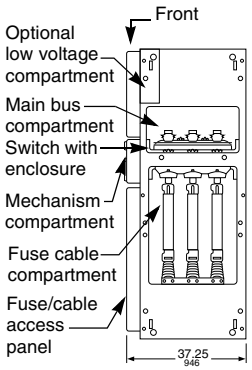
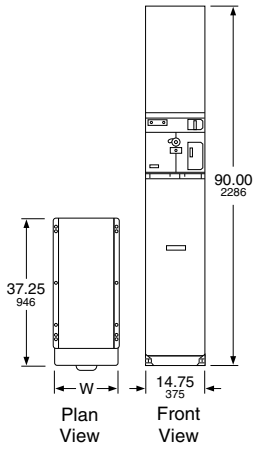
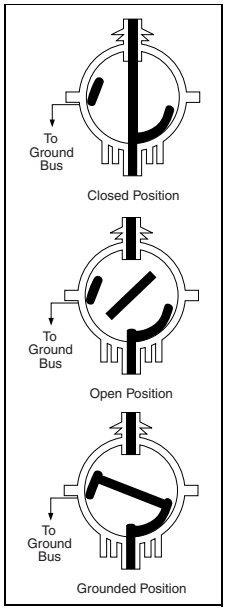


Right Side View



Plan View | Front View



Switch Contact Positions

Listed Metal-enclosed Interrupter Switchgear

HVL/cc Metal-Enclosed Load Interrupter Switchgear—Full Range

Square D™ brand HVL/cc metal-enclosed load interrupter switchgear provides switching, metering, and interrupting capabilities for medium voltage electrical power distribution systems and is designed and tested per applicable ANSI/IEEE and NEMA standards.

Made up of modular units, the HVL/cc is easy to expand. Two main bus positions allow future extensions and connections to existing equipment.

HVL/cc switchgear is available in either single or multiple bay units. The design is compact, with front accessibility.

The HVL/cc switch can be equipped with either an over-toggle mechanism (OTM), which is standard, or an optional stored energy mechanism (SEM). An option with both mechanisms is the Fuselogic™ system. The Fuselogic system offers fuse tripping (with SEM) to provide protection against single phasing loads when a fuse has blown. It also has a mechanical interlock to prevent inadvertent switching until fuses have been installed or blown fuses have been replaced.

The HVL/cc enclosure is designed for front access only and can be positioned against walls, in small rooms or in pre-fabricated buildings. The small footprint can result in considerable cost savings from the reduction of building or room sizes.

Table 11.14: HVL/cc Load Interrupter Switches—Full Range 600/1200 A Ratings

Switch (kV)—maximum design	5.5	17.5	17.5	25.8	38
BIL (kV)	60	95	110	125	150
Frequency (Hz)	50/60	50/60	50/60	50/60	50/60
Withstand (kV)	19	36	36	50	80
Continuous current (A)	600/1200	600/1200	600/1200	600	600
Interrupting current (A)	600/1200	600/1200	600/1200	600	600
Fault close (kA asymmetrical)	40	40	40	32	32
Momentary current (kA asymmetrical)	40	40	40	32	32
Short time current (kA symmetrical)	25	25	25	25	25
Electrical endurance (number of operations at 80% P.F.)	100/600 A 26/1200 A	100/600 A 26/1200 A	100/600 A 26/1200 A	100	100
Mechanical endurance (number of operations)	1000	1000	1000	1000	1000

Switch Standard Features

- Switch Positions: Closed, open, and internally grounded (optional) (connects switch contacts to ground)
- Enclosure: Epoxy
- Medium: Sulphur hexalfluoride
- Maintenance: Maintenance free sealed for life
- Pressure:
  - — 5.8 PSI (≤17.5 kV)
  - — 22 PSI (25.8–38 kV)
- View ports to show switch blade position

Options

- Internal ground switch: Has full fault making capability
- Fuselogic™ system
- Infrared viewing windows
- Class I, Division 2
- Fast auto transfers
- Duplex configurations
- Protective relaying
- Powerlogic™ metering
- 20-inch or 29.5-inch wide enclosures

Fuselogic™

Fuselogic is a protection system that provides the ultimate in medium voltage fuse protection. This patented system utilizes Square D™ brand current-limiting fuses with mechanical sensors that function without any auxiliary power requirements. Several combinations of Fuselogic functions can be combined to provide simple blown fuse indication contacts with mechanical lockout to anti-single phasing protection. Anti-single phasing requires the optional stored energy mechanism (SEM). Fuselogic is available on both HVL/cc and HVL switches.

Switchgear Standard Features

- Compartments: Switch, bus, fuse/cable, mechanism, and optional low voltage/control
- 11 gauge steel enclosure
- Epoxy insulators
- Fuse/cable access panel interlocked with switch
- Front access only
- Animated mechanism mimic bus
- Padlocking open or closed provision
- Top or bottom cable entry
- UL/CUL Listed
- Live line indicators on all incoming switch bays and outgoing feeder circuits
- Cable lugs included for one cable per phase
- Tin plated copper bus for lineups

Table 11.15: Surge Arresters

System L-L Voltage kV		Arrester MCOV-kV	
Nominal	**Maximum**	**Effectively Grounded Neutral Circuits**	**Impedance Grounded and Ungrounded Circuits**
2.4	2.54	—	2.55
4.16	4.4	2.55	5.1
4.8	5.08	—	5.1
6.9	7.26	—	7.65
12.0	12.7	7.65	12.70
12.47	13.2	7.65	12.70
13.2	13.97	8.4	—
13.8	14.52	8.4	—

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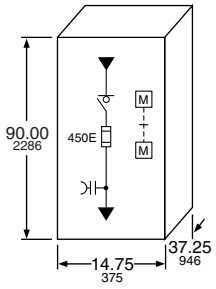
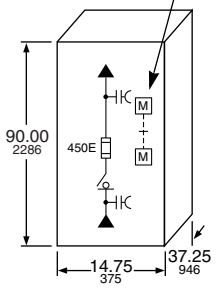
NOTE: Cable entry and exit must be opposite to maintain the minimum sections shown.



5 kV Indoor N1
Top Cable In/Bottom Cable Out Switch in Position A

Mechanical interlock between switch and fuse access panel.

NOTE: Mechanical interlock is standard on switches.



5 kV Indoor N1
Top Cable In/Bottom Cable Out Switch in Position B

HVL/cc Switchgear—Quick Ship Program—5–15 kV, 600 A

The HVL/cc quick ship program provides basic fused and unfused load interrupter switch configurations for standalone or transformer primary applications. The Quick Ship program offers faster delivery, but with fewer options.

Three-pole, 600 A individual HVL/cc switches are available in free-standing indoor (NEMA 1) enclosures. These switches are available unfused or with provisions for Square D™ brand current-limiting DIN/E fuses. Factory optional accessories include auxiliary bays, main bus, auxiliary switches, extra cable terminating lugs, and distribution class surge arresters. The fuse access panel is mechanically interlocked with the switch mechanism. Key interlocks are not an available option with Digest-listed HVL/cc switches. (1) Set screw type lugs for (2) #2–350 kcmil copper or aluminum cables are provided for line and load connections. **Fuses are not furnished with this equipment. For fuse information and pricing refer to page 11-10.**

Provisions for Future Expansion

All “single” HVL/cc switches have provisions for future expansion on either side.

Order main bus kits for copper 600 A bus. Include sketch for factory-assembled parts or lineups.

600 A Single Switch Unfused

Manual over-toggle mechanism, no grounding switch

Includes (1) set screw for (2) #2–350 kcmil Cu or Al conductors per phase

Application A = Top entry (incoming—cable or main bus), bottom exit (load—cable or main bus)

Application B = Bottom entry (incoming—cable or main bus), top exit (load—cable or main bus)

Table 11.16: Unfused Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		$ Price
				in	mm	
HVLCCA14305N	4.76	—	A	14.75	375	**17500.00**
HVLCCA20305N	4.76	—	A	20.00	508	**18024.00**
HVLCCA14315N	15	—	A	14.75	375	**19244.00**
HVLCCA20315N	15	—	A	20.00	508	**19770.00**
HVLCCB14305N	4.76	—	B	14.75	375	**17500.00**
HVLCCB20305N	4.76	—	B	20.00	508	**18024.00**
HVLCCB14315N	15	—	B	14.75	375	**19244.00**
HVLCCB20315N	15	—	B	20.00	508	**19770.00**

600 A Single Switch Fused

(Provisions only for Square D™ brand current-limiting DIN/E fuses—order fuses separately)

Manual over-toggle mechanism, no grounding switch

Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase

Application A = Top entry (incoming—cable or main bus), bottom exit (load—cable or main bus)

Application B = Bottom entry (incoming—cable or main bus), top exit (load—cable or main bus)

Table 11.17: Fused Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		$ Price
				in	mm	
HVLCCA14305D	4.76	10–450E	A	14.75	375	**19392.00**
HVLCCA20305D	4.76	10–450E	A	20.00	508	**19916.00**
HVLCCA14315D	15	10–200E	A	14.75	375	**19858.00**
HVLCCA20315D	15	10–200E	A	20.00	508	**20382.00**
HVLCCB14305D	4.76	10–450E	B	14.75	375	**19392.00**
HVLCCB20305D	4.76	10–450E	B	20.00	508	**19916.00**
HVLCCB14315D	15	10–200E	B	14.75	375	**19858.00**
HVLCCB20315D	15	10–200E	B	20.00	508	**20382.00**

600 A Incoming Line Auxiliary Bay

For top incoming cable to application A (bottom cable exit) switch(es), order 600 A tin plated Cu main bus to adjacent section from bus table. Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase.

Table 11.18: Bays for Top Entry/Exit Cables

Catalog No.	kV Rating	Fuse Range	Application	Width		$ Price
				in	mm	
HVLCCA14A	4.76/15	—	A	14.75	375	**1968.00**
HVLCCA20A	4.76/15	—	A	20.00	508	**2492.00**

For bottom incoming cable to application B (top cable exit) switch(es), order 600 A tin plated Cu main bus to adjacent section from main bus kits table. Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase.

Table 11.19: Bays for Bottom Entry/Exit Cables

Catalog No.	kV Rating	Fuse Range	Application	Width		$ Price
				in	mm	
HVLCCB14A	4.76/15	—	B	14.75	375	**1968.00**
HVLCCB20A	4.76/15	—	B	20.00	508	**2492.00**

600 A Tin Plated Copper Main Bus Kits

Table 11.20: Bus Kits

Catalog No.	Left (From) Application	Width		Right (To) Application	Width		$ Price
		in	mm		in	mm	
HVLCCMBA14A14	A	14.75	375	A	14.75	375	**882.00**
HVLCCMBA14A20	A	14.75	375	A	20.00	508	**946.00**
HVLCCMBA20A14	A	20.00	508	A	14.75	375	**946.00**
HVLCCMBA20A20	A	20.00	508	A	20.00	508	**1008.00**
HVLCCMBB14B14	B	14.75	375	B	14.75	375	**882.00**
HVLCCMBB14B20	B	14.75	375	B	20.00	508	**946.00**
HVLCCMBB20B14	B	20.00	508	B	14.75	375	**946.00**
HVLCCMBB20B20	B	20.00	508	B	20.00	508	**1008.00**

Ratings

HVL/cc Switch with manually operated type OTM mechanism in cubicle enclosure (does not include internal ground switch). Ratings are based on an X/R ratio of 1.6.

Table 11.21: HVL/cc Switch Ratings

Switch (kV)—maximum design	5.5	17.5
BIL (kV)	60	95
Frequency (Hertz)	50/60	50/60
Withstand (kV)	19	36
Continuous current (amperes)	600	600
Interrupting current (amperes)	600	600
Fault close (amperes asymmetrical)	40,000	40,000
Integrated switch and fuse rating (amperes	65,000	65,000
Momentary current (amperes asymmetrical)	40,000	40,000
Short time current, 2 seconds (amperes symmetrical)	25,000	25,000
Operations at Full Load	100	100
Mechanical Endurance (number of operations)	1000	1000

▲ 50,000 for 630 A fuse.

Factory Modifications

Table 11.22: Factory Modifications

Catalog No.	Description	$ Price
HVLCC-X3	Auxiliary switch 2 N.O.–2 N.C. contact	**762.00**

Distribution Class Surge Arresters

(One Set of Three) Switch Load Side Connected or Incoming Line Bay)

Table 11.23: Surge Arresters

Catalog No.	kV Rating	Section Width Minimum Required		$ Price
		in	mm	
HVLCCDSA3	3 kV, 2.55 kV MCOV	14.75	375	**1618.00**
HVLCCDSA6	6 kV, 5.10 kV MCOV	14.75	375	**1926.00**
HVLCCDSA9	9 kV, 7.65 kV MCOV	14.75	375	**2248.00**
HVLCCDSA10	10 kV, 8.40 kV MCOV	14.75	375	**2446.00**
HVLCCDSA12	12 kV, 10.20 kV MCOV	14.75	375	**2836.00**
HVLCCDSA15	15 kV, 12.70 kV MVOV	20.00	508	**3424.00**
HVLCCDSA18	18 kV, 15.3 kV MCOV	20.00	508	**3948.00**

Listed Metal-enclosed Interrupter Switchgear

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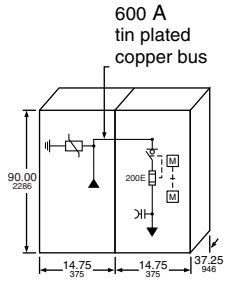

Listed Metal-enclosed Interrupter Switchgear

600 A "Single" HVL/cc Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry™, Power-Cast™, and Uni-Cast™ Transformers

(FLC = 300 A MAXIMUM)
RH—Transformer on right, LH—Transformer on Left
Application A = Top Entry (Incoming Cables)
Application B = Bottom Entry (Incoming Cables)

Table 11.24: 600 A "Single" HVL/cc Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		RH / LH	$ Price
				in	mm		
HVLCCA14405DGR	4.76	10–450E	A	14.75	375	RH	**20134.00**
HVLCCA20405DGR	4.76	10–450E	A	20.00	508	RH	**20660.00**
HVLCCA14405DGL	4.76	10–450E	A	14.75	375	LH	**20134.00**
HVLCCA20405DGL	4.76	10–450E	A	20.00	508	LH	**20660.00**
HVLCCA14415DGR	15	10–200E	A	14.75	375	RH	**20614.00**
HVLCCA20415DGR	15	10–200E	A	20.00	508	RH	**21138.00**
HVLCCA14415DGL	15	10–200E	A	14.75	375	LH	**20614.00**
HVLCCA20415DGL	15	10–200E	A	20.00	508	LH	**21138.00**
HVLCCB14405DGR	4.76	10–450E	B	14.75	375	RH	**20134.00**
HVLCCB20405DGR	4.76	10–450E	B	20.00	508	RH	**20660.00**
HVLCCB14405DGL	4.76	10–450E	B	14.75	375	LH	**20134.00**
HVLCCB20405DGL	4.76	10–450E	B	20.00	508	LH	**20660.00**
HVLCCB14415DGR	15	10–200E	B	14.75	375	RH	**20614.00**
HVLCCB20415DGR	15	10–200E	B	20.00	508	RH	**21138.00**
HVLCCB14415DGL	15	10–200E	B	14.75	375	LH	**20614.00**
HVLCCB20415DGL	15	10–200E	B	20.00	508	LH	**21138.00**

NOTE: Switches with transformer connections are painted ANSI 49. Standalone switches are painted ANSI 61. Transformer connections in HVL/cc switches are based on standard Square D™ brand transformer connections. If these switches are used to connect to other manufacturers' transformers, then connections must match standard Square D™ brand transformer connections. (Cable connections are furnished with the transformer.)

General Purpose E-Rated Current-Limiting Fuses:Type DIN/E for HVL/cc Switches

Integrated rating for 600 A HVL/cc switches with Square D™ brand DIN/E fuses listed below is 65 kA rms symmetrical amperes. (50 kA rms for 630 A fuse.)

Current-limiting fuses increase the integrated short-circuit current rating because of their energy-limiting capabilities.

To increase the short-circuit current rating of the entire lineup of switchgear, current-limiting fuses must be used in the entrance sections.

Table 11.25: Fuse Selection

Catalog No.	kV Rating	Fuse Rating	Set of Fuses ▲	Fuse Size	Section Width Required		$ Price
					in	mm	
55DE010	5.5	10E	1	Actual	14.75	375	**954.00**
55DE015	5.5	15E	1	Actual	14.75	375	**954.00**
55DE020	5.5	20E	1	Actual	14.75	375	**954.00**
55DE025	5.5	25E	1	Actual	14.75	375	**954.00**
55DE030	5.5	30E	1	Actual	14.75	375	**1980.00**
55DE040	5.5	40E	1	Actual	14.75	375	**1980.00**
55DE050	5.5	50E	1	Actual	14.75	375	**1980.00**
55DE065	5.5	65E	1	Actual	14.75	375	**1980.00**
55DE080	5.5	80E	1	Actual	14.75	375	**1980.00**
55DE100	5.5	100E	1	Actual	14.75	375	**3326.00**
55DE125	5.5	125E	1	Actual	14.75	375	**3326.00**
55DE150	5.5	150E	1	Actual	14.75	375	**3326.00**
55DE175	5.5	175E	1	Actual	14.75	375	**3326.00**
55DE200	5.5	200E	1	Actual	14.75	375	**3326.00**
55DE250	5.5	250E	1	Actual	14.75	375	**5742.00**
55DE300	5.5	300E	1	Actual	14.75	375	**5742.00**
55DE350	5.5	350E	1	Actual	14.75	375	**5742.00**
55DE400	5.5	400E	1	Actual	14.75	375	**6430.00**
55DE450	5.5	450E	1	Actual	14.75	375	**6430.00**
175DE010	15.5	10E	1	Actual	14.75	375	**3214.00**
175DE015	15.5	15E	1	Actual	14.75	375	**3214.00**
175DE020	15.5	20E	1	Actual	14.75	375	**3214.00**
175DE025	15.5	25E	1	Actual	14.75	375	**3214.00**
175DE030	15.5	30E	1	Actual	14.75	375	**3290.00**
175DE040	15.5	40E	1	Actual	14.75	375	**3290.00**
175DE050	15.5	50E	1	Actual	14.75	375	**3290.00**
175DE065	15.5	65E	1	Actual	14.75	375	**4446.00**
175DE080	15.5	80E	1	Actual	14.75	375	**4446.00**
175DE100	15.5	100E	1	Actual	14.75	375	**4446.00**
175DE125	15.5	125E	1	Actual	14.75	375	**6878.00**
175DE150	15.5	150E	1	Actual	14.75	375	**6878.00**
155DE175	15.5	175E	1	Actual	14.75	375	**6878.00**
155DE200	15.5	200E	1	Actual	14.75	375	**6878.00**

▲ Each (1) set of fuses contains three fuses. (E.g., (2) sets of fuses yield a total of six fuses.)

600 A "Duplex" HVL/cc Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry, Power-Cast, and Uni-Cast Transformers

(FLC = 300 A MAXIMUM)
RH—Transformer on Right,
LH—Transformer on Left Includes Mechanical Interlock to Prevent Paralleling of Sources
Application A = Top Entry (Incoming Cables)
Application B = Bottom Entry (Incoming Cables)

Table 11.26: 600 A "Duplex" HVL/cc Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		RH / LH	$ Price
				in	mm		
HVLCCA14505DGR	4.76	10–450E	A	14.75	375	RH	**54174.00**
HVLCCA20505DGR	4.76	10–450E	A	20.00	508	RH	**56068.00**
HVLCCA14505DGL	4.76	10–450E	A	14.75	375	LH	**54174.00**
HVLCCA20505DGL	4.76	10–450E	A	20.00	508	LH	**56068.00**
HVLCCA14515DGR	15	10–200E	A	14.75	375	RH	**57428.00**
HVLCCA20515DGR	15	10–200E	A	20.00	508	RH	**59322.00**
HVLCCA14515DGL	15	10–200E	A	14.75	375	LH	**57428.00**
HVLCCA20515DGL	15	10–200E	A	20.00	508	LH	**59322.00**
HVLCCB14505DGR	4.76	10–450E	B	14.75	375	RH	**54174.00**
HVLCCB20505DGR	4.76	10–450E	B	20.00	508	RH	**56068.00**
HVLCCB14505DGL	4.76	10–450E	B	14.75	375	LH	**54174.00**
HVLCCB20505DGL	4.76	10–450E	B	20.00	508	LH	**56068.00**
HVLCCB14515DGR	15	10–200E	B	14.75	375	RH	**57428.00**
HVLCCB20515DGR	15	10–200E	B	20.00	508	RH	**59322.00**
HVLCCB14515DGL	15	10–200E	B	14.75	375	LH	**57428.00**
HVLCCB20515DGL	15	10–200E	B	20.00	508	LH	**59322.00**

Ordering Information

1. Select switch catalog number based on fused or unfused and cable entry locations (top or bottom) from Table 11.16 or Table 11.17 on page 9.
2. Select incoming line auxiliary bay from Table 11.18 or Table 11.19 on page 9, if required.
3. Select main bus from Table 11.20 on page 9, if required.
4. Select catalog numbers for factory modifications from Table 11.22 on page 9, if required.
5. If fused, select DIN/E fuses from Table 11.25.

Pricing Example

Order indoor 600 A, 5 kV, HVL/cc switch with bottom incoming and bottom outgoing cables (1) #2 AWG per phase, (1) set 200E fuses, and (1) set 6 kV surge arresters.

Order:	Catalog. No.	$ Price
Switch w/fuse provisions and bottom exit load cables	HVLCCA14305D	**19392.00**
600 incoming line auxiliary bay (Application A—bottom entry)	HVLCCA14A	**1968.00**
Main Bus (Application A—14 in. to Application A–14 in.)	HVLCCMBA14A14	**882.00**
6 kV LAs	HVLCCDSA6	**1926.00**
Set 200E fuses	55DE200	**3326.00**
	Total Price	**13747.00**

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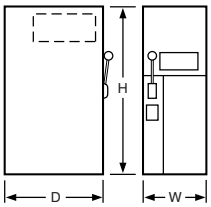
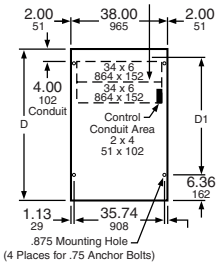


Side view Front view

Recommended power cable conduit area



Listed Metal-enclosed Interrupter Switchgear

HVL Metal-Enclosed Load Interrupter Switchgear—Full Range

HVL™ 5–38 kV Load Interrupter is the most popular ANSI-rated switchgear in its class in America. Among medium voltage interrupter switchgear, both the switch and the enclosure stand as industry benchmarks in the areas of design, manufacturing, and performance. Load interrupter switchgear must perform a number of critical functions in a unit substation - protecting equipment and disconnecting faulted lines and transformers. Designed and tested to the latest applicable standards, HVL has been engineered to provide superior protection for your distribution system.

HVL switchgear is available for various applications and configurations, including:

- Individual service entrance bays
- Multiple-bay lineups incorporating HVL load interrupters and optional Visi/Vac™ circuit interrupters
- Substation primaries

Square D™ brand metal-enclosed switchgear has become an industry standard for its better system performance, lower maintenance cost, easier system expansion, and reduced system expense.

A full range of ratings and options are available but not listed in this publication. Contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

Table 11.27: Ratings

Maximum design voltage (kV)	4.76	15	17	25.8	29	38
BIL (kV)	60	95	95	125	125	150
Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60
Continuous amperes	600/1200	600/1200	600	600/1200	600/1200	600
Interrupting amperes	600/1200	600/1200	600	600	400	400
Momentary (kA asymmetrical)	40/61/80	40/61/80	61	40/61	40/61	40
Fault close (kA asymmetrical)	40/61	40/61	40	40	40	20
Capacitor switching (kVAR)	2400	2400	–	–	–	–
Short time rating 2 seconds (kA symmetrical)	25/38/50	25/38/50	25	25	25	25
Low frequency withstand (kV)	19	36	36	60	60	60

Standard Features

- 11 gauge steel enclosure
- Direct drive mechanism
- Permanently attached operating handle
- Visible isolation viewing window
- Mechanical interlocked fuse access door
- Provision for padlock and key interlock
- Highly flexible design
- ANSI 61 paint

Options

- Outdoor construction
- Square D™ brand DIN-style current-limiting fuses
- Boric acid fuses
- Silver or tin plated copper bus
- 600, 1200, or 2000 A main bus
- Heat shrink insulated bus
- Motor operator
- Shunt trip
- Fuselogic™ tripping system
- Automatic load transfer schemes
- Roof bushings
- Key interlocks
- Surge arresters
- Utility metering bays
- Line selector switch
- Duplex switch
- Transformer connections
- Infrared windows for thermal scanning of connections

Fuselogic™

Fuselogic is a protection system that provides the ultimate in medium voltage fuse protection. This patented system utilizes the Square D™ brand current-limiting fuses with mechanical sensors that function without any auxiliary power requirements. Several combinations of Fuselogic functions can be combined to provide simple blown fuse indication contacts with mechanical lockout to anti-single phasing protection. Anti-single phasing requires the optional stored energy mechanism (SEM). Fuselogic is available on both HVL/cc™ and HVL switches.

HVL Switchgear—Quick Ship Program—5 kV–15 kV, 600 A Features

The HVL quick ship program provides basic fused and unfused load interrupter switch configurations for stand-alone or transformer primary applications. The Quick Ship program offers faster delivery, but with fewer options.

Three-pole, 600 A individual HVL switches are available in free-standing indoor (NEMA 1) or outdoor (NEMA 3R) enclosures. The switches used in these enclosures are UL Recognized and are listed under Category WIQG2 in File E140591(M). These switches are available unfused or with provisions for 3-inch diameter Square D™ brand current-limiting fuses or for boric acid fuses. Factory optional accessories include auxiliary switches, extra cable terminating lugs and distribution class surge arresters. The door is mechanically interlocked with the switch operating handle and provisions for key interlocks are standard. Set screw type lugs for one #2 solid—600 kcmil copper or aluminum cables are provided for line and load connections. Other standard features include a bolted enclosure with a viewing window, ground pad, and space heater (NEMA 3R only). Control power for heater must be from external source. **Fuses are not furnished with this equipment. For fuse information and pricing, refer to page 11-14. Switches are listed on pages 11-11 and 11-12, and many of the fuses listed on page 11-14 are available from stock.**

Table 11.28: 600 A "Single" Switch Unfused

Catalog No.	kV Rating	Fuse Range	Enclosure Type	$ Price
HVL305NG	4.76	—	NEMA 1	**17500.00**
HVL305NW	4.76	—	NEMA 3R	**21524.00**
HVL315NG	15	—	NEMA 1	**19244.00**
HVL315NW	15	—	NEMA 3R	**23478.00**

Table 11.29: 600 A "Single" Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses

Catalog No.	kV Rating	Fuse Range	Enclosure Type	$ Price
HVL305DEG	4.76	10–450E	NEMA 1	**19392.00**
HVL305DEW	4.76	10–450E	NEMA 3R	**21636.00**
HVL315DEG1	15	10–100E	NEMA 1	**19858.00**
HVL315DEG2	15	125–200E	NEMA 1	**19858.00**
HVL315DEW1	15	10–100E	NEMA 3R	**23978.00**
HVL315DEW2	15	125-200E	NEMA 3R	**23978.00**

Table 11.30: 600 A "Single" Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses

Catalog No.	kV Rating	Fuse Range	Enclosure Type	$ Price
HVL305BG	4.76	10E–400E	NEMA 1	**24936.00**
HVL305BW	4.76	10E–400E	NEMA 3R	**28606.00**
HVL315BG	15	10E–400E	NEMA 1	**26650.00**
HVL315BW	15	10E–400E	NEMA 3R	**30688.00**
HVL317BG	17	10E–400E	NEMA 1	**29610.00**
HVL317BW	17	10E–400E	NEMA 3R	**34098.00**

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Table 11.31: Ratings

Max. Design Voltage (kV)	4.76	15.0
BIL (kV)	60	95
Frequency (Hz)	50/60	50/60
Continuous amperes	600	600
Interrupting amperes	600	600
Momentary (amperes asymmetrical)	40,000	40,000
Fault close (amperes asymmetrical)	40,000	40,000
Capacitor switching (kVAR)	2,400	2,400
Short-time rating, 2 seconds (amperes symmetrical)	25,000	25,000
Low frequency withstand (kV)	19	36

Table 11.32: Distribution Class Surge Arresters

System L-L Voltage kV		Arrester MCOV-kV	
Nominal	Maximum	Effectively Grounded Neutral Circuits	Impedance Grounded and Ungrounded Circuits
2.4	2.54	—	2.55
4.16	4.4	2.55	5.1
4.8	5.08	—	5.1
6.9	7.26	—	7.65
12.0	12.7	7.65	12.70
12.47	13.2	7.65	12.70
13.2	13.97	8.4	—
13.8	14.52	8.4	—

Table 11.33: Enclosure Type

Type	W		D		H		Weight	
	in	mm	in	mm	in	mm	lbs	kg
Indoor	38.00	965	54.50	1384	90.00	2286	1200	545
Outdoor	38.00	965	60.00	1524	97.50	2477	1400	636

Provisions for Future Expansion

All "single" Digest switches have provisions for future expansion on either side. Order kits HVMB for top crossover copper 600 A bus and HVLC for line connections to the top bus. (Refer to the Factory Modifications table on page 11-13.) Include sketch for factory-assembled parts or lineups.

HVL Switches for Power-Dry II ™, Power-Cast II ™, and Uni-Cast II ™ Transformer Connections

HVL switches can be configured for close coupling cable connections to listed dry type transformers for primary main switches of unit substations. These are listed in the tables below with current-limiting or boric acid fuses. Both single and duplex switch mains are included in this selection. Transformers are listed on page 14-20 and may not be suitable for close coupling. For transformer availability and specific configurations, contact your local Schneider Electric sales office. All connections in this digest are based on standard Square D™ brand transformer connections. If these switches are used to connect to other manufacturers' transformers, then connections must coordinate with standard Square D™ brand transformer connections. (Cable connections are furnished with the transformer.)

Table 11.34: 600 A "Single" Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers
(FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	$ Price
HVL405DEGR	4.76	10–450E	NEMA 1	RH	**20134.00**
HVL405DEGL	4.76	10–450E	NEMA 1	LH	**20134.00**
HVL405DEWRH	4.76	10–450E	NEMA 3R	RH	**25322.00**
HVL405DEWLH	4.76	10–450E	NEMA 3R	LH	**25322.00**
HVL415DEGR1	15	10–100E	NEMA 1	RH	**20614.00**
HVL415DEGR2	15	125–200E	NEMA 1	RH	**20614.00**
HVL415DEGL1	15	10–100E	NEMA 1	LH	**20614.00**
HVL415DEGL2	15	125–200E	NEMA 1	LH	**20614.00**
HVL415DEWR1H	15	10–100E	NEMA 3R	RH	**28070.00**
HVL415DEWR2H	15	125-200E	NEMA 3R	RH	**28070.00**
HVL415DEWL1H	15	10–100E	NEMA 3R	LH	**28070.00**

Table 11.34: 600 A "Single" Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers
(FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	$ Price
HVL415DEWL2H	15	125-200E	NEMA 3R	LH	**28070.00**

Table 11.35: 600 A "Duplex" Switch with PROVISIONS ONLY for Square D™ brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers
(FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	$ Price
HVL505DEGR	4.76	10–450E	NEMA 1	RH	**42028.00**
HVL505DEGL	4.76	10–450E	NEMA 1	LH	**42028.00**
HVL505DEWRH	4.76	10–450E	NEMA 3R	RH	**49484.00**
HVL505DEWLH	4.76	10–450E	NEMA 3R	LH	**49484.00**
HVL515DEGR1	15	10–100E	NEMA 1	RH	**43084.00**
HVL515DEGR2	15	125–200E	NEMA 1	RH	**43084.00**
HVL515DEGL1	15	10–100E	NEMA 1	LH	**43084.00**
HVL515DEGL2	15	125–200E	NEMA 1	LH	**43084.00**
HVL515DEWR1H	15	10–100E	NEMA 3R	RH	**54904.00**
HVL515DEWR2H	15	125–200E	NEMA 3R	RH	**54904.00**
HVL515DEWL1H	15	10–100E	NEMA 3R	LH	**54904.00**
HVL515DEWL2H	15	125-200E	NEMA 3R	LH	**54904.00**

Table 11.36: 600 A "Single" Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers ■
(FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	$ Price
HVL405BGR	4.76	10E–400E	NEMA 1	RH	**25666.00**
HVL405BGL	4.76	10E–400E	NEMA 1	LH	**25666.00**
HVL405BWRH	4.76	10E–400E	NEMA 3R	RH	**30674.00**
HVL405BWLH	4.76	10E–400E	NEMA 3R	LH	**30674.00**
HVL415BGR	15	10E–400E	NEMA 1	RH	**27390.00**
HVL415BGL	15	10E–400E	NEMA 1	LH	**27390.00**
HVL415BWRH	15	10E–400E	NEMA 3R	RH	**32476.00**
HVL415BWLH	15	10E–400E	NEMA 3R	LH	**32476.00**

▲ Includes fuse holder only. See table on page 11-14 for fuse refills.

Table 11.37: 600 A "Duplex" Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers ■
(FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	$ Price
HVL505BGR	4.76	10E–400E	NEMA 1	RH	**47470.00**
HVL505BGL	4.76	10E–400E	NEMA 1	LH	**47470.00**
HVL505BWRH	4.76	10E–400E	NEMA 3R	RH	**57742.00**
HVL505BWLH	4.76	10E–400E	NEMA 3R	LH	**57742.00**
HVL515BGR	15	10E–400E	NEMA 1	RH	**49540.00**
HVL515BGL	15	10E–400E	NEMA 1	LH	**49540.00**
HVL515BWRH	15	10E–400E	NEMA 3R	RH	**60514.00**
HVL515BWLH	15	10E–400E	NEMA 3R	LH	**60514.00**

■ Includes fuse holder only. See table on page 11-14 for fuse refills.

NOTE: Switches with transformer connections are painted ANSI 49. Standalone switches are painted ANSI 61.

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Fuse Selection

The rule of thumb method for selecting fuses for transformer protection is 1.33 times the self-cooled full load current of the transformer or the next higher fuse rating. Selection of the fuse is the customer's responsibility and should be based on transformer and system characteristics.

- **Maximum Fuse Size:**
  Maximum fuse size should be determined by comparing the fuse total clearing curve to the transformer damage curve. Contact Schneider Electric for transformer overload and short-circuit withstand capability.
- **Minimum Fuse Size:**
  Minimum fuse size shall carry the transformer magnetizing inrush current of 12 times full load amperes for 0.1 second.

Table 11.38: Factory Modifications

Catalog No.	Description	$ Price
HVMB	Main Bus Kit, 600 A copper	**2288.00**
HVLC	Line side connector kit (main bus) 600 A with 2–1/0=500 MCM lugs (bottom entry only)	**1282.00**
	Provisions for key interlocks (does not include key cylinders—order separately	**0.00**
HVLX3	Auxiliary switch 2 N.O.—2 N.C. contact	**762.00**
HVLC2	Set screw type lugs 1/0—500 kcmil (qty. 3)	**196.00**
Distribution Class Surge Arresters ▲		
HVDSA3	3 kV, 2.55 MCOV	**1618.00**
HVDSA6	6 kV, 5.10 MCOV	**1926.00**
HVDSA9	9 kV, 7.65 MCOV	**2248.00**
HVDSA10	10 kV, 8.40 MCOV	**2446.00**
HVDSA12	12 kV, 10.20 MCOV	**2836.00**
HVDSA15	15 kV, 12.70 MCOV	**3424.00**

▲ Load side connected

Standard Features

- Switches for transformer primaries are cable connected only.
- Key interlocks must be ordered and coordinated by customer.
- Standard color is ANSI 61 for standalone units; ANSI 49 for switches connecting to transformers.
- If switches are purchased to coordinate with Square D™ brand transformers, composite drawings and shipment coordination will not be available.
- Switches are not designed for any special dimensions for retrofit purposes. For dimensions other than shown, contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

Ordering Information

1. Select switch catalog number based on fused or unfused and enclosure type.
2. Select catalog numbers for factory modifications from the table above.
3. If fused, select fuse from table on page 11-14.
4. Price switch and fuses separately. Switches are furnished with provisions only for current-limiting fuse or boric acid fuse.

Pricing Example

Price one (1) indoor (NEMA 1), 15 kV, 600 A switch with 80E SM-5S boric acid fuses and 10 kV distribution class surge arresters for a 7.62/13.2 kV grounded wye system.

Order:	Catalog No.	$ Price
Switch with indoor enclosure	HVL315BG	**26650.00**
Surge arrester, 10 kV	HVDSA10	**2446.00**
Boric acid fuse (set of three, from page 11-14	15SM5080	**1508.00**
	Total Price	**30634.00**

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Square D™ Brand DIN/E Fuse Selection Tables—HVL

Table 11.39: DIN/E Current-Limiting Fuses, Non-Disconnecting Type ▲■♦
(Extended Travel Blown Fuse Indicator)

Continuous Current	Fuse Mounting Clip ★		Catalog No. ▼	$ Price △
	Centers (in)	Diameter (mm)		
5 kV Fuse				
10E	17.4	51	55DE010	**954.00**
15E	17.4	51	55DE015	
20E	17.4	51	55DE020	
25E	17.4	51	55DE025	
30E	17.4	51	55DE030	**1980.00**
40E	17.4	51	55DE040	
50E	17.4	51	55DE050	
65E	17.4	51	55DE065	
80E	17.4	51	55DE080	
100E	17.4	51	55DE100	
125E	17.4	76	55DE125	**3326.00**
150E	17.4	76	55DE150	
175E	17.4	76	55DE175	
200E	17.4	76	55DE200	
250E	17.4	76	55DE250	**5742.00**
300E	17.4	76	55DE300	
350E	17.4	76	55DE350	
400E	17.4	76	55DE400	**6430.00**
450E	17.4	76	55DE450	
15 kV Fuse				
10E	17.4	51	175DE010	**3214.00**
15E	17.4	51	175DE015	
20E	17.4	51	175DE020	
25E	17.4	51	175DE025	
30E	17.4	51	175DE030	**3290.00**
40E	17.4	76	175DE040	
50E	17.4	76	175DE050	
65E	17.4	76	175DE065	**4446.00**
80E	17.4	76	175DE080	
100E	17.4	88	175DE100	
125E	21.14	88	175DE125	**6878.00**
150E	21.14	88	175DE150	
175E	21.14	88	155DE175	
200E	21.14	88	155DE200	

▲ Square D™ brand DIN/E fuses are shown in this table. For fuses produced by other manufacturers, contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

■ Current-limiting fuses will increase the integrated short-circuit ratings beyond the non-fusible units. Contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

♦ Caution—These fuses will not work for the MiniBreak. See page 11-7 for the appropriate MiniBreak fuses.

★ All fuses are single barrel arrangement with ferrule diameters per the chart.

▼ Contact your Schneider Electric representative for current stock quantities.

△ Price includes one set of three fuses, packed in a single box.

Boric Acid Fuse Selection Tables□—HVL

Table 11.40: Boric Acid Fuses

Continuous Current	Fuse Type◊	Catalog No.	$ Price	Fuse Type ☆	Catalog No. ▽	$ Price ◒
5 kV Fuse Refill						
10E	SM-5S	5SM5010		RBA400	405WBAF010	
15E	SM-5S	5SM5015		RBA400	405WBAF015	
20E	SM-5S	5SM5020		RBA400	405WBAF020	
25E	SM-5S	5SM5025		RBA400	405WBAF025	
30E	SM-5S	5SM5030		RBA400	405WBAF030	
40E	SM-5S	5SM5040		RBA400	405WBAF040	
50E	SM-5S	5SM5050	**1472.00**	RBA400	405WBAF050	**1692.00**
65E	SM-5S	5SM5065		RBA400	405WBAF065	
80E	SM-5S	5SM5080		RBA400	405WBAF080	
100E	SM-5S	5SM5100		RBA400	405WBAF100	
125E	SM-5S	5SM5125		RBA400	405WBAF125	
150E	SM-5S	5SM5150		RBA400	405WBAF150	
175E	SM-5S	5SM5175		—	—	
200E	SM-5S	5SM5200		RBA400	405WBAF200	
250E	SM-5S	5SM5250	**1528.00**	RBA400	405WBAF250	**1758.00**
300E	SM-5S	5SM5300		RBA400	405WBAF300	
400E	SM-5S	5SM5400		RBA400	405WBAF400	
15 kV Fuse Refill						
10E	SM-5S	15SM5010		RBA400	415WBAF010	
15E	SM-5S	15SM5015		RBA400	415WBAF015	
20E	SM-5S	15SM5020		RBA400	415WBAF020	
25E	SM-5S	15SM5025		RBA400	415WBAF025	
30E	SM-5S	15SM5030		RBA400	415WBAF030	
40E	SM-5S	15SM5040		RBA400	415WBAF040	
50E	SM-5S	15SM5050	**1508.00**	RBA400	415WBAF050	**1732.00**
65E	SM-5S	15SM5065		RBA400	415WBAF065	
80E	SM-5S	15SM5080		RBA400	415WBAF080	
100E	SM-5S	15SM5100		RBA400	415WBAF100	
125E	SM-5S	15SM5125		RBA400	415WBAF125	
150E	SM-5S	15SM5150		RBA400	415WBAF150	
175E	SM-5S	15SM5175		—	—	
200E	SM-5S	15SM5200		RBA400	415WBAF200	
250E	SM-5S	15SM5250	**1554.00**	RBA400	415WBAF250	**1788.00**
300E	SM-5S	15SM5300		RBA400	415WBAF300	
400E	SM-5S	15SM5400		RBA400	415WBAF400	

□ S&C Boric Acid Fuses
Type SM-5S fuses are manufactured by the S&C Electric Company. SM-5S has a 25.0 kA symmetrical short-circuit rating from 2.4 kV to 17.0 kV. For 16.5 kV ratings, only S&C boric acid fuses can be used.

◊ Cutler-Hammer - Westinghouse Fuses
Type RBA-400 fuses are manufactured by Cutler-Hammer - EATON Corporation. RBA-400 has a 37.5 kA symmetrical ampere short-circuit rating from 2.4 kV to 4.8 kV and 29.4 kA symmetrical from 12 kV to 13.8 kV.

☆ Caution—These fuses will not work for the MiniBreak. See page 11-7 for the appropriate MiniBreak fuses.

▽ Contact your Schneider Electric representative for current stock quantities.

◒ Price includes one set of three fuses, packed in a single box.

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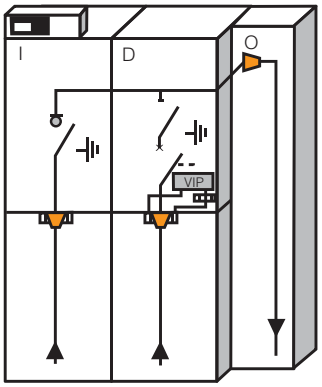
Typical IDO Configuration



Recommended Configurations

D + O
Transformer protection + Outgoing line

(I + D + O)
Incoming line + Transformer protection + Outgoing line

(I + I + D + O)
Two Incoming lines + Transformer protection + Outgoing line

New!

DVCAS Switchgear for Wind Farm Applications

DVCAS medium voltage (MV) switchgear from Schneider Electric is designed to meet the electrical switching, protection, and connection needs of wind farm applications up to 38 kV. Three different modules are available:

- Transformer protection module D
- Outgoing line module O
- Incoming line module I

For standard wind power applications, a maximum of four modules can be connected in various configurations to provide the most commonly used wind power functions.

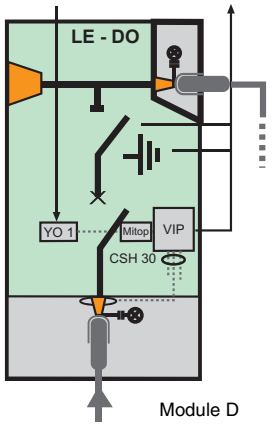
DVCAS switchgear is designed, manufactured, and tested in accordance with the following standards:

- C37.20.3
- C37.54
- CAN/CSA C22.2 No.31-M89

Transformer Protection Module D

DVCAS switchgear module D provides transformer protection. Construction features include:

- Metal base frame
- Operating mechanism and relay compartment
  - — disconnector operating mechanism
  - — operating mechanism of the circuit breaker
  - — protection relay VIP
  - — zero sequence current transformer CSH 30
- MV cable compartment
  - — bushings for cable connection
  - — Three CRc current sensors per phase
- Stainless steel, gas-tight tank
  - — busbar system
  - — three position disconnector
  - — circuit breaker



Module D

Outgoing Line Module O

DVCAS switchgear module O functions as an outgoing line to a downstream wind generator. There are two medium voltage cables per phase. Construction features include:

- Metal base frame
- Voltage presence indicator
- MV cable compartment
  - — bushings for cable connection
  - — clamps for MV cable connection

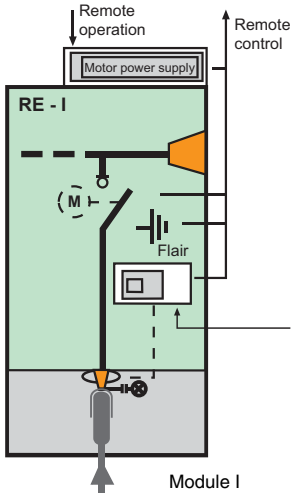
Incoming Line Module I

DVCAS switchgear module I is a three-position switch-disconnector. It is recommended for the incoming line function from an upstream wind generator for the following reasons:

- Reduces downtime caused by faults
- Helps with fault detection
- Reduces interruptions due to maintenance work
- Improves energization works

Module I is always connected to module D on the right with single-phase, coupling bushings. Construction features include:

- Metal base frame
- Operating mechanism compartment
  - — operating mechanism of the switch-disconnector
  - — motor for the operating mechanism (optional)
- MV cable compartment
  - — bushings for cable connection
- Stainless steel, gas-tight tank
  - — busbar system
  - — three position disconnector



Module I

Table 11.41: Ratings

Type	Rating	Type	Rating
Frequency (Hz)	50/60	**Short circuit breaking current capacity (kA)**	20
Rated voltage (kV)	38	**Short circuit making capacity, peak (kA)**	50
Insulation level		**Internal arc withstand IAC AFL (kA/1s)**	20
Power frequency withstand voltage (kV)	70	**Degree of protection (NEMA/IP)**	
Lightning impulse withstand voltage, peak (kV)	170	HV compartment	6/67
Rated current of the main busbar (A)	600	LV and operating mechanism compartment	6P/3X
Short time withstand current (kA/s)	20/3	**SF6 gas pressure at 20 ºC (PSI/bar)**	4.35/0.3

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Two-high, Masterclad 5–27 kV Indoor, Metalclad Switchgear

Vacuum VR Circuit Breaker for Masterclad Switchgear

Masterclad 27 kV, Outdoor, Non Walk-in, Metalclad Switchgear

Arc-Terminator™ Arc Extinguishing System

Two-high, Masterclad 5-15 kV Metalclad, Arc-Resistant Switchgear

Masterclad™ Medium Voltage Metalclad Switchgear (UL Listed)

The Reliability of a Quality Design

The quality of Square D™ brand Masterclad medium voltage metalclad switchgear stems from a design and manufacturing process that focuses on long-term switchgear performance with the highest degree of reliability.

Based on specific customer application needs, Schneider Electric engineers and technicians select the appropriate standard sections and bus configurations, with the ability to customize where needed. After the specified circuit breakers, instrument and control power transformers, relays, meters and other components are selected and approved. All are factory-assembled, wired, and tested as a complete assembly.

Listed Metalclad Switchgear

Table 11.42: Ratings

Nominal voltage (kV)	4.16			7.2	13.8				24.9	
Maximum voltage (kV)	4.76			8.25	15.0				27.0	
BIL (kV)	60			95	95				125	
Frequency (Hz)	50/60									
Continuous amperes (A)	1200–3000								1200–2000	
MVA (reference only)	250	350	500	500	500	750	1000	1500	1250	2000
Short-time rating (kA) 3 seconds	40	50	63	50	25	40	50	63	25	40
Close and latch rating (kA) (peak)	104	130	164	130	65	104	130	164	68	108

Type VR Vacuum Circuit Breaker

The VR breaker is a horizontal drawout type designed to provide long life, reduced maintenance, and ease of handling. The Type RI advanced design motor-charged stored energy mechanism is a model of reliability with simplicity-with an operating life exceeding ANSI requirements. The VR circuit breaker is UL labeled and includes a permanently mounted manual charging handle.

Switchgear Construction

- Floor mounted breaker racking mechanism
- Standard epoxy supports or optional porcelain supports
- Aluminum or copper main bus
- Indoor NEMA 1
- Outdoor NEMA 3R
- Walk-in
- Non walk-in

Active, Arc-Resistant Arc Terminator™ Arc Extinguishing System

Active system detects and controls the effects of internal arcing faults. It complies with ANSI C37.20.7 requirements for arc-resistant switchgear for Type 1, Type 2B, and Type 2C enclosures.

Benefits

- Prevents pressure buildup
- Reduces release of toxic materials
- Eliminates need for reinforced switchgear
- Elimnates special requirements for buildings or plenums
- Minimizes equipment damage
- Reduces operating downtime

Passive, Arc-Resistant Masterclad™ Medium Voltage Switchgear

This switchgear and all its components meet the IEEE C37.20.7 arc-resistant test guideline for Type 2B enclosures as well as all other applicable ANSI, UL, and CSA standards for metalclad switchgear.

Benefits

- 50 kA arc containment for 0.5 seconds
- Voltage ratings from 2.4 kV to 15 kV up to 3,000 A
- Type 2B construction, one- and two-high structures
- Custom exhaust plenum available

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Power-Zone Load Center Unit Substations

Unit Substation

Table 11.42: Complete Close Coupled Unit Substations Available

Product Type	Class Nos.	Product Section No.
Primary Section		
Medium voltage load interrupter switchgear	6040, 6045	11-1
Metalclad switchgear	6055	
Low voltage Power-Style™ QED switchboard	2741-2744	
Air terminal chamber	7421-23, 7310, 7240, 7320	
Transformer Section		
Open, ventilated dry—Power-Dry™	7421-23	14-1
Open, ventilated dry/cast resin combination—Uni-Cast™	7320	
Open, ventilated cast resin—Power-Cast™	7310	
Mineral oil or high fire point fluid—liquid	7240	
Secondary Section		
Medium voltage load interrupter switchgear	6040	11-1
Metalclad switchgear	6055	
Medium voltage motor control center	8198	
Low voltage Power-Style QED switchboard	2741-2744	
Air terminal chamber	7421,23, 7310, 7240, 7320	
Low voltage drawout switchgear	6037	
Low voltage Model 6 motor control centers	8998	17-1

New! Power-Zone Model III Package Unit Substations

Model III Package Unit Substation
with HVL/cc Load Interrupter Switch (on left)

General

Power-Zone Model III package unit substations combine a primary switch, dry-type transformer, and I-Line™ distribution section into a single, compact unit. All components are engineered, manufactured, and tested by Schneider Electric. The substation is available with a UL listing.

The Model III is only 49 inches deep and 90 inches high, which allows the entire substation to pass through standard size doorways and narrow hallways.

The Model III is front accessible; the transformer taps are accessible from the side. For proper ventilation, a minimum distance of 12 inches should be maintained on the transformer side of the equipment.

Model III package unit substations are ideal for renovations and high rise applications requiring increased customer electrical demand as well as new construction requiring multiple zones and a small footprint.

75–1000 kVA at 480 V; 75–500 kVA at 240 V

Available with primary voltages of 2400–13800 V. Forced air cooling (AA/FA) provides an additional 33%. Features 220 °C insulation and 150 °C, 115 °C, or 80 °C temperature rise. Largest 80 °C or 115 °C rise unit available is 750 kVA.

The secondary circuit breaker distribution section may be equipped with an individually mounted secondary main breaker or an I-Line distribution panelboard. Branch circuit breakers from 15 A FY to PowerPact RLC 1200 A may be installed. PowerPact™ molded case circuit breakers M, P, and R frame are available with electronic trip units.

Additional options include CM 3000 and CM 4000 series circuit monitors, PM-800 series power meters, surge arresters, and I-Line plug-on unit with a Surgelogic™ Surge Protective Device (SPD).

Incoming Line Section

Most Model IIIs are supplied with a Square D™ brand fused HVL/cc 600 A load interrupter switch. The HVL/cc offers the smallest footprint in the industry and is an exclusive sealed interruption type compartmentalized switch. Where switching and overcurrent protection are provided elsewhere, a full-height air-filled terminal chamber can be provided in place of the switch.

Table 11.43: Primary Switch Ratings, Type HVL/cc

Nominal Voltage	4.16	13.8
BIL	60	95
Continuous amperes	600	600
Interrupting amperes	600	600
Fault close (kA asymmetrical)	40	40
Momentary current (kA asymmetrical 10 cycles)	40	40
Duty-cycle-fault-close (number of operations)	4	4
Grounding switch fault close (kA asymmetrical)	40	40
Short-time rating (kA asymmetrical 2 seconds)	25	25
Dielectric withstand (kV 1 minute)	19	36
Electrical endurance (close-open)	100	100
Mechanical endurance (close-open)	1000	1000

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Transformer Section

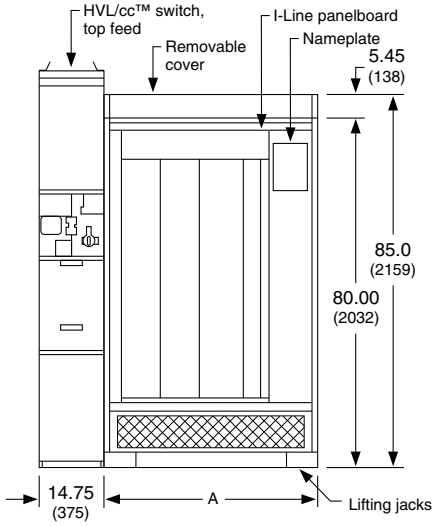
Special barrel wound dry-type transformers employing resin encapsulated VPI (Vacuum Pressure Impregnation) techniques are used to achieve the low-loss, compact design necessary for the space-saving package substation concept. Class H, 220 °C insulation is used throughout. Temperature rise is 150 °C as standard, although 80°C or 115 °C low temperature premium transformers are available through 750 kVA. Aluminum windings are standard with copper as an option. Four full capacity 2-1/2 percent taps are provided-two above nominal voltage and two below.

Fan cooling is optional. When selected, it increases the capacity rating of the transformer an additional 33 percent. The Model 98 digital controller is employed. This system provides precision control through the use of three high accuracy thermocouple type sensors—one in each phase of the windings.

The controller has a membrane front panel for displaying the temperature of all three phases with individual readings. The hottest phase is automatically displayed. The Model 98 digital controller features simple three-button operation with fan, alarm and trip function settings and is Powerlogic™ compatible.

Table 11.44: Transformer Basic Insulation Levels

KV Class	Primary Voltages	BIL	600 Hz Test
1.2	< 600 V Secondary	10	4 kV
2.5	2400	20	10 kV
5.0	4160, 4800	30	12 kV
7.2	6900, 7200	30	12 kV
8.7	8320	45	19 kV
15.0	12, 12.47, 13.2, 13.8	60	31 kV



Power-Zone Model III
Front View

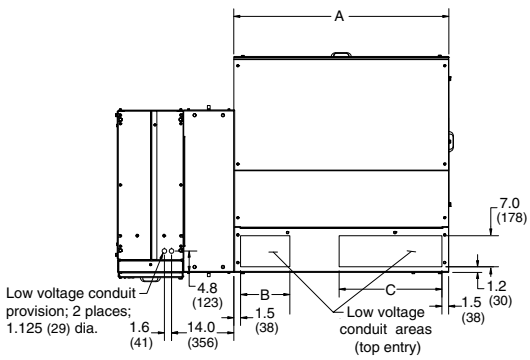
Dimensions shown in Inches (mm). See Table 11.45 for A, B, C, D, E dimensions.

Distribution Section

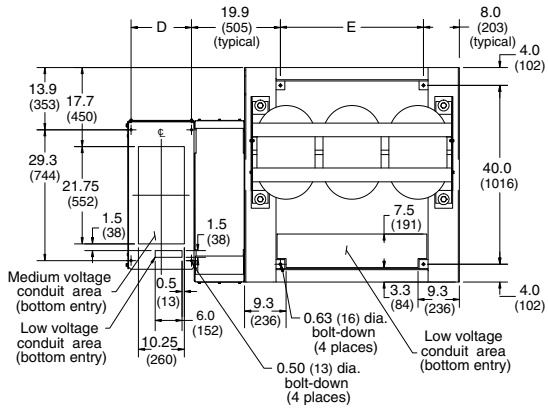
I-Line™ Mounted Molded Case Circuit Breakers

Molded case circuit breakers are group mounted in an I-Line panelboard section offering the inherent ease of installation for which the plug-on I-Line circuit breaker has become known. All circuit breakers are quick-make, quick-break, thermal magnetic, permanent trip type and are factory-calibrated and sealed for accurate overcurrent response and maximum short-circuit strength. PowerPact™ P and R circuit breakers are available with solid-state Micrologic™ trip units. Current limiting high interrupting capacity FI, KI, and LI circuit breakers are also available. Circuit breakers may be safely back-fed for use as main circuit breakers. All circuit breakers are UL listed and carry integrated equipment rating when used exclusively with other Square D™ brand circuit breakers in intended assemblies.

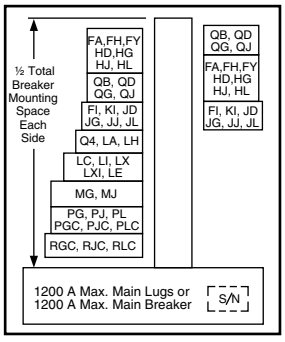
I-Line panel is available in 1200 A. Maximum mounting space is 108 inches. Tin-plated copper bus is standard.



Top Conduit Entrances



Bottom Conduit Entrances



HCR-U 1200 A I-Line panelboards can be used for up to 600 Vac. They are UL Listed under File E33139.

Table 11.45: Substation Dimensions and Approximate Weights

kVA	Temperature Rise ° C	Dimensions (for above drawings)					Estimated Weight
		A	B	C	D	E	
75	80, 115, 150	48	11.0	23.0	13.5	32.0	3600
112.5							
150							
225	80, 115, 150						4500
300							
500	150						6000
500	80, 115	60	18.5	27.0	18.75	44.0	6200
750	80, 115, 150						6700
1000	150						7500

Contact your nearest Schneider Electric sales office for pricing assistance.

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Motorpact™ Medium Voltage Motor Controllers (UL Listed)

Square D™ brand Motorpact medium voltage motor controllers from Schneider Electric are designed and manufactured to tackle the toughest power and process control challenges. Our motor controllers feature industry-first innovations that provide unmatched performance, high reliability, low maintenance and exclusive technologies. Motorpact medium voltage motor controllers are designed to provide the most efficient means to control and protect a wide range of applications and may be configured for motor starting, transformer feeders, capacitor feeders, or future spaces. The design has fewer losses inside the controller, providing more efficient use of power for the connected load.

Motorpact controllers are designed to meet or exceed the standards for NEMA ICS3 Part 2, UL Standard 347, and IEC 60470. UL and cULus labels are standard.

Starting application for squirrel cage induction motors:

- Full voltage non-reversing
- Full voltage reversing
- 2-speed, 2-winding, 2-speed, 1-winding
- Reduced voltage non-reversing
  - — Auto transformers
  - — Solid state soft start
  - — Sequential soft start (S3) multi-motor starting

Enclosures are available in NEMA Type 1, 1A, and 3R and feature the smallest footprint in the industry at 14.75 inches wide. Enclosures that are 20 inches and 29.5 inches wide are also available for FVNR.

Optional arc resistant enclosures are available that meet IEEE C37.20.7.

Units are designed as one-high construction for ease of use with a optimum height for the operator controls and isolation switch disconnect handle.

Full front and or front and rear accessibility are provided. A full height cable pulling area is standard.

Controller voltage ratings range from 2.3–7.2 kV vacuum contactors feature a drawout design and have ratings of 200, 400, 450, and 720 A.

Options include live line indicators, blown fuse tripping, solid state protective relays, power factor correction capacitors, surge arresters, surge capacitors and a cable grounding switch.

Listed Controllers

Vacuum Substation Circuit Breakers—Types FVR, EOX, VOX (Not UL Listed)

By combining the latest developments in circuit breaker technology with world-renowned quality, vacuum substation circuit breakers from Schneider Electric are the most advanced medium voltage circuit breakers available. Type FVR Powersub™ circuit breakers include arc-resistant construction and are built to comply with ANSI standards. Type EOX substation circuit breakers are available with a magnetic or spring actuator. Type VOX includes a vacuum circuit breaker housed in a tank filled with SF6 (sulfur hexafluoride) for added environmental benefits and reduced space requirements.

Table 11.46: Vacuum Substation Circuit Breaker Ratings

Type	Voltage (kV)	Amperage (A)	BIL	Short-time Rating kA (3 seconds)
EOX ▲	15	1200, 2000	110	12–31.5 ■
FVR		600–4000	110	12–40
EOX ♦	27	1200, 2000	125 (150)	25–31.5
FVR		1200, 2000	125 (150)	12–25@125; 31.5@150
VOX	38	1200, 2000	150 (200)	12–40
FVR		1200, 2000	150	12–31.5
		1200	200	12–25

▲ Spring- and magnetic-actuated.
■ 31.5 for spring-actuated; maximum magnetic-actuated = 25.
♦ Spring- actuated.

Type FVR

New! Type EOX

New! Type VOX

The arc-resistant design of Type FVR circuit breakers takes safety to the next level. In the event of an arc, the arc-resistant construction provides increased safety for personnel working in proximity of the breaker by venting resultant arc by-products and ionized gases upward and away from exterior panels that otherwise may not remain intact and in place. Type FVR circuit breakers also provide superior protection as a result of their high speed operation. You can expect long life from the product as the vacuum interrupter contacts are protected from corroding elements and contamination.

Type EOX magnetic circuit breakers contain a magnetic actuator, electronic controller, and capacitors to store energy for circuit breaker operation. Our innovative design uses only one coil for opening and closing the circuit breaker. There are no critical friction parts, which increases the reliability and life of the mechanism. The tripping energy required is also lower than that of other products available on the market. In emergency situations, the circuit breaker can be easily tripped mechanically.

Type VOX circuit breaker vacuum interrupters are housed in a fully welded, sealed-for-life, stainless steel tank, providing a controlled gas insulated environment totally immune to external ambient conditions. A spring-charged mechanism provides manual or motorized circuit breaker operation.

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New! Automatic Circuit Recloser

N-series

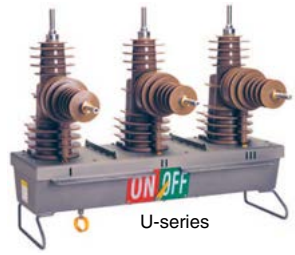
W-series

Overview

The Automatic Circuit Recloser combines state-of-the-art vacuum arc interruption with integrated voltage and current measurement. These features are encased in a fully welded and sealed, 316 grade, stainless steel tank. Three types of reclosers are available: N-series (three-phase), U-series (three-phase), and W-series (single phase).

Applications

- Feeder automatic circuit recloser
- Substation automatic circuit recloser
- Loop automation
- Automatic change-over
- Smart grid



U-series

New! Load Break Switch/Sectionalizer

RL-series

Overview

The RL-series Load Break Switch/Sectionalizer is a switch used in conjunction with an upstream recloser or circuit breaker. It counts the interruptions created by a recloser during a fault sequence. On a preset count, the sectionalizer trips during the dead time of the up stream recloser and isolates the faulty network section.

Applications

- Manual load-break switch
- Motorized load-break switch
- Fully automated sectionalizer
- Normally-open tie point

Table 11.47: Ratings

Attribute	Automatic Circuit Recloser			Load Break Switch/Sectionalizer
	N-series	U-series	W-series	RL-series
Phases	3		1	3
Nominal Voltage (kV)	15, 27, 38	15, 27	15, 24	15, 27, 38
Continuous amperes (A)	800	630	400	630
Short-time rating (kA)	12.5/16	12.5	6	12.5/16
Insulation	Gas	Epoxy	Epoxy	Gas
Interruption	Vacuum			Gas
Operations (elec/mech)	10000/10000			600/5000

New! ADVC Controller

ADVC ULTRA Controller

Overview

The ADVC controller offers advanced protection, measurement, diagnostic, and communication features in a reliable package. Designed around the user, the controller offers flexibility and choice. Users have a choice of two cubicle sizes (ULTRA and COMPACT) and two operator interfaces (flexVUE and setVUE).

All the protection, monitoring, communication, diagnostic, and automation features are included as standard in all models:

- ULTRA—large 316SS controller cubicle with two accessory mounting areas
- COMPACT—smaller 304SS controller cubicle with one accessory mounting area
- flexVUE—interface with 20 configurable status lamps and 12 quick action keys
- setVUE—large 4 x 40 LCD with familiar menu-driven operation

Applications

The ADVC controller interfaces with the following:

- N-series recloser
- U-series recloser
- W-series recloser
- RL-series load break switch/sectionalizer

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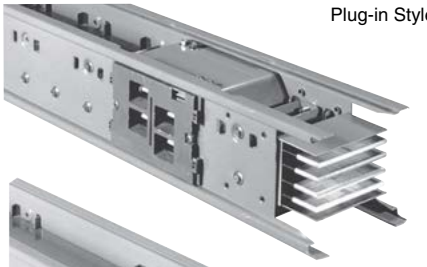
Section 12

Busway

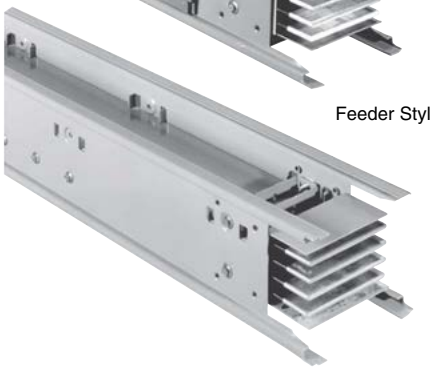
Powerbus 100–400 A pp. **12-2**

I-Line Plug-in Busway 225–600 A pp. **12-4**

Plug-in Style



Feeder Style



I-Line II Busway 800–5000 A pp. **12-5**

I-Line Plug-In Units pp. **12-9**

Power-Zone Busway pp.**12-16**

Powerbus™ Busway

400 Ampere—600 Volt	**12-2**
225 Ampere—600 Volt	**12-2**
100 Ampere—600 Volt	**12-2**
Powerbus Plug-In Units	**12-3, 12-20**

I-Line™/ I-Line II Busway

I-Line Busway Standard Components	**12-4**
I-Line II Busway Standard Components	**12-5**
I-Line II Pricing Instructions	**12-6, 12-7**
Accessories	**12-8**
Plug-In Units (Fusible and Circuit Breaker Types)	**12-9, 12-10**
PowerPact™ H- and J-Frame Plug-in Units	**12-11**
New! PowerPact™ H-, J-, and L-Frame Plug-in Units with Electronic Trip	**12-12**
PowerPact™ M-Frame Plug-in Units	**12-13**
New! PowerPact™ P-Frame Plug-in Units	**12-14**
PowerPact™ R-Frame Plug-in Units	**12-15**

Power-Zone™ Busway

Non-Segregated Busway	**12-16**
Footage and Fittings	**12-17**
Options and Accessories	**12-18**

Distinct service advantages make your Busway installation “hassle-free”

- **Missing Link** program guarantees shipment in a maximum of 5 working days of a small quantity of indoor feeder straight lengths and fittings. Orders for outdoor busway or for international destinations may require 2 extra days for processing.
- **Measurement Services** are offered for your critical and complex projects. Schneider Electric will assist with field measurement and assume responsibility for the layout and exact fit of all components. Contact your local Schneider Electric sales office for exact details.
- **Emergency Service;** we are on call 24 hours a day, 7 days a week, 365 days a year. For emergencies, call 1-888-SquareD (1-888-778-2733).
- **Quick Ship** program provides product availability for time sensitive orders. The program is available through the product selectors and offers a limited selection of I-Line busway footage and fittings. Contact your local Schneider Electric sales office for exact details.

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Schneider Electric

Powerbus Busway

Construction

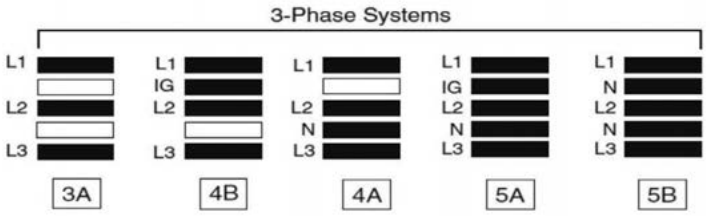
Powerbus busway construction consists of a light-weight electrical grade all-aluminum housing with up to five (5) silver-plated copper conductor bars for maximum electrical efficiency. The total product offer includes straight sections, fittings, accessories, and plug-in units for a total installation. This busway is available in 400 A, 225 A and 100 A ratings. A 50% integral ground is standard.

Straight Sections

Straight sections of busway are available in 10 ft. and 4 ft. lenghts in a painted black finish. The Enhanced busway offer includes 10 plug-in openings on each side of a 10 ft. section and 3 plug-in openings on each side of a 4 ft. section.

Metering and Communications Options

Powerbus busway tap boxes and plug-in units are available with optional metering and communication capabilities, which include an integrated display and the ability to remotely monitor the busway.



NOTE: *Single phase sysstems are also available. Contact your local Schneider Electric representative.*

Table 12.1: 3Ø3W—Powerbus Straight Lengths and Fittings▲—600 V Maximum

Amperage	Component	Configuration 3A		Configuration 4B	
		Catalog No.	$ Price	Catalog No.	$ Price
100 A	Enhanced Straight 10 ft.	PBCE3A100AST120B	1556.00	PBCE4B100AST120B	1860.00
	Enhanced Straight 4 ft.	PBCE3A100AST48B	887.00	PBCE4B100AST48B	1105.00
	Elbow – Left	PBCF3A100ALLB	1344.00	PBCF4B100ALLB	1406.00
	Elbow – Right	PBCF3A100ALRB	1344.00	PBCF4B100ALRB	1406.00
	Cross Fitting	PBCF3A100ACRB	1574.00	PBCF4B100ACRB	1660.00
	Tap Box	PBCF3A100ATBB	1962.00	PBCF4B100ATBB	2152.00
	Tap Box w/Meter■♦	PBCF3A100ATBM( )B	5207.00	PBCF4B100ATBM( )B	5397.00
225 A	Enhanced Straight 10 ft.	PBCE3A225AST120B	2896.00	PBCE4B225AST120B	3570.00
	Enhanced Straight 4 ft.	PBCE3A225AST48B	1208.00	PBCE4B225AST48B	1475.00
	Elbow – Left	PBCF3A225ALLB	2044.00	PBCF4B225ALLB	2490.00
	Elbow – Right	PBCF3A225ALRB	2044.00	PBCF4B225ALRB	2490.00
	Cross Fitting	PBCF3A225ACRB	2510.00	PBCF4B225ACRB	3060.00
	Tap Box	PBCF3A225ATBB	2600.00	PBCF4B225ATBB	2954.00
	Tap Box w/Meter■	PBCF3A225ATBM( )B	5845.00	PBCF4B225ATBM( )B	6199.00
400 A	Enhanced Straight 10 ft.	PBCE3A400AST120B	4690.00	PBCE4B400AST120B	5850.00
	Enhanced Straight 4 ft.	PBCE3A400AST48B	1976.00	PBCE4B400AST48B	2340.00
	Elbow – Left	PBCF3A400ALLB	2867.00	PBCF4B400ALLB	3595.00
	Elbow – Right	PBCF3A400ALRB	2867.00	PBCF4B400ALRB	3595.00
	Cross Fitting	PBCF3A400ACRB	3760.00	PBCF4B400ACRB	4694.00
	Tap Box	PBCF3A400ATBB	4275.00	PBCF4B400ATBB	4750.00
	Tap Box w/Meter■	PBCF3A400ATBM( )B	7520.00	PBCF4B400ATBM( )B	7995.00

Table 12.2: 3Ø4W—Straight Lengths and Fittings▲—600 V Maximum

Amperage	Component	Configuration 4A		Configuration 5A		Configuration 5B	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
100 A	Enhanced Straight 10 ft.	PBCE4A100AST120B	1860.00	PBCE5A100AST120B	2319.00	PBCE5B100AST120B	2319.00
	Enhanced Straight 4 ft.	PBCE4A100AST48B	1105.00	PBCE5A100AST48B	1219.00	PBCE5B100AST48B	1219.00
	Elbow – Left	PBCF4A100ALLB	1406.00	PBCF5A100ALLB	2212.00	PBCF5B100ALLB	2212.00
	Elbow – Right	PBCF4A100ALRB	1406.00	PBCF5A100ALRB	2212.00	PBCF5B100ALRB	2212.00
	Cross Fitting	PBCF4A100ACRB	1660.00	PBCF5A100ACRB	2984.00	PBCF5B100ACRB	2984.00
	Tap Box	PBCF4A100ATBB	2152.00	PBCF5A100ATBB	2502.00	PBCF5B100ATBB	2502.00
	Tap Box w/Meter■♦	PBCF4A100ATBM( )B	5397.00	PBCF5A100ATBM( )B	5747.00	PBCF5B100ATBM( )B	5747.00
225 A	Enhanced Straight 10 ft.	PBCE4A225AST120B	3570.00	PBCE5A225AST120B	4650.00	PBCE5B225AST120B	4650.00
	Enhanced Straight 4 ft.	PBCE4A225AST48B	1475.00	PBCE5A225AST48B	2456.00	PBCE5B225AST48B	2456.00
	Elbow – Left	PBCF4A225ALLB	2490.00	PBCF5A225ALLB	3920.00	PBCF5B225ALLB	3920.00
	Elbow – Right	PBCF4A225ALRB	2490.00	PBCF5A225ALRB	3920.00	PBCF5B225ALRB	3920.00
	Cross Fitting	PBCF4A225ACRB	3060.00	PBCF5A225ACRB	5408.00	PBCF5B225ACRB	5408.00
	Tap Box	PBCF4A225ATBB	2954.00	PBCF5A225ATBB	4570.00	PBCF5B225ATBB	4570.00
	Tap Box w/Meter■	PBCF4A225ATBM( )B	6199.00	PBCF5A225ATBM( )B	7815.00	PBCF5B225ATBM( )B	7815.00
400 A	Enhanced Straight 10 ft.	PBCE4A400AST120B	5850.00	PBCE5A400AST120B	7150.00	PBCE5B400AST120B	7150.00
	Enhanced Straight 4 ft.	PBCE4A400AST48B	2340.00	PBCE5A400AST48B	2860.00	PBCE5B400AST48B	2860.00
	Elbow – Left	PBCF4A400ALLB	3595.00	PBCF5A400ALLB	5145.00	PBCF5B400ALLB	5145.00
	Elbow – Right	PBCF4A400ALRB	3595.00	PBCF5A400ALRB	5145.00	PBCF5B400ALRB	5145.00
	Cross Fitting	PBCF4A400ACRB	4694.00	PBCF5A400ACRB	6565.00	PBCF5B400ACRB	6565.00
	Tap Box	PBCF4A400ATBB	4750.00	PBCF5A400ATBB	6705.00	PBCF5B400ATBB	6705.00
	Tap Box w/Meter■	PBCF4A400ATBM( )B	7995.00	PBCF5A400ATBM( )B	9950.00	PBCF5B400ATBM( )B	9950.00

Note: Also suitable for DC applications.

▲ Busway catalog numbers shown include a black painted finish. Contact your local Schneider Electric representative for a natural aluminum finish option.

■ Replace the ( ) in the Tap Box w/Meter catalog number with the meter suffix number in the table below. The meter will be configured based on the system voltage.

♦ For 100 A busway only, add an additional (L) for top cable access or a (U) for bottom cable access.

Table 12.3: Accessories

Description	100 A		225 A		400 A	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
Standard Hanger	PB100FH	50.00	PB225FH	80.00	PB400FH	100.00
Side Mount Hanger	PB100HFW	120.00	PB225HFW	120.00	PB400HFW	120.00
Vertical Sway Brace	PB100VSB	50.00	PB225VSB	80.00	PB400VSB	100.00
End Closure	PB100AEC	120.00	PB225AEC	226.00	PB400AEC	298.00
Wall Flange	PB100WF	140.00	PB225WF	196.00	PB400WF	244.00
Plug-in Opening Cover	PBPIOCVR	60.00	PBPIOCVR	60.00	PBPIOCVR	60.00

Meter Suffix	System Voltage
1	208Y/120 V 3Ø4W
2	240 V 3Ø3W
4	415/240 V 3Ø4W
5	480Y/277 V 3Ø4W

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Three-Phase Systems

3A

4B

4A

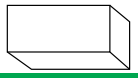
5A

5B

Powerbus Plug-in Units

Powerbus plug-in units are rated maximum 100 A and may be offered as field installable or factory assembled units. All units conform to NEMA type 1. An optional kit is available for FA and QO units to raise the protection to IP54. This kit raises the QOR unit to moisture protection of IPX3.

Table 12.4: Plug-In Units— Circuit breakers not included

Busbar Configuration		Space for One (1) 3 Phase FA Circuit Breaker		3 Spaces for QO/QOB Circuit Breakers		3 Spaces for QO/QOB Circuit Breakers 3 Openings for Receptacles▽❂●▼:	
							
	Tap Box	FA Unit		QO Unit		QOR Unit	
	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
3A	PBPTB3A100	**614.00**	PBPFA3A100	**832.00**	PBPQO3A100	**424.00**	PBPQOR3A100	**566.00**
4B	PBPTB4B100	**670.00**	PBPFA4B100	**870.00**	PBPQO4B100	**452.00**	PBPQOR4B100	**586.00**
4A	PBPTB4A100	**670.00**	PBPFA4A100	**870.00**	PBPQO4A100	**452.00**	PBPQOR4A100	**586.00**
5A	PBPTB5A100	**782.00**	PBPFA5A100	**946.00**	PBPQO5A100	**466.00**	PBPQOR5A100	**604.00**

Note: Plug-in tap box to be installed on 100 A and 225 A busways only.

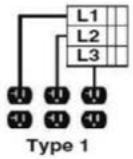
▲ Certain NEMA receptacles can be field installed in this unit. Consult your local Schneider Electric representative.

Table 12.5: Factory Assembled Units with FA Circuit Breakers—600 V max

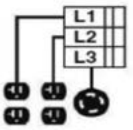
Circuit Breaker Rating	3A Configuration		4A Configuration▲		5A Configuration		5B Configuration	
	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
15	PBPFA3A100A015	**1780.00**	PBPFA4A100A015	**1820.00**	PBPFA5A100A015	**1978.00**	PBPFA5B100A015	**1978.00**
20	PBPFA3A100A020	**1780.00**	PBPFA4A100A020	**1820.00**	PBPFA5A100A020	**1978.00**	PBPFA5B100A020	**1978.00**
30	PBPFA3A100A030	**1780.00**	PBPFA4A100A030	**1820.00**	PBPFA5A100A030	**1978.00**	PBPFA5B100A030	**1978.00**
40	PBPFA3A100A040	**1780.00**	PBPFA4A100A040	**1820.00**	PBPFA5A100A040	**1978.00**	PBPFA5B100A040	**1978.00**
50	PBPFA3A100A050	**1780.00**	PBPFA4A100A050	**1820.00**	PBPFA5A100A050	**1978.00**	PBPFA5B100A050	**1978.00**
60	PBPFA3A100A060	**1780.00**	PBPFA4A100A060	**1820.00**	PBPFA5A100A060	**1978.00**	PBPFA5B100A060	**1978.00**
70	PBPFA3A100A070	**1912.00**	PBPFA4A100A070	**1954.00**	PBPFA5A100A070	**2124.00**	PBPFA5B100A070	**2124.00**
80	PBPFA3A100A080	**1912.00**	PBPFA4A100A080	**1954.00**	PBPFA5A100A080	**2124.00**	PBPFA5B100A080	**2124.00**
90	PBPFA3A100A090	**1912.00**	PBPFA4A100A090	**1954.00**	PBPFA5A100A090	**2124.00**	PBPFA5B100A090	**2124.00**
100	PBPFA3A100A100	**1912.00**	PBPFA4A100A100	**1954.00**	PBPFA5A100A100	**2124.00**	PBPFA5B100A100	**2124.00**

Note: See Digest Section 7 for FA circuit breaker information.

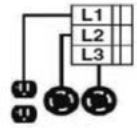
▲ The 4B configuration catalog numbers are also available and are priced the same as the 4A configuration.



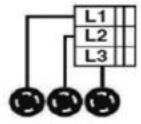
Type 1



Type 2



Type 3



Type 4

Table 12.6: 120 V Factory Assembled Units

1-pole QO/QOB circuit breakers with NEMA 5-15R or 5-20R receptacles▲

Circuit Breaker Rating	Type	4A Configuration		5A Configuration		5B Configuration	
		Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
Type 1		**(3 circuit breakers w. 3 duplex receptacles)**					
15	QO	PBPQOR4A100M115	**850.00**	PBPQOR5A100M115	**950.00**	PBPQOR5B100M115	**950.00**
15	QOB	PBPQOR4A100M115B	**886.00**	PBPQOR5A100M115B	**986.00**	PBPQOR5B100M115B	**986.00**
20	QO	PBPQOR4A100M120	**850.00**	PBPQOR5A100M120	**950.00**	PBPQORBA100M120	**950.00**
20	QOB	PBPQOR4A100M120B	**886.00**	PBPQOR5A100M120B	**986.00**	PBPQOR5B100M120B	**986.00**
Type 2		**(3 circuit breakers w. 2 duplex/1 locking recpt.)**					
15	QO	PBPQOR4A100M215	**862.00**	PBPQOR5A100M215	**962.00**	PBPQOR5B100M215	**962.00**
15	QOB	PBPQOR4A100M215B	**898.00**	PBPQOR5A100M215B	**998.00**	PBPQOR5B100M215B	**998.00**
20	QO	PBPQOR4A100M220	**862.00**	PBPQOR5A100M220	**962.00**	PBPQOR5B100M220	**962.00**
20	QOB	PBPQOR4A100M220B	**898.00**	PBPQOR5A100M220B	**998.00**	PBPQOR5B100M220B	**998.00**
Type 3		**(3 circuit breakers w. 1 duplex/2 locking recpt.)**					
15	QO	PBPQOR4A100M315	**874.00**	PBPQOR5A100M315	**974.00**	PBPQOR5B100M315	**974.00**
15	QOB	PBPQOR4A100M315B	**910.00**	PBPQOR5A100M315B	**1010.00**	PBPQOR5B100M315B	**1010.00**
20	QO	PBPQOR4A100M320	**874.00**	PBPQOR5A100M320	**974.00**	PBPQOR5B100M320	**974.00**
20	QOB	PBPQOR4A100M320B	**910.00**	PBPQOR5A100M320B	**1010.00**	PBPQOR5B100M320B	**1010.00**
Type 4		**(3 circuit breakers w. 3 locking receptacles)**					
15	QO	PBPQOR4A100M415	**886.00**	PBPQOR5A100M415	**986.00**	PBPQOR5B100M415	**986.00**
15	QOB	PBPQOR4A100M415B	**922.00**	PBPQOR5A100M415B	**1022.00**	PBPQOR5B100M415B	**1022.00**
20	QO	PBPQOR4A100M420	**886.00**	PBPQOR5A100M420	**986.00**	PBPQOR5B100M420	**986.00**
20	QOB	PBPQOR4A100M420B	**922.00**	PBPQOR5A100M420B	**1022.00**	PBPQOR5B100M420B	**1022.00**

Note: See Digest Section 7 for QOU circuit breaker information.

▲ Many more factory assembled units are availalbe using combinations of 1P/2P/3P circuit breakers with other NEMA receptacles. Maximum of 3 breaker spacess available. Consult your local Schneider Electric representative.

Table 12.7: Factory Assembled Units

One (1) QOU circuit breaker and one (1) drop cord with connector▲

Circuit Breaker Rating	Poles	NEMA Connector	Drop Cord Length (ft)	4A Configuration		5A Configuration		5B Configuration	
				Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
15 A	1	L5-15	3	PBPQOU4A100COOL515	**886.00**	PBPQOU5A100COOL515	**986.00**	PBPQOU5B100COOL515	**986.00**
20 A	1	L5-20	3	PBPQOU4A100COOL520	**886.00**	PBPQOU5A100COOL520	**986.00**	PBPQOU5B100COOL520	**986.00**
30 A	1	L5-30	3	PBPQOU4A100COOL530	**896.00**	PBPQOU5A100COOL530	**996.00**	PBPQOU5B100COOL530	**996.00**
15 A	2	L6-15	3	PBPQOU4A100COOL615	**948.00**	PBPQOU5A100COOL615	**1048.00**	PBPQOU5B100COOL615	**1048.00**
20 A	2	L6-20	3	PBPQOU4A100COOL620	**948.00**	PBPQOU5A100COOL620	**1048.00**	PBPQOU5B100COOL620	**1048.00**
30 A	2	L6-30	3	PBPQOU4A100COOL630	**958.00**	PBPQOU5A100COOL630	**1058.00**	PBPQOU5B100COOL630	**1058.00**
20 A	3	L21-20	3	PBPQOU4A100COOL2120	**1152.00**	PBPQOU5A100COOL2120	**1252.00**	PBPQOU5B100COOL2120	**1252.00**
30 A	3	L21-30	3	PBPQOU4A100COOL2130	**1162.00**	PBPQOU5A100COOL2130	**1262.00**	PBPQOU5B100COOL2130	**1262.00**
15 A	1	L5-15	6	PBPQOU4A100FOOL515	**946.00**	PBPQOU5A100FOOL515	**1046.00**	PBPQOU5B100FOOL515	**1046.00**
20 A	1	L5-20	6	PBPQOU4A100FOOL520	**946.00**	PBPQOU5A100FOOL520	**1046.00**	PBPQOU5B100FOOL520	**1046.00**
30 A	1	L5-30	6	PBPQOU4A100FOOL530	**956.00**	PBPQOU5A100FOOL530	**1056.00**	PBPQOU5B100FOOL530	**1056.00**
15 A	2	L6-15	6	PBPQOU4A100FOOL615	**1008.00**	PBPQOU5A100FOOL615	**1108.00**	PBPQOU5B100FOOL615	**1108.00**
20 A	2	L6-20	6	PBPQOU4A100FOOL620	**1008.00**	PBPQOU5A100FOOL620	**1108.00**	PBPQOU5B100FOOL620	**1108.00**
30 A	2	L6-30	6	PBPQOU4A100FOOL630	**1018.00**	PBPQOU5A100FOOL630	**1118.00**	PBPQOU5B100FOOL630	**1118.00**
20 A	3	L21-20	6	PBPQOU4A100FOOL2120	**1212.00**	PBPQOU5A100FOOL2120	**1312.00**	PBPQOU5B100FOOL2120	**1312.00**
30 A	3	L21-30	6	PBPQOU4A100FOOL2130	**1222.00**	PBPQOU5A100FOOL2130	**1322.00**	PBPQOU5B100FOOL2130	**1322.00**

Note: See Digest Section 7 for QOU circuit breaker information. Catalog numbers shown have the breaker in the top slot in the front cover and the drop cord in the left position in the base of the unit. Other combinations are available.

▲ Factory assembled units are availalbe using combinations of 1P/2P/3P circuit breakers with other NEMA and IEC type receptacles. Maximum of three drop cords with six breaker spaces available. Consult your local Schneider Electric representative.

NOTE: *Factory Assembled Units with Metering for Powerbus has been moved to page 12-20.*

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Table 12.8: Standard Components—Aluminum

Aluminum

Number of Poles and Voltage	Rating (A)	10'-0" Length		6'-0" Length		Front Elbow▲		Top Elbow▲		Plug-In Tee		Plug-In Tap Box	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W	225	AP30210	**1900.00**	AP3026	**1140.00**	AP302LF( )	**2048.00**	AP302LT( )	**2048.00**	PTT23WG	**3060.00**	PTB302G	**2134.00**
	400	AP30410	**2320.00**	AP3046	**1392.00**	AP304LF( )	**2174.00**	AP304LT( )	**2174.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
	600	AP30610	**2920.00**	AP3066	**1752.00**	AP306LF( )	**2354.00**	AP306LT( )	**2354.00**	PTT43WG	**3060.00**	PBTB306G	**4036.00**
3Ø4W	225	AP50210	**2320.00**	AP5026	**1392.00**	AP502LF( )	**2496.00**	AP502LT( )	**2496.00**	PTT24WG	**3726.00**	PTB502G	**2588.00**
	400	AP50410	**2920.00**	AP5046	**1752.00**	AP504LF( )	**2676.00**	AP504LT( )	**2676.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**
	600	AP50610	**3980.00**	AP5066	**2388.00**	AP506LF( )	**2994.00**	AP506LT( )	**2994.00**	PTT44WG	**3726.00**	PBTB506G	**4566.00**
3Ø3W + Integral Ground Bus	225	AP302G10	**2520.00**	AP302G6	**1512.00**	AP302GLF( )	**2234.00**	AP302GLT( )	**2234.00**	PTT23WG	**3060.00**	PTB302G	**2134.00**
	400	AP304G10	**2940.00**	AP304G6	**1764.00**	AP304GLF( )	**2360.00**	AP304GLT( )	**2360.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
	600	AP306G10	**3580.00**	AP306G6	**2148.00**	AP306GLF( )	**2552.00**	AP306GLT( )	**2552.00**	PTT43WG	**3060.00**	PBTB306G	**4036.00**
3Ø4W + Integral Ground Bus	225	AP502G10	**2940.00**	AP502G6	**1764.00**	AP502GLF( )	**2682.00**	AP502GLT( )	**2682.00**	PTT24WG	**3726.00**	PTB502G	**2588.00**
	400	AP504G10	**3540.00**	AP504G6	**2124.00**	AP504GLF( )	**2862.00**	AP504GLT( )	**2862.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**
	600	AP506G10	**4640.00**	AP506G6	**2784.00**	AP506GLF( )	**3192.00**	AP506GLT( )	**3192.00**	PTT44WG	**3726.00**	PBTB506G	**4566.00**

Table 12.9: Standard Components—Copper

Aluminum

Number of Poles and Voltage	Rating (A)	10'-0" Length		6'-0" Length		Front Elbow▲		Top Elbow▲		Plug-In Tee		Plug-In Tap Box	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W	225	CP30210	**2280.00**	CP3026	**1368.00**	CP302LF( )	**2162.00**	CP302LT( )	**2162.00**	PTT23WG	**3060.00**	PTB302G	**2134.00**
	400	CP30410	**3460.00**	CP3046	**2076.00**	CP304LF( )	**2516.00**	CP304LT( )	**2516.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
	600	CP30610	**4460.00**	CP3066	**2676.00**	CP306LF( )	**2816.00**	CP306LT( )	**2816.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
3Ø4W	225	CP50210	**3060.00**	CP5026	**1836.00**	CP502LF( )	**2718.00**	CP502LT( )	**2718.00**	PTT24WG	**3726.00**	PTB502G	**2588.00**
	400	CP50410	**5080.00**	CP5046	**3048.00**	CP504LF( )	**3324.00**	CP504LT( )	**3324.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**
	600	CP50610	**5780.00**	CP5066	**3468.00**	CP506LF( )	**3468.00**	CP506LT( )	**3534.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**
3Ø3W + Integral Ground Bus	225	CP302G10	**3260.00**	CP302G6	**1956.00**	CP302GLF( )	**2456.00**	CP302GLT( )	**2456.00**	PTT23WG	**3060.00**	PTB302G	**2134.00**
	400	CP304G10	**4440.00**	CP304G6	**2664.00**	CP304GLF( )	**2810.00**	CP304GLT( )	**2810.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
	600	CP306G10	**5480.00**	CP306G6	**3288.00**	CP306GLF( )	**3122.00**	CP306GLT( )	**3122.00**	PTT33WG	**3060.00**	PBTB306G	**4036.00**
3Ø4W + Integral Ground Bus	225	CP502G10	**4040.00**	CP502G6	**2424.00**	CP502GLF( )	**3012.00**	CP502GLT( )	**3012.00**	PTT24WG	**3726.00**	PTB502G	**2588.00**
	400	CP504G10	**6060.00**	CP504G6	**3636.00**	CP504GLF( )	**3618.00**	CP504GLT( )	**3618.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**
	600	CP506G10	**6800.00**	CP506G6	**4080.00**	CP506GLF( )	**3840.00**	CP506GLT( )	**3840.00**	PTT34WG	**3726.00**	PBTB506G	**4566.00**

▲ Add "I" for inside elbow; add "O" for outside elbow.

Table 12.10: Common Accessories

Ampere Rating		Hanger						End Closure		Wall Flange		Floor Flange	
Aluminum	Copper	Flatwise	Vertical	Edgewise	$ Price	Seismic▲	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
225	225	HP2F	HP2V	HP3E	**64.00**	HP2SH	**96.00**	ACP2EC	**446.00**	ACP2WF	**418.00**	ACP2FF	**418.00**
400	400	HP3F	HP3V	HP3E	**64.00**	HP3SH	**96.00**	ACP3EC	**446.00**	ACP3WF	**418.00**	ACP3FF	**418.00**
—	600	HP3F	HP3V	HP3E	**64.00**	HP3SH	**96.00**	ACP3EC	**446.00**	ACP3WF	**418.00**	ACP3FF	**418.00**
600	—	HP5F	HP4V	HP5E	**64.00**	HP5SH	**96.00**	ACP4EC	**446.00**	ACP4WF	**418.00**	ACP4FF	**418.00**

▲ For seismic applications, seismic hangers must be used with horizontal mount flatwise or edgewise busway. Vertical mount busway may use standard fixed or spring hangers.

"Footage and Fittings" Method of Pricing

NOTE: *For fast estimates not requiring catalog numbers, use these charts.*

Table 12.11: Footage

Number of Poles and Voltage	Ampere Rating	Aluminum Busway Footage			Copper Busway Footage		
		Standard	High Short Circuit	Ground Bus	Standard	High Short Circuit	Ground Bus
		$ Price Per Foot	$ Price Per Foot	$ Price Per Foot Adder	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot Adder
3Ø3W 600 V	225	**190.00**	—	**62.00**	**228.00**	—	**98.00**
	400	**232.00**	**292.00**	**62.00**	**346.00**	**404.00**	**98.00**
	600	**292.00**	**346.00**	**66.00**	**446.00**	**500.00**	**102.00**
3Ø4W 277/480 V	225	**232.00**	—	**62.00**	**306.00**	—	**98.00**
	400	**292.00**	**346.00**	**62.00**	**508.00**	**582.00**	**98.00**
	600	**398.00**	**446.00**	**66.00**	**578.00**	**630.00**	**102.00**

Table 12.12: Fittings

Number of Poles and Voltage	Ampere Rating	Flanged End	Elbow Right Angle	Tap Box	Tee	Unfused Reducer	Expansion Fitting	Adapter Cubicle C/B or Fus.	End Closures	Fire Barriers
		$ Price Labor Only	$ Price Labor Only	$ Price Labor Only	$ Price Labor Only	$ Price Labor Only	$ Price Labor Only	$ Price Each	$ Price Each	$ Price Each
3Ø3W 600 V	225	**954.00**	**1478.00**	**2134.00**	**1800.00**	—	**2486.00**	**10432.00**	**446.00**	**764.00**
	400	**1098.00**	**1478.00**	**4036.00**	**1800.00**	**930.00**	**2800.00**	**12312.00**	**446.00**	**764.00**
	600	**1408.00**	**1478.00**	**4036.00**	**1800.00**	**1024.00**	**3038.00**	**18298.00**	**446.00**	**764.00**
3Ø4W 277/480 V	225	**982.00**	**1800.00**	**2588.00**	**2098.00**	—	**2936.00**	**10882.00**	**446.00**	**764.00**
	400	**1128.00**	**1800.00**	**4566.00**	**2098.00**	**1288.00**	**3186.00**	**12700.00**	**446.00**	**764.00**
	600	**1454.00**	**1800.00**	**4566.00**	**2098.00**	**1404.00**	**3634.00**	**18890.00**	**446.00**	**764.00**

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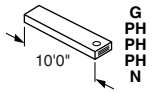
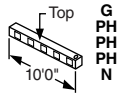
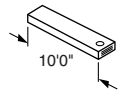
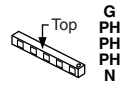
Table 12.13: Straight Lengths (10 ft.) and Plug-in Tap Box

Number of Poles	Ampere Rating	Aluminum				Both Aluminum and Copper		Copper			
											
		10'0" Length				Plug-In Tap Box♦★		10'0" Length			
		Feeder Style▲		Plug-In Style■				Feeder Style▲		Plug-In Style■	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W + Integral Ground Bus	800	AF2308G10ST	3940.00	AP2308G10ST	3940.00	PTB316G ( )	4664.00	CF2308G10ST	6440.00	CP2308G10ST	6440.00
	1000	AF2310G10ST	4400.00	AP2310G10ST	4400.00	PTB316G ( )	4664.00	CF2310G10ST	6820.00	CP2310G10ST	6820.00
	1200	AF2312G10ST	5920.00	AP2312G10ST	5920.00	PTB316G ( )	4664.00	CF2312G10ST	8840.00	CP2312G10ST	8840.00
	1350	AF2313G10ST	6820.00	AP2313G10ST	6820.00	PTB316G ( )	4664.00	CF2313G10ST	10320.00	CP2313G10ST	10320.00
	1600	AF2316G10ST	8380.00	AP2316G10ST	8380.00	PTB316G ( )	4664.00	CF2316G10ST	11860.00	CP2316G10ST	11860.00
	2000	AF2320G10ST	10040.00	AP2320G10ST	10040.00	—	—	CF2320G10ST	15140.00	CP2320G10ST	15140.00
	2500	AF2325G10ST	12220.00	AP2325G10ST	12220.00	—	—	CF2325G10ST	19220.00	CP2325G10ST	19220.00
	3000	AF2330G10ST	13980.00	AP2330G10ST	13980.00	—	—	CF2330G10ST	22880.00	CP2330G10ST	22880.00
	4000	AF2340G10ST	19120.00	AP2340G10ST	19120.00	—	—	CF2340G10ST	29600.00	CP2340G10ST	29600.00
	5000	—	—	—	—	—	—	CF2350G10ST	35700.00	CP2350G10ST	35700.00
3Ø4W + Integral Ground Bus	800	AF2508G10ST	4780.00	AP2508G10ST	4780.00	PTB516G ( )	5324.00	CF2508G10ST	8340.00	CP2508G10ST	8340.00
	1000	AF2510G10ST	5780.00	AP2510G10ST	5780.00	PTB516G( )	5324.00	CF2510G10ST	9860.00	CP2510G10ST	9860.00
	1200	AF2512G10ST	7220.00	AP2512G10ST	7220.00	PTB516G ( )	5324.00	CF2512G10ST	11800.00	CP2512G10ST	11800.00
	1350	AF2513G10ST	8260.00	AP2513G10ST	8260.00	PTB516G ( )	5324.00	CF2513G10ST	13180.00	CP2513G10ST	13180.00
	1600	AF2516G10ST	10000.00	AP2516G10ST	10000.00	PTB516G ( )	5324.00	CF2516G10ST	15940.00	CP2516G10ST	15940.00
	2000	AF2520G10ST	12220.00	AP2520G10ST	12220.00	—	—	CF2520G10ST	19620.00	CP2520G10ST	19620.00
	2500	AF2525G10ST	15000.00	AP2525G10ST	15000.00	—	—	CF2525G10ST	24040.00	CP2525G10ST	24040.00
	3000	AF2530G10ST	17440.00	AP2530G10ST	17440.00	—	—	CF2530G10ST	30620.00	CP2530G10ST	30620.00
	4000	AF2540G10ST	23420.00	AP2540G10ST	23420.00	—	—	CF2540G10ST	38720.00	CP2540G10ST	38720.00
	5000	—	—	—	—	—	—	CF2550G10ST	46900.00	CP2550G10ST	46900.00

▲ Feeder style also available in lengths from 16 to 119 inches.
■ Plug-in style also available in 4, 6, and 8 foot lengths.
♦ Add "(H)" or "(V)" to catalog number based on horizontal or vertical mounting arrangement.
★ Cannot be used for 800 A copper busway.

Table 12.14: Fittings (All Feeder Style)

Number of Poles	Ampere Rating	Aluminum						Copper					
		End Tap Box		Edgewise Elbow		Flatwise Elbow		End Tap Box		Edgewise Elbow		Flatters Elbow	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W with Integral Ground Bus	800	AF2308GETBMB	4744.00	AF2308GLEM11	2186.00	AF2308GLFM11	2186.00	CF2308GETBMB	4953.00	CF2308GLEM11	2645.00	CF2308GLFM11	2645.00
	1000	AF2310GETBMB	4919.00	AF2310GLEM11	2271.00	AF2310GLFM12	2344.00	CF2310GETBMB	5120.00	CF2310GLEM11	2714.00	CF2310GLFM11	2714.00
	1200	AF2312GETBMB	5253.00	AF2312GLEM11	3051.00	AF2312GLFM12	3150.00	CF2312GETBMB	5497.00	CF2312GLEM11	3587.00	CF2312GLFM12	3734.00
	1350	AF2313GETBMB	5444.00	AF2313GLEM11	3216.00	AF2313GLFM13	3444.00	CF2313GETBMB	5736.00	CF2313GLEM11	3858.00	CF2313GLFM12	4030.00
	1600	AF2316GETBMB	5786.00	AF2316GLEM11	3502.00	AF2316GLFM13	3782.00	CF2316GETBMB	6076.00	CF2316GLEM11	4140.00	CF2316GLFM12	4338.00
	2000	AF2320GETBMB	6257.00	AF2320GLEM11	3807.00	AF2320GLFM15	4476.00	CF2320GETBMB	6682.00	CF2320GLEM11	4742.00	CF2320GLFM13	5246.00
	2500	AF2325GETBMB	7430.00	AF2325GLEM11	4206.00	AF2325GLFM17	5428.00	CF2325GETBMB	8014.00	CF2325GLEM11	5490.00	CF2325GLFM15	6771.00
	3000	AF2330GETBMB	8003.00	AF2330GLEM11	4529.00	AF2330GLFM18	6160.00	CF2330GETBMB	8745.00	CF2330GLEM11	6161.00	CF2330GLFM16	8067.00
	4000	AF2340GETBMB	9371.00	AF2340GLEM11	5983.00	AF2340GLFM22	9489.00	CF2340GETBMB	10260.00	CF2340GLEM11	7938.00	CF2340GLFM21	12901.00
	5000	—	—	—	—	—	—	CF2350GETBMB	12869.00	CF2350GLEM11	9023.00	CF2350GLFM21	14973.00
3Ø4W with Integral Ground Bus	800	AF2508GETBMB	5408.00	AF2508GLEM11	2668.00	AF2508GLFM11	2668.00	CF2508GETBMB	5705.00	CF2508GLEM11	3321.00	CF2508GLFM11	3321.00
	1000	AF2510GETBMB	5712.00	AF2510GLEM11	2852.00	AF2510GLFM12	2948.00	CF2510GETBMB	6052.00	CF2510GLEM11	3600.00	CF2510GLFM11	3600.00
	1200	AF2512GETBMB	6052.00	AF2512GLEM11	3802.00	AF2512GLFM12	3922.00	CF2512GETBMB	6433.00	CF2512GLEM11	4641.00	CF2512GLFM12	4838.00
	1350	AF2513GETBMB	6286.00	AF2513GLEM11	3992.00	AF2513GLFM13	4268.00	CF2513GETBMB	6696.00	CF2513GLEM11	4894.00	CF2513GLFM12	5114.00
	1600	AF2516GETBMB	6679.00	AF2516GLEM11	4311.00	AF2516GLFM13	4645.00	CF2516GETBMB	7174.00	CF2516GLEM11	5400.00	CF2516GLFM12	5666.00
	2000	AF2520GETBMB	7412.00	AF2520GLEM11	4718.00	AF2520GLFM15	5533.00	CF2520GETBMB	8029.00	CF2520GLEM11	6075.00	CF2520GLFM13	6729.00
	2500	AF2525GETBMB	9006.00	AF2525GLEM11	5228.00	AF2525GLFM17	6728.00	CF2525GETBMB	9759.00	CF2525GLEM11	6885.00	CF2525GLFM15	8488.00
	3000	AF2530GETBMB	9921.00	AF2530GLEM11	5675.00	AF2530GLFM18	7710.00	CF2530GETBMB	11020.00	CF2530GLEM11	8092.00	CF2530GLFM16	10643.00
	4000	AF2540GETBMB	11628.00	AF2540GLEM11	7212.00	AF2540GLFM22	11505.00	CF2540GETBMB	12903.00	CF2540GLEM11	10017.00	CF2540GLFM21	16470.00
	5000	—	—	—	—	—	—	CF2550GETBMB	14952.00	CF2550GLEM11	11516.00	CF2550GLFM21	19333.00

Table 12.15: Accessories

Ampere Rating		Hangers							End Closure		Wall Flange	
Al	Cu	Horizontal Mount Busway		Vertical Mount Busway		$ Price	Seismic▲	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
		Flatwise	Edgewise	Fixed	Spring							
—	800	HF38F	HF43E	HFV	See Table 12.18 on page 12-8	64.00	HF38SH	96.00	ACF38EC	446.00	ACF38WF	418.00
800	1000	HF43F	HF43E	HFV		64.00	HF43SH	96.00	ACF43EC	446.00	ACF43WF	418.00
1000	1200	HF53F	HF58E	HFV		64.00	HF53SH	96.00	ACF53EC	446.00	ACF53WF	418.00
—	1350	HF58F	HF58E	HFV		64.00	HF58SH	96.00	ACF58EC	446.00	ACF58WF	418.00
1200	—	HF63F	HF67E	HFV		64.00	HF63SH	96.00	ACF63EC	446.00	ACF63WF	418.00
—	1600	HF67F	HF67E	HFV		64.00	HF67SH	96.00	ACF67EC	446.00	ACF67WF	418.00
1350	—	HF73F	HF78E	HFV		64.00	HF73SH	96.00	ACF73EC	446.00	ACF73WF	418.00
—	2000	HF78F	HF78E	HFV		64.00	HF78SH	96.00	ACF78EC	446.00	ACF78WF	418.00
1600	—	HF88F	HF88E	HFV		64.00	HF88SH	96.00	ACF88EC	446.00	ACF88WF	418.00
2000	2500	HF13F	HF13E	HFV		64.00	HF13SH	96.00	ACF13EC	578.00	ACF13WF	418.00
—	3000	HF15F	HF15E	HFV		64.00	HF15SH	96.00	ACF15EC	578.00	ACF15WF	418.00
2500	3200	HF16F	HF16E	HFV		64.00	HF16SH	96.00	ACF17EC	578.00	ACF17WF	418.00
3000	—	HF19F	HF19E	HFV		64.00	HF19SH	96.00	ACF19EC	578.00	ACF19WF	606.00
4000	—	HF26F	HF26E	HFV		64.00	HF26SH	96.00	ACF26EC	732.00	ACF26WF	606.00
—	4000	HF24F	HF24E	HFV		64.00	HF24SH	96.00	ACF24EC	732.00	ACF24WF	606.00
—	5000	HF25F	HF26E	HFV		64.00	HF25SH	96.00	ACF25EC	732.00	ACF25WF	606.00

▲ For seismic applications, seismic hangers must be used with horizontal mount flatwise or edgewise busway. Vertical mount busway may use standard fixed or spring hangers.

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Table 12.16: Footage

Number of Poles and Voltage	Ampere Rating	Aluminum Busway						Copper Busway					
		Indoor Feeder/ Plug-In/Riser		Drip Resistant Feeder/ Plug-in/Riser		Outdoor Feeder		Indoor Feeder/ Plug-in Riser		Drip Resistant Feeder/ Plug-in/Riser		Outdoor Feeder	
		Standard Short Circuit	High Short Circuit	Standard Short Circuit	High Short Circuit	Standard Short Circuit	High Short Circuit	Standard Short Circuit	High Short Circuit	Standard Short Circuit	High Short Circuit	Standard Short Circuit	High Short Circuit
		$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot	$ Price Per Foot
3Ø3W 600 V 50% Integral Ground	800	394.00	440.00	428.00	478.00	462.00	514.00	644.00	708.00	712.00	784.00	778.00	860.00
	1000	440.00	496.00	488.00	548.00	536.00	598.00	682.00	736.00	754.00	814.00	826.00	892.00
	1200	592.00	644.00	654.00	710.00	714.00	774.00	884.00	942.00	974.00	1036.00	1062.00	1130.00
	1350	682.00	732.00	752.00	808.00	822.00	884.00	1032.00	1088.00	1118.00	1182.00	1204.00	1274.00
	1600	838.00	894.00	926.00	990.00	1014.00	1084.00	1186.00	1282.00	1310.00	1416.00	1434.00	1550.00
	2000	1004.00	1062.00	1100.00	1164.00	1194.00	1264.00	1514.00	1594.00	1670.00	1756.00	1824.00	1916.00
	2500	1222.00	1282.00	1350.00	1416.00	1478.00	1550.00	1922.00	1972.00	2112.00	2168.00	2300.00	2362.00
	3000	1398.00	1464.00	1540.00	1612.00	1682.00	1760.00	2288.00	2362.00	2520.00	2602.00	2752.00	2842.00
	3200	1748.00	1830.00	1925.00	2015.00	2103.00	2200.00	2608.00	2692.00	2872.00	2966.00	3137.00	3240.00
	4000	1912.00	2008.00	2106.00	2212.00	2300.00	2416.00	2978.00	3070.00	3274.00	3376.00	3570.00	3682.00
	5000	—	—	—	—	—	—	3570.00	3686.00	3928.00	4054.00	4284.00	4420.00
3Ø4W 277/480 V 50% Integral Ground	800	478.00	528.00	520.00	584.00	562.00	640.00	834.00	918.00	932.00	1024.00	1028.00	1130.00
	1000	578.00	628.00	632.00	686.00	686.00	744.00	986.00	1046.00	1084.00	1152.00	1182.00	1256.00
	1200	722.00	772.00	796.00	852.00	870.00	930.00	1180.00	1252.00	1298.00	1378.00	1416.00	1504.00
	1350	826.00	884.00	914.00	978.00	1000.00	1070.00	1318.00	1394.00	1452.00	1538.00	1584.00	1680.00
	1600	1000.00	1046.00	1094.00	1144.00	1186.00	1240.00	1594.00	1680.00	1754.00	1846.00	1912.00	2012.00
	2000	1222.00	1282.00	1350.00	1416.00	1478.00	1550.00	1962.00	2024.00	2162.00	2230.00	2362.00	2434.00
	2500	1500.00	1546.00	1648.00	1698.00	1796.00	1848.00	2404.00	2482.00	2648.00	2734.00	2892.00	2986.00
	3000	1744.00	1810.00	1914.00	1986.00	2084.00	2162.00	3062.00	3124.00	3368.00	3436.00	3672.00	3746.00
	3200	—	—	—	—	—	—	3491.00	3561.00	3840.00	3917.00	4186.00	4270.00
	4000	2342.00	2430.00	2572.00	2672.00	2802.00	2912.00	3872.00	3950.00	4256.00	4340.00	4640.00	4730.00
	5000	—	—	—	—	—	—	4690.00	4784.00	5156.00	5258.00	5622.00	5732.00

Pricing Instructions For “Factory Assembled” Busway Systems (or Components)

Standard Straight Lengths

The basic component of a busway system is a straight section with a “joint pak” factory-affixed to one end. Plug-in busway is available in standard lengths of 4, 6, 8, and 10 feet. Feeder busway is available in lengths from 16” to 120” in increments of 1”.

Riser Busway

We also offer a “Riser” Plug-In busway with openings on one side only for riser installations. This busway offers the same short circuit ratings as our standard plug-in busway.

Indoor Drip Resistant and IP54 Splash Resistant Busway

These water resistant features are available as an option for indoor plug-in and feeder busway. Price the drip resistant busway using the appropriate per foot price. Price the IP54 splash resistant busway using the outdoor per foot price.

Outdoor Construction (Feeder Busway Only)

Besides the additional charge for outdoor busway, you must also add a charge for a weather seal if the busway passes through a building wall or roof from an interior to an exterior space (found under Miscellaneous Additions and Accessories on page 12-8). Please indicate the thickness of the wall, roof or floor when entering order. Add the “labor only” price for fittings and special features per general pricing instruction.

High Short Circuit Bracing

I-Line busway is available with either standard short circuit bracing or high short circuit bracing. Table 12.19 on 12-8 lists maximum short circuit ratings for each busway type and rating.

General Pricing Instructions

- Prepare a layout sketch of the busway run showing:
  - — All dimensions in feet and inches
  - — All wall and floor locations and thicknesses
  - — All fittings (use top of page 12-7 as a checklist)
- Add all dimensions together. Round up to the next foot.
- Multiply this total by the appropriate price per foot according to the tables above.
- To this, add the “labor only” charges for all fittings from page 12-7.
- Add hangers per page 12-8 (quantities explained below)
- Add for any other unit price items such as end closures, wall flanges, or special lug requirements from page 12-8.

Hangers

Hangers for the I-Line II busway should be priced from the table on page 12-8. Indoor horizontal busway requires one hanger for every 10 feet of busway. Vertical indoor busway requires one hanger for every 16 feet. Outdoor feeder busway requires one hanger for every 5 feet in either vertical or horizontal mounting.

Elbows

The elbow “labor only” charge applies to all types of 90° elbows within a particular rating of busway. The charge does not include any busway footage (i.e. a charge for the appropriate amount of busway footage would have to be added to the “labor only” charge to obtain a “complete device” charge). If elbow is other than 90°, double the labor only charge.

Tee

The labor charge for tees shown in applies to all factory assembled types of 90° tee fittings within a given rating. Dimensions and catalog number suffix of flatwise tee fittings will be found in the Class 5600 Manual. Refer to factory for edgewise tee dimensions. Crosses are also available.

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Table 12.17: Fittings

Number of Poles and Voltage	Ampere Rating	"Labor Only" Charges for Each Component (Copper or Aluminum)												
		Elbow Right Angle	Elbow Other Than 90°	Tee	Cross	Flanged End	Tap Box or Service Head	Unfused Reducer	Fused or C/B Cubicle	Expansion FTG.	Phase Transition	Bussed XFMR Conn.	Transformer Taps	
													One 3Ø XFMR Y or ▲	Three 1Ø XFMRS Y or ▲
3Ø3W 600 V 50% Ground	800	1464.00	2928.00	1792.00	3584.00	1512.00	4416.00	1334.00	20826.00	3950.00	10890.00	11164.00	1968.00	6440.00
	1000	1464.00	2928.00	1792.00	3584.00	1722.00	4552.00	1512.00	24108.00	4214.00	11158.00	12112.00	2284.00	6636.00
	1200	1966.00	3932.00	2482.00	4964.00	1900.00	4760.00	2514.00	28938.00	4330.00	11274.00	13270.00	2492.00	6944.00
	1350	1966.00	3932.00	2482.00	4964.00	2016.00	4876.00	3256.00	—	4396.00	11340.00	13690.00	2636.00	7112.00
	1600	1966.00	3932.00	2482.00	4964.00	2202.00	5088.00	3610.00	35192.00	5926.00	12872.00	14654.00	2918.00	7420.00
	2000	1966.00	3932.00	2482.00	4964.00	2624.00	5420.00	4578.00	41174.00	6468.00	13404.00	15816.00	3342.00	7904.00
	2500	1966.00	3932.00	2482.00	4964.00	3134.00	6412.00	4768.00	—	6944.00	13886.00	17594.00	3966.00	9144.00
	3000	1966.00	3932.00	2482.00	4964.00	3706.00	6838.00	7094.00	—	8704.00	15646.00	19562.00	4652.00	10602.00
	3200	2478.00	4956.00	2918.00	5836.00	4447.00	7612.00	8512.00	—	10229.00	17172.00	23474.00	5304.00	11891.00
	4000	2478.00	4956.00	2918.00	5836.00	4606.00	7778.00	8954.00	—	10556.00	17500.00	25188.00	5444.00	12168.00
	5000	2478.00	4956.00	2918.00	5836.00	5384.00	9894.00	11084.00	—	11092.00	18030.00	32432.00	5950.00	14072.00
3Ø4W 277/480 V 50% Ground	800	1792.00	3584.00	2084.00	4168.00	1598.00	5010.00	1722.00	21232.00	4358.00	11296.00	12514.00	2066.00	6684.00
	1000	1792.00	3584.00	2084.00	4168.00	1908.00	5230.00	2024.00	24854.00	4958.00	11902.00	13700.00	2458.00	6982.00
	1200	2478.00	4956.00	2918.00	5836.00	2046.00	5450.00	3454.00	30526.00	5916.00	12858.00	15076.00	2668.00	7278.00
	1350	2478.00	4956.00	2918.00	5836.00	2144.00	5598.00	4404.00	—	6552.00	13496.00	15566.00	2806.00	7470.00
	1600	2478.00	4956.00	2918.00	5836.00	2482.00	5846.00	4778.00	37208.00	7944.00	14882.00	16890.00	3186.00	7802.00
	2000	2478.00	4956.00	2918.00	5836.00	2880.00	6394.00	6422.00	43144.00	8436.00	15380.00	17996.00	3606.00	8532.00
	2500	2478.00	4956.00	2918.00	5836.00	3486.00	7756.00	7932.00	—	9126.00	16070.00	20380.00	4326.00	9960.00
	3000	2478.00	4956.00	2918.00	5836.00	4130.00	8468.00	9538.00	—	11978.00	18922.00	22350.00	5074.00	11622.00
	3200	2918.00	5836.00	3412.00	6824.00	4956.00	9463.00	11445.00	—	13457.00	20397.00	26820.00	5795.00	13139.00
	4000	2918.00	5836.00	3412.00	6824.00	5136.00	9676.00	12754.00	—	13774.00	20714.00	29248.00	5950.00	13464.00
	5000	2918.00	5836.00	3412.00	6824.00	6416.00	11044.00	14984.00	—	14484.00	21428.00	36712.00	7420.00	15216.00

Indoor Tap Boxes

Feeder cable tap boxes are used at the end (-ETBMB) or center (-CTB) of a busway run and incorporate a short section of busway into their construction. See Catalog Class 5600 for the length of the tap box then add the "labor only" charges shown above to complete the price.

Plug-in cable tap boxes are plugged into the side of the busway (at any opening except the very last opening of a run). The price shown in the table on page 12-5 is the complete device price. No "labor only" charge is required.

Lugs other than standard mechanical lugs may be selected from the table on page 12-8.

Service Heads

Service heads are of outdoor construction and include Square D™ brand standard lugs. Price footage to end of busway run including dimension of service head. Add service head labor charge.

Unfused Reducer

Unfused reducers are used to reduce from a higher amperage busway to a lower amperage. Price each rating of busway to the centerline of reducer and include the "labor only" price of the higher rating.

NOTE: *The National Electric Code does not allow the use of unfused reducers in vertical riser installations. Refer to the NEC for restrictions in industrial installations.*

Fused or Circuit Breaker Cubicle

These are used as in-line overcurrent protection devices. They can be used in conjunction with an unfused reducer to offer a device which reduces a run of busway in ampacity and offers overcurrent protection.

I-Line to I-Line II Adapter

This adapter is used to join I-Line II busway (800 A–5000 A) to existing installations of original I-Line busway. If connecting to an existing "slot end" of original I-Line, use a "bolt end" adapter (-12B), and vice versa. Price as four feet of busway for 800 through 5000 A busway.

Expansion Fittings

Expansion fitting labor only charge does not include busway footage. The expansion fitting is built into a 3 ft. – 4 in. straight length for 800 A–5000 A and a 5 feet – 0 inch straight length for 225 A–600 A. Limit of expansion or contraction is ±1-1/2 inches. Not available in outdoor construction.

Bussed Transformer Connection

A bussed transformer connection is used when the busway physically attaches (other than cable) to a three phase transformer. Price busway footage to the edge of transformer L.V. or H.V. terminal. To this, add labor only charge for a "bussed transformer connection." For power company vault termination charges, consult the factory.

Transformer Taps

Transformer taps are used to make cable connection to transformers. Calculate footage price to end of busway. Use standard dimensions. Price of taps includes lugs; if lugs other than standard Square D brand lugs are required, add charges from page 12-8. Note that taps need **NOT** be located directly above transformers for cable connections.

Finger Protection to IP2X

This feature provides improved protection from accidental contact with live parts during insertion and removal of plug-in units. This feature meets the IP2X rating as defined by IEC529 standard. (Pricing on page 12-8.)

Connection to Competitive Busway

Consult your nearest Schneider Electric sales office.

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Miscellaneous Additions and Accessories

Table 12.18: Additions and Accessories

Description			$ Price
Integral Weather Seal Vapor Barrier (Required when busway passes through an exterior wall or roof)			**764.00**
Roof Collar (Required when busway penetrates an exterior roof)			**870.00**
Roof Flange Kit (Optional when busway penetrates an exterior roof)			**2346.00**
Hanger, Horizontal Flatwise and Edgewise (See "Table 12.15: Accessories" on page 5.)			**64.00**
Hangers, Vertical Fixed (HF-V)			**64.00**
Hangers, Vertical Spring			
Aluminum Busway	**Copper Busway**		
• 800 A through 1200 A	• 800 A through 1200 A	HFVS1	**148.00**
• 2000 A through 2500 A	• 1350 A through 2000 A	HFVS2	**292.00**
• 3000 A through 4000 A	• 2500 A through 5000 A	HFVS8	**292.00**
Lugs – Other than Square D Standard		each lug	**70.00**
Lugs – Square D Standard added to flanged end		each lug	**70.00**
Sway Brace Collar HP1SBC			**82.00**
Assembly Tool AT2			**N/C**
Finger Protection to IP2X (For each plug-in opening) Plug-in Busway only		per foot	**17.00**

Note: Finger protection can be ordered on I-Line II (800–5000 A) plug-in busway only.

Electrical Data for I-Line II Busway

Standards:	UL857 (File Number E22182); CSA C22.2 No. 27-1994 (File Number LL-61778); IEC 439 Part 2
Systems:	AC–3Ø3W, 3Ø4W, 1Ø2W, 1Ø3W. DC–2-pole. All neutrals are 100% capacity.
Voltage:	600 volts AC/DC, 50 Hz and 60 Hz
Integral Ground:	50% capacity as standard for 800 A to 5000 A, as an option on 225 A to 600 A
Enclosure:	Indoor, indoor drip resistant and outdoor (indoor drip resistant and outdoor are available in I-Line II [800–5000 A] busway only)

Table 12.19: Short Circuit Ratings: UL 3 Cycle▲Test (KA, RMS Symmetrical)

Ampere Rating	Aluminum				Copper			
	AOF2 AF2	AOFH2 AFH2	AP AP2/AR2	APH APH2/ARH2	COF2 CF2	COFH2 CFH2	CP CP2/CR2	CPH CPH2/CRH2
225	—	—	22	—	—	—	22	—
400	—	—	22	42	—	—	22	42
600	—	—	22	42	—	—	22	42
800	50	85	50	75	50	85	50	75
1000	50	100	50	100	50	85	50	75
1200	50	100	50	100	50	100	50	100
1350	50	100	50	100	50	100	50	100
1600	50	100	50	100	50	100	50	100
2000	100	100	125	150	50	100	65	100
2500	100	150	125	150	100	150	125	150
3000	100	150	125	150	100	150	125	150
3200	—	—	—	—	100	150	125	150
4000	150	200	200	—	150	200	200	—
5000	—	—	—	—	150	200	200	—

▲ 6 cycle and 30 cycle ratings are available. Please reference Catalog **5600CT9101**.

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"Hook-Swing" Mounting

Table 12.20: Fusible Plug-In Units

Ampere Rating	Type of Connection	240 Vac 3-Pole, 3 Fuse + G		120/208 Vac, (240 Vac Max.) 4-Pole, 3 Fuse + G		600 Vac 3-Pole, 3 Fuse + G		277/480 Vac, (600 Vac Max.) 4-Pole, 3 Fuse + G	
		Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
30	Plug-in	PQ3203G	**972.00**	PQ4203G	**1136.00**	PQ3603G	**1042.00**	PQ4603G	**1182.00**
60		PQ3206G	**1042.00**	PQ4206G	**1182.00**	PQ3606G	**1110.00**	PQ4606G	**1230.00**
100		PQ3210G	**1478.00**	PQ4210G	**1604.00**	PQ3610G	**1512.00**	PQ4610G	**1734.00**
200		PQ3220G	**2462.00**	PQ4220G	**2728.00**	PQ3620G	**2566.00**	PQ4620G	**2866.00**
200▲		PS3220G▲	**2462.00**	PS4220G▲	**2728.00**	PS3620G▲	**2566.00**	PS4620G▲	**2866.00**
400		PBQ3640G■	**6442.00**	PBQ4640G■	**6996.00**	PBQ3640G■	**6442.00**	PBQ4640G■	**6996.00**
600		PBQ3660G■	**9224.00**	PBQ4660G■	**10090.00**	PBQ3660G■	**9224.00**	PBQ4660G■	**10090.00**
800	Bolt-on	—	—	—	—	PTQ36080G( )♦	**16014.00**	PTQ46080G( )♦	**19312.00**
1000		—	—	—	—	PTQ36100G( )♦	**18810.00**	PTQ46100G( )♦	**19436.00**
1200		—	—	—	—	PTQ36120G( )♦	**30042.00**	PTQ46120G( )♦	**30168.00**

Class J Fuses – Provisions for installing Class J fuses are included in 30 through 600 A fusible devices. Conversion to Class J fuse spacing requires relocating the load side fuse base assembly from standard Class H fuse location to an alternate position in the enclosure.

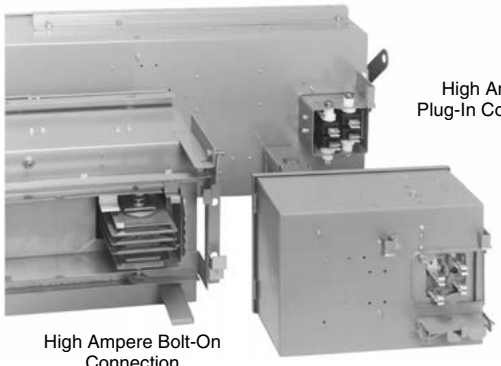
▲ For use on vertical riser applications only.

■ For vertical riser applications order auxiliary mounting kit—Catalog Number PBQ4060RMK. (Price **$300.**)

♦ This device uses bolt-on connection. It may be used only on plug-in busway with same number of poles. Add suffix (H) for horizontal applications and suffix (V) for vertical applications. Not for use on 800 A copper busway.

Note: For IP54 splash resistant construction, add "M54" suffix. IP54 price adder is 15%.

Table 12.21: Class R Fuse Kits★



High Ampere Plug-In Connection

High Ampere Bolt-On Connection

Low Ampere Plug-In Connection

Switch Size (A)	Voltage Rating	Kit★ Catalog No.	$ Price
30	250 V▼ 600 V▼	QMB30R QMB36R	**31.20** **32.60**
60	250 V▼ 600 V▼	QMB36R QMB60R	**32.60** **32.60**
100 200	All	HRK1020	**31.80**
400 600	All	QMB4060R	**74.00**

Class R Fuse Kits when installed reject all but class R fuses.

★ Kit must be field installed.

▼ Contains parts to convert two units.

Table 12.22: Hooksticks

Length	Catalog No.	$ Price	Length	Catalog No.	$ Price
8'	515608	**452.00**	14'	515614	**778.00**

Table 12.23: F-Frame Circuit Breaker Plug-in Units

Circuit Breaker Frame	Trip Rating (A)	240 Vac 3-Pole + G		120/208 Vac (240 Vac Max.) 3Ø4W + G		480 Vac 3-Pole + G		600 Vac 3-Pole + G		277/480 Vac (600 Vac Max.) 3Ø4W + G	
		Catalog No.	Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
FA	15	PFA32015G	**1456.00**	PFA32015GN	**1640.00**	PFA34015G	**1776.00**	PFA36015G	**1930.00**	PFA36015GN	**2111.00**
	20	PFA32020G	**1456.00**	PFA32020GN	**1640.00**	PFA34020G	**1776.00**	PFA36020G	**1930.00**	PFA36020GN	**2111.00**
	30	PFA32030G	**1456.00**	PFA32030GN	**1640.00**	PFA34030G	**1776.00**	PFA36030G	**1930.00**	PFA36030GN	**2111.00**
	40	PFA32040G	**1456.00**	PFA32040GN	**1640.00**	PFA34040G	**1776.00**	PFA36040G	**1930.00**	PFA36040GN	**2111.00**
	50	PFA32050G	**1456.00**	PFA32050GN	**1640.00**	PFA34050G	**1776.00**	PFA36050G	**1930.00**	PFA36050GN	**2111.00**
	60	PFA32060G	**1456.00**	PFA32060GN	**1640.00**	PFA34060G	**1776.00**	PFA36060G	**1930.00**	PFA36060GN	**2111.00**
	70	PFA32070G	**1706.00**	PFA32070GN	**1894.00**	PFA34070G	**1942.00**	PFA36070G	**2132.00**	PFA36070GN	**2317.00**
	80	PFA32080G	**1706.00**	PFA32080GN	**1894.00**	PFA34080G	**1942.00**	PFA36080G	**2132.00**	PFA36080GN	**2317.00**
	90	PFA32090G	**1706.00**	PFA32090GN	**1894.00**	PFA34090G	**1942.00**	PFA36090G	**2132.00**	PFA36090GN	**2317.00**
	100	PFA32100G	**1706.00**	PFA32100GN	**1894.00**	PFA34100G	**1942.00**	PFA36100G	**2132.00**	PFA360100GN	**2317.00**
FH	15	—	—	—	—	—	—	PFH36015G	**2394.00**	PFH36015GN	**2578.00**
	20	—	—	—	—	—	—	PFH36020G	**2394.00**	PFH36020GN	**2578.00**
	30	—	—	—	—	—	—	PFH36030G	**2394.00**	PFH36030GN	**2578.00**
	40	—	—	—	—	—	—	PFH36040G	**2394.00**	PFH36040GN	**2578.00**
	50	—	—	—	—	—	—	PFH36050G	**2394.00**	PFH36050GN	**2578.00**
	60	—	—	—	—	—	—	PFH36060G	**2394.00**	PFH36060GN	**2578.00**
	70	—	—	—	—	—	—	PFH36070G	**2582.00**	PFH36070GN	**2784.00**
	80	—	—	—	—	—	—	PFH36080G	**2582.00**	PFH36080GN	**2784.00**
	90	—	—	—	—	—	—	PFH36090G	**2582.00**	PFH36090GN	**2784.00**
	100	—	—	—	—	—	—	PFH36100G	**2582.00**	PFH360100GN	**2784.00**

▲ All these devices use plug-in connections.

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Table 12.24: Current Limiting Circuit Breaker Plug-in Units

Breaker Frame	Trip Rating Ampere	480 Vac 3-Pole + G		277/480 Vac 3Ø4W + G	
		Catalog No. ▲	$ Price	Catalog No. ▲	$ Price
FI	20	PFI34020G	5982.00	PFI34020GN	6152.00
	30	PFI34030G	5982.00	PFI34030GN	6152.00
	40	PFI34040G	5982.00	PFI34040GN	6152.00
	50	PFI34050G	5982.00	PFI34050GN	6152.00
	60	PFI34060G	5982.00	PFI34060GN	6152.00
	70	PFI34070G	5982.00	PFI34070GN	6152.00
	80	PFI34080G	5982.00	PFI34080GN	6152.00
	90	PFI34090G	5982.00	PFI34090GN	6152.00
	100	PFI34100G	5982.00	PFI34100GN	6152.00
KI	125	PKI34125G	12438.00	PKI34125GN	12920.00
	150	PKI34150G	12438.00	PKI34150GN	12920.00
	175	PKI34175G	12438.00	PKI34175GN	12920.00
	200	PKI34200G	12438.00	PKI34200GN	12920.00
	225	PKI34225G	12438.00	PKI34225GN	12920.00
	250	PKI34250G	14274.00	PKI34250GN	14826.00
LI	300	PBLI34300G	17430.00	PBLI34300GN	18078.00
	350	PBLI34350G	17430.00	PBLI34350GN	18078.00
	400	PBLI34400G	17430.00	PBLI34400GN	18078.00
	500	PBLI34500G	25224.00	PBLI34500GN	26154.00
	600	PBLI34600G	25224.00	PBLI34600GN	26154.00
LXI■	300	PBLXI36300G	26606.00	PBLXI36300GN	27254.00
	350	PBLXI36350G	26606.00	PBLXI36350GN	27254.00
	400	PBLXI36400G	26606.00	PBLXI36400GN	27254.00
	500	PBLXI36500G	37712.00	PBLXI36500GN	38642.00
	600	PBLXI36600G	37712.00	PBLXI36600GN	38642.00

▲ All these devices use plug-in connections.
■ LXI circuit breakers are rated up to 600 Vac max. and are supplied with -LSI (long time, short time, instantaneous pickup) adjustable trip unit functions. Contact your local Schneider Electric field office for pricing if alternate trip unit functions are required.

Surge Protective Device Plug-In Units

All Busway SPD Plug-In Units include as standard:

- Individually Fused Modules
- Circuit Breaker Disconnect
- Cover Mounted Diagnostic Panel
- EMI/RFI Filter
- Audible Alarm with Test/Disable/Enable

Table 12.25: Surge Capacity

System Voltage	60,000 Amperes Per Phase		240,000 Amperes Per Phase	
	Catalog Number	$ Price	Catalog Number	$ Price
208Y/120 Vac, 3Ø4W/Grd.	PIU2IMA16	4472.00	PIU2IMA24	6407.00
240Y/120 Vac, 3Ø4W/Grd.	PIU3IMA16	4472.00	PIU3IMA24	6407.00
480Y/277 Vac, 3Ø4W/Grd.	PIU4IMA16	4740.00	PIU4IMA24	6792.00
600Y/347 Vac, 3Ø4W/Grd.	PIU8IMA16	4919.00	PIU8IMA24	7048.00

Note: For IP54 splash resistant construction, add an "M54" suffix. The IP54 price adder is 15%.

Table 12.26: Options

Description	When Required Add Suffix to Catalog Number	$ Price
Surge Counter and Dry Contacts	—	STD.
Remote Monitor with Dry Contacts	M	788.00

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Table 12.27: H-Frame Circuit Breaker Plug-in Units—Standard (80%) Rated—3Ø3W

Trip Rating Ampere	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W + G, 600 Vac 50/60 Hz								
15	PHD36015G	**1930.00**	PHG36015G	**2394.00**	PHJ36015G	**3184.00**	PHL36015G	**5171.00**
20	PHD36020G	**1930.00**	PHG36020G	**2394.00**	PHJ36020G	**3184.00**	PHL36020G	**5171.00**
30	PHD36030G	**1930.00**	PHG36030G	**2394.00**	PHJ36030G	**3184.00**	PHL36030G	**5171.00**
40	PHD36040G	**1930.00**	PHG36040G	**2394.00**	PHJ36040G	**3184.00**	PHL36040G	**5171.00**
50	PHD36050G	**1930.00**	PHG36050G	**2394.00**	PHJ36050G	**3184.00**	PHL36050G	**5171.00**
60	PHD36060G	**1930.00**	PHG36060G	**2394.00**	PHJ36060G	**3184.00**	PHL36060G	**5171.00**
70	PHD36070G	**2132.00**	PHG36070G	**2582.00**	PHJ36070G	**3718.00**	PHL36070G	**5715.00**
80	PHD36080G	**2132.00**	PHG36080G	**2582.00**	PHJ36080G	**3718.00**	PHL36080G	**5715.00**
90	PHD36090G	**2132.00**	PHG36090G	**2582.00**	PHJ36090G	**3718.00**	PHL36090G	**5715.00**
100	PHD36100G	**2132.00**	PHG36100G	**2582.00**	PHJ36100G	**3718.00**	PHL36100G	**5715.00**
125	PHD36125G	**4246.00**	PHG36125G	**6031.00**	PHJ36125G	**8266.00**	PHL36125G	**9987.00**
150	PHD36150G	**4246.00**	PHG36150G	**6031.00**	PHJ36150G	**8266.00**	PHL36150G	**9987.00**

Table 12.28: H-Frame Circuit Breaker Plug-in Units—Standard (80%) Rated—3Ø4W

Trip Rating Ampere	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø4W + G, 277/480 Vac (600 Vac Max.) 50/60 Hz								
15	PHD36015GN	**2111.00**	PHG36015GN	**2578.00**	PHJ36015GN	**3428.00**	PHL36015GN	**5318.00**
20	PHD36020GN	**2111.00**	PHG36020GN	**2578.00**	PHJ36020GN	**3428.00**	PHL36020GN	**5318.00**
30	PHD36030GN	**2111.00**	PHG36030GN	**2578.00**	PHJ36030GN	**3428.00**	PHL36030GN	**5318.00**
40	PHD36040GN	**2111.00**	PHG36040GN	**2578.00**	PHJ36040GN	**3428.00**	PHL36040GN	**5318.00**
50	PHD36050GN	**2111.00**	PHG36050GN	**2578.00**	PHJ36050GN	**3428.00**	PHL36050GN	**5318.00**
60	PHD36060GN	**2111.00**	PHG36060GN	**2578.00**	PHJ36060GN	**3428.00**	PHL36060GN	**5318.00**
70	PHD36070GN	**2317.00**	PHG36070GN	**2784.00**	PHJ36070GN	**4008.00**	PHL36070GN	**5878.00**
80	PHD36080GN	**2317.00**	PHG36080GN	**2784.00**	PHJ36080GN	**4008.00**	PHL36080GN	**5878.00**
90	PHD36090GN	**2317.00**	PHG36090GN	**2784.00**	PHJ36090GN	**4008.00**	PHL36090GN	**5878.00**
100	PHD36100GN	**2317.00**	PHG36100GN	**2784.00**	PHJ36100GN	**4008.00**	PHL36100GN	**5878.00**
125	PHD36125GN	**4478.00**	PHG36125GN	**6267.00**	PHJ36125GN	**8510.00**	PHL36125GN	**10254.00**
150	PHD36150GN	**4478.00**	PHG36150GN	**6267.00**	PHJ36150GN	**8510.00**	PHL36150GN	**10254.00**

Table 12.29: J-Frame Circuit Breaker Plug-in Units—Standard (80%) Rated—3Ø3W

Trip Rating Ampere	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø3W + G, 600 Vac 50/60 Hz								
175	PJD36175G	**4618.00**	PJG36175G	**8056.00**	PJJ36175G	**9424.00**	PJL36175G	**11581.00**
200	PJD36200G	**4618.00**	PJG36200G	**8056.00**	PJJ36200G	**9424.00**	PJL36200G	**11581.00**
225	PJD36225G	**4618.00**	PJG36225G	**8056.00**	PJJ36225G	**9424.00**	PJL36225G	**11581.00**
250	PJD36250G	**6380.00**	PJG36250G	**9834.00**	PJJ36250G	**10816.00**	PJL36250G	**13292.00**

Table 12.30: J-Frame Circuit Breaker Plug-in Units—Standard (80%) Rated—3Ø4W

Trip Rating Ampere	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
3Ø4W + G, 277/480 Vac (600 Vac Max.) 50/60 Hz								
175	PJD36175GN	**4950.00**	PJG36175GN	**8366.00**	PJJ36175GN	**9788.00**	PJL36175GN	**11910.00**
200	PJD36200GN	**4950.00**	PJG36200GN	**8366.00**	PJJ36200GN	**9788.00**	PJL36200GN	**11910.00**
225	PJD36225GN	**4950.00**	PJG36225GN	**8366.00**	PJJ36225GN	**9788.00**	PJL36225GN	**11910.00**
250	PJD36250GN	**6712.00**	PJG36250GN	**10144.00**	PJJ36250GN	**11158.00**	PJL36250GN	**13669.00**

▲ All these devices use plug-in connections.

Note: For IP54 splash resistant construction, add an "M54" suffix. The IP54 price adder is 15%.

Table 12.31: Circuit Breaker Interrupting Ratings

Interrupting Ratings (kA)	D	G	J	L
240 V	25	65	100	125
480 V	18	35	65	100
600 V	14	18	25	50

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Table 12.32: H- and J-Frame Circuit Breaker Plug-in Units with Electronic Trip—Standard (80%) Rated—3Ø3W New!

Trip Rating Ampere	Trip Function▲	Trip Unit	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
			Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price
Micrologic Standard Trip Unit										
3Ø3W + G, 600 Vac 50/60 Hz										
60	LI	3.2	PHD36060GU31X	2113.00	PHG36060GU31X	2577.00	PHJ36060GU31X	3367.00	PHL36060GU31X	5354.00
100			PHD36100GU31X	2315.00	PHG36100GU31X	2765.00	PHJ36100GU31X	3901.00	PHL36100GU31X	5898.00
150			PHD36150GU31X	4429.00	PHG36150GU31X	6214.00	PHJ36150GU31X	8449.00	PHL36150GU31X	10170.00
250			PJD36250GU31X	6641.00	PJG36250GU31X	10095.00	PJJ36250GU31X	11077.00	PJL36250GU31X	13553.00
60	LSI	3.2 S	PHD36060GU33X	2309.00	PHG36060GU33X	2773.00	PHJ36060GU33X	3563.00	PHL36060GU33X	5550.00
100			PHD36100GU33X	2511.00	PHG36100GU33X	2961.00	PHJ36100GU33X	4097.00	PHL36100GU33X	6094.00
150			PHD36150GU33X	4625.00	PHG36150GU33X	6410.00	PHJ36150GU33X	8645.00	PHL36150GU33X	10366.00
250			PJD36250GU33X	6920.00	PJG36250GU33X	10374.00	PJJ36250GU33X	11356.00	PJL36250GU33X	13832.00
Micrologic Ammeter Trip Unit										
3Ø3W + G, 600 Vac 50/60 Hz										
60	LSI	5.2 A	PHD36060GU43X	2968.00	PHG36060GU43X	3432.00	PHJ36060GU43X	4222.00	PHL36060GU43X	6209.00
100			PHD36100GU43X	3170.00	PHG36100GU43X	3620.00	PHJ36100GU43X	4756.00	PHL36100GU43X	6753.00
150			PHD36150GU43X	5284.00	PHG36150GU43X	7069.00	PHJ36150GU43X	9304.00	PHL36150GU43X	11025.00
250			PJD36250GU43X	7860.00	PJG36250GU43X	11314.00	PJJ36250GU43X	12296.00	PJL36250GU43X	14772.00

Table 12.33: H- and J-Frame Circuit Breaker Plug-in Units with Electronic Trip—Standard (80%) Rated—3Ø4W New!

Trip Rating Ampere	Trip Function ▲	Trip Unit	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
			Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price
Micrologic Standard Trip Unit										
3Ø4W + G, 600 Vac 50/60 Hz										
60	LI	3.2	PHD36060GNU31X	2294.00	PHG36060GNU31X	2761.00	PHJ36060GNU31X	3611.00	PHL36060GNU31X	5501.00
100			PHD36100GNU31X	2500.00	PHG36100GNU31X	2967.00	PHJ36100GNU31X	4191.00	PHL36100GNU31X	6061.00
150			PHD36150GNU31X	4661.00	PHG36150GNU31X	6450.00	PHJ36150GNU31X	8693.00	PHL36150GNU31X	10437.00
250			PJD36250GNU31X	6973.00	PJG36250GNU31X	10405.00	PJJ36250GNU31X	11419.00	PJL36250GNU31X	13930.00
60	LSI	3.2 S	PHD36060GNU33X	2490.00	PHG36060GNU33X	2957.00	PHJ36060GNU33X	3807.00	PHL36060GNU33X	5697.00
100			PHD36100GNU33X	2696.00	PHG36100GNU33X	3163.00	PHJ36100GNU33X	4387.00	PHL36100GNU33X	6257.00
150			PHD36150GNU33X	4857.00	PHG36150GNU33X	6646.00	PHJ36150GNU33X	8889.00	PHL36150GNU33X	10633.00
250			PJD36250GNU33X	7252.00	PJG36250GNU33X	10684.00	PJJ36250GNU33X	11698.00	PJL36250GNU33X	14209.00
Micrologic Ammeter Trip Unit										
3Ø4W + G, 600 Vac 50/60 Hz										
60	LSI	5.2 A	PHD36060GNU43X	3149.00	PHG36060GNU43X	3616.00	PHJ36060GNU43X	4466.00	PHL36060GNU43X	6356.00
100			PHD36100GNU43X	3355.00	PHG36100GNU43X	3822.00	PHJ36100GNU43X	5046.00	PHL36100GNU43X	6916.00
150			PHD36150GNU43X	5516.00	PHG36150GNU43X	7305.00	PHJ36150GNU43X	9548.00	PHL36150GNU43X	11292.00
250			PJD36250GNU43X	8192.00	PJG36250GNU43X	11624.00	PJJ36250GNU43X	12638.00	PJL36250GNU43X	15149.00

▲ If alternate trip functions are required, contact your local Schneider Electric field office for pricing.
■ All these devices use plug-in connections.
Note: For IP54 splash resistant construction, add an "M54" suffix. The IP54 price adder is 15%.

Table 12.34: L-Frame Circuit Breaker Plug-in Units with Electronic Trip—Standard (80%) Rated—3Ø3W New!

Trip Rating Ampere	Trip Function▲	Trip Unit	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
			Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price
Micrologic Standard Trip Unit										
3Ø3W + G, 600 Vac 50/60 Hz										
400	LI	3.3	PBLD36400GU31X	9398.00	PBLG36400GU31X	12846.00	PBLJ36400GU31X	14958.00	PBLL36400GU31X	17030.00
600			PBLD36600GU31X	13840.00	PBLG36600GU31X	16975.00	PBLJ36600GU31X	18600.00	PBLL36600GU31X	21326.00
400	LSI	3.3 S	PBLD36400GU33X	10496.00	PBLG36400GU33X	14345.00	PBLJ36400GU33X	16676.00	PBLL36400GU33X	18049.00
600			PBLD36600GU33X	14939.00	PBLG36600GU33X	18320.00	PBLJ36600GU33X	21093.00	PBLL36600GU33X	22344.00
Micrologic Ammeter Trip Unit										
3Ø3W + G, 600 Vac 50/60 Hz										
400	LSI	5.3 A	PBLD36400GU43X	12174.00	PBLG36400GU43X	15640.00	PBLJ36400GU43X	17605.00	PBLL36400GU43X	19608.00
600			PBLD36600GU43X	16617.00	PBLG36600GU43X	19377.00	PBLJ36600GU43X	21128.00	PBLL36600GU43X	23902.00
400	LSIG	6.3 A	PBLD36400GU44X	15865.00	PBLG36400GU44X	19686.00	PBLJ36400GU44X	21247.00	PBLL36400GU44X	23536.00
600			PBLD36600GU44X	20309.00	PBLG36600GU44X	23904.00	PBLJ36600GU44X	24770.00	PBLL36600GU44X	27329.00

Table 12.35: L-Frame Circuit Breaker Plug-in Units with Electronic Trip—Standard (80%) Rated—3Ø4W New!

Trip Rating Ampere	Trip Function▲	Trip Unit	D Interrupting		G Interrupting		J Interrupting		L Interrupting	
			Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price	Catalog Number■	$ Price
Micrologic Standard Trip Unit										
3Ø4W + G, 600 Vac 50/60 Hz										
400	LI	3.3	PBLD36400GNU31X	9890.00	PBLG36400GNU31X	13509.00	PBLJ36400GNU31X	15730.00	PBLL36400GNU31X	17910.00
600			PBLD36600GNU31X	14555.00	PBLG36600GNU31X	17851.00	PBLJ36600GNU31X	19560.00	PBLL36600GNU31X	22375.00
400	LSI	3.3 S	PBLD36400GNU33X	10885.00	PBLG36400GNU33X	14875.00	PBLJ36400GNU33X	16942.00	PBLL36400GNU33X	18716.00
600			PBLD36600GNU33X	15490.00	PBLG36600GNU33X	18996.00	PBLJ36600GNU33X	20870.00	PBLL36600GNU33X	23130.00
Micrologic Ammeter Trip Unit										
3Ø4W + G, 600 Vac 50/60 Hz										
400	LSI	5.3 A	PBLD36400GNU43X	12625.00	PBLG36400GNU43X	15956.00	PBLJ36400GNU43X	18256.00	PBLL36400GNU43X	20334.00
600			PBLD36600GNU43X	17232.00	PBLG36600GNU43X	19830.00	PBLJ36600GNU43X	21908.00	PBLL36600GNU43X	24748.00
400	LSIG	6.3 A	PBLD36400GNU44X	16450.00	PBLG36400GNU44X	20485.00	PBLJ36400GNU44X	22030.00	PBLL36400GNU44X	24385.00
600			PBLD36600GNU44X	21055.00	PBLG36600GNU44X	24216.00	PBLJ36600GNU44X	25677.00	PBLL36600GNU44X	28294.00

▲ If alternate trip functions are required, contact your local Schneider Electric field office for pricing.
■ All these devices use plug-in connections.
Note: For IP54 splash resistant construction, add an "M54" suffix. The IP54 price adder is 15%.
The 250 A with Standard Trip Unit is also available. Contact your local Schneider Electric field office for ordering information.

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Table 12.36: M-Frame Circuit Breaker Plug-in Units with Basic Electronic Trip Unit (ET 1.0)—3Ø3W *New!*

Trip Rating Ampere	G Interrupting		J Interrupting	
	Catalog Number▲■♦	$ Price	Catalog Number▲■♦	$ Price
3Ø3W + G, 600 Vac 50/60 Hz				
300	PTMG36300G( )	**16014.00**	PTMJ36300G( )	**17918.00**
350	PTMG36350G( )	**16014.00**	PTMJ36350G( )	**17918.00**
400	PTMG36400G( )	**16014.00**	PTMJ36400G( )	**17918.00**
450	PTMG36450G( )	**16014.00**	PTMJ36450G( )	**17918.00**
500	PTMG36500G( )	**16014.00**	PTMJ36500G( )	**17918.00**
600	PTMG36600G( )	**16014.00**	PTMJ36600G( )	**17918.00**
700	PTMG36700G( )	**18810.00**	PTMJ36700G( )	**20368.00**
800	PTMG36800G( )	**18810.00**	PTMJ36800G( )	**20368.00**

Table 12.37: M-Frame Circuit Breaker Plug-in Units with Basic Electronic Trip Unit (ET 1.0)—3Ø4W *New!*

Trip Rating Ampere	G Interrupting		J Interrupting	
	Catalog Number▲■♦	$ Price	Catalog Number▲■♦	$ Price
3Ø4W + G, 600 Vac 50/60 Hz				
300	PTMG36300GN( )	**16640.00**	PTMJ36300GN( )	**18536.00**
350	PTMG36350GN( )	**16640.00**	PTMJ36350GN( )	**18536.00**
400	PTMG36400GN( )	**16640.00**	PTMJ36400GN( )	**18536.00**
450	PTMG36450GN( )	**16640.00**	PTMJ36450GN( )	**18536.00**
500	PTMG36500GN( )	**16640.00**	PTMJ36500GN( )	**18536.00**
600	PTMG36600GN( )	**16640.00**	PTMJ36600GN( )	**18536.00**
700	PTMG36700GN( )	**19436.00**	PTMJ36700GN( )	**22082.00**
800	PTMG36800GN( )	**19436.00**	PTMJ36800GN( )	**22082.00**

▲ The ET 1.0 trip unit cannot be field replaced or have the long-time trip point setting adjusted.
■ All these devices use bolt-on connection. It may be used only on busway with same number of poles. Not for use on 800 A copper busway.
♦ To complete the catalog number, replace the blank with an “H” for horizontal applications and “V” for vertical applications.
Note: For IP54 splash resistant construction, add "M54" suffix. IP54 price adder is 15%.

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Table 12.38: P-Frame Circuit Breaker Plug-in Units—3Ø3W New!

Trip Rating Ampere	Trip Function	Trip Unit	Interrupting Rating					
			G			J		
			Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price	
				80 % Rated	100 % Rated		80 % Rated	100 % Rated
Micrologic Standard Trip Unit								
3Ø3W + G, 600 Vac 50/60 Hz								
400			PTPG36040G( )U31A	**26760.00**	**37560.00**	PTPJ36040G( )U31A	**27995.00**	**38745.00**
600			PTPG36060G( )U31A	**26760.00**	**37560.00**	PTPJ36060G( )U31A	**27995.00**	**38745.00**
800	LI	3.0	PTPG36080G( )U31A	**26760.00**	**37560.00**	PTPJ36080G( )U31A	**27995.00**	**38745.00**
1000			PTPG36100G( )U31A	**34637.00**	**45366.00**	PTPJ36100G( )U31A	**35929.00**	**46502.00**
1200			PTPG36120G( )U31A	**34637.00**	—	PTPJ36120G( )U31A	**35929.00**	—
400			PTPG36040G( )U33A	**27300.00**	**37900.00**	PTPJ36040G( )U33A	**28532.00**	**39400.00**
600			PTPG36060G( )U33A	**27300.00**	**37900.00**	PTPJ36060G( )U33A	**28532.00**	**39400.00**
800	LSI	5.0	PTPG36080G( )U33A	**27300.00**	**37900.00**	PTPJ36080G( )U33A	**28532.00**	**39400.00**
1000			PTPG36100G( )U33A	**35064.00**	**46168.00**	PTPJ36100G( )U33A	**36328.00**	**47934.00**
1200			PTPG36120G( )U33A	**35064.00**	—	PTPJ36120G( )U33A	**36328.00**	—
Micrologic Ammeter Trip Unit								
3Ø3W + G, 600 Vac 50/60 Hz								
400			PTPG36040G( )U41A	**28072.00**	**38560.00**	PTPJ36040G( )U41A	**29295.00**	**40068.00**
600			PTPG36060G( )U41A	**28072.00**	**38560.00**	PTPJ36060G( )U41A	**29295.00**	**40068.00**
800	LI	3.0 A	PTPG36080G( )U41A	**28072.00**	**38560.00**	PTPJ36080G( )U41A	**29295.00**	**40068.00**
1000			PTPG36100G( )U41A	**35826.00**	**46435.00**	PTPJ36100G( )U41A	**37055.00**	**48856.00**
1200			PTPG36120G( )U41A	**35826.00**	—	PTPJ36120G( )U41A	**37055.00**	—
400			PTPG36040G( )U43A	**30300.00**	**40430.00**	PTPJ36040G( )U43A	**31520.00**	**41695.00**
600			PTPG36060G( )U43A	**30300.00**	**40430.00**	PTPJ36060G( )U43A	**31520.00**	**41695.00**
800	LSI	5.0 A	PTPG36080G( )U43A	**30300.00**	**40430.00**	PTPJ36080G( )U43A	**31520.00**	**41695.00**
1000			PTPG36100G( )U43A	**38010.00**	**49424.00**	PTPJ36100G( )U43A	**39124.00**	**50342.00**
1200			PTPG36120G( )U43A	**38010.00**	—	PTPJ36120G( )U43A	**39124.00**	—
400			PTPG36040G( )U44A	**33052.00**	**42760.00**	PTPJ36040G( )U44A	**34250.00**	**44330.00**
600			PTPG36060G( )U44A	**33052.00**	**42760.00**	PTPJ36060G( )U44A	**34250.00**	**44330.00**
800	LSIG	6.0 A	PTPG36080G( )U44A	**33052.00**	**42760.00**	PTPJ36080G( )U44A	**34250.00**	**44330.00**
1000			PTPG36100G( )U44A	**40725.00**	**50824.00**	PTPJ36100G( )U44A	**41700.00**	**51910.00**
1200			PTPG36120G( )U44A	**40725.00**	—	PTPJ36120G( )U44A	**41700.00**	—

Table 12.39: P-Frame Circuit Breaker Plug-in Units—3Ø4W New!

Trip Rating Ampere	Trip Function	Trip Unit	Interrupting Rating					
			G			J		
			Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price	
				80 % Rated	100 % Rated		80 % Rated	100 % Rated
Micrologic Standard Trip Unit								
3Ø4W + G, 600 Vac 50/60 Hz								
400			PTPG36040GN( )U31A	**27760.00**	**38560.00**	PTPJ36040GN( )U31A	**28995.00**	**39745.00**
600			PTPG36060GN( )U31A	**27760.00**	**38560.00**	PTPJ36060GN( )U31A	**28995.00**	**39745.00**
800	LI	3.0	PTPG36080GN( )U31A	**27760.00**	**38560.00**	PTPJ36080GN( )U31A	**28995.00**	**39745.00**
1000			PTPG36100GN( )U31A	**35637.00**	**46366.00**	PTPJ36100GN( )U31A	**36929.00**	**47502.00**
1200			PTPG36120GN( )U31A	**35637.00**	—	PTPJ36120GN( )U31A	**36929.00**	—
400			PTPG36040GN( )U33A	**28300.00**	**38900.00**	PTPJ36040GN( )U33A	**29532.00**	**40400.00**
600			PTPG36060GN( )U33A	**28300.00**	**38900.00**	PTPJ36060GN( )U33A	**29532.00**	**40400.00**
800	LSI	5.0	PTPG36080GN( )U33A	**28300.00**	**38900.00**	PTPJ36080GN( )U33A	**29532.00**	**40400.00**
1000			PTPG36100GN( )U33A	**36064.00**	**47168.00**	PTPJ36100GN( )U33A	**37328.00**	**48934.00**
1200			PTPG36120GN( )U33A	**36064.00**	—	PTPJ36120GN( )U33A	**37328.00**	—
Micrologic Ammeter Trip Unit								
3Ø4W + G, 600 Vac 50/60 Hz								
400			PTPG36040GN( )U41A	**29072.00**	**39560.00**	PTPJ36040GN( )U41A	**30295.00**	**41068.00**
600			PTPG36060GN( )U41A	**29072.00**	**39560.00**	PTPJ36060GN( )U41A	**30295.00**	**41068.00**
800	LI	3.0 A	PTPG36080GN( )U41A	**29072.00**	**39560.00**	PTPJ36080GN( )U41A	**30295.00**	**41068.00**
1000			PTPG36100GN( )U41A	**36826.00**	**47435.00**	PTPJ36100GN( )U41A	**38055.00**	**49856.00**
1200			PTPG36120GN( )U41A	**36826.00**	—	PTPJ36120GN( )U41A	**38055.00**	—
400			PTPG36040GN( )U43A	**31300.00**	**41430.00**	PTPJ36040GN( )U43A	**32520.00**	**42695.00**
600			PTPG36060GN( )U43A	**31300.00**	**41430.00**	PTPJ36060GN( )U43A	**32520.00**	**42695.00**
800	LSI	5.0 A	PTPG36080GN( )U43A	**31300.00**	**41430.00**	PTPJ36080GN( )U43A	**32520.00**	**42695.00**
1000			PTPG36100GN( )U43A	**39010.00**	**50424.00**	PTPJ36100GN( )U43A	**40124.00**	**51342.00**
1200			PTPG36120GN( )U43A	**39010.00**	—	PTPJ36120GN( )U43A	**40124.00**	—
400			PTPG36040GN( )U44A	**34052.00**	**43760.00**	PTPJ36040GN( )U44A	**35250.00**	**45330.00**
600			PTPG36060GN( )U44A	**34052.00**	**43760.00**	PTPJ36060GN( )U44A	**35250.00**	**45330.00**
800	LSIG	6.0 A	PTPG36080GN( )U44A	**34052.00**	**43760.00**	PTPJ36080GN( )U44A	**35250.00**	**45330.00**
1000			PTPG36100GN( )U44A	**41725.00**	**51824.00**	PTPJ36100GN( )U44A	**42700.00**	**52910.00**
1200			PTPG36120GN( )U44A	**41725.00**	—	PTPJ36120GN( )U44A	**42700.00**	—

▲ The standard rating plug supplied with a trip unit will be the "A" rating plug. To specify an alternative rating plug, replace the "A" at the end of the catalog number with the applicable suffix letter. See the chart on page 7-45 for rating plug catalog suffix letters.

■ All these devices use bolt-on connection. It may be used only on busway with same number of poles. Not for use on 800 A copper busway. To complete the catalog number, replace the blank with an "H" for horizontal applications and "V" for vertical applications.

♦ Listed catalog numbers are for 80% rated circuit breakers. For 100% rated circuit breakers, replace the blank with an "HC" for horizontal applications and "VC" for vertical applications. For example, the catalog number for a 100% standard trip unit with standard LI trip functions at 800 A 3Ø3W for a horizontal application would be PTPG36080GHCU31A.

Notes:

- For IP54 splash resistant construction, add a "M54" suffix. IP54 price adder is 15%.
- The 250 A is available as a special device. Contact your local Schneider Electric field office for ordering information.

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Table 12.40: R-Frame Circuit Breaker Plug-in Units—3Ø3W

Trip Rating Ampere	Trip Function	Trip Unit	Interrupting Rating								
			G			J			L		
			Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price	
				80 % Rated	100 % Rated		80 % Rated	100 % Rated		80 % Rated	100 % Rated
Micrologic Standard Trip Unit											
3Ø3W + G, 600 Vac 50/60 Hz											
800	LI	3.0	PTRG36080G( )U31A	**42232.00**	**48472.00**	PTRJ36080G( )U31A	**43800.00**	**50040.00**	PTRL36080G( )U31A	**45366.00**	**51606.00**
1000			PTRG36100G( )U31A	**42232.00**	**48472.00**	PTRJ36100G( )U31A	**43800.00**	**50040.00**	PTRL36100G( )U31A	**45366.00**	**51606.00**
1200			PTRG36120G( )U31A	**42232.00**	**48472.00**	PTRJ36120G( )U31A	**43800.00**	**50040.00**	PTRL36120G( )U31A	**45366.00**	**51606.00**
1600			PTRG36160G( )U31A	**42232.00**	—	PTRJ36160G( )U31A	**43800.00**	—	PTRL36160G( )U31A	**45366.00**	—
800	LSI	5.0	PTRG36080G( )U33A	**42686.00**	**48772.00**	PTRJ36080G( )U33A	**44254.00**	**50340.00**	PTRL36080G( )U33A	**45820.00**	**51906.00**
1000			PTRG36100G( )U33A	**42686.00**	**48772.00**	PTRJ36100G( )U33A	**44254.00**	**50340.00**	PTRL36100G( )U33A	**45820.00**	**51906.00**
1200			PTRG36120G( )U33A	**42686.00**	**48772.00**	PTRJ36120G( )U33A	**44254.00**	**50340.00**	PTRL36120G( )U33A	**45820.00**	**51906.00**
1600			PTRG36160G( )U33A	**42686.00**	—	PTRJ36160G( )U33A	**44254.00**	—	PTRL36160G( )U33A	**45820.00**	—
Micrologic Ammeter Trip Unit											
3Ø3W + G, 600 Vac 50/60 Hz											
800	LI	3.0 A	PTRG36080G( )U41A	**43368.00**	**49342.00**	PTRJ36080G( )U41A	**44936.00**	**50910.00**	PTRL36080G( )U41A	**46502.00**	**52476.00**
1000			PTRG36100G( )U41A	**43368.00**	**49342.00**	PTRJ36100G( )U41A	**44936.00**	**50910.00**	PTRL36100G( )U41A	**46502.00**	**52476.00**
1200			PTRG36120G( )U41A	**43368.00**	**49342.00**	PTRJ36120G( )U41A	**44936.00**	**50910.00**	PTRL36120G( )U41A	**46502.00**	**52476.00**
1600			PTRG36160G( )U41A	**43368.00**	—	PTRJ36160G( )U41A	**44936.00**	—	PTRL36160G( )U41A	**46502.00**	—
800	LSI	5.0 A	PTRG36080G( )U43A	**45366.00**	**51184.00**	PTRJ36080G( )U43A	**46934.00**	**52752.00**	PTRL36080G( )U43A	**48500.00**	**54318.00**
1000			PTRG36100G( )U43A	**45366.00**	**51184.00**	PTRJ36100G( )U43A	**46934.00**	**52752.00**	PTRL36100G( )U43A	**48500.00**	**54318.00**
1200			PTRG36120G( )U43A	**45366.00**	**51184.00**	PTRJ36120G( )U43A	**46934.00**	**52752.00**	PTRL36120G( )U43A	**48500.00**	**54318.00**
1600			PTRG36160G( )U43A	**45366.00**	—	PTRJ36160G( )U43A	**46934.00**	—	PTRL36160G( )U43A	**48500.00**	—
800	LSIG	6.0 A	PTRG36080G( )U44A	**47856.00**	**53426.00**	PTRJ36080G( )U44A	**49424.00**	**54994.00**	PTRL36080G( )U44A	**50990.00**	**56560.00**
1000			PTRG36100G( )U44A	**47856.00**	**53426.00**	PTRJ36100G( )U44A	**49424.00**	**54994.00**	PTRL36100G( )U44A	**50990.00**	**56560.00**
1200			PTRG36120G( )U44A	**47856.00**	**53426.00**	PTRJ36120G( )U44A	**49424.00**	**54994.00**	PTRL36120G( )U44A	**50990.00**	**56560.00**
1600			PTRG36160G( )U44A	**47856.00**	—	PTRJ36160G( )U44A	**49424.00**	—	PTRL36160G( )U44A	**50990.00**	—

Table 12.41: R-Frame Circuit Breaker Plug-in Units—3Ø4W

Trip Rating Ampere	Trip Function	Trip Unit	Interrupting Rating								
			G			J			L		
			Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price		Catalog Number▲■♦	$ Price	
				80 % Rated	100 % Rated		80 % Rated	100 % Rated		80 % Rated	100 % Rated
Micrologic Standard Trip Unit											
3Ø4W + G, 277/480 Vac (600 Vac Max.) 50/60 Hz											
800	LI	3.0	PTRG36080GN( )U31A	**43232.00**	**49472.00**	PTRJ36080GN( )U31A	**44800.00**	**51040.00**	PTRL36080GN( )U31A	**46366.00**	**52606.00**
1000			PTRG36100GN( )U31A	**43232.00**	**49472.00**	PTRJ36100GN( )U31A	**44800.00**	**51040.00**	PTRL36100GN( )U31A	**46366.00**	**52606.00**
1200			PTRG36120GN( )U31A	**43232.00**	**49472.00**	PTRJ36120GN( )U31A	**44800.00**	**51040.00**	PTRL36120GN( )U31A	**46366.00**	**52606.00**
1600			PTRG36160GN( )U31A	**43232.00**	—	PTRJ36160GN( )U31A	**44800.00**	—	PTRL36160GN( )U31A	**46366.00**	—
800	LSI	5.0	PTRG36080GN( )U33A	**43686.00**	**49772.00**	PTRJ36080GN( )U33A	**45254.00**	**51340.00**	PTRL36080GN( )U33A	**46820.00**	**52906.00**
1000			PTRG36100GN( )U33A	**43686.00**	**49772.00**	PTRJ36100GN( )U33A	**45254.00**	**51340.00**	PTRL36100GN( )U33A	**46820.00**	**52906.00**
1200			PTRG36120GN( )U33A	**43686.00**	**49772.00**	PTRJ36120GN( )U33A	**45254.00**	**51340.00**	PTRL36120GN( )U33A	**46820.00**	**52906.00**
1600			PTRG36160GN( )U33A	**43686.00**	—	PTRJ36160GN( )U33A	**45254.00**	—	PTRL36160GN( )U33A	**46820.00**	—
Micrologic Ammeter Trip Unit											
3Ø4W + G, 277/480 Vac (600 Vac Max.) 50/60 Hz											
800	LI	3.0 A	PTRG36080GN( )U41A	**44368.00**	**50342.00**	PTRJ36080GN( )U41A	**45936.00**	**51910.00**	PTRL36080GN( )U41A	**47502.00**	**53476.00**
1000			PTRG36100GN( )U41A	**44368.00**	**50342.00**	PTRJ36100GN( )U41A	**45936.00**	**51910.00**	PTRL36100GN( )U41A	**47502.00**	**53476.00**
1200			PTRG36120GN( )U41A	**44368.00**	**50342.00**	PTRJ36120GN( )U41A	**45936.00**	**51910.00**	PTRL36120GN( )U41A	**47502.00**	**53476.00**
1600			PTRG36160GN( )U41A	**44368.00**	—	PTRJ36160GN( )U41A	**45936.00**	—	PTRL36160GN( )U41A	**47502.00**	—
800	LSI	5.0 A	PTRG36080GN( )U43A	**46366.00**	**52184.00**	PTRJ36080GN( )U43A	**47934.00**	**53752.00**	PTRL36080GN( )U43A	**49500.00**	**55318.00**
1000			PTRG36100GN( )U43A	**46366.00**	**52184.00**	PTRJ36100GN( )U43A	**47934.00**	**53752.00**	PTRL36100GN( )U43A	**49500.00**	**55318.00**
1200			PTRG36120GN( )U43A	**46366.00**	**52184.00**	PTRJ36120GN( )U43A	**47934.00**	**53752.00**	PTRL36120GN( )U43A	**49500.00**	**55318.00**
1600			PTRG36160GN( )U43A	**46366.00**	—	PTRJ36160GN( )U43A	**47934.00**	—	PTRL36160GN( )U43A	**49500.00**	—
800	LSIG	6.0 A	PTRG36080GN( )U44A	**48856.00**	**54426.00**	PTRJ36080GN( )U44A	**50424.00**	**55994.00**	PTRL36080GN( )U44A	**51990.00**	**57560.00**
1000			PTRG36100GN( )U44A	**48856.00**	**54426.00**	PTRJ36100GN( )U44A	**50424.00**	**55994.00**	PTRL36100GN( )U44A	**51990.00**	**57560.00**
1200			PTRG36120GN( )U44A	**48856.00**	**54426.00**	PTRJ36120GN( )U44A	**50424.00**	**55994.00**	PTRL36120GN( )U44A	**51990.00**	**57560.00**
1600			PTRG36160GN( )U44A	**48856.00**	—	PTRJ36160GN( )U44A	**50424.00**	—	PTRL36160GN( )U44A	**51990.00**	—

▲ The standard rating plug supplied with a trip unit will be the "A" rating plug. To specify an alternative rating plug, replace the "A" at the end of the catalog number with the applicable suffix letter. See the chart on page 7-45 for rating plug catalog suffix letters.

■ All these devices use bolt-on connection. It may be used only on busway with same number of poles. Not for use on 800 A copper busway. To complete the catalog number, replace the blank with an "H" for horizontal applications and "V" for vertical applications.

♦ Listed catalog numbers are for 80% rated circuit breakers. For 100% rated circuit breakers, replace the blank with an "HC" for horizontal applications and "VC" for vertical applications. For example, the catalog number for a 100% standard trip unit with standard LI trip functions at 800 A 3Ø3W for a horizontal application would be PTRG36080GHCU31A.

Notes:

- For IP54 splash resistant construction, add a "M54" suffix. IP54 price adder is 15%.
- The 600 A is available as a special device. Contact your local Schneider Electric field office for ordering information.

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- Non-segregated phase bus
- 600 V through 15 kV (1200 A–4000 A) [1]
- Aluminum, steel or stainless steel housing
- Aluminum or copper bus bars
- Insulated with fluidized bed epoxy (5 kV–15 kV)
- Complete line of fittings provides for any configuration
- Indoor trapeze and outdoor column supports
- For use in utilities, industrial and commercial facilities

Power-Zone bus is custom designed, manufactured and tested per ANSI C37.23 standards to meet customer specifications. The 600 V product is also UL Listed. It is a completely coordinated package of equipment with all the auxiliary material and supports for connecting transformers, switchgear, MCCs, and motors, in all types of utility, industrial, and commercial facilities.

General Pricing Instruction – Prepare a layout sketch (if applicable) of the run(s) showing all dimensions in feet and inches, all wall and floor locations and thicknesses and all fittings such as elbows, tees, flanged ends, cable tap boxes, expansion fittings, transformer connections, etc. Add all dimensions together using the center line of the bus and adjust the total to the higher whole foot. Multiply this total by the per foot price as determined by the type (indoor or weatherproof) (aluminum or copper) and the number of poles and any optional accessories (aluminum or steel enclosures, fiberglass or porcelain conductor supports, etc.). To this add the charges for each of the elbows, tees, flanged ends, cable tap boxes, expansion fittings, transformer connections, etc. The sum of these items plus the sum of any optional accessory is the price of the entire bus run. NOTE: Because the bus run is custom designed and built there are no “Complete Device” prices.

Bus Footage – The per foot price of the bus may be a combination of several prices depending on the job specifications and requirements. Some of these options are special momentary rating, special housing material and/or finish, special conductor supports, heaters and thermostats, and ground bus. The prices for these options are shown on page 12-17. They should be added to the per foot prices shown on page 12-17.

Weatherproof Bus – Priced the same as indoor. In addition, all weatherproof runs must be equipped with strip heaters to eliminate condensation and, if applicable, a thermostat. A heater should be priced for every seven (7) foot of bus and no more than 20 heaters can be controlled by one thermostat. Also, each bus run should have its own thermostat. The heaters are rated 240 V, 500 watts and operate at 120 V, 125 watts.

Flanged Ends – A flanged end is used to terminate the bus into switchgear, motor control centers, switchboards, or any rigid bus-to-bus connection. It consists of a gasketed equipment flange, up to 1'-0" of 3Ø3W conductor (3Ø4W as applicable), necessary insulation tapes, and required bolting hardware. If additional conductor length is required, add to the footage price on a per foot basis.

Cable Tap Box – A cable tap box includes a gasketed and accessible termination box, lugs, necessary insulation tape (between bus and lugs only), and required bolting hardware. Lug sizes and quantity should be specified by purchaser.

Transformer/Generator Connection – This type of termination should be priced whenever the bus is connecting to a transformer, generator, motor, switch or any connection where the bus bars are connecting to porcelain mounted equipment terminals. It will include the same components as a flanged end plus one set of flexible braid type connectors and a terminal box (if required).

Bushing Box (Weatherhead) – A bushing box is used on service entrance run where the cable connection to the bus must be made via porcelain bushings. It is comprised of the same components as a transformer connection plus 3 through stud type apparatus bushings, bushing stud connectors (lug pads) and a strip heater.

Ground Bus – The bus housing is designed and constructed to provide an electrically continuous ground path. The side rails of the bus housings are capable of carrying the full rated phase current continuously and, under short circuit conditions, are capable of carrying up to 60 kA RMS asymmetrical fault current for 3 seconds. Consequently, a separate ground bus is not necessary unless specified.

Wall Entrance Seal – A wall entrance seal consists of a wall throat, wall flange (one side of wall only), and a barrier which prevents air or vapor from passing from one room to another or from outdoors to indoors. It also carries a 1/2 hour fire rating. Consult factory for higher fire ratings. If additional wall flanges are required, they should be added at the prices given on page 12-19.

Equipment Entrance Seal – An equipment entrance seal should be priced whenever a barrier is required to prevent the passing of flame and/or gasses between the bus housing and the terminating equipment.

Expansion Fittings – An expansion fitting is used to counteract the strain placed on the bus due to the expansion and contraction of the building or the bus itself. One should be priced whenever the bus run crosses a building expansion joint and whenever a straight run of bus exceeds 60 feet.

Flexible Housing (Misalignment) Collar – Required at terminations or wall penetrations when vibrations due to seismic forces may cause damage to the bus. It may also be used to adjust for the “settling” of terminating equipment after installation.

1 For additional ratings, contact the factory.

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Supporting Steel (Hangers) – Supports are not included in the "per foot" price of the bus and should be added on the basis of one for every 10 ft. for indoor and one for every 12 ft. for outdoor. Indoor supports are a trapeze type hanger while outdoor supports are a single or double column type support. Consult factory for other type supports.

Hazardous or Seismic Locations – Consult factory for bus runs which are to be installed in a location which is classified as hazardous or in a seismic location.

Standard Construction – The prices on this page are based on standard Power-Zone construction. Page 12-19 should be used to add any options or accessories. Standard construction is as follows:

- Conductor (plating): Copper (silver) or Aluminum (tin)
- Conductor Insulation (5 kV and 15 kV only): epoxy
- Conductor Supports: Glass reinforced polyester blocks
- Housing Material: Extruded Aluminum (1/8-inch Nominal)
- Housing Construction: Totally Enclosed Non-ventilated
- Joint Insulation: EPR and PVC tape
- BIL Rating: 25 kV (600 V), 60 kV (5 kV) and 95 kV (15 kV)
- Momentary (Short Circuit) Rating: 75 kA (600 V) and 60 kA (5 kV, 15 kV)
- Ground Conductor: Housing (100% rated)

Table 12.42: Footage and Fittings

Cond. Mtl.	No. of Poles, Wires	Current Rtg.	$ Price Per Foot ▲	Flanged End	Vert. Elb.	Horz. Elb.	Cable Tap Box	Vert. Tee	Horz. Tee	Indr. Exp. Ftg.	Outdr. Exp. Ftg.	Wall Entr. Seal	Equip. Entr. Seal	Phase Phase Trans.	Xfrm Conn.	Porc. Bshg. Box
600 V																
Aluminum	3P, 3W	1200 A	1235.	4430.	4885.	4195.	14348.	6740.	6740.	6595.	13905.	5400.	3970.	8825.	15725.	34275.
		1600 A	1315.	4535.	5005.	4265.	14838.	6760.	6760.	8075.	15610.	5410.	3975.	9150.	17265.	37510.
		2000 A	1485.	4905.	5160.	4340.	17165.	7020.	7020.	8635.	16395.	5435.	3985.	9840.	19450.	42687.
		2500 A	1635.	5120.	5420.	4390.	17777.	7190.	7190.	10895.	18950.	5450.	3995.	10145.	21755.	47865.
		3200 A	1845.	5310.	5470.	4435.	18736.	7195.	7195.	12835.	20885.	5475.	4005.	10525.	23880.	54800.
	3P, 4W 100% Neutral	1200 A	1605.	5759.	6351.	5454.	18652.	8762.	8762.	8574.	18077.	7020.	5161.	11473.	20443.	44558.
		1600 A	1710.	5895.	6507.	5545.	19290.	8788.	8788.	10498.	20293.	7033.	5168.	11895.	22445.	48763.
		2000 A	1930.	6376.	6708.	5642.	22315.	9126.	9126.	11226.	21314.	7066.	5181.	12792.	25285.	53417.
		2500 A	2125.	6656.	7046.	5707.	23110.	9347.	9347.	14164.	24635.	7085.	5194.	13189.	28282.	62225.
		3200 A	2399.	6903.	7111.	5766.	24357.	9354.	9354.	16686.	27151.	7104.	5207.	13683.	31044.	71240.
Copper	3P, 3W	1200 A	1785.	5115.	5030.	4195.	15101.	6885.	6885.	6890.	14200.	5400.	3970.	10085.	16555.	34960.
		1600 A	1985.	5320.	5192.	4230.	15702.	7007.	7007.	8310.	15615.	5410.	3975.	10505.	18180.	38250.
		2000 A	2665.	6190.	5355.	4265.	18579.	7130.	7130.	8815.	16350.	5435.	3985.	12205.	20840.	41220.
		2500 A	2950.	6645.	5455.	4340.	19454.	7320.	7320.	11160.	18920.	5450.	3995.	13105.	23410.	49420.
		3200 A	4125.	8995.	6172.	4390.	22789.	8007.	8007.	16120.	24175.	5475.	4005.	16740.	29205.	59385.
		4000 A	5970.	10680.	6890.	4435.	26693.	8695.	8695.	19690.	28680.	5527.	4050.	20215.	35905.	72125.
		5000 A	6470.	11585.	7570.	4620.	29178.	9330.	9330.	24950.	34705.	5580.	4190.	22400.	42035.	80380.
		6000 A	7335.	13895.	9815.	4590.	33649.	11060.	11060.	32305.	42055.	5610.	4235.	25960.	50735.	96635.
	3P, 4W 100% Neutral	1200 A	2320.	6650.	6539.	5454.	19632.	8951.	8951.	8957.	18460.	7020.	5161.	13111.	21522.	45448.
		1600 A	2580.	6916.	6750.	5501.	20413.	9110.	9110.	10803.	20300.	7033.	5168.	13657.	23634.	49725.
		2000 A	3464.	8047.	6962.	5595.	24153.	9269.	9269.	11460.	21255.	7066.	5181.	15867.	27092.	53586.
		2500 A	3835.	8639.	7092.	5642.	25291.	9516.	9516.	14508.	24596.	7085.	5194.	17037.	30433.	64246.
		3200 A	5362.	11694.	7779.	5707.	29626.	11492.	11492.	20956.	31428.	7104.	5207.	21762.	37967.	77201.
		4000 A	7760.	13884.	9153.	5766.	34701.	11810.	11810.	25597.	37284.	7129.	5265.	26280.	46677.	93763.
		5000 A	8411.	15061.	9841.	6006.	37932.	12129.	12129.	32435.	45117.	7254.	5447.	29120.	54646.	104494.
		6000 A	9535.	18064.	12760.	6246.	43744.	14378.	14378.	41997.	54672.	7293.	5506.	33748.	65956.	125626.
5 kV																
Aluminum	3P, 3W■	1200 A	1410.	4550.	4495.	4175.	14480.	6730.	6730.	6635.	14690.	5500.	4265.	9385.	15835.	52874.
		1600 A	1500.	4655.	4570.	4275.	14971.	6760.	6760.	8105.	16635.	5515.	4285.	9575.	17385.	56289.
		2000 A	1690.	5020.	4640.	4405.	17292.	7020.	7020.	8635.	17625.	5525.	4315.	10065.	19560.	62104.
		2500 A	1840.	5185.	4690.	4505.	17849.	7080.	7080.	10680.	19205.	5540.	4370.	10355.	21715.	68579.
		3000 A	2120.	5505.	4760.	4685.	18951.	7195.	7195.	12835.	21825.	5590.	4425.	10910.	24070.	76874.
Copper	3P, 3W■	1200 A	1815.	5025.	4495.	4325.	15003.	6885.	6885.	6940.	14995.	5500.	4265.	10230.	16465.	53499.
		1600 A	2185.	5445.	4532.	4330.	15840.	7000.	7000.	8360.	16415.	5515.	4285.	11070.	18305.	57384.
		2000 A	2870.	6300.	4570.	4615.	18700.	7115.	7115.	8825.	17350.	5525.	4310.	12620.	20935.	62494.
		2500 A	3165.	6755.	4640.	4695.	19576.	7320.	7320.	11160.	20150.	5540.	4370.	13325.	23525.	71284.
		3000 A	4340.	9180.	4715.	5493.	22993.	8840.	8840.	16120.	25110.	5590.	4425.	17115.	29395.	83604.
		4000 A	6375.	10875.	6340.	6426.	26908.	9085.	9085.	19690.	28680.	5640.	4471.	20605.	36100.	98519.
		5000 A	6965.	11825.	7435.	7519.	29448.	9330.	9330.	24950.	34705.	5740.	4590.	22880.	42280.	110539.
		6000 A	8175.	14275.	10095.	8797.	34068.	11065.	11065.	32315.	42065.	5840.	4610.	26715.	51120.	133414.
15 kV																
Aluminum	3P, 3W■	1200 A	1445.	4655.	4495.	4175.	14596.	6820.	6820.	6815.	14870.	5500.	4280.	9510.	16035.	70042.
		1600 A	1550.	4765.	4570.	4275.	15092.	6850.	6850.	8290.	16815.	5515.	4305.	9710.	17590.	74618.
		2000 A	1745.	5190.	4640.	4405.	17479.	7160.	7160.	8910.	17900.	5525.	4345.	10265.	19865.	82879.
		2500 A	1900.	5445.	4690.	4505.	17772.	7245.	7245.	10445.	18970.	5540.	4410.	10325.	21525.	89639.
		3000 A	2205.	5700.	4760.	4685.	19165.	7330.	7330.	13105.	22095.	5590.	4485.	11170.	24405.	102938.
Copper	3P, 3W■	1200 A	1850.	5130.	4495.	4325.	15118.	6975.	6975.	7125.	15180.	5500.	4280.	10350.	16660.	70854.
		1600 A	2225.	5555.	4570.	4330.	15961.	7092.	7092.	8545.	16600.	5515.	4305.	11195.	18505.	76139.
		2000 A	2915.	6415.	4640.	4615.	18827.	7210.	7210.	9005.	17535.	5525.	4345.	12756.	21140.	83152.
		2500 A	3220.	6925.	4690.	4695.	19763.	7455.	7455.	11430.	20420.	5540.	4410.	13525.	23825.	95223.
		3000 A	4385.	9380.	4760.	5493.	23213.	8975.	8975.	16395.	25385.	5590.	4485.	17370.	29725.	111960.
		4000 A	6435.	11075.	6340.	6426.	27128.	9232.	9232.	19960.	28950.	5640.	4685.	20860.	36435.	132968.
		5000 A	7305.	12065.	7435.	7519.	29712.	9490.	9490.	25270.	35025.	5740.	4900.	23195.	42680.	150018.
		6000 A	8955.	14575.	10095.	8797.	34398.	11250.	11250.	32680.	42430.	5840.	6540.	27135.	51605.	181627.

▲ Hangers, supports and heater prices not included. See page 12-18 for pricing.
■ Add 30% for 3Ø4W (half-neutral): add 45% for 3Ø4W (full-neutral).

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Space Heaters/Thermostats

Space heaters must be priced for all weatherproof applications. One heater should be priced for every 7 feet of outdoor bus. If a thermostat is specified to control the heaters, at least one should be priced for each bus run. No more than 20 heaters can be controlled by each thermostat.

Table 12.43: Thermostats/Space Heaters

Description	$ Price Each
Thermostat	**800.00**
120 V, 125 W space heater (240 V, 500 W rated)	**680.00**

Hangers/Supports

Hangers and supports are not included in prices on page 12-17. Price one indoor hanger for every 10 feet (maximum) of indoor bus and one outdoor support for every 12 feet (maximum) of outdoor bus (if required).

Table 12.44: Hangers/Supports

Support Description	Maximum Height	$ Price Each
Indoor Trapeze Hanger	—	**820.00**
Outdoor, Single Column Support	6 feet 8 feet 10 feet 12 feet	**5709.00** **6524.00** **7340.00** **8155.00**
Outdoor, Double Column Support	14 feet 16 feet 18 feet 20 feet 22 feet	**14995.00** **16495.00** **17994.00** **19494.00** **20993.00**

Construction Options

Table 12.45: Momentary (Asymmetrical Short Circuit) Ratings

Voltage Class	Amperes	$ Price Per Foot ♦ Multiplier
600 V	75 KA 100 KA 150 KA	Standard 1.25 1.50
5 kV	60 KA 80 KA 100 KA	Standard 1.05 1.25
15 kV	60 KA 80 KA 100 KA 150 KA	Standard 1.05 1.25 1.50

♦ Include base price (page 12-17) plus all options.

Table 12.46: Bus Enclosures

Material and Finish	Per Foot $ Price Adder
Painted Aluminum (1/8" Nominal)	**Standard**
Painted 14 Gauge Steel	**680.00**
Painted 11 Gauge Steel	**800.00**
Unpainted 14 Gauge 304 Stainless Steel	**1600.00**
Unpainted 14 Gauge 316 Stainless Steel	**2160.00**

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Miscellaneous Terminating Accessories

Miscellaneous terminating accessory prices should be added only if not already included in the price of the termination (see pricing instruction for further information).

Table 12.47: Bushing Stud Connectors (Lug Pads)★

Amperes	$ Price Each
1200 A	**5607.00**
1600 A	**5904.00**
2000 A	**6315.00**
2500 A	**7221.00**
3000 A	**8202.00**
4000 A	**9528.00**

★ If not included on terminating equipment.

Table 12.48: Flexible Connectors

Voltage Class	$ Price Per Three Phase Connection▼					
	1200 A	1600 A	2000 A	2500 A	3000 A	4000 A
600 V	**7550.00**	**9175.00**	**10045.00**	**12425.00**	**16705.00**	**22245.00**
5 kV	**7706.00**	**9300.00**	**10155.00**	**12535.00**	**16890.00**	**22440.00**
15 kV	**7922.00**	**9405.00**	**10265.00**	**12705.00**	**17085.00**	**22635.00**

▼ Add 45% for 3Ø4W (100%) connection. Add 30% for 3Ø4W (50%).

Table 12.49: Terminal Boxes

Box Size	11 Gauge Steel	3/16" Aluminum
3' x 2' x 3'	**8350.00**	**11690.00**
3' x 3' x 4'	**9895.00**	**13853.00**
4' x 3' x 4'	**11195.00**	**15673.00**
4' x 4' x 5'	**11935.00**	**16709.00**
5' x 4' x 5'	**12740.00**	**17836.00**
5' x 5' x 5'	**14020.00**	**19628.00**

Table 12.50: Miscellaneous Additions

Description	$ Price
PVC insulating boots: (optional)▲	
Splice (joint) (3Ø3W)	**2000.00**
Termination (3Ø3W)	**2000.00**
Wall Flange: (optional) (in addition to wall entrance seal)	
Aluminum	**1750.00**
14 Gauge Steel	**1250.00**
14 Gauge 304 Stainless Steel	**2000.00**
14 Gauge 316 Stainless Steel	**2600.00**
Optional Conductor Support	
High Alumina Porcelain■	**1150.00**
Flexible Housing (Misalignment) Collar (optional)	**3560.00**

▲ Add 45% for 3Ø4W (100%) connection. Add 30% for 3Ø4W (50%).
■ Per foot

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Powerbus Plug-in Units With Metering

Powerbus plug-in units with metering are rated maximum 100 A and are offered as factory assembled units. All units conform to NEMA type 1.

Table 12.51: Factory Assembled Units with Metering

One (1) ED circuit breaker, one (1) drop cord with connector▲, and one (1) PM5350 meter

Circuit Breaker		NEMA Connector	Drop Cord Length (ft)	4A Configuration		5A Configuration		5B Configuration	
Rating	Poles			Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
15 A	1	L5-15	3	PBPEDU4A100COOL515M( )	**1961.00**	PBPEDU5A100COOL515M( )	**2061.00**	PBPEDU5B100COOL515M( )	**2061.00**
20 A	1	L5-20	3	PBPEDU4A100COOL520M( )	**1971.00**	PBPEDU5A100COOL520M( )	**2071.00**	PBPEDU5B100COOL520M( )	**2071.00**
30 A	1	L5-30	3	PBPEDU4A100COOL530M( )	**1986.00**	PBPEDU5A100COOL530M( )	**2086.00**	PBPEDU5B100COOL530M( )	**2086.00**
15 A	2	L6-15	3	PBPEDU4A100COOL615M( )	**2268.00**	PBPEDU5A100COOL615M( )	**2368.00**	PBPEDU5B100COOL615M( )	**2368.00**
20 A	2	L6-20	3	PBPEDU4A100COOL620M( )	**2278.00**	PBPEDU5A100COOL620M( )	**2378.00**	PBPEDU5B100COOL620M( )	**2378.00**
30 A	2	L6-30	3	PBPEDU4A100COOL630M( )	**2293.00**	PBPEDU5A100COOL630M( )	**2393.00**	PBPEDU5B100COOL630M( )	**2393.00**
20 A	3	L21-20	3	PBPEDU4A100COOL2120M( )	**2482.00**	PBPEDU5A100COOL2120M( )	**2582.00**	PBPEDU5B100COOL2120M( )	**2582.00**
30 A	3	L21-30	3	PBPEDU4A100COOL2130M( )	**2497.00**	PBPEDU5A100COOL2130M( )	**2597.00**	PBPEDU5B100COOL2130M( )	**2597.00**
15 A	1	L5-15	6	PBPEDU4A100FOOL515M( )	**2021.00**	PBPEDU5A100FOOL515M( )	**2121.00**	PBPEDU5B100FOOL515M( )	**2121.00**
20 A	1	L5-20	6	PBPEDU4A100FOOL520M( )	**2031.00**	PBPEDU5A100FOOL520M( )	**2131.00**	PBPEDU5B100FOOL520M( )	**2131.00**
30 A	1	L5-30	6	PBPEDU4A100FOOL530M( )	**2046.00**	PBPEDU5A100FOOL530M( )	**2146.00**	PBPEDU5B100FOOL530M( )	**2146.00**
15 A	2	L6-15	6	PBPEDU4A100FOOL615M( )	**2328.00**	PBPEDU5A100FOOL615M( )	**2428.00**	PBPEDU5B100FOOL615M( )	**2428.00**
20 A	2	L6-20	6	PBPEDU4A100FOOL620M( )	**2338.00**	PBPEDU5A100FOOL620M( )	**2438.00**	PBPEDU5B100FOOL620M( )	**2438.00**
30 A	2	L6-30	6	PBPEDU4A100FOOL630M( )	**2353.00**	PBPEDU5A100FOOL630M( )	**2453.00**	PBPEDU5B100FOOL630M( )	**2453.00**
20 A	3	L21-20	6	PBPEDU4A100FOOL2120M( )	**2542.00**	PBPEDU5A100FOOL2120M( )	**2642.00**	PBPEDU5B100FOOL2120M( )	**2642.00**
30 A	3	L21-30	6	PBPEDU4A100FOOL2130M( )	**2557.00**	PBPEDU5A100FOOL2130M( )	**2657.00**	PBPEDU5B100FOOL2130M( )	**2657.00**

Note: See Digest Section 9 for ED circuit breaker information. Catalog numbers shown have the breaker in the top slot in the front cover and the drop cord in the left position in the base of the unit. Other combinations are available. The Power Meter display will be located below the breaker specs.
For remote monitoring capabilities, an EGX gateway is required. The EGX is located in the tap box with metering or in a separate EGX plug-in unit listed below. The units with metering can be daisy-chained together back to the EGX gateway. A maximum of 30 units should be daisy-chained together to one EGX.

▲ Factory assembled units are availalbe using combinations of 1P/2P/3P circuit breakers with other NEMA and IEC type receptacles. Maximum of three drop cords with three breaker spaces available. Consult your local Schneider Electric representative.

Table 12.52: EGX Plug-in Unit (480 V Max)

4A Configuration		5A Configuration		5B Configuration	
Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
PBPEGX4A100T	**2687.00**	PBPEGX5A100T	**2787.00**	PBPEGX5B100T	**2787.00**

Note: For remote monitoring capabilities, an EGX gateway is required. The EGX is located in the tap box with metering or in a separate EGX plug-in unit listed above. Units with metering can be daisy-chained together back to the EGX gateway. A maximum of 30 units should be daisy-chained together to one EGX.

Table 12.53: NEMA Receptacles and Connectors

Wring	Voltage	NEMA Non-Locking			NEMA Locking		
		15 A	20 A	30 A	15 A	20 A	30 A
2-pole, 3-wire grounding	120	5–15	5–20	5–30	L5–15	L5–20	L5–30
2-pole, 3-wire grounding	240	6–15	6–20	6–30	L6–15	L6–20	L6–20
3-pole, 4-wire grounding	120/240	14–15	14–20	14–30	—	L14–20	L14–30
3-pole, 4-wire grounding	3Ø 240	15–15	15–20	15–30	—	L15–20	L15–30
4-pole, 5-wire grounding	3ØY 120/208	—	—	—	—	L21–20	L21–30

Note: Additional NEMA and IEC type receptacles and connectors are available.

Meter Suffix	System Voltage
1	208Y/120 V 3Ø4W
2	240 V 3Ø3W
4	415/240 V 3Ø4W
5	480Y/277 V 3Ø4W

Note: Replace ( ) in above table with the appropriate meter suffix number. Connectors must be rated for appropriate voltages.

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Section 13

Wire Management

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Trench Duct pp. **13-5**

Wireway

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Oiltight Wireway	**13-3**
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Wall Duct

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Trench Duct

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Straight Sections and Fittings	**13-6**
Accessories and Components	**13-6**

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General Purpose—NEMA Type 1

Standards

Square-Duct wireway is Underwriters Laboratories listed as steel enclosed wireway and auxiliary gutter. CSA listing is also available.

Sizes

2-1/2", 4", and 6" sizes are manufactured from 16 gauge steel. Straight lengths are available with or without knockouts. Knockouts are of various sizes in sides and bottom of wireway. 8", 10", and 12" sizes are made of 14 gauge steel and are furnished without knockouts.

Painted Hinge-Cover★
Type LDB—ANSI 49 Gray
Polyester Powder Finish

Table 13.1: (Connectors not supplied; order separately▲)

Component	2-1/2" x 2-1/2"			4" x 4"			6" x 6"			8" x 8"		10" x 10"		12" x 12"★	
	Catalog Number			Catalog Number			Catalog Number			Cat. No.		Cat. No.		Cat. No.	
	With Knockouts	Without Knockouts	$ Price	With Knockouts	Without Knockouts	$ Price	With Knockouts	Without Knockouts	$ Price	Without Knockouts	$ Price	Without Knockouts	$ Price	Without Knockouts	$ Price
1' Length	LDB21KO	LDB21	24.00	LDB41KO	LDB41	26.10	LDB61KO	LDB61	48.20	LDB81	76.00	LDB101	97.00	LDB121	107.00
2' Length	LDB22KO	LDB22	34.80	LDB42KO	LDB42	38.50	LDB62KO	LDB62	59.00	LDB82	116.00	LDB102	160.00	LDB122	206.00
3' Length	LDB23KO	LDB23	44.20	LDB43KO	LDB43	54.00	LDB63KO	LDB63	84.00	LDB83	177.00	LDB103	226.00	LDB123	308.00
4' Length	LDB24KO	LDB24	61.00	LDB44KO	LDB44	75.00	LDB64KO	LDB64	111.00	LDB84	215.00	LDB104	294.00	LDB124	371.00
5' Length	LDB25KO	LDB25	75.00	LDB45KO	LDB45	80.00	LDB65KO	LDB65	120.00	LDB85	240.00	LDB105	362.00	LDB125	427.00
6' Length	—	—	—	LDB46KO	LDB46	96.00	LDB66KO	LDB66	151.00	LDB86	284.00	LDB106	428.00	—	—
10' Length	LDB210KO	LDB210	151.00	LDB410KO	LDB410	167.00	LDB610KO	LDB610	284.00	LDB810	507.00	LDB1010	693.00	LDB1210	882.00
90° L	—	LDB290L	54.00	—	LDB490L	61.00	—	LDB690L	69.00	LDB890L	111.00	LDB1090L	158.00	LDB1290L	202.00
90° Sweep L	—	LDB290LS	95.00	—	LDB490LS	107.00	—	LDB690LS	155.00	LDB890LS	200.00	LDB1090LS	308.00	LDB1290LS	410.00
45° L	—	LDB245L	54.00	—	LDB445L	66.00	—	LDB645L	69.00	LDB845L	111.00	LDB1045L	158.00	LDB1245L	202.00
Tee	—	LDB2T	62.00	—	LDB4T	75.00	—	LDB6T	84.00	LDB8T	155.00	LDB10T	206.00	LDB12T	292.00
Junction Box	—	LDB2J	69.00	—	LDB4J	84.00	—	LDB6J	104.00	LDB8J	164.00	LDB10J	208.00	LDB12J	292.00
Telescope Ftg.	—	LDB2TF	101.00	—	LDB4TF	111.00	—	LDB6TF	131.00	LDB8TF	218.00	LDB10TF	271.00	LDB12TF	317.00
Connector▲	—	LDB2C	7.70	—	LDB4C	9.50	—	LDB6C	11.40	LDB8C	23.10	LDB10C	33.60	LDB12C	46.30
Drop/Brkt Hgr.	—	LDB2H	14.80	—	LDB4H	17.10	—	LDB6H	30.80	LDB8H	44.60	LDB10H	75.00	LDB12H	118.00
Support Hanger	—	LDB2SH	9.20	—	LDB4SH	12.60	—	LDB6SH	22.10	LDB8SH	31.50	LDB10SH	43.10	LDB12SH	58.00
Closing Plate	LDB2CPKO	LDB2CP	7.70	LDB4CPKO	LDB4CP	9.50	LDB6CPKO	LDB6CP	11.40	LDB8CP■	15.50	LDB10CP■	25.20	LDB12CP■	34.80
Panel Adapter	—	LDB2A	23.00	—	LDB4A	27.10	—	LDB6A	35.40	LDB8A	48.20	LDB10A	71.00	LDB12A	80.00
Open Adapter	—	LDB2OA	30.50	—	LDB4OA	45.20	—	LDB6OA	59.00	LDB8OA	74.00	LDB10OA	108.00	LDB12OA	142.00
Reducer	—	—	—	—	LDB42R	39.80	—	LDB64R	69.00	LDB86R	80.00	LDB108R	100.00	LDB1210R	109.00
	—	—	—	—	—	—	—	—	—	—	—	—	—	LDB128R	116.00
Adapter to "LD"♦	—	LDB2GASK	23.00	—	LDB4GAS	29.10	—	LDB6GAS	36.50	LDB8GASK	44.20	LDB10GASK	88.00	—	—
Barrier Kit—5 ft. long w/hardware	—	—	—	—	LJB45B	34.80	—	LJB65B	70.00	LJB85B	87.00	—	—	—	—
5 pc. Barrier Pack—5 ft. long	—	—	—	—	LJB45BKM	79.00	—	LJB65BKM	120.00	—	—	—	—	—	—
5 pc. Barrier Bracket—2 compartment	—	—	—	—	LJB4BB2C	23.10	—	LJB6BB2C	80.00	—	—	—	—	—	—
5 pc. Barrier Bracket—3 compartment	—	—	—	—	LJB4BB3C	49.40	—	LJB6BB3C	96.00	—	—	—	—	—	—

▲ Add connectors for all lengths and fittings, except closing plates, reducers, and adapters.
■ These closing plates also available with knockout. Add "KO" to cat #; price is the same.
♦ Adapters to competitors' wireways also available. Contact your nearest Schneider Electric sales office for price and availability.
★ Painted 12" x 12" wireway is not furnished with hinge-cover (screw-cover only).

NOTE: For wireway fill information, see NEC 376.

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Oiltight—NEMA Type 12

Type LJB Oiltight lay-in wireway is fully gasketed and used to protect runs of electrical wiring from oil, water, coolants, dirt, or dust as well as physical damage. This wireway is manufactured to exceed oiltight and NFPA standards for industrial control equipment.

Lengths and fittings are made of 14 gauge steel with 10 gauge end flanges. Straight lengths and fittings have hinged covers with oil resistant gasket all around and are held closed with pull-down latches. All lengths and fittings are without knockouts. Type LJB lay-in Wireway is finished with ANSI-49 gray polyester powder finish over a corrosion resistant phosphate preparation. All Type LJB oiltight wireway is UL listed as steel enclosed wireway and auxiliary gutter. Conforms to NEMA Type 12.

Table 13.2: Type LJB Lay-in■

Description	2-1/2" x 2-1/2"		4" x 4"		6" x 6"		8" x 8"		12" x 6"	
	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
1" Nipple	LJB201	74.00	LJB401	76.00	LJB601	95.00	—	—	—	—
2" Nipple	LJB202	80.00	LJB402	81.00	LJB602	100.00	—	—	—	—
3" Nipple	LJB203	84.00	LJB403	85.00	LJB603	106.00	—	—	—	—
6" Length	LJB206	92.00	LJB406	99.00	LJB606	123.00	LJB806	170.00	LJB12606	251.00
1' Length	LJB21	99.00	LJB41	110.00	LJB61	135.00	LJB81	202.00	LJB1261	325.00
2' Length	LJB22	129.00	LJB42	135.00	LJB62	184.00	LJB82	271.00	LJB1262	518.00
3' Length	LJB23	147.00	LJB43	168.00	LJB63	230.00	LJB83	330.00	LJB1263	624.00
4' Length	LJB24	186.00	LJB44	201.00	LJB64	280.00	LJB84	391.00	LJB1264	741.00
5' Length	LJB25	201.00	LJB45	227.00	LJB65	332.00	LJB85	452.00	LJB1265	846.00
10' Length▲	LJB210	352.00	LJB410	439.00	LJB610	637.00	LJB810	842.00	LJB12610	1523.00
45° Top Opening	LJB245LT	201.00	LJB445LT	182.00	LJB645LT	234.00	LJB845LT	332.00	LJB12645LT	410.00
45° Inside Opening	LJB245LI	159.00	LJB445LI	182.00	LJB645LI	234.00	LJB845LI	332.00	—	—
45° Outside Opening	LJB245LO	159.00	LJB445LO	182.00	LJB645LO	234.00	LJB845LO	332.00	—	—
90° Inside Opening	LJB290LI	159.00	LJB490LI	182.00	LJB690LI	234.00	LJB890LI	332.00	LJB12690LI	410.00
90° Outside Opening	LJB290LO	159.00	LJB490LO	182.00	LJB690LO	234.00	LJB890LO	332.00	LJB12690LO	410.00
90° Outside Top Opening	—	—	LJB490LOT	182.00	LJB690LOT	234.00	LJB890LOT	332.00	—	—
90° Top Opening	LJB290LT	159.00	LJB490LT	182.00	LJB690LT	234.00	LJB890LT	332.00	LJB12690LT	410.00
Tee—Top Opening	LJB2TT	188.00	LJB4TT	238.00	LJB6TT	285.00	LJB8TT	365.00	LJB126TT	572.00
Tee—Outside Opening	LJB2TO	221.00	LJB4TO	273.00	LJB6TO	328.00	LJB8TO	421.00	—	—
Cross	LJB2X	259.00	LJB4X	318.00	LJB6X	383.00	LJB8X	530.00	LJB126X	683.00
Junction Box	LJB2JB	247.00	LJB4JB	289.00	LJB6JB	351.00	LJB8JB	431.00	—	—
Telescopic Fitting	LJB2TF	144.00	LJB4TF	155.00	LJB6TF	177.00	LJB8TF	257.00	LJB126TF	464.00
Closing Plate	LJB2CP	29.70	LJB4CP	32.80	LJB6CP	43.40	LJB8CP	61.00	LJB126CP	81.00
Panel Adapter	LJB2A	29.00	LJB4A	39.80	LJB6A	47.80	LJB8A	76.00	LJB126A	107.00
Bracket Hanger	LJB2BH	15.50	LJB4BH	18.80	LJB6BH	25.10	LJB8BH	66.00	—	—
Drop Hanger	LJB2DH	19.20	LJB4DH	25.10	LJB6DH	39.50	LJB8DH	75.00	—	—
Extra Connector Kit■	LJB2C	21.20	LJB4C	27.10	LJB6C	29.10	LJB8C	38.50	LJB126C	46.30
90° Connector	LJB290C	21.20	LJB490C	27.10	LJB690C	29.10	LJB890C	38.50	LJB12690C	79.00
Reducer to 2"	—	—	LJB42R	97.00	—	—	—	—	—	—
Reducer to 4"	—	—	—	—	LJB64R	132.00	—	—	LJB1264R	144.00
Reducer to 6"	—	—	—	—	—	—	LJB86R	167.00	LJB1266R	144.00
Cut-off fitting—not Lay-in	LJB2CF	84.00	LJB4CF	100.00	LJB6CF	124.00	LJB8CF	181.00	LJB126CF	211.00
Cut-off fitting—Lay-in	LJB2CFL	150.00	LJB4CFL	166.00	LJB6CFL	190.00	LJB8CFL	266.00	LJB126CFL	318.00
Transposition Fitting—CCW (Str)	LJB21CCW	159.00	LJB41CCW	177.00	LJB61CCW	234.00	—	—	—	—
Transposition Fitting—CW (Str)	LJB21CW	140.00	LJB41CW	177.00	LJB61CW	211.00	—	—	—	—
Transposition Elbow—CCW	LJB290LCCW	159.00	LJB490LCCW	182.00	LJB690LCCW	234.00	LJB890LCCW	315.00	—	—
Transposition Elbow—CW	LJB290LCW	159.00	LJB490LCW	182.00	LJB690LCW	234.00	LJB890LCW	315.00	—	—
Swivel fitting—Wireway to Wireway	LJB2S	171.00	LJB4S	184.00	LJB6S	254.00	LJB8S	340.00	—	—
Swivel fitting—Wireway to Box	LJB2SB	171.00	LJB4SB	184.00	LJB6SB	254.00	LJB8SB	340.00	—	—
Flex Fitting—Feed Through	LJB2FF	212.00	LJB4FF	299.00	LJB6FF	385.00	LJB8FF	418.00	—	—
Barrier Kit—5 ft. long w/hardware	—	—	LJB45B	34.80	LJB65B	70.00	LJB85B	87.00	LJB65B	70.00
5 pc. Barrier Pack—5 ft. long	—	—	LJB45BKM	79.00	LJB65BKM	120.00	—	—	—	—
5 pc. Barrier Bracket—2 compartment	—	—	LJB4BB2C	23.10	LJB6BB2C	80.00	—	—	—	—
5 pc. Barrier Bracket—3 compartment	—	—	LJB4BB3C	49.40	LJB6BB3C	99.00	—	—	—	—

▲ 10 foot straight lengths UL listed for up to 10 foot hanger spacing.

■ Connector kit furnished with each length and fitting.

Raintight Wireway—NEMA Type 3R

Outdoor raintight wireway is used to protect electrical wiring against rain, sleet, and physical damage. Unique drip shield cover protects wiring from weather and maintains the "lay-in" feature for ease of wiring installation. Lengths and fittings are constructed of 16 gauge galvanized steel with ANSI-49 gray polyester powder finish over a corrosion resistant phosphate preparation. Underwriters Laboratories Listed as steel enclosed wireway and auxiliary gutter *(horizontal mounting only)*. Conforms to NEMA Type 3R.

Table 13.3: Raintight Wireway

Description▲	4" x 4"		6" x 6"		8" x 8"	
	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
1' Length	LDRB41M	99.00	LDRB61M	150.00	LDRB81M	226.00
5' Length	LDRB45M	198.00	LDRB65M	291.00	LDRB85M	474.00
10' Length	LDRB410M	487.00	LDRB610M	641.00	LDRB810M	641.00
90° L	LDRB490L	148.00	LDRB690L	198.00	LDRB890L	278.00
30° Sweep L	LDRB430SE	302.00	LDRB630SE	431.00	LDRB830SE	546.00
Tee	LDRB4T	186.00	LDRB6T	347.00	LDRB8T	317.00
Junction Box	LDRB4J	257.00	LDRB6J	296.00	LDRB8J	439.00
Panel Adapter	LDRB44A	87.00	LDRB66A	88.00	LDRB88A	126.00
Connector▲	LDRB4C	21.00	LDRB6C	31.50	LDRB8C	42.00
Closing Plate	LDRB4CP	48.20	LDRB6CP	58.00	LDRB8CP	67.00
Drop Hanger	LDRB4DH	23.10	LDRB6DH	32.60	LDRB8DH	63.00
Wall Hanger	LDRB4WH	53.00	LDRB6WH	84.00	LDRB8WH	116.00
Reducer	—	—	LDRB64R	132.00	LDRB86R	164.00

▲ Add connectors for all lengths and fittings.

Raintight Trough—NEMA Type 3R

Raintight trough is designed for ganging meter devices, panelboards, switches, and circuit breaker enclosures. Each length is a completely enclosed section with a removable cover that has provisions for sealing.

Design: 4" and 6" wireway is constructed of 16 gauge galvanized steel. 8", 10", and 12" wireway is constructed of 14 gauge galvanized steel. All raintight troughs conform to NEMA Type 3R.

Finish: ANSI-49 gray polyester powder finish over a corrosion resistant phosphate preparation. All raintight troughs are Underwriters Laboratories listed as steel enclosed wireway and auxiliary gutter *(horizontal mounting only)*.

Table 13.4: Raintight Trough

Length	4" x 4"		6" x 6"		8" x 8"		10" x 10"		12" x 12"	
	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
1'	RDB41	84.00	RDB61	109.00	—	—	—	—	—	—
2'	RDB42	120.00	RDB62	162.00	RDB82	215.00	RDB102	289.00	RDB122	366.00
3'	RDB43	151.00	RDB63	212.00	RDB83	287.00	RDB103	382.00	RDB123	440.00
4'	RDB44	188.00	RDB64	266.00	RDB84	360.00	—	—	—	—
5'	RDB45	224.00	RDB65	318.00	RDB85	427.00	RDB105	527.00	RDB125	626.00
6'	—	—	RDB66	372.00	RDB86	589.00	RDB106	632.00	RDB126	673.00

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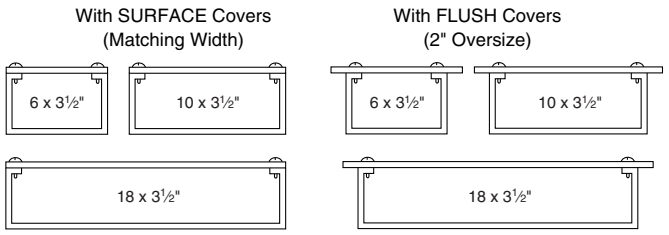
Class 5250—Wall Duct

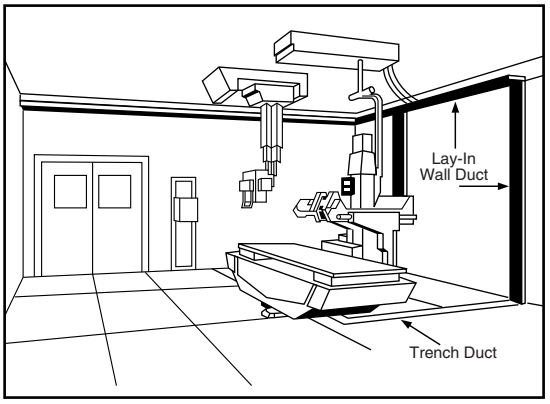
UL Listed, File E65247, for Enclosure of Wiring to X-Ray Machines. Also available in aluminum for MRI application.

Wall duct is used as the continuation for standard trench duct in the floor. Wall duct can be routed up the wall and across the ceiling or under the finished floor (in ceiling space below) to provide a continuous lay-in raceway system from control consoles and floor equipment to overhead apparatus. Devices are furnished complete with covers and are available for either flush or surface mounted installations.

General Notes:

1. Standard construction is 14 gauge steel with gray electrodeposition paint. Alternate construction is painted aluminum.
2. Covers and coupling devices are furnished with each device.
3. Wire retainers are furnished with each device.
4. Straight lengths are field cut to length.
5. Partitions and tunnels are to be field modified and installed where required.
6. Hangers or other mounting devices to be furnished by others.





Components and Accessories

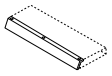
Horizontal Elbow

Edgewise Elbow

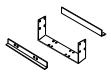
Tee

Cross

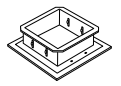
Flanged Cabinet Connector

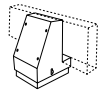

Wall Duct Dust Cover

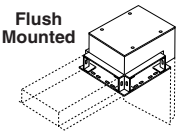
Sweep Edgewise Tee Kit


Edgewise Tee Kit

Reverse Edgewise Elbow


Ceiling Drop-out (Depth Adj. 4" to 7")


Sweep Edgewise Elbow Cabinet Connector


Flush Mounted

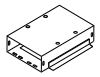
Surface Mounted

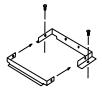
Sweep Edgewise Elbow

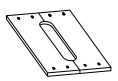
18" to 10" Reducer

Cabinet Connector

End Cap


Flush to Surface Adaptor


Floor Trench Vertical Elbow


Split Cover with Grommet

Sweep Wall Duct To Trench Duct Adaptor

Table 13.5: Lay-In Wall Duct Components

Component	Flush Cover			Surface Cover		
	Catalog Number	$ Price	Weight Lbs.	Catalog Number	$ Price	Weight Lbs.
5'–0" Straight Length With Cover 6"W	RWT06S60	**668.00**	22.5	RWT06S60S	**668.00**	20.4
10"W	RWT10S60	**668.00**	39.2	RWT10S60S	**668.00**	36.4
18"W	RWT18S60	**836.00**	62.2	RWT18S60S	**836.00**	59.4
1'–6" Straight Length With Cover 6"W	RWT06S18	**334.00**	12.6	RWT06S18S	**334.00**	12.6
10"W	RWT10S18	**334.00**	16.4	RWT10S18S	**334.00**	16.3
18"W	RWT18S18	**418.00**	23.3	RWT18S18S	**418.00**	23.3
Horizontal Elbow With Cover—90° 6"W	RWT06HE	**534.00**	6.5	RWT06HES	**534.00**	6.0
10"W	RWT10HE	**534.00**	9.3	RWT10HES	**534.00**	8.1
18"W	RWT18HE	**668.00**	24.9	RWT18HES	**668.00**	23.7
Horizontal Elbow With Cover—45° 6"W	—	—	—	RWT06HE45S	**534.00**	6.0
10"W	—	—	—	RWT10HE45S	**534.00**	8.1
18"W	—	—	—	RWT18HE45S	**668.00**	23.7
Edgewise Elbow With Cover 6"W	RWT06EE	**534.00**	5.5	RWT06EES	**534.00**	5.5
10"W	RWT10EE	**534.00**	7.5	RWT10EES	**534.00**	7.4
18"W	RWT18EE	**668.00**	11.1	RWT18EES	**668.00**	11.0
Tee With Cover 6"W	RWT06TE	**534.00**	6.2	RWT06TES	**534.00**	5.9
10"W	RWT10TE	**534.00**	8.5	RWT10TES	**534.00**	7.3
18"W	RWT18TE	**668.00**	24.1	RWT18TES	**668.00**	22.9
Cross With Cover 10"W	RWT10XE	**534.00**	1.3	RWT10XES	**534.00**	6.2
18"W	RWT18XE	**668.00**	1.8	RWT18XES	**668.00**	21.8
Flanged Cabinet Connector With Cover 10"W	RWT10CUC	**334.00**	8.0	RWT10CUCS	**334.00**	7.8
Reverse Edgewise Elbow With Cover 6"W	RWT06REE	**534.00**	5.8	RWT06REES	**534.00**	5.7
10"W	RWT10REE	**534.00**	7.5	RWT10REES	**534.00**	7.4
18"W	RWT18REE	**668.00**	11.1	RWT18REES	**668.00**	11.0
Sweep Edgewise Elbow With Cover 6"W	—		10.0	RWT06SSEES	**534.00**	4.8
10"W	RWT10SFEE	**534.00**	12.0	RWT10SSEES	**534.00**	11.8
18"W	RWT18SFEE	**668.00**	16.5	RWT18SSEES	**668.00**	16.3
Sweep Edgewise Elbow Cabinet Connector 10"W	—	—	—	RWT10SWEECC	**668.00**	14.0
18"W	—	—	—	RWT18SWEECC	**878.00**	20.0

Note: All devices available in aluminum. Add "A" suffix to the catalog number. Contact your local Schneider Electric sales office for pricing.

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Wall Duct Accessories

Table 13.6: Lay-In Wall Duct Accessories

Accessories	Catalog Number	$ Price	Weight Lbs.
5'–0" Partition	RWTP60	**100.00**	5.4
Straight through tunnel for tees ▲ 10"W 18"W	 RWT10ST RWT18ST	 **100.00** **124.00**	 2.9 3.8
90° Elbow tunnel for crosses ▲ 10"W 18"W	RWT10ET RWT18ET	**150.00** **222.00**	3.2 5.1
3 compartment tunnel for tees 10"W 18"W	RWT10PTE RWT18PTE	**368.00** **420.00**	5.0 6.0
3 compartment tunnel for crosses 10"W 18"W	RWT10PXE RWT18PXE	**526.00** **630.00**	8.0 9.0
Edgewise Tee Kit 10"W 18"W	RWT10ETK RWT18ETK	**150.00** **222.00**	1.3 2.1
Sweep Edgewise Tee Kit 10"W 18"W	RWT10SWET RWT18SWET	**822.00** **990.00**	8.0 8.0
Flush to Surface Adaptor 10"W 18"W	RWT10FS RWT18FS	**418.00** **522.00**	11.9 16.4
Ceiling Drop-Out 12x12 Flush Cover 8"x8"	RWTCDO	**584.00**	15.0
Extra Coupling Device 10"W 18"W	RWT10COUP RWT18COUP	**40.80** **64.00**	.4 .5
Extra Straight Cover—30" long (Order 2 pcs. for 5 ft. of duct.) Flush 10"W 18"W Surface 10"W 18"W	 RWT10SCOV RWT18SCOV RWT10SCOVS RWT18SCOVS	 **100.00** **130.00** **69.00** **130.00**	 7.2 13.0 6.1 11.8

▲ Tunnels form a 3" wide compartment.

Note: All devices available in aluminum. Add "A" suffix to the catalog number. Contact your local Schneider Electric sales office for pricing.

Table 13.7: Wall Duct Accessories

Accessories	Catalog Number	$ Price	Weight Lbs.
Reducer Coupling— 18" to 10" 10" to 6"	RWTRC RWT06RC	**150.00** **150.00**	2.1 1.6
Cabinet Connector 6"W 10"W 18"W	RWT06CC RWT10CC RWT18CC	**150.00** **150.00** **222.00**	1.0 1.3 2.4
End Cap 6"W 10"W 18"W	RWT06EC RWT10EC RWT18EC	**84.00** **84.00** **104.00**	1.0 1.3 1.8
Vertical Elbows for: 6" Trench to 6" Wall Duct 12" Trench to 10" Wall Duct 12" Trench to 18" Wall Duct 18" Trench to 10" Wall Duct 18" Trench to 18" Wall Duct	 RWT06FTVE06 RWT10FTVE12 RWT18FTVE12 RWT10FTVE18 RWT18FTVE18	 **160.00** **160.00** **280.00** **200.00** **250.00**	 1.1 1.2 1.2 1.3
Sweep Trench Duct to Wall Duct Adapter (available in surface cover only) 12" Trench to 10" Wall Duct 18" Trench to 18" Wall Duct	 RWT10SWFTVE12 RWT18SWFTVE18	 **348.00** **522.00**	 10.0 14.0
Split Cover with Grommet 12" long–3"x 8" Opening Flush 6"W 10"W 18"W Surface 6"W 10"W 18"W	 RWT06ACP RWT10ACP RWT18ACP RWT06ACPS RWT10ACPS RWT18ACPS	 **94.00** **94.00** **104.00** **74.00** **74.00** **93.00**	 2.6 3.1 4.8 2.0 2.7 4.0
Dust Cover—5 ft. long	RWTDCOV60	**150.00**	5.5
Grommet—100 ft. roll	RWTBG100	**440.00**	

Note: All devices available in aluminum. Add "A" suffix to the catalog number. Contact your local Schneider Electric sales office for pricing.

Trench Duct

1. STANDARD LENGTH of trench duct is 10 ft. Gasketed cover plates are ordered and shipped separately.
2. FEATURES of trench duct:
   - —Trench duct width is cover plate width.
   - —Tub width is trench duct width less 1.8".
   - —Overall width (bottom flange to flange) is 3" wider than trench duct width.
   - —Standard depth is adjustable from 2-3/8" to 3-3/8". Also available as standard is depth adjustable from 3" to 4". To order, change "2" to "3". Ex. RSV063100120. Applies to trench duct, elbows, crosses, tees, and reducers. Same price as standard device. Other depths available.
   - —Tees, crosses, horizontal elbows, and reducers are shipped complete with cover plates assembled.
   - —Grey vinyl tile trim is furnished as standard. Aluminum is available when requested.
   - —All compartments over 17" wide must be supported with dividers or posts.
3. PRICES for additions and special features:
   - —For each foot of adjustable partition, add **$64.00** per foot of partition.
   - —For each 1" of depth beyond range of 3" to 4", add **$32.00** per foot of trench duct.
   - —For double tile trim on two sides of cover plate, ONLY add **$120.00** per foot of trench duct.
   - —For double tile trim on all four sides of cover plate, add **$400.00** per foot of trench duct.
   - —For support post, add **$64.00** per foot of trench duct for each row of posts required.

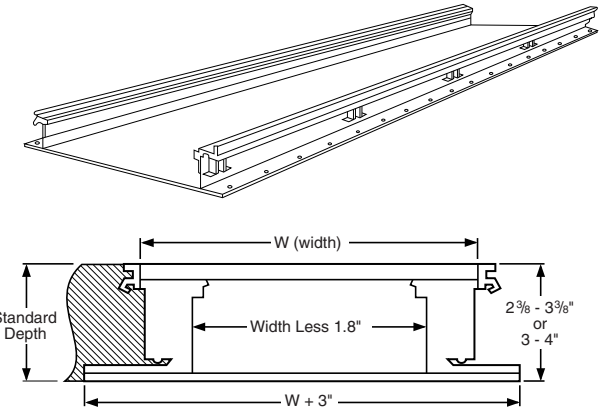

Table 13.8: Assembled Trench Duct

All part numbers listed below are for 2 3/8"–3 3/8" deep, one compartment trench with vinyl tile trims.

Straight Sections	Trench Duct				Complete Device	
	Length	Width	Catalog Number	$ Price	Per 10' Length	Per Foot
Full Length	10'-0"	6"	RSV062100120	**1840.00**	**3240.00**	**324.00**
		9"	RSV092100120	**1840.00**	**3240.00**	**324.00**
		12"	RSV122100120	**2220.00**	**3920.00**	**392.00**
		18"	RSV182100120	**2640.00**	**4740.00**	**474.00**
		24"	RSV242100120	**3160.00**	**5660.00**	**566.00**
		30"	RSV302100120	**3800.00**	**7100.00**	**710.00**
	Covers Only (5 Plates per 10' Length)■					
	24"	6"	RCP0624	**280.00**	**3240.00**	**324.00**
		9"	RCP0924	**280.00**	**3240.00**	**324.00**
		12"	RCP1224	**340.00**	**3920.00**	**392.00**
		18"	RCP1824	**420.00**	**4740.00**	**474.00**
		24"	RCP2424	**500.00**	**5660.00**	**566.00**
		30"	RCP3024	**660.00**	**7100.00**	**710.00**
	12"	12"	RCP1212	**268.00**	—	—
		18"	RCP1812	**334.00**	—	—
Factory Cut-to-Length (12" Wide Only)	6'-0"L	12"	RSV122100072	**1654.00**	—	—
	4'-3-1/2"L	12"	RSV122100051.5	**1102.00**		
	3'-3-1/2"L	12"	RSV122100039.5	**1102.00**		
	2'-0"L	12"	RSV122100024	**550.00**		
	1'-0"L	12"	RSV122100012	**550.00**		
	0'-3-1/2"L	12"	RSV122100003.5	**268.00**		
	3–24" Long Covers♦ 2–24" Long Covers & 1 – Wall Duct Vertical Elbow♦ 1–24" & 1–12" Long Cover & 1—Wall Duct Vertical Elbow♦ 1–24" Long Cover♦ 1–12" Long Cover♦ 1–Wall Duct Vertical Elbow♦				All ordered separately	

■ Straight length cover plates are shipped separately and must be ORDERED SEPARATELY.

♦ Covers and/or vertical elbows for connecting trench duct to lay-in wall duct—ORDER SEPARATELY.

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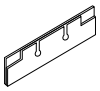
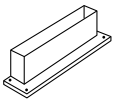
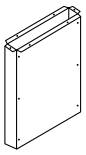
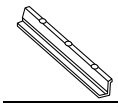
Table 13.9: Trench Duct Fittings

Item	Width	Catalog No.	$ Price
 End Closures▲	6"	REC06	**116.00**
	9"	REC09	**116.00**
	12"	REC12	**140.00**
	18"	REC18	**168.00**
	24"	REC24	**202.00**
	30"	REC30	**242.00**
 Vertical Elbows	6"	RVE06	**398.00**
	9"	RVE09	**398.00**
	12"	RVE12	**440.00**
	18"	RVE18	**570.00**
	24"	RVE24	**646.00**
	30"	RVE30	**762.00**
 Riser and Cabinet Connector (Removable Front)	6"	RRC06	**500.00**
	9"	RRC09	**500.00**
	12"	RRC12	**602.00**
	18"	RRC18	**722.00**
	24"	RRC24	**866.00**
	30"	RRC30	**1038.00**
 Z-Divider 5'-0"▲ Adjustable Barrier and Support Strip		RZD60	**252.00**
Tape for Trench Duct (180 ft. rolls)		G1414	**132.00**
Marker for Cellular Floor		G1426	**20.60**

▲ For 3" to 4" trench duct, add a "3" to end of catalog number.

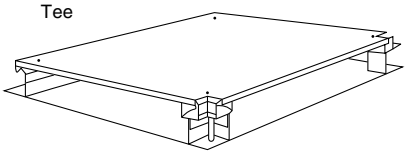
Note: All devices through 18" width are available in aluminum. Height is factory-set to customer specifications from 2-1/2 to 4 inches. (Non-Adjustable)

Table 13.10: Trench Duct Elbows, Tees, and Crosses

Item	Complete Device		
	Width	Catalog Number	$ Price
90° Horizontal▲ Elbows	6"	RHV062100009	**1168.00**
	9"	RHV092100012	**1168.00**
	12"	RHV122100015	**1462.00**
	18"	RHV182100021	**1670.00**
	24"	RHV242100027	**2284.00**
	30"	RHV302100033	**2854.00**
45° Horizontal Elbow▲	12"	RHV12245	**1446.00**
Tees▲	6"	RTV062100011	**1168.00**
	9"	RTV092100014	**1168.00**
	12"	RTV122100017	**1462.00**
	18"	RTV182100023	**1828.00**
	24"	RTV242100029	**2284.00**
	30"	RTV302100035	**2854.00**
Crosses▲	6"	RXV062100012	**1670.00**
	9"	RXV092100015	**1670.00**
	12"	RXV122100018	**2086.00**
	18"	RXV182100024	**2610.00**
	24"	RXV242100030	**3262.00**
	30"	RXV302100036	**4076.00**

▲ Includes cover; shipped attached.

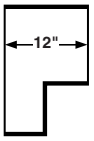
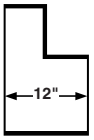
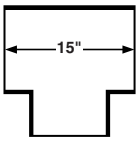
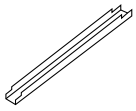
Tee



Note: All cover plate corner notches are 1-1/2" deep.

Accessories and Components

Table 13.11: Trench Duct Accessories

Item/Catalog Number		$ Price
 Right Hand Reducer 18" to 12" Cover Included	RRV182100012RR	**1670.00**
 Left Hand Reducer 18" to 12" Cover Included	RRV182100012LR	**1670.00**
 Reducing Tee 18" to 12" Cover Included	RTV182100017	**1754.00**
 Spacer Bar and Barrier Adjustment Gage	6" RSB06 9" RSB09 12" RSB12 18" RSB18 24" RSB24 30" RSB30	**200.00** **200.00** **252.00** **312.00** **392.00** **470.00**

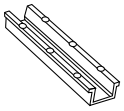
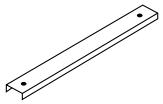
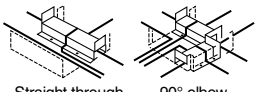
Item/Catalog Number			$ Price
	U-Compartment 5'-0" Long x 3 -1/2" Wide with Adjustable Height Sides	RUC60	**500.00**
 Leveling Legs	9" and 12" wide trench 18" and 24" wide trench 30" wide trench	G1500T12 G1500T24 G1500T36	**84.00** **84.00** **84.00**
	Support Channel Leveling Legs Not Included 5/16 x 18 x 3"	G19103	**17.00**
	Cover Lifter (Suction Cup Device)	G1735S	**836.00**
Tunnels for Trench Duct Elbows (Tee or Cross)  Straight through tunnel 90° elbow tunnel	90° tunnel for 12" trench 90° tunnel for 18" trench Straight tunnel for 12" trench Straight tunnel for 18" trench	RSV122ET RSV182ET RSV122ST RSV182ST	**200.00** **280.00** **116.00** **118.00**

Table 13.12: Grommets

Grommet Material (50 ft. rolls)	RG50	**152.00**

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Section 14

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Public Law 109-58 of the Energy Policy Act of 2005 requires the manufacturing of energy efficient transformers after January 1, 2007 for all low-voltage distribution transformers.

According to Department of Energy Federal Registry Final Rule 10 CFR Part 429, 430, and 431, *Low-Voltage Dry-Type Distribution Transformers*, the efficiency of a low-voltage, dry-type, distribution transformer manufactured on or after January 1, 2007, shall be no less than that required for its kVA rating in the table below.

Table 14.1: Required Efficiency Ratings of Low-Voltage Distribution Transformers

Single-Phase		Three-Phase	
kVA	Efficiency (%) ▲	kVA	Efficiency (%) ▲
15	97.7	15	97
25	98	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98
75	98.5	112.5	98.2
100	98.6	150	98.3
167	98.7	225	98.5
250	98.8	300	98.6
333	98.9	500	98.7
		750	98.8
		1000	98.9

▲ Efficiencies are determined at the following reference conditions:
(1) for no-load losses, at the temperature of 20 °C;
(2) for load-losses, at the temperature of 75 °C and 35 percent of nameplate load.

(Source: Table 4–2 of National Electrical Manufacturers Association (NEMA) Standard TP–1–2002, *Guide for Determining Energy Efficiency for Distribution Transformers*.)

The following family of products meets these requirements.

General Purpose, Three-Phase (15–2000 kVA) and Single-Phase (15–333 kVA)

General Purpose transformers provide the most economical solution.

- Aluminum or copper windings
- Isolation transformer
- 150 °C rise design on 220 °C insulation systems.

Watchdog, Three-Phase (15–1500 kVA) and Single-Phase (15–333 kVA)

Watchdog transformers, by design, reduce energy consumption at loads greater than 50% loading, giving fewer BTUs/hour at those loading levels. The life expectancy is greater than that of 150 °C rise General Purpose units.

- Aluminum or copper windings
- Isolation transformer
- Two temperature rise options:
  - — 115 °C rise on 220 °C insulation systems (15% continuous emergency overload capacity)
  - — 80 °C rise on 220 °C insulation systems (30% continuous emergency overload capacity)

K-Rated, Three-Phase (15–1000 kVA)

K-rated transformers mitigate Triplen harmonics via a Delta-Wye configuration.

- Aluminum or copper windings
- Isolation transformer with electrostatic shield
- K-4 and K-13 levels

Harmonic Mitigating, Three-Phase (15–1000 kVA)

Harmonic Mitigating transformers mitigate Triplen harmonics via electromagnetic phase relations. They remove 5th and 7th harmonics when using dual devices with a 0° and a +30° phase shift. They further reduce 11th and 13th harmonics when a +15° or -15° shift is added to the dual devices. Available with:

- Aluminum or copper windings
- Isolation transformer

The following products are **not** included in the definition of Low Voltage, Dry-Type Distribution Transformers and are not required to comply with the efficiency table.

Sealed, General Purpose, Three-Phase (3–30 kVA) and Single-Phase (.050–25 kVA)

Core and coils encapsulated in a sand and resin mixture allows for a more compact design.

- Copper windings
- Isolation transformer

Non-Ventilated, Three-Phase (15–500 kVA) and Single-Phase (15–250 kVA)

Non-Ventilated transformers are designed to operate in harsh environmental conditions: dust, airborne contaminants, metal particles, or where weather conditions make ventilated openings impractical.

Drive Isolation Transformers

Square D™ brand drive isolation transformers from Schneider Electric meet the special requirements for both adjustable frequency drives and dc motor drive power isolation. They cover the allowance for high surges, harmonics, and offset currents.

Drive isolation transformers are not shielded isolation transformers, but act to lessen transient generation into the supply power and act as a buffer for SCR current surges.

Available Voltages:

- Primary: 230 Delta, 460 Delta, 575 Delta
- Secondary: 230Y/133, 460Y/265, 5575Y/332

Available kVA:

- 7.5, 11, 15, 20, 27, 34, 40, 51, 63, 75, 93,118, 145, 175, 220, 275, 330, 440, 550 kVA

For part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

Motor Starting Auto Transformers

Auto transformers' design matches starter requirements.

- Open core and coil available
- Two-winding and three-winding
- Available in the following voltages:
  - — 208, 240, 480, or 600 V
- Available in the following horsepower:
  - — 10, 20, 30, 50, 75, 100, 125, 150, 200, 250, 300, 400 hp

For part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

IP00 Core and Coil Transformers

All Type 2 distribution devices are available as IP00 Core and Coil. These units are compliant with the 2005 Energy Act, as well as the excluded items.

For part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

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New!

NEMA Premium

NEMA Premium is the only third-party standard that defines a complete range of efficiency levels that exceeds 2005 Energy Act requirements.

As a partner in the NEMA Premium Transformer Program, Schneider Electric has determined that this product meets the NEMA Premium efficiency specifications for premium energy efficiency.

NOTE: NEMA Premium is a trademark of the National Electrical Manufacturers Association.

Table 14.2: Efficiency Ratings of NEMA Premium Transformers

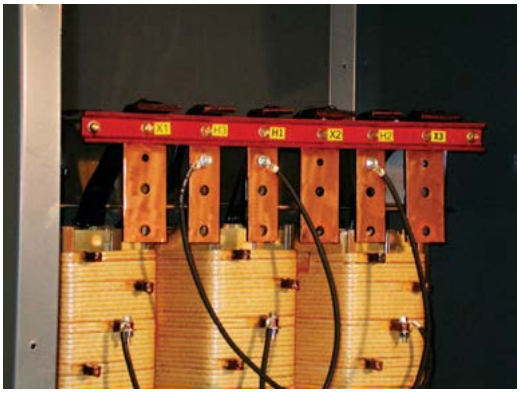
Single phase		Three phase	
kVA	Efficiency (%)	kVA	Efficiency (%)
15	98.39	15	97.90
25	98.60	30	98.25
37.5	98.74	45	98.39
50	98.81	75	98.60
75	98.95	112.5	98.74
100	99.02	150	98.81
167	99.09	225	98.95
250	99.16	300	99.02
333	99.23	500	99.09
		750	99.16
		1000	99.23

Schneider Electric Premium 30 Transformers Family

- K-rated, Three-Phase (15–1000 kVA). Available with:
  - Copper windings
  - K-9 and K-13 levels
- Harmonic Mitigating, Three-Phase (15–1000 kVA)
- Watchdog, Three-Phase (15–1000 kVA) and Single-Phase (15–333 kVA)

Features of Distribution and NEMA Premium Transformers

- Provide an adequate wire bending radius for multiple cable options, per NEC 312.6(A) (called out in NEC 450.12 *Terminal Wire Space*)
- 200% cable landing on all X0 or H0 terminals
- Required ventilation clearance marked on all units in accordance with NEC Section 450.9.
  - All ventilated transformers from Schneider Electric require only a three-inch clearance—50% smaller than the industry average
- Terminals are sized for overcurrent and wire size, not for nameplate current rating
  - Primary terminals are sized to accept lugs up to 250% of nameplate current rating
  - Secondary terminals are sized to accept lugs up to 125% of nameplate current rating



Square D™ brand transformers from Schneider Electric feature the largest terminals in the industry.

Sound Levels

Square D™ brand transformers meet the NEMA standards for sound level shown in Table 14.3.

Table 14.3: NEMA Standards for Sound Levels

kVA Rating	Sound Level
0–9	40 dB
10–50	45 dB
51–150	50 dB
151–300	55 dB
301–500	60 dB
501–700	62 dB
701–1000	64 dB

For an additional charge, any Square D™ brand transformer can be built with a sound level that is 3 or 6 dB below the NEMA standard.

For part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

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Table 14.4: EE Three-Phase Transformers; 60 Hz; 208Y/120 Secondary; cULus Listed

kVA	Catalog No.	$ Price	Full Capacity Taps	Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
480 V Delta Primary, Aluminum Windings						
15	EE15T3H	**3941.00**	6–2.5%2+4–	150	220	17D
30	EE30T3H	**5181.00**	6–2.5%2+4–	150	260	17D
45	EE45T3H	**6234.00**	6–2.5%2+4–	150	368	18D
75	EE75T3H	**9393.00**	6–2.5%2+4–	150	585	20D
112.5	EE112T3H	**12513.00**	6–2.5%2+4–	150	620	21D
150	EE150T3H	**16334.00**	6–2.5%2+4–	150	835	22D
225	EE225T3H	**21776.00**	6–2.5%2+4–	150	1110	24D
300	EE300T3H	**27924.00**	6–2.5%2+4–	150	1350	25D
500	EE500T68H	**39052.00**	4–2.5%2+2–	150	1875	30D
750	EE750T68H	**75516.00**	4–2.5%2+2–	150	2965	31D
1000	EE1000T77H	**121263.00**	2–5%1+1–	150	5200	♦
600 V Delta Primary, Aluminum Windings						
15	EE15T65H	**5011.00**	6–2.5%2+4–	150	240	17D
30	EE30T65H	**6586.00**	6–2.5%2+4–	150	290	17D
45	EE45T65H	**7925.00**	6–2.5%2+4–	150	372	18D
75	EE75T65H	**11941.00**	6–2.5%2+4–	150	585	20D
112.5	EE112T65H	**15907.00**	6–2.5%2+4–	150	712	21D
150	EE150T65H	**20765.00**	6–2.5%2+4–	150	790	22D
225	EE225T65H	**27683.00**	6–2.5%2+4–	150	945	24D
300	EE300T65H	**35498.00**	6–2.5%2+4–	150	1305	25D
500	EE500T79H	**49645.00**	4–2.5%2+2–	150	1870	30D
750	EE750T79H	**96000.00**	4–2.5%2+2–	150	2990	31D
1000	EE1000T79H	**154157.00**	4–2.5%2+2–	150	5800	♦
208 V Delta Primary, Aluminum Windings						
15	EE15T211H	**5011.00**	3–5%1+2–	150	210	17D
30	EE30T211H	**6586.00**	3–5%1+2–	150	210	17D
45	EE45T211H	**7925.00**	3–5%1+2–	150	374	18D
75	EE75T211H	**11941.00**	3–5%1+2–	150	575	20D
112.5	EE112T211H	**15907.00**	3–5%1+2–	150	604	21D
150	EE150T211H	**20765.00**	3–5%1+2–	150	795	22D
225	EE225T211H	**27683.00**	3–5%1+2–	150	1000	24D
300	EE300T211H	**35498.00**	3–5%1+2–	150	1425	25D
500	EE500T211H	**49645.00**	3–5%1+2–	150	1870	30D
240 V Delta Primary, Aluminum Windings						
15	EE15T67H	**5011.00**	6–2.5%2+4–	150	240	17D
30	EE30T67H	**6586.00**	6–2.5%2+4–	150	260	17D
45	EE45T67H	**7925.00**	6–2.5%2+4–	150	379	18D
75	EE75T67H	**11941.00**	6–2.5%2+4–	150	590	20D
112.5	EE112T67H	**15907.00**	6–2.5%2+4–	150	620	21D
150	EE150T67H	**20765.00**	6–2.5%2+4–	150	805	22D
225	EE225T67H	**27683.00**	6–2.5%2+4–	150	972	24D
300	EE300T239H	**35498.00**	3–5%1+2–	150	1360	25D
500	EE500T239H	**49645.00**	3–5%1+2–	150	1900	25D
480 V Delta Primary, Copper Windings						
15	EE15T3HCU	**6306.00**	6–2.5%2 + 4–	150	310	17D
30	EE30T3HCU	**8290.00**	6–2.5%2 + 4–	150	340	17D
45	EE45T3HCU	**9974.00**	6–2.5%2 + 4–	150	418	18D
75	EE75T3HCU	**15029.00**	6–2.5%2 + 4–	150	642	20D
112.5	EE112T3HCU	**20021.00**	6–2.5%2 + 4–	150	725	21D
150	EE150T3HCU	**26134.00**	6–2.5%2 + 4–	150	915	22D
225	EE225T3HCU	**34842.00**	6–2.5%2 + 4–	150	1125	24D
300	EE300T3HCU	**44679.00**	6–2.5%2 + 4–	150	1535	25D
500	EE500T68HCU	**62483.00**	4–2.5%2 + 2–	150	2350	30D
750	EE750T68HCU	**120826.00**	4–2.5%2 + 2–	150	3485	31D

Table 14.5: EE Three-Phase Transformers; 60 Hz; 480Y/277 Secondary; cULus Listed

kVA	Catalog No.	$ Price	Full Capacity Taps	Deg. C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
208 V Delta Primary, Aluminum Windings						
15	EE15T212H	**5011.00**	3–5%1+2–	150	230	17D
30	EE30T212H	**6586.00**	3–5%1+2–	150	260	17D
45	EE45T212H	**7925.00**	3–5%1+2–	150	375	18D
75	EE75T212H	**11941.00**	3–5%1+2–	150	550	20D
112.5	EE112T212H	**15907.00**	3–5%1+2–	150	615	21D
150	EE150T212H	**20765.00**	3–5%1+2–	150	800	22D
225	EE225T212H	**27683.00**	3–5%1+2–	150	991	24D
300	EE300T212H	**35498.00**	3–5%1+2–	150	1425	25D
500	EE500T212H	**49645.00**	3–5%1+2–	150	1919	30D
480 V Delta Primary, Aluminum Windings						
15	EE15T1814H	**5011.00**	6–2.5%2+4–	150	215	17D
30	EE30T1814H	**6586.00**	6–2.5%2+4–	150	260	17D
45	EE45T1814H	**7925.00**	6–2.5%2+4–	150	385	18D
75	EE75T1814H	**11941.00**	6–2.5%2+4–	150	660	20D
112.5	EE112T1814H	**15907.00**	6–2.5%2+4–	150	615	21D
150	EE150T1814H	**20765.00**	6–2.5%2+4–	150	820	22D
225	EE225T1814H	**27683.00**	6–2.5%2+4–	150	998	24D
300	EE300T1814H	**35498.00**	6–2.5%2+4–	150	1500	25D
500	EE500T76H	**49645.00**	4–2.5%2+2–	150	2040	30D

Table 14.6: EE Three-Phase Transformers; 60 Hz; 240 Delta Secondary; cULus Listed

kVA	Catalog No.	$ Price	Full Capacity Taps	Deg. C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
480 V Delta Primary, Aluminum Windings						
15	EE15T6H	**5011.00**	6–2.5%2+4–	150	220	17D
30	EE30T6H	**6586.00**	6–2.5%2+4–	150	260	17D
45	EE45T6H	**7925.00**	6–2.5%2+4–	150	368	18D
75	EE75T6H	**11941.00**	6–2.5%2+4–	150	585	20D
112.5	EE112T6H	**15907.00**	6–2.5%2+4–	150	620	21D
150	EE150T6H	**20765.00**	6–2.5%2+4–	150	835	22D
225	EE225T6H	**27683.00**	6–2.5%2+4–	150	1110	24D
300	EE300T6H	**35498.00**	6–2.5%2+4–	150	1350	25D
500	EE500T63H	**49645.00**	4–2.5%2+2–	150	1875	30D
750	EE750T63H	**96000.00**	4–2.5%2+2–	150	2965	31D
1000	EE1000T78H	**154157.00**	2–5%1+1–	150	5200	♦
480 V Primary with 120 Center Tap, Aluminum Windings						
240 Delta with 120 center taps have historically been limited to 5% capacity on the center tap. The units from Schneider Electric offer greater limits on 120 V center tap. Limits are determined by the total transformer loading and the following formula used to size new 120 V center tap units: (240 V balanced loads) + 2.5 x (120 V loads) = kVA required						
15	EE15T151HCT	**5117.00**	2–5%–	150	220	17D
30	EE30T151HCT	**6726.00**	2–5%–	150	295	17D
45	EE45T151HCT	**8093.00**	2–5%–	150	385	18D
75	EE75T151HCT	**12193.00**	2–5%–	150	590	19D
112.5	EE112T151HCT	**16243.00**	2–5%–	150	635	21D
150	EE150T151HCT	**21202.00**	2–5%–	150	783	22D
225	EE225T151HCT	**28266.00**	2–5%–	150	1080	24D
300	EE300T151HCT	**36247.00**	2–5%–	150	1355	25D
500	EE500T151HCT	**50691.00**	2–5%–	150	2137	30D
750	EE750T151HCT	**98020.00**	2–5%–	150	2982	31D
1000	EE1000T151HCT	**149905.00**	2–5%–	150	5800	♦

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.
♦ Contact factory.

NOTE: FCBN = full capacity below normal
Lugs are furnished by customer
Refer to www.squared.com/eexfmr for additional information.

Other Primary and Secondary combinations are available via the Schneider Electric Product Configurator. Contact your local Schneider Electric representative for more information.

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Table 14.7: EE Single-Phase Transformers

kVA	Catalog No.	$ Price	Full Capacity Taps	Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
Single-Phase—240 X 480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed through 167 kVA						
15	EE15S3H	**3072.00**	6–2.5%2+4–♦	150	215	17D
25	EE25S3H	**4151.00**	6–2.5%2+4–♦	150	275	17H
37.5	EE37S3H	**5534.00**	6–2.5%2+4–♦	150	340	18H
50	EE50S3H	**6731.00**	6–2.5%2+4–♦	150	395	18H
75	EE75S3H	**9128.00**	6–2.5%2+4–♦	150	619	21D
100	EE100S3H	**15091.00**	6–2.5%2+4–♦	150	682	22D
167	EE167S3H	**17333.00**	6–2.5%2+4–♦	150	982	24D
250	EE250S3H	**35837.00**	6–2.5%2+4–♦	150	1060	25D
333	EE333S3H	**44586.00**	6–2.5%2+4–♦	150	1854	31D
Single-Phase—600 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed through 167 kVA						
15	EE15S3534H	**3733.00**	6–2.5%2+4–♦	150	215	17D
25	EE25S3534H	**5044.00**	6–2.5%2+4–♦	150	275	17H
37.5	EE37S3534H	**6723.00**	6–2.5%2+4–♦	150	400	18H
50	EE50S3534H	**8177.00**	6–2.5%2+4–♦	150	450	18H
75	EE75S3534H	**11089.00**	6–2.5%2+4–♦	150	605	21D
100	EE100S3534H	**18332.00**	6–2.5%2+4–♦	150	795	22D
167	EE167S3534H	**21056.00**	6–2.5%2+4–♦	150	985	24D
250	EE250S3534H	**43535.00**	6–2.5%2+4–♦	150	1065	25D
333	EE333S3534H	**50383.00**	6–2.5%2+4–♦	150	1865	31D
Single-Phase—208 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed through 167 kVA						
15	EE15S60H	**4506.00**	2-5%FCBN	150	200	17D
25	EE25S60H	**5866.00**	2-5%FCBN	150	275	17H
37.5	EE37S60H	**7818.00**	2-5%FCBN	150	397	18H
50	EE50S60H	**9508.00**	2-5%FCBN	150	420	18H
75	EE75S60H	**12890.00**	2-5%FCBN	150	621	21D
100	EE100S60H	**19613.00**	2-5%FCBN	150	795	22D
167	EE167S60H	**24484.00**	2-5%FCBN	150	985	24D
Single-Phase—277 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed through 167 kVA						
15	EE15S61H	**4506.00**	2-5%FCBN	150	225	17D
25	EE25S61H	**5866.00**	2-5%FCBN	150	285	17H
37.5	EE37S61H	**7818.00**	2-5%FCBN	150	410	18H
50	EE50S61H	**9508.00**	2-5%FCBN	150	460	18H
75	EE75S61H	**12890.00**	2-5%FCBN	150	630	21D
100	EE100S61H	**19613.00**	2-5%FCBN	150	695	22D
167	EE167S61H	**24484.00**	2-5%FCBN	150	995	24D

EE Three- and Single-Phase Watchdog Low Temperature Rise Transformers

Designed to maximize energy efficiency, supplies highest efficient levels for 24 hour loading greater than 50%. Extra long life expectancy using 220 °C insulation system designed for full load operation at a maximum temperature rise of 115 °C or 80 °C instead of 150 °C. Continuous emergency overload capability of 15% on 115 °C rise and 30% on 80 °C rise.

Table 14.8: EE Watchdog Transformers

kVA	Catalog No.	$ Price	Full Capacity Taps	Weight (lbs) ▲	Enclosure ▲■
115 °C Rise Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed					
15	EE15T3HF	**4861.00**	6–2.5%2 + 4–	220	17D
30	EE30T3HF	**7292.00**	6–2.5%2 + 4–	368	18D
45	EE45T3HF	**8777.00**	6–2.5%2 + 4–	585	20D
75	EE75T3HF	**13222.00**	6–2.5%2 + 4–	620	21D
112.5	EE112T3HF	**17614.00**	6–2.5%2 + 4–	835	22D
150	EE150T3HF	**22993.00**	6–2.5%2 + 4–	980	24D
225	EE225T3HF	**30652.00**	6–2.5%2 + 4–	1349	25D
300	EE300T68HF	**39094.00**	6–2.5%2 + 4–	2050	30D
500	EE500T68HF	**54673.00**	6–2.5%2 + 2–	2330	30D
115 °C Rise Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed. Copper Windings					
15	EE15T3HFCU	**7778.00**	6–2.5%2 + 4–	260	17D
30	EE30T3HFCU	**11667.00**	6–2.5%2 + 4–	420	18D
45	EE45T3HFCU	**14043.00**	6–2.5%2 + 4–	642	20D
75	EE75T3HFCU	**21155.00**	6–2.5%2 + 4–	675	20D
112.5	EE112T3HFCU	**28182.00**	6–2.5%2 + 4–	741	21D
150	EE150T3HFCU	**36789.00**	6–2.5%2 + 4–	1050	22D
225	EE225T3HFCU	**49043.00**	6–2.5%2 + 4–	1220	24D
300	EE300T68HFCU	**62551.00**	6–2.5%2 + 4–	2300	30D
500	EE500T68HFCU	**87477.00**	6–2.5%2 + 2–	2409	30D
80 °C Rise Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed					
15	EE15T3HB	**5304.00**	6–2.5%2 + 4–	220	17D
30	EE30T3HB	**7956.00**	6–2.5%2 + 4–	368	18D
45	EE45T3HB	**9574.00**	6–2.5%2 + 4–	585	20D
75	EE75T3HB	**14424.00**	6–2.5%2 + 4–	620	21D
112.5	EE112T3HB	**19215.00**	6–2.5%2 + 4–	835	22D
150	EE150T3HB	**24641.00**	6–2.5%2 + 4–	980	24D
225	EE225T3HB	**33438.00**	6–2.5%2 + 4–	1349	25D
300	EE300T68HB	**43282.00**	6–2.5%2 + 4–	2400	30D
500	EE500T68HB	**60531.00**	6–2.5%2 + 2–	2964	31D
80 °C Rise Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed. Copper Windings					
15	EE15T3HBCU	**8486.00**	6–2.5%2 + 4–	260	17D
30	EE30T3HBCU	**12730.00**	6–2.5%2 + 4–	418	18D
45	EE45T3HBCU	**15318.00**	6–2.5%2 + 4–	642	20D
75	EE75T3HBCU	**23078.00**	6–2.5%2 + 4–	725	21D
112.5	EE112T3HBCU	**30744.00**	6–2.5%2 + 4–	910	21D
150	EE150T3HBCU	**39426.00**	6–2.5%2 + 4–	1125	24D
225	EE225T3HBCU	**53501.00**	6–2.5%2 + 4–	1425	24D
300	EE300T68HBCU	**69251.00**	6–2.5%2 + 4–	2400	30D
500	EE500T68HBCU	**96850.00**	6–2.5%2 + 2–	2578	30D
115 °C Rise Single-Phase—240x480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed					
15	EE15S3HF	**4453.00**	6–2.5%2 + 4–♦	275	17H
25	EE25S3HF	**5797.00**	6–2.5%2 + 4–♦	340	18H
37.5	EE37S3HF	**7726.00**	6–2.5%2 + 4–♦	395	18H
50	EE50S3HF	**9396.00**	6–2.5%2 + 4–♦	620	21D
75	EE75S3HF	**12738.00**	6–2.5%2 + 4–♦	685	22D
100	EE100S3HF	**19381.00**	6–2.5%2 + 4–♦	985	24D
80 °C Rise Single-Phase—240x480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed					
15	EE15S3HB	**4918.00**	6–2.5%2 + 4–♦	280	17H
25	EE25S3HB	**6403.00**	6–2.5%2 + 4–♦	345	18H
37.5	EE37S3HB	**8533.00**	6–2.5%2 + 4–♦	400	18H
50	EE50S3HB	**10378.00**	6–2.5%2 + 4–♦	625	21D
75	EE75S3HB	**14069.00**	6–2.5%2 + 4–♦	690	22D
100	EE100S3HB	**21406.00**	6–2.5%2 + 4–♦	995	24D

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.
♦ When 240 V tap is used, there will be 3–5% taps: 1 above and 2 below.

NOTE: FCBN = full capacity below normal
Lugs are furnished by customer
Refer to www.squared.com/eexfmr for additional information.

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EE NL and NLP Series Transformers

- Three-phase dry type transformers, 480 Delta to 208Y/120
- Aluminum or copper windings
- Electrostatic shield
- Class 220 insulation
- Double size neutral terminal for additional customer neutral cables
- Additional coil capacity to compensate for higher non-linear load loss
- cULus Listed

Table 14.9: 480 Delta Primary, 208Y/120 Primary

kVA	Catalog No.	$ Price	Taps	Weight (lbs) ▲	Enclosure ▲■
NL Series for Typical Non-Linear Load Service; K-4 Rated; Aluminum Windings; 115 °C Rise					
15	EE15T3HFISNL	**5834.00**	6–2.5% 2+4–	256	17D
30	EE30T3HFISNL	**8751.00**	6–2.5% 2+4–	320	18D
45	EE45T3HFISNL	**10533.00**	6–2.5% 2+4–	515	20D
75	EE75T3HFISNL	**15866.00**	6–2.5% 2+4–	535	21D
112.5	EE112T3HFISNL	**21137.00**	6–2.5% 2+4–	800	22D
150	EE150T3HFISNL	**27592.00**	6–2.5% 2+4–	1110	24D
225	EE225T3HFISNL	**38389.00**	6–2.5% 2+4–	1349	25D
300	EE300T68HFISNL	**53179.00**	4–2.5% 2+2–	1750	30D
500	EE500T68HFISNL	**73483.00**	4–2.5% 2+2–	2295	31D
NL Series for Typical Non-Linear Load Service; K-4 Rated; Copper Windings; 115 °C Rise					
15	EE15T3HFISCUNL	**9334.00**	6–2.5% 2+4–	260	17D
30	EE30T3HFISCUNL	**14002.00**	6–2.5% 2+4–	395	18D
45	EE45T3HFISCUNL	**16853.00**	6–2.5% 2+4–	730	20D
75	EE75T3HFISCUNL	**25386.00**	6–2.5% 2+4–	640	20D
112.5	EE112T3HFISCUNL	**33819.00**	6–2.5% 2+4–	935	22D
150	EE150T3HFISCUNL	**44147.00**	6–2.5% 2+4–	1300	24D
225	EE225T3HFISCUNL	**61422.00**	6–2.5% 2+4–	1450	25D
300	EE300T68HFISCUNL	**85086.00**	4–2.5% 2+2–	2450	25D
NLP Series for More Severe Non-Linear Load Service; K-13 Rated; Aluminum Windings; 115 °C Rise					
15	EE15T3HFISNLP	**6636.00**	6–2.5% 2+4–	256	17D
30	EE30T3HFISNLP	**9954.00**	6–2.5% 2+4–	375	18D
45	EE45T3HFISNLP	**11981.00**	6–2.5% 2+4–	500	20D
75	EE75T3HFISNLP	**18048.00**	6–2.5% 2+4–	560	21D
112.5	EE112T3HFISNLP	**24043.00**	6–2.5% 2+4–	800	22D
150	EE150T3HFISNLP	**31386.00**	6–2.5% 2+4–	1110	24D
225	EE225T3HFISNLP	**42764.00**	6–2.5% 2+4–	1335	25D
300	EE300T68HFISNLP	**56966.00**	4–2.5% 2+2–	2350	30D
500	EE500T68HFISNLP	**79157.00**	4–2.5% 2+2–	3200	31D
NLP Series for More Severe Non-Linear Load Service; K-13 Rated; Copper Windings; 115 °C Rise					
15	EE15T3HFISCUNLP	**10618.00**	6–2.5% 2+4–	260	17D
30	EE30T3HFISCUNLP	**15926.00**	6–2.5% 2+4–	430	18D
45	EE45T3HFISCUNLP	**19170.00**	6–2.5% 2+4–	730	20D
75	EE75T3HFISCUNLP	**28877.00**	6–2.5% 2+4–	640	20D
112.5	EE112T3HFISCUNLP	**38469.00**	6–2.5% 2+4–	985	22D
150	EE150T3HFISCUNLP	**50218.00**	6–2.5% 2+4–	1135	24D
225	EE225T3HFISCUNLP	**68422.00**	6–2.5% 2+4–	1477	25D
300	EE300T68HFISCUNLP	**91146.00**	4–2.5% 2+2–	2650	30D

Table 14.10: Harmonic Mitigating, 480 Primary to 208zz/120 Secondary—UL Listed

kVA	Catalog No.	$ Price	Taps	Weight (lbs) ▲	Enclosure ▲■
0° Phase Shift; Copper Windings; 130 °C Rise					
15	HM15T208NCU	**12670.00**	6–2.5% 2+4–	310	17D
30	HM30T208NCU	**19416.00**	6–2.5% 2+4–	340	17D
45	HM45T208NCU	**23364.00**	6–2.5% 2+4–	418	18D
75	HM75T208NCU	**35204.00**	6–2.5% 2+4–	642	20D
112.5	HM112T208NCU	**46900.00**	6–2.5% 2+4–	725	21D
150	HM150T208NCU	**61226.00**	6–2.5% 2+4–	915	22D
225	HM225T208NCU	**81616.00**	6–2.5% 2+4–	1125	24D
300	HM300T208NCU	**104664.00**	6–2.5% 2+4–	1535	25D
30° Phase Shift; Copper Windings; 130 °C Rise					
15	HM15T255NCU	**12670.00**	3-5%1+2-	310	17D
30	HM30T255NCU	**19416.00**	3-5%1+2-	340	17D
45	HM45T255NCU	**23364.00**	3-5%1+2-	418	18D
75	HM75T255NCU	**35204.00**	3-5%1+2-	642	20D
112.5	HM112T255NCU	**46900.00**	3-5%1+2-	725	21D
150	HM150T255NCU	**61226.00**	3-5%1+2-	915	22D
225	HM225T255NCU	**81616.00**	3-5%1+2-	1125	24D
300	HM300T255NCU	**104664.00**	3-5%1+2-	1535	25D
+15° Phase Shift; Copper Windings; 130 °C Rise					
15	HM15T251NCU	**12670.00**	6–2.5% 2+4–	310	17D
30	HM30T251NCU	**19416.00**	6–2.5% 2+4–	340	17D
45	HM45T251NCU	**23364.00**	6–2.5% 2+4–	418	18D
75	HM75T251NCU	**35204.00**	6–2.5% 2+4–	642	20D
112.5	HM112T251NCU	**46900.00**	6–2.5% 2+4–	725	21D
150	HM150T251NCU	**61226.00**	6–2.5% 2+4–	915	22D
225	HM225T251NCU	**81616.00**	6–2.5% 2+4–	1125	24D
300	HM300T251NCU	**104664.00**	6–2.5% 2+4–	1535	25D
15° Phase Shift; Copper Windings; 130 °C Rise					
15	HM15T259NCU	**12670.00**	6–2.5% 2+4–	310	17D
30	HM30T259NCU	**19416.00**	6–2.5% 2+4–	340	17D
45	HM45T259NCU	**23364.00**	6–2.5% 2+4–	418	18D
75	HM75T259NCU	**35204.00**	6–2.5% 2+4–	642	20D
112.5	HM112T259NCU	**46900.00**	6–2.5% 2+4–	725	21D
150	HM150T259NCU	**61226.00**	6–2.5% 2+4–	915	22D
225	HM225T259NCU	**81616.00**	6–2.5% 2+4–	1125	24D
300	HM300T259NCU	**104664.00**	6–2.5% 2+4–	1535	25D

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.

Additional temperature rises are available; for part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

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New!

NEMA Premium

As a partner in the NEMA Premium Transformer Program, Schneider Electric has determined that this product meets the NEMA Premium Efficiency specifications for premium energy efficiency.

Table 14.11: 480 V Delta Primary, 208Y/120 Secondary

kVA	Catalog No.	$ Price	Taps	Weight (lbs) ▲	Enclosure ▲■
NP Series for Typical Non-Linear Load Service— K-9 Rated—Copper Windings; 130 °C Rise					
15	EP15T3HNISCUNP	**16395.00**	6–2.5% 2+4–	310	17D
30	EP30T3HNISCUNP	**24925.00**	6–2.5% 2+4–	340	18D
45	EP45T3HNISCUNP	**28425.00**	6–2.5% 2+4–	418	20D
75	EP75T3HNISCUNP	**44590.00**	6–2.5% 2+4–	642	21D
112.5	EP112T3HNISCUNP	**57863.00**	6–2.5% 2+4–	725	22D
150	EP150T3HNISCUNP	**74683.00**	6–2.5% 2+4–	915	24D
225	EP225T3HNISCUNP	**104646.00**	6–2.5% 2+4–	1125	25D
300	EP300T3HNISCUNP	**136718.00**	4–2.5% 2+2–	1535	30D
NP Series for Typical Non-Linear Load Service— K-9Rated—Copper Windings; 115 °C Rise					
15	EP15T3HFISCUNP	**21313.00**	6–2.5% 2+4–	310	17D
30	EP30T3HFISCUNP	**32402.00**	6–2.5% 2+4–	340	18D
45	EP45T3HFISCUNP	**36952.00**	6–2.5% 2+4–	418	20D
75	EP75T3HFISCUNP	**57967.00**	6–2.5% 2+4–	642	20D
112.5	EP112T3HFISCUNP	**75222.00**	6–2.5% 2+4–	725	22D
150	EP150T3HFISCUNP	**97088.00**	6–2.5% 2+4–	915	24D
225	EP225T3HFISCUNP	**136040.00**	6–2.5% 2+4–	1125	25D
300	EP300T3HFISCUNP	**177733.00**	4–2.5% 2+2–	1535	25D
NLP Series for More Severe Non-Linear Load Service—K-13 Rated—Copper Windings; 150 °C Rise					
15	EP15T3HISCUNLP	**17451.00**	6–2.5% 2+4–	260	17D
30	EP30T3HISCUNLP	**26527.00**	6–2.5% 2+4–	430	18D
45	EP45T3HISCUNLP	**30253.00**	6–2.5% 2+4–	730	20D
75	EP75T3HISCUNLP	**47459.00**	6–2.5% 2+4–	640	20D
112.5	EP112T3HISCUNLP	**61585.00**	6–2.5% 2+4–	985	22D
150	EP150T3HISCUNLP	**79488.00**	6–2.5% 2+4–	1135	24D
225	EP225T3HISCUNLP	**110288.00**	6–2.5% 2+4–	1477	25D
300	EP300T68HISCUNLP	**141419.00**	4–2.5% 2+2–	2650	30D

Table 14.12: Harmonic Mitigating, 480 Primary to 208zz/120 Secondary; Copper Windings

kVA	Catalog No.	$ Price	Taps	Weight (lbs) ▲	Enclosure ▲■
0° Phase Shift					
15	HM15T208HNCUEP	**20822.00**	6–2.5% 2+4–	310	17D
30	HM30T208HNCUEP	**32341.00**	6–2.5% 2+4–	340	17D
45	HM45T208HNCUEP	**36872.00**	6–2.5% 2+4–	418	18D
75	HM75T208HNCUEP	**57857.00**	6–2.5% 2+4–	642	20D
112.5	HM112T208HNCUEP	**75082.00**	6–2.5% 2+4–	725	21D
150	HM150T208HNCUEP	**96912.00**	6–2.5% 2+4–	915	22D
225	HM225T208HNCUEP	**131554.00**	6–2.5% 2+4–	1125	24D
300	HM300T208HNCUEP	**162393.00**	6–2.5% 2+4–	1535	25D
30° Phase Shift					
15	HM15T255HNCUEP	**20822.00**	3-5%1+2-	310	17D
30	HM30T255HNCUEP	**32341.00**	3-5%1+2-	340	17D
45	HM45T255HNCUEP	**36872.00**	3-5%1+2-	418	18D
75	HM75T255HNCUEP	**57857.00**	3-5%1+2-	642	20D
112.5	HM112T255HNCUEP	**75082.00**	3-5%1+2-	725	21D
150	HM150T255HNCUEP	**96912.00**	3-5%1+2-	915	22D
225	HM225T255HNCUEP	**131554.00**	3-5%1+2-	1125	24D
300	HM300T255HNCUEP	**162393.00**	3-5%1+2-	1535	25D
+15° Phase Shift					
15	HM15T251HNCUEP	**20822.00**	6–2.5% 2+4–	310	17D
30	HM30T251HNCUEP	**32341.00**	6–2.5% 2+4–	340	17D
45	HM45T251HNCUEP	**36872.00**	6–2.5% 2+4–	418	18D
75	HM75T251HNCUEP	**57857.00**	6–2.5% 2+4–	642	20D
112.5	HM112T251HNCUEP	**75082.00**	6–2.5% 2+4–	725	21D
150	HM150T251HNCUEP	**96912.00**	6–2.5% 2+4–	915	22D
225	HM225T251HNCUEP	**131554.00**	6–2.5% 2+4–	1125	24D
300	HM300T251HNCUEP	**162393.00**	6–2.5% 2+4–	1535	25D
-15° Phase Shift					
15	HM15T259HNCUEP	**20822.00**	6–2.5% 2+4–	310	17D
30	HM30T259HNCUEP	**32341.00**	6–2.5% 2+4–	340	17D
45	HM45T259HNCUEP	**36872.00**	6–2.5% 2+4–	418	18D
75	HM75T259HNCUEP	**57857.00**	6–2.5% 2+4–	642	20D
112.5	HM112T259HNCUEP	**75082.00**	6–2.5% 2+4–	725	21D
150	HM150T259HNCUEP	**96912.00**	6–2.5% 2+4–	915	22D
225	HM225T259HNCUEP	**131554.00**	6–2.5% 2+4–	1125	24D
300	HM300T259HNCUEP	**162393.00**	6–2.5% 2+4–	1535	25D

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.

Additional temperature rises are available; for part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

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Sealed Three- and Single-Phase Transformers

Table 14.13: Sealed Transformers

kVA	Catalog No.	$ Price	Full Capacity Taps	Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed; Copper Windings						
3	3T2F	**2016.00**	2–5%FCBN	115	120	12C
6	6T2F	**2310.00**	2–5%FCBN	115	145	12C
9	9T2F	**3088.00**	2–5%FCBN	115	235	14C
15	15T2F	**4644.00**	2–5%FCBN	115	300	14C
30	30T2F	**8536.00**	2–5%FCBN	115	660	16C
Three-Phase—480 V Delta Primary; 240 V Delta Secondary; 60 Hz; cULus Listed; Copper Windings						
3	3T5F	**2016.00**	2–5%FCBN	115	120	12C
6	6T5F	**2310.00**	2–5%FCBN	115	145	12C
9	9T75F	**3088.00**	4–2.5%FCBN	115	235	14C
15	15T75F	**4644.00**	4–2.5%FCBN	115	300	14C
30	30T75F	**8536.00**	4–2.5%FCBN	115	660	16C
Single-Phase—240 X 480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed						
0.05	50SV1A	**182.00**	None	55	4.2	1A
0.10	100SV1A	**214.00**	None	55	4.5	2A
0.15	150SV1A	**254.00**	None	55	6.2	3A
0.25	250SV1B	**270.00**	None	80	10.5	4A
0.50	500SV1B	**386.00**	None	80	13.8	5A
0.75	750SV1F	**460.00**	None	115	15.5	6A
1	1S1F	**602.00**	None	115	21.2	7A
1.5	1.5S1F	**724.00**	None	115	30.1	8A
2	2S1F	**896.00**	None	115	39.1	9A
3	3S1F	**1144.00**	None	115	60	10A
5	5S1F	**1556.00**	None	115	115	13B
7.5	7S1F	**2188.00**	None	115	135	13B
10	10S1F	**2712.00**	None	115	165	13B
Single-Phase—600 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed						
0.05	50SV51A	**182.00**	None	55	4.2	1A
0.10	100SV51A	**214.00**	None	55	4.5	2A
0.15	150SV51A	**262.00**	None	55	6.2	3A
0.25	250SV51B	**290.00**	None	80	10.5	4A
0.50	500SV51B	**408.00**	None	80	13.8	5A
0.75	750SV51F	**486.00**	None	115	15.5	6A
1	1S51F	**634.00**	None	115	21.2	7A
1.5	1.5S51F	**758.00**	None	115	30.1	8A
2	2S51F	**940.00**	None	115	39.1	9A
3	3S4F	**1240.00**	2–5%FCBN	115	60	10A
5	5S4F	**1676.00**	2–5%FCBN	115	115	13B
7.5	7S4F	**2348.00**	2–5%FCBN	115	135	13B
10	10S4F	**2922.00**	2–5%FCBN	115	165	13B
Single-Phase—120x240 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed						
1	1S6F	**1090.00**	None	115	21.2	7A
1.5	1.5S6F	**1558.00**	None	115	30.1	8A
2	2S6F	**1746.00**	None	115	39.1	9A
3	3S6F	**1892.00**	None	115	60	10A
5	5S6F	**2418.00**	None	115	110	13B
7.5	7S6F	**3216.00**	None	115	135	13B
10	10S6F	**3992.00**	None	115	150	13B
Single-Phase—208 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed						
1	1S7F	**1090.00**	None	115	21.2	7A
1.5	1.5S7F	**1558.00**	None	115	30.1	8A
2	2S7F	**1746.00**	None	115	39.1	9A
3	3S7F	**1892.00**	None	115	60	10A
5	5S7F	**2418.00**	None	115	110	13B
7.5	7S7F	**3216.00**	None	115	135	13B
10	10S7F	**3992.00**	None	115	150	13B
Single-Phase—277 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed						
1	1S8F	**1090.00**	None	115	21.2	7A
1.5	1.5S8F	**1558.00**	None	115	30.1	8A
2	2S8F	**1746.00**	None	115	39.1	9A
3	3S8F	**1892.00**	None	115	60	10A
5	5S8F	**2418.00**	None	115	110	13B
7.5	7S8F	**3216.00**	None	115	135	13B
10	10S8F	**3992.00**	None	115	150	13B

NOTE: FCBN = full capacity below normal

Sealed Single-Phase Export Model Transformers

These general purpose transformers accommodate voltage systems worldwide. Export model transformers 10 kVA and smaller, certified by TUV (File no. E9571881.01) to meet EN61558-1, are CE marked in addition to being cULus Listed. For CE marked transformers in other ratings, contact your local Schneider Electric representative for CE marked transformers up to 300 kVA, single and three phase. See page 14-11 for optional Fingersafe™ terminal block cover kit.

Table 14.14: Sealed Export Model Transformers

kVA	Catalog No.	$ Price	Deg. C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
Single-Phase—190/200/208/220/380/400/416/440 V Primary; 110/220 V Secondary; 50/60 Hz; cULus Listed ★					
1	1S67F	**1180.00**	115	21.2	7A
2	2S67F	**1716.00**	115	39.1	9A
3	3S67F	**2290.00**	115	55.2	10A
5	5S67F	**2554.00**	115	135	13B
7.5	7S67F	**3314.00**	115	165	13B
10	10S67F	**4004.00**	115	165	13B

Sealed Single-Phase Buck and Boost Transformers—cULus Listed

When buck and boost transformers are interconnected as an autotransformer, they can supply small changes in voltage. Wiring diagrams and sizing are available from catalog 7414CT0201 or www.buckboostcalculator.com.

Units can also be used as isolation transformers for 120 x 240 to 12/24 or 16/32 by connecting using the directions located on the transformer's name plate.

NOTE: When used to supply a 3-phase, 4-wire load, the source must be 3-phase, 4-wire.

Table 14.15: Sealed Buck and Boost Transformers

kVA	120 x 240 V Primary 60 Hz			240 x 480 V Primary 60 Hz		Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
	12/24 V Secondary	16/32 V Secondary	$ Price	24/48 V Secondary	$ Price			
.05	50SV43A	50SV46A	**206.00**	50SV82A	**284.00**	55	4.2	1A
.10	100SV43A	100SV46A	**246.00**	100SV82A	**344.00**	55	4.5	2A
.15	150SV43A	150SV46A	**276.00**	150SV82A	**386.00**	55	6.2	3A
.25	250SV43B	250SV46B	**328.00**	250SV82B	**460.00**	80	10.5	4A
.50	500SV43B	500SV46B	**420.00**	500SV82B	**588.00**	80	13.8	5A
.75	750SV43F	750SV46F	**552.00**	750SV82F	**774.00**	115	15.5	6A
1.0	1S43F	1S46F	**676.00**	1S82F	**948.00**	115	21.2	7A
1.5	1.5S43F	1.5S46F	**830.00**	1.5S82F	**1162.00**	115	30.1	8A
2.0	2S43F	2S46F	**1072.00**	2S82F	**1500.00**	115	39.1	9A
3.0	3S43F	3S46F	**1480.00**	3S82F	**2072.00**	115	60	♦

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.
♦ Dimensions: 14.50 (H) x 8.60 (W) x 6.50 (D).
★ May be used for 240 x 480 to 120/240 at 60 Hz only.

NOTE: Refer to www.us.squared.com/buckboost for additional information.

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Stainless Steel Enclosed

The transformers listed below have an epoxy-resin encapsulated core and coil assembly inside a non-ventilated, #316 stainless steel enclosure that meets NEMA Type 3R or Type 4X requirements. All units are painted ANSI 49 gray to give an extra layer of protection and improve the cosmetic appearance of the device.

Table 14.16: Stainless Steel Enclosed Transformers

kVA	Catalog No.	$ Price	Full Capacity Taps	Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed; NEMA Type 3R						
3	3T2FSS	**4116.00**	2–5% FCBN	115	120	12C
6	6T2FSS	**4924.00**	2–5% FCBN	115	145	12C
9	9T2FSS	**6072.00**	2–5% FCBN	115	234	14C
15	15T2FSS	**7726.00**	2–5% FCBN	115	300	14C
30	30T2FSS	**13022.00**	2–5% FCBN	115	660	16C
Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz; cULus Listed; NEMA Type 4X						
3	4X3T2FSS	**13377.00**	2–5% FCBN	115	165	54X
6	4X6T2FSS	**16003.00**	2–5% FCBN	115	195	54X
9	4X9T2FSS	**19734.00**	2–5% FCBN	115	290	54X
15	4X15T2FSS	**25110.00**	2–5% FCBN	115	350	54X
30	4X30T2FSS	**42322.00**	2–5% FCBN	115	850	55X
Single-Phase—240x480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed; NEMA Type 3R						
1	1S1FSS	**1274.00**	None	115	21	7A
1.5	1.5S1FSS	**1778.00**	None	115	30	8A
2	2S1FSS	**1914.00**	None	115	39	9A
3	3S1FSS	**2684.00**	None	115	60	10A
5	5S1FSS	**3880.00**	None	115	110	13B
7.5	7S1FSS	**4164.00**	None	115	135	13B
10	10S1FSS	**4764.00**	None	115	150	13B
15	15S1FSS	**7036.00**	None	115	225	15B
25	25S1FSS	**9606.00**	None	115	300	15B
Single-Phase—240x480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed; NEMA Type 4X						
1	4X1S1FSS	**9555.00**	None	115	48	51X
1.5	4X1.5S1FSS	**9779.00**	None	115	55	51X
2	4X2S1FSS	**10527.00**	None	115	55	51X
3	4X3S1FSS	**14762.00**	None	115	75	52X
5	4X5S1FSS	**12610.00**	None	115	125	52X
7.5	4X7S1FSS	**13533.00**	None	115	150	52X
10	4X10S1FSS	**15483.00**	None	115	180	52X
15	4X15S1FSS	**22867.00**	None	115	390	53X
25	4X25S1FSS	**31220.00**	None	115	450	53X
Single-Phase—480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed; NEMA Type 3R						
3	3S40FSS	**2684.00**	2–5% FCBN	115	60	10A
5	5S40FSS	**3880.00**	2–5% FCBN	115	110	13B
7.5	7S40FSS	**4164.00**	2–5% FCBN	115	135	13B
10	10S40FSS	**4764.00**	2–5% FCBN	115	150	13B
15	15S40FSS	**7036.00**	2–5% FCBN	115	225	15B
25	25S40FSS	**9606.00**	2–5% FCBN	115	300	15B
Single-Phase—480 V Primary; 120/240 V Secondary; 60 Hz; cULus Listed; NEMA Type 4X						
3	4X3S40FSS	**14762.00**	2–5% FCBN	115	75	52X
5	4X5S40FSS	**12610.00**	2–5% FCBN	115	125	52X
7.5	4X7S40FSS	**13533.00**	2–5% FCBN	115	150	52X
10	4X10S40FSS	**15483.00**	2–5% FCBN	115	180	52X
15	4X15S40FSS	**22867.00**	2–5% FCBN	115	390	53X
25	4X25S40FSS	**31220.00**	2–5% FCBN	115	450	53X

Non-Ventilated

Non-ventilated enclosures meet the IP55 protection code (dust and jetting water protection) per the IEC 60529 standard. This makes the product ideal for environments where large quantities of dust, airborne contaminants, spraying water, or any other environmental conditions (for example, drifting snow) that a ventilated Type 3R enclosed device would be impractical.

Table 14.17: Non-Ventilated Transformers

kVA	Catalog No.	$ Price	Full Capacity Taps	Degree C Temp. Rise	Weight (lbs) ▲	Enclosure ▲■
Three-Phase—480 V Delta Primary; 208Y/120 V Secondary; 60 Hz						
30	30T3HNV	**8090.00**	6–2.5%2 + 4–	150	340	19E
45	45T3HNV	**12396.00**	6–2.5%2 + 4–	150	510	19E
75	75T3HNV	**19118.00**	6–2.5%2 + 4–	150	1025	22E
112.5	112T3HNV	**25848.00**	6–2.5%2 + 4–	150	1250	24E
150	150T3HNV	**33348.00**	6–2.5%2 + 4–	150	2000	25E
225	225T3HNV	**50238.00**	6–2.5%2 + 4–	150	2100	30E
300	300T3HNV	**55152.00**	6–2.5%2 + 4–	150	3950	31E
Single-Phase—240X480 V Primary; 120/240 V Secondary; 60 Hz						
15	15S3HNV	**5042.00**	6–2.5%2 + 4–♦	150	230	17E
25	25S3HNV	**7562.00**	6–2.5%2 + 4–♦	150	310	18E
37.5	37S3HNV	**11248.00**	6–2.5%2 + 4–♦	150	350	18E
50	50S3HNV	**14384.00**	6–2.5%2 + 4–♦	150	450	21E
75	75S3HNV	**17600.00**	6–2.5%2 + 4–♦	150	880	24E
100	100S3HNV	**22286.00**	6–2.5%2 + 4–♦	150	975	25E

▲ Not for construction. Contact your local Schneider Electric representative for certified prints.
■ For enclosure styles, see Table 14.19 on page 14-10.
♦ When 240 V tap is used, there will be 3–5% taps: 1 above and 2 below.

NOTE: FCBN = full capacity below normal
Lugs are furnished by customer

Transformer Enclosures

New!

Designed to allow energy efficient products to be installed in environments requiring more protection. These are Type 3R enclosures constructed of #304 stainless steel for corrosive protection.

Transformer enclosures are shipped separately from transformers so they can be pre-installed on the job site. Three standard enclosures are available for installation of enclosure types D, H, or F.

Table 14.18: Transformer Enclosures

Catalog No.	$ Price	Enclosure ▲■
7400SS3R18D22D	**8444.00**	18D, 18H, 19D, 20D, 21D, 22D
7400SS3R24D38D	**15118.00**	24D, 25D, 26D, 28D, 29D, 30D, 31D, 36D, 37D, 38D
7400SS3R31D35F	**24622.00**	31D, 32F, 33F, 34F, 35F, 36D, 37D, 38D

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Style A—NEMA 3R Rated

Style B—NEMA 3R Rated

Style C—NEMA 3R Rated

Styles D and H—NEMA 2 Rated
Converts to NEMA 3R with Weathershield

Style E—IP55 Rated

Style F—NEMA 1 Rated

Enclosures and Accessories

Table 14.19: Enclosure Dimensions and Accessories ▲

Enclosure Number/ Style		Height		Width		Depth		Mounting	Weathershield	Wall Mounting Bracket	Ceiling Mounting Bracket	Insulation Class °C
		In.	mm	In.	mm	In.	mm					
1	A	5.00	127	4.47	114	3.44	87	Wall	■	♦	—	105
2	A	5.50	140	4.47	114	3.44	87	Wall	■	♦	—	105
3	A	5.00	127	4.85	123	3.75	95	Wall	■	♦	—	105
4	A	5.50	140	5.23	133	4.06	103	Wall	■	♦	—	130
5	A	6.19	157	6.19	157	4.69	119	Wall	■	♦	—	130
6	A	6.69	170	6.19	157	4.69	119	Wall	■	♦	—	180
7	A	8.13	270	6.94	176	5.31	135	Wall	■	♦	—	180
8	A	8.25	210	8.68	220	6.56	167	Wall	■	♦	—	180
9	A	9.56	243	8.68	220	6.56	167	Wall	■	♦	—	180
10	A	10.50	267	8.62	219	6.50	165	Wall	■	♦	—	180
11	A	12.56	319	8.62	219	6.50	165	Wall	■	♦	—	180
12	C	13.50	343	14.75	375	9.00	229	Wall	■	♦	—	180
13	B	14.75	375	9.75	248	11.75	298	Wall	■	♦	—	180
14	C	14.75	375	19.10	485	12.25	311	Wall	■	♦	—	180
15	B	20.00	508	15.00	381	13.50	343	Wall	■	♦	—	180
16	C	22.00	559	25.00	635	13.50	343	Wall	■	♦	—	180
17	D	27.00	686	20.00	508	16.00	406	Floor	WS363	WMB361362	CMB363	220
	E	27.00	686	20.00	508	16.00	406	Floor	▼	WMB361362	CMB363	220
	H	37.00	940	20.00	508	16.00	406	Floor	WS363	WMB361362	CMB363	220
18	D	30.00	762	20.00	508	20.00	508	Floor	WS363	WMB363364	CMB363	220
	E	30.00	762	20.00	508	20.00	508	Floor	▼	WMB363364	CMB363	220
	H	37.00	940	20.00	508	20.00	508	Floor	WS363	WMB363364	CMB363	220
19	D	30.00	762	30.00	762	20.00	508	Floor	WS364	WMB363364	CMB364	220
	E	30.00	762	30.00	762	20.00	508	Floor	▼	WMB363364	CMB364	220
20	D	37.00	940	30.00	762	20.00	508	Floor	WS364	WMB363364	CMB364	220
	E	37.00	940	30.00	762	20.00	508	Floor	▼	WMB363364	CMB364	220
21	D	37.00	940	30.00	762	24.00	610	Floor	WS364	—	CMB364	220
	E	37.00	940	30.00	762	24.00	610	Floor	▼	—	CMB364	220
22	D	43.75	1111	32.00	813	27.00	686	Floor	WS380	—	CMB380	220
	E	43.75	1111	32.00	813	27.00	686	Floor	▼	—	CMB380	220
23	E	48	1219	48	1219	29.5	749	Floor	▼	—	—	220
24	D	49.5	1257	35	889	28.5	724	Floor	WS381	—	CMB381	220
	E	49.5	1257	35	889	28.5	724	Floor	Note 5	—	CMB381	220
25	D	49.5	1257	41	1041	32	813	Floor	WS382	—	—	220
	E	49.5	1257	41	1041	32	813	Floor	▼	—	—	220
26	D	57.5	1461	41	1041	32	813	Floor	WS382	—	—	220
28	D	60	1524	56	1422	36	914	Floor	WS370A	—	—	220
	E	60	1524	56	1422	36	914	Floor	▼	—	—	220
29	D	68	1727	56	1422	36	914	Floor	WS370A	—	—	220
30	D	71	1803	48	1219	36	914	Floor	WS383	—	—	220
	E	71	1803	48	1219	36	914	Floor	▼	—	—	220
31	D	74	1880	56	1422	40.5	1029	Floor	WS384	—	—	220
	E	74	1880	56	1422	40.5	1029	Floor	▼	—	—	220
32	F	91.5	2388	56	1422	54	1372	Floor	★	—	—	220
33	F	94	2388	72	1829	54	1372	Floor	★	—	—	220
34	F	94	2388	84	2134	54	1372	Floor	★	—	—	220
35	F	94	2388	96	2438	54	1372	Floor	★	—	—	220
36	D	40.5	1031	36.5	916	21.75	553	Floor	★	—	—	220
37	D	51.5	1310	40.5	1031	26.5	674	Floor	★	—	—	220
38	D	66	1679	50.5	1285	32	814	Floor	★	—	—	220
39	F	90	2290	80	2036	50	1272	Floor	★	—	—	220
40	F	90	2290	90	2290	50	1272	Floor	★	—	—	220
41	F	100	2545	100	2545	60	1527	Floor	★	—	—	220
42	F	108	2748	108	2748	60	1527	Floor	★	—	—	220
43	F	90	2290	64	1628	44	1120	Floor	★	—	—	220
44	F	90	2290	72	1832	50	1272	Floor	★	—	—	220
45	D	80	2036	64	1628	44	1120	Floor	★	—	—	220
51	X	9.5	24	10	25	7.75	20	Wall	△	♦	—	180
52	X	12	30	13.75	35	13.75	35	Wall	△	♦	—	180
53	X	24	61	21.5	55	16.38	42	Wall	△	♦	—	180
54	X	23	58	25.5	65	13.75	35	Wall	△	♦	—	180
55	X	31.5	80	31.5	80	16.25	41	Wall	△	♦	—	180
61	HX	Contact your local Schneider Electric representative for details.										
62	HX											
63	HX											

▲ These dimensions are not for construction. Contact your local Schneider Electric representative for certified prints.
■ Transformer is NEMA Type 3R Standard. Weathershield not required for outdoor use.
♦ Wall mounting brackets are a standard part of transformer enclosure. Accessory not required.
★ Special outdoor construction required for NEMA Type 3R applications. Contact your local Schneider Electric representative for details.
▼ Indoor/outdoor enclosure standard. Weathershield not required.
△ Transformer is NEMA Type 4X Standard. Weathershield not required.

NOTE: Wall mounting brackets are used with units weighing no more than 700 lbs.
Ceiling mounting brackets are used with units weighing no more than 1200 lbs.
Weathershields are available for units 600 Volts and below. For 2.4, 5, and 15 kV units suitable for outdoor use, contact the factory.

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Lugs are not supplied with transformer units. They must be purchased separately.

Table 14.20: Mechanical Lug Kits

Catalog No. ▲	$ Price Per Kit	Lugs Per Kit	Wire Range	Cap Screws	Current Range	Grounding Lugs per Kit	Wire Range	Bonding Lugs per Kit	Wire Range
Single-Phase Primary, Single-Phase Secondary, Three-Phase Delta Primary, Three-Phase Delta Secondary									
DASKP100	**28.00**	3	1/0–14 STR.	1/4 x 1 in	Up to 100 A	Not applicable	Not applicable	Not applicable	Not applicable
DASKP250	**51.00**	3	350 kcmil–6 STR.	3/8 x 2 in	101 to 250 A				
DASKP400	**91.00**	3	600 kcmil–4 STR. (2) 250 kcmil–1/0 STR.	3/8 x 2 in	201 to 400 A				
DASKP600	**182.00**	6	600 kcmil–4 STR. (2) 250 kcmil–1/0 STR.	3/8 x 2 in	601 to 800 A				
DASKP1000	**272.00**	9	600 kcmil–2 STR.	3/8 x 2 in	601 to 800 A				
DASKP1200	**363.00**	12	600 kcmil–2 STR.	3/8 x 2 in	801 to 1200 A				
Single-Phase Primary and Secondary, Three-Phase Wye Secondary, Three-Phase Delta with Center Tap									
DASKGS100	**79.00**	5	1/0–14 STR.	1/4 x 1 in	Up to 100 A	1	(4) 2/0 to 14 STR	1	2 to 14 STR
DASKGS250	**118.00**	5	350 kcmil–6 STR.	3/8 x 2 in	101 to 250 A	1	(4) 2/0 to 14 STR	1	2 to 14 STR
DASKGS400	**184.00**	5	600 kcmil–4 STR. (2) 250 kcmil–1/0 STR.	3/8 x 2 in	201 to 400 A	1	(4) 2/0 to 14 STR	1	1/0 to 14 STR
DASKGS600	**370.00**	10	600 kcmil–2 STR.	3/8 x 2 in	601 to 800 A	1	(4) 350 kcmil to 6 STR.	1	250 kcmil to 6 STR.
DASKGS1000	**521.00**	15	600 kcmil–2 STR.	3/8 x 2 in	601 to 800 A	1	(4) 350 kcmil to 6 STR.	1	250 kcmil to 6 STR.
DASKGS1200	**672.00**	20	600 kcmil–2 STR.	3/8 x 2 in	801 to 1200 A	1	(4) 350 kcmil to 6 STR.	1	250 kcmil to 6 STR.
DASKGS2000	**824.00**	25	600 kcmil–2 STR.	3/8 x 2 in	1201 to 2000 A	1	(4) 350 kcmil to 6 STR.	1	250 kcmil to 6 STR.

▲ Subject to minimum billing and freight charges when not ordered with transformer.

Table 14.21: Compression Lug Kits

Transformer kVA Sizes	Kit Catalog No.	$ Price Per Kit	Terminal Lugs		Aluminum or Copper Conductor Range (AWG or kcmil)	Hardware Included	
			Qty.	Catalog No.		Qty.	Cap Screws
15–37 ½ 1Ø 15–45 3Ø	VCELSK1	**261.00**	8 5	VCEL02114S1 VCEL030516H1	#8–1/0 #4–300 kcmil	8 1	1/4 x 1 in 1/4 x 2 in
50–75 1Ø 75–112 ½ 3 Ø	VCELSK2	**424.00**	13	VCEL030516H1	#4–300 kcmil	8 8	1/4 x 1 in 1/4 x 2 in
100–167 1Ø 150–300 3Ø	VCELSK3	**2407.00**	3	VCEL030516H1	#4–300 kcmil	3	1/4 x 3/4 in
			26	VCEL07512H1	500–750 kcmil Al 500 kcmil Cu	16	3/8 x 2 in
500 3Ø	VCELSK4	**2619.00**	34	VCEL07512H1	500–750 kcmil Al 500 kcmil Cu	21	3/8 x 2 in

Fingersafe™ terminal block cover kits for encapsulated transformers can be used to meet touch-safe requirements of EN60-204.

Table 14.22: Fingersafe Terminal Block Cover Kits

Fits Enclosure	Kit Catalog No.	$ Price
7A (1 kVA)	7400ENT9	**200.00**
9A (2 kVA)	7400ENT11	**200.00**
10A (3 kVA)	7400ENT11	**200.00**
13B (5–10 kVA)	7400ENT13	**284.00**

Table 14.23: Weathershields; Wall and Ceiling Mounting Brackets

Weathershields		Ceiling Mounting Brackets ♦		Wall Mounting Brackets ■	
Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
WS363	**299.00**	CMB363	**300.00**	WMB361362	**663.00**
WS364	**299.00**	CMB364	**300.00**	WMB363364	**663.00**
WS370A	**2325.00**	CMB380	**748.00**		
WS380	**682.00**	CMB381	**748.00**		
WS381	**682.00**				
WS382	**1160.00**				
WS383	**2184.00**				
WS384	**2464.00**				

■ Wall mounting brackets may be prohibited in some California areas requiring 12-inch spacing from wall. Wall mounting brackets can only be used with units weighing no more than 700 lbs.

♦ Base channels are supplied for ceiling mounting; trapeze hangers must be furnished by customer. Ceiling mounting brackets can only be used with units weighing no more than 1200 lbs.

New! All ventilated units are now available with factory-installed, thermo-viewing windows. The windows allow completion of yearly maintenance requirements without removing the front cover and accessing the transformers.

Available on all enclosures 17D through 35D. For more information, refer to Data Bulletin 7400DB1101 or contact your local Schneider Electric representative or distributor.

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Sealed, Mini Power-Zone™ Unit Substation

The Square D™ brand Mini Power-Zone™ unit substation from Schneider Electric provides the answer to requirements for a portable, compact power supply for small loads. This complete package yields considerable savings in installation time and costs. Its NEMA Type 3R enclosure is suitable for both indoor and outdoor use. The transformer is 115 °C rise and epoxy-resin encapsulated. The panel section uses Square D™ brand QO™ style circuit breakers.

NOTE: Mini Power-Zone unit substations are UL 1062 File E92978 Listed.

Mini Power-Zone unit substations include factory-installed primary main and secondary main circuit breakers. Circuit breaker ratings are selected to meet National Electrical Code requirements and coordinate with transformer magnetizing inrush current. Order feeder circuit breakers (QO™ plug-on type) from your local Schneider Electric distributor. Use Qwik-Gard™ breakers for required ground fault protection. Tandem breakers are not permitted.

If bolt-on circuit breakers are required instead of plug-on, change the Mini Power-Zone part number from MPZ to MPZB. The MPZB product line leverages the NQ interior for application requirements.

The Mini Power-Zone unit substation uses a separate transformer and panel section. This allows the panel section to be removed and wired first if desired. Also the transformer can be replaced without disturbing the panel section and associated wiring. The new transformer simply slides into the top of the panel section and primary and secondary leads are reconnected to the main circuit breakers.

Table 14.24: Standard Enclosure (NEMA Type 3R)

kVA	Catalog No.	$ Price	Input Voltage	Full Capacity Taps	Weight (lbs)	Dimensions ▲ H In.	H mm	W In.	W mm	D In.	D mm	Primary Main Circuit Breaker Rating (A)	Secondary Main Circuit Breaker Rating (A)	Feeder Breakers Max. No. 1- or 3-Pole	Feeder Breakers Max. A
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZ15T2F	**10088.00**	480	2–5% FCBN	510	44.6	1133	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZ22T2F	**12502.00**	480	2–5% FCBN	725	44.6	1133	27.4	696	13.6	345	70	80		60
30	MPZ30T2F	**15338.00**	480	2–5% FCBN	755	44.6	1133	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZ3S40F	**3565.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZ5S40F	**3890.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	15	30		20
7.5	MPZ7S40F	**4542.00**	480	2–5% FCBN	200	32.7	831	12.0	305	11.9	302	20	40		30
10	MPZ10S40F	**4938.00**	480	2–5% FCBN	215	32.7	831	12.0	305	11.9	302	30	60		40
15	MPZ15S40F	**6410.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZ25S40F	**9560.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	100	125		100
Output Three-Phase Panel Rated 208Y/120—Interrupting Rating 25 AIC														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZ15T2F25K	**12395.00**	480	2–5% FCBN	710	44.6	1133	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZ22T2F25K	**14809.00**	480	2–5% FCBN	725	44.6	1133	27.4	696	13.6	345	70	80		60
30	MPZ30T2F25K	**17645.00**	480	2–5% FCBN	755	44.6	1133	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240—Interrupting Rating 25 AIC														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZ3S40F25K	**5872.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZ5S40F25K	**6197.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	15	30		20
7.5	MPZ7S40F25K	**6849.00**	480	2–5% FCBN	200	32.7	831	12.0	305	11.9	302	20	40		30
10	MPZ10S40F25K	**7245.00**	480	2–5% FCBN	215	32.7	831	12.0	305	11.9	302	30	60		40
15	MPZ15S40F25K	**8717.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZ25S40F25K	**11867.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	100	125		100
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZB15T2F	**12610.00**	480	2–5% FCBN	510	48.6	1234	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZB22T2F	**15624.00**	480	2–5% FCBN	725	48.6	1234	27.4	696	13.6	345	70	80		60
30	MPZB30T2F	**19176.00**	480	2–5% FCBN	755	48.6	1234	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZB3S40F	**4535.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZB5S40F	**4860.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	15	30		20
7.5	MPZB7S40F	**5680.00**	480	2–5% FCBN	200	41.0	1041	12.0	305	11.9	302	20	40		30
10	MPZB10S40F	**6170.00**	480	2–5% FCBN	215	41.0	1041	12.0	305	11.9	302	30	60		40
15	MPZB15S40F	**8010.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZB25S40F	**11950.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	100	125		100

▲ Dimensions: DO NOT use for construction. Contact your local Schneider Electric representative for certified prints.

NOTE: Other input voltages are available. Contact your local Schneider Electric representative for part numbers and quotations.
Available input voltages: 600, 240, and 208, single- and three-phase.
FCBN = full capacity below normal

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Table 14.25: Standard Enclosure (NEMA Type 3R) (continued)

kVA	Catalog No.	$ Price	Input Voltage	Full Capacity Taps	Weight (lbs)	Dimensions ▲ H In.	H mm	W In.	W mm	D In.	D mm	Primary Main Circuit Breaker Rating (A)	Secondary Main Circuit Breaker Rating (A)	Feeder Breakers Max. No. 1- or 3-Pole	Feeder Breakers Max. A
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZB15T2F25K	**14917.00**	480	2–5% FCBN	710	48.6	1234	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZB22T2F25K	**17931.00**	480	2–5% FCBN	725	48.6	1234	27.4	696	13.6	345	70	80		60
30	MPZB30T2F25K	**21483.00**	480	2–5% FCBN	755	48.6	1234	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZB3S40F25K	**6843.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZB5S40F25K	**7168.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	15	30		20
7.5	MPZB7S40F25K	**7987.00**	480	2–5% FCBN	200	41.0	1041	12.0	305	11.9	302	20	40		30
10	MPZB10S40F25K	**8478.00**	480	2–5% FCBN	215	41.0	1041	12.0	305	11.9	302	30	60		40
15	MPZB15S40F25K	**10317.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZB25S40F25K	**14257.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	100	125		100
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZB15T2F65K	**15638.00**	480	2–5% FCBN	710	48.6	1234	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZB22T2F65K	**18652.00**	480	2–5% FCBN	725	48.6	1234	27.4	696	13.6	345	70	80		60
30	MPZB30T2F65K	**22204.00**	480	2–5% FCBN	755	48.6	1234	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZB3S40F65K	**7564.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZB5S40F65K	**7889.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	15	30		20
7.5	MPZB7S40F65K	**8708.00**	480	2–5% FCBN	200	41.0	1041	12.0	305	11.9	302	20	40		30
10	MPZB10S40F65K	**9799.00**	480	2–5% FCBN	215	41.0	1041	12.0	305	11.9	302	30	60		40
15	MPZB15S40F65K	**11038.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZB25S40F65K	**14978.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	343	100	125		100

Table 14.26: Painted 316 Stainless Steel Enclosure (NEMA Type 3R)

kVA	Catalog No.	$ Price	Input Voltage	Full Capacity Taps	Weight (lbs)	Dimensions ▲ H In.	H mm	W In.	W mm	D In.	D mm	Primary Main Circuit Breaker Rating (A)	Secondary Main Circuit Breaker Rating (A)	Feeder Breakers Max. No. 1- or 3-Pole	Feeder Breakers Max. A
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZ15T2FSS	**20108.00**	480	2–5% FCBN	710	44.6	1133	27.4	696	13.6	345	40	60	24 or 8	40
22.5	MPZ22T2FSS	**23122.00**	480	2–5% FCBN	725	44.6	1133	27.4	696	13.6	345	70	80		60
30	MPZ30T2FSS	**24376.00**	480	2–5% FCBN	755	44.6	1133	27.4	696	13.6	345	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZ3S40FSS	**10705.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZ5S40FSS	**11030.00**	480	2–5% FCBN	175	32.7	831	12.0	305	11.9	302	15	30		20
7.5	MPZ7S40FSS	**12428.00**	480	2–5% FCBN	200	32.7	831	12.0	305	11.9	302	20	40		30
10	MPZ10S40FSS	**12920.00**	480	2–5% FCBN	215	32.7	831	12.0	305	11.9	302	30	60		40
15	MPZ15S40FSS	**14758.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	60	80	28 or 13	60
25	MPZ25S40FSS	**17266.00**	480	2–5% FCBN	390	42.9	1090	17.4	442	13.5	343	100	125		100
Output Three-Phase Panel Rated 208Y/120														**Max. No. 1- or 3-Pole**	**Max. A**
15	MPZB15T2FSS	**25135.00**	480	2–5% FCBN	710	48.6	1234	27.4	696	13.6	48.6	40	60	24 or 8	40
22.5	MPZB22T2FSS	**28896.00**	480	2–5% FCBN	725	48.6	1234	27.4	696	13.6	48.6	70	80		60
30	MPZB30T2FSS	**30476.00**	480	2–5% FCBN	755	48.6	1234	27.4	696	13.6	48.6	90	100		80
Output Single-Phase Panel Rated 120/240														**Max. No. 1- or 2-Pole**	**Max. A**
3	MPZB3S40FSS	**13455.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	302	10	20	10 or 5	20
5	MPZB5S40FSS	**13780.00**	480	2–5% FCBN	175	41.0	1041	12.0	305	11.9	41.0	15	30		20
7.5	MPZB7S40FSS	**15542.00**	480	2–5% FCBN	200	41.0	1041	12.0	305	11.9	41.0	20	40		30
10	MPZB10S40FSS	**16159.00**	480	2–5% FCBN	215	41.0	1041	12.0	305	11.9	41.0	30	60		40
15	MPZB15S40FSS	**18442.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	51.0	60	80	28 or 13	60
25	MPZB25S40FSS	**21583.00**	480	2–5% FCBN	390	51.0	1295	17.4	442	13.5	51.0	100	125		100

▲ Dimensions: DO NOT use for construction. Contact your local Schneider Electric representative for certified prints.

NOTE: FCBN = full capacity below normal

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Type T transformers are designed with low impedance windings for excellent voltage regulation and can accommodate the high inrush current associated with contactors, starters, solenoids, and relays. Type T transformers are manufactured using the most advanced insulating materials and are the best choice if size and cost are of concern.

Type TF transformers include factory-installed primary and secondary fuse blocks. Type TF transformers consist of two primary fuse blocks and one secondary fuse block. The primary includes rejection-style clips to increase the AIC ratings for the fuses. Since the fuse blocks are mounted on the top of the transformer, Type TF transformers are interchangeable with Type T transformers except for their increased height.

Table 14.27: Type T and TF Transformers

VA	VA	Type T Transformers		Type TF Transformers		Weight (lbs)
UL/CSA/ NOM	CE	Catalog No.	$ Price	Catalog No.	$ Price	
240 V x 480 V Primary, 120 V Secondary; 230 V x 460 V Primary, 115 V Secondary; 220 V x 440 V Primary, 110 V Secondary						
25	25	9070T25D1	**111.00**	9070TF25D1	**160.00**	2.5
50	50	9070T50D1	**116.00**	9070TF50D1	**165.00**	2.5
75	75	9070T75D1	**138.00**	9070TF75D1	**185.00**	3.8
100	100	9070T100D1	**155.00**	9070TF100D1	**201.00**	3.8
150	150	9070T150D1	**165.00**	9070TF150D1	**213.00**	5.5
200	200	9070T200D1	**204.00**	9070TF200D1	**255.00**	5.5
250	160	9070T250D1	**239.00**	9070TF250D1	**287.00**	7.1
300	200	9070T300D1	**264.00**	9070TF300D1	**312.00**	8.5
350	250	9070T350D1	**281.00**	9070TF350D1	**330.00**	10.5
500	300	9070T500D1	**350.00**	9070TF500D1	**395.00**	11.9
750	500	9070T750D1	**483.00**	9070TF750D1	**531.00**	11.0
1000	630	9070T1000D1	**585.00**	9070TF1000D1	**639.00**	20.6
1500	1000	9070T1500D1	**837.00**	9070TF1500D1	**884.00**	34.0
2000	1500	9070T2000D1	**1017.00**	9070TF2000D1	**1065.00**	47.0
3000	2000	9070T3000D1	**1412.00**	—	—	60.0
5000	3000	9070T5000D1	**2373.00**	—	—	89.0
208 V Primary, 120 V Secondary						
50	50	9070T50D3	**135.00**	9070TF50D3	**185.00**	2.5
75	75	9070T75D3	**162.00**	9070TF75D3	**230.00**	3.8
100	100	9070T100D3	**182.00**	9070TF100D3	**276.00**	3.8
150	150	9070T150D3	**230.00**	9070TF150D3	**287.00**	5.5
200	200	9070T200D3	**293.00**	9070TF200D3	**347.00**	5.5
250	160	9070T250D3	**363.00**	9070TF250D3	**417.00**	7.1
300	200	9070T300D3	**372.00**	9070TF300D3	**426.00**	8.5
350	250	9070T350D3	**432.00**	9070TF350D3	**522.00**	10.5
500	300	9070T500D3	**471.00**	9070TF500D3	**696.00**	11.9
750	500	9070T750D3	**665.00**	9070TF750D3	**716.00**	11.0
1000	630	9070T1000D3	**837.00**	9070TF1000D3	**906.00**	20.6
1500	1000	9070T1500D3	**1170.00**	9070TF1500D3	**1221.00**	34.0
2000	1500	9070T2000D3	**1358.00**	9070TF2000D3	**1409.00**	47.0
3000	2000	9070T3000D3	**1914.00**	—	—	60.0
5000	3000	9070T5000D3	**3015.00**	—	—	89.0
600 V Primary, 120 V Secondary; 575 V Primary, 115 V Secondary; 550 V Primary, 110 V Secondary						
50	50	9070T50D5	**135.00**	9070TF50D5	**185.00**	2.5
75	75	9070T75D5	**162.00**	9070TF75D5	**230.00**	3.8
100	100	9070T100D5	**182.00**	9070TF100D5	**276.00**	3.8
150	150	9070T150D5	**230.00**	9070TF150D5	**287.00**	5.5
200	200	9070T200D5	**293.00**	9070TF200D5	**347.00**	5.5
250	160	9070T250D5	**363.00**	9070TF250D5	**417.00**	7.1
300	200	9070T300D5	**372.00**	9070TF300D5	**426.00**	8.5
350	250	9070T350D5	**432.00**	9070TF350D5	**522.00**	10.5
500	300	9070T500D5	**471.00**	9070TF500D5	**696.00**	11.9
750	500	9070T750D5	**665.00**	9070TF750D5	**716.00**	11.0
1000	630	9070T1000D5	**837.00**	9070TF1000D5	**906.00**	20.6
1500	1000	9070T1500D5	**1170.00**	9070TF1500D5	**1221.00**	34.0
2000	1500	9070T2000D5	**1358.00**	9070TF2000D5	**1409.00**	47.0
3000	2000	9070T3000D5	**1914.00**	—	—	60.0
5000	3000	9070T5000D5	**3015.00**	—	—	89.0
277 V Primary, 120 V Secondary						
50	50	9070T50D4	**135.00**	—	—	2.5
75	75	9070T75D4	**162.00**	—	—	3.8
100	100	9070T100D4	**182.00**	—	—	3.8
150	150	9070T150D4	**230.00**	—	—	5.5
200	200	9070T200D4	**293.00**	—	—	5.5
250	160	9070T250D4	**363.00**	—	—	7.1
300	200	9070T300D4	**372.00**	—	—	8.5
350	250	9070T350D4	**432.00**	—	—	10.5
500	300	9070T500D4	**471.00**	—	—	11.9
750	500	9070T750D4	**665.00**	—	—	11.0
1000	630	9070T1000D4	**837.00**	—	—	20.6
1500	1000	9070T1500D4	**1170.00**	—	—	34.0
2000	1500	9070T2000D4	**1358.00**	—	—	47.0
3000	2000	9070T3000D4	**1914.00**	—	—	60.0
5000	3000	9070T5000D4	**3015.00**	—	—	89.0

VA	VA	Type T Transformers		Type TF Transformers		Weight (lbs)
UL/CSA/ NOM	CE	Catalog No.	$ Price	Catalog No.	$ Price	
240 V x 480 V Primary, 120/240 V Secondary; 230 V x 460 V Primary, 115/230 V Secondary; 220 V x 440 V Primary, 110/220 V Secondary						
50	50	9070T50D31	**188.00**	9070TF50D31	**372.00**	2.5
75	75	9070T75D31	**197.00**	9070TF75D31	**384.00**	3.8
100	100	9070T100D31	**207.00**	9070TF100D31	**394.00**	3.8
150	150	9070T150D31	**273.00**	9070TF150D31	**452.00**	5.5
200	200	9070T200D31	**353.00**	9070TF200D31	**498.00**	5.5
250	160	9070T250D31	**381.00**	9070TF250D31	**564.00**	7.1
300	200	9070T300D31	**435.00**	9070TF300D31	**570.00**	8.5
350	250	9070T350D31	**455.00**	9070TF350D31	**630.00**	10.5
500	300	9070T500D31	**509.00**	9070TF500D31	**638.00**	11.9
750	500	9070T750D31	**710.00**	9070TF750D31	**795.00**	11.0
1000	630	9070T1000D31	**837.00**	9070TF1000D31	**920.00**	20.6
1500	1000	9070T1500D31	**1224.00**	9070TF1500D31	**1524.00**	34.0
2000	1500	9070T2000D31	**1854.00**	9070TF2000D31	**2154.00**	47.0
3000	2000	9070T3000D31	**2741.00**	—	—	60.0
5000	3000	9070T5000D31	**3368.00**	—	—	89.0
600 V Primary, 120/240 V Secondary; 575 V Primary, 115/230 V Secondary						
50	50	9070T50D37	**135.00**	9070TF50D37	**372.00**	2.5
75	75	9070T75D37	**162.00**	9070TF75D37	**384.00**	3.8
100	100	9070T100D37	**182.00**	9070TF100D37	**394.00**	3.8
150	150	9070T150D37	**230.00**	9070TF150D37	**452.00**	5.5
200	200	9070T200D37	**293.00**	9070TF200D37	**498.00**	5.5
250	160	9070T250D37	**363.00**	9070TF250D37	**564.00**	7.1
300	200	9070T300D37	**372.00**	9070TF300D37	**570.00**	8.5
350	250	9070T350D37	**432.00**	9070TF350D37	**630.00**	10.5
500	300	9070T500D37	**471.00**	9070TF500D37	**638.00**	11.9
750	500	9070T750D37	**665.00**	9070TF750D37	**795.00**	11.0
1000	630	9070T1000D37	**837.00**	9070TF1000D37	**920.00**	20.6
1500	1000	9070T1500D37	**1170.00**	9070TF1500D37	**1524.00**	34.0
2000	1500	9070T2000D37	**1358.00**	9070TF2000D37	**2154.00**	47.0
3000	2000	9070T3000D37	**1914.00**	—	—	60.0
5000	3000	9070T5000D37	**3015.00**	—	—	89.0
380/400/415 V Primary, 115/230 V Secondary						
50	50	9070T50D33	**188.00**	9070TF50D33	**372.00**	2.5
75	75	9070T75D33	**197.00**	9070TF75D33	**384.00**	3.8
100	100	9070T100D33	**207.00**	9070TF100D33	**394.00**	3.8
150	150	9070T150D33	**273.00**	9070TF150D33	**452.00**	5.5
200	200	9070T200D33	**353.00**	9070TF200D33	**498.00**	5.5
250	160	9070T250D33	**381.00**	9070TF250D33	**564.00**	7.1
300	200	9070T300D33	**435.00**	9070TF300D33	**570.00**	8.5
350	250	9070T350D33	**455.00**	9070TF350D33	**630.00**	10.5
500	300	9070T500D33	**509.00**	9070TF500D33	**638.00**	11.9
750	500	9070T750D33	**710.00**	9070TF750D33	**795.00**	11.0
1000	630	9070T1000D33	**837.00**	9070TF1000D33	**920.00**	20.6
1500	1000	9070T1500D33	**1224.00**	9070TF1500D33	**1524.00**	34.0
2000	1500	9070T2000D33	**1854.00**	9070TF2000D33	**2154.00**	47.0
3000	2000	9070T3000D33	**2741.00**	—	—	60.0
5000	3000	9070T5000D33	**3368.00**	—	—	89.0

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Table 14.28: Type T and TF Transformers (continued)

VA	VA	Type T Transformers		Type TF Transformers		Weight (lbs)
UL/CSA/ NOM	CE	Catalog No.	$ Price	Catalog No.	$ Price	
208/230/460 V Primary, 115 V Secondary						
50	50	9070T50D20	**188.00**	9070TF50D20	**270.00**	4
75	75	9070T75D20	**197.00**	9070TF75D20	**293.00**	5.5
100	100	9070T100D20	**207.00**	9070TF100D20	**360.00**	5.5
150	150	9070T150D20	**273.00**	9070TF150D20	**443.00**	5.5
200	200	9070T200D20	**353.00**	9070TF200D20	**497.00**	8.5
250	160	9070T250D20	**381.00**	9070TF250D20	**548.00**	10.5
300	200	9070T300D20	**435.00**	9070TF300D20	**563.00**	10.5
350	250	9070T350D20	**455.00**	9070TF350D20	**585.00**	11.9
500	300	9070T500D20	**509.00**	9070TF500D20	**608.00**	11
750	500	9070T750D20	**710.00**	9070TF750D20	**951.00**	20.6
1000	630	9070T1000D20	**837.00**	9070TF1000D20	**1320.00**	34
1500	1000	9070T1500D20	**1224.00**	9070TF1500D20	**1524.00**	47
2000	1500	9070T2000D20	**1854.00**	9070TF2000D20	**2154.00**	60
3000	2000	9070T3000D20	**2741.00**	—	—	89
240/480/600 V Primary, 120 V Secondary; 230/460/575 V Primary, 115 V Secondary; 220/440/550 V Primary, 110 V Secondary						
50	50	9070T50D32	**188.00**	9070TF50D32	**372.00**	3.8
75	75	9070T75D32	**197.00**	9070TF75D32	**384.00**	3.8
100	100	9070T100D32	**207.00**	9070TF100D32	**394.00**	5.5
150	150	9070T150D32	**273.00**	9070TF150D32	**452.00**	5.5
200	200	9070T200D32	**353.00**	9070TF200D32	**498.00**	7.1
250	160	9070T250D32	**381.00**	9070TF250D32	**564.00**	8.5
300	200	9070T300D32	**435.00**	9070TF300D32	**570.00**	10.5
350	250	9070T350D32	**455.00**	9070TF350D32	**630.00**	11.9
500	300	9070T500D32	**509.00**	9070TF500D32	**638.00**	11.0
750	500	9070T750D32	**710.00**	9070TF750D32	**795.00**	20.6
1000	630	9070T1000D32	**837.00**	9070TF1000D32	**920.00**	34.0
1500	1000	9070T1500D32	**1224.00**	9070TF1500D32	**1524.00**	47.0
2000	1500	9070T2000D32	**1854.00**	9070TF2000D32	**2154.00**	60.0
3000	2000	9070T3000D32	**2741.00**	—	—	89.0
240/416/480/600 V Primary, 99/120/130 V Secondary; 230/400/460/575 V Primary, 95/115/125 V Secondary; 220/380/440/550 V Primary, 90/110/120 V Secondary; 208/360/416/520 V Primary, 85/104/115 V Secondary						
50	50	9070T50D50	**315.00**	9070TF50D50	**502.00**	4
75	75	9070T75D50	**341.00**	9070TF75D50	**528.00**	7.2
100	100	9070T100D50	**350.00**	9070TF100D50	**537.00**	7.1
150	150	9070T150D50	**366.00**	9070TF150D50	**553.00**	8.5
200	200	9070T200D50	**417.00**	9070TF200D50	**604.00**	10.5
250	160	9070T250D50	**455.00**	9070TF250D50	**642.00**	10.5
300	200	9070T300D50	**497.00**	9070TF300D50	**684.00**	11.9
350	250	9070T350D50	**512.00**	9070TF350D50	**699.00**	11
500	300	9070T500D50	**656.00**	9070TF500D50	**843.00**	11
750	500	9070T750D50	**761.00**	9070TF750D50	**948.00**	20.6
1000	630	9070T1000D50	**996.00**	9070TF1000D50	**1183.00**	34
1500	1000	9070T1500D50	**1352.00**	9070TF1500D50	**1524.00**	47.0
2000	1500	9070T2000D50	**1854.00**	9070TF2000D50	**2154.00**	60.0
3000	2000	9070T3000D50	**2741.00**	—	—	89.0
240 V X 480 V Primary, 24/120 V Secondary (24 V limited to 20% Capacity)						
50	50	9070T50D15	**135.00**	—	—	2.5
75	75	9070T75D15	**162.00**	—	—	3.8
100	100	9070T100D15	**207.00**	—	—	3.8
150	150	9070T150D15	**230.00**	—	—	5.5
200	200	9070T200D15	**293.00**	—	—	5.5
250	160	9070T250D15	**381.00**	—	—	7.1
300	200	9070T300D15	**435.00**	—	—	8.5
350	250	9070T350D15	**455.00**	—	—	10.5
500	300	9070T500D15	**509.00**	—	—	11.9
750	500	9070T750D15	**710.00**	—	—	11.0
1000	630	9070T1000D15	**837.00**	—	—	20.6
1500	1000	9070T1500D15	**1224.00**	—	—	34.0
2000	1500	9070T2000D15	**1854.00**	—	—	47.0
3000	2000	9070T3000D15	**2229.00**	—	—	60.0
5000	3000	9070T5000D15	**3015.00**	—	—	89.0

Table 14.29: Type T Transformers

VA	VA	Catalog No.	$ Price	Weight (lbs)
UL/CSA/ NOM	CE			
240 V x 480 V Primary, 24 V Secondary				
50	50	9070T50D2	**135.00**	2.5
75	75	9070T75D2	**162.00**	3.8
100	100	9070T100D2	**182.00**	3.8
150	150	9070T150D2	**230.00**	5.5
200	200	9070T200D2	**293.00**	5.5
250	160	9070T250D2	**363.00**	7.1
300	200	9070T300D2	**372.00**	8.5
350	250	9070T350D2	**432.00**	10.5
500	300	9070T500D2	**471.00**	11.9
750	500	9070T750D2	**665.00**	11.0
1000	630	9070T1000D2	**837.00**	20.6
208 V Primary, 24 V Secondary				
50	50	9070T50D14	**135.00**	2.5
75	75	9070T75D14	**162.00**	3.8
100	100	9070T100D14	**182.00**	3.8
150	150	9070T150D14	**230.00**	5.5
200	200	9070T200D14	**293.00**	5.5
250	160	9070T250D14	**363.00**	7.1
300	200	9070T300D14	**372.00**	8.5
350	250	9070T350D14	**432.00**	10.5
500	300	9070T500D14	**471.00**	11.9
750	500	9070T750D14	**665.00**	11.0
1000	630	9070T1000D14	**837.00**	20.6
120 V x 240 V Primary, 24 V Secondary				
50	50	9070T50D23	**135.00**	2.5
75	75	9070T75D23	**162.00**	3.8
100	100	9070T100D23	**182.00**	3.8
150	150	9070T150D23	**230.00**	5.5
200	200	9070T200D23	**293.00**	5.5
250	160	9070T250D23	**363.00**	7.1
300	200	9070T300D23	**372.00**	8.5
350	250	9070T350D23	**432.00**	10.5
500	300	9070T500D23	**471.00**	11.9
750	500	9070T750D23	**665.00**	11.0
1000	630	9070T1000D23	**837.00**	20.6
120 V Primary, 12/24 V Secondary				
50	50	9070T50D13	**135.00**	2.5
75	75	9070T75D13	**162.00**	3.8
100	100	9070T100D13	**182.00**	3.8
150	150	9070T150D13	**230.00**	5.5
200	200	9070T200D13	**293.00**	5.5
250	160	9070T250D13	**363.00**	7.1
300	200	9070T300D13	**372.00**	8.5
350	250	9070T350D13	**432.00**	10.5
500	300	9070T500D13	**471.00**	11.9
750	500	9070T750D13	**665.00**	11.0
1000	630	9070T1000D13	**837.00**	20.6
MultiTap 24 Volt Control Primary 208/240/277/380/480 V Primary, 24 V Secondary				
50	50	9070T50D19	**188.00**	4.0
75	75	9070T75D19	**197.00**	7.2
100	100	9070T100D19	**207.00**	7.2
150	150	9070T150D19	**273.00**	7.1
200	200	9070T200D19	**353.00**	8.5
250	160	9070T250D19	**381.00**	10.5
300	200	9070T300D19	**435.00**	11.9
350	250	9070T350D19	**455.00**	11.9
500	300	9070T500D19	**509.00**	11.0
750	500	9070T750D19	**710.00**	20.6
1000	630	9070T1000D19	**837.00**	34.0

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Table 14.30: Type T Dimensions

Type	Voltage Code	Height		Width		Depth		Accessory Key
		In.	mm	In.	mm	In.	mm	
T25	D1	2.58	66	3.00	76	3.09	79	I
T50	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	2.58	66	3.00	76	3.09	79	I
	D20, D32	2.89	73	3.38	86	3.34	85	II
	D19, D50	2.89	73	3.38	86	4.43	113.0	III, IV
T75	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37, D20, D32	2.58	66	3.00	76	3.09	79	I
	D19, D50	3.20	81	3.75	95	4.7	119.4	III, IV
T100	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	2.89	73	3.38	86	3.34	85	I
	D20, D32	3.20	81	3.75	95	3.59	91	II
	D19, D50	3.20	81	3.75	95	4.7	119.4	III, IV
T150	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37, D20	3.20	81	3.75	95	3.59	91	I
	D19, D32	3.20	81	3.75	95	4.7	119.4	II
	D50	3.84	98.0	4.50	114.3	4.74	120.4	III, IV
T200	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	3.20	81	3.75	95	3.59	91	I
	D20	3.20	81	3.75	95	4.7	119.4	II
	D19, D32	3.84	98.0	4.50	114.3	4.74	120.4	II
	D50	3.84	98.0	4.50	114.3	5.11	129.8	III, IV
T250	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	3.21	82	3.75	95	5.30	135	I
	D20	3.84	98.0	4.50	114.3	4.74	120.4	II
	D19, D32, D50	3.84	98.0	4.50	114.3	5.11	129.8	III, IV
T300	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	3.84	98.0	4.50	114.3	4.74	120.4	I
	D19, D20	3.84	98.0	4.50	114.3	5.11	129.8	II
	D32, D50	3.84	98.0	4.50	114.3	5.49	139.4	III, IV
T350	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	3.84	98.0	4.50	114.3	5.11	129.8	I
	D19, D20, D32	3.84	98.0	4.50	114.3	5.49	139.4	II
	D50	4.51	114.6	5.25	133.4	5.61	142.5	III, IV
T500	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	3.84	98.0	4.50	114.3	5.49	139.4	I
	D19, D20, D32, D50	4.51	114.6	5.25	133.4	5.61	142.5	III, IV
T750	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	4.51	114.6	5.25	133.4	5.61	142.5	I
	D19, D20, D32, D50	4.51	114.6	5.25	133.4	6.30	160.0	III, IV
T1000	D1, D5, D2, D23, D14, D13, D15, D3, D4, D31, D33, D37	4.51	114.6	5.25	133.4	6.30	160.0	I
	D19, D20, D32, D50	6.17	156.7	7.06	179.3	5.92	150.4	III, IV
T1500	D1, D5, D15, D3, D4, D31, D33, D37	6.17	156.7	7.06	179.3	5.92	150.4	I
	D20, D32, D50	6.17	156.7	7.06	179.3	7.17	182.1	III, IV
T2000	D1, D5, D15, D3, D4, D31, D33, D37	6.17	156.7	7.06	179.3	7.17	182.1	I
	D20, D32, D50	7.63	193.8	9.00	228.6	6.38	162.1	III, IV
T3000	D3, D4, D15, D31, D33, D37	7.63	193.8	9.00	228.6	6.38	162.1	I
	D20	7.63	194	9.00	229	8.31	211	II
	D1, D5,	8.75	222	9.00	229	7.24	184	I
	D32, D50	8.75	222	9.00	229	9.15	232	III, IV
T5000	D3, D4, D15, D31, D33, D37	7.63	194	9.00	229	8.31	211	I
	D1, D5,	8.75	222	9.00	229	9.15	232	I
TF2000	D1, D5, D15, D3, D4, D31, D33, D37	7.46	189.5	7.06	179.3	7.17	182.1	I
	D20, D32, D50			9.00	228.6	6.38	162.1	III, IV

Table 14.31: Type TF Dimensions

Type	Voltage Code	Height		Width		Depth		Accessory Key
		In.	mm	In.	mm	In.	mm	
TF25	D1	4	101.6	3.00	76	3.09	79	I
TF50	D1, D5, D3, D4, D31, D33, D37	4	101.6	3.00	76	3.09	79	I
	D20, D32	4.25	107.9	3.38	86	3.34	85	II
	D50	4.25	107.9	3.38	86	4.43	113.0	III, IV
TF75	D1, D5, D3, D4, D31, D33, D37, D20, D32	4.25	107.9	3.00	76	3.09	79	I
	D50	4.55	115.6	3.75	95	4.7	119.4	III, IV
TF100	D1, D5,D3, D4, D31, D33, D37	4.25	107.9	3.38	86	3.34	85	I
	D20, D32	4.55	115.6	3.75	95	3.59	91	II
	D50	4.55	115.6	3.75	95	4.7	119.4	III, IV
TF150	D1, D5, D3, D4, D31, D33, D37, D20	4.55	115.6	3.75	95	3.59	91	I
	D32	4.55	115.6	3.75	95	4.7	119.4	II
	D50	5.1	129.6	4.50	114.3	4.74	120.4	III, IV
TF200	D1, D5, D3, D4, D31, D33, D37	4.55	115.6	3.75	95	3.59	91	I
	D20	5.1	129.6	3.75	95	4.7	119.4	II
	D32	5.1	129.6	4.50	114.3	4.74	120.4	II
	D50	5.1	129.6	4.50	114.3	5.11	129.8	III, IV
TF250	D1, D5, D3, D4, D31, D33, D37	4.55	115.6	3.75	95	5.30	135	I
	D20	5.1	129.6	4.50	114.3	4.74	120.4	II
	D32, D50	5.1	129.6	4.50	114.3	5.11	129.8	III, IV
TF300	D1, D5, D3, D4, D31, D33, D37	5.1	129.6	4.50	114.3	4.74	120.4	I
	D20	5.1	129.6	4.50	114.3	5.11	129.8	II
	D32, D50	5.1	129.6	4.50	114.3	5.49	139.4	III, IV
TF350	D1, D5, D3, D4, D31, D33, D37	5.1	129.6	4.50	114.3	5.11	129.8	I
	D20, D32	5.1	129.6	4.50	114.3	5.49	139.4	II
	D50	5.73	145.6	5.25	133.4	5.61	142.5	III, IV
TF500	D1, D5, D3, D4, D31, D33, D37	5.1	129.6	4.50	114.3	5.49	139.4	I
	D20, D32, D50	5.73	145.6	5.25	133.4	5.61	142.5	III, IV
TF750	D1, D5,D3, D4, D31, D33, D37	5.73	145.6	5.25	133.4	5.61	142.5	I
	D20, D32, D50	5.73	145.6	5.25	133.4	6.30	160.0	III, IV
TF1000	D1, D5, D3, D4, D31, D33, D37	5.73	145.6	5.25	133.4	6.30	160.0	I
	D20, D32, D50	7.46	189.5	7.06	179.3	5.92	150.4	III, IV
TF1500	D1, D5, D15, D3, D4, D31, D33, D37	7.46	189.5	7.06	179.3	5.92	150.4	I
	D20, D32, D50	7.46	189.5	7.06	179.3	7.17	182.1	III, IV
TF2000	D1, D5, D15, D3, D4, D31, D33, D37	7.46	189.5	7.06	179.3	7.17	182.1	I
	D20, D32, D50			9.00	228.6	6.38	162.1	III, IV

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Accessories

The Type T control transformers offer multiple field installable accessories:

Table 14.32: Fingersafe™ Covers (Not Supplied with Unit)

Type	Type Accessory Key ▲			Description	$ Price Each	Order Qty.	Order $ Price
	I	II	III, IV				
FSC1	T25–T200	T25–T150	—	2 covers per kit	**21.00**	10	**210.00**
FSC2	T250–T5000	T250–T5000	—	2 covers per kit	**30.00**	10	**300.00**
FSC23	—	—	T25–T5000	2 covers per kit	**30.00**	10	**300.00**

▲ Kits must be ordered separately. Also supplied in bulk packages of 100 individual covers. Add "B" to Type number (available only on FSC1B and FSC2B).

Table 14.33: Separate NEMA Type 1 Enclosures for Transformers

Class 9991 Type	For Use With
UE7	EO1, EO17, T50
LG1	EO2, EO3, EO4, EO15, EO16, EO18, EO19, T75, T100, T150, T200, T250, T300, T350, T500
SDG4	EO51, EO61, T750, T1000, EO71

NOTE: User must drill mounting holes. See pages 16-106 and 16-107 for dimensions.

Table 14.34: Jumper Kits

Catalog No.	Type Accessory Key			Description	$ Price Each	Order Qty.	Order $ Price
	I	II	III, IV				
3003302753	T25–T200	T25–T150	—	Two jumpers per bag Minimum order of 50 kits	**8.00**	50	**400.00**
3003302754	T250–T5000	T200–T3000	T25–T3000		**5.00**	50	**250.00**

NOTE: Jumpers are supplied with voltage codes that require them. If additional kits are required, order per above chart.

Table 14.35: Fuse Pullers (For Use on TF and FB Accessory)

Catalog No.	$ Price Each	Order Qty.	Order $ Price
9070FP1	**33.00**	10	**330.00**

Field Installed Fuse Options

Table 14.36: Primary and Secondary Fusing

Type	Type Accessory Key			Description	$ Price Each	Order Qty.	Order $ Price
	I	II	III, IV				
FB3A	25–200	25–150	—	Three pole fuse block for primary and secondary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (2 rejection and 1 non-rejection)	**87.00**	1	**87.00**
FB3B	250–2000	200–2000	25–2000	Three pole fuse block for primary and secondary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (2 rejection and 1 non-rejection)	**87.00**	1	**87.00**

Table 14.37: Primary Fusing

Type	Type Accessory Key			Description	$ Price Each	Order Qty.	Order $ Price
	I	II	III, IV				
FB2A	25–200	25–150	—	Two pole fuse block for primary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (2 rejection)	**75.00**	1	**75.00**
FB2B	250–2000	200–2000	25–2000	Two pole fuse block for primary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (2 rejection)	**75.00**	1	**75.00**

Table 14.38: Field-Installable Secondary Fuse Clips

Type	Type Accessory Key ♦			Description	$ Price Each	Order Qty.	Order $ Price
	I	II	III, IV				
SF25A	25–200	25–150	—	Secondary fuse block accommodates 1-1/4 x 1/4 inch fuse	**21.00**	10	**210.00**
SF25B	250–2000	200–2000	25–2000	Secondary fuse block accommodates 1-1/4 x 1/4 inch fuse	**21.00**	10	**210.00**
SF41A ■	25–200	25–150	—	Secondary fuse clip accommodates 1-1/2 x 13/32 inch midget fuse	**18.00**	10	**180.00**
SF41B ■	250–2000	200–2000	25–2000	Secondary fuse clip accommodates 1-1/2 x 13/32 inch midget fuse	**18.00**	10	**180.00**
FB1A	25–200	25–150	—	One pole fuse block for secondary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (1 non-rejection)	**53.00**	1	**53.00**
FB1B	250–2000	200–2000	25–2000	One pole fuse block for secondary fusing, accommodates 1-1/2 x 13/32 inch midget fuse (1 non-rejection)	**53.00**	1	**53.00**

■ SF41 can be installed on the following voltage codes: D1, D5, D24, D3, D4, D51, D2, D23, D14, D25, D20, D95, D19, D22, D36.

♦ I = voltage codes D1, D2, D3, D4, D5, D12, D13, D14, D15, D23, D24, D25, D31, D32, D33, D36, D5
II = voltage codes D18, D20
III, IV= voltage codes D19, D50

Selection Guide

1. Determine the inrush and sealed VA of each coil in the control circuit and the VA of all other components.
2. Total the **sealed** VA of all operating coils and the VA of all other loads. (This determines the minimum VA size required for the circuit.)
3. Total the **inrush** VA of all coils that are starting at the same time and all loads and coils that are running.
4. Locate a value in the VA column of Table 14.39 that is **equal to** or **greater than** the value calculated in step 2.
5. In the VA row selected in step 4, find the inrush value under the appropriate voltage regulation column of Table 14.39. If this value is **greater than** the calculated value from step 3, this is the correct transformer VA rating.

   If the inrush value on the selected VA row is **not greater than** the calculated value from step 3, use the next higher transformer VA rating, that is, the rating on the next row.

If your supply voltage is stable and fluctuates less than 5%, Schneider Electric recommends you use the 90% secondary voltage column. If your supply voltage is not stable and fluctuates more than 10% we recommend you use the 95% secondary voltage column. We recommend that you never use the 85% secondary voltage column since magnetic devices lose life expectancy if they are continuously started at 85% of rated voltage.

Table 14.39: Regulation Chart for Type T

VA	Inrush VA @ 20% power factor			Inrush VA @ 40% power factor		
	95% Secondary Voltage	90% Secondary Voltage	85% Secondary Voltage	95% Secondary Voltage	90% Secondary Voltage	85% Secondary Voltage
50	193	266	339	151	215	282
75	271	396	20	210	318	430
100	339	499	659	266	404	549
150	666	893	1120	529	731	942
200	588	815	1041	459	659	866
250	1416	1910	2388	1057	1494	1936
300	1634	2184	2709	1194	1681	2169
350	1894	2592	3261	1392	2005	621
500	3197	4104	4981	2374	3195	4019
750	3770	5515	7231	2887	4391	5945
1000	6587	9079	11430	4706	6886	9051
1500	19324	23983	28607	15066	19361	23756
2000	31384	38777	6161	24794	31630	38667
3000	26539	39934	52713	19355	30721	42216
5000	53111	85265	116277	39368	66309	93882

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Transformer disconnects are available in NEMA Type 1 Standard, NEMA Type 12 Standard, and NEMA Type 1 Mini.

Transformer Disconnects for NEMA Type 1 and Type 12 Enclosures

Square D™ brand transformer disconnects mount inside or outside a control system enclosure. The transformer disconnect being connected directly to the 480 V system controls power for auxiliary, single-phase loads when the main three-phase disconnect is either ON or OFF. The transformer disconnect is normally wired to the line side of the control panel's main disconnect.

This convenient source of 120 V power can be used for auxiliary or isolated loads, such as panel lighting, portable power tools, and programmable controller equipment.

Units consist of copper-wound transformers, a disconnect switch, and primary and secondary fuse blocks. All blocks are installed in NEMA Type 1 or Type 12 enclosures.

Transformer disconnects are UL Listed. Use Square D™ brand Type TF industrial control transformers and Square D™ brand disconnect switches.

Multiple enclosure options and accessories are available. See catalog 9070CT0301 or contact your local Schneider Electric representative or distributor.

- Standard NEMA Type 1
- Mini NEMA Type 1
- Compact NEMA Type 1
- NEMA Type 12

Table 14.40: Transformer Disconnects

VA	Catalog No. Without Outlet	$ Price	Catalog No. With Outlet	$ Price	Enclosure	H		W		D		Weight (lbs)
						In.	mm	In.	mm	In.	mm	
NEMA Type 1 Enclosure, 240 x 480 V Primary, 120 V Secondary (Compact Design)												
100	9070MN100G0D1	**1338.00**	9070MN100G0D1G13	**1551.00**	G0	7.00	178	11.30	287	7.81	198	16
250	9070MN250G0D1	**1488.00**	9070MN250G0D1G13	**1701.00**	G0	7.00	178	11.30	287	7.81	198	21
500	9070MN500G0D1	**1640.00**	9070MN500G0D1G13	**1853.00**	G0	7.00	178	11.30	287	7.81	198	24
750	9070SK750G3D1	**1721.00**	9070SK750G3D1G13	**1934.00**	G3	13.40	340	14.80	376	10.21	259	47
1000	9070SK1000G3D1	**2259.00**	9070SK1000G3D1G13	**2472.00**	G3	13.40	340	14.80	376	10.21	259	51
1500	9070SK1500G3D1	**3351.00**	9070SK1500G3D1G13	**3564.00**	G3	13.40	340	14.80	376	10.21	259	65
2000	9070SK2000G3D1	**4257.00**	9070SK2000G3D1G13	**4470.00**	G3	13.40	340	14.80	376	10.21	259	71
3000	9070SK3000G3D1	**5696.00**	9070SK3000G3D1G13	**5909.00**	G3	13.40	340	14.80	376	10.21	259	85
NEMA Type 1 Enclosure, 240 x 480 V Primary, 120 V Secondary												
250	9070SK250G1D1	**1353.00**	9070SK250G1D1G13	**1566.00**	G1	9.40	239	11.80	300	8.96	228	26
500	9070SK500G1D1	**1488.00**	9070SK500G1D1G13	**1701.00**	G1	9.40	239	11.80	300	8.96	228	28
750	9070SK750G1D1	**1674.00**	9070SK750G1D1G13	**1887.00**	G1	9.40	239	11.80	300	8.96	228	33
1000	9070SK1000G1D1	**2199.00**	9070SK1000G1D1G13	**2412.00**	G1	9.40	239	11.80	300	8.96	228	37
1500	9070SK1500G2D1	**3255.00**	9070SK1500G2D1G13	**3468.00**	G2	13.40	340	14.80	376	12.21	310	67
2000	9070SK2000G2D1	**3699.00**	9070SK2000G2D1G13	**3912.00**	G2	13.40	340	14.80	376	12.21	310	73
3000	9070SK3000G2D1	**4955.00**	9070SK3000G2D1G13	**5168.00**	G2	13.40	340	14.80	376	12.21	310	87
NEMA Type 1 Enclosure, 480 V Primary, 120 V Secondary												
5000	9070SK5000G4D9	**7748.00**	9070SK5000G4D9G13	**7961.00**	G4	16.90	429	18.20	462	14.50	368	125
NEMA Type 12 Enclosure, 240 x 480 V Primary, 120 V Secondary												
250	9070SK250A2D1	**3281.00**	9070SK250A2D1G13	**3494.00**	A2	16.50	419	14.50	368	13.50	343	46
500	9070SK500A2D1	**3417.00**	9070SK500A2D1G13	**3630.00**	A2	16.50	419	14.50	368	13.50	343	49
750	9070SK750A2D1	**3621.00**	9070SK750A2D1G13	**3834.00**	A2	16.50	419	14.50	368	13.50	343	53
1000	9070SK1000A2D1	**3723.00**	9070SK1000A2D1G13	**3936.00**	A2	16.50	419	14.50	368	13.50	343	58
1500	9070SK1500A2D1	**4095.00**	9070SK1500A2D1G13	**4308.00**	A2	16.50	419	14.50	368	13.50	343	79
2000	9070SK2000A2D1	**4364.00**	9070SK2000A2D1G13	**4577.00**	A2	16.50	419	14.50	368	13.50	343	85
3000	9070SK3000A2D1	**5448.00**	9070SK3000A2D1G13	**5661.00**	A2	16.50	419	14.50	368	13.50	343	99
NEMA Type 12 Enclosure, 240 x 480 V Primary, 120 V Secondary, Flange Switch												
250	9070SK250A3D1	**3281.00**	9070SK250A3D1G13	**3494.00**	A3	15.50	394	17.00	432	10.00	254	48
500	9070SK500A3D1	**3417.00**	9070SK500A3D1G13	**3630.00**	A3	15.50	394	17.00	432	10.00	254	53
750	9070SK750A3D1	**3621.00**	9070SK750A3D1G13	**3834.00**	A3	15.50	394	17.00	432	10.00	254	57
1000	9070SK1000A3D1	**3723.00**	9070SK1000A3D1G13	**3936.00**	A3	15.50	394	17.00	432	10.00	254	61
1500	9070SK1500A3D1	**4095.00**	9070SK1500A3D1G13	**4308.00**	A3	15.50	394	17.00	432	10.00	254	75
2000	9070SK2000A3D1	**4364.00**	9070SK2000A3D1G13	**4577.00**	A3	15.50	394	17.00	432	10.00	254	86

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Voltage Transformers

Schneider Electric offers three models of voltage transformers, each suited for a particular application:

- Model 450R
  - — Applications requiring accurate voltage measurement within the 0.3% accuracy class
  - — Switchboards with 1% instrumentation
- Model 460R
  - — Applications with less critical accuracy and low burden requirements
  - — Transducers and other panelboard monitoring
- Model E470
  - — Extremely accurate voltage measurement
  - — Low burden applications, such as PLC modules and similar, high-impedance electronic devices

Table 14.41: Voltage Transformers

Application	Model Number	Accuracy/Burden and Thermal Rating	Primary Voltages (120 V Secondary)
Large Burden	450R	0.3 W, X, M, Y; 500 VA Thermal	120–600 V
Small Burden	460R	0.6 W, 1.2X; 150 VA Thermal	120–600 V
Small Burden	470R	0.3W, 1.2X; 150 VA Thermal	120–600 V

Current Transformers

Current transformers are low cost, compact units that offer good electrical performance in a general purpose transformer.

- They are very easy to mount on the conductors.
- All current transformers feature permanent polarity marks molded into the case.

The following types of current transformers are available:

- General purpose
- Toroidal (single ratio)
- Rectangle window (single ratio)
- Split core
- Bushing (single ratio) (multi-ratio)

For part numbers, see Section 6 of the Supplemental Digest or see the Schneider Electric Product Configurator.

Contact your local Schneider Electric representative for other available features.

Table 14.42: Current Transformers

Window Diameter		Model Number	Usual Application			Primary Range in Amperes ▲	UL Recognized Product
In.	mm		Metering	Metering or Control Relaying	High Output Relaying		
1.3	28	2NR	X			50–300	
1.56	40	5NR	X			100–600	
		54R	X			100–600	
1.94	49	64R	X			100–750	
		66R		X		100–750	
2.25	57	7RL				50–1500	
		7RT				50–1500 150–1500 ■	
2.34	59	74R	X			200–1500	
		76R		X		200–1500	
2.50	63	74RFT				—	
		180R		X		100–1500	
		200R		X		100–600	
3.50	89	201R		X		100–800	
4.00	102	100R		X		200–2000	Yes
		110R		X		200–2000	
4.25	108	170R		X		200–2000	
4.50	114	312R			X	600–4000	
		202R		X	X	100–1000	
5.25	133	203R		X		100–3000	
5.75	146	120R		X		200–3000	
6.25	159	210R		X	X	200–3000	
6.88	175	151R			X	600–4000	
		152R		X	X	50–4000	
8.13	206	140R		X	X	50–6000	
2.12 x 4.25	54 x 108	260R	X			100–4000	
3.50 x 6.25	89 x 159	273	X			200–4000	
3.56 x 8.81	90 x 224	270R	X			400–5000	
7.45 x 3.75	189 x 95	560R	X			400–5000	

▲ With a 5 A secondary.
■ With a 1 A secondary.

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Ordering Information

To complete the three- or single-phase catalog numbers on this page:

1. In Table 14.44 or Table 14.46, find your required voltage rating.
2. Note the voltage code for that rating.
3. In Table 14.43 or Table 14.45, find the transformer with the required voltage rating.
4. Replace the ( ) in the catalog number of that transformer with the voltage code noted in step 2.

Example 1: 1000 kVA, 3Ø, 60 Hz, 150 °C temp. rise, 60 kV BIL, NEMA sound level, ventilated indoor enclosure, 13.2 kV delta 480Y/277, 2-2.5% full capacity taps. 2AN and 2BN = catalog no. EE1000T51H.

Example 2: 750 kVA 3Ø, 60 Hz, 80 °C temp. rise, 60 kV BIL, NEMA sound level, ventilated indoor enclosure, 4160 V Delta, 480Y/277, 2-2.5% full capacity taps. 2AN and 2BN = catalog no. EE750T19HB. Add 20% to listed price.

Example 3: 167 kVA, 2400/4160Y-120/240, 1Ø, 60 Hz = catalog no. EE167S13H. The unit would be supplied with 2–2.5% above and 2–2.5% full capacity below normal taps on the primary.

1201–15,000 V, Three-Phase, Indoor Transformers

New!

All transformers are built with 220 °C insulation and 150 °C temperature rise. For 115 °C rise add 10% to price and F to catalog number. For 80 °C rise add 20% to price and B to catalog number. Check with your local Schneider Electric representative to verify dimensional changes and weights and for copper windings.

Standard high voltage taps: 4-2.5%, 2AN and 2BN. For 4-2.5% FCBN, add BN to catalog number.

Table 14.43: Three-Phase Transformers

kVA	Catalog No.	$ Price	Weight (lbs)	Enclosure ▲
2.4 kV and 5 kV Voltage Class, 60 Hz, 150 °C Rise				
112.5	EE112T( )H	**51125.00**	1540	36D
150	EE150T( )H	**62805.00**	1760	37D
225	EE225T( )H	**84500.00**	2090	37D
300	EE300T( )H	**101965.00**	2310	38D
500	EE500T( )H	**119077.00**	3520	38D
750 ■	EE750T( )H	**149110.00**	4290	39F
1000 ■	EE1000T( )H	**185080.00**	8140	40F
1500 ■	EE1500T( )H	**222440.00**	9900	40F
2000 ■	EE2000T( )H	**255265.00**	11990	41F
2500 ■	EE2500T( )H	**308692.00**	13420	42F
15 kV Voltage Class, 60 Hz,150 °C Rise				
112.5	EE112T( )H	**58586.00**	2200	38D
150	EE150T( )H	**72309.00**	2420	38D
225	EE225T( )H	**98125.00**	3080	45D
300	EE300T( )H	**137445.00**	3630	45D
500	EE500T( )H	**139650.00**	5500	44F
750 ■	EE750T( )H	**165870.00**	6600	39F
1000 ■	EE1000T( )H	**210915.00**	8140	40F
1500 ■	EE1500T( )H	**241298.00**	9900	40F
2000 ■	EE2000T( )H	**282852.00**	11990	41F
2500 ■	EE2500T( )H	**327549.00**	13420	42F
3000 ■	EE3000T( )H	**421833.00**	16940	42F

▲ See 14-10 for enclosures. Enclosures are for indoor use only. Transformers suitable for outdoor use are available on special order. Adding a weather shield will not make medium voltage transformer suitable for outdoor use.

■ Dimensions and prices listed for 480 volt secondary only. For 240 V or 208 V, contact your local Schneider Electric representative.

Table 14.44: Three-Phase Voltage Codes

kV Class	Code	Primary	Secondary
2.4 30 kV BIL	13	2400 Delta	208Y/120
	14	2400 Delta	480Y/277
	15	2400 Delta	240 Delta
	16	2400 Delta	480 Delta
	17	2400 Delta	600 Delta
5 30 kV BIL	18	4160 Delta	208Y/120
	19	4160 Delta	480Y/277
	20	4160 Delta	240 Delta
	21	4160 Delta	480 Delta
	22	4160 Delta	600 Delta
	23	4160Y/2400	240 Delta
	25	4160Y/2400	480 Delta
	26	4160/2400	600 Delta
	27	4800 Delta	208Y/120
	28	4800 Delta	480Y/277
	29	4800 Delta	240 Delta
	30	4800 Delta	480 Delta
	31	4800 Delta	600 Delta
15 60 kV BIL	32	7200 Delta	208Y/120
	33	7200 Delta	480Y/277
	34	7200 Delta	240 Delta
	35	7200 Delta	480 Delta
	36	7200 Delta	600 Delta
	37	12000 Delta	208Y/120
	38	12000 Delta	480Y/277
	39	12000 Delta	240 Delta
	40	12000 Delta	480 Delta
	41	12000 Delta	600 Delta
	42	12470 Delta	208Y/120
	43	12470 Delta	480Y/277
	44	12470 Delta	240 Delta
	45	12470 Delta	480 Delta
	46	12470 Delta	600 Delta
	47	12470Y/7200	240 Delta
	48	12470Y/7200	480 Delta
	49	12470Y/7200	600 Delta
	50	13200 Delta	208Y/120
	51	13200 Delta	480Y/277
	52	13200 Delta	240 Delta
	53	13200 Delta	480 Delta
	54	13200 Delta	600 Delta
	55	13200Y/7620	240 Delta
	56	13200Y/7620	480 Delta
	57	13200Y/7620	600 Delta
	58	13800 Delta	208Y/120
	59	13800 Delta	480Y/277
	60	13800 Delta	240 Delta
	61	13800 Delta	480 Delta
	62	13800 Delta	600 Delta

1201–15,000 V, Single-Phase, Indoor Transformers

New!

All transformers are built with 220 °C insulation and 150 °C temperature rise. For 115 °C rise add 10% to price and F to catalog number. For 80 °C rise add 20% to price and B to catalog number, and check with your local Schneider Electric representative for dimensional changes.

Standard high voltage taps: 4–2.5%, 2AN and 2BN. For 4-2.5% FCBN, add BN to catalog number.

Table 14.45: Single-Phase Transformers

kVA	Catalog No.	$ Price	Weight (lbs)	Enclosure ♦
2.4 kV Voltage Class, 60 Hz, 150 °C Rise				
167	EE167S( )H	**45444.00**	1650	38D
250	EE250S( )H	**59253.00**	2420	38D
333	EE333S( )H	**72783.00**	3300	45D
5 kV Voltage Class, 60 Hz, 150 °C Rise				
167	EE167S( )H	**48777.00**	1650	38D
250	EE250S( )H	**63312.00**	2420	38D
333	EE333S( )H	**77478.00**	3520	45D
15 kV Voltage Class, 60 Hz, 150 °C Rise				
167	EE167S( )H	**56136.00**	2640	38D
250	EE250S( )H	**72705.00**	3740	45D
333	EE333S( )H	**86835.00**	5500	45D

♦ See 14-10 for enclosures. Enclosures are for indoor use only. Transformers suitable for outdoor use are available on special order. Adding a weather shield will not make medium voltage transformer suitable for outdoor use.

Table 14.46: Single-Phase Voltage Codes

kV Class	Code	Primary	Secondary
2.4 30 kV BIL	14	2400 Delta	120/240
	25	2400 Delta	277
5 30 kV BIL	13	2400/4160Y	120/240
	15	4800 Delta	20/240
	16	4160 Delta	20/240
	24	2400/4160Y	277
	26	4800 Delta	277
	27	4160 Delta	277
15 60 kV BIL	17	4160/7200Y	120/240
	18	7200	120/240
	28	4160/7200Y	277
	29	7200	277
	19	4160/12470Y	120/240
	20	7620/13200Y	120/240
	21	12470	120/240
	22	13200	120/240
	23	13800	120/240
	30	4160/12470Y	277
	31	7620/13200Y	277
	32	12470	277
	33	13200	277
	34	13800	277

Special Notes

1. Distribution class lightning arresters are recommended as good practice, but are not included in the above prices. Arrester addition may affect dimensions. Contact your local Schneider Electric representative.
2. For 15 kV transformers requiring bottom entrance or exit, a separate compartment is required for adequate termination space and clearance. Transformers 1500 kVA and above with top entrance or exit may require a separate compartment to provide adequate wiring space. Contact your local Schneider Electric representative for special requirements.
3. If the transformer requires a 94-inch high enclosure for a switchgear line-up, or if a special enclosure is required, contact your local Schneider Electric representative.
4. For 95 kV BIL, consult your local Schneider Electric representative. (May affect dimensions.)

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Section 15
Medical Products

Operating Room Isolated Power Panel
(see page **15-2**)

Iso-Gard Series 6 LIM
(see page **15-4**)

Iso-Gard IGR Nurses' Station Indicator
(see page **15-5**)

Isolated Power Panels 15-2
Operating Room Panels 15-2
ICU/CCU Panels 15-2
Controlled Panels 15-3
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New! Iso-Gard™ Series 6 15-4
Remote Indicators/Displays 15-4
New! Remote Alarm Indicators 15-4
New! Nurses' Station Indicators/Alarm Annunciator 15-5
New! IGT Dual Clock/Timer 15-5
New! IGT1550 Remote Control 15-5
Accessories 15-6
Power/Ground Modules 15-6
Hospital Ground Cords and Jacks 15-6

All Square D™ brand Isolated Power Panels meet or exceed UL® 1022 and 1047 and are cUL Listed.

All products listed in this section are available through standard ordering procedures from authorized Schneider Electric distributors. For more information, contact your nearest Schneider Electric sales office or distributor. Call 1-888-778-2733 or visit www.schneider-electric.us.

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Life Safety from Schneider Electric Medical Products

Schneider Electric has been deeply involved in isolated power systems since 1944. The current Iso-Gard™ brand of isolated power panels has evolved over the years and will continue to do so. With the ever-changing needs of the health care industry, Schneider Electric is the leader in innovation and design.

Recent updates to some of our current panels include the ability to use bolt-on or plug-on circuit breakers in all panels. With the growing need for X-ray and laser use, the controlled power panel solves many difficult situations where both of these technologies are required, but at different ampere ratings.

Mixing and matching components is easier today than ever before, with panels that can serve up to 16 circuits. The Iso-Gard Series 6 line isolation monitor (LIM) has communication capabilities and the ability to monitor the transformer temperature and current flow.

Schneider Electric can work with facility managers, design engineers, contractors, or anyone else trying to design an isolated power system. We can provide custom configurations to fit your needs. Simply configure the panel desired by starting with the basic operating room (OR) panel and adding the intensive care unit (ICU)/critical care unit (CCU) or controlled power panel options you need.

- Panels are field expandable to 16 circuits for all panels by adding Square D™ brand QO™ or QOB circuit breakers from Schneider Electric.
- Panels come with a main circuit breaker.
- Panels are 5 mA and field adjustable to 2mA.
- Six-inch deep panels are not available for all kVA ratings.

Orders can be automatically configured on the Schneider Electric brand ordering system available from your nearest Schneider Electric distributor.

To request drawings and/or product design and availability information, send an e-mail to: medical_products@us.schneider-electric.com

Operating Room Panels

First introduced in the 1960s, but newly redesigned in 2011, this standard unit is most often used to supply 120 V service to the receptacles in an operating room. However, its use is not restricted to that application; it can also be used in critical care areas. This panel incorporates the following Schneider Electric components:

- Primary circuit breaker
- Isolation transformer
  - — low-leakage
  - — electrostatically shielded
  - — 180 °C insulat ion system
  - — 115 °C temperature rise
  - — 30 dB sound level
- Reference ground bus bar
- Iso-Gard LIM
- NQ panelboard interior

Operating room panels are non-ventilated and are supplied with a #304 stainless steel trim with a brushed finish. Under continuous full load and normal hospital ambient conditions, the surface temperature of the front trim panel will be no greater than 50 °C. The panels are UL Listed under Section 1047, *Isolated Power Systems Equipment*

Table 15.1: Operating Room Panel Ordering Information

Catalog No.	kVA Rating	Backbox Depth (in inches)	Width/Height (in inches)
SIP	3 and 5	6	24 W x 43 H
	7.5 and 10	8	

ICU/CCU Panels

Redesigned in 2011, these panels incorporate the same components and features as the operating room panels, but have the added feature of eight power receptacles and six approved grounding jacks connected to a ground bus for attaching fixed equipment and building structural grounds.

The power receptacles are “hospital only,” locking-type receptacles. Duplex or single receptacles are available on request. Although the panel is designed to serve the needs of a coronary care or intensive care bed, it has been widely applied to provide power within special procedure rooms, cardiovascular laboratories, and general operating rooms.

Table 15.2: ICU/CCUPanel Ordering Information

Catalog No.	kVA Rating	Backbox Depth (in inches)	Width/Height (in inches)
SIP	3, 5, 7.5 and 10	8	24 W x 45 H

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Controlled Panels

Controlled isolated power panels from Schneider Electric are designed to provide power for portable equipment outlets. In the past, most equipment operated on 60 A circuits. Today, these loads vary from 20 to 60 A and multiple pieces of equipment are being used. By applying the proper kVA loading, a panel can now provide power to multiple rooms and maintain safe operating conditions. All these panels are available in both one-phase and three-phase configurations with 5 to 25 kVA ratings.

The type of controls applied depends on the need. Schneider Electric has a variety of control schemes from push buttons to switches located in the operating room. The NEC requires that an audible and visual indication of alarm be available wherever isolated power is used. We use a receptacle module with a remote alarm indicator built into it for this purpose. A receptacle module without a remote alarm indicator is also available. The control of these circuits is important not only for the safety of turning them on and off, but they also turn the remote alarm indicators on and off at the same time. This reduces any confusion caused by an alarm going off in the operating room from circuits that don't need to be energized.

The basic control scheme is the mechanical interlock panel. The panel will serve various locations within the hospital. Interlocking circuitry allows predetermined locations to be used at any given time. Consequently, the line isolation monitor (LIM) monitors only the wiring and its inherent leakage to that receptacle. Remote indicator alarm stations must be located at the receptacle location. A push button station located in the panel controls the interlocking system. If the panel location is inaccessible or inconvenient for operating personnel, the push button station is available in a separate module that can be installed at the nurses' station or any other convenient location. This can be an inconvenience since this type of control system requires someone to select which room will be turned on. It also poses a potential problem in that someone could easily push a button to turn the power on in another room, thus turning off the power in a room that may actually be usinga piece of equipment.

Table 15.3: Controlled Panel Ordering Information

Catalog No.	kVA Rating	Backbox Depth (in inches)	Width/Height (in inches)
SIP	15	12	30 W x 51 H
	25	14	

Receptacle Modules for Controlled Panels

X-ray/laser power receptacle modules from Schneider Electric provide a convenient source of power for portable X-ray and laser equipment. The receptacle provided in each module is matched to the NEMA plug configuration of the equipment with which it will be used, and is mounted behind the door on the stainless steel face plate. The door features a concealed hinge and a touch latch.

Duplex Panels

The Duplex Isolation Power Panel is a single enclosure containing two complete hospital isolation systems. A divider in the unit's backbox separates the systems from top-to-bottom and front-to-back.

Each system has its own set of equipment, all of which is manufactured by Schneider Electric:

- Primary circuit breaker
- Isolation transformer
- Reference ground bus bar
- Iso-Gard™ line isolation monitor (LIM)
- NQ panelboard interior

Table 15.4: Duplex Isolation Panel Ordering Information

Catalog No.	kVA Rating ▲	Backbox Depth (in inches)	Width/Height (in inches)
SIX	3–10	8	34 W x 71 H

▲ Panels are available in any combination of two kVA ratings.

Dual Output Voltage Panels

The dual output voltage, hospital isolated power panel is a single, ungrounded panel that can supply two different output voltages simultaneously. Similar to a standard distribution panel or load center, it can supply both 120/208 V or 120/240 V of ungrounded, isolated, single-phase power using only one isolation transformer. Other hospital isolation panels can supply only one output voltage.

Typically, the 208 or 240 V circuits of the dual output voltage panel supply power to operating room equipment such as mobile X-ray machines or surgical lasers. At the same time, the panel's 120 V circuits can supply power to convenience receptacles, surgical lights, X-ray film illuminators, sterilizers, and other 120 V appliances commonly found in operating rooms. This panel is ideally suited as a power supply for power/ground modules and X-ray indicator/receptacle modules.

Table 15.5: Dual Output Panel Ordering Information

Catalog No.	Output Voltage Rating (in Vac)	Backbox Depth (in inches)	Width/Height (in inches)
SIDV	120/208	14	34 W x 51 H
	120/240		

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New! Iso-Gard™ Series 6 Line Isolation Monitor—UL Recognized

The Square D brand, Iso-Gard Series 6, microprocessor-controlled, line isolation monitor (LIM) is included as standard equipment in all Schneider Electric hospital isolation panels. This LIM is also available as a replacement unit for older LIMs, is a direct replacement for all previous Schneider Electric LIMs, and is electrically compatible with all hospital isolated power systems.

- Automatic and manual self-test and self-calibration that reduces the frequency of required periodic testing
- Digital and analog display
- Unique audible alarm that will not be confused with other equipment
- UL component recognized and CSA classified
- Microprocessor-controlled circuitry for highest accuracy and stability

Table 15.6: Iso-Gard LIM Ordering Information and Specifications

Catalog No.	Operating Voltage	Hazard Current Alarm Level	Mode	Monitor Hazard Current
IG6	85–265 Vac, 50 or 60 Hz	2 or 5 mA (selectable)	Single-phase	25 µA or less

Remote Alarm Indicators

The National Electrical Code® (NEC®) **requires** audible and visual alarm indication where isolation power is used (NEC 517-160). Schneider Electric offers the IG2000P and RA1 remote alarm indicators for this purpose.

New! IG2000P

RA1

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New! Nurses' Station Indicators/Alarm Annunciators

Nurses' station indicators are available by combining the standard IG2000P remote onto a ganged plate or by using the new IGR or IGRD indicators/alarm annunciators. The IGR unit can support up to 199 panels on a single, twisted-pair connector. The IGRD unit has a larger capacity.

IGR

IGRD

New! Iso-Gard™ IGT Dual Clock/Timer

The IGT unit displays both time of day and elapsed time information. The top, four-digit display shows the current time. It can operate in both 12- and 24-hour time modes. The bottom, four-digit display is an elapsed time counter controlled by the Count/Reset and Hold/Resume buttons.

- Bright-red LED display for enhanced readability under the intense lighting conditions found in hospital operating rooms
- 12/24 hour selectable mode
- Power outage backup for at least 24 hours without batteries
- Designed for flush wall mounting

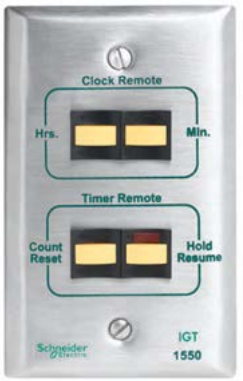
A multi-display unit is available by combining the IGT unit into a four display unit and utilizing an IGT 1550 four-point remote control.

New! Iso-Gard™ IGT1550 Remote Control

The IGT1550 remote control provides the ability to control a clock/elapsed timer, such as the IGT, from a more convenient location.

IGT

IGT1550



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Power/Ground Modules

When both ground jacks and power receptacles are required, these UL Listed modules offer convenience and save labor in field wiring. The units include four power receptacles, four twist-to-lock ground jacks, and a ground bus with a generous number of lugs for external ground connections.

The main ground connection in the module accommodates up to a #1/0 cable. The units are completely factory wired; only field power connections and ground connections are necessary. They are furnished with Type 304, brushed stainless steel face plates.

4 Red Duplex Receptacles and 4 Ground Jacks

4 Locking Receptacles and 4 Ground Jacks

Hospital Ground Cords and Jacks

Schneider Electric provides hospital-grade devices for the supply and grounding of portable equipment.

- Hospital ground cords
  - — Highly flexible wire with a heavy duty lug or clip end
  - — Ground cord with lug end is UL Listed (UL 467)
  - — Various lengths available
- Hospital ground jacks

Ground Cord with Lug End

Ground Jack

Ground Cord with Clip End

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Section 16

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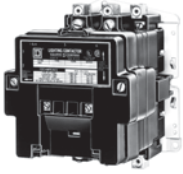

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- Electronic Motor Circuit Protector (MCP) Class 8539 **16-35, 16-36, 16-37**
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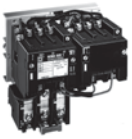

Class	2510, 2511, 2512	8502 & 8702	8536 & 8736	8538 & 8738	8539 & 8739
	Manual Starters and Switches, Non-Reversing, Reversing and Two Speed	NEMA Style Full Voltage Non-Reversing and Full Voltage Reversing Magnetic Contactors	NEMA Style Full Voltage Non-Reversing and Full Voltage Reversing Magnetic Starters	NEMA Style Full Voltage Non-Reversing and Full Voltage Reversing Combination (Disconnect Switch) Magnetic Starters	NEMA Style Full Voltage Non-Reversing and Full Voltage Reversing Combination (PowerPact™ Circuit Breaker) Magnetic Starters
Page	16-4	8502 16-14	8536 16-18	8538 16-31	8539 16-35
		8702 16-44	8736 16-46	8738 16-51	8739 16-53
NEMA Sizes	Type F = N/A	00 to 7	00 to 7	8538 = 0 to 6	8539 = 0 to 7
	Type K = N/A			8738 = 0 to 5	8739 = 0 to 6
	Type M = 0 & 1				
Load Voltage	Type F = 277 V	600 Vac Max.	600 Vac Max.	600 Vac Max.	600 Vac Max.
	Types K & M = 600 Vac				
Current Ratings (Continuous)	Type F = 16 A	9A to 810 A	9 A to 810 A	8538 = 18 A to 540 A	8539 = 18 A to 810 A
	Types K & M = 30 A			8738 = 18 A to 270 A	8739 = 18 A to 540 A
Horsepower Ratings (Maximum)	Type F = 1	1/2 to 600	1/2 to 600	8538 =1/2 to 400	8539 = 1/2 to 600
	Type K = 20			8738 = 1/2 to 200	8739 = 1/2 to 400
	Type M = 10				
Overload Relay	Type F = Melting Alloy	N/A	Melting Alloy	Melting Alloy	Melting Alloy
	Type K = N/A		Bi-Metalic	Bi-Metalic	Bi-Metalic
	Type M = Melting Alloy		Solid State	Solid State	Solid State
Enclosure Types	1, Flush Mount, 3R, 4, 4X, 7 & 9 and Open	1, 3R, 4, 4X, 12/3R, 7 & 9 and Open	1, 3R, 4, 4X, 12/3R, 7 & 9 and Open	1, 4, 4X, 12/3R	1, 4, 4X, 12/3R
Approvals	UL File E42243 NLRV	UL File E78351 NLDX	UL File E78351 NLDX	UL File E152395 NKJH7	UL File E152395 NKJH7
	UR File E42243 NLRV2	CSA 60905 Class 3211-04	CSA 60905 Class 3211-04	CSA LR584 Class 3211 04	CSA LR584 Class 3211 04
	CSA File LR 25490	CE IEC 947-4-1 Sizes 00–5 Only	CE IEC 947-4-1 Sizes 00–5 Only		

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Selection Information

8903L & 8903S	8903 Combination Devices	8910, 8911, 8965	8940	8941
Multipole electrically held and mechanically held contactors available in 30 A configurations to 12 poles and 800 A configurations to 3 poles.	Type S lighting contactors electrically held and mechanically held available with disconnect switches or PowerPact™ circuit breakers	Definite Purpose non- reversing contactors available as compact 1 or 2 pole to 40 A and 2 to 4 pole to 90 A. Reversing and Starter Configurations also available.	Well-Guard Control™ Pumping Plant Panels available with disconnect switches or PowerPact™ circuit breakers.	NEMA Style AC Duplex Motor Controllers available as a combination starter or without disconnecting means.
16-59	16-61	8910 16-70	16-75	16-78
		8911 16-74		
		8965 16-81		
N/A	N/A	N/A	1 to 7	1 to 4
600 Vac Max.	600 Vac Max.	600 Vac Max.	600 Vac Max.	600 Vac Max.
8903L to 30 A	300 A (Disconnect)	20 A to 40 A (Compact)	27 A to 810 A	27 A to 135 A
8903S to 800 A	600 A (Circuit Breaker)	20 A to 90 A		
N/A	N/A	1/2 to 50	1/2 to 600	1/2 to 100
N/A	N/A	Melting Alloy (8911)	Melting Alloy	Melting Alloy
			Bi-Metallic	Bi-Metallic
			Solid State	Solid State
1, 3R, 4, 4X, 12/3R and Open	1, 4, 4X, 12/3R	1	3R	1, 4, 4X, 12/3R and Open
UL File E78427 NRNT	UL File E16151 NRNT	UR E3190 NLDX2	UL/cUL 152395 NKJH	UL File E152395 NKJH7
CSA LR60905 Class 3231 01	cUL File E16151 NRNT	CSA LR25490 Class 3211 04		

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Fractional Horsepower Manual Starters with Melting Alloy Type Thermal Overload Relay

Table 16.1: Single-Unit Types—Class 2510—Rated 16 A — Thermal Units
Prices shown do not include thermal units. Standard trip thermal units are $21.50 each. See page 16-116 for selection information.

Type of Operator	No. of Poles	Features	NEMA 1 General Purpose Enclosure Surface Mounting				General Purpose Flush Mounting (Without Pull Box)						NEMA Type 4▲ Watertight and Dusttight Enclosure		NEMA Types 3R, 7 & 9 Hazardous Locations Div. 1 & 2 Class I Groups B, C, & D & Class II Groups E, F & G Enclosure		Open Type		Number of Thermal Units Required
			Standard		Oversized		Gray Flush Plate		Standard Stainless Steel Flush Plate		Jumbo Stainless Steel Flush Plate								
			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	
Basic Starter—Class 2510																			
Toggle	1	Standard	FG1	**86.00**	FGJ1	**99.00**	FF1	**78.00**	FS1	**83.00**	—	—	—	—	—	—	FO1	**71.00**	1
		With Red Pilot Light♦	FG1P	**129.00**	FGJ1P	**143.00**	FF1P	**122.00**	FS1P	**129.00**	FSJ1P	**149.00**	—	—	—	—	FO1P	**116.00**	
	2	Standard	FG2	**99.00**	FGJ2	**116.00**	FF2	**93.00**	FS2	**99.00**	—	—	—	—	—	—	FO2	**86.00**	1
		With Red Pilot Light♦	FG2P	**143.00**	FGJ2P	**158.00**	FF2P	**120.00**	FS2P	**143.00**	FSJ2P	**165.00**	—	—	—	—	FO2P	**129.00**	
Key	1	Standard	FG3	**116.00**	FGJ3	**129.00**	FF3	**107.00**	FS3	**114.00**	—	—	—	—	—	—	FO3	**99.00**	1
		With Red Pilot Light♦	FG3P	**158.00**	FGJ3P	**171.00**	FF3P	**149.00**	FS3P	**158.00**	FSJ3P	**179.00**	—	—	—	—	FO3P	**143.00**	
	2	Standard	FG4	**129.00**	FGJ4	**143.00**	FF4	**122.00**	FS4	**129.00**	—	—	—	—	—	—	FO4	**114.00**	1
		With Red Pilot Light♦	FG4P	**171.00**	FGJ4P	**185.00**	FF4P	**165.00**	FS4P	**171.00**	FSJ4P	**192.00**	—	—	—	—	FO4P	**158.00**	
Starter with Handle Guard/Lock-Off—Class 2510																			
Toggle	1	Standard	FG5	**99.00**	FGJ5	**114.00**	Order basic starter plus separate handle guard kit.						FW1	**320.00**	FR1	**350.00**	■	—	1
		With Red Pilot Light ♦	FG5P	**143.00**	FGJ5P	**158.00**							FW1P	**435.00**	—	—		—	
	2	Standard	FG6	**116.00**	FGJ6	**129.00**							FW2	**336.00**	FR2	**363.00**	■	—	1
		With Red Pilot Light♦	FG6P	**158.00**	FGJ6P	**171.00**							FW2P	**449.00**	—	—		—	

▲ Furnished with one 3/4" pipe tap in bottom (reversible for top feed). To obtain 3/4" pipe tap top and bottom, add suffix letter "H" to type number and add **$19.10** to price.
■ For replacement starter, order open type above. For NEMA 4 with pilot light, retain pilot light mounting bracket from original device.

Table 16.2: Duplex Units—Class 2510

Type of Operator	No. of Poles	Features	NEMA 1 General Purpose Enclosure Surface Mounting		General Purpose Flush Mounting (Without Pull Box)						Number of Thermal Units Required
					Gray Flush Plate for Wall or Cavity Mounting		Stainless Steel Flush Plate for Wall or Cavity Mounting		Replacement Starter Class 2510		
			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	
One Starter in Duplex Enclosure—Class 2510											
Toggle	2	Standard	FG02	**158.00**	—	—	—	—	—	—	1
		With Red Pilot Light ♦	FG02P	**201.00**	—	—	—	—	—	—	
Key	2	With Red Pilot Light ♦	FG04P	**201.00**	—	—	—	—	—	—	1
Two Starters in One Enclosure—Class 2510											
Toggle	2 Each Str.	Standard	FG22	**243.00**	FF22	**228.00**	—	—	—	—	2
		With Red Pilot Light on Each♦	FG22P	**399.00**	FF22P	**386.00**	FS22P	**399.00**	—	—	
Key	2 Each Str.	With Red Pilot Light on Each♦	FG44P	**458.00**	FF44P	**441.00**	FS44P	**458.00**	—	—	2
Starter and "AUTO-OFF-HAND" SPDT Selector Switch (AC Only)—Class 2510											
Toggle	1	Standard	FG71	**221.00**	FF71	**207.00**	—	—	—	—	1
		With Red Pilot Light ♦	FG71P	**264.00**	FF71P	**251.00**	FS71P	**264.00**	—	—	
	2	Standard	FG72	**234.00**	FF72	**221.00**	—	—	—	—	1
		With Red Pilot Light♦	FG72P	**278.00**	FF72P	**264.00**	FS72P	**278.00**	—	—	
Key	2	With Red Pilot Light♦	FG74P	**306.00**	FF74P	**293.00**	FS74P	**306.00**	—	—	1
Two Speed Starters (AC Only)—Class 2512									Replacement Starter Class 2510		
Toggle	1	With Mechanical Interlock:									2
		Standard	FG11	**314.00**	FF11	**300.00**	—	—	FO1T	**86.00**	
		With 2 Red Pilot Lights♦	FG11P	**471.00**	FF11P	**458.00**	—	—	FO1PT	**129.00**	
		With HIGH-OFF-LOW Selector Switch:									
		With 2 Red Pilot Lights♦	—	—	—	—	FS101P	**471.00**	FO1PT	**129.00**	
	2	With Mechanical Interlock:									2
		Standard	FG22	**342.00**	FF22	**329.00**	—	—	FO2T	**99.00**	
		With 2 Red Pilot Lights♦	FG22P	**500.00**	FF22P	**485.00**	—	—	FO2PT	**143.00**	
		With HIGH-OFF-LOW Selector Switch:									
		With 2 Red Pilot Lights♦	—	—	—	—	FS202P	**500.00**	FO2PT	**143.00**	

♦ For green pilot light, add the letter "G" to the catalog number (i.e. 2510FG2P**G**).

Type FG2P

Table 16.3: Horsepower Ratings Type F

Volts	Maximum Horsepower		
	AC Single Phase		DC 2-Pole Only
	1-Pole	2-Pole	
115–230	1	1	3/4
277	1	1	—

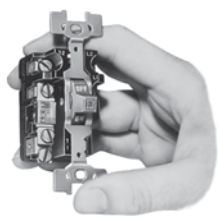
Note: Continuous current rating—16 A.

Table 16.4: Approvals—2510 Type F and K

Enclosed		Open	
(UL Listed)	File E42243	(UL Component Recognized)	File E42243
	CCN NLRV		CCN NLRV2
CSA Certified File LR25490 Class 3211-05			

Table 16.5: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	2510	FG1



Type FO2

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Table 16.6: Non-Reversing—Class 2510

Type of Operator	No. of Poles	Features	NEMA 1 General Purpose Enclosure Surface Mounting				General Purpose Flush Mounting (Without Pull Box)						NEMA Type 4 ▲ Watertight and Dusttight Enclosure		NEMA Types 3R, 7 & 9 ▲ Hazardous Locations Div. 1 & 2 Class I Groups B, C & D & Class II Groups E, F, and G Enclosure		Open Type	
			Standard		Oversized		Gray Flush Plate		Standard Stainless Steel Flush Plate		Jumbo Stainless Steel Flush Plate							
			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
Toggle	2	Standard	KG1	**66.00**	KGJ1	**81.00**	KF1	**59.00**	KS1	**66.00**	—	—	KW1	**314.00**	KR1	**342.00**	KO1	**52.00**
		With Pilot Light ♦																
		115 Vac	KG1A	**138.00**	KGJ1A	**153.00**	KF1A	**131.00**	KS1A	**138.00**	KSJ1A	**161.00**	KW1A	**428.00**	—	—	KO1A ■	**125.00**
		230 Vac	KG1B	**138.00**	KGJ1B	**153.00**	KF1B	**131.00**	KS1B	**138.00**	KSJ1B	**161.00**	KW1B	**428.00**	—	—	KO1B ■	**125.00**
	3	Standard	KG2	**149.00**	KGJ2	**165.00**	KF2	**143.00**	KS2	**149.00**	—	—	KW2	**386.00**	KR2	**442.00**	KO2	**120.00**
		With Pilot Light ♦																
		208-277 Vac	KG2B	**221.00**	KGJ2B	**234.00**	KF2B	**215.00**	KS2B	**221.00**	KSJ2B	**243.00**	KW2B	**500.00**	—	—	KO2B ■	**207.00**
		440-600 Vac	KG2C	**221.00**	KGJ2C	**234.00**	KF2C	**215.00**	KS2C	**221.00**	KSJ2C	**243.00**	KW2C	**500.00**	—	—	KO2C ■	**207.00**
	2	Standard	KG5	**78.00**	KGJ5	**93.00**	—	—	—	—	—	—	KW5	**327.00**	—	—	KO5	**64.00**
		With Pilot Light ♦																
		115 Vac	KG5A	**149.00**	—	—	—	—	—	—	—	—	KW5A	**440.00**	—	—	KO5A ■	**120.00**
		230 Vac	KG5B	**149.00**	—	—	—	—	—	—	—	—	KW5B	**440.00**	—	—	KO5B ■	**120.00**
	3	Standard	KG6	**162.00**	KGJ6	**176.00**	—	—	—	—	—	—	KW6	**396.00**	—	—	KO6	**147.00**
		With Pilot Light ♦																
		208-277 Vac	KG6B	**233.00**	—	—	—	—	—	—	—	—	KW6B	**512.00**	—	—	KO6B ■	**219.00**
		440-600 Vac	KG6C	**233.00**	—	—	—	—	—	—	—	—	KW6C	**512.00**	—	—	KO6C ■	**219.00**
Key	2	Standard	KG3	**95.00**	KGJ3	**110.00**	KF3	**89.00**	KS3	**95.00**	—	—	—	—	—		KO3	**81.00**
		With Pilot Light ♦																
		115 Vac	KG3A	**167.00**	KGJ3A	**179.00**	KF3A	**161.00**	KS3A	**167.00**	KSJ3A	**185.00**	—	—	—		KO3A	**153.00**
		230 Vac	KG3B	**167.00**	KGJ3B	**179.00**	KF3B	**161.00**	KS3B	**167.00**	KSJ3B	**185.00**	—	—	—	—	KO3B	**153.00**
	3	Standard	KG4	**179.00**	KGJ4	**192.00**	KF4	**171.00**	KS4	**179.00**	—	—	—	—	—	—	KO4	**165.00**
		With Pilot Light ♦																
		208-277 Vac	KG4B	**251.00**	KGJ4B	**264.00**	KF4B	**243.00**	KS4B	**251.00**	KSJ4B	**270.00**	—	—	—	—	KO4B	**234.00**
		440-600 Vac	KG4C	**251.00**	KGJ4C	**264.00**	KF4C	**243.00**	KS4C	**251.00**	KSJ4C	**270.00**	—	—	—	—	KO4C	**234.00**

▲ Furnished with one 3/4" pipe tap in bottom (reversible for top feed). To obtain 3/4" pipe tap top and bottom, add suffix letter "H" to type number and add **$28.70** to price.

■ When replacing starter with pilot light in NEMA 4 enclosure, retain pilot light mounting bracket from original device.

Table 16.7: Reversing—Class 2511

Type of Operator	Number of Poles	Motor Types for Which Suitable	Features (Including Mechanical Interlock)	NEMA 1 General Purpose Enclosure Surface Mounting		With Flush Plate for Cavity Mounting (Without Pull Box)		Replacement Switch Class 2510	
				Type	$ Price	Type	$ Price	Type	$ Price
Toggle	2	Single Ø 3-Lead Repulsion-Induction	Standard	KG11	**287.00**	KF11	**270.00**	KO1T	**66.50**
			With Pilot Light: ♦						
			115 Vac	KG11A	**399.00**	KF11A	**386.00**	KO1AT	**138.00**
			230 Vac	KG11B	**399.00**	KF11B	**386.00**	KO1BT	**138.00**
	3	Three Ø; Also Single Ø Capacitor, Split Ø, or 4-Lead Repulsion-Induction	Standard	KG22	**441.00**	KF22	**428.00**	KO2T	**149.00**
			With Pilot Light: ♦						
			110–120 Vac	KG22A	**557.00**	KF22A	**543.00**	KO2AT	**221.00**
			208–220 Vac	KG22B	**557.00**	KF22B	**543.00**	KO2BT	**221.00**
			440–600 Vac	KG22C	**557.00**	KF22C	**543.00**	KO2CT	**221.00**

Table 16.8: Two Speed—Class 2512

Type of Operator	Number of Poles	Motor Types for Which Suitable	Features (Including Mechanical Interlock)	NEMA 1 General Purpose Enclosure Surface Mounting		With Flush Plate for Cavity Mounting (Without Pull Box)		Replacement Switch Class 2510	
				Type	$ Price	Type	$ Price	Type	$ Price
Toggle	2	Single Ø Two Winding (3-Lead)	Standard	KG11	**287.00**	KF11	**270.00**	KO1T	**66.50**
			With 2 Pilot Lights: ♦						
			115 Vac	KG11A	**513.00**	KF11A	**500.00**	KO1AT	**138.00**
			230 Vac	KG11B	**513.00**	KF11B	**500.00**	KO1BT	**138.00**
	3	Three Ø Separate Winding (Wye-Connected)	Standard	KG22	**441.00**	KF22	**428.00**	KO2T	**152.00**
			With 2 Pilot Lights: ♦						
			208–240 Vac	KG22B	**671.00**	KF22B	**656.00**	KO2BT	**221.00**
			440–600 Vac	KG22C	**671.00**	KF22C	**656.00**	KO2CT	**221.00**

♦ For green pilot light, add the letter "G" to the catalog number (i.e. 2510KW2C**G**).

Table 16.9: Class 2510 Horsepower Ratings

Class 2510	No. of Poles	Motor Type AC	Maximum Hp				DC Rating		
			115 Volts	230 Volts	460 Volts	575 Volts	90 Volts	115 Volts	230 Volts
KO1 KO3	2	Single Ø	2	2	3	3	1	2	1-1/2
KO2 KO4	3	Three Ø	2	7-1/2	10	10	1	2	1-1/2
KO5	2	Single Ø	2	3	7-1/2	10	1	2	1-1/2
KO6	3	Three Ø	2	7-1/2	15	20	1	2	1-1/2

Note: Continuous current rating 30 A at 600 Vac maximum.

Table 16.10: How to Order

To Order Specify:	Catalog Number	
• Class Number	Class	Type
• Type Number	2510	KO2

Table 16.11: Class 2511 and 2512 Horsepower Ratings Type K

Device	No. of Poles	Motor Type AC	Maximum Hp			DC Ratings		
			115 Volts	230 Volts	460–575 Volts	90 Volts	115 Volts	230 Volts
Class 2511	2	Single Ø	2	2	3	1	2	1-1/2
	3	Three Ø	2	7-1/2	10	1	2	1-1/2
Class 2512	2	Single Ø	2	2	3	1	2	1-1/2
	3	3 Ø, Constant or Variable Torque	2	7-1/2	10	1	2	1-1/2
	3	3 Ø, Constant Horsepower	2	7-1/2	10	1	2	1-1/2

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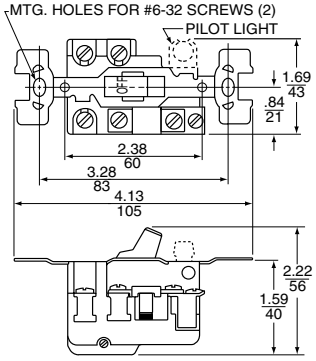
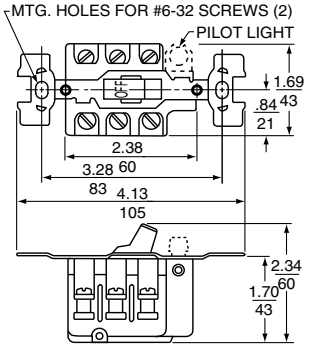
Open Type

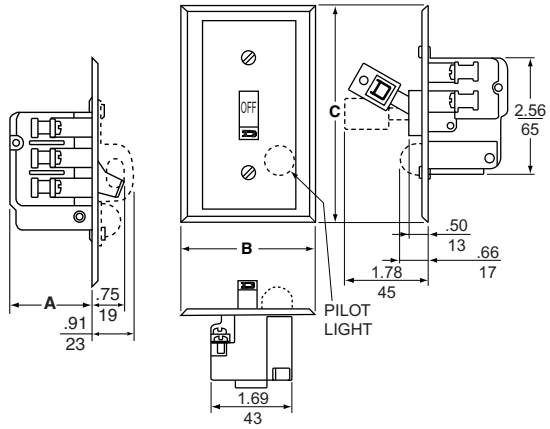


Types FO1, 1P, 2
Fractional Hp Starter



Types KO1, 1A, 1B, 2, 2B, 2C
Types KO5, 5A, 5B, 6, 6B, 6C
Motor Starting Switch

NEMA 1 General Purpose Enclosure (Flush Mount)



NEMA 4 Watertight Die Cast Zinc Enclosure

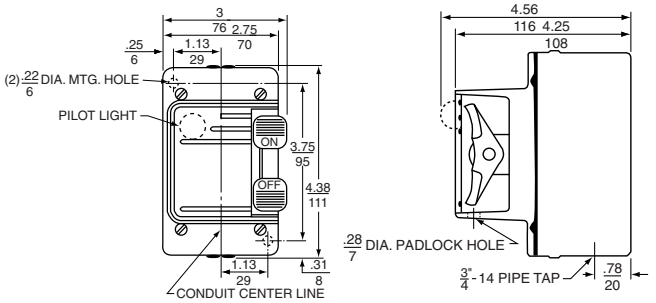


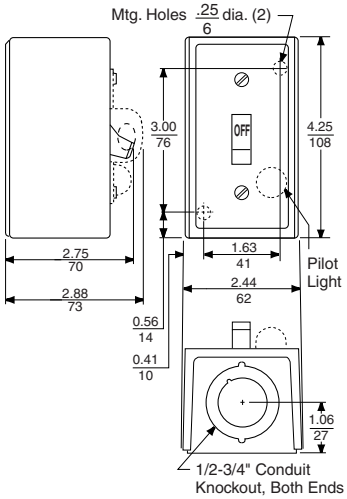
Table 16.12:

Device	Class	Type
Fractional Hp Starter	2510	FW1, 1P, 2, 2P
Motor Starting Switch	2510	KW1, 1A, 1B, 2, 2B, 2C

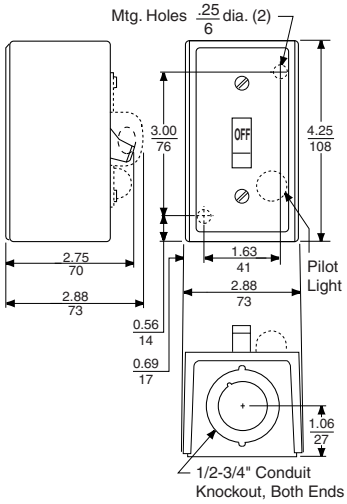
Table 16.13:

Device	Type of Operator	Class 2510 Type	Dimensions		
			A	B	C
Fractional Hp Starter	Toggle	FF1, 1P, 2, 2P FS1, 1P, 2, 2P	1-7/16	2-3/4	4-1/2
		FSJ1P, 2P	1-7/16	3-1/2	5-1/4
	Key	FF3, 3P, 4, 4P FS3, 3P, 4, 4P	1-7/16	2-3/4	4-1/2
		FSJ3P, 4P	1-7/16	3-1/2	5-1/4
Motor Starting Switch	Toggle	KF1, 1A, 1B, 2, 2B, 2C KS1, 1A, 1B, 2, 2B, 2C	1-3/4	2-3/4	4-1/2
		KSJ1A, 1B, 2B, 2C	1-3/4	3-1/2	5-1/4
	Key	KF3, 3A, 3B, 4, 4B, 4C KS3, 3A, 3B, 4, 4B, 4C	1-3/4	2-3/4	4-1/2
		KSJ3A, 3B, 4B, 4C	1-3/4	3-1/2	5-1/4

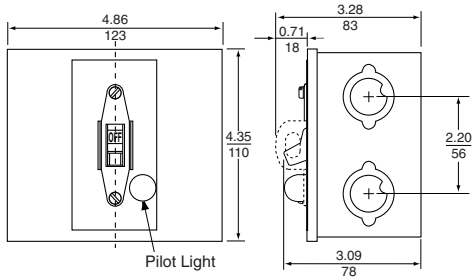
NEMA 1 General Purpose Enclosure (Surface Mount)



Standard
(Class 2510 Types FG & KG, Single Unit)



Oversized
(Class 2510 Types FGJ & KGJ, Single Unit)



Jumbo
(Class 9991Type KE2, see page 16-11)

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NEMA 3R, 7, and 9 Aluminum Enclosure for Hazardous Locations

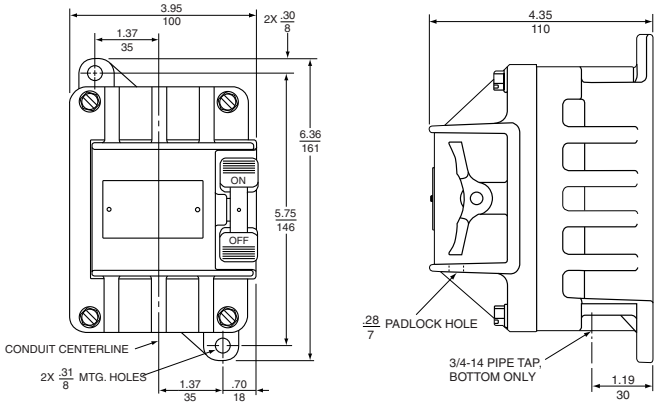

Table 16.14: NEMA 3R, 7, and 9 Aluminum Enclosure for Hazardous Locations

Device	Class	Type
Fractional Hp Starter	2510	FR1, 2
Motor Starting Switch	2510	KR1, 2

Dimensions for Duplex Devices

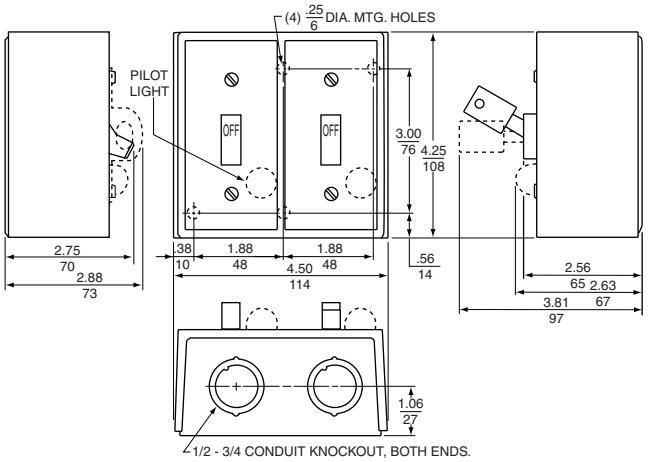

Table 16.15: NEMA 1 General Purpose Surface Mount Enclosure for Duplex Devices

Device	Type of Operator	Class	Type
One Starter	Toggle	2510	FGO2, 02P
	Key	2510	FGO4P
Two Starters	Toggle	2510	FG22, 22P
	Key	2510	FG44P
One Starter and One Selector Switch▲	Toggle	2510	FG71, 71P, 72, 72P
	Key	2510	FG74P
Reversing Switch■	Toggle	2511	KG11, 11A, 11B, 22, 22A, 22B, 22C
Two Speed Starter	Toggle	2512	FG11, 11P, 22, 22P
Two Speed Switch	Toggle	2512	KG11, 11A, 11B, 22, 22B, 22C

▲ Selector switch is on left, increases overall depth to 3-1/2".
■ Only one pilot light (located on right) is used on Class 2511 switches.

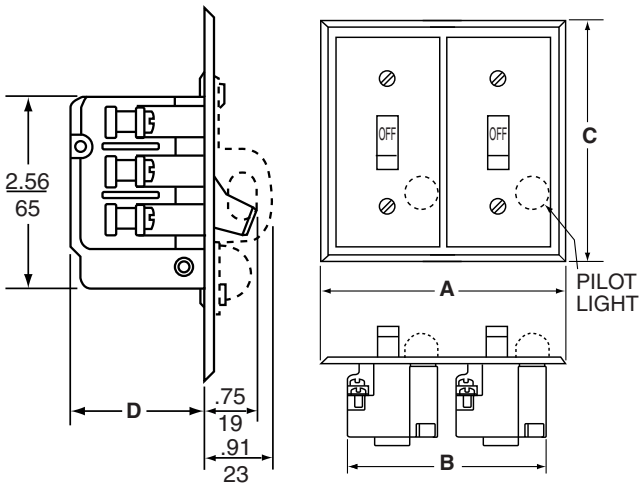

Table 16.16: General Purpose Flush Mounting Plate for Duplex Devices

Device	Type of Operator	Class	Type	Dimensions♦			
				A	B	C	D
Two Starters	Toggle	2510	FF22, 22P	5-1/4	3-3/4	5-1/4	1-7/16
			FS22P	4-9/16	3-1/2	4-1/2	1-7/16
	Key	2510	FF44P	5-1/4	3-3/4	5-1/4	1-7/16
			FS44P	4-9/16	3-1/2	4-1/2	1-7/16
One Starter and One Selector Switch★	Toggle	2510	FF71, 71P, 72, 72P	5-1/4	3/4	5-1/4	2
			FS71P, 72P	4-9/16	3-1/2	4-1/2	2
	Key	2510	FF74P	5-1/4	3-3/4	5-1/4	2
			FS74P	4-9/16	3-1/2	4-1/2	2
Reversing Switch	Toggle	2511	KF11, 11A, 11B KF22, 22A KF22B, 22C	5-1/4	3-3/4	5-1/4	1-3/4
Two Speed Starter	Toggle	2512	FF11, 11P, 22, 22P	5-1/4	3-3/4	5-1/4	1-7/16
Two Speed Switch	Toggle	2512	KF11, 11A, 11B, KF22, 22B, 22C	5-1/4	3-3/4	5-1/4	1-3/4

♦ Dimensions include factory wired power connections.
★ Selector Switch is on left, extends 1-5/8" from mounting surface.

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Types M and T integral horsepower manual starters provide convenient "On-Off" operation of small single phase, polyphase or DC motors. Typical applications include small machine tools, pumps, fans and conveyors.

- Push button (M) or toggle (T) operators
- Reliable overload protection
- Pilot light and auxiliary contact available

Table 16.17: Integral Horsepower Manual Starters

Note that the prices shown do not include thermal units. Standard trip thermal units are **$21.50** each; see page 16-116 for selection information.

Non-Reversing					Class 2510												Max. Voltage: 600 Vac			
No. of Poles	NEMA Size	Ratings			NEMA 1 Surface Mounting			NEMA 4/4X Watertight and Dusttight Enclosure Brushed Stainless Steel		NEMA 4/4X Watertight, Dusttight and Corrosion-Resistant Glass-Polyester Enclosure		▲ NEMA 7 & 9 For Hazardous Locations Class I – Groups C, D Class II – Groups E, F & G		NEMA 12 Dusttight and Driptight Industrial Use Enclosure		Open Type			
		Motor Voltage	Max. Hp		Square P.B. Operator	Toggle Operator	$ Price									Square P.B. Operator	Toggle Operator	$ Price	
			Poly-Phase	Single Phase	Type			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type			
2-Pole	M-0	115 230	— —	1 2	MBG1	TBG1	**264.00**	MBW11■	**720.00**	MBW1■	**720.00**	MBR1■	**1004.00**	MBA1■	**363.00**	MBO1	TBO1	**234.00**
	M-1	115 230	— —	2 3	MCG1	TCG1	**336.00**	MCW11	**891.00**	MCW1	**891.00**	MCR1	**1197.00**	MCA1	**435.00**	MCO1	TCO1	**306.00**
	M-1P	115 230	— —	3 5	MCG2	TCG2	**491.00**	MCW12	**1089.00**	MCW2	**1089.00**	MCR2	**1382.00**	MCA2	**593.00**	MCO2	TCO2	**309.00**
3-Pole	M-0	115 200-230 380-575	— 3 5	— — —	MBG2	TBG2	**314.00**	MBW12■	**770.00**	MBW2■	**770.00**	MBR2■	**1062.00**	MBA2■	**414.00**	MBO2	TBO2	**287.00**
	M-1	115 200-230 380-575	— 7-1/2 10	— — —	MCG3	TCG3	**386.00**	MCW13	**941.00**	MCW3	**941.00**	MCR3	**1254.00**	MCA3	**485.00**	MCO3	TCO3	**356.00**
DC 2-Pole	M-0	115 230	1 hp–D.C. 1-1/2 hp–D.C.		MBG4	TBG4	**264.00**	MBW14	**720.00**	MBW4	**720.00**	—	—	MBA4	**363.00**	MBO4	TBO4	**234.00**
	M-1	115 230	1-1/2 hp–D.C 2 hp–D.C.		MCG5	TCG5	**336.00**	MCW15	**891.00**	MCW5	**891.00**	MCR5	**1188.00**	MCA5	**435.00**	MCO5	TCO5	**306.00**

▲ NEMA 7 & 9 enclosures are cast-iron. NEMA 7 & 9 enclosures (cast aluminum) are available for outdoor use; to order these type of enclosures, replace the "R" in the catalog number with a "T". For additional information, contact Schneider Electric Customer Care Center.

■ Approved for group motor installations per NEC 430-53(c).

All Except NEMA 7 & 9

File E42243
CCN NLRV

File LR60905
Class 3211-05

NEMA 7 & 9 Only

File E58760
CCN NPXZ

File LR26817
Class 3218-04

Table 16.18: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	2510	MCA1

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Reversing and Two Speed

Class 2511 reversing and Class 2512 two-speed manual starters consist of two mechanically interlocked Class 2510 Types M or T manual starters.

Table 16.19: Reversing Class 2511

Class	Description	Number of Poles	NEMA Size	Ratings		NEMA 1 Surface Mounting			Open Type		
				Motor Voltage	Maximum Hp	Square P.B. Operator	Toggle Operator	$ Price	Square P.B. Operator	Toggle Operator	$ Price
2511	Standard	3-Pole	M-0	200-230 380-575	3 5	MBG1	TBG1	**984.00**	MBO1	TBO1	**899.00**
			M-1	200-230 380-575	7-1/2 10	MCG1	TCG1	**1197.00**	MCO1	TCO1	**1112.00**

Table 16.20: Two Speed (Wye-Connected Separate Winding Motors Only) Class 2512

Class	Description	Number of Poles	NEMA Size	Ratings			NEMA 1 Surface Mounting			Open Type		
				Motor Voltage	Constant Hp	Constant Torque or Variable Torque	Square P.B. Operator	Toggle Operator	$ Price	Square P.B. Operator	Toggle Operator	$ Price
2512	Standard	3-Pole	M-0	200-230 380-575	2 3	3 5	MBG1	TBG1	**984.00**	MBO1	TBO1	**899.00**
			M-1	200-230 380-575	5 7-1/2	7-1/2 10	MCG1	TCG1	**1197.00**	MCO1	TCO1	**1112.00**

Thermal Units

Starters will not operate without properly installed thermal units and device reset. Thermal unit must be installed so that markings face the front of starter.

Application Data

Size–Available in NEMA Sizes M-0, M-1, and M-1P.

Poles–Two poles single phase; three poles polyphase; 2 poles DC.

Voltage–600 volts AC max.; 250 volts DC max.

Overload Relays–Melting alloy thermal overload relays have provisions for one Type B thermal unit for single phase starters and three Type B thermal units for three phase starters. **All thermal units must be installed and the device reset before the starter contacts will operate.** After overload relays have tripped, allow one or two minutes for the alloy to solidify before resetting.

Operator–Available with a push button or toggle operator in open and NEMA 1 versions. NEMA 4/4X (stainless) and 12 versions utilize a direct acting push button only. NEMA 4/4X (polyester) and 7/9 versions utilize an external toggle to actuate a push button device inside.

Maintenance of Equipment

For proper performance, all equipment should be periodically inspected and maintained. Replacement contacts and interlocks are available in kit form to facilitate servicing and stocking. In addition, the service bulletin contains an exploded view of the device with components clearly marked for easy identification by description and part number.

Mechanism Lock Off–Both open devices and starters in NEMA 1 surface and flush mounting, and NEMA 4, 4X, 7 & 9 and 12 enclosures can be locked in the OFF or STOP position. The NEMA 1 surface mounting, 4, 4X, 7 & 9 and 12 enclosures can also be locked closed to prevent unauthorized entry.

Table 16.21: Terminal information and Replacement Contact Kits

NEMA Size	Power Terminals		Auxiliary Interlock Terminals		Number of Poles	Service Bulletin	Replacement Contact Kit	
	Type of Lug	Wire Size (Solid or Stranded Copper Wire) Min.-Max.	Type of Lug	Wire Size (Solid or Stranded Copper Wire) Min.-Max.			Class	Type
M-0	Pressure Wire	#14–#8	Pressure Wire	#16–#12	2 or 3	312AS	9998	ML1
M-1	Pressure Wire	#14–#8	Pressure Wire	#16–#12	2 or 3	312AS	9998	ML2
M-1P	Box Lug	#14–#6	Pressure Wire	#16–#12	2	312AS	9998	ML2

Accessories and Modification Kits

One auxiliary contact, either N.O. or N.C. can easily be added internally to any open or enclosed Type M or T manual starter. It occupies the space provided in either the upper right hand or left hand corners of the device. These contacts are for AC loads only. For electrical ratings, refer to page 16-110, Class 9999 Types SX11 or SX12.

A unique red **pilot light** assembly that clips into place is available **factory installed** on NEMA 1, 4, 4X, 12 and flush enclosures or as a **field modification kit** on the NEMA 1 surface or flush mounting enclosures. See page 16-11. The color cap assembly snaps into a knockout in the enclosure cover on the NEMA 1 enclosures. Pilot light kits are available for use on Various voltages (110-600 volts). Pilot light assemblies are not available for NEMA 7 & 9 enclosures.

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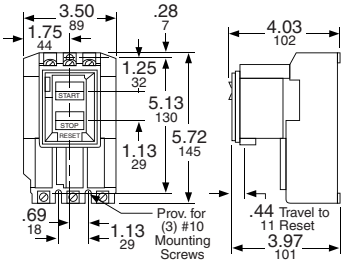
Type M and T—Integral Horsepower—Approximate Dimensions

Class **2510, 2511, 2512** / Refer to Catalog **2510CT9701**

NEMA 1
General Purpose Surface Mounting

NEMA 4/4X
Watertight and Dusttight
Stainless Steel

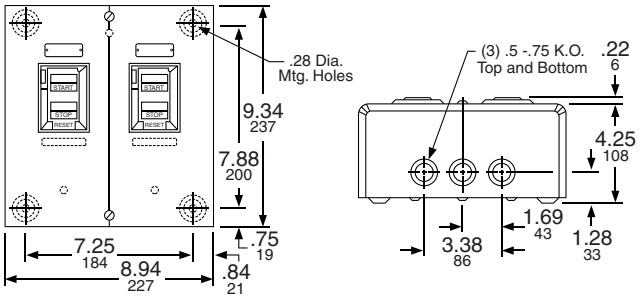
NEMA 12
Dusttight and Driptight
Industrial Use



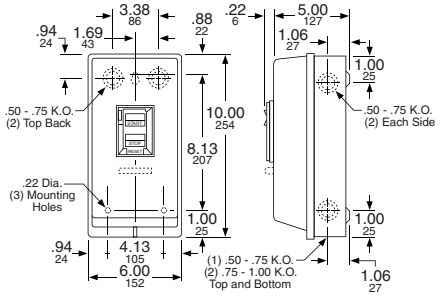
Class 2510 Type M Sizes M-0, M-1
and M-1P, Open Type
Approximate Shipping Weight—3 lb

NEMA 4/4X
Watertight, Dusttight
and Corrosion Resistant
Glass Polyester

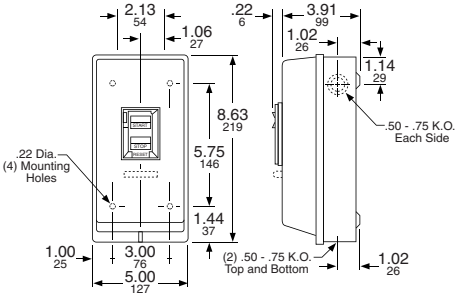
NEMA 7 & 9
Hazardous Locations
Cast Iron



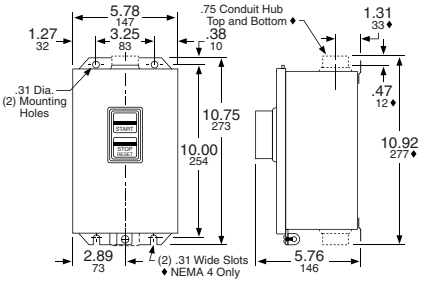
Classes 2511, 2512, Types M & T
Sizes M-0 and M-1 NEMA 1
General Purpose Enclosure
Approximate Shipping Weight—9 lb



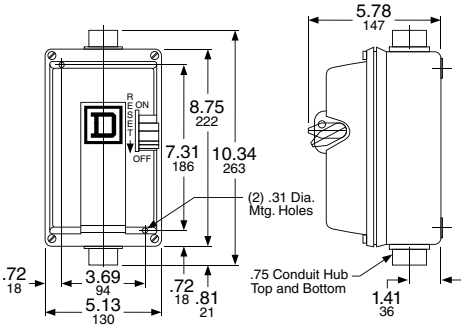
Class 2510 Type M & T Size M-1P
NEMA 1 General Purpose Enclosure
Approximate Shipping Weight—5 lb



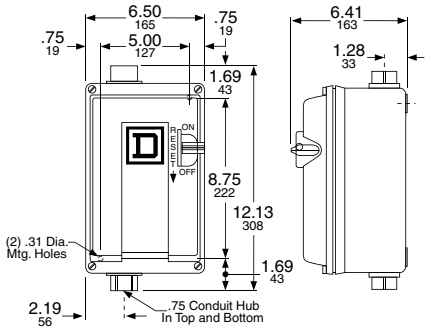
Class 2510 Types M & T Sizes M-0 and M-1
NEMA 1 General Purpose Enclosure
Approximate Shipping Weight—5 lb



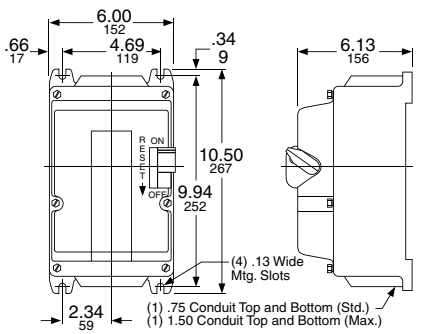
Class 2510 Type M Sizes M-0, M-1 and M-1P
NEMA 4/4X Watertight Stainless Steel Enclosure
NEMA 12 Dusttight Industrial Use Enclosure
Approximate Shipping Weight—9 lb



Class 2510 Type M Size M-0 (AC–DC)
and Size M-1 (DC) NEMA 4/4X
Watertight Corrosion-Resistant
Glass Polyester Enclosure
Approximate Shipping Weight—6 lb



Class 2510 Type M Sizes M-1 and M-1P (AC)
NEMA 4/4X Watertight Corrosion-Resistant
Glass Polyester Enclosure
Approximate Shipping Weight—6 lb



Class 2510 Type M Sizes M-0, M-1 and M-1P
NEMA 7 & 9 Hazardous Location
Cast Iron Enclosure
Approximate Shipping Weight—18 lb

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Table 16.22: Accessories—Class 2510 Types F and K

Description	Class & Type	$ Price
Handle Guard Kit with Padlock Provision▲	2510FL1	**14.30**
Emergency Off Actuator	2510PB1	**35.60**
Additional Key for Key Operated Devices	2510FK1	**4.80**

▲ Standard on Type K devices.

Table 16.23: Pilot Light Kits—Class 2510 Types F and K

Application	Voltage	Red Pilot Light	Green Pilot Light	$ Price
		Class & Type	Class & Type	
Type KF, KG, KW■	110–120 Vac	9999PL11	9999PL11G	**71.00**
	208–277 Vac	9999PL12	9999PL12G	**71.00**
	440–600 Vac	9999PL13	9999PL13G	**71.00**
Type FF, FG, FW■	115–240 Vac/dc	9999PL10	9999PL10G	**42.80**

■ Lens cannot be replaced. Pilot light kits for NEMA 4 Enclosed Units are for replacement purposes only.

Table 16.24: Replacement Nameplates—Class 2510 Types F and K

Description	Application	Nameplate Marking	Nameplate Type Number—Class 2510				$ Price
			For Type K Switch		For Type F Starter (Includes "Reset" Indication)		
			Without Pilot Light	With Pilot Light	Without Pilot Light	With Pilot Light	
1-3/4" x 2-13/16" Nameplate with Embossed Mounting Holes for #6 Oval Head Screws	Standard commercial switch box cover or flush plate, including Square D stainless steel plates	(Blank)	FN1	—	FN2	—	**21.50**
		(Special marking – Specify marking desired.)	FN5	—	FN6	—	**42.80**
1-29/32" x 3-27/32" Flat Nameplate with Mounting Holes for #6 Pan Head Screws	Square D NEMA 1 surface mounted enclosure or gray flush plate	(Blank)	FN10	FN20	FN30	FN40	**21.50**
		High	FN11	FN21	FN31	FN41	**21.50**
		Low	FN12	FN22	FN32	FN42	**21.50**
		Forward	FN13	—	—	—	**21.50**
		Reverse	FN14	FN24	—	—	**21.50**
		(Special marking—Specify marking desired.)	FN15	FN25	FN35	FN45	**42.80**

Contact Kits

See page 16-107 for Class 9998 Replacement Contact Kits.

Table 16.25: Modifications (Types M & T only)

Description	Factory Modifications and Forms		Field Modifications	
	Form Number	Price Addition	Kit Class & Type	$ Price
Red Pilot Light♦	P11△	**116.00**	9999MP1 (110–120 V) 9999MP2 (208–240 V) 9999MP3 (440–600 V)	**140.00**
Auxiliary Contacts★	X1 (1 N.O.) X2 (1 N.C.)	**158.00**	9999SX11 (N.O.) 9999SX12 (N.C.)	**99.00**
Jumper Straps ▼	N/A	—	9998SO31	**14.30**
Contactor only	Y76	No Charge	N/A	—

♦ May only be field-added to NEMA 1 enclosures. For green pilot light, order 9999SPG1 additionally.

★ For proper operation, only one auxiliary contact kit per device may be added.

▼ Used to control a single phase motor utilizing a three phase starter.

△ P11 Pilot Light Voltage Codes:
120 V—V02
200/208 V—V08
230 V—V03
460 V—V06
575 V—V07
The pilot light Form P11 requires a voltage code.
Catalog number example: 2510MBG1V02P11.

Table 16.26: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	9991	KE1

Table 16.27: Replacement Parts

Description	Class and Type	$ Price
Replacement Toggle Kits: Type FW and KW (NEMA 4) Type FR and KR (NEMA 7 & 9)	 9998HW1 9998HR2	 **29.30** **30.90**
Replacement Handle Kits: NEMA 12 (Ser. B) Type MBA, MCA NEMA 4/4X (Stainless) (Ser. A & B) Type MBW, MCW NEMA 4/4X (Stainless) (Ser. C) Type MBW, MCW NEMA 4/4X (Polyester) Type MBW, MCW NEMA 7 and 9 Type MBR, MCR	 9998HWA1 9998HWA1 31085-381-50 9998HWA1 9998HR3	 **57.00** **57.00** **57.00** **57.00** **57.00**
Internal Lever	9998IL1	**14.30**

Table 16.28: Enclosures

For use with Class 2510 Type	Enclosure	Catalog Number	$ Price
F and K	NEMA 1 Standard	9991EN1	**29.30**
M–Sizes M0 & M1		9991MG1	**57.00**
M–Size M1P		9991MG2	**57.00**
FO1, FO1P, FO2, FO2P, FO3, FO3P, FO4, FO4P	NEMA 1 Oversized	9991FE1	**42.80**
KO1, KO1A, KO1B, KO2, KO2B, KO2C, KO3, KO3A, KO3B, KO4, KO4B, KO4C, KO5, KO5A, KO5B, KO6, KO6B, KO6C	NEMA 1 Oversized	9991KE1	**42.80**
	NEMA 1 Jumbo	9991KE2	**86.00**
	NEMA 3R	9991KE3	**215.00**

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NEMA Style TeSys™ U Simple Motor Starter

Refer to Catalog **8502CT0201**

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www.schneider-electric.us

NEMA style TeSys U motor starter is integrated, simple to choose and to install, consisting of a control unit snapped in a powerbase. NEMA style TeSys U can be configured to fit specific applications as well. The NEMA style TeSys U uses the same optional accessories: reverser, current limiter, predictive maintenance options and communication options as the IEC TeSys U.

To get detailed information about TeSys U, visit our website at www.schneider-electric.us.com.

Selecting a NEMA TeSys U Motor Starter in Three Steps

Power Base

Table 16.29: Step 1. Select Power Base

Control Connection	NEMA Size	Three Phase (HP max.)				Single Phase (HP max.)	Power Bases	
		200/208 V	220/240 V	460 V	575/600 V	240 V	Catalog Number	$ Price
With screw terminations	1	7.5	7.5	10	10	3	LUB32NR	**488.00**

Table 16.30: Step 2. Select Control Unit ■

Setting Range A	Standard 3-phase Class 10 trip ▲	$ Price	Advanced 3-phase Class 10 trip ▲	$ Price	Advanced single-phase Class 10 trip ▲	$ Price	Advanced 3-phase Class 20 trip ▲	$ Price
0.15–0.6	LUCAX6••	**120.00**	LUCBX6••	**150.00**	LUCCX6••	**150.00**	LUCDX6••	**150.00**
0.3–1.4	LUCA1X••	**120.00**	LUCB1X••	**150.00**	LUCC1X••	**150.00**	LUCD1X••	**150.00**
1.25–5.0	LUCA05••	**120.00**	LUCB05••	**150.00**	LUCC05••	**150.00**	LUCD05••	**150.00**
3–12	LUCA12••	**120.00**	LUCB12••	**150.00**	LUCC12••	**150.00**	LUCD12••	**150.00**
4.5–18	LUCA18••	**120.00**	LUCB18••	**150.00**	LUCC18••	**150.00**	LUCD18••	**150.00**
8–32	LUCA32••	**120.00**	LUCB32••	**150.00**	LUCC32••	**150.00**	LUCD32••	**150.00**

▲ Complete catalog number by adding appropriate code from voltage code table below. For example: LUCAX6FU.
■ The control unit contains solid state overload relay and control power source for TeSys U. For more details on the different control units, their functions, and placement on the power base see page 18-29.

Control Unit

Table 16.31: Voltage Codes

Volts	24	48–72	110–240
DC	BL♦	—	—
AC	B	—	—
DC or AC	—	ES★	FU

♦ DC voltage with range of 0.90 to 1.10 of nominal.
★ 48–72 Vdc; 48 Vac

Auxiliary Contact

Table 16.32: Step 3. Select Auxiliary Contacts (optional)

Terminals	Contact Indicates	Contact Normal Status	Contact State for Each Mode▼ Off	Ready	Run	Short Circuit Trip	Overload Trip (Manual Reset)	Overload Trip (Remote/ Auto Reset)△	Catalog Number	$ Price
Auxiliary Contact Blocks										
Screw	Ready condition	N.O.	O	I	I	O	O	I	LUA1C11	**34.50**
	Fault condition	N.C.	I	I	I	O	O	I		
Screw	Ready condition	N.O.	O	I	I	O	O	I	LUA1C20	
	Fault condition	N.O.	O	O	O	I	I	O		
Auxiliary Contact Function Modules										
Screw	Power pole status	2 N.O.	—	—	—	—	—	—	LUFN20	**34.50**
Screw	Power pole status	1 N.O. and 1 N.C.	—	—	—	—	—	—	LUFN11	
Screw	Power pole status	2 N.C.	—	—	—	—	—	—	LUFN02	

▼ I–indicates closed contact; O–indicates open contact
△ Requires multifunction or advanced control unit plus fault differentiation module LUFDDA10.

Accessories for LUB32/LUB32NR	Quick Description	For details & selection, see pages:
Current Limiter	Increases the breaking capacity to 130kA @ 460 V	18-30
Reverser	Stacked or side mounted (LU6MB0•• ▲ only)	18-30
Line phase barrier	Required for use as a self-protected combination starter (UL508E)	18-30
Multifunction Control Unit	Has functions for monitoring and predictive maintenance	18-30
Function modules	Fault differentiation, Thermal overload, Motor load indication	18-30
Communication modules	Integrates into existing networks, major protocols available	18-31
Soft Starter + TeSys U	Use Altistart U01Soft Starter with TeSys U	18-32
Powerbus	Use TeSys U with a prewired system	18-31
Configuration and connection accessories	PowerSuite software, busbar, external handle	18-31

▲ Complete catalog number by adding appropriate code from voltage code table below. For example: LUCAX6FU.

Accessories . . . . . pages 18-29 to 18-31
Dimensions. . . . . page 18-50

E164862
CCN NLDX

LR43364
Class 3211 08

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Class 8536 **Type S C G - 3 V02** **Form S**

General Classification

8502	Contactor Page 16-14
8536	Starter Page 16-18
8538	Combination Starter with Disconnect Switch Page 16-31
8539	Combination Starter with Circuit Breaker Page 16-35
8702	Reversing Contactor Page 16-44
8736	Reversing Starter Page 16-46
8738	Reversing Combination Starter with Disconnect Switch Page 16-54
8739	Reversing Combination Starter with Circuit Breaker
8810	Two Speed Starter ▲
8903	Type S Lighting Contactors Page 16-60 ▲
8940	Pumping Plant Panel ▲
8941	Duplex Controller Page 16-78 ▲

Numerals

Used to designate specific, physical arrangements, such as number of poles, fuse clip size, etc.; but the numbering varies with Class of equipment. Consult Digest listings for specific device numbers.

Voltage Code

AC operated devices without control transformer

Code	Voltage/Frequency
V01	24/60
V02	120/60 or 110/50
V06	480/60 or 440/50
V07	600/60 or 550/50
V08	208/60

V81 - 480V Primary, 120V Secondary for units using a fused transformer control circuit Form (F4T).

This is only a partial listing consult Digest pages 16-14 and 16-101 for more information.

Design

Type S NEMA Contactors and Starters

NEMA Size		8903 (only)	
A	Size 00		
B	Size 0	M	30 Amperes
C	Size 1	P	60 Amperes
D	Size 2	Q	100 Amperes
E	Size 3	V	200 Amperes
F	Size 4	X	300 Amperes
G	Size 5	Y	400 Amperes
H	Size 6	Z	600 Amperes
J	Size 7	J	800 Amperes

Common Forms (factory modifications) Page 16-100

A	"Start-Stop" pushbuttons in the enclosure cover
B■	Bimetallic overload relays
C	"Hand-Off-Auto" selector switch in the enclosure cover
F4T	Fused transformer control circuit (primary fuses only)
FF4T	Fused transformer control circuit (primary & secondary fuses)
H	Solid state overload relay
P1	Red ON pilot light in the enclosure cover
P2	Green OFF pilot light in cover
S	Separate control circuit
X01	One "normally closed" auxiliary contact N.C.
X10	One "normally open" auxiliary contact N.O.

Consult Digest pages 16-100 to 16-104 for additional form letters, When more than one form is applied to a single device, arrange Forms in alphabetical order.

Enclosure

A	NEMA 12 Industrial Use
F	NEMA 1 Flush Mounting General Purpose
G	NEMA 1 General Purpose Surface Mounting
H	NEMA 3R Rainproof
O	Open Style Device (no enclosure)
R	NEMA 7 & 9 Hazardous Environments, Spin Top
T	NEMA 7 & 9 Hazardous Environments, Bolted
W	NEMA 4 Watertight, 4X Corrosion Resistant

▲ Combination two speed starters will replace the "S" with a "C", "U" or "D". Pumping plant panels have Various leading characters. Not all use Type S contactors. Duplex controllers use "N", "C", "U", and "D".

■ May also designate Motor Logic Plus overload relay

Table 16.33: How to Order

To Order Specify:	Catalog Number			
• Class Number • Type Number • Voltage Code • Form(s) see pages 16-100–16-104	Class	Type	Voltage Code	Form(s)
	8539	SCG44	V06	AH20P1X11

Note: Description: NEMA Size 1, (10 Hp) Electronic Motor Circuit Protector (MCP) Combo Starter in a NEMA Type 1 enclosure with a 480V coil, start/stop pushbutton (A), class 20 SSOLR (H20), red pilot light (P1), 1 N.O. and 1 N.C. auxiliary contact (X11)

IMPORTANT - This information is intended for general interpretation of catalog numbers. Do not use to create catalog numbers for this product line.

Note: The terms Type and Form do not appear in the catalog number.

Devices are wired from factory according to customer preference as follows:

- Common control
- Separate control (Form S)
- Control power transformer (CPT)

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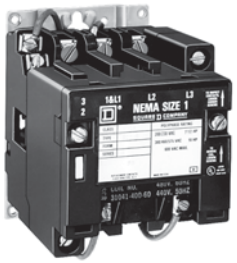

Type SCO2
Size 1, 3-Pole Contactor

Class 8502 Type S magnetic contactors are used to switch heating loads, capacitors, transformers, and electric motors where overload protection is provided separately. Class 8502 contactors are available in NEMA sizes 00 through 7. Type S contactors are designed for operation at 600 Vac, 50 to 60 Hz.

Table 16.34: 3-Pole Polyphase—600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure (Size 0-5)▲	
				Type	$ Price	Type	$ Price	Type	$ Price
00	9	200 230 460 575	1-1/2 1-1/2 2 2	SAO12■	**329.00**	SAG12■	**360.00**	Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBO2■	**414.00**	SBG2■	**446.00**	SBW12■	**945.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO2■	**485.00**	SCG2■	**518.00**	SCW12■	**1031.00**
2	45	200 230 460 575	10 15 25 25	SDO2■	**882.00**	SDG2■	**1031.00**	SDW12■	**1391.00**
3	90	200 230 460 575	25 30 50 50	SEO2■	**1425.00**	SEG2■	**1715.00**	SEW12■	**3167.00**
4	135	200 230 460 575	40 50 100 100	SFO2■	**3419.00**	SFG2■	**4022.00**	SFW12■	**6501.00**
5	270	200 230 460 575	75 100 200 200	SGO2■	**7451.00**	SGG2■	**8550.00**	SGW12■	**11685.00**
6	540	200 230 460 575	150 200 400 400	SHO2■	**20339.00**	SHG2■	**25172.00**	SHW2■	**32378.00**
7	810	200 230 460 575	— 300 600 600	SJO2■	**29028.00**	SJG2■	**33875.00**	SJW2■	**40995.00**

▲ Size 6 and 7 are rated NEMA 4 only, painted sheet steel.
■ Coil voltage code must be specified to order this product. Refer to standard voltage codes shown below.

Table 16.35: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24♦	—	V01	No Charge
120★	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

♦ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8502SBO2V01S).
★ 120 Volt Polyphase contactors are wired for separate control Form S must be specified (i.e., order as 8502SCO2V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

Dimensions . . . . . page 16-24
Factory Modifications (Forms) . . . . . page 16-100
Separate Enclosures (Class 9991) . . . . . page 16-93
Replacement Parts (Class 9998) . . . . . page 16-105
Type S Accessories (Class 9999) . . . . . page 16-108

For How to Order Information, see page 16-13.

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Table 16.36: 3-Pole Polyphase—600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	NEMA 4X Watertight, Dusttight, Corrosion-Resistant Glass-Polyester Enclosure		NEMA 7 & 9 Hazardous Locations Div. 1 & 2 Class I, Groups C & D Class II, Groups E, F, & G					NEMA 12/3R ▲ Dusttight & Driptight Industrial Use Enclosure	
						Bolted Type						
				Type	$ Price	Cast Iron ■	Cast Aluminum ★	$ Price	SPIN TOP™ Type	$ Price	Type	$ Price
00	9	200 230 460 575	1-1/2 1-1/2 2 2	Use Size 0		Use Size 0			Use Size 0		Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBW22♦	**945.00**	SBT2♦	SBT42♦	**2070.00**	SBR2♦	**2591.00**	SBA2♦	**617.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCW22♦	**1031.00**	SCT2♦	SCT42♦	**2163.00**	SCR2♦	**2705.00**	SCA2♦	**689.00**
2	45	200 230 460 575	10 15 25 25	SDW22♦	**2057.00**	SDT2♦	SDT42♦	**3482.00**	SDR2♦	**4350.00**	SDA2♦	**1344.00**
3	90	200 230 460 575	25 30 50 50	SEW22♦	**3959.00**	—	SET42♦	**5205.00**	SER2♦	**2007.00**	SEA2♦	**2084.00**
4	135	200 230 460 575	40 50 100 100	SFW22♦	**8123.00**	—	SFT42♦	**8415.00**	SFR2♦	**10524.00**	SFA2♦	**5247.00**
5	270	200 230 460 575	75 100 200 200	—	—	—	SGT42♦	**18542.00**	SGR2♦	**23178.00**	SGA2♦	**11685.00**
6	540	200 230 460 575	150 200 400 400	—	—	—	—	—	—	—	SHA2♦	**29016.00**
7	810	200 230 460 575	– 300 600 600	—	—	—	—	—	—	—	SJA2♦	**37719.00**

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ Limited to one Pilot Light and a Selector Switch or Start-Stop Push Button.
♦ Coil voltage code must be specified to order this product. Refer to voltage codes shown on page 16-14.
★ NEMA 7 and 9 bolted cast aluminum are not UL listed.

Auxiliary Units

Auxiliary contacts and power poles can be added by the factory or in the field on all Type S starters and contactors. The table below shows the maximum number of auxiliary units **(in addition to the holding circuit contact)** that can be added to a given size starter or contactor. In addition, it is possible to add a second internal contact on NEMA Size 0, 1, and 2 contactors and starters.

Table 16.37:

NEMA Size	Type	No. of Poles of Basic Contactor	Maximum Number of External Auxiliary Units (In addition to holding circuit contact)
00	SA	2–3	4 single circuit auxiliary contacts (N.O. or N.C.) if second internal auxiliary contact is not used.
0, 1 and 2	SB SC SD	1, 2 or 3	4 single circuit auxiliary contacts (N.O. or N.C.)
			2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 power pole adder (1 or 2 poles, N.O. or N.C.)
		4 or 5	2 single circuit auxiliary contacts (N.O. or N.C.)
3, 4 and 5	SE SF SG	2–5 (Size 3 and 4)	3 single circuit auxiliary contacts (N.O. or N.C.)
		2–3 (Size 5)	2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 NEMA Size 0-1 or Size 2 power pole adder (1 or 2 poles, N.O. or N.C.)
6 and 7	SH SJ	2–3	3 single circuit auxiliary contacts (N.O. or N.C.)
			2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 NEMA Size 0–1 or Size 2 power pole adder (1 or 2 poles, N.O. or N.C.)

Dimensions . . . . . .page 16-24
Factory Modifications (Forms) . . . . . .page 16-100
Separate Enclosures (Class 9991) . . . . . .page 16-93
Replacement Parts (Class 9998) . . . . . .page 16-105
Type S Accessories (Class 9999) . . . . . .page 16-108

For How to Order Information, see page 16-13.

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Table 16.38: 600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X –Watertight, Dusttight, Brushed Stainless Steel Enclosure (Size 0-5)▲	
				Type	$ Price	Type	$ Price	Type	$ Price
1-Pole Single Phase									
0	18	115 230	1 2	SBO5■	**329.00**	SBG5■	**360.00**	SBW15■	**860.00**
1	27	115 230	2 3	SCO5■	**399.00**	SCG5■	**432.00**	SCW15■	**945.00**
2-Pole Single Phase									
00	9	115 230	1/3 1	SAO11■	**287.00**	SAG11■	**318.00**	Use Size 0	
0	18	115 230	1 2	SBO1■	**372.00**	SBG1■	**404.00**	SBW11■	**903.00**
1	27	115 230	2 3	SCO1■	**441.00**	SCG1■	**476.00**	SCW11■	**989.00**
2	45	115 230	3 7-1/2	SDO1■	**827.00**	SDG1■	**975.00**	SDW11■	**1998.00**
3	90	— —	— —	SEO1■	**1310.00**	SEG1■	**1601.00**	SEW11■	**3054.00**
4	135	—	—	SFO1■	**3162.00**	SFG1■	**3765.00**	SFW11■	**6245.00**
5	270	—	—	SGO1■	**6852.00**	SGG1■	**7952.00**	SGW11■	**11087.00**
6	540	—	—	SHO1■	**17433.00**	SHG1■	**22266.00**	SHW1■	**29388.00**
7	810	—	—	SJO1■	**25452.00**	SJG1■	**30285.00**	SJW1■	**37407.00**
4-Pole Polyphase									
0	18	200 230 460 575	3 3 5 5	SBO3■	**527.00**	SBG3■	**561.00**	SBW13■	**1074.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO3■	**599.00**	SCG3■	**633.00**	SCW13■	**1146.00**
2	45	200 230 460 575	10 15 25 25	SDO3■	**1139.00**	SDG3■	**1287.00**	SDW13■	**2712.00**
3	90	200 230 460 575	25 30 50 50	SEO3■	**1823.00**	SEG3■	**2114.00**	SEW13■	**3965.00**
4	135	200 230 460 575	40 50 100 100	SFO3■	**4757.00**	SFG3■	**5360.00**	SFW13■	**8864.00**
5-Pole Polyphase									
0	18	200 230 460 575	3 3 5 5	SBO4■	**684.00**	SBG4■	**719.00**	SBW14■	**1229.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO4■	**755.00**	SCG4■	**788.00**	SCW14■	**1301.00**
2	45	200 230 460 575	10 15 25 25	SDO4■	**1710.00**	SDG4■	**1857.00**	SDW14■	**3281.00**
3	90	200 230 460 575	25 30 50 50	SEO4■	**2735.00**	SEG4■	**3024.00**	SEW14■	**4877.00**
4	135	200 230 460 575	40 50 100 100	SFO4■	**6579.00**	SFG4■	**7182.00**	SFW14■	**10688.00**

▲ Size 6 and 7 are rated NEMA 4 only, painted sheet steel.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed on page 16-14.

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Table 16.39: 600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	NEMA 4X Watertight, Dusttight Corrosion-Resistant Glass-Polyester Enclosure		NEMA 7 & 9, Div. 1 & 2 Hazardous Locations Class I, Groups C & D Class II, Groups E, F & G					NEMA 12/3R▲ Dusttight & Driptight Industrial Use Enclosure	
						Bolted Type			SPIN TOP™ Type			
				Type	$ Price	Cast Iron ■	Cast Aluminum★	$ Price		$ Price	Type	$ Price
1-Pole Single Phase												
0	18	115 230	1 2	— —	—	SBT5♦	SBT45♦	**1979.00**	SBR5♦	**2475.00**	SBA5♦	**531.00**
1	27	115 230	2 3	— —	—	SCT5♦	SCT45♦	**2070.00**	SCR5♦	**2591.00**	SCA5♦	**603.00**
2-Pole Single Phase												
00	9	115 230	1/3 1	Use Size 0		Use Size 0			Use Size 0		Use Size 0	
0	18	115 230	1 2	SBW21♦	**903.00**	SBT1♦	SBT41♦	**2021.00**	SBR1♦	**2528.00**	SBA1♦	**575.00**
1	27	115 230	2 3	SCW21♦	**989.00**	SCT1♦	SCT41♦	**2100.00**	SCR1♦	**2627.00**	SCA1♦	**647.00**
2	45	115 230	3 7-1/2	SDW21♦	**1998.00**	SDT1♦	SDT41♦	**3402.00**	SDR1♦	**4257.00**	SDA1♦	**1287.00**
3	90	— —	— —	Consult Schneider Electric CCC at (1-888-778-2733)		— —	SET41♦	**5076.00**	SER1♦	**6344.00**	SEA1♦	**1971.00**
4	135	—	—			— —	SFT41♦	**8139.00**	SFR1♦	**10175.00**	SFA1♦	**4991.00**
5	270	—	—	—	—	— —	— —	—	SGR1♦	**22350.00**	SGA1♦	**11087.00**
6	540	—	—	—	—	— —	— —	—	—	—	SHA1♦	**26112.00**
7	810	—	—	—	—	—	—	—	—	—	SJA1♦	**34131.00**
4-Pole Polyphase												
0	18	200 230 460 575	3 3 5 5	SBW23♦	**1074.00**	SBT3♦	Consult Schneider Electric CCC at (1-888-778-2733)	**2199.00**	SBR3♦	**2748.00**	SBA3♦	**732.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 19	SCW23♦	**1146.00**	SCT3♦		**2291.00**	SCR3♦	**2867.00**	SCA3♦	**804.00**
2	45	200 230 460 575	10 15 25 25	SDW23♦	**2712.00**	SDT3♦		**4199.00**	SDR3♦	**5255.00**	SDA3♦	**1601.00**
3	90	200 230 460 575	25 30 50 50	Consult Schneider Electric CCC at (1-888-778-2733)				—	SER3♦	**7604.00**	SEA3♦	**2484.00**
4	135	200 230 460 575	40 50 100 100					—	SFR3♦	**14283.00**	SFA3♦	**7011.00**
5-Pole Polyphase												
0	18	200 230 460 575	3 3 5 5	Consult Schneider Electric CCC at (1-888-778-2733)		—	—	—	—	—	SBA4♦	**890.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10			—	—	—	—	—	SCA4♦	**959.00**
2	45	200 230 460 575	10 15 25 25			—	—	—	—	—	SDA4♦	**2169.00**
3	90	200 230 460 575	25 30 50 50			—	—	—	—	—	SEA4♦	**3396.00**
4	135	200 230 460 575	40 50 100 100			—	—	—	—	—	SFA4♦	**8837.00**

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ Limited to 1 pilot light and a selector switch or Start-Stop push button.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown on page 16-14.
★ NEMA 7 and 9 bolted cast aluminum are not UL listed.

Coil Voltage Codes and page number reference for additional information are shown on page 16-14.
For How to Order Information, see page 16-13.

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Type SCO3
Size 1, 3-Pole Starter

General Information

Type S magnetic starters are used for full-voltage starting and stopping of AC squirrel cage motors. Motor overload protection is provided via melting alloy type thermal overload relays. Type S starters are available in NEMA Sizes 00 through 7, and are designed for operation at 600 Vac, 50 to 60 Hz.

Solid State Overload Relay Protection (Motor Logic™)

These ambient insensitive overload relays are available on Sizes 00 through 6 and standard on size 7. They provide phase loss, phase unbalance protection. To order, add Form **H30** (for selectable trip class 10 or 20 protection). For more information about Motor Logic, see pages 16-83 and 16-102.

New! Adapted Bimetal (NEMA Sizes 00–1)

The Adapted Bimetal motor starter consists of a specially designed adapter that attaches with bus bars to the NEMA Type S contactor and holds the LRD or LR3D (IEC Style) bimetal overload relay. This starter configuration can be ordered by adding Form E (adapater only) to the standard catalog number. Once the FLA of the motor has been determined, the LRD or LR3D bimetal overload can be purchased separately and installed in the field at a later date. For more information see Table 16.269.

New! TeSys T Motor Management System (NEMA Sizes 1–6)

TeSys T is a flexible system that integrates seamlessly into your automation system through five major communication protocols. TeSys T can predict what will happen in the process, as it accurately monitors current, voltage, and power over a wide range. For additional information about TeSys T Motor Management System, see pages 16-84 to 16-88 and page 16-103.

3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 00–6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.40:

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure (Size 0-5)▲		NEMA 4X Watertight, Dusttight, Corrosion-Resistant Glass-Polyester Enclosure	
				Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
00	9	200 230 460 575	1-1/2 1-1/2 2 2	SAO12■	**386.00**	SAG12■	**419.00**	Use Size 0		Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBO2■	**485.00**	SBG2■	**518.00**	SBW12■	**1017.00**	SBW22■	**1017.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO3■	**557.00**	SCG3■	**590.00**	SCW13■	**1103.00**	SCW23■	**1103.00**
2	45	200 230 460 575	10 15 25 25	SDO1■	**1013.00**	SDG1■	**1160.00**	SDW11■	**2186.00**	SDW21■	**2186.00**
3	90	200 230 460 575	25 30 50 50	SEO1■	**1638.00**	SEG1■	**1929.00**	SEW11■	**3380.00**	SEW21■	**4226.00**
4	135	200 230 460 575	40 50 100 100	SFO1■	**3747.00**	SFG1■	**4350.00**	SFW11■	**6827.00**	SFW21■	**8535.00**
5	270	200 230 460 575	75 100 200 200	SGO1■	**9152.00**	SGG1■	**10254.00**	SGW11■	**15795.00**	—	—
6	540	200 230 460 575	150 200 400 400	SHO2■	**21756.00**	SHG2■	**28881.00**	SHW2■	**36003.00**	—	—
7	810	200 230 460 575	— 300 600 600	SJO2■	**31256.00**	SJG2■	**38381.00**	SJW2■	**45503.00**	—	—

▲ Size 6 and 7 are rated NEMA 4 only, painted sheet steel.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

Schneider Electric offers express shipping for factory modified NEMA Type 1 and Type 12/3R Enclosed Starters. When you need them fast, our Laser™ Delivery program is the answer to getting your product when you need it most. Ask for Laser™ Delivery, then select the product and the modifications you need when you place your order. It's as easy as that!

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Table 16.41: 3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 00–6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	NEMA 7 & 9 For Hazardous Locations Div. 1 & 2 Class I–Groups C, D Class II–Groups E, F, & G					NEMA 12/3R▲ Dusttight & Driptight Industrial Use Enclosure	
				Bolted Type			SPIN TOP™ Type	$ Price	Type	$ Price
				Cast Iron■	Cast Aluminum★	$ Price				
00	9	200 230 460 575	1-1/2 1-1/2 2 2	Use Size 0			Use Size 0		Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBT2♦	SBT42♦	**2150.00**	SBR2♦	**2690.00**	SBA2♦	**689.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCT3♦	SCT43♦	**2241.00**	SCR3♦	**2804.00**	SCA3♦	**761.00**
2	45	200 230 460 575	10 15 25 25	SDT1♦	SDT41♦	**3623.00**	SDR1♦	**4527.00**	SDA1♦	**1472.00**
3	90	200 230 460 575	25 30 50 50	—	SET43♦	**5439.00**	SER3♦	**6800.00**	SEA1♦	**2298.00**
4	135	200 230 460 575	40 50 100 100	—	SFT41♦	**8778.00**	SFR1♦	**10971.00**	SFA1♦	**5574.00**
5	270	200 230 460 575	75 100 200 200	—	SGT41♦	**20970.00**	SGR1♦	**26211.00**	SGA1♦	**13386.00**
6	540	200 230 460 575	150 200 400 400	—	—	—	—	—	SHA2♦	**32727.00**
7	810	200 230 460 575	– 300 600 600	—	—	—	—	—	SJA2♦	**42227.00**

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ Limited to 1 Pilot Light and Selector Switch or Start-Stop Push-Button.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection Table 16.41 shown on page 16-18.
★ NEMA 7 and 9 bolted cast aluminum are not UL listed.

Table 16.42: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼	—	V01	No Charge
120△	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

▼ 24 V coils are not available on Sizes 4–7. On Sizes 00-3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8536SBO2V01S).
△ 120 Volt Polyphase contactors are wired for separate control. **Form S** (separate control) must be specified (i.e., order as 8536SCO2V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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For How to Order Information, see page 16-13.

Schneider Electric offers express shipping for factory modified NEMA Type 1 and Type 12/3R Enclosed Starters. When you need them fast, our Laser™ Delivery program is the answer to getting your product when you need it most. Ask for Laser™ Delivery, then select the product and the modifications you need when you place your order. It's as easy as that!

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2-Pole Single Phase—600 Vac Maximum—50–60 Hz

Table 16.43:

Note that prices shown do not include thermal units. Devices require 1 thermal unit. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 4X Watertight, Dusttight, Corrosion-Resistant Glass-Polyester Enclosure	
				Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
00	9	115 230	1/3 1	SAO11▲	**386.00**	SAG11▲	**419.00**	Use Size 0		Use Size 0	
0	18	115 230	1 2	SBO1▲	**435.00**	SBG1▲	**468.00**	SBW11▲	**966.00**	SBW21▲	**966.00**
1	27	115 230	2 3	SCO1▲	**507.00**	SCG1▲	**539.00**	SCW11▲	**1052.00**	SCW21▲	**1052.00**
1P	36	115 230	3 5	SCO2▲	**662.00**	SCG2▲	**696.00**	SCW12▲	**1209.00**	SCW22▲	**1209.00**
2	45	115 230	3 7-1/2	SDO6▲	**918.00**	SDG6▲	**1067.00**	SDW16▲	**2091.00**	SDW26▲	**2091.00**

4-Pole, 2-Phase—600 Vac Maximum—50–60 Hz

Table 16.44:

Note that prices shown do not include thermal units. Devices require 2 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 4X Watertight, Dusttight, Corrosion-Resistant Glass-Polyester Enclosure	
				Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
0	18	200 230 460 575	3 3 5 5	SBO3▲	**629.00**	SBG3▲	**675.00**	SBW13▲	**1229.00**	SBW23▲	**1229.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO4▲	**714.00**	SCG4▲	**761.00**	SCW14▲	**1301.00**	SCW24▲	**1301.00**
2	45	200 230 460 575	10 15 25 25	SDO2▲	**1283.00**	SDG2▲	**1430.00**	SDW12▲	**2910.00**	SDW22▲	**2910.00**
3	90	200 230 460 575	25 30 50 50	SEO2▲	**2096.00**	SEG2▲	**2357.00**	SEW12▲	**4206.00**	Consult Schneider Electric CCC at (1-888-778-2733)	
4	135	200 230 460 575	40 50 100 100	SFO2▲	**5142.00**	SFG2▲	**5715.00**	SFW12▲	**9221.00**		

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed below.

Table 16.45: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24■	—	V01	No Charge
120♦	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

■ 24 V coils are not available on Sizes 4–7. On sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8536SBO2V01S).

♦ 120 Volt Polyphase starters are wired for separate control. **Form S** (separate control) must be specified (i.e., order as 8536SCO2V02S).

Note: For voltage codes used with control transformers, see 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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2-Pole Single Phase—600 Vac Maximum—50–60 Hz

Table 16.46:

Note that prices shown do not include thermal units. Devices require 1 thermal unit. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	NEMA 7 & 9 Hazardous Locations, Div. 1 & 2 Class I, Groups C & D Class II, Groups E, F, & G					NEMA 12/3R■ Dusttight & Driptight Industrial Use Enclosure	
				Bolted Type			SPIN TOP™ Type	$ Price	Type	$ Price
				Cast Iron ♦	Cast Aluminum▲	$ Price				
00	9	115 230	1/3 1	Use Size 0			Use Size 0		Use Size 0	
0	18	115 230	1 2	SBT1★	SBT41	**2091.00**	SBR1★	**2619.00**	SBA1★	**639.00**
1	27	115 230	2 3	SCT1★	SCT41	**2186.00**	SCR1★	**2732.00**	SCA1★	**710.00**
1P	36	115 230	3 5	SCT2★	SCT42	**2363.00**	SCR2★	**2952.00**	SCA2★	**867.00**
2	45	115 230	3 7-1/2	SDT6★	SDT46	**3513.00**	SDR6★	**4400.00**	SDA6★	**1380.00**

▲ NEMA 7 and 9 bolted cast aluminum are not UL listed.

4-Pole 2-Phase—600 Vac Maximum—50–60 Hz

Table 16.47:

Note that prices shown do not include thermal units. Devices require 2 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Coil Voltage	NEMA 7 & 9 Hazardous Locations Class I, Groups C & D Class II, Groups E, F, & G					NEMA 12/3R ■ Dusttight & Driptight Industrial Use Enclosure	
					Bolted Type			SPIN TOP™ Type	$ Price	Type	$ Price
					Cast Iron ♦	Cast Aluminum	$ Price				
0	18	200 230 460 575	3 3 5 5	208 240 480 600	SBT3★	Consult Schneider Electric CCC at (1-888-778-2733)	**2348.00**	SBR3★	**2939.00**	SBA3★	**846.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	208 240 480 600	SCT4★		**2433.00**	SCR4★	**3047.00**	SCA4★	**932.00**
2	45	200 230 460 575	10 15 25 25	208 240 480 600	SDT2★		**4797.00**	SDR2★	**6002.00**	SDA2★	**1742.00**
3	90	200 230 460 575	25 30 50 50	208 240 480 600	Consult Schneider Electric CCC at (1-888-778-2733)		—	SER2★	**8679.00**	SEA2★	**2726.00**
4	135	200 230 460 575	40 50 100 100	208 240 480 600			—	—	—	SFA2★	**7370.00**

■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Limited to 1 Pilot Light and Selector Switch or Start-Stop Push-Button.
★ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed on page 16-20.

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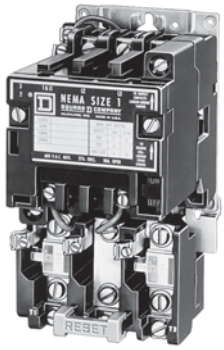

Types SB–SD With Auxiliary Load Terminals

It is sometimes desirable to use capacitors in motor branch circuits to improve power factor. The Size 0–2 Type SB–SD starters listed below include three auxiliary terminals to allow easy connection of power factor correction capacitors. When capacitors are connected using these terminals, no adjustment to the selection of thermal units is necessary. The auxiliary terminals accept #12–16 solid or stranded wire. NEMA Size 3 & 4 starters have provisions for auxiliary connections. User must supply lugs as necessary.

The Type S starters with auxiliary load terminals may also be used to control two motors simultaneously from a single starter. However, this application is tightly restricted by Section 430-53 of the National Electrical Code. Refer to the NEC for restrictions regarding overload protection, size of controller and motor branch circuit protection.

Table 16.48: 3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Motor Voltage	Max. Hp	Open Type	$ Price
0	200 230 460 575	3 3 5 5	SBTO2▲	**485.00**
1	200 230 460 575	7-1/2 7-1/2 10 10	SCTO3▲	**557.00**
2	200 230 460 575	10 15 25 25	SDTO1▲	**1011.00**

Extra Capacity Single Phase Starters (Not NEMA Style)
2-Pole Single Phase—250 Vac Maximum—50–60 Hz

Table 16.49:

Note that prices shown do not include thermal unit. Devices require 1 thermal unit. Standard trip thermal unit is **$21.50** each. See page 16-116 for selection information.

Motor Voltage	Max. Hp	Open Type		NEMA 1 General Purpose Enclosure		NEMA 3R Rainproof, Sleet Resistant, Outdoor Use Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 4X Watertight Corrosion Resistant Glass-Polyester Enclosure		NEMA 12/3R ♦ Dusttight and Driptight Industrial Use Enclosure	
		Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
115 230	5 10	SDO8▲■	**1304.00**	—	—	SDH8▲■	**1787.00**	—	—	—	—	—	—
115 230	7-1/2 15	SEO6▲	**1431.00**	SEG6▲	**1722.00**	SEH6▲	**2091.00**	SEW16▲	**3176.00**	SEW26▲	**3969.00**	SEA6▲	**2091.00**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
■ Uses a Size 3 overload relay.
♦ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.

Table 16.50: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified.
▼ 120 Volt Polyphase starters are wired for separate control and must be ordered with Form S (i.e., 8536SCO2V02S).
Note: For voltage codes used with control transformers, see page 16-101. Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

Dimensions. . . . . page 16-24
Factory Modifications (Forms) . . . . . page 16-100
Separate Enclosures (Class 9991) . . . . . page 16-93
Replacement Parts (Class 9998). . . . . page 16-105
Type S Accessories (Class 9999) . . . . . page 16-108

For How to Order Information, see page 16-13.

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Application Data for Selection

Table 16.51:

NEMA Size	Load Voltage	Maximum Hp Rating—Nonplugging and Nonjogging Duty		Maximum Hp Rating—Plugging and Jogging Duty ▲		Continuous Current Rating, (A) 600 Volt Max.	Service—Limit Current Rating, (A) ■	Tungsten and Infrared Lamp Load, (A) 250 Volts Max. ♦	Resistance Heating Loads, KW—other than Infrared Lamp Loads ★		KVA Rating for Switching Transformer Primaries at 50 or 60 Cycles				3Ø Rating for Switching Capacitors ▼
											Inrush Currents (Worst Case Peak) ? 20 Times Peak of Continuous Current Rating		Inrush Currents (Worst Case Peak) > 20–40 Times Peak of Continuous Current Rating		
		Single Phase	Poly-Phase	Single Phase	Poly-Phase				Single Phase	Poly-Phase	Single Phase	Poly-Phase	Single Phase	Poly-Phase	KVAR
00	115	1/2	—	—	—	9	11	5	—	—	—	—	—	—	—
	200	—	1-1/2	—	—	9	11	5	—	—	—	—	—	—	—
	230	1	1-1/2	—	—	9	11	5	—	—	—	—	—	—	—
	380	—	1-1/2	—	—	9	11	—	—	—	—	—	—	—	—
	460	—	2	—	—	9	11	—	—	—	—	—	—	—	—
	575	—	2	—	—	9	11	—	—	—	—	—	—	—	—
0	115	1	—	1/2	—	18	21	10	—	—	0.6	—	0.3	—	—
	200	—	3	—	1-1/2	18	21	10	—	—	—	1.8	—	0.9	—
	230	2	3	1	1-1/2	18	21	10	—	—	1.2	2.1	0.6	1.0	—
	380	—	5	—	1-1/2	18	21	—	—	—	—	—	—	—	—
	460	—	5	—	2	18	21	—	—	—	2.4	4.2	1.2	2.1	—
	575	—	5	—	2	18	21	—	—	—	3.0	5.2	1.5	2.6	—
1	115	2	—	1	—	27	32	15	3	5	1.2	—	0.6	—	—
	200	—	7-1/2	—	3	27	32	15	—	9.1	—	3.6	—	1.8	—
	230	3	7-1/2	2	3	27	32	15	6	10	2.4	4.3	1.2	2.1	—
	380	—	10	—	5	27	32	—	—	16.5	—	—	—	—	—
	460	—	10	—	5	27	32	—	12	20	4.9	8.5	2.5	4.3	—
	575	—	10	—	5	27	32	—	15	25	6.2	11.0	3.1	5.3	—
1P	115	3	—	1-1/2	—	36	42	24	—	—	—	—	—	—	—
	230	5	—	3	—	36	42	24	—	—	—	—	—	—	—
2	115	3	—	2	—	45	52	30	5	8.5	2.1	—	1.0	—	—
	200	—	10	—	7-1/2	45	52	30	—	15.4	—	6.3	—	3.1	—
	230	7-1/2	15	5	10	45	52	30	10	17	4.1	7.2	2.1	3.6	8
	380	—	25	—	15	45	52	—	—	28	—	—	—	—	—
	460	—	25	—	15	45	52	—	20	34	8.3	14	4.2	7.2	16
	575	—	25	—	15	45	52	—	25	43	10.0	18	5.2	8.9	20
3	115	—	—	—	—	90	104	60	10	17	4.1	—	2.0	—	—
	200	—	25	—	15	90	104	60	—	31	—	12	—	6.1	—
	230	—	30	—	20	90	104	60	20	34	8.1	14	4.1	7.0	27
	380	—	50	—	30	90	104	—	—	56	—	—	—	—	—
	460	—	50	—	30	90	104	—	40	68	16	28	8.1	14	53
	575	—	50	—	30	90	104	—	50	86	20	35	10	18	67
4	200	—	40	—	25	135	156	120	—	45	—	20	—	10	—
	230	—	50	—	30	135	156	120	30	52	14	23	6.8	12	40
	380	—	75	—	50	135	156	—	—	86.7	—	—	—	—	—
	460	—	100	—	60	135	156	—	60	105	27	47	14	23	80
	575	—	100	—	60	135	156	—	75	130	34	59	17	29	100
5	200	—	75	—	60	270	311	240	—	91	—	41	—	20	—
	230	—	100	—	75	270	311	240	60	105	27	47	14	24	80
	380	—	150	—	125	270	311	—	—	173	—	—	—	—	—
	460	—	200	—	150	270	311	—	120	210	54	94	27	47	160
	575	—	200	—	150	270	311	—	150	260	68	117	34	59	200
6△	200	—	150	—	125	540	621	480	—	182	—	81	—	41	—
	230	—	200	—	150	540	621	480	120	210	54	94	27	47	160
	380	—	300	—	250	540	621	—	—	342	—	—	—	—	—
	460	—	400	—	300	540	621	—	240	415	108	188	54	94	320
	575	—	400	—	300	540	621	—	300	515	135	234	68	117	400
7△	230	—	300	—	—	810	932	—	180	315	—	—	—	—	240
	460	—	600	—	—	810	932	—	360	625	—	—	—	—	480
	575	—	600	—	—	810	932	—	450	775	—	—	—	—	600

Tables and footnotes are taken from NEMA Standards.

▲ Ratings shown are for applications requiring repeated interruptions of stalled motor current or repeated closing of high transient currents encountered in rapid motor reversal, involving more than five openings or closings per minute and more than ten in a ten-minute period, such as plug-stop, plug-reverse or jogging duty. Ratings apply to single speed and multi-speed controllers.

■ Per NEMA Standards paragraph ICS 2-321.20, the service-limit current represents the maximum rms current, in Amperes, which the controller may be expected to carry for protracted periods in normal service. At service-limit current ratings, temperature rises may exceed those obtained by testing the controller at its continuous current rating. The ultimate trip current of over-current (overload) relays or other motor protective devices shall not exceed the service-limit current ratings of the controller.

♦ FLUORESCENT LAMP LOADS—300 VOLTS AND LESS—The characteristics of fluorescent lamps are such that it is not necessary to derate Class 8502 contactors below their normal continuous current rating. Class 8903 contactors may also be used with fluorescent lamp loads. For controlling tungsten and infrared lamp loads, and resistance heating loads, Class 8903 AC lighting contactors are recommended. These contactors are specifically designed for such loads and are applied at their full rating as listed in the Class 8903 Section.

★ Ratings apply to contactors which are employed to switch the load at the utilization voltage of the heat producing element with a duty which requires continuous operation of not more than five openings per minute. Class 8903 Types L and S lighting contactors are rated for resistance heating loads.

▼ When discharged, a capacitor has essentially zero impedance. For repetitive switching by a contactor, sufficient impedance should be connected in series to limit inrush current to not more than 6 times the contactor rated continuous current. In many installations, the impedance of connecting conductors may be sufficient for this purpose. When switching to connect additional banks, the banks already on the line may be charged and can supply additional available short-circuit current which should be considered when selecting the impedance to limit the current.

The ratings for capacitor switching above assume the following maximum available fault currents:

— NEMA Size 00–3: 5,000 A RMS Sym.
— NEMA Size 4–5: 10,000 A RMS Sym.
— NEMA Size 6: 18,000 A RMS Sym.
— NEMA Size 7: 30,000 A RMS Sym.

Note: If available fault current is greater than these values, connect sufficient impedance in series as noted in the previous paragraph.

△ For NEMA Size 6 & 7, the operation rate is as follows: Continuous operation rate is 3 operations per minute maximum; Jogging or Plugging Duty operation rate is 15 operations per minute for a maximum of three minutes.

The motor ratings in Table 16.51 are NEMA standard ratings and apply only when the code letter of the motor is the same as or occurs earlier in the alphabet than is shown in the Table 16.52. Motors having code letters occurring later in the alphabet may require a larger controller. Consult Schneider Electric CCC at (1-888-778-2733).

Table 16.52:

Motor Hp Rating	Maximum Allowable Motor Code Letter
1-1/2–2	L
3–5	K
7-1/2 and above	H

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Approximate Dimensions

Table 16.53: Dimensions for Class 8502 Open Type

NEMA Size	Type	No. of Poles	Fig. No.	Dimensions—Inches (Refer to Appropriate Figure)									Wt
				A	B	C	D	E	F	G	H	I	
				IN	IN	IN	IN	IN	IN	IN	IN	IN	(lb)
00	SAO	2–3	1	3-7/32	4-11/32	4-7/32	1-5/8	1-5/8	7/32	3-15/16	—	—	4
0	SBO	1–3	1	3-7/32	4-11/32	4-7/32	1-5/8	1-5/8	7/32	3-15/16	—	—	4
1	SCO	4–5		4-1/4	4-11/32	4-7/32	1-5/8	2-5/8	7/32	3-15/16	—	—	4-1/2
2	SDO	2–3	1	4-5/16	5-1/8	4-15/16	2-5/32	2-5/32	7/32	4-19/32	17/32	1-1/16	6-3/4
		4–5		5-5/8	5-1/8	4-15/16	2-5/32	3-15/32	7/32	4-19/32	17/32	1-1/16	8-1/4
3	SEO	2–3	1	5-15/32	7-3/32	6-1/2	1-7/8	3-17/32	5/16	6-1/32	3-1/4	4-3/4	14
		4–5		9-3/4	7-7/8	6-1/2	3-15/16	5-13/16	5/16	7	4-17/32	9-1/16	22
4	SFO	2–3	1	6	8-3/16	6-1/2	2-1/16	3-15/16	5/16	7	3-19/32	5-5/16	18
		4–5		9-3/4	8-3/16	6-1/2	3-15/16	5-13/16	5/16	7	4-17/32	9-1/16	22
5	SGO	2–3	1	8-2/3	12-5/16	8-3/4	3-1/4	5-13/16	5/8	11-1/8	4-3/4	7-1/4	45
6	SHO	2–3	1	10-35/64	28-1/16	9	3-17/32	7-1/32	5-1/16	18-9/16	4-3/4	7-1/4	80
7	SJO	2–3	1	10-35/64	37-1/4	10-7/8	3-17/32	7-1/32	7-7/32	22-3/8	4-3/4	7-1/4	135

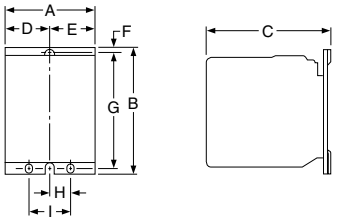

Figure 1
Class 8502

Table 16.54: Dimensions for 8536 Open Type

NEMA Size	Type	No. of Poles	Fig. No.	Dimensions—Inches (Refer to Appropriate Figure)									Wt
				A	B	C	D	E	F	G	H	I	
				IN	IN	IN	IN	IN	IN	IN	IN	IN	(lb)
00, 0, 1, 1P	SAO–SCO	2–3	2	3-1/2	6-49/64	4-7/32	1/2	1	1-39/64	13/64	6-1/4	3-31/32	5
0, 1	SBO–SCO	4	2	4-17/32	6-49/64	4-7/32	1/2	1	2-2/3	13/64	6-1/4	3-31/32	5-1/2
2	SDO	2–3	2	4-5/16	7-13/16	4-15/16	1/2	1	2-5/32	13/64	7-11/32	4-1/16	7-3/4
		4		5-5/8	7-13/16	4-15/16	1/2	1	3-15/32	13/64	7-11/32	4-1/16	9-1/4
3	SEO	2–3	2	5-15/32	11-3/32	6-1/2	7/8	1-3/4	3-19/32	5/16	10-3/16	5-3/4	17
		4		9-3/4	12-1/8	6-1/2	1-13/16	1-3/4	5-13/16	5/16	11-3/16	5-3/4	25
4	SFO	3	2	6	12-7/8	6-1/2	1-13/16	1-3/4	3-15/16	5/16	11-3/16	5-3/4	22
		4		9-3/4	12-7/8	6-1/2	1-13/16	1-3/4	5-29/32	5/16	11-3/16	5-3/4	25
5	SGO	3	2	8-9/16	17-9/16	8-3/4	4-3/4	7-1/4	5-12/32	5/8	16-3/8	6	62
6	SHO	3	2	12-11/32	28-1/16	9	4-3/4	7-1/4	5-25/32	5-1/16	18-9/16	8-11/16	85
7	SJO	3	2	12-11/32	37-1/4	10-7/8	4-3/4	7-1/4	5-25/32	7-7/32	22-3/8	9	140

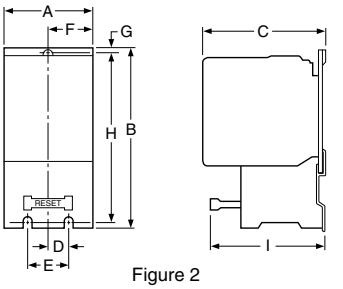

Figure 2
Class 8536

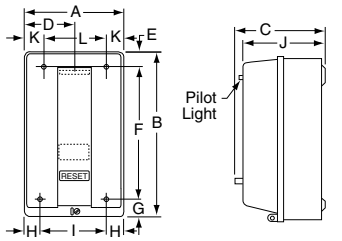

Figure 3

Table 16.55: Dimensions for NEMA 1 General Purpose Enclosure

NEMA Size	Type	No. of Poles	Fig. No.	Dimensions—Inches												
				A	B	C		D	E	F	G	H	I	J	K	L
						8502	8536									
00 0 1	SAG SBG SCG	All All All	3 3 3	6	10	5-9/32	5-9/16	3	7/8	8-1/8	1	15/16	4-1/8	5	—	—
2	SDG	All	3	7-13/16	12-11/16	6-1/32	6-5/16	—	1-3/32	10-1/2	1-3/32	1-3/32	5-5/8	5-3/4	1-3/32	5-5/8
3	SEG	All	3	11-7/16	21-13/16	8	8-3/8	—	1-17/32	18-3/4	1-17/32	1-17/32	8-3/8	7-3/4	1-17/32	8-3/8
4	SFG	All	5	11-1/4	25-5/32	9	9	8-19/32	1-1/4	1-1/4	22-5/16	1-7/16	7/16	—	—	—
5	SGG	All	5	17-7/32	44-7/32	12-13/16	12-15/16	13	2-1/8	2-1/8	40	2-1/8	9/16	—	—	—
6	SHG	All	4	65-3/4	20-7/32	13-1/8	13-1/8	—	11	64-1/2	2-5/16	5-1/2	—	—	—	—
7	SJG	All	4	93	34-1/2	23-1/2	23-1/2	Floor Mounting								

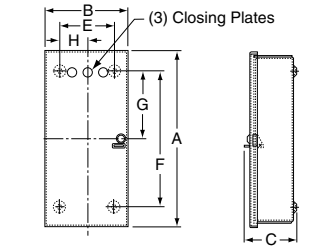

Figure 4

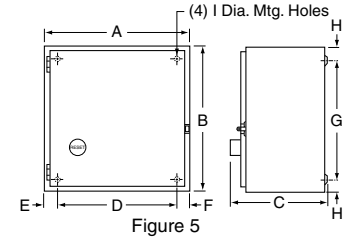

Figure 5

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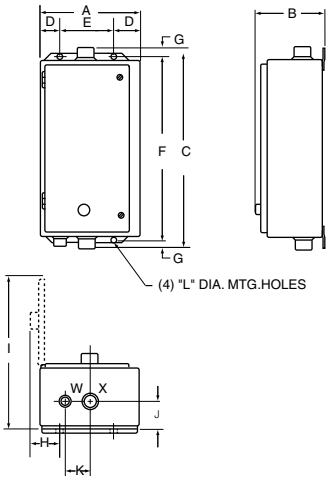
Approximate Dimensions

Table 16.56: NEMA 4 & 4X—Stainless Steel Watertight Enclosures▲

NEMA Size	Class	Type	No. of Poles	Dimensions—Inches												Bot. Hub Only	Top & Bot. Hub
				A	B	C	D	E	F	G	H	I	J	K	L	W	X
0 and 1	8502	SBW	All	6-3/8	7-1/8	13-3/16	1-9/16	3-1/4	12	19/32	1-3/16	11-25/32	1-5/8	2-5/16	5/16	3/4" Dia. Hub	1" Dia. Hub
		SCW															
	8536	SBW	All	6-3/8	7-13/16	13-3/16	1-9/16	3-1/4	12	19/32	1-7/8	11-25/32	1-5/8	2-5/16	5/16		
		SCW															
2	8502	SDW	All	8-1/8	7-7/8	16-3/16	1-9/16	5	15	1-3/32	1-15/16	14-3/4	2	2-5/8	5/16	3/4" Dia. Hub	1-1/2" Dia. Hub
	8536	SDW	All	8-1/8	8-9/16	16-3/16	1-9/16	5	15	1-3/32	2-7/8	14-3/4	2	2-5/8	5/16		
3 and 4	8502	SEW	All	18-5/32	8-3/4	32-7/32	3-5/64	12	30-1/2	7/8	3-11/16	26-23/32	2-9/16	3-3/16	7/16	3/4" Dia. Hub	2-1/2" Dia. Hub
		SFW															
	8536	SEW	All	18-5/32	9-9/16	32-7/32	3-5/64	12	30-1/2	7/8	4-1/2	26-23/32	2-9/16	3-3/16	7/16	3/4" Dia. Hub	2-1/2" Dia. Hub
		SFW															
5	8502 & 8536	SGW	All	17-7/32	12-5/8	47-7/32	4-1/8	9	46	5/8	4-19/32	28-5/16	3-1/8	5-3/4	9/16	3/4" Dia. Hub	3-1/2" Dia. Hub
6▲	8502 & 8536	SHW	All	20-7/32	12-1/8	65-7/32	4-1/8	12	64	5/8	4-19/32	30-13/16	2-11/16	4-1/2	9/16	3/4" Dia. Hub	(2) 3" Dia. Hub
7▲	8502 & 8536	SJW	All	34-1/2	23-1/2	101	Floor Mounting										

▲ Size 6 and 7 are sheet steel enclosures, and are rated NEMA 4 only.



NEMA 4 & 4X
Watertight Enclosure

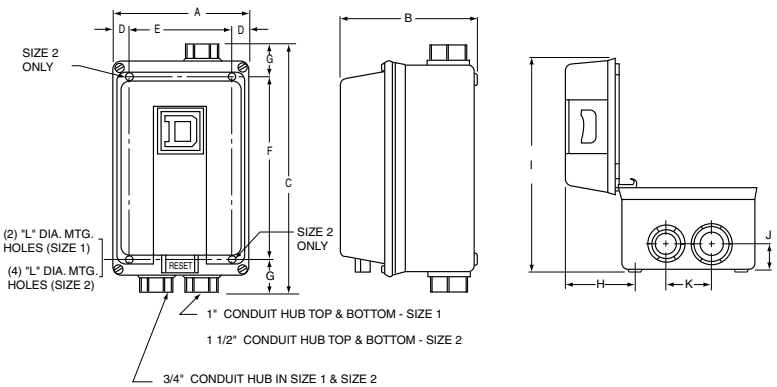
Table 16.57: NEMA 4 & 4X—Stainless Steel Watertight Enclosures with Form F4T■

NEMA Size	Class	Type	No. of Poles	Dimensions—Inches											
				A	B	C	D	E	F	G	H	I	J	K	L
0 and 1	8502	SBW	All	12-5/8	7-1/8	14-11/16	2-9/16	7-1/2	13-1/2	19/32	3-3/16	18-13/16	1-21/32	2-5/16	5/16
		SCW													
	8536	SBW	All	12-5/8	7-13/16	14-11/16	2-9/16	7-1/2	13-1/2	19/32	3-7/8	18-13/32	1-21/32	2-5/16	5/16
		SCW													
2	8502	SDW	All	14-7/8	7-9/16	16-5/16	2-9/16	9-3/4	15	21/32	3-3/16	20-7/8	2	2-5/8	5/16
	8536	SDW	All	14-7/8	8-1/4	16-5/16	2-9/16	9-3/4	15	21/32	3-7/8	20-7/8	2	2-5/8	5/16
3 and 4	8502	SEW	2–3	Same as Standard NEMA 4 dimensions, see above.											
		SFW	2–3												
	8536	SEW	2–3	Same as Standard NEMA 4 dimensions, see above.											
		SFW	2–3												
5	8502 & 8536	SGW	All	Same as Standard NEMA 4 dimensions, see above.											
6■	8502 & 8536	SHW	All	Form F4T is supplied as standard. Refer to page 16-101.											
7■	8502 & 8536	SJW	All												

■ Size 6 and 7 are sheet steel enclosures, and are rated NEMA 4 only.

Table 16.58: NEMA 4X—Watertight & Corrosion Resistant Glass Polyester Enclosures

Size	Type	No. of Poles	Dimensions—Inches (see the figure below)													Bot. Hub Only	Top & Bot. Hub	Weight (lb)
			A	B	C	D	E	F	G	H	I	J	K	L		W	X	
0, 1	SBW	All	6-1/2	6-7/16	12-1/8	3/4	5	8-3/4	1-11/16	3-11/32	10-1/16	1-5/16	2-1/8	5/16		3/4	1	17
	SCW																	
2	SDW	All	8-1/2	7-1/16	13-7/8	3/4	7	10-1/2	1-11/16	3-29/32	11-15/16	1-5/8	2-3/8	5/16		3/4	1-1/2	22



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Approximate Dimensions

Table 16.59: NEMA 4X—Watertight & Corrosion Resistant Glass Polyester Enclosures

NEMA Size	Type	No. of Poles	Dimensions—Inches (see Figure 1)				
			A	B	C	E	F
0-2▲	SBW SCW SDW	All	16-7/8	9-25/32	22-3/4	10-1/8	21-1/2
3-4■	SEW SFW	All	25-13/16	11-15/16	33-1/2	18-1/2	32-1/4

▲ With control power transformer (Form F4T).
■ Dimensions also for Form F4T.

Note: Devices with Form F4T may use larger enclosure. Consult Schneider Electric CCC at (1-888-778-2733) for dimensions.

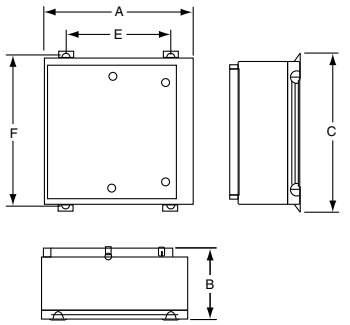

Figure 1
NEMA 4X

NEMA 7 & 9—Bolted Cover, Cast Iron

See Figure 2 for dimensions for NEMA size 0 and 1 (weight is 59 pounds).
See Figure 3 for NEMA size 2 (weight is 75 pounds).

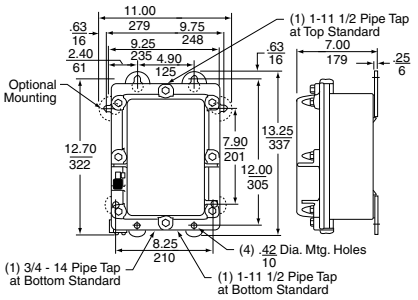

Figure 2
Size 0 and 1

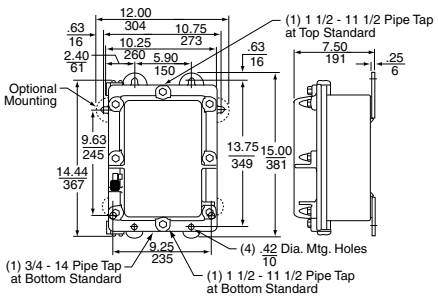

Figure 3
Size 2

Table 16.60: NEMA 7 & 9—SPIN TOP™ Enclosure

Conduit Sizes Loc. A, B, C & D			Dimensions—Inches (See Figure 4)													Wt. (lb)
NEMA Size	Std.	Type	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	
0–1	1-1/4	SBR SCR	10-5/8	26	15-1/4	8	4-3/4	5-3/8	3-3/4	1-1/16	7-1/2	11	7-5/16	2-1/16	—	—	70
2	1-1/2	SDR	13-7/8	30-1/2	19-1/4	8	4-3/4	5-1/4	3-3/4	1-1/16	7	18	9-3/8	2-3/4	—	—	100
3–4	2-1/2	SER SFR	13-3/8	39-1/2	20-1/4	8	4-3/4	7-1/2	3-3/4	—	7-3/4	23	8-5/8	3	—	—	165 195
5	4	SGR	19	53-1/2	27-3/4	—	—	11-1/4	5-3/4	1/8	16	20-5/8	11-3/8	4-5/16	12	6-1/2	375

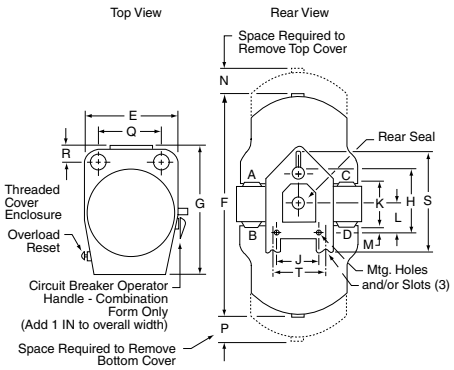

Figure 4
NEMA 7 & 9
SPIN TOP™ Enclosure

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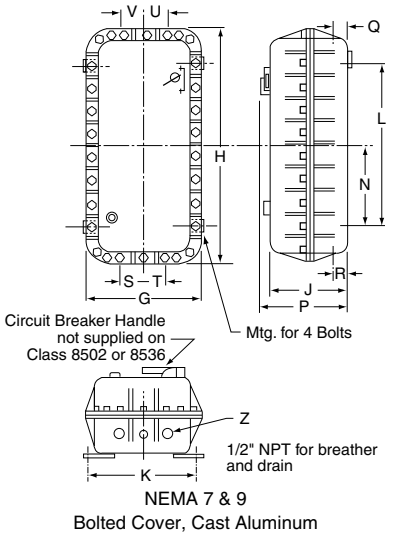
Approximate Dimensions

Table 16.61: NEMA 7 & 9—Bolted Cover, Cast Aluminum

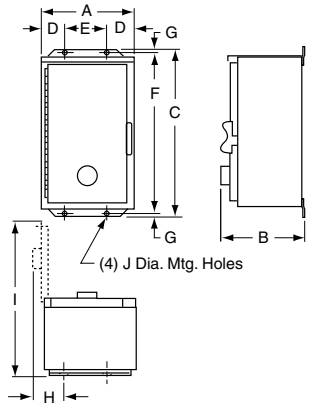
NEMA Size	Type	Dimensions—Inches									Z Dia.	Wt. (lb)
		G	H	J	K	L	N	P	Q, R	S, T, U, V		
0–1	SBT SCT	14-1/4	17-1/4	9-1/2	12-1/4	8-7/8	4-1/2	11	2-3/8	3-1/8	1-1/2	75
2	SDT	13-5/8	27-5/8	9-1/2	12-1/4	19-1/4	9-5/8	11	2-3/8	3-1/8	1-1/2	115
3–4	SET SFT	18-1/8	31-5/8	10	16-1/4	19-1/4	9-5/8	12-5/8	2-3/8	3-3/4	2-1/2	180
5	SGT	24-1/2	45-5/8	13-3/4	22-1/2	27-1/2	13-3/4	15-3/8	3-7/16	4	4	500



NEMA 7 & 9
Bolted Cover, Cast Aluminum

Table 16.62: NEMA 12/3R—Dusttight Enclosure

NEMA Size	Type	No. of Poles	Dimensions—Inches										Weight (lb)	
			A	B	C	D	E	F	G	H	I	J	Class 8502	Class 8536
0	SBA	All	6-3/8	8-17/32	12-3/4	1-9/16	3-1/4	12	3/8	3-9/16	12-1/4	5/16	15	16
1	SCA	All												
2	SDA	All	8-1/8	9-9/32	16	1-9/16	5	15	1/2	3-9/16	15-3/8	5/16	22	23
3	SEA	All	18-5/32	9-9/16	31-1/2	3-5/64	12	30-1/2	1/2	4-1/2	26-23/32	7/16	65	68
4	SFA	All											69	73
5	SGA	All	17-7/32	13-7/16	47	4-1/8	9	46	1/2	5-13/32	28-5/16	9/16	160	177
6	SHA	All	20-7/32	13	65	4-1/8	12	64	1/2	6-7/16	30-7/8	11/16	228	233
7	SJA	All	34-1/2	23-1/2	93	Floor Mounting							—	—



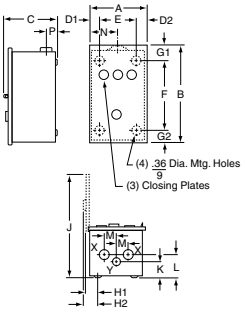
NEMA 12

Table 16.63: NEMA 12/3R—Dusttight Enclosure With Form F4T

NEMA Size	Type	No. of Poles	Dimensions—Inches									
			A	B	C	D	E	F	G	H	I	J
0	SBA	All	11-7/8	8	13-1/2	2-13/16	6-3/4	12-3/4	3/8	3-29/32	18-3/8	5/16
1	SCA	All										
2	SDA	All	14-7/8	8-1/8	16	2-9/16	9-3/4	15	3/8	3-21/32	21-1/2	5/16
3	SEA	2–3	Same as Standard NEMA 12 dimensions, see above.									
4	SFA	2–3										
5	SGA	All	Same as Standard NEMA 12 dimensions, see above.									
6	SHA	All	Form F4T is supplied as standard. Refer to page 16-101.									
7	SJA	All										

Table 16.64: NEMA 3R—Rainproof and Sleet Resistant Enclosures

Size	Type	No. of Poles	Dimensions—Inches																	
			A	B	C	D1	D2	E	F	G1	G2	H1	H2	J	K	L	M	N	P	K.O. X	K.O. Y
0, 1	SBH SCH	All	8-27/32	12-9/32	7-1/8	1-3/8	1-7/16	6	7-1/2	2-19/32	2-3/16	2-1/16	2-5/8	14-9/32	1-3/8	1-3/8	1-7/8	4-3/8	1-27/32	1/2 3/4 1	1/2 3/4 1
2	SDH	All	9-27/32	16-9/32	8-5/8	1-3/8	1-7/16	7	11-1/2	2-19/32	2-3/16	2-1/16	2-5/8	16-25/32	1-5/16	1-3/4	2-1/8	4-7/8	1-27/32	1 1-1/4 1-1/2	1/2 3/4
3	SEH	All	12-27/32	25-9/32	8-5/8	1-3/8	1-7/16	10	20-1/2	2-19/32	2-3/16	2-1/16	2-5/8	19-25/32	1-5/16	1-15/16	2-7/16	6-3/8	1-27/32	1 1-1/4 2 2-1/2	1/2 3/4
4	SFH	All	12-27/32	40-9/32	9-1/8	1-3/8	1-7/16	10	35-1/2	2-19/32	2-3/16	2-1/16	2-5/8	20-9/32	1-5/16	2-5/16	2-11/16	6-3/8	1-27/32	1 1-1/4 2 2-1/2	1/2 3/4



NEMA 3R

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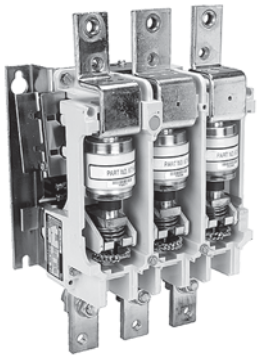


Class 8502 Type WH

General Information

Class 8502 Type W non-reversing vacuum contactors used to switch capacitors, transformers and electric motors where overload protection is separately provided. Type W vacuum contactors are designed for operation at 600 Volts, 50/60 Hz. (See page 16-50 for Class 8702 Reversing Vacuum Contactors.)

Table 16.65: Class 8502—Full Voltage 3 Pole Vacuum Contactors

NEMA Size	Enclosed Ampere Rating	Locked Rotor Current (A)	Motor Voltage	Max. Hp	Open Type	
					Type	$ Price
4	135	1080	200 230 460 575	40 50 100 100	WFO3▲	**3965.00**
5	270	2160	200 230 460 575	75 100 200 200	WGO3▲	**8004.00**
6	540	4320	200 230 460 575	150 200 400 400	WHO3▲	**22383.00**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table below.

Table 16.66: Class 9998—Replacement Coils for Class 8502 and 8702 Vacuum Contactors (Includes Rectifier)

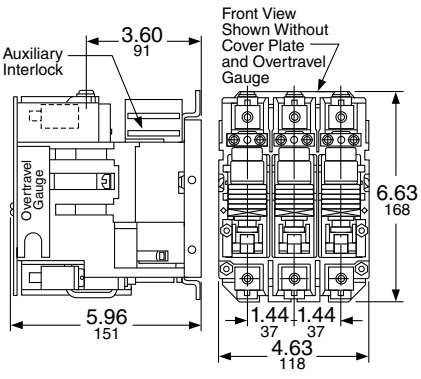
Size	Type	Poles	Class and Type	Suffix Number (Complete Coil Number Consists of Class and Type Followed by Suffix Number)				$ Price
				120 V 110 V	240 V 220 V	480 V 440 V	600 V 550 V	
4	WF	3	9998WF	120	240	480	600	**732.00**
5	WG	3	9998WG	120	240	480	600	**1724.00**
6	WH	3	9998WH	120	240	480	600	**1904.00**

Table 16.67: Class 9999—Vacuum Contactor Kits

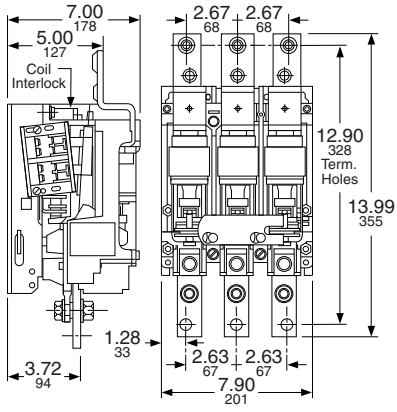
For Use With		Kit Description	Class 9999 Type	$ Price
Type	Size			
WF–WG WH	4–5 6	Auxiliary Contacts, Non-Convertible 1-N.O. & 1-N.C. Isolated Contacts	WX11	**116.00**
WF WG–WH	4 5–6	Coil Circuit Auxiliary Contacts 1-N.O. & 1-N.C. Isolated Contacts, Delayed Break 1-N.C. Isolated Contact	WCX11 WLX01	**153.00** **476.00**
WG	5	Lug Kits (6) lugs included	LUW5	**261.00**
WH	6	Lug Kits (6) lugs included	LUW6	**270.00**

Table 16.68: Coil Voltage Codes

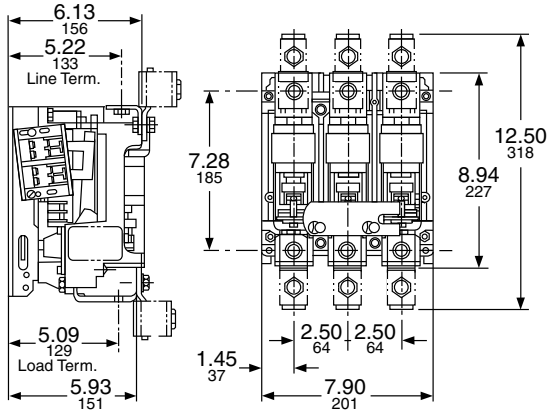
Volts	110	120	220	240	440	480	550	600
50 Hz	V02		V03		V06		V07	
60 Hz		V02		V03		V06		V07



Dimensions for Class 8502 Type WF Size 4



Dimensions for Class 8502 Type WH Size 6



Dimensions for Class 8502 Type WG Size 5

For How to Order Information, see page 16-13.

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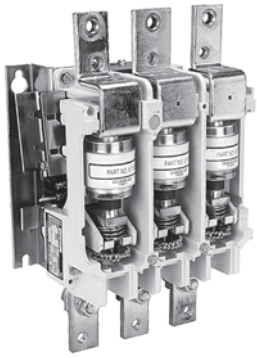
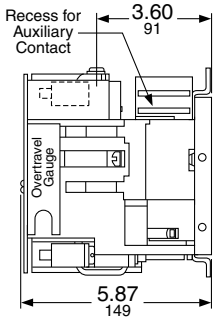
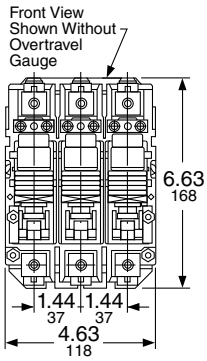
General Information

The Class 8502 Type V vacuum contactor is a three-pole, 1500 V rated device which meets UL508 (1.5 kV) and CSA. Vacuum technology offers long life and low maintenance in a compact, lightweight design. The contactor is suitable for contaminated atmospheres because the main contacts are sealed in vacuum bottles. Also, since gravity is not used to assist contactor operation, the Class 8502 contactor may be mounted in any plane without special modifications. Type V vacuum contactors are designed for the control of inductive or non-inductive loads at voltages between 200 and 1500 Vac.



Class 8502 Type VH





Dimensions for Class 8502 Type VF Size 4

Table 16.69: Class 8502—Full Voltage 3 Pole Vacuum Contactors

NEMA Size	Enclosed Ampere Rating	Locked Rotor Current (A)	Motor Voltage	Max. Hp	Open Type	
					Type	$ Price
4	160	1080	200 230 460 575 800 1000 1500	50 60 125 150 200 250 400	VFO3▲	**3965.00**
5	320	2160	200 230 460 575 800 1000 1500	100 125 250 300 400 — 800	VGO3▲	**8004.00**
6	540	4320	200 230 460 575 800 1000 1500	150 200 400 400 — — 1300	VHO3▲	**22383.00**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table below.

Table 16.70: Class 9998—Replacement Coils for Class 8502 and 8702 (Contains Rectifier)

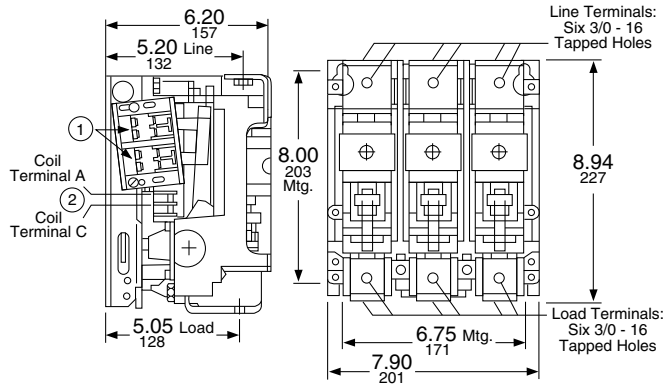
Size	Type	Poles	Class and Type	Suffix Number (Complete Coil Number Consists of Class and Type Followed by Suffix Number)				$ Price
				120 Volts 110 Volts	240 Volts 220 Volts	480 Volts 440 Volts	600 Volts 550 Volts	
4	VF	3	9998WF	120	240	480	600	**732.00**
5	VG	3	9998WG	120	240	480	600	**1724.00**
6	VH	3	9998WH	120	240	480	600	**1904.00**

Table 16.71: Class 9999—Vacuum Starter Kits

For Use With		Kit Description	Class 9999 Type	$ Price
Type	Size			
VF–VG VH	4–5 6	Auxiliary Contacts, Non-Convertible 1 N.O. & 1 N.C. Isolated Contacts	WX11	**116.00**
VF VG–VH	4 5–6	Coil Circuit Auxiliary Contacts 1 N.O. & 1 N.C. Isolated Contacts, Delayed Break 1 N.C. Isolated Contact	WCX11 WLX01	**153.00** **476.00**
VG	5	Lug Kits (6) lugs included	LUW5	**261.00**
VH	6	Lug Kits (6) lugs included	LUW6	**1715.00**

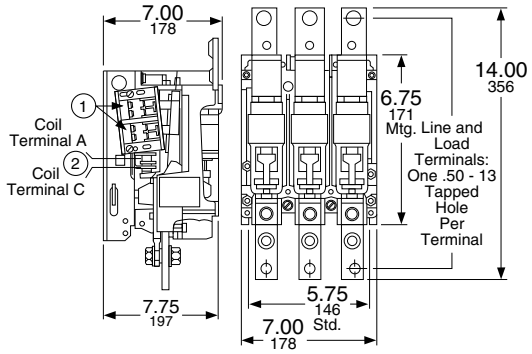
Table 16.72: Coil Voltage Codes

Volts	110	120	220	240	440	480	550	600
50 Hz	V02		V03		V06		V07	
60 Hz		V02		V03		V06		V07



(1) Two Dual Circuit Auxiliary Contacts can be located on both sides of contactor.
(2) Coil Terminals B and D located on opposite side of contactor.

Dimensions for Class 8502 Type VG Size 5



(1) Two Dual Circuit Auxiliary Contacts can be located on both sides of contactor.
(2) Coil Terminals B and D located on opposite side of contactor.

Dimensions for Class 8502 Type VH Size 6

For How to Order Information, see page 16-13.

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General Information

Class 8536 Type W non-reversing vacuum starters are used to switch electric motors where overload protection is not separately provided.

Type W vacuum starters are designed for operation at 600 Volts, 50/60 Hz. Starters are available exclusively with Motor Logic™ Feature Base Solid State Overload Relays.

Table 16.73: Class 8536—Full Voltage Vacuum Starters

NEMA Size	Enclosed Ampere Rating	Locked Rotor Current (A)	Motor Voltage	Max. Hp	Open Type	
					Type	$ Price
4	135	1080	200 230 460 575	40 50 100 100	WFO3▲	**4433.00**
5	270	2160	200 230 460 575	75 100 200 200	WGO3▲	**10125.00**
6	540	4320	200 230 460 575	150 200 400 400	WHO3▲	**24008.00**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table at left.

Table 16.74: Class 9998—Replacement Coils for Class 8536 Vacuum Starters

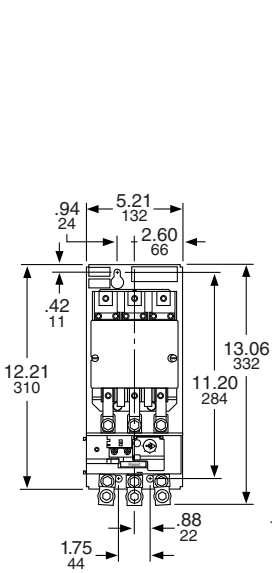
Size	Type	Poles	Class and Type	Suffix Number (Complete Coil Number Consists of Class and Type Followed by Suffix Number)				$ Price
				120 Volts 110 Volts	240 Volts 220 Volts	480 Volts 440 Volts	600 Volts 550 Volts	
4	WF	All	9998WF	120	240	480	600	**732.00**
5	WG	All	9998WG	120	240	480	600	**1724.00**
6	WH	All	9998WH	120	240	480	600	**1904.00**

Table 16.75: Class 9999—Vacuum Starter Kits

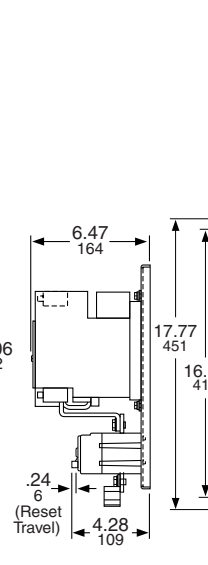
For Use With		Kit Description	Class 9999 Type	$ Price
Type	Size			
WF–WG WH	4–5 6	Auxiliary Contacts, Non-Convertible 1 N.O. & 1 N.C. Isolated Contacts	WX11	**122.00**
WF WG–WH	4 5–6	Coil Circuit Auxiliary Contacts 1 N.O. & 1 N.C. Isolated Contacts, Delayed Break 1 N.C. Isolated Contact	WCX11 WLX01	**114.00** **503.00**
WG	5	Lug Kits (6) lugs included	LUW5	**275.00**

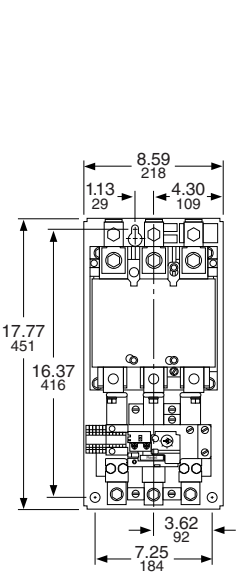
Table 16.76: Coil Voltage Codes

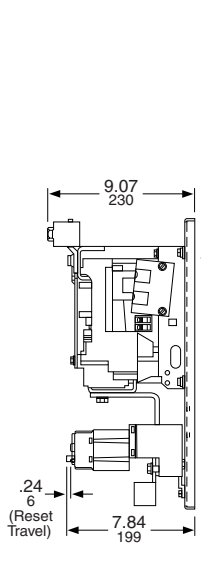
Volts	110	120	220	240	440	480	550	600
50 Hz	V02		V03		V06		V07	
60 Hz		V02		V03		V06		V07



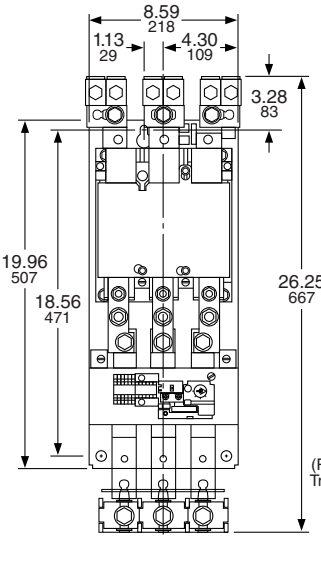
Dimensions for Class 8536 Type WF Size 4

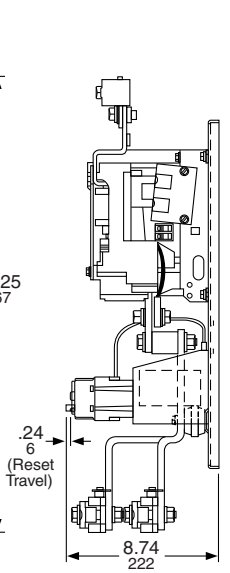






Dimensions for Class 8536 Type WG Size 5





Dimensions for Class 8536 Type WH Size 6

For How to Order Information, see page 16-13.

CP1 Discount Schedule

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3 or 5 Days
Laser Delivery

Schneider Electric offers express shipping for factory modified NEMA Combo Starters. When you need them fast, our Laser™ Delivery program is the answer to getting your product when you need it most. Ask for Laser™ Delivery, then select the product and the modifications you need when you place your order. It's as easy as that!

General Information

Class 8538 and 8539 Type S combination starters combine the requirements of motor overload and short circuit protection into one package. These starters are manufactured in accordance with NEMA standards and are UL Listed (although some Form numbers may not be listed—contact Schneider Electric Customer Care Center for information). Class 8538 and 8539 combination starters are designed to operate at 600 Vac maximum, 50 to 60 Hz—and are supplied with melting alloy overload relays as standard.

3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information. For class J fuse clip, use Form **Y1072** (no charge).

Table 16.77: Fusible Full Voltage Type (Class H Fuse Clips), with Melting Alloy Overload Relays

Ratings			Fuse Clip Size (A)	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)♦		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size								With External Reset	Without External Reset	$ Price
				Type	$ Price	Type	$ Price	Type	$ Price	Type	Type	
200 (208)	3	0	30	SBG12▲	1344.00	SBW12▲	2712.00	SBW22▲	3123.00	SBA22▲	SBA12▲	1686.00
	5	1	30	SCG12▲	1416.00	SCW12▲	2781.00	SCW22▲	3195.00	SCA22▲	SCA12▲	1758.00
	7-1/2		60	SCG13▲	1443.00	SCW13▲	2811.00	SCW23▲	3239.00	SCA23▲	SCA13▲	1785.00
	10	2	60	SDG12▲	2228.00	SDW12▲	4334.00	SDW22▲	4778.00	SDA22▲	SDA12▲	2712.00
	20	3	100	SEG15▲	3752.00	SEW15▲	7425.00	SEW25▲	8166.00	SEA25▲	SEA15▲	4377.00
	25		200	SEG12▲	4064.00	SEW12▲	7739.00	—	—	SEA22▲	SEA12▲	4692.00
	40	4	200	SFG15▲	7199.00	SFW15▲	11898.00	—	—	SFA25▲	SFA15▲	8936.00
	75	5	400	SGG15▲	16122.00	SGW15▲	28112.00	—	—	SGA25▲	SGA15▲	20336.00
	150	6	600	SHG13▲	42305.00	SHW13▲	54077.00	—	—	SHA23▲	SHA13▲	47219.00
230 (240)	3	0	30	SBG12▲	1344.00	SBW12▲	2712.00	SBW22▲	3123.00	SBA22▲	SBA12▲	1686.00
	5	1	30	SCG12▲	1416.00	SCW12▲	2781.00	SCW22▲	3195.00	SCA22▲	SCA12▲	1758.00
	7-1/2		60	SCG13▲	1443.00	SCW13▲	2811.00	SCW23▲	3239.00	SCA23▲	SCA13▲	1785.00
	15	2	60	SDG12▲	2228.00	SDW12▲	4334.00	SDW22▲	4778.00	SDA22▲	SDA12▲	2712.00
	25	3	100	SEG15▲	3752.00	SEW15▲	7425.00	SEW25▲	8166.00	SEA25▲	SEA15▲	4377.00
	30		200	SEG12▲	4064.00	SEW12▲	7739.00	—	—	SEA22▲	SEA12▲	4692.00
	50	4	200	SFG15▲	7199.00	SFW15▲	11898.00	—	—	SFA25▲	SFA15▲	8936.00
	100	5	400	SGG15▲	16122.00	SGW15▲	28112.00	—	—	SGA25▲	SGA15▲	20336.00
	200	6	600	SHG13▲	42305.00	SHW13▲	54077.00	—	—	SHA23▲	SHA13▲	47219.00
460 (480)	5	0	30	SBG13▲	1344.00	SBW13▲	2712.00	SBW23▲	3123.00	SBA23▲	SBA13▲	1686.00
	10	1	30	SCG14▲	1443.00	SCW14▲	2811.00	SCW24▲	3239.00	SCA24▲	SCA14▲	1785.00
	15	2	30	SDG16▲	2241.00	SDW16▲	4350.00	SDW26▲	4791.00	SDA26▲	SDA16▲	2712.00
	25		60	SDG14▲	2271.00	SDW14▲	4377.00	SDW24▲	4820.00	SDA24▲	SDA14▲	2754.00
	50	3	100	SEG13▲	3824.00	SEW13▲	7497.00	SEW23▲	8244.00	SEA23▲	SEA13▲	4449.00
	100	4	200	SFG13▲	7254.00	SFW13▲	11955.00	—	—	SFA23▲	SFA13▲	8991.00
	200	5	400	SGG13▲	16122.00	SGW13▲	28112.00	—	—	SGA23▲	SGA13▲	20336.00
	400	6	600	SHG12▲	42305.00	SHW12▲	54077.00	—	—	SHA22▲	SHA12▲	47219.00
575 (600)	5	0	30	SBG13▲	1344.00	SBW13▲	2712.00	SBW23▲	3123.00	SBA23▲	SBA13▲	1686.00
	10	1	30	SCG14▲	1443.00	SCW14▲	2811.00	SCW24▲	3239.00	SCA24▲	SCA14▲	1785.00
	15	2	30	SDG16▲	2241.00	SDW16▲	4350.00	SDW26▲	4791.00	SDA26▲	SDA16▲	2712.00
	25		60	SDG14▲	2271.00	SDW14▲	4377.00	SDW24▲	4820.00	SDA24▲	SDA14▲	2754.00
	50	3	100	SEG13▲	3824.00	SEW13▲	7497.00	SEW23▲	8244.00	SEA23▲	SEA13▲	4449.00
	100	4	200	SFG13▲	7254.00	SFW13▲	11955.00	—	—	SFA23▲	SFA13▲	8991.00
	200	5	400	SGG13▲	16122.00	SGW13▲	28112.00	—	—	SGA23▲	SGA13▲	20336.00
	400	6	600	SHG12▲	42305.00	SHW12▲	54077.00	—	—	SHA22▲	SHA12▲	47219.00

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown on page 16-32.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.78: Fusible Disconnect Switch Type (Class H Fuse Clips), Single Phase▼△

Motor Voltage	Max. Hp	Coil Voltage	NEMA Size	Poles	Fuse Clip Size (A)	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R★ Dusttight and Driptight Industrial Use Enclosure		
												With External Reset	Without External Reset	$ Price
						Type	$ Price	Type	$ Price	Type	$ Price	Type	Type	
120	1	120	0	2	30	SBG62V02	1344.	SBW62V02	2712.	SBW65V02	3123.	SBA65V02	SBA62V02	1686.
	2		1		30	SCG62V02	1416.	SCW62V02	2781.	SCW65V02	3195.	SCA65V02	SCA62V02	1758.
	3		2		60	SDG62V02	2228.	SDW62V02	4334.	SDW65V02	4778.	SDA65V02	SDA62V02	2712.
240	2	240	0	2	30	SBG62V03	1344.	SBW62V03	2712.	SBW65V03	3123.	SBA65V03	SBA62V03	1686.
	3		1		30	SCG62V03	1416.	SCW62V03	2781.	SCW65V03	3195.	SCA65V03	SCA62V03	1758.
	7-1/2		2		60	SDG62V03	2228.	SDW62V03	4334.	SDW65V03	4778.	SDA65V03	SDA62V03	2712.

★ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
▼ Single phase units require one thermal unit and are not available with Form Hxx—Solid State Overload Relays.
△ Not included in Laser™ Delivery program.

For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50-60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Refer to page 16-31 for details.

Table 16.79: Non-Fusible Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relays

Ratings			NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)■		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R▲ Dusttight and Driptight Industrial Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
									Type	Type	
200 (208)	3	0	SBG11♦	1301.00	SBW11♦	2669.00	SBW21♦	3068.00	SBA21♦	SBA11♦	1643.00
	7-1/2	1	SCG11♦	1373.00	SCW11♦	2739.00	SCW21♦	3153.00	SCA21♦	SCA11♦	1715.00
	10	2	SDG11♦	2169.00	SDW11♦	4278.00	SDW21♦	4706.00	SDA21♦	SDA11♦	2654.00
	25	3	SEG11♦	3609.00	SEW11♦	7284.00	SEW21♦	8010.00	SEA21♦	SEA11♦	4235.00
	40	4	SFG11♦	6956.00	SFW11♦	11655.00	—	—	SFA21♦	SFA11♦	8693.00
	75	5	SGG11♦	15609.00	SGW11♦	27599.00	—	—	SGA21♦	SGA11♦	19823.00
	150	6	SHG11♦	41174.00	SHW11♦	52568.00	—	—	SHA21♦	SHA11♦	45710.00
230 (240)	3	0	SBG11♦	1301.00	SBW11♦	2669.00	SBW21♦	3068.00	SBA21♦	SBA11♦	1643.00
	7-1/2	1	SCG11♦	1373.00	SCW11♦	2739.00	SCW21♦	3153.00	SCA21♦	SCA11♦	1715.00
	15	2	SDG11♦	2169.00	SDW11♦	4278.00	SDW21♦	4706.00	SDA21♦	SDA11♦	2654.00
	30	3	SEG11♦	3609.00	SEW11♦	7284.00	SEW21♦	8010.00	SEA21♦	SEA11♦	4235.00
	50	4	SFG11♦	6956.00	SFW11♦	11655.00	—	—	SFA21♦	SFA11♦	8693.00
	100	5	SGG11♦	15609.00	SGW11♦	27599.00	—	—	SGA21♦	SGA11♦	19823.00
	200	6	SHG11♦	41174.00	SHW11♦	52568.00	—	—	SHA21♦	SHA11♦	45710.00
460 (480)	5	0	SBG11♦	1301.00	SBW11♦	2669.00	SBW21♦	3068.00	SBA21♦	SBA11♦	1643.00
	10	1	SCG11♦	1373.00	SCW11♦	2739.00	SCW21♦	3153.00	SCA21♦	SCA11♦	1715.00
	25	2	SDG11♦	2169.00	SDW11♦	4278.00	SDW21♦	4706.00	SDA21♦	SDA11♦	2654.00
	50	3	SEG11♦	3609.00	SEW11♦	7284.00	SEW21♦	8010.00	SEA21♦	SEA11♦	4235.00
	100	4	SFG11♦	6956.00	SFW11♦	11655.00	—	—	SFA21♦	SFA11♦	8693.00
	200	5	SGG11♦	15609.00	SGW11♦	27599.00	—	—	SGA21♦	SGA11♦	19823.00
	400	6	SHG11♦	41174.00	SHW11♦	52568.00	—	—	SHA21♦	SHA11♦	45710.00
575 (600)	5	0	SBG11♦	1301.00	SBW11♦	2669.00	SBW21♦	3068.00	SBA21♦	SBA11♦	1643.00
	10	1	SCG11♦	1373.00	SCW11♦	2739.00	SCW21♦	3153.00	SCA21♦	SCA11♦	1715.00
	25	2	SDG11♦	2169.00	SDW11♦	4278.00	SDW21♦	4706.00	SDA21♦	SDA11♦	2654.00
	50	3	SEG11♦	3609.00	SEW11♦	7284.00	SEW21♦	8010.00	SEA21♦	SEA11♦	4235.00
	100	4	SFG11♦	6956.00	SFW11♦	11655.00	—	—	SFA21♦	SFA11♦	8693.00
	200	5	SGG11♦	15609.00	SGW11♦	27599.00	—	—	SGA21♦	SGA11♦	19823.00
	400	6	SHG11♦	41174.00	SHW11♦	52568.00	—	—	SHA21♦	SHA11♦	45710.00

Table 16.80: Non-Fusible Disconnect Switch Type, Single Phase★▼

Motor Voltage	Max. Hp	Coil Voltage	NEMA Size	Poles	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R▲ Dusttight and Driptight Industrial Enclosure		
					Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
											Type	Type	
120	1	120	0	2	SBG61V02	1301.00	SBW61V02	2669.00	SBW64V02	3068.00	SBA64V02	SBA61V02	1643.00
	2		1		SCG61V02	1373.00	SCW61V02	2739.00	SCW64V02	3153.00	SCA64V02	SCA61V02	1715.00
	3		2		SDG61V02	2169.00	SDW61V02	4278.00	SDW64V02	4706.00	SDA64V02	SDA61V02	2654.00
240	2	240	0	2	SBG61V03	1301.00	SBW61V03	2669.00	SBW64V03	3068.00	SBA64V03	SBA61V03	1643.00
	3		1		SCG61V03	1373.00	SCW61V03	2739.00	SCW64V03	3153.00	SCA64V03	SCA61V03	1715.00
	7-1/2		2		SDG61V03	2169.00	SDW61V03	4278.00	SDW64V03	4706.00	SDA64V03	SDA61V03	2654.00

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosure.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
★ Single phase units require one thermal unit and are not available with Form Hxx—Solid State Overload Relays.
▼ Not included in Laser™ Delivery program.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.81: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24□△	—	V01	No Charge
120□	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

△ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified(i.e., order as 8538SBG11V01S).
□ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S**, please supply motor voltage when ordering (i.e., order as 8538SCG11V02S).
Note: For voltage codes used with control transformers, see page 16-101. Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

For How to Order Information, see page 16-13.

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3-Pole Polyphase – 600 Vac Maximum – 50-60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

3 or 5 Days Laser Delivery

Refer to page 16-31 for details.

Table 16.82: Fusible (with Class R Fuse Clips) Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relays—(100,000 AIC Rated)

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)♦		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R▲ Dusttight and Driptight Industrial Enclosure		
										With External Reset	Without External Reset	
Motor Voltage (Starter Voltage)	Max. Hp Polyphase	NEMA Size	Fuse Clip Size (A)	Type	$ Price	Type	$ Price	Type	$ Price	Type	Type	$ Price
200 (208)	3	0	30	SBG32■	1367.00	SBW32■	2732.00	SBW42■	3140.00	SBA42■	SBA32■	1709.00
	5	1	30	SCG32■	1436.00	SCW32■	2804.00	SCW42■	3225.00	SCA42■	SCA32■	1778.00
	7-1/2	1	60	SCG33■	1466.00	SCW33■	2834.00	SCW43■	3252.00	SCA43■	SCA33■	1808.00
	10	2	60	SDG32■	2249.00	SDW32■	4356.00	SDW42■	4791.00	SDA42■	SDA32■	2732.00
	20	3	100	SEG35■	3794.00	SEW35■	7469.00	SEW45■	8216.00	SEA45■	SEA35■	4419.00
	25	3	200	SEG32■	4108.00	SEW32■	7781.00	—	—	SEA42■	SEA32■	4734.00
	40	4	200	SFG35■	7241.00	SFW35■	11942.00	—	—	SFA45■	SFA35■	8978.00
	75	5	400	SGG35■	16221.00	SGW35■	28214.00	—	—	SGA45■	SGA35■	20435.00
	150	6	600	SHG33■	42782.00	SHW33■	54176.00	—	—	SHA43■	SHA33■	47696.00
230 (240)	3	0	30	SBG32■	1367.00	SBW32■	2732.00	SBW42■	3140.00	SBA42■	SBA32■	1709.00
	5	1	30	SCG32■	1436.00	SCW32■	2804.00	SCW42■	3225.00	SCA42■	SCA32■	1778.00
	7-1/2	1	60	SCG33■	1466.00	SCW33■	2834.00	SCW43■	3252.00	SCA43■	SCA33■	1808.00
	15	2	60	SDG32■	2249.00	SDW32■	4356.00	SDW42■	4791.00	SDA42■	SDA32■	2732.00
	25	3	100	SEG35■	3794.00	SEW35■	7469.00	SEW45■	8216.00	SEA45■	SEA35■	4419.00
	30	3	200	SEG32■	4108.00	SEW32■	7781.00	—	—	SEA42■	SEA32■	4734.00
	50	4	200	SFG35■	7241.00	SFW35■	11942.00	—	—	SFA45■	SFA35■	8978.00
	100	5	400	SGG35■	16221.00	SGW35■	28214.00	—	—	SGA45■	SGA35■	20435.00
	200	6	600	SHG33■	42782.00	SHW33■	54176.00	—	—	SHA43■	SHA33■	47696.00
460 (480)	5	0	30	SBG33■	1394.00	SBW33■	2762.00	SBW43■	3176.00	SBA43■	SBA33■	1736.00
	10	1	30	SCG34■	1466.00	SCW34■	2834.00	SCW44■	3252.00	SCA44■	SCA34■	1808.00
	15	2	30	SDG36■	2262.00	SDW36■	4370.00	SDW46■	4805.00	SDA46■	SDA36■	2748.00
	25	2	60	SDG34■	2291.00	SDW34■	4400.00	SDW44■	4841.00	SDA44■	SDA34■	2775.00
	50	3	100	SEG33■	3866.00	SEW33■	7541.00	SEW43■	8294.00	SEA43■	SEA33■	4491.00
	100	4	200	SFG33■	7298.00	SFW33■	11997.00	—	—	SFA43■	SFA33■	9035.00
	200	5	400	SGG33■	16221.00	SGW33■	28214.00	—	—	SGA43■	SGA33■	20435.00
	400	6	600	SHG32■	42782.00	SHW32■	54176.00	—	—	SHA42■	SHA32■	47696.00
575 (600)	5	0	30	SBG33■	1394.00	SBW33■	2762.00	SBW43■	3176.00	SBA43■	SBA33■	1736.00
	10	1	30	SCG34■	1466.00	SCW34■	2834.00	SCW44■	3252.00	SCA44■	SCA34■	1808.00
	15	2	30	SDG36■	2262.00	SDW36■	4370.00	SDW46■	4805.00	SDA46■	SDA36■	2748.00
	25	2	60	SDG34■	2291.00	SDW34■	4400.00	SDW44■	4841.00	SDA44■	SDA34■	2775.00
	50	3	100	SEG33■	3866.00	SEW33■	7541.00	SEW43■	8294.00	SEA43■	SEA33■	4491.00
	100	4	200	SFG33■	7298.00	SFW33■	11997.00	—	—	SFA43■	SFA33■	9035.00
	200	5	400	SGG33■	16221.00	SGW33■	28214.00	—	—	SGA43■	SGA33■	20435.00
	400	6	600	SHG32■	42782.00	SHW32■	54176.00	—	—	SHA42■	SHA32■	47696.00

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
♦ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
Note: Some control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on page 16-41.

Table 16.83: Fusible Disconnect Switch Type (Class R Fuses), Single Phase★▼

Motor Voltage	Max. Hp	Coil Voltage	NEMA Size	Poles	Fuse Clip Size (A)	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R Dusttight and Driptight Industrial Use Enclosure		
												With External Reset	Without External Reset	
						Type	$ Price	Type	$ Price	Type	$ Price	Type	Type	$ Price
120	1	120	0	2	30	SBG63V02	1367.00	SBW63V02	2732.00	SBW66V02	3140.00	SBA66V02	SBA63V02	1709.00
	2		1		30	SCG63V02	1436.00	SCW63V02	2804.00	SCW66V02	3225.00	SCA66V02	SCA63V02	1178.00
	3		2		60	SDG63V02	2249.00	SDW63V02	4356.00	SDW66V02	4791.00	SDA66V02	SDA63V02	2732.00
240	2	240	0	2	30	SBG63V03	1367.00	SBW63V03	2732.00	SBW66V03	3140.00	SBA66V03	SBA63V03	1709.00
	3		1		30	SCG63V03	1436.00	SCW63V03	2804.00	SCW66V03	3225.00	SCA66V03	SCA63V03	1178.00
	7-1/2		2		60	SDG63V03	2249.00	SDW63V03	4356.00	SDW66V03	4791.00	SDA66V03	SDA63V03	2732.00

★ Single phase units require one thermal unit and are not available with Form Hxx—Solid State Overload Relays.
▼ Not included in Laser™ Delivery program.

Table 16.84: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24□△	—	V01	No Charge
120□	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

△ 24 V coils are not available on Sizes 4–7. On Sizes 00-3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8538SBG32V01S).
□ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S**, please supply motor voltage when ordering (i.e., order as 8538SCG32V02S).
Note: For voltage codes used with control transformers, see page 16-101. Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Full Voltage Type With Melting Alloy Overload Relays

Note that prices shown do not include thermal units. Devices require 3 thermal units, standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.85:

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dustight Enclosure Stainless Steel (304)		NEMA 12/3R▲ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Fuse Clip Size (A)	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
Class 8538 Non-Fusible Disconnect Switch Type—NEMA Size 0–2■□										
200 (208)	3	0	N/A	SBG11S8♦	**1656.00**	SBW11S8♦	**3738.00**	SBA21S8♦	SBA11S8♦	**2285.00**
	7-1/2	1	N/A	SCG11S8♦	**1728.00**	SCW11S8♦	**3807.00**	SCA21S8♦	SCA11S8♦	**2327.00**
	10	2	N/A	SDG11S8♦	**2528.00**	SDW11S8♦	**3564.00**	SDA21S8♦	SDA11S8♦	**2178.00**
230 (240)	3	0	N/A	SBG11S8♦	**1656.00**	SBW11S8♦	**3738.00**	SBA21S8♦	SBA11S8♦	**2285.00**
	7-1/2	1	N/A	SCG11S8♦	**1728.00**	SCW11S8♦	**3807.00**	SCA21S8♦	SCA11S8♦	**2327.00**
	15	2	N/A	SDG11S8♦	**2528.00**	SDW11S8♦	**3564.00**	SDA21S8♦	SDA11S8♦	**2178.00**
460 (480)	5	0	N/A	SBG11S8♦	**1656.00**	SBW11S8♦	**3738.00**	SBA21S8♦	SBA11S8♦	**2285.00**
	10	1	N/A	SCG11S8♦	**1728.00**	SCW11S8♦	**3807.00**	SCA21S8♦	SCA11S8♦	**2327.00**
	25	2	N/A	SDG11S8♦	**2528.00**	SDW11S8♦	**3564.00**	SDA21S8♦	SDA11S8♦	**2178.00**
575 (600)	5	0	N/A	SBG11S8♦	**1656.00**	SBW11S8♦	**3738.00**	SBA21S8♦	SBA11S8♦	**2285.00**
	10	1	N/A	SCG11S8♦	**1728.00**	SCW11S8♦	**3807.00**	SCA21S8♦	SCA11S8♦	**2327.00**
	25	2	N/A	SDG11S8♦	**2528.00**	SDW11S8♦	**3564.00**	SDA21S8♦	SDA11S8♦	**2178.00**
Class 8538 Fusible Disconnect Switch Type—NEMA Size 0–2■□										
200 (208)	3	0	30	SBG12S8♦	**1700.00**	SBW12S8♦	**3780.00**	SBA22S8♦	SBA12S8♦	**2327.00**
	5	1	30	SCG12S8♦	**1772.00**	SCW12S8♦	**3851.00**	SCA22S8♦	SCA12S8♦	**2370.00**
	7-1/2	1	60	SCG13S8♦	**1800.00**	SCW13S8♦	**3879.00**	SCA23S8♦	SCA13S8♦	**2399.00**
	10	2	60	SDG12S8♦	**2583.00**	SDW12S8♦	**5403.00**	SDA22S8♦	SDA12S8♦	**3324.00**
230 (240)	3	0	30	SBG12S8♦	**1700.00**	SBW12S8♦	**3780.00**	SBA22S8♦	SBA12S8♦	**2327.00**
	5	1	30	SCG12S8♦	**1772.00**	SCW12S8♦	**3851.00**	SCA22S8♦	SCA12S8♦	**2370.00**
	7-1/2	1	60	SCG13S8♦	**1800.00**	SCW13S8♦	**3879.00**	SCA23S8♦	SCA13S8♦	**2399.00**
	15	2	60	SDG12S8♦	**2583.00**	SDW12S8♦	**5403.00**	SDA22S8♦	SDA12S8♦	**3324.00**
460 (480)	5	0	30	SBG13S8♦	**1728.00**	SBW13S8♦	**3807.00**	SBA23S8♦	SBA13S8♦	**2357.00**
	10	1	30	SCG14S8♦	**1800.00**	SCW14S8♦	**3879.00**	SCA24S8♦	SCA14S8♦	**2399.00**
	15	2	30	SDG16S8♦	**2597.00**	SDW16S8♦	**5418.00**	SDA26S8♦	SDA16S8♦	**3338.00**
	25	2	60	SDG14S8♦	**2627.00**	SDW14S8♦	**5445.00**	SDA24S8♦	SDA14S8♦	**3366.00**
575 (600)	5	0	30	SBG13S8♦	**1728.00**	SBW13S8♦	**3807.00**	SBA23S8♦	SBA13S8♦	**2357.00**
	10	1	30	SCG14S8♦	**1800.00**	SCW14S8♦	**3879.00**	SCA24S8♦	SCA14S8♦	**2399.00**
	15	2	30	SDG16S8♦	**2597.00**	SDW16S8♦	**5418.00**	SDA26S8♦	SDA16S8♦	**3338.00**
	25	2	60	SDG14S8♦	**2627.00**	SDW14S8♦	**5445.00**	SDA24S8♦	SDA14S8♦	**3366.00**
Class 8538 Fusible Disconnect Switch Type with Class R Fuse Clips—NEMA Size 0–2■□										
200 (208)	3	0	30	SBG32S8♦	**1722.00**	SBW32S8♦	**3753.00**	SBA42S8♦	SBA32S8♦	**2348.00**
	5	1	30	SCG32S8♦	**1794.00**	SCW32S8♦	**3873.00**	SCA42S8♦	SCA32S8♦	**2390.00**
	7-1/2	1	60	SCG33S8♦	**1821.00**	SCW33S8♦	**3900.00**	SCA43S8♦	SCA33S8♦	**2420.00**
	10	2	60	SDG32S8♦	**2604.00**	SDW32S8♦	**5426.00**	SDA42S8♦	SDA32S8♦	**3344.00**
230 (240)	3	0	30	SBG32S8♦	**1722.00**	SBW32S8♦	**3753.00**	SBA42S8♦	SBA32S8♦	**2348.00**
	5	1	30	SCG32S8♦	**1794.00**	SCW32S8♦	**3873.00**	SCA42S8♦	SCA32S8♦	**2390.00**
	7-1/2	1	60	SCG33S8♦	**1821.00**	SCW33S8♦	**3900.00**	SCA43S8♦	SCA33S8♦	**2420.00**
	15	2	60	SDG32S8♦	**2604.00**	SDW32S8♦	**5426.00**	SDA42S8♦	SDA32S8♦	**3344.00**
460 (480)	5	0	30	SBG33S8♦	**1751.00**	SBW33S8♦	**3830.00**	SBA43S8♦	SBA33S8♦	**2376.00**
	10	1	30	SCG34S8♦	**1821.00**	SCW34S8♦	**3900.00**	SCA44S8♦	SCA34S8♦	**2420.00**
	15	2	30	SDG36S8♦	**2619.00**	SDW36S8♦	**5439.00**	SDA46S8♦	SDA36S8♦	**3360.00**
	25	2	60	SDG34S8♦	**2646.00**	SDW34S8♦	**5468.00**	SDA44S8♦	SDA34S8♦	**3387.00**
575 (600)	5	0	30	SBG33S8♦	**1751.00**	SBW33S8♦	**3830.00**	SBA43S8♦	SBA33S8♦	**2376.00**
	10	1	30	SCG34S8♦	**1821.00**	SCW34S8♦	**3900.00**	SCA44S8♦	SCA34S8♦	**2420.00**
	15	2	30	SDG36S8♦	**2619.00**	SDW36S8♦	**5439.00**	SDA46S8♦	SDA36S8♦	**3360.00**
	25	2	60	SDG34S8♦	**2646.00**	SDW34S8♦	**5468.00**	SDA44S8♦	SDA34S8♦	**3387.00**

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ For NEMA Size 3–5 starters in oversized NEMA 1, 4 or 12 enclosures, contact factory for pricing and TAG number.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown to the right.
Note: Some control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on page 16-41.

Table 16.86: Class 8538 Fusible Disconnect Switch Type for Horizontal Mounting□

Ratings				NEMA 12/3R▲ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Fuse Clip Size (A)	With External Reset Type	Without External Reset Type	$ Price
200 (208)	2	1	30	SCA22S1★	SCA12S1★	**1754.00**
	7-1/2		60	SCA23S1★	SCA13S1★	**1781.00**
230 (240)	2	1	30	SCA22S1★	SCA12S1★	**1754.00**
	7-1/2		60	SCA23S1★	SCA13S1★	**1781.00**
460 (480)	10	1	30	SCA24S1★	SCA14S1★	**1781.00**
575 (600)	10	1	30	SCA24S1★	SCA14S1★	**1781.00**

★ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection Table 16.87.

Table 16.87: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24△▼	—	V01	No Charge
120△	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

▼ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8538SBG1158V01S).
△ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S,** supply motor voltage when ordering (i.e., order as 8538SCG1158V02S).
□ Not included in Laser™ Delivery program.
Note: For voltage codes used with control transformers, see page 16-101.

For How to Order Information, see page 16-13.

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Electronic Motor Circuit Protector (MCP)
3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 00–6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.88: Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relay

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)▲		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Hp Range Poly-phase	NEMA Size	Circuit Breaker (See Page 7-32 for Breaker Adjustment Range)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
200 (208)	1/4–3	0	HLL36030M71	SBG43♦	**1814.00**	SBW43♦	**3182.00**	\SBW53♦	**3653.00**	SBA53♦	SBA43♦	**2156.00**
	1/4–5 7-1/2	1	HLL36030M71 HLL36050M72	SCG44♦ SCG45♦	**1886.00**	SCW44♦ SCW45♦	**3252.00**	SCW54♦ SCW55♦	**3738.00**	SCA54♦ SCA55♦	SCA44♦ SCA45♦	**2228.00**
	1-1/2–5 7-1/2–10	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**2669.00**	SDW42♦ SDW43♦	**4778.00**	SDW52♦ SDW53♦	**5255.00**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**3153.00**
	15–25	3	HLL36100M73	SEG42♦	**3879.00**	SEW42♦	**7554.00**	SEW52♦	**8310.00**	SEA52♦	SEA42♦	**4505.00**
	30–40	4	JLL36250M75	SFG44♦	**8508.00**	SFW44♦	**13208.00**	SFW54♦	**14534.00**	SFA54♦	SFA44♦	**10245.00**
	50–60 70	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**19724.00**	SGW44♦ SGW45♦	**31716.00**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**22859.00**
	100 125–150	6	LJL36400M36 LJL36600M42	SHG43♦ SHG45♦	**42825.00**	SHW43♦ SHW45♦	**49946.00**	— —	—	SHA53♦ SHA55♦	SHA43♦ SHA45♦	**46670.00**
230 (240)	1/4–3	0	HLL36030M71	SBG43♦	**1814.00**	SBW43♦	**3182.00**	SBW53♦	**3653.00**	SBA53♦	SBA43♦	**2156.00**
	1/4–7-1/2	1	HLL36030M71	SCG44♦	**1886.00**	SCW44♦	**3182.00**	SCW54♦	**3738.00**	SCA54♦	SCA44♦	**2228.00**
	1-1/2–7-1/2 10 15	2	HLL36030M71 HLL36050M72 HLL36100M73	SDG42♦ SDG43♦ SDG44♦	**2669.00**	SDW42♦ SDW43♦ SDW44♦	**4778.00**	SDW52♦ SDW53♦ SDW54♦	**5255.00**	SDA52♦ SDA53♦ SDA54♦	SDA42♦ SDA43♦ SDA44♦	**3153.00**
	15–30	3	HLL36100M73	SEG42♦	**3879.00**	SEW42♦	**7554.00**	SEW52♦	**8310.00**	SEA52♦	SEA42♦	**4505.00**
	40–50	4	JLL36250M75	SFG44♦	**8508.00**	SFW44♦	**13208.00**	SFW54♦	**14534.00**	SFA54♦	SFA44♦	**10245.00**
	60 75–100	5	JLL36250M75 LJL36400M36	SGG44♦ SGG46♦	**19724.00**	SGW44♦ SGW45♦	**31716.00**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**22859.00**
	125–150 200	6	LJL36600M42 PLL34080M68	SHG45♦ SHG46♦	**42825.00**	SHW45♦ SHW46♦	**49946.00**	— —	—	SHA55♦ SHA56♦	SHA45♦ SHA46♦	**46670.00**
	250–300	7	PLL36100M69	SJA43♦	**57837.00**	SJW43♦	**64958.00**	—	—	SJA53♦	—	**61682.00**

▲ NEMA Size 6 and 7 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.89: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8539SBG41V01S).
▼ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S,** please supply motor voltage when ordering (i.e., order as 8539SCG41V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

Dimensions . . . . . page 16-42
Factory Modifications (Forms). . . . . page 16-100
Replacement Parts (Class 9998) . . . . . page 16-105
Type S Accessories (Class 9999). . . . . page 16-108

NEMA Type 1 Enclosure with 30 mm Operators

Refer to page 16-31 for details.

For How to Order Information, see page 16-13.

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Electronic Motor Circuit Protector (MCP)
3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 00–6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.90: Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relays

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)▲		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Hp Range Poly-phase	NEMA Size	Circuit Breaker (See Page 7-32 for Breaker Adjustment Range)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
460 (480)	1/4–5	0	HLL36030M71	SBG43♦	**1814.**	SBW43♦	**3182.**	SBW53♦	**3653.**	SBA53♦	SBA43♦	**2156.**
	1/4–10	1	HLL36030M71	SCG44♦	**1886.**	SCW44♦	**3252.**	SCW54♦	**3738.**	SCA54♦	SCA44♦	**2228.**
	5–15 20–25	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**2669.**	SDW42♦ SDW43♦	**4778.**	SDW52♦ SDW53♦	**5255.**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**3153.**
	20–25 30–50	3	HLL36050M72 HLL36100M73	SEG41♦ SEG42♦	**3879.**	SEW41♦ SEW42♦	**7554.**	SEW51♦ SEW52♦	**8310.**	SEA51♦ SEA52♦	SEA41♦ SEA42♦	**4505.**
	60–100	4	JLL36250M75	SFG44♦	**8508.**	SFW44♦	**13208.**	SFW54♦	**14534.**	SFA54♦	SFA44♦	**10245.**
	125 150–200	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**19724.**	SGW44♦ SGW45♦	**31716.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**22859.**
	250–350 400	6	LJL36600M42 PLL34080M68	SHG45♦ SHG46♦	**42825.**	SHW45♦ SHW46♦	**49946.**	— —	—	SHA55♦ SHA56♦	SHA45♦ SHA46♦	**46670.**
	500 600	7	PLL36080M68 PLL36100M69	SJA42♦ SJA43♦	**57837.**	SJW42♦ SJW43♦	**64958.**	— —	—	SJA52♦ SJA53♦	— —	**61682.**
575 (600)	1/4–5	0	HLL36030M71	SBG43♦	**1814.**	SBW43♦	**3182.**	SBW53♦	**3653.**	SBA53♦	SBA43♦	**2156.**
	1/4–10	1	HLL36030M71	SCG44♦	**1886.**	SCW44♦	**3252.**	SCW54♦	**3738.**	SCA54♦	SCA44♦	**2228.**
	5–20 25	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**2669.**	SDW42♦ SDW43♦	**4778.**	SDW52♦ SDW53♦	**5255.**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**3153.**
	25–30 40–50	3	HLL36050M72 HLL36100M73	SEG41♦ SEG42♦	**3879.**	SEW41♦ SEW42♦	**7554.**	SEW51♦ SEW52♦	**8310.**	SEA51♦ SEA52♦	SEA41♦ SEA42♦	**4505.**
	60–100	4	JLL36250M75	SFG44♦	**8508.**	SFW44♦	**13208.**	SFW54♦	**14534.**	SFA54♦	SFA44♦	**10245.**
	125–150 200	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**19724.**	SGW44♦ SGW45♦	**31716.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**22859.**
	250 300–400	6	LJL36400M36 LJL36600M42	SHG43♦ SHG45♦	**42825.**	SHW43♦ SHW45♦	**49946.**	— —	—	SHA53♦ SHA55♦	SHA43♦ SHA45♦	**46670.**
	500–600	7	PLL34100M69	SJG41♦	**57837.**	SJW41♦	**64958.**	—	—	SJA51♦	—	**61682.**

▲ NEMA Size 6 and 7 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.91: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8539SBG41V01S).
▼ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S,** please supply motor voltage when ordering (i.e., order as 8539SCG41V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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3 or 5 Days Laser Delivery

Refer to page 16-31 for details.

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Electronic Motor Circuit Protectors (MCP) in Oversized Enclosure
3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.92: Electronic Motor Circuit Protectors (MCP) in Oversized Enclosure, NEMA Size 0–2■△ Full Voltage Type, Non-Reversing with Melting Alloy Overload Relays

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 12/3R▲ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Hp Range Poly-phase	NEMA Size	Circuit Breaker (See Page 7-32 for Breaker Adjustment Range)	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
200 (208)	1/4–3	0	HLL36030M71	SBG43S8♦	**2169.00**	SBW43S8♦	**4248.00**	SBA53S8♦	SBA43S8♦	**2798.00**
	1/4–5 71/2	1	HLL36030M71 HLL36050M72	SCG44S8♦ SCG45S8♦	**2241.00**	SCW44S8♦ SCW45S8♦	**4320.00**	SCA54S8♦ SCA55S8♦	SCA44S8♦ SCA45S8♦	**2867.00**
	1-1/2–5 71/2–10	2	HLL36030M71 HLL36050M72	SDG42S8♦ SDG43S8♦	**3024.00**	SDW42S8♦ SDW43S8♦	**5844.00**	SDA52S8♦ SDA53S8♦	SDA42S8♦ SDA43S8♦	**3794.00**
230 (240)	1/4–3	0	HLL36030M71	SBG43S8♦	**2169.00**	SBW43S8♦	**4248.00**	SBA53S8♦	SBA43S8♦	**2798.00**
	1/4–7-1/2	1	HLL36030M71	SCG44S8♦	**2241.00**	SCW44S8♦	**4320.00**	SCA54S8♦	SCA44S8♦	**3867.00**
	1-1/2–7-1/2 10 15	2	HLL36030M71 HLL36050M72 HLL36100M73	SDG42S8♦ SDG43S8♦ SDG44S8♦	**3024.00**	SDW42S8♦ SDW43S8♦ SDW44S8♦	**5844.00**	SDA52S8♦ SDA53S8♦ SDA54S8♦	SDA42S8♦ SDA43S8♦ SDA44S8♦	**3794.00**
460 (480)	1/4–5	0	HLL36030M71	SBG43S8♦	**2169.00**	SBW43S8♦	**4248.00**	SBA53S8♦	SBA43S8♦	**2798.00**
	1/4–10	1	HLL36030M71	SCG44S8♦	**2241.00**	SCW44S8♦	**4320.00**	SCA54S8♦	SCA44S8♦	**2867.00**
	5–15 20–25	2	HLL36030M71 HLL36050M72	SDG42S8♦ SDG43S8♦	**3024.00**	SDW42S8♦ SDW43S8♦	**5855.00**	SDA52S8♦ SDA53S8♦	SDA42S8♦ SDA43S8♦	**3794.00**
575 (600)	1/4–5	0	HLL36060M71	SBG43S8♦	**2169.00**	SBW43S8♦	**4248.00**	SBA53S8♦	SBA43S8♦	**2798.00**
	1/4–10	1	HLL36030M71	SCG44S8♦	**2241.00**	SCW44S8♦	**4320.00**	SCA54S8♦	SCA44S8♦	**3867.00**
	5–20 25	2	HLL36030M71 HLL36050M72	SDG42S8♦ SDG43S8♦	**3024.00**	SDW42S8♦ SDW43S8♦	**5844.00**	SDA52S8♦ SDA53S8♦	SDA42S8♦ SDA43S8♦	**3794.00**

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ For NEMA Size 3–5 starters in oversized NEMA 1, 4 or 12 enclosures, contact factory for pricing and TAG number.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.93: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8539SBG41S8V01S).
▼ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S,** please supply motor voltage when ordering (i.e., order as 8539SCG41S8V02S).
△ Not included in Laser™ Delivery program.
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 0-6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.94: Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relays

Ratings					NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)▲		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Circuit Breaker		Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
			Type	Ampere Rating							Type	Type	
200 (208)	2 3	0	HLL36015 HLL36020	15 20	SBG1♦ SBG3♦	1400.	SBW1♦ SBW3♦	2768.	SBW11♦ SBW13♦	3182.	SBA11♦ SBA13♦	SBA1♦ SBA3♦	1742.
	5 7-1/2	1	HLL36035 HLL36050	35 50	SCG5♦ SCG2♦	1472.	SCW5♦ SCW2♦	2840.	SCW15♦ SCW12♦	3267.	SCA15♦ SCA12♦	SCA5♦ SCA2♦	1814.
	10	2	HLL36060	60	SDG1♦	2255.	SDW1♦	4364.	SDW11♦	4805.	SDA11♦	SDA1♦	2739.
	15 20 25	3	HLL36100 HLL36125 HLL36150	100 125 150	SEG3♦ SEG1♦ SEG5♦	3879.	SEW3♦ SEW1♦ SEW5♦	7554.	SEW13♦ SEW11♦ SEW15♦	8310.	SEA13♦ SEA11♦ SEA15♦	SEA3♦ SEA1♦ SEA5♦	4505.
	30 40	4	JLL36200 JLL36250	200 250	SFG3♦ SFG4♦	8508.	SFW3♦ SFW4♦	13208.	SFW13♦ SFW14♦	14534.	SFA13♦ SFA14♦	SFA3♦ SFA4♦	10245.
	50 60–75	5	JLL36250 LLL36400E20	250 400	SGG6♦ SGG4♦	19724.	SGW6♦ SGW4♦	31716.	— —	—	SGA16♦ SGA14♦	SGA6♦ SGA4♦	22859.
	100–125 150	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	42825.	SHW4♦ SHW5♦	49946.	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	46670.
230 (240)	2 3	0	HLL36015 HLL36020	15 20	SBG1♦ SBG3♦	1400.	SBW1♦ SBW3♦	2768.	SBW11♦ SBW13♦	3182.	SBA11♦ SBA13♦	SBA1♦ SBA3♦	1742.
	5 7-1/2	1	HLL36035 HLL36045	35 45	SCG5♦ SCG6♦	1472.	SCW5♦ SCW6♦	2840.	SCW15♦ SCW16♦	3267.	SCA15♦ SCA16♦	SCA1♦ SCA6♦	1814.
	10 15	2	HLL36060 HLL36090	60 90	SDG1♦ SDG7♦	2255.	SDW1♦ SDW7♦	4364.	SDW11♦ SDW17♦	4805.	SDA11♦ SDA17♦	SDA1♦ SDA7♦	2739.
	20 25–30	3	HLL36100 HLL36150	100 150	SEG3♦ SEG5♦	3879.	SEW3♦ SEW5♦	7554.	SEW13♦ SEW15♦	8310.	SEA13♦ SEA15♦	SEA3♦ SEA5♦	4505.
	40 50	4	JLL36225 JLL36250	225 250	SFG1♦ SFG4♦	8508.	SFW1♦ SFW4♦	13208.	SFW11♦ SFW14♦	14534.	SFA11♦ SFA14♦	SFA1♦ SFA4♦	10245.
	60 75 100	5	JLL36250 LLL36400E20 LLL36600E20	250 400 600	SGG6♦ SGG4♦ SGG2♦	19724.	SGW6♦ SGW4♦ SGW2♦	31716.	— — —	—	SGA16♦ SGA14♦ SGA12♦	SGA6♦ SGA4♦ SGA2♦	22859.
	125 150–200	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	42825.	SHW4♦ SHW5♦	49946.	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	46670.
	250–300	7	PKL36100	1200	SJG3♦	57837.	SJW3♦	64958.	—	—	SJA13♦	—	61682.

▲ NEMA Size 6 & 7 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed below.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

Table 16.95: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8539SBG1V01S).
▼ These voltage codes must include **Form S** (supplied at no charge). When specifying **Form S,** please supply motor voltage when ordering (i.e., order as 8539SCG5V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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For How to Order Information, see page 16-13.

3 or 5 Days
Laser Delivery

Refer to page 16-31 for details.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Devices require 3 thermal units (Sizes 00-6). Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.96: Line Voltage Type, Non-Reversing, with Melting Alloy Overload Relays

Ratings					NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)▲		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Circuit Breaker		Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
			Type	Ampere Rating							Type	Type	
460 (480)	5	0	HLL36015	15	SBG1♦	**1814.**	SBW1♦	**3182.**	SBW11♦	**3653.**	SBA11♦	SBA1♦	**2156.**
	7-1/2 10	1	HLL36025 HLL36030	25 30	SCG3♦ SCG7♦	**1886.**	SCW3♦ SCW7♦	**3252.**	SCW13♦ SCW17♦	**3738.**	SCA13♦ SCA17♦	SCA3♦ SCA7♦	**2228.**
	15 20 25	2	HLL36045 HLL36060 HLL36070	45 60 70	SDG3♦ SDG1♦ SDG5♦	**2669.**	SDW3♦ SDW1♦ SDW5♦	**4778.**	SDW13♦ SDW11♦ SDW15♦	**5255.**	SDA13♦ SDA11♦ SDA15♦	SDA3♦ SDA1♦ SDA5♦	**3153.**
	30 40 50	3	HLL36080 HLL36100 HLL36150	80 100 150	SEG7♦ SEG3♦ SEG5♦	**3879.**	SEW7♦ SEW3♦ SEW5♦	**7554.**	SEW17♦ SEW13♦ SEW15♦	**8310.**	SEA17♦ SEA13♦ SEA15♦	SEA7♦ SEA3♦ SEA5♦	**4505.**
	60 75 100	4	JLL36150 JLL36200 JLL36250	150 200 250	SFG5♦ SFG3♦ SFG4♦	**8508.**	SFW5♦ SFW3♦ SFW4♦	**13208.**	SFW15♦ SFW13♦ SFW14♦	**14534.**	SFA15♦ SFA13♦ SFA14♦	SFA5♦ SFA3♦ SFA4♦	**10245.**
	125–150 200	5	LLL36400E20 LLL36600E20	400 600	SGG4♦ SGG2♦	**19724.**	SGW4♦ SGW2♦	**31716.**	— —	—	SGA14♦ SGA12♦	SGA4♦ SGA2♦	**22859.**
	250 300–400	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	**42825.**	SHW4♦ SHW5♦	**49946.**	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	**46670.**
	500–600	7	PLL36120	1200	SJG3♦	**57837.**	SJW3♦	**64958.**	—	—	SJA13♦	—	**61682.**
575 (600)	5	0	HLL36015	15	SBG1♦	**1814.**	SBW1♦	**3182.**	SBW11♦	**3653.**	SBA11♦	SBA1♦	**2156.**
	7-1/2 10	1	HLL36020 HLL36025	20 25	SCG8♦ SCG3♦	**1886.**	SCW8♦ SCW3♦	**3252.**	SCW18♦ SCW13♦	**3738.**	SCA18♦ SCA13♦	SCA8♦ SCA3♦	**2228.**
	15 20 25	2	HLL36035 HLL36045 HLL36060	35 45 60	SDG8♦ SDG3♦ SDG1♦	**2669.**	SDW8♦ SDW3♦ SDW1♦	**4778.**	SDW18♦ SDW13♦ SDW11♦	**5255.**	SDA18♦ SDA13♦ SDA11♦	SDA8♦ SDA3♦ SDA1♦	**3153.**
	30 40 50	3	HLL36070 HLL36090 HLL36100	70 90 100	SEG4♦ SEG6♦ SEG3♦	**3879.**	SEW4♦ SEW6♦ SEW3♦	**7554.**	SEW14♦ SEW16♦ SEW13♦	**8310.**	SEA14♦ SEA16♦ SEA13♦	SEA4♦ SEA6♦ SEA3♦	**4505.**
	60–75 100	4	JLL36150 JLL36250	150 250	SFG5♦ SFG4♦	**8508.**	SFW5♦ SFW4♦	**13208.**	SFW15♦ SFW14♦	**14534.**	SFA15♦ SFA14♦	SFA5♦ SFA4♦	**10245.**
	125–150 200	5	JLL36250 LLL36400E20	250 400	SGG6♦ SGG4♦	**19724.**	SGW6♦ SGW4♦	**31716.**	— —	—	SGA16♦ SGA14♦	SGA6♦ SGA4♦	**22859.**
	250–350 400	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	**42825.**	SHW4♦ SHW5♦	**49946.**	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	**46670.**
	500–600	7	PKL36100	1200	SJG2♦	**57837.**	SJW2♦	**64958.**	—	—	SJA12♦	—	**61682.**

Table 16.97: Thermal Magnetic Circuit Breaker Type, Single Phase★▼

Motor Voltage	Max. Hp	Coil Voltage	NEMA Size	Poles	Circuit Breaker (Type)	Ampere Rating	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–2)		NEMA 4 & 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
													With External Reset	Without External Reset	$ Price
							Type	$ Price	Type	$ Price	Type	$ Price	Type	Type	
120	1 2 3	120	0 1 2	2	HLL26030 HLL26050 HLL26080	30 50 80	SBG72V02 SCG72V02 SDG71V02	**1400.00 1474.00 2255.00**	SBW72V02 SCW72V02 SDW71V02	**2768.00 2840.00 4364.00**	SBW75V02 SCW75V02 SDW74V02	**3182.00 3267.00 4805.00**	SBA75V02 SCA75V02 SDA74V02	SBA72V02 SCA72V02 SDA71V02	**1742.00 1814.00 2739.00**
240	2 3 7.5	240	0 1 2	2	HLL26025 HLL26035 HLL26080	25 35 80	SBG71V03 SCG71V03 SDG71V03	**1400.00 1474.00 2255.00**	SBW71V03 SCW71V03 SDW71V03	**2768.00 2840.00 4364.00**	SBW74V03 SCW74V03 SDW74V03	**3182.00 3267.00 4805.00**	SBA74V03 SCA74V03 SDA74V03	SBA71V03 SCA71V03 SDA71V03	**1742.00 1814.00 2739.00**

▲ NEMA Size 6 and 7 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed on page 16-38.
★ Single phase units require one thermal unit and are not available with Form Hxx—Solid State Overload Relays.
▼ Not included in Laser™ Delivery program.
Note: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on page 16-41.

For How to Order Information, see page 16-13.

Refer to page 16-31 for details.

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Application Data

Table 16.98: Class 8539—UL Listed Short Circuit Ratings

Motor Circuit Protector Type			
NEMA Size	Enclosure	AIC at 480 Vac (RMS)	AIC at 600 Vac (RMS)
0, 1	Standard▲	100,000	35,000
2 thru 5	Standard▲	100,000	50,000
6	Standard▲	65,000	18,000
7	Standard▲	65,000	30,000

▲ Standard enclosure includes: NEMAs 1, 4 & 4X stainless and 12/3R.

Table 16.99: Electronic Motor Circuit Protector (MCP) Selection by HP Ratings of Induction-type Squirrel-Cage Motors

3Ø 60 Hz Voltages				Full-Load (A)	Suffix
200 Vac	230 Vac	460 Vac	575 Vac		
.5–5	.5–7.5	.75–15	1–20	1.5–25	M71
5–10	5–15	10–30	15–40	14–42	M72
10–25	15–30	25–60	30–75	30–80	M73
20–40	25–50	50–100	60–125	58–130	M74
40–60	50–75	100–150	125–200	114–217	M75

Note: The MCP adjustable trip range is determined by the suffix of the circuit breaker catalog number. Table 16.99 indicates the trip range which corresponds to a given suffix number. The MCP Motor Circuit Protector should be adjusted to a level just above Locked-Rotor Current of the motor. This setting will provide optimum overcurrent protection for the motor. For more information on MCP instantaneous trip circuit breakers, refer to the MCP circuit breaker section of this Catalog.

Table 16.100: UL Listed Short Circuit Ratings

Thermal Magnetic Circuit Breaker Type			
NEMA Size	Enclosure	AIC at 480 Vac (RMS)	AIC at 600 Vac (RMS)
0, 1	Standard■	100,000	35,000
2 thru 5	Standard■	100,000	50,000
6	Standard■	65,000	18,000
7	Standard■	65,000	30,000

■ Standard enclosure includes: NEMAs 1, 4 & 4X stainless and 12/3R.

Table 16.101: Class 8538—UL Listed Short Circuit Ratings

NEMA Size	NEMA Fuse Class	Enclosure	Available Amperes RMS Symmetrical
0–3	Class H or K	Standard♦	5,000
0–3	Class R/J	Standard♦	100,000
0–2	Class H or K	Oversize	5,000
0–2	Class R/J	Standard	100,000
4–5	Class H or K	Standard♦	10,000
4–5	Class R/J	Standard♦	100,000
6	Class H or K	Standard♦	18,000
6	Class R/J	Standard♦	100,000

♦ Standard enclosure includes non-oversize NEMAs 1, 4 & 4X Stainless, and 12.

Table 16.102: Table 2: Motor Code Letter Table

Horsepower	Motor Code Letters
1/2 or less	A-L
3/4–1-1/2	A-K
2–3	A-J
5–25	A-H
30–125	A-G
150 or more	A-F

Note: The combination starter selection tables on pages 16-36–16-37 are suitable for motors with Locked-Rotor Current letters per NEC Table 430-7(b) as listed in Table 16.102. For other motors a special thermal magnetic circuit breaker with adjustable magnetic trip settings for the specific motor is required. When ordering for these special applications, specify the motor horsepower, voltage, frequency, full load current and code letter (or locked rotor current) to assure proper protection.

Table 16.103: Terminals

NEMA Size	Type	Line Terminals on Disconnect			Power Terminals On Magnetic Starter			Control Terminals On Magnetic Starter		
		Type of Lug	Wire Range		Type of Lug	Wire Range	Wires Per Terminal	Type of Lug	Wire Range	Wires Per Terminal
			Switch	Circuit Breaker						
0 & 1	SB & SC	Box Lug	#14–1/0 Cu/Al	(1) 14-3/0 Al or Cu	Pressure Wire	#14–#8 Cu	1 or 2	Pressure Wire	#16–#12 Cu	2
2	SD	Box Lug	#14–1/0 Cu/Al	(1) 14-3/0 Al or Cu	Box Lug	#14–#4 Cu	1	Pressure Wire	#16–#12 Cu	2
3	SE	Box Lug	#14–1/0 Cu/Al	(1) 14-3/0 Al or Cu	Box Lug	#14–#0 Cu	1	Pressure Wire	#16–#12 Cu	2
4	SF	Box Lug	#6–300 MCM Cu/Al	(1) 4-4/0 Al or Cu (JLL Breaker 150 A - 175 A) (1) 3/0 - 350 MCM Al or Cu (JLL Breaker 200 A - 250 A)	Box Lug	#8–250 MCM Cu	1	Pressure Wire	#16–#12 Cu	2
5	SG	Box Lug	One #4–500 MCM Cu	(1) 2 - 500 MCM Al or (1) 2 - 350 MCM Cu (DJL36400 Breaker) (2) 2/0 - 500 MCM Al or (2) 2/0 - 350 MCM Cu (DLL36600 Breaker) (1) 3/0 - 350 MCM Al or (1) 3/0 - 350 MCM Cu (JLL36250 Breaker)	Box Lug	#4–500 MCM Cu	1	Pressure Wire	#16–#12 Cu	2
6	SH	Box Lug	—	(2) 2/0 - 500 MCM Al or (2) 2/0 - 350 MCM Cu (DJL36600 Breaker, DLL Breaker) (1) 2 - 600 MCM Al or (1) 2 - 350 MCM Cu (DJL36400 Breaker) (3) 3/0 - 500 MCM Al or (3) 3/0 - 350 MCM Cu (MJL36800 Breaker) (3) 3/0 - 500 MCM Al or (3) 3/0 - 350 MCM Cu (PLL34080M68 Breaker)	Parallel Groove	250–500 MCM Cu★	1 or 2	Pressure Wire	#16–#12 Cu▼	2
7	SJ	Box Lug	—	(4) 3/0 - 300 MCM Al or CU (PJL, PKL, PLL Breaker)	Parallel Groove	250–500 MCM Cu	1–4	Pressure Wire	#16–#12 Cu	2

★ Order Class 9999 Type SCU6 parts kit to convert power terminals to accept sizes 2/0–300 MCM wire.
▼ Terminal block range limited to #16–#14.

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Accessories

Interlocks and Control Transformers

A one or two pole electrical interlock can be added to the disconnect switch or circuit breaker. Thus, if a separate control circuit is used, the magnetic starter can be de-energized when the disconnect is switched to the OFF position. See Table 16.104 for proper interlock selection. For electrical ratings of disconnect and circuit breaker interlocks, see Table 16.105 below.

An electrical interlock may also be factory installed in either a disconnect switch or circuit breaker combination starter. Specify **Form Y74** for single pole, or **Form Y75** for two pole interlocks. For pricing see factory modifications (Forms).

Table 16.104: Disconnect Switch and Breaker Interlocks

Class	Type	SPDT (Y74)		DPDT (Y75)	
		Class 9999 Type	$ Price	Class 9999 Type	$ Price
8538	SB▲, SC▲, SD▲ (Series B)	R6	116.00	R7	221.00
8538 & 8738	SD (Series C)	R43	116.00	R44	221.00
	SB, SC (Series C)	R45	107.00	R46	207.00
	SE, SF (Series A)	R8	131.00	R9	243.00
	SE (Series B & C)	R41	131.00	R42	243.00
	SF (Series B & C)	R39	135.00	R40	243.00
	SG	R35	435.00	R36	521.00
8539, 8739	SB, SC, SD, SE, SF, SG (Series K)	R26	131.00	R27	243.00
8538	SBA, SCA, SBG, SCG (Series D and above)	TC11	120.00	TC21	239.00
8538	SBAS8, SCAS8, SBGS8, SCGS8 (Series D and above)	TC10	120.00	TC20	239.00
8738	SBAS8, SCAS8, SBGS8, SCGS8 (Series E and above)	TC10	120.00	TC20	239.00
8738	SBA, SCA, SBG, SCG (Series E and above)	TC11	120.00	TC21	239.00
8538	SDA, SDA▲, SDG, SDG▲ (Series D and above)	TC10	120.00	TC20	239.00
8738	SDA, SDG (Series E and above)	TC10	120.00	TC20	239.00
8538, 8738	SEA, SEG (Series D and above)	TC10	120.00	TC20	239.00

▲ Class 8538 type numbers ending in suffix "S8".

Table 16.105: Disconnect Switch and Breaker Interlock Electrical Ratings

Class 9999 Type R6, 8, 26, 35, 39, 41, 43, 45, TC10, & TC11				Class 9999 Type R7, 9, 27, 36, 40, 42, 44, 46 & TC 20, 21					
AC—50 or 60 Hz				AC—50 or 60 Hz					
Volts	Maximum Current			Volts	Maximum Current				
	Make	Break	Continuous Carrying Current (A)		Make		Break		Continuous Carrying Current (A)
	(A)	(A)			(A)	VA	(A)	VA	
120	40	15	15	120	30	3450	3	345	10
240	20	10	15	240	15	3450	1.5	345	10
480	10	6	15	480	7.5	3450	.75	345	10
600	8	5	15	600	6	3450	.6	345	10

Table 16.106: Control Transformer Selection

NEMA Size	Starter Type	Standard★ Capacity (Form F4T)	50 VA★ Additional Capacity (Form F4T10)	100 VA★ Additional Capacity (Form F4T11)	200 VA★ Additional Capacity (Form F4T12)
		Class 9070 Type	Class 9070 Type	Class 9070 Type	Class 9070 Type
0 & 1	SB & SC	TF100	TF150	TF200	TF300■
2	SD	TF100	TF150	TF200	TF300♦
3	SE	TF150	TF200	TF300	TF500
4	SF	TF300	TF300	TF500	T500
5	SG	TF100 and 8501XO20	TF100 and 8501XO20	TF150 and 8501XO20	TF300 and 8501XO20
6	SH	EO3S2 is standard	N/A	EO3FS2 and T100	EO3S2 and TF200
7	SJ	EO19S2 is standard	N/A	EO19S2 and TF100	EO3S2 and TF200

Note: 9070TF transformers are now standard in Series K combination starters.

■ Requires oversized enclosure. (Size 2 reversing enclosure.)

♦ Available in standard enclosure with Mag-Gard™ circuit breaker and non-fusible disconnect switch. Requires oversized enclosure with thermal-magnetic circuit breakers and fusible disconnect switches. (Size 2 reversing enclosure.)

★ Complete the contactor or starter Class and Type with Voltage Code, see page 16-101.

Internal Auxiliary Switch—Circuit breakers can be supplied with a factory installed auxiliary switch for remote indication of an open and/or tripped or a closed breaker. One (specify **Form Y741**) or two (specify **Form Y751**) auxiliary switches can be supplied. The switches are supplied with normally open and normally closed circuits with a common connection. Contacts must be used on the same polarity and are rated 15 A at 240 Vac. The auxiliary switches are located internally and are furnished with 19-20 inch long leads.

Alarm Switch—The alarm switch only operates when the breaker is tripped. It is used to actuate bell alarms and warning lights. The alarm switch is factory installed only (specify **Form Y742**) and consists of a single pole single throw switch which is normally open except when the breaker is tripped. The contacts are rated 4 A at 240 Vac. This switch is located in the breaker and is supplied with 19-20 inch long leads.

Transformer Selection—Space and drilling are provided in all disconnect switch and circuit breaker combination starters in NEMA 1, 4 & 4X stainless and polyester, 12 and 7 & 9 bolted enclosures for the field addition (or factory installation) of a Class 9070 control circuit transformer and Class 9999 Type SFR4 fuse holder. This kit can be either panel mounted or side mounted on the Type S starter. For standard control transformer selection in combination starters, see Table 16.106. Consult field office for transformer additions to NEMA 7 & 9 SPIN TOP™ enclosures. For secondary fuse holder order 9080PF1.

Fuse Block Mounting Brackets—The standard capacity transformer, Class 9070 Type T100, for the Size 0 and 1 starters mounts to the right of the magnetic starter.

Standards—Most combination starters and forms are UL Listed in file E152395, Category NKJH, and CSA File CR 584.

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Approximate Dimensions

Table 16.107: NEMA 1 Enclosure—Figure 1

NEMA Size	Class	Type	Dimensions in Inches▲																Top & Bottom		Sides	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X	Y	
0–1	8538	SBG SCG	9-1/2	22-1/2	8-11/32	6-3/8	20-1/2	14-21/32	1-13/16	1-11/16	3	2-5/16	1-1/16	3-1/4	2-3/16	1-1/4	7/8	—	1/2–3/4	1/2–3/4	1/2	38
	8539	SBG SCG	9-1/2	22-1/2	9-27/32	6-3/8	20-1/2	14-21/32	1-13/16	1-11/16	3	2-5/16	1-1/16	3-1/4	2-3/16	1-1/4	7/8	—	1/2–3/4	1/2–3/4	1/2	38
2	8538 & 8539	SDG	10-1/2	26	9-19/32	7-3/8	24	16-29/32	2-1/8	2	4	2-5/16	1-1/16	3-1/4	2-3/16	1-1/4	7/8	—	1–1-1/4	1/2–3/4	1/2	54

Table 16.108: NEMA 1 Enclosure—Figure 2

NEMA Size	Class	Type	Dimensions in Inches▲																Top & Bottom		Sides	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X	Y	
3■	8538 & 8539	SEG	15-1/4	42	10-19/32	9-1/4	3	22-23/32	41	1/2	—	2-53/64	3-17/32	5	2-11/16	5-3/8	1-9/32	29/32	1–1-1/4 2–2-1/2	1/2–3/4	1/2	102
4	8538	SFG	16	52-1/2	10-17/32	10	3	23-21/32	51-1/2	1/2	—	2-53/64	3-17/32	5	2-11/16	5-3/8	1-9/32	29/32	2-1/2	1/2–3/4	1/2	163
	8539	SFG	16	52-1/2	10-17/32	10	3	23-21/32	51-1/2	1/2	—	2-53/64	3-17/32	5	2-11/16	5-3/8	1-9/32	29/32	2-1/2	1/2–3/4	1/2	163
5	8538	SGG	20	78	15-1/2	12	4	29-13/32	77	1/2	—	3-33/64	4-39/64	9-1/4	3-3/16	—	—	—	1/2–3/4♦	3	—	450
	8539	SGG	20	66	13-23/32	12	4	29-13/32	65	1/2	—	3-33/64	4-39/64	5	3-3/16	—	—	—	1/2–3/4	3	—	420
6▼	8538 & 8539	SHG	36	90	21-1/32	—	—	41-3/8	—	—	—	—	—	5	—	—	—	—	—	—	—	—

Table 16.109: NEMA 12/3R Enclosure—Figure 3

NEMA Size	Class	Type	Dimensions in Inches★										Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	
0–1	8538	SBA SCA	9-1/2	8-11/32	24	3-1/4	2-1/2	4-1/2	23-1/2	19/32	4-7/16	14-5/16	40
	8539	SBA SCA	9-1/2	9-27/32	24	3-1/4	2-1/2	4-1/2	23-1/2	19/32	4-7/16	14-5/16	40
2	8538 & 8539	SDA	10-1/2	9-19/32	27-3/4	3-1/4	2-1/2	5-1/2	27	3/8	4-1/8	16-9/16	55
3■	8538 & 8539	SEA	15-1/4	10-19/32	42	5	3	9-1/4	41	1/2	5-1/16	22-5/16	111
4	8538	SFA	16	10-17/32	52-1/2	5	3	10	51-1/2	1/2	4-3/16	22-31/32	170
	8539	SFA	16	10-17/32	52-1/2	5	3	10	51-1/2	1/2	5-3/16	22-31/32	170
5	8538	SGA	20	13-23/32	78	9-1/4	4	12	77	1/2	7-25/32	29-13/32	—
	8539	SGA	20	13-23/32	66	5	4	12	65	1/2	7-25/32	27-13/32	440
6▼	8538 & 8539	SHA	36	17	90	5	—	—	—	—	—	47-3/8	—

Table 16.110: NEMA 4 and 4X Stainless Steel Enclosures—Figure 4

NEMA Size	Class	Type	Dimensions in Inches▲												Bottom	Top & Bot.	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	W	X	
0–1	8538	SBW SCW	9-1/2	8-11/32	24-1/16	3-1/4	2-1/2	4-1/2	23-1/2	19/32	3-1/32	1-5/16	2-5/16	14-9/32	3/4 Hub	1 Hub	40
	8539	SBW SCW	9-1/2	9-27/32	24-1/16	3-1/4	2-1/2	4-1/2	23-1/2	19/32	3-1/32	1-5/16	2-5/16	14-9/32	3/4 Hub	1 Hub	40
2	8538 & 8539	SDW	10-1/2	9-19/32	27-3/4	3-1/4	2-1/2	5-1/2	27	19/32	3	2	2-5/8	16-17/32	3/4 Hub	1-1/2 Hub	55
3■	8538 & 8539	SEW	15-1/4	10-19/32	42	5	3-3/16	10-1/4	40-1/2	19/32	3	2-9/16	3-3/16	223/16	3/4 Hub	2-1/2 Hub	111
4	8538	SFW	16	10-17/32	52-1/2	5	3-9/16	11	51	19/32	3	2-9/16	3-3/16	22-15/32	3/4 Hub	2-1/2 Hub	158
	8539	SFW	16	10-17/32	52-1/2	3-1/4	2-1/2	11	51	19/32	3	2-9/16	3-3/16	22-15/32	3/4 Hub	2-1/2 Hub	120
5	8538	SGW	20	13-23/32	78	9-1/4	4	12	77	9/16	4-1/2	3	3-1/2	29-13/32	3/4 Hub	3-1/2 Hub	—
	8539	SGW	20	13-23/32	66	5	4	12	65	9/16	4-1/2	3	3-1/2	29-13/32	3/4 Hub	3-1/2 Hub	440
6▼	8538 & 8539	SHW	36	17	90	—	—	—	—	—	—	—	—	47-7/8	—	—	—

▲ Dimensions also for **Form F4T** (standard control transformer). **Form F4T11** (100 VA extra capacity) and **Form F4T12** (200 VA extra capacity) could require the use of an oversized enclosure. Refer to control transformer selection table on page 16-41.

■ Class 8538 Size 3 devices with 200 A fuse clips use dimensions for Class 8538 Size 4.

♦ Left side only.

★ Dimensions include space for control circuit transformers.

▼ Size 6 enclosures are floor mounting.

Note: Illustrations may not represent the actual enclosure; they are intended for dimensional information only.

△ (4) .31 in (8 mm) dia. mtg. holes for sizes 0, 1, and 2, (4) .44 in (11 mm) dia. mtg. holes for sizes 3 and 4, (4) .56 in (14 mm) dia. mtg. holes located on external flanges for size 5.

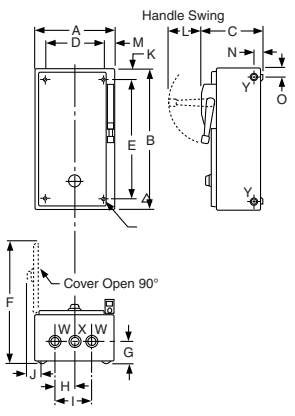

Figure 1
NEMA 1 Enclosure

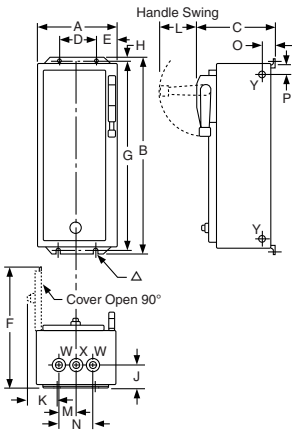

Figure 2
NEMA 1 Enclosure

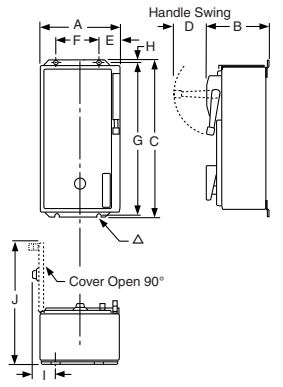

Figure 3
NEMA 12 Enclosure

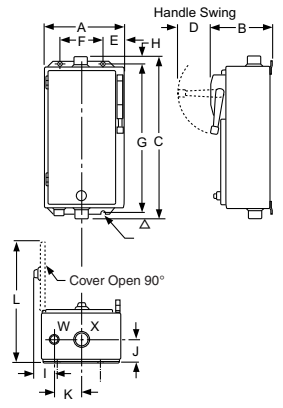

Figure 4
NEMAs 4 and 4X
Stainless Steel Enclosure

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Table 16.111: NEMA 4X Polyester Enclosure—Figure 1

NEMA Size	Class	Dimensions in Inches ▲					
		Type	A	B	C	E	F
0, 1	8538	SBW SCW SDW	13.72	11.4	26.94	6.25	25.75
0, 1	8539						
0, 1, & 2	8738, 8739	SBW SCW SDW	25.25	11.4	27.00	17.88	25.75
2	8538, 8539						
3–4	8538, 8738 8539, 8739	SEW SFW ■	26.31	11.4	33.50	18.50	32.25

▲ Dimensions also for **Form F4T** (standard control transformer) and **Form F4T10** (50 VA additional capacity). Other control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on page 16-41.

■ 8539 Size 4 only.

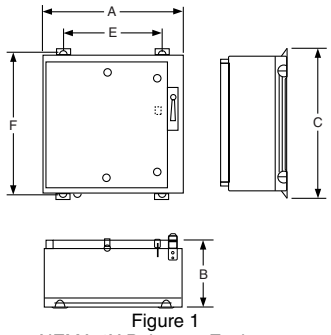

Figure 1
NEMA 4X Polyester Enclosure

Table 16.112: NEMA 1, 4, 4X Stainless, 12/3R Oversize Enclosure—Figure 2

NEMA Size	NEMA Type Encl.	Dimensions in Inches					
		Wide A	High B	Deep C	Handle L	Mounting	
						D	E
0–2	1	15	28-1/3	9-19/32	3-1/4	11-5/8	26-1/4
	4	15	30-1/32	9-19/32	3-1/4	10	29-3/4
	12	15	31	10-31/32	3-1/4	9	30-1/4

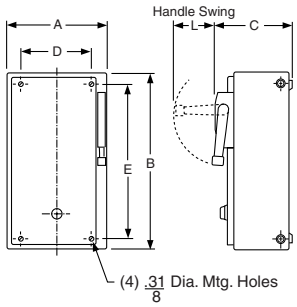

Figure 2
Class 8538 and 8539
in Oversize Enclosures —
NEMA 1, 4 & 4X Stainless and 12

Information on Hubs

Hubs are supplied with each NEMA Type 4X combination starter as shown in the table below.

Note that hubs are only installed in stainless steel enclosures; they are not installed in polyester enclosures.

Table 16.113: Hub Sizes

NEMA Size	Quantity	Hub Size
0 & 1	1 2	0.75" 1.00"
2	1 2	0.75" 1.50"
3 & 4	1 2	0.75" 2.50"

Note: Illustrations may not represent the actual enclosure; they are intended for dimensional information only.

Table 16.114: Conduit Sizes LOC A, B, C and D

NEMA Size	Standard
0—1	1-1/4
2	1-1/2
3—4	2-1/2
5	4

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NEMA 00, 0, 1
Reversing Contactor

Class 8702 Type S reversing magnetic contactors are used for starting, stopping, and reversing AC motors where overload protection is separately provided. Class 8702 reversing contactors consist of two Class 8502 contactors mechanically and electrically interlocked. Open type devices, Sizes 0–5, are available in either horizontal or vertical arrangements. Sizes 00, 6, and 7 are available as horizontal only. Enclosed devices, Size 00–7, use horizontally arranged components. Type S reversing contactors are designed for operation at 600 Vac, 50–60 Hz.

Table 16.115:

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type			NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure (Sizes 0–5)▲		NEMA 7 & 9 ♦ Hazardous Locations, Div. 1 & 2 Class I, Groups C & D Class II, Groups E, F & G				NEMA 12/3R★ Dusttight & Driptight Industrial Use Enclosure	
				Vertical Type	Horizontal Type	$ Price	Type	$ Price	Type	$ Price	Bolted Type Aluminum	$ Price	SPIN TOP™ Type	$ Price	Type	$ Price
00	9	200 230 460 575	1-1/2 1-1/2 2 2	— — — —	SAO4■	**855.00**	SAG4■	**917.00**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBO12■	SBO4■	**1026.00**	SBG4■	**1088.00**	SBW14■	**1742.00**	SBT49■	**3716.00**	SBR9■	**4649.00**	SBA4■	**1344.00**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO7■	SCO8■	**1169.00**	SCG8■	**1259.00**	SCW14■	**2241.00**	SCT49■	**3900.00**	SCR9■	**4877.00**	SCA4■	**1515.00**
2	45	200 230 460 575	10 15 25 25	SDO1■	SDO2■	**2222.00**	SDG2■	**2456.00**	SDW11■	**3936.00**	SDT43■	**6507.00**	SDR3■	**8139.00**	SDA1■	**2883.00**
3	90	200 230 460 575	25 30 50 50	SEO1■	SEO2■	**3689.00**	SEG2■	**4094.00**	SEW11■	**6287.00**	—	—	—	—	SEA1■	**5034.00**
4	135	200 230 460 575	40 50 100 100	SFO1■	SFO3■	**9201.00**	SFG3■	**9945.00**	SFW11■	**13820.00**	— — — —	—	— — — —	—	SFA1■	**11399.00**
5	270	200 230 460 575	75 100 200 200	SGO1■	SGO3■	**16592.00**	SGG3■	**20885.00**	SGW11■	**24017.00**	— — — —	—	— — — —	—	SGA1■	**24017.00**
6	540	200 230 460 575	150 200 400 400	— — — —	SHO1■	**41489.00**	SHG1■	**48614.00**	SHW1■	**55736.00**	— — — —	—	— — — —	—	SHA1■	**52461.00**
7	810	200 230 460 575	— 300 600 600	— — — —	SJO1■	**59372.00**	SJG1■	**66816.00**	SJW1■	**73619.00**	— — — —	—	— — — —	—	SJA1■	**70343.00**

▲ NEMA 4 and 4X stainless steel enclosures (sizes 0–5) have a brushed finish. Sizes 6 and 7 are painted sheet steel and are rated NEMA 4 only.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table below.
♦ NEMA 7 and 9 bolted are not UL listed.
★ NEMA 12 enclosure may be field modified for outdoor non-corrosive and non-service-entrance-rated application; see page 16-95 for more information.

Table 16.116: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼△	—	V01	No Charge
120△	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

▼ 24 V coils are not available on Sizes 4-7. On Sizes 00-3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8702SAO4V01S).
△ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8702SAO4V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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Table 16.117: 600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Type of Motor	Open Type			NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 7 & 9 ■ Hazardous Locations, Div. 1 & 2 Class I, Groups C & D Class II, Groups E, F & G				NEMA 12/3R♦ Dusttight & Driptight Industrial Use Enclosure	
					Vertical Type	Horizontal Type	$ Price	Type	$ Price	Type	$ Price	Bolted Type	$ Price	SPIN TOP™ Type	$ Price	Type	$ Price
2-Pole Single Phase																	
00	9	115 230	1/3 1	Single Phase 3-Wire	— —	SAO1▲	**827.**	SAG1▲	**887.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	115 230	1 2		SBO9▲	SBO1▲	**998.**	SBG1▲	**1061.**	SBW11▲	**1715.**	SBT46▲	**3686.**	SBR6▲	**4613.**	SBA1▲	**1314.**
1	27	115 230	2 3		SCO1▲	SCO2▲	**1139.**	SCG2▲	**1229.**	SCW11▲	**2142.**	SCT46▲	**3873.**	SCR6▲	**4841.**	SCA1▲	**1485.**
3-Pole Single Phase																	
00	9	115 230	1/3 1	4-Wire Rep.-Ind.	— —	SAO2▲	**855.**	SAG2▲	**917.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
		115 230	1/3 1	4-Wire Split Ph.	— —	SAO3▲	**855.**	SAG3▲	**917.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	115 230	1 2	4-Wire Rep.-Ind.	SBO10▲	SBO2▲	**1026.**	SBG2▲	**1088.**	SBW12▲	**1742.**	SBT47▲	**3716.**	SBR7▲	**4649.**	SBA2▲	**1344.**
		115 230	1 2	4-Wire Split Ph.	SBO11▲	SBO3▲	**1026.**	SBG3▲	**1088.**	SBW13▲	**1742.**	SBT48▲	**3716.**	SBR8▲	**4649.**	SBA3▲	**1344.**
1	27	115 230	2 3	4-Wire Rep.Ind.	SCO3▲	SCO4▲	**1169.**	SCG4▲	**1259.**	SCW12▲	**2169.**	SCT47▲	**3900.**	SCR7▲	**3227.**	SCA2▲	**1515.**
		115 230	2 3	4-Wire Split Ph.	SCO5▲	SCO6▲	**1169.**	SCG6▲	**1259.**	SCW13▲	**2169.**	SCT48▲	**3900.**	SCR8▲	**3227.**	SCA3▲	**1515.**
4-Pole Polyphase																	
0	18	200 230 460 575	3 3 5 5	2 Phase 4-Wire	SBO13▲	SBO5▲	**1310.**	SBG5▲	**1368.**	SBW15▲	**2028.**	Consult Schneider Electric CCC at (1-888-778-2733)		SBR10▲	**5040.**	SBA5▲	**1629.**
1	27	200 230 460 575	7-1/2 7-1/2 10 10		SCO9▲	SCO10▲	**1497.**	SCG10▲	**1557.**	SCW15▲	**2469.**			SCR10▲	**5297.**	SCA5▲	**1814.**
2	45	200 230 460 575	10 15 25 25		— — — —	SDO4▲	**2820.**	SDG4▲	**3054.**	SDW12▲	**4620.**			SDR4▲	**9071.**	SDA2▲	**3528.**
3	90	200 230 460 575	25 30 50 50		— — — —	SEO4▲	**4671.**	SEG4▲	**5103.**	SEW12▲	**7238.**	— — — —	—	— — — —	—	SEA2▲	**6017.**
4	135	200 230 460 575	40 50 100 100		— — — —	SFO4▲	**11879.**	SFG4▲	**12653.**	SFW12▲	**16556.**	— — — —	—	— — — —	—	SFA2▲	**14129.**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table on page 16-44.
■ NEMA 7 and 9 bolted are not UL listed.
♦ NEMA 12 enclosure may be field modified for outdoor non-corrosive and non-service-entrance-rated application; see page 16-95 for more information.

Table 16.118: Auxiliary Units—Class 8702, 8736 and 8810

The table below shows the maximum number of auxiliary units **(in addition to the holding circuit and interlocking contacts)** that can be added to either the forward or reverse contactor or starter.

NEMA Size (Type)	No. of Poles of Basic Contactor	Maximum number of auxiliary units on each contactor, forward or reverse. (In addition to internal holding circuit and interlocking contacts.)
00 (SA)	2 or 3	2 single circuit auxiliary contacts (N.O. or N.C.)
0, 1 and 2 (SB, SC and SD)	2 or 3	4 single circuit auxiliary contacts (N.O. or N.C.)★
	4	2 single circuit auxiliary contacts (N.O. or N.C.)
3, 4, 5, 6, and 7 (SE, SF, SG, SH, and SJ)	Any	2 single circuit auxiliary contacts (N.O. or N.C.)

★ When adding 4 external auxiliary contacts to one Size 0 or 1 contactor, remove one of the return springs.

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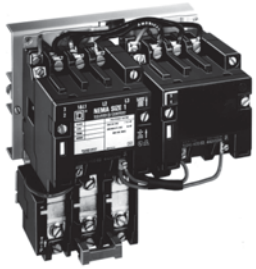


NEMA Sizes 00, 0, 1 Reversing Starter (Horizontal Type)

Class 8736 Type S reversing magnetic starters are used for full-voltage starting, stopping, and reversing AC squirrel cage motors. Class 8736 starters consist of one Class 8502 contactor and one Class 8536 starter mechanically and electrically interlocked. Open type devices, Sizes 0–5, are available in either horizontal or vertical arrangements. Sizes 00, 6, and 7 are available as horizontal only. Enclosed devices use horizontally arranged components. Type S starters are designed for operation at 600 Vac, 50–60 Hz.

Overload Relays

Class 8736 Type S Size 00–6 reversing starters are provided with melting alloy thermal overload relay as standard. Interchangeable thermal units are available in standard trip Sizes 00–6, as are bimetallic overload relays. Ambient compensated and non-compensated versions are supplied with manual or automatic reset, trip current adjustment, and an alarm contact on Sizes 0–2.

Quick trip is available on Sizes 00–4, and slow trip on Sizes 00–3.

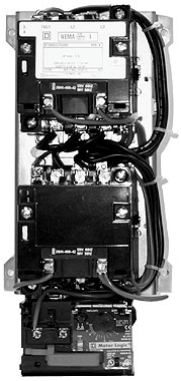
Single phase starters use one thermal unit; three phase starters use three thermal units. See page 16-116 for selection information.

New! Adapted Bimetal (NEMA Sizes 00–1)

The Adapted Bimetal motor starter consists of a specially designed adapter that attaches with bus bars to the NEMA Type S contactor and holds the LRD or LR3D (IEC Style) bimetal overload relay. This starter configuration can be ordered by adding Form E (adapater only) to the standard catalog number. Once the FLA of the motor has been determined, the LRD or LR3D bimetal overload can be purchased separately and installed in the field at a later date. For more information see Table 16.269.

Solid State Overload Relay Protection (Motor Logic™)

These ambient insensitive overload relays are available on three phase sizes 00 through 6 and standard on size 7. They provide phase loss, phase unbalance protection. To order, add Form **H30** (for selectable trip class 10 or 20 protection). For more information about Motor Logic overload relays, see pages 16-83 and 16-102.



NEMA Sizes 00, 0, 1 Reversing Starter (Vertical Type)

New! TeSys T Motor Management System (NEMA Sizes 1–6)

TeSys T is a flexible system that integrates seamlessly into your automation system through five major communication protocols. TeSys T can predict what will happen in the process, as it accurately monitors current, voltage, and power over a wide range. For additional information about TeSys T Motor Management System, see pages 16-84 to 16-88 and page 16-103.

Table 16.119:

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type			NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure (Sizes 0–5)▲		NEMA 7 & 9 ♦ Hazardous Locations Class I, Groups C & D Class II, Groups E, F & G				NEMA 12/3R★ Dusttight & Driptight Industrial Use Enclosure	
				Vertical Type	Horizontal Type	$ Price	Type	$ Price	Type	$ Price	Bolted Type	$ Price	SPIN-TOP™ Type	$ Price	Type	$ Price
00	9	200 230 460 575	1-1/2 1-1/2 2 2	— — — —	SAO16■	**926.**	SAG16■	**989.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	200 230 460 575	3 3 5 5	SBO10■	SBO4■	**1097.**	SBG4■	**1160.**	SBW14■	**1814.**	SBT49■	**3794.**	SBR9■	**4742.**	SBA4■	**1416.**
1	27	200 230 460 575	7-1/2 7-1/2 10 10	SCO7■	SCO8■	**1241.**	SCG8■	**1331.**	SCW14■	**2241.**	SCT49■	**3978.**	SCR9■	**4976.**	SCA4■	**1587.**
2	45	200 230 460 575	10 15 25 25	SDO1■	SDO2■	**2349.**	SDG2■	**2583.**	SDW11■	**4064.**	SDT43■	**6642.**	SDR3■	**8064.**	SDA1■	**3011.**
3	90	200 230 460 575	25 30 50 50	SEO1■	SEO2■	**3902.**	SEG2■	**4307.**	SEW11■	**6501.**	—	—	—	—	SEA1■	**5247.**
4	135	200 230 460 575	40 50 100 100	SFO1■	SFO3■	**9530.**	SFG3■	**10274.**	SFW11■	**14148.**	— — — —	—	— — — —	—	SFA1■	**11727.**
5	270	200 230 460 575	75 100 200 200	SGO1■	SGO3■	**18309.**	SGG3■	**22602.**	SGW11■	**25734.**	— — — —	—	— — — —	—	SGA1■	**25734.**
6	540	200 230 460 575	150 200 400 400	— — — —	SHO1■	**43205.**	SHG1■	**50331.**	SHW1■	**57452.**	— — — —	—	— — — —	—	SHA1■	**54176.**
7	810	200 230 460 575	– 300 600 600	— — — —	SJO1■	**61250.**	SJG1■	**68736.**	SJW1■	**75497.**	— — — —	—	— — — —	—	SJA1■	**72221.**

▲ NEMA 4 and 4X stainless steel enclosures (sizes 0–5) have a brushed finish. Sizes 6 and 7 are painted sheet steel and are rated NEMA 4 only.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown on page 16-47.
♦ NEMA 7 and 9 bolted are not UL listed.
★ NEMA 12 enclosure may be field modified for outdoor non-corrosive and non-service-entrance-rated application; see page 16-95 for more information.

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Table 16.120: 600 Vac Maximum—50–60 Hz

Note that prices shown do not include thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Type of Motor	Open Type			NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 7 & 9 ■ Hazardous Locations Class I, Groups C & D Class II, Groups E, F & G				NEMA 12/3R♦ Dusttight & Driptight Industrial Use Enclosure	
					Vertical Type	Horizontal Type	$ Price	Type	$ Price	Type	$ Price	Bolted Type	$ Price	SPIN TOP™ Type	$ Price	Type	$ Price
2-Pole Single Phase—1 Thermal Unit Required																	
00	9	115 230	1/3 1	Single Phase 3-Wire	— —	SAO13▲	**863.**	SAG13▲	**923.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	115 230	1 2		SBO7▲	SBO1▲	**1034.**	SBG1▲	**1094.**	SBW11▲	**1751.**	SBT46▲	**3722.**	SBR6▲	**4656.**	SBA1▲	**1350.**
1	27	115 230	2 3		SCO1▲	SCO2▲	**1175.**	SCG2▲	**1265.**	SCW11▲	**2177.**	SCT46▲	**3909.**	SCR6▲	**4883.**	SCA1▲	**1521.**
3-Pole Single Phase—1 Thermal Unit Required																	
00	9	115 230	1/3 1	4-Wire Rep.-Ind.	— —	SAO14▲	**891.**	SAG14▲	**953.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
		115 230	1/3 1	4-Wire Split Ph.	— —	SAO15▲	**594.**	SAG15▲	**635.**	Use Size 0		Use Size 0		Use Size 0		Use Size 0	
0	18	115 230	1 2	4-Wire Rep.-Ind.	SBO8▲	SBO2▲	**1062.**	SBG2▲	**1124.**	SBW12▲	**1778.**	SBT47▲	**3752.**	SBR7▲	**4692.**	SBA2▲	**1380.**
		115 230	1 2	4-Wire Split Ph.	SBO9▲	SBO3▲	**1062.**	SBG3▲	**1124.**	SBW13▲	**1778.**	SBT48▲	**3752.**	SBR8▲	**4692.**	SBA3▲	**1380.**
1	27	115 230	2 3	4-Wire Rep.Ind.	SCO3▲	SCO4▲	**1205.**	SCG4▲	**1295.**	SCW12▲	**2205.**	SCT47▲	**3942.**	SCR7▲	**4932.**	SCA2▲	**1551.**
		115 230	2 3	4-Wire Split Ph.	SCO5▲	SCO6▲	**1205.**	SCG6▲	**1295.**	SCW13▲	**2205.**	SCT48▲	**3942.**	SCR8▲	**4932.**	SCA3▲	**1551.**
4-Pole Polyphase—2 Thermal Units Required																	
0	18	200 230 460 575	3 3 5 5	2 Phase 4-Wire	SBO11▲	SBO5▲	**1382.**	SBG5▲	**1443.**	SBW15▲	**2100.**	Consult Schneider Electric CCC at (1-888-778-2733)		SBR10▲	**5133.**	SBA5▲	**1670.**
1	27	200 230 460 575	7-1/2 7-1/2 10 10		SCO9▲	SCO10▲	**1566.**	SCG10▲	**1629.**	SCW15▲	**2541.**	Consult Schneider Electric CCC at (1-888-778-2733)		SCR10▲	**5396.**	SCA5▲	**1886.**
2	45	200 230 460 575	10 15 25 25		—	SDO4▲	**2948.**	SDG4▲	**3182.**	SDW12▲	**4748.**	Consult Schneider Electric CCC at (1-888-778-2733)		SDR4▲	**9248.**	SDA2▲	**3609.**
3	90	200 230 460 575	25 30 50 50		—	SEO4▲	**4886.**	SEG4▲	**5318.**	SEW12▲	**7482.**	—	—	—	—	SEA2▲	**6228.**
4	135	200 230 460 575	40 50 100 100		—	SFO4▲	**12207.**	SFG4▲	**12981.**	SFW12▲	**16883.**	—	—	—	—	SFA2▲	**14462.**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

■ NEMA 7 and 9 bolted are not UL listed.

♦ NEMA 12 enclosure may be field modified for outdoor non-corrosive and non-service-entrance-rated application; see page 16-95 for more information.

Table 16.121: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8736SCO1U01S).

▼ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8736SBO7V02S).

Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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Approximate Dimensions

Table 16.122: Open Type—2 or 3-Pole Only

Class	NEMA Size	Type	Mounting	Figure Number	Dimensions—Inches													Weight (lb)
					A	B	C	D	E	F	G	H	I	J	K	L	M	
8702	00	SAO	Horizontal	1	7-1/8	5	5-5/16	—	—	3-13/32	15/32	4-11/32	3/16	5-1/2	29/32	—	—	12
	0, 1	SBO, SCO	Horizontal Vertical	1 1▲	7-1/8 5-15/32	5 9-7/32	5-5/16 5-5/16	— 5-1/2	— 7/32	3-13/32 —	15/32 39/64	4-11/32 8	3/16 39/64	5-1/2 5-1/32	29/32 7/32	— —	— —	12 12
	2	SDO	Horizontal Vertical	1 1▲	9 6-3/4	6-7/8 11-3/8	6-1/32 6-1/32	— 6-1/4	— 1/4	4-1/2 —	3/8 1/2	5-5/8 10-3/8	1/4 1/2	6 1/4	1-1/2 1/4	— —	— —	16 16
	3	SEO	Horizontal Vertical	1 1▲	12-23/32 7-13/64	7-31/32 19	7 7	11-3/4 6-1/4	31/64 31/64	— —	31/64 1-1/64	7 17	31/64 63/64	11-3/4 6-1/4	31/64 31/64	— —	— —	35 35
	4	SFO	Horizontal Vertical	1 1▲	14-1/4 7-31/32	11-11/16 23-29/32	7 7	13-1/4 7	1/2 31/64	— —	1/2 1-13/16	8 20-1/4	1-27/32 1-3/16	13-1/4 7	1/2 31/64	— —	— —	45 45
	5	SGO	Horizontal Vertical	1 1▲	19-5/16 10-3/4	16-3/16 34-13/32	9-3/8 9-3/8	18 9-1/2	21/32 5/8	— —	1-1/32 1-1/4	14 32	1-5/32 1-5/32	18 9-1/2	21/32 5/8	— —	— —	98 98
	6	SHO	Horizontal	1	22-3/8	28-3/64	9-33/64	18	40/64	—	3-53/64	21-3/16	3-1/32	18	49/64	—	—	195
	7	SJO	Horizontal	1	24-1/4	37-1/4	13-13/16	19-3/4	1-33/64	—	—	30	—	—	—	—	—	310
8736	00	SAO	Horizontal	2	7-1/8	6-29/32	5-5/16	—	—	3-13/32	15/32	4-11/32	6-7/32	4-17/32	5-1/16	21/32	—	13
	0, 1	SBO, SCO	Horizontal Vertical	2 2▲	7-1/8 5-15/32	6-29/32 11-33/64	5-5/16 5-5/16	— 5-1/32	— 7/32	3-13/32 —	15/32 39/64	4-11/32 8	6-7/32 10-45/64	4-17/32 2-33/64	5-1/16 5-1/16	21/32 7/32	— 5-1/32	13 13
	2	SDO	Horizontal Vertical	2 2▲	9 6-3/4	8-1/2 13-31/64	6-1/32 6-1/32	— 6-1/4	— 1/4	4-1/2 —	3/8 25/32	5-5/8 10-3/8	7-1/2 12-31/32	5 3-1/8	5-5/32 5-5/32	1-1/2 1/4	— 6	18 18
	3	SEO	Horizontal Vertical	2 2▲	12-23/32 7-5/16	11-23/32 22-1/4	7 7	11-3/4 6-1/4	31/64 31/64	— —	31/64 1-1/64	10-3/4 20-3/4	10-3/4 —	11-3/4 6-1/4	6-1/4 6-1/4	31/64 31/64	11-3/4 6-1/4	38 38
	4	SFO	Horizontal Vertical	2 2▲	14-1/4 7-31/32	14-19/32 26-13/16	7 7	13-1/4 7	1/2 31/64	— —	1-27/32 1-27/32	12-1/4 24-1/2	12-1/4 —	13-1/4 4-3/64	6-1/4 6-1/4	1/2 31/64	13-1/4 7	48 48
	5	SGO	Horizontal Vertical	2 2▲	19-5/16 10-3/4	20-29/32 39-5/32	9-3/8 9-3/8	18 9-1/2	21/32 21/32	— —	1-9/32 1-9/32	19 371/4	19 37-1/4	18 9-1/2	6-5/8 6-5/8	5/8 5/8	18 9-1/2	115 115
	6	SHO	Horizontal	2	22-3/8	28-3/64	9-33/64	18	44/64	—	3-53/64	21-3/16	3-1/32	18	49/64	—	—	200
	7	SJO	Horizontal	1	24-1/4	37-1/4	13-13/16	19-3/4	1-33/64	—	—	30	—	—	—	—	—	315

▲ Vertical type design differs from that shown on the corresponding NEMA size horizontal type figure, but dimensions listed apply to that figure.

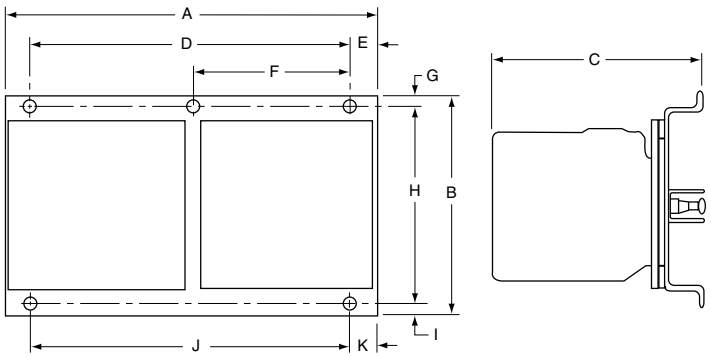

Figure 1 (Class 8702 Open Type)

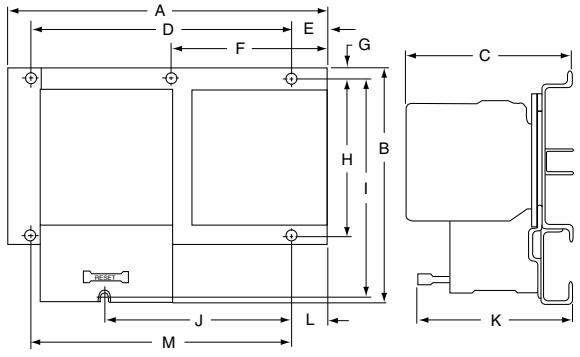

Figure 2 (Class 8736 Open Type)

Table 16.123: NEMA 1 (Class 8702 and 8736)

NEMA Size	Dimensions—Inches										Weight (lb)	
	A	B	C		D	E	F	G	H	I	8702	8736
			8702	8736								
00, 0♦ 1■	11-7/8	11-7/8	7-13/32	7-17/32	9-3/4	1-1/16	1-1/16	9-3/4	1-1/16	5/16	16	17
2■	14-7/8	14-1/8	7-9/16	7-21/32	12-3/4	1-1/16	1-1/16	12	1-1/16	5/16	24	25
3♦ 4♦	18-5/32	29-5/32	9-1/4	9-1/4	15-1/2	1-21/64	1-21/64	26-1/2	1-21/64	7/16	95	98
5	35-7/32	46-7/32	12-13/16	12-15/16	31	2-7/64	2-7/64	42	2-7/64	9/16	298	315
6	36-7/32	62-7/32	19-15/32		Floor Mounting.						400	405
7	34-1/2	93	23-1/2								—	—

■ Standard enclosure has space for a fused control transformer, **Form F4T**, on Sizes 0-2, except for Size 0 & 1 4-Pole devices.

♦ 3-Pole only.

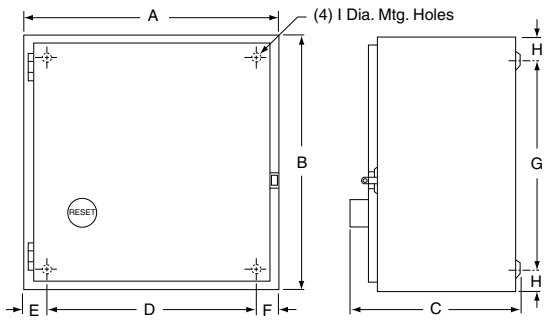

Figure 3—NEMA 1

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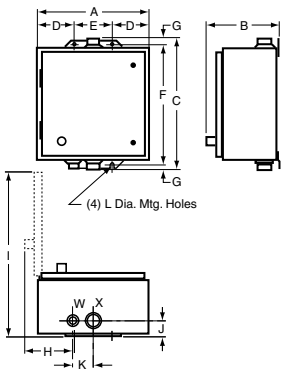
Approximate Dimensions

Table 16.124: NEMA 4 & 4X—Stainless Steel♦

NEMA Size	Class Number	Dimensions—Inches												Hub Dia.		Weight (lb)	
		A	B	C	D	E	F	G	H	I	J	K	L	W Bot. Only	X Top & Bot.	8702	8736
0▲ 1▲	8702 & 8736	12-5/8	7-13/16	14-11/16	2-9/16	7-1/2	13-1/2	19/32	3-7/8	18-13/32	1-21/32	2-5/16	5/16	3/4	1	25	26
2▲	8702 & 8736	14-7/8	8-1/4	15-3/4	2-9/16	9-3/4	15	3/8	3-7/8	20-7/8	1-23/32	2-5/8	5/16	3/4	1-1/2	33	35
3■ 4■	8702	18-5/32	8-3/4	32-7/32	3-5/64	12	30-1/2	7/8	3-11/16	26-23/32	2-9/16	3-3/16	7/16	3/4	2-1/2	96	—
	8736	18-5/32	9-9/16	32-7/32	3-5/64	12	30-1/2	7/8	4-1/2	26-23/32	2-9/16	3-3/16	7/16	3/4	2-1/2	—	99
5	8702	35-7/32	12-1/8	49-7/32	4-7/64	27	48	5/8	4-19/32	45-13/16	2-31/32	3-1/2	9/16	3/4	3-1/2	300	—
	8736	35-7/32	12-15/16	49-7/32	4-7/64	27	48	5/8	5-13/32	45-13/16	2-31/32	3-1/2	9/16	3/4	3-1/2	—	317
6	8702 & 8736	36-7/32	19-15/32	70-1/8	Floor Mounting											500	505
7	8702 & 8736	34-1/2	23-1/2	101												—	—

▲ Standard enclosure has space for a fused control transformer, **Form F4T**, on Sizes 0-2, except for Size 0 & 1 4-Pole devices.
■ 3-Pole only.
♦ Size 6 & 7 are sheet steel enclosures and are rated NEMA 4 only.



NEMA 4 & 4X
Stainless Steel

Table 16.125: NEMA 7 and 9 Bolted Enclosure

See page 16-27 for drawing of enclosure.

NEMA Size	Type	Dimensions—Inches★									Wt. (lb)
		G	H	J	K	L	N	P	Q, R	S, T, U, V	
0–2	SBT SCT SDT	14-1/4	27-5/8	9-1/2	12-1/4	19-1/4	9-5/8	11-1/2	2-3/8	3-1/8	115
3–4	SET SFT	24-1/2	45-5/8	13-3/4	22-1/2	27-1/2	13-3/4	15-3/8	3-7/16	4	180

★ Dimensions shown for 2 or 3-Pole devices only.

Table 16.126: NEMA 7 & 9 SPIN TOP™ Enclosure

See page 16-26 for drawing of enclosure.

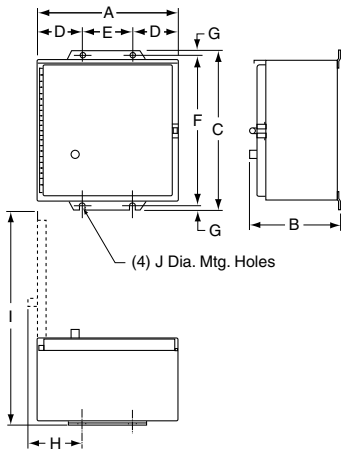
NEMA Size	Type	Dimensions—Inches																					Wt. (lb)
		A	B▼	B△	C▼	C△	D	E▼	E△	F	G▼	G△	H▼	H△	J▼	J△	K	L	M	N	P	R	
0-1	SBR SCR	12	41-1/16	46-1/8	68-1/16	79-1/8	16-3/4	7-1/4	12-1/4	7-11/16	26-1/8	26-1/8	3	9	24	24	8-1/2	2-1/16	9-3/8	5-1/4	1-1/2	3/8	70
2	SDR	16-1/8	48-1/2	50-1/2	81-1/2	85	20-1/4	12-1/8	9-1/8	8-5/8	27-3/4	32-3/4	8	4-1/2	25	30	12	2-5/8	11	5-1/2	2-1/2	3/8	100
3	SER	Consult Schneider Electric CCC at (1-888-778-2733)																					

▼ Without control transformer.
△ With control transformer (**Form F4T**).

Table 16.127: NEMA 12/3R

NEMA Size	Class Number	Dimensions—Inches										Weight (lb)	
		A	B	C	D	E	F	G	H	I	J	8702	8736
0□ 1□	8702 & 8736	11-7/8	7-3/4	13-3/4	2-9/16	6-3/4	12-3/4	1/2	3-21/32	18-1/8	5/16	23	24
2□	8702 & 8736	14-7/8	7-7/8	16	2-9/16	9-3/4	15	1/2	3-21/32	21-1/4	5/16	31	32
3◊ 4◊	8702	18-5/32	9-1/4	31-1/2	3-5/64	12	30-1/2	1/2	3-11/16	26-23/32	7/16	96	—
	8736	18-5/32	9-9/16	31-1/2	3-5/64	12	30-1/2	1/2	4-1/2	26-23/32	7/16	—	99
5	8702	35-7/32	13-1/8	49	4-1/8	27	48	1/2	5-5/16	45-7/8	9/16	302	—
	8736	35-7/32	13-15/16	49	4-1/8	27	48	1/2	6-1/8	45-7/8	9/16	—	319
6	8702 & 8736	36-7/32	19-15/32	62-7/32	Floor Mounting							490	495
7	8702 & 8736	34-1/2	23-1/2	93								—	—

□ Standard enclosure has space for a fused control transformer, **Form F4T**, on Sizes 0-2, except for Size 0 & 1 4-Pole devices.
◊ 3-Pole only.



NEMA 12

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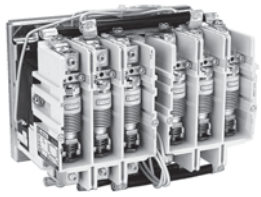


Class 8702 Type W Reversing Vacuum Contactors are used to switch capacitors, transformers and electric motors where overload protection is separately provided. Type W reversing vacuum contactors are designed for operation at 600 Volts, 50/60 Hz.

Auxiliary Contacts—An auxiliary contact block, Class 9999 Type WX11, with one normally open contact and one normally closed contact, is used with Size 4, 5 and 6 vacuum contactors. Additional auxiliary contact units may be added to the Size 4 and 5 reversing contactors in the field. A maximum of 2 units may be added to the Size 4; a maximum of 1 unit may be added to the Size 5.

Termination Means—The Size 4 reversing vacuum contactor is supplied with line and load side lugs. The Size 5 and 6 reversing vacuum contactors are supplied without line and load side lugs.

Table 16.128: Class 8702 Full Voltage Reversing Vacuum Contactors (Horizontal Only) 3-Pole Polyphase—600 Vac Maximum—50–60 Hz

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum Horsepower	Open Type	
				Type	$ Price
4	135	200 230 380 460 575	40 50 75 100 100	WFO3▲	**10659.00**
5	270	200 230 380 460 575	75 100 150 200 200	WGO3▲	**18678.00**
6	540	200 230 380 460 575	150 200 300 400 400	WHO3V▲	**45666.00**

▲ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed on page 16-51. Replacement coils are listed on page 16-28.

Table 16.129: Class 9998—Replacement Coils for Class 8702 Reversing Contactors

Size	Type	Poles	Class and Type	Suffix Number (Complete Coil Number Consists of Class and Type Followed by Suffix Number)				$ Price
				120 Volts 110 Volts	240 Volts 220 Volts	480 Volts 440 Volts	600 Volts 550 Volts	
4	WF	All	9998WF	120	240	480	600	**732.00**
5	WG	All	9998WG	120	240	480	600	**1724.00**
6	WH	All	9998WH	120	240	480	600	**1904.00**

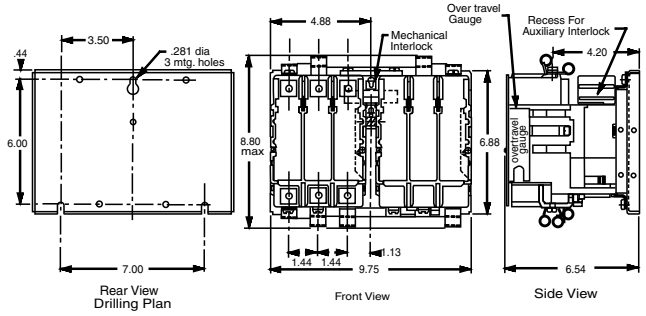
Table 16.130: Class 9999—Vacuum Starter Kits

For Use With		Kit Description	Class 9999 Type	$ Price
Type	Size			
WF–WG WH	4–5 6	Auxiliary Contacts, Non-Convertible 1 N.O. & 1 N.C. Isolated Contacts	WX11	**122.00**
WF WG–WH	4 5–6	Coil Circuit Auxiliary Contacts 1 N.O. & 1 N.C. Isolated Contacts, Delayed Break 1 N.C. Isolated Contact	WCX11 WLX01	**114.00** **503.00**
WG	5	Lug Kits (6) lugs included	LUW5	**275.00**

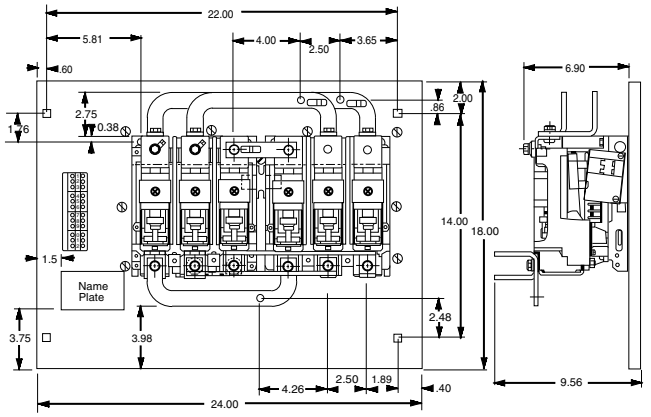
Table 16.131: Coil Voltage Codes

Volts	110	120	220	240	440	480	550	600
50 Hz	V02		V03		V06		V07	
60 Hz		V02		V03		V06		V07

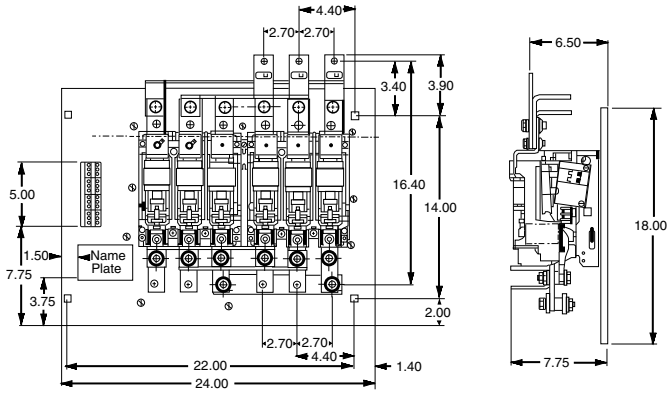
Approximate Dimensions



Size 4 Reversing Contactor Outline with Lugs
Class 8702 WF



Size 5 Reversing Contactor Outline without Lugs
Class 8702 WG



Size 6 Reversing Contactor Outline without Lugs
Class 8702 WH

For How to Order Information, see page 16-13.

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Class 8738 and 8739 Type S reversing combination starters combine the requirements of motor overload and short circuit protection into one convenient package. Type S reversing combination starters are manufactured in accordance with NEMA standards, and are UL Listed (although some Form numbers may not be listed—contact your nearest Square D/Schneider Electric sales office for further information). Class 8738 and 8739 reversing combination starters are designed to operate at 600 Vac, 50–60 Hz—and are supplied with melting alloy overload relays as standard. For Class J fuses, use form Y1072 (No Charge).

Class 8738 Fusible Disconnect Switch Type

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each.
See page 16-116 for selection information.

Table 16.132: Class 8738 Full-Voltage Type, Fusible (With Class H Fuse Clips) Reversing with Melting Alloy Overload Relays—3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R▲ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Fuse Clip Size (A)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
										Type	Type	
200 (208)	3	0	30	SBG12■	2169.00	SBW12■	3909.00	SBW22■	4491.00	SBA22■	SBA12■	2654.00
	5	1	30	SCG12■	2313.00	SCW12■	4050.00	SCW22■	4656.00	SCA22■	SCA12■	2798.00
	7-1/2		60	SCG13■	2340.00	SCW13■	4077.00	SCW23■	4692.00	SCA23■	SCA13■	2825.00
	10	2	60	SDG12■	3851.00	SDW12■	6501.00	SDW22■	7149.00	SDA22■	SDA12■	4478.00
	20	3	100	SEG15■	6357.00	SEW15■	11001.00	—	—	SEA25■	SEA15■	7182.00
	40	4	200	SFG15■	13409.00	SFW15■	19277.00	—	—	SFA25■	SFA15■	15672.00
	75	5	400	SGG15■	25605.00	SGW15■	40589.00	—	—	SGA25■	SGA15■	30990.00
230 (240)	3	0	30	SBG12■	2169.00	SBW12■	3909.00	SBW22■	4491.00	SBA22■	SBA12■	2654.00
	5	1	30	SCG12■	2313.00	SCW12■	4050.00	SCW22■	4656.00	SCA22■	SCA12■	2798.00
	7-1/2		60	SCG13■	2340.00	SCW13■	4077.00	SCW23■	4692.00	SCA23■	SCA13■	2825.00
	15	2	60	SDG12■	3851.00	SDW12■	6501.00	SDW22■	7149.00	SDA22■	SDA12■	4478.00
	25	3	100	SEG15■	6357.00	SEW15■	11001.00	—	—	SEA25■	SEA15■	7182.00
	50	4	200	SFG15■	13409.00	SFW15■	19277.00	—	—	SFA25■	SFA15■	15672.00
	100	5	400	SGG15■	25605.00	SGW15■	40589.00	—	—	SGA25■	SGA15■	30990.00
460 (480)	5	0	30	SBG13■	2199.00	SBW13■	3936.00	SBW23■	4527.00	SBA23■	SBA13■	2682.00
	10	1	30	SCG14■	2340.00	SCW14■	4077.00	SCW24■	4692.00	SCA24■	SCA14■	2825.00
	15	2	30	SDG16■	3873.00	SDW16■	6515.00	SDW26■	7163.00	SDA26■	SDA16■	4491.00
	25		60	SDG14■	3893.00	SDW14■	6543.00	SDW24■	7199.00	SDA24■	SDA14■	4521.00
	50	3	100	SEG13■	6443.00	SEW13■	11087.00	—	—	SEA23■	SEA13■	7268.00
	100	4	200	SFG13■	13464.00	SFW13■	19332.00	—	—	SFA23■	SFA13■	15728.00
	200	5	400	SGG13■	26204.00	SGW13■	41187.00	—	—	SGA23■	SGA13■	31589.00
575 (600)	5	0	30	SBG13■	2199.00	SBW13■	3936.00	SBW23■	4527.00	SBA23■	SBA13■	2682.00
	10	1	30	SCG14■	2340.00	SCW14■	4077.00	SCW24■	4692.00	SCA24■	SCA14■	2825.00
	15	2	30	SDG16■	3873.00	SDW16■	6515.00	SDW26■	7163.00	SDA26■	SDA16■	4491.00
	25		60	SDG14■	3893.00	SDW14■	6543.00	SDW24■	7199.00	SDA24■	SDA14■	4521.00
	50	3	100	SEG13■	6443.00	SEW13■	11087.00	—	—	SEA23■	SEA13■	7268.00
	100	4	200	SFG13■	13464.00	SFW13■	19332.00	—	—	SFA23■	SFA13■	15728.00
	200	5	400	SGG13■	26204.00	SGW13■	41187.00	—	—	SGA23■	SGA13■	31589.00

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information. For class J fuse clip, use Form **Y1072** (no charge).

■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

Table 16.133: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24★♦	—	V01	No Charge
120★	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

♦ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8738SBG12V01S).

★ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8738SC13V02S).

Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage.
Form S is supplied at no charge.

Dimensions . . . . . page 16-57
Factory Modifications (Forms). . . . . page 16-100
Replacement Parts (Class 9998) . . . . . page 16-105
Type S Accessories (Class 9999). . . . . page 16-108

For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.134: Non-Fusible Disconnect Switch Type—Full-Voltage Type Reversing with Melting Alloy Overload Relays

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R▲ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-Phase	NEMA Size	Fuse Clip Size (A)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
200 (208)	3	0	None	SBG11■	2127.00	SBW11■	3866.00	SBW21■	4442.00	SBA21■	SBA11■	2613.00
	7-1/2	1	None	SCG11■	2271.00	SCW11■	4008.00	SCW21■	4607.00	SCA21■	SCA11■	2754.00
	10	2	None	SDG11■	3794.00	SDW11■	6443.00	SDW21■	7083.00	SDA21■	SDA11■	4419.00
	25	3	None	SEG11■	6287.00	SEW11■	10929.00	—	—	SEA21■	SEA11■	7113.00
	40	4	None	SFG11■	13166.00	SFW11■	19034.00	—	—	SFA21■	SFA11■	15431.00
	75	5	None	SGG11■	25691.00	SGW11■	40674.00	—	—	SGA21■	SGA11■	31076.00
230 (240)	3	0	None	SBG11■	2127.00	SBW11■	3866.00	SBW21■	4442.00	SBA21■	SBA11■	2613.00
	7-1/2	1	None	SCG11■	2271.00	SCW11■	4008.00	SCW21■	4607.00	SCA21■	SCA11■	2754.00
	15	2	None	SDG11■	3794.00	SDW11■	6443.00	SDW21■	7083.00	SDA21■	SDA11■	4419.00
	30	3	None	SEG11■	6287.00	SEW11■	10929.00	—	—	SEA21■	SEA11■	7113.00
	50	4	None	SFG11■	13166.00	SFW11■	19034.00	—	—	SFA21■	SFA11■	15431.00
	100	5	None	SGG11■	25691.00	SGW11■	40674.00	—	—	SGA21■	SGA11■	31076.00
460 (480)	5	0	None	SBG11■	2127.00	SBW11■	3866.00	SBW21■	4442.00	SBA21■	SBA11■	2613.00
	10	1	None	SCG11■	2271.00	SCW11■	4008.00	SCW21■	4607.00	SCA21■	SCA11■	2754.00
	25	2	None	SDG11■	3794.00	SDW11■	6443.00	SDW21■	7083.00	SDA21■	SDA11■	4419.00
	50	3	None	SEG11■	6287.00	SEW11■	10929.00	—	—	SEA21■	SEA11■	7113.00
	100	4	None	SFG11■	13166.00	SFW11■	19034.00	—	—	SFA21■	SFA11■	15431.00
	200	5	None	SGG11■	25691.00	SGW11■	40674.00	—	—	SGA21■	SGA11■	31076.00
575 (600)	5	0	None	SBG11■	2127.00	SBW11■	3866.00	SBW21■	4442.00	SBA21■	SBA11■	2613.00
	10	1	None	SCG11■	2271.00	SCW11■	4008.00	SCW21■	4607.00	SCA21■	SCA11■	2754.00
	25	2	None	SDG11■	3794.00	SDW11■	6443.00	SDW21■	7083.00	SDA21■	SDA11■	4419.00
	50	3	None	SEG11■	6287.00	SEW11■	10929.00	—	—	SEA21■	SEA11■	7113.00
	100	4	None	SFG11■	13166.00	SFW11■	19034.00	—	—	SFA21■	SFA11■	15431.00
	200	5	None	SGG11■	25691.00	SGW11■	40674.00	—	—	SGA21■	SGA11■	31076.00

▲ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
■ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown on page 16-53.

Table 16.135: Fusible Disconnect Switch Type With Class R Fuse Clips—100,000 AIC Rating

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure▼		NEMA 12/3R♦ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-Phase	NEMA Size	Fuse Clip Size (A)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
200 (208)	3	0	30	SBG32★	2192.00	SBW32★	3929.00	SBW42★	4521.00	SBA42★	SBA32★	2676.00
	5	1	30	SCG32★	2334.00	SCW32★	4071.00	SCW42★	4685.00	SCA42★	SCA32★	2817.00
	7-1/2		60	SCG33★	2363.00	SCW33★	4100.00	SCW43★	4706.00	SCA43★	SCA33★	2847.00
	10	2	60	SDG32★	3873.00	SDW32★	6521.00	SDW42★	7176.00	SDA42★	SDA32★	4499.00
	20	3	100	SEG35★	6399.00	SEW35★	11043.00	—	—	SEA45★	SEA35★	7226.00
	40	4	200	SFG35★	13451.00	SFW35★	19319.00	—	—	SFA45★	SFA35★	15714.00
	75	5	400	SGG35★	25707.00	SGW35★	40689.00	—	—	SGA45★	SGA35★	31089.00
230 (240)	3	0	30	SBG32★	2192.00	SBW32★	3929.00	SBW42★	4521.00	SBA42★	SBA32★	2676.00
	5	1	30	SCG32★	2334.00	SCW32★	4071.00	SCW42★	4685.00	SCA42★	SCA32★	2817.00
	7-1/2		60	SCG33★	2363.00	SCW33★	4100.00	SCW43★	4706.00	SCA43★	SCA33★	2847.00
	15	2	60	SDG32★	3873.00	SDW32★	6521.00	SDW42★	7176.00	SDA42★	SDA32★	4499.00
	25	3	100	SEG35★	6399.00	SEW35★	11043.00	—	—	SEA45★	SEA35★	7226.00
	50	4	200	SFG35★	13451.00	SFW35★	19319.00	—	—	SFA45★	SFA35★	15714.00
	100	5	400	SGG35★	25707.00	SGW35★	40689.00	—	—	SGA45★	SGA35★	31089.00
460 (480)	5	0	30	SBG33★	2219.00	SBW33★	3959.00	SBW43★	4548.00	SBA43★	SBA33★	2705.00
	10	1	30	SCG34★	2363.00	SCW34★	4100.00	SCW44★	4712.00	SCA44★	SCA34★	2847.00
	15	2	30	SDG36★	3893.00	SDW36★	6534.00	SDW46★	7191.00	SDA46★	SDA36★	4514.00
	25		60	SDG34★	3915.00	SDW34★	6564.00	SDW44★	7433.00	SDA44★	SDA34★	4541.00
	50	3	100	SEG33★	6485.00	SEW33★	11129.00	—	—	SEA43★	SEA33★	7311.00
	100	4	200	SFG33★	13508.00	SFW33★	19376.00	—	—	SFA43★	SFA33★	15771.00
	200	5	400	SGG33★	26303.00	SGW33★	41288.00	—	—	SGA43★	SGA33★	31688.00
575 (600)	5	0	30	SBG33★	2219.00	SBW33★	3959.00	SBW43★	4548.00	SBA43★	SBA33★	2705.00
	10	1	30	SCG34★	2363.00	SCW34★	4100.00	SCW44★	4712.00	SCA44★	SCA34★	2847.00
	15	2	30	SDG36★	3893.00	SDW36★	6534.00	SDW46★	7191.00	SDA46★	SDA36★	4514.00
	25		60	SDG34★	3915.00	SDW34★	6564.00	SDW44★	7433.00	SDA44★	SDA34★	4541.00
	50	3	100	SEG33★	6485.00	SEW33★	11129.00	—	—	SEA43★	SEA33★	7311.00
	100	4	200	SFG33★	13508.00	SFW33★	19376.00	—	—	SFA43★	SFA33★	15771.00
	200	5	400	SGG33★	26303.00	SGW33★	41288.00	—	—	SGA43★	SGA33★	31688.00

♦ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
★ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown on page 16-53.
▼ 5,000 AIC Rating

For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.136: Full-Voltage Type, Reversing with Melting Alloy Overload Relays

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)▲		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Hp Range Poly-phase	NEMA Size	Circuit Breaker (See Page 7-32 for Breaker Adjustment Range)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
200 (208)	1/4–3	0	HLL36030M71	SBG43♦	**2555.**	SBW43♦	**4292.**	SBW53♦	**4932.**	SBA53♦	SBA43♦	**3038.**
	1/4–5 7-1/2	1	HLL36030M71 HLL36050M72	SCG44♦ SCG45♦	**2726.**	SCW44♦ SCW45♦	**4463.**	SCW54♦ SCW55♦	**5133.**	SCA54♦ SCA55♦	SCA44♦ SCA45♦	**3209.**
	1-1/2–5 71/2–10	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**4350.**	SDW42♦ SDW43♦	**6998.**	SDW52♦ SDW53♦	**7695.**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**4976.**
	15–25	3	HLL36100M73	SEG42♦	**6501.**	SEW42♦	**11142.**	SEW52♦	**12254.**	SEA52♦	SEA42♦	**7326.**
	30–40	4	JJL36250M75	SFG44♦	**14718.**	SFW44♦	**20586.**	SFW54♦	**22644.**	SFA54♦	SFA44♦	**16982.**
	50–60 75	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**29808.**	SGW44♦ SGW45♦	**44792.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**35190.**
	100 125–150	6	LJL36400M36 LJL36600M42	SHG43♦ SHG45♦	**64274.**	SHW43♦ SHW45♦	**71396.**	— —	—	SHA53♦ SHA55♦	SHA43♦ SHA45♦	**68120.**
230 (240)	1/4–3	0	HLL36030M71	SBG43♦	**2555.**	SBW43♦	**4292.**	SBW53♦	**4932.**	SBA53♦	SBA43♦	**3038.**
	1/4–7-1/2	1	HLL36030M71	SCG44♦	**2726.**	SCW44♦	**4463.**	SCW54♦	**5133.**	SCA54♦	SCA44♦	**3209.**
	1-1/2–7-1/2 10 15	2	HLL36030M71 HLL36050M72 HLL36100M73	SDG42♦ SDG43♦ SDG44♦	**4350.**	SDW42♦ SDW43♦ SDW44♦	**6998.**	SDW52♦ SDW53♦ SDW54♦	**7695.**	SDA52♦ SDA53♦ SDA54♦	SDA42♦ SDA43♦ SDA44♦	**4976.**
	15–30	3	HLL36100M73	SEG42♦	**6501.**	SEW42♦	**11142.**	SEW52♦	**12254.**	SEA52♦	SEA42♦	**7326.**
	40–50	4	JJL36250M75	SFG44♦	**14718.**	SFW44♦	**20586.**	SFW54♦	**22644.**	SFA54♦	SFA44♦	**16982.**
	60 75–100	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**29808.**	SGW44♦ SGW45♦	**44792.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**35190.**
	125–150 200	6	LJL36600M42 PLL34080M68	SHG45♦ SHG46♦	**64274.**	SHW45♦ SHW46♦	**71396.**	— —	—	SHA55♦ SHA56♦	SHA45♦ SHA46♦	**68120.**

▲ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed below.

Table 16.137: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8739SBG41V01S).
▼ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8739SCG41V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.138: Full-Voltage Type, Reversing with Melting Alloy Overload Relays

Ratings				NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0–5)▲		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Hp Range Poly-phase	NEMA Size	Circuit Breaker (See Page 7-32 for Breaker Adjustment Range)	Type	$ Price	Type	$ Price	Type	$ Price	With External Reset Type	Without External Reset Type	$ Price
460 (480)	1/4–5	0	HLL36030M71	SBG43♦	**2555.**	SBW43♦	**4292.**	SBW53♦	**4932.**	SBA53♦	SBA43♦	**3038.**
	1/4–10	1	HLL36030M71	SCG44♦	**2726.**	SCW44♦	**4463.**	SCW54♦	**5133.**	SCA54♦	SCA44♦	**3209.**
	5–15 20–25	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**4350.**	SDW42♦ SDW43♦	**6998.**	SDW52♦ SDW53♦	**7695.**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**4976.**
	20–25 30–50	3	HLL36050M72 HLL36100M73	SEG41♦ SEG42♦	**6501.**	SEW41♦ SEW42♦	**11142.**	SEW51♦ SEW52♦	**12254.**	SEA51♦ SEA52♦	SEA41♦ SEA42♦	**7326.**
	60–100	4	JLL36250M75	SFG44♦	**14718.**	SFW44♦	**20586.**	SFW54♦	**22644.**	SFA54♦	SFA44♦	**16982.**
	125 150–200	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**29808.**	SGW44♦ SGW45♦	**44792.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**35190.**
	250–350 400	6	LJL36600M42 PLL34080M68	SHG45♦ SHG46♦	**64274.**	SHW45♦ SHW46♦	**71396.**	— —	—	SHA55♦ SHA56♦	SHA45♦ SHA46♦	**68120.**
575 (600)	1/4–5	0	HLL36030M71	SBG43♦	**2555.**	SBW43♦	**4292.**	SBW53♦	**4932.**	SBA53♦	SBA43♦	**3038.**
	1/4–10	1	HLL36030M71	SCG44♦	**2726.**	SCW44♦	**4463.**	SCW54♦	**5133.**	SCA54♦	SCA44♦	**3209.**
	5–20 25	2	HLL36030M71 HLL36050M72	SDG42♦ SDG43♦	**4350.**	SDW42♦ SDW43♦	**6998.**	SDW52♦ SDW53♦	**7695.**	SDA52♦ SDA53♦	SDA42♦ SDA43♦	**4976.**
	25–30 40–50	3	HLL36050M72 HLL36100M73	SEG41♦ SEG42♦	**6501.**	SEW41♦ SEW42♦	**11142.**	SEW51♦ SEW52♦	**12254.**	SEA51♦ SEA52♦	SEA41♦ SEA42♦	**7326.**
	60–100	4	JLL36250M75	SFG44♦	**14718.**	SFW44♦	**20586.**	SFW54♦	**22644.**	SFA54♦	SFA44♦	**16982.**
	125–150 200	5	JLL36250M75 LJL36400M36	SGG44♦ SGG45♦	**29808.**	SGW44♦ SGW45♦	**44792.**	— —	—	SGA54♦ SGA55♦	SGA44♦ SGA45♦	**35190.**
	250 300–400	6	LJL36400M36 LJL36600M42	SHG43♦ SHG45♦	**64274.**	SHW43♦ SHW45♦	**71396.**	— —	—	SHA53♦ SHA55♦	SHA43♦ SHA45♦	**68120.**

▲ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed below.

Table 16.139: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8739SBG41V01S).
▼ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8739SCG41V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.140: Full-Voltage Type, Reversing with Melting Alloy Overload Relays

Ratings					NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)▲		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Circuit Breaker		Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
			Type	Ampere Rating							Type	Type	
200 (208)	2 3	0	HLL36015 HLL36020	15 20	SBG1♦ SBG3♦	2228.	SBW1♦ SBW3♦	3965.	SBW11♦ SBW13♦	4563.	SBA11♦ SBA13♦	SBA1♦ SBA3♦	2712.
	5 7-1/2	1	HLL36035 HLL36050	35 50	SCG5♦ SCG2♦	2399.	SCW5♦ SCW2♦	4136.	SCW15♦ SCW12♦	4761.	SCA15♦ SCA12♦	SCA5♦ SCA2♦	2883.
	10	2	HLL36060	60	SDG1♦	4022.	SDW1♦	6672.	SDW11♦	7340.	SDA11♦	SDA1♦	4649.
	15 20 25	3	HLL36100 HLL36125 HLL36150	100 125 150	SEG3♦ SEG1♦ SEG5♦	6501.	SEW3♦ SEW1♦ SEW5♦	11142.	SEW13♦ SEW11♦ SEW15♦	12254.	SEA13♦ SEA11♦ SEA15♦	SEA3♦ SEA1♦ SEA5♦	7326.
	30 40	4	JLL36200 JLL36250	200 250	SFG3♦ SFG4♦	14718.	SFW3♦ SFW4♦	20586.	SFW13♦ SFW14♦	22644.	SFA13♦ SFA14♦	SFA3♦ SFA4♦	16982.
	50 60–75	5	JLL36250 LLL36400E20	250 400	SGG6♦ SGG4♦	29808.	SGW6♦ SGW4♦	44792.	— —	—	SGA16♦ SGA14♦	SGA6♦ SGA4♦	35190.
	100–125 150	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	64274.	SHW4♦ SHW5♦	71396.	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	68120.
230 (240)	2 3	0	HLL36015 HLL36020	15 20	SBG1♦ SBG3♦	2228.	SBW1♦ SBW3♦	3965.	SBW11♦ SBW13♦	4563.	SBA11♦ SBA13♦	SBA1♦ SBA3♦	2712.
	5 7-1/2	1	HLL36035 HLL36045	35 45	SCG5♦ SCG6♦	2399.	SCW5♦ SCW6♦	4136.	SCW15♦ SCW16♦	4761.	SCA15♦ SCA16♦	SCA5♦ SCA6♦	2883.
	10 15	2	HLL36060 HLL36090	60 90	SDG1♦ SDG7♦	4022.	SDW1♦ SDW7♦	6672.	SDW11♦ SDW17♦	7340.	SDA11♦ SDA17♦	SDA1♦ SDA7♦	4649.
	20 25–30	3	HLL36100 HLL36150	100 150	SEG3♦ SEG5♦	6501.	SEW3♦ SEW5♦	11142.	SEW13♦ SEW15♦	12254.	SEA13♦ SEA15♦	SEA3♦ SEA5♦	7326.
	40 50	4	JLL36225 JLL36250	225 250	SFG1♦ SFG4♦	14718.	SFW1♦ SFW4♦	20586.	SFW11♦ SFW14♦	22644.	SFA11♦ SFA14♦	SFA1♦ SFA4♦	16982.
	60 75 100	5	JLL36250 LLL36400E20 LLL36600E20	250 400 600	SGG6♦ SGG4♦ SGG2♦	29808.	SGW6♦ SGW4♦ SGW2♦	44792.	— — —	—	SGA16♦ SGA14♦ SGA12♦	SGA6♦ SGA4♦ SGA2♦	35190.
	125 150–200	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	64274.	SHW4♦ SHW5♦	71396.	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	68120.

▲ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

Table 16.141: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8739SBG1V01S).
▼ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8739SCG5V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

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For How to Order Information, see page 16-13.

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3-Pole Polyphase—600 Vac Maximum—50–60 Hz

Note that the prices shown do not include thermal units. Devices require 3 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Table 16.142: Full-Voltage Type, Reversing with Melting Alloy Overload Relays

Ratings					NEMA 1 General Purpose Enclosure		NEMA 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0 - 5)▲		NEMA 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure		NEMA 12/3R■ Dusttight and Driptight Industrial Use Enclosure		
Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	NEMA Size	Circuit Breaker		Type	$ Price	Type	$ Price	Type	$ Price	With External Reset	Without External Reset	$ Price
			Type	Ampere Rating							Type	Type	
460 (480)	5	0	HLL36015	15	SBG1♦	**2555.**	SBW1♦	**4292.**	SBW11♦	**4932.**	SBA11♦	SBA1♦	**3038.**
	7-1/2 10	1	HLL36025 HLL36030	25 30	SCG3♦ SCG7♦	**2726.**	SCW3♦ SCW7♦	**4463.**	SCW13♦ SCW17♦	**5133.**	SCA13♦ SCA17♦	SCA3♦ SCA7♦	**3209.**
	15 20 25	2	HLL36045 HLL36060 HLL36070	45 60 70	SDG3♦ SDG1♦ SDG5♦	**4350.**	SDW3♦ SDW1♦ SDW5♦	**6998.**	SDW13♦ SDW11♦ SDW15♦	**7695.**	SDA13♦ SDA11♦ SDA15♦	SDA3♦ SDA1♦ SDA5♦	**4976.**
	30 40 50	3	HLL36080 HLL36100 HLL36150	80 100 150	SEG6♦ SEG3♦ SEG5♦	**6501.**	SEW6♦ SEW3♦ SEW5♦	**11142.**	SEW16♦ SEW13♦ SEW15♦	**12254.**	SEA16♦ SEA13♦ SEA15♦	SEA6♦ SEA3♦ SEA5♦	**7326.**
	60 75 100	4	JJL36105 JJL36200 JJL36250	150 200 250	SFG5♦ SFG3♦ SFG4♦	**14718.**	SFW5♦ SFW3♦ SFW4♦	**20586.**	SFW15♦ SFW13♦ SFW14♦	**22644.**	SFA15♦ SFA13♦ SFA14♦	SFA5♦ SFA3♦ SFA4♦	**16982.**
	125–150 200	5	LLL36400E20 LLL36600E20	400 600	SGG4♦ SGG2♦	**29808.**	SGW4♦ SGW2♦	**44792.**	— —	—	SGA14♦ SGA12♦	SGA4♦ SGA2♦	**35190.**
	250 300–400	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	**64274.**	SHW4♦ SHW5♦	**71396.**	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	**68120.**
575 (600)	5	0	HLL36015	15	SBG1♦	**2555.**	SBW1♦	**4292.**	SBW11♦	**4932.**	SBA11♦	SBA1♦	**3038.**
	7-1/2 10	1	HLL36020 HLL36025	20 25	SCG8♦ SCG3♦	**2726.**	SCW8♦ SCW3♦	**4463.**	SCW18♦ SCW13♦	**5133.**	SCA18♦ SCA13♦	SCA8♦ SCA3♦	**3209.**
	15 20 25	2	HLL36035 HLL36045 HLL36060	35 45 60	SDG8♦ SDG3♦ SDG1♦	**4350.**	SDW8♦ SDW3♦ SDW1♦	**6998.**	SDW18♦ SDW13♦ SDW11♦	**7695.**	SDA18♦ SDA13♦ SDA12♦	SDA8♦ SDA3♦ SDA1♦	**4976.**
	30 40 50	3	HLL36070 HLL36090 HLL36100	70 90 100	SEG4♦ SEG6♦ SEG3♦	**6501.**	SEW4♦ SEW6♦ SEW3♦	**11142.**	SEW14♦ SEW16♦ SEW13♦	**12254.**	SEA14♦ SEA16♦ SEA13♦	SEA4♦ SEA6♦ SEA3♦	**7326.**
	60–75 100	4	JLL36150 JLL36250	150 250	SFG5♦ SFG4♦	**14718.**	SFW5♦ SFW4♦	**20586.**	SFW15♦ SFW14♦	**22644.**	SFA15♦ SFA14♦	SFA5♦ SFA4♦	**16982.**
	125–150 200	5	JLL36250 LLL36400E20	250 400	SGG6♦ SGG4♦	**29808.**	SGW6♦ SGW4♦	**44792.**	— —	—	SGA16♦ SGA14♦	SGA6♦ SGA4♦	**35190.**
	250–350 400	6	LLL36600E20 MJL36800	600 800	SHG4♦ SHG5♦	**64274.**	SHW4♦ SHW5♦	**71396.**	— —	—	SHA14♦ SHA15♦	SHA4♦ SHA5♦	**68120.**

▲ NEMA Size 6 starters are NEMA 4 painted sheet steel enclosures.
■ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

Table 16.143: Class 8738 UL Listed Short Circuit Ratings

NEMA Size	Fuse Clip Type	Enclosure	Ampere Interrupting Capability Rating (AIC)
0-3	Standard	Standard★	5,000
0-3	Class R	Standard★	100,000
4-5	Standard	Standard★	10,000
4-5	Class R	Standard★	100,000

★ Standard enclosure includes: NEMAs 1, 4 & 4X stainless, and 12/3R.

Table 16.144: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24△▼	—	V01	No Charge
120△	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

▼ 24 V coils are not available on Sizes 4–7. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified (i.e., order as 8739SBG2V01S).
△ These voltage codes must include **Form S** (supplied at no charge) (i.e., order as 8739SDG3V02S).
Note: For voltage codes used with control transformers, see page 16-101.
Form S (separate control) is used when a separate source of power is available for the control (coil) voltage. Form S is supplied at no charge.

Table 16.145: Class 8739 UL Listed Short Circuit Ratings

Motor Circuit Protector Type			
NEMA Size	Voltage	Enclosure	Ampere Interrupting Capability Rating (AIC)
0, 1	480	Standard□	100,000
0, 1	481 – 600	Standard□	35,000
2, 3, 4, 5	480	Standard□	100,000
2, 3, 4, 5	481 – 600	Standard□	50,000
6	480	Standard□	65,000
6	600	Standard□	18,000
Thermal Magnetic Circuit Breaker Type			
0, 1	480	Standard□	100,000
0, 1	481 – 600	Standard□	35,000
2, 3, 4, 5	480	Standard□	100,000
2, 3, 4, 5	481 – 600	Standard□	50,000
6	480	Standard□	65,000
6	600	Standard□	18,000

□ Standard enclosure includes: NEMAs 1, 4 & 4X stainless, and 12/3R.

For How to Order Information, see page 16-13.

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Approximate Dimensions

Table 16.146: NEMA 1 Enclosure (Size 0–2) Figure 1

NEMA Size	Class	Type	Dimensions (in inches)♦—see Figure 1																Top & Bottom		Sides	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X	Y	
0–1	8738 & 8739	SBG SCG	13-3/4	23	8-11/32	10-5/8	21	18-29/32	1-7/8	1-7/8	3-3/4	2-5/16	1-1/16	3-1/4	2-3/16	1-1/4	7/8	—	1/2–3/4–1	1/2–3/4–1	1/2	49
2	8738 & 8739	SDG	15	28-3/4	9-19/32	11-5/8	26-1/4	21-15/32	2-3/16	2	4	2-9/16	1-1/4	3-1/4	2-3/16	1-1/4	29/32	—	1–1-1/4	1–1-1/4	1/2	80

Table 16.147: NEMA 1 Enclosure (Size 3–6) Figure 2

NEMA Size	Class	Type	Dimensions (in inches)♦—see Figure 2																Top & Bottom		Sides	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X	Y	
3	8738 & 8739	SEG	18-1/2	44	10-19/32	12-1/2	3	25-31/32	43-1/2	1/4	—	2-13/16	3-1/2	5	2-11/16	5-3/8	1-7/32	29/32	1–1-1/4 2–2-1/4	1/2–3/4	1/2	245
4	8738	SFG	21	51-1/2	10-17/32	15	3	30-23/32	51	1/4	—	2-13/16	3-1/2	5	2-11/16	5-3/8	1-7/32	29/32	2-1/2	1/2–3/4	1/2	—
	8739	SFG	18-1/2	44	10-19/32	12-1/2	3	25-31/32	43-1/2	1/4	—	2-13/16	3-1/2	5	2-11/16	5-3/8	1-7/32	29/32	1–1-1/4 2–2-1/4	1/2–3/4	1/2	—
5	8738	SGG	30	77	15-1/2	22	4	39-13/32	76	1/2	—	3-1/2	6-9/32	9-1/4	3-3/16	—	—	—	1/2–3/4	3	—	—
	8739	SGG	30	65	13-23/32	22	4	39-13/32	64	1/2	—	3-1/2	6-9/32	5	3-3/16	—	—	—	1/2–3/4	3	—	—
6	8738 & 8739	SHG	36	90	17-1/32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 16.148: NEMA 12/3R Enclosure Figure 3

NEMA Size	Class	Type	Dimensions (in inches)♦—see Figure 3										Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	
0–1	8738 & 8739	SBA SCA	13-3/4	10-3/32	24-3/4	3-1/4	2-1/2	8-3/4	24	3/8	3-3/4	20-5/16	52
2	8738 & 8739	SDA	15	10-31/32	31	3-1/4	3	9	30-1/4	3/8	3-3/4	23-7/16	95
3	8738 & 8739	SEA	18-1/2	10-19/32	45	5	3	12-1/2	44	1/2	3-3/4	25-19/32	255
4	8738	SFA	21	10-19/32	52-1/2	5	3	15	51-1/2	1/2	3-3/4	30-11/32	—
	8739	SFA	18-1/2	10-19/32	45	3-1/4	3	12-1/2	44	1/2	3-3/4	25-19/32	—
5	8738	SGA	30	15-1/2	78	9-1/4	4	22	77	1/2	7-1/2	39-13/32	—
	8739	SGA	30	15-1/2	66	—	4	22	65	1/2	7-1/2	37-7/8	—
6▲	8739	SHA	36	17-1/32	90	—	—	—	—	—	—	—	—

▲ Size 6 enclosures are floor mounting.

Table 16.149: NEMA 4X Polyester Enclosure■ Figure 4

NEMA Size	Class	Dimensions (in inches)♦—see Figure 4					
		Type	A	B	C	E	F
0-2	8738 & 8739	SBW SCW SDW	25.25	11.4	27.00	17.88	25.75
3-4	8739	SEW SFW	26.31	11.4	33.50	18.50	32.25

■ See page 16-58 for important information on hubs for NEMA 4X enclosures.

♦ The dimensions shown in all tables above are also for **Form F4T** (standard control transformer), **Form F4T11** (100 VA extra-capacity), and **Form F4T12** (200 VA extra-capacity).

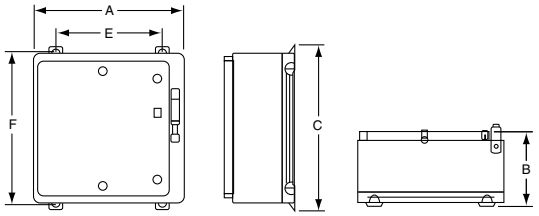

Figure 4: NEMA 4X Polyester Enclosure

NOTE: *Illustrations may not represent the actual enclosure; they are intended for dimensional information only.*

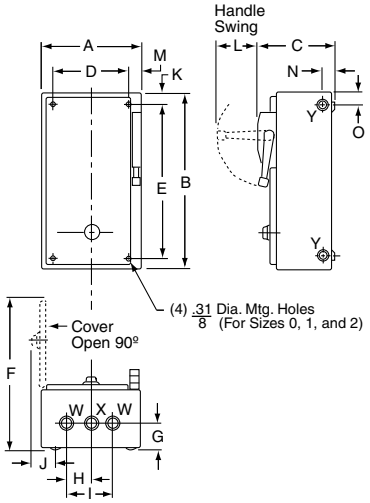

Figure 1:
NEMA 1 Enclosure (Sizes 0–2)

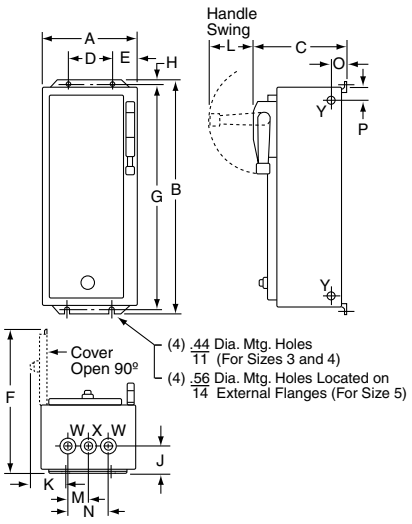

Figure 2:
NEMA 1 Enclosure (Sizes 3–6)

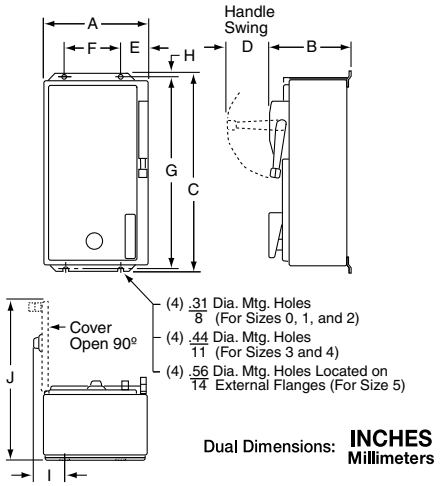

Figure 3:
NEMA 12 Enclosure

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Approximate Dimensions

Table 16.150: NEMA 4 & 4X Stainless Enclosure Figure 1

NEMA Size	Class	Type	Dimensions (in inches)▲—see Figure 1												Bottom	Top & Bot.	Wt. (lb)
			A	B	C	D	E	F	G	H	I	J	K	L	W	X	
0–1	8738 & 8739	SBW SCW	13-3/4	8-11/32	25-3/16	3-1/4	2-1/2	8-3/4	24	19/32	3	1-5/8	2-5/16	18-17/32	3/4 Hub	1 Hub	52
2	8738 & 8739	SDW	15	9-19/32	30-1/32	3-1/4	2-1/2	10	29-3/4	5/8	3	2	2-5/8	21-1/32	3/4 Hub	1-1/2 Hub	95
3	8738 & 8739	SEW	18-1/2	10-9/16	45-3/16	5	3	12-1/2	44	19/32	3-1/2	2-5/8	3-3/16	25-1/2	3/4 Hub	2-1/2 Hub	255
4	8738	SFW	21	10-17/32	52-11/16	5	3	15	51-1/2	19/32	3-1/2	2-5/8	3-3/16	30-1/4	3/4 Hub	2-1/2 Hub	—
	8739	SFW	18-1/2	10-9/16	45-3/16	5	3	12-1/2	44	19/32	3-1/2	2-5/8	3-3/16	25-1/2	3/4 Hub	2-1/2 Hub	—
5	8738	SGW	30	15-1/2	78-3/32	9-1/4	4	22	77	9/16	6-3/32	3	3-1/2	39-13/32	3/4 Hub	3-1/2 Hub	—
	8739	SGW	30	13-57/64	66-3/32	5	4	22	65	9/16	6-3/32	3	3-1/2	37-7/8	3/4 Hub	3-1/2 Hub	—
6	8739	SHW	36	17-1/32	98	—	—	—	—	—	—	—	—	—	—	—	—

▲ Above dimensions also for **Form F4T** (standard control transformer), **Form F4T11** (100 VA extra capacity) and **Form F4T12** (200 VA extra capacity).

NOTE: *Illustrations may not represent the actual enclosure; they are intended for dimensional information only.*

Information on Hubs

Hubs are supplied with each NEMA 4X combination starter as shown in the table below.

Note that hubs are only installed in stainless steel enclosures; they are supplied but not installed in polyester enclosures.

Table 16.151:

NEMA Size	Quantity	Hub Size
0 & 1	1 2	0.75" 1.00"
2	1 2	0.75" 1.50"
3 & 4	1 2	0.75" 2.50"

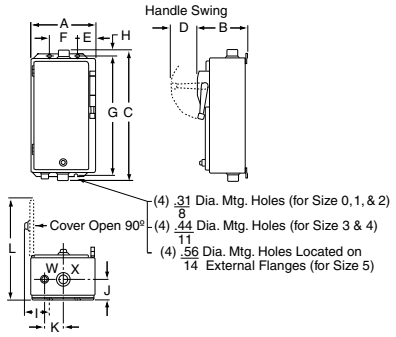

Figure 1:
NEMA 4 & 4X Stainless Enclosure

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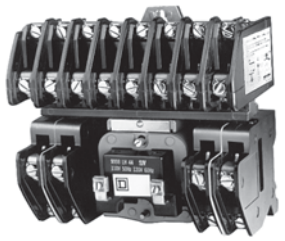
Multipole Lighting Contactors, Type L & LX

Features

- 30 A fluorescent lighting rating, 20 A tungsten lighting rating
- Electrically and mechanically held
- 2 through 12-pole versions
- Field-convertible contacts with N.O. and N.C. indicators (8 N.C. contacts maximum★)
- Silver-Cadmium-Oxide double break contacts

File E78427 CCN NRNT

File LR60905 Class 3211 07



Type L

Type LX

Table 16.152: Multipole Lighting Contactors (50–60 Hz)

Contact Ampere Ratings	No. of Poles	NEMA 1 General Purpose Enclosure		NEMA 1 Flush Mounting General Purpose Enclosure with Plaster Adjustment		NEMA 3R Rainproof Enclosure▼		NEMA 4 & 4X Watertight, Dusttight and Corrosion-Resistant Glass-Polyester Enclosure		NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure		NEMA 12/3R△ Dusttight and Driptight Industrial Use Enclosure		Open Type■	
		Type	$ Price▲	Type	$ Price▲	Type	$ Price▲	Type	$ Price▲	Type	$ Price▲	Type	$ Price▲	Type	$ Price▲
Electrically Held★															
30♦	2	LG20♦	**446.00**	LF20♦	**689.00**	LH20♦	**860.00**	LWW20♦	**1146.00**	LW20♦	**917.00**	LA20♦	**860.00**	LO20♦	**404.00**
	3	LG30♦	**489.00**	LF30♦	**732.00**	LH30♦	**903.00**	LWW30♦	**1197.00**	LW30♦	**959.00**	LA30♦	**903.00**	LO30♦	**446.00**
	4	LG40♦	**617.00**	LF40♦	**860.00**	LH40♦	**1031.00**	LWW40♦	**1358.00**	LW40♦	**1088.00**	LA40♦	**1031.00**	LO40♦	**575.00**
	6	LG60♦	**890.00**	LF60♦	**1031.00**	LH60♦	**1202.00**	LWW60♦	**1571.00**	LW60♦	**1259.00**	LA60♦	**1202.00**	LO60♦	**746.00**
	8	LG80♦	**1160.00**	LF80♦	**1301.00**	LH80♦	**1472.00**	LWW80♦	**1908.00**	LW80♦	**1529.00**	LA80♦	**1472.00**	LO80♦	**1017.00**
	10	LG1000♦	**1331.00**	LF1000♦	**1472.00**	LH1000♦	**1643.00**	LWW1000♦	**2123.00**	LW1000♦	**1700.00**	LA1000♦	**1643.00**	LO1000♦	**1188.00**
	12	LG1200♦	**1529.00**	LF1200♦	**1673.00**	LH1200♦	**1844.00**	LWW1200♦	**2372.00**	LW1200♦	**1899.00**	LA1200♦	**1844.00**	LO1200♦	**1386.00**
Mechanically Held▼□															
30♦	2	LXG20♦	**702.00**	LXF20♦	**975.00**	—	—	LXWW20♦	**1728.00**	LXW20♦	**1728.00**	LXA20♦	**1017.00**	LXO20♦	**590.00**
	3	LXG30♦	**738.00**	LXF30♦	**1008.00**	—	—	LXWW30♦	**1764.00**	LXW30♦	**1764.00**	LXA30♦	**1052.00**	LXO30♦	**624.00**
	4	LXG40♦	**761.00**	LXF40♦	**1031.00**	—	—	LXWW40♦	**1785.00**	LXW40♦	**1785.00**	LXA40♦	**1074.00**	LXO40♦	**647.00**
	6	LXG60♦	**1160.00**	LXF60♦	**1430.00**	—	—	LXWW60♦	**2186.00**	LXW60♦	**2186.00**	LXA60♦	**1472.00**	LXO60♦	**1044.00**
	8	LXG80♦	**1287.00**	LXF80♦	**1557.00**	—	—	LXWW80♦	**2313.00**	LXW80♦	**2313.00**	LXA80♦	**1601.00**	LXO80♦	**1173.00**
	10	LXG1000♦	**1430.00**	LXF1000♦	**1700.00**	—	—	LXWW1000♦	**2456.00**	LXW1000♦	**2456.00**	LXA1000♦	**1742.00**	LXO1000♦	**1314.00**
	12	LXG1200♦	**1580.00**	LXF1200♦	**1850.00**	—	—	LXWW1200♦	**2604.00**	LXW1200♦	**2604.00**	LXA1200♦	**1893.00**	LXO1200♦	**1466.00**

▲ Price does not include holding circuit contact.
■ Separate enclosures are available for these devices. It may be possible to improve delivery by ordering an open type contactor and separate Class 9991 enclosure.
♦ Coil voltage code must be specified to order this product. Refer to standard voltage codes listed below. All lighting contactors are provided with separate control as standard.
★ Factory conversion of N.O. contacts to N.C., order by catalog number and add **$42.80** to price (i.e. For 6 N.O. and 2 N.C. poles on an 8 pole contactor, order as 8903LG62V02). Versions are available from the factory with up to 12 N.C. poles electrically held or 2, 4, 6 and 12 N.C. poles mechanically held. For field conversion, there is a maximum of eight N.C. poles for Type L and a maximum of six N.C. poles for Type LX contactors.

NOTE: *For contactors with more than 8 poles, the catalog number configuration will be the number of normally open contacts followed by a 0 and then the number of normally closed contacts (i.e. for 4 NO and 6 NC on a 10 pole contactor order 8903LG406V02).*

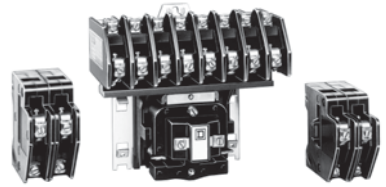
▼ Cannot support control transformer forms.
△ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service entrance rated applications. See page 16-95 for more information.
□ When ordering Form C, Form R6 must be included.

Table 16.153: Power Poles for Type L or LX -

The kits below are used to add 30 Ampere power poles to existing Type L contactors when additional circuits are required. Type L lighting contactors are supplied with mounting brackets, so that adder poles may be mounted from the front by a single captive screw. Adder poles are supplied standard with N.O. contacts which are convertible to N.C.

Power Pole Adder Kit◊		Can Only Be Added to Contactor Type☆
Class 8903 Type	$ Price	
Single Pole		LO60 LXO60 LO80 LXO80 LO1000 LXO1000
L1L L1R	**86.00** **86.00**	
Double Pole		
L3L L3R	**171.00** **171.00**	

◊ 8903LO (electrically held) devices can accommodate 10 or 12 N.C. contacts use **only** 120 V 60Hz coils.
☆ LO60 & LXO60—add 1-pole kits only, 1 on each side, for converting to 8-pole. To maintain proper operation, it cannot be converted to greater than 8-pole contactor. LO80 & LXO80—use single-pole kits, 1 on each side, for converting to 10-pole and use two-pole kits, 1 on each side, for converting to 12-pole. LO1000 & LXO1000—remove existing single pole kit and install two-pole kits, 1 on each side, for converting to 12-pole.

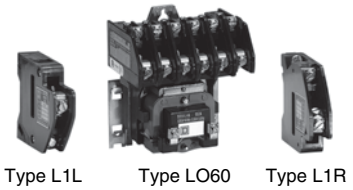


Type L3L Type LO80 Type L3R

Table 16.154: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24	—	V01	No Charge
120	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
Specify	Specify	V99	35.60

Factory Modifications (Forms). . . . . .page 16-63
Replacement Coils . . . . . .pages 16-105, 16-106
Replacement Contacts . . . . . page 16-107



Type L1L Type LO60 Type L1R

Table 16.155: How to Order

To Order Specify:	Catalog Number			
	Class	Type	Voltage Code	Form(s)
• Class Number • Type Number • Voltage Code • Form(s)	8903	LXG60	VO4	CF4R6

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Features

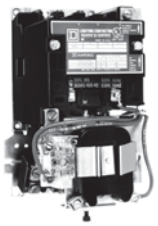
- Electrically and mechanically held
- 30–800 A lighting ratings
- 2- through 5-pole versions (5-poles through 200 A)
- UL Listed short-circuit rating up to 100,000 Amperes
- Factory wired controls and clearly marked termination points
- Quick ship on most items in 5–7 days

Table 16.156: Multipole Lighting Contactors—Type S (50–60 Hz)

Contact Ampere Ratings	No. of Poles	NEMA 1 General Purpose Enclosure		NEMA 1 Flush Mounting General Purpose Enclosure with Plaster Adjustment		NEMA Type 3R Rainproof Enclosure△		NEMA 4 & 4X Watertight, Dusttight and Corrosion-Resistant Glass-Polyester Enclosure		NEMA Type 4 & 4X▲ Watertight and Dusttight Enclosure		NEMA Type 12 / 3R◊ Dusttight and Driptight Industrial Use Enclosure		Open Type	
		Type	$ Price■	Type	$ Price■	Type	$ Price■	Type	$ Price■	Type	$ Price■	Type	$ Price■	Type	$ Price■
Electrically Held♦															
30	2	SMG1★	476.	SMF1★	660.	SMH1★	647.	SMW21★	989.	SMW1★	989.	SMA1★	647.	SMO1★▼	446.
	3	SMG2★	518.	SMF2★	689.	SMH2★	689.	SMW22★	1031.	SMW2★	1031.	SMA2★	810.	SMO2★▼	488.
	4	SMG3★	633.	SMF3★	818.	SMH3★	804.	SMW23★	1146.	SMW3★	1146.	SMA3★	804.	SMO3★▼	603.
	5	SMG4★	831.	SMF4★	1017.	SMH4★	1002.	SMW24★	1344.	SMW4★	1344.	SMA4★	1002.	SMO4★▼	534.
60	2	SPG1★	975.	SPF1★	1215.	SPH1★	1287.	SPW21★	1998.	SPW1★	1998.	SPA1★	1287.	SPO1★▼	831.
	3	SPG2★	1031.	SPF2★	1272.	SPH2★	1344.	SPW22★	2057.	SPW2★	2057.	SPA2★	1344.	SPO2★▼	890.
	4	SPG3★	1287.	SPF3★	1529.	SPH3★	1601.	SPW23★	2712.	SPW3★	2712.	SPA3★	1601.	SPO3★▼	1146.
	5	SPG4★	1857.	SPF4★	2100.	SPH4★	2142.	SPW24★	3281.	SPW4★	3281.	SPA4★	2142.	SPO4★▼	1715.
100	2	SQG1★	1601.	SQF1★	2015.	SQH1★	1971.	SQW21★	3815.	SQW1★	3054.	SQA1★	1971.	SQO1★▼	1314.
	3	SQG2★	1715.	SQF2★	2127.	SQH2★	2084.	SQW22★	3959.	SQW2★	3167.	SQA2★	2084.	SQO2★▼	1430.
	4	SQG3★	2114.	—	—	SQH3★	2484.	—	—	SQW3★	3965.	SQA3★	2484.	SQO3★▼	1827.
	5	SQG4★	3024.	—	—	SQH4★	3396.	—	—	SQW4★	4877.	SQA4★	3396.	SQO4★▼	2739.
200	2	SVG1★	3765.	—	—	SVH1★	4991.	—	—	SVW1★	6245.	SVA1★	4991.	SVO1★	3167.
	3	SVG2★	4022.	—	—	SVH2★	5247.	—	—	SVW2★	6501.	SVA2★	5247.	SVO2★	3423.
	4	SVG3★	5285.	—	—	—	—	—	—	SVW3★	8864.	SVA3★	7011.	SVO3★	4761.
	5	SVG4★	7127.	—	—	—	—	—	—	SVW4★	10646.	SVA4★	8793.	SVO4★	6543.
300	2	SXG1★	7952.	—	—	—	—	—	—	SXW1★	11087.	SXA1★	11087.	SXO1★	6857.
	3	SXG2★	8550.	—	—	—	—	—	—	SXW2★	11685.	SXA2★	11685.	SXO2★	7455.
400□	2	SYG1★	20813.	—	—	—	—	—	—	SYW1★	27935.	SYA1★	24659.	SYO1★	16299.
	3	SYG2★	23534.	—	—	—	—	—	—	SYW2★	30654.	SYA2★	27378.	SYO2★	19020.
600□	2	SZG1★	25550.	—	—	—	—	—	—	SZW1★	32670.	SZA1★	29394.	SZO1★	20879.
	3	SZG2★	28704.	—	—	—	—	—	—	SZW2★	35825.	SZA2★	32549.	SZO2★	24026.
800□	2	SJG1★	30285.	—	—	—	—	—	—	SJW1★	37535.	SJA1★	33845.	SJO1★	25457.
	3	SJG2★	33875.	—	—	—	—	—	—	SJW2★	40995.	SJA2★	37719.	SJO2★	29033.
Mechanically Held♦															
30	2	SMG10★	738.	SMF10★	923.	—	—	SMW31★	1251.	SMW10★	1251.	SMA10★	912.	SMO10★▼	710.
	3	SMG11★	782.	SMF11★	966.	—	—	SMW32★	1295.	SMW11★	1295.	SMA11★	953.	SMO11★▼	752.
	4	SMG12★	824.	SMF12★	1008.	—	—	SMW33★	1337.	SMW12★	1337.	SMA12★	995.	SMO12★▼	795.
	5	SMG13★	1025.	SMF13★	1209.	—	—	SMW34★	1538.	SMW13★	1538.	SMA13★	1196.	SMO13★▼	995.
60	2	SPG10★	1485.	SPF10★	1758.	—	—	SPW31★	2511.	SPW10★	2511.	SPA10★	1800.	SPO10★▼	1373.
	3	SPG11★	1544.	SPF11★	1814.	—	—	SPW32★	2570.	SPW11★	2570.	SPA11★	1857.	SPO11★▼	1430.
	4	SPG12★	1827.	SPF12★	2100.	—	—	SPW33★	3252.	SPW12★	3252.	SPA12★	2142.	SPO12★▼	1715.
	5	SPG13★	2399.	SPF13★	2669.	—	—	SPW34★	3824.	SPW13★	3824.	SPA13★	2712.	SPO13★▼	2285.
100	2	SQG10★	2084.	SQF10★	2241.	—	—	SQW31★	4419.	SQW10★	3537.	SQA10★	2456.	SQO10★▼	1827.
	3	SQG11★	2199.	SQF11★	2357.	—	—	SQW32★	4563.	SQW11★	3653.	SQA11★	2570.	SQO11★▼	1943.
	4	SQG12★	2627.	—	—	—	—	—	—	SQW12★	4478.	SQA12★	2996.	SQO12★▼	2370.
	5	SQG13★	3537.	—	—	—	—	—	—	SQW13★	5390.	SQA13★	3909.	SQO13★▼	3281.
200	2	SVG10★	5333.	—	—	—	—	—	—	SVW10★	7811.	SVA10★	6557.	SVO10★	4505.
	3	SVG11★	6015.	—	—	—	—	—	—	SVW11★	8495.	SVA11★	7241.	SVO11★	4877.
	4	SVG12★	7353.	—	—	—	—	—	—	SVW12★	10859.	SVA12★	9008.	SVO12★	6215.
300	2	SXG13★	9320.	—	—	—	—	—	—	SXW13★	12455.	SXA13★	12455.	SXO13★	7554.
	3	SXG14★	10232.	—	—	—	—	—	—	SXW14★	13365.	SXA14★	13365.	SXO14★	7811.
400	2	SYG16★	22593.	—	—	—	—	—	—	SYW16★	29714.	SYA16★	26441.	SYO16★	18080.
	3	SYG17★	25316.	—	—	—	—	—	—	SYW17★	32436.	SYA17★	29160.	SYO17★	20799.
600	2	SZG18★	27329.	—	—	—	—	—	—	SZW18★	34451.	SZA18★	31175.	SZO18★	22658.
	3	SZG19★	30483.	—	—	—	—	—	—	SZW19★	37605.	SZA19★	34329.	SZO19★	25806.

▲ **NEMA 4 & 4X** enclosures are brush finished stainless steel for contactors sized 30 A through 300 A. Sizes 400–800 A are painted sheet steel.
■ Price does not include holding circuit contact.
♦ All lighting contactors are provided with separate control as standard, except electrically held 400, 600 and 800 A devices. Electrically held 400, 600 and 800 A devices are provided with common control.
★ Voltage code must be specified to order this product. Refer to standard voltage codes above left.
▼ Separate enclosures are available for these devices. It may be possible to improve delivery by ordering an open type contactor and separate Class 9991 enclosure from pages 16-93 and 16-94.
△ Cannot support control transformer forms.
□ **Form F4T** is provided as standard; include line voltage when ordering. Control voltage is 120–60. For 400, 600 and 800 ampere devices—must specify line voltage, not coil voltage.
◊ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service entrance rated applications. See page 16-95 for more information.

Electrically Held



Mechanically Held

File E78427
CCN NRNT

File LR60905
(Open Devices Only)
Class 3231 01

Poles for Type S Only

A single-pole or double-pole kit can be added to any 2- or 3-pole 30 or 60 A Type S lighting contactor to make a 4- or 5-pole device. Factory assembled 4- and 5-pole contactors utilize the basic 3-pole device with a single or double-pole kit installed. Only one power pole can be added per contactor. Sufficient room is provided in all enclosure styles for the addition of a power pole kit.

For How to Order Information, see page 16-13.

Table 16.157:

Coil Voltage Codes♦			
Voltage		Code	Price Adder
60 Hz	50 Hz		
24☆	—	V01	N/C
120	110	V02	N/C
208	—	V08	N/C
240	220	V03	N/C
277	—	V04	N/C
480	440	V06	N/C
Specify	Specify	V99	**35.60**

☆ 24 volt coils are not available for 200–800 A devices. Contact your nearest Square D/Schneider Electric sales office for additional information.

Table 16.158:

Ampere Rating	Description	Class 9999 Type	$ Price
30	One N.O.	SB6	**158.00**
	One N.C.	SB7	**158.00**
	One N.O. and One N.C.	SB8	**365.00**
	Two N.O.	SB9	**365.00**
	Two N.C.	SB10	**365.00**
60	One N.O.	SB21▽	**306.00**
	One N.C.	SB22▽	**306.00**
	One N.O. and One N.C.	SB23▽	**656.00**
	Two N.O.	SB24▽	**656.00**
	Two N.C.	SB25▽	**656.00**

▽ When power pole is added to 60 Ampere contactor, a 4-pole coil is also required. Order from Coil Table page 16-105. 60 A power poles are suitable for use with copper or aluminum wire.

Factory Modifications (Forms) . . . . . page 16-63
Replacement Coils . . . . . pages 16-105, 16-106
Replacement Contacts. . . . . page 16-107

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File E16151
CCN NRNT

Features

The features include: disconnect switch and circuit breaker versions; rugged flange-mounted handle; easy installation; occupation of less space; increased operator protection; room to spare for modifications; Class R fuse clips standard; electrically and mechanically held; 30–600 Amperes.

It is desirable to install the branch-circuit protective device and lighting contactor, combining switching and over-current protection, in one enclosure. Combination lighting contactors are well suited for industrial, highway and area lighting applications, or where a lighting circuit may have to be disconnected for periodic maintenance. They may also be used for resistance heating loads.

Table 16.159: Fusible or Non-Fusible Disconnect Switch (3-Pole, 50–60 Hz)

Contactor Ampere Rating	Fuse Clip Size (A)	Fuse Clip Spacing (V)	NEMA 1 General Purpose Enclosure		NEMA 4 & 4X ■ Watertight and Dusttight Enclosure Stainless Steel		NEMA 12/3R▼ Dusttight, Oiltight Driptight, Industrial Use Enclosure	
			Type	$ Price▲	Type	$ Price▲	Type	$ Price▲
Electrically Held♦								
30	None 30 30	— 600 250	SMG60★ SMG61★ SMG62★	**1301.00** **1373.00** **1344.00**	SMW60★ SMW61★ SMW62★	**2669.00** **2739.00** **2712.00**	SMA60★ SMA61★ SMA62★	**1643.00** **1715.00** **1686.00**
60	None 60 60	— 600 250	SPG60★ SPG61★ SPG62★	**2042.00** **2142.00** **2100.00**	SPW60★ SPW61★ SPW62★	**4149.00** **4248.00** **4206.00**	SPA60★ SPA61★ SPA62★	**2528.00** **2627.00** **2583.00**
100	None 100 100	— 600 250	SQG60★ SQG61★ SQG62★	**3396.00** **3609.00** **3537.00**	SQW60★ SQW61★ SQW62★	**7070.00** **7284.00** **7212.00**	SQA60★ SQA61★ SQA62★	**4022.00** **4235.00** **4163.00**
200	None 200 200	— 600 250	SVG60★ SVG61★ SVG62★	**6629.00** **6926.00** **6870.00**	SVW60★ SVW61★ SVW62★	**11327.00** **11627.00** **11570.00**	SVA60★ SVA61★ SVA62★	**8366.00** **8585.00** **8607.00**
300	None 400 400	— 600 250	SXG60★ SXG61★ SXG62★	**13905.00** **14418.00** **14418.00**	SXW60★ SXW61★ SXW62★	**25898.00** **26411.00** **26411.00**	SXA60★ SXA61★ SXA62★	**18122.00** **18635.00** **18635.00**
Mechanically Held♦								
30	None 30 30	— 600 250	SMG70★ SMG71★ SMG72★	**1458.00** **1529.00** **1502.00**	SMW70★ SMW71★ SMW72★	**2825.00** **2897.00** **2867.00**	SMA70★ SMA71★ SMA72★	**1800.00** **1871.00** **1844.00**
60	None 60 60	— 600 250	SPG70★ SPG71★ SPG72★	**2583.00** **2682.00** **2640.00**	SPW70★ SPW71★ SPW72★	**4692.00** **4791.00** **4748.00**	SPA70★ SPA71★ SPA72★	**3068.00** **3167.00** **3123.00**
100	None 100 100	— 600 250	SQG70★ SQG71★ SQG72★	**3909.00** **4121.00** **4050.00**	SQW70★ SQW71★ SQW72★	**7583.00** **7797.00** **7725.00**	SQA70★ SQA71★ SQA72★	**4535.00** **4748.00** **4676.00**
200	None 200 200	— 600 250	SVG70★ SVG71★ SVG72★	**8081.00** **8379.00** **8324.00**	SVW70★ SVW71★ SVW72★	**12780.00** **13080.00** **13023.00**	SVA70★ SVA71★ SVA72★	**9818.00** **10116.00** **10061.00**
300	None 400 400	— 600 250	SXG70★ SXG71★ SXG72★	**14261.00** **14774.00** **14774.00**	SXW70★ SXW71★ SXW72★	**26253.00** **26766.00** **26766.00**	SXA70★ SXA71★ SXA72★	**18477.00** **18990.00** **18990.00**

Table 16.160: Circuit Breaker (3-Pole, 50–60 Hz)

Contactor Ampere Rating	Circuit Breaker		NEMA 1 General Purpose Enclosure		NEMA 4 & 4X■ Watertight and Dusttight Enclosure Stainless Steel (30-300 A)		NEMA 12/3R▼ Dusttight, Oiltight, Driptight, Industrial Use Enclosure	
	Ampere Rating	Maximum Volts	Type	$ Price▲	Type	$ Price▲	Type	$ Price▲
Electrically Held♦								
30	30	600	SMG81★	**1814.00**	SMW81★	**3182.00**	SMA81★	**2156.00**
60	60	600	SPG81★	**2541.00**	SPW81★	**4649.00**	SPA81★	**3024.00**
100	100	600	SQG81★	**3666.00**	SQW81★	**7340.00**	SQA81★	**4292.00**
200	200	600	SVG81★	**8181.00**	SVW81★	**12879.00**	SVA81★	**9918.00**
300	300	600	SXG81★	**18023.00**	SXW81★	**30014.00**	SXA81★	**21155.00**
400	400	600	SYG81★	**40085.00**	SYW81★	**47205.00**	SYA81★	**43929.00**
600	600	600	SZG81★	**45090.00**	SZW81★	**52212.00**	SZA81★	**48936.00**
Mechanically Held♦								
30	30	600	SMG91★	**1971.00**	SMW91★	**3338.00**	SMA91★	**2313.00**
60	60	600	SPG91★	**3081.00**	SPW91★	**5189.00**	SPA91★	**3567.00**
100	100	600	SQG91★	**4179.00**	SQW91★	**7853.00**	SQA91★	**4805.00**
200	200	600	SVG91★	**9633.00**	SVW91★	**14333.00**	SVA91★	**11970.00**
300	300	600	SXG91★	**18378.00**	SXW91★	**30371.00**	SXA91★	**21510.00**
400	400	600	SYG91★	**41864.00**	SYW91★	**48986.00**	SYA91★	**45710.00**
600	600	600	SZG91★	**46728.00**	SZW91★	**53991.00**	SZA91★	**50715.00**

▲ Price does not include holding circuit contact.
■ For **NEMA 4 & 4X** Watertight, Dusttight and Corrosion-Resistant Glass-Polyester enclosure pricing, multiply stainless steel enclosed price by 1.25 and add **Form G18** (limited to 100 A max.). 400 & 600 A enclosures are painted sheet steel **(NEMA Type 4 & 4X).**
♦ Control/coil voltage must be specified.
★ Coil voltage codes must be specified to order this product. Refer to standard voltage codes shown on page 16-60.
▼ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service entrance rated applications. See page 16-95 for more information.

Table 16.161: Coil Voltage Codes♦

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24△	—	V01	N/C
120	110	V02	N/C
208	—	V08	N/C
240	220	V03	N/C
277	—	V04	N/C
480	440	V06	N/C
Specify	Specify	V99	35.60

△ 24 volt coils are not available for 200 A or larger devices. Contact Schneider Electric CCC for additional information.

For How to Order Information, see page 16-13.

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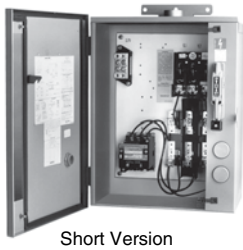
NIGHT-MASTER® Combination Lighting Contactors

Class **8903** / Refer to Catalog **8903CT9701**

NIGHT-MASTER Outdoor Combination Lighting Contactors offer disconnecting means, overcurrent protection and a lighting contactor in one NEMA 3R Rainproof enclosure. These combination units satisfy requirements of the National Electrical Code and UL 508 for service entrance equipment.

Long Version



Short Version

UL Approved for Service Entrance

File E16151
CCN NRNT

Features:

- Solid neutral standard
- Grounding lug standard
- Padlocking provisions
- Short and long versions available
- Electrically held Type S lighting contactor
- Eliminates the need for separate mounted safety switches
- Additional panel space eliminates the need for external mounting of time clocks

Table 16.162: Disconnect Switch Type ■ (3-Pole)

Contactor Ampere Rating	Fuse Clip Size (A)	Fuse Clip Spacing (V)	Short Version				Long Version			
			Class 8903 Type 3R	$ Price▲	Class 8903 Type 3R Stainless Steel	$ Price▲	Class 8903 Type 3R	$ Price▲	Class 8903 Type 3R Stainless Steel	$ Price ▲
30	30 30	600 250	SMC61♦ SMC62♦	**2015.00** **1956.00**	SMH61♦ SMH62♦	**3263.00** **3150.00**	SMC63♦ SMC64♦	**2199.00** **2177.00**	SMH63♦ SMH64♦	**3600.00** **3488.00**
60	60 60	600 250	SPC61♦ SPC62♦	**2664.00** **2505.00**	SPH61♦ SPH62♦	**4275.00** **4050.00**	SPC63♦ SPC64♦	**2933.00** **2825.00**	SPH63♦ SPH64♦	**4725.00** **4500.00**
100	100 100	600 250	SQC61♦ SQC62♦	**4571.00** **4454.00**	SQH61♦ SQH62♦	**7425.00** **7200.00**	SQC63♦ SQC64♦	**4797.00** **4626.00**	SQH63♦ SQH64♦	**7875.00** **7650.00**
200	200 200	600 250	SVC61♦ SVC62♦	**8171.00** **7986.00**	SVH61♦ SVH62♦	**12525.00** **12825.00**	SVC63♦ SVC64♦	**8949.00** **8868.00**	SVH63♦ SVH64♦	**13725.00** **13725.00**

Table 16.163: Circuit Breaker Type■ (3-Pole)

Contactor Ampere Rating	Circuit Breaker		Short Version				Long Version			
	Ampere Rating	Maximum Volts	Class 8903 Type 3R	$ Price▲	Class 8903 Type 3R Stainless Steel	$ Price▲	Class 8903 Type 3R	$ Price▲	Class 8903 Type 3R Stainless Steel	$ Price ▲
30	30	600	SMC81♦	**2475.00**	SMH81♦	**4050.00**	SMC83♦	**2807.00**	SMH83♦	**4500.00**
60	60	600	SPC81♦	**3159.00**	SPH81♦	**5175.00**	SPC83♦	**3320.00**	SPH83♦	**5625.00**
100	100	600	SQC81♦	**4544.00**	SQH81♦	**7425.00**	SQC83♦	**4841.00**	SQH83♦	**7875.00**
200	200	600	SVC81♦	**8711.00**	SVH81♦	**14175.00**	SVC83♦	**9909.00**	SVH83♦	**14625.00**

▲ Price does not include holding circuit contact.
■ All lighting contactors are provided with separate control as standard.
♦ Coil voltage codes must be specified to order this product. Refer to standard voltage codes listed below.

NIGHT-MASTER Combination Lighting Contactors

The Class 8903 NIGHT-MASTER Outdoor Combination Lighting Contactor is the only product on the market that is UL Listed for Service Entrance. This allows the contactor to be pole mounted when used to control lighting in remote locations such as parks, monuments, group sports facilities, and streets and highways.

Factory modifications such as photocells, time switches, key operated selector switches, and the combination of photocells and time switches (photocell on, time switch off) allow the NIGHT-MASTER to be located in applications where manual operation of lights is not practical.

NIGHT-MASTER comes in long and short versions in sizes 30 through 200 Amperes. Most common modifications can be provided from the factory, or added in the field to the pre-drilled and pre-tapped panels.

Table 16.164: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24★	—	V01	No Charge
120	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
277	—	V04	No Charge
480	440	V06	No Charge
Specify	Specify	V99	35.60

★ 24 volt coils are not available for 200 A devices. Contact your nearest Schneider Electric sales office for additional information.

For How to Order Information, see page 16-13.

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Standard Equipment dimensions and enclosure construction may not apply when certain special features are added. Such cases should be referred to the factory with complete description when accurate dimensions are required.

NOTE: *If UL label is required, consult Schneider Electric CCC at (1-888-778-2733). Some Forms* ***are not*** *UL Listed.*

Table 16.165:

Description	Form Letter	NEMA Enclosure Type	Used On: Std. Elec. Held	Std. Mech. Held	Combo Elec. Held	Combo Mech. Held	NIGHT-MASTER ▲	Type L 30 A	30 A	60 A	100 A	200 A	300 A	400, 600, 800 A
"ON-OFF" (momentary contact) push button	A3	1		Y		Y		336.	336.	336.	336.	336.	336.	336.
	A3	3R, 4, 12		Y		Y		336.	336.	336.	336.	336.	336.	336.
"ON-OFF" push button (with holding circuit interlock)	A12	Any	Y		Y		Y	336.	336.	336.	336.	336.	336.	336.
"HAND–OFF–AUTO" selector switch. To substitute a key operated selector switch, use Form C33 and specify positions, legend marking, and key removal. This form must be used with another selector switch form (example: CC33). Add **$266.** (C33) **+ $224.** (C) = **$490.**	C	1	Y	Y▽	Y	Y▽		336.	336.	336.	336.	336.	336.	336.
	C	3R, 4, 12	Y	Y▽	Y	Y▽	Y	336.	336.	336.	336.	336.	336.	336.
"ON-OFF" selector switch. To substitute a key operated selector switch, use Form C33 and specify positions, legend marking, and key removal. This form must be used with another selector switch form (example: C33C6). Add **$266.** (C33) + **$224.** (C6) = **$490.**	C6	1	Y	Y	Y	Y		336.	336.	336.	336.	336.	336.	336.
	C6	3R, 4, 12	Y	Y	Y	Y	Y	336.	336.	336.	336.	336.	336.	336.
Control circuit fuse (1 fuse)	F	Any	Y	Y	Y	Y	Y	314.	314.	314.	314.	314.	314.	314.
Control circuit fuses (2 fuses)	F4	Any	Y	Y	Y	Y	Y	314.	314.	314.	314.	314.	314.	314.
Control circuit transformer standard capacity 50/60 Hz														
Fuses: Primary / Secondary; Transformer capacity														
2 ■ / 0 / Std.	F4T	1, 4, 12	Y	Y	Y	Y	Y	386.	386.	543.	797.	968.	1097. ☆	1097. ♦
2 / 1 / Std.	FF4T	1, 4, 12	Y	Y	Y	Y	Y	698.	698.	855.	1112.	1283.	1412. ☆	1412. ♦
2 / 1 / 100 VA Add.	FF4T11	1, 4, 12	Y	Y	Y	Y	Y	975.	975.	1197.	1425.	1566. ☆	1710. ☆	1710. ♦
2 / 1 / 200 VA Add	FF4T12	1, 4, 12	Y	Y	Y	Y	Y	1241.	1241.	1467.	1695. ☆	1839. ☆	1839. ☆	1839. ♦
2 / 1 / 300 VA Add	FF4T13	1, 4, 12	Y	Y	Y	Y	Y	1481. ☆	1481. ☆	1737. ☆	1967. ☆	2109. ☆	2109. ☆	2109. ♦
Noise reduced enclosure and shock mounted panel	G4	Any		Y				1389.	1389.	1596.	1674.	2307.	2921.	3924.
Addition of photoelectric receptacle	G10	1★, 3R, 12	Y		Y		Y	185.	185.	185.	185.	185.	185.	185.
Addition of photoelectric receptacle with photo-cell	G101	1★, 3R, 12	Y		Y		Y	399.	399.	399.	399.	399.	399.	399.
Addition of photoelectric receptacle and relay (R6)▼	G10R6	1★, 12		Y		Y		549.	912.	912.	912.	1326.	1467.	1467.
With photo-cell installed ▼	G101R6	1★, 12		Y		Y		509.	750.	750.	750.	1026.	1121.	1121.
Addition of terminal blocks (other than standard). "xx" Represents the number of terminals needed. Available in multiples of 5 only.														
(PER TERMINAL PRICE) WIRED	G56xx	Any	Y	Y	Y	Y	Y	116.	116.	116.	116.	116.	116.	116.
(PER TERMINAL PRICE) UNWIRED	G50xx	Any	Y	Y	Y	Y	Y	57.	57.	57.	57.	57.	57.	57.
Addition of 24 hour time clock (120-277 V only)	K14	1, 4, 12	Y	Y	Y	Y		1197.	1197.	1197.	1197.	1197.	1197.	1197.
Addition of 24 hour time clock w/day omission (120-277 V)	K141	1, 4, 12	Y	Y	Y	Y		1197.	1197.	1197.	1197.	1197.	1197.	1197.
Addition of 7 day time clock (120-277 V)	K142	1, 4, 12	Y	Y	Y	Y		1368.	1368.	1368.	1368.	1368.	1368.	1368.
Addition of 24 hour time clock (120-277 V only)	K14	3R					Y	N/A	783.	783.	783.	783.	N/A	N/A
Addition of 24 hr time clock w/skip day (120-277 V)	K141	3R					Y	N/A	783.	783.	783.	783.	N/A	N/A
Addition of 7 day time clock (120-277 V)	K142	3R					Y	N/A	954.	954.	954.	954.	N/A	N/A
Addition of solid neutral terminal block	N	1, 4, 12	Y	Y	Y	Y	Std.	116.	116.	116.	171.	342.	714.	855.
Red Pilot Light	P1	Any	Y	Y	Y	Y	Y	336.	336.	336.	336.	336.	336.	336.
Two or more lights △ (each)	P	Any	Y	Y	Y	Y	Y	336.	336.	336.	336.	336.	336.	336.
Red Push-To-Test Pilot Light	P21	Any	Y	Y	Y	Y	Y	435.	435.	435.	435.	435.	435.	435.
Interlock necessary for pilot light one needed for each additional pilot light	□	Any	Y	Y	Y	Y	Y	◊	158.	158.	158.	158.	158.	158.
Two Wire Interface for Mechanically Held ▼	R6	Any		Y		Y		363.	728.	728.	728.	1139.	1283.	1283.
Addition of under and overvoltage relay	R46	Any	Y	Y	Y	Y	Y	1463.	1463.	1463.	1463.	1463.	1463.	1463.
Three wire control for long distance applications▼	R62	Any		Y		Y		728.	1454.	1454.	1454.	2280.	2564.	2564.
Auxiliary contacts (specify number of N.O. + N.C.)	X	Any	Y	Y	Y	Y	Y	◊	158.	158.	158.	158.	158.	158.
Addition of DC coil to Type L (7 poles max)	Y48	Any	Y					243.	N/A	N/A	N/A	N/A	N/A	N/A
Auxiliary electrical interlock installed on disconnect switch or circuit breaker operating mechanism	Y74	Any			Y	Y	Y	N/A	158.	158.	158.	158.	414.	414.
Coil Transient suppressor (120 Vac Only)	Y145	Any	Y		Y		Y	158.	158.	158.	158.	158.	158.	N/A
Coil Transient suppressor (120 Vac Only)	Y145	Any		Y		Y		314.	314.	314.	314.	314.	314.	314.
Addition of lightning arrestor	Y1532	Any	Y	Y	Y	Y	Y	570.	570.	570.	570.	570.	570.	570.
Substitute copper only lugs for standard	Y157	Any	Y	Y	Y	Y	Y	N/A	N/A	N/C	N/C	N/C	N/C	N/C

▲ NIGHT-MASTER maximum 200 A, minimum 30 A.

■ Transformer Voltage Codes.

♦ Mechanically held only. Electrically held device has a control circuit requiring a 120 V secondary, therefore, a transformer is supplied. The transformer comes wired to L1 and L2 unless Form S is called for. It is supplied with two primary and one secondary fuse.

★ Photocell mounted on a NEMA 1 enclosure is designed for indoor areas which rely on natural light. Addition of the photocell does not make the enclosure suitable for outdoor (NEMA Type 3R) installations.

▼ Available for 24 V, 120 V, 240 V, 277 V and 480 V applications only.

△ For electrically held enclosed devices, the first pilot is wired in parallel with the coil. Operating interlocks are required for all additional pilot lights. Mechanically held devices require operating interlocks for all pilot lights.

□ DO NOT use Form X for any interlock which is wired in series with pilot light, but DO specify how pilot light and interlock are to be wired into the circuit.

◊ Electrically held 20 A multipole contactors cannot add interlocks. Additional poles can be used for the same function, however. Mechanically held (Type LX) provide one double throw auxiliary (or status) contact as standard.

☆ Single primary voltage must be specified using the codes shown below:

▽ Form R6 must be used with Form C on mechanically held devices.

Voltage 60 Hz	Code
120–24	V89
208–120	V84
240–24	V82
240–120	V80
277–120	V85
480–24	V83
480–120	V81
480–240	V87
600–120	V86

Order Example

You have previously selected a Class 8903SMG2V02.

V02 means that you need a coil voltage of 120-60/110-50 wired for separate control. You would like to add form FF4T with the transformer voltages being 480 volt primary, 120 volt secondary.
The new and complete Class, Type, Voltage Code and Form number:

Class	Type	Voltage Code	Form◒
8903	SMG2	V81	FF4T

◒ Form numbers should always be shown in alphabetical order.

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Table 16.166:

Description	Types L & LX		Type S												Form No.
	30 A		30 A		60 A		100 A		200 A		300 A		400, 600, 800 A		
	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	
Auxiliary Contacts															
1 N.O. LH or RH Mounting	—	—	9999SX6	**86.00**	9999SX6	**86.00**	9999SX6	**86.00**	9999SX6	**86.00**	9999SX6	**86.00**	9999SX6	**86.00**	
1 N.C. LH or RH Mounting	—	—	9999SX7	**86.00**	9999SX7	**86.00**	9999SX7	**86.00**	9999SX7	**86.00**	9999SX7	**86.00**	9999SX7	**86.00**	
1 N.C. & 1 N.O. Isolated LH or RH	—	—	9999SX8	**116.00**	9999SX8	**116.00**	9999SX8	**116.00**	9999SX8	**116.00**	9999SX8	**116.00**	9999SX8	**116.00**	X
1 N.O. Overlapping LH or RH	—	—	9999SX9	**116.00**	9999SX9	**116.00**	9999SX9	**116.00**	9999SX9	**116.00**	9999SX9	**116.00**	9999SX9	**116.00**	
1 N.C. Overlapping LH or RH	—	—	9999SX10	**116.00**	9999SX10	**116.00**	9999SX10	**116.00**	9999SX10	**116.00**	9999SX10	**116.00**	9999SX10	**116.00**	
Control Circuit Fuse Holder															
Single Fuse Unit	9999LLX and 9999SFR3	**23.70** **42.80**	9999SFR3	**64.00**	9999SFR3	**64.00**	9999SFR3	**64.00**	9999SFR3	**64.00**	9999SFR3	**64.00**	9999SFR3	**64.00**	F
Two Fuse Unit	9999LLX and 9999SFR4	**23.70** **57.00**	9999SFR4	**86.00**	9999SFR4	**86.00**	9999SFR4	**86.00**	9999SFR4	**86.00**	9999SFR4	**86.00**	9999SFR4	**86.00**	F4
Transformers (For Prices See Class 9070 Section)	9070T50	—	9070T100	—	9070T100	—	9070T150	—	9070T300	—	9070T500	—	9070T750	—	T
Oversized Enclosures (Non-Combo)															
NEMA 1	9991SDG3	**266.00**	9991SDG3	**339.00**	9991SDG3	**339.00**	—	—	—	—	—	—	—	—	—
NEMA 4	9991SDW3	**779.00**	9991SDW3	**1169.00**	9991SDW3	**1169.00**	—	—	—	—	—	—	—	—	—
NEMA 12	9991SDA3	**456.00**	9991SDA3	**684.00**	9991SDA3	**684.00**	—	—	—	—	—	—	—	—	—
Standard Enclosures															
NEMA 1–Surface Mount	9991LXG1	**95.00**	9991SCG7▲	**57.00**	9991SDG7▲	**143.00**	9991SFG8	**599.00**	9991SFG4	**1259.00**	9991SGG8	**1241.00**	—	—	—
NEMA 3R	9991SDH1	**323.00**	9991SCH2	**372.00**	9991SDH1	**485.00**	9991SEH1	**684.00**	9991SFH1	**1853.00**	—	—	—	—	—
NEMA 4–Standard	9991SDW1	**779.00**	9991SCW1	**684.00**	9991SDW1	**1169.00**	—	—	—	—	—	—	—	—	—
NEMA 4–With 2 Cvr Mtd. Clsng Plts	9991SDW11	**798.00**	9991SCW11	**714.00**	9991SDW11	**1197.00**	9991SEW11	**1767.00**	—	—	—	—	—	—	—
NEMA 4X–Glass Polyester	9991SDW20	**779.00**	9991SCW20	**684.00**	9991SDW20	**1169.00**	—	—	—	—	—	—	—	—	—
NEMA 12	9991SDA11	**323.00**	9991SCA11	**372.00**	9991SDA11	**485.00**	9991SEA11	**684.00**	—	—	—	—	—	—	—
NEMA 1–Flushmount–Complete	—	—	—	—	—	—	9991SEF11	**882.00**	—	—	—	—	—	—	—
NEMA 1–Flush Mount Parts	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
FLUSH PARTS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Standard–Elec. held	9991SDF13	**114.00**	9991SCF11	**57.00**	9991SDF11	**171.00**	—	—	—	—	—	—	—	—	—
–Mech. held	9991SDF13	**114.00**	9991SCF13	**201.00**	9991SDF13	**171.00**	—	—	—	—	—	—	—	—	—
Mounting Strap	9991SDF2	**66.00**	9991SCF2	**71.00**	9991SDF2	**99.00**	—	—	—	—	—	—	—	—	—
Pull Box	9991SDF1	**77.00**	9991SCF1	**86.00**	9991SDF1	**116.00**	—	—	—	—	—	—	—	—	—
Internal Operator Mounting Bracket	3010215901	**26.10**	3010215901	**39.20**	3010215901	**39.20**	3010215901	**39.20**	3010215901	**39.20**	3010215901	**39.20**	3010215901	**39.20**	G53
Solid Neutral	9999SN1	**89.00**	9999SN1	**134.00**	9999SN1	**134.00**	9999SN1	**134.00**	9999SN2	**392.00**	9999SN2	**392.00**	9999SN3■	**624.00**	N
Combination Lighting Contactor Disconnect Interlock Kit															
Breaker Type															
1-Pole	—	—	9999R26	**131.00**	9999R26	**131.00**	9999R26	**131.00**	9999R26	**131.00**	9999R26	**131.00**	9999R26	**131.00**	
2-Pole	—	—	9999R27	**243.00**	9999R27	**243.00**	9999R27	**243.00**	9999R27	**243.00**	9999R27	**243.00**	9999R27	**243.00**	
Disconnect Type															
1-Pole	—	—	9999TC11	**120.00**	9999TC10	**116.00**	9999TC10	**120.00**	9999R8	**131.00**	9999R35	**435.00**	9999R26	**131.00**	
2-Pole	—	—	9999TC21	**239.00**	9999TC20	**221.00**	9999TC20	**239.00**	9999R9	**243.00**	9999R36	**521.00**	9999R27	**243.00**	Y74
Lightning Arrestor															
175 Vac to Ground Max 2 or 3 wire Grounded	SDSA1175	**92.00**	SDSA1175	**92.00**	SDSA1175	**92.00**	SDSA1175	**92.00**	SDSA1175	**92.00**	SDSA1175	**92.00**	SDSA1175	**92.00**	Y1532
650 Vac to Ground Max 3 or 4 wire Grounded	SDSA3650	**248.00**	SDSA3650	**248.00**	SDSA3650	**248.00**	SDSA3650	**248.00**	SDSA3650	**248.00**	SDSA3650	**248.00**	SDSA3650	**248.00**	

▲ For electrically held only.
■ Limited to 400 and 600 A versions. 800 A is a factory modification only.

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Table 16.167: Mechanically Held

Description	Form No.	TYPE LX		TYPE S											
		30 A		30 A		60 A		100 A		200 A		300 A		400, 600, 800 A	
		Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price
PUSH BUTTON (ON-OFF) NEMA 1 Enclosure	A3	9999BLX 9999LXPB	**35.60 116.00**	▲	—	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**
NEMA 3R, 4 or 12 Enclosure		9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**	9001KA2 9999SA3■	**21.50 215.00**
SELECTOR SWITCH (2 POSITION) NEMA 1 Enclosure	C6	9999BLX 9999LXS	**35.60 116.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**
NEMA 3R, 4 or 12 Enclosure		9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**
SELECTOR SWITCH (3 POSITION) NEMA 1 Enclosure (MUST INCLUDE TWO WIRE CONTROL RELAY, Form R6	C	9999BLX 9999SC2	**35.60 116.00**	9001KN260 9001KS46BH2	**4.40 138.00**	9001KN260 9001KS46BH2	**4.40 138.00**	9001KN260 9001KS46BH2	**4.40 138.00**	9001KN260 9001KS46BH2	**4.40 138.00**	9001KN260 9001KS46BH2	**4.40 138.00**	9001KN260 9001KS46BH2	**4.40 138.00**
NEMA 3R, 4 or 12 Enclosure		9001KN260 9001KS46BH2	**4.40 138.00**												
TWO WIRE CONTROL RELAY (Form R6)△	R6	9999RLX CA2SK11□	**35.60 95.00**	8501XO11	**201.00**	8501XO11	**201.00**	8501XO11	**201.00**	8501XO11	**201.00**	8501XO11	**201.00**	8501XO11	**201.00**

Table 16.168: Electrically Held

Description	Form No.	TYPE L		TYPE S											
		30 A		30 A		60 A		100 A		200 A		300 A		400, 600, 800 A	
		Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price	Kit	$ Price
PILOT LIGHTS (RED and GREEN) NEMA 1 Enclosure NEMA 3R, 4 or 12 Enclosure	P1	9999SP28R	**215.00**	9999SP2R 9999SP28R	**215.00 215.00**	9999SP3R 9999SP28R	**215.00 215.00**	♦ 9999SP14R 9999SP28R	**215.00 215.00**	★ 9999SP28R 9999SP28R	**215.00 215.00**	★ 9999SP28R 9999SP28R	**215.00 215.00**	9999SP28R 9999SP28R	**215.00 215.00**
PUSH BUTTONS▼ NEMA 1 Enclosure	A12	9999BLX 9999SA10	**35.60 116.00**	9999SA10	**116.00**	9999SA10	**116.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**
NEMA 3R, 4 or 12 Enclosure		9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**	9999SA3	**215.00**
SELECTOR SWITCH (2 POSITION) NEMA 1 Enclosure	C6	9999BLX 9999SC22	**35.60 116.00**	9999SC22	**116.00**	9999SC22	**116.00**	9999SC22	**116.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**
NEMA 3R, 4 or 12 Enclosure		9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BM1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**	9001KN244 9001KS11BH1	**4.40 96.00**
SELECTOR SWITCH (3 POSITION) NEMA 1 Enclosure	C	9999BLX 9999SC2	**35.60 116.00**	9999SC2	**116.00**	9999SC2	**116.00**	9999SC2	**116.00**	9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**
NEMA 3R, 4 or 12 Enclosure		9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**	9999SC8	**215.00**

▲ No field installed kit available.
■ Mechanically held contactors need two distinct signals to operate. An N.O. contact block must be added to the Class 9999 Type SA3 push button kit.
♦ Selection for 2- or 3-Pole only; for 4- or 5-Pole use Class 9999SP15R **$215.**
★ The coil voltage must be the same as the pilot light rating. Kit contains one (1) Class 9001, Type KP1R6 120 V/60 Hz red pilot light control unit. For other voltages, refer to the Class 9001, Type KP Control Section.
▼ Requires holding circuit interlock for Type S or additional power pole on Type L devices.
△ Form R6 available for 24 V, 120 V, 240 V and 277 V only.
□ Insert CA2SK11( ) voltage code from page 23-21.

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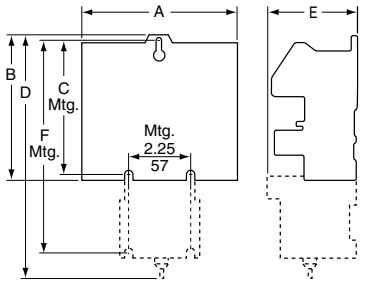
Approximate Dimensions

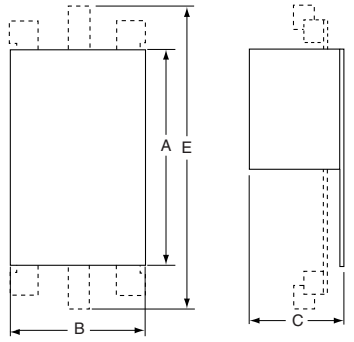
Table 16.169: Open Type

Electrically Held							Mechanically Held						
Ampere Rating	Type	Number of Poles	Dimensions				Type	Dimensions					
			A	B	C	E		A	B	C	D	E	F
30	LO	2–4	**2.88** 73	**5** 127	**4.62** 117	**3.12** 79	LXO	**2.88** 73	—	—	**8.81** 224	**3.25** 83	**7.70** 196
		6	**4.25** 108	**5** 127	**4.62** 117	**3.12** 79		**4.25** 108	—	—	**8.81** 224	**3.25** 83	**7.70** 196
		8–12	**5.63** 143	**5** 127	**4.62** 117	**3.12** 79		**5.63** 143	—	—	**8.81** 224	**3.25** 83	**7.70** 196
30	SMO	2–3	**4.34** 110	**3.22** 82	**4.22** 107	**3.50** 89	—	**7.15** 182	**3.79** 96	**4.68** 119	—	**6.04** 153	—
		4–5	**4.34** 110	**4.25** 108	**4.22** 107	**3.50** 89	—	**7.15** 182	**4.54** 115	**4.68** 119	—	**6.04** 153	—
60	SPO	2–3	**5.33** 135	**4.31** 110	**4.94** 125	**5.50** 140	—	**8.25** 210	**4.61** 117	**5.23** 133	—	**7.81** 198	—
		4–5	**6.22** 158	**5.61** 142	**4.94** 125	**5.50** 140	—	**8.70** 221	**5.90** 150	**5.23** 133	—	**7.81** 198	—
100	SQO	2–3	**7.09** 180	**5.45** 138	**6.50** 165	**7.26** 184	—	**10.13** 257	**5.94** 151	**6.72** 171	—	**7.26** 184	—
		4–5	**7.82** 199	**9.75** 248	**6.50** 165	**7.26** 184	—	**10.56** 268	**9.75** 248	**6.72** 171	—	**7.26** 184	—
200	SVO	2–3	**9.14** 232	**6.00** 152	**6.50** 165	**9.14** 232	SVO	**11.35** 288	**6.00** 152	**6.72** 171	—	**9.14** 232	—
		4 & 5▲	**9.14** 232	**9.75** 248	**6.50** 165	**9.14** 232		**11.55** 293	**9.75** 248	**6.72** 171	—	**9.14** 232	—
300	SXO	2–3	**12.31** 313	**8.66** 220	**8.74** 222	**12.25** 311	SXO	**12.31** 313	**8.66** 220	**10.50** 267	—	**12.31** 313	—
400	SYO	2–3	—	**12.33** 313	**9.00** 229	**27.78** 706	SYO	—	**8.66** 220	**10.50** 267	—	**21.00** 533	—
600	SZO						SZO						
800	SJO	2–3	—	**12.33** 313	**11.94** 303	**42.70** 1085	—	—	—	—	—	—	—

▲ 5-Pole, electrically held only.



Open Type L & LX



Open Type S

Table 16.170: NEMA 1 Enclosure (Non-Combination) Electrically and Mechanically Held

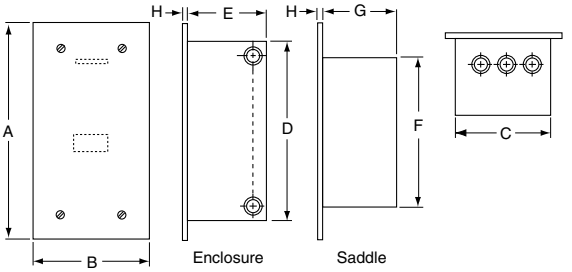
Ampere Rating	Type	Number of Poles	Form(s)		Dimensions		
					Width	Height	Depth
30	LG, LXG	Any	Standard, A3, A12, C, C6, F, R6, Y48		**7.81** 198	**12.69** 322	**6.03** 153
			P, T		**11.88** 302	**11.88** 302	**7.44** 189
30			K14, K141, K142		**16.00** 406	**22.00** 559	**7.13** 181
30	SMG	2–5	Electrically Held	Std., A12, C, C6, P, X	**6.00** 152	**10.00** 254	**5.28** 134
			Mechanically Held	Std., X			
			Electrically Held	T	**6.34** 161	**15.88** 403	**5.19** 132
				N	**14.88** 378	**14.12** 359	**7.56** 192
			Mechanically Held	T, N, R6			
				A3, C, C6, P	**8.12** 206	**14.12** 359	**9.73** 247
60	SPG	2–5	Electrically Held	Std., A12, C, C6, P, X	**7.81** 198	**12.69** 322	**6.03** 153
		2–5	Electrically Held & Mechanically Held	T, N, R6	**14.88** 378	**14.12** 359	**7.56** 192
		2–5	Mechanically Held	Std., A3, C, C6, P, X	**8.12** 206	**14.12** 359	**9.73** 247
100	SQG	2 & 3	Electrically Held	Std., A12, C, C6, F, P, X, T	**11.25** 286	**25.15** 639	**8.99** 228
			Mechanically Held	Std., F, X, T			
			Electrically Held	N, R6, T, T10-T13,■	**18.15** 461	**29.15** 740	**9.24** 235
			Mechanically Held	A3, C, C6, N, R6, T, T10-T13,■			
		4 & 5	Electrically Held	Std., A12, C, C6, F, P, X	**11.25** 286	**25.15** 639	**8.99** 228
			Mechanically Held	Std., F, X			
			Electrically Held	■	**18.15** 461	**29.15** 740	**9.24** 235
			Mechanically Held	A3, C, C6, ■			
			Electrically Held	N, R6, T, T10-T13	**22.15** 563	**39.15** 994	**10.24** 260
			Mechanically Held	N, R6, T, T10-T13			
200	SVG	All	Electrically and Mechanically Held	Standard and All Forms	**22.15** 563	**39.15** 994	**10.24** 260
300	SXG	All	Electrically and Mechanically Held	Standard and All Forms	**17.21** 437	**44.21** 1123	**12.83** 326
400 and 600	SYG & SZG	All	Electrically and Mechanically Held	Standard and All Forms	**20.21** 513	**65.75** 1670	**13.10** 333
800	SJG	2–3	With or without any Forms		**34.50** 876	**93.00** 2362	**23.50** 597

■ All Type K Forms.

Dual Dimensions: **INCHES** Millimeters

Table 16.171: NEMA 1 Flush Mounted

Ampere Rating	Type	Form(s)		Dimensions						
				A	B	C	D	E	F	G
30	LF LXF	Standard, F, Y48, R6		**15.19** 386	**8.94** 227	**7.63** 194	**12.88** 327	**5.44** 138	**10.94** 278	**5.13** 130
		A3, A12, C, C6, T, P		**24.00** 610	**17.50** 445	**15.00** 381	**19.25** 489	**7.12** 181	—	—
30	SMF	Electrically Held	Std., A12, C, C6, P, X	**13.44** 341	**7.19** 183	**5.88** 149	**11.13** 283	**4.75** 121	**9.19** 233	**4.50** 114
		Mechanically Held	Std., X							
		Electrically Held	T, N	**24.00** 610	**17.50** 445	**15.00** 381	**19.25** 489	**5.75** 146	—	—
		Mechanically Held	A3, C, C6, T, N, P, R6							
60	SPF	Electrically Held	Std., A12, C, C6, P, X	**15.19** 386	**8.94** 227	**7.63** 194	**12.88** 327	**5.44** 138	**10.94** 278	**5.13** 130
		Mechanically Held	Std., X							
		Electrically Held	T, N	**24.00** 610	**17.50** 445	**15.00** 381	**19.25** 489	**5.75** 146	—	—
		Mechanically Held	A3, C, C6, T, N, P, R6							
100	SQF	With or without any Forms		**31.00** 787	**16.75** 425	**14.25** 362	**26.25** 667	**8.00** 203	—	—



NEMA 1 Flush Mounted

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Approximate Dimensions

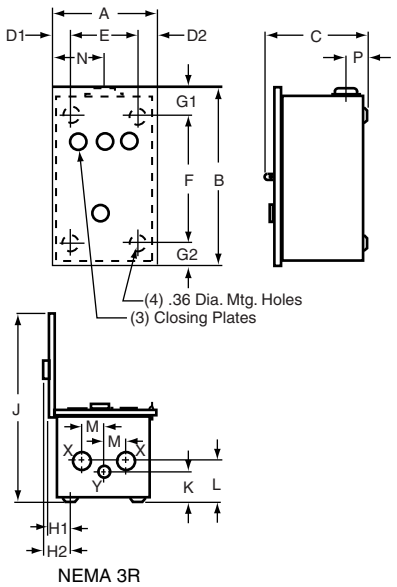
Table 16.172: NEMA 3R

Ampere Rating	Type	Number of Poles	A	B	C	D1	D2	E	F	G1	G2	H1	H2	J	K	L	M	N	P	K.O. X	K.O. Y
30	SMH	All	8.83 224	12.30 312	7.12 181	1.39 35	1.44 37	6.00 152	7.50 191	2.64 67	2.16 55	2.08 53	2.62 66	14.28 363	1.37 35	1.37 35	1.88 48	4.38 111	1.83 46	1/2 3/4 1	1/2 3/4 1
30 60	LH SPH	All	9.83 250	16.30 414	8.62 219	1.39 35	1.44 37	7.00 178	11.50 292	2.64 67	2.16 55	2.08 53	2.62 66	16.78 426	1.31 33	1.75 44	2.13 54	4.88 124	1.83 46	1 1 1/4 1 1/2	1/2 3/4
100	SQH	All	12.83 326	25.30 643	8.62 219	1.39 35	1.44 37	10.00 254	20.50 521	2.64 67	2.16 55	2.08 53	2.62 66	19.78 502	1.31 33	1.94 49	2.44 62	6.38 162	1.83 46	1 1 1/4 2 2 1/2	1/2 3/4
200	SVH	All	12.83 326	40.30 1024	9.12 232	1.39 35	1.44 37	10.00 254	35.50 902	2.64 67	2.16 55	2.08 53	2.62 66	20.28 515	1.31 33	2.31 59	2.69 68	6.38 162	1.83 46	1 1 1/4 2 2 1/2	1/2 3/4

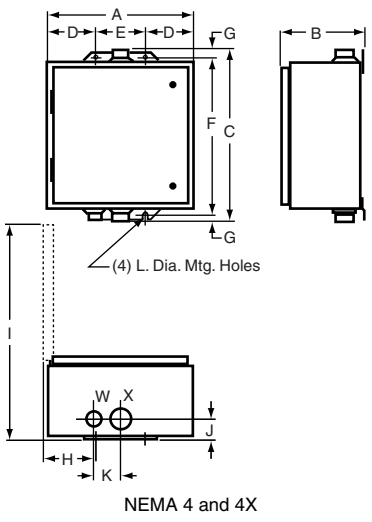
Table 16.173: NEMA 4 and 4X Stainless Steel Only♦

Ampere Rating	Type	Number of Poles	Form(s)		Dimensions for Stainless Steel Enclosures For Glass Polyester (through 100 A), see Size 2 NEMA 4/4X dimensions on page 16-25.												Bottom Hub Only	Top & Bottom Hub
					A	B	C	D	E	F	G	H	I	J	K	L	W	X
30	LW LXW	Any	Standard, F, R6, Y48		8.13 206	7.88 200	16.19 411	1.56 40	5.00 127	15.00 381	.60 15	1.94 49	14.75 375	2.00 51	2.63 67	.31 8	3/4"	1 1/2"
			A3, A12, C, C6, P, T		12.62 321	7.81 198	14.69 373	2.56 65	7.50 191	13.50 343	.63 16	3.38 86	18.44 468	1.69 43	2.31 59	.31 8	3/4"	1"
30	SMW	2–5	Electrically Held	Std., A12, C, C6, P, X	6.38 162	7.13 181	13.19 335	1.56 40	3.25 83	12.00 305	.63 16	1.19 30	11.81 300	1.63 41	2.31 59	.31 8	3/4"	1"
			Mechanically Held	Std., F, X														
			Electrically Held	T	12.63 321	7.11 181	14.69 373	2.56 65	7.50 191	13.50 343	.63 16	3.19 81	18.50 470	1.64 42	2.31 59	.31 8	3/4"	1"
			Electrically Held	N, R6	14.88 378	7.25 184	16.31 414	2.56 65	9.75 248	15.00 381	.63 16	3.19 81	20.88 530	2.06 52	2.63 67	.31 8	3/4"	1 1/2"
			Mechanically Held	A3, C, C6, T, N, P, R6														
60	SPW	2–5	Electrically Held	Std., A12, C, C6, P, X	8.13 206	7.88 200	16.19 411	1.56 40	5.00 127	15.00 381	.60 15	1.94 49	14.75 375	2.00 51	2.63 67	.31 8	3/4"	1 1/2"
			Mechanically Held	Std., A3, C, C6, P, X														
			Electrically Held	T, N, R6	14.88 378	7.25 184	16.31 414	2.56 65	9.75 248	15.00 381	.63 16	3.88 98	20.88 530	2.06 52	2.63 67	.31 8	3/4"	1 1/2"
			Mechanically Held	A3, C, C6, T, N, P, R6														
100	SQW	2 & 3	Electrically Held	Std., A12, C, C6, F, N, R6, P, T, T10-13, X	18.15 461	8.77 223	32.21 818	3.08 78	12.00 305	30.50 775	.61 15	3.67 93	26.71 678	2.58 66	3.19 81	.44 11	3/4"	2 1/2"
			Mechanically Held	Std., A3, C, C6, F, N, P, R6, T, T10-13, X														
		4 & 5	Electrically Held	Std., A12, C, C6, F, P, ■	18.15 461	8.77 223	32.21 818	3.08 78	12.00 305	30.50 775	.61 15	3.67 93	26.71 678	2.58 66	3.19 81	.44 11	3/4"	2 1/2"
			Mechanically Held	Std., A3, C, C6, P, ■														
			Electrically Held	N, R6, T, T10-13	22.15 563	9.77 248	42.21 1072	3.08 78	16.00 406	40.50 1029	.61 15	3.67 93	31.71 805	2.33 59	2.88 73	.44 11	3/4"	2 1/2"
			Mechanically Held	N, R6, T, T10-13														
200	SVW	All	Electrically and Mechanically Held	Standard and All Forms	22.15 563	9.77 248	42.21 1072	3.08 78	16.00 406	40.50 1029	.61 15	3.67 93	31.71 805	2.33 59	2.88 73	.44 11	3/4"	2 1/2"
300	SXW	All	Electrically and Mechanically Held	Standard and All Forms	17.21 437	12.63 321	47.21 1199	4.11 104	9.00 229	46.00 1168	.61 15	4.59 117	28.32 719	3.11 79	5.75 146	.56 14	3/4"	3 1/2"
400 & 600	SYW & SZW	All	Electrically and Mechanically Held	Standard and All Forms	20.21 513	12.13 308	65.21 1656	4.11 104	12.00 305	64.00 1626	.61 15	4.59 117	30.82 783	2.67 68	4.50 114	.56 14	3/4" ▲	Two 3"▲
800	SJW	2–3	With or without any Forms		34.50 876	23.50 597	101.00 2565	Floor Mounting										

▲ X hub is 1/4" left of center. W hub shown is another X hub. K dimension is distance between two X hubs. Actual W hub is located 3-3/16" to the right of X hub shown.
■ All "K" forms.
♦ For glass polyester (through 100A), see Size 2 NEMA 4/4X dimensions on page 16-25.



NEMA 3R



NEMA 4 and 4X

Dual Dimensions: **INCHES** Millimeters

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Approximate Dimensions

Table 16.174: NEMA 12/3R

Ampere Rating	Type	Number of Poles	Form(s)		Dimensions▲ A	B	C	D	E	F	G	H	I	J
30	LA LXA	Any	Standard, F, R6, Y48		**8.13** 206	**8.50** 216	**15.75** 400	**1.56** 40	**5.00** 127	**15.00** 381	**.31** 8	**2.13** 54	**14.75** 375	**.31** 8
			A3, A12, C, C6, P, T		**11.88** 302	**7.75** 197	**13.50** 343	**3.81** 97	**4.25** 108	**12.75** 324	**.38** 10	**4.94** 125	**18.12** 460	**.31** 8
30	SMA	2-5	Electrically Held	Std., A12, C, C6, P, X	**6.38** 162	**8.53** 217	**12.75** 324	**1.56** 40	**3.25** 83	**12.00** 305	**.38** 10	**3.56** 90	**12.50** 318	**.31** 8
			Mechanically Held	Std., F, P, X										
			Electrically Held	T	**11.88** 302	**7.75** 197	**13.50** 343	**2.56** 65	**6.75** 171	**12.75** 324	**.38** 10	**3.66** 93	**18.12** 460	**.31** 8
			Electrically Held	N, R6	**14.88** 378	**7.88** 200	**16.00** 406	**2.56** 65	**9.75** 248	**15.00** 381	**.50** 13	**3.66** 93	**21.25** 540	**.31** 8
			Mechanically Held	A3, C, C6, T, N, P, R6										
60	SPA	2-5	Electrically Held	Std., A12, C, C6, P, X	**8.13** 206	**9.28** 236	**16.00** 406	**1.56** 40	**5.00** 127	**15.00** 381	**.50** 13	**3.66** 93	**15.38** 391	**.31** 8
			Mechanically Held	Std., A3, C, C6, P, X										
			Electrically Held	T, N, R6	**14.88** 378	**7.88** 200	**15.75** 400	**2.56** 65	**9.75** 248	**15.00** 381	**.38** 10	**3.66** 93	**21.25** 540	**.31** 8
			Mechanically Held	A3, C, C6, T, N, P, R6										
100	SQA	2 & 3	Electrically Held	Std., A12, C, C6, F, N, R6, P, T, T10-13, X	**18.15** 461	**9.24** 235	**31.50** 800	**3.08** 78	**12.00** 305	**30.50** 775	**.50** 13	**3.67** 93	**26.71** 678	**.44** 11
			Mechanically Held	Std., A3, C, C6, F, N, P, R6, T, T10-13, X										
		4 & 5	Electrically Held	Std., A12, C, C6, F, N, P, ■										
			Mechanically Held	Std., A3, C, C6, P, ■										
			Electrically Held	N, R6, T, T10-13, ■	**22.15** 563	**10.24** 260	**41.50** 1054	**3.08** 78	**16.00** 406	**40.50** 1029	**.50** 13	**3.67** 93	**31.71** 805	**.44** 11
			Mechanically Held	N, R6, T, T10-13, ■										
200	SVA	All	Electrically and Mechanically Held	Standard and All Forms	**22.15** 563	**10.24** 260	**41.50** 1054	**3.08** 78	**16.00** 406	**40.50** 1029	**.50** 13	**3.67** 93	**31.71** 805	**.44** 11
300	SXA	All	Electrically and Mechanically Held	Standard and All Forms	**17.21** 437	**13.33** 339	**47.00** 1194	**4.11** 104	**9.00** 229	**46.00** 1168	**.50** 13	**4.59** 117	**28.32** 719	**.56** 14
400 & 600	SYA & SZA	All	Electrically and Mechanically Held	Standard and All Forms	**20.21** 513	**13.00** 330	**65.00** 1651	**4.11** 104	**12.00** 305	**64.00** 1626	**.50** 13	**5.31** 135	**30.87** 784	**.69** 18
800	SJA	2-3	With or without any Forms		**93.00** 2362	**34.50** 876	**23.50** 597	Floor Mounting						

▲ See Figure 1 for all dimensions except 800 A; for 800 A dimensions, see Figure 2.
■ All Type "K" Forms using Class 9001 Type K Control Units.

Table 16.175: NIGHT-MASTER® Outdoor Lighting Contactors (Short Version)—NEMA 3R

Ampere Rating	Description	Type Number	A	B	C	D	E	F	G	H	J♦	K	L	M	Knockouts N	P	Q
30	Disconnect Switch & Circuit Breaker Types	SMC61, 62 & 81	**23.50** 597	**15.00** 381	**8.42** 214	**10.50** 267	**19.00** 483	**22.38** 568	**7.00** 178	**2.18** 55	1.50 38	**2.13** 54	**2.13** 54	**2.13** 54	.50–.75	1.–1.25 1.50	.50–.75
60	Disconnect Switch & Circuit Breaker Types	SPC61, 62 & 81															
100	Disconnect Switch & Circuit Breaker Types	SQC61, 62 & 81	**34.53** 877	**20.00** 508	**8.42** 214	**10.50** 267	**30.04** 763	**33.41** 849	**7.00** 178	**2.18** 55	**2.0** 51	**2.68** 68	**2.68** 68	**3.44** 87	.50–.75	1.–1.25 2.-2.50	1.–1.25 1.5-2.0
200	Disconnect Switch Type Circuit Breaker Type	SVC61 & 62 SVC81	**48.37** 1229	**19.00** 483	**9.12** 232	**10.53** 267	**44.00** 1118	**47.25** 1200	**7.00** 178	**2.18** 55	2.50 64	**2.68** 68	**2.68** 68	**3.44** 87	.50–.75	1.–1.25 2.–2.50	1.–1.25 1.5–2.0

Table 16.176: NIGHT-MASTER® Outdoor Lighting Contactors (Long Version)—NEMA 3R

Ampere Rating	Description	Type Number	A	B	C	D	E	F	G	H	J♦	K	L	M	Knockouts N	P	Q
30	Disconnect Switch & Circuit Breaker Types	SMC63, 64 & 83	**38.88** 987	**15.00** 381	**8.42** 214	**10.42** 265	**34.38** 873	**37.76** 959	**7.00** 178	**2.18** 55	1.50 38	**2.13** 54	**2.13** 54	**2.13** 54	.50–.75	1.–1.25 1.50	.50–.75
60	Disconnect Switch & Circuit Breaker Types	SPC63, 64 & 83															
100	Disconnect Switch & Circuit Breaker Types	SQC63, 64 & 83	**42.53** 1080	**20.00** 508	**8.42** 214	**10.42** 265	**38.04** 966	**41.41** 1052	**7.00** 178	**2.18** 55	**2.0** 51	**2.68** 68	**2.68** 68	**3.44** 87	.50–.75	1.–1.25 2.–2.50	1.–1.25 1.5–2.0
200	Disconnect Switch Type Circuit Breaker Type	SVC63 & 64 SVC83	**56.37** 1432	**19.00** 483	**9.12** 232	**10.53** 267	**52.00** 1321	**55.25** 1403	**7.00** 178	**2.18** 55	2.50 64	**2.68** 68	**2.69** 68	**3.44** 87	.50–.75	1.–1.25 2.–2.50	1.–1.25 1.5–2.0

♦ Conduit size.

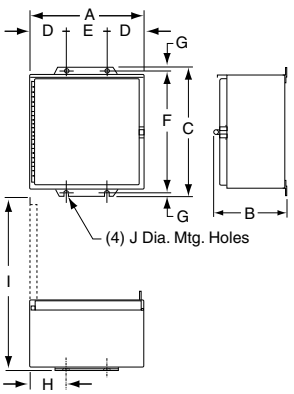

Figure 1: NEMA 12 (30–600 A)

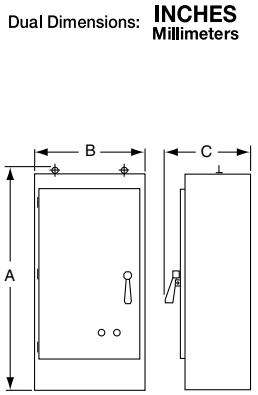

Figure 2: NEMA 12 (800 A)

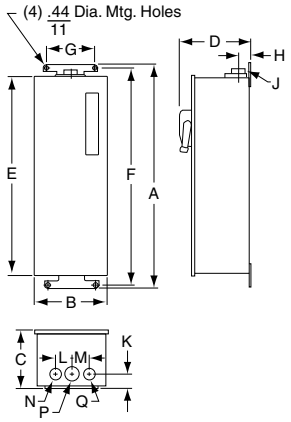

Figure 3: NIGHT-MASTER

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Approximate Dimensions

Table 16.177: Combination Lighting Contactors—NEMA 1 Enclosure

Ampere Rating	Type	Dimensions▲ (see Figure 1)															Top & Bot.		Sides
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	W	X	Y
30	SMG6– & 8–	**9.50** 241	**22.50** 572	**8.37** 213	**6.38** 162	**20.50** 521	**14.68** 373	**1.81** 46	**1.69** 43	**3.37** 86	**3.38** 86	**1.06** 27	**3.25** 83	**2.18** 55	**1.25** 32	**.87** 22	.50-.75	.50-.75	.50
	SMG7– & 9–	**13.75** 349	**23.00** 584	**8.36** 212	**10.63** 270	**21.00** 533	**20.07** 510	**1.87** 47	**1.88** 48	**3.76** 96	**2.06** 52	**1.06** 27	**3.25** 83	**2.18** 55	**1.25** 32	**.87** 22	.50-.75-1.0	.50-.75-1.0	.50
60	SPG6– & 8–	**10.50** 267	**26.00** 660	**9.62** 244	**7.37** 187	**24.00** 610	**17.00** 432	**2.12** 54	**2.00** 51	**4.00** 102	**2.06** 52	**1.06** 27	**3.25** 83	**2.18** 55	**1.25** 32	**.87** 22	1.0-1.25	.50-.75	.50
	SPG7– & 9–	**15.00** 381	**28.75** 730	**9.62** 244	**11.62** 295	**26.25** 667	**21.50** 546	**2.18** 55	**2.00** 51	**4.00** 102	**2.56** 65	**1.31** 33	**3.25** 83	**2.18** 55	**1.25** 32	**.87** 22	1.0-1.25	.50-.75	.50

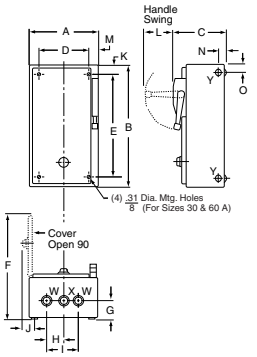

Figure 1
NEMA 1 Enclosure
Combination Devices

Table 16.178: NEMA 1 Enclosure

Ampere Rating	Type	Dimensions▲ (see Figure 2)															Top & Bot.		Sides
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	W	X	Y
100	SQG6– & 7– SQG81 & 91	**15.25** 387	**39.50** 1003	**10.60** 269	**9.25** 235	**3.00** 76	**22.68** 576	**41.00** 1041	**2.69** 68	**5.38** 137	**2.83** 72	**3.74** 95	**5.00** 127	—	**1.21** 31	**.90** 23	1.-1.25 2.-2.50	.50-.75	.50
200	SVG6– & 7– SVG81 & 91	**16.00** 406	**50.00** 1270	**10.68** 271	**10.00** 254	**3.00** 76	**23.68** 601	**51.50** 1308	**2.69** 68	**5.38** 137	**2.83** 72	**3.74** 95	**5.00** 127	—	**1.21** 31	**.90** 23	2.50	.50-.75	.50
300	SXG6– & 7–	**20.00** 508	**75.00** 1905	**14.37** 365	**12.00** 305	**4.00** 102	**29.43** 748	**77.00** 1956	**3.19** 81	—	**3.52** 89	**7.00** 178	**9.25** 235	—	—	—	.50-.75	3.00	—
	SXG81 & 91	**20.00** 508	**63.00** 1600	**14.37** 365	**12.00** 305	**4.00** 102	**27.43** 697	**65.00** 1651	**3.19** 81	—	**3.52** 89	**7.00** 178	**5.00** 127	—	—	—	.50-.75	3.00	—
400	SYG81 & 91	**36.00** 914	**90.00** 2286	**17.00** 432	Floor Mounting Enclosure												—	—	—
600	SZG81 & 91																		

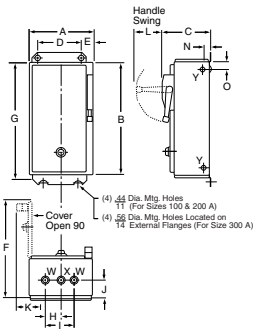

Figure 2
NEMA 1 Enclosure

Table 16.179: NEMA 4 & 4X Enclosure

Ampere Rating	Type	Dimensions▲ (see Figure 3)													
		A	B	C	D	E	F	G	H	I	J	K	L	W	X
30	SMW6–& 8–	**9.50** 241	**8.36** 212	**24.76** 629	**3.25** 83	**2.50** 64	**4.50** 114	**23.50** 597	**.63** 16	**3.00** 76	**1.62** 41	**2.31** 59	**14.31** 363	.75 Hub	1.0 Hub
	SMW7– & 9–	**13.75** 349	**8.36** 212	**25.26** 642	**3.25** 83	**4.75** 121	**4.25** 108	**24.00** 610	**.63** 16	**5.25** 133	**1.62** 41	**2.31** 59	**20.14** 512	.75 Hub	1.0 Hub
60	SPW6– & 8–	**10.50** 267	**9.61** 244	**28.26** 718	**3.25** 83	**2.50** 64	**5.50** 140	**27.00** 686	**.63** 16	**3.00** 76	**2.00** 51	**2.63** 67	**16.56** 421	.75 Hub	1.50 Hub
	SPW7– & 9–	**15.00** 381	**9.61** 244	**31.01** 788	**3.25** 83	**5.38** 137	**4.25** 108	**29.75** 756	**.63** 16	**5.88** 149	**2.00** 51	**2.63** 67	**21.06** 535	.75 Hub	1.50 Hub
100	SQW6– & 7– SQW81 & 91	**15.25** 387	**10.60** 269	**41.76** 1061	**5.00** 127	**2.50** 64	**10.25** 260	**40.50** 1029	**.63** 16	**3.24** 82	**2.61** 66	**3.19** 81	**22.18** 563	.75 Hub	2.50 Hub
200	SVW6– & 7– SVW81 & 91	**16.00** 406	**10.56** 268	**52.26** 1327	**5.00** 127	**2.50** 64	**11.00** 279	**51.00** 1295	**.63** 16	**3.24** 82	**2.61** 66	**3.19** 81	**23.00** 584	.75 Hub	2.50 Hub
300	SXW6– & 7–	**20.00** 508	**14.21** 361	**78.12** 1984	**9.25** 235	**4.00** 102	**12.00** 305	**77.00** 1956	**.56** 14	**4.77** 121	**2.96** 75	**3.50** 89	**29.43** 748	.75 Hub	3.50 Hub
	SXW81 & 91	**20.00** 508	**14.21** 361	**66.12** 1679	**5.00** 127	**4.00** 102	**12.00** 305	**65.00** 1651	**.56** 14	**4.77** 121	**2.96** 75	**3.50** 89	**27.43** 697	.75 Hub	3.50 Hub
400	SYW81 & 91	**36.00** 914	**17.71** 450	**98.00** 2489	Floor Mounting Enclosure									—	—
600	SZW81 & 91														

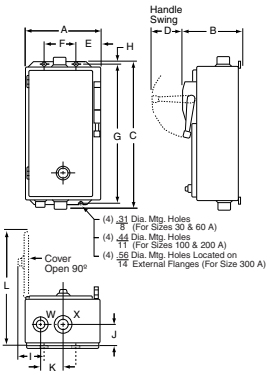

Figure 3
NEMA 4 & 4X Enclosure

Table 16.180: NEMA 12/3R Enclosure

Ampere Rating	Type	Dimensions▲ (see Figure 4)									
		A	B	C	D	E	F	G	H	I	J
30	SMA6– & 8–	**9.50** 241	**8.36** 212	**24.26** 616	**3.25** 83	**2.50** 64	**4.50** 114	**23.50** 597	**.38** 10	**3.25** 83	**14.31** 363
	SMA7– & 9–	**13.75** 349	**10.10** 257	**24.76** 629	**3.25** 83	**4.75** 121	**4.25** 108	**24.00** 610	**.38** 10	**5.50** 140	**22.00** 559
60	SPA6– & 8–	**10.50** 267	**9.61** 244	**27.76** 705	**3.25** 83	**2.50** 64	**5.50** 140	**27.00** 686	**.38** 10	**3.25** 83	**16.56** 421
	SPA7– & 9–	**15.00** 381	**10.98** 279	**30.51** 775	**3.25** 83	**5.38** 137	**4.25** 108	**29.75** 756	**.38** 10	**6.13** 156	**23.43** 595
100	SQA6– & 7– SQA81 & 91	**15.25** 387	**10.59** 269	**42.00** 1067	**5.00** 127	**3.00** 76	**9.25** 235	**41.00** 1041	**.50** 13	**3.75** 95	**22.31** 567
200	SVA6– & 7– SVA81 & 91	**16.00** 406	**10.52** 267	**52.50** 1334	**5.00** 127	**3.00** 76	**10.00** 254	**51.50** 1308	**.50** 13	**3.75** 95	**23.00** 584
300	SXA6– & 7–	**20.00** 508	**14.21** 361	**78.00** 1981	**9.25** 235	**4.00** 102	**12.00** 305	**77.00** 1956	**.50** 13	**7.75** 197	**29.43** 748
	SXA81 & 91	**20.00** 508	**14.21** 361	**66.00** 1676	**5.00** 127	**4.00** 102	**12.00** 305	**65.00** 1651	**.50** 13	**7.75** 197	**27.43** 697
400	SYA81 & 91	**36.00** 914	**17.71** 450	**90.00** 2286	Floor Mounting Enclosure						
600	SZA81 & 91										

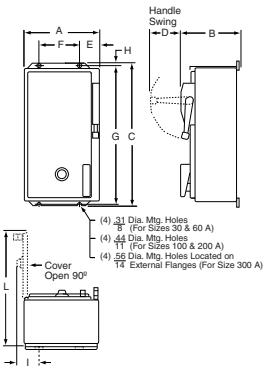

Figure 4
NEMA 12/3R Enclosure

▲ Dimensions are the same for Form F4T (standard control transformer), Form F4T11 (100 VA extra capacity) and Form F4T12 (200 VA extra capacity).

Dual Dimensions: **INCHES** / **Millimeters**

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- Compact Design
- Industry Standard Mounting
- Double Break Contacts
- Low Coil VA
- Straight-Through Wiring
- Low Cost

Definite purpose contactors are ideal for heating, air conditioning, refrigeration, data processing, and food service equipment. New compact 1 and 2-Pole contactors are available along with standard size 2, 3, and 4-Pole devices.

They feature quick connect terminals and binder head screws for easy wiring. Box lugs are standard on 40 A contactors and larger. An exclusive DIN track mounting option may reduce installation costs. Coils can be changed on the Type DPA contactors (50 to 90 A) quickly without a tool. Auxiliary contact modules snap on either side of the Type DPA contactors.

8910DP22V09
Definite Purpose Contactor

Table 16.181: Compact 1-Pole Contactors—600 Vac Maximum

Full Load (A)	Locked Rotor (A)			Resistive Load (A)	N.O. Poles	Type	$ Price
	277 V	460 V	575 V				
20	120	100	80	30	1	DP11♦	**32.80**
25	150	125	100	35	1	DP21♦	**38.20**
30	150	125	100	40	1	DP31♦	**45.90**
40	240	200	160	50▲	1	DP41♦	**54.00**

8910DP42V14
Definite Purpose Contactor

Table 16.182: Compact 2-Pole Contactors—600 Vac Maximum■

Full Load (A)	Locked Rotor (A)			Resistive Load (A)	N.O. Poles	Type	$ Price
	277 V	460 V	575 V				
20	120	100	80	30	2	DP12♦	**38.20**
25	150	125	100	35	2	DP22♦	**50.00**
30	150	125	100	40	2	DP32♦	**55.00**
40	240	200	160	50	2	DP42♦	**65.00**

8910DPA33V04
Definite Purpose Contactor

Table 16.183: 2, 3, and 4-Pole Contactors—600 Vac Maximum■

Full Load (A)	Locked Rotor (A)			Resistive Load (A)	Horsepower Ratings				N.O. Poles	Type	$ Price
	230 V	460 V	575 V		115 V 1Ø	230 V 1Ø	230 V 3Ø	460/575 V 3Ø			
20	120	100	80	30	1.5	3	7-1/2	7-1/2	2 3 4	DPA12♦ DPA13♦ DPA14♦	**53.00** **61.00** **76.00**
25	150	125	100	35	2	5	10	15/20	2 3 4	DPA22♦ DPA23♦ DPA24♦	**58.00** **67.00** **86.00**
30	180	150	120	40	2	5	10	15/20	2 3 4	DPA32♦ DPA33♦ DPA34♦	**71.00** **75.00** **99.00**
40	240	200	160	50	3	7-1/2	10	20/25	2 3 4	DPA42♦ DPA43♦ DPA44♦	**79.00** **88.00** **114.00**
50	300	250	200	65	3	10	15	30	2 3	DPA52♦ DPA53♦	**164.00** **174.00**
60	360	300	240	75	5	10	25	30	2 3	DPA62♦ DPA63♦	**185.00** **193.00**
75	450	375	300	94	5	15	25	40	2 3	DPA72♦ DPA73♦	**221.00** **247.00**
90	540	450	360	120	7-1/2	20	30	50	2 3	DPA92♦ DPA93♦	**286.00** **311.00**

▲ 50 A Resistive, maximum 277 V. All others rated 40 A Resistive (above 277 V).
■ Above 240 V, all lines must be switched.
♦ Voltage code must be specified to order this product. Refer to standard voltage codes listed below.

Table 16.184: Coil Voltage Codes

Voltage		Code Type DP, DPA
60 Hz	50 Hz	
24	24	V14
24	—	—
120	110	V02
208	—	—
208-240	220	V09
230-240	220	—
277	—	V04
480	440	V06★
600	550	V07▼

★ Not available for Type DP11 through DP31 single-pole devices.
▼ Not available for Type DP one- and two-pole devices.

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Types DP, DPA Application Data

Table 16.185: 2 Normally Open & 2 Normally Closed 4-Pole Contactors—600 Vac Maximum

Full Load (A)	Resistive Load (A)	N.O. Poles	N.C. Poles■	Class 8910		$ Price
				Type	Form	
20	25	2	2	DPA14▲	Y392	**148.00**
25	35	2	2	DPA24▲	Y392	**159.00**
30	40	2	2	DPA34▲	Y392	**171.00**

▲ Voltage code must be specified to order this product. Refer to standard voltage codes below.
■ Above 240 volts, all lines must be switched.
Note: N.C. poles on outside. N.C. poles open before N.O. poles close.

Table 16.186: Auxiliary Contacts, 5 A, 600 Vac Rated

For Use With Class 8910 Type	Contact Arrangement	Class 9999 Type		$ Price
		20–40 A	50–90 A	
DPA	1 N.O.	DD10	D10	**16.40**
	1 N.C.	DD01	D01	**16.40**
	1 N.O. & 1 N.C.	DD11	D11	**29.50**
	2 N.O.	DD20	D20	**29.50**

Table 16.187: NEMA 1 General Purpose Enclosures for Type DP, DPA Contactors

Class 8910 Type	Full Load (A)	Poles	Class 9991 Type	$ Price ♦
DP	20–40	1 & 2	DPG1	**78.00**
DPA	20–40	2 & 3	DPG1	**78.00**
DPA	50	2 & 3	DPG2	**99.00**
	20–40	4		
DPA	60–75	2 & 3	DPG3	**143.00**
DPA	90	2 & 3	DPG4	**287.00**

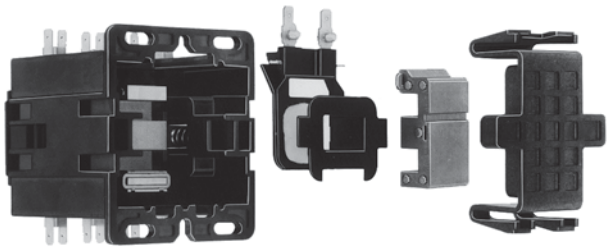
♦ CP1 discount schedule.

Table 16.188: Application Data

Mechanical Life:	500,000 operations
Electrical Life:	
Type DP	100,000 operations
Type DPA	200,000 operations
Duty Cycle:	Continuous
Approvals:	
UL Component Recognized	
UL Listed (Form U1)	File E3190, CCN NLDX2
CSA Certified	File E3190, CCN NLDX
DPA is CE marked	File LR25490, Class 321104

Note: See page 16-107 for replacement contacts.

Coil Replacement



No tools required (DPA50–60A)

Table 16.189: Class 8910 Type DPA Replacement Coils

Full Load (A)	Poles	Class 9998 Type	Volt-Amperes▼		$ Price△
			Inrush	Sealed	
50–60 A	2 & 3	DA2★	109	10	**92.00**
75–90 A	2 & 3	DA3★	214	19	**114.00**

★ Replace diamond with suffix from DPA Coil Table 16.193. Example: Coil for Class 8910 DPA53V02 120 V 60 Hz would be a Class 9998 Type DA2V02.
▼ For Types DP11 through DP32: Inrush 30 VA; Sealed 5 VA.
△ CP10 Discount Schedule, not CP1.

Table 16.190: Terminals

Full Load (A)	Power Terminals	
	Type of Lug	Wire Range□
20–30 A	Binder Head	#14–#8
40 A	Box Lug	#14–#6
50–60 A	Box Lug	#14–#2
75–90 A	Box Lug	#14–#I/O

□ Solid or stranded copper wire only.

Table 16.191: Miscellaneous Parts

Description	Class 9999 Type	$ Price
DIN mounting bracket attachment (Type DPA, 20 A to 60 A only)	DMB1	**15.00**
Type DP Series B Cover	DPC1	**2.10**

Table 16.192: Factory Modifications

Auxiliary contacts can be factory installed along with a DIN mounting bracket option. Special terminations are also available.

Modification	Type	Form	$ Price
Factory installed auxiliary contacts	—	◊	◊
Pressure wire connectors (20–30 A)	DPA	Y122	**1.70 per pole**
Box lugs (20–30 A)	DP	Y124	**3.30 per pole**
	DPA		
DIN mounting bracket attached (35 mm style)☆	DP	Y135	**3.30**
	DPA		**8.70**
Contact cover for Type DP Series B	—	Y248	**2.10**
UL Listed label on device	DP	U1	**No Charge**

◊ Contact your nearest Schneider Electric sales office.
☆ Available for 20 through 60 A only.

Table 16.193: Type DPA Coil Voltage Codes

Voltage, 60 Hz	Voltage, 50 Hz	Voltage Code
24	24	V14
120	110	V02
208–240	220	V09
277	—	V04
480	440	V06▽
600	550	V07▽

▽ Available for Type DPA contactors only.

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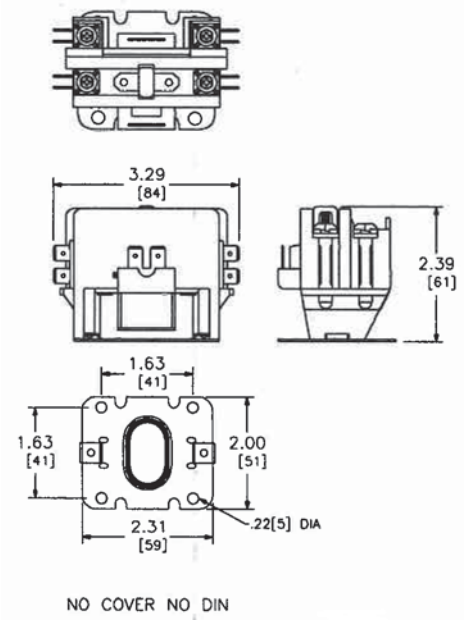
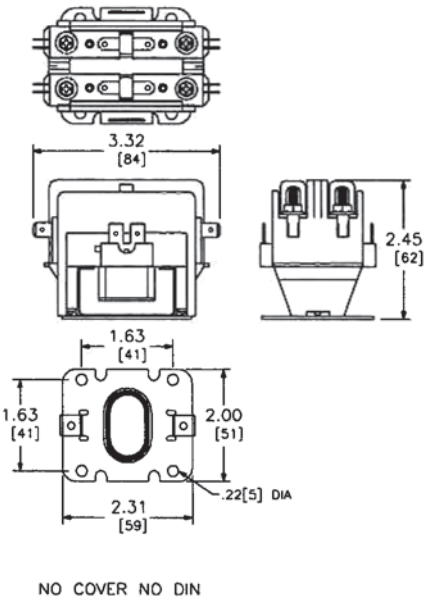
Types DP, DPA Approximate Dimensions

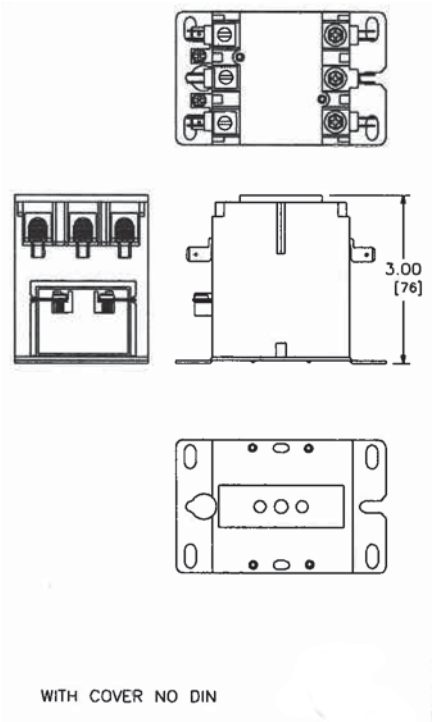
Class **8910** / Refer to Catalog **8910CT9301**



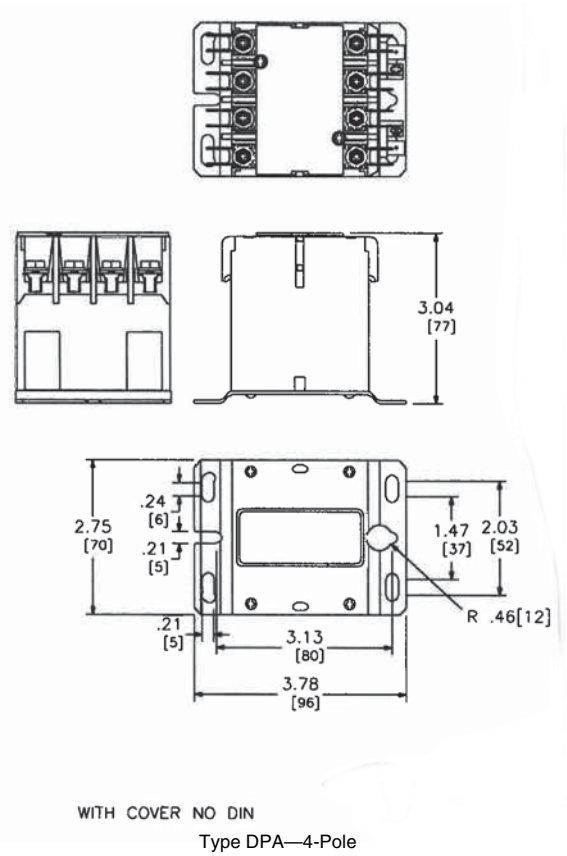
Type DP—1-Pole
20 through 40 Full Load Amperes



Type DP—2-Pole
20 through 40 Full Load Amperes



Type DPA—2 and 3-Pole
20 through 40 Full Load Amperes



Type DPA—4-Pole
20 through 40 Full Load Amperes

Dual Dimensions: INCHES
Millimeters

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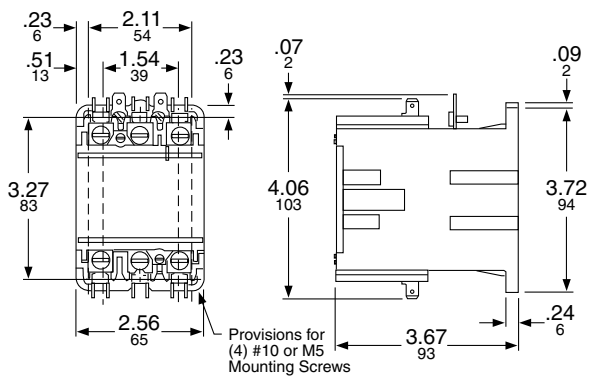
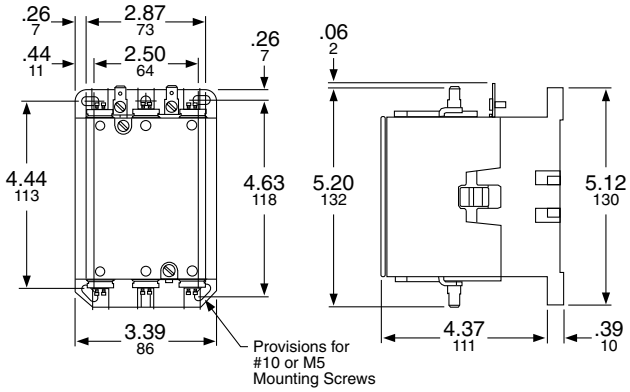


Type DPA—2 and 3-Pole
50 and 60 Full Load Amperes



Type DPA—2 and 3-Pole
75 and 90 Full Load Amperes

Dual Dimensions: INCHES Millimeters

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8911DPSO33V09
Definite Purpose Starter

Type DPSG23V02

Class 8911 definite purpose starters are inexpensive starters for applications with relatively low duty cycles. Typical applications include air compressors, agricultural equipment, pumps, and HVAC equipment. Definite purpose starters offer:

- Low cost
- Small size
- Melting alloy overload block
- Trip-free reset mechanism
- Open type or enclosed
- 500,000 mechanical operations

Table 16.194: 2- and 3-Pole Starters—600 Vac Maximum

No. of Poles	Full Load (A)	Horsepower Ratings 115 V 1Ø	230 V 1Ø	230 V 3Ø	460/575 V 3Ø	Open Type Type■	Open Type $ Price▲	NEMA 1 Enclosed Type■	NEMA 1 Enclosed $ Price▲	No. of Thermal Units▲
2-Pole Single Phase	20	1 1/2	3	—	—	DPSO12♦	**270.00**	DPSG12♦	**332.00**	1
	25	2	5	—	—	DPSO22♦	**296.00**	DPSG22♦	**354.00**	
	30	2	5	—	—	DPSO32♦	**333.00**	DPSG32♦	**392.00**	
	40	3	7 1/2	—	—	DPSO42♦	**365.00**	DPSG42♦	**426.00**	
	50	3	10	—	—	DPSO52♦	**482.00**	DPSG52♦	**539.00**	
3-Pole Poly-Phase	20	1 1/2	3	7 1/2	7 1/2	DPSO13♦	**297.00**	DPSG13♦	**356.00**	3
	25	2	5	10	15/20	DPSO23♦	**320.00**	DPSG23♦	**381.00**	
	30	2	5	10	15/20	DPSO33♦	**363.00**	DPSG33♦	**423.00**	
	40	3	7 1/2	10	20/25	DPSO43♦	**399.00**	DPSG43♦	**459.00**	
	50	3	10	15	30	DPSO53♦	**638.00**	DPSG53♦	**696.00**	

▲ **Prices do not include thermal units.** Standard trip thermal units are priced at **$21.50** each. See page 16-116 for selection information.
■ Holding circuit contacts are not provided as standard; refer to table below for kit.
♦ Voltage code must be specified to order this product. Refer to standard voltage codes listed below.

Table 16.195: Cross Reference Existing/Replacement Class 8911

Existing Device	Replacement Device
HO33	DPSO13
HG33	DPSG13
JO33	DPSO23
JG33	DPSG23
KO33	DPSO33
KG33	DPSG33
KO43	★
KG43	★
LO33	DPSO43
LG33	DPSG43
MO33	DPSO53
MG33	DPSG53
MO43	★
MG43	★

★ Type DPS 4-Pole starter not available. Suggest 3-Pole device with auxiliary contact.

Table 16.196: Miscellaneous Parts and Kits

Description	Class & Type	$ Price
Start-Stop push button kit▼△	8911DPB1	**134.00**
Hand-Off-Auto selector switch kit▼	8911DSS1	**134.00**
Standard N.C. overload relay contact	9998SO1	**42.80**
N.C. and N.O. isolated overload relay alarm contacts	9999SO4	**116.00**
Overload relay jumper strap	9998SO31	**14.30**

▼ Use for 20 to 40 A starters. For 50 A starters, use the 9999BLX bracket.
△ Does not include holding circuit interlock—order auxiliary contact.

Table 16.197: Class 8911 Type DPS Replacement Parts

Full Load (A)	Poles	Class 9998 Type	Volt A Inrush	Volt A Sealed	$ Price□
50 A	2 & 3	DA2◊	109	10	**92.00**

See page 16-107 for replacement contacts for DPS devices.

□ CP10 Discount Schedule, not CP1.
◊ Replace with Voltage Code from the Coil Table shown below.

Table 16.198: Coil Voltage Codes

Voltage, 60 Hz	Voltage, 50 Hz	Voltage Code
24	24	V14
120	110	V02
208–240	220	V09
277	—	V04
480	440	V06
600	550	V07

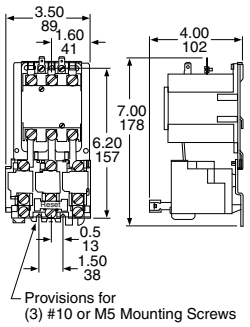
Table 16.199: Auxiliary Contacts For Type DPS Starters

Description	20–40 A Class 9999 Type	50 A Class 9999 Type	$ Price☆
1 N.O.	DD10	D10	**16.40**
1 N.C.	DD01	D01	**16.40**
1 N.O./1 N.C.	DD11	D11	**29.50**
2 N.O.	DD20	D20	**29.50**

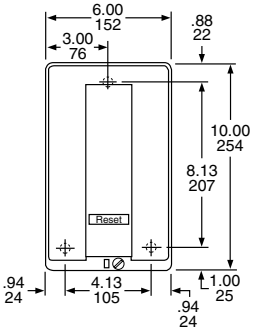
☆ CP1B discount schedule.

NOTE: *Auxiliary contacts must be field installed.*

Approximate Dimensions



Type DPSO—2 and 3-Pole and DSO 20–50 Full Load Amperes



Type DPSG—2 and 3-Pole 20–40 Full Load Amperes

Table 16.200: Ratings—Overload Contacts and Auxiliary Contacts

Device	Volts AC	Pilot Duty – AC Only (35% Power Factor) Make	Pilot Duty – AC Only (35% Power Factor) Carry and Break	Continuous Current Rating
9998 SO1 9999 SO4	120 or Less	30 A	3 A	5 A
9999 R20 & R21 9999 D10, D01, D11 & D20	120–600	3600 VA	360 VA	5 A

Table 16.201: How to Order

To Order Specify:	Catalog Number Class	Typse	Coil Voltage Code	Form(s)
• Class Number • Type Number • Voltage Code • Form(s)	8911	DPSG33	V02	

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NOTE: *Motor Logic™SSOLR are designed to protect 50/60 hertz three-phase AC motors from overload and phase loss conditions. Open Delta systems or grounded B-phase systems are difficult to balance and could cause the Motor Logic SSOLR to trip. For applications of this nature, it is recommended that bi-metallic overload relays (Form B12) be used.*

Class 8940 Type NS, SS, and XS panels in NEMA 3R enclosures are specifically designed for pumping applications. Extra space is provided for field installation of auxiliary equipment.

Type SSD4030

Type SSE4050

- Type S Contactor provided as standard
- Approved for submersible pump applications
- Motor Logic™ Class 10/20 (Selectable) SSOLR through 200 hp–480 V, 100 hp–240 V, Type SS only (Includes rubber boot.)
- All prices include a START push button and a HAND-OFF-AUTO selector switch
- Adjustable trip current
- Phase failure sensitive through 200 hp–480 V, 100 hp–240 V, Type SS only
- Ambient temperature compensated overload
- All devices are UL Listed, and marked “SUITABLE FOR USE AS SERVICE EQUIPMENT”

NOTE: *Class 10 Motor Logic SSOLR does not protect for phase imbalance.*

Table 16.202: 3-Pole Polyphase—480 Vac Maximum (50–60 Hz)—Fusible or Thermal Magnetic Breaker▲

Volts	Maximum Hp Polyphase	Coil Voltage	Fuse Clip (A)♦	Type	$ Price
240	3, 5, 7-1/2	240–60	30	SSC2007★	**2003.00**
	10, 15		60	SSD2015★	**2480.00**
	20, 25, 30		100	SSE2030★	**4194.00**
	40, 50		200	SSF2050★	**7718.00**
	75	220–50	LLL36400E20▼	XSG2075■	**19890.00**
	100		400	SSG2100★	**16286.00**
	100		LLL36600E20▼	XSG2100■	**19890.00**
	200		MJL36800▼	XSH2200■	**43133.00**
	250, 300		PLL34120▼	XSJ2300■	**58145.00**
480	3, 5, 7-1/2, 10	480–60	30	SSC4010★	**2003.00**
	15, 20, 25		60	SSD4025★	**2480.00**
	30		60	SSD4030★	**3338.00**
	40, 50		100	SSE4050★	**4194.00**
	60, 75, 100		200	SSF4100★	**7718.00**
	150	440–50	LLL36400E20▼	XSG4150■	**19890.00**
	200		400	SSG4200★	**16286.00**
	200		LLL36600E20▼	XSG4200■	**19890.00**
	300, 350, 400		MJL36800▼	XSH4400■	**4313300**
	500, 600		PLL34120▼	XSJ4600■	**58145.00**

Table 16.203: 3-Pole Polyphase—480 Vac Maximum (50–60 Hz)—Electronic Motor Circuit Protector (MCP)

Volts	Max. Hp Polyphase	Coil Voltage■	Circuit Breaker△	Type	$ Price
240	30	240–60 220–50	HLL36100M73	XSE2030V03	**4599.00**
	40		JLL36250M75	XSE2040V03	**7650.00**
	50		JLL36250M75	XSF2050V03	**8258.00**
480	40	480–60 440–50	HLL36100M73	XSE4040V06	**4599.00**
	50			XSE4050V06	**4599.00**
	75		JLL36250M75	XSE4075V06	**7650.00**
	100		JLL36250M75	XSF4100V06	**8258.00**

▲ To substitute an IEC ambient compensated bimetallic overload relay (up to size 5) for the Motor Logic SSOLR, request Form B12 and state motor hp (no charge). This applies to the above (SSx) devices only.
■ See page 16-76 for coil voltage codes and pricing.
♦ Fuse clips are sized for use with dual-element time-delay fuses.
★ Voltage code not required for 240 V or 480 V common control with 8940SS controllers.
▼ Circuit breaker disconnect supplied. (See page 7-32 for circuit breaker adjustment range.)
△ See page 7-32 for circuit breaker adjustment range.

Table 16.204: Class 8940—UL Listed Short Circuit Ratings

Thermal Magnetic Circuit Breaker Type			
NEMA Size	Voltage	Enclosure	Available Amperes RMS Symmetrical
0-5	0-480	Standard	100,000
6, 7	0-480	Standard	65,000

□ Standard enclosure includes non-oversize NEMAs 1, 4 & 4X Stainless, and 12.

Table 16.205: Class 10 Pump Panel Replacement Motor Logic SSOLR (with rubber boot)

Description	Catalog Number	$ Price
Pump Panel SSOLR 27A Special	3116154764 (Size 1)	**$192.00**
Pump Panel SSOLR 45A Special	3116154883 (Size 2)	**270.00**
Pump Panel SSOLR 90A Special	3116155158 (Size 3)	**329.00**
Pump Panel SSOLR 135A Special	3116155368 (Size 4)	**477.00**
Pump Panel SSOLR 270A Special	3116118474 (Size 5)	**221.00**
Pump Panel SSOLR 540A Special	3116118476 (Size 6)	**221.00**
Pump Panel SSOLR 810A Special	3116118477 (Size 7)	**221.00**
Replacement Boot Size 1 & 2	9999MRB12 (5 boots)	**50.00**
Replacement Boot Size 3 & 4	9999MRB34 (5 boots)	**50.00**

Table 16.206: Class 8940—UL Listed Short Circuit Ratings

NEMA Size	NEMA Fuse Class	Enclosure	Available Amperes RMS Symmetrical
0–3	Class H or K	Standard	5,000
0–3	Class R	Standard	100,000
0–2	Class H or K	Standard	5,000
0–2	Class R	Standard	100,000
4–5	Class H or K	Standard	10,000
4–5	Class R	Standard	100,000
6	Class H or K	Standard	18,000
6	Class R	Standard	100,000

For How to Order Information, see page 16-13.

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Class 8940 "S2" Pumping Plant Panels in NEMA 3R enclosures are specifically designed for oil field applications. All panels are supplied with an Electonic Motor Circuit Protector (MCP) or a visible blade, fused, disconnect switch. This line of pumping plant panels features:

- Rugged spring latches for easy access without a tool
- Side mounted control units for convenient operation
- Door retainer available for windy areas
- Price includes Hand-Off-Auto selector switch
- UL Listed for use as service equipment for motors
- Extra panel space for additional electrical controls
- All devices are UL Listed, and marked "SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT"

Thermal units must be ordered separately at **$21.50** each. See page 16-116 for selection information.

NOTE: *Overload relays are ambient temperature compensated.*

Type WC3S2V06

Type XE3S2V02B12S

Table 16.202: 3-Pole Polyphase—480 Vac Maximum (50–60 Hz)

Volts	Max. Hp Polyphase	Coil▲ Voltage	NEMA Size	Fusible Disconnect Type			Circuit Breaker Type		
				Fuse Clip (A)■	Type	$ Price	Frame Size	Type	$ Price
240	7-1/2	240–60 220–50	1	30	WC1S2V03	**2109.00**	HLL36030M71	XC1S2V03	**2228.00**
	10		2	60	WD1S2V03	**2880.00**	HLL36050M72	XD1S2V03	**2997.00**
	15						HLL36100M73	XD2S2V03	**2997.00**
	30		3	100	WE1S2V03	**4649.00**	HLL36100M73	XE1S2V03	**4886.00**
	50		4	200	WF1S2V03	**8724.00**	JLL36250M75	XF2S2V03	**8963.00**
480	10	480–60 440–50	1	30	WC3S2V06	**2109.00**	HLL36030M71	XC4S2V06	**2262.00**
	15		2	60	WD3S2V06	**2919.00**	HLL36030M71	XD3S2V06	**3036.00**
	25		2				HLL36050M72	XD4S2V06	**3036.00**
	50		3	100	WE3S2V06	**4748.00**	HLL36100M73	XE3S2V06	**4986.00**
	100		4	200	WF3S2V06	**8801.00**	JLL36250M75	XF4S2V06	**9036.00**

▲ Coil voltage code must be supplied to order this product. See Coil Voltage Codes table to the left for codes.
■ Fuse clips are sized for use with dual-element time-delay fuses.

Table 16.203: Factory Modifications (Forms)

Description	Form Letter	$ Price
Substitute Class 10 IEC overload relay – state motor hp (NEMA Sizes 0–4 only)	B12	**No Charge**
Control transformer with fused primary: Types: NPD, NPE, NPF, SSC, WC, XC (50 VA) NPG, SSD, XD, WD (100 VA) NPJ, SSE, XE, WE (150 VA) SSF, XF, WF (300 VA) SSG, NSG, XSG (50 VA and an interposing control relay)	F4T	 **386.00** **539.00** **797.00** **968.00** **1097.00**
Factory installed door wind latch assembly in a standard 8940NPD, NPE, NPF, NPG, NPJ, SSC, SSD, SSE and SSF	G45	**113.00**
Elapsed time meter	G97	**827.00**
Substitute Class 10 Motor Logic™ SSOLR▼	H10	**64.00**
ON Delay Timer	K25	**1197.00**
OFF Delay Timer	K26	**1197.00**
Program timer with day omission feature	K141	**1197.00**
Backspin timer (time delay upon energization)	K15	**1112.00**
Start Pushbutton (S2 panels only)	A28	**No Charge**
"Slim" panel (Types WC, WD, WE, XC, XD, XE only)	L8	**No Charge**
"Short" panel (Types SSE, SSF, XE-S2 and XF-S2 only)	L9	**No Charge**
Pilot light (specify lens color). Does not include auxiliary contact.	P♦	**336.00**
Separate control	S	**No Charge**
Auxiliary contacts (specify N.O. or N.C.)	X★	**158.00**
Special UL panel label for modified UL Listed devices on non-standard panels, requires approval by manufacturing plant	Y1	**267.00**
Lightning arrestor	Y1532	**570.00**
Phase failure, phase reversal relay with time delay including under and over voltage protection	R44	**1463.00**
Substitute standard trip melting alloy overload relays	Y61	**No Charge**
Substitute quick-trip melting alloy overload relay (Sizes 1 and 2 only) – Not available on IEC style contactors	Y611	**No Charge**
Substitution of Class R rejection fuse clips for standard fuse clip. (8940 RD, RE, RF, RG, MD, ME, MF, MG, SSC, SSD, SSE, SSF, SSG, WC, WD, WE and WF)	Y1071	**No Charge**

♦ Indicate pilot light color as **Form P1** (red) or **Form P2** (green). See page 16-100, footnote △ for more selections.
★ To determine the maximum number of auxiliary contacts which can be added to each Type S device and for the appropriate "X Form," refer to tables in the Class 8536 section.
▼ Motor Logic SSOLR are designed to protect 50/60 hertz three-phase AC motors from overload, phase unbalance and phase loss conditions. Open Delta systems or grounded B-phase systems are difficult to balance and could cause the Motor Logic SSOLR to trip. For applications of this nature, it is recommended that bi-metallic overload relays (Form B12) be used.

Table 16.204: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24△□	—	V01	N/C
120□	110□	V02	N/C
208□	—	V08	N/C
240	220	V03	N/C
—	380	V05	N/C
480	440	V06	N/C
600□	550□	V07	N/C
Specify	Specify	V99	35.60

△ 24 V coils are not available on Size 4 starters. On Size 1–3, 24 V coils are available. **Form S** must be used.
□ **Form S** required for separate control.

For How to Order Information, see page 16-13.

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Table 16.205: Replacement Overload Relay for Square D Class 8940 Pump Panel with IEC Style Bi-metallic Overload Relays Mounted on Current Transformers

AMP Range	Number of Poles	Form	Series	Type▲	$ Price
40A-63A	3	B12	B	TJF40	**428.00**
63A-100A	3	B12	B	TJF63	**428.00**
100A-160A	3	B12	B	TJF100	**468.00**
160A-250A	3	B12	B	TJF160	**468.00**

◊ A retro-fit reset kit is required for pre-series B pump panels. See page 16-92 for selection.

Approximate Dimensions

Table 16.206:

Type	Fig.	A		B		C		D		E		F		G		H		J		K		L	M		Knockouts			V	
		IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	Conduit	IN	mm	R	S	T	IN	mm
NPD/E/F SSC SSD	1	39.05	992	13.73	349	6.67	169	9.70	246	33.05	839	37.93	963	7.00	178	2.41	61	3.00	76	3.00	76	2-1/2	2.41	61	1/2–3/4	1-1/4–1-1/2	1/2–3/4	1.41	36
NPG/J SSE/F XSE/F	1	49.00	1245	19.15	486	8.81	224	10.37	263	44.07	1119	47.88	1216	7.00	178	2.17	55	2.69	68	3.44	87	2-1/2	2.57	65	1/2–3/4	1–1-1/4 1–2-1/2	1–1-1/4 1-1/2–2	1.41	36
WC—S2 WD—S2 XC—S2 XD—S2	1	38.50	978	19.00	483	7.29	185	9.39	239	34.00	864	37.38	949	7.00	178	2.18	55	2.13	54	2.13	54	1-1/2	2.12	54	1/2–3/4	1–1-1/4 1-1/2	1/2–3/4	—	—
WE—S2 WF—S2 XE—S2 XF—S2	1	56.50	1435	23.00	584	8.23	209	10.33	262	52.00	1321	55.38	1407	7.00	178	2.18	55	2.69	68	3.44	87	2	2.68	68	1/2–3/4	1–1-1/4 2–2-1/2	1–1-1/4 1-1/2–2	1.50	38
SSG XSG	1	75.50	1892	22.00	559	13.80	351	17.55	446	73.00	1854	74.50	13	14.00	356	N/A	N/A	.56	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.50	38
XSH	2	82.50	2096	36.00	914	20.00	508	23.25	591	80.00	2032	33.75	857	16.50	419	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
XSJ	2	92.50	2350	34.00	864	20.00	508	23.25	591	90.00	2286	31.75	806	16.50	419	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: *Illustrations may not represent the actual enclosure; they are intended for dimensional information only.*

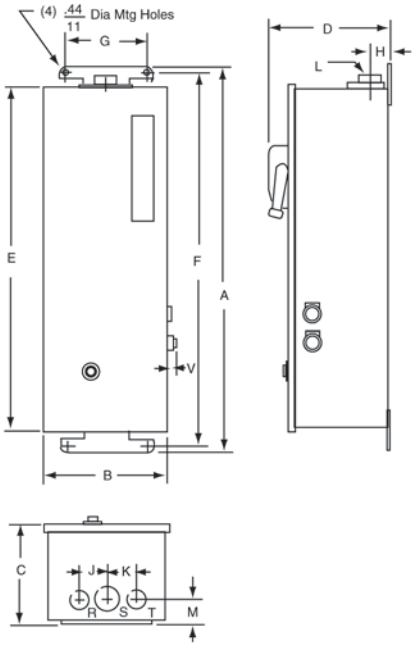

Figure 1

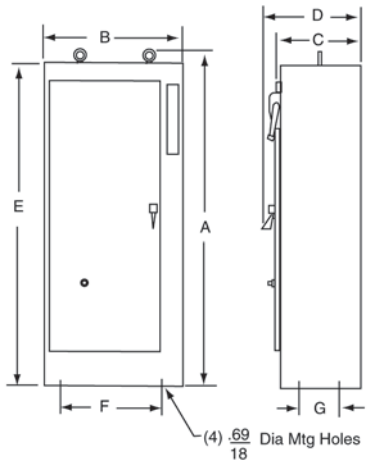

Figure 2

Dual Dimensions: **INCHES** Millimeters

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Duplex Motor Controllers are used to control two motors, and consist of two starters in a common enclosure. Two separate disconnect switches or circuit breakers with operators are included with all combination devices. Unless **Form Y68** is specified, an alternation circuit (a Class 8501 Type XO40 relay) is included, which alternately operates first one motor and then the other on each successive closing of a pilot device. Both motors will be energized should a second pilot device close. All devices incorporate a terminal block to simplify wiring of pilot devices A and B. Typical applications include pump motors where a second pump is required for peak demand periods yet alternation is desirable to equalize pump wear.

Table 16.207: 3-Pole Polyphase—600 Vac Maximum (50–60 Hz)
Non-Combination Type—Without Disconnect—With Electric Alternation

Note that the prices shown do not include thermal units. Devices require 6 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

NEMA Size	Maximum Rating Each Motor		NEMA 1 General Purpose Enclosure		NEMA 4/4X Watertight and Dusttight Enclosure Stainless Steel		NEMA 12 (NEMA 3 and 3R)▲ Dusttight and Driptight Industrial Use Enclosure		Open Type	
	Voltage	Hp Polyphase	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
0	200–230 460–575	3 5	NBG10■	**2322.00**	NBW10■	**3105.00**	NBA10■	**2564.00**	NBO10■	**2138.00**
1	200–230 460–575	7-1/2 10	NCG20■	**2478.00**	NCW20■	**3290.00**	NCA20■	**2721.00**	NCO20■	**2294.00**
2	200 230 460–575	10 15 25	NDG30■	**3731.00**	NDW30■	**5427.00**	NDA30■	**4359.00**	NDO30■	**3290.00**
3	200 230 460–575	25 30 50	NEG40■	**5112.00**	NEW40■	**8303.00**	NEA40■	**5925.00**	NEO40■	**4487.00**
4	200 230 460–575	40 50 100	NFG50■	**10440.00**	NFW50■	**15881.00**	NFA50■	**13131.00**	NFO50■	**9116.00**

Table 16.208: 3-Pole Polyphase—600 Vac Maximum (50–60 Hz)
Combination Thermal Magnetic Circuit Breaker Type—With Electric Alternation

Note that the prices shown do not include thermal units. Devices require 6 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Motor Starter Voltage	Max. Hp Poly-phase	Coil Voltage ■	NEMA Size	Circuit Breaker		NEMA 1 General Purpose Enclosure		NEMA 4/4X Watertight and Dusttight Stainless Steel Enclosure		NEMA 12 (NEMA 3 and 3R)▲ Dusttight and Driptight Industrial Use Enclosure	
				Frame Size	Ampere Rating	Type	$ Price	Type	$ Price	Type	$ Price
200 (208)	2 3	208–60	0	HLL36015 HLL36020	15 20	CBG06■ CBG08■	**3945.00**	CBW06■ CBW08■	**6951.00**	CBA06■ CBA08■	**4701.00**
	5 7-1/2		1	HLL36035 HLL36050	35 50	CCG12■ CCG15■	**4103.00**	CCW12■ CCW15■	**7109.00**	CCA12■ CCA15■	**4859.00**
	10		2	HLL36060	60	CDG22■	**5826.00**	CDW22■	**10470.00**	CDA22■	**6894.00**
	15 20 25		3	HLL36100 HLL36125 HLL36150	100 125 150	CEG32■ CEG36■ CEG38■	**9401.00**	CEW32■ CEW36■ CEW38■	**17490.00**	CEA32■ CEA36■ CEA38■	**10782.00**
	30 40		4	JLL36200 JLL36250	200 250	CFG41■ CFG44■	**19584.00**	CFW41■ CFW44■	**29924.00**	CFA41■ CFA44 ■	**23400.00**
230 (240)	2 3	240–60 220–50	0	HLL36015 HLL36020	15 20	CBG06■ CBG08■	**3945.00**	CBW06■ CBW08■	**6951.00**	CBA06■ CBA08■	**4701.00**
	5 7-1/2		1	HLL36035 HLL36045	35 45	CCG14■ CCG16■	**4103.00**	CCW14■ CCW16■	**7109.00**	CCA14■ CCA16■	**4859.00**
	10 15		2	HLL36060 HLL36090	60 90	CDG22■ CDG24■	**5826.00**	CDW22■ CDW24■	**10470.00**	CDA22■ CDA24■	**6894.00**
	25 30		3	HLL36150	150	CEG38■	**9401.00**	CEW38■	**17490.00**	CEA38■	**10782.00**
	40 50		4	JLL36225 JLL36250	225 250	CFG43■ CFG44■	**19584.00**	CFW43■ CFW44■	**29924.00**	CFA43■ CFA44■	**23400.00**
460 (480)	5	480–60 440–50	0	HLL36015	15	CBG10■	**4859.00**	CBW10■	**7862.00**	CBA10■	**5612.00**
	7-1/2 10		1	HLL36025 HLL36030	25 30	CCG18■ CCG20■	**5013.00**	CCW18■ CCW20■	**8019.00**	CCA18■ CCA20■	**5769.00**
	15 20 25		2	HLL36045 HLL36060 HLL36070	45 60 70	CDG26■ CDG28■ CDG30■	**6737.00**	CDW26■ CDW28■ CDW30■	**12881.00**	CDA26■ CDA28■ CDA30■	**7806.00**
	30 50		3	HLL36080 HLL36150	80 150	CEG39■ CEG40■	**9401.00**	CEW39■ CEW40■	**17490.00**	CEA39■ CEA40■	**10782.00**
	75 100		4	JLL36200 JLL36250	200 250	CFG45■ CFG47■	**19584.00**	CFW45■ CFW47■	**29924.00**	CFA45■ CFA47■	**23400.00**

▲ NEMA 12 enclosures may be field modified for outdoor applications. For details refer to Class 9991, page 16-95.
■ Coil voltage code must be specified to order this product. Refer to standard voltage codes listed on page 16-80.
Note: For voltage codes used with control transformers, see page 16-101.

For How to Order Information, see page 16-13.

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Table 16.209: 3-Pole Polyphase—600 Vac Maximum (50–60 Hz) Combination Disconnect Switch Type—With Electric Alternation

Note that the prices shown do not include thermal units. Devices require 6 thermal units. Standard trip thermal units are **$21.50** each. See page 16-116 for selection information.

Motor Voltage (Starter Voltage)	Max. Hp Poly-phase	Coil Voltage ♦	NEMA Size	Fuse Clip Size (A)■	NEMA 1 General Purpose Enclosure		NEMA 4/4X Watertight and Dusttight Enclosure Stainless Steel		NEMA 12 (NEMA 3 and 3R)▲ Dusttight and Driptight Industrial Use Enclosure	
					Type	$ Price	Type	$ Price	Type	$ Price
200 (208)	3	208-60	0	None 30	UBG10♦ DBG08♦	**3731.00** **3816.00**	UBW10♦ DBW08♦	**6737.00** **6822.00**	UBA10♦ DBA08♦	**4487.00** **4572.00**
	7-1/2		1	None 60	UCG20♦ DCG18♦	**3888.00** **3974.00**	UCW20♦ DCW18♦	**6894.00** **6980.00**	UCA20♦ DCA18♦	**4644.00** **4730.00**
	10		2	None 60	UDG30♦ DDG28♦	**5642.00** **5754.00**	UDW30♦ DDW28♦	**10283.00** **10398.00**	UDA30♦ DDA28♦	**6708.00** **6822.00**
	25		3	None 200	UEG40♦ DEG38♦	**8798.00** **9072.00**	UEW40♦ DEW38♦	**16892.00** **17163.00**	UEA40♦ DEA38♦	**10184.00** **10454.00**
230 (240)	3	240-60 220-50	0	None 30	UBG10♦ DBG08♦	**3731.00** **3816.00**	UBW10♦ DBW08♦	**6737.00** **6822.00**	UBA10♦ DBA08♦	**4487.00** **4572.00**
	7-1/2		1	None 60	UCG20♦ DCG18♦	**3888.00** **3974.00**	UCW20♦ DCW18♦	**6894.00** **6980.00**	UCA20♦ DCA18♦	**4644.00** **4730.00**
	15		2	None 60	UDG30♦ DDG28♦	**5642.00** **5754.00**	UDW30♦ DDW28♦	**10283.00** **10398.00**	UDA30♦ DDA28♦	**6708.00** **6822.00**
	30		3	None 200	UEG40♦ DEG38♦	**8802.00** **9072.00**	UEW40♦ DEW38♦	**16892.00** **17163.00**	UEA40♦ DEA38♦	**10184.00** **10454.00**
460 (480)	5	480-60 440-50 575 (600)	0	None 30	UBG10♦ DBG10♦	**3731.00** **3833.00**	UBW10♦ DBW10♦	**6737.00** **6836.00**	UBA10♦ DBA10♦	**4487.00** **4586.00**
	10		1	None 30	UCG20♦ DCG20♦	**3888.00** **3987.00**	UCW20♦ DCW20♦	**6894.00** **6993.00**	UCA20♦ DCA20♦	**4644.00** **4743.00**
	25		2	None 60	UDG30♦ DDG30♦	**5642.00** **5796.00**	UDW30♦ DDW30♦	**10283.00** **10440.00**	UDA30♦ DDA30♦	**6708.00** **6866.00**
	50		3	None 100	UEG40♦ DEG40♦	**8802.00** **9230.00**	UEW40♦ DEW40♦	**16892.00** **17319.00**	UEA40♦ DEA40♦	**10184.00** **10611.00**

▲ NEMA 12 enclosures may be field modified for outdoor applications. For details refer to Class 9991, page 16-95.
■ Hp rating applies only when dual element time delay fuses are used.
♦ Coil voltage code must be specified to order this product. Refer to standard voltage codes listed on page 16-80.
Note: For voltage codes used with control transformers, see page 16-101.

Table 16.210: Factory Modifications (Forms)

Description◊	Enclosure Type	Form	Price/NEMA Size			
			0–1	2	3	4
PILOT DEVICES IN COVER★ "START-STOP" push buttons—one supplied for each motor. (**Form C** or **Form Y68** required.)	1, 4, 12	A	**671.00**	**671.00**	**671.00**	**671.00**
"HAND-OFF-AUTO" selector switch—one supplied for each motor.	1, 4,12	C	**671.00**	**671.00**	**671.00**	**671.00**
"NO. 1 LEAD—NO. 2 LEAD" selector switch for manual selection of lead pump. (**Form Y68** required.) Red "ON" pilot light—one supplied for each motor.	Any 1, 4, 12	C13 P1	**513.00** **671.00**	**513.00** **671.00**	**513.00** **671.00**	**513.00** **671.00**
Push-to-test red "ON" pilot light—one supplied for each motor. Non-standard markings for pilot devices. "TEST" push button for each starter.	1, 4, 12 Any Any	P21 G12 Y29	**869.00** **28.70** **671.00**	**869.00** **28.70** **671.00**	**869.00** **28.70** **671.00**	**869.00** **28.70** **671.00**
CONTROL CIRCUIT MODIFICATIONS Fused control circuit without transformer One fuse Two fuses Fused control circuit transformer, two fuses in primary, with 600, 480, 240 or 208 V primary and 120 V secondary –one supplied for each starter.	 Any Any Any	 F F4 F4T	 **627.00** **627.00** **770.00**	 **627.00** **627.00** **1083.00**	 **627.00** **627.00** **1596.00**	 **627.00** **627.00** **1938.00**
Fused control circuit transformer, two fuses in primary, one fuse in secondary—one supplied for each starter. 100 VA additional capacity 200 VA additional capacity	Any Any Any	FF4T FF4T11 FF4T12	**1395.00** **1994.00** **2478.00**	**1710.00** **2393.00** **2934.00**	**2222.00** **2849.00** **3392.00** □	**2564.00** **3135.00** □ **3675.00** □
Extra capacity control circuit transformer—two fuses in primary—one supplied for each starter (See Table 16.211) 100 VA additional capacity 200 VA additional capacity Elapsed time meter for each starter	 Any Any Any	 F4T11 F4T12 G97	 **1446.00** **1853.00** **1652.00**	 **1767.00** **2303.00** **1652.00**	 **2222.00** **2763.00** **1652.00**	 — △ — △ **1652.00**
Pressure switch for each starter (Square D pressure switch 9012GAW25) Addition of 2 relays to modify controller for operation with single pole pilot devices. Addition of 3 relays to modify controller for operation with single pole mercury float switches.	Any Any Any	D R7 R8	**755.00** **1454.00** **2178.00**	**755.00** **1454.00** **2178.00**	**755.00** **1454.00** **2178.00**	**755.00** **1454.00** **2178.00**
Control circuit wired for separate 120 V source.	Any	S	**No Charge**	**No Charge**	**No Charge**	**No Charge**
Addition of 1 N.O. unwired interlock per starter for use by customer. (1 N.O. unwired interlock per starter is supplied as standard.) Addition of 1 N.C. unwired interlock per starter for customer use.	 Any Any	 X10 X01	 **315.00** **315.00**	 **315.00** **315.00**	 **315.00** **315.00**	 **315.00** **315.00**
Modified wiring for use with double pole mercury float switches. **Deduct** for omission of electrical alternating circuit. Additional Control circuit terminals—per wired terminal. (5 point terminal block is standard) Unwired	 Any Any Any Any	 Y24 Y68 G56▼ G50▼	 **314.00** **869.00** **116.00** **57.00**	 **314.00** **869.00** **116.00** **57.00**	 **314.00** **869.00** **116.00** **57.00**	 **314.00** **869.00** **116.00** **57.00**

★ Not available on open style devices.
▼ Addition of terminal block 9080CA or 9080GR6 only. 5 point terminal block is provided as standard for custom connection. A wiring diagram must be supplied for factory wiring.
△ Not available on this size. Use **Form FF4T_ _.**
□ Single primary voltage must be specified.
◊ These Forms are most commonly used. Other Forms may be available. Consult Schneider Electric CCC at (1-888-778-2733) for additional information.

Table 16.211:

NEMA Size	Standard Capacity (Form F4T)	100 VA Additional Capacity (Form F4T11)	200 VA Additional Capacity (Form F4T12)
	Class 9070 Type	Class 9070 Type	Class 9070 Type
0 & 1	T100	T200	T300
2	T100	T200	T300
3	T150	T300	T500
4	T300	T500	T500

For How to Order Information, see page 16-13.

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Approximate Dimensions

Table 16.212: NEMA 1 Enclosure—Non-Combination (Figure 1)

Starter Size	A	B	C	D	E	F	G	H
0, 1, or 2	20-1/2	24-1/8	8-11/16	17-7/8	21-1/2	1-5/16	1-5/16	5/16 Dia.
3 or 4	22-1/8	34	9-3/4	16	35-1/2	3-1/16	3/4	7/16 Dia.

Table 16.213: NEMA 1 Enclosure—Combination (Figure 2)

Starter Size	A	B	C	D	E	F	G	H	J	K
0, 1, or 2 (For FAL Circuit Breaker and 30 A & 60 A Disconnect Switch)	20-3/8	35	9-5/8	17	32-1/2	3-5/16	1-1/4	1-1/4	1-1/4	7/16 Dia.
3 or 4 (For FAL & KAL Circuit Breaker and 100 A Disconnect Switch)	32	44	10-3/4	24	46	▲	1	2-1/2	2-1/2	9/16 Dia.

▲ For FAL & KAL Circuit Breaker. Dimension F=3-5/16. For 100 A Disconnect Switch Dimension F=4-7/8

Table 16.214: NEMA 4 Enclosure—Non-Combination (Figure 3)

Starter Size	A	B	C	D	E	F	G	H	J
0, 1, or 2	20-1/2	24	8	25	15-3/8	26	2-9/16	1/2	5/16
3 or 4	22	34	9-1/8	35	17	36	2-1/2	1/2	9/16

Table 16.215: NEMA 4 Enclosure—Combination (Figure 4)

Starter Size	A	B	C	D	E	F	G	H	J	K
0, 1, or 2 (For FA Circuit Breaker and 30 A & 60 A Disconnect Switch)	20-1/2	35	9-9/16	36	15-3/8	37	2-9/16	1/2	5/16	3-5/16
3 or 4 (For FA and KA Circuit Breaker and 100 A Disconnect Switch)	32	44	10-11/16	46	26	47	3	1/2	9/16	■

■ For FA or KA Circuit Breaker K = 3-1/16. For 100 A Disconnect Switch K = 4-7/8

Table 16.216: NEMA 12/3R Enclosure—Non-Combination (Figure 3)

Starter Size	A	B	C	D	E	F	G	H	J
0, 1, or 2	20-1/2	24-1/4	8	25-1/2	14-3/8	26-1/2	3-1/16	1/2	7/16
3 or 4	22	34	9-1/8	35-1/2	16	36-1/2	3	1/2	7/16

Table 16.217: NEMA 12/3R Enclosure—Combination (Figure 4)

Starter Size	A	B	C	D	E	F	G	H	J	K
0, 1, or 2 (For FA Circuit Breaker and 30 A & 60 A Disconnect Switch)	20-1/2	35	9-9/16	36-1/2	14-3/8	37-1/2	3	1/2	7/16	3-5/16
3 or 4 (For FA and KA Circuit Breaker and 100 A Disconnect Switch)	32-1/4	44-1/4	10-11/16	46	24	47	4-1/8	1/2	9/16	♦

♦ For FA or KA Circuit Breaker K = 3-5/16. For 100 A Disconnect Switch K = 4-7/8

Table 16.218: Coil Voltage Codes

Voltage		Code	$ Price Adder
60 Hz	50 Hz		
24▼★	—	V01	No Charge
120▼	110	V02	No Charge
208	—	V08	No Charge
240	220	V03	No Charge
—	380	V05	No Charge
480	440	V06	No Charge
600	550	V07	No Charge
Specify	Specify	V99	35.60

★ 24 V coil is not available on Size 4. On Sizes 00–3, where 24 V coils are available, **Form S** (separate control) must be specified.

▼ These voltage codes must include **Form S** (No additional charge).

NOTE: *Illustrations may not represent the actual enclosure; they are intended for dimensional information only. Dimensions are in inches.*

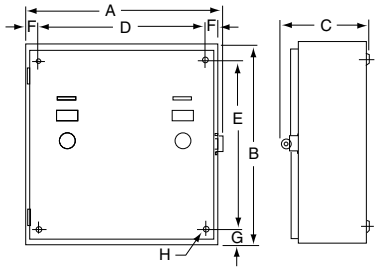

Figure 1

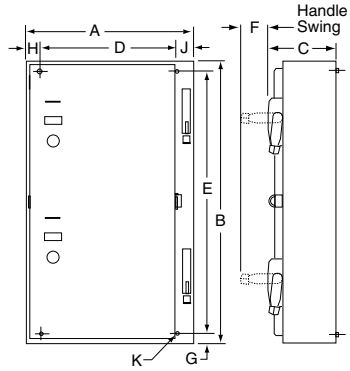

Figure 2

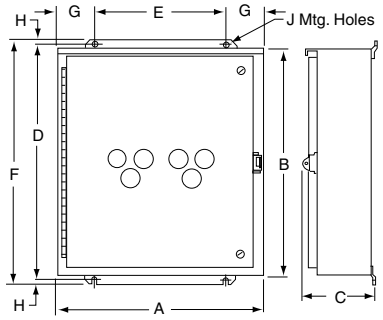

Figure 3

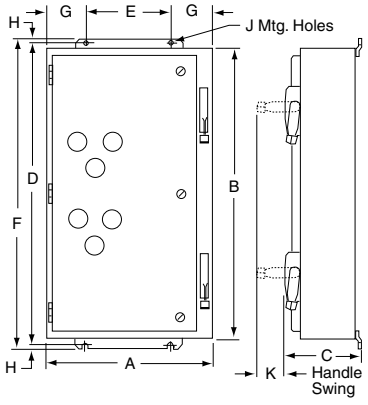

Figure 4

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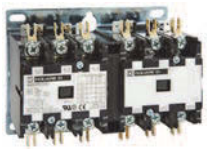


8965DPR33V02
Hoist Contactor
600 Vac, 25 A
DPR, Angled

Class 8965 Type DPR reversing/hoist contactors are designed for the control of motors in hoists, overhead doors, small elevators, commercial laundry equipment, and other related products which use reversing motors. They are rated to perform in the short periods of jogging experienced in hoist service.

The coils are designed to operate on line voltages of 85% to 110% of rated voltage, and are for applications at 50 or 60 Hz only. Coils are easily replaced with external base removed.

Auxiliary contacts may be easily field–added to any Class 8965 reversing contactor. Type DPR contactors accept one auxiliary contact module with up to two isolated circuits per side (two modules per device). When auxiliary contacts are ordered separately, two modules are normally used for each device; one for forward, one for reverse.

Table 16.219: Reversing/Hoist Contactors—600 Vac Maximum

No. of Poles	Horsepower Ratings▲ 115 V 1Ø	230 V 1Ø	230 V 3Ø	460/575 V 3Ø	Open Type Type	$ Price	Replacement Coil Class 9998 Type	$ Price■
3-Pole Poly-Phase	1	2	5	7-1/2	DPR13♦	**998.00**	DA1♦	**68.00**
	2	3	7-1/2	10	DPR23♦	**1139.00**	DA1♦	**68.00**
	2	5	10	15	DPR33♦	**1283.00**	DA1♦	**68.00**
	3	7-1/2	15	20	DPR43♦	**1425.00**	DA1♦	**68.00**
4-Pole Poly-Phase	1	2	5	7-1/2	DPR14♦	**1070.00**	DA2♦	**92.00**
	2	3	7-1/2	10	DPR24♦	**1211.00**	DA2♦	**92.00**
	2	5	10	15	DPR34♦	**1353.00**	DA2♦	**92.00**
	3	7-1/2	10	20	DPR44♦	**1497.00**	DA2♦	**92.00**

▲ For rapid operation (jogging duty), use the next larger size contactor.
■ CP10 Discount Schedule, not CP1.
♦ Voltage code must be specified to order this product. Refer to standard voltage codes listed below.

Table 16.220: Auxiliary Contacts Separate Module★

Description	Class 9999 Type	$ Price
1 N.O.	DD10	**35.60**
1 N.C.	DD01	**24.60**
1 N.O.–1 N.C.	DD11	**64.00**
2 N.O.	DD20	**44.30**

★ Order two modules for Type DPR, one for each side.

Table 16.221: Factory Installed

Description	Form	$ Price
1 N.O. Each Side	X1010	**95.00**
1 N.C. Each Side	X0101	**95.00**
1 N.O.–1 N.C. Each Side	X1111	**153.00**
2 N.O. Each Side	X2020	**153.00**

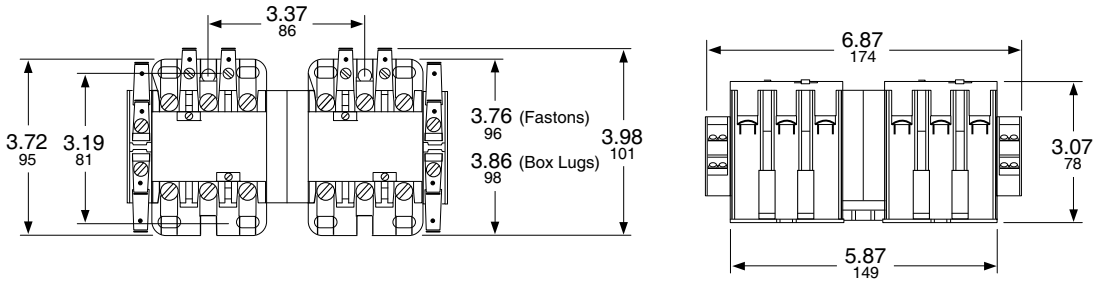
Table 16.222: Coil Voltage Codes

Volts, 60 Hz	Volts, 50 Hz	Voltage Code
24	24	V14
120	110	V02
208–240	220	V09
277	—	V04
480	440	V06
600	550	V07

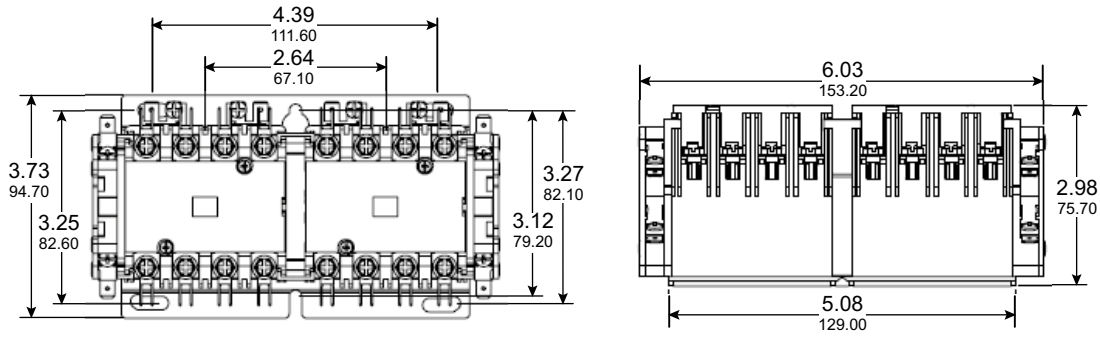
Approvals

UL Component Recognized—File E42240, CCN NLDX
CSA Certified—File LR25490, Class 3211 04

Approximate Dimensions



Type DPR13 through DPR43



Type DPR14 through DPR44

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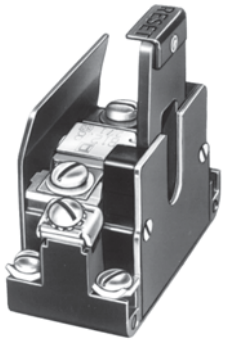


Type CO1R

NEMA-styled Thermal Overload Relays feature:

- Exclusive One-Piece Thermal Unit
- Inverse Time Delay Trip
- Trip Free Reset Mechanism on Types G & S
- Replaceable Contact Units on Types G & S

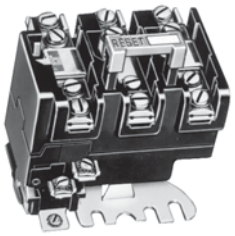
Note that the prices shown on this page do not include thermal units. Standard trip thermal units are **$21.50** each. Slow trip (Class 30) and quick trip (Class 10) melting alloy thermal units are available for all Size 1, 2, 5 and 6, and some Size 3 and 4 applications.

Table 16.223: For Separate Mounting—Melting Alloy—600 Volts Maximum, AC or DC▲

NEMA Size	Maximum Full Load Current (A)	Open Type for Separate Panel Mounting			For Terminal Block Channel Mounting Order Open Type Relay and Bracket Kit Below	
		Left Hand Type	Right Hand Type	$ Price	Type	$ Price
Single Pole Construction (One N.C. Contact)—1 Thermal Unit Required						
1	25	CO1■	CO1R■	**64.00**	—	—
2	45	TO1■	TO1■	**100.00**	—	—
3	86	UO1■	UO1■	**122.00**	—	—
Three Pole Construction (One Common N.C. Contact on Type S Only)—3 Thermal Units Required						
1	25	SEO5		**129.00**	SM2	**35.60**
2	45	SEO8		**185.00**	SM2	**35.60**
3	86	SEO12		**243.00**	—	—
4	133	SEO15		**386.00**	—	—
5	266	Use 3 Type GO11R Relays Listed Above			—	—

▲ Maximum power circuit rating for separate mounting overload relays, Types C, F, G, T and U, is 600 Vac or Vdc; Type S is 600 Vac only. Maximum control circuit contact rating for Types C, F, G, T, U and SDO18 is 600 Vac and 250 Vdc; the remaining Type S versions are 600 Vac only

■ Not UL listed.



Type SE05

Table 16.224: Replacement Melting Alloy Overload Relays for Square D Class 8536 Starters

Locate Class 8536 Starter in this Column				Order Class 9065 Overload Relay from this Column		
NEMA Size	Type	Series	Number of Poles	Type	$ Price	Number of Thermal Units Required
00	SA	A & B	2 3	SDO4 SDO5	**86.00** **149.00**	1 3
0	SB	A	2 3–5	SDO4 SDO5	**86.00** **149.00**	1 3♦
1	SC	A	2 3–5	SDO4 SDO5	**86.00** **149.00**	1 3♦
1P	SC	A	2	SDO10	**116.00**	1
2	SD	A	2 3–5	SDO7 SDO8	**116.00** **207.00**	1 3♦
3	SE	A	2 3 4 5	SDO11 SDO12 SDO13 SDO14	**143.00** **264.00** **264.00** **264.00**	1 3 2 3
4	SF	A	3 4 5	SDO15 SDO16 SDO17	**414.00** **414.00** **414.00**	3 2 3
5	SG	A	3	Form Y500 and Series B use SEO5	**129.00**	3
6	SH	A & B	3	SEO5	**129.00**	3

♦ For 4-pole starters used on two phase systems order two thermal units plus one Class 9998 Type SO31 jumper strap kit for every two starters. Each kit includes two jumper straps.

Table 16.225: Special Features for Melting Alloy Types

	Form	$ Price
Substitute 1-N.O. isolated alarm contact and 1-N.C. contact per relay. (Type S starters only)▼	Y342▼	**179.00**
Substitute 2-N.C. contacts for standard N.C. contact per relay. (Type S starters only)	Y344▼	**179.00**
Modify Type SDO12 relays to accept Type FB quick trip or SB slow trip thermal units, and Type F and Type SDO15 relays to accept Type FB quick trip thermal units. (Rejects Type CC standard trip units)	Y81★	**No Charge**

★ This form cannot be field modified.

▼ Field modification possible. Order 9999S04 (for **Form Y342**) or 9999S05 (for **Form Y344**).

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Motor Logic

Solid State Overload relays feature: 3 to 1 adjustment for trip current; phase loss and unbalance protection; direct replacement for Type S melting alloy. They are ambient insensitive and self–powered. Switch selectable trip class; Class II ground fault detection; and direct replacement for Type S melting alloy. Electrical remote reset is also available.

NOTE: *Motor Logic SSOLR are designed to protect 50/60 hertz three-phase AC motors from overload, phase unbalance and phase loss conditions. Open Delta systems or grounded B-phase systems are difficult to balance and could cause the Motor Logic SSOLR to trip. For applications of this nature, it is recommended that bi-metallic overload relays (Form B12) be used.*

Table 16.226: Class 10/20 (Selectable): For Separate Mounting Solid State Overload Relay 600 Vac Maximum

NEMA Size□ (3-Pole)	Full Load Current Range (A)	Open Type Trip Class 10/20	$ Price
00B	1.5–4.5△	SFB20	**221.00**
00C	3–9△	SFC20	**221.00**
0	6–18△	SF020	**221.00**
1	9–27△	SF120	**221.00**
2	15–45	SF220	**309.00**
3	30–90	SF320	**378.00**
4	45–135	SF420	**545.00**

△ Size 00B, 00C, 0, and 1 are supplied without lugs. Lower amperage loads can be protected by looping of power wires. Lugs are available. See page 16-111.

□ NEMA Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic Solid State Overload Relay.

Table 16.227: Class 10/20 (Selectable): Replacement SSOLR for Retrofit of Square D Type S Starter Solid State Overload Relay 600 Vac Maximum

Locate 8536 Starter in this column		Order Class 9065 Overload Relay from this column	
NEMA Size◒	Full Load Current Range (A)	Open Type Trip Class 10/20	$ Price
00B◊	1.5–4.5	SFB20	**221.00**
00C◊	3–9	SFC20	**221.00**
0◊	6–18	SF020	**221.00**
1◊	9–27	SF120	**221.00**
2	15–45	ST220	**288.00**
3	30–90	ST320	**351.00**
4	45–135	ST420	**516.00**
5☆	90–270	ST520	**221.00**
5▽	90–270	SF520	**1074.00**
6☆	180–540	ST620	**221.00**
7☆	270–810	ST720	**221.00**

◊ Size 00B, 00C, 0, and 1 are supplied without lugs. Lower amperage loads can be protected by looping of power wires.

☆ Size 5, 6 and 7 Replacement Overloads are only for existing NEMA S starters with Motor Logic overload relay. External CTs and additional components are not included.

▽ Size 5 is a complete drop-in replacement for Square D NEMA S melting alloy, bimetallic, and Y500 overload relays **only**.

◒ NEMA Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA Size 00 Motor Logic Solid State Overload Relay.

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TeSys™ T Motor Management System

TeSys T is a motor management system that provides full motor monitoring, control, and protection when used with short circuit protection and a contactor. TeSys T manages most critical processes while reducing downtime and increasing productivity.

TeSys T is a flexible system that integrates seamlessly into your automation system through five major communication protocols. TeSys T predicts what will happen in the process, as it accurately monitors current, voltage, and power over a wide range.

TeSys T is a green motor management system with unique power monitoring capabilities for better energy management.

TeSys T carries all appropriate and necessary third party certifications.

To get detailed information about TeSys T, visit our website at www.schneider-electric.us.com.

TeSys T detailed functionalities and possible configuration:

Communication:

TeSys T is a flexible motor management system that supports five major communication protocols: Modbus, CANopen, DeviceNet, Profibus, and Ethernet Modbus TCP.

These communication protocols allow the TeSys T controller to integrate seamlessly into your automation systems.

Ethernet Modbus TCP provides Faulty Device Replacement to reduce maintenance time to a minimum.

Protection functions:

- thermal overload
- phase imbalance and phase failure
- thermal motor protection via PTC probes
- phase reversal
- ground fault detection
- long starting times and motor stalling
- automatic load shedding and restarting
- load fluctuations (current, voltage, power)
- variations of Cos φ (power factor)

Metering functions:

- Measurements (rms values):
  - current on the 3 phases
  - voltage on the 3 phases (shedding)
  - motor temperature
  - ground fault sensing
- Values calculated:
  - average current
  - frequency
  - Power factor, power, power consumption

Motor control functions:

A motor managed by a TeSys T controller can be controlled:

- locally, using the logic inputs present on the product, or via the human machine interface (HMI)
- remotely, via the network

Motor control modes:

10 predefined motor control modes are incorporated in the controller. Each listed mode is available as 2 or 3 wire control.

- overload mode: monitoring of motors whose control is not managed by the controller
- independent mode: starting of full voltage non-reversing motors
- reverser mode: starting of full voltage reversing motors
- 2-step mode: 2-step starting of motors (star-delta, by autotransformer and by resistor)
- 2-speed mode: 2-speed starting of motors (Dahlander, pole changer)

A custom mode is available to allow the user to create a specific motor control mode that is not predefined in the controller.

Custom Logic has the basic functions of a small programmable logic controller (PLC). Programming can be done in Structured Text mode or in Block Diagrams through PowerSuite V2.6 software. To ensure consistency, the same software used to commission the TeSys T controller is used for Custom Logic programming.

Statistical and diagnostic functions:

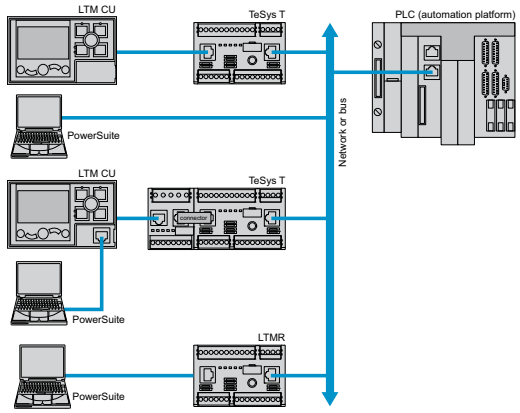
- history of the last five detected faults
- motor statistics
- controller operations
- warning of pending faults

Standards and Certifications

Product Type	LTMR Controllers	LTMEV40 Expansion Modules
Conforming to standards	IEC/EN 60947-4-1, UL 508, UL E164353 NKCR, CSA 22-2 n°14, CSA LR43364 Class 3211 03, IACS E10	
Product certifications	UL, CSA, BV, LROS, DNV, GL, RINA, ABS, RMRos, NOM, CCC, C-TIC'K, ATEX, GOST, KERI	

Possible Configurations:

TeSys T controller is a flexible motor management system using PowerSuite V2.6 commissioning tool. PowerSuite is the configuration software for the TeSys T controllers. See page 16-86 for details.



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LTMR Controller:

The controller is the central component in the motor management system. It manages the basic functions such as:

LTMR27EBD

- measurement of 3-phase current via integral current transformers from 0.4 to 100 A (up to 1000 A by external current transformers)
- measurement of ground current internally or external ground sensors
- measurement of motor temperature
- inputs and outputs for the various motor control modes, detected fault management, and other functions

Characteristics

As standard, the controller manages the following:

Control Modes

- overload mode
- independent mode
- reverser mode
- 2-speed mode
- 2-step mode
- Custom mode

Inputs/Outputs

- 6 discrete logic inputs
- 3 relay logic outputs (1 N.O. contact each)
- 1 relay output for detected fault signalling (1 N.O. + 1 N.C.) overload relay

Measurements

- connection for a thermistor probe
- connections for a ground sensor

Table 16.228: Controllers

Setting Range (A)	Control Voltage (V)	Current Range (A)	Catalog Number	$ Price
For Modbus®				
8	24 Vdc	0.4–8	LTMR08MBD	**675.00**
	100–240 Vac	0.4–8	LTMR08MFM	**675.00**
27	24 Vdc	1.35–27	LTMR27MBD	**675.00**
	100–240 Vac	1.35–27	LTMR27MFM	**675.00**
100	24 Vdc	5–100	LTMR100MBD	**765.00**
	100–240 Vac	5–100	LTMR100MFM	**765.00**
For EtherNet Modbus TCP				
8	24 Vdc	0.4–8	LTMR08EBD	**825.00**
	100–240 Vac	0.4–8	LTMR08EFM	**825.00**
27	24 Vdc	1.35–27	LTMR27EBD	**825.00**
	100–240 Vac	1.35–27	LTMR27EFM	**825.00**
100	24 Vdc	5–100	LTMR100EBD	**935.00**
	100–240 Vac	5–100	LTMR100EFM	**935.00**
For CANopen				
8	24 Vdc	0.4–8	LTMR08CBD	**750.00**
	100–240 Vac	0.4–8	LTMR08CFM	**750.00**
27	24 Vdc	1.35–27	LTMR27CBD	**750.00**
	100–240 Vac	1.35–27	LTMR27CFM	**750.00**
100	24 Vdc	5–100	LTMR100CBD	**850.00**
	100–240 Vac	5–100	LTMR100CFM	**850.00**
For DeviceNet				
8	24 Vdc	0.4–8	LTMR08DBD	**750.00**
	100–240 Vac	0.4–8	LTMR08DFM	**750.00**
27	24 Vdc	1.35–27	LTMR27DBD	**750.00**
	100–240 Vac	1.35–27	LTMR27DFM	**750.00**
100	24 Vdc	5–100	LTMR100DBD	**850.00**
	100–240 Vac	5–100	LTMR100DFM	**850.00**
For Probibus DP				
8	24 Vdc	0.4–8	LTMR08PBD	**750.00**
	100–240 Vac	0.4–8	LTMR08PFM	**750.00**
27	24 Vdc	1.35–27	LTMR27PBD	**750.00**
	100–240 Vac	1.35–27	LTMR27PFM	**750.00**
100	24 Vdc	5–100	LTMR100PBD	**850.00**
	100–240 Vac	5–100	LTMR100PFM	**850.00**

LTME Expansion Module:

The expansion module adds the following functionalities to the TeSys T controller:

LTMEV40FM

- voltage measurement between phases up to 690 V nominal
- 4 additional inputs

Inputs

- 4 discrete logic inputs (isolated)
- 2 types of power for the inputs: 24 Vdc and 100 to 240 Vac
  - — A 24 Vdc LTMR controller can be assembled with a 240 Vac expansion module and vice versa

The LTMVE must be connected to the LTMR controller by a connecting cable.

Table 16.229: Expansion Module

Input Control Voltage	Number of Inputs	Supply to the Electronics	Catalog Number	$ Price
24 Vdc	4	via the LTMR controller	LTMEV40BD	**300.00**
100–240 Vac	4		LTMEV40FM	**300.00**

HMI — Human Machine Interface:

Depending on the application, two types of HMI can be used with the motor management system.

- The LTMCU operator control unit:
  - — Control/monitoring of a 1 to 1 LTMR controller
- A Magelis XBTN410 terminal
  - — Control/monitoring of 1 to 8 LTMR controllers

LTMCU Compact Display:

New!

LTM9KCU
(Holder Only)

- Configure the parameters
- Display information
- Monitor the alarms and detected faults
- Local control of the motor via the local control interface (keys can be customized)
- Three different languages can be loaded into the LTMCU controller at the same time: English, French, Spanish are the defaults.

LTMCU

A language download utility (LangTool), together with all the other languages, are available on the website www.schneider-electric.com.

This tool allows the languages present in the LTMCU control until to be adapted.

The LTMCU HMI control unit has an additional front panel RJ45 port, protected by a flexible cover.

Magelis Display:

Two applications have been predefined for the TeSys T controller. Depending on the application loaded, the HMI terminal makes it possible to:

- Configure and monitor a motor starter (LTM_1T1_V1.dop)
- Monitor and modify certain parameters up to 8 motor starters (LTM_1T8_X_V1.dop)

Vijeo Designer programming software is needed for loading applications into the XBT HMI terminal.

Table 16.230: HMI Modules and Software

Description	Supply Voltage	Catalog Number	$ Price
Operator Control unit	via the LTMR controller	LTMCU	**265.00**
Holder for LTMCU (with magnetic back)		LTM9KCU	**30.00**
Magelis compact display	24 Vdc	XBTN410	**300.00**
Configuration software Windows 99, 2000, XP		VJD SND TMS V13M	**161.00**

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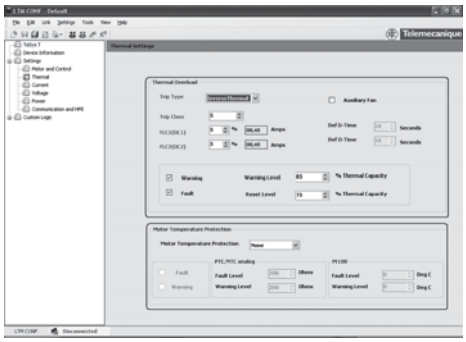
LT6CT4001

DA1TT••



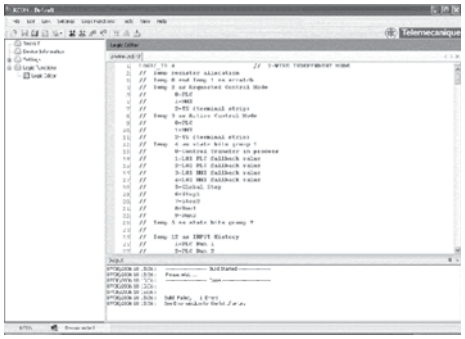


Table 16.231: Current Transformers

Current Transformer Ratio ▲	Catalog Number	$ Price
100:1	LT6CT1001	**300.00**
200:1	LT6CT2001	**300.00**
400:1	LT6CT4001	**700.00**
800:1	LT6CT8001	**1000.00**

▲ For use with LTMR08•• controllers. Three current transformers are required for 3-phase applications.

Table 16.232: Ground Fault Sensors

Rated Operational Current Ie (A)	Internal Toroid Ø (mm)	Catalog Number	$ Price
Closed Toroids, Type A			
65	30	50437	**250.00**
85	50	50438	**325.00**
160	80	50439	**410.00**
250	120	50440	**555.00**
400	200	50441	**835.00**
630	300	50442	**1530.00**
Split Toroids, Type QA			
85	46	50485	**1145.00**
250	110	50486	**2010.00**

Note: Dimensional drawings are in catalog DIA1ED2061002EN-US.

Table 16.233: PTC Thermistor Probes ■

Description	Nominal Operating Temperature (NOT) °C	Color	Catalog Number ♦	$ Price Each
Triple Probes	90	Green/green	DA1TT090	**3.30**
	110	Brown/brown	DA1TT110	**3.30**
	120	Grey/grey	DA1TT120	**3.30**
	130	Blue/blue	DA1TT130	**3.30**
	140	White/blue	DA1TT140	**3.30**
	150	Black/black	DA1TT150	**3.30**
	160	Blue/red	DA1TT160	**3.30**
	170	White/green	DA1TT170	**3.30**

■ PTC: Positive Temperature Coefficient.
♦ Sold in lots of 10.

Configuration with PowerSuite

The TeSys T configurator is incorporated in the PowerSuite software application, versions 2.6 and higher.

PowerSuite software allows configuration, commissioning and maintenance of motor starters protected by a TeSys T controller.

A library containing predefined motor control mode functions is available in order to:

- allow standardization
- avoid errors
- reduce motor starter setup times

By using logic functions, a custom mode makes it possible to:

- easily adapt these predefined motor control mode functions to the specific needs of your applications
- create new functions

The functions thus defined can be saved and used to build your function library for future applications.

To create special functions, a logic editor is incorporated in the configurator and allows a choice of 2 programming languages:

- function block
- structured text

Table 16.234: Configuration Tools

Description	Composition	Catalog Number	$ Price
Connection kit for PC serial port for Modbus® PLC multidrop connection	1 x 3 m length cable with two RJ45 connectors	VW3A8106	
	1 RS232/RS485 converter with one 9-pin female SUB-D connector and one RJ45 connector.		**75.00**
USB serial port adapter★ for connecting a TeSys T controller to your PC	1 USB / serial port adapter★	TSXCUSB485	**250.00**
USB serial port cable for connecting a TeSys T controller to your PC	1 USB / serial port cable	TCSMCNAM3M002P	**52.00**

★ Modbus (RS485) cable required, not included.

TeSys T and SMS PowerLogic:

TeSys T is integrated in PowerLogic SMS Version 4.0. and will address energy management needs by fully utilizing the TeSys T power/energy management features. For more information on PowerLogic products, see Power Monitor Control Section 4.

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New!

8536SCO3V02H626

Table 16.235: Connecting Cables

Description	Number and type of connectors	Length m (ft)	Catalog Number	$ Price
LTMCU control unit	2 x RJ45	1 (3)	VW3A1104R10	35.00
		3 (10)	VW3A1104R30	35.00
		5 (16)	VW3A1104R50	35.00
XBTN410	SUB-D 25-pin female to RJ45	2.5 (8)	XBTZ938	30.00
LTME expansion module	2 x RJ45	0.04 (0.13)	LTMCC004	125.00
		0.3 (1)	LU9R03	20.00
		1 (3)	LU9R10	25.00
180 degree Ethernet external connector	1 x RJ45	–	LTM9CE180T	20.00

Table 16.236: Connection Accessories

Description		Length m (ft)	Catalog Number	$ Price
For EtherNet (Modbus TCP) connection				
Shielded twisted pair cables to standard EIA/TIA568				
Cables fitted with 2 x RJ45 connectors for connection to terminal equipment	Straight	2 (7)	490NTW00002	48.60
		5 (16)	490NTW00005	58.00
		12 (39)	490NTW00012	77.00
		40 (131)	490NTW00040	150.00
		80 (263)	490NTW00080	266.00
Shielded twisted pair cables, UL and CA 22.1 approved				
Cables fitted with 2 x RJ45 connectors for connection to terminal equipment	Straight	2 (7)	490NTW00002U	48.00
		5 (16)	490NTW00005U	57.00
		12 (39)	490NTW00012U	75.00
		40 (131)	490NTW00040U	159.00
		80 (263)	490NTW00080U	258.00
For Modbus® PLC connection				
Cables fitted with 2 x RJ45 connectors		0.3 (1)	VW3A8306R03	20.00
		1 (3)	VW3A8306R10	25.00
		3 (10)	VW3A8306R30	30.00
T-junctions		0.3 (1)	VW3A8306TF03	75.00
		1 (3)	VW3A8306TF10	85.00
RS485 line terminator		—	VW3A8306R	N/A
For CANopen connection				
Cables		50 (164)	TSXCANCA50	112.00
		100 (328)	TSXCANCA100	467.00
		300 (984)	TSXCANCA300	1323.00
IP20 connectors SUB-D 9-pin female Line end adapter switch	Elbowed (90°)	—	TSXCANKCDF90T	52.00
	Straight	—	TSXCANKCDF180T	52.00
	Elbowed (90°) SUB-D 9-pin connector for connection to PC or diagnostic tool	—	TSXCANKCDF90TP	78.00
For DeviceNet connection				
Cables		50 (164)	TSXCANCA50	112.00
		100 (328)	TSXCANCA100	467.00
		300 (984)	TSXCANCA300	1323.00
For Profibus DP connection				
Cables		100 (328)	TSXPBSCA100	826.00
		400 (1313)	TSXPBSCA400	2990.00
Connectors	With line terminator	—	490NAD01103	73.00
	Without line terminator	—	490NAD01104	62.00
	With line terminator and terminal port	—	490NAD01105	101.00

Table 16.237: Marking Accessories

Description	Composition	Sold in lots of	Catalog Number	$ Price Each
Clip-in markers (maximum of 5 per unit)	Strips of 10 identical numbers (0 to 9)	25	AB1R•▲	0.52
	Strips of 10 identical capital letters (A to Z)	25	AB1G•▲	0.52

▲ When ordering replace the • in the catalog number with the number or letter required.

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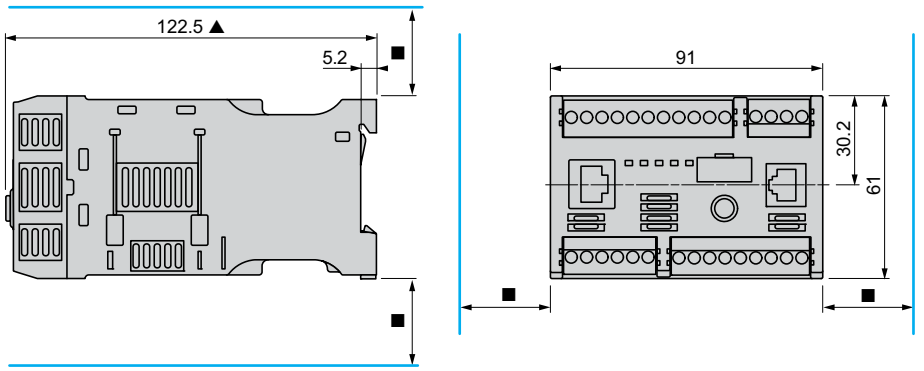
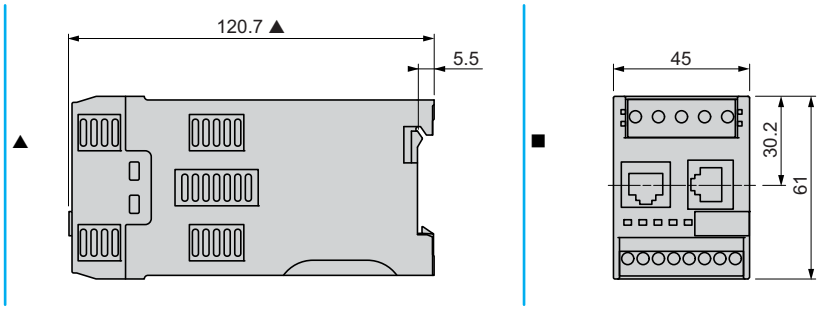
LTMR•• controllers

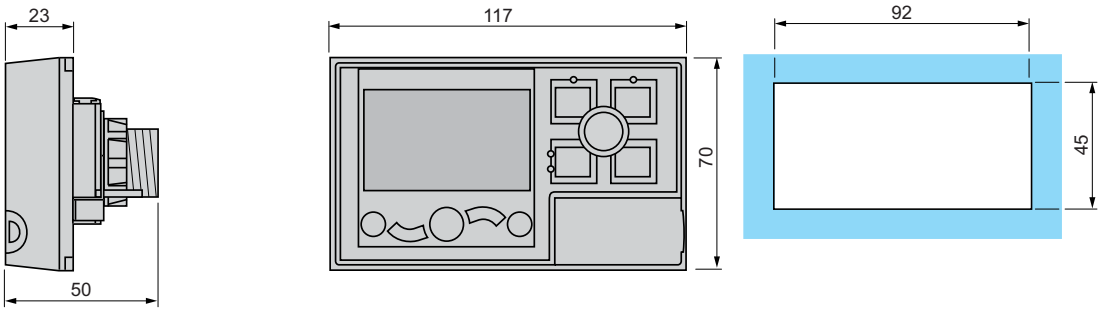


LTMEV40•• expansion modules



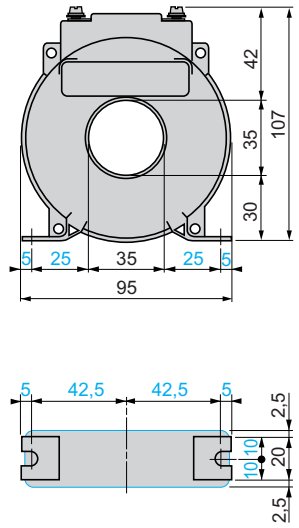
LTMCU operator control unit

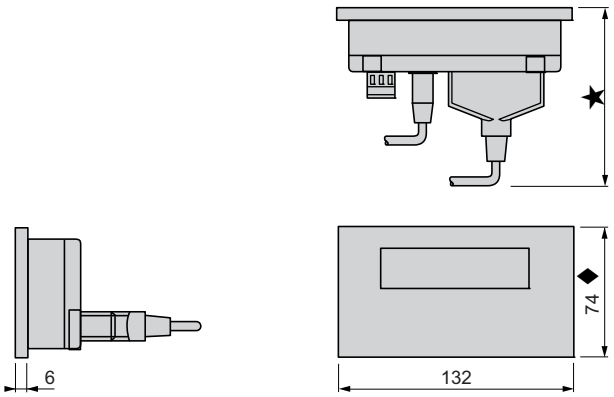
Panel mounting, cut-out



▲ 140 mm with RJ45 connector for connection to expansion module and to network, 166 mm with Profibus DP/CANopen connector.
■ Leave a gap around the device of: 9 mm at 45 °C, 9 to 40 mm from 45 to 50 °C, 40 mm at 60 °C.

Current Transformers	HMI Terminal
LT6CT	XBTN410





♦ 104 mm with mounting clips (supplied with the product).
★ 58 mm with SUB-D 25-pin elbowed cable **XBTZ9680** for Twido®, TSX Micro™ and Premium™ PLCs or **XBTZ998** for Advantys™ STB distributed I/O system.
104 mm with SUB-D 25-pin cable **XBTZ68/Z9681** for Twido®, TSX Micro™ and Premium™ PLCs

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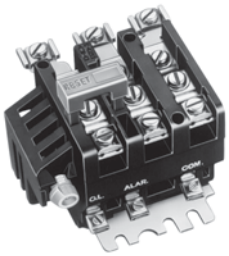

Class 9065
Type SEO6B2
Three Pole Construction
Non-Compensated

Bimetallic thermal overload relays feature Class 20 protection with automatic reset or hand reset and a trip-free mechanism. There are ambient temperature-compensated versions. Note that thermal units are not included in the shown prices. Standard trip thermal units are **$21.50** each.

Table 16.238: For Separate Mounting—Bimetallic—600 V Maximum AC or DC▲

Description	Size	Maximum Full Load Current (A)	Open Type	$ Price	Bracket Kit for Terminal Block Channel Mounting		Number of Thermal Units Required
					Type	$ Price	
Single Pole Construction (One N.C. Contact)							
Compensated	00, 0, 1 2 3 4	25 60 100 180	DA2 GA2 HA2 JA2	**107.00** **149.00** **261.00** **306.00**	— — — —	— — — —	1
Three Pole Construction (One Common SPDT Contact on Type S)							
Non-Compensated	1 2	26 45	SEO6B2 SEO9B2	**392.00** **441.00**	SM2 SM2	**35.60** **35.60**	3
Ambient Temperature-Compensated	1 2	26 45	SEO6B SEO9B	**441.00** **441.00**	SM2 SM2	**35.60** **35.60**	3
	For additional selections see International Control Products.						

▲ Maximum power contact rating for separate mounting overload relays. Maximum control circuit contact rating for Type S versions is 600 Vac only.

Table 16.239: Replacement Overload Relay for Square D Class 8536 Bimetallic Overload Relay on an Existing Starter

Locate Class 8536 Starter in this Column					Order Class 9065 Overload Relay from this Column		
NEMA Size	Type	Series	Number of Poles	Form	Type	$ Price	Number of Thermal Units Required
0	SB	A & B	Any	B■ B1■ B2■	SDO6B SDO5B1 SDO6B2	**441.00** **392.00** **392.00**	3 2 3
1	SC	A & B	Any	B■ B1■ B2■	SDO6B SDO5B1 SDO6B2	**441.00** **392.00** **392.00**	3 2 3
2	SD	A	Any	B■ B1■ B2■	SDO9B SDO8B1 SDO9B2	**512.00** **464.00** **464.00**	3 2 3
3 ▼	SE	A	3	Y59♦	26005-11000	**243.00**	1
		A B	3		SHA01Y59	**1089.00**	3
4 ▼	SF	A	3	Y59♦	26005-11500	**306.00**	1
		A B	3		SJA01Y59	**1431.00**	3
5	SG	A & B	3	B2★	SEO6B2	**392.00**	3
				B★	SEO6B	**441.00**	3
6	SH	A & B	3	B B2	SEO6B SEO6B2	**441.00** **392.00**	3 3

■ B indicates ambient temperature-compensated bimetallic overload relay.
B1 indicates single phase non-ambient temperature compensated bimetallic overload relay.
B2 indicates polyphase non-ambient temperature compensated bimetallic overload relay.

♦ Y59 indicates single phase ambient temperature compensated bimetallic overload relay.

★ B2Y500 indicates bimetallic overload relay with current transformer sensing. BY500 indicates ambient temperature compensated bimetallic overload relay with current transformer sensing. This part number does not include the current transformer assembly.

▼ Non-compensated Size 3 & 4 OLRs are no longer available. Select an ambient compensated OLR from appropriate table above.

New! Adapted Bimetal Overload Relay Adapter (NEMA Sizes 00–1)

The adapted bimetallic Type S starter incorporates a mounting bracket for use with a self-contained adjustable bimetal overload relay. A separate mount version of the bracket is also available for use with contactors that do not offer the same terminal configuration as the Type S or for applications with height restraints that demand mounting mext to the contactor rather than directly below as is typical for most starter configurations.

The bimetallic thermal overload relays feature Class 10 or Class 20 protection with automatic and hand reset and a trip-free mechanism. These overloads are ambient temperature compensated and are available with or without phase imbalance protection. The component is available as a replacement on a starter or as a separately mounted overload relay adapter. The overload relay (LRD or LR3D) can be purchased separately and installed in the field at a later date. For more information see Table 16.269.

Table 16.240: Replacement

Description	Sizes	Maximum Full Load Current (A) of Overload Relay	Catalog Number	List $ Price
Two Pole	00, 0, 1	27	SADR751	**89.00**
Three Pole	00, 0, 1	27	SADR75	**89.00**

Table 16.241: Stand Alone

Description	Sizes	Maximum Full Load Current (A) of Overload Relay	Catalog Number	List $ Price
Two Pole	00, 0, 1	27	SAD751	**89.00**
Three Pole	00, 0, 1	27	SAD75	**89.00**

NOTE: *The LRD or LR3D bimetal overload relay must be purchased separately.*

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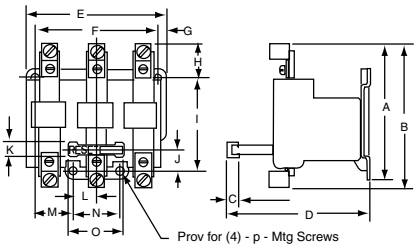
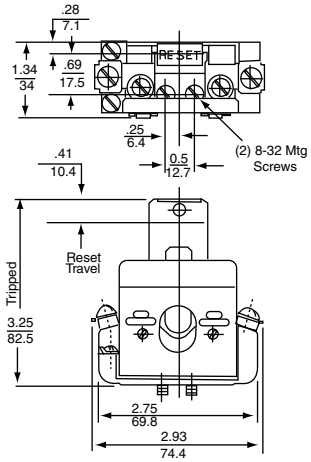
Approximate Dimensions

Table 16.242: Melting Alloy Type NEMA Style

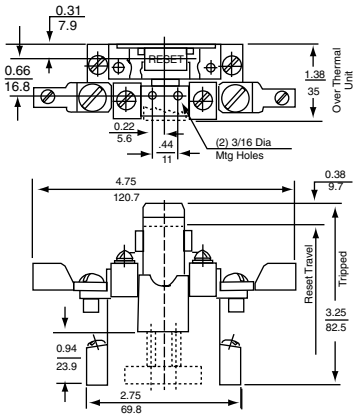
Type	Dimensions (IN)																Shipping Weight (lb)
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
SEO5	3-5/16	—	15/32	3-31/32	3-17/32	2-13/16	7/32	11/16	2-5/16	1/2	1/2	1/2	27/32	1	1-3/8	#10	1
SEO8	3-5/16	—	15/32	3-31/32	3-1/2	2-13/16	3/16	11/16	2-5/16	1/2	1/2	1/8	27/32	1	1-3/8	#10	1-1/4
SEO12	—	5-19/32	9/16	5-3/4	5-5/16	4-3/4	9/32	1-7/16	3-9/16	3/4	9/16	7/8	1-1/2	1-3/4	2	#1/4	3
SEO15	—	6-31/32	9/16	5-3/4	5-5/16	4-3/4	9/32	2-1/8	3-9/16	3/4	9/16	7/8	1-1/2	1-3/4	2	#1/4	4



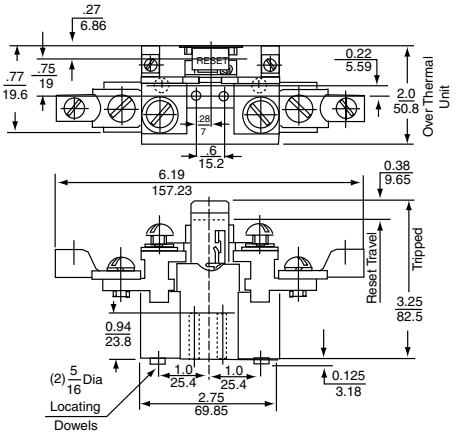
Type SEO



Type CO1
Weight–$1\frac{1}{2}$ lb

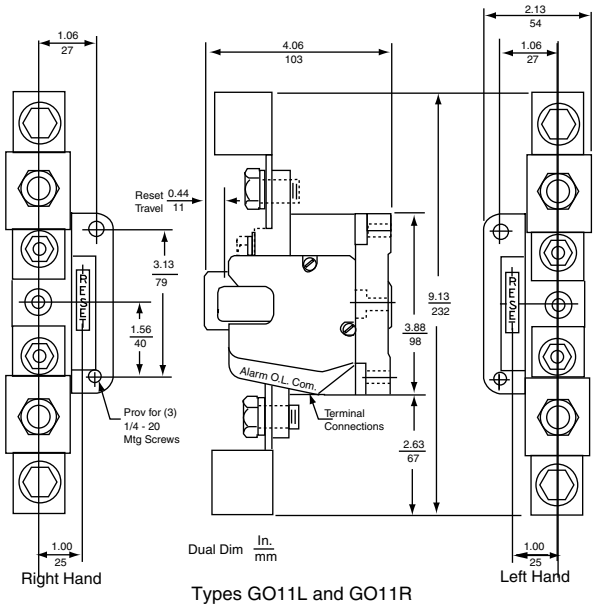


Type TO1▲
Weight–$1\frac{1}{2}$ lb

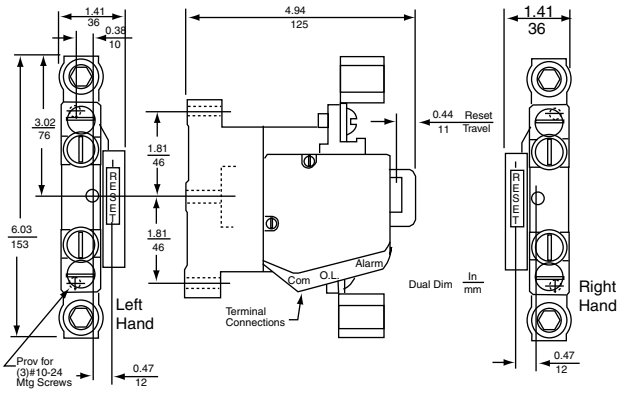


Type UO1▲
Weight–$1\frac{1}{2}$ lb

▲ Dimensions shown for Types TO1 and UO1 do not apply when Form Y342 or Y34 is supplied.



Types GO11L and GO11R
Weight–5 lb



Types FO1L and FO1R
Weight–2 lb

Dual Dimensions: **INCHES** Millimeters

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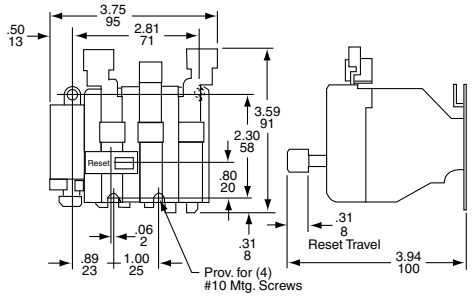
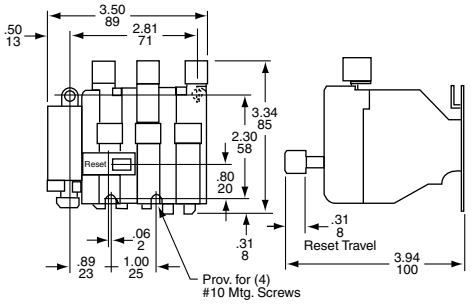
Approximate Dimensions

Bimetallic Overload Relays



Types SEO6B and SEO6B2
Weight—1lb

Dual Dimensions: **INCHES** / **Millimeters**

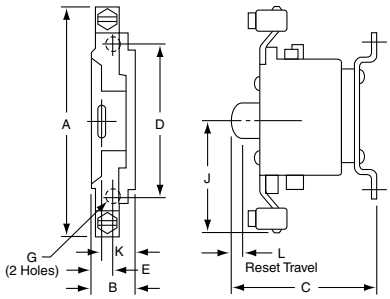


Types SEO9B and SEO9B2
Weight—1 1/4 lb

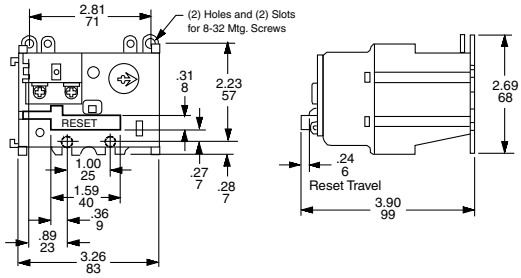
Table 16.243:

Class 9065	Ampere Rating	Outline Dimensions			Mounting Dimensions		Reset Dimensions		Mounting Screw	Maximum Wire Size	Approximate Shipping Weight (lb)
		A	B	C	D	E	K	L	G		
DA	25	3-1/2	7/8	3-3/16	3	1/2	3/8	1/8	10	8	2
GA	60	4-7/8	7/8	3-3/16	3	1/2	3/8	1/8	10	1	2
HA	100	4-7/8	1-1/4	3-3/16	3-1/2	1/16	1/2	1/8	10	00	3
JA	180	5-15/16	1-1/4	3-3/16	3-1/2	1/2	3/16	1/8	10	250 MCM	4

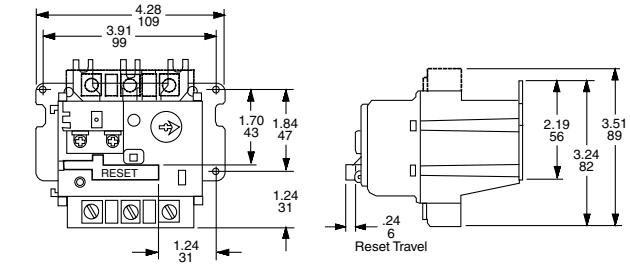
NOTE: *Dimensions shown in inches.*



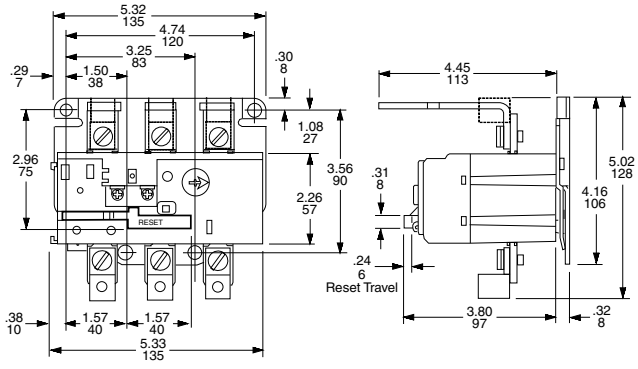
Motor Logic™ Solid State Overload Relay



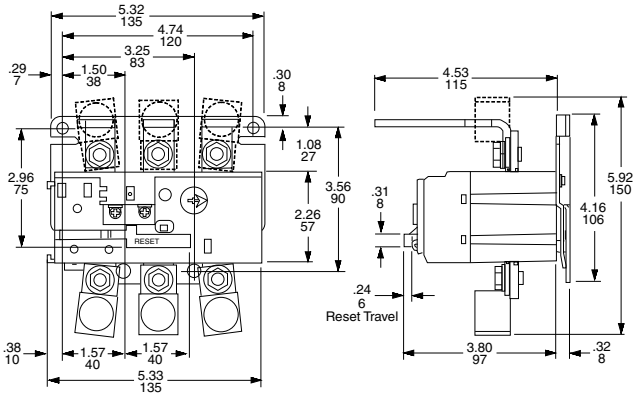
NEMA Size 00B, 00C, 0, and 1 Devices
Note: NEMA Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA size 00 Motor Logic Solid State Overload Relay.



Size 2 Devices



Size 3 Devices



Size 4 Devices

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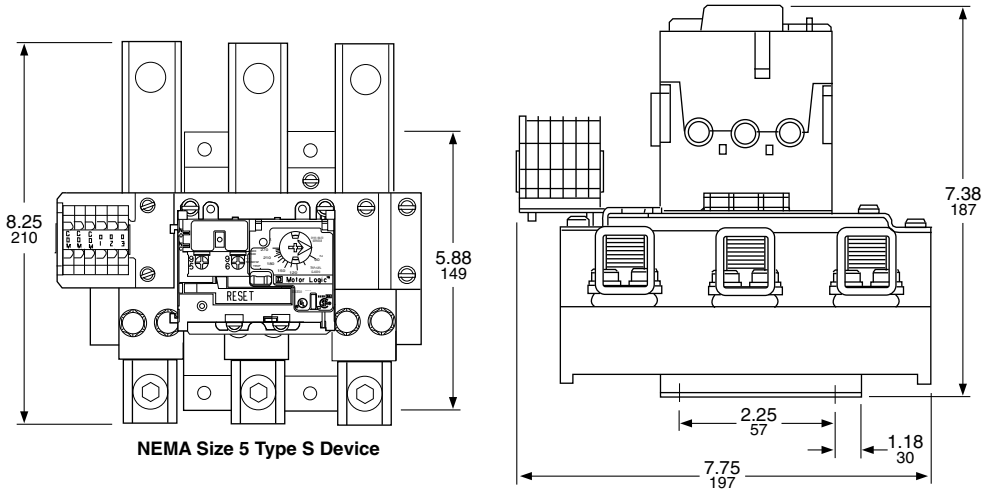
Approximate Dimensions

Class **9065** / Refer to Catalog **9065CT9701**

Note: The dimensions are for reference only.



NEMA Size 5 Type S Device

External Reset Mechanisms

Class 9066

Type RB1

Type W1

Type RA2 Series B

Type SC1

Type RA kits provide a convenient external means for resetting overload relays mounted in control enclosures of almost any depth. Designed for use on NEMA 1, 4 or 12 enclosures, they can be used with any Square D open type magnetic starter or Class 9065 overload relay. All kits are individually packaged for easy stocking and include complete installation instructions.

Only a single mounting hole is required in the enclosure door. Each kit contains one or more threaded reset rods, grooved at intervals of 3/4" so they can be cut to the approximate length required without thread damage. Final adjustment is easily made after installation by rotating a plunger and tightening the lock nut. Mechanisms with more than one reset rod include a steel cross bar with mounting holes located at 1/2" intervals, providing a choice of rod locations to suit any application. All steel parts are electrically isolated from the enclosure and the operator.

Type RB kits make it possible to field install external reset mechanisms to Type S combination starters in NEMA 12 enclosures. They may also be used to replace external reset mechanisms on Type S combination starters in NEMA 1, 4 and 12 enclosures.

Table 16.244:

Where Used	Type of Enclosure	Reset Mechanism Kit		
		Description	Type	$ Price
OEM Kit for commercial enclosures	NEMA 1, 12	With 1 Rod With 2 Rods With 3 Rods	RA1 RA2 RA3	**57.00** **71.00** **86.00**
Replacement on 8538, 8539 starters	NEMA 1, 12	Size 0 and 1 Size 2	RB1 RB2	**42.80** **42.80**
On commercial enclosures or Type S combination starters	NEMA 4	W1 is a boot only and must be used with RA or RB Kit listed above	W1	**28.70**
Replacement on Class 8536 Type S starters	NEMA 1 with slip-on covers	Size 00, 0 and 1 Size 2 Size 3	SC1 SD1 SE1	**7.20** **12.00** **14.30**
Retro-fit kit Class 8940 Pump Panel	NEMA 3R	Reset for use with 9065TJF Series B OLR	RTJF	**42.80**

CP1 Discount Schedule

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Type SCW21
NEMA 4X
Enclosure

Type SCA11
NEMA 12
Enclosure

Type SCW11
NEMA 4
Enclosure

Type SCH2
NEMA 3R
Enclosure

Separate enclosures can be used with open style devices for field assembly of enclosed controls. These enclosures, plus the open style components, are equivalent to a factory-assembled device. Separate enclosures are to be used only with the equipment listed below:

- **NEMA 4 and 12** Class 9991 separate enclosures for Type S devices are supplied as standard with closing plates. See selection chart below for specific number of closing plates on Various enclosures. For applications requiring enclosures without closing plates, contact your nearest Schneider Electric sales office.
- **NEMA 3R** enclosures for field assembly of equipment for outdoor applications are provided with three closing plates, a reset mechanism and predrilled panel as standard. For conduit connection to the top of these enclosures, select watertight hubs from listing on Digest page 3-10 in accordance with applicable code requirements. Square D's NEMA 12 enclosures can also be modified for outdoor use. For details, refer to NEMA 12 enclosure modification information on page 16-95. **NOTE: Not for use in high-corrosive outdoor locations or sea coast environments.**
- **NEMA 4X** enclosures for Type S devices, Sizes 0–2 and 30–60 Ampere, are provided as standard without closing plates. Cover mounted control units for NEMA 4X separate enclosures are available as a factory modification only.

When closing plates are removed from NEMAs 4, 12 & 3R enclosure covers, the openings can be used for easy installation of Class 9001 Type K or Type SK cover mounted control units. Convenient Class 9999 modification kits containing Class 9001 Type K control kits can be found on page 16-109.

Table 16.245:

For Use With		NEMA Size or Ampere Rating	Enclosure Classification									
			NEMA 4X Watertight, Dusttight and Corrosion-Resistant Glass-Polyester		NEMA 4★ Watertight and Dusttight Stainless Steel			NEMA 12/3R Dusttight and Driptight			NEMA 3R Rainproof, Sleet Resistant, Outdoor Use	
Class	Types (All Pole Arrangements)		Type	$ Price	Type	$ Price	Number of Closing Plates	Type	$ Price	Number of Closing Plates	Type	$ Price
Manual Starters												
2510	MBO, MCO	MO M1 M1P	MW1▼	**485.00**	MW11	**485.00**	—	MA1	**129.00**	—	—	—
Magnetic Contactors												
8502▲	SAO, SBO, SCO	00, 0, 1	SCW20	**684.00**	SCW11	**714.00**	2	SCA11△	**372.00**	3	SCH2	**372.00**
	SDO	2	SDW20	**1169.00**	SDW11	**1197.00**	2	SDA11△	**485.00**	3	SDH1	**485.00**
	SEO	3	—	—	SEW11	**1767.00**	3	SEA11△	**684.00**	3	SEH1	**684.00**
	SFO	4	—	—	SFW11	**3119.00**	3	SFA11△	**1853.00**	3	SFH1	**1853.00**
Magnetic Starters												
8536	SAO, SBO, SCO	00, 0, 1	SCW21	**684.00**	SCW11	**714.00**	2	SCA11△	**372.00**	3	SCH2	**372.00**
	SDO	2	SDW21	**1169.00**	SDW11	**1197.00**	2	SDA11△	**485.00**	3	SDH1	**485.00**
	SEO	3	—	—	SEW11♦	**1767.00**	3	SEA11♦△	**684.00**	3	SEH1	**684.00**
	SFO	4	—	—	SFW11♦	**3119.00**	3	SFA11♦△	**1853.00**	3	SFH1	**1853.00**
Lighting Contactors, Non-Combination, Electrically and Mechanically Held												
8903▲	LO, LXO	20 Amp	SDW20	**1107.00**	SDW11	**1197.00**	2	SDA11△	**485.00**	3	SDH1	**485.00**
	SMO	30 Amp	SCW20■	**684.00**	SCW11	**714.00**	2	SCA11△	**372.00**	3	SCH2	**372.00**
	SPO	60 Amp	SCW20■	**1169.00**	SDW11	**1197.00**	2	SDA11△	**485.00**	3	SDH1	**485.00**
	SQO	100 Amp	—	—	SEW11♦	**1767.00**	3	SEA11♦△	**684.00**	3	SEH1	**684.00**
	SVO	200 Amp	—	—	—	—	—	—	—	—	SFH1	**1853.00**
Reversing and Two Speed Horizontally Arranged Contactors and Starters												
8702▲ 8736	SBO, SCO SDO	0, 1 2	—	—	SCW12 SDW12	**1182.00** **1754.00**	3	SCA12△ SDA12△	**527.00** **728.00**	3	— —	— —
8810	SBO & SCO	0, 1	—	—	SCW13	**1610.00**	3	SCA13△	**714.00**	3	—	—

▲ For contactors, replace reset assembly with proper closing plate; for NEMA 4 use Class 9001 Type K52, for NEMAs 3R and 12 use Class 9001 Type K51. Class 9991 Types SCW20 and SDW20 are designed for contactors only, reset closing plates not required.
■ For electrically held devices only.
♦ Enclosure suitable for starter with melting alloy and solid state overload relays **only**.
★ The standard cabinet has a brushed finish.
▼ Type MBO, Size MO only.
△ NEMA 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see page 16-95 for more information.

Table 16.246: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	9991	SCW11

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NEMA Type 1 and Flush Mounting

Flush Mounting Selection Table

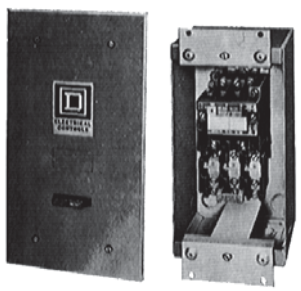
Flush Mounting General Purpose separate enclosures for Type S Sizes 0–2, 30–60 ampere are provided with knock-outs in the cover for field assembly of one Class 9999 push button or selector switch kit and one Class 9999 pilot light kit. (Refer to Class 9999 for selection.) For Type S Size 3, 100 ampere, three closing plates are provided for installation of Class 9001 Type K oiltight control units. For enclosure dimensions, refer to page 16-96.

Table 16.247:

For Use With		NEMA Size or Ampere Rating	Flush Mounting General Purpose (Components)							
			Flush Plates				Mounting Strap		Pull Box	
			Standard		Stainless Steel■					
Class	Types (All Pole Arrange-ments)		Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
2510	MBO & MCO	MO M1 M1P	MF1	**215.00**	(with pullbox and plaster adjustment)					
			MF2	**129.00**	(without pullbox but with mounting strap)					
Magnetic Contactors										
8502▲	SBO & SCO	0, 1	SCF11	**57.00**	SCF12	**201.00**	SCF2	**71.00**	SCF1	**86.00**
	SDO	2	SDF11	**171.00**	SDF12	**386.00**	SDF2	**99.00**	SDF1	**116.00**
	SEO	3	SEF11	**882.00**	(Enclosure Complete)					
Magnetic Starters										
8536	SBO & SCO	0, 1	SCF11	**57.00**	SCF12	**201.00**	SCF2	**71.00**	SCF1	**86.00**
	SDO	2	SDF11	**171.00**	SDF12	**386.00**	SDF2	**99.00**	SDF1	**86.00**
Lighting Contactors Non-Combination Electrically and Mechanically Held										
8903▲	LO, LXO	20 A	SDF13	**171.00**	—	—	SDF2	**99.00**	SDF1	**86.00**
	SMO 1–4	30 A	SCF11	**57.00**	—	—	SCF2	**71.00**	SCF1	**86.00**
	SMO 10–13	30 A	SCF13	**201.00**	—	—	SCF2	**71.00**	SCF1	**86.00**
	SPO 1–4	60 A	SDF11	**171.00**	—	—	SDF2	**99.00**	SDF1	**86.00**
	SPO 10–13	60 A	SDF13	**171.00**	—	—	SDF2	**99.00**	SDF1	**86.00**
	SQO 1–13	100 A	SEF11	**882.00**	(Enclosure Complete)					

▲ For contactors, replace reset assembly with proper closing plate. For Flush Mounting use Class 9999 Type SG2 except for Class 9991 Type SDF11 which requires a Class 9001 Type K51 or K11 closing plate. Class 9991 Types SEF11 and LF1 are designed for contactors only, reset closing plates not required.

■ The standard cabinet has a brushed finish.



Flush Mounting Starter With Pull Box and Mounting Strap Having Plaster Adjustment Feature

Type SCG8 NEMA 1 Enclosure

NEMA 1 Selection Table

The **NEMA 1 General Purpose** separate enclosures listed below, when used with open style components, are equivalent to a standard factory assembled control device.

Table 16.248:

For Use With			NEMA 1 General Purpose Enclosure Class 9991	
Class	Type	No. of Poles	Type	$ Price
2510	F and K	All	EN1	**29.30**
	M–Sizes M0 and M1	All	MG1	**57.00**
	M–Size M1P	All	MG2	**57.00**
8501	CO	All	UE1♦	**39.40**
	XO	2–12, 2–4 w/Attachments	UE7	**99.00**
	XDO	2–8 w/o Attachments		
8502	SAO, SBO, SCO	2–4	SCG7	**57.00**
	SDO	2–4	SDG7	**143.00**
	SEO	2–4	SEG7	**287.00**
	SFO	2–4	SFG8	**599.00**
8536	SAO, SBO, SCO	2–4	SCG8	**57.00**
	SDO	2–4	SDG8	**143.00**
	SEO	2–4	SEG8★	**287.00**
	SFO	2–4	SFG8★	**599.00**
	SGO	3	SGG8★□	**1241.00**
8702, 8736	SAO, SBO, SCO	All	SCG9▼	**171.00**
	SDO	All	SDG9▼	**372.00**
8903	LO, LXO	All	LXG1◊	**143.00**
	SMO	All	SCG7△	**57.00**
	SPO	All	SDG7△	**143.00**
	SQO	All	SFG8	**599.00**
	SVO	All	SFG4	**1259.00**
8910	DP	1–2	DPG1	**78.00**
	DPA12, 13, 22, 23, 32, 33, 42, 43	2–3	DPG1	**78.00**
	DPA14, 24, 34, 44, 52, 53	2–4	DPG2	**99.00**
	DPA62, 63	2–3	DPG3	**143.00**
	DPA72, 73, 92, 93, 122, 123	2–3	DPG4	**287.00**
	H, J, K, L & M	All	UE6	**99.00**
8911	DPSO13, 23, 33, 43	3	DPSG1	**59.00**
	DPSO53	3	DPSG2	**102.00**
	DPSO63, 73, 93	3	SEG8	**287.00**
9050	AO (Single Head)	All	UE6	**99.00**
	HO	All	UE6	**99.00**
9070	EO51, EO61, EO71, K750, K1000	—	SDG4	**458.00**
	EO2, EO3, EO4, EO15, EO16 EO18, EO19, T75, T100, T150, T200, T250, T300, T350, T500	—	LG1	**143.00**
	EO1, EO17, T50	—	UE7	**99.00**

♦ CP2 Discount Schedule, not CP1.

★ Enclosure suitable for starter with melting alloy or solid state overload relay **only**.

▼ For horizontally arranged Class 8702 contactors replace reset assembly with a Class 9001 Type K51 closing plate.

△ For electrically held contactors only. See page 16-95 for mechanically held contactors.

□ Series B starter enclosure.

◊ If cover mounted control units are required, select oversized enclosure listed on page 16-95.

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Type SCW4
NEMA 4 Enclosure

Type SCG1
With Starter, Transformer and Fuse Block Installed

Type SCA11
NEMA 12 Enclosure

NEMA 1, 4 and Oversized

For Addition of Control Circuit Transformer

The Class 9991 enclosures listed below accept an open type Class 8502 or 8536 Type S, NEMA Size 0, 1, 1P, or 2 contactor or starter along with a fused control circuit transformer (Form F4T) to allow field assembly of enclosed controllers. In the cover of the Class 9991 Type SCG1 enclosure, knock-outs are provided for field addition of Class 9999 cover-mounted control units. All other Class 8502 & 8536 enclosures include a panel with space and drilling for an open-type device and a fused control circuit transformer. In addition, three closing plates are included in each cover for easy installation of Class 9001 Type K or SK control units.

Oversized enclosures for open type Class 8903 Type L & LX, 20 A and Type S, 30 and 60 A electrically and mechanically held lighting contactors include a panel with space and drilling for an open- type contactor and fused control circuit transformer (Form F4T) and/or an auxiliary relay for use with single pole pilot devices (Form R6). When an auxiliary relay is required, use a Class 8501 Type XO11 relay. Three closing plates are provided as standard for easy installation of Class 9001 Type K or SK control units. **Note:** A Class 9991 Type SCG1 NEMA 1 separate enclosure can also be used for Class 8903 Type SMO, 30 A electrically held lighting contactor if Form F4T (control transformer), with or without cover control units is required.

Table 16.249:

For Use With				Class 9991 Enclosure						Recommended Class 9070♦ Transformer Selection					Fuse Block
Class	Type	NEMA Size or Ampere Rating	No. of Poles	General Purpose NEMA 1		Watertight and Dusttight Stainless Steel NEMA 4▼		Dusttight and Driptight Industrial Use NEMA 12■		Standard		Extra Capacity			
				Type	$ Price	Type	$ Price	Type	$ Price	Type	VA	100 VA Type	150 VA Type	300 VA Type	
Magnetic Contactors and Starters															
★ 8502 & 8536	SAO, SBO & SCO	00, 0 & 1	1–3	SCG1	**270.00**	SCW4	**827.00**	SCA4	**485.00**	T50	50 VA	T100▲	T150▲	—	Class 9999 Type SFR4
			4–5							T100▲	100 VA	—	T150▲	—	
	SDO	2	2–5	SDG4	**458.00**	SDW4	**1488.00**	SDA4	**705.00**	T100	100 VA	—	T150	T300	
Lighting Contactors, Non-Combination															
8903	LO, LXO	20 A	All	SDG3	**399.00**	SDW3	**1169.00**	SDA3	**684.00**	T50	50 VA	—	—	—	
										T50	50 VA	T100▲	T150▲	—	
	SMO△	30 A	1–3							T100▲	100 VA	—	T150▲	—	
			4–5							T100	100 VA	—	T150	T300	
	SPO△	60 A	2–5												

▲ For mounting in SCG1 enclosure, a Class 9991 Type S1 adapter bracket is also required — **$44.00**
■ NEMA 12 modified for outdoor use (see below).
♦ For price list and complete description, see the Class 9070 section. **Note:** Class 9991 Type SCG1 enclosure is provided with a Class 9999 Type SF4 fuse block as standard.
★ For contactors (Class 8502), a separate closing plate is provided with each enclosure to replace the reset mechanism with the exception of Class 9991 Type SCG1 which requires a separate reset closing plate.
Class 9999 Type SG2 — **$14.30**
▼ The standard cabinet has a brushed finish.
△ Mechanically held.

NEMA 12/3R Enclosures Modified for Outdoor Applications (not to be used in salt air or corrosive environments)

Field Modifications for NEMA 3 dusttight, raintight and sleet resistant outdoor applications are as follows: Watertight conduit hubs or equivalent provision for watertight connection at the conduit entrance shall be used.

Field Modifications for NEMA 3R rainproof and sleet resistant outdoor applications are as follows:

1. Watertight conduit hubs or equivalent provision for watertight connection at the conduit entrance, when the conduit enters at a level higher than the lowest live part, shall be used.
2. Drain holes of 1/8 inch diameter shall be added to the bottom of the enclosure.

Class 9001 Type K oiltight/watertight control units can be easily installed in NEMAs 4, 12, and oversized NEMA 1 separate enclosures provided with closing plates. When installing control units simply remove the closing plates and install the proper Class 9001 Type K components. Convenient control unit kits complete with assembled and pre-wired operators for quick installation are available as Class 9999 user modification kits. See Table 16.250 for contents of each control unit kit. Class 9001 Type SK NEMA 4X corrosion resistant control units may be used as an alternate.

Table 16.250: Control Unit Selection Table

Class 9999 Type	Control Function	Kit Contents	
		Class and Type	Description
SA3	Start-Stop Pushbutton	1-9001 KR1B 1-9001 KR1R 1-9001 KN201 1-9001 KN202 2-9001 KA1	Start Operator Stop Operator Start Legend Plate Stop Legend Plate Contact Block
SC8	Hand-Off-Auto Selector Switch	1-9001 KS43B 1-9001 KN260 1-9001 KA1	Selector Operator Switch Hand-Off-Auto Legend Plate Contact Block
SP28R	Pilot Light (120 V)	1-9001 KP1R31	Red Pilot Light

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Table 16.251: NEMA 1—General Purpose Enclosures (Standard)

Class 9991 Type	For Use With				Dimensions (inches/millimeters)														Weight (lb)
	Class	Type	Size	No. of Poles	Fig. No.	Mounting Screws (in.)	A	B	C	D	E	F	G	H	I	J	K	L	
LXG1	8903	LO, LXO	20 A	2–12	1	—	7.81 198	12.69 322	6.03 153	—	1.09 28	10.50 267	1.09 28	1.09 28	5.63 143	5.75 146	1.09 28	5.63 143	8
DPG1	8910	DP	20–40 A	1–2	1	(4)#10	4.85 123	8.5 216	4.03 102	2.42 62	.109 3	5.75 146	.531 13	.92 23	3.00 76	3.75 95	—	—	2
		DPA		1–3															
SCG7	8903	SMO (E.H.)	30 A	All	1	(3)#10	6.00 152	10.00 254	5.28 134	3.00 76	.88 22	8.13 206	1.00 25	.94 24	4.13 105	5.00 127	—	—	4
	8502	SAO	00	2–3															
		SBO SCO	0 1	All															
SCG8	8536	SAO	00	2–3					5.56 141										
		SBO SCO	0 1	All															
DPG2	8910	DPA	—	—															
DPSG1	8911	DPS	—	—															
SDG7	8903	SPO (E.H.)	60 A	2–12	1	(4)1/4	7.81 198	12.69 322	6.03 153	—	1.09 28	10.50 267	1.09 28	1.09 28	5.63 143	5.75 146	1.09 28	5.63 143	8
	8502	SDO	2	All															
SDG8	8536	SDO	2	All					6.31 160										
DPG3	8910	DPA	—	—															
DPSG2	8911	DPS	—	—															
SEG7	8502	SEO	3	All	1	(4)3/8	11.44 291	21.81 554	8.00 203	—	1.53 39	18.75 476	1.53 39	1.53 39	8.38 213	7.75 197	1.53 39	8.38 213	23
SEG8	8536	SEO	3	All															
	8911	DPSG63 to 93	—	All															
DPG4	8910	DPA	—	—					8.38 213										
SFG8	8502	SFO	4	All	2	(4)7/16	11.25 286	25.15 639	8.99 228	8.60 218	1.25 32	1.25 32	22.31 567	1.42 36	.44 11	—	—	—	34
	8536	SFO	4	All															
	8903	SQO (E.H. & M.H.)	100 A	All															
SCG9	8702▲	SBO, SCO	0 & 1	All	2	(4)5/16	11.88 302	11.88 302	7.41 188	9.75 248	1.06 27	1.06 27	9.75 248	1.06 27	.31 8	—	—	—	16
	8922	ETBC20, ETBC36	—																
SDG9	8702▲	SCO	2	All	2	(4)5/16	14.88 378	14.13 359	7.56 192	12.75 324	1.06 27	1.06 27	12.00 305	1.06 27	.31 8	—	—	—	24
	8922	ETBC60	—																

▲ Standard enclosure has space for a fused control transformer, Form F4T, on Sizes 0–2.

Table 16.252: NEMA 1—General Purpose Enclosures (Oversize)

Class 9991 Type	For Use With				Fig. No.	Mounting Screws (in.)	A	B	C	D	E	F	G	H	I	Weight (lb)
	Class	Type	Size	No. of Poles												
SDG3	8903	LO, LXO SMO (M.H.) SPO (Form F4T)	20 A 30 A 60 A	All	2	(4)5/16	14.88 378	14.13 359	7.56 192	12.75 324	1.06 27	1.06 27	12.00 305	1.06 27	.31 8	15
SDG4	8502	SDO (Form F4T)	2	All												21
	8536	SDO (Form F4T)	2	All					7.66 194							
	9070	EO51, EO61, EO71, T750, T1000	—	—					7.56 192							
SCG1	8502	SBO, SCO (Form F4T)	0, 1	All	3	(4)9/32	6.34 161	15.88 403	5.19 132	4.66 118	.84 21	14.38 365	.75 19	.28 7	.35 9	8
	8536	SBO, SCO (Form F4T)	0, 1	All												
	8903	SMO (E.H.) (Form F4T)	30 A	All												

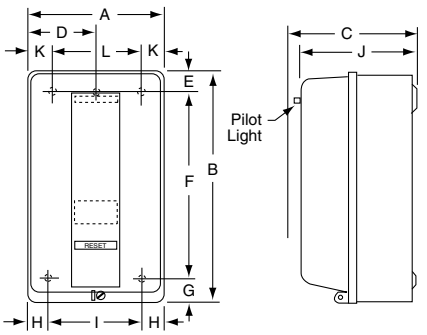

Figure 1

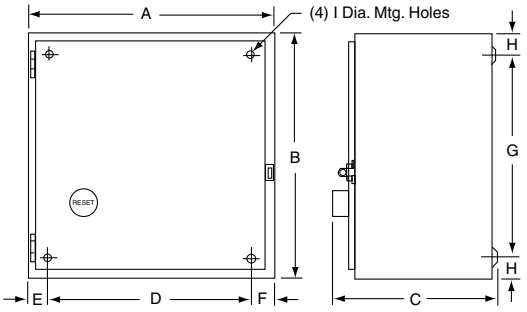

Figure 2

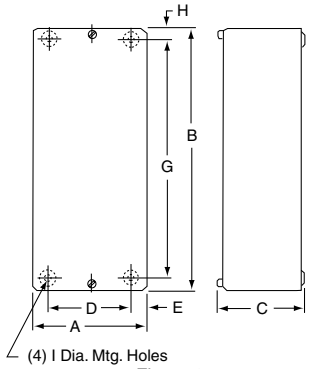

Figure 3

Dual Dimensions: **INCHES** Millimeters

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Table 16.253: NEMA 1—General Purpose Enclosures

Class 9991 Type	For Use With			Dimensions (See Figure 4)										Weight (lb)
	Class	Type	No. of Poles	A	B	C	D	E	F	G	H	J	L	
UE1	8501	CO	All	3.63 92	5.28 134	3.31 84	1.88 48	3.63 92	1.06 27	1.50 38	1/4 in.▲	1/2–3/4 in.		2
UE6	8910	H, J, K L & M	All	4.91 125	5.75 146	5.53 140	3.50 89	4.38 111	1.56 40	2.00 51	9/32 in.	1/2–3/4 in. 1–1-1/4 in.	1/2–3/4 in.	2
	9050	AO (Single Head)	All											
		HO	All											
UE7	8501	XO	2–12, 2–4 w/Attachments	4.87 124	7.79 198	7.53 191	3.50 89	6.38 162	1.31 33	1.88 48	#10	1/2–3/4 in.		4
		XDO	2–8											
	9070	EO1, EO17 T25, & T50	—											
LG1	9070	EO2, EO3, EO4, EO15, EO16, EO18, EO19 T75, T100, T150, T200, T250, T300, T350, & T500	—	7.53 191	9.78 248	5.91 150	6.13 156	8.38 213	1.31 33	1.88 48	9/32 in.	1/2–3/4–1 in. ■		10

▲ Class 9991 UE1 has only (3) -H diameter mounting holes; 2 in the bottom as shown and 1 centered at the top.
■ Class 9999 LG1 has three knockouts, top and bottom.

Table 16.254: NEMA 3R—Rainproof and Sleet-Resistant Enclosures

Class 9991 Type	For Use With				Dimensions (see Figure 5)																	
	Class	Type	Size	No. of Poles	A	B	C	D1	D2	E	F	G1	G2	H1	H2	J	K	L	M	N	P	K.O. X	K.O. Y
SCH2	8502 8536	SBO, SCO	0, 1	All	8.83 224	12.30 312	7.12 181	1.39 35	1.44 37	6.00 152	7.50 191	2.61 66	2.19 56	2.08 53	2.62 66	14.28 363	1.37 35	1.37 35	1.88 48	4.38 111	1.83 46	1/2 3/4 1	1/2 3/4 1
	8903	SMO	30 A																				
SDH1	8502 8536	SDO	2	All	9.83 250	16.30 414	8.62 219	1.39 35	1.44 37	7.00 178	11.50 292	2.61 66	2.19 56	2.08 53	2.62 66	16.78 426	1.31 33	1.75 44	2.13 54	4.88 124	1.83 46	1 1-1/4 1-1/2	1/2 3/4
	8903	LO LXO	20 A																				
	8903	SPO	60 A																				
SEH1	8502 8536	SEO	3	All	12.63 321	25.30 643	8.62 219	1.39 35	1.44 37	10.00 254	20.60 523	2.61 66	2.19 56	2.08 53	2.62 66	19.78 502	1.31 33	2.31 59	2.69 68	6.38 162	1.83 46	1 1-1/4 2 2-1/2	1/2 3/4
	8903	SQO	100 A																				
SFH1	8502 8536	SFO	4	All	12.63 321	40.30 1024	9.12 232	1.39 35	1.44 37	10.00 254	35.50 902	2.61 66	2.19 56	2.08 53	2.62 66	20.28 515	1.31 33	2.31 59	2.69 68	6.38 162	1.83 46	1 1-1/4 2 2-1/2	1/2 3/4
	8903	SVO	200 A	2-3																			

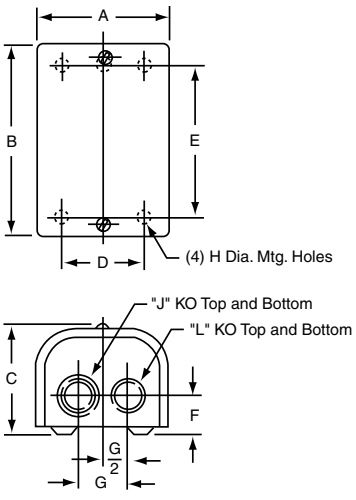

Figure 4

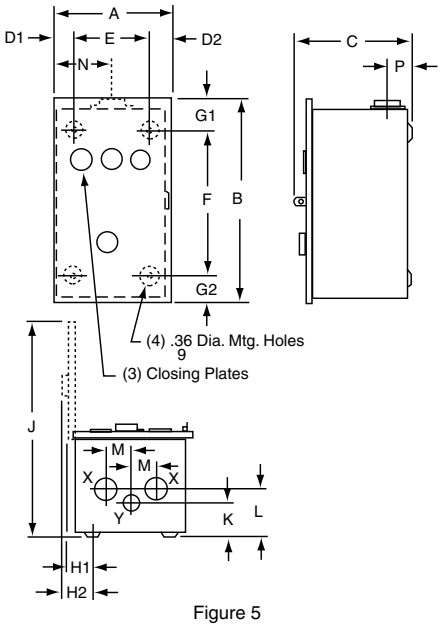

Figure 5

Dual Dimensions: **INCHES** Millimeters

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Table 16.255: NEMA 4X—Watertight and Corrosion Resistant Enclosures

Class 9991 Type	For Use With				Dimensions (see Figure 6)												Hub Dia.		Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	I	J	K	L	Bot. Only W	Top & Bot. X	
SCW20	8903	SMO (E.H.)	30 A	All	6.50 165	6.44 164	12.13 308	.75 19	5.00 127	8.25 210	1.69 43	3.34 85	10.06 256	1.31 33	2.13 54	.31 8	3/4 in.	1 in.	7
	8502	SBO, SCO	0, 1	All															
SCW21	8536	SBO, SCO	0, 1	All															
SDW20	8903	LO, LXO	20 A	All	8.50 216	7.06 179	13.88 352	.75 19	7.00 178	10.50 267	1.69 43	3.91 99	11.94 303	1.63 41	2.38 60	.31 8	3/4 in.	1-1/2 in.	13
	8903	SPO (E.H.)	60 A	All															
	8502	SDO	2	All															
SDW21	8536	SDO	2	All															

Table 16.256: NEMA 4—Watertight Enclosures (Standard)

Class 9991 Type	For Use With				Dimensions (see Figure 6)												Hub Dia.		Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	I	J	K	L	Bot. Only W	Top & Bot. X	
SCW11	8903	SMO	30 A	All	6.38 162	7.13 181	13.19 335	1.56 40	3.25 83	12.00 305	.59 15	1.88 48	11.78 299	1.63 41	2.31 59	.31 8	3/4 in.	1 in.	12
	8502	SBO, SCO	0, 1	All															
	8536	SBO, SCO	0, 1	All	6.38 162	7.81 198	13.19 335	1.56 40	3.25 83	12.00 305	.59 15	1.88 48	11.78 299	1.63 41	2.31 59	.31 8			
SDW11	8903	LO, LXO	20 A	All	8.13 206	7.88 200	16.19 411	1.56 40	5.00 127	15.00 381	1.09 28	1.94 49	14.75 375	2.00 51	2.63 67	.31 8	3/4 in.	1-1/2 in.	18
	8903	SPO	60 A	All															
	8502	SDO	2	All															
	8536	SDO	2	All	8.13 206	8.56 217	16.19 411	1.56 40	5.00 127	15.00 381	1.09 28	2.88 73	14.75 375	2.00 51	2.63 67	.31 8			
SEW11	8903	SQO	100 A	All	18.15 461	8.77 223	32.21 818	3.08 78	12.00 305	30.50 775	.86 22	3.67 93	26.71 678	2.58 66	3.19 81	.44 11	3/4 in.	2-1/2 in.	51
	8502	SEO	3	All															
	8536	SEO	3	All	18.15 461	9.58 243	32.21 818	3.08 78	12.00 305	30.50 775	.86 22	4.48 114	26.71 678	2.58 66	3.19 81	.44 11			
SFW11	8536	SFO	4	All															
	8502	SFO	4	All	18.15 461	8.77 223	32.21 818	3.08 78	12.00 305	30.50 775	.86 22	3.67 93	26.71 678	2.58 66	3.19 81	.44 11			

Table 16.257: NEMA 4—Watertight Enclosures (Oversize)

Class 9991 Type	For Use With				Dimensions (see Figure 7)												Hub Dia.		Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	I	J	K	L	Bot. Only W	Top & Bot. X	
SCW2	8702 8736	SCO	1	All	12.63 321	7.81 198	14.69 373	2.56 65	7.50 191	13.50 343	.59 15	3.88 98	18.41 468	1.66 42	2.31 59	.31 8	3/4 in.	1 in.	23
SCW3	8810	SBO SCO	0 1	All															19
SCW4	8502 8536	SBO, SCO (Form F4T)	0, 1	All															24
SDW2	8702 8736	SDO	2	All	14.88 378	7.25 184	16.19 411	2.56 65	9.75 248	15.00 381	.38 10	3.88 98	20.88 530	1.72 44	2.63 67	.31 8	3/4 in.	1-1/2 in.	25
SDW3	8903	LO, LXO SMO, SPO (Form F4T)	20 A 30 A 60 A	All															29
SDW4	8502 8536	SDO (Form F4T)	2	All															28

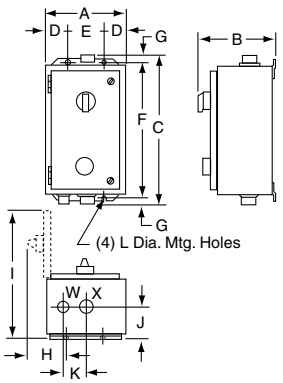

Figure 6

Dual Dimensions: **INCHES** Millimeters

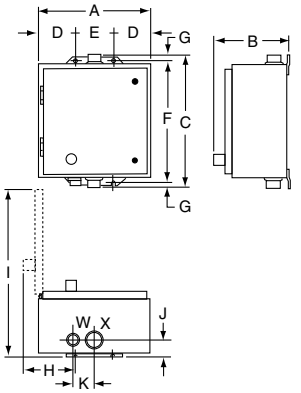

Figure 7

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Approximate Dimensions

Table 16.258: NEMA 12/3R—Dusttight and Driptight Enclosures (Standard)

Class 9991 Type	For Use With			Dimensions (see Figure 8)											Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	I	J	
SCA11	8502	SBO, SCO	0, 1	All	6.38 162	8.53 217	12.75 324	1.56 40	3.25 83	12.00 305	.38 10	3.56 90	12.50 318	.31 8	10
	8536	SBO, SCO	0, 1	All											
	8903	SMO	30 A	All											
SDA11	8502	SDO	2	All	8.13 206	9.28 236	16.00 406	1.56 40	5.00 127	15.00 381	.50 13	3.56 90	15.38 391	.31 8	15
	8536	SDO	2	All											
	8903	LO, LXO	20 A	All											
	8903	SPO	60 A	All											
SEA11	8903	SQO	100 A	All	18.15 461	9.24 235	31.50 800	3.08 78	12.0 305	30.50 775	.50 13	3.67 93	26.71 678	.44 11	51
	8502	SEO	3	All											
	8536	SEO	3	All	18.15 461	9.58 243	31.50 800	3.08 78	12.0 305	30.50 775	.50 13	4.48 114	26.71 678	.44 11	
SFA11	8536	SFO	4	All											
	8502	SFO	4	All	18.15 461	9.24 235	31.50 800	3.08 78	12.0 305	30.50 775	.50 13	3.67 93	26.71 678	.44 11	

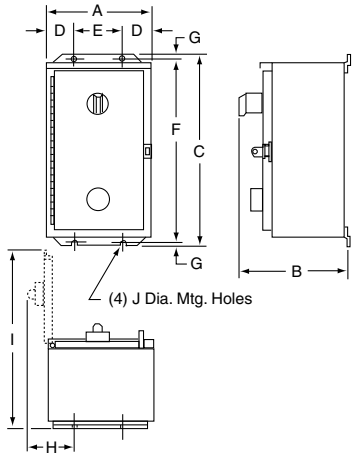

Figure 8

Table 16.259: NEMA 12/3R—Dusttight and Driptight Enclosures (Oversized)

Class 9991 Type	For Use With			Dimensions (see Figure 9)											Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	I	J	
SCA2	8702 8736	SCO	1	All	11.88 302	7.75 197	13.5 343	2.56 65	6.75 171	12.75 324	.38 10	3.66 93	18.13 460	.31 8	17
SCA3	8810	SBO SCO	0 1	All											18
SCA4	8502 8536	SBO, SCO (Form F4T)	0, 1	All											19
SDA2	8702 8736	SDO	2	All	14.88 378	7.88 200	16.00 406	2.56 65	9.75 248	15.00 381	.50 13	3.66 93	21.25 540	.31 8	24
SDA3	8903	LO, LXO SMO, SPO (**Form F4T**)	20 A 30 A 60 A	All											27
SDA4	8502 8536	SDO (**Form F4T**)	2	All											27

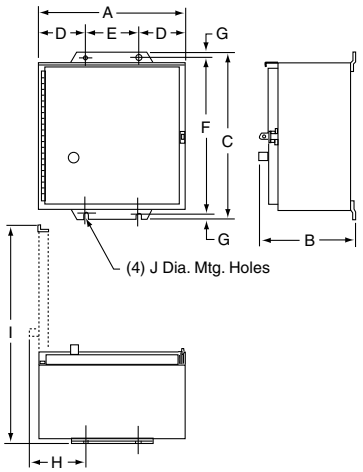

Figure 9

Table 16.260: Flush Mounting General Purpose Enclosures

Class 9991 Type	For Use With			Dimensions (see Figure 10)									Weight (lb)
	Class	Type	Size	No. of Poles	A	B	C	D	E	F	G	H	
SDF13 (w/SDF1 & SDF2)	8903	LO, LXO	20 A	All	15.19 386	8.94 227	7.63 194	12.88 327	5.44 138	10.94 278	5.13 130	.38 10	17
SCF11 (w/SDF1 & SDF2)	8502	SBO, SCO	0, 1	All	13.44 341	7.19 183	5.88 149	11.13 283	4.75 121	9.19 233	4.50 114	.38 10	10
	8536	SBO, SCO	0, 1	All									
	8903	SMO (E.H.)	30 A	All									
SDF11 (w/SDF1 & SDF2)	8502	SDO	2	All	15.19 386	8.94 227	7.63 194	12.88 327	5.44 138	10.94 278	5.13 130	.38 10	17
	8536	SDO	2	All									
	8903	SPO (E.H.)	60 A	All									
SEF11	8502	SEO	3	All	31.00 787	16.75 425	14.25 362	26.25 667	8.00 203	—	—	.18 5	48
	8903	SQO	100 A	All									

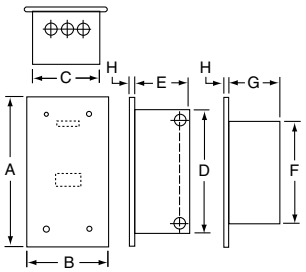

Figure 10

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Factory installed modifications are available for the classes of control equipment listed in the respective tables. Prices shown are **additions** to standard equipment prices and are **not** to be used as separate selling prices. Kits are also available for many field modifications and normal parts replacement on most control items. Refer to Classes 9998 and 9999 for complete listings.

Standard equipment dimensions and enclosure construction may not apply when certain special features are added. Such cases should be referred to the factory with complete description when accurate dimensions are required.

NOTE: *If UL label is required, consult Schneider Electric CCC at (1-888-778-2733). Some Forms **are not** UL Listed.*

Table 16.261: Full Voltage Starters

	Factory Modifications	Enclosure Type	Form	NEMA Size								
				00	0	1	2	3	4	5	6	7
PILOT DEVICES IN COVER Full Voltage Non-Reversing Controllers Only Classes 8502 8536 8538 8539	**Push Buttons ▲**											
	Start-Stop	1□, 3R, 4, 4X, 12 7 & 9	A A	— —	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	Start-Stop (maintained contact)▼	1□, 3R, 4, 4X, 12	A16	—	378.00	378.00	378.00	378.00	378.00	378.00	378.00	378.00
	Start-Stop push button and Hand-Off-Auto selector switch	1□, 3R, 4, 4X, 12	AC	—	671.00	671.00	671.00	671.00	671.00	671.00	671.00	671.00
	On-Off	1□, 3R, 4, 4X, 12	A3	—	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	Single Oiltight Pushbutton (specify marking)	1, 3R, 4, 4X, 12	A11	—	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	Selector Switches											
	Hand-Off-Auto	1□, 3R, 4, 4X, 12 7 & 9	C C	— —	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	On-Off	1□, 3R, 4, 4X, 12 7 & 9	C6 C6	— —	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	NON-STANDARD markings for Pilot Devices	1, 3R, 4, 12	G12★	—	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
	Addition of padlock attachment to Class 9001 operators	1, 3R, 4, 12	G122	—	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00
	Pilot Lights (specify color/type) ■ See Table 16.262 below.											
	With Operating Interlock: Add price of each interlock per light	1, 3R, 4, 4X, 12	X△	158.00	158.00	158.00	158.00	158.00	158.00	158.00	158.00	158.00
PILOT DEVICES IN COVER Full Voltage Reversing and Multi-Speed Controllers Only Classes 8702 8736 8738 8739 8810 8811 8812	**Push Buttons ▲**											
	Forward-Reverse-Stop	1, 4, 4X, 12 7, 9	A1 A1	— —	570.00 1017.00	570.00 1017.00	570.00 1017.00	570.00 1017.00	570.00 1017.00	570.00 1017.00	570.00 1017.00	570.00 1017.00
	High-Low-Stop	1, 4, 12	A2	—	570.00	570.00	570.00	570.00	570.00	570.00	570.00	570.00
	Fast-Off-Slow	1, 4, 12	A9	—	570.00	570.00	570.00	570.00	570.00	570.00	570.00	570.00
	High-Low push button and Hand-Off-Auto selector	1, 4, 12	A10C	—	671.00	671.00	671.00	671.00	671.00	671.00	671.00	671.00
	Single Oiltight Pushbutton (specify marking)	1, 4, 4X, 12	A11	—	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	Selector Switches											
	Hand-Off-Auto	1□, 4, 4X, 12 7 & 9	C C	— —	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	On-Off	1□, 4, 4X 7 & 9	C6 C6	— —	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	High-Off-Low	1, 4, 12	C7	224.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	Forward-Off-Reverse	1, 4, 4X, 12 7 & 9	C14	—	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00	336.00 599.00
	High-Low and Hand-Off-Auto	1, 4, 12	CC17	—	671.00	671.00	671.00	671.00	671.00	671.00	671.00	671.00
	Slow-Fast	1, 4, 4X, 12	C19	—	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	Forward-Reverse	1, 4, 4X, 12	C20	—	336.00	336.00	336.00	336.00	336.00	336.00	336.00	336.00
	High-Low-Off-Auto	1, 4, 12	C25	—	671.00	671.00	671.00	671.00	671.00	671.00	671.00	671.00
	NON-STANDARD markings for Pilot Devices	Any	G12★	—	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
	Pilot Lights ■ With Operating Interlock: Add price of each interlock per light	1, 4, 4X, 12	X△	158.00	158.00	158.00	158.00	158.00	158.00	158.00	158.00	158.00

▲ All push buttons are momentary contact unless specified otherwise.

■ Indicate pilot light color as **Form P1** (red) or **Form P2** (green), etc. as shown in the table below. Unless otherwise requested, standard practice is to wire red pilot light to indicate device is energized. No additional auxiliary contact is required. Also, standard practice is to wire green pilot light to indicate device is de-energized. An additional normally closed auxiliary contact is supplied. A wiring diagram must be supplied for other pilot light colors and/or arrangements.

♦ Pilot lights available at 120 to 600 V only.

★ Specify marking and/or Class 9001 Type KN or Type SKN legend plate required.

▼ Specify appropriate Class 9001 Type K or SK operator required.

△ To determine the maximum number of auxiliary contacts which can be added to each Type S device and for the appropriate "X Form", refer to the tables in the Class 8536 section on page 16-15 (for non-reversing single-speed devices) or the Class 8736 section on page 16-52 (for reversing or two-speed devices). For Class 8600 Reduced Voltage controllers, consult Schneider Electric CCC at (1-888-778-2733).

□ Various form combinations selected may force the use of a larger enclosure.

Table 16.262: Pilot Light Forms

	Standard			Push-to-Test			LED			LED-Push-to-Test		
	Form	Ty 1/4/12	Ty 7/9	Form	Ty 1/4/12	Ty 7/9	Form	Ty 1/4/12	Ty 7/9	Form	Ty 1/4/12	Ty 7/9
Red ON	P1	336.00	599.00	P21	435.00	599.00	P51	383.00	599.00	P42	482.00	599.00
Red OFF	P71	336.00	599.00	P81	435.00	599.00	P91	383.00	599.00	P43	482.00	599.00
Red Unwired	P38	336.00	599.00	P28	435.00	599.00	P58	383.00	599.00	P44	482.00	599.00
Green ON	P72	336.00	599.00	P82	435.00	599.00	P92	383.00	599.00	P45	482.00	599.00
Green OFF	P2	336.00	599.00	P22	435.00	599.00	P52	383.00	599.00	P46	482.00	599.00
Green Unwired	P39	336.00	599.00	P29	435.00	599.00	P59	383.00	599.00	P47	482.00	599.00
Amber	P3	336.00	599.00	P23	435.00	599.00	P53	383.00	599.00	P63	482.00	599.00
Clear	P4	336.00	599.00	P24	435.00	599.00	P54	383.00	599.00	P64	482.00	599.00
Yellow	P35	336.00	599.00	P25	435.00	599.00	P55	383.00	599.00	P48	482.00	599.00
Blue	P36	336.00	599.00	P26	435.00	599.00	P56	383.00	599.00	P66	482.00	599.00
White	P37	336.00	599.00	P27	435.00	599.00	P57	383.00	599.00	P67	482.00	599.00
Red LOW - Green HI	P73	672.00	1197.00	P83	870.00	1197.00	P93	765.00	1197.00	P77	963.00	1197.00
Green LOW - Red HI	P74	672.00	1197.00	P84	870.00	1197.00	P94	765.00	1197.00	P78	963.00	1197.00
Red OFF - Green FWD/REV	P75	1008.00	1796.00	P85	1305.00	1796.00	P95	1184.00	1796.00	P79	1445.00	1796.00
Green OFF - Red FWD/REV	P76	1008.00	1796.00	P86	1305.00	1796.00	P96	1184.00	1796.00	P80	1445.00	1796.00

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For Full Voltage Contactors and Starters

Table 16.263: Full Voltage Controllers Only

Classes 8502, 8536, 8538, 8539, 8702, 8736, 8738, 8739, 8810, 8811 and 8812													
Factory Modifications		Enclosure Type	Form	NEMA SIZE									
				00	0	1	2	3	4	5	6	7
CONTROL CIRCUIT Full Voltage and Multi-Speed Controllers Only Classes 8502 8536 8538 8539 8702 8736 8738 8739 8810 8811 8812	Separate Control Circuit—(specify voltage and frequency)	Any	S▲		No Charge	No Charge	No Charge	No Charge	No Charge	No Charge	No Charge	No Charge
	Fused Control Circuit (without control transformer)											
	One fuse	1, 3R, 4, 4X, 12	F	314.00	314.00	314.00	314.00	314.00	314.00	314.00	—	—
	Two fuses	1, 3R, 4, 4X, 7, 9, 12	F4	314.00	314.00	314.00	314.00	314.00	314.00	314.00	—	—
	Control Circuit Transformers■—Standard capacity (50 or 60 Hz) Note: All orders requesting Form FT will be supplied as Form F4T.											
	FUSES: Primary / Secondary											
	2 / 1	1, 4, 4X, 12	FF4T	698.00	698.00	698.00	855.00	1112.00	1283.00	1412.00 ♦	1412.00	1412.00
	2 / 1	7 & 9	FF4T	755.00	755.00	755.00	1053.00	1353.00	1640.00	1839.00 ♦	1839.00	1839.00
	2 / 2	1, 4, 4X, 12	F4F10T	698.00	698.00	698.00	855.00	1112.00	1283.00	1412.00 ♦	—	—
	Additional Capacity (50 or 60 Hz)											
	Two fuses in primary and one fuse in secondary											
	100 VA additional capacity	1, 4, 4X, 12	FF4T11	998.00	998.00	998.00	1197.00	1425.00	1566.00 ♦	1710.00 ♦	1710.00	1710.00
	100 VA additional capacity	7 & 9	FF4T11	1053.00	1053.00	1053.00	1395.00	1668.00	1925.00 ♦	2138.00 ♦	—	—
	200 VA additional capacity	1, 4, 4X, 12	FF4T12	1241.00	1241.00	1241.00	1467.00	1695.00 ♦	1839.00 ♦	1839.00 ♦	1839.00	1839.00
	300 VA additional capacity	1, 4, 4X, 12	FF4T13	1481.00	1481.00 ♦	1481.00 ♦	1737.00 ♦	1967.00 ♦	2109.00 ♦	2109.00 ♦	2109.00	2109.00
	400 VA additional capacity	1, 4, 4X, 12	FF4T14	1967.00	1967.00 ♦	1967.00 ♦	2280.00 ♦	2507.00 ♦	2793.00 ♦	2793.00 ♦	2793.00 ♦	2793.00 ♦
	500 VA additional capacity	1, 4, 4X, 12	FF4T15	2250.00	2250.00 ♦	2250.00 ♦	2564.00 ♦	2793.00 ♦	3077.00 ♦	3077.00 ♦	3077.00 ♦	3077.00 ♦

▲ All combination style devices such as 8538, 8539, 8738, 8739, that use **Form S** should also use **Form Y74** (auxiliary contact installed on disconnect switch) per NEC Article 430-74.
■ Table 16.266 at right.
♦ **Single** primary voltage must be specified.

Table 16.264: Marine Control

Class	Factory Modification	Enclosure Type	Form	$ Price
8502 8536 8538 8539 8702 8736 8738 8739 8810 8941	Modification of standard device for use as marine control per UL508	12/3R 4/4X (S.S. only)	M10	See Below

Table 16.265:

Form	NEMA Size★							
	00▼	0▼	1	2	3	4	5	6
M10	—	—	338.00	450.00	720.00	1260.00	3015.00	4725.00

★ Not available for NEMA Size 7.
▼ Cannot be used with Marine controls.

■Selection of Control Circuit Transformers

The standard primary/secondary voltages for control circuit transformers are indicated in the following table.

Table 16.266:

AC-OPERATED DEVICES With Control Transformers	
Voltage 60 Hz (Primary–Secondary)	Code
120–12△	V88
120–24△	V89
208–120	V84
240–24△	V82
240–120	V80
277–120	V85
480–24△	V83
480–120	V81
480–240	V87
600–120	V86
Specify	V99

△ 12 V coils are not available on Sizes 3–7.
24 V coils are not available on Sizes 4–7.

To order, select the desired device with the appropriate transformer Form designation. Then convert the previously selected voltage code (V••) to reflect the desired primary/secondary voltage for the transformer. The secondary voltage should equal the previously selected coil voltage of the device.

Example:

You have previously selected a Class 8536SDG1V02S. V02S means that you need a coil voltage of 120-60/110-50 wired for separate control. You would like to add **Form FF4T** with the transformer voltages being 480 volt primary, 120 volt secondary with Solid State Overload Relay Protection Class 20 Trip Class (H20).

The new and complete class, type, voltage code and form number will be:

Class	Type	Voltage Code	Form □
8536	SDG1	V81	FF4H20T

□ Form numbers should always be shown in alphabetical order. Each letter indicates the beginning of a new form and may be followed by one or more numbers.

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Solid State Overload Relay Factory Modifications (Forms)

The solid state overload relay is available on NEMA Size 00–7.
For Class 8536, 8538, 8539, 8736, 8738, 8739 and 8810 devices.

H # # #

Form Description

Type S Starter with MOTOR LOGIC™
Solid State Overload Relay
3—MOTOR LOGIC, Class 10/20 (Selectable)

0—No additional modifications
1—N.O. Auxiliary Contact (Field Convertible to N.C.)

Special Overload/Contactor Size Combinations (Base Unit & Feature Units):
(Must Be Specified On Size 00 Starter Orders)
Blank -Overload Matched to Starter Size (i.e., Size 1 contactor & 9-27 A overload)
0—A 6–18 A overload on a starter size as indicated by the Starter Catalog Number
1—A 9–27 A overload on a starter size as indicated by the Starter Catalog Number
2—A 15–45 A overload on a starter size as indicated by the Starter Catalog Number
3—A 30–90 A overload on a starter size as indicated by the Starter Catalog Number
4—A 45–135 A overload on a starter size as indicated by the Starter Catalog Number
8—A 1.5–4.5 A overload on a starter size as indicated by the Starter Catalog Number (only offered on Feature Units)
9—A 3–9 A overload on a starter size as indicated by the Starter Catalog Number

SPECIAL NOTE for Class 8810 devices:
You MUST SPECIFY TWO SEPARATE FORM NUMBERS TO GET MOTOR LOGIC OVERLOADS ON TWO SPEED STARTERS. The catalog number will be alphanumeric.
EXAMPLE: Open Style, Size 4 Two Speed Starter with MOTOR LOGIC Overload Relays Required.
Single Winding, 460 V, Constant or Variable Torque
High Speed FLA = 96 A
Low Speed FLA = 27 A (use Size 2 Overload)
Catalog Number to Order: 8810SF01V02H20H202S
Where: Form H20 is a Size 4 Contactor with a 45-135 A MOTOR LOGIC Overload Relay for the High Speed and form H202 is a 15–45 A MOTOR LOGIC Overload Relay on the low speed contactor.

Table 16.267: Classes 8536, 8538, 8539, 8736, 8738, 8739 and 8810

Factory Modifications		Form	NEMA Size (Overload Current Range)								
			00	0	1	2	3	4	5	6	7
			3–9 A	6–18 A	9–27 A	15–45 A	30–90 A	45–135 A	90–270 A	180–540 A	270–810 A
Motor Logic Solid State Overload Relay	Class 10/20 (Selectable)	H30	**93.00**	**93.00**	**93.00**	**102.00**	**116.00**	**131.00**	**215.00**	**215.00**	**Std.**
Motor Logic Solid State Overload Relay with Auxiliary Contact	Class 10/20 (Selectable)	H31	**149.00**	**149.00**	**149.00**	**161.00**	**171.00**	**188.00**	**270.00**	**270.00**	**56.00**

Table 16.268: Special Starter Combinations with Motor Logic Overload Relay Protection

NEMA Contactor Size	Solid State Overload Relay Size						
	00_B	00_C	0	1	2	3	4
00	◊	Std					
0	◊	◊	Std				
1	◊	◊	◊	Std			

NEMA Contactor Size	Solid State Overload Relay Size						
	00_B	00_C	0	1	2	3	4
2	◊	◊	◊	◊	Std		
3	n/a	n/a	n/a	n/a	n/a	Std	
4	n/a	n/a	n/a	n/a	n/a	◊	Std

◊ Possible factory starter combinations available.

Table 16.269: *New!* Adapted Bimetal Overload Relay for NEMA Type S Starter

This bimetallic overload relay is available on NEMA Sizes 00, 0 & 1 for Class 8536, 8538, 8539, 8736, 8738 and 8739 devices. To order a astarter with the adapter ONLY add Form E to the catalog number (8536SBG2V02ES). When ordering with the adapter and bimetallic overload relay installed, please use the Q2C product configurator.

E X YY Z

Form Description

Bimetal Overload Relay

1—Class 10 Balanced Loads
2—Class 20 Balanced Loads
3—Class 10 Unbalanced Loads (single phase)
4—Class 20 Unbalanced Loads (single phase)

YY—Numbers (suffix from O/L table below
i.e. 4 to 6 FLA use suffix 10

Z—0 for Screw Terminal and 6 for Ring Tongue Terminals

Sample Catalog Number: 8536SCO3V02E2160S
NEMA Size 1 Starter controlling a 7.5 hp motor (FA 11)
Bimetal would be: LRD16L (9 to 13 FLA)

Table 16.270: TeSys N Size 5–7, Non-Reversing and Reversing Starters

Current Setting Range Amperes	Class 20 with Single Phase Sensitivity W/O Lugs	Class 20 without Single Phase Sensitivity W/O Lugs	Class 20 with Single Phase Sensitivity With Lugs	Class 20 without Single Phase Sensitivity With Lugs	Adder CP1 List $ Price	Factory Installed Catalog Number Suffix
0.40 to 0.63	LRD04L	LR3D04L	LRD04L6	LR3D04L6	**85.28**	04
0.63 to 1	LRD05L	LR3D05L	LRD05L6	LR3D05L6	**85.28**	05
1 to 1.6	LRD06L	LR3D06L	LRD06L6	LR3D06L6	**85.28**	06
1.6 to 2.5	LRD07L	LR3D07L	LRD07L6	LR3D07L6	**85.28**	07
2.5 to 4	LRD08L	LR3D08L	LRD08L6	LR3D08L6	**85.28**	08
4 to 6	LRD10L	LR3D10L	LRD10L6	LR3D10L6	**85.28**	10
5.5 to 8	LRD12L	LR3D12L	LRD12L6	LR3D12L6	**87.46**	12
7 to 10	LRD14L	LR3D14L	LRD14L6	LR3D14L6	**87.46**	14
9 to 13	LRD16L	LR3D16L	LRD16L6	LR3D16L6	**87.46**	16
12 to 18	LRD21L	LR3D21L	LRD21L6	LR3D21L6	**87.46**	21
17 to 24	LRD22L	LR3D22L	LRD22L6	LR3D22L6	**87.46**	22
23 to 32	LRD32L	LR3D32L	LRD32L6	LR3D32L6	**87.46**	32

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Table 16.271: TeSys T Motor Management System Modifications - H6xx or H7xx for use with Class 8536 and 8736 (Open Starters)

NOTE: *Product Configurator Must Be Used To Order TeSys T Open Starters.*

Used on Size	Range	Control Voltage 100-240 Vac Form		Control Voltage 24 Vdc Form
00, 0, 1	0.4–8 A	H61X▲		H71X▲
0, 1	1.35–27 A	H62X▲		H72X▲
2, 3	5.0–100 A	H63X▲	or	H73X▲
4	8–160 (CT 300:5 3 turns)	H65X▲		H75X▲
5	24–480 A (CT 300:5 1 turn)	H66X▲		H76X▲
6	48–960 A (CT 600:5 1 turn)	H67X▲		H77X▲

▲ Where X is the communication option per table (i.e.H612)

Code	Communication Type	List Price Adder
2	Modbus	**$2,295.00**
3	ProfiBus	**$2,550.00**
4	CANopen	**$2,550.00**
5	DeviceNet	**$2,550.00**
6	Ethernet	**$2,805.00**

NOTE: *Auxiliary contact for control of starter coil has a maximum rating of 240V AC.*

Table 16.272: Full Voltage Controllers Only

Classes 8502, 8536, 8538, 8539, 8702, 8736, 8738, 8739, 8810, 8811 and 8812													
Factory Modifications		Enclosure Type	Form	NEMA Size									
				00	0	1	2	3	4	5	6	7	
Power Poles	Addition of one NEMA Size 1, 30 A single pole N.O. unit	Any	Y428	—	**287.00**	**287.00**	**287.00** ■	**287.00**	**287.00**	**287.00**	**287.00**	**287.00**	
	Addition of one NEMA Size 1, 30 A single pole N.C. unit	Any	Y429	—	**287.00**	**287.00**	**287.00** ■	**287.00**	**287.00**	**287.00**	**287.00**	**287.00**	
	Addition of one NEMA Size 1, 30 A double pole N.O./N.O. unit	Any	Y430	—	**441.00**	**441.00**	**441.00** ■	**441.00**	**441.00**	**441.00**	**441.00**	**441.00**	
	Addition of one NEMA Size 1, 30 A double pole N.C./N.C. unit	Any	Y434	—	**441.00**	**441.00**	**441.00** ■	**441.00**	**441.00**	**441.00**	**441.00**	**441.00**	
	Addition of one NEMA Size 1, 30 A double pole N.O./N.C. unit	Any	Y435	—	**441.00**	**441.00**	**441.00** ■	**441.00**	**441.00**	**441.00**	**441.00**	**441.00**	
	Addition of one NEMA Size 2 single pole N.O. unit	Any	Y436	—	—	—	**414.00** ■	**414.00**	**414.00**	**414.00**	**414.00**	**414.00**	
	Addition of one NEMA Size 2 single pole N.C. unit	Any	Y437	—	—	—	**414.00** ■	**414.00**	**414.00**	**414.00**	**414.00**	**414.00**	
	Addition of one NEMA Size 2 double pole N.O./N.O. unit	Any	Y438	—	—	—	**698.00** ■	**698.00**	**698.00**	**698.00**	**698.00**	**698.00**	
	Addition of one NEMA Size 2 double pole N.C./N.C. unit	Any	Y439	—	—	—	**698.00** ■	**698.00**	**698.00**	**698.00**	**698.00**	**698.00**	
	Addition of one NEMA Size 2 double pole N.O./N.C. unit	Any	Y440	—	—	—	**698.00** ■	**698.00**	**698.00**	**698.00**	**698.00**	**698.00**	
Miscellaneous	Coil transient suppressor (120 Volt only). Per Coil.	Any	Y145	**158.00**	**158.00**	**158.00**	**158.00**	**158.00**	**158.00**	**158.00**	**158.00**	**158.00**	
	Addition of terminal blocks (specify wired or unwired).												
	Wired, per terminal. Each	1, 4, 12	G56▲	—	**116.00**	**116.00**	**116.00**	**116.00**	**116.00**	**116.00**	**116.00**	**116.00**	
	Unwired, per terminal. Each	1, 4, 12	G50▲	—	**57.00**	**57.00**	**57.00**	**57.00**	**57.00**	**57.00**	**57.00**	**57.00**	

▲ Addition of terminal block type 9080CA or 9080GR6 only. Number of circuits is same as ending of form number. (Ex.: G505 is 5 un-wired terminal block.) Available in groups of 5 only.

■ When adding a power pole to a Size 2 device, also specify **Form Y118** and add **$140.00.**

Table 16.273: Reversing Full Voltage Starters Only♦

Class 8810										
Factory Modifications		Enclosure Type	Form	NEMA Size						
				0	1	2	3	4	5	6	7
Circuit Breaker or Disconnect Switch	Molded case circuit breaker	1	Y791	**2010.00**	**2010.00**	**2451.00**	**2664.00**	**4872.00**	**9471.00**	**13944.00**	**19328.00**
		4, 7★, 9★	Y791	**2862.00**	**2862.00**	**3533.00**	**4886.00**	**7092.00**	**11808.00**	**18216.00**	**23601.00**
		12	Y791	**2037.00**	**2037.00**	**2564.00**	**2862.00**	**5079.00**	**10839.00**	**14990.00**	**20397.00**
	Non–fusible disconnect switch	1	Y792	**1340.00**	**1340.00**	**1710.00**	**2165.00**	**2165.00**	**5355.00**	—	—
		4, 9★	Y792	**2172.00**	**2172.00**	**2646.00**	**4388.00**	**5327.00**	**7691.00**	—	—
		12	Y792	**1368.00**	**1368.00**	**1823.00**	**2366.00**	**4815.00**	**5925.00**	—	—
	Fusible switch with 30 A fuse clips	1	Y793	**1566.00**	**1566.00**	—	—	—	—	—	—
		4	Y793	**2421.00**	**2421.00**	—	—	—	—	—	—
		12	Y793	**1596.00**	**1596.00**	—	—	—	—	—	—
	Fusible switch with 60 A fuse clips	1	Y794	—	**1566.00**	**1823.00**	—	—	—	—	—
		4	Y794	—	**2421.00**	**2885.00**	—	—	—	—	—
		12	Y794	—	**1596.00**	**1938.00**	—	—	—	—	—
	Fusible switch with 100 A fuse clips	1	Y795	—	—	—	**1336.00**	—	—	—	—
		4	Y795	—	—	—	**4559.00**	—	—	—	—
		12	Y795	—	—	—	**2537.00**	—	—	—	—
	Fusible switch with 200 A fuse clips	1	Y796	—	—	—	**2885.00**	**3596.00**	—	—	—
		4	Y796	—	—	—	**5129.00**	**5840.00**	—	—	—
		12	Y796	—	—	—	**3105.00**	**5327.00**	—	—	—
	Fusible switch with 400 A fuse clips	1	Y797	—	—	—	—	—	**5868.00**	**11039.00**	—
		4	Y797	—	—	—	—	—	**8204.00**	**15354.00**	—
		12	Y797	—	—	—	—	—	**6438.00**	**12861.00**	—
	Automatic molded case switch with 600 A fuse clips	1	Y798	—	—	—	—	—	—	**13802.00**	—
		4	Y798	—	—	—	—	—	—	**18075.00**	—
		12	Y798	—	—	—	—	—	—	**14871.00**	—
	Automatic molded case switch with 1200 A or less fuse clips	1	Y799	—	—	—	—	—	—	**15425.00**	**15425.00**
		4	Y799	—	—	—	—	—	—	**19697.00**	**19697.00**
		12	Y799	—	—	—	—	—	—	**17562.00**	**17562.00**
	Automatic molded case switch	1	Y7910	—	—	—	—	—	—	**12293.00**	**13004.00**
		4	Y7910	—	—	—	—	—	—	**16565.00**	**17276.00**
		12	Y7910	—	—	—	—	—	—	**13361.00**	**14072.00**

♦ For non-reversing 2-speed starters with disconnect switch or circuit breaker, see pages 16-60–16-64.

★ NEMA 7 & 9 adders apply to 8810 non-reversing devices Sizes 0, 1 and 2 only.

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For Full Voltage Contactors & Starters

Table 16.274: Full Voltage Controllers△

Classes 8502, 8536, 8538, 8539, 8702, 8736, 8738, 8739, and 8810											
Factory Modifications		Enclosure Type	Form	NEMA Size							
				0	1 1 PW 1 YD	2 2 PW 2 YD	3 3 PW 3 YD	4 4 PW 4 YD	5 5 PW 5 YD	6 6 PW 6 YD	7 7 PW 7 YD
Auxiliary Relays	Control relay (4 & 8 poles)	1, 12	R174	$ 485.00	$ 485.00	$ 485.00	$ 485.00	$ 485.00	$ 485.00	$ 485.00	$ 485.00
		4, 4X■	R174	741.00	741.00	741.00	741.00	741.00	741.00	741.00	741.00
		7, 9	R174	741.00	741.00	741.00	741.00	741.00	741.00	—	—
		1, 12	R178	741.00	741.00	741.00	741.00	741.00	741.00	741.00	741.00
		4, 4X■	R178	1112.00	1112.00	1112.00	1112.00	1112.00	1112.00	1112.00	1112.00
		7, 9	R178	1112.00	1112.00	1112.00	1112.00	1112.00	1112.00	—	—
	Pneumatic Timing Relay – specify Class 9050 Type A or B										
	0.1 seconds to 1.0 minute—On delay	1	K25	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00
		3R, 4, 4X■, 12	K25	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00
		7, 9	K25	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	—	—
	0.1 seconds to 1.0 minute—Off delay	1	K26	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00
		3R, 4, 4X■, 12	K26	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00
		7, 9	K26	1566.00	1566.00	1566.00	1566.00	1566.00	1566.00	—	—
	1.0 to 3.0 minute—On delay	1, 3R, 4, 12	K37	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00
		4X■, 7, 9	K37	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	—	—
	1.0 to 3.0 minute—Off delay	1, 3R, 4, 12	K38	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00
		4X■, 7, 9	K38	1197.00	1197.00	1197.00	1197.00	1197.00	1197.00	—	—
	Solid State Timing Relay (specify timing range) and timer (120 V control required)	1, 4, 4X, 7, 9, 12	K1070	449.00	449.00	449.00	449.00	449.00	449.00	449.00	449.00
	Motor driven timing relay▲♦	1, 4, 12	K5	2507.00	2507.00	2507.00	2507.00	2507.00	2507.00	2507.00	2507.00
	Phase failure and phase reversal relay with time delay option including under and over voltage protection. Addition of a protective relay with options of Phase Failure with Time Delay, Phase Reversal and Under/ Over Voltage Protection. (RM3TR1). Both motor voltage and control voltage (V8• voltage code) must be specified with device even if Form S is specified. Form replaces Forms Y444, Y445, Y447, Y448 and Y449.	1, 3R, 4, 4X, 7/9, 12	R44	1463.00	1463.00	1463.00	1463.00	1463.00	1463.00	1463.00	1463.00
	For multispeed controllers: Compelling relay (requires motor to be started in low speed)	1, 4, 7, 9, 12	R1	941.00	941.00	941.00	941.00	941.00	941.00	941.00	941.00
	Accelerating relay (provides timed acceleration to selected speed):										
	For Class 8810	1, 4, 7, 9, 12	R2	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00
	For Class 8811	1, 4, 7, 9, 12	R2	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00
	For Class 8812	1, 4, 7, 9, 12	R2	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00
	Decelerating relay (imposes a timing delay during transfer from a higher to a lower speed):										
	For Class 8810	1, 4, 7, 9, 12	R3	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00	2195.00
	For Class 8811	1, 4, 7, 9, 12	R3	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00	4388.00
	For Class 8812	1, 4, 7, 9, 12	R3	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00	6579.00
	Antiplugging timers and relays	1, 4, 7, 9, 12	R10	3846.00	3846.00	3846.00	3846.00	3846.00	3846.00	3846.00	3846.00
★ Meters and Metering	Ammeter in cover (includes current transformer if required)	1, 12	G91	1994.00	1994.00	1994.00	1994.00	2820.00	2820.00	2820.00	2820.00
	Ammeter and switch with two current transformers	1, 12	G92	—	4274.00	4274.00	4274.00	4274.00	4274.00	4274.00	4274.00
	Ammeter and switch with three current transformers	1, 12	G93	—	5270.00	5270.00	5270.00	5270.00	5270.00	5270.00	5270.00
	Voltmeter mounted	1, 12	G94	—	2820.00	2820.00	2820.00	2820.00	2820.00	2820.00	2820.00
	Voltmeter and switch mounted	1, 12	G95	—	4274.00	4274.00	4274.00	4274.00	4274.00	4274.00	4274.00
	Elapsed time meter	1, 12	G97	827.00	827.00	827.00	827.00	827.00	827.00	827.00	827.00
	Operation counter	1, 12	G99	1425.00	1425.00	1425.00	1425.00	1425.00	1425.00	1425.00	1425.00
Auxiliary Contacts	Additional starter (contactor) auxiliary contacts (Specify number of additional N.O. or N.C. contacts required per contactor.) Each will be X_ _ (2 digits) i.e. X01	Any	X▼	158.00	158.00	158.00	158.00	158.00	158.00	158.00	158.00
	Auxiliary contacts installed on disconnect switch or circuit breaker operating mechanism.										
	SPDT	1, 4, 4X, 12	Y74	192.00	192.00	192.00	221.00	221.00	413.00	413.00	413.00
	DPDT	1, 4, 4X, 12	Y75	386.00	386.00	386.00	441.00	441.00	570.00	570.00	570.00
	(**Note:** Above contacts do not switch with automatic tripping of circuit breaker. If such operation is required, consult your nearest Schneider Electric Sales Office.)										
Enclosures	Space heater with N.C. auxiliary contact	1, 4, 4X, 12	G51	386.00	386.00	684.00	1097.00	1767.00	2622.00	3987.00	3987.00
	Function identification plate, with marking as specified	Any	G11	42.80	42.80	42.80	42.80	42.80	42.80	42.80	42.80
	Drain and breather installed	7 & 9□	Y41	372.00	372.00	372.00	372.00	372.00	372.00	372.00	—
	Cover gaskets added to NEMA 1 enclosures:										
	For Classes 8538 and 8539	1	Y47	143.00	143.00	Std.	Std.	Std.	Std.	—	—
	For Classes 8738 and 8739	1	Y47	Std.	Std.	Std.	Std.	Std.	Std.	—	—
	For other full voltage controllers	1	Y47	143.00	143.00	215.00	320.00	534.00	1070.00	1710.00	1710.00
	For reduced voltage controllers	1	Y47	143.00	143.00	215.00	320.00	534.00	1070.00	1710.00	1710.00
	Brushed stainless steel watertight device (add to catalog price of sheet steel watertight device):										
	Class 8606	—	Y56	—	—	1710.00	2138.00	3419.00	4773.00	8546.00	8546.00
	Classes 8630 and 8640	—	Y56	—	Std.	Std.	Std.	Std.	4773.00	8546.00	8546.00

▲ If controller has a control transformer, price that transformer with additional capacity for the relay provided.
■ This adder, used with a NEMA 4X enclosure, applies only to Classes 8538, 8539, 8738, 8739 and 8810 non-reversing.
♦ Specify control and line voltage.
★ Motor hp and voltage required when placing order. Meters will be panel mounted in NEMA 12 enclosures.
▼ To determine the maximum number of auxiliary contacts which can be added to each Type S device and for the appropriate "X Form", refer to the tables in the Class 8536 section on page 16-15 (for non-reversing single-speed devices) or the Class 8736 section on page 16-45 (for reversing or two-speed devices). For Class 8600 Reduced Voltage controllers, consult Schneider Electric CCC at (1-888-778-2733).
△ NEMA Type 7 & 9 enclosures not available with Class 8600 devices.
□ Available only on SPIN TOP™ and cast aluminum NEMA 7/9 enclosures.

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Table 16.275: Replacement AC Magnet Coils for Magnetic Contactors and Starters
(Refer to Table 16.277 on page 16-106 for listing of mechanically held unlatch coils.)

Equipment To Be Serviced				Coil Prefix or Class and Type	Hz	Suffix Number (Complete Coil Number Consists of Prefix or Class and Type Followed by Suffix Number.)												Coil VA		$ Price
Device	Size	Type	Poles			24 V	110-115 V	120 V	208 V	220 V	240 V	277 V	380 V	440 V	480 V	550 V	600 V	In-rush	Sealed	
Coils for Present Design Magnetic Contactors and Starters Classes 8502, 8536, 8538, 8539, 8606, 8630, 8640, 8647, 8650, 8651, 8702, 8736, 8738, 8739, 8810, 8811, 8812, 8903, 8910♦ and 8940 (except NP)	30 A	L	2–6	9998L	60 50	23 24	— 44	44 45	50 52	▲ 53	53 54	55 —	— 60	— 62	62 63	— 65	65 66	150 140	30 30	**85.00**
			8–12	9998LH	60 50	23 24	— 44	44 45	50 —	▲ 53	53 54	55 —	— 60	— 62	62 —	— 65	65 —	180 170	35 35	**85.00**
		LX (Latch)	2–4	9998L	60 50	23 24	— 44	44 45	50 52	— 53	53 54	55 —	— 60	— 62	62 63	— 65	65 66	150 140	— —	**85.00**
			6–12	9998LH	60 50	23 24	— 44	44 45	50 —	— 53	53 54	55 —	— 60	— 62	62 —	— 65	65 —	180 170	— —	**85.00**
	00	SA■ (Series B)	All	9998SAC	60 50	23 —	▲ 45	45 —	52 —	▲ 54	54 —	55 —	59 —	▲ 62	62 —	▲ 65	65 —	165 —	33 —	**85.00**
	00 0, 1, 1–P & 30 A	SA (Series A) SB, SC & SM	All	31041-400	60 50	20 22	▲ 42	42 43	48 —	▲ 51	51 53	52 —	56 57	58 60	60 ▲	61 62	62 64	245 232	27 26	**98.00**
	2 & 60 A	SD & SP	2 & 3	31063-409	60 50	16 17	▲ 38	38 39	44 —	▲ 47	47 48	49 —	53 54	▲ 57	57 —	▲ 60	60 61	311 296	37 36	**128.00**
			4 & 5	31063-400	60 50	16 17	▲ 38	38 39	44 —	▲ 47	47 48	49 —	53 54	▲ 57	57 —	▲ 60	60 61	438 429	38 37	**128.00**
	3 & 100 A	DPA12_, SE, SQ & SYD138	2 & 3	31074-400	60 50	16 17	▲ 38	38 39	44 —	▲ 47	47 48	49 —	53 54	▲ 57	57 —	▲ 60	60 61	700 678	46 47	**254.00**
			4 & 5	31091-400	60 50	— —	▲ 38	38 39	44 —	▲ 47	47 48	49 —	53 54	▲ 57	57 58	▲ 60	60 61	1185 1260	85 89	**254.00**
	4 & 200 A	SF, SV & SYD230	All	31091-400	60 50	— —	▲ 38	38 39	44 —	▲ 47	47 48	49 —	53 54	▲ 57	57 58	▲ 60	60 61	1185 1260	85 89	**254.00**
	5 & 300 A	SG, SX & SYD368 Series A	All	31096-400	60 50	— —	▲ 09	09 10	15 —	▲ 18	18 —	19 —	21 22	▲ 24	24 —	▲ 29	29 30	2970 2970	212 250	**354.00**
		SG, SX & SYD368 Series B	All	31096-320	60 50	— —	50 50	50 50	51 —	52 52	52 52	53 —	54 54	55 55	55 55	— —	— —	1300 —	14 —	**600.00**
	6 & 7	SH & SJ	2–3	Coil Part Number 3110440050 (All System Voltages)														1780	48	**860.00**
	400, 600 & 800 A	SY, SZ, SJ (Elect. Held)																1960	59	
		SY, SZ, SJ (Mech. Held)	2–3	31104-418	60 50	— —	▲ 09	09 —	15 —	▲ 18	18 —	19 —	— —	▲ 24	24 —	▲ 29	29 —	1530 1250	— —	**860.00**

▲ Use next higher voltage, 60 Hz coil.
■ Use on Type S Series B devices only.
♦ For 8910DPA1x to DPA9x, see page 16-71.

NEMA S Size 5 E-Coil Modification Kit

Classes 8502, 8536, 8538, 8539, 8606, 8630, 8640, 8647, 8650, 8651, 8702, 8736, 8738, 8739, 8810, 8811, 8812, 8910 and 8903

Consisting of:

- E-Coil
- Armature
- 15 A, 600 V Fuse and Holder (Class 9999SFR)
- Bottom Magnet
- Instruction Material

Table 16.276:

Catalog Number	Description	$ Price
9998SG120	Coil Modification Kit 120 V	**1506.00**
9998SG480	Coil Modification Kit 480 V	**1506.00**
9998SG277	Coil Modification Kit 277 V	**1506.00**
9998SG208	Coil Modification Kit 208 V	**1506.00**
9998SG240	Coil Modification Kit 240 V	**1506.00**
9998SG380	Coil Modification Kit 380 V	**1506.00**

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Table 16.277: Replacement AC Magnet Coils for Relays, Timers and Contactors

Equipment To Be Serviced			Coil Prefix or Class and Type	Hz	Suffix Number (Complete Coil Number Consists of Prefix or Class and Type Followed by Suffix Number)												Coil VA		$ Price
Device	Type	Poles			24 V	110–115 V	120 V	208 V	220 V	240 V	277 V	380 V	440 V	480 V	550 V	600 V	In-rush	Sealed	
Classes 8501 and 9050																			
8501 (Relays)	X	All	9998-X▲	60 50	23 24	— 44	44 —	51 52	52 53	53 —	55 —	— —	— 62	62 —	— 65	65 —	148 143	23 25	**69.00**
9050 (Timer)	A	All	2959-S49-	60 50	W25A W25B	W31B W32A	W32A W32B	W34A W34B	W34B W35A	W35A W35B	W35B W36A	— —	W37B W38A	W38A W38B	W38B W39A	W39A W39B	74 68	17 17	**132.00**
	B■	All	31017-400-	60 50	33 34	— —	54 55	61 —	61 63	63 64	65 —	— —	70 72	72 73	73 75	75 76	165 155	27 27	**98.00**
Mechanically Held *Unlatch* Coils—Classes 8508 and 8903 Note: A *latch* coil is also used with mechanically held devices. For selection of latch coils for mechanically held relays, refer to page 16-105.																			
8903 (Lighting Contactors)	LX	All	9998LX	60 50	23 —	— 44	44 —	51 —	— 53	53 —	55 —	— —	— 62	62 —	— 65	65 —	25 —	— —	**118.00**
	SM, SP	All	2959-S13	60 50	W23B W24B	♦ W30B	W30B W31B	W33A —	♦ W33B	W33B W34B	W34A —	— W36A	♦ W36B	W36B —	♦ W37B	W37B —	80 —	— —	**202.00**
	SQ, SV, SX, SY, SZ	All	31096-416	60 50	03 —	♦ 09	09 —	15 —	♦ 18	18 —	20 —	— 22	♦ 24	24 —	♦ 28	28 —	550 —	— —	**202.00**
	SJ	All	31123-403	60 50	03 —	♦ 09	09 —	15 —	♦ 18	18 —	20 —	— 22	♦ 24	24 —	♦ 28	28 —	2100 —	— —	**202.00**

Table 16.278: Replacement DC Magnet Coils for Magnetic Relays and Timers

Equipment To Be Serviced			Coil Prefix or Class and Type	Suffix Number (Complete Coil Number Consists of Prefix or Class and Type Followed by Suffix Number.)													Coil Burden Watts	$ Price
Class	Type	Poles		6 V	12 V	18 V	24 V	32 V	48 V	64 V	72 V	90 V	110 V	115/ 125 V	220 V	230/ 250 V		
8501 (Relays)	XD	All	9998 XD	19	28	34	37	40	46	49	52	55	—	58	—	67	18	**168.00**
	XDL	—	9998 XDL	19	28	34B	37B	40B	46B	49B	52B	55B	—	58B	—	67B	50	**216.00**
	XUD	All	9998 XUD	19	28	—	37	—	46	—	—	—	—	58★	—	67★	16	**168.00**
9050 (Timers)	C		31018-400-	22	31	—	40	—	49	—	—	—	—	61	—	70	14	**312.00**
	H		4491S1	W21	W24	—	W27	—	W30	—	—	—	—	W34	—	W37	14	**210.00**

Table 16.279: Replacement Coil for 8903 Panel Board Lighting Contactors

Class	Type	Replacement Solenoid	Catalog Number	$ Price ▼
8903	PB	120 V	9998PBV02	**428.00**
		208 V	9998PBV08	**428.00**
		240/277 V	9998PBV39	**428.00**
		480 V	9998PBV28	**428.00**

▲ To order an unlatch coil add the letter "L" to the type number and the letter "B" to the suffix number.
Example: For a 120 V 60 Hz unlatch coil order a Class 9998 Type X**L**44**B**.
Price for the 9998 Type XL coil series is **$114.00**.

■ Series C (Double Pole) and Series E (Single Pole).

♦ Use next higher voltage, 60 Hz coil.

★ Not dual rated. 125 Vdc or 250 Vdc only.

▼ CP1 discount schedule.

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Class 9998 replacement parts kits are available for servicing Square D relays, contactors, and starters as well as pressure, vacuum, and float switches. Each kit contains the necessary movable and stationary contacts, contact springs (when required—NEMA Size 3 and above do not include contact springs, and springs are not available), and additional hardware required to service the devices listed below. When servicing devices having more poles than contained in the corresponding kit, it may be necessary to order an additional kit.

Table 16.280: Magnetic Contactor and Starter Contact Kits for Present Designs

Equipment To Be Serviced			No. of Poles in Kit	Class 9998 Parts Kit Type No.	$ Price
Class	Type	NEMA Size or Ampere Rating			
8502 8536 8538 8539 8547 8549 8606 8630 8640 8647 8702 8736 8738 8739 8810 8811 8812 8940	SA-, (Series B)	00	3	SJ1	**90.00**
	SB-	0	3 4	SL2 SL12	**130.00** **176.00**
	SB-, SC-(Power Pole Adder)	0 & 1	1	SL22	**63.00**
	SC-	1 & 1P 1	3 4	SL3 SL13	**188.00** **246.00**
	SD-	2	3 4	SL4 SL14	**370.00** **494.00**
	SD-(Power Pole Adder)	2	1	SL24	**124.00**
	SE-	3	2 3	SL6 SL7	**442.00** **662.00**
	SF-	4	2 3	SL8 SL9	**848.00** **1270.00**
	SG-	5	2 3	SL10 SL11	**2104.00** **3120.00**
	SH-	6	2 3	SL25 SL26	**3762.00** **5606.00**
	SJ-	7	2 3	SL30 SL31	**5454.00** **8162.00**
8903	L (Series C) & LX (Series B)	30 A	4	RA5B	**174.00**
	SM-	30 A	3 4	SL3 SL13	**188.00** **246.00**
	SP-	60 A	3 4	SL4 SL14	**370.00** **494.00**
	SQ-	100 A	2 3	SL6 SL7	**442.00** **662.00**
	SV-	200 A	2 3	SL8 SL9	**848.00** **1270.00**
	SX-	300 A	2 3	SL10 SL11	**2104.00** **3120.00**
	SY-	400 A	2 3	SL25 SL26	**3762.00** **5606.00**
	SZ-	600 A	2 3	SL32 SL33	**3762.00** **5606.00**
	SJ-	800 A	2 3	SL30 SL31	**5454.00** **8162.00**
	PBM, PBP	30, 60 A	2	PB2	**520.00**
	PBN, PBQ	75, 100 A			
	PBM, PBP	30, 60 A	3	PB3	**780.00**
	PBN, PBQ	75, 100 A			
	PBR, PBV, PBW	150, 200, 225 A	2	PB14	**850.00**
	PBR, PBV, PBW	150, 200, 225 A	3	PB15	**1276.00**

Table 16.281: Magnetic Contactor and Starter Contact Kits for Obsolete Designs

Equipment To Be Serviced			No. of Poles in Kit	Class 9998 Parts Kit Type No.	$ Price
Class	Type	NEMA Size			
8502 & 8536▲	SA-, (Series A)	00	3 4	SL2 SL12	**130.00** **176.00**
8903	LL, L (Series A, B) & LX (Series A)	20 A	4	RA5	**174.00**

▲ Includes reversing, two speed and similar devices. Select coil based on NEMA size of basic starter or contactor.

Table 16.282: Class 8965 Replacement Contact Kits

Device Type	Device Series	Class 9998 Kit Type	Device Series	Class 9998 Kit Type	$ Price
DPR53 DPR63	A A	DRC5■ DRC6■	—	—	**52.00** **59.00**
RO10	A & B	RA10	C	RA14	**202.00**
RO11	A & B	RA11	C	RA15	**202.00**
RO12	A & B	RA12	C	RA16	**236.00**
RO13	A & B	RA13	C	RA17	**236.00**

■ Single pole kits.

Table 16.283: Manual Starter Contact Kits

Equipment To Be Serviced			No. of Poles in Kit	Class 9998 Parts Kit Type No.	$ Price
Class	Type	NEMA Size			
2510 Manual Starters	M-, T-	M-0	3	ML1	**90.00**
		M-1 & M-1P	3	ML2	**106.00**

Table 16.284: Replacement Control Transformers (150 VA) Class 8502, 8536 Type S Size 6

Voltage		Part Number	$ Price
60 Hz	50 Hz		
240/480–120	220/440–110	3110451250	
208–120	—	3110451252	
277–120	—	3110451253	
—	380–110	3110451254	**188.00**
600–120	550–110	3110451251	
120–120	110–110	3110451255	
240–120	220–110	3110451256	

Table 16.285: Replacement Control Transformers (200 VA) Class 8502, 8536 Type S Size 7

Voltage		Part Number	$ Price
60 Hz	50 Hz		
240/480–120	220/440–110	3112350150	
208–120	—	3112350152	
277–120	—	3112350153	
—	380–110	3112350154	**236.00**
600–120	550–110	3112350151	
120–120	110–110	3112350155	
240–120	220–110	3112350156	

Table 16.286: Class 8910, 8911 & 8965 Replacement Contact Kits

Device To Be Serviced			Class 9998		$ Price
Class 8910 Type	Class 8911 Type	Series	1-Pole Type	3-Pole Type	
SYD138 SYD230 SYD368	— — —	— — —	— — —	SL27 SL28 SL29	**662.00** **1270.00** **3120.00**
DPA_50A DPA_60A DPA_75A DPA_90A	DPSO5_ — — —	A, B A, B A A	DRC5 DRC6 DRC7 DRC9	— — — —	**52.00** **59.00** **100.00** **132.00**

Table 16.287: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	9998	SL6

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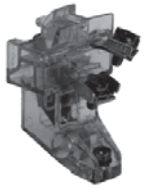


Class 9998 Type SO1

Contact Units for Melting Alloy Type Overload Relays

One normally closed contact, Class 9998 Type SO1, is provided in each overload relay block on Type S starters Sizes 00-6. The Class 9998 Type SO1 contact unit listed below is provided as standard in each Class 9065 melting alloy overload relay. Contact modules can be easily replaced and are identified in the table below. Isolated overload relay alarm circuit contacts are available as an optional feature. A pilot light or alarm bell can be wired in series with this contact to indicate that the overload relay has tripped. For further information on isolated alarm contacts refer to Class 9999 Types SO4 and SO5 (page 16-113).

Table 16.288:

Magnetic Starter			Description ▲	Parts Kit Number	$ Price
NEMA Size	Type	Series			
00–4 & 6	SA–SF SH	A & B	Standard N.C. contact unit	Class 9998 Type SO1 ■	**39.40**
5	SG	A	Standard N.C. contact unit	3110251450	**134.00**
			N.C. and N.O. alarm (three point) contact unit	3110251451	**196.00**

▲ Refer to page 16-110 for contact ratings.
■ The Type SO1 is also the replacement contact unit for Class 9065 Type M melting alloy overload relays.

Overload Contact Unit
Part No. 31102-514-50.
Used on Size 5 Starter
(8536SGO) with Melting Alloy
Overload Relay.

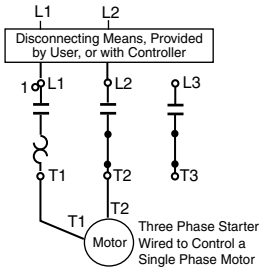
Class 9998 Type UB Universal Baseplate

A universal baseplate may be used to retrofit a Square D Type S NEMA starter into an application which is currently using a competitive NEMA starter. The universal baseplate is a metal plate which attaches to the panel in the location of the starter to be replaced. The Type S starter then mounts to the baseplate. It is available for NEMA Sizes 00 through 4, and mounting screws are provided with each plate.

The universal baseplate adapter allows the Type S starter to replace the following competitive starters:

Table 16.289:

Competitor Starter	NEMA Size	Baseplate	NEMA Size	Baseplate	NEMA Size	Baseplate	NEMA Size	Baseplate	$ Price
Allen Bradley 509	0, 1	UB01	2	UB02	3	UB03	4	UB04	No charge
Allen Bradley 709	1		2		3		4		
Cutler Hammer Freedom Series	00, 0, 1		2		3		4		
Furnas ESP100	0, 1		2		3		4		
Furnas INNOVA	0, 1		2		3		4		
General Electric CR306	00, 0, 1		2		3		4		
Telemecanique "A" Line and Pre-type "S"	0, 1	UB11	2	UB12	3	UB13	4	UB14	



Melting Alloy Overload Relay
Jumper Strap Kits

Melting Alloy Overload Relay Jumper Strap Kits

Jumper strap kits are for use on three-phase manual or magnetic starters with melting alloy overload relays only, where a three-phase starter is used to control a single-phase motor. These kits will include two jumper straps, a wiring diagram showing how to wire a three-phase starter to control a single-phase motor, and single-phase (one thermal unit) selection tables.

Table 16.290: Melting Alloy Overload Relay Jumper Strap Kits

Class	For Starter		Class 9998 Kit Type	$ Price ♦
	Size	Type		
ALL	00, 0, 1, 2 and M0 & M1	SA, SB, SC, SD and M & T (Manual)	SO31	**14.30**
	3,4	SE, SF	SO32	**50.00**
	5	SG	None Available	

♦ CP1 discount schedule.

How to Order

Table 16.291: How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	Class	Type
	9998	UB01

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Cover-Mounted Control Units

Class 9999 push button, selector switch and pilot light cover-mounted control unit kits can be easily field installed in a NEMA 1, 3R, 4 or 12 Type S contactor or starter enclosure cover. Knockouts or removable closing plates are furnished with many enclosure covers for convenient field installation of control units. Kits are supplied with leads and clearly illustrated instructions. The Class 9999 cover mounted control unit kits are identical to the units which are factory installed.

Table 16.292:

For Use With					NEMA 1 Kit 8538, 8539 and 8903 Pre-Series K Description									NEMAs 1, 3R & 12 Kit 8538, 8539 and 8903 Series K and Later Description★				NEMA 4/4X Kit (Stainless) Description★			
Class	Type	NEMA Size or Ampere Rating	No. of Poles	Voltage	Red or Green Pilot Light■				Push Button		Selector Switch		$ Price	Red or Green Pilot Light	Push Button	Selector Switch	$ Price	Red or Green Pilot Light	Push Button	Selector Switch	$ Price
					With Control Transformer (Form F4T)		Standard		Start-Stop	On-Off	Hand-Off-Auto	On-Off		120 V 60 Hz	Start-Stop or On-Off	Hand-Off-Auto		120 V 60 Hz	Start-Stop or On-Off	Hand-Off-Auto	
					Type	Price	Type	Price	Type	Type	Type	Type		Type	Type	Type		Type	Type	Type	
8502 & 8536	SA, SB & SC	00, 0, 1 & 1P	All	6–600 Volts 50–60 Hz	SP28R♦	**215.**	SP2R	**215.**	SA2	SA10	SC2	SC22	**116.**	SP28R♦■ (incandescent) SPL28R (LED–Red) SPL28G (LED–Green)	SA3▲	SC8	**215.**	SP29R♦■ (incandescent) SPL29R (LED–Red) SPL29G (LED–Green)	SA13	SC9	**215.**
	SD	2	All		SP28R♦	**215.**	SP3R	**215.**													
	SE	3	2–3		SP28R♦	**215.**	SP4R	**215.**													
			4–5		SP28R♦	**215.**	SP5R	**215.**													
	SF	4	All		SP28R♦	**215.**	SP28R♦	**215.**	SA3	SA3	SC8	—	**215.**								
	SG–SJ	5–7	All		SP28R♦	**215.**	SP28R♦	**215.**													
8538 8539 8702 8736	SB & SC	0 & 1	All		SP12R	**215.**	SP12R	**215.**	SA2	SA10	SC2	SC22	**116.**								
	SD	2	All		SP13R	**215.**	SP13R	**215.**													
	SE	3	All		SP14R	**215.**	SP14R	**215.**													
	SF	4	All		SP15R	**215.**	SP15R	**215.**													
	SG–SJ	5–7	All		SP28R♦	**215.**	SP28R♦	**215.**	SA3	SA3	SC8	—	**215.**								
△ 8903 (Electrically Held)	L	20 A	All		SP28R♦	**215.**	—	—	—	SA10▼	—	SC22 ▼	**116.**								
	SM	30 A	All		SP28R♦	**215.**	SP2R	**215.**	SA2▲	SA10▲	SC2	SC22	**116.**								
	SP	60 A	All		SP28R♦	**215.**	SP3R	**215.**													
	SQ	100 A	All		SP28R♦	**215.**	SP28R♦	**215.**	SA3▲	SA3▲	SC8	—	**215.**								
	SJ, SV, SX SY, SZ	200–800 A	All		SP28R♦	**215.**	SP28R♦	**215.**	SA3▲	SA3▲	SC8	—	**215.**								

▲ Also requires N.O. auxiliary contact for holding circuit contact when used on Class 8903 electrically held lighting contactors.
■ Each pilot light kit contains 1 red and 1green lens cap.
♦ The coil voltage must be the same as the pilot light rating. Kit contains one Class 9001 Type KP1R31120V, 60 Hz red pilot light control unit. For other voltages, refer to Class 9001 Type KP.
★ User made openings are required in order to field install these modification kits on standard 8502, 8536 Type S Sizes 0–2, and 8903 Sizes 30–60 A NEMAs 4 and 12 enclosures.
▼ To mount control unit in a NEMA 1 enclosure, a Class 9999 Type BLX bracket is also required, **$35.60**.
△ For Class 8903 (mechanically held contactor) control unit kits, refer to the Class 8903 section, page 16-65.
Note: There are no field modification kits available for the polyester enclosures.

Table 16.293: NEMA 1 Enclosure Closing Plates

For Use With			Description	Type	$ Price
Class	Type	NEMA Size or Ampere Rating			
8502, 8536, 8903	SA–SE or SM–SP	00–3 or 30–60A	For Pilot Light or Reset—Slip-on Cover NEMA 1 Enclosure	SG2	**29.00**
			For Push Button or Selector Switch—Slip-on Cover NEMA 1 Enclosure	SG3	**29.00**
8538 & 8539 Pre-series "K"	SB–SF	0–4	For Push Button or Selector Switch—Hinged Cover NEMA 1 Enclosure	SG1	**29.00**
			For Pilot Light—Hinged Cover NEMA 1 Enclosure	SG2	**14.30**
8538 & 8539 Series J and later	SB–SF	0–4	Pushbutton or Pilog Light NEMA Combination Starter	9001K51	**14.30**
8903	SM–SV	30–400 A	Combination Lighting Contactor	9001K51	**14.30**

Table 16.294: How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	Class	Type
	9999	SP29R

Class 9999 Type SP2R
Pilot Light Kit

Class 9999 Type SA2
Push Button Kit

Class 9999 Type SC2
Selector Switch Kit

Class 9999 Type SA3
Push Button Kit

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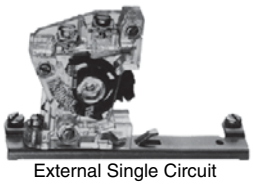
Auxiliary Contacts for Manual and Magnetic Contactors and Starters

Internal Contacts

Internal Auxiliary Contact

Class 9999 Type SX11 internal contact kit is a replacement unit for the N.O. holding circuit contact supplied as standard on Type S Sizes 00–2 three phase starters and contactors. The Class 9999 Type SX12 is a replacement unit for the N.C. electrical contact which is furnished as standard on Type S, Sizes 00–2 mechanically interlocked devices (e.g., Class 8736 reversing starters). Internal contacts are also used on Class 2510 Types M & T manual starters. The internal contacts can be used for other applications as long as the electrical rating is not exceeded. See table below for electrical ratings.

External Contacts


External Single Circuit Auxiliary Contact

Class 9999 Type SX6 external auxiliary contact is supplied as standard for the N.O. holding circuit contact on Type S Sizes 3–7 starters and contactors. Additional auxiliary contacts can be added to Type S contactors, starters and lighting contactors. These contacts mount on either side of the basic contactor and are available with convertible or non-convertible contacts. The contacts of the convertible version can be changed from N.O. to N.C. or vice versa in the field. The non-convertible version has fixed contacts, either N.O. or N.C.

To determine the number of auxiliary contacts which can be added to each Type S contactor or starter, refer to the Class 8536 or Class 8736 section.

See table below for electrical ratings.

Table 16.295: Maximum Ratings for Type S Auxiliary Contacts and Timers

Class 9999 Type	Contact Ratings				Class 9999 Type	Contact Ratings			
	Volts AC	AC Only (35% Power Factor)		Continuous		Volts AC	AC Only (35% Power Factor)		Continuous
		Make	Break				Make	Break	
SX11, SX12	120 or Less	30 A	3 A	3 A	SX6-SX10 SX13-SX17	120 or Less	60 A	6 A	10 A
	120-600	3600 VA	360 VA	3 A		120–600	7200 VA	720 VA	10 A

Table 16.296: Class 8502, 8536 and 8903 Type S

For Use With		Kit Description	Ordering Information	
			Class 9999	
Type	NEMA Size		Type	$ Price
External—Field Convertible				
SA-SJ	00–7	1-N.O. Contact	SX6	**86.00**
		1-N.C. Contact	SX7	**86.00**
		1-N.O. and 1-N.C. Isolated Contacts	SX8	**116.00**
		1-N.O. Overlapping Contact	SX9▲	**116.00**
		1-N.C. Overlapping Contact	SX10▲	**116.00**
External—Non-Convertible				
SA-SJ	00–7	1-N.O. Contact	SX13	**99.00**
		1-N.C. Contact	SX14	**99.00**
		1-N.O. & 1 N.C. Isolated Contacts	SX15	**134.00**
		1-N.O. Overlapping Contact	SX16▲	**134.00**
		1-N.C. Overlapping Contact	SX17▲	**134.00**
Internal—Non-Convertible				
SA-SD	00–2	1-N.O. Contact	SX11■	**99.00**
		1-N.C. Contact	SX12■	**99.00**

▲ Types SX9 and SX10 or Types SX16 and SX17 must be used together and mounted on the same side of the contactor. They are suitable for applications where it is necessary for a normally open contact to overlap a normally closed contact.

■ Types SX11 and SX12 are not applicable for use on NEMA Sizes 3 or larger. Internal contacts can also be used on Class 2510 Types M and T manual starters.

Table 16.297: Class 8910 and 8911 Definite Purpose Contactors and Starters – Auxiliary Contacts

Device To Be Serviced	Auxiliary Contact Kit			
Class 8910 or 8911 Type	Contact Arrangement	Class 9999		$ Price Each
		Series B (20-90 A)	Series C (20-40 A)	
DPA DPS	1 N.O.	D10	DD10	**24.60**
	1 N.C.	D01	DD01	
	1 N.O./1 N.C.	D11	DD11	**44.30**
	2 N.O.	D20	DD20	

Table 16.298: Class 8965 Reversing/Hoist Contactors –Auxiliary Contacts

Device To Be Serviced	Auxiliary Contact Kit			
Class 8965 Type	Contact Arrangement	Type of Connector	Class 9999 Type	$ Price Each
DPR	1 N.O.	Screw/ Quick-Connect	D10	**35.60**
	1 N.C.		D01	
	1 N.O./1 N.C.		D11	**64.00**
	2 N.O.		D20	
RO2 & RG2 RO10 Form X1 RO11 Form X1	1 N.O. each side	Slip-on	R10	**50.00**
RO3 & RG3 RO10 Form X2 RO11 Form X2	1 N.C. each side		R11	**75.00**
RO5 & RG5 RO12 Form X1 RO13 Form X1	1 N.O. each side	Screw	R12	**50.00**
RO6 & RG6 RO12 Form X2 RO13 Form X2	1 N.C. each side		R13	**75.00**

Table 16.299: How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	Class	Type
	9999	SX6

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Motor Logic—Class 9999

Isolated Auxiliary Contacts for Motor Logic Overload Relays

Overload relay auxiliary contacts are available factory installed or in kit form for field installation on Motor Logic overload relays. These contacts may be used for isolated alarm contact applications.

Table 16.300:

For Use With		Parts Kit Description	Class 9999 Type	$ Price
Class & Type	NEMA Size♦			
8536 SA-SJ	00B through 7	N.O. or N.C. Auxiliary Contact (Field Convertible)	AC04	**57.00**
9065 SS, SR, SF, ST	00B through 7			

DIN Adapter

The DIN adapter provides a method to mount the Motor Logic overload relay to a 35 mm DIN rail.

Table 16.301:

For Use With		Parts Kit Description	Class 9999 Type	$ Price
Class & Type	NEMA Size♦			
9065 SS or SF	00B, 00C, 0, and 1	DIN Adapter	DA01	**23.90**

Lug-Lug and Lug-Extender Kits

A Class 9999 LL0 Lug-Lug Kit can be field installed on separately mounted overload relays. The standard Size 00B, 00C, 0, and 1 Class 9065 Type SS and SF overload relays are supplied without lugs. A Class 9999 LB0 Lug-Extender Kit is designed for Size 00B, 00C, 0, and 1 Retrofit Starter Applications. This kit allows the lugs to be in the same location as the Class 9065 melting alloy overload relay, eliminating the need for additional wire length.

Table 16.302:

For Use With		Parts Kit Description	Class 9999 Type	$ Price
Class & Type	NEMA Size♦			
9065 SS or SF	00B, 00C, 0, and 1	Lug-Lug Kit for separate mounting	LL0	**42.80**
9065 SS or SF	00B, 00C, 0, and 1	Lug-Extender Kit for retrofitting existing NEMA S starters	LB0	**35.60**

Remote Reset Module

The Remote Reset Module can be easily field installed on solid state overload relays. This module will allow the overload relay to be reset from a remote location.

Table 16.303:

For Use With		Parts Kit Description	Class 9999 Type	$ Price
Class and Type	NEMA Size♦			
536 SA-SJ	00B through 7	Remote Reset Module	RR04■	**162.00**
9065 SS, SR, SF, ST	00B through 7			
8536 SE-SF	3 and 4	Top Mounting Bracket	RB34▲■	**100.00**
9065 SS, SR, SF, ST	3 and 4			

▲ To be used to mount the remote reset module on the top of the overload relay.
■ 120 Vac power required.
♦ NEMA Size 00B and 00C are not actual NEMA sizes. These designations are used to differentiate the lower FLA of these devices from the NEMA size 00 Motor Logic Solid State Overload Relay.

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Class 9999 Type SB9 Double Power Pole Adder

Class 9999 Type SB9 Double Power Pole Adder

Class 9999 Type SB6 Single Power Pole Adder

Power Pole Adders

One single or double circuit power pole kit may be field added to a basic 2 or 3-Pole Type S contactor or starter Sizes 0, 1 and 2, or 30–60 A lighting contactors. See table below for selection. The ratings for these power pole adders correspond to the NEMA contact ratings found on page 16-105. A two or three pole contactor or starter accepts only one single or double circuit unit. A power pole cannot be used on four or five pole devices or devices which are mechanically interlocked.

To add a power pole to a Size 0 and 1 device, remove return springs.

When adding a power pole to a Size 2 or 60 A device, a coil change is required. Select a 4- and 5-Pole coil from the coil selection table on page 16-105, or specify Form Y118 as noted in the footnote below.

When adding Sizes 0–2 power pole kits to a Size 3–7 or 100–800 A device, an adapter bracket (9999 SBT1) is required. The Class 9999 Types SB6 through SB15 power pole kits are suitable for copper wire only. Types SB21 through 25 are supplied with lugs suitable for copper and aluminum wire.

Table 16.304:

For Use With		Power Pole Adder Kit		
Type	Size	Description	Class 9999 Type	$ Price
SB, SC & SM	0, 1 & 30 A	One N.O. power pole adder	SB6	158.00
SD	2		SB11▲	287.00
SP	60 A		SB21▲	
SB, SC & SM	0, 1 & 30 A	One N.C. power pole adder	SB7	158.00
SD	2		SB12▲	287.00
SP	60 A		SB22▲	
SB, SC & SM	0, 1 & 30 A	One N.O. and one N.C. power pole adder	SB8	365.00
SD	2		SB13▲	656.00
SP	60 A		SB23▲	
SB, SC & SM	0, 1 & 30 A	Two N.O. power pole adders	SB9	365.00
SD	2		SB14▲	656.00
SP	60 A		SB24▲	
SB, SC & SM	0, 1 & 30 A	Two N.C. power pole adders	SB10	365.00
SD	2		SB15▲	656.00
SP	60 A		SB25▲	
SE-SJ & SQ-SZ & SJ	3-7 & 100-800 A	Adapter Bracket	SBT1	100.00

▲ To order a Size 2 or 60 A power pole kit complete with a new starter coil, specify **Form Y118,** voltage and frequency and add **$140.00** to the price of the kit (e.g., Class 9999 Type SB11 **Form Y118,** 120 volts, 60 cycles. Priced at **$426.00**).

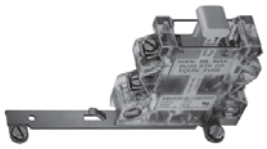
Control Circuit Fuse Holder

The control circuit fuse holder is designed to be used on Type S contactors and starters, Sizes 00–7, when either one or two control circuit fuses, 600 V maximum, are required. The Type SF3 and SF4 fuse holders will accept standard 600 V Bussmann Type KTK or equivalent fuses (13/32" x 1-1/2"); 6 A maximum. The SFR3 and SFR4 will accept Class CC 600 V Bussmann Type KTK-R or equivalent fuses only.

Table 16.305:

Description ■	Class 9999	
	Type	$ Price
Single Fuse Unit	SF3	64.00
Single Fuse Unit for Class CC Fuse	SFR3	64.00
Two Fuse Unit	SF4	86.00
Two Fuse Unit for Class CC Fuses	SFR4	86.00

■ Fuses not included.



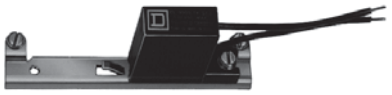
Class 9999 Type SF4 Fuse Kit

Transient Suppression Module

The transient suppression module is designed to be used where the transient voltage, generated when opening the coil circuit, interferes with the proper operation of nearby integrated or solid state control circuits. The module consists of an RC circuit and is designed to suppress the coil voltage transients to approximately 200% of peak coil supply voltage. The module is wired across the coil for Type S, Sizes 00–5 and is designed for coil voltages of 120 volts only.

Table 16.306:

Description	Class 9999	
	Type	$ Price
For Sizes 00-2	ST1	62.00
For Sizes 3-5	ST2	62.00



Class 9999 Type ST1 Transient Suppression Module

Table 16.307: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	9999	SM1

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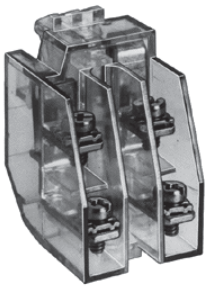
Isolated Alarm Contacts For Melting Alloy Overload Relays



Type SO4

Isolated overload relay alarm contacts are available factory installed or in kit form for field installation in Type S, NEMA Size 00–6▲ starters and Class 9065 Types M and S melting alloy overload relays. Type S, NEMA Size 7, utilizes a solid state overload relay which has isolated alarm contacts as a standard feature. The alarm contacts allow the starter to be used in applications which require isolated contacts, such as inputs to a computer.

Class 9999 Types SO4 and SO5 modules are interchangeable with the standard module (Class 9998 Type SO1) and may be installed on starters already in service. The case is made of clear plastic (polycarbonate) to allow for visual inspection of contacts.

Table 16.308: Contact Unit For Melting Alloy Overload Relays

Magnetic Starter		Parts Kit Description	Class 9999 Type	$ Price
NEMA Size	Type			
00-6▲	SA-SH	N.O. Isolated Alarm Contact Plus Standard N.C. Overload Contact	SO4	**116.00**
		N.C. Isolated Alarm Contact Plus Standard N.C. Overload Contact	SO5	

▲ Isolated alarm contacts **cannot** be added in the field to the Type S Size 5 starter. Current transformers and a Size 1 overload block must be used. For factory installation specify **Form Y342.**

Solid Neutral

The Class 9999 Type SN kit can be used on Class 8903 Type S lighting contactors and other controllers where field addition of a solid neutral is required. Each kit has lugs suitable for both copper and aluminum wire, and mounts with two screws.

Table 16.309:

Number of Lugs	Wire Capacity Per Lug (Cu/Al)	Class 9999	
		Type	$ Price
4	14–2/0	SN1	**134.00**
3	(1) 4–600 MCM or (2) 1/0–250 MCM	SN2	**392.00**
3 (Dual)	(2) 2–600 MCM	SN3	**624.00**
2 (Dual)	(2) 6–350 MCM	SN4	**392.00**

Tie Point Terminal Block

Tie Point Terminal Block

The tie point terminal block provides easy wiring of a Hand-Off-Auto selector switch or Start-Stop push buttons with separate control. The T7 terminal block requires no panel space. It simply snaps on Type S Sizes 00–4 contactors and starters by two tabs and is secured to the left hand coil terminal.

Table 16.310:

Magnetic Contactor or Starter		Class 9999 Type	$ Price
NEMA Size	Type		
00–4	SA-SF	T7	**33.30**

Table 16.311: How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	Class	Type
	9999	SO4

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Mechanical Interlock

Type SM1

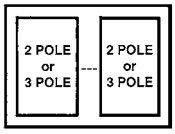
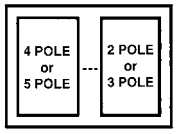
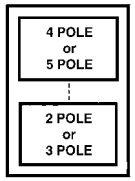
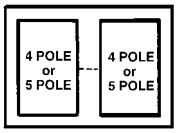
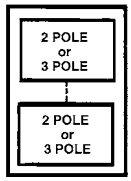
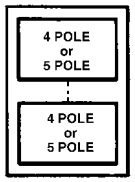
General: Type S contactors or starters can be mechanically interlocked so that only one device is energized at a time. The mechanical interlock is an interference (non-jamming) type, locking at the beginning of the stroke of any starter or contactor.

Type S Sizes 00, 0, 1 and 2—The mechanical interlock is mounted on the underside of the reversing baseplate. Two pins extend from the mechanical interlock through openings in the baseplate and engage the contact carrier of each contactor. Two styles of mechanical interlocks are used: one version for three pole contactors, a different version for four or five pole contactors. **When adding a power pole to the left-hand side of an existing Size 0, 1, or 2 three-pole reversing contactor, a new mechanical interlock must also be installed. When added to the right-hand side only, the power pole will not be mechanically interlocked with the left-hand contactor.**

Type S Sizes 3 and 4—The mechanical interlock is separate from the mounting pan on Sizes 3 and 4. Cams on the mechanical interlocks are operated by the contact carrier of each contactor. The mechanical interlock is attached to the underside of the two contactor baseplates on Sizes 3 and 4.

Table 16.312: Mechanical Interlock for Two Contactors

The following mechanical interlock kits can be used to interlock 2–5 pole contactors. Mechanical interlocks for horizontal and vertical arrangement are listed in Various pole arrangements.

	Contactor NEMA Size	Class 9999 Type	$ Price
 Horizontal Type SM1 for Size 00–1 Type SM6 for Size 2 Type SM12 for Sizes 3 & 4	00, 0, 1	SM1	**116.00**
 Horizontal Type SM2 for Size 0 or 1▲ Type SM7 for Size 2 Type SM12 for Sizes 3 & 4	0, 1	SM2	**116.00**
 Vertical Type SM2 for Size 0 or 1▲ Type SM10 for Size 2 Type SM11 for Size 3 Type SM13 for Size 4	0, 1	SM3	**116.00**
	0, 1	SM4	**116.00**
	0, 1	SM5	**116.00**
 Horizontal Type SM3 for Size 0 or 1 Type SM8 for Size 2 Type SM12 for Sizes 3 & 4	2	SM6	**257.00**
 Vertical Type SM4 for Size 0 or 1 Type SM9 for Size 2 Type SM11 for Size 3 Type SM13 for Size 4	2	SM7	**257.00**
 Vertical Type SM5 for Size 0 or 1 Type SM11 for Size 3 Type SM13 for Size 4	2	SM8	**257.00**
	2	SM9	**257.00**
	2	SM10	**257.00**
	3	SM11	**257.00**
	3, 4	SM12	**257.00**
	4	SM13	**257.00**

▲ The Type SM2 interlock is factory assembled for horizontal mounting, but can easily be converted to vertical mounting. Conversion instructions are included.

Overload Relay Mounting Bracket

Table 16.313: Overload Relay Mounting Bracket

Mechanical interlock Types SM1 through SM10 for Sizes 00-2 devices use overload relay mounting brackets to support the overload relay portion of the starter.

Kit Description	Class 9999 Type	$ Price
Bracket for one overload relay used with horizontal mechanical interlocks, Types SM1 through SM10	SO11	**14.30**
Bracket for two overload relays used with vertical mechanical interlocks, Types SM2, SM4, SM5, SM9 and SM10	SO12	**42.80**

Type SM12

Table 16.314: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number	9999	SM1

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Class 8538 (Series D and newer), Class 8738 (Series E and newer), and Class 8903 (Series C and newer) Type S non-fusible combination starters and lighting contactors (sizes 0–2, 30 to 60 A) can be converted to the fusible type by installing a Class 9422 Fuse Clip Kit. Both fusible and non-fusible combination devices have the same size enclosure in NEMAs 1, 4, and 12 construction, which permits this conversion. The 9422 Fuse Clip Kits contain line and load fuse clips, load base, and fuse pullers.

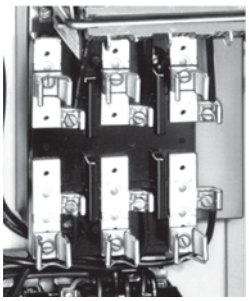
Class 9422 TC33
Fuse Block

Table 16.315: Class 9422 Replacement Fuse Clip Kits

Device Used on	Disconnect Ampere Rating	NEMA Class H, K, J, R Fuses			$ Price	Class R Fuse Clip Kits	$ Price
		Fuse Clip Ratings (A)		Class & Type			
Size or Ampere Rating		250 V Max.	600 V Max.				
0, 1 & 30 A	30	0–30	—	9422TC30▲	**42.80**	RFK03■	**32.60**
0, 1 & 30 A	30	31–60	0–30	9422TC33▲	**71.00**	RFK06■	**34.00**
2 & 60 A	60	31–60	0–30	9422TC33	**71.00**	RFK06■	**36.50**
2 & 60 A	60	—	31–60	9422TD63	**99.00**	RFK06H■	**34.00**

▲ When using with a 9422FTCN or FTCF disconnect switch in 8538 or 8738 combination starters, remove and discard metal base plate.
■ No Class Number required Discount Schedule DE1.

Table 16.316: Class 9999 Replacement Fuse Clip Kits (8538 Pre-Series D, 8738 Pre-Series E)



Class 9999 Type S2
Interchangeable Fuse Clips

Device Used on	Disconnect Ampere Rating	NEMA Class H Fuses				NEMA Class R Fuses				NEMA Class J Fuses		
		Fuse Clip Ratings (A)		Type	$ Price	Fuse Clip Ratings (A)		Type	$ Price	Fuse Clip Ratings (A) 600 V Max.	Type	$ Price
Size or Ampere Rating		250 V Max.	600 V Max.			250 V Max.	600 V Max.					
0, 1 & 30 A	30	0–30 — 31–60	— 0–30 0–30	S1 S2 S2	**35.60** **35.60** **35.60**	0–30 — 31–60	— 0–30 0–30	SR1 SR2 SR2	**35.60** **47.60** **47.60**	— 0–30 0–30	— SJ2 SJ2	— **105.00** **105.00**
2 & 60 A	60	31–60 —	0–30 31–60	S2 S3	**35.60** **50.00**	31–60 —	0–30 31–60	SR2 SR3	**47.60** **64.00**	0–30 31–60	SJ2 SJ3	**105.00** **125.00**
3 & 100 A	100	61–100 101–200	61–100 —	S4★ S5★	**144.00** **270.00**	61–100 101–200	61–100 —	SR4♦ SR4♦	**47.60** **47.60**	61–100 —	SJ4 —	**201.00** —
4 & 200 A	200	101–200	101–200	S5★	**270.00**	101–200	101–200	SR4♦	**47.60**	—	—	—
5 & 300 A	400	—	—	—	—	201–400	201–400	SR5♦	**107.00**	—	—	—
6 & 400, 600 A	600	—	—	—	—	401–600	401–600	SR5♦	**107.00**	—	—	—

♦ Fuse clips are not provided in the Type SR4 and SR5 kits. On new installations Class 9999 Type S fuse clips must also be purchased. Three non-removable pins are supplied and can be installed only in the latest production devices, which have a hole in the lower fuse clips.
★ Cannot be used in Series B or newer 8538 devices.

Table 16.317: Class 9999 Auxiliary Contact Kits for Disconnect Switches and Circuit Breakers

Class 9999 Type TC10

Class	Type	SPDT		DPDT	
		Type	$ Price	Type	$ Price
8538, 8738	SB, SC (Series C)	R45	**71.00**	R46	**207.00**
8539, 8739	SB, SC, SD, SE, SF, SG	R26	**131.00**	R27	**243.00**
8538	SBA, SCA, SBG, SCG (Series K)	TC11	**120.00**	TC21	**239.00**
8738	SBA, SCA, SBG, SCG (Series K)	TC10	**120.00**	TC20	**239.00**
8538	SB▼, SC▼, SD▼ (Series B)	R6	**113.00**	R7	**221.00**
8538	SBAS8, SCAS8, SBGS8, SCGS8, (Series K)	TC10	**120.00**	TC20	**239.00**
8538, 8738	SD (Series C)	R43	**116.00**	R44	**221.00**
8538	SDA, SDA▼, SDG, SDG▼ (Series K)	TC10	**120.00**	TC20	**239.00**
8738	SDA, SDG (Series K)	TC10	**120.00**	TC20	**239.00**
8538, 8738	SE (Series B & C)	R41	**131.00**	R42	**243.00**
8538, 8738	SE, SF (Series A)	R8	**131.00**	R9	**243.00**
8538, 8738	SF (Series B & C)	R39	**135.00**	R40	**243.00**
8538, 8738	SG	R35	**435.00**	R36	**521.00**

▼ Class 8538 type numbers ending in suffix "S8".

Class	Type	SPDT		DPDT	
		Type	$ Price	Type	$ Price
Disconnect Switches					
9422	BTCF, BTCN, BTDF, BTEF, BTEN	TC11	**120.00**	TC21	**239.00**
9422	TCF, TCN, TDF, TDN, TEF, TEN	TC10	**120.00**	TC11	**239.00**
9422	TF	R8	**87.00**	R9	**243.00**
Circuit Breaker Operating Mechanisms					
9421	LF, LK, LL, LM, LN, LP, LR, LT, LW	R47	**131.00**	R48	**221.00**
9422	RM, RN, RP, RQ, RR, RT	R26	**131.00**	R27	**243.00**
9422	CFA, CKA, CLA, CSF, CMP	R26	**131.00**	R27	**243.00**

Table 16.318: How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	Class	Type
	9999	R6

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General

All tables are based on the operation of the motor and controller in the same ambient temperature, 40°C (104°F) or less. Always be certain the correct thermal units are installed in the starter before operating the motor. Each thermal unit shall be installed such that its catalog number is visible. See page 16-120, Figure 1 for complete thermal unit installation instructions. On melting alloy thermal units the ratchet wheel must engage the pawl assembly.

Selection Procedure

1. Determine motor data:
   - a. Full load current rating
   - b. Service factor

   NOTE: *If motor full load current (FLC) is not known, a tentative thermal unit selection could be made, based on horsepower and voltage. Refer to page 16-120.*
2. Motor and controller in *same ambient temperature:*
   - a. All starter classes, except Class 8198:
     1. For 1.15 to 1.25 service factor motors use 100% of motor FLC for thermal unit selection.
     2. For 1.0 service factor motors use 90% of motor FLC for thermal unit selection.
   - b. Class 8198 only:
     1. For 1.0 service factor motors use 100% of motor FLC for thermal unit selection.
     2. For 1.15 to 1.25 service factor motors use 110% of motor FLC for thermal unit selection.
3. Motor and controller in *different ambient temperatures:*
   - a. Multiply motor FLC by the multiplier in Table A. Use the resultant full load current for thermal unit selection.
4. Locate proper selection table from index, pages 16-117 and 16-118.
   - a. The proper thermal unit number will be found adjacent, to the right of the range of full load currents in which the motor FLC or resultant full load current falls.
5. See page 16-119 for calculation of trip current rating.

Slow Trip Thermal Unit Selection

To select Type SB slow trip thermal units, the selection table for a standard Type B thermal unit may be used with the following modifications: For continuous rated motors having service factors of 1.15 to 1.25, select thermal units from the standard Type B table using 93% (102% for Class 8198) of the full load current shown on the motor nameplate and then substitute an SB for the B in the thermal unit type number.

Example: A motor with a full load current of 12 A controlled by an 8536SCG3 would require B22 thermal units for standard trip applications and SB19.5 thermal units for slow trip applications. The SB is selected by multiplying 12 A times 93% for 11.16 A and using this value to select B19.5. Then add the S prefix to arrive at SB19.5.

For continuous rated motors having a service factor of 1.0, select thermal units in the same manner using 84% (93% for Class 8198) of full load current shown on the motor nameplate.

NOTE: *SB thermal units are used on Size 0, 1, 2 and only some Size 3 applications. Check thermal unit tables for current ranges.*

Table A: Selection of Thermal Units for Special Applications

Class of Controller	Continuous Duty Motor Service Factor	Melting Alloy and Non-Compensated Bimetallic Relays			Ambient Temp.-Comp. Relays
		Ambient Temperature of Motor			
		Same as Controller Ambient	Constant 10°C (18°F) Higher Than Controller Ambient	Constant 10° C (18°F) Lower Than Controller Ambient	Constant 40°C (104°F) or less, for Any Controller Ambient
		Full Load Current Multiplier			
All Classes, Except 8198	1.15 to 1.25	1.0	0.9	1.05	1.0
	1.0	0.9	0.8	.95	0.9
Class 8198	1.15 to 1.25	1.1	1.0	1.15	1.1
	1.0	1.0	0.9	1.05	1.0

Table 16.382: Thermal Unit Prices

Melting Alloy			Bimetallic		
Type of Trip	Thermal Unit Type	$ Price	Type of Trip	Thermal Unit Type	$ Price
Standard	A	**21.50**	Standard	AR	**21.50**
	B	**21.50**		AF	**21.50**
	C	**21.50**		AU	**21.50**
	CC	**21.50**		E	**21.50**
	DD	**21.50**			
Quick	FB	**35.60**			
Slow	SB	**57.00**			

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NOTE: *For thermal unit selection tables for other devices including obsolete devices, consult Schneider Electric CCC at (1-888-778-2733).*

Table 16.383: Thermal Unit Selection

Controller					Thermal Unit Selection Table Number				
					Hand Reset Melting Alloy			Bimetallic	
Starter Type	Class	Type	Series▲	Size	Standard Trip (20)	Quick Trip (10)	Slow Trip (30)	Non-Compensated	Compensated
Manual Starters FHP	2510 2512 8908	F	A	FHP	43◊	—	—	—	—
Manual Starters (Small Enclosure)	2510	M, T	A	M–0 M–1 M–1P	1 1 1	72 72 72	▽ ▽ ▽	— — —	— — —
Manual Starters (Large Enclosure)	2510 2511 2512 8925	M, T	A	M–0 M–1 M–1P	2 2 2	73 73 73	▽ ▽ ▽	— — —	— — —
DC Magnetic Starters EC & M Crane Control Product	7135 7136 7735 7736	C, D	—	1, 2	65	—	▽	—	—
		E	—	3	9	—	—	—	—
		F	—	4	10	—	—	—	—
		G	—	5	12	—	—	—	—
AC Magnetic Starters (Small Enclosure)	8536 8904■ (Starter In Own Enclosure)	A (8536 only)	B, C	00	17◊	—	—	—	—
		SA	A, B	00	13	—	▽	—	—
		SB	A	0	13	74	▽	8	33
	8933	SC	A	1	13	74	▽	8	33
			A	1P	41	—	▽	—	—
	8998 8999 (Model 3 Control Center) I-LINE® and QMB Motor Starter Centers	SD	A	2	56	75	▽	62	70
		SE	A	3	18	76☆	134☆▽	63	37□
			B	3	—	—	—	142□	—
		SF	A	4	54	77☆	—	11	29□
			B	4	—	—	—	144□	—
		SG	A	5	49	—	—	38	46
			B✱	5	59	83	—	23	42
		SH	A, B	6	21	—	—	39	47
	8998 8999 (Model 4 Control Center)	SC	A	1 Fusible	66	74	—	64	33
				1 Circuit Breaker	15	74	—		
		SD	A	2 Fusible	67	75	—	57	70
				2 Circuit Breaker	58△	75	—		
		SE	A	3 Small Enclosure	16	76☆	134☆▽	51	37□
				3 Large Enclosure	68△	76☆	133☆▽		
			B	3	—	—	—	141□	—
		SF	A	4	61	77☆	—	35	29△
			B	4	—	—	—	143□	—
		SG	A	5	24	—	—	52	46
		SH	A	6	20	—	—	48	47
	8998 (Model 5 and Model 6 MCCs)	SC◒	A	1	109	—	—	—	97
				1 COMPAC 6	104	—	—	—	—
		SD◒	A	2	110	—	—	—	98
		SE◒	A	3	111	—	—	—	99□
		SF◒	A	4	112	—	—	—	100□
		SG◒	A	5	113	—	—	—	101
			B	5 CT	103	—	—	—	—
		SH◒	A	6	114	—	—	—	102
	8911	DPSG	C	20–30 A	135	—	—	—	—
				40 A	145	—	—	—	—
			A	50 A	146	—	—	—	—

Table continued on the next page; see page 16-118 for Footnotes.

NOTE: *For thermal unit selection tables for other devices including obsolete devices, consult Schneider Electric CCC at (1-888-778-2733).*

Thermal Unit Prices . . . . . .page 16-116.

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Table 16.384: Thermal Unit Selection

Controller					Thermal Unit Selection Table Number				
					Hand Reset Melting Alloy			Bimetallic	
Starter Type	Class	Type	Series▲	Size	Standard Trip (20)	Quick Trip (10)	Slow Trip (30)	Non-Compensated	Compensated
AC Magnetic Starters (Large Enclosure)	8198	G, S	—	—	5	—	▽	—	6
	8536 (Starter Used in Multi-Motor Panel) 8538 8904▼ 8539 8906 8606 8907 8630♦ 8920 8640★ 8922 9089 8924 8647 8925 8650 8930 8736 8941 8738 8739	A (8536 only)	B, C	00	14◊	—	—	—	—
		SA	A, B	00	53	—	▽	55	25
		SB, NB	A	0	15	78	▽	64	33
		SC, NC	A	1	15	78	▽	64	33
		SD, ND	A	2	58	79	▽	57	70
		SE, NE	A	3	16	80☆	133☆▽	51	37□
			B	3	—	—	—	141□	—
		SF, NF	A	4	61	81☆	—	35	29□
			B	4	—	—	—	143□	—
		SG	A	5	24	—	—	52	46
			B✱	5	59	83	—	23	42
		SH	A, B	6	20	—	▽	48	47
	8810 8811 8812	CB, DB, SB, UB	A	0	15	78	▽	64	33
		CC, DC, SC, UC	A	1	15	78	▽	64	33
		CD, DD, SD, UD	A	2	58	79	▽	57	70
		CE, DE, SE, UE	A	3	16	80☆	133☆▽	51	37□
		CF, DF, SF, UF	A	4	61	81☆	—	35	29□
		SE	B	3	—	—	—	141□	—
		SF	B	4	—	—	—	143□	—
		CG, DG, SG, UG	A	5	24	—	—	52	46
			B✱	5	59	83	—	23	42
		CH, DH, SH, UH	A	6	20	—	▽	48	47
	8940 WELL-GUARD™ Control	WC, XC	A	1	13	78	—	—	33
		WD, XD, MD, RD,	A	2	56	79	—	—	70
		WE, XE, ME, RE,	A	3	18	80☆	—	—	37□
		PF, WF, XF, MF, RF,	A	4	54	81☆	—	—	29□
		XSG, NSG, MG,RG, VG◊	A	5	—	—	—	—	46
			B✱	5	—	—	—	—	42
		XSH, VH	A	6	—	—	—	—	47
	8911	DPSO	C	20–30 A	136	—	—	—	—
				40 A	147	—	—	—	—
			A	50 A	148	—	—	—	—
AC Magnetic Part-Winding	8998 (Model 5 and Model 6 MCCs)	SC◒	A	1	127	—	—	—	121
		SD◒	A	2	128	—	—	—	122
		SE◒	A	3	129	—	—	—	123□
		SF	A	4	105	—	—	—	117□
		SG	A	5	115	—	—	—	118
			B✱	5 CT	116	—	—	—	—
Separately Mounted Overload Relays	9065	AF	B	4(133 A)	—	—	—	30	—
		AG	A	5(266 A)	—	—	—	36	—
		AR	A	1(25 A)	—	—	—	32	—
		AT	A	2(45 A)	—	—	—	60	—
		AU	—	3(86 A)	—	—	—	50	—
		DA2	A	1(25 A)	—	—	—	—	140□
		GA2	A	2(60 A)	—	—	—	—	139□
		HA2	A	3(100 A)	—	—	—	—	138□
		JA2	A	4(180 A)	—	—	—	—	137□
		C	A	1(25 A)	44	82	▽	—	—
		F	B	4(133 A)	19	85☆	—	—	—
		G	A	5(266 A)	22	—	—	—	—
		MEO	A	(32 A)	86	—	—	—	—
		S	A	1(26 A)	59	83	▽	23	42
				2(45 A)	69	84	▽	27	71
				3(86 A)	34	—	—	—	—
				4(133 A)	28	—	—	—	—
		T	A	2(45 A)	31	—	▽	—	—
		U	—	3(86 A)	40	—	—	—	—

▲ Series letters listed refer to the marking on the nameplate of the basic open type starter. When the starter is supplied in a controller containing other devices, the controller may have a different series letter marked on the enclosure nameplate.

■ Small enclosure tables apply for **Class 8904** non-combination and non-reversing starters. For combination and reversing **Class 8904** starters refer to the large enclosure selections, index above.

♦ For **Class 8630** starters divide the delta connected motor full load current by 1.73, and use this quotient to select thermal units.

★ For **Class 8640** and **Class 8940** (MD, PD, ME, PE, MF, PF, MG and PG) starters use the full load current of each motor winding as a basis for thermal unit selection—normally one-half total motor current.

▼ Large enclosure tables apply for **Class 8904** combination and reversing starters. For non-combination and non-reversing **Class 8904** starters refer to small enclosure selections, page 16-117.

△ Use for Autotransformer Starters (Fusible and Circuit Breaker).

□ Order Type E thermal units by number from Schneider Electric, Furnas Electric Company, Batavia, Illinois or a Furnas distributor at **$13.50** each, subject to motor control discounts.

◊ Type A thermal units for full load currents lower than those listed in this table are available. For complete information, consult Schneider Electric CCC at (1-888-778-2733).

☆ Form Y81 must be specified to use quick trip (Class 10) or slow trip (Class 30) thermal units on Size 3 starters and quick trip (Class 10) thermal units on Size 4 starters.

▽ This device will accept Type SB slow trip (Class 30) thermal units. For selection, see page 16-116.

◒ Refers to type number of starter in MCC, not actual type number of MCC.

✱ Divide the motor FLC by 60 and use this quotient to select the appropriate thermal units.

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Calculation of Trip Current Rating

Trip Current Rating—Trip current rating is a nominal value which approximates the minimum current to trip an overload relay in an ambient temperature, outside of the enclosure, of 40°C (104°F). In all selection tables except Class 8198, the trip current rating is 1.25 times the minimum full load current shown for the thermal unit selected. For Class 8198, the trip current rating is 1.15 times the minimum full load current. This applies to bimetallic overload relays with the trip adjustment set at 100 percent.

Calculation Procedure

1. Use the selection table for the specific controller involved.
2. Find the minimum motor full load current listed for the thermal unit in question.
3. Multiply that current by 1.25 (1.15 for Class 8198). The result is the trip current rating.

Example 1: Determine the thermal unit selection and trip current rating for thermal units in a Class 8536 Type SCG3 Size 1 magnetic starter used to control a three-phase, 1.15 service factor motor with a full load current of 17.0 Amperes, where the motor and controller are both located in a 40°C (104°F) ambient temperature.

1. From Table 13 the proper selection is B32.
2. The minimum motor full load current is 16. 0 Amperes.
3. Trip current rating is 16.0 x 1.25= 20.0 Amperes.

Protection Level is the relationship between trip current rating and full load current. Protection level, in percent, is the trip current rating divided by the motor full load current times 100. In Example 1 the protection level for the B32 thermal unit is: 20.0/17.0 x 100=118%.

National Electrical Code, Section 430-32, allows a maximum protection level of 125% for the motor in the above example.

Minimum Trip Current (also called ultimate current) may vary from the trip current rating value, since ratings are established under standardized test conditions. Factors which influence variations include: the number of thermal units installed, enclosure size, proximity to heat producing devices, size of conductors installed, ambient (room) temperature, and others.

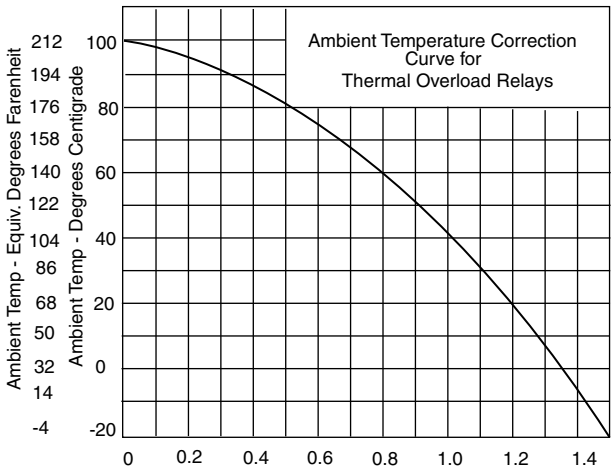
Except for ambient temperature-compensated overload relays, an ambient temperature higher than 40°C would lower the trip current, and a lower temperature would increase it. This variation is not a factor in selecting thermal units for the average application, since most motor ratings are based on an ambient temperature of 40°C, and motor capacity varies with temperature in about the same proportion as the change in trip current. Temperature-compensated relays maintain a nearly constant trip current over a wide range of ambient temperature, and are intended for use where the relay, because of its location, cannot sense changes in the motor ambient temperature.

Calculation of Trip Current For Ambient Temperatures Other Than 40°C

For a controller ambient temperature other than 40°C (104°F) trip current can be calculated by applying a correction factor from the curve in Figure 1. The approximate trip current for a particular ambient temperature is the product of (1) the multiplier M corresponding to the temperature and (2) the 40°C trip current rating.

NOTE: *Ambient temperature is the temperature surrounding the starter enclosure. Normal temperature rise inside the enclosure has been taken into account in preparing the thermal unit selection tables.*

Example 2: Determine the trip current for the motor and controller in Example 1, except the controller is in a 30°C (86°F) ambient temperature. From the curve in Figure 1 the multiplier M is 1.1 at 30°C. Approximate Trip Current is 16.0 x 1.25 x 1.1=22 Amperes



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Approximate Thermal Unit Selection Based On Horsepower and Voltage

General—Thermal units selected using approximate full load currents from the table below will provide a trip current between 101% and 125% of full load current for many 4-pole, single speed, normal torque, 60 Hz motors. Since full load current rating of different makes and types of motors vary so widely, these selections may not be suitable.

Thermal units should be selected on the basis of motor nameplate full load current and service factor. Thermal unit sizes originally selected on an approximate basis should always be rechecked and corrected at the time of installation if required.

Instructions:

1. Locate motor horsepower and voltage.
2. Determine approximate full load current from the table below.
3. Use approximate full load current in place of actual nameplate full load current and follow instructions on page 16-116.

Only Use This Table When Motor Full Load Current Is Not Known

Table 16.385:

Motor Horsepower	Motor Full Load Current					
	Three Ø				Single Ø	
	200 V	230 V	460 V	575 V	115 V	230 V
1/6	—	—	—	—	4.4	2.2
1/4	—	—	—	—	5.8	2.9
1/3	—	—	—	—	7.2	3.6
1/2	2.5	2.2	1.1	0.9	9.8	4.9
3/4	3.7	3.2	1.6	1.3	13.8	6.9
1	4.8	4.2	2.1	1.7	16	8
1-1/2	6.9	6.0	3.0	2.4	20	10
2	7.8	6.8	3.4	2.7	24	12
3	11.0	9.6	4.8	3.9	34	17
5	17.5	15.2	7.6	6.1	56	28
7-1/2	25.3	22	11	9	80	40
10	32.2	28	14	11	—	50
15	48.3	42	21	17	—	—
20	62.1	54	27	22	—	—
25	78.2	68	34	27	—	—
30	92	80	40	32	—	—
40	120	104	52	41	—	—
50	150	130	65	52	—	—
60	177	154	77	62	—	—
75	221	192	96	77	—	—
100	285	248	124	99	—	—
125	359	312	156	125	—	—
150	414	360	180	144	—	—
200	552	480	240	192	—	—

NOTE: *These currents should not be used for selection of fuses, circuit breakers or wire sizes. See NEC tables 430-248 through 430-250. For motors rated 208-220 volts, use 230 V column. For motors rated 440 to 550 volts, use 460 and 575 V columns, respectively.*

Mounting Thermal Units

Figure 1

Always be certain the correct thermal units are installed in the starter before operating the motor. Thermal units should always be mounted so that their type designation can be read from the front of the starter (see Figure 1). Melting alloy thermal units should be mounted so that the tooth of the pawl assembly can engage the teeth of the ratchet wheel when the reset button is pushed.

Mounting surfaces of starter and thermal units should be clean and care should be taken to insure that thermal unit mounting screws are fastened securely.

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Table 1

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.33–0.36	0.29–0.32	B 0.44
0.37–0.40	0.33–0.36	B 0.51
0.41–0.45	0.37–0.39	B 0.57
0.46–0.52	0.40–0.47	B 0.63
0.53–0.59	0.48–0.56	B 0.71
0.60–0.66	0.57–0.63	B 0.81
0.67–0.73	0.64–0.69	B 0.92
0.74–0.81	0.70–0.77	B 1.03
0.82–0.91	0.78–0.86	B 1.16
0.92–1.02	0.87–0.96	B 1.30
1.03–1.14	0.97–1.11	B 1.45
1.15–1.29	1.12–1.23	B 1.67
1.20–1.42	1.24–1.37	B 1.88
1.43–1.64	1.38–1.55	B 2.10
1.65–1.80	1.56–1.75	B 2.40
1.81–2.10	1.76–1.92	B 2.65
2.11–2.30	1.93–2.16	B 3.00
2.31–2.61	2.17–2.50	B 3.30
2.62–2.99	2.51–2.81	B 3.70
3.00–3.37	2.82–3.16	B 4.15
3.38–3.94	3.17–3.40	B 4.85
3.95–4.24	3.41–3.76	B 5.50
4.25–4.54	3.77–4.00	B 6.25
4.55–5.29	4.01–4.68	B 6.90
5.30–5.73	4.69–5.18	B 7.70
5.74–6.35	5.19–5.51	B 8.20
6.36–7.08	5.52–6.19	B 9.10
7.09–7.83	6.20–7.12	B 10.2
7.84–8.47	7.13–8.15	B 11.5
8.48–9.83	8.16–8.60	B 12.8
9.84–10.5	8.61–9.21	B 14.0
10.6–11.4	9.22–10.1	B 15.5
11.5–12.8	10.2–11.2	B 17.5
12.9–13.9	11.3–12.0	B 19.5
14.0–16.1	—	B 22.0
16.2–18.0	—	B 25.0
Following Selections for Size M-1 & M-1P Only.		
—	11.3–12.1	B 19.5
—	12.2–13.6	B 22.0
16.2–17.6	13.7–15.3	B 25.0
17.7–20.6	15.4–17.3	B 28.0
20.7–23.1	17.4–19.1	B 32.0
23.2–26.0	19.2–21.7	B 36.0
—	21.8–24.2	B 40.0
—	24.3–26.0	B 45.0
Following Selections for Size M-1P Only		
23.2–27.1	—	B 36.0
27.2–29.2	—	B 40.0
29.3–33.0	—	B 45.0
33.1–36.0	—	B 50.0

Table 2

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.35–0.38	0.30–0.32	B 0.44
0.39–0.43	0.33–0.37	B 0.51
0.44–0.48	0.38–0.39	B 0.57
0.49–0.56	0.40–0.48	B 0.63
0.57–0.63	0.49–0.57	B 0.71
0.64–0.71	0.58–0.64	B 0.81
0.72–0.78	0.65–0.70	B 0.92
0.79–0.88	0.71–0.78	B 1.03
0.89–0.99	0.79–0.87	B 1.16
1.00–1.15	0.88–0.98	B 1.30
1.16–1.23	0.99–1.13	B 1.45
1.24–1.43	1.14–1.25	B 1.67
1.44–1.51	1.26–1.40	B 1.88
1.52–1.75	1.41–1.58	B 2.10
1.76–1.93	1.59–1.79	B 2.40
1.94–2.25	1.80–1.91	B 2.65
2.26–2.47	1.92–2.20	B 3.00
2.48–2.81	2.21–2.55	B 3.30
2.82–3.20	2.56–2.87	B 3.70
3.21–3.63	2.88–3.24	B 4.15
3.64–4.19	3.25–3.48	B 4.85
4.20–4.53	3.49–3.85	B 5.50
4.54–4.89	3.86–4.10	B 6.25
4.90–5.68	4.11–4.79	B 6.90
5.69–6.27	4.80–5.31	B 7.70
6.28–6.85	5.32–5.65	B 8.20
6.86–7.73	5.66–6.35	B 9.10
7.74–8.50	6.36–7.31	B 10.2
8.51–9.29	7.32–8.34	B 11.5
9.30–10.4	8.35–8.84	B 12.8
10.5–11.3	8.85–9.47	B 14.0
11.4–12.3	9.48–10.4	B 15.5
12.4–13.9	10.5–11.5	B 17.5
14.0–15.0	11.6–12.0	B 19.5
15.1–18.0	—	B 22.0
Following Selections for Size M-1 & M-1P Only.		
—	11.6–12.4	B 19.5
15.1–17.4	12.5–14.0	B 22.0
17.5–19.2	14.1–15.8	B 25.0
19.3–22.0	15.9–17.8	B 28.0
22.1–24.6	17.9–19.7	B 32.0
24.7–26.0	19.8–22.4	B 36.0
—	22.5–25.1	B 40.0
—	25.1–26.0	B 45.0
Following Selections for Size M-1P Only.		
24.7–29.1	—	B 36.0
29.2–31.7	—	B 40.0
31.8–36.0	—	B 45.0

Table 3

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.29–0.31	0.28–0.29	B 0.44
0.32–0.36	0.30–0.33	B 0.51
0.37–0.39	0.34–0.36	B 0.57
0.40–0.47	0.37–0.44	B 0.63
0.48–0.56	0.45–0.52	B 0.71
0.57–0.63	0.53–0.59	B 0.81
0.64–0.69	0.60–0.64	B 0.92
0.70–0.77	0.65–0.71	B 1.03
0.78–0.86	0.72–0.80	B 1.16
0.87–0.97	0.81–0.90	B 1.30
0.98–1.12	0.91–1.03	B 1.45
1.13–1.24	1.04–1.14	B 1.67
1.25–1.39	1.15–1.27	B 1.88
1.40–1.57	1.28–1.44	B 2.10
1.58–1.78	1.45–1.63	B 2.40
1.79–1.96	1.64–1.79	B 2.65
1.97–2.20	1.80–2.01	B 3.00
2.21–2.41	2.02–2.19	B 3.30
2.42–2.75	2.20–2.52	B 3.70
2.76–3.25	2.53–2.95	B 4.15
3.26–3.50	2.96–3.17	B 4.85
3.51–3.87	3.18–3.50	B 5.50
3.88–4.13	3.51–3.73	B 6.25
4.14–4.69	3.74–4.22	B 6.90
4.70–5.20	4.23–4.68	B 7.70
5.21–5.53	4.69–4.98	B 8.20
5.54–6.23	4.99–5.59	B 9.10
6.24–7.18	5.60–6.43	B 10.2
7.19–8.20	6.44–7.41	B 11.5
8.21–8.98	7.42–8.02	B 12.8
8.99–9.63	8.03–8.59	B 14.0
9.64–10.6	8.60–9.52	B 15.5
10.7–11.8	9.53–10.5	B 17.5
11.9–12.7	10.6–11.2	B 19.5
12.8–14.3	11.3–12.0	B 22.0
14.4–16.1	—	B 25.0
16.2–18.0	—	B 28.0
Following Selections for Size M-1 & M-1P Only.		
—	11.3–12.7	B 22.0
—	12.8–14.3	B 25.0
16.2–18.3	14.4–16.1	B 28.0
18.4–20.2	16.2–17.8	B 32.0
20.3–23.0	17.9–20.1	B 36.0
23.1–26.0	20.2–22.6	B 40.0
—	22.7–25.5	B 45.0
—	25.6–26.0	B 50.0
Following Selections for Size M-1P Only		
25.9–29.0	—	B 45.0
29.1–30.8	—	B 50.0
30.9–32.7	—	B 56.0
32.8–36.0	—	B 62.0

Table 4

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
0.32–0.33	0.29–0.30	B 0.44
0.34–0.38	0.31–0.35	B 0.51
0.39–0.41	0.36–0.37	B 0.57
0.42–0.50	0.38–0.45	B 0.63
0.51–0.61	0.46–0.54	B 0.71
0.62–0.68	0.55–0.61	B 0.81
0.69–0.74	0.62–0.66	B 0.92
0.75–0.83	0.67–0.74	B 1.03
0.84–0.93	0.75–0.83	B 1.16
0.94–1.05	0.84–0.93	B 1.30
1.06–1.21	0.94–1.07	B 1.45
1.22–1.34	1.08–1.19	B 1.67
1.35–1.50	1.20–1.33	B 1.88
1.51–1.70	1.34–1.51	B 2.10
1.71–1.93	1.52–1.70	B 2.40
1.94–2.12	1.71–1.87	B 2.65
2.13–2.38	1.88–2.10	B 3.00
2.39–2.61	2.11–2.29	B 3.30
2.62–2.99	2.30–2.63	B 3.70
3.00–3.53	2.64–3.09	B 4.15
3.54–3.80	3.10–3.32	B 4.85
3.81–4.21	3.33–3.67	B 5.50
4.22–4.49	3.68–3.91	B 6.25
4.50–5.10	3.92–4.43	B 6.90
5.11–5.66	4.44–4.91	B 7.70
5.67–6.03	4.92–5.23	B 8.20
6.04–6.79	5.24–5.88	B 9.10
6.80–7.84	5.89–6.77	B 10.2
7.85–8.96	6.78–7.90	B 11.5
8.97–9.82	7.91–8.44	B 12.8
9.83–10.4	8.45–9.05	B 14.0
10.5–11.6	9.06–9.99	B 15.5
11.7–12.9	10.0–11.0	B 17.5
13.0–13.9	11.1–11.9	B 19.5
14.0–15.7	12.0–12.0	B 22.0
15.8–18.0	—	B 25.0
Following Selections for Size M-1 & M-1P Only.		
—	12.0–13.4	B 22.0
—	13.5–15.1	B 25.0
17.8–20.1	15.2–17.0	B 28.0
20.2–22.2	17.1–18.9	B 32.0
22.3–25.3	19.0–21.4	B 36.0
25.4–26.0	21.5–24.0	B 40.0
—	24.1–26.0	B 45.0
Following Selections for Size M-1P Only.		
25.4–28.4	—	B 40.0
28.5–33.1	—	B 45.0
33.2–36.0	—	B 50.0

Table 5

Current Transformer Ratio										Thermal Unit Number
25/5	50/5	75/5	100/5	150/5	200/5	250/5	300/5	400/5	500/5	
Motor FLC										
10.6–11.7	21.1–23.6	31.7–35.4	42.3–47.2	63.4–70.9	84.5–94.6	106.–117.	127.–141.	169.–188.	211.–236.	B 3.00
11.8–13.2	23.7–26.5	35.5–39.8	47.3–53.1	71.0–79.7	94.7–105.	118.–132.	142.–159.	189.–212.	237.–265.	B 3.30
13.3–14.8	26.6–29.6	39.9–44.5	53.2–59.4	79.8–89.1	106.–118.	133.–148.	160.–177.	213.–237.	266.–296.	B 3.70
14.9–17.2	29.7–34.5	44.6–51.8	59.5–69.2	89.2–103.	119.–138.	149.–172.	178.–207.	238.–276.	297.–345.	B 4.15
17.3–19.6	34.6–39.2	51.9–58.9	69.3–78.6	104.–117.	139.–156.	173.–196.	208.–235.	277.–314.	346.–360.	B 4.85
19.7–22.3	39.3–44.6	59.0–67.0	78.7–89.3	118.–133.	157.–178.	197.–223.	236.–267.	315.–357.	—	B 5.50

Table 6

Current Transformer Ratio										Thermal Unit Number
25/5	50/5	75/5	100/5	150/5	200/5	250/5	300/5	400/5	500/5	
Motor FLC										
10.6–11.9	21.2–23.9	31.8–35.9	42.4–47.9	63.6–72.0	84.8–96.0	106.–119.	127.–143.	170.–191.	212.–239.	AR 3.62
12.0–13.4	24.0–26.9	36.0–40.3	48.0–53.8	72.1–80.8	96.1–107.	120.–134.	144.–161.	192.–215.	240.–269.	AR 3.98
13.5–15.0	27.0–30.0	40.4–45.1	53.9–60.1	80.9–90.2	108.–119.	135.–150.	162.–180.	216.–240.	270.–300.	AR 4.37
15.1–16.6	30.1–33.4	45.2–50.1	60.2–66.9	90.3–99.9	120.–133.	151.–166.	181.–200.	241.–267.	301.–334.	AR 4.80
16.7–18.7	33.5–37.5	50.2–56.3	67.0–75.1	100.–112.	134.–149.	167.–187.	201.–225.	268.–300.	335.–360.	AR 5.3
18.8–20.7	37.6–41.4	56.4–62.2	75.2–82.9	113.–124.	150.–165.	188.–207.	226.–248.	301.–331.	—	AR 5.8
20.8–22.8	41.5–45.7	62.3–68.5	83.0–91.4	125.–136.	166.–182.	208.–228.	249.–274.	332.–365.	—	AR 6.4

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Table 8

Motor FLC (A)			Thermal Unit Number
2.T.U.1Ø	2 T.U.2Ø	3 T.U.	
0.37–0.39	0.37–0.39	0.30–0.31	AR .45
0.40–0.42	0.40–0.42	0.32–0.34	AR .49
0.43–0.46	0.43–0.46	0.35–0.37	AR .54
0.47–0.50	0.47–0.50	0.38–0.41	AR .59
0.51–0.54	0.51–0.54	0.42–0.45	AR .65
0.55–0.59	0.55–0.59	0.46–0.49	AR .71
0.60–0.65	0.60–0.65	0.50–0.54	AR .78
0.66–0.71	0.66–0.71	0.55–0.56	AR .86
0.72–0.78	0.72–0.78	0.57–0.62	AR .95
0.79–0.86	0.79–0.86	0.63–0.68	AR 1.05
0.87–0.94	0.87–0.94	0.69–0.75	AR 1.15
0.95–1.04	0.95–1.04	0.76–0.82	AR 1.26
1.05–1.14	1.05–1.14	0.83–0.91	AR 1.39
1.15–1.25	1.15–1.25	0.92–1.00	AR 1.53
1.26–1.42	1.26–1.42	1.01–1.18	AR 1.68
1.43–1.62	1.43–1.62	1.19–1.30	AR 1.85
1.63–1.75	1.63–1.75	1.31–1.41	AR 2.04
1.76–1.91	1.76–1.91	1.42–1.53	AR 2.24
1.92–2.07	1.92–2.07	1.54–1.69	AR 2.46
2.08–2.25	2.08–2.25	1.70–1.79	AR 2.71
2.26–2.47	2.26–2.47	1.80–2.02	AR 2.98
2.48–2.73	2.48–2.73	2.03–2.19	AR 3.28
2.74–2.99	2.74–2.99	2.20–2.43	AR 3.62
3.00–3.31	3.00–3.31	2.44–2.81	AR 3.98
3.32–3.71	3.32–3.71	2.82–3.12	AR 4.37
3.72–4.15	3.72–4.15	3.13–3.47	AR 4.80
4.16–4.65	4.16–4.65	3.48–3.89	AR 5.3
4.66–5.11	4.66–5.11	3.90–4.30	AR 5.8
5.12–5.68	5.12–5.68	4.31–4.69	AR 6.4
5.69–6.24	5.69–6.24	4.70–5.19	AR 7.0
6.25–7.15	6.25–7.15	5.20–5.93	AR 7.7
7.16–7.84	7.16–7.84	5.94–6.45	AR 8.5
7.85–8.56	7.85–8.56	6.46–7.08	AR 9.3
8.57–9.40	8.57–9.40	7.09–7.71	AR 10.2
9.41–10.2	9.41–10.2	7.72–8.39	AR 11.2
10.3–10.7	10.3–10.7	8.40–8.64	AR 12.4
10.8–12.2	10.8–12.2	8.65–9.74	AR 13.6
12.3–14.1	—	9.75–11.0	AR 15.4
14.2–15.9	—	11.1–12.0	AR 17.6
16.0–18.0	—	—	AR 20.5
Following Selections for Size 1 Only			
—	10.8–12.2	—	AR 13.6
—	12.3–14.1	—	AR 15.4
—	14.2–15.9	11.1–12.4	AR 17.6
16.0–18.1	16.0–18.1	12.5–13.9	AR 20.5
18.2–20.8	18.2–20.8	14.0–15.9	AR 23.0
20.9–23.6	20.9–23.6	16.0–17.7	AR 27.0
23.7–26.0	23.7–26.0	17.8–20.3	AR 30.0
—	—	20.4–22.8	AR 35.0
—	—	22.9–26.0	AR 40.0

Table 9

Motor FLC (A)	Thermal Unit Number
15.3–16.7	C 20.0
16.8–19.8	C 22.0
19.9–22.8	C 26.0
22.9–25.8	C 30.0
25.9–30.4	C 34.0
30.5–31.9	C 40.0
32.0–34.2	C 42.0
34.3–38.8	C 45.0
38.9–44.2	C 51.0
44.3–50.2	C 58.0
50.3–57.1	C 66.0
57.2–63.2	C 75.0
63.3–68.6	C 83.0
68.7–78.6	C 90.0
78.7–86.9	C 103.0
87.0–100.0	C 114.0

Table 10

Motor FLC (A)	Thermal Unit Number
43.6–47.3	CC 54.5
47.4–51.3	CC 59.4
51.4–54.6	CC 64.3
54.7–59.7	CC 68.5
59.8–65.1	CC 74.6
65.2–70.1	CC 81.5
70.2–75.1	CC 87.7
75.2–82.2	CC 94.0
82.3–89.2	CC 103.0
89.3–96.5	CC 112.0
96.6–104.	CC 121.0
105.–113.	CC 132.0
114.–123.	CC 143.0
124.–132.	CC 156.0
133.–150.	CC 167.0

Table 11

Motor FLC (A)		Thermal Unit Number
2 T.U.	3 T.U.	
33.0–36.1	30.5–33.4	AU 44.0
36.2–40.2	33.5–37.1	AU 50.0
40.3–44.5	37.2–42.0	AU 56.0
45.6–51.3	42.1–47.0	AU 64.0
51.4–58.5	47.1–53.5	AU 72.0
58.6–62.6	53.6–57.5	AU 81.0
62.7–71.3	57.6–64.4	AU 88.0
71.4–77.1	64.5–69.4	AU 99.0
77.2–86.9	69.5–77.4	AU 110.0
87.0–93.3	77.5–83.6	AU 123.0
93.4–102.	83.7–92.9	AU 135.0
103.–107.	93.0–100.	AU 152.0
108.–112.	101.–104.	AU 169.0
113.–121.	105.–115.	AU 183.0
122.–123.	116.–119.	AU 198.0
124.–133.	120.–123.	AU 217.0
———	124.–133.	AU 235.0

Table 12

Motor FLC (A)	Thermal Unit Number
92.–100.	DD 112.0
101.–109.	DD 121.0
110.–119.	DD 128.0
120.–131.	DD 140.0
132.–139.	DD 150.0
140.–156.	DD 160.0
157.–166.	DD 185.0
167.–180.	DD 213.0
181.–189.	DD 220.0
190.–209.	DD 230.0
210.–225.	DD 250.0
226.–238.	DD 265.0
239.–263.	DD 280.0
264.–300.	DD 300.0

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Table 13

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.29–0.31	0.29–0.31	0.28–0.30	B 0.44
0.32–0.34	0.32–0.34	0.31–0.34	B 0.51
0.35–0.38	0.35–0.38	0.35–0.37	B 0.57
0.39–0.45	0.39–0.45	0.38–0.44	B 0.63
0.46–0.54	0.46–0.54	0.45–0.53	B 0.71
0.55–0.61	0.55–0.61	0.54–0.59	B 0.81
0.62–0.66	0.62–0.66	0.60–0.64	B 0.92
0.67–0.73	0.67–0.73	0.65–0.72	B 1.03
0.74–0.81	0.74–0.81	0.73–0.80	B 1.16
0.82–0.94	0.82–0.94	0.81–0.90	B 1.30
0.95–1.05	0.95–1.05	0.91–1.03	B 1.45
1.06–1.22	1.06–1.22	1.04–1.14	B 1.67
1.23–1.34	1.23–1.34	1.15–1.27	B 1.88
1.35–1.51	1.35–1.51	1.28–1.43	B 2.10
1.52–1.71	1.52–1.71	1.44–1.62	B 2.40
1.72–1.93	1.72–1.93	1.63–1.77	B 2.65
1.94–2.14	1.94–2.14	1.78–1.97	B 3.00
2.15–2.40	2.15–2.40	1.98–2.32	B 3.30
2.41–2.72	2.41–2.72	2.33–2.51	B 3.70
2.73–3.15	2.73–3.15	2.52–2.99	B 4.15
3.16–3.55	3.16–3.55	3.00–3.42	B 4.85
3.56–4.00	3.56–4.00	3.43–3.75	B 5.50
4.01–4.40	4.01–4.40	3.76–3.98	B 6.25
4.41–4.88	4.41–4.88	3.99–4.48	B 6.90
4.89–5.19	4.89–5.19	4.49–4.93	B 7.70
5.20–5.73	5.20–5.73	4.94–5.21	B 8.20
5.74–6.39	5.74–6.39	5.22–5.84	B 9.10
6.40–7.13	6.40–7.13	5.85–6.67	B 10.2
7.14–7.90	7.14–7.90	6.68–7.54	B 11.5
7.91–8.55	7.91–8.55	7.55–8.14	B 12.8
8.56–9.53	8.56–9.53	8.15–8.72	B 14.0
9.54–10.6	9.54–10.6	8.73–9.66	B 15.5
10.7–11.8	10.7–11.8	9.67–10.5	B 17.5
11.9–13.2	11.9–12.0	10.6–11.3	B 19.5
13.3–14.9	—	11.4–12.0	B 22.0
15.0–16.6	—	—	B 25.0
16.7–18.0	—	—	B 28.0
Following Selections for Size 1 Only			
—	11.9–13.2	—	B 19.5
—	13.3–14.9	11.4–12.7	B 22.0
—	15.0–16.6	12.8–14.1	B 25.0
16.7–18.9	16.7–18.9	14.2–15.9	B 28.0
19.0–21.2	19.0–21.2	16.0–17.5	B 32.0
21.3–23.0	21.3–23.0	17.6–19.7	B 36.0
23.1–25.5	23.1–25.5	19.8–21.9	B 40.0
25.6–26.0	25.6–26.0	22.0–24.4	B 45.0
—	—	24.5–26.0	B 50.0

Table 14

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.43–0.47	0.41–0.45	0.40–0.41	A .49
0.48–0.51	0.46–0.50	0.42–0.46	A .54
0.52–0.56	0.51–0.55	0.47–0.51	A .59
0.57–0.64	0.56–0.62	0.52–0.57	A .65
0.65–0.69	0.63–0.67	0.58–0.62	A .71
0.70–0.76	0.68–0.72	0.63–0.67	A .78
0.77–0.84	0.73–0.81	0.68–0.75	A .86
0.85–0.91	0.82–0.88	0.76–0.80	A .95
0.92–1.01	0.89–0.97	0.81–0.89	A 1.02
1.02–1.15	0.98–1.08	0.90–1.02	A 1.16
1.16–1.23	1.09–1.18	1.03–1.09	A 1.25
1.24–1.37	1.19–1.32	1.10–1.21	A 1.39
1.38–1.45	1.33–1.40	1.22–1.29	A 1.54
1.46–1.56	1.41–1.48	1.30–1.37	A 1.63
1.57–1.67	1.49–1.60	1.38–1.48	A 1.75
1.68–1.77	1.61–1.72	1.49–1.58	A 1.86
1.78–1.92	1.73–1.84	1.59–1.72	A 1.99
1.93–2.09	1.85–2.00	1.73–1.85	A 2.15
2.10–2.31	2.01–2.22	1.86–2.05	A 2.31
2.32–2.56	2.23–2.45	2.06–2.29	A 2.57
2.57–2.92	2.46–2.82	2.30–2.62	A 2.81
2.93–3.16	2.83–3.08	2.63–2.84	A 3.61
3.17–3.48	3.09–3.39	2.85–3.10	A 3.95
3.49–3.83	3.40–3.75	3.11–3.46	A 4.32
3.84–4.24	3.76–4.16	3.47–3.85	A 4.79
4.25–4.62	4.17–4.51	3.86–4.16	A 5.30
4.63–4.92	4.52–4.83	4.17–4.46	A 5.78
4.93–5.61	4.84–5.49	4.47–5.08	A 6.20
5.62–5.85	5.50–5.67	5.09–5.35	A 6.99
5.86–6.36	5.68–6.16	5.36–5.82	A 7.65
6.37–6.99	6.17–6.75	5.83–6.34	A 8.38
7.00–7.67	6.76–7.00	6.35–6.95	A 9.25
7.68–8.15	—	6.96–7.00	A 9.85
8.16–9.00	—	—	A 11.0

Table 15

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.31–0.33	0.31–0.33	0.29–0.31	B 0.44
0.34–0.36	0.34–0.36	0.32–0.36	B 0.51
0.37–0.40	0.37–0.40	0.37–0.38	B 0.57
0.41–0.48	0.41–0.48	0.39–0.46	B 0.63
0.49–0.57	0.49–0.57	0.47–0.55	B 0.71
0.58–0.64	0.58–0.64	0.56–0.61	B 0.81
0.65–0.70	0.65–0.70	0.62–0.66	B 0.92
0.71–0.77	0.71–0.77	0.67–0.75	B 1.03
0.78–0.85	0.78–0.85	0.76–0.83	B 1.16
0.86–0.99	0.86–0.99	0.84–0.93	B 1.30
1.00–1.10	1.00–1.10	0.94–1.06	B 1.45
1.11–1.28	1.11–1.28	1.07–1.18	B 1.67
1.29–1.41	1.29–1.41	1.19–1.31	B 1.88
1.42–1.58	1.42–1.58	1.32–1.47	B 2.10
1.59–1.80	1.59–1.80	1.48–1.67	B 2.40
1.81–2.03	1.81–2.03	1.68–1.83	B 2.65
2.04–2.25	2.04–2.25	1.84–2.04	B 3.00
2.26–2.51	2.26–2.51	2.05–2.38	B 3.30
2.52–2.83	2.52–2.83	2.39–2.60	B 3.70
2.84–3.29	2.84–3.29	2.61–3.13	B 4.15
3.30–3.75	3.30–3.75	3.14–3.59	B 4.85
3.76–4.22	3.76–4.22	3.60–3.94	B 5.50
4.23–4.65	4.23–4.65	3.95–4.19	B 6.25
4.66–5.16	4.66–5.16	4.20–4.72	B 6.90
5.17–5.53	5.17–5.53	4.73–5.21	B 7.70
5.54–6.09	5.54–6.09	5.22–5.51	B 8.20
6.10–6.80	6.10–6.80	5.52–6.17	B 9.10
6.81–7.60	6.81–7.60	6.18–7.07	B 10.2
7.61–8.35	7.61–8.35	7.08–8.05	B 11.5
8.36–9.04	8.36–9.04	8.06–8.69	B 12.8
9.05–9.99	9.05–9.99	8.70–9.32	B 14.0
10.0–11.1	10.0–11.1	9.33–10.2	B 15.5
11.2–12.3	11.2–12.0	10.3–11.3	B 17.5
12.4–13.7	—	11.4–12.0	B 19.5
13.8–15.4	—	—	B 22.0
15.5–18.0	—	—	B 25.0
Following Selections for Size 1 Only			
—	11.2–12.3	—	B 17.5
—	12.4–13.7	11.4–12.1	B 19.5
—	13.8–15.4	12.2–13.7	B 22.0
15.5–17.2	15.5–17.2	13.8–15.2	B 25.0
17.3–19.4	17.3–19.4	15.3–17.2	B 28.0
19.5–21.7	19.5–21.7	17.3–18.9	B 32.0
21.8–23.9	21.8–23.9	19.0–21.4	B 36.0
24.0–26.0	24.0–26.0	21.5–23.7	B 40.0
—	—	23.8–26.0	B 45.0

Table 16

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
16.2–17.5	15.1–16.2	14.3–15.4	CC 20.9
17.6–18.8	16.3–17.3	15.5–16.4	CC 22.8
18.9–20.5	17.4–19.5	16.5–18.5	CC 24.6
20.6–22.2	19.6–20.7	18.6–19.6	CC 26.3
22.3–23.7	20.8–22.3	19.7–21.1	CC 28.8
23.8–25.4	22.4–24.0	21.2–22.7	CC 31.0
25.5–27.3	24.1–25.7	22.8–24.4	CC 33.3
27.4–29.3	25.8–27.5	24.5–26.1	CC 36.4
29.4–31.5	27.6–29.6	26.2–28.1	CC 39.6
31.6–33.9	29.7–31.7	28.2–30.0	CC 42.7
34.0–36.2	31.8–33.9	30.1–32.1	CC 46.6
36.3–39.3	34.0–36.6	32.2–34.7	CC 50.1
39.4–42.3	36.7–39.3	34.8–37.3	CC 54.5
42.4–45.3	39.4–42.3	37.4–40.1	CC 59.4
45.4–48.3	42.4–44.9	40.2–42.6	CC 64.3
48.4–52.0	45.0–48.3	42.7–45.8	CC 68.5
52.1–54.9	48.4–50.9	45.9–48.3	CC 74.6
55.0–59.7	51.0–55.5	48.4–52.6	CC 81.5
59.8–65.4	55.6–59.9	52.7–56.8	CC 87.7
65.5–69.6	60.0–64.2	56.9–60.9	CC 94.0
69.7–74.8	64.3–68.7	61.0–65.1	CC 103.0
74.9–79.7	68.8–71.4	65.2–67.7	CC 112.0
79.8–83.1	71.5–74.8	67.8–70.9	CC 121.0
83.2–86.0	74.9–78.0	71.0–73.9	CC 132.0
—	78.1–80.7	74.0–76.5	CC 143.0
—	80.8–86.0	76.6–80.2	CC 156.0
—	—	80.3–83.1	CC 167.0
—	—	83.2–86.0	CC 180.0

Table 17

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
0.42–0.46	0.39–0.43	0.38–0.40	A .49
0.47–0.50	0.44–0.47	0.41–0.44	A .54
0.51–0.55	0.48–0.52	0.45–0.49	A .59
0.56–0.62	0.53–0.58	0.50–0.55	A .65
0.63–0.67	0.59–0.64	0.56–0.60	A .71
0.68–0.73	0.65–0.68	0.61–0.65	A .78
0.74–0.81	0.69–0.77	0.66–0.72	A .86
0.82–0.89	0.78–0.84	0.73–0.79	A .95
0.90–0.98	0.85–0.93	0.80–0.88	A 1.02
0.99–1.12	0.94–1.05	0.89–0.98	A 1.16
1.13–1.20	1.06–1.13	0.99–1.07	A 1.25
1.21–1.34	1.14–1.25	1.08–1.17	A 1.39
1.35–1.41	1.26–1.33	1.18–1.25	A 1.54
1.42–1.51	1.34–1.42	1.26–1.33	A 1.63
1.52–1.62	1.43–1.52	1.34–1.44	A 1.75
1.63–1.73	1.53–1.63	1.45–1.53	A 1.86
1.74–1.86	1.64–1.75	1.54–1.65	A 1.99
1.87–2.02	1.76–1.90	1.66–1.79	A 2.15
2.03–2.25	1.91–2.13	1.80–1.99	A 2.31
2.26–2.46	2.14–2.33	2.00–2.18	A 2.57
2.47–2.77	2.34–2.73	2.19–2.45	A 2.81
2.78–2.99	2.74–2.86	2.46–2.65	A 3.61
3.00–3.26	2.87–3.14	2.66–2.90	A 3.95
3.27–3.59	3.15–3.47	2.91–3.19	A 4.32
3.60–3.99	3.48–3.83	3.20–3.56	A 4.79
4.00–4.42	3.84–4.16	3.57–3.83	A 5.30
4.43–4.61	4.17–4.43	3.84–4.08	A 5.78
4.62–5.23	4.44–5.00	4.09–4.64	A 6.20
5.24–5.39	5.01–5.16	4.65–5.00	A 6.99
5.40–5.88	5.17–5.56	5.01–5.36	A 7.65
5.89–6.56	5.57–6.22	5.37–5.87	A 8.38
6.57–7.18	6.23–6.89	5.88–6.43	A 9.25
7.19–7.80	6.90–7.00	6.44–6.79	A 9.85
7.81–9.00	—	6.80–7.00	A 11.0

Table 18

Motor FLC (A)			Thermal Unit Number
1.T.U.	2 T.U.	3 T.U.	
15.5–16.4	14.4–15.3	13.6–14.5	CC 20.9
16.5–17.6	15.4–16.4	14.6–15.5	CC 22.8
17.7–19.1	16.5–18.4	15.6–17.4	CC 24.6
19.2–20.4	18.5–19.6	17.5–18.5	CC 26.3
20.5–22.1	19.7–21.0	18.6–19.9	CC 28.8
22.2–23.4	21.1–22.7	20.0–21.5	CC 31.0
23.5–25.6	22.8–24.2	21.6–22.9	CC 33.3
25.7–27.3	24.3–25.9	23.0–24.5	CC 36.4
27.4–29.4	26.0–27.8	24.6–26.3	CC 39.6
29.5–31.5	27.9–29.8	26.4–28.2	CC 42.7
31.6–33.7	29.9–31.7	28.3–30.0	CC 46.6
33.8–36.5	31.8–34.2	30.1–32.3	CC 50.1
36.6–39.1	34.3–36.9	32.4–34.9	CC 54.5
39.2–41.7	37.0–39.8	35.0–37.6	CC 59.4
41.8–44.8	39.9–42.3	37.7–40.0	CC 64.3
44.9–48.0	42.4–45.3	40.1–42.8	CC 68.5
48.1–50.7	45.4–47.9	42.9–45.3	CC 74.6
50.8–54.9	48.0–51.9	45.4–49.1	CC 81.5
55.0–59.9	52.0–56.5	49.2–53.4	CC 87.7
60.0–63.3	56.6–60.7	53.5–57.4	CC 94.0
63.4–67.2	60.8–64.8	57.5–61.3	CC 103.0
67.3–72.4	64.9–67.1	61.4–63.5	CC 112.0
72.5–74.9	67.2–70.1	63.6–66.3	CC 121.0
75.0–77.4	70.2–72.9	66.4–69.0	CC 132.0
77.5–80.7	73.0–74.9	69.1–70.9	CC 143.0
80.8–83.1	75.0–77.9	71.0–73.7	CC 156.0
83.2–86.0	78.0–80.9	73.8–76.5	CC 167.0
—	81.0–82.9	76.6–78.4	CC 180.0
—	83.0–86.0	78.5–86.0	CC 196.0

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Table 19

Motor FLC (A)	Thermal Unit Number
43.6–47.3	CC 54.5
47.4–51.3	CC 59.4
51.4–54.6	CC 64.3
54.7–59.7	CC 68.5
59.8–65.1	CC 74.6
65.2–70.1	CC 81.5
70.2–75.1	CC 87.7
75.2–82.2	CC 94.0
82.3–89.2	CC 103.0
89.3–96.5	CC 112.0
96.6–104.	CC 121.0
105.–113.	CC 132.0
114.–123.	CC 143.0
124.–133.	CC 156.0

Table 20

Motor FLC (A)	Thermal Unit Number
133.–148.	B 1.30
149.–174.	B 1.45
175.–195.	B 1.67
196.–219.	B 1.88
220.–239.	B 2.10
240.–271.	B 2.40
272.–308.	B 2.65
309.–348.	B 3.00
349.–397.	B 3.30
398.–429.	B 3.70
430.–495.	B 4.15
496.–520.	B 4.85

Table 21

Motor FLC (A)	Thermal Unit Load
128.–140.	B 1.30
141.–163.	B 1.45
164.–179.	B 1.67
180.–201.	B 1.88
202.–227.	B 2.10
228.–251.	B 2.40
252.–278.	B 2.65
279.–308.	B 3.00
309.–346.	B 3.30
347.–380.	B 3.70
381.–426.	B 4.15
427.–454.	B 4.85
455.–489.	B 5.50
490.–520.	B 6.25

Table 22

Motor FLC (A)	Thermal Unit Number
92.0–100.	DD 112.0
101.–109.	DD 121.0
110.–119.	DD 128.0
120.–131.	DD 140.0
132.–139.	DD 150.0
140.–156.	DD 160.0
157.–166.	DD 185.0
167.–180.	DD 213.0
181.–189.	DD 220.0
190.–209.	DD 230.0
210.–225.	DD 250.0
226.–238.	DD 265.0
239.–266.	DD 280.0

Table 23

Motor FLC (A) 2 or 3 T.U.		Thermal Unit Number
Large Enclosure	Small Enclosure	
0.31–0.32	0.29–0.30	AR .45
0.33–0.36	0.31–0.33	AR .49
0.37–0.39	0.34–0.37	AR .54
0.40–0.43	0.38–0.41	AR .59
0.44–0.47	0.42–0.45	AR .65
0.48–0.52	0.46–0.50	AR .71
0.53–0.58	0.51–0.55	AR .78
0.59–0.60	0.56–0.57	AR .86
0.61–0.62	0.58–0.60	AR .95
0.63–0.69	0.61–0.66	AR 1.05
0.70–0.76	0.67–0.73	AR 1.15
0.77–0.84	0.74–0.81	AR 1.26
0.85–0.93	0.82–0.90	AR 1.39
0.94–1.03	0.91–0.99	AR 1.53
1.04–1.23	1.00–1.18	AR 1.68
1.24–1.35	1.19–1.30	AR 1.85
1.36–1.47	1.31–1.42	AR 2.04
1.48–1.61	1.43–1.49	AR 2.24
1.62–1.76	1.50–1.69	AR 2.46
1.77–1.93	1.70–1.85	AR 2.71
1.94–2.12	1.86–2.03	AR 2.98
2.13–2.35	2.04–2.25	AR 3.28
2.36–2.61	2.26–2.50	AR 3.62
2.62–2.79	2.51–2.68	AR 3.98
2.80–3.14	2.69–3.01	AR 4.37
3.15–3.48	3.02–3.35	AR 4.80
3.49–3.89	3.36–3.74	AR 5.3
3.90–4.30	3.75–4.14	AR 5.8
4.31–4.73	4.15–4.57	AR 6.4
4.74–5.20	4.58–5.03	AR 7.0
5.21–5.95	5.04–5.76	AR 7.7
5.96–6.49	5.77–6.29	AR 8.5
6.50–7.08	6.30–6.87	AR 9.3
7.09–7.77	6.88–7.54	AR 10.2
7.78–8.48	7.55–8.25	AR 11.2
8.49–9.15	8.26–8.60	AR 12.4
9.16–10.3	8.61–9.63	AR 13.6
10.4–11.9	9.64–11.1	AR 15.4
12.0–13.4	11.2–12.5	AR 17.6
13.5–15.4	12.6–14.3	AR 20.5
15.5–17.5	14.4–16.1	AR 23.0
17.6–19.8	16.2–18.2	AR 27.0
19.9–22.5	18.3–20.6	AR 30.0
22.6–26.0	20.7–23.4	AR 35.0
—	23.5–26.0	AR 40.0

Table 24

Motor FLC (A)	Thermal Unit Number
88.2–95.1	DD 112.0
95.2–101.	DD 121.0
102.–111.	DD 128.0
112.–119.	DD 140.0
120.–131.	DD 150.0
132.–149.	DD 160.0
150.–170.	DD 185.0
171.–180.	DD 220.0
181.–197.	DD 240.0
198.–204.	DD 250.0
205.–213.	DD 265.0
214.–237.	DD 280.0
238.–243.	DD 300.0
244.–266.	DD 320.0

Table 25

Motor FLC (A)	Thermal Unit Number
0.28–0.30	AR .45
0.31–0.33	AR .49
0.34–0.36	AR .54
0.37–0.39	AR .59
0.40–0.42	AR .65
0.43–0.46	AR .71
0.47–0.50	AR .78
0.51–0.52	AR .86
0.53–0.56	AR .95
0.57–0.60	AR 1.05
0.61–0.66	AR 1.15
0.67–0.73	AR 1.26
0.74–0.81	AR 1.39
0.82–0.90	AR 1.53
0.91–1.05	AR 1.68
1.06–1.15	AR 1.85
1.16–1.25	AR 2.04
1.26–1.35	AR 2.24
1.36–1.47	AR 2.46
1.48–1.58	AR 2.71
1.59–1.74	AR 2.98
1.75–1.94	AR 3.28
1.95–2.20	AR 3.62
2.21–2.47	AR 3.98
2.48–2.76	AR 4.37
2.77–3.07	AR 4.80
3.08–3.45	AR 5.3
3.46–3.81	AR 5.8
3.82–4.20	AR 6.4
4.21–4.65	AR 7.0
4.66–5.29	AR 7.7
5.30–5.84	AR 8.5
5.85–6.27	AR 9.3
6.28–7.00	AR 10.2

Table 26

Size 7 Type J	Size 8 Type K	Thermal Unit Number
Current Transformer Ratio		
120/5	2000/5	
Motor FLC		
166.–187.	277.–312.	B 1.03
188.–211.	313.–352.	B 1.16
212.–232.	353.–388.	B 1.30
233.–267.	389.–445.	B 1.45
268.–301.	446.–503.	B 1.67
302.–336.	504.–561.	B 1.88
337.–383.	562.–640.	B 2.10
384.–425.	641.–708.	B 2.40
426.–466.	709.–777.	B 2.65
467.–522.	778.–870.	B 3.00
523.–587.	871.–978.	B 3.30
588.–656.	979.–1093.	B 3.70
657.–764.	1094.–1215.	B 4.15

Table 27

Motor FLC (A)		Thermal Unit Number
2 or 3 T.U.		
Large Enclosure	Small Enclosure	
4.32–4.93	4.14–4.71	AR 8.5
4.94–5.40	4.72–5.18	AR 9.3
5.41–5.95	5.19–5.74	AR 10.2
5.96–6.13	5.75–5.98	AR 11.2
6.14–6.81	5.99–6.47	AR 12.4
6.82–7.84	6.48–7.42	AR 13.6
7.85–8.97	7.43–8.46	AR 15.4
8.98–10.1	8.47–9.56	AR 17.6
10.2–11.6	9.57–10.9	AR 20.5
11.7–13.2	11.0–12.3	AR 23.0
13.3–15.0	12.4–14.0	AR 27.0
15.1–17.1	14.1–15.9	AR 30.0
17.2–19.6	16.0–18.1	AR 35.0
19.7–21.9	18.2–20.3	AR 40.0
22.0–23.8	20.4–22.0	AR 44.0
23.9–25.6	22.1–23.6	AR 47.0
25.7–27.9	23.7–25.5	AR 51.0
28.0–30.5	25.6–27.8	AR 55.0
30.6–33.0	27.9–30.0	AR 60.0
33.1–35.7	30.1–32.4	AR 66.0
35.8–39.5	32.5–35.7	AR 72.0
39.6–41.5	35.8–38.3	AR 79.0
41.6–45.0	38.4–40.9	AR 86.0
—	41.0–45.0	AR 94.0

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Table 28

Motor FLC (A) 2 or 3 T.U.		Thermal Unit Number
Large Enclosure	Small Enclosure	
45.3–48.2	40.3–42.8	CC 64.3
48.3–52.4	42.9–46.2	CC 68.5
52.5–56.4	46.3–49.8	CC 74.6
56.5–61.2	49.9–54.9	CC 81.5
61.3–66.1	55.0–57.9	CC 87.7
66.2–71.4	58.0–62.5	CC 94.0
71.5–77.0	62.6–67.3	CC 103.0
77.1–80.7	67.4–73.4	CC 112.0
80.8–87.7	73.5–78.9	CC 121.0
87.8–94.9	79.0–84.9	CC 132.0
95.0–102.	85.0–91.0	CC 143.0
103.–110.	91.1–97.2	CC 156.0
111.–117.	97.3–104.	CC 167.0
118.–133.	105.–121.	CC 180.0
—	122.–133.	CC 196.0

Table 29

Motor FLC (A)	Thermal Unit Number
50.0–55.9	E 88
56.0–60.9	E 89
61.0–65.9	E 91
66.0–69.9	E 92
70.0–75.9	E 93
76.0–81.9	E 94
82.0–86.9	E 96
87.0–92.9	E 97
93.0–97.9	E 98
98.0–107.9	E 99
108.0–113.9	E 101
114.0–125.9	E 102

Table 30

Motor FLC (A)		Thermal Unit Number
Large Enclosure	Small Enclosure	
39.0–42.9	37.0–40.8	AU 44.0
43.0–48.0	40.9–45.6	AU 50.0
48.1–54.7	45.7–51.8	AU 56.0
54.8–62.2	51.9–58.8	AU 64.0
62.3–71.3	58.9–67.4	AU 72.0
71.4–76.0	67.5–70.4	AU 81.0
76.1–85.5	70.5–79.4	AU 88.0
85.6–92.4	79.5–86.3	AU 99.0
92.5–103.	86.4–96.7	AU 110.0
104.–111.	96.8–105.	AU 123.0
112.–123.	106.–117.	AU 135.0
124.–133.	118.–133.	AU 152.0

Table 31

Motor FLC (A)	Thermal Unit Number
0.31–0.35	B 0.44
0.36–0.39	B 0.51
0.40–0.44	B 0.57
0.45–0.50	B 0.63
0.51–0.61	B 0.71
0.62–0.68	B 0.81
0.69–0.73	B 0.92
0.74–0.82	B 1.03
0.83–0.92	B 1.16
0.93–1.03	B 1.30
1.04–1.19	B 1.45
1.20–1.34	B 1.67
1.35–1.50	B 1.88
1.51–1.74	B 2.10
1.75–1.97	B 2.40
1.98–2.14	B 2.65
2.15–2.47	B 3.00
2.48–2.91	B 3.30
2.92–3.31	B 3.70
3.32–3.75	B 4.15
3.76–4.05	B 4.85
4.06–4.94	B 6.25
4.95–5.52	B 6.90
5.53–6.11	B 7.70
6.12–6.52	B 8.20
6.53–7.31	B 9.10
7.32–8.43	B 10.2
8.44–9.83	B 11.5
9.84–10.7	B 12.8
10.8–11.6	B 14.0
11.7–12.9	B 15.5
13.0–14.3	B 17.5
14.4–15.7	B 19.5
15.8–17.8	B 22.0
17.9–20.3	B 25.0
20.4–23.3	B 28.0
23.4–26.6	B 32.0
26.7–30.3	B 36.0
30.4–35.3	B 40.0
35.4–41.5	B 45.0
41.6–45	B 50.0

Table 32

Motor FLC (A)	Thermal Unit Number
0.33–0.35	AR .45
0.36–0.39	AR .49
0.40–0.42	AR .54
0.43–0.46	AR .59
0.47–0.51	AR .65
0.52–0.56	AR .71
0.57–0.62	AR .78
0.63–0.68	AR .86
0.69–0.75	AR .95
0.76–0.83	AR 1.05
0.84–0.91	AR 1.15
0.92–1.00	AR 1.26
1.01–1.10	AR 1.39
1.11–1.21	AR 1.53
1.22–1.33	AR 1.68
1.34–1.47	AR 1.85
1.48–1.62	AR 2.04
1.63–1.77	AR 2.24
1.78–1.96	AR 2.46
1.97–2.16	AR 2.71
2.17–2.37	AR 2.98
2.38–2.62	AR 3.28
2.63–2.88	AR 3.62
2.89–3.17	AR 3.98
3.18–3.48	AR 4.37
3.49–3.83	AR 4.80
3.84–4.20	AR 5.3
4.21–4.62	AR 5.8
4.63–5.08	AR 6.4
5.09–5.57	AR 7.0
5.58–6.13	AR 7.7
6.14–6.83	AR 8.5
6.84–7.41	AR 9.3
7.42–8.05	AR 10.2
8.06–8.98	AR 11.2
8.99–9.93	AR 12.4
9.94–10.9	AR 13.6
11.0–12.4	AR 15.4
12.5–14.3	AR 17.6
14.4–15.8	AR 20.5
15.9–17.9	AR 23.0
18.0–20.0	AR 27.0
20.1–22.4	AR 30.0
22.5–25.0	AR 35.0

Table 33

Motor FLC (A)	Thermal Unit Number
0.28–0.30	AR .45
0.31–0.33	AR .49
0.34–0.36	AR .54
0.37–0.39	AR .59
0.40–0.42	AR .65
0.43–0.46	AR .71
0.47–0.50	AR .78
0.51–0.52	AR .86
0.53–0.56	AR .95
0.57–0.60	AR 1.05
0.61–0.66	AR 1.15
0.67–0.73	AR 1.26
0.74–0.81	AR 1.39
0.82–0.90	AR 1.53
0.91–1.05	AR 1.68
1.06–1.15	AR 1.85
1.16–1.25	AR 2.04
1.26–1.35	AR 2.24
1.36–1.47	AR 2.46
1.48–1.58	AR 2.71
1.59–1.74	AR 2.98
1.75–1.94	AR 3.28
1.95–2.20	AR 3.62
2.21–2.47	AR 3.98
2.48–2.76	AR 4.37
2.77–3.07	AR 4.80
3.08–3.45	AR 5.3
3.46–3.81	AR 5.8
3.82–4.20	AR 6.4
4.21–4.65	AR 7.0
4.66–5.29	AR 7.7
5.30–5.84	AR 8.5
5.85–6.27	AR 9.3
6.28–6.97	AR 10.2
6.98–7.59	AR 11.2
7.60–7.89	AR 12.4
7.90–8.95	AR 13.6
8.96–10.3	AR 15.4
10.4–11.7	AR 17.6
11.8–12.0	AR 20.5
Following Selections for Size 1 Only	
11.8–13.3	AR 20.5
13.4–15.2	AR 23.0
15.3–17.2	AR 27.0
17.3–19.7	AR 30.0
19.8–22.4	AR 35.0
22.5–26.0	AR 40.0

Table 34

Motor FLC (A)	Thermal Unit Number
15.1–16.2	CC 20.9
16.3–17.5	CC 22.8
17.6–19.1	CC 24.6
19.2–20.7	CC 26.3
20.8–22.2	CC 28.8
22.3–24.0	CC 31.0
24.1–25.7	CC 33.3
25.8–27.8	CC 36.4
27.9–30.1	CC 39.6
30.2–32.5	CC 42.7
32.6–35.1	CC 46.6
35.2–38.0	CC 50.1
38.1–41.1	CC 54.5
41.2–44.0	CC 59.4
44.1–47.2	CC 64.3
47.3–51.1	CC 68.5
51.2–55.8	CC 74.6
55.9–59.5	CC 81.5
59.6–64.5	CC 87.7
64.6–69.5	CC 94.0
69.6–75.0	CC 103.0
75.1–78.1	CC 112.0
78.2–82.3	CC 121.0
82.4–86.0	CC 132.0

Table 35

Motor FLC (A)		Thermal Unit Number
2 T.U.	3 T.U.	
36.3–39.9	34.7–37.1	AU 44.0
40.0–44.1	37.2–41.5	AU 50.0
44.2–50.0	41.6–47.1	AU 56.0
50.1–56.4	47.2–53.4	AU 64.0
56.5–64.4	53.5–60.7	AU 72.0
64.5–68.4	60.8–64.9	AU 81.0
68.5–77.7	65.0–73.4	AU 88.0
77.8–84.2	73.5–79.5	AU 99.0
84.3–94.8	79.6–89.0	AU 110.0
94.9–101.	89.1–96.9	AU 123.0
102.–115.	97.0–108.	AU 135.0
116.–122.	109.–115.	AU 152.0
123.–133.	116.–120.	AU 169.0
—	121.–133.	AU 183.0

Table 36

Motor FLC (A)	Thermal Unit Number
90.6–97.4	AF 110.0
97.5–111.	AF 123.0
112.–129.	AF 135.0
130.–149.	AF 150.0
150.–163.	AF 159.0
164.–189.	AF 168.0
190.–213.	AF 188.0
214.–240.	AF 205.0
241.–266.	AF 220.0

Table 37

Motor FLC (A)	Thermal Unit Number
27.1–30.0	E 67
30.1–33.2	E 69
33.3–35.7	E 70
35.8–39.4	E 71
39.5–43.4	E 72
43.5–46.9	E 73
47.0–51.5	E 74
51.6–57.0	E 76
57.1–62.8	E 77
62.9–69.1	E 78
69.2–75.0	E 79
75.1–83.3	E 80

Table 38

Motor FLC (A)	Thermal Unit Number
85.0–95.9	AF 123.0
96.0–108.	AF 135.0
109.–127.	AF 150.0
128.–136.	AF 159.0
137.–147.	AF 168.0
148.–162.	AF 188.0
163.–185.	AF 205.0
186.–202.	AF 220.0
203.–219.	AF 240.0
220.–233.	AF 260.0
234.–266.	AF 308.0

Table 39

Motor FLC (A)	Thermal Unit Number
148.–173.	AR 1.68
174.–189.	AR 1.85
190.–205.	AR 2.04
206.–222.	AR 2.24
223.–243.	AR 2.46
244.–261.	AR 2.71
262.–289.	AR 2.98
290.–324.	AR 3.28
325.–367.	AR 3.62
368.–389.	AR 3.98
390.–404.	AR 4.37
405.–451.	AR 4.80
452.–495.	AR 5.3
496.–520.	AR 5.8

Table 40

Motor FLC (A)	Thermal Unit Number
15.3–16.7	C 20.0
16.8–19.8	C 22.0
19.9–22.8	C 26.0
22.9–25.8	C 30.0
25.9–30.4	C 34.0
30.5–31.9	C 40.0
32.0–34.2	C 42.0
34.3–38.8	C 45.0
38.9–44.2	C 51.0
44.3–50.2	C 58.0
50.3–57.1	C 66.0
57.2–63.2	C 75.0
63.3–68.6	C 83.0
68.7–78.6	C 90.0
78.7–86.0	C 103.0

Table 41

Motor FLC (A)	Thermal Unit Number
0.81–0.92	B 1.16
0.93–1.07	B 1.30
1.08–1.14	B 1.45
1.15–1.26	B 1.67
1.27–1.49	B 1.88
1.50–1.73	B 2.10
1.74–1.89	B 2.40
1.90–2.16	B 2.65
2.17–2.37	B 3.00
2.38–2.66	B 3.30
2.67–2.99	B 3.70
3.00–3.40	B 4.15
3.41–3.94	B 4.85
3.95–4.15	B 5.50
4.16–4.49	B 6.25
4.50–5.15	B 6.90
5.16–5.77	B 7.70
5.78–6.61	B 8.20
6.62–7.14	B 9.10
7.15–7.97	B 10.2
7.98–8.15	B 11.5
8.16–9.32	B 12.8
9.33–9.97	B 14.0
9.98–10.7	B 15.5
10.8–12.0	B 17.5
12.1–13.9	B 19.5
14.0–15.7	B 22.0
15.8–18.4	B 25.0
18.5–21.6	B 28.0
21.7–24.0	B 32.0
24.1–28.6	B 36.0
28.7–30.7	B 40.0
30.8–33.5	B 45.0
33.6–36.0	B 50.0

Table 42

Motor FLC (A)	Thermal Unit Number
0.28–0.30	AR .45
0.31–0.33	AR .49
0.34–0.36	AR .54
0.37–0.39	AR .59
0.40–0.42	AR .65
0.43–0.46	AR .71
0.47–0.50	AR .78
0.51–0.52	AR .86
0.53–0.56	AR .95
0.57–0.60	AR 1.05
0.61–0.66	AR 1.15
0.67–0.73	AR 1.26
0.74–0.81	AR 1.39
0.82–0.90	AR 1.53
0.91–1.05	AR 1.68
1.06–1.15	AR 1.85
1.16–1.25	AR 2.04
1.26–1.35	AR 2.24
1.36–1.47	AR 2.46
1.48–1.58	AR 2.71
1.59–1.74	AR 2.98
1.75–1.94	AR 3.28
1.95–2.20	AR 3.62
2.21–2.47	AR 3.98
2.48–2.76	AR 4.37
2.77–3.07	AR 4.80
3.08–3.45	AR 5.3
3.46–3.81	AR 5.8
3.82–4.20	AR 6.4
4.21–4.65	AR 7.0
4.66–5.29	AR 7.7
5.30–5.84	AR 8.5
5.85–6.27	AR 9.3
6.28–6.97	AR 10.2
6.98–7.59	AR 11.2
7.60–7.89	AR 12.4
7.90–8.95	AR 13.6
8.96–10.3	AR 15.4
10.4–11.7	AR 17.6
11.8–13.3	AR 20.5
13.4–15.2	AR 23.0
15.3–17.2	AR 27.0
17.3–19.7	AR 30.0
19.8–22.4	AR 35.0
22.5–26.0	AR 40.0

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Table 43

Motor FLC (A)	Thermal Unit Number
0.41–0.44	A .49
0.45–0.49	A .54
0.50–0.53	A .59
0.54–0.58	A .65
0.59–0.65	A .71
0.66–0.71	A .78
0.72–0.78	A .86
0.79–0.85	A .95
0.86–0.96	A 1.02
0.97–1.04	A 1.16
1.05–1.16	A 1.25
1.17–1.29	A 1.39
1.30–1.37	A 1.54
1.38–1.47	A 1.63
1.48–1.56	A 1.75
1.57–1.65	A 1.86
1.66–1.79	A 1.99
1.80–1.95	A 2.15
1.96–2.15	A 2.31
2.16–2.38	A 2.57
2.39–2.75	A 2.81
2.76–2.84	A 3.61
2.85–3.06	A 3.95
3.07–3.45	A 4.32
3.46–3.70	A 4.79
3.71–4.07	A 5.30
4.08–4.32	A 5.78
4.33–4.90	A 6.20
4.91–5.35	A 6.99
5.36–5.85	A 7.65
5.86–6.41	A 8.38
6.42–6.79	A 9.25
6.80–7.57	A 9.85
7.58–8.15	A 11.0
8.16–8.98	A 11.9
8.99–9.67	A 13.2
9.68–9.95	A 14.1
9.96–10.8	A 14.8
10.9–12.1	A 16.2
12.2–13.1	A 17.9
13.2–13.9	A 19.8
14.0–15.0	A 21.3
15.1–16.0	A 25.2

Table 44

Motor FLC (A)	Thermal Unit Number
0.34–0.38	B 0.44
0.39–0.43	B 0.51
0.44–0.48	B 0.57
0.49–0.53	B 0.65
0.54–0.62	B 0.71
0.63–0.69	B 0.81
0.70–0.78	B 0.92
0.79–0.88	B 1.03
0.89–0.99	B 1.16
1.00–1.10	B 1.30
1.11–1.26	B 1.45
1.27–1.43	B 1.67
1.44–1.59	B 1.88
1.60–1.81	B 2.10
1.82–2.00	B 2.40
2.01–2.28	B 2.65
2.29–2.52	B 3.00
2.53–2.87	B 3.30
2.88–3.28	B 3.70
3.29–3.75	B 4.15
3.76–4.27	B 4.85
4.28–4.77	B 5.50
4.78–5.27	B 6.25
5.28–5.91	B 6.90
5.92–6.25	B 7.70
6.26–6.83	B 8.20
6.84–7.65	B 9.10
7.66–8.55	B 10.2
8.56–9.56	B 11.5
9.57–10.3	B 12.8
10.4–11.3	B 14.0
11.4–12.4	B 15.5
12.5–14.1	B 17.5
14.2–15.7	B 19.5
15.8–17.9	B 22.0
18.0–20.1	B 25.0
20.2–22.5	B 28.0
22.6–25.0	B 32.0

Table 45

Size 7	Size 8	Thermal Unit Number
Type J	Type K	
Current Transformer Ratio		
1200/5	2000/5	
Motor FLC (A)		
Non-Compensated		
136.–150.	227.–251.	AR 1.05
151.–165.	252.–276.	AR 1.15
166.–183.	277.–305.	AR 1.26
184.–202.	306.–337.	AR 1.39
203.–224.	338.–373.	AR 1.53
225.–267.	374.–445.	AR 1.68
268.–293.	446.–489.	AR 1.85
294.–319.	490.–532.	AR 2.04
320.–349.	533.–582.	AR 2.24
350.–381.	583.–636.	AR 2.46
382.–418.	637.–697.	AR 2.71
419.–459.	698.–766.	AR 2.98
460.–509.	767.–849.	AR 3.28
510.–565.	850.–942.	AR 3.62
566.–604.	943.–1007.	AR 3.98
605.–697.	1008.–1133.	AR 4.37
698.–753.	—	AR 4.80
Compensated		
161.–177.	268.–295.	AR 1.26
178.–196.	296.–327.	AR 1.39
197.–217.	328.–363.	AR 1.53
218.–253.	364.–423.	AR 1.68
254.–277.	424.–463.	AR 1.85
278.–301.	464.–503.	AR 2.04
302.–325.	504.–543.	AR 2.24
326.–354.	544.–592.	AR 2.46
355.–381.	592.–635.	AR 2.71
382.–419.	636.–699.	AR 2.98
420.–467.	700.–779.	AR 3.28
468.–529.	780.–883.	AR 3.62
530.–594.	884.–991.	AR 3.98
595.–664.	992.–1107.	AR 4.37
665.–738.	1108.–1231.	AR 4.80
739.–829.	—	AR 5.3

Table 46

Motor FLC (A)	Thermal Unit Number
105.–116.	AR 3.28
117.–132.	AR 3.62
133.–148.	AR 3.98
149.–165.	AR 4.37
166.–184.	AR 4.80
185.–207.	AR 5.3
208.–229.	AR 5.8
230.–266.	AR 6.4

Table 47

Motor FLC (A)	Thermal Unit Number
146.–169.	AR 1.68
170.–185.	AR 1.85
186.–201.	AR 2.04
202.–217.	AR 2.24
218.–236.	AR 2.46
237.–253.	AR 2.71
254.–279.	AR 2.98
280.–311.	AR 3.28
312.–353.	AR 3.62
354.–396.	AR 3.98
397.–442.	AR 4.37
443.–492.	AR 4.80
493.–520.	AR 5.3

Table 48

Motor FLC (A)	Thermal Unit Number
158.–187.	AR 1.68
188.–206.	AR 1.85
207.–224.	AR 2.04
225.–244.	AR 2.24
245.–267.	AR 2.46
268.–289.	AR 2.71
290.–324.	AR 2.98
325.–361.	AR 3.28
362.–406.	AR 3.62
407.–445.	AR 3.98
446.–463.	AR 4.37
464.–520.	AR 4.80

Table 49

Motor FLC (A)	Thermal Unit Number
82.5–88.2	DD 112.0
88.3–95.9	DD 121.0
96.0–102.	DD 128.0
103.–109.	DD 140.0
110.–121.	DD 150.0
122.–139.	DD 160.0
140.–154.	DD 185.0
155.–163.	DD 220.0
164.–175.	DD 240.0
176.–184.	DD 250.0
185.–195.	DD 265.0
196.–215.	DD 280.0
216.–224.	DD 300.0
225.–243.	DD 320.0
244.–266.	DD 340.0

Table 50

Motor FLC (A)	Thermal Unit Number
14.4–16.1	AU 20.0
16.2–18.6	AU 23.0
18.7–20.5	AU 26.0
20.6–23.4	AU 29.0
23.5–26.9	AU 33.0
27.0–28.3	AU 38.0
28.4–30.8	AU 40.0
30.9–35.0	AU 44.0
35.1–38.8	AU 50.0
38.9–44.3	AU 56.0
44.4–49.3	AU 64.0
49.4–55.5	AU 72.0
55.6–61.0	AU 81.0
61.1–68.6	AU 88.0
68.7–76.3	AU 99.0
76.4–86.0	AU 110.0

Table 51

Motor FLC (A)	Thermal Unit Number
15.7–17.7	AU 20.0
17.8–19.9	AU 23.0
20.0–22.7	AU 26.0
22.8–25.7	AU 29.0
25.8–29.1	AU 33.0
29.2–30.8	AU 38.0
30.9–34.3	AU 40.0
34.4–38.3	AU 44.0
38.4–42.3	AU 50.0
42.4–47.5	AU 56.0
47.6–53.0	AU 64.0
53.1–60.5	AU 72.0
60.6–64.9	AU 81.0
65.0–71.5	AU 88.0
71.6–77.3	AU 99.0
77.4–86.0	AU 110.0

Table 52

Motor FLC (A)	Thermal Unit Number
92.0–103.	AF 123.0
104.–116.	AF 135.0
117.–139.	AF 150.0
140.–150.	AF 159.0
151.–167.	AF 168.0
168.–177.	AF 188.0
178.–205.	AF 205.0
206.–222.	AF 220.0
223.–232.	AF 240.0
233.–247.	AF 260.0
248.–266.	AF 308.0

Table 53

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
0.31–0.33	0.29–0.31	B 0.44
0.34–0.36	0.32–0.36	B 0.51
0.37–0.40	0.37–0.38	B 0.57
0.41–0.48	0.39–0.46	B 0.63
0.49–0.57	0.47–0.55	B 0.71
0.58–0.64	0.56–0.61	B 0.81
0.65–0.70	0.62–0.66	B 0.92
0.71–0.77	0.67–0.75	B 1.03
0.78–0.85	0.76–0.83	B 1.16
0.86–0.99	0.84–0.93	B 1.30
1.00–1.10	0.94–1.06	B 1.45
1.11–1.28	1.07–1.18	B 1.67
1.29–1.41	1.19–1.31	B 1.88
1.42–1.58	1.32–1.47	B 2.10
1.59–1.80	1.48–1.67	B 2.40
1.81–2.03	1.68–1.83	B 2.65
2.04–2.25	1.84–2.04	B 3.00
2.26–2.51	2.05–2.38	B 3.30
2.52–2.83	2.39–2.60	B 3.70
2.84–3.29	2.61–3.13	B 4.15
3.30–3.75	3.14–3.59	B 4.85
3.76–4.22	3.60–3.94	B 5.50
4.23–4.65	3.95–4.19	B 6.25
4.66–5.16	4.20–4.72	B 6.90
5.17–5.53	4.73–5.21	B 7.70
5.54–6.09	5.22–5.51	B 8.20
6.10–6.80	5.52–6.17	B 9.10
6.81–7.60	6.18–7.00	B 10.2
7.61–8.35	—	B 11.5
8.36–9.00	—	B 12.8

Table 54

Motor FLC (A)		Thermal Unit Number
2 T. U.	3 T. U.	
43.6–45.5	41.1–43.5	CC 64.3
45.6–49.6	43.6–46.8	CC 68.5
49.7–53.1	46.9–50.0	CC 74.6
53.2–57.6	50.1–54.9	CC 81.5
57.7–62.4	55.0–57.5	CC 87.7
62.5–67.5	57.6–61.8	CC 94.0
67.6–71.1	61.9–66.2	CC 103.0
71.2–75.9	66.3–72.4	CC 112.0
76.0–81.9	72.5–78.1	CC 121.0
82.0–84.6	78.2–80.7	CC 132.0
84.7–90.7	80.8–86.5	CC 143.0
90.8–98.4	86.6–93.9	CC 156.0
98.5–105.	94.0–100.	CC 167.0
106.–117.	101.–112.	CC 180.0
118.–123.	113.–117.	CC 196.0
124.–133.	118.–123.	CC 208.0
—	124.–133.	CC 219.0

Table 55

Motor FLC (A)		Thermal Unit Number
2 T. U.	3 T. U.	
0.38–0.40	0.31–0.33	AR .45
0.41–0.43	0.34–0.36	AR .49
0.44–0.48	0.37–0.39	AR .54
0.49–0.52	0.40–0.43	AR .59
0.53–0.56	0.44–0.47	AR .65
0.57–0.61	0.48–0.51	AR .71
0.62–0.67	0.52–0.56	AR .78
0.68–0.73	0.57–0.58	AR .86
0.74–0.81	0.59–0.64	AR .95
0.82–0.89	0.65–0.70	AR 1.05
0.90–0.97	0.71–0.77	AR 1.15
0.98–1.07	0.78–0.85	AR 1.26
1.08–1.17	0.86–0.94	AR 1.39
1.18–1.31	0.95–1.03	AR 1.53
1.32–1.49	1.04–1.22	AR 1.68
1.50–1.69	1.23–1.34	AR 1.85
1.70–1.83	1.35–1.46	AR 2.04
1.84–2.00	1.47–1.58	AR 2.24
2.01–2.17	1.59–1.76	AR 2.46
2.18–2.35	1.77–1.85	AR 2.71
2.36–2.60	1.86–2.08	AR 2.98
2.61–2.87	2.09–2.27	AR 3.28
2.88–3.14	2.28–2.51	AR 3.62
3.15–3.47	2.52–2.90	AR 3.98
3.48–3.90	2.91–3.23	AR 4.37
3.91–4.36	3.24–3.58	AR 4.80
4.37–4.88	3.59–4.02	AR 5.3
4.89–5.37	4.03–4.43	AR 5.8
5.38–5.97	4.44–4.86	AR 6.4
5.98–6.55	4.87–5.37	AR 7.0
6.56–7.50	5.38–6.12	AR 7.7
7.51–8.23	6.13–6.65	AR 8.5
8.24–9.00	6.66–7.00	AR 9.3

Table 56

Motor FLC (A)		Thermal Unit Number
1 or 2 T. U.	3 T. U.	
3.29–3.74	3.18–3.40	B 4.85
3.75–4.23	3.41–3.76	B 5.50
4.24–4.68	3.77–4.00	B 6.25
4.69–5.22	4.01–4.57	B 6.90
5.23–5.67	4.58–5.03	B 7.70
5.68–6.13	5.04–5.32	B 8.20
6.14–6.91	5.33–5.97	B 9.10
6.92–7.70	5.98–6.88	B 10.2
7.71–8.56	6.89–7.82	B 11.5
8.57–9.39	7.83–8.47	B 12.8
9.40–10.4	8.48–9.15	B 14.0
10.5–11.6	9.16–10.1	B 15.5
11.7–12.9	10.2–11.2	B 17.5
13.0–14.6	11.3–12.0	B 19.5
14.7–16.5	12.1–13.6	B 22.0
16.6–18.5	13.7–15.2	B 25.0
18.6–21.0	15.3–17.1	B 28.0
21.1–23.6	17.2–19.0	B 32.0
23.7–26.3	19.1–21.5	B 36.0
26.4–29.3	21.6–24.1	B 40.0
29.4–35.1	24.2–27.0	B 45.0
35.2–36.1	27.1–28.7	B 50.0
36.2–39.1	28.8–30.4	B 56.0
39.2–41.5	30.5–32.2	B 62.0
41.6–45.0	32.3–35.4	B 70.0
—	35.5–38.2	B 79.0
—	38.3–45.0	B 88.0

Table 57

Motor FLC (A))		Thermal Unit Number
2 T. U.	3 T. U.	
5.09–5.59	5.15–5.97	AR 8.5
5.60–6.11	5.98–6.50	AR 9.3
6.12–6.72	6.51–7.04	AR 10.2
6.73–7.37	7.05–7.59	AR 11.2
7.38–7.67	7.60–7.93	AR 12.4
7.68–8.68	7.94–9.04	AR 13.6
8.69–9.94	9.05–10.2	AR 15.4
9.95–11.1	10.3–11.5	AR 17.6
11.2–12.9	11.6–13.2	AR 20.5
13.0–14.7	13.3–14.9	AR 23.0
14.8–16.9	15.0–16.9	AR 27.0
17.0–19.2	17.0–19.3	AR 30.0
19.3–21.9	19.4–21.7	AR 35.0
22.0–24.4	21.8–25.0	AR 40.0
24.5–26.3	25.1–27.0	AR 44.0
26.4–28.0	27.1–29.1	AR 47.0
28.1–30.3	29.2–30.8	AR 51.0
30.4–32.2	30.9–32.9	AR 55.0
32.3–34.4	33.0–35.0	AR 60.0
34.5–36.6	35.1–37.1	AR 66.0
36.7–39.5	37.2–39.1	AR 72.0
39.6–45.0	39.2–41.5	AR 79.0
—	41.6–45.0	AR 86.0

Table 58

Motor FLC (A)		Thermal Unit Number
1 or 2 T. U.	3 T. U.	
3.37–3.82	3.28–3.51	B 4.85
3.83–4.33	3.52–3.89	B 5.50
4.34–4.79	3.90–4.14	B 6.25
4.80–5.33	4.15–4.73	B 6.90
5.34–5.79	4.74–5.22	B 7.70
5.80–6.27	5.23–5.53	B 8.20
6.28–7.03	5.54–6.21	B 9.10
7.04–7.88	6.22–7.17	B 10.2
7.89–8.73	7.18–8.19	B 11.5
8.74–9.55	8.20–8.90	B 12.8
9.56–10.6	8.91–9.57	B 14.0
10.7–11.8	9.58–10.6	B 15.5
11.9–13.1	10.7–11.8	B 17.5
13.2–14.9	11.9–12.7	B 19.5
15.0–16.9	12.8–14.4	B 22.0
17.0–18.8	14.5–16.1	B 25.0
18.9–21.5	16.2–18.2	B 28.0
21.6–24.1	18.3–20.2	B 32.0
24.2–26.8	20.3–22.8	B 36.0
26.9–29.9	22.9–25.6	B 40.0
30.0–35.5	25.7–28.8	B 45.0
35.6–36.5	28.9–30.6	B 50.0
36.6–39.6	30.7–32.4	B 56.0
39.7–41.5	32.5–34.6	B 62.0
41.6–45.0	34.7–38.6	B 70.0
—	38.7–45.0	B 79.0

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Table 59

Motor FLC (A)		Thermal Unit Number
1 or 2 T. U.	3 T. U.	
0.34–0.38	0.29–0.31	B 0.44
0.39–0.43	0.32–0.35	B 0.51
0.44–0.47	0.36–0.38	B 0.57
0.48–0.53	0.39–0.46	B 0.63
0.54–0.60	0.47–0.55	B 0.71
0.61–0.68	0.56–0.62	B 0.81
0.69–0.76	0.63–0.67	B 0.92
0.77–0.86	0.68–0.75	B 1.03
0.87–0.97	0.76–0.84	B 1.16
0.98–1.07	0.85–0.95	B 1.30
1.08–1.23	0.96–1.09	B 1.45
1.24–1.39	1.10–1.21	B 1.67
1.40–1.55	1.22–1.35	B 1.88
1.56–1.77	1.36–1.53	B 2.10
1.78–1.96	1.54–1.73	B 2.40
1.97–2.15	1.74–1.90	B 2.65
2.16–2.41	1.91–2.14	B 3.00
2.42–2.71	2.15–2.34	B 3.30
2.72–3.03	2.35–2.67	B 3.70
3.04–3.53	2.68–3.22	B 4.15
3.54–4.01	3.23–3.48	B 4.85
4.02–4.56	3.49–3.87	B 5.50
4.57–5.03	3.88–4.14	B 6.25
5.04–5.59	4.15–4.73	B 6.90
5.60–5.95	4.74–5.28	B 7.70
5.96–6.58	5.29–5.64	B 8.20
6.59–7.31	5.65–6.39	B 9.10
7.32–8.15	6.40–7.43	B 10.2
8.16–9.13	7.44–8.55	B 11.5
9.14–9.91	8.56–9.40	B 12.8
9.92–10.7	9.41–10.0	B 14.0
10.8–12.1	10.1–11.2	B 15.5
12.2–13.5	11.3–12.5	B 17.5
13.6–15.1	12.6–13.5	B 19.5
15.2–17.0	13.6–15.4	B 22.0
17.1–18.9	15.5–17.5	B 25.0
19.0–21.5	17.6–19.9	B 28.0
21.6–24.0	20.0–22.2	B 32.0
24.1–26.0	22.3–25.5	B 36.0
—	25.6–26.0	B 40.0

Table 60

Motor FLC (A)	Thermal Unit Number
6.84–7.49	AR 9.3
7.50–8.05	AR 10.2
8.06–9.10	AR 11.2
9.11–9.99	AR 12.4
10.0–11.1	AR 13.6
11.2–12.7	AR 15.4
12.8–14.8	AR 17.6
14.9–16.6	AR 20.5
16.7–19.3	AR 23.0
19.4–21.4	AR 27.0
21.5–25.1	AR 30.0
25.2–28.3	AR 35.0
28.4–31.2	AR 40.0
31.3–33.3	AR 44.0
33.4–35.7	AR 47.0
35.8–38.5	AR 51.0
38.6–41.5	AR 55.0
41.6–45.0	AR 60.0

Table 61

Motor FLC (A)		Thermal Unit Number
2 T. U.	3 T. U.	
46.8–50.0	45.3–48.2	CC 64.3
50.1–54.2	48.3–52.4	CC 68.5
54.3–58.3	52.5–56.4	CC 74.6
58.4–63.6	56.5–61.2	CC 81.5
63.7–68.5	61.3–66.1	CC 87.7
68.6–74.0	66.2–71.4	CC 94.0
74.1–79.8	71.5–77.0	CC 103.0
79.9–83.0	77.1–79.0	CC 112.0
83.1–88.9	79.1–84.7	CC 121.0
89.0–95.6	84.8–91.1	CC 132.0
95.7–102.	91.2–98.1	CC 143.0
103.–109.	98.2–104.	CC 156.0
110.–119.	105.–113.	CC 167.0
120.–133.	114.–123.	CC 180.0
—	124.–133.	CC 196.0

Table 62

Motor FLC (A)		Thermal Unit Number
2 T. U.	3 T. U.	
4.83–5.33	4.90–5.68	AR 8.5
5.34–5.84	5.69–6.19	AR 9.3
5.85–6.43	6.20–6.71	AR 10.2
6.44–7.03	6.72–7.14	AR 11.2
7.04–7.30	7.15–7.49	AR 12.4
7.31–8.29	7.50–8.48	AR 13.6
8.30–9.49	8.49–9.66	AR 15.4
9.50–10.7	9.67–10.8	AR 17.6
10.8–12.3	10.9–12.4	AR 20.5
12.4–14.0	12.5–13.9	AR 23.0
14.1–16.0	14.0–15.7	AR 27.0
16.1–18.4	15.8–18.1	AR 30.0
18.5–21.0	18.2–20.3	AR 35.0
21.1–23.0	20.4–23.0	AR 40.0
23.1–25.5	23.1–25.2	AR 44.0
25.6–26.7	25.3–26.6	AR 47.0
26.8–28.3	26.7–28.2	AR 51.0
28.4–30.3	28.3–30.2	AR 55.0
30.4–32.5	30.3–32.3	AR 60.0
32.6–34.5	32.4–34.3	AR 66.0
34.6–37.6	34.4–36.7	AR 72.0
37.7–39.7	36.8–39.3	AR 79.0
39.8–41.4	39.4–45.0	AR 86.0
41.5–45.0	—	AR 94.0

Table 63

Motor FLC (A)	Thermal Unit Number
1 or 2 T. U.	3 T. U.
15.1–17.0	AU 20.0
17.1–19.1	AU 23.0
19.2–21.8	AU 26.0
21.9–24.5	AU 29.0
24.6–27.9	AU 33.0
28.0–29.5	AU 38.0
29.6–32.9	AU 40.0
33.0–36.6	AU 44.0
36.7–40.3	AU 50.0
40.4–45.1	AU 56.0
45.2–50.4	AU 64.0
50.5–57.3	AU 72.0
57.4–62.4	AU 81.0
62.5–68.3	AU 88.0
68.4–73.9	AU 99.0
74.0–80.6	AU 110.0
80.7–86.0	AU 123.0

Table 64

Motor FLC (A)			Thermal Unit No.
2 T. U. 1Ø	2 T. U. 2Ø	3 T. U.	
0.38–0.40	0.38–0.40	0.31–0.33	AR .45
0.41–0.43	0.41–0.43	0.34–0.36	AR .49
0.44–0.48	0.44–0.48	0.37–0.39	AR .54
0.49–0.52	0.49–0.52	0.40–0.43	AR .59
0.53–0.56	0.53–0.56	0.44–0.47	AR .65
0.57–0.61	0.57–0.61	0.48–0.51	AR .71
0.62–0.67	0.62–0.67	0.52–0.56	AR .78
0.68–0.73	0.68–0.73	0.57–0.58	AR .86
0.74–0.81	0.74–0.81	0.59–0.64	AR .95
0.82–0.89	0.82–0.89	0.65–0.70	AR 1.05
0.90–0.97	0.90–0.97	0.71–0.77	AR 1.15
0.98–1.07	0.98–1.07	0.78–0.85	AR 1.26
1.08–1.17	1.08–1.17	0.86–0.94	AR 1.39
1.18–1.31	1.18–1.31	0.95–1.03	AR 1.53
1.32–1.49	1.32–1.49	1.04–1.22	AR 1.68
1.50–1.69	1.50–1.69	1.23–1.34	AR 1.85
1.70–1.83	1.70–1.83	1.35–1.46	AR 2.04
1.84–2.00	1.84–2.00	1.47–1.58	AR 2.24
2.01–2.17	2.01–2.17	1.59–1.76	AR 2.46
2.18–2.35	2.18–2.35	1.77–1.85	AR 2.71
2.36–2.60	2.36–2.60	1.86–2.08	AR 2.98
2.61–2.87	2.61–2.87	2.09–2.27	AR 3.28
2.88–3.14	2.88–3.14	2.28–2.51	AR 3.62
3.15–3.47	3.15–3.47	2.52–2.90	AR 3.98
3.48–3.90	3.48–3.90	2.91–3.23	AR 4.37
3.91–4.36	3.91–4.36	3.24–3.58	AR 4.80
4.37–4.88	4.37–4.88	3.59–4.02	AR 5.3
4.89–5.37	4.89–5.37	4.03–4.43	AR 5.8
5.38–5.97	5.38–5.97	4.44–4.86	AR 6.4
5.98–6.55	5.98–6.55	4.87–5.37	AR 7.0
6.56–7.50	6.56–7.50	5.38–6.12	AR 7.7
7.51–8.23	7.51–8.23	6.13–6.65	AR 8.5
8.24–8.99	8.24–8.99	6.66–7.31	AR 9.3
9.00–9.86	9.00–9.86	7.32–7.96	AR 10.2
9.87–10.7	9.87–10.7	7.97–8.69	AR 11.2
10.8–11.2	10.8–11.2	8.70–8.99	AR 12.4
11.3–12.8	11.3–12.0	9.00–10.1	AR 13.6
12.9–14.8	—	10.2–11.5	AR 15.4
14.9–16.7	—	11.6–12.0	AR 17.6
16.8–18.0	—	—	AR 20.5
Following Selections for Size 1 Only.			
—	11.3–12.8	—	AR 13.6
—	12.9–14.8	—	AR 15.4
—	14.9–16.7	11.6–13.0	AR 17.6
16.8–19.0	16.8–19.0	13.1–14.6	AR 20.5
19.1–22.0	19.1–22.0	14.7–16.5	AR 23.0
22.1–24.9	22.1–24.9	16.6–18.5	AR 27.0
25.0–26.0	25.0–26.0	18.6–21.0	AR 30.0
—	—	21.1–23.6	AR 35.0
—	—	23.7–26.0	AR 40.0

Table 65

Motor FLC (A)	Thermal Unit Number
0.31–0.35	B 0.44
0.36–0.39	B 0.51
0.40–0.44	B 0.57
0.45–0.50	B 0.63
0.51–0.58	B 0.71
0.59–0.65	B 0.81
0.66–0.73	B 0.92
0.74–0.82	B 1.03
0.83–0.92	B 1.16
0.93–1.03	B 1.30
1.04–1.19	B 1.45
1.20–1.34	B 1.67
1.35–1.50	B 1.88
1.51–1.67	B 2.10
1.68–1.89	B 2.40
1.90–2.14	B 2.65
2.15–2.36	B 3.00
2.37–2.65	B 3.30
2.66–2.97	B 3.70
2.98–3.47	B 4.15
3.48–3.94	B 4.85
3.95–4.44	B 5.50
4.45–4.94	B 6.25
4.95–5.52	B 6.90
5.53–5.88	B 7.70
5.89–6.52	B 8.20
6.53–7.31	B 9.10
7.32–8.21	B 10.2
8.22–9.18	B 11.5
9.19–9.90	B 12.8
10.0–11.0	B 14.0
11.1–12.4	B 15.5
12.5–13.9	B 17.5
14.0–15.7	B 19.5
15.8–17.8	B 22.0
17.9–20.0	B 25.0
20.1–22.9	B 28.0
23.0–25.0	B 32.0
Following Selections for Size 2 Only.	
23.0–25.7	B 32.0
25.8–28.6	B 36.0
28.7–32.2	B 40.0
32.3–35.8	B 45.0
35.9–40.1	B 50.0
40.2–44.4	B 56.0
44.5–50.0	B 62.0

Table 66

Motor FLC (A)	Thermal Unit Number
0.31–0.32	B 0.44
0.33–0.36	B 0.51
0.37–0.41	B 0.57
0.42–0.49	B 0.63
0.50–0.54	B 0.71
0.55–0.61	B 0.81
0.62–0.67	B 0.92
0.68–0.76	B 1.03
0.77–0.87	B 1.16
0.88–0.98	B 1.30
0.99–1.05	B 1.45
1.06–1.25	B 1.67
1.26–1.33	B 1.88
1.34–1.56	B 2.10
1.57–1.71	B 2.40
1.72–1.97	B 2.65
1.98–2.15	B 3.00
2.16–2.42	B 3.30
2.43–2.78	B 3.70
2.79–3.28	B 4.15
3.29–3.88	B 4.85
3.89–4.13	B 5.5
4.14–4.43	B 6.25
4.44–4.96	B 6.90
4.97–5.35	B 7.70
5.36–5.91	B 8.20
5.92–6.79	B 9.10
6.80–7.56	B 10.2
7.57–7.83	B 11.5
7.84–8.09	B 12.8
8.10–9.51	B 14.0
9.52–10.1	B 15.5
10.2–11.3	B 17.5
11.4–13.1	B 19.5
13.2–14.9	B 22.0
15.0–16.1	B 25.0
16.2–17.8	B 28.0
17.9–19.1	B 32.0
19.2–22.4	B 36.0
22.5–23.5	B 40.0
23.6–26.0	B 45.0

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Table 67

Motor FLC (A)	Thermal Unit Number
3.79–4.14	B 5.50
4.15–4.44	B 6.25
4.45–5.22	B 6.90
5.23–5.29	B 7.70
5.30–5.99	B 8.20
6.00–6.82	B 9.10
6.83–7.68	B 10.2
7.69–7.92	B 11.5
7.93–8.47	B 12.8
8.48–9.99	B 14.0
10.0–10.8	B 15.5
10.9–12.3	B 17.5
12.4–12.9	B 19.5
13.0–15.1	B 22.0
15.2–16.7	B 25.0
16.8–17.9	B 28.0
18.0–20.1	B 32.0
20.2–23.8	B 36.0
23.9–25.8	B 40.0
25.9–28.3	B 45.0
28.4–29.6	B 50.0
29.7–32.1	B 56.0
32.2–34.4	B 62.0
34.5–38.3	B 70.0
38.4–39.9	B 79.0
40.0–45.0	B 88.0

Table 68

Motor FLC (A)	Thermal Unit Number
14.9–16.1	CC 20.9
16.2–17.3	CC 22.8
17.4–19.5	CC 24.6
19.6–20.7	CC 26.3
20.8–22.4	CC 28.8
22.5–23.9	CC 31.0
24.0–25.8	CC 33.3
25.9–27.6	CC 36.4
27.7–29.7	CC 39.6
29.8–31.8	CC 42.7
31.9–34.2	CC 46.6
34.3–37.0	CC 50.1
37.1–39.6	CC 54.5
39.7–42.5	CC 59.4
42.6–45.0	CC 64.3
45.1–48.6	CC 68.5
48.7–51.2	CC 74.6
51.3–56.0	CC 81.5
56.1–60.1	CC 87.7
60.2–64.3	CC 94.0
64.4–68.9	CC 103.0
69.0–71.9	CC 112.0
72.0–75.4	CC 121.0
75.5–78.9	CC 132.0
79.0–82.1	CC 143.0
82.2–86.0	CC 156.0

Table 69

Motor FLC (A)		Thermal Unit Number
1 or 2 T. U.	3 T. U.	
3.46–3.90	3.38–3.65	B 4.85
3.91–4.44	3.66–4.07	B 5.50
4.45–4.91	4.08–4.36	B 6.25
4.92–5.51	4.37–5.19	B 6.90
5.52–5.84	5.20–5.59	B 7.70
5.85–6.54	5.60–5.98	B 8.20
6.55–7.33	5.99–6.78	B 9.10
7.34–8.31	6.79–7.91	B 10.2
8.32–9.22	7.92–9.12	B 11.5
9.23–10.0	9.13–10.0	B 12.8
10.1–11.2	10.1–10.7	B 14.0
11.3–12.5	10.8–12.0	B 15.5
12.6–14.2	12.1–13.5	B 17.5
14.3–16.1	13.6–14.6	B 19.5
16.2–18.4	14.7–16.7	B 22.0
18.5–20.5	16.8–18.9	B 25.0
20.6–23.2	19.0–21.6	B 28.0
23.3–26.6	21.7–24.1	B 32.0
26.7–29.6	24.2–27.6	B 36.0
29.7–33.5	27.7–31.2	B 40.0
33.6–37.2	31.3–35.5	B 45.0
37.3–41.5	35.6–37.8	B 50.0
41.6–45.0	37.9–41.5	B 56.0
—	41.6–45.0	B 62.0

Table 70

Motor FLC (A)	Thermal Unit Number
4.24–4.62	AR 8.5
4.63–5.05	AR 9.3
5.06–5.54	AR 10.2
5.55–6.13	AR 11.2
6.14–6.44	AR 12.4
6.45–7.48	AR 13.6
7.49–8.55	AR 15.4
8.56–9.74	AR 17.6
9.75–11.1	AR 20.5
11.2–12.7	AR 23.0
12.8–14.4	AR 27.0
14.5–16.4	AR 30.0
16.5–18.9	AR 35.0
19.0–21.6	AR 40.0
21.7–23.3	AR 44.0
23.4–24.9	AR 47.0
25.0–26.9	AR 51.0
27.0–29.1	AR 55.0
29.2–31.3	AR 60.0
31.4–33.5	AR 66.0
33.6–36.9	AR 72.0
37.0–39.1	AR 79.0
39.2–40.9	AR 86.0
41.0–45.0	AR 94.0

Table 71

Motor FLC (A)	Thermal Unit Number
3.98–4.53	AR 8.5
4.54–5.03	AR 9.3
5.04–5.46	AR 10.2
5.47–6.01	AR 11.2
6.02–6.31	AR 12.4
6.32–7.19	AR 13.6
7.20–8.29	AR 15.4
8.30–9.49	AR 17.6
9.50–11.0	AR 20.5
11.1–12.6	AR 23.0
12.7–14.3	AR 27.0
14.4–16.5	AR 30.0
16.6–19.2	AR 35.0
19.3–21.9	AR 40.0
22.0–23.8	AR 44.0
23.9–25.5	AR 47.0
25.6–27.7	AR 51.0
27.8–30.1	AR 55.0
30.2–32.5	AR 60.0
32.6–34.8	AR 66.0
34.9–38.5	AR 72.0
38.6–41.5	AR 79.0
41.6–45.0	AR 86.0

Table 72

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
2.38–2.62	2.38–2.62	FB 3.33
2.63–2.94	2.63–2.94	FB 3.71
2.95–3.31	2.95–3.31	FB 4.1
3.32–3.43	3.32–3.43	FB 4.5
3.44–3.81	3.44–3.81	FB 4.75
3.82–4.32	3.82–4.32	FB 5.3
4.33–4.75	4.33–4.75	FB 6.1
4.76–5.38	4.76–5.38	FB 6.75
5.39–5.75	5.39–5.75	FB 7.45
5.76–5.97	5.76–5.97	FB 7.8
5.98–6.30	5.98–6.30	FB 8.21
6.31–6.55	6.31–6.55	FB 8.6
6.56–6.89	6.56–6.89	FB 9.0
6.90–7.14	6.90–7.14	FB 9.5
7.15–7.36	7.15–7.36	FB 10.0
7.37–8.30	7.37–8.30	FB 10.6
8.31–8.59	8.31–8.59	FB 11.2
8.60–9.01	8.60–9.01	FB 12.1
9.02–9.68	9.02–9.68	FB 13.1
9.69–9.99	9.69–9.99	FB 13.9
10.0–10.9	10.0–10.9	FB 14.8
11.0–11.3	11.0–11.3	FB 15.6
11.4–12.4	11.4–12.0	FB 16.4
12.5–12.9	—	FB 17.6
13.0–14.0	—	FB 18.4
14.1–14.5	—	FB 19.4
14.6–15.7	—	FB 21.1
15.8–16.6	—	FB 22.6
16.7–18.0	—	FB 23.6
Following Selections for Size M–1 & M–1P Only.		
—	11.4–12.4	FB 16.4
—	12.5–12.9	FB 17.6
—	13.0–14.0	FB 18.4
—	14.1–14.5	FB 19.4
—	14.6–15.7	FB 21.1
—	15.8–16.6	FB 22.6
16.7–17.6	16.7–17.6	FB 23.6
17.7–18.3	17.7–18.3	FB 24.8
18.4–19.4	18.4–19.4	FB 26.7
19.5–20.5	19.5–20.5	FB 28.3
20.6–21.7	20.6–21.7	FB 29.6
21.8–22.8	21.8–22.8	FB 30.5
22.9–24.3	22.9–24.3	FB 32.5
24.4–24.7	24.4–24.7	FB 34.1
24.8–25.4	24.8–25.4	FB 35.0
25.5–26.0	25.5–26.0	FB 36.6
Following Selections for Size M–1P Only.		
26.1–27.7	—	FB 38.3
27.8–28.9	—	FB 40.2
29.0–30.6	—	FB 42.0
30.7–32.5	—	FB 44.0
32.6–36.0	—	FB 46.0

Table 73

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
2.42–2.67	2.42–2.67	FB 3.33
2.68–3.00	2.68–3.00	FB 3.71
3.01–3.36	3.01–3.36	FB 4.1
3.37–3.53	3.37–3.53	FB 4.5
3.54–3.91	3.54–3.91	FB 4.75
3.92–4.41	3.92–4.41	FB 5.3
4.42–4.83	4.42–4.83	FB 6.1
4.84–5.45	4.84–5.45	FB 6.75
5.46–5.89	5.46–5.89	FB 7.45
5.90–6.04	5.90–6.04	FB 7.8
6.05–6.55	6.05–6.55	FB 8.21
6.56–6.72	6.56–6.72	FB 8.6
6.73–7.00	6.73–7.00	FB 9.0
7.01–7.39	7.01–7.39	FB 9.5
7.40–7.54	7.40–7.54	FB 10.0
7.55–8.41	7.55–8.41	FB 10.6
8.42–8.91	8.42–8.91	FB 11.2
8.92–9.16	8.92–9.16	FB 12.1
9.17–10.0	9.17–10.0	FB 13.1
10.1–10.3	10.1–10.3	FB 13.9
10.4–11.4	10.4–11.4	FB 14.8
11.5–11.8	11.5–11.8	FB 15.6
11.9–12.9	11.9–12.9	FB 16.4
13.0–13.4	—	FB 17.6
13.5–14.2	—	FB 18.4
14.3–15.1	—	FB 19.4
15.2–18.0	—	FB 21.1
Following Selections for Size M–1 & M–1P Only.		
—	11.5–11.8	FB 15.6
—	11.9–12.9	FB 16.4
—	13.0–13.4	FB 17.6
—	13.5–14.2	FB 18.4
—	14.3–15.1	FB 19.4
15.2–17.1	15.2–17.1	FB 21.1
17.2–18.0	17.2–18.0	FB 22.6
18.1–18.9	18.1–18.9	FB 23.6
19.0–19.7	19.0–19.7	FB 24.8
19.8–20.9	19.8–20.9	FB 26.7
21.0–21.9	21.0–21.9	FB 28.3
22.0–23.1	22.0–23.1	FB 29.6
23.2–24.3	23.2–24.3	FB 30.5
24.4–25.5	24.4–25.5	FB 32.6
25.6–26.0	25.6–26.0	FB 34.1
Following Selections for Size M–1P Only.		
26.1–26.8	—	FB 35.0
26.9–27.3	—	FB 36.6
27.4–28.7	—	FB 38.3
28.8–30.2	—	FB 40.2
30.3–31.9	—	FB 42.0
32.0–36.0	—	FB 44.0

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Table 74

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
2.23–2.47	2.23–2.47	FB 3.33
2.48–2.76	2.48–2.76	FB 3.71
2.77–3.04	2.77–3.04	FB 4.1
3.05–3.24	3.05–3.24	FB 4.5
3.25–3.61	3.25–3.61	FB 4.75
3.62–4.19	3.62–4.19	FB 5.3
4.20–4.62	4.20–4.62	FB 6.1
4.63–5.14	4.63–5.14	FB 6.75
5.15–5.39	5.15–5.39	FB 7.45
5.40–5.69	5.40–5.69	FB 7.8
5.70–5.99	5.70–5.99	FB 8.21
6.00–6.29	6.00–6.29	FB 8.6
6.30–6.64	6.30–6.64	FB 9.0
6.65–6.99	6.65–6.99	FB 9.5
7.00–7.39	7.00–7.39	FB 10.0
7.40–7.79	7.40–7.79	FB 10.6
7.80–7.94	7.80–7.94	FB 11.2
7.95–8.49	7.95–8.49	FB 12.1
8.50–8.99	8.50–8.99	FB 13.1
9.00–9.59	9.00–9.59	FB 13.9
9.60–10.1	9.60–10.1	FB 14.8
10.2–10.6	10.2–10.6	FB 15.6
10.7–11.3	10.7–11.3	FB 16.4
11.4–12.0	11.4–12.0	FB 17.6
12.0–12.6	—	FB 18.4
12.7–13.8	—	FB 19.4
13.9–14.7	—	FB 21.1
14.8–15.2	—	FB 22.6
15.3–16.2	—	FB 23.6
16.3–18.0	—	FB 24.8
Following Selections for Size 1 Only.		
—	12.0–12.6	FB 18.4
—	12.7–13.8	FB 19.4
13.9–14.7	13.9–14.7	FB 21.1
14.8–15.2	14.8–15.2	FB 22.6
15.3–16.2	15.3–16.2	FB 23.6
16.3–17.4	16.3–17.4	FB 24.8
17.5–18.5	17.5–18.5	FB 26.7
18.6–19.6	18.6–19.6	FB 28.3
19.7–20.2	19.7–20.2	FB 29.6
20.3–21.5	20.3–21.5	FB 30.5
21.6–22.4	21.6–22.4	FB 32.6
22.5–23.2	22.5–23.2	FB 34.1
23.3–24.3	23.3–24.3	FB 35.0
24.4–25.4	24.4–25.4	FB 36.6
25.5–26.0	25.5–26.0	FB 38.3

Table 75

Motor FLC (A)	Thermal Unit Number
3.22–3.57	FB 4.75
3.58–4.14	FB 5.3
4.15–4.56	FB 6.1
4.57–5.10	FB 6.75
5.11–5.39	FB 7.45
5.40–5.64	FB 7.8
5.65–5.96	FB 8.21
5.97–6.25	FB 8.6
6.26–6.58	FB 9.0
6.59–6.91	FB 9.5
6.92–7.41	FB 10.0
7.42–7.82	FB 10.6
7.83–8.32	FB 11.2
8.33–8.89	FB 12.1
8.90–9.47	FB 13.1
9.48–10.0	FB 13.9
10.1–10.5	FB 14.8
10.6–11.1	FB 15.6
11.2–12.0	FB 16.4
12.1–12.7	FB 17.6
12.8–13.5	FB 18.4
13.6–14.6	FB 19.4
14.7–15.7	FB 21.1
15.8–16.5	FB 22.6
16.6–17.4	FB 23.6
17.5–18.8	FB 24.8
18.9–20.1	FB 26.7
20.2–21.0	FB 28.3
21.1–21.6	FB 29.6
21.7–23.3	FB 30.5
23.4–24.3	FB 32.6
24.4–25.0	FB 34.1
25.1–26.3	FB 35.0
26.4–27.6	FB 36.6
27.7–29.1	FB 38.3
29.2–30.4	FB 40.2
30.5–32.0	FB 42.0
32.1–33.3	FB 44.0
33.4–35.2	FB 46.0
35.3–37.0	FB 48.0
37.1–38.5	FB 50.5
38.6–40.7	FB 52.5
40.8–45.0	FB 55.5

Table 76

Motor FLC (A)	Thermal Unit Number
19.9–20.8	FB 26.7
20.9–22.2	FB 28.3
22.3–23.8	FB 29.6
23.9–25.4	FB 30.5
25.5–27.2	FB 32.6
27.3–29.2	FB 34.1
29.3–31.9	FB 38.3
32.0–33.8	FB 40.2
33.9–36.1	FB 42.0
36.2–38.5	FB 44.0
38.6–41.4	FB 46.0
41.5–43.6	FB 48.0
43.7–45.9	FB 50.5
46.0–48.2	FB 52.5
48.3–50.7	FB 55.5
50.8–53.9	FB 58.0
54.0–56.7	FB 60.0
56.8–60.8	FB 63.5
60.9–67.6	FB 69.0
67.7–73.6	FB 77.0
73.7–82.9	FB 84.0
83.0–86.0	FB 92.0

Table 77

Motor FLC (A)	Thermal Unit Number
48.0–50.9	FB 50.5
51.0–53.7	FB 52.5
53.8–57.0	FB 55.5
57.1–60.4	FB 58.0
60.5–64.0	FB 60.0
64.1–71.9	FB 63.5
72.0–83.9	FB 69.0
84.0–93.1	FB 77.0
93.2–104	FB 84.0
105–109	FB 92.0
110–123	FB 105.0
124–133	FB 115.0

Table 78

Motor FLC (A)		Thermal Unit Number
1 T. U.	2 T. U. or 3 T. U.	
2.26–2.51	2.26–2.51	FB 3.33
2.52–2.82	2.52–2.82	FB 3.71
2.83–3.09	2.83–3.09	FB 4.1
3.10–3.30	3.10–3.30	FB 4.5
3.31–3.69	3.31–3.69	FB 4.75
3.70–4.27	3.70–4.27	FB 5.3
4.28–4.72	4.28–4.72	FB 6.1
4.73–5.25	4.73–5.25	FB 6.75
5.26–5.53	5.26–5.53	FB 7.45
5.54–5.81	5.54–5.81	FB 7.8
5.82–6.14	5.82–6.14	FB 8.21
6.15–6.44	6.15–6.44	FB 8.6
6.45–6.81	6.45–6.81	FB 9.0
6.82–7.19	6.82–7.19	FB 9.5
7.20–7.59	7.20–7.59	FB 10.0
7.60–7.99	7.60–7.99	FB 10.6
8.00–8.17	8.00–8.17	FB 11.2
8.18–8.74	8.18–8.74	FB 12.1
8.75–9.31	8.75–9.31	FB 13.1
9.32–9.94	9.32–9.94	FB 13.9
9.95–10.5	9.95–10.5	FB 14.8
10.6–11.1	10.6–11.1	FB 15.6
11.2–11.9	11.2–12.0	FB 16.4
12.0–12.4	—	FB 17.6
12.5–13.1	—	FB 18.4
13.2–14.3	—	FB 19.4
14.4–15.3	—	FB 21.1
15.4–15.9	—	FB 22.6
16.0–18.0	—	FB 23.6
Following Selections for Size 1 Only.		
—	12.0–12.4	FB 17.6
—	12.5–13.1	FB 18.4
—	13.2–14.3	FB 19.4
14.4–15.3	14.4–15.3	FB 21.1
15.4–15.9	15.4–15.9	FB 22.6
16.0–16.9	16.0–16.9	FB 23.6
17.0–18.3	17.0–18.3	FB 24.8
18.4–19.5	18.4–19.5	FB 26.7
19.6–20.5	19.6–20.5	FB 28.3
20.6–21.1	20.6–21.1	FB 29.6
21.2–22.6	21.2–22.6	FB 30.5
22.7–23.7	22.7–23.7	FB 32.6
23.8–24.3	23.8–24.3	FB 35.0
24.4–26.0	24.4–26.0	

Table 79

Motor FLC (A)	Thermal Unit Number
3.31–3.67	FB 4.75
3.68–4.23	FB 5.3
4.24–4.69	FB 6.1
4.70–5.21	FB 6.75
5.22–5.49	FB 7.45
5.50–5.74	FB 7.8
5.75–6.07	FB 8.21
6.08–6.35	FB 8.6
6.36–6.71	FB 9.0
6.72–7.03	FB 9.5
7.04–7.53	FB 10.0
7.54–7.91	FB 10.6
7.92–8.53	FB 11.2
8.54–9.14	FB 12.1
9.15–9.71	FB 13.1
9.72–10.2	FB 13.9
10.3–10.8	FB 14.8
10.9–11.5	FB 15.6
11.6–12.3	FB 16.4
12.4–13.0	FB 17.6
13.1–13.9	FB 18.4
14.0–15.1	FB 19.4
15.2–16.1	FB 21.1
16.2–16.9	FB 22.6
17.0–17.9	FB 23.6
18.0–19.4	FB 24.8
19.5–20.7	FB 26.7
20.8–21.7	FB 28.3
21.8–22.3	FB 29.6
22.4–23.9	FB 30.5
24.0–25.1	FB 32.6
25.2–25.9	FB 34.1
26.0–27.1	FB 35.0
27.2–28.6	FB 36.6
28.7–30.1	FB 38.3
30.2–31.7	FB 40.2
31.8–33.3	FB 42.0
33.4–34.5	FB 44.0
34.6–36.5	FB 46.0
36.6–38.5	FB 48.0
38.6–39.9	FB 50.5
40.0–45.0	FB 52.5

Table 80

Motor FLC (A)	Thermal Unit Number
20.5–21.7	FB 26.7
21.8–23.1	FB 28.3
23.2–24.8	FB 29.6
24.9–26.5	FB 30.5
26.6–28.4	FB 32.6
28.5–30.4	FB 34.1
30.5–32.8	FB 38.3
32.9–34.9	FB 40.2
35.0–37.3	FB 42.0
37.4–39.8	FB 44.0
39.9–42.5	FB 46.0
42.6–45.8	FB 48.0
45.9–48.2	FB 50.5
48.3–50.6	FB 52.5
50.7–53.1	FB 55.5
53.2–56.5	FB 58.0
56.6–59.4	FB 60.0
59.5–63.4	FB 63.5
63.5–71.0	FB 69.0
71.1–78.8	FB 77.0
78.9–86.0	FB 84.0

Table 81

Motor FLC (A)	Thermal Unit Number
52.2–55.6	FB 50.5
55.7–58.8	FB 52.5
58.9–62.5	FB 55.5
62.6–66.0	FB 58.0
66.1–70.1	FB 60.0
70.2–78.6	FB 63.5
78.7–92.0	FB 69.0
92.1–102	FB 77.0
103–114	FB 84.0
115–123	FB 92.0
124–133	FB 105.0

Table 82

Motor FLC (A)	Thermal Unit Number
2.36–2.63	FB 3.33
2.64–2.96	FB 3.71
2.97–3.23	FB 4.1
3.24–3.45	FB 4.5
3.46–3.86	FB 4.75
3.87–4.44	FB 5.3
4.45–4.95	FB 6.1
4.96–5.47	FB 6.75
5.48–5.75	FB 7.45
5.76–6.09	FB 7.8
6.10–6.42	FB 8.21
6.43–6.75	FB 8.6
6.76–7.16	FB 9.0
7.17–7.43	FB 9.5
7.44–7.99	FB 10.0
8.00–8.46	FB 10.6
8.47–9.19	FB 11.2
9.20–9.74	FB 12.1
9.75–10.3	FB 13.1
10.4–10.8	FB 13.9
10.9–11.6	FB 14.8
11.7–12.2	FB 15.6
12.3–13.1	FB 16.4
13.2–13.7	FB 17.6
13.8–14.3	FB 18.4
14.4–15.5	FB 19.4
15.6–16.7	FB 21.1
16.8–17.6	FB 22.6
17.7–18.6	FB 23.6
18.7–19.9	FB 24.8
20.0–21.1	FB 92.0
21.2–25.0	FB 105.0

Table 83

Motor FLC (A)	Thermal Unit Number
2.30–2.60	FB 3.33
2.61–2.87	FB 3.71
2.88–3.17	FB 4.1
3.18–3.37	FB 4.5
3.38–3.76	FB 4.75
3.77–4.29	FB 5.3
4.30–4.75	FB 6.1
4.76–5.26	FB 6.75
5.27–5.51	FB 7.45
5.52–5.78	FB 7.8
5.79–6.13	FB 8.21
6.14–6.41	FB 8.6
6.42–6.75	FB 9.0
6.76–7.09	FB 9.5
7.10–7.57	FB 10.0
7.58–7.90	FB 10.6
7.91–8.81	FB 11.2
8.82–9.47	FB 12.1
9.48–10.0	FB 13.1
10.1–10.7	FB 13.9
10.8–11.4	FB 14.8
11.5–12.1	FB 15.6
12.2–13.1	FB 16.4
13.2–13.7	FB 17.6
13.8–14.7	FB 18.4
14.8–16.0	FB 19.4
16.1–17.3	FB 21.1
17.4–18.2	FB 22.6
18.3–19.4	FB 23.6
19.5–20.7	FB 24.8
20.8–22.3	FB 26.7
22.4–23.5	FB 28.3
23.6–24.2	FB 29.6
24.3–26.0	FB 30.5

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Table 84

Motor FLC (A)	Thermal Unit Number
3.38–3.78	FB 4.75
3.79–4.37	FB 5.3
4.38–4.87	FB 6.1
4.88–5.51	FB 6.75
5.52–5.73	FB 7.45
5.74–6.09	FB 7.8
6.10–6.44	FB 8.21
6.45–6.75	FB 8.6
6.76–7.15	FB 9.0
7.16–7.57	FB 9.5
7.58–8.07	FB 10.0
8.08–8.47	FB 10.6
8.48–8.81	FB 11.2
8.82–9.46	FB 12.1
9.47–10.1	FB 13.1
10.2–10.8	FB 13.9
10.9–11.4	FB 14.8
11.5–12.1	FB 15.6
12.2–13.1	FB 16.4
13.2–13.8	FB 17.6
13.9–14.8	FB 18.4
14.9–16.1	FB 19.4
16.2–17.4	FB 21.1
17.5–18.3	FB 22.6
18.4–19.5	FB 23.6
19.6–21.0	FB 24.8
21.1–22.5	FB 26.7
22.6–23.7	FB 28.3
23.8–24.5	FB 29.6
24.6–26.4	FB 30.5
26.5–27.7	FB 32.6
27.8–28.7	FB 34.1
28.8–29.9	FB 35.0
30.0–31.8	FB 36.6
31.9–33.5	FB 38.3
33.6–35.1	FB 40.2
35.2–37.1	FB 42.0
37.2–38.8	FB 44.0
38.9–41.1	FB 46.0
41.2–45.0	FB 48.0

Table 85

Motor FLC (A)	Thermal Unit Number
42.9–45.4	FB 44.0
45.6–48.3	FB 46.0
48.4–52.4	FB 48.0
52.5–55.9	FB 50.5
56.0–59.8	FB 52.5
59.9–63.8	FB 55.5
63.9–67.9	FB 58.0
68.0–72.6	FB 60.0
72.7–83.2	FB 63.5
83.3–94.7	FB 69.0
94.8–105	FB 77.0
106–116	FB 84.0
117–121	FB 92.0
122–133	FB 105.0

Table 86

Motor FLC (A)	Thermal Unit Number
0.43–0.44	A .49
0.45–0.47	A .54
0.48–0.53	A .59
0.54–0.61	A .65
0.62–0.65	A .71
0.66–0.71	A .78
0.72–0.79	A .86
0.80–0.86	A .95
0.87–0.96	A 1.02
0.97–1.04	A 1.16
1.05–1.17	A 1.25
1.18–1.31	A 1.39
1.32–1.38	A 1.54
1.39–1.47	A 1.63
1.48–1.57	A 1.75
1.58–1.65	A 1.86
1.66–1.77	A 1.99
1.78–1.93	A 2.15
1.94–2.18	A 2.31
2.19–2.46	A 2.57
2.47–2.68	A 2.81
2.69–2.87	A 3.61
2.88–3.07	A 3.95
3.08–3.59	A 4.32
3.60–3.79	A 4.79
3.80–4.27	A 5.30
4.28–4.59	A 5.78
4.60–4.90	A 6.20
4.91–5.06	A 6.99
5.07–5.44	A 7.65
5.45–6.24	A 8.38
6.25–7.21	A 9.25
7.22–7.69	A 9.85
7.70–8.24	A 11.0
8.25–8.81	A 11.9
8.82–9.32	A 132
9.33–9.99	A 14.1
10.0–10.5	A 14.8
10.6–11.5	A 16.2
11.6–12.2	A 17.9
12.3–13.3	A 21.3
13.4–15.8	A 25.2
15.9–18.4	A 27.1
18.5–20.5	A 29.5
20.6–21.5	A 31.9
21.6–23.9	A 33.8
24.0–26.8	A 35.9
26.9–28.2	A 40.0
28.3–29.8	A 42.3
29.9–32.0	A 44.7

Table 87

Motor FLC (A)	Thermal Unit Number
0.40–0.41	A .49
0.42–0.45	A .54
0.46–0.51	A .59
0.52–0.58	A .65
0.59–0.63	A .71
0.64–0.68	A .78
0.69–0.76	A .86
0.77–0.83	A .95
0.84–0.93	A 1.02
0.94–1.01	A 1.16
1.02–1.14	A 1.25
1.15–1.28	A 1.39
1.29–1.34	A 1.54
1.35–1.44	A 1.63
1.45–1.55	A 1.75
1.56–1.61	A 1.86
1.62–1.71	A 1.99
1.72–1.85	A 2.15
1.86–2.04	A 2.31
2.05–2.38	A 2.57
2.39–2.60	A 2.81
2.61–2.77	A 3.61
2.78–2.98	A 3.95
2.99–3.40	A 4.32
3.41–3.64	A 4.79
3.65–4.08	A 5.30
4.09–4.38	A 5.78
4.39–4.68	A 6.20
4.69–4.79	A 6.99
4.80–5.11	A 7.65
5.12–5.84	A 8.38
5.85–6.70	A 9.25
6.71–7.18	A 9.85
7.19–7.70	A 11.0
7.71–8.14	A 11.9
8.15–8.56	A 13.2
8.57–9.15	A 14.1
9.16–9.80	A 14.8
9.81–10.6	A 16.2
10.7–11.0	A 17.9

Table 88

Motor FLC (A)	Thermal Unit Number
0.39–0.40	A .49
0.41–0.44	A .54
0.45–0.49	A .59
0.50–0.57	A .65
0.58–0.61	A .71
0.62–0.66	A .78
0.67–0.73	A .86
0.74–0.80	A .95
0.81–0.90	A 1.02
0.91–0.97	A 1.16
0.98–1.09	A 1.25
1.10–1.23	A 1.39
1.24–1.57	A 1.86
1.58–1.66	A 1.99
1.67–1.79	A 2.15
1.80–1.99	A 2.31
2.00–2.31	A 2.57
2.32–2.50	A 2.81
2.51–2.66	A 3.61
2.67–2.85	A 3.95
2.86–3.26	A 4.32
3.27–3.49	A 4.79
3.50–3.92	A 5.30
3.93–4.20	A 5.78
4.21–4.49	A 6.20
4.50–4.64	A 6.99
4.65–4.94	A 7.65
4.95–5.62	A 8.38
5.63–6.39	A 9.25
6.40–6.82	A 9.85
6.83–7.27	A 11.0
7.28–7.71	A 11.9
7.72–8.13	A 13.2
8.14–8.64	A 14.1
8.65–9.15	A 14.8
9.16–9.97	A 16.2
9.98–11.0	A 17.9

Table 89

Motor FLC (A)	Thermal Unit Number
10.0–11.1	B 17.5
11.2–12.0	B 19.5
12.1–13.3	B 22.0
13.4–15.1	B 25.0
15.2–17.1	B 28.0
17.2–18.6	B 32.0
18.7–21.4	B 36.0
21.5–25.7	B 40.0
25.8–28.2	B 45.0
28.3–29.7	B 50.0
29.8–31.2	B 56.0
31.3–32.1	B 62.0
32.2–35.7	B 70.0
35.8–40.7	B 79.0
40.8–48.0	B 88.0

Table 90

Motor FLC (A)	Thermal Unit Number
4.88–5.13	A 7.65
5.14–5.85	A 8.38
5.86–6.67	A 9.25
6.68–7.09	A 9.85
7.10–7.62	A 11.0
7.63–8.04	A 11.9
8.05–8.46	A 13.2
8.47–9.11	A 14.1
9.12–9.69	A 14.8
9.70–10.5	A 16.2
10.6–11.6	A 17.9
11.7–12.3	A 21.3
12.4–14.6	A 25.2
14.7–16.8	A 27.1
16.9–17.9	A 29.5
18.0–18.7	A 31.9
18.8–19.8	A 33.8
19.9–21.4	A 35.9
21.5–22.8	A 40.0
22.9–23.8	A 42.3
23.9–26.0	A 44.7

Table 91

Motor FLC (A)	Thermal Unit Number
4.80–5.07	A 7.65
5.08–5.73	A 8.38
5.74–6.48	A 9.25
6.49–6.90	A 9.85
6.91–7.25	A 11.0
7.26–7.81	A 11.9
7.82–8.29	A 13.2
8.30–8.81	A 14.1
8.82–9.40	A 14.8
9.41–10.0	A 16.2
10.1–11.1	A 17.9
11.2–11.7	A 21.3
11.8–13.7	A 25.2
13.8–16.0	A 27.1
16.1–16.9	A 29.5
17.0–17.7	A 31.9
17.8–18.7	A 33.8
18.8–20.2	A 35.9
20.3–21.4	A 40.0
21.5–22.5	A 42.3
22.6–23.8	A 44.7
23.9–26.0	A 48.0

Table 92

Motor FLC (A)	Thermal Unit Number
10.5–11.7	B 17.5
11.8–12.5	B 19.5
12.6–14.0	B 22.0
14.1–15.8	B 25.0
15.9–18.0	B 28.0
18.1–19.6	B 32.0
19.7–23.5	B 36.0
23.6–27.4	B 40.0
27.5–30.5	B 45.0
30.6–32.2	B 50.0
32.3–34.0	B 56.0
34.1–35.2	B 62.0
35.3–39.5	B 70.0
39.6–43.9	B 79.0
44.0–48.0	B 88.0

Table 93

Motor FLC (A)	Thermal Unit Number
23.8–25.2	CC 36.4
25.3–26.8	CC 39.6
26.9–28.4	CC 42.7
28.5–30.3	CC 46.6
30.4–32.1	CC 50.1
32.2–34.2	CC 54.5
34.3–36.3	CC 59.4
36.4–40.2	CC 64.3
40.3–43.1	CC 68.5
43.2–45.9	CC 74.6
46.0–49.2	CC 81.5
49.3–51.6	CC 87.7
51.7–54.2	CC 94.0
54.3–55.7	CC 103.0
55.8–60.3	CC 112.0
60.4–63.5	CC 121.0
63.6–67.1	CC 132.0
67.2–70.3	CC 143.0
70.4–74.1	CC 156.0
74.2–78.3	CC 167.0
78.4–83.3	CC 180.0
83.4–86.0	CC 196.0

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Table 94

Motor FLC (A)	Thermal Unit Number
25.8–27.5	CC 36.4
27.6–29.4	CC 39.6
29.5–31.4	CC 42.7
31.5–33.2	CC 46.6
33.3–36.2	CC 50.1
36.3–38.8	CC 54.5
38.9–41.6	CC 59.4
41.7–44.7	CC 64.3
44.8–47.9	CC 68.5
48.0–50.9	CC 74.6
51.0–54.4	CC 81.5
54.5–57.4	CC 87.7
57.5–60.6	CC 94.0
60.7–63.9	CC 103.0
64.0–68.4	CC 112.0
68.5–73.4	CC 121.0
73.5–78.7	CC 132.0
78.8–83.8	CC 143.0
83.9–86.0	CC 156.0

Table 95

Motor FLC (A)	Thermal Unit Number
42.5–44.7	CC 64.3
44.8–47.9	CC 68.5
48.0–51.2	CC 74.6
51.3–55.2	CC 81.5
55.3–59.4	CC 87.7
59.5–63.8	CC 94.0
63.9–68.8	CC 103.0
68.9–73.8	CC 112.0
73.9–77.7	CC 121.0
77.8–82.5	CC 132.0
82.6–86.6	CC 143.0
86.7–91.9	CC 156.0
92.0–97.2	CC 167.0
97.3–104	CC 180.0
105–114	CC 196.0
115–123	CC 208.0
124–150	CC 219.0

Table 96

Motor FLC (A)	Thermal Unit Number
49.5–52.0	CC 64.3
52.1–54.8	CC 68.5
54.9–58.7	CC 74.6
58.8–63.3	CC 81.5
63.4–68.3	CC 87.7
68.4–73.6	CC 94.0
73.7–79.4	CC 103.0
79.5–85.5	CC 112.0
85.6–89.7	CC 121.0
89.8–94.8	CC 132.0
94.9–99.9	CC 143.0
100–105	CC 156.0
106–111	CC 167.0
112–126	CC 180.0
127–131	CC 196.0
132–141	CC 208.0
142–150	CC 219.0

Table 97

Motor FLC (A)	Thermal Unit Number
0.57–0.60	AR 1.05
0.61–0.66	AR 1.15
0.67–0.73	AR 1.26
0.74–0.81	AR 1.39
0.82–0.90	AR 1.53
0.91–1.05	AR 1.68
1.06–1.15	AR 1.85
1.16–1.25	AR 2.04
1.26–1.35	AR 2.24
1.36–1.47	AR 2.46
1.48–1.58	AR 2.71
1.59–1.74	AR 2.98
1.75–1.94	AR 3.28
1.95–2.20	AR 3.62
2.21–2.47	AR 3.98
2.48–2.76	AR 4.37
2.77–3.07	AR 4.80
3.08–3.45	AR 5.3
3.46–3.81	AR 5.8
3.82–4.20	AR 6.4
4.21–4.65	AR 7.0
4.66–5.29	AR 7.7
5.30–5.84	AR 8.5
5.85–6.27	AR 9.3
6.28–6.97	AR 10.2
6.98–7.59	AR 11.2
7.60–7.89	AR 12.4
7.90–8.95	AR 13.6
8.96–10.3	AR 15.4
10.4–11.7	AR 17.6
11.8–13.3	AR 20.5
13.4–15.2	AR 23.0
15.3–17.2	AR 27.0
17.3–19.7	AR 30.0
19.8–22.4	AR 35.0
22.5–26.0	AR 40.0

Table 98

Motor FLC (A)	Thermal Unit Number
4.24–4.62	AR 8.5
4.63–5.05	AR 9.3
5.06–5.54	AR 10.2
5.55–6.13	AR 11.2
6.14–6.44	AR 12.4
6.45–7.48	AR 13.6
7.49–8.55	AR 15.4
8.56–9.74	AR 17.6
9.75–11.1	AR 20.5
11.2–12.7	AR 23.0
12.8–14.4	AR 27.0
14.5–16.4	AR 30.0
16.5–18.9	AR 35.0
19.0–21.6	AR 40.0
21.7–23.3	AR 44.0
23.4–24.9	AR 47.0
25.0–26.9	AR 51.0
27.0–29.1	AR 55.0
29.2–31.3	AR 60.0
31.4–33.5	AR 66.0
33.6–36.9	AR 72.0
37.0–39.1	AR 79.0
39.2–40.9	AR 86.0
41.0–45.0	AR 94.0

Table 99

Motor FLC (A)	Thermal Unit Number
27.1–30.0	E 67
30.1–33.2	E 69
33.3–35.7	E 70
35.8–39.4	E 71
39.5–43.4	E 72
43.5–46.9	E 73
47.0–51.5	E 74
51.6–57.0	E 76
57.1–62.8	E 77
62.9–69.1	E 78
69.2–75.0	E 79
75.1–83.3	E 80

Table 100

Motor FLC (A)	Thermal Unit Number
50–55.9	E 88
56–60.9	E 89
91–65.9	E 91
66–69.9	E 92
70–75.9	E 93
76–81.9	E 94
82–86.9	E 96
87–92.9	E 97
93–97.9	E 98
98–107.9	E 99
108–113.9	E 101
114–125.9	E 102

Table 101

Motor FLC (A)	Thermal Unit Number
105–116	AR 3.28
117–132	AR 3.62
133–148	AR 3.98
149–165	AR 4.37
166–184	AR 4.80
185–207	AR 5.3
208–229	AR 5.8
230–266	AR 6.4

Table 102

Motor FLC (A)	Thermal Unit Number
146–169	AR 1.68
170–185	AR 1.85
186–201	AR 2.04
202–217	AR 2.24
218–236	AR 2.46
237–253	AR 2.71
254–279	AR 2.98
280–311	AR 3.28
312–353	AR 3.62
354–396	AR 3.98
397–442	AR 4.37
443–492	AR 4.80
493–520	AR 5.3

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Table 103

Motor FLC (A)	Thermal Unit Number
40.8–45.5	B 1.03
45.6–49.9	B 1.16
51.0–57.5	B 1.30
57.6–65.9	B 1.45
66.0–73.1	B 1.67
73.2–81.5	B 1.88
81.6–92.3	B 2.10
92.4–104	B 2.40
105–114	B 2.65
115–128	B 3.00
129–140	B 3.30
141–160	B 3.70
161–193	B 4.15
194–209	B 4.85
210–232	B 5.50
233–248	B 6.25
249–266	B 6.90

Table 104

Motor FLC (A)	Thermal Unit Number	Max. Fuse Rating (A)	
		600 V Max.	250 V Max.
0.65–0.73	B 1.03	1.50	
0.74–0.82	B 1.16	1.50	
0.93–0.91	B 1.30	1.60	
0.92–1.04	B 1.45	2.00	
1.05–1.16	B 1.67	2.00	
1.17–1.26	B 1.88	2.25	
1.27–1.47	B 2.10	2.60	
1.48–1.65	B 2.40	3.00	
1.66–1.89	B 2.65	3.50	
1.90–2.17	B 3.00	4.00	
2.18–2.49	B 3.30	4.50	
2.50–2.79	B 3.70	5.00	
2.80–3.13	B 4.15	5.60	
3.14–3.36	B 4.85	6.00	
3.37–3.69	B 5.50	7.00	
3.70–3.92	B 6.25	7.00	
3.93–4.42	B 6.90	8.00	
4.43–4.99	B 7.70	9.00	
5.00–5.27	B 8.20	10.0	
5.28–5.84	B 9.10	12.0	
5.85–6.61	B 10.2	12.0	
6.62–7.42	B 11.5	15.0	
7.43–8.02	B 12.8	15.0	
8.03–8.53	B 14.0	15.0	
8.54–9.34	B 15.5	17.5	
9.35–10.1	B 17.5	17.5	
10.2–10.8	B 19.5	20.0	
10.9–12.0	B 22.0	25.0	
12.1–13.0	B 25.0	25.0	
13.1–15.5	B 28.0	30.0	
15.6–17.9	B 32.0	30	30
18.0–21.4	B 36.0	30	40
21.5–25.1	B 40.0	30	40
25.2–27.0	B 45.0	30	40

Table 105

Motor FLC (A)	Thermal Unit Number
105–112	CC 74.6
113–122	CC 81.5
123–131	CC 87.7
132–142	CC 94.0
143–153	CC 103.0
154–157	CC 112.0
158–169	CC 121.0
170–181	CC 132.0
182–195	CC 143.0
196–209	CC 156.0
210–227	CC 167.0
228–247	CC 180.0
248–266	CC 196.0

Table 109

Motor FLC (A)	Thermal Unit Number
0.56–0.63	B 0.81
0.64–0.68	B 0.92
0.69–0.77	B 1.03
0.78–0.85	B 1.16
0.86–0.97	B 1.30
0.98–1.09	B 1.45
1.10–1.21	B 1.67
1.22–1.33	B 1.88
1.34–1.53	B 2.10
1.54–1.73	B 2.40
1.74–1.89	B 2.65
1.90–2.17	B 3.00
2.18–2.53	B 3.30
2.54–2.87	B 3.70
2.88–3.22	B 4.15
3.23–3.49	B 4.85
3.50–3.85	B 5.50
3.86–4.11	B 6.25
4.12–4.70	B 6.90
4.71–5.21	B 7.70
5.22–5.53	B 8.20
5.54–6.17	B 9.10
6.18–7.02	B 10.2
7.03–7.92	B 11.5
7.93–8.61	B 12.8
8.62–9.17	B 14.0
9.18–10.0	B 15.5
10.1–11.0	B 17.5
11.1–11.8	B 19.5
11.9–13.5	B 22.0
13.6–15.3	B 25.0
15.4–17.4	B 28.0
17.5–19.4	B 32.0
19.5–22.2	B 36.0
22.3–25.1	B 40.0
25.2–27.0	B 45.0

Table 110

Motor FLC (A)	Thermal Unit Number
3.94–4.45	B 6.90
4.46–4.97	B 7.70
4.98–5.28	B 8.20
5.29–5.97	B 9.10
5.98–6.89	B 10.2
6.90–7.92	B 11.5
7.93–8.71	B 12.8
8.72–9.27	B 14.0
9.28–10.2	B 15.5
10.3–11.4	B 17.5
11.5–12.3	B 19.5
12.4–13.9	B 22.0
14.0–15.8	B 25.0
15.9–17.9	B 28.0
18.0–19.9	B 32.0
20.0–22.8	B 36.0
22.9–25.4	B 40.0
25.5–28.9	B 45.0
29.0–30.8	B 50.0
30.9–32.5	B 56.0
32.6–34.9	B 62.0
35.0–39.7	B 70.0
39.8–44.7	B 79.0

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Table 111

Motor FLC (A)	Thermal Unit Number
14.0–14.9	CC 20.9
15.0–16.2	CC 22.8
16.3–17.2	CC 24.6
17.3–18.7	CC 26.3
18.8–20.2	CC 28.8
20.3–21.7	CC 31.0
21.8–23.3	CC 33.3
23.4–25.2	CC 36.4
25.3–27.1	CC 39.6
27.2–29.4	CC 42.7
29.5–31.6	CC 46.6
31.7–34.0	CC 50.1
34.1–36.8	CC 54.5
36.9–39.8	CC 59.4
39.9–42.3	CC 64.3
42.4–45.7	CC 68.5
45.8–49.2	CC 74.6
49.3–52.8	CC 81.5
52.9–56.8	CC 87.7
56.9–61.2	CC 94.0
61.3–66.1	CC 103.0
66.2–71.2	CC 112.0
71.3–76.7	CC 121.0
76.8–82.9	CC 132.0
83.0–90.0	CC 143.0

Table 112

Motor FLC (A)	Thermal Unit Number
44.0–46.8	CC 64.3
46.9–50.6	CC 68.5
50.7–54.5	CC 74.6
54.6–58.4	CC 81.5
58.5–62.9	CC 87.7
63.0–67.7	CC 94.0
67.8–72.9	CC 103.0
73.0–78.1	CC 112.0
78.2–83.9	CC 121.0
84.0–91.1	CC 132.0
91.2–97.5	CC 143.0
97.6–104	CC 156.0
105–113	CC 167.0
114–133	CC 180.0

Table 113

Motor FLC (A)	Thermal Unit Number
88.2–95.1	DD 112.0
95.2–101	DD 121.0
102–111	DD 128.0
112–119	DD 140.0
120–131	DD 150.0
132–149	DD 160.0
150–170	DD 185.0
171–180	DD 220.0
181–197	DD 240.0
198–204	DD 250.0
205–213	DD 265.0
214–237	DD 280.0
238–243	DD 300.0
244–266	DD 320.0

Table 114

Motor FLC (A)	Thermal Unit Number
133–148	B 1.30
149–174	B 1.45
175–195	B 1.67
196–219	B 1.88
220–239	B 2.10
240–271	B 2.40
272–308	B 2.65
309–348	B 3.00
349–397	B 3.30
398–429	B 3.70
430–495	B 4.15
496–520	B 4.85

Table 115

Motor FLC (A)	Thermal Unit Number
176–190	DD 112.0
191–203	DD 121.0
203–223	DD 128.0
224–239	DD 140.0
240–253	DD 150.0
254–299	DD 160.0
300–341	DD 185.0
342–361	DD 220.0
362–395	DD 240.0
396–409	DD 250.0
410–427	DD 265.0
428–475	DD 289.0
476–487	DD 300.0
488–532	DD 320.0

Table 116

Motor FLC (A))	Thermal Unit Number
81.6–91.1	B 1.03
91.2–101	B 1.16
102–115	B 1.30
116–131	B 1.45
132–146	B 1.67
147–163	B 1.88
164–184	B 2.10
185–209	B 2.40
210–229	B 2.65
230–257	B 3.00
258–281	B 3.30
282–321	B 3.70
322–387	B 4.15
388–419	B 4.35
420–465	B 5.60
466–497	B 6.25
496–532	B 6.90

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Table 117

Motor FLC (A)	Thermal Unit Number
100–111.9	E 88
112–121.9	E 89
122–131.9	E 91
132–139.9	E 92
140–151.9	E 93
152–163.9	E 94
164–173.9	E 96
174–185.9	E 97
186–195.9	E 98
196–215.9	E 99
216–227.9	E 101
228–251.9	E 102

Table 118

Motor FLC (A)	Thermal Unit Number
210–233	AR 3.28
234–265	AR 3.62
266–297	AR 3.98
298–331	AR 4.37
332–369	AR 4.8
370–415	AR 5.3
416–459	AR 5.8
460–532	AR 6.4

Table 121

Motor FLC (A)	Thermal Unit Number
1.14–1.21	AR 1.05
1.22–1.33	AR 1.15
1.34–1.47	AR 1.26
1.48–1.63	AR 1.39
1.64–1.81	AR 1.53
1.82–2.11	AR 1.68
2.12–2.31	AR 1.85
2.32–2.51	AR 2.04
2.52–2.71	AR 2.24
2.72–2.95	AR 2.46
2.96–3.17	AR 2.71
3.18–3.49	AR 2.98
3.50–3.89	AR 3.28
3.90–4.41	AR 3.62
4.42–4.95	AR 3.98
4.96–5.53	AR 4.37
5.54–6.15	AR 4.80
6.16–6.91	AR 5.3
6.92–7.63	AR 5.8
7.64–8.41	AR 6.4
8.42–9.31	AR 7.0
9.32–10.59	AR 7.7
10.60–11.69	AR 8.5
11.70–12.55	AR 9.3
12.56–13.95	AR 10.2
13.96–15.19	AR 11.2
15.20–15.79	AR 12.4
15.80–17.91	AR 13.6
17.92–20.7	AR 15.4
20.8–23.5	AR 17.6
23.6–26.7	AR 20.5
26.8–30.5	AR 23.0
30.6–34.5	AR 27.0
34.6–39.5	AR 30.0
39.6–44.9	AR 35.0
45.0–52.0	AR 40.0

Table 122

Motor FLC (A)	Thermal Unit Number
8.48–9.25	AR 8.5
9.26–10.11	AR 9.3
10.12–11.09	AR 10.2
11.10–12.27	AR 11.2
12.28–12.89	AR 12.4
12.90–14.97	AR 13.6
14.98–17.11	AR 15.4
17.12–19.49	AR 17.6
19.50–22.3	AR 20.5
22.4–22.5	AR 23.0
22.6–28.9	AR 27.0
29.0–32.9	AR 30.0
33.0–37.9	AR 35.0
38.0–43.3	AR 40.0
43.4–46.7	AR 44.0
46.8–49.9	AR 47.0
50.0–53.9	AR 51.0
54.0–58.3	AR 55.0
58.4–62.7	AR 60.0
62.8–67.1	AR 66.0
67.2–73.8	AR 72.0
74.0–78.3	AR 79.0
78.4–81.9	AR 86.0
82.0–90.0	AR 94.0

Table 123

Motor FLC (A)	Thermal Unit Number
54.2–60.1	E 67
60.2–66.5	E 69
66.6–71.5	E 70
71.6–78.9	E 71
79.0–86.9	E 72
87.0–93.9	E 73
94.0–103.1	E 74
103.2–114.1	E 76
114.2–125.7	E 77
125.8–138.3	E 78
138.4–150.1	E 79
150.2–166.6	E 80

Table 127

Motor FLC (A)	Thermal Unit Number
1.12–1.27	B 0.81
1.28–1.37	B 0.92
1.38–1.55	B 1.03
1.56–1.71	B 1.16
1.72–1.95	B 1.30
1.96–2.19	B 1.45
2.20–2.43	B 1.67
2.44–2.67	B 1.88
2.68–3.07	B 2.10
3.08–3.47	B 2.40
3.48–3.79	B 2.65
3.80–4.35	B 3.00
4.36–5.07	B 3.30
5.08–5.75	B 3.70
5.76–6.45	B 4.15
6.46–6.99	B 4.85
7.00–7.71	B 5.50
7.72–8.23	B 6.25
8.24–9.41	B 6.90
9.42–10.43	B 7.70
10.44–11.07	B 8.20
11.08–12.35	B 9.10
12.36–14.05	B 10.2
14.06–15.85	B 11.5
15.86–17.23	B 12.8
17.24–18.35	B 14.0
18.36–20.1	B 15.5
20.2–22.1	B 17.5
22.2–23.7	B 19.5
23.8–27.1	B 22.0
27.2–30.7	B 25.0
30.8–34.9	B 28.0
35.0–38.9	B 32.0
39.0–44.5	B 36.0
44.6–50.3	B 40.0
50.4–54.0	B 45.0

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Table 128

Motor FLC (A)	Thermal Unit Number
7.88–8.91	B 6.90
8.92–9.95	B 7.70
9.96–10.57	B 8.20
10.58–11.95	B 9.10
11.96–13.79	B 10.2
13.80–15.85	B 11.5
15.86–17.43	B 12.8
17.44–18.55	B 14.0
18.56–20.5	B 15.5
20.6–22.9	B 17.5
23.0–24.7	B 19.5
24.8–27.9	B 22.0
28.0–31.7	B 25.0
31.8–35.9	B 28.0
36.0–39.9	B 32.0
40.0–45.7	B 36.0
45.8–50.9	B 40.0
51.0–61.7	B 45.0
61.8–65.1	B 50.0
65.2–69.9	B 56.0
70.0–79.5	B 62.0
79.6–89.4	B 70.0

Table 129

Motor FLC (A)	Thermal Unit Number
28.0–29.9	CC 20.9
30.0–32.5	CC 22.8
32.6–34.5	CC 24.6
34.6–37.5	CC 26.3
37.6–40.5	CC 28.8
40.6–43.5	CC 31.0
43.6–46.7	CC 33.3
46.8–50.5	CC 36.4
50.6–54.3	CC 39.6
54.4–58.9	CC 42.7
59.0–63.3	CC 46.6
63.4–68.1	CC 50.1
68.2–73.7	CC 54.5
73.8–79.7	CC 59.4
79.8–84.7	CC 64.5
84.8–91.5	CC 68.5
91.6–98.5	CC 74.6
98.6–105.7	CC 81.5
105.8–113.7	CC 87.7
113.8–122.5	CC 94.0
122.6–132.3	CC 103.0
132.4–142.5	CC 112.0
142.6–153.5	CC 121.0
153.6–165.9	CC 132.0
166.0–180.0	CC 143.0

Table 133

Motor FLC (A)	Thermal Unit Number
4.60–5.23	B 6.90
5.24–5.86	B 7.70
5.87–6.25	B 8.20
6.26–7.09	B 9.10
7.10–8.25	B 10.2
8.26–9.49	B 11.5
9.50–10.3	B 12.8
10.4–11.2	B 14.0
11.3–12.5	B 15.5
12.6–13.8	B 17.5
13.9–15.0	B 19.5
15.1–16.9	B 22.0
17.0–19.1	B 25.0
19.2–22.0	B 28.0
22.1–24.4	B 32.0
24.5–28.0	B 36.0
28.1–31.8	B 40.0
31.9–36.0	B 45.0
36.1–38.5	B 50.0
38.6–41.2	B 56.0
41.3–44.4	B 62.0
44.5–50.3	B 70.0
50.4–56.9	B 79.0
57.0–59.0	B 88.0

Table 134

Motor FLC (A)	Thermal Unit Number
4.30–4.98	B 6.90
4.99–5.57	B 7.70
5.58–5.94	B 8.20
5.95–6.71	B 9.10
6.72–7.79	B 10.2
7.80–8.93	B 11.5
8.94–9.77	B 12.8
9.78–10.5	B 14.0
10.6–11.7	B 15.5
11.8–13.0	B 17.5
13.1–14.0	B 19.5
14.1–15.0	B 22.0
15.1–17.2	B 25.0
17.3–19.9	B 28.0
20.0–22.3	B 32.0
22.4–26.0	B 36.0
26.1–29.8	B 40.0
29.9–34.0	B 45.0
34.1–36.7	B 50.0
36.8–39.5	B 56.0
39.6–42.1	B 62.0
42.2–46.6	B 70.0
46.7–51.5	B 79.0
51.6–54.0	B 88.0

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Table 135

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
0.77–0.88	0.85–0.95	B 1.30
0.89–1.02	0.96–1.09	B 1.45
1.03–1.19	1.10–1.21	B 1.67
1.20–1.37	1.22–1.35	B 1.88
1.38–1.62	1.36–1.56	B 2.10
1.63–1.90	1.57–1.76	B 2.40
1.91–2.12	1.77–1.94	B 2.65
2.13–2.46	1.95–2.22	B 3.00
2.47–2.83	2.23–2.57	B 3.30
2.84–3.19	2.58–2.87	B 3.70
3.20–3.61	2.88–3.21	B 4.15
3.62–3.89	3.22–3.50	B 4.85
3.90–4.32	3.51–3.79	B 5.50
4.33–4.57	3.80–4.04	B 6.25
4.58–5.19	4.05–4.53	B 6.90
5.20–5.79	4.54–5.03	B 7.70
5.80–6.16	5.04–5.36	B 8.20
6.17–6.94	5.37–5.97	B 9.10
6.95–7.99	5.98–6.89	B 10.2
7.80–8.99	6.90–7.79	B 11.5
9.00–9.98	7.80–8.53	B 12.8
9.99–10.6	8.54–9.09	B 14.0
10.7–11.6	9.10–9.99	B 15.5
11.7–13.1	10.0–10.9	B 17.5
13.2–14.2	11.0–11.7	B 19.5
14.3–15.4	11.8–13.4	B 22.0
15.5–17.6	13.5–15.4	B 25.0
17.7–20.0	15.5–17.9	B 28.0
–	18.0–20.0	B 32.0
For Type DPSG12 & DPSG13, 20 A Starter. Select Thermal Units from above.		
20.1–22.7	18.0–20.2	B 32.0
22.8–25.0	20.3–23.2	B 36.0
–	23.3–25.0	B 40.0
For Type DPSG22 & DPSG23, 25 A Starter. Select any of the Thermal Units from above.		
22.8–26.1	–	B 36.0
26.2–29.6	23.3–25.8	B 40.0
29.7–30.0	25.9–28.6	B 45.0
For Type DPSG32 & DPSG33, 30 A Starter. Select any of the Thermal Units from above.		

Table 136

Motor FLC (A)		Thermal Unit Number
1 T. U.	3 T. U.	
0.98–1.09	0.88–0.98	B 1.30
1.10–1.24	0.99–1.13	B 1.45
1.25–1.41	1.14–1.26	B 1.67
1.42–1.59	1.27–1.38	B 1.88
1.60–1.81	1.39–1.62	B 2.10
1.82–2.04	1.63–1.82	B 2.40
2.05–2.19	1.83–2.04	B 2.65
2.20–2.52	2.05–2.36	B 3.00
2.53–2.90	2.37–2.72	B 3.30
2.91–3.29	2.73–3.07	B 3.70
3.30–3.69	3.08–3.44	B 4.15
3.70–3.99	3.45–3.69	B 4.85
4.00–4.42	3.70–4.11	B 5.50
4.43–4.69	4.12–4.34	B 6.25
4.70–5.37	4.35–4.89	B 6.90
5.38–5.94	4.90–5.44	B 7.70
5.95–6.34	5.45–5.80	B 8.20
6.35–7.05	5.81–6.47	B 9.10
7.06–8.14	6.48–7.45	B 10.2
8.15–9.39	7.46–8.49	B 11.5
9.40–10.3	8.50–9.29	B 12.8
10.4–11.1	9.30–9.99	B 14.0
11.2–12.2	10.0–10.8	B 15.5
12.3–13.5	10.9–12.1	B 17.5
13.6–14.7	12.2–13.1	B 19.5
14.8–16.1	13.2–14.6	B 22.0
16.2–18.3	14.7–16.4	B 25.0
18.4–20.0	16.5–18.9	B 28.0
–	19.0–20.0	B 32.0
For Type DPSO12 & DPSO13, 20 A Starter. Select Thermal Units from above.		
18.4–20.9	–	B 28.0
21.0–23.6	19.0–20.9	B 32.0
23.7–25.0	21.0–24.1	B 36.0
–	24.2–25.0	B 40.0
For Type DPSO22 & DPSO23, 25 A Starter. Select any of the Thermal Units from above.		
23.7–27.2	–	B 36.0
27.3–30.0	24.2–27.2	B 40.0
	27.3–30.0	B 45.0
For Type DPSO32 & DPSO33, 30 A Starter. Select any of the Thermal Units from above.		

Table 137

Motor FLC (A)	Thermal Unit Number
50–55.9	E 88
56–60.9	E 89
61–65.9	E 91
66–69.9	E 92
70–75.9	E 93
76–81.9	E 94
82–86.9	E 96
87–92.9	E 97
93–97.9	E 98
98–107	E 99
108–113	E 101
114–125	E 102
126–138	E 103
139–153	E 104
154–163	E 106
164–180	E 107

Table 138

Motor FLC (A)	Thermal Unit Number
22.6–25.5	E 62
25.6–26.4	E 65
26.5–28.9	E 66
29.0–31.9	E 67
32.0–34.5	E 69
34.6–36.9	E 70
37.0–40.6	E 71
40.7–44.0	E 72
44.1–47.4	E 73
47.5–53.1	E 74
53.2–58.3	E 76
58.4–63.5	E 77
63.6–69.9	E 78
70.0–77.1	E 79
77.2–83.3	E 80
83.4–86.9	E 96
87.0–92.9	E 97
93.0–100	E 98

Table 139

Motor FLC (A)	Thermal Unit Number
13.7–15.2	E 57
15.3–16.8	E 59
16.9–18.7	E 60
18.8–20.0	E 61
20.1–22.5	E 62
22.6–23.3	E 65
23.4–25.5	E 66
25.6–27.9	E 67
28.0–30.8	E 69
30.9–33.2	E 70
33.3–36.6	E 71
36.7–38.9	E 72
39.0–43.1	E 73
43.2–47.4	E 74
47.5–50.0	E 76
50.1–55.2	E 77
55.3–60.0	E 78

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Table 140

Motor FLC (A)	Thermal Unit Number
0.34–0.36	E 3
0.37–0.40	E 4
0.41–0.43	E 5
0.44–0.47	E 6
0.48–0.51	E 7
0.52–0.56	E 8
0.57–0.62	E 9
0.63–0.67	E 11
0.68–0.73	E 12
0.74–0.77	E 13
0.78–0.84	E 14
0.85–0.93	E 16
0.94–1.00	E 17
1.01–1.08	E 18
1.09–1.15	E 19
1.16–1.27	E 23
1.28–1.45	E 24
1.46–1.61	E 26
1.62–1.81	E 27
1.82–2.00	E 28
2.01–2.12	E 29
2.13–2.29	E 31
2.30–2.43	E 32
2.44–2.66	E 33
2.67–2.98	E 34
2.99–3.16	E 36
3.17–3.39	E 37
3.40–3.69	E 38
3.70–4.00	E 39
4.01–4.48	E 41
4.49–5.00	E 42
5.01–5.44	E 44
5.45–5.99	E 46
6.00–6.60	E 47
6.61–6.96	E 48
6.97–7.26	E 49
7.27–7.99	E 50
8.00–8.89	E 51
8.90–9.74	E 52
9.75–10.50	E 53
10.6–11.5	E 54
11.6–12.3	E 55
12.4–13.4	E 56
13.5–15.2	E 57
15.3–17.2	E 60
17.3–18.4	E 61
18.5–20.6	E 62
20.7–21.3	E 65
21.4–23.4	E 66
23.5–24.0	E 67

Table 141

Motor FLC (A)	Thermal Unit Number	Max. Fuse Rating (A)	
12.2–14.4	E56	25	
14.5–17.8	E57	30	
17.9–18.8	E60	40	
18.9–21.4	E61	40	
21.5–23.0	E62	45	
23.1–25.7	E65	50	
25.8–28.0	E66	50	
28.1–31.0	E67	60	
31.1–32.7	E69	60	
32.8–35.5	E70	70	
35.6–38.2	E71	80	
38.3–43.3	E73	80	
43.4–46.9	E73A	90	
47.0–50.1	E74	100	
		600 V Max.	**250 V Max.**
50.2–54.0	E76	100	110
54.1–58.0	E77	100	110
58.1–60.0	E78	100	125
60.1–67.0	E79	100	125
67.1–70.5	E80	100	125
70.6–75.9	E94	100	125
76.0–82.0	E96	100	125
82.1–86.0	E97	100	125

Table 142

Motor FLC (A)	Thermal Unit Number	Max. Fuse Rating (A)	
11.7–13.5	E56	25	
13.6–16.7	E57	30	
16.8–18.1	E60	35	
18.2–20.0	E61	40	
20.1–21.9	E62	40	
22.0–24.2	E65	45	
24.3–26.2	E66	50	
26.3–29.2	E67	50	
29.3–32.0	E69	60	
32.1–34.3	E70	70	
34.4–36.2	E71	70	
36.3–39.9	E73	80	
40.0–43.8	E73A	90	
43.9–46.2	E74	90	
46.3–50.0	E76	100	
		600 V Max.	**250 V Max.**
50.1–53.9	E77	100	110
54.0–56.0	E78	100	110
56.1–61.0	E79	100	125
61.1–65.9	E80	100	125
66.0–72.0	E94	100	125
72.1–75.9	E96	100	125
76.0–79.9	E98	100	125
80.0–86.0	E101	100	125

Table 143

Motor FLC (A)	Thermal Unit Number	Max. Fuse Rating (A)
18.9–20.0	E60	40
20.1–22.8	E61	45
22.9–24.7	E62	50
24.8–26.9	E65	50
27.0–29.2	E66	60
29.3–32.8	E67	60
32.9–34.9	E69	70
35.0–37.5	E70	70
37.6–39.6	E72	80
39.7–46.1	E73	80
46.2–49.9	E73A	100
50.0–56.3	E74	110
56.4–61.0	E76	125
61.1–64.0	E77	125
64.1–66.0	E78	125
66.1–72.4	E79	125
72.5–78.2	E80	150
78.3–83.9	E94	175
84.0–86.0	E96	175
86.1–92.8	E97	175
92.9–97.9	E98	200
98.0–105.0	E101	200
105.1–117.0	E102	200
117.1–133.0	E103	200

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Table 144

Motor FLC (A)	Thermal Unit Number	Max. Fuse Rating (A)
18.2–19.1	E60	40
19.2–22.1	E61	40
22.2–23.1	E62	45
23.2–25.7	E65	50
25.8–27.7	E66	50
27.8–31.3	E67	60
31.4–33.3	E69	70
33.4–35.9	E70	70
36.0–38.4	E71	80
38.5–44.2	E73	80
44.3–46.8	E73A	90
46.9–52.6	E74	100
52.7–56.0	E76	110
56.1–58.4	E77	125
58.5–61.9	E78	125
62.0–67.1	E79	125
67.2–72.3	E80	150
72.4–75.9	E94	150
76.0–85.6	E96	150
85.7–91.2	E98	175
91.3–100.0	E101	200
100.1–108.9	E102	200
109.0–119.9	E103	200
120.0–133.0	E104	200

Table 145

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
1.00–1.11	0.91–1.02	B1.30
1.12–1.27	1.03–1.15	B1.45
1.28–1.36	1.16–1.27	B1.67
1.37–1.53	1.28–1.39	B1.88
1.54–1.78	1.40–1.61	B2.10
1.79–2.02	1.62–1.84	B2.40
2.03–2.20	1.85–2.03	B2.65
2.21–2.52	2.04–2.34	B3.00
2.53–2.94	2.35–2.69	B3.30
2.95–3.30	2.70–3.02	B3.70
3.31–3.70	3.03–3.39	B4.15
3.71–4.02	3.40–3.65	B4.85
4.03–4.46	3.66–4.04	B5.50
4.47–4.69	4.05–4.28	B6.25
4.70–5.37	4.29–4.85	B6.90
5.38–5.94	4.86–5.38	B7.70
5.95–6.34	5.39–5.71	B8.20
6.35–7.09	5.72–6.39	B9.10
7.10–8.46	6.40–7.53	B10.2
8.47–9.32	7.54–8.34	B11.5
9.33–10.2	8.35–9.14	B12.8
10.3–10.9	9.15–9.74	B14.0
11.0–12.1	9.75–10.7	B15.5
12.2–13.4	10.8–11.8	B17.5
13.5–14.2	11.9–12.2	B19.5
14.3–16.0	12.3–14.4	B22.0
16.1–18.1	14.5–16.4	B25.0
18.2–20.5	16.5–18.9	B28.0
20.6–23.5	19.0–21.3	B32.0
23.6–27.2	21.4–23.3	B36.0
27.3–30.8	23.4–27.9	B40.0
30.9–35.0	28.0–31.4	B45.0
35.1–37.2		B50.0
37.3–40.0		B56.0

For Type DPSG42 & DPSG43, 40 A Starter.
Select any of the Thermal Units from above.

Table 146

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
3.90–4.22	3.60–3.89	B5.50
4.23–4.49	3.90–4.15	B6.25
4.50–5.14	4.16–4.76	B6.90
5.15–5.78	4.77–5.30	B7.70
5.79–6.23	5.31–5.70	B8.20
6.24–7.03	5.71–6.46	B9.10
7.04–8.23	6.47–7.65	B10.2
8.24–9.31	7.66–8.55	B11.5
9.32–10.1	8.56–9.36	B12.8
10.2–10.7	9.37–9.9	B14.0
10.8–11.9	10.0–10.9	B15.5
12.0–13.1	11.0–12.0	B17.5
13.2–13.9	12.1–12.8	B19.5
14.0–15.9	12.9–14.2	B22.0
16.0–18.0	14.3–16.0	B25.0
18.1–20.8	16.1–18.5	B28.0
20.9–23.1	18.6–21.2	B32.0
23.2–26.9	21.3–24.9	B36.0
27.0–31.4	25.0–28.0	B40.0
31.5–36.0	28.1–31.7	B45.0
36.1–38.8	31.8–34.6	B50.0
38.9–41.7	34.7–37.4	B56.0
41.8–46.3	37.5–40.0	B62.0
46.4–50.0	40.1–46.4	B70.0
—	46.5–50.0	B79.0

For Type DPSG52 & DPSG53, 50 A Starter.
Select any of the Thermal Units from above.

Table 147

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
1.04–1.14	0.93–1.04	B1.30
1.15–1.29	1.05–1.18	B1.45
1.30–1.43	1.19–1.33	B1.67
1.44–1.56	1.34–1.43	B1.88
1.57–1.79	1.44–1.67	B2.10
1.80–2.03	1.68–1.88	B2.40
2.04–2.26	1.89–2.09	B2.65
2.27–2.51	2.10–2.41	B3.00
2.52–3.03	2.42–2.79	B3.30
3.04–3.31	2.80–3.15	B3.70
3.32–3.73	3.16–3.54	B4.15
3.74–4.07	3.55–3.75	B4.85
4.08–4.49	3.76–4.22	B5.50
4.50–4.76	4.23–4.46	B5.25
4.77–5.44	4.47–5.09	B6.90
5.45–6.04	5.10–5.61	B7.70
6.05–6.46	5.62–5.99	B8.20
6.47–7.24	6.00–6.70	B9.10
7.25–8.64	6.71–8.19	B10.20
8.65–9.59	8.20–8.79	B11.5
9.60–10.5	8.80–9.66	B12.8
10.6–11.3	9.67–10.2	B14.0
11.4–12.6	10.3–11.4	B15.5
12.7–13.9	11.5–12.6	B17.5
14.0–14.9	12.7–13.5	B19.5
15.0–16.5	13.6–15.1	B22.0
16.6–18.9	15.2–17.2	B25.0
19.0–22.2	17.3–19.9	B28.0
22.3–24.6	20.0–22.5	B32.0
24.7–28.6	22.6–26.2	B36.0
28.7–32.4	26.3–29.9	B40.0
32.5–37.3		B45.0
37.4–39.5		B50.0
39.6–40.0		B56.0

For Type DPSO42 & DPSO43, 40 A Starter.
Select any of the Thermal Units from above.

Table 148

Motor FLC (A)		Thermal Unit Number
1 T.U.	3 T.U.	
4.14–4.45	3.70–4.09	B5.50
4.46–4.88	4.10–4.35	B6.25
4.89–5.44	4.36–5.07	B6.90
5.45–6.08	5.08–5.79	B7.70
6.09–6.42	5.80–6.27	B8.20
6.43–7.28	6.28–7.16	B9.10
7.29–8.42	7.17–8.58	B10.2
8.43–9.64	8.59–9.55	B11.5
9.65–10.4	9.56–10.2	B12.8
10.5–11.2	10.3–10.9	B14.0
11.3–12.3	11.0–11.9	B15.5
12.4–13.7	12.0–13.1	B17.5
13.8–14.8	13.2–14.0	B19.5
14.9–16.5	14.1–14.8	B22.0
16.6–18.7	14.9–17.0	B25.0
18.8–21.4	17.1–19.6	B28.0
21.5–24.3	19.7–22.1	B32.0
24.4–28.0	22.2–26.0	B36.0
28.1–33.3	26.1–29.4	B40.0
33.4–37.6	29.5–34.0	B45.0
37.7–41.1	34.1–36.4	B50.0
41.2–44.1	36.5–39.2	B56.0
44.2–47.8	39.3–42.4	B62.0
47.9–50.0	42.5–49.3	B70.0
—	49.4–50.0	B79.0

For Type DPSO52 & DPSO53, 50 A Starter.
Select any of the Thermal Units from above.

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Table 16.386: TeSys N Catalog Numbering System

T	40	C	A	1	3	V80	M	Forms

Product Family

T — TeSys N

Device Type

02 — Contactor
36 — Starter
40 — Self-Protected Combination Starter

NEMA Size

T02 and T36 devices	T40 devices (only)
A — Size 00	A — Size 00
B — Size 0	B — Size 0
C — Size 1	C — Size 1
D — Size 2	
E — Size 3	
F — Size 4	
G — Size 5	
H — Size 6▲	
J — Size 7▲	

▲ Not available for reversing type T36 devices

Enclosure Type

T02 and T36 devices	T40 devices (only)
N—No enclosure	A — NEMA Type 12/3R Industrial Use
	G — NEMA Type 1 General Purpose Surface Mounting
	W — NEMA Type 4/4X Stainless Steel

Direction

1 — Non-reversing
2 — Reversing

Numerals

Used to define specific, physical arrangements such as number of poles for devices type T02 or protection type for devices type T36 and T40. Numbering varies with type of device. Consult Digest listings for specific device numbers.

Most Common Forms

S — Separate control circuit
P51 — Red LED Light ON
P52 — Green LED Light OFF
A — Start-Stop pushbutton
C — Hand-Off-Auto selector switch
CP1 — Abbreviated Forms: Form C + Form P51♦
AP1 — Abbreviated Forms: Form A + Form P51♦

This is only a partial listing. Consult Digest pages for more information.

When more than one form is applied to a single device, arrange forms in alphabetical order.

♦ Abbreviated Forms cannot be used with other forms (with the exception of Form S). To use other forms, non-abbreviated forms must be used. E.g: CP51P68

Communication Code

Mandatory for T40 devices
This field is not applicable to T02 and T36 devices

M — Modbus
C — CANopen
D — DeviceNet
P — Profibus
N — No communication

This only a partial listing. Consult Digest pages for more information.

Voltage Code

B7 — 24 Vac, 50/60 Hz
G7 — 120 Vac, 50/60 Hz
LE7 — 208 Vac, 50/60 Hz
U7 — 240 Vac, 50/60 Hz
T7 — 480 Vac, 50/60 Hz
BD — 24 Vdc coil
V81 — 480/120 Vac Control Power Transformer
V83 — 480/24 Vac Control Power Transformer
V89 — 120/24 Vac Control Power Transformer
BD4 — 480 Vac/24 Vdc Power Supply

CPT includes fuse protection on primary and secondary as standard. This is only a partial listing. Consult Digest pages for more information.

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TeSys N non-reversing contactor, Size 1

TeSys N non-reversing contactor, Size 3

TeSys N Contactors

TeSys N contactors are used to switch heating loads, capacitors, transformers and electric motors where overload protection is provided separately. TeSys N contactors are available in NEMA Sizes 00 through 7. Target market segments include Hospitals, Retail, Food & Beverage, Marine, Oil & Gas and Mining, Metals & Minerals.

Table 16.387: TeSys N Non-Reversing Contactors, 3-Pole Polyphase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	200 230 460 575	1.5 1.5 2 2	T02AN13▲	**296.00**
0	18	200 230 460 575	3 3 5 5	T02BN13▲	**373.00**
1	27	200 230 460 575	7.5 7.5 10 10	T02CN13▲	**437.00**
2	45	200 230 460 575	10 15 25 25	T02DN13▲	**795.00**
3	90	200 230 460 575	25 30 50 50	T02EN13▲■	**1285.00**
4	135	200 230 460 575	40 50 100 100	T02FN13▲■	**3080.00**
5	270	200 230 460 575	75 100 200 200	T02GN13▲■	**6705.00**
6	540	200 230 460 575	150 200 400 400	T02HN13▲■	**18305.00**
7	810	200 230 460 575	— 300 600 600	T02JN13▲■	**26125.00**

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.
■ Lugs ordered separately. See Table 16.410 on page 16-146.

Table 16.388: TeSys N Non-Reversing Contactors, 3-Pole Single Phase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	115 230	1/3 1	T02AN13▲	**296.00**
0	18	115 230	1 2	T02BN13▲	**373.00**
1	27	115 230	2 3	T02CN13▲	**437.00**
2	45	115 230	3 7.5	T02DN13▲	**795.00**

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.

Table 16.389: TeSys N Coil Voltage Codes

Voltage	Voltage Code by NEMA Size									$ Price Adder
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7	
24 Vac	B7	B7	B7	B7	B6	B6	n/a			No Charge
24 Vdc	BD	BD	BD	BD	BD	BD	n/a			No Charge
120 Vac	G7	G7	G7	G7	G6	G6	G7	F7	F7	No Charge
208 Vac	LE7	LE7	LE7	LE7	L6	L6	L7	L7	L7	No Charge
240 Vac	U7	U7	U7	U7	U6	U6	U7	U7	U7	No Charge
480 Vac	T7	T7	T7	T7	Q5	Q5	S7	N7	N7	No Charge

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TeSys N reversing contactor, Size 00

TeSys N reversing contactor, Size 4

TeSys N Reversing Contactors

TeSys N reversing contactors are used for starting, stopping and reversing AC motors where overload protection is provided separately. TeSys N reversing contactors are mechanically and electrically interlocked and are available in NEMA Sizes 00 through 7. Target market segments include Hospitals, Retail, Food & Beverage, Marine, Oil & Gas and Mining, Metals & Minerals.

Table 16.390: TeSys N Reversing Contactors, 3-Pole Polyphase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	200 230 460 575	1.5 1.5 2 2	T02AN23▲	**770.00**
0	18	200 230 460 575	3 3 5 5	T02BN23▲	**923.00**
1	27	200 230 460 575	7.5 7.5 10 10	T02CN23▲	**1052.00**
2	45	200 230 460 575	10 15 25 25	T02DN23▲	**2000.00**
3	90	200 230 460 575	25 30 50 50	T02EN23▲■	**3320.00**
4	135	200 230 460 575	40 50 100 100	T02FN23▲■	**8280.00**
5	270	200 230 460 575	75 100 200 200	T02GN23▲■	**14935.00**
6	540	200 230 460 575	150 200 400 400	T02HN23▲■	**37340.00**
7	810	200 230 460 575	— 300 600 600	T02JN23▲■	**53435.00**

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.
■ Lugs ordered separately. See Table 16.410 on page 16-146.

Table 16.391: TeSys N Reversing Contactors, 3-Pole Single Phase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	115	1/3	T02AN23▲	**770.00**
		230	1		
0	18	115	1	T02BN23▲	**923.00**
		230	2		
1	27	115	2	T02CN23▲	**1052.00**
		230	3		
2	45	115	3	T02DN23▲	**2000.00**
		230	7.5		

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.

Table 16.392: TeSys N Coil Voltage Codes

Voltage	Voltage Code by NEMA Size									$ Price Adder
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7	
24 Vac	B7	B7	B7	B7	B6	B6	n/a			No Charge
24 Vdc	BD	BD	BD	BD	BD	BD	n/a			No Charge
120 Vac	G7	G7	G7	G7	G6	G6	G7	F7	F7	No Charge
208 Vac	LE7	LE7	LE7	LE7	L6	L6	L7	L7	L7	No Charge
240 Vac	U7	U7	U7	U7	U6	U6	U7	U7	U7	No Charge
480 Vac	T7	T7	T7	T7	Q5	Q5	S7	N7	N7	No Charge

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TeSys N non-reversing starter, Size 1

TeSys N non-reversing starter, Size 3

TeSys N Size 1 Contactor + TeSys D Bimetal Overload Relay

TeSys N Starters

TeSys N starters are used for full-voltage starting and stopping of AC squirrel cage motors. Starters are available in NEMA Sizes 00 through 7 and come standard with Motor Logic Class 10/20 selectable solid state overload relays. Starters with bimetal overload protection can be assembled from TeSys N contactors and TeSys D overload relays. For more information on TeSys D relays, see Table 16.395 below.

Table 16.393: TeSys N Non-Reversing Starters, 3-Pole Polyphase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	200 230 460 575	1.5 1.5 2 2	T36AN13▲	**431.00**
0	18	200 230 460 575	3 3 5 5	T36BN13▲	**520.00**
1■	27	200 230 460 575	7.5 7.5 10 10	T36CN13▲	**585.00**
2	45	200 230 460 575	10 15 25 25	T36DN13▲	**1005.00**
3	90	200 230 460 575	25 30 50 50	T36EN13▲	**1580.00**
4	135	200 230 460 575	40 50 100 100	T36FN13▲	**3490.00**
5	270	200 230 460 575	75 100 200 200	T36GN13▲	**8430.00**
6	540	200 230 460 575	150 200 400 400	T36HN13▲	**19775.00**
7	810	200 230 460 575	— 300 600 600	T36JN13▲	**28130.00**

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.

■ Special contactor/Motor Logic overload relay size combinations available: Add '0' to catalog number before coil voltage for Size 0 overload (6–18 A), '9' for Size 00C overload (3–9 A), and '8' for Size 00B overload (1.5–4.5 A). (i.e. T36CN130G7).

Table 16.394: TeSys N Coil Voltage Codes

Voltage	Voltage Code by NEMA Size									$ Price Adder
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7	
24 Vac■	B7	B7	B7	B7	B6	B6	n/a			No Charge
24 Vdc▲	BD	BD	BD	BD	BD	BD	n/a			No Charge
120 Vac■	G7	G7	G7	G7	G6	G6	G7	F7	F7	No Charge
208 Vac	LE7	LE7	LE7	LE7	L6	L6	L7	L7	L7	No Charge
240 Vac	U7	U7	U7	U7	U6	U6	U7	U7	U7	No Charge
480 Vac	T7	T7	T7	T7	Q5	Q5	S7	N7	N7	No Charge

▲ 24 Vdc coil requires separate control, add Form S to catalog number (ie. T36AN13BDS).

■ 24 and 120 Vac coils available with optional separate control, add Form S to catalog number (ie. T36AN13B7S).

Table 16.395: TeSys D Overload Relays—Ambient Compensated, Bimetallic, Direct Mounting

Current Setting Range (A)	For Direct Mounting to TeSys N contactors	Class 10 with Single-Phase Sensitivity	Class 10 without Single-Phase Sensitivity	Class 20 with Single-Phase Sensitivity	Class 20 without Single-Phase Sensitivity	$ Price
0.10–0.16	Size 00–1	LRD01	LR3D01	—	—	**60.00**
0.16–0.25		LRD02	LR3D02	—	—	
0.25–0.40		LRD03	LR3D03	—	—	
0.40–0.63		LRD04	LR3D04	—	—	
0.63–1		LRD05	LR3D05	—	—	
1–1.6		LRD06	LR3D06	—	—	
1.6–2.5		LRD07	LR3D07	—	—	
2.5–4		LRD08	LR3D08	LRD1508	LR3D1508A1	
4–6		LRD10	LR3D10	LRD1510	LR3D1510A1	
5.5–8	Size 00–1	LRD12	LR3D12	LRD1512	LR3D1512A1	**62.00**
7–10	Size 00–1	LRD14	LR3D14	LRD1514	LR3D1514A1	
9–13	Size 0–1	LRD16	LR3D16	LRD1516	LR3D1516A1	
12–18	Size 0–1	LRD21	LR3D21	LRD1521	LR3D1521A1	
16–24	Size 0–1	LRD22	LR3D22	—	—	
17–25	Size 0–1	—	—	LRD1522	LR3D1522A1	
23–32	Size 1	LRD32	LR3D32	—	—	**73.00**
23–28		—	—	LRD1530	LR3D1530A1	
25–32		—	—	LRD1532	LR3D1532A1	
9-13	Size 2	LRD313	LR3D313	LRD313L	—	**107.00**
12-18		LRD318	LR3D318	LRD318L	—	
16-25		LRD325	LR3D325	LRD325L	—	
23-32		LRD332	LR3D332	LRD332L	—	
30-40		LRD340	LR3D340	LRD340L	—	
37-50		LRD350	LR3D350	LRD350L	—	

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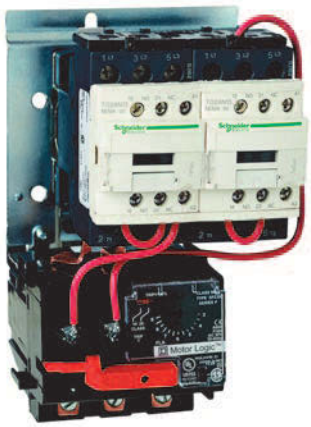

TeSys N reversing starter, Size 00

TeSys N reversing starter, Size 4

TeSys N Reversing Starters

TeSys N reversing starters are used for full-voltage starting, stopping and reversing of AC squirrel cage motors. Reversing starters are mechanically and electrically interlocked and are available in NEMA Sizes 00 through 5. Starters come standard with Motor Logic Class 10/20 selectable solid state overload relays. Reversing starters with bimetal overload protection can be assembled from TeSys N reversing contactors and TeSys D overload relays. For more information on TeSys D relays, see Table 16.395 on page 16-142.

Table 16.396: TeSys N Reversing Starters, 3-Pole Polyphase, 600 Vac Max.

NEMA Size	Continuous Current Rating (A)	Motor Voltage	Max HP	Open	
				Catalog Number	$ Price
00	9	200 230 460 575	1.5 1.5 2 2	T36AN23▲	**1019.00**
0	18	200 230 460 575	3 3 5 5	T36BN23▲	**1190.00**
1■	27	200 230 460 575	7.5 7.5 10 10	T36CN23▲	**1335.00**
2	45	200 230 460 575	10 15 25 25	T36DN23▲	**2450.00**
3	90	200 230 460 575	25 30 50 50	T36EN23▲	**4020.00**
4	135	200 230 460 575	40 50 100 100	T36FN23▲	**9660.00**
5	270	200 230 460 575	75 100 200 200	T36GN23▲	**18525.00**

▲ Coil voltage code must be specified to order this product. Refer to voltage codes shown below.
■ Special contactor/Motor Logic overload relay size combinations available: Add '0' to catalog number before coil voltage for Size 0 overload (6–18 A), '9' for Size 00C overload (3–9 A), and '8' for Size 00B overload (1.5–4.5 A). (i.e. T36CN230G7).

Table 16.397: TeSys N Coil Voltage Codes

Voltage	Voltage Code by NEMA Size							$ Price Adder
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	
24 Vac■	B7	B7	B7	B7	B6	B6	n/a	No Charge
24 Vdc▲	BD	BD	BD	BD	BD	BD	n/a	No Charge
120 Vac■	G7	G7	G7	G7	G6	G6	G7	No Charge
208 Vac	LE7	LE7	LE7	LE7	L6	L6	L7	No Charge
240 Vac	U7	U7	U7	U7	U6	U6	U7	No Charge
480 Vac	T7	T7	T7	T7	Q5	Q5	S7	No Charge

▲ 24 Vdc coil requires separate control, add Form S to catalog number (ie. T36AN23BDS).
■ 24 and 120 Vac coils available with optional separate control, add Form S to catalog number (ie. T36AN13B7S).

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E164862
CCN NLDX

LR43364
Class 3211 04

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Front Mounted
Auxiliary Blocks

Table 16.398: Standard, Instantaneous Auxiliary Contact Blocks

Snap-On Mounting	Number of Contacts	Composition N.O.	Composition N.C.	Catalog Number	$ Price
To front of Size 00–2 or **To right side of** Size 3–7	4	2	2	LADN22 ▲	**41.50**
		1	3	LADN13 ▲	**41.50**
		4	0	LADN40 ▲	**41.50**
		0	4	LADN04 ▲	**41.50**
		3	1	LADN31 ▲	**41.50**
		2 ■	2 ■	LADC22 ▲■	**41.50**
	2	1	1	LADN11 ▲	**20.70**
		2	0	LADN20 ▲	**20.70**
		0	2	LADN02▲	**20.70**
To left side of Size 3–7	1	1	0	LADN10	**13.10**
		0	1	LADN01	**13.10**
To side of Size 00–2	2	1	1	LAD8N11 ♦	**20.70**
		2	0	LAD8N20 ♦	**20.70**

▲ For spring terminal versions of these blocks, add a **3** to the end of the catalog number (for example, LADN223). There is no charge for this modification. For slip-on versions, add **9** to the end of the catalog number (for example, LADN229).
■ Including 1 N.O. + 1 N.C. make-before-break overlapping contacts.
♦ 1 block may be added to the left side of Size 00–1, AC coils only; only 1 block may be added to either side of the Size 2 contactor, AC coil only. Cannot be installed on Size 00–2 contactors with DC coils.

Table 16.399: Instantaneous Blocks with Dust-Tight Auxiliary Contacts (IP54) NEMA 12

Snap-On Mounting	Standard Contacts N.O.	Standard Contacts N.C.	Dust-Tight Contacts N.O.	Dust-Tight Contacts N.C.	Catalog Number	$ Price
To front of Size 00–2 or **To right side of** Size 3–7	—	—	2	—	LA1DX20	**65.00**
	2	—	2	—	LA1DZ40	**82.00**
	1	1	2	—	LA1DZ31	**82.00**
	—	—	2	—	LA1DY20★	**77.00**

★ Device supplied with 4 ground terminal points.

Table 16.400: Pneumatic Time Delay Contact Blocks

Snap-On Mounting	Time Delay Contacts N.O.	Time Delay Contacts N.C.	Type	Range of Time Delay	Catalog Number △	$ Price
To front of Size 00–2 or **To right side of** Size 3–7	1	1	On energization (on delay)	0.1 to 3 s▼	LADT0	**131.00**
				0.1 to 30 s	LADT2	**131.00**
				10 to 180 s	LADT4	**131.00**
				1 to 30 s□	LADS2	**131.00**
	1	1	On de-energization (off-delay)	0.1 to 3 s▼	LADR0	**131.00**
				0.1 to 30 s	LADR2	**131.00**
				10 to 180 s	LADR4	**131.00**

▼ Scale range is expanded between 0.1 and 0.6 seconds on the dial for more accurate settings at the lower end of the range.
△ For spring terminal versions of these blocks, add a **3** to the end of the catalog number (for example, LADT23). There is no charge for this modification.
□ Switching time between the opening of the N.C. contact and the closing of the N.O. contact: 40 ms ± 15 ms .

Table 16.401: Mechanical Latch Blocks with Manual or Electrical Unlatch

Front snap-on mounting onto	Application	Catalog Number	$ Price
Size 00–2	For silent operation and energy conservation	LAD6K10◊☆	**77.00**

◊ Does not include internal coil clearing contact.
☆ Complete the catalog number by adding the coil voltage code (for example, LAD6K10F).

Table 16.402: Coil Voltage Codes for LA6DK Mechanical Latch Blocks

Volts	24	120	208	240	480
AC or DC▽	B	F	L	M	R

▽ DC available at 24 V only.

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LA4DA1U

RC Coil Suppressor

- Limitation of transient voltage to 300% of nominal voltage maximum.
- Oscillating frequency limited to 400 Hz maximum. Slight increase in drop-out time (1.2 to 2 times normal).

Table 16.403: Resistor/Capacitor Circuit (RC) for Reduction of Electrical Noise in AC Contactor Coils

Installed by	Mounting on	Operating Voltage 50/60 Hz	Catalog Number	$ Price
Snapping into the cavity on the right side without tools◒	Size 00–1	24 V	LAD4RCE	26.20
		120 V	LAD4RCG	26.20
		120–240 V	LAD4RCU	26.20
Snap-on mounting, and connection without tools to the contactor coil terminals	Size 2	24 V	LAD4RC3E	26.20
		120 V	LAD4RC3G	26.20
		120-240 V	LAD4RC3U	26.20

Varistor Coil Suppressor

- Limitation of transient voltage value to 200% of nominal voltage maximum.
- Maximum reduction of transient voltage peaks. Slight increase in drop-out time (1.1 to 1.5 times normal).

Table 16.404: Varistor (Peak Limiting) for Reduction of Electrical Noise in AC Contactor Coils

Installed by	Mounting on	Operating Voltage 50/60 Hz	Catalog Number	$ Price
Snapping into the cavity on the right side without tools◒	Size 00–1	24 V	LAD4VE	26.20
		120 V	LAD4VG	26.20
		120–240 V	LAD4VU	26.20
Snap-on mounting, and connection without tools to the contactor coil terminals	Size 2	24 V	LAD4V3E	26.20
		120 V	LAD4V3G	26.20
		120-240 V	LAD4V3U	26.20

Diode Coil Suppressor

- No overvoltage or oscillating frequency.
- Polarized component. Increased drop-out time (6–10 times normal).

Table 16.405: Diode for Reduction of Electrical Noise in DC Contactor Coils

Installed on the upper part by	Mounting on	Operating Voltage, DC	Catalog Number	$ Price
Snap-on mounting and connection w/o tools to the contactor coil terminals	Size 00–1	24 Vdc	LAD4DDL	26.20
Clip-on front mounting	Size 2	24 Vdc	LAD4D3U	26.20

LAD4T3B

Bidirectional Diode Coil Suppressor

- Protection provided by limiting the transient voltage to 2 Uc max.
- Maximum reduction of transient voltage peaks

Table 16.406: Bidirectional Peak Limiting Diode

Installed by	Mounting on	Operating Voltage 50/60 Hz and DC	Catalog Number	$ Price
Snapping into the cavity on the right side of the contactor ◒	Size 00–1✱	24 (AC only)	LAD4TB	26.20
Clip-on front mounting and connection without tools to the contactor coil terminals ✱	Size 2	24 V	LAD4T3B	26.20
		120 V	LAD4T3G	26.20
		208–240 V	LAD4T3U	26.20

◒ Installing the suppressor into the cavity makes the electrical connection. Overall width of the contactor remains the same.
✱ For Size 00–2 with DC coils, 3-pole contactors are fitted with built-in bidirectional diode suppression as standard.

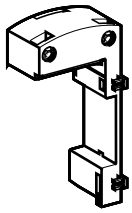
LAD4BB••

Table 16.407: Cabling Accessories

Usage	Mounting on	Operating Voltage 50/60 Hz		Catalog Number	$ Price
For adapting existing wiring to a new product or for use with top-mounting accessory.	Size 00–1, AC only	Without coil suppression		LAD4BB	23.00
		With coil suppression (varistor)	24 V	LAD4BBVE	23.00
			120 V	LAD4BBVG	23.00
			120-240 V	LAD4BBVU	23.00
For adapting existing wiring to a new product or for use with top-mounting accessory	Size 2, AC only	—		LAD4BB3	26.20

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The following accessories require use of cabling accessories (LAD4BB●●) for proper mounting. See page 16-145 for illustration.

Table 16.408: Electronic Serial Timer Modules

These solid state modules delay the energizing of the contactor coil, and feature built-in varistor surge suppression.

Type	Operational Voltage	Time Delay	Catalog Number	$ Price
	24–250 Vac			
On-delay	Size 00–2	0.1–2 s	LA4DT0U	82.
		1.5–30 s	LA4DT2U	82.
		25–500 s	LA4DT4U	82.

Table 16.409: Interface Modules ▲

These modules allow the contactor coils to be energized from low voltage and low current level signals. They come in mechanical relay and solid state versions. The relay plus manual operation versions include a lever for manually turning the contactor on and off. When a module receives a low level signal, it allows the separate-sourced control voltage to flow to the contactor coil. It saves space and wiring time compared to conventional interposing relays.

LA4DFB

Interface Type	Operational Voltage	Input Voltage	Catalog Number	$ Price
	24–250 Vac			
Relay	Size 00–2	24 Vdc	LA4DFB	55.
Relay Plus Manual Operation	Size 00–2	24 Vdc	LA4DLB	71.
Solid State	Size 00–2	24 Vdc	LA4DWB	71.

▲ Adapter required, see Table 16.407 on page 16-145.

Table 16.410: Lugs and Lug Kits▲

TeSys N Contactor	Lugs		Lug Kits■	Cable size AWG range
	Line Size	Load Side		
Size 3	3 each DZ2FF1	3 each DZ2FF1	DZ2FF6	14 to 2/0
Size 4	3 each DZ2FG1	3 each DZ2FG1	DZ2FG6	6 to 3/0
Size 5	3 each DZ2FJ1	3 each DZ2FJ1	DZ2FJ6	4 to 500 MCM
Size 6	3 each DZ2FK1	3 each DZ2FK1	DZ2FK6	2 x 2 to 600 MCM
Size 7	1 each DZ2FL1 DZ2FL2 DZ2FL3	1 each DZ2FL1 DZ2FL2 DZ2FL3	DZ2FL6	3 x 2 to 600 MCM

▲ Mounting hardware (screws, washers and nuts) are provided with the contactors, not the lugs. Starters Sizes 3–7 supplied with lugs. See Table 16.411 for pricing.
■ Lug kits incude 6 lugs.

Table 16.411: Lug Pricing

Lug Catalog Number	$ Price
DZ2FF1	6.50
DZ2FG1	11.00
DZ2FJ1	11.00
DZ2FK1	21.80
DZ2FL1	27.30
DZ2FL2	27.30
DZ2FL3	27.30

Lug Kit Catalog Number	$ Price
DZ2FF6	39.30
DZ2FG6	65.00
DZ2FJ6	65.00
DZ2FK6	131.00
DZ2FL6	164.00

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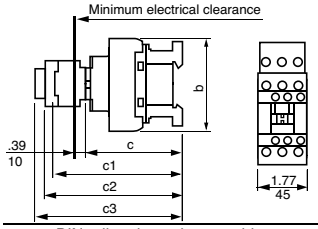
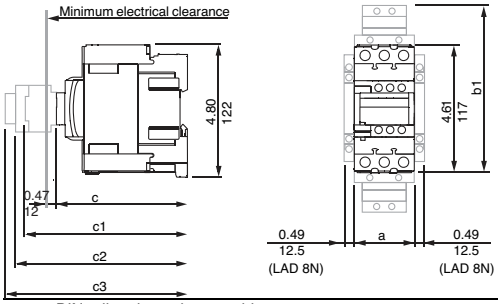
Table 16.412: TeSys N Contactors, Size 00–1, Non-Reversing▲

Dimensional Diagram	Dimension	Description	Dimensions			
			AC Coil		DC Coil	
			In	mm	In	mm
	b	Without add-on accessories	3.35	85	3.35	85
	b1	With LAD4BB	3.86	98	n/a	n/a
		With LA4D•2	4.49	114	n/a	n/a
		With LA4DF, DT	4.84	123	n/a	n/a
		With LA4DR, DW, DL	5.12	130	n/a	n/a
	c	Without cover or add-on blocks	3.54	90	3.90	99
		With cover, without add-on blocks	3.62	92	3.98	101
	c1	With LADN or LADC	4.84	123	5.20	132
	c2	With LAD6K10	5.31	135	5.67	144
	c3	With LADT, R, S	5.63	143	5.98	152
		With LADT, R, S and sealing cover	5.79	147	6.14	156

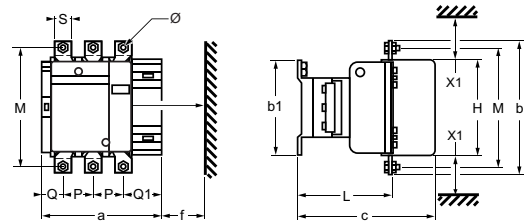
▲ DIN rail and panel mountable.

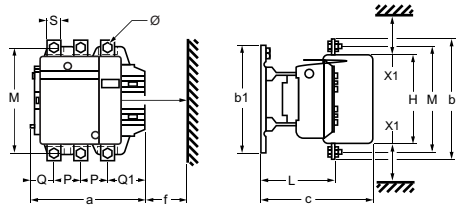
Table 16.413: TeSys N Contactors, Size 2, Non-Reversing▲

Dimensional Diagram	Dimension	Description	Dimensions	
			AC or DC Coils	
			In	mm
	a		2.17	55
	b1	With LA4 DB3 or LAD 4BB3	5.35	136
		With LA4 DF, DT	6.18	157
		With LA4 DM, DW, DL	6.54	166
	c	Without cover or add-on blocks	4.65	118
		With cover, without add-on blocks	4.72	120
	c1	With LAD N or C (2 or 4 contacts)	5.91	150
	c2	With LAD 6K10 or LA6 DK	6.42	163
	c3	With LAD T, R, S	6.73	171
		With LAD T, R, S and sealing cover	6.89	175

▲ DIN rail and panel mountable.

Table 16.414: TeSys N Contactors, Size 3–7, Non-Reversing

Dimensional Diagram, Size 3–5	Dimension	Dimensions					
		T02EN13		T02FN13		T02GN13	
		In	mm	In	mm	In	mm
	a	6.4	163.5	6.4	163.5	8.4	213
	P	1.5	37	1.6	40	1.9	48
	Q	1.2	29.5	1	26	1.7	43
	Q1	2.4	60	2.3	57.5	2.9	74
	S	0.8	20	0.8	20	1	25
	ø	M6		M8		M10	
	f	5.2	131	5.2	131	5.8	147
	b	6.4	162	6.7	170	8.1	206
	b1	5.4	137	5.4	137	5.7	145
	M	5.8	147	5.9	150	7.1	181
	H	4.9	124	4.9	124	6.2	158
	c	6.7	171	6.7	171	8.6	219
	L	4.2	107	4.2	107	5.7	145
	X1 220–500 V	0.4	10	0.4	10	0.4	10

Dimensional Diagram, Size 6	Dimension	T02HN13	
		In	mm
	a	9.2	233
	P	2.2	55
	Q	1.8	46
	Q1	3	77
	S	1.2	30
	ø	M10	
	f	5.9	150
	b	9.4	238
	b1	8.2	209
	M	8.2	208
	H	6.8	172
	c	9.1	232
	L	5.7	146
	X1 220–500 V	0.6	15

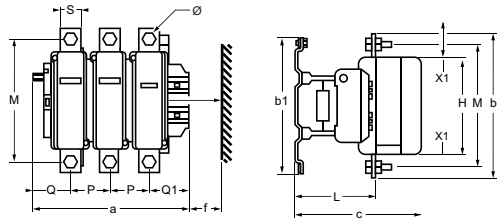
Dimensional Diagram, Size 7	Dimension	T02JN13	
		In	mm
	a	12.2	309
	P	3.2	80
	Q	2.4	60
	Q1	3.5	89
	S	1.6	40
	ø	M12	
	f	7.1	181
	b	12	304
	b1	11	280
	M	10.4	264
	H	8	202
	c	10	255
	L	6.1	155
	X1 220–500 V	0.8	20

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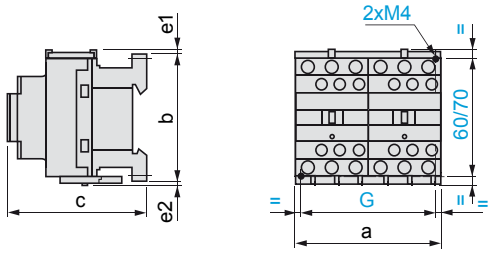
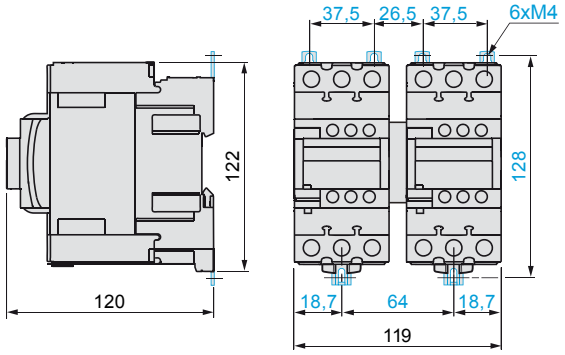
Table 16.415: TeSys N Size 00–1, Reversing Contactors▲

Dimensional Diagram	Dimension	Description	Dimensions			
			AC Coil		DC Coil	
			In	mm	In	mm
	a	Without side-mount accessories	3.54	90	3.54	90
	b	Contactor base	3.35	85	3.35	85
	c	With cover, without add-on blocks	3.62	92	3.98	101
	e1		0.35	9	0.35	9
	e2		0.20	5	0.20	5
	G	Mounting holes	3.15	80	3.15	80

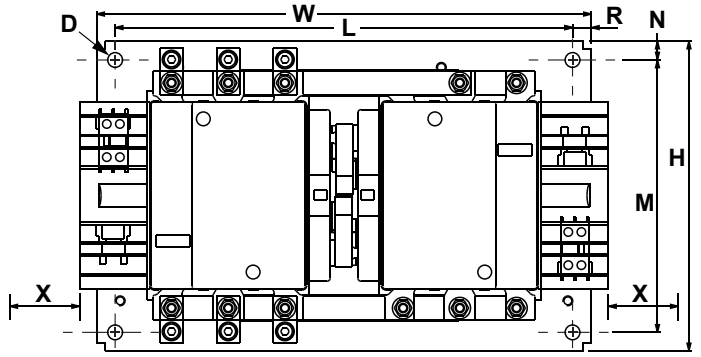
▲ DIN rail and panel mountable.

Table 16.416: TeSys N Size 2, Reversing Contactors▲

Dimensional Diagram	Description	Dimensions	
		AC and DC Coils	
		In	mm
	Width	4.69	119
	Height	4.80	122
	Depth with cover, without add-on blocks	4.72	120
	Load side mounting hole width	2.52	64
	Line side mounting hole width	3.40	101.5
	Mounting hole height	5.04	128

▲ DIN rail and panel mountable.

Table 16.417: TeSys N Size 3–7, Reversing Contactors

Dimensional Diagram	Dimension	Dimensions									
		T02EN23		T02FN23		T02GN23		T02HN23		T02JN23	
		In	mm	In	mm	In	mm	In	mm	In	mm
	D	0.38	9, 7	0.38	9, 7	0.56	14, 2	0.56	14, 2	0.56	14, 2
	H	7.96	202, 2	7.96	202, 2	15.27	387, 9	15.27	387, 9	22.25	565, 2
	L	11.75	298, 5	11.75	298, 5	18	457, 2	18	457, 2	30	762, 0
	M	7	177, 8	7	177, 8	14	355, 6	14	355, 6	19.75	501, 7
	N	0.49	12, 5	0.49	12, 5	0.62	15, 8	0.62	15, 8	1.25	31, 8
	R	0.49	12, 5	0.49	12, 5	0.62	15, 8	0.62	15, 8	0.69	17, 5
	W	12.71	322, 8	12.71	322, 8	19.27	489, 5	19.27	489, 5	31.38	797, 0
	X	5.16	131, 0	5.16	131, 0	5.79	147, 0	5.91	150, 0	7.13	181, 0

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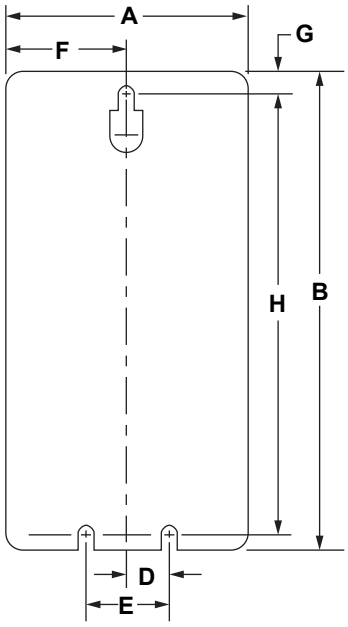
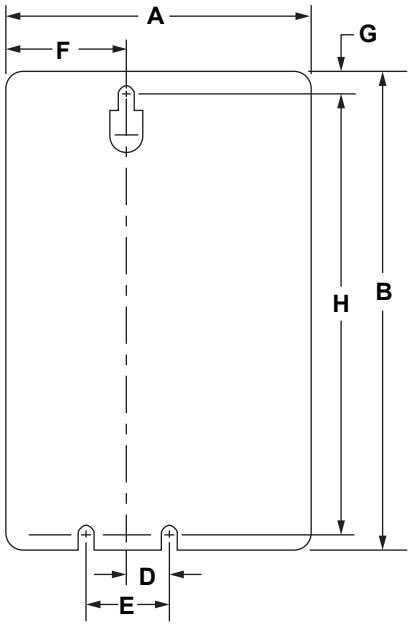
Non-reversing
T36AN13 / T36BN13 / T36CN13 / T36DN13



Reversing
T36AN23 / T36BN23 / T36CN23 / T36DN23



Depth

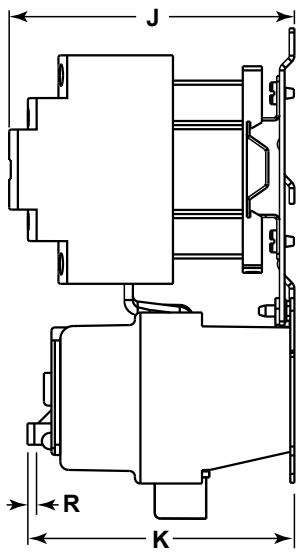


Table 16.418: TeSys N Size 00–2, Non-Reversing and Reversing Starters

Dimension	Non-Reversing								Reversing							
	Size 00 T36AN13		Size 0 T36BN13		Size 1 T36CN13		Size 2 T36DN13		Size 00 T36AN23		Size 0 T36BN23		Size 1 T36CN23		Size 2 T36DN23	
	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm
A	3.19	81, 0	3.19	81, 0	3.19	81, 0	3.19	81, 0	43.9	111, 5	43.9	111, 5	43.9	111, 5	5.19	131, 8
B	6.64	168, 7	6.64	168, 7	6.64	168, 7	8.61	218, 7	6.64	168, 7	6.64	168, 7	6.64	168, 7	8.61	218, 7
D	0.5	12, 7	0.5	12, 7	0.5	12, 7	0.5	12, 7	0.5	12, 7	0.5	12, 7	0.5	12, 7	0.5	12, 7
E	1.0	25, 4	1.0	25, 4	1.0	25, 4	1.0	25, 4	1.0	25, 4	1.0	25, 4	1.0	25, 4	1.0	25, 4
F	1.59	40, 5	1.59	40, 5	1.59	40, 5	1.59	40, 5	1.59	40, 5	1.59	40, 5	1.59	40, 5	1.59	40, 5
G	0.20	5, 2	0.20	5, 2	0.20	5, 2	0.20	5, 2	0.20	5, 2	0.20	5, 2	0.20	5, 2	0.20	5, 2
H	6.16	156, 5	6.16	156, 5	6.16	156, 5	8.22	208, 8	6.16	156, 5	6.16	156, 5	6.16	156, 5	8.22	208, 8
J (AC Coil)	4.17	105, 9	4.17	105, 9	4.17	105, 9	4.94	125, 4	4.17	105, 9	4.17	105, 9	4.17	104, 9	4.94	125, 4
J (DC Coil)	4.52	114, 9	4.52	114, 9	4.52	114, 9			4.52	114, 9	4.52	114, 9	4.52	114, 9		
K	3.90	99, 0	3.90	99, 0	3.90	99, 0	3.90	99, 0	3.90	99, 0	3.90	99, 0	3.90	99, 0	3.90	99, 0
R▲	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1

▲ Reset travel.

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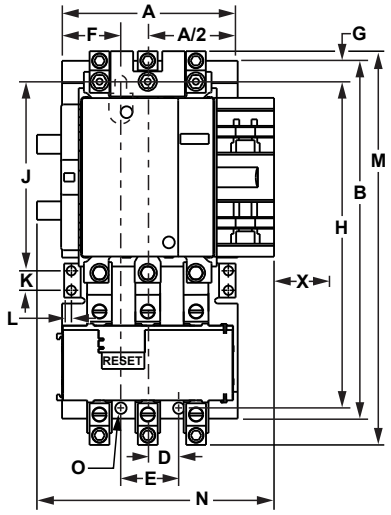
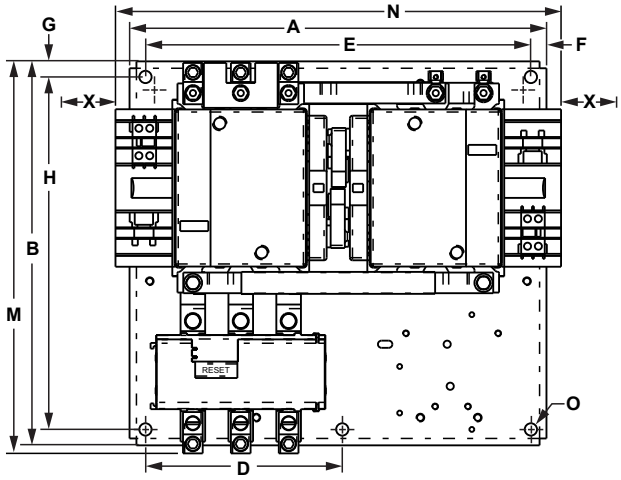
Non-Reversing
T36EN13 / T36FN13



Reversing
T36EN23 / T36FN23



Depth

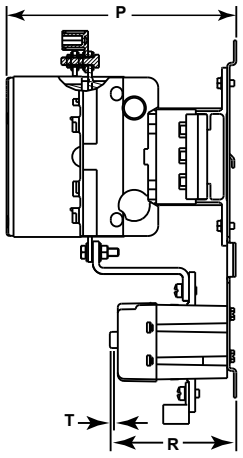


Table 16.419: TeSys N Size 3–4, Non-Reversing and Reversing Starters

Dimension	Non-Reversing				Reversing			
	Size 3 T36EN13		Size 4 T36FN13		Size 3 T36EN23		Size 4 T36FN23	
	In	mm	In	mm	In	mm	In	mm
A	5.31	134, 9	5.31	134, 9	12.71	322, 8	12.71	322, 8
B	10.82	274, 8	10.82	274, 8	11.71	297, 4	11.71	297, 4
D	0.88	22, 4	0.88	22, 4	6.0	152, 4	6.0	152, 4
E	1.75	44, 5	1.75	44, 5	11.75	298, 5	11.75	298, 5
F	1.78	45, 0	1.78	45, 0	0.48	12, 2	0.48	12, 2
G	0.32	8, 1	0.32	8, 1	0.48	12, 2	0.48	12, 2
H	10.19	258, 8	10.19	258, 8	10.75	273, 1	10.75	273, 1
J	6.03	153, 2	6.03	153, 2	—	—	—	—
K	0.59	15, 0	0.59	15, 0	—	—	—	—
L	0.22	5, 6	0.22	5, 6	—	—	—	—
M	11.91	302, 4	11.91	302, 4	11.96	303, 8	11.96	303, 8
N	6.57	166, 8	6.57	166, 8	13.58	344, 9	13.58	344, 9
O	0.375	9, 5	0.375	9, 5	0.375	9, 5	0.375	9, 5
P	6.96	176, 7	6.96	176, 7	7.18	182, 4	7.18	182, 4
R	3.8	97	3.8	97	3.8	97	3.8	97
T▲	0.24	6.1	0.24	6.1	0.24	6.1	0.24	6.1
X■	5.16	131, 0	5.16	131, 0	5.16	131, 0	5.16	131, 0

▲ Reset travel.
■ Minimum distance for coil removal.

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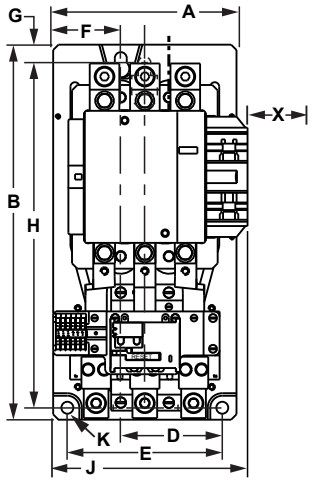
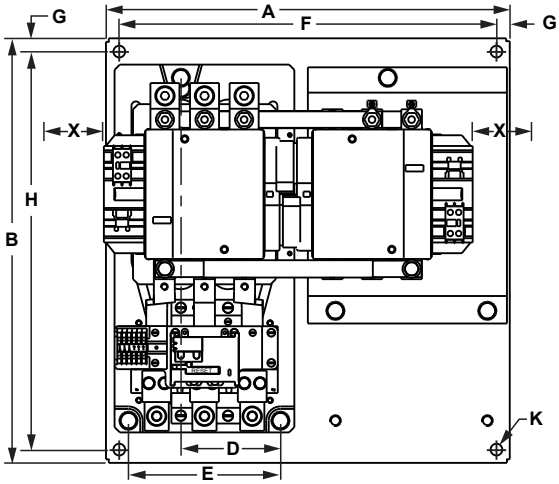
Non-reversing
T36GN13 / T36HN13 / T36JN13



Reversing
T36GN23



Depth

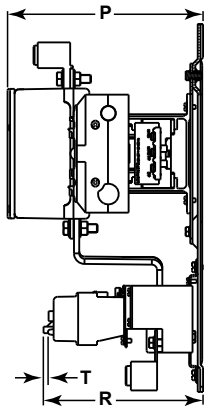


Table 16.420: TeSys N Size 5–7, Non-Reversing and Reversing Starters

Dimension	Non-Reversing						Reversing	
	Size 5 T36GN13		Size 6 T36HN13		Size 7 T36JN13		Size 5 T36GN23	
	In	mm	In	mm	In	mm	In	mm
A	8.58	217, 9	8.58	217, 9	8.58	217, 9	19.3	489, 4
B	17.56	446, 0	19.75	501, 7	23.58	598, 9	20.3	514, 8
D	4.75	120, 7	4.75	120, 7	4.75	120, 7	4.75	120, 7
E	7.25	184, 2	7.25	184, 2	7.25	184, 2	7.25	184, 2
F	3.17	80, 4	3.17	80, 4	3.17	80, 4	18.0	457, 2
G	0.63	16, 0	0.63	16, 0	0.63	16, 0	0.63	16, 1
H	16.37	415, 8	18.56	463, 6	22.38	565, 9	19.0	482, 6
J	9.91	251, 6	9.91	251, 6	9.91	251, 6	—	—
K	0.56	14, 2	0.56	14, 2	0.56	14, 2	0.56	14, 2
P	9.32	236, 8	9.32	236, 8	9.32	236, 8	9.95	252, 7
R	7.38	187, 0	9.16	232, 7	8.07	205, 0	7.38	187, 0
T▲	0.24	6, 1	0.24	6, 1	0.24	6, 1	0.24	6, 1
X■	5.79	147 1	5.91	150, 1	7.13	181, 1	5.79	147, 1

▲ Reset travel.
■ Minimum distance for coil removal.

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TeSys N Self-Protected combination starters combine the requirements of motor overload and short-circuit protection into one smaller package. These next-generation starters are manufactured in accordance with NEMA standards and are UL listed. They offer superior performance and efficiency and are easier to install and maintain.

In order to select a TeSys N Self-Protected combination starter, follow the 5-step process described below.

1. Choose a base configuration

Table 16.421: Base Configurations

Ratings				Type 1 enclosure				Type 12/3R enclosure				Type 4/4X enclosure			
Motor Voltage (V)	Max. HP		NEMA Size	Non-reversing starter		Reversing starter		Non-reversing starter		Reversing starter		Non-reversing starter		Reversing starter	
	Single phase	Three-phase		Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price
115	1/3		00	T40AG1	**1575.**	T40AG2	**2331.**	T40AA1	**1883.**	T40AA2	**2639.**	T40AW1	**2805.**	T40AW2	**3561.**
230	1														
200		1.5													
230		1.5													
460		2													
575		2													
115	1		0	T40BG1	**1575.**	T40BG2	**2331.**	T40BA1	**1883.**	T40BA2	**2639.**	T40BW1	**2805.**	T40BW2	**3561.**
230	2														
200		3													
230		3													
460		5													
575		5													
115	2		1	T40CG1	**1575.**	T40CG2	**2331.**	T40CA1	**1883.**	T40CA2	**2639.**	T40CW1	**2805.**	T40CW2	**3561.**
230	3														
200		7.5													
230		7.5													
460		10													
575		10													

Type 1 enclosure

2. Choose Thermal Overload Relay (Plug-in Control Unit)

The thermal overload relay is a control unit that plugs into the TeSys U starter. No tool is needed to install or remove the control unit.

If you do not wish to select the thermal overload relay at this time, select Thermal Overload Relay Type codes N1 or N3 in function of the motor configuration (single phase or 3-phase) in Table 16.422. A thermal overload relay can be selected and ordered later on independently before installation.

In order to select a thermal overload relay, you must follow the next 2 steps. First, select the thermal overload protection type code in Table 16.422. Secondly, select the full load amperage code in Table 16.423 on page 16-153.

2.1 Choose the thermal overload protection type.

Table 16.422: Thermal Overload Protection Types

	Advanced Control Unit			Multifunction Control Unit	No Control Unit (Ordered later on independently)	
					Single Phase	3-Phase
$ Price	180.00			738.00	—	
Thermal Overload Protection Type Code	4▲	1▲	2▲	3▲	180.00	
Protection Type						
Single phase, Class 10	■					
3-phase, Class 10		■				
3-phase, Class 20			■			
3-phase, Selectable Class 5–30				■		
Protection Functions						
Short circuit	■	■	■	■		
Over current	■	■	■	■		
Thermal overload	■	■	■	■		
Phase loss		■	■	■		
Phase imbalance		■	■	■		
Ground fault	■	■	■	■		
Underload, long start, jam	♦	♦	♦	■		
Control Functions						
Automatic or local/remote reset	♦	♦	♦	■		
Fault differentiation	♦	♦	♦	■		
Thermal alarm	♦	♦	♦	■		
Motor load display	♦	♦	♦	■		
Fault history				■		
Alarm threshold adjustment				■		
Tripping test	■	■	■	■		

▲ Complete the Thermal Overload Relay Selection by adding the full load amperage code after the thermal overload protection type code.
■ Built-in Control Unit.
♦ Available when combined with appropriate Function module.

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2.2 Choose the Motor Full Load Amperage

Table 16.423: Full Load Amperage Code

Full Load Amperage Setting Range (A)	Full Load Amperage Code
0.15–0.6	5
0.3–1.4	6
1.25–5.0	9
3–12	8
4.5–18	0
8–27	1

3 Choose the Power Source

Table 16.424: Control Power Source Code

Control Circuit Source	System Type	Motor Voltage		Control Voltage		Control Power Source Code	$ Price
		Voltage	Voltage Type	Voltage	Voltage Type		
Common Control	Single Phase	120	AC	120	AC	G7	—
		240	AC	240	AC	U7	—
	Three-Phase	208	AC	208	AC	LE7	—
		240	AC	240	AC	U7	—
Separate Control	Single Phase	120	AC	24	AC	B7▲	—
		120	AC	24	DC	BD▲	—
		120	AC	120	AC	G7▲	—
		240	AC	24	AC	B7▲	—
		240	AC	24	DC	BD▲	—
		240	AC	120	AC	G7▲	—
	Three-Phase	208	AC	24	AC	B7▲	—
		208	AC	24	DC	BD▲	—
		208	AC	120	AC	G7▲	—
		240	AC	24	AC	B7▲	—
		240	AC	24	DC	BD▲	—
		240	AC	120	AC	G7▲	—
		480	AC	24	AC	B7▲	—
		480	AC	24	DC	BD▲	—
		480	AC	120	AC	G7▲	—
		600	AC	24	AC	B7■	—
		600	AC	24	DC	BD■	—
		600	AC	120	AC	G7■	—
Factory Installed Control Power Transformer ♦	Single Phase	120	AC	24	AC	V89	**698.00**
		240	AC	120	AC	V80	**698.00**
		240	AC	24	AC	V82	**698.00**
	Three-Phase	208	AC	24	AC	V90	**698.00**
		208	AC	120	AC	V84	**698.00**
		240	AC	24	AC	V82	**698.00**
		240	AC	120	AC	V80	**698.00**
		480	AC	24	AC	V83	**698.00**
		480	AC	120	AC	V81	**698.00**
		600	AC	24	AC	V91	**698.00**
		600	AC	120	AC	V86	**698.00**
Factory Installed Power Supply ★	Single Phase	120	AC	24	DC	BD1	**698.00**
		240	AC	24	DC	BD1	**698.00**
	Three-Phase	208	AC	24	DC	BD1	**698.00**
		240	AC	24	DC	BD1	**698.00**
		480	AC	24	DC	BD4	**867.00**
		600	AC	24	DC	BD6	**1072.00**

▲ Form S must be added at the end of the catalog number.
■ Form S6 must be added at the end of the catalog number. Current limiter is provided and factory installed.
♦ Two fuses in primary and one fuse in secondary provided as standard.
★ Fuse holder with 2 fuses provided as standard.

4 Choose Communication Type

If you do not need communication capabilities, select communication code N.

If a Communication protocol is selected, Control Voltage must be 24 Vdc (Control Power Source Codes BD, BD1, BD4 or BD6 only. Refer to Table 16.424)

Table 16.425: Communication Code

Communication Protocol	Communication Code	$ Price
Modbus	M	**262.00**
Modbus TCP/IP	E	**712.00**
CANopen	C	**262.00**
DeviceNet	D	**262.00**
Beckoff	B	**262.00**
Profibus	P	**262.00**
Advantys STB	A	**262.00**
AS-interface	J	**226.00**
AS-interface V2	K	**226.00**
No Communication	N	—

5 Choose Factory Modifications

When choosing Factory modifications, the Form code must be added at the end of the catalog number. If several forms are selected, they must be arranged in alphabetical order. There are two types of Forms available: abbreviated forms and standard forms.

5.1 Abbreviated Forms

Abbreviated forms are defined combinations of the most commonly ordered standard forms and are part of the profiled configurations with short lead time. For example, abbreviated form CP1 is a combination of standard forms C and P51.

Abbreviated forms cannot be mixed with other standard forms, with the exceptions of forms S and S6. If your combination of forms is not available as an abbreviated form, use only standard forms and arrange them in alphabetical order. For example, T40CG1CFG7NCP1S is a valid catalog number with the abbreviated form CP1. If you want to add Form P68, the valid catalog number is T40CG1CFG7NCP51P68S. T40CG1GFG7NCP1P68S is invalid because abbreviated form CP1 cannot be used with standard form P68.

Table 16.426: Abbreviated Forms

Factory Modifications	Form	$ Price
Hand/Off/Auto Selector Switch + Red ON LED Standard Pilot Light	CP1	**672.00**
Hand/Off/Auto Selector Switch + Green ON LED Standard Pilot Light	CP2	**672.00**
Hand/Off/Auto Selector Switch + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	C12	**1008.00**
Hand/Off/Auto Selector Switch + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	C21	**1008.00**
Start/Stop Push Buttons + Red ON LED Standard Pilot Light	AP1	**672.00**
Start/Stop Push Buttons + Green ON LED Standard Pilot Light	AP2	**672.00**
Start/Stop Push Buttons + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	A12	**1008.00**
Start/Stop Push Buttons + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	A21	**1008.00**
ON/OFF Selector Switch + Red ON LED Standard Pilot Light	C61	**672.00**
ON/OFF Selector Switch + Green ON LED Standard Pilot Light	C62	**672.00**
ON/OFF Selector Switch + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	C66	**1008.00**
ON/OFF Selector Switch + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	C67	**1008.00**
Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	P12	**672.00**
Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	P21	**672.00**

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5.2 Standard Forms

Table 16.427: Push Button Forms

Factory Modifications	Form	$ Price
Start/Stop	A	336.00
Forward/Reverse/Stop	A1	570.00
ON/OFF	A3	336.00
Miscellaneous	A11	336.00
Stop	A13	336.00
Start Push Button + Stop Mushroom Head	A22	336.00
Emergency Stop Mushroom Head	A31	336.00
Turn-To-Release Emergency Stop Mushroom Head	A32	336.00

Table 16.428: Selector Switch Forms

Factory Modifications	Form	$ Price
Hand/Off/Auto	C	336.00
Start/Stop	C1	336.00
ON/Auto	C2	336.00
ON/OFF	C6	336.00
Hand/Auto	C8	336.00
Forward/OFF/Reverse	C14	336.00
Forward/Reverse	C20	336.00
Three position	C34	336.00
Two position	C35	336.00
Keyed Hand/Off/Auto	C36	735.00
Keyed Start/Stop	C37	735.00
Keyed ON/Auto	C38	735.00
Keyed ON/OFF	C39	735.00
Keyed Forward/Off/Reverse	C43	735.00
Keyed Forward/Reverse	C47	735.00

Table 16.429: 30mm Standard LED Pilot Light Forms

Factory Modifications	Form	$ Price
Red ON	P51	336.00
Green OFF	P52	336.00
White — Not Factory wired	P54	336.00
Blue — Not Factory wired	P56	336.00
Amber Overload Trip	P68	336.00
Yellow SSC Trip	P69	336.00
Red OFF	P91	336.00
Green ON	P92	336.00
Green Forward/Reverse	P95	672.00
Red Forward/Reverse	P96	672.00

Table 16.430: 30mm Push-To-Test LED Pilot Light Forms

Factory Modifications	Form	$ Price
Red ON	P42	435.00
Red OFF	P43	435.00
Green ON	P45	435.00
Green OFF	P46	435.00
Blue — Not Factory wired	P66	435.00
White — Not Factory wired	P67	435.00
Green Forward/Reverse	P79	870.00
Red Forward/Reverse	P80	870.00
Amber Overload Trip	P88	435.00
Yellow SSC Trip	P89	435.00

Table 16.431: Separate Control Forms

Factory Modifications	Form	$ Price
Separate Control for starters with line voltage less or equal to 480 V	S	—
Separate Control for starters with line voltage equalt to 600 V — Current Limiter is factory installed.	S6	205.00

Table 16.432: Additional Capacity Forms

NOTE: *Fuses are provided. Two fuses in primary and one fuse in secondary.*

Factory Modifications	Form	$ Price
50VA additional capacity	T10	215.00
100VA additional capacity	T11	372.00

Table 16.433: Auxiliary Contact Forms

Factory Modifications	Form	$ Price
2 N.O.	U8	41.00
1 N.O. and 1 N.C.	U9	41.00
2 N.C.	U10	41.00
1 N.C. fault signaling contact and 1 N.O. contact indicating starter is in "ready" state	U6	41.00
1 N.O. fault signaling contact and 1 N.O. contact indicating starter is in "ready" state	U7	41.00

Table 16.434: Auxiliary Relay Forms

NOTE: *Auxiliary Relays are not factory wired.*

Factory Modifications	Form	$ Price
4 poles screw clamp Control Relay — 4 N.O.	R1740	485.00 for Type 1 and 12/3R enclosures 741.00 for Type 4/4X enclosures
4 poles screw clamp Control Relay — 3 N.O. and 1 N.C.	R1731	485.00 for Type 1 and 12/3R enclosures 741.00 for Type 4/4X enclosures
4 poles screw clamp Control Relay — 2 N.O. and 2 N.C.	R1722	485.00 for Type 1 and 12/3R enclosures 741.00 for Type 4/4X enclosures
Programmable Timer Relay	K1070	449.00

Table 16.435: Enclosure Forms

Factory Modifications	Form	$ Price
Factory Modify Type 12/3R enclosure for Type 3R application	G26	—
Oversized enclosure	G28	$425.00 for Type 1 and 12/3R enclosures $690.00 for Type 4/4X enclosures
Plain Blank Door — No covered pre-stamped holes	G30	TAG

Table 16.436: Miscellaneous Forms

Factory Modifications	Form	$ Price
Function Nameplate	G11	43.00
Non-standard control unit marking	G12	30.00
Unwired Terminal Block	G50▲	57.00
Wired Terminal Block	G56▲■	116.00
Space Heater - thermostat control	G55	770.00
Wire markers	G105	675.00
Padlock attachment	G122	75.00
Transient suppressor	U11	47.00
Special factory orders	SPL	TAG
Custom control wiring	Y217	TAG
Solid neutral Terminal Block	N	116.00

▲ Add number of terminal block points required. Number must be in increments of 5.
■ Wiring diagram must be provided by customer.

Table 16.437: Increase Short Circuit Current Rating Forms

Factory Modifications	Form	$ Price
130 kA @480 V — Current Limiter factory installed	Y1261	205.00

Table 16.438: Starter Status Indication Forms

Factory Modifications	Form	$ Price
Fault Differentiation Module — Manual Reset	U1	187.00
Fault Differentiation Module — Automatic or remote reset	U2	187.00
Thermal Overload Alarm Module	U3	187.00
Motor Load Indication Module	U4	226.00

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Section 17

Motor Control Centers

Model 6 Motor Control Centers

Structure and Unit Features	**17-2**
Merchandised Units General Information	**17-2**
Combination Starters with Motor Circuit Protector Disconnects	**17-3**
Combination Starters with Fusible Switch Disconnects	**17-4**
Compac™ 6 Combination Starters	**17-5**
Branch Feeder Units	**17-6**

Overview

Designed and manufactured to tackle the toughest power and process control challenges, the Model 6 Motor Control Center features industry-finest innovations that provide unmatched performance, high reliability, and low maintenance. The Model 6 Motor Control Center has integrated industry-leading components into the smallest and most flexible footprint possible to meet your power, control, and automation needs. The Model 6 provides superior performance, as well as long, reliable operation with enhanced safety features.

Model 6 Unit

Model 6 Motor Control Center

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Schneider Electric

Model 6
Motor Control Center

Model 6

Model 6 Structure Features

- Horizontal main bus uses captive splice bar assembly; allows splicing without removing units
- Horizontal bus is located at the top of the structure for easy installation, inspection and maintenance Available ampacity 600 A, 800 A, 1200 A, 2000 A, and 2500 A
- Sliding non-conductive bus barrier
- 300 A and 600 A vertical bus
- Vertical bus openings built on 3-inch centers
- Optional automatic vertical bus shutters are available
- Mounting channel includes leveling notches for ease of alignment
- Full depth vertical wireway available, either 4-inch or 9-inch width
- Vertical ground bus is standard

Model 6 Unit Features

- Cast metal handle, color coded for clear indication of disconnect position (including “Tripped”)
- Twin-handle cam (“Butterfly”) mechanism standard on all plug-on units (except Compac™ 6)
- Rugged unit construction features solid rear, side and hinged bottom plates
- Forward tilted pull-apart control terminal blocks standard with NEMA Type B or C wiring
- Starter units available with Class 8536 Type S NEMA or D-Line IEC
- Available overload relays on starter include: melting alloy, bimetallic, Motor Logic™, and TeSys T ™
- Control station plate for pilot devices is mounted on front of unit (no cables across door hinge)
- Easily accessible control transformer
- Starter mounted on right-hand side of unit, adjacent to wireway, for ease of cable termination

Available units include:

- — Automation equipment
- — Altivar™ AC drives
- — Altistart™ soft starts
- — Surge Protection Device (SPD) units
- — PowerLogic™ circuit monitor and power meter
- — Compac 6 starters and branch feeders
- — Reduced voltage starters
- — Distribution transformers and panelboards
- — Empty mounting units
- — Masterpact™ drawout main circuit breakers
- — Master terminal compartments
- — Automatic transfer switches
- — Full voltage non-reversing
- — Full voltage reversing
- — Circuit breaker branch feeders
- — Fusible switch branch feeders
- — Full voltage 2-speed
- — Programmable logic controllers
- — Incoming devices
- — Tie breakers

New!

Intelligent Motor Control Center—Model 6 iMCC

Streamline troubleshooting and maximize uptime by incorporating “intelligent” components and cabling solutions into your motor control center.

Access the information you need in real time—anywhere, anytime. Designed to work on open network protocols, the Square D™ brand Model 6 iMCC allows you to monitor AC drive parameters, view full voltage starter status, spot abnormal conditions immediately and quickly diagnose equipment failures from any networked computer.

Communication protocols available: CANopen, DeviceNet™, Ethernet, Modbus™, and PROFIBUS. Connect to your network control system and communcate with every unit in the iMCC regardless of your communication protocol. Monitor each motor and load so you can know what’s going on at all times and take action before problems arise.

Merchandised Units (shipment in 3 days)

Model 6 Industrial Package units (white) are available for ordering by catalog number. A listing of types available by quick shipment may be found on the following pages. This limited offering includes popular combinations of types and options. Catalog numbers consist of class number (8998), disconnect and device types, horsepower or ampacity ratings and options (for example, 8998SBA001XFTMA). See table below. All units are UL Listed.

Combination Starters Catalog Numbering System

Units rated as follows:

- Model 6 Industrial Package, 480 V, 60 Hz, NEMA 12 enclosure
- Type 1B wiring, 100,000 AIR rating, 1 N.O./1 N.C. auxiliary interlock on each contactor

Table 17.1: Numbering System

First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
8998	S	B	A	005	A	FT	MA
Class	**Type**	**Disconnect**	**Device**	**Motor Hp**	**Pilot Device Function**	**Control Power**	**Overload Relay**
8998	S- Standard Size H- High Density (Compac 6)▲	B- Circuit Breaker (PowerPact™ MCP) F- Fusible (Class R except Compac 6 Class J)	A-FVNR C-FVR■	001=1 hp 002=2 hp 003=3 hp 005=5 hp 007=7.5 hp 010=10 hp 015=15 hp■ 025=25 hp■ 040=40 hp■ 050=50 hp■ 060=60 hp■ 075=75 hp■ 100=100 hp■	X=None A=Start-Stop PB, On/Off Lights♦ C=HOA Sel.Switch, On/Off Lights▲	FT- 480-120 V CPT★ FS- 120 V Fused Separate Ctl w/intlk	MA-Melting Alloy (Thermal Units not Included) SS-Motor Logic SSOL (Class 20 Base Unit)

▲ Not available with FVR
■ Not available with Compac 6
♦ Includes forward, reverse and stop push-buttons; and forward and reverse pilot lights with FVR starters
★ Includes extra 50 VA CPT on Sz 1 FVNR (T1)

For more information, contact your nearest Schneider Electric sales office.

Complete Model 6 Motor Control Centers are available from the factory.

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Combination Starters with Motor Circuit Protector Disconnects

Model 6 NEMA-rated FVNR combination starters use PowerPact™ Motor Circuit Protectors.

Ratings: 480 V, NEMA 12, Type 1B-D wiring, 100,000 AIR. Units include 1 N.O./1 N.C. auxiliary contacts. Units with pilot devices use 22 mm type. Units without pilot devices include a station plate with knockouts for five 22 mm devices.

Thermal units are not included with melting alloy overloads.

Table 17.2: FVNR Combination Starters with Motor Circuit Protector Disconnects

Ratings			Control Transformer						Fused Separate Control					
			No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA Red On/Green Off Lights		No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA Red On/Green Off Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
Full Voltage Non-Reversing (FVNR) Starters With Motor Circuit Protector Disconnect and Melting Alloy Overload Relay														
1	1	12	SBA001XFTMA	2988.00	SBA001AFTMA	3530.00	SBA001CFTMA	3530.00	SBA001XFSMA	2672.00	SBA001AFSMA	3214.00	SBA001CFSMA	3214.00
	2		SBA002XFTMA		SBA002AFTMA		SBA002CFTMA		SBA002XFSMA		SBA002AFSMA		SBA002CFSMA	
	3		SBA003XFTMA		SBA003AFTMA		SBA003CFTMA		SBA003XFSMA		BA003AFSMA		SBA003CFSMA	
	5		SBA005XFTMA		SBA005AFTMA		SBA005CFTMA		SBA005XFSMA		SBA005AFSMA		SBA005CFSMA	
	7.5		SBA007XFTMA		SBA007AFTMA		SBA007CFTMA		SBA007XFSMA		SBA007AFSMA		SBA007CFSMA	
	10		SBA010XFTMA		SBA010AFTMA		SBA010CFTMA		SBA010XFSMA		SBA010AFSMA		SBA010CFSMA	
2	15	12	SBA015XFTMA	3322.00	SBA015AFTMA	3864.00	SBA015CFTMA	3864.00	SBA015XFSMA	3006.00	SBA015AFSMA	3548.00	SBA015CFSMA	3548.00
	25		SBA025XFTMA		SBA025AFTMA		SBA025CFTMA		SBA025XFSMA		SBA025AFSMA		SBA025CFSMA	
3	40	18	SBA040XFTMA	4798.00	SBA040AFTMA	5340.00	SBA040CFTMA	5340.00	SBA040XFSMA	4362.00	SBA040AFSMA	4904.00	SBA040CFSMA	4904.00
	50		SBA050XFTMA		SBA050AFTMA		SBA050CFTMA		SBA050XFSMA		SBA050AFSMA		SBA050CFSMA	
4	60	21	SBA060XFTMA	6644.00	SBA060AFTMA	7186.00	SBA060CFTMA	7186.00	SBA060XFSMA	6086.00	SBA060AFSMA	6628.00	SBA060CFSMA	6628.00
	75		SBA075XFTMA		SBA075AFTMA		SBA075CFTMA		SBA075XFSMA		SBA075AFSMA		SBA075CFSMA	
	100		SBA100XFTMA		SBA100AFTMA		SBA100CFTMA		SBA100XFSMA		SBA100AFSMA		SBA100CFSMA	
Full Voltage Non-Reversing (FVNR) Starters With Motor Circuit Protector Disconnect and Solid State Overload Relay (Motor Logic™)														
1	1	12	SBA001XFTSS	3184.00	SBA001AFTSS	3726.00	SBA001CFTSS	3726.00	SBA001XFSSS	2868.00	SBA001AFSSS	3410.00	SBA001CFSSS	3410.00
	2		SBA002XFTSS		SBA002AFTSS		SBA002CFTSS		SBA002XFSSS		SBA002AFSSS		SBA002CFSSS	
	3		SBA003XFTSS		SBA003AFTSS		SBA003CFTSS		SBA003XFSSS		SBA003AFSSS		SBA003CFSSS	
	5		SBA005XFTSS		SBA005AFTSS		SBA005CFTSS		SBA005XFSSS		SBA005AFSSS		SBA005CFSSS	
	7.5		SBA007XFTSS		SBA007AFTSS		SBA007CFTSS		SBA007XFSSS		SBA007AFSSS		SBA007CFSSS	
	10		SBA010XFTSS		SBA010AFTSS		SBA010CFTSS		SBA010XFSSS		SBA010AFSSS		SBA010CFSSS	
2	15	12	SBA015XFTSS	3518.00	SBA015AFTSS	4060.00	SBA015CFTSS	4060.00	SBA015XFSSS	3202.00	SBA015AFSSS	3744.00	SBA015CFSSS	3744.00
	25		SBA025XFTSS		SBA025AFTSS		SBA025CFTSS		SBA025XFSSS		SBA025AFSSS		SBA025CFSSS	
3	40	18	SBA040XFTSS	5074.00	SBA040AFTSS	5616.00	SBA040CFTSS	5616.00	SBA040XFSSS	4638.00	SBA040AFSSS	5180.00	SBA040CFSSS	5180.00
	50		SBA050XFTSS		SBA050AFTSS		SBA050CFTSS		SBA050XFSSS		SBA050AFSSS		SBA050CFSSS	
4	60	21	SBA060XFTSS	6920.00	SBA060AFTSS	7462.00	SBA060CFTSS	7462.00	SBA060XFSSS	6362.00	SBA060AFSSS	6904.00	SBA060CFSSS	6904.00
	75		SBA075XFTSS		SBA075AFTSS		SBA075CFTSS		SBA075XFSSS		SBA075AFSSS		SBA075CFSSS	
	100		SBA100XFTSS		SBA100AFTSS		SBA100CFTSS		SBA100XFSSS		SBA100AFSSS		SBA100CFSSS	

Table 17.3: FVR Combination Starters with Motor Circuit Protector Disconnects

Ratings			Control Transformer				Fused Separate Control			
			No Pilot Devices		Forward-Rev.-Stop PB, Forward/Reverse Lights		No Pilot Devices		Forward-Rev.-Stop PB, Forward/Reverse Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
Full Voltage Reversing (FVR) Starters With Motor Circuit Protector Disconnect and Melting Alloy Overload Relay										
1	1	18	SBC001XFTMA	3884.00	SBC001AFTMA	4494.00	SBC001XFSMA	3568.00	SBC001AFSMA	4178.00
	2		SBC002XFTMA		SBC002AFTMA		SBC002XFSMA		SBC002AFSMA	
	3		SBC003XFTMA		SBC003AFTMA		SBC003XFSMA		SBC003AFSMA	
	5		SBC005XFTMA		SBC005AFTMA		SBC005XFSMA		SBC005AFSMA	
	7.5		SBC007XFTMA		SBC007AFTMA		SBC007XFSMA		SBC007AFSMA	
	10		SBC010XFTMA		SBC010AFTMA		SBC010XFSMA		SBC010AFSMA	
2	15	18	SBC015XFTMA	4760.00	SBC015AFTMA	5370.00	SBC015XFSMA	4484.00	SBC015AFSMA	5054.00
	25		SBC025XFTMA		SBC025AFTMA		SBC025XFSMA		SBC025AFSMA	
3	40	27	SBC040XFTMA	6246.00	SBC040AFTMA	6856.00	SBC040XFSMA	5810.00	SBC040AFSMA	6420.00
	50		SBC050XFTMA		SBC050AFTMA		SBC050XFSMA		SBC050AFSMA	
4	60	33	SBC060XFTMA	9826.00	SBC060AFTMA	10436.00	SBC060XFSMA	9268.00	SBC060AFSMA	9878.00
	75		SBC075XFTMA		SBC075AFTMA		SBC075XFSMA		SBC075AFSMA	
	100		SBC100XFTMA		SBC100AFTMA		SBC100XFSMA		SBC100AFSMA	
Full Voltage Reversing (FVR) Starters With Motor Circuit Protector Disconnect and Solid State Overload Relay (Motor Logic)										
1	1	18	SBC001XFTSS	4160.00	SBC001AFTSS	4690.00	SBC001XFSSS	3764.00	SBC001AFSSS	4374.00
	2		SBC002XFTSS		SBC002AFTSS		SBC002XFSSS		SBC002AFSSS	
	3		SBC003XFTSS		SBC003AFTSS		SBC003XFSSS		SBC003AFSSS	
	5		SBC005XFTSS		SBC005AFTSS		SBC005XFSSS		SBC005AFSSS	
	7.5		SBC007XFTSS		SBC007AFTSS		SBC007XFSSS		SBC007AFSSS	
	10		SBC010XFTSS		SBC010AFTSS		SBC010XFSSS		SBC010AFSSS	
2	15	18	SBC015XFTSS	5116.00	SBC015AFTSS	5566.00	SBC015XFSSS	4640.00	SBC015AFSSS	5250.00
	25		SBC025XFTSS		SBC025AFTSS		SBC025XFSSS		SBC025AFSSS	
3	40	27	SBC040XFTSS	6682.00	SBC040AFTSS	7132.00	SBC040XFSSS	6086.00	SBC040AFSSS	6696.00
	50		SBC050XFTSS		SBC050AFTSS		SBC050XFSSS		SBC050AFSSS	
4	60	33	SBC060XFTSS	10102.00	SBC060AFTSS	10712.00	SBC060XFSSS	9544.00	SBC060AFSSS	10154.00
	75		SBC075XFTSS		SBC075AFTSS		SBC075XFSSS		SBC075AFSSS	
	100		SBC100XFTSS		SBC100AFTSS		SBC100XFSSS		SBC100AFSSS	

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Combination Starters with Fusible Switch Disconnects

Model 6 NEMA-rated FVNR combination starters listed below use fusible switches with Class R fuse clips (fuses not included).

Ratings: 480 V, NEMA 12, Type 1B-D wiring, 100,000 AIR. Units include 1 N.O./1 N.C. auxiliary contacts. Units with pilot devices use 22 mm type. Units without pilot devices include a station plate with knockouts for five 22 mm devices.

Thermal units are not included with melting alloy overloads.

Table 17.4: FVNR Combination Starters with Fusible Switch Disconnects

Ratings			Control Transformer						Fused Separate Control					
			No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA Red On/Green Off Lights		No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA Red On/Green Off Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
Full Voltage Non-Reversing (FVNR) Starters With Fusible Switch Disconnect and Melting Alloy Overload Relay														
1	1	12	SFA001XFTMA	2330.00	SFA001AFTMA	2872.00	SFA001CFTMA	2872.00	SFA001XFSMA	2014.00	SFA001AFSMA	2556.00	SFA001CFSMA	2556.00
	2		SFA002XFTMA		SFA002AFTMA		SFA002CFTMA		SFA002XFSMA		SFA002AFSMA		SFA002CFSMA	
	3		SFA003XFTMA		SFA003AFTMA		SFA003CFTMA		SFA003XFSMA		SFA003AFSMA		SFA003CFSMA	
	5		SFA005XFTMA		SFA005AFTMA		SFA005CFTMA		SFA005XFSMA		SFA005AFSMA		SFA005CFSMA	
	7.5		SFA007XFTMA		SFA007AFTMA		SFA007CFTMA		SFA007XFSMA		SFA007AFSMA		SFA007CFSMA	
	10		SFA010XFTMA		SFA010AFTMA		SFA010CFTMA		SFA010XFSMA		SFA010AFSMA		SFA010CFSMA	
2	15	12	SFA015XFTMA	2750.00	SFA015AFTMA	3292.00	SFA015CFTMA	3292.00	SFA015XFSMA	2434.00	SFA015AFSMA	2976.00	SFA015CFSMA	2976.00
	25		SFA025XFTMA		SFA025AFTMA		SFA025CFTMA		SFA025XFSMA		SFA025AFSMA		SFA025CFSMA	
3	40	18	SFA040XFTMA	3960.00	SFA040AFTMA	4502.00	SFA040CFTMA	4502.00	SFA040XFSMA	3524.00	SFA040AFSMA	4066.00	SFA040CFSMA	4066.00
	50		SFA050XFTMA		SFA050AFTMA		SFA050CFTMA		SFA050XFSMA		SFA050AFSMA		SFA050CFSMA	
4	60	30	SFA060XFTMA	6344.00	SFA060AFTMA	6886.00	SFA060CFTMA	6886.00	SFA060XFSMA	5786.00	SFA060AFSMA	6328.00	SFA060CFSMA	6328.00
	75		SFA075XFTMA		SFA075AFTMA		SFA075CFTMA		SFA075XFSMA		SFA075AFSMA		SFA075CFSMA	
	100		SFA100XFTMA		SFA100AFTMA		SFA100CFTMA		SFA100XFSMA		SFA100AFSMA		SFA100CFSMA	
Full Voltage Non-Reversing (FVNR) Starters With Fusible Switch Disconnect and Solid State Overload Relay (Motor Logic™)														
1	1	12	SFA001XFTSS	2526.00	SFA001AFTSS	3068.00	SFA001CFTSS	3068.00	SFA001XFSSS	2210.00	SFA001AFSSS	2752.00	SFA001CFSSS	2752.00
	2		SFA002XFTSS		SFA002AFTSS		SFA002CFTSS		SFA002XFSSS		SFA002AFSSS		SFA002CFSSS	
	3		SFA003XFTSS		SFA003AFTSS		SFA003CFTSS		SFA003XFSSS		SFA003AFSSS		SFA003CFSSS	
	5		SFA005XFTSS		SFA005AFTSS		SFA005CFTSS		SFA005XFSSS		SFA005AFSSS		SFA005CFSSS	
	7.5		SFA007XFTSS		SFA007AFTSS		SFA007CFTSS		SFA007XFSSS		SFA007AFSSS		SFA007CFSSS	
	10		SFA010XFTSS		SFA010AFTSS		SFA010CFTSS		SFA010XFSSS		SFA010AFSSS		SFA010CFSSS	
2	15	12	SFA015XFTSS	2946.00	SFA015AFTSS	3488.00	SFA015CFTSS	3488.00	SFA015XFSSS	2630.00	SFA015AFSSS	3172.00	SFA015CFSSS	3172.00
	25		SFA025XFTSS		SFA025AFTSS		SFA025CFTSS		SFA025XFSSS		SFA025AFSSS		SFA025CFSSS	
3	40	18	SFA040XFTSS	4236.00	SFA040AFTSS	4778.00	SFA040CFTSS	4778.00	SFA040XFSSS	3800.00	SFA040AFSSS	4342.00	SFA040CFSSS	4342.00
	50		SFA050XFTSS		SFA050AFTSS		SFA050CFTSS		SFA050XFSSS		SFA050AFSSS		SFA050CFSSS	
4	60	30	SFA060XFTSS	6620.00	SFA060AFTSS	7162.00	SFA060CFTSS	7162.00	SFA060XFSSS	6062.00	SFA060AFSSS	6604.00	SFA060CFSSS	6604.00
	75		SFA075XFTSS		SFA075AFTSS		SFA075CFTSS		SFA075XFSSS		SFA075AFSSS		SFA075CFSSS	
	100		SFA100XFTSS		SFA100AFTSS		SFA100CFTSS		SFA100XFSSS		SFA100AFSSS		SFA100CFSSS	

Table 17.5: FVR Combination Starters with Fusible Switch Disconnects

Ratings			Control Transformer				Fused Separate Control			
			No Pilot Devices		Forward-Rev.-Stop PB, Forward/Reverse Lights		No Pilot Devices		Forward-Rev.-Stop PB, Forward/Reverse Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
Full Voltage Reversing (FVR) Starters With Fusible Switch Disconnect and Melting Alloy Overload Relay										
1	1	18	SFC001XFTMA	3322.00	SFC001AFTMA	3932.00	SFC001XFSMA	3006.00	SFC001AFSMA	3616.00
	2		SFC002XFTMA		SFC002AFTMA		SFC002XFSMA		SFC002AFSMA	
	3		SFC003XFTMA		SFC003AFTMA		SFC003XFSMA		SFC003AFSMA	
	5		SFC005XFTMA		SFC005AFTMA		SFC005XFSMA		SFC005AFSMA	
	7.5		SFC007XFTMA		SFC007AFTMA		SFC007XFSMA		SFC007AFSMA	
	10		SFC010XFTMA		SFC010AFTMA		SFC010XFSMA		SFC010AFSMA	
2	15	18	SFC015XFTMA	4460.00	SFC015AFTMA	5070.00	SFC015XFSMA	4144.00	SFC015AFSMA	4754.00
	25		SFC025XFTMA		SFC025AFTMA		SFC025XFSMA		SFC025AFSMA	
3	40	27	SFC040XFTMA	6328.00	SFC040AFTMA	6938.00	SFC040XFSMA	5892.00	SFC040AFSMA	6502.00
	50		SFC050XFTMA		SFC050AFTMA		SFC050XFSMA		SFC050AFSMA	
4	60	39	SFC060XFTMA	10358.00	SFC060AFTMA	10968.00	SFC060XFSMA	9800.00	SFC060AFSMA	10410.00
	75		SFC075XFTMA		SFC075AFTMA		SFC075XFSMA		SFC075AFSMA	
	100		SFC100XFTMA		SFC100AFTMA		SFC100XFSMA		SFC100AFSMA	
Full Voltage Reversing (FVR) Starters with Fusible Switch Disconnect and Solid State Overload Relay (Motor Logic)										
1	1	18	SFC001XFTSS	3518.00	SFC001AFTSS	4128.00	SFC001XFSSS	3202.00	SFC001AFSSS	3812.00
	2		SFC002XFTSS		SFC002AFTSS		SFC002XFSSS		SFC002AFSSS	
	3		SFC003XFTSS		SFC003AFTSS		SFC003XFSSS		SFC003AFSSS	
	5		SFC005XFTSS		SFC005AFTSS		SFC005XFSSS		SFC005AFSSS	
	7.5		SFC007XFTSS		SFC007AFTSS		SFC007XFSSS		SFC007AFSSS	
	10		SFC010XFTSS		SFC010AFTSS		SFC010XFSSS		SFC010AFSSS	
2	15	18	SFC015XFTSS	4656.00	SFC015AFTSS	5266.00	SFC015XFSSS	4340.00	SFC015AFSSS	4950.00
	25		SFC025XFTSS		SFC025AFTSS		SFC025XFSSS		SFC025AFSSS	
3	40	27	SFC040XFTSS	6604.00	SFC040AFTSS	7214.00	SFC040XFSSS	6168.00	SFC040AFSSS	6778.00
	50		SFC050XFTSS		SFC050AFTSS		SFC050XFSSS		SFC050AFSSS	
4	60	39	SFC060XFTSS	10634.00	SFC060AFTSS	11244.00	SFC060XFSSS	10076.00	SFC060AFSSS	10686.00
	75		SFC075XFTSS		SFC075AFTSS		SFC075XFSSS		SFC075AFSSS	
	100		SFC100XFTSS		SFC100AFTSS		SFC100XFSSS		SFC100AFSSS	

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Compac™ 6 Combination Starters with Motor Circuit Protector Disconnects

NEMA-rated Compac 6, half-height FVNR combination starters use GJ frame Mag-Gard™ Motor Circuit Protectors.

Ratings: 480 V, NEMA 12, Type 1B-D wiring, 100,000 AIR. Units include 1 N.O./1 N.C. auxiliary contacts. Units with pilot devices use 22 mm type.

Units without pilot devices include a station plate with knockouts for four 22 mm devices. Thermal units are not included with melting alloy overloads.

Table 17.6: Compac 6 Combination Starters with Motor Circuit Protector Disconnects

Ratings			Control Transformer						Fused Separate Control					
			No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA, Red On/Green Off Lights		No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA, Red On/Green Off Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
Full Voltage Non-Reversing (FVNR) Starters With Motor Circuit Protector Disconnect and Melting Alloy Overload Relay														
1	1	6	HBA001XFTMA	2860.00	HBA001AFTMA	3402.00	HBA001CFTMA	3402.00	HBA001XFSMA	2544.00	HBA001AFSMA	3086.00	HBA001CFSMA	3086.00
	2		HBA002XFTMA		HBA002AFTMA		HBA002CFTMA		HBA002XFSMA		HBA002AFSMA		HBA002CFSMA	
	3		HBA003XFTMA		HBA003AFTMA		HBA003CFTMA		HBA003XFSMA		HBA003AFSMA		HBA003CFSMA	
	5		HBA005XFTMA		HBA005AFTMA		HBA005CFTMA		HBA005XFSMA		HBA005AFSMA		HBA005CFSMA	
	7.5		HBA007XFTMA		HBA007AFTMA		HBA007CFTMA		HBA007XFSMA		HBA007AFSMA		HBA007CFSMA	
	10		HBA010XFTMA		HBA010AFTMA		HBA010CFTMA		HBA010XFSMA		HBA010AFSMA		HBA010CFSMA	
Full Voltage Non-Reversing (FVNR) Starters With Motor Circuit Protector Disconnect and Solid State Overload Relay (Motor Logic™)														
1	1	6	HBA001XFTSS	3056.00	HBA001AFTSS	3598.00	HBA001CFTSS	3598.00	HBA001XFSSS	2740.00	HBA001AFSSS	3282.00	HBA001CFSSS	3282.00
	2		HBA002XFTSS		HBA002AFTSS		HBA002CFTSS		HBA002XFSSS		HBA002AFSSS		HBA002CFSSS	
	3		HBA003XFTSS		HBA003AFTSS		HBA003CFTSS		HBA003XFSSS		HBA003AFSSS		HBA003CFSSS	
	5		HBA005XFTSS		HBA005AFTSS		HBA005CFTSS		HBA005XFSSS		HBA005AFSSS		HBA005CFSSS	
	7.5		HBA007XFTSS		HBA007AFTSS		HBA007CFTSS		HBA007XFSSS		HBA007AFSSS		HBA007CFSSS	
	10		HBA010XFTSS		HBA010AFTSS		HBA010CFTSS		HBA010XFSSS		HBA010AFSSS		HBA010CFSSS	

Compac 6 Combination Starters with Fusible Switch Disconnects

NEMA-rated Compac 6, half-height FVNR combination starters listed below use fusible switches with Class J fuse clips (fuses not included).

Ratings: 480 V, NEMA 12, Type 1B-D wiring, 100,000 AIR. Units include 1 N.O./1 N.C. auxiliary contacts.

Units with pilot devices use 22 mm type. Units without pilot devices include a station plate with knockouts for four 22 mm devices. Thermal units are not included with melting alloy overloads.

Table 17.7: Compac 6 Combination Starters with Fusible Switch Disconnects

Ratings			Control Transformer						Fused Separate Control					
			No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA, Red On/Green Off Lights		No Pilot Devices		Start-Stop PB, Red On/Green Off Lights		HOA, Red On/Green Off Lights	
NEMA Size	Max. Hp	Space (IN)	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price	Catalog No.	$ Price
Full Voltage Non-Reversing (FVNR) Starters with Fusible Switch Disconnect and Melting Alloy Overload Relay														
1	1	6	HFA001XFTMA	2492.00	HFA001AFTMA	3034.00	HFA001CFTMA	3034.00	HFA001XFSMA	2176.00	HFA001AFSMA	2718.00	HFA001CFSMA	2718.00
	2		HFA002XFTMA		HFA002AFTMA		HFA002CFTMA		HFA002XFSMA		HFA002AFSMA		HFA002CFSMA	
	3		HFA003XFTMA		HFA003AFTMA		HFA003CFTMA		HFA003XFSMA		HFA003AFSMA		HFA003CFSMA	
	5		HFA005XFTMA		HFA005AFTMA		HFA005CFTMA		HFA005XFSMA		HFA005AFSMA		HFA005CFSMA	
	7.5		HFA007XFTMA		HFA007AFTMA		HFA007CFTMA		HFA007XFSMA		HFA007AFSMA		HFA007CFSMA	
	10		HFA010XFTMA		HFA010AFTMA		HFA010CFTMA		HFA010XFSMA		HFA010AFSMA		HFA010CFSMA	
Full Voltage Non-Reversing (FVNR) Starters With Fusible Switch Disconnect and Solid State Overload Relay (Motor Logic)														
1	1	6	HFA001XFTSS	2688.00	HFA001AFTSS	3230.00	HFA001CFTSS	3230.00	HFA001XFSSS	2372.00	HFA001AFSSS	2914.00	HFA001CFSSS	2914.00
	2		HFA002XFTSS		HFA002AFTSS		HFA002CFTSS		HFA002XFSSS		HFA002AFSSS		HFA002CFSSS	
	3		HFA003XFTSS		HFA003AFTSS		HFA003CFTSS		HFA003XFSSS		HFA003AFSSS		HFA003CFSSS	
	5		HFA005XFTSS		HFA005AFTSS		HFA005CFTSS		HFA005XFSSS		HFA005AFSSS		HFA005CFSSS	
	7.5		HFA007XFTSS		HFA007AFTSS		HFA007CFTSS		HFA007XFSSS		HFA007AFSSS		HFA007CFSSS	
	10		HFA010XFTSS		HFA010AFTSS		HFA010CFTSS		HFA010XFSSS		HFA010AFSSS		HFA010CFSSS	

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Branch Feeder Units Catalog Numbering System

Units rated as follows:

- 480 V, 60 Hz, NEMA Type 12 Enclosure, Industrial Package
- Short Circuit rating: 100,000 AIR

Table 17.8: Circuit Breaker Branch Feeder Units

First Position	Second Position	Third Position	Fourth Position	Fifth Position
8998	S	B	F	015
Class	**Type**	**Disconnect**	**Device**	**Feeder Amps**
8998	S- Standard Size H- Compac™ 6	B- Breaker (Thermal-Mag)	F- Feeder	015 080 020 100 030 125 040 150 050 200 060 250 070
Amps	**Breaker Frame**	**Space (IN)**	**Catalog No.**	**$ Price**
15	HL	6	HBF015	**2300.00**
20			HBF020	
30			HBF030	
40			HBF040	
50			HBF050	
60			HBF060	
70			HBF070	**2650.00**
80			HBF080	
100			HBF100	
125			HBF125	**4850.00**
150			HBF150	
200	JL		HBF200	**4950.00**
250			HBF250	**6400.00**
15	HL	12	SBF015	**2200.00**
20			SBF020	
30			SBF030	
40			SBF040	
50			SBF050	
60			SBF060	
70			SBF070	**2550.00**
80			SBF080	
100			SBF100	
125			SBF125	**4370.00**
150			SBF150	
200	JL	18	SBF200	**4800.00**
250			SBF250	**5510.00**

Table 17.9: Fusible Branch Feeder Units

First Position	Second Position	Third Position	Fourth Position	Fifth Position
8998	S	F	F	015
Class	**Type**	**Disconnect**	**Device**	**Feeder Amps**
8998	S- Standard Size H- Compac 6	F- Fusible▲	F- Feeder	030 060 100 200 ■
Amps	**Fuse Clips**	**Space (IN)**	**Catalog No.**	**$ Price**
30	Class J	6 (Compac 6)	HFF030	**1272.00**
60			HFF060	
100			HFF100	**1746.00**
30	Class R	12	SFF030	**1160.00**
60			SFF060	
100			SFF100	**1592.00**
200		24	SFF200	**1960.00**

▲ Class R except Compac 6, fuses not included.
■ Not available with Compac 6.

Model 6 Blank Doors

These doors may be used to cover an unused space in the MCC. A blank door will be required when placing a new unit in an existing space that is larger than the new unit.

Table 17.10: Model 6 Blank Doors

Catalog Number	Description	$ Price
8998CP03	3 Inch High Blank Cover Plate	**58.00**
8998CP06	6 Inch High Blank Door	**58.00**
8998CP09	9 Inch High Blank Door	**70.00**
8998CP12	12 Inch High Blank Door	**82.00**
8998CP15	15 Inch High Blank Door	**96.00**
8998CP18	18 Inch High Blank Door	**112.00**
8998CP24	24 Inch High Blank Door	**140.00**

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Section 18

TeSys™ IEC Contactors and Starters

TeSys D Contactors (p. 18-4)

New!

TeSys F1700, F2100

TeSys F Contactors (p. 18-5)

GV7 Manual Motor Starters and Protectors (p. 18-35)

GV3P (p.18-33)

LUB•2 (p. 18-28)

GV2P21 (p.18-33)

Contactors

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Motor Starters and Protectors

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Dimensions

Dimensions	**18-40**

For more information on lighting, definite purpose (DP), and elevator ratings for TeSys D and TeSys F contactors, refer to catalog 8502CT9901.

For more information on machine safety applications using TeSys D and TeSys F contactors, refer to catalog MKTED208051EN-US.

See our website, www.schneider-electric.us, for UL 508A short circuit ratings (SCCR).

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Table 18.1: TeSys D Contactors—Interpretation of the Catalog Number

LC	____	D	____	____	____	____
Full Voltage, Non-Reversing	1					
Full Voltage, Reversing	2					
TeSys D 3 Pole Contactors, 9–150 A						
Contactor AC-3 Full Load Amperes (FLA)						
9 A FLA		09				
12 A FLA		12				
18 A FLA		18				
25 A FLA		25				
32 A FLA		32				
40 A FLA		40				
50 A FLA		50				
65 A FLA		65				
80 A FLA		80				
115 A FLA		115				
150 A FLA		150				
Everlink Power Connection (40–65 A only)			A			
No Everlink Power Connection (9–32 A, 80–150 A)			Blank			
Termination Options (choose one)						
Screw Termination						Blank
Spring Terminations †						3
Ring Tongue Terminations ●						6
Slip-on Terminations (9–12 A only)						9

Coil Voltage (choose one)

AC Coils (50/60 Hz)		DC Coils (standard)		DC Coils low consumption available for 9–38 A only	
12 V	J7	12 V	JD	5 V	AL
21 V	Z7	21 V	ZD	12 V	JL
24 V	B7	24 V	BD	21 V	ZL
36 V	C7	36 V	CD	24 V	BL
42 V	D7	48 V	ED	48 V	EL
48 V	E7	60	ND	72 V	SL
60 V	EE7	72 V	SD	96 V	DL
100 V	K7	110 V	FD	110 V	FL
110 V	F7	125 V	GD	220 V	ML
115 V	FE7	220 V	MD	250 V	UL
120 V	G7	250 V	UD		
127 V	FC7	440 V	RD		
200 V	L7				
208 V	LE7				
220 V	M7				
230 V	P7				
240 V	U7				
277 V	W7				
380 V	Q7				
400 V	V7				
415 V	N7				
440 V	R7				
480 V	T7				
500 V	S7				
575 V	SC7				
600 V	X7				
660 V	Y5 (50 Hz only)				

† For spring terminal versions of LC1D09–LC1D65A, add **3** to the catalog number prior to adding the voltage code (for example, LC1D12G7 becomes LC1D12**3**G7, and LC1D40AG7 becomes LC1D40A**3**G7. Note that 40–65 A spring terminals are only on the control terminations and not on power terminations). There is no charge for this modification.

● For ring tongue versions of LC1D09–LC1D65A and LC1DT20–LC1DT80A, add **6** to the catalog number prior to adding the voltage code (for example, LC1D09G7 becomes LC1D09**6**G7, and LC1D50AG7 becomes LC1D50A**6**G7). There is no charge for this modification.

Note: Use this table **only** to interpret current catalog numbers. Some combinations are not available.

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Table 18.2: TeSys F Contactors—Interpretation of the Catalog Number

LC ____ **F** ____ ____ ____ ____

Full Voltage, Non-Reversing	1			
Full Voltage, Reversing	2			
TeSys F 2, 3, and 4 Pole Contactors 115–800 A				
Contactor AC-3 Full Load Amperes (FLA)				
115 A FLA		115		
150 A FLA		150		
185 A FLA		185		
225 A FLA		225		
265 A FLA		265		
330 A FLA		330		
400 A FLA		400		
500 A FLA		500		
630 A FLA		630		
780 A FLA		780		
800 A FLA		800		
Number of Poles				
2 Poles (400 A, 500 A, and 630 A only)			2	
3 Poles (all sizes)			Blank	
4 Poles (all sizes except 800 A)			4	
Termination Options—Purchase Lugs Separately				Blank

Coil Voltage (choose one, noting the contactor size it can be used on)

AC Coils		For use on:
24 V (50 Hz)	B5	LC1F115–F225
24 V (60 Hz)	B6	LC1F115–F225
24 V (40-400 Hz)	B7	LC1F225–F400
42 V (50 Hz)	D5	LC1F115–F225
48 V (50 Hz)	E5	LC1F115–F225
48 V (60 Hz)	E6	LC1F115–F225
48 V (40-400 Hz)	E7	LC1F115–F630
110 V (50 Hz)	F5	LC1F115–F225
110 V (60 Hz)	F6	LC1F115–F225
110 V	F7	LC1F1700, F2100
110 V (40-400 Hz)	F7	LC1F115–F780
115 V (50 Hz)	FE5	LC1F115–F225
115 V (40-400 Hz)	FE7	LC1F115–F780
120 V (60 Hz)	G6	LC1F115–F225
120 V	G7	LC1F1700, F2100
120 V (40-400 Hz)	G7	LC1F115–F400
120 V (40-400 Hz)	F7	LC1F500–F780
127 V (60 Hz)	G6	LC1F115–F225
127 V (40-400 Hz)	G7	LC1F115–F780
200/208 V (60 Hz)	L6	LC1F115–F225
200/208 V (40-400 Hz)	L7	LC1F265–F780
208 V (40-400 Hz)	L7	LC1F115–F225
220 V (50 Hz)	M5	LC1F115–F225
220 V (60 Hz)	M6	LC1F115–F225
220 V (40-400 Hz)	M7	LC1F115–F780
220 V	M7	LC1F1700, F2100
230 V (50 Hz)	P5	LC1F115–F225
230 V (40-400 Hz)	P7	LC1F115–F800

AC Coils		For use on:
230 V	P7	LC1F1700, F2100
240 V (50 Hz)	U5	LC1F115–F225
240 V (60 Hz)	U6	LC1F115–F225
240 V (40-400 Hz)	U7	LC1F115–F780
240 V	U7	LC1F1700, F2100
277 V (50 Hz)	W5	LC1F115–F225
277 V (40-400 Hz)	W7	LC1F115–F780
277 V	W7	LC1F1700, F2100
380 V (50 Hz)	Q5	LC1F115–F225
380 V (60 Hz)	Q6	LC1F115–F225
380 V (40-400 Hz)	Q7	LC1F115–F780
380 V	Q7	LC1F1700, F2100
400 V (50 Hz)	V5	LC1F115–F225
400 V (40-400 Hz)	V7	LC1F115–F800
400 V	V7	LC1F1700, F2100
415 V (50 Hz)	N5	LC1F115–F225
415 V (40-400 Hz)	N7	LC1F115–F780
415 V	N7	LC1F1700, F2100
440 V (50 Hz)	R5	LC1F115–F225
440 V (40-400 Hz)	R7	LC1F115–F780
440 V	R7	LC1F1700, F2100
460/480 V (60 Hz)	Q6	LC1F115–F225
480 V (40-400 Hz)	N7	LC1F780
500 V (50 Hz)	S5	LC1F115–F225
500 V (40-400 Hz)	S7	LC1F115–F780
500 V	S7	LC1F1700, F2100
600 V (40-400 Hz)	X7	LC1F500–F630
660 V (60 Hz)	Y6	LC1F115–F225

DC Coils		For use on:
24 V	BD	LC1F115–F400
48 V	ED	LC1F115–F630
110 V	FD	LC1F115–F780
110 V	FD	LC1F1700, F2100
110 V	FW	LC1F800
125 V	GD	LC1F115–F780
125 V	GD	LC1F1700, F2100
220 V	MD	LC1F265–F780
250 V	UD	LC1F1700, F2100
220/240 V	MW	LC1F800
250 V	UD	LC1F115–F780
380/400 V	QW	LC1F800
440 V	RD	LC1F1700, F2100
440 V	RD	LC1F115–F780

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LC1D09

LC1D093

LC1D40A

LC1D115

LRD22

LRD3

E164862
CCN NLDX

LR43364
Class 3211 04

Table 18.3: TeSys D Contactors—3 or 4 Pole, Screw Terminal Connections

Maximum Horsepower Ratings						Maximum Current Utilization Categories		No. of Poles		Instantaneous Auxiliary Contacts		Catalog Number ▲	$ Price	
Single-Phase		Three-Phase				Inductive AC3 (A)	Resistive AC1 (A)	N.O.	N.C.	N.O.	N.C.		AC Coils	DC Coils
115 V hp	230 V hp	200 V hp	230 V hp	460 V hp	575 V hp									
0.5	1	2	2	5	7.5	9	20	3	0	1	1	LC1D09 ♦★▼	94.00	119.00
—	—	—	—	—	—	—		4				LC1DT20 ♦	94.00	119.00
—	—	—	—	—	—	—		2	2			LC1D098 ♦	94.00	119.00
1	2	3	3	7.5	10	12	25	3	0	1	1	LC1D12 ♦★▼	119.00	149.00
—	—	—	—	—	—	—		4				LC1DT25 ♦	119.00	149.00
—	—	—	—	—	—	—		2	2			LC1D128 ♦	119.00	149.00
1	3	5	5	10	15	18	32	3	0	1	1	LC1D18 ♦★	136.00	160.00
—	—	—	—	—	—	—		4				LC1DT32 ♦	149.00	183.00
—	—	—	—	—	—	—		2	2			LC1D188 ♦	149.00	183.00
2	3	7.5	7.5	15	20	25	40	3	0	1	1	LC1D25 ♦★	151.00	181.00
—	—	—	—	—	—	—		4				LC1DT40 ♦	193.00	240.00
—	—	—	—	—	—	—		2	2			LC1D258 ♦	193.00	240.00
2	5	10	10	20	30	32	50	3	0	1	1	LC1D32 ♦★	172.00	213.00
3	5	10	10	30	30	40	60	3	0	1	1	LC1D40A ♦	218.00	275.00
—	—	—	—	—	—	—		4		0	0	LC1DT60A♦	296.00	353.00
3	7.5	15	15	40	40	50	80	3	0	1	1	LC1D50A ♦	234.00	291.00
5	10	20	20	40	50	65		3				LC1D65A ♦	322.00	379.00
—	—	—	—	—	—	—		4	0	0	0	LC1DT80A♦	446.00	503.00
7.5	15	25	30	60	60	80	125	3	0	1	1	LC1D80	363.00	420.00
—	—	—	—	—	—	—		4		0	0	LC1D80004 ■	489.00	524.00
—	—	—	—	—	—	—		2	2			LC1D80008 ■	489.00	524.00
—	—	30	40	75	100	115	200	3	0	1	1	LC1D115	479.00	479.00
—	—	40	50	100	125	150		3				LC1D150	696.00	696.00
—	—	—	—	—	—	—		4		0	0	LC1D115004	630.00	630.00

▲ Complete the catalog number by adding the coil voltage code from Table 18.11 on page 18-6 (for example, LC1D09G7).
■ For DC version of these devices, replace the **C** with a **P** (for example, **LC**1D80004•• becomes **LP**1D80004••). This applies only to 80 A, 4-pole devices.
♦ For ring tongue versions of LC1D09–LC1D65A and LC1DT20–LC1DT80A, add **6** to the catalog number prior to adding the voltage code (for example, LC1D09G7 becomes LC1D09**6**G7 and LC1D50AG7 becomes LC1D50A**6**G7). There is no charge for this modification.
★ For spring terminals versions of LC1D09–LC1D65A, add **3** to the catalog number prior to adding the voltage code (for example, LC1D12G7 becomes LC1D12**3**G7 and LC1D40AG7 becomes LC1D40A**3**G7. Note that 40–65 A spring terminals are only on the control terminations and not on power terminations). Ring tongue terminations have a 10% adder to list price.
▼ For slip-on connector versions of LC1D09 and LC1D12 only, add **9** to the catalog number prior to adding the voltage code (for example, LC1D09G7 becomes LC1D0**9**9G7). There is no charge for this modification.

Table 18.4: TeSys D Overload Relays—Ambient Compensated, Bimetallic, Direct Mounting

Current Setting Range (A)	For Direct Mounting to LC1...	Class 10 with Single-Phase Sensitivity	Class 10 without Single-Phase Sensitivity	Class 20 with Single-Phase Sensitivity	Class 20 without Single-Phase Sensitivity	$ Price
0.10–0.16	D09–D32	LRD01	LR3D01	—	—	60.00
0.16–0.25		LRD02	LR3D02	—	—	
0.25–0.40		LRD03	LR3D03	—	—	
0.40–0.63		LRD04	LR3D04	LRD04L	LR3D04L	
0.63–1		LRD05	LR3D05	LRD05L	LR3D05L	
1–1.6		LRD06	LR3D06	LRD06L	LR3D06L	
1.6–2.5		LRD07	LR3D07	LRD07L	LR3D07L	
2.5–4		LRD08	LR3D08	LRD08L	LRD08L	
4–6		LRD10	LR3D10	LRD10L	LRD10L	
5.5–8	D09–D32	LRD12	LR3D12	LRD12L	LR3D12L	62.00
7–10	D09–D32	LRD14	LR3D14	LRD14L	LR3D14L	
9–13	D12–D32	LRD16	LR3D16	LRD16L	LR3D21L	
12–18	D18–D32	LRD21	LR3D21	LRD21L	LR3D21L	
17–24	D25–D32	—	—	LRD22L	LR3D22L	
23–32	D25–D32	LRD32	LR3D32	LRD32L	LR3D32L	73.00
30–38	D32	LRD35	LR3D35	—	—	
9-13	D40A-D65A △	LRD313	LR3D313	LRD313L	—	107.00
12-18	D40A-D65A △	LRD318	LR3D318	LRD318L	—	
16-25	D40A-D65A △	LRD325	LR3D325	LRD325L	—	
23-32	D40A-D65A △	LRD332	LR3D332	LRD332L	—	
30-40	D40A-D65A △	LRD340	LR3D340	LRD340L	—	
37-50	D40A-D65A △	LRD350	LR3D350	LRD350L	—	
48-65	D40A-D65A △	LRD365	LR3D365	LRD365L	—	
17-25	D40-D80 □	LRD3322	LR3D3322	LR2D3522	LR3D3522	107.00
23-32	D40-D80 □	LRD3353	LR3D3353	LR2D3553	LR3D3553	
30-40	D40-D80 □	LRD3355	LR3D3355	LR2D3555	LR3D3555	
37-50	D50-D80 □	LRD3357	LR3D3357	LR2D3557	LR3D3557	
48-65	D50-D80 □	LRD3359	LR3D3359	LR2D3559	LR3D3559	
55–70	D65–D80	LRD3361	LR3D3361	LR2D3561	LR3D3561	127.00
63–80	D65–D80	LRD3363	LR3D3363	LR2D3563	LR3D3563	
80–104	D80	LRD3365	—	—	—	
80–104	D115–D150	LRD4365	—	—	—	362.00
95–120	D115–D150	LRD4367	—	—	—	
110–140	D150	LRD4369	—	—	—	

△ Overload relays with Everlink termination—direct mount to D40A to D65A only.
□ Direct mount to old D2 style D40 to D65 (no Everlink terminations) and to D80 only.

NOTE: *For Stand Alone Adapter order LAD7B205.*

NOTE: *To add ring tongue terminations, add '6' to end of part number. Only devices 0.4 A–32 A.*

TeSys D contactor accessories . . . . . pages 18-8 to 18-11
TeSys D overload relay accessories . . . . . page 18-16
TeSys D replacement coils . . . . . page 18-19
Dimensions . . . . . pages 18-40 to 18-46
TeSys T . . . . . pages 16-91

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Table 18.5: TeSys D Overload Relays—Solid State

Current Setting Range (A)	For Direct Mounting Beneath Contactor LC1	Class 10	Class 20	$ Price
60–100	D115–D150	LR9D5367	LR9D5567	**298.00**
90–150	D115–D150	LR9D5369	LR9D5569	**298.00**

Table 18.6: TeSys F Contactors—2, 3, and 4 Pole

LC1F115

LC1F1700, F2100

Standard power ratings of 3-phase motors 50/60 Hz in category AC-3				Maximum Current		Number of Poles	Catalog Number ▲	$ Price
200 V / 208 V	220 V / 240 V	460 V / 480 V	575 V / 600 V	AC-3	AC-1		Panel Mounting with Screws	
HP	HP	HP	HP	A	A			
30	40	75	100	115	200	3	LC1F115	**479.00**
						4	LC1F1154	**630.00**
40	50	100	125	150	250	3	LC1F150	**696.00**
						4	LC1F1504	**825.00**
50	60	125	150	185	275	3	LC1F185	**938.00**
						4	LC1F1854	**1439.00**
Current Rated				225	315	3	LC1F225	**1059.00**
						4	LC1F2254	**1935.00**
60	75	150	175	265	350	3	LC1F265	**1179.00**
						4	LC1F2654	**1646.00**
75	100	200	250	330	400	3	LC1F330	**1621.00**
						4	LC1F3304	**1846.00**
100	125	250	300	400	500	2	LC1F4002	**1521.00**
						3	LC1F400	**1874.00**
						4	LC1F4004	**2133.00**
150	200	400	500	500	700	2	LC1F5002	**4324.00**
						3	LC1F500	**4970.00**
						4	LC1F5004	**5617.00**
250	300	600	800	630	1000	2	LC1F6302	**5917.00**
						3	LC1F630	**6474.00**
						4	LC1F6304	**7582.00**
Current Rated				780	1600	3	LC1F780	**7788.00**
						4	LC1F7804	**9940.00**
—	450	800	900	800	1000	3	LC1F800	**6676.00**
Current Rated					1700	3	LC1F1700	**10,000.00**
					2100	3	LC1F2100	**12,050.00**

▲ Complete the part number by adding the coil voltage code from Table 18.8 (for example, LC1F115G7). All contactors except F780 include 1 N.O. coil interlock contact.

Table 18.7: TeSys F 3-Phase Overload Relays—Solid State, Separate Mounting ■

Current Setting Range A	For Direct Mounting to Contactor LC1●●●●	Class 10 Trip ♦ Catalog Number	Class 20 ♦ Catalog Number	$ Price
30–50	F115–F185	LR9F5357	LR9F5557	**298.00**
48–80	F115–F185	LR9F5363	LR9F5563	**298.00**
60–100	F115–F185	LR9F5367	LR9F5567	**298.00**
90–150	F115–F185	LR9F5369	LR9F5569	**298.00**
132–220	F185 ★ –F265	LR9F5371	LR9F5571	**298.00**
200–330	F265–F500	LR9F7375■	LR9F7575■	**333.00**
300–500	F265–F500	LR9F7379■	LR9F7579■	**737.00**
380–630	F400–F630	LR9F7381■	LR9F7581■	**905.00**

■ When mounting overload relays LR9F5●57–LR9F5●71 directly beneath the contactor, supporting the relays with a mounting plate is recommended. With overload relays LR9F7●75–LR9F7●81, use of a support mounting plate is mandatory.
♦ IEC standard 60947-4 specifies the following trip times when the overload relay senses 7.2 times the setting current: Class 10—between 4 and 10 seconds; Class 20—between 6 and 20 seconds.
★ Interconnection kit LA7F407 is required to mount an LR9F●71 to an LC1F185.

Table 18.8: Coil Voltage Codes ◊

Contactor	Hz	24 V	48 V	110 V	120 V	208 V	220 V	240 V	440 V	480 V	500 V	600 V
AC												
D09–D150	50/60	B7	E7	F7	G7	LE7	M7	U7	—	T7 ▼	—	X7 ▼△
LC1D80–LC1D150 only	60	B6	E6	F6	G6	L6	M6	U6	—	T6	—	X6 △
	50	B5	E5	F5	—	—	M5 ▼	U5	—	—	—	—
F115, F150, and F185	50	B5	E5	F5	—	—	M5	U5	—	—	—	—
	60	B6	E6	F6	G6	L6	M6	U6	—	Q5	—	S7
F265, and F330	40–400	B7	E7	F7	G7	L7	M7	U7	—	S7☆	—	X7
F400— F780	40–400	—	E7	F7	G7	L7	M7	U7	—	N7	—	X7 □
F1700— F2100	40–400	—	—	F7	G7	—	M7	U7	R7	—	S7	—
Contactor	**Hz**	**24 V**	**48 V**	**110 V**	**125 V**	**220 V**	**250 V**	**440 V**				
DC ▽												
D09-D32, DT20-D258 Low Consumption	—	BL	EL	FL	—	ML	UL	—				
D09–D150	—	BD	ED	FD	GD	MD	UD	RD				
F115-F330	—	BD	ED	FD	GD	MD	UD	RD				
F400–F780	—	—	ED	FD	GD	MD	UD	RD				
F1700— F2100	—	—	—	FD	GD	MD	UD	RD				

▼ Not available for LC1D80.
△ Not available for LC1D115 or LC1D150.
□ Not available for LC1F780. The 600 V coils for LC1F400–LC1F630 do not include an auxiliary contact for holding circuits.
◊ For additional voltage codes refer to the IEC Contactor and Starter Catalog **8502CT9901**.
☆ For use with F265–F330 only.
▽ DC coils 3-pole contactors are fitted with built-in surge suppression as standard.

Table 18.9: Coil Voltage Codes for AC and DC Voltages for F800 (includes built-in surge suppressor)

Vac/Vdc	110	120	127	220	240	380	415	440
50/60 HZ	FW	FW	FW	MW	MW	QW	QW	QW

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Each 3-pole device is prewired with line and load side power wiring for reversing applications.
Each 4-pole device is prewired with load side power wiring.

LC2D09

Table 18.10: 3-Pole and 4-Pole Mechanically Interlocked Contactors

Maximum Horsepower Ratings						Maximum Current		No. of N.O. Power Poles	Built In Auxiliary Contacts (per contactor)		Catalog Number ▲■	$ Price	
Single Phase		Three Phase				Inductive AC3 (A)	Resistive AC1 (A)		N.O.	N.C.		AC Control	DC Control
115 V hp	230 V hp	200 V hp	230 V hp	460 V hp	575 V hp								
0.5	1	2	2	5	7.5	9	20	3	1	1	LC2D09♦	**234.00**	**317.00**
—	—	—	—	—	—	—		4	1	1	LC2DT20	**234.00**	**317.00**
1	2	3	3	7.5	10	12	25	3	1	1	LC2D12♦	**317.00**	**368.00**
—	—	—	—	—	—	—		4	1	1	LC2DT25	**317.00**	**368.00**
1	3	5	5	10	15	18	35	3	1	1	LC2D18♦	**344.00**	**400.00**
—	—	—	—	—	—	—	32	4	1	1	LC2DT32	**419.00**	**443.00**
2	3	7.5	7.5	15	20	25	40	3	1	1	LC2D25♦	**374.00**	**436.00**
—	—	—	—	—	—	—		4	1	1	LC2DT40	**456.00**	**477.00**
2	5	10	10	20	30	32	50	3	1	1	LC2D32♦	**415.00**	**503.00**
3	5	10	10	30	30	40	60	3	1	1	LC2D40A	**565.00**	**650.00**
3	7.5	15	15	40	40	50	70	3	1	1	LC2D50A	**596.00**	**680.00**
5	10	20	20	50	50	65	80	3	1	1	LC2D65A	**778.00**	**857.00**
7.5	15	30	30	60	60	80	125	3	1	1	★		—
—	—	—	—	—	—	—		4	—	—	★		—
—	—	30	40	75	100	115	200	3	1	1	LC2D115 ▼	**1165.00**	**1165.00**
—	—	—	—	—	—	—		4	—	—	LC2D115004 ▼	**1391.00**	**1391.00**
—	—	40	50	100	125	150	200	3	1	1	LC2D150▼	**1598.00**	**1598.00**

▲ Use voltage codes from Table 18.11 to complete the catalog number (for example, LC2D09G7).
■ Includes mechanical interlock without electrical contacts. Installer to complete wiring for electronically interlocking contactor operating coils by using a N.C. auxiliary contact integrated in the contactor or optional LADN or LAD8N auxiliary contact block.
♦ For LC2D09–LC2D32, electrical interlock can be included by adding a **V** to the end of the catalog number (for example LC2DO9B7**V**). List price adder: $5.00.
★ For these items, order two non-reversing contactors and one mechanical interlock separately. See page 18-4 and 18-14 for selection.
▼ Includes mechanical interlock (LA9D11502) with prewired electrical contacts for interlocking contactor operating coils.

Table 18.11: Coil Voltage Codes ☆

Contactor	Hz	24 V	48 V	110 V	120 V	125 V	208 V	220 V	240 V	250 V	440 V	480 V	600 V
AC													
D09–D150	50/60	B7	E7	F7	G7	—	LE7	M7	U7	—	—	T7 △	X7 △
LC1D80–LC1D150	50	B5	E5	F5	—	—	—	M5 △	U5	—	—	—	—
	60	B6	E6	F6	G6	—	L6	M6	U6	—	—	T6	X6 □△
F115, F150, F185	50 Hz	B5	E5	F5	—	—	—	M5	U5	—	—	—	—
	60 Hz	B6	E6	F6	G6	—	L6	M6	U6	—	—	Q5	SC
F265, F330	40–400 Hz	B7	E7	F7	G7	—	L7	M7	U7	—	—	S7 ▽	X7
F400–F780	40–400 Hz	—	E7	F7	F7	—	L7	M7	U7	—	—	N7	X7 ◊
DC													
D09-D32, DT20-D258 Low Consumption	—	BL	EL	FL	—	—	—	ML	—	UL	—	—	—
D09–D150	—	BD	ED	FD	—	GD	—	MD	—	UD	RD	—	—
F115–F330	—	BD	ED	FD	—	GD	—	MD	—	UD	RD	—	—
F400–F780	—	—	ED	FD	—	GD	—	MD	—	UD	RD	—	—

△ Not available for LC1D80–LC1D150.
□ Not available for LC1D115 or LC1D150.
◊ Not available for LC1F780. The 600 V coils for LC1F400–LC1F630 do not include an auxiliary contact for holding circuits.
☆ For additional voltage codes refer to the IEC Contactor and Starter catalog, **8502CT9901**.
▽ For use with F265–F330 only.

Table 18.12: Coil Voltage Codes for AC and DC Coil Voltages for F800 (includes built-in surge suppressor)

Vac/Vdc	24	48	110	120	127	208	220	240	277	380	415	440	480	575	600	660
50/60 Hz	—	—	FW	FW	FW	—	MW	MW	—	QW	QW	QW	—	—	—	—

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LC1F265

How to Order:

Components are available for customer assembly of TeSys F reversing contactors. For example, the following components must be ordered to build a reversing contactor, 75 hp @ 460 V, with a 120 V / 60 Hz coil:

Table 18.13: Example of Components

Description	Quantity	Catalog Number
Contactors	2	LC1F115G6
Lugs (page 18-12)	6	DZ2FF1
Auxiliary contacts	2	LADN11
Power connections	1	LA9FF976
Mechanical interlock	1	LA9FF970

Table 18.14: 3-Pole Contactors

Maximum Horsepower Ratings				Maximum Current		Holding Circuit Contact Built Into Coil		Catalog Number▲	$ Price
Three Phase				Inductive AC3 (A)	Resistive AC1 (A)	N.O.	N.C.		
200 V hp	230 V hp	460 V hp	575 V hp						
30	40	75	100	115	200	1	0	LC1F115	**479.00**
40	50	100	125	150	250	1	0	LC1F150	**696.00**
50	60	125	150	185	275	1	0	LC1F185	**938.00**
60	75	150	200	265	350	1	0	LC1F265	**1179.00**
75	100	200	250	330	400	1	0	LC1F330	**1621.00**
100	125	250	300	400	500	1	0	LC1F400	**1874.00**
150	200	400	500	500	700	1	0	LC1F500	**4970.00**
250	300	600	800	630	1000	1	0	LC1F630	**6872.00**
Current rated				780	1600	0	0	LC1F780	**7788.00**
—	450	800	900	800	1000	0	0	LC1F800	**6676.00**

▲ Use coil voltage codes from the Voltage Codes table on page 18-6 to complete the contactor catalog number.

Table 18.15: Auxiliary Contact (Electrical Interlocking)—2 must be purchased

For use with	Number of Contacts	Maximum Number of Blocks Per Contactor	Contact Arrangement		Catalog Number	$ Price
LC1F to be ordered separately	1	1	1	—	LADN10	**13.10**
			—	1	LADN01	**13.10**
	2	2	1	1	LADN11	**20.70**
			2	-	LADN20	**20.70**
	4	2	2	2	LADN22	**41.50**
			1	3	LADN13	**41.50**
			4	—	LADN40	**41.50**
			—	4	LADN04	**41.50**
			3	1	LADN31	**41.50**
			2	2 ■	LADC22	**41.50**

■ including 1 N.O. + 1 N.C. make-before-break

Table 18.16: Accessories—For the Assembly of 3-Pole Reversing Contactors (Horizontal Mounting)

With 2 Identical Contactors ♦	Set of Power Connections Catalog Number	$ Price	Horizontal Mounting Mechanical Interlock Kit Catalog Number	$ Price
LC1F115	LA9FF976	**106.00**	LA9FF970	**53.00**
LC1F150	LA9F15076	**96.00**	LA9FF970	**53.00**
LC1F185	LA9FG976	**113.00**	LA9FG970	**53.00**
LC1F265	LA9FH976	**151.00**	LA9FJ970	**76.00**
LC1F330	LA9FJ976	**225.00**	LA9FJ970	**76.00**
LC1F400	LA9FJ976	**198.00**	LA9FJ970	**76.00**
LC1F500	LA9FK976	**306.00**	LA9FJ970	**76.00**
LC1F630, F800	LA9FL976	**568.00**	LA9FL970	**76.00**

♦ For two contactors of different size, refer to pages 18-15.

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TeSys F overload relay accessories . . . . . page 18-16
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Table 18.17: Definite Purpose Ratings, 3-Phase, Breaking All Lines (Hermetic Refrigeration Compressor)

Device	FLA	LRA		
		240V	480V	600V
LC1D09 (AC coil only)	9	54	45	36
LC1D12 (AC coil only)	12	72	60	48
LC1D18 (AC coil only)	18	108	90	72
LC1D25 (AC coil only)	25	150	125	100
LC1D32 (AC coil only)	32	192	160	128
LC1D40A	40	240	200	160
LC1D50A	50	300	250	200
LC1D65A	65	390	325	260
LC1D80	75	450	375	300
LC1D95	—	—	—	—
LC1D115	115	690	575	460
LC1D150	150	900	750	600

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Front Mounted Auxiliary Blocks

Table 18.18: Standard, Instantaneous Auxiliary Contact Blocks

Snap-On Mounting	Number of Contacts	Composition N.O.	Composition N.C.	Catalog Number ▲	$ Price
To front of LC●DT20–D258 (4P), LC●D09–D150▲ or **To right side of** LC●F	4 ▲	2	2	LADN22 ■	**41.50**
		1	3	LADN13 ■	**41.50**
		4	0	LADN40 ■	**41.50**
		0	4	LADN04 ■	**41.50**
		3	1	LADN31 ■	**41.50**
		2 ♦	2 ♦	LADC22 ■♦	**41.50**
	2	1	1	LADN11 ■	**20.70**
		2	0	LADN20 ■	**20.70**
		0	2	LADN02■	**20.70**
To front of LC●D80 and D115 or **To left side of** LC●F	1	1	0	LADN10 ★	**13.10**
		0	1	LADN01 ★	**13.10**
To side of LC●D09 to D150 only (not for use on TeSys F)	2	1	1	LAD8N11 ▼	**20.70**
		2	0	LAD8N20 ▼	**20.70**

▲ For low consumption coils (LC1D09–D32 only), only one front-mounted two-contact block allowed. No side-mounted contact blocks allowed.

■ For spring terminal versions of these blocks, add a **3** to the end of the catalog number (for example, LADN22**3**). There is no charge for this modification. For slip-on versions, add **9** to the end of the catalog number (for example, LADN22**9**).

♦ Including 1 N.O. + 1 N.C. make-before-break overlapping contacts.

★ This block cannot be added to the LC1D 09–D32 contactors; a maximum of 2 blocks can be mounted on the LC1D40A–LC1/LP1D80 contactors only.

▼ 1 block may be added to the left side of LC1D09–D32, AC coils only; only 1 block may be added to either side of the LC1D40A–D80 contactors, AC coils only. Cannot be installed on TeSys D contactors with DC coils.

Table 18.19: Instantaneous Blocks with Dust-Tight Auxiliary Contacts (IP54) NEMA 12

Snap-On Mounting	Standard Contacts N.O.	Standard Contacts N.C.	Dust-Tight Contacts N.O.	Dust-Tight Contacts N.C.	Catalog Number	$ Price
To front of LP●D40–D80, LC●DT20–D258 (4P), LC●D09 to D80 or **To right side of** LC●F	—	—	2	—	LA1DX20	**65.00**
	2	—	2	—	LA1DZ40	**82.00**
	1	1	2	—	LA1DZ31	**82.00**
	—	—	2	—	LA1DY20△	**77.00**

△ Device supplied with 4 ground terminal points.

Table 18.20: Pneumatic Time Delay Contact Blocks

Snap-On Mounting	Time Delay Contacts N.O.	Time Delay Contacts N.C.	Type	Range of Time Delay	Catalog Number ◊	$ Price
To front of LP●D40–D80, LC●DT20–D258 (4P), LC●D09 to D150 or **To right side of** LC●F	1	1	On energization (on delay)	0.1 to 3 s□	LADT0	**131.00**
				0.1 to 30 s	LADT2	**131.00**
				10 to 180 s	LADT4	**131.00**
				1 to 30 s☆	LADS2	**131.00**
	1	1	On de-energization (off-delay)	0.1 to 3 s□	LADR0	**131.00**
				0.1 to 30 s	LADR2	**131.00**
				10 to 180 s	LADR4	**131.00**

□ Scale range is expanded between 0.1 and 0.6 seconds on the dial for more accurate settings at the lower end of the range.

◊ For spring terminal versions of these blocks, add a **3** to the end of the catalog number (for example, LADT2**3**). There is no charge for this modification.

☆ Switching time between the opening of the N.C. contact and the closing of the N.O. contact: 40 ms ± 15 ms .

Table 18.21: Mechanical Latch Blocks with Manual or Electrical Unlatch (TeSys D only)

Front snap-on mounting onto	Application	Catalog Number ⊖	$ Price
LC●D09 to D65A	For silent operation and energy conservation	LAD6K10▽⊖✱	**77.00**
LC1 D80 to D150 LP1 D80	For silent operation and energy conservation	LA6DK20▽⊖	**77.00**

▽ Does not include internal coil clearing contact.

⊖ Complete the catalog number by adding the coil voltage code (for example, LAD6K10F).

✱ Low consumption DC contactors (and relays) (code coil xL) are not compatible with the LAD6K10x mechanical latching blocks.

Table 18.22: Coil Voltage Codes for LA6DK Mechanical Latch Blocks

Volts	12	24	32/36	42/48	60/72	100	110/127	200/208	220/240	380/415	440/480	500/600
AC or DC	J	B	C	E	EN	K	F	L	M	Q	R	S

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LA4DA1U

RC Coil Suppressor

- Limitation of transient voltage to 300% of nominal voltage maximum.
- Oscillating frequency limited to 400 Hz maximum. Slight increase in drop-out time (1.2 to 2 times normal).

Table 18.23: Resistor/Capacitor Circuit (RC) for Reduction of Electrical Noise in AC Contactor Coils

Installed by	Mounting on	Operating Voltage 50/60 Hz	Catalog Number	$ Price
Snapping into the cavity on the right side without tools ⬙	LC1D09 to LC1D32 (3P) LC●DT20 to DT40 (4P),	24–28 V	LAD4RCE	**26.20**
		50–127 V	LAD4RCG	**26.20**
		110–240 V	LAD4RCU	**26.20**
Snap-on mounting, and connection without tools to the contactor coil terminals	LC1D40A to LC1D65A (3P), LC1DT60A to LC1DT80A (4P)	24-48 V	LAD4RC3E	**26.20**
		50-127 V	LAD4RC3G	**26.20**
		110-240 V	LAD4RC3U	**26.20**
		380-415 V	LAD4RC3N	**26.20**
Screw connection to the contactor coil terminals	LC●D80 to D150 (3P or 4P) LC●D80 to D115 (4P)	24–48 V	LA4DA2E	**26.20**
		50–127 V	LA4DA2G	**26.20**
		110–240 V	LA4DA2U	**26.20**
		380–415 V	LA4DA2N	**26.20**

Varistor Coil Suppressor

- Limitation of transient voltage value to 200% of nominal voltage maximum.
- Maximum reduction of transient voltage peaks. Slight increase in drop-out time (1.1 to 1.5 times normal).

Table 18.24: Varistor (Peak Limiting) for Reduction of Electrical Noise in AC Contactor Coils

Installed by	Mounting on	Operating Voltage 50/60 Hz	Catalog Number	$ Price
Snapping into the cavity on the right side without tools ⬙	LC●D09 to D32 TeSys D contactors	24–48 V	LAD4VE	**26.20**
		50–127 V	LAD4VG	**26.20**
		110–250 V	LAD4VU	**26.20**
Snap-on mounting, and connection without tools to the contactor coil terminals	LC1D40A to LC1D65A (3P), LC1DT60A to LC1DT80A (4P)	24-48 V	LAD4V3E	**26.20**
		50-127 V	LAD4V3G	**26.20**
		110-250 V	LAD4V3U	**26.20**
Screw connection to the contactor coil terminals	LC●D80 to D115 (3P or 4P) LC●D12, D25 (4P)	24–48 Vac	LA4DE2E	**26.20**
		50–127 Vac	LA4DE2G	**26.20**
		110–250 Vac	LA4DE2U	**26.20**
Screw connection to the contactor coil terminals	LC●D80 (3P or 4P)	24–48 Vdc	LA4DE3E	**26.20**
		50–127 Vdc	LA4DE3G	**26.20**
		110–250 Vdc	LA4DE3U	**26.20**

LA4DC3U

Diode Coil Suppressor

- No overvoltage or oscillating frequency.
- Polarized component. Increased drop-out time (6–10 times normal).

Table 18.25: Diode for Reduction of Electrical Noise in DC Contactor Coils

Installed on the upper part by	Mounting on	Operating Voltage, DC	Catalog Number	$ Price
Snap-on mounting and connection w/o tools to the contactor coil terminals	LC●D09–D32	24–250 Vdc	LAD4DDL	**26.20**
Clip-on front mounting	LC●D40A to D65, D65A to DT80A	24–250 Vdc	LAD4D3U	**26.20**
Screw connection of wire to the contactor coil terminals	D80 (3P) D80 (4P)	24–250 Vdc	LA4DC3U	**26.20**

LAD4T3B

Bidirectional Diode Coil Suppressor

- Protection provided by limiting the transient voltage to 2 Uc max.
- Maximum reduction of transient voltage peaks

Table 18.26: Bidirectional Peak Limiting Diode

Installed by	Mounting on	Operating Voltage 50/60 Hz and DC	Catalog Number	$ Price
Snapping into the cavity on the right side of the contactor ⬙	LC●D09 to LC●D32 (3P) ◑ DT20 to DT40 (4P)	24 (AC only)	LAD4TB	**26.20**
		72 (AC only)	LAD4TS	**26.20**
Clip-on front mounting and connection without tools to the contactor coil terminals ◑	LC1D40A to LC1D65A (3P), LC1DT60A to LC1DT80A (4P)	12–24 V	LAD4T3B	**26.20**
		25–72 V	LAD4T3S	**26.20**
		73–125 V	LAD4T3G	**26.20**
		126–250 V	LAD4T3U	**26.20**
		251–440 V	LAD4T3R	**26.20**
Screw mounting ✪	LC●D80	24 (AC only)	LA4DB2B	**56.00**
		72 (AC only)	LA4DB2S	**26.20**
		24 (DC only)	LA4DB3B	**56.00**
		72 (DC only)	LA4DB3S	**56.00**

⬙ Installing the suppressor into the cavity makes the electrical connection. Overall width of the contactor remains the same.
◑ For LC●D09–LC●D65A with DC or low consumption DC coils, 3-pole contactors are fitted with built-in bidirectional diode suppression as standard.
✪ Mounting at the top of the contactor on coil terminals A1 and A2.

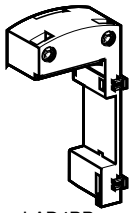
LAD4BB••

Table 18.27: Cabling Accessories

Usage	Mounting on	Operating Voltage 50/60 Hz		Catalog Number	$ Price
For adapting existing wiring to a new product or for use with top-mounting accessory.	LC1D09 to D38 LC1DT20 to DT60 AC only	Without coil suppression		LAD4BB	**23.00**
		With coil suppression (varistor)	24-48 V	LAD4BBVE	**23.00**
			50-127 V	LAD4BBVG	**23.00**
			110-250 V	LAD4BBVU	**23.00**
For adapting existing wiring to a new product or for use with top-mounting accessory	LC1D40A to LC1D65A (with no coil suppressor)	—		LAD4BB3	**26.20**

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The following accessories require use of cabling accessories (LAD4BB●●) for proper mounting. See page 18-9 for illustration.

Table 18.28: Electronic Serial Timer Modules

These solid state modules delay the energizing of the contactor coil, and feature built-in varistor surge suppression.

Type	Operational Voltage ▲		Time Delay	Catalog Number	$ Price
	24–250 Vac	100–250 Vac			
On-delay	LC1D09–D65A	LC1D80–D150	0.1–2 s	LA4DT0U	82.
			1.5–30 s	LA4DT2U	82.
			25–500 s	LA4DT4U	82.

▲ For 24 V operation, the contactor must be fitted with a 21 V coil: coil voltage code Z5 for 50 Hz; Z6 for 60 Hz; and ZD for DC.

Table 18.29: Interface Modules ■

These modules allow the contactor coils to be energized from low voltage and low current level signals. They come in mechanical relay and solid state versions. The relay plus manual operation versions include a lever for manually turning the contactor on and off. When a module receives a low level signal, it allows the separate-sourced control voltage to flow to the contactor coil. It saves space and wiring time compared to conventional interposing relays.

LA4DFB

Interface Type	Operational Voltage		Input Voltage	Catalog Number	$ Price
	24–250 Vac	100–250 Vac			
Relay	LC1D09–D150	—	24 Vdc	LA4DFB	55.
	LC1D09–D150	—	48 Vdc	LA4DFE	55.
Relay Plus Manual Operation	LC1D09–D150	—	24 Vdc	LA4DLB	71.
	LC1D09–D150	—	48 Vdc	LA4DLE	71.
Solid State	LC1D09–D65	LC1D80–D115	24 Vdc	LA4DWB	71.

■ Adapter required for D09–D65A, see table 18.27.

Table 18.30: Automatic-Manual-Stop Control Modules

These modules allow for local and/or remote operation of the contactor coil. Each module includes a lever to switch from automatic to manual operation and a dial to turn the contactor on and off.

Operational Voltage		Catalog Number	$ Price
24–100 Vac	100–250 Vac		
LC1D09–D150	—	LA4DMK	35.

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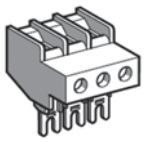
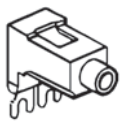

LA9D3260


LA9D2561

LA9D80962

LA9D11567

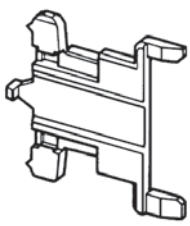

LA9D511

Table 18.31: For Power Pole or Control Connection

Description			For use with contactors LC1/LP1	Sold in lots of	Catalog Number	$ Price each
Connectors for larger cable sizes	4 poles	#8 AWG (10 mm^2)	D09, D12	1	LAD92560	**8.70**
	3 poles	#4 AWG (25 mm^2)	D09–D32	1	LA9D3260	**12.00**
Everlink™ terminal block	3 poles		D40A–D65A	1	LAD96560	**10.00**
Links for the parallel connection of:	2 poles		D09–D32	10	LA9D2561	**26.20**
			D40A–D65A	1	LAD9P32	**6.00**
			D80	2	LA9D80961	**6.50**
			F115	4	LA9FF602	**55.00**
			F150, F185	4	LA9FG602	**65.00**
			F265, F330, F400	4	LA9FH602	**169.00**
			F500	4	LA9FK602	**228.00**
			F630, F800	4	LA9FL602	**278.00**
	3 poles (wye-delta shorting strap)		D09–D32	10	LAD9P3	**10.00**
			D40A-D65A	1	LAD9P33	**25.00**
			D80	1	LA9D80962	**6.50**
			F115	1	LA9FF601	**6.80**
			F150, F185	1	LA9FG601	**8.20**
			F265, F330, F400	1	LA9FH601	**12.00**
			F500	1	LA9FK601	**21.80**
			F630, F800	1	LA9FL601	**38.20**
	4 poles		DT20, DT25	2	LA9D1263	**8.70**
			D80	2	LA9D80963	**17.50**
Second coil connection			LP1D40–D80	10	LA9D09966	**2.20**
Control circuit take-off from main pole			D115, D150	10	LA9D11567	**4.00**
			D80	10	LA9D8067	**5.50**
Spreaders for increasing pole pitch to 45 mm			D115, D150	3	GV7AC03	**31.10**
Replacement power terminal block			D115, D150	1	LA9D115603	**55.00**

Table 18.32: For Marking

Description	For use with contactors LC1/LP1	Sold in lots of	Catalog Number	$ Price each
Reference label holder snap-on 8 x 22 mm	4-pole contactors D80–D115	100	LA9D92	**.06**
Reference label holder snap-on 8 x 18 mm 3 poles	D09-D65A, DT20-DT80A, LADN, LADT, LADR	100	LAD90	**.06**
Sheet of 300 labels self adhesive 7 x 21 mm	For holder LA9D92	1	LA9D93	**4.30**

Table 18.33: For Mounting

Description	For use with contactors LC1/LP1	Sold in lots of	Catalog Number	$ Price each
Set of shims for mounting LAD8N and LA8DN	D80	1	LA9D511	**9.80**
Retrofit plate for replacement of LC1D40-D65 with LC1D40A-D65A	D40A-D65A	1	LAD7X3	**25.00**
35 mm DIN Rail – 2 meters long	LC1D09 to D80	10	AM1DP200	**5.20**

Table 18.34: Replacement Contacts

	For use with contactors		Catalog Number	$ Price
Three-pole	LC1D115	3 poles	LA5D1158031	**239.00**
	LC1D150	3 poles	LA5D150803	**239.00**
Four-pole	LC1D115	4 poles	LA5D115804	**318.00**

Table 18.35: Arc Chambers

	For use with contactors		Catalog Number	$ Price
Three-pole	LC1D115	3 poles	LA5D11550	**90.00**
	LC1D150	3 poles	LA5D15050	**90.00**
Four-pole	LC1D115	4 poles	LA5D115450	**119.00**

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TeSys F contactors . . . . . pages 18-5, 18-7
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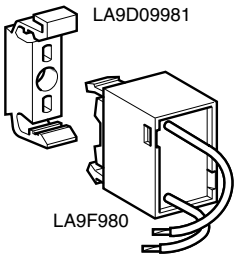


Table 18.36: Suppressor Blocks

Operating limit: up to 220 V, 50/60 Hz coils				
Description	**For Use**		**Catalog Number**	**$ Price**
Suppressor block (clip-on mounting to coil)	With coils	LX1FF, FG, FH, F115, F150, F185, F225, F265, F330	LA9F980	**21.80**
	With coils	LX1FJ, FK, FL, FX, F400, F500, F630, F780, LX9FF, FG, FH, F115, F150, F185, F225, F265, F330	LA9D09980	**20.70**
Mounting bracket (for 35 mm DIN rail or panel mounting) for suppressor block			LA9D09981	**5.50**

Table 18.37: Lugs and Lug Kits ▲

Contactor Type LC1	Lug Kit Catalog Number Contactor Only	Cable Size AWG range	Overload Relay	Directly mounted to contactor	Lugs Required		Cable size AWG range	
—	—	—	—	LC1•	Line side of contactor	Load side of overload	Line side of contactor	Load side of overload
F115	DZ2FF6	14 to 2/0	LR9F5•57 to F5•69	F115	3 each DZ2FF1	3 each DZ2FG1	14 to 2/0	6 to 3/0
F150, F185	DZ2FG6	6 to 3/0	LR9F5•57 to F5•71	F150 to F185	1 each DZ2FG6		6 to 3/0	
—	—	—	LR9F5•71	F225, F265	1 each DZ2FH6		6 to 300 MCM	
F225, F265, F330	DZ2FH6	6 to 300 MCM	LR9F7•75 to F7•79	F265 or F330	3 each DZ2FH1	—	6 to 300 MCM	4 to 500 MCM
F400	DZ2FJ6	4 to 500 MCM	LR9F7•75 to F7•81	F400	3 each DZ2FJ1	—	4 to 500 MCM	4 to 500 MCM
F500	DZ2FK6	2 x 2 to 600 MCM	LR9F7•75 to F7•81	F500	3 each DZ2FK1	—	2x2 to 600 MCM	4 to 500 MCM
F630, F800	DZ2FL6	3 x 2 to 600 MCM	LR9F7•81	F630	1 each DZ2FL1 DZ2FL2 DZ2FL3	1 each DZ2FR1	3x2 to 600 MCM	4 to 500 MCM
F780	DZ2FX6	4 x 1/0 to 750 MCM	—	—	—	—	—	—

▲ Lug kits ending in the number **6** include 6 identical lugs. In some cases the LR9F overload relay mounted directly on the load side of an LC1F contactor will require a different size lug for your choice of contactor and overload. If the two sizes are different, order 3 of each size lug. Mounting hardware (screws, washers, and nuts) are provided with the contactors and overload relays, not with the lugs. See Table 18.39 for pricing.

Table 18.38: Lugs, 2- and 4-Pole ♦

Contactor Type LC1	Lug Kit Catalog Number	Qty. Required		AL/CU Cable Size
		2-Pole	4-Pole	
F115	DZ2FF1	4	8	14 to 2/0
F150, F185	DZ2FG1	4	8	6 to 3/0
F225, F265, F330	DZ2FH1	4	8	6 to 300 MCM
F400	DZ2FJ1	4	8	4 to 500 MCM
F500	DZ2FK1	4	8	2 X 2 to 600 MCM
F630	DZ2FL■	■	■	3 X 2 to 600 MCM
F780	DZ2FX1	4	8	4 X 1/0 to 750 MCM

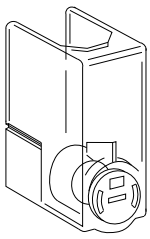
■ For 2-pole F630 contactors, order two DZ2FL1 (L1 and T2), and two DZ2FL3 (L2 and T1).
For 4-pole F6304, order two DZ2FL1 (L1 and T4), four DZ2FL2 (L2, T2, L3, T3) and two DZ2FL3 (L4 and T1).

♦ Lugs for LC1F contactors and overload relays must be ordered separately. Each kit consists of one lug. Mounting hardware (screws, washers, nuts) are provided with the contactors, not the lugs. See Table 18.39 for pricing.

Table 18.39: Lugs Pricing

Lug Catalog Number	$ Price
DZ2FF6	**39.30**
DZ2FG6	**65.00**
DZ2FH6	**65.00**
DZ2FJ6	**65.00**
DZ2FK6	**131.00**
DZ2FL6	**164.00**
DZ2FX6	**163.80**
DZ2FF1	**6.50**
DZ2FG1	**11.00**

Lug Catalog Number	$ Price
DZ2FH1	**11.00**
DZ2FJ1	**11.00**
DZ2FK1	**21.80**
DZ2FL1	**27.30**
DZ2FL2	**55.00**
DZ2FL3	**27.30**
DZ2FR1	**173.30**
DZ2FX1	**27.30**


LA9F70●

These clear plastic protective shrouds are an effective means to meet international touch-safe requirements for power terminals. They are designed to be used with power cables that have been bolted to the terminal.

NOTE: *The protection shrouds do not attach to contactors or overloads using* ***DZ2F*** *lug kits.*

Table 18.40: Power Terminal Protection Shrouds

For Use With 2-, 3-, And 4-pole Contactors	Number of Shrouds Per Set	Catalog Number	$ Price
LC1F115	6	LA9F701	**42.40**
LC1F150, F185	6	LA9F702	**61.00**
LC1F225, F265, F330, F400 and F4002, F500 and F5002	6	LA9F703	**82.00**
LC1F630, F6302 and F800	6	LA9F704	**93.00**
LC1F1154	8	LA9F706	**58.00**
LC1F1504 and F1854	8	LA9F707	**80.00**
LC1F2254, F2654, F3304, F4004, F5004	8	LA9F708	**111.00**
LC1F6304	8	LA9F709	**120.00**

For contactors LC1F115, LC1F150, and LC1F185, an available touch-safe terminal block may be used in place of lugs for power connections.

Table 18.41: Insulated Terminal Blocks

For contactor type LC1	For overload relay LR9	Maximum Cable Size	Catalog Number	$ Price
F115, F150, F185	F5•57, F5•63, F5•67, F5•69	300 MCM	LA9F103	**55.00**

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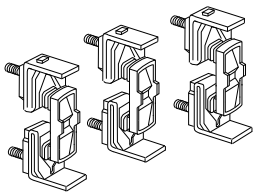
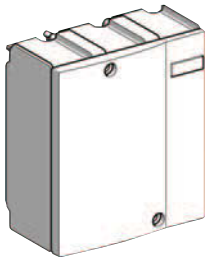

LA5FG431

Table 18.42: Replacement Contact Sets ▲

	For use on contactors	NUmber of Poles	Catalog Number	$ Price
Two-pole	LC1F4002	2 poles	LA5F400802	**717.**
	LC1F5002	2 poles	LA5F500802	**1111.**
	LC1F6302	2 poles	LA5F630802	**1651.**
Three-pole	LC1F115, F150	3 poles	LA5FF431	**239.**
	LC1F185	3 poles	LA5FG431	**418.**
	LC1F265	3 poles	LA5FH431	**793.**
	LC1F330, F400	3 poles	LA5F400803	**1076.**
	LC1F500	3 poles	LA5F500803	**1589.**
	LC1F630	3 poles	LA5F630803	**2488.**
	LC1F780	1 pole	LA5F780801★	**1651.**
	LC1F800	3 poles	LA5F800803	**2488.**
Four-pole	LC1F1504, F1154	4 poles	LA5FF441	**318.**
	LC1F1854	4 poles	LA5FG441	**549.**
	LC1F2654	4 poles	LA5FH441	**966.**
	LC1F3304, F400, F4004	4 poles	LA5F400804	**1435.**
	LC1F5004	4 poles	LA5F500804	**2461.**
	LC1F6304	4 poles	LA5F630804	**3304.**
	LC1F7804	1 pole	LA5F780801★	**1651.**

Table 18.43: Arc Chambers


LA5F11550

	For use on contactors	Number of Poles	Catalog Number	$ Price
Two-pole	LC1F4002	2 poles	LA5F400250	**280.**
	LC1F5002	2 poles	LA5F500250	**305.**
	LC1F6302	2 poles	LA5F630250	**431.**
Three-pole	LC1F115	3 poles	LA5F11550	**90.**
	LC1F150	3 poles	LA5F15050	**101.**
	LC1F185	3 poles	LA5F18550	**179.**
	LC1F265	3 poles	LA5F26550	**269.**
	LC1F330	3 poles	LA5F33050	**287.**
	LC1F400	3 poles	LA5F40050	**305.**
	LC1F500	3 poles	LA5F50050	**341.**
	LC1F630	3 poles	LA5F63050	**646.**
	LC1F780	1 pole	LA5F780150★	**431.**
	LC1F800	3 poles	LA5F80050	**750.**
Four-pole	LC1F1154	4 poles	LA5F115450	**119.**
	LC1F1504	4 poles	LA5F150450	**131.**
	LC1F1854	4 poles	LA5F185450	**248.**
	LC1F2654	4 poles	LA5F265450	**299.**
	LC1F3304	4 poles	LA5F330450	**414.**
	LC1F4004	4 poles	LA5F400450♦	**573.**
	LC1F5004	4 poles	LA5F500450♦	**610.**
	LC1F6304	4 poles	LA5F630450■	**861.**
	LC1F7804	1 pole	LA5F780150★	**431.**

▲ Supplied per pole are: 2 fixed contacts, 1 moving contact, 2 deflectors, 1 backplate, mounting screws and washers.
■ Comprises single-pole components.
♦ Comprises 2-pole components.
★ 2 identical components per pole are supplied.

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Table 18.44: AC and DC Coil Part Numbers for LC1F1700 and LC1F2100

Control Circuit Voltage of the Contactor	Voltage Code	Spare Coil Part Number	Quantity
AC Coils			
110 V	F7	LX1FK065	2
120 V	G7	LX1FK070	2
220 V	M7	LX1FK110	2
230 V	P7	LX1FK110	2
240 V	U7	LX1FK127	2
277 V	W7	LX1FK140	2
380 V	Q7	LX1FK200	2
400 V	V7	LX1FK200	2
415 V	N7	LX1FK220	2
440 V	R7	LX1FK220	2
500 V	S7	LX1FK240	2
DC Coils			
110 V	FD	LX4FK055	2
125 V	GD	LX4FK065	2
220 V	MD	LX4FK110	2
250 V	UD	LX4FK125	2
440 V	RD	LX4FK220	2

Note: These coills are standard parts included when a voltage code is added to the contactor part number LC1F1700 or LC1F2100.

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Table 18.45: Contactors

Reversing contactors comprising two identical, horizontally mounted contactors:	Mechanical interlock				Set of power connections			
	Without electrical interlock		With incorporated electrical interlock (2 N.C. contacts)		Reversing contactors for motor control		Four pole contactors	
	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
LC1D09, LC1D12, LC1D18, LC1D25, LC1D32	LAD9R1▲	32.10	LAD9R1V▲	45.50	Included with kit		—	
LC1DT20, LC1DT25, LC1DT32, LC1DT40	LADT9R1▲	36.90	LADT9R1V▲	45.50	—		Included with kit	
	▲ Kit including mechanical interlock and wiring.							
LC1D40, LC1D50, LC1D/LP1D65	LA9D50978	31.70	LA9D4002	45.90	LA9D6569	53.00	LA9D6570	63.00
LC1D40A, D50A, D65A	LAD4CM	45.00	—		LA9D65A69	75.00	—	
New!	LAD9R3 ■	65.00	—		—		—	
	■ Kit combines both LAD4CM and LA9D65A69							
LC1D80 AC coil	LA9D50978	31.70	LA9D4002	45.90	LA9D8069	65.00	LA9D8070	79.00
LC1D80 DC coil	LA9D80978	31.70	LA9D8002	65.00	LA9D8069	65.00	LA9D8070	79.00
LC1D115 and LC1D150	Not Available		LA9D11502	78.00	LA9D11569	129.00	LA9D11571 (3P)	53.00
			—				LA9D11570 (4P) (D115 only)	53.00

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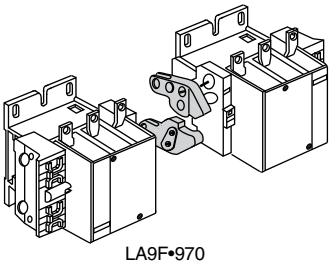
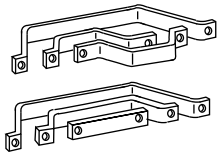
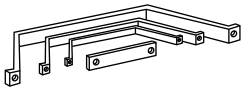


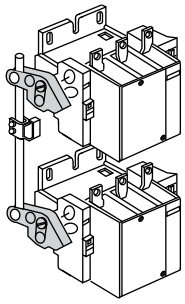
LA9F•970



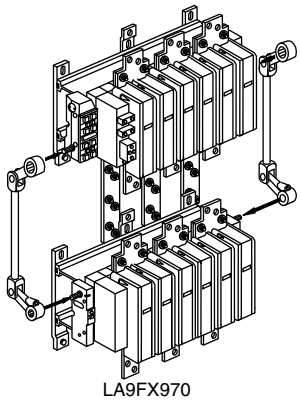
LA9F•976



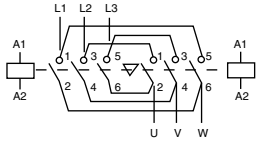
LA9F•977



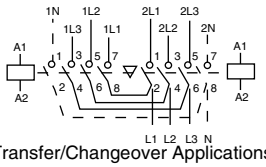
LA9F•4•



LA9FX970



Reversing (motors) Application



Transfer/Changeover Applications

Table 18.46: Component Parts for the Assembly of F-Line 3-pole Reversing Contactors

With 2 Identical Contactors ▲	Set of Power Connections Catalog Number	$ Price	Mechanical Interlock Kit Catalog Number	$ Price
Horizontal Mounting				
LC1F115	LA9FF976	**106.00**	LA9FF970	**53.00**
LC1F150	LA9F15076	**96.00**	LA9FF970	**53.00**
LC1F185	LA9FG976	**113.00**	LA9FG970	**53.00**
LC1F265	LA9FH976	**151.00**	LA9FJ970	**76.00**
LC1F330	LA9FJ976	**225.00**	LA9FJ970	**76.00**
LC1F400	LA9FJ976	**225.00**	LA9FJ970	**76.00**
LC1F500	LA9FK976	**306.00**	LA9FJ970	**76.00**
LC1F630 or F800	LA9FL976	**568.00**	LA9FL970	**76.00**
Vertical Mounting				
LC1F115 or F150	★	—	LA9FF4F	**97.00**
LC1F185	★	—	LA9FG4G	**113.00**
LC1F265	★	—	LA9FH4H	**126.00**
LC1F330	★	—	LA9FJ4J	**149.00**
LC1F400	★	—	LA9FJ4J	**149.00**
LC1F500	★	—	LA9FK4K	**149.00**
LC1F630 or F800	★	—	LA9FL4L	**149.00**
LC1F780	■	—	LA9FX970 ■	**508.00**

Table 18.47: Component Parts for the Assembly of TeSys F 3-pole or 4-pole Transfer Contactors

Horizontal Mounting	Set of Power Connections		$ Price	Mechanical Interlock Kit Catalog Number	$ Price
	Three-Pole	Four-Pole			
Horizontal Mounting					
LC1F115/4	LA9FF982	LA9FF977	**53.00**	LA9FF970	**53.00**
LC1F150/4	LA9F15082	LA9F15077	**53.00**	LA9FF970	**53.00**
LC1F185/4	LA9FG982	LA9FG977	**53.00**	LA9FG970	**53.00**
LC1F265/4	LA9FH982	LA9FH977	**83.00**	LA9FJ970	**76.00**
LC1F330/4	LA9FJ982	LA9FJ977	**113.00**	LA9FJ970	**76.00**
LC1F400/4	LA9FJ982	LA9FJ977	**113.00**	LA9FJ970	**76.00**
LC1F500/4	LA9FK982	LA9FK977	**154.00**	LA9FJ970	**76.00**
LC1F630/4	LA9FL982	LA9FL977	**233.00**	LA9FL970	**76.00**
Vertical Mounting					
LC1F115/4	★	★	—	LA9FF4F	**97.00**
LC1F185/4	★	★	—	LA9FG4G	**113.00**
LC1F265/4	★	★	—	LA9FH4H	**149.00**
LC1F330/4	★	★	—	LA9FJ4J	**149.00**
LC1F400/4	★	★	—	LA9FJ4J	**149.00**
LC1F500/4	★	★	—	LA9FK4K	**149.00**
LC1F630/4	★	★	—	LA9FL4L	**149.00**
LC1F780/4	■	♦	—	LA9FX970 ♦	**508.00**

Table 18.48: Vertical Mounting of 2 Contactors of Different Ratings ▲

Upper Contactor	Lower Contactor ▼	Mechanical Interlock Kit Catalog Number	$ Price
LC1F185 or 1854	LC1F115/150 or 1154/1504	LA9FG4F	**113.00**
LC1F265 or 2654	LC1F115/150 or 1154/1504	LA9FH4F	**126.00**
LC1F330 or 3304	LC1F185/1854 or 265/265A	LA9FH4G	**126.00**
LC1F400 or 4004	LC1F115/150 or 1154/1504	LA9FJ4F	**126.00**
	LC1F185 or 1854	LA9FJ4G	**126.00**
	LC1F265/2654 or 330/330A	LA9FJ4H	**149.00**
LC1F500 or 5004	LC1F115/150 or 1154/1504	LA9FK4F	**149.00**
	LC1F185 or 1854	LA9FK4G	**126.00**
	LC1F265/2654 or 330/330A	LA9FK4H	**149.00**
	LC1F400 or 4004	LA9FK4J	**149.00**
LC1F630, 6304 or LC1F800	LC1F115/150 or 1154/1504	LA9FL4F	**116.00**
	LC1F185 or 1854	LA9FL4G	**126.00**
	LC1F265/2654 or 330/330A	LA9FL4H	**149.00**
	LC1F400 or 4004	LA9FL4J	**149.00**
	LC1F500 or 5004	LA9FL4K	**149.00**

▲ With identical or different numbers of poles.
■ Double mechanical interlock with 2 mechanical links and 3 power connection bars.
♦ Double mechanical interlock with 2 mechanical links and 4 power connection bars.
★ Power connection to be assembled by the customer, except for contactors LC1F780 and F7804.
▼ Lower contactor must have equal or lower current rating.

TeSys F contactors . . . . . pages 18-5, 18-7
TeSys F overload relay accessories . . . . . page 18-16
TeSys F replacement coils and parts . . . . . pages 18-18 to 18-20
Dimensions . . . . . pages 18-42 to 18-47

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TeSys D Overload Relay Accessories

LA7D901

Table 18.49: Mounting Kits and Plates▲

Description	For use with overload relays:	Catalog Number	$ Price
Separate mounting kits for mounting to 35 mm DIN rail or for panel mounting with screws	LRD01–35 and LR3D01–35	LAD7B10	8.70
	LRD01–35 and LRD01–35 for ring tongue terminals	LAD7B106	8.70
	LRD15••	LAD7B105	10.40
	New! LR2D15••, LR3D15	LA7D1064	8.70
	LR2D25••	LA7D2064	13.10
	LRD3•••, LR3D3•••, LR2D35••	LA7D3064	17.50
Mounting plates for screw mounting at 110 mm (4.3 in.) centers	LRD01–35, LR3D01–35, LR2D15••	DX1AP25	11.00
	LR2D25••	DX1AP26	12.00
	LRD3•••, LR3D3••, LR2D35••	LA7D902	16.40

▲ When using mounting plates, separate mounting kits are also required.

Table 18.50: Accessories

Description	For use with	Standard Packaging	Catalog Number	$ Price
Prewiring kit allows direct connection of the N.C. contact of relay LRD01–D32 or LR3D01–D32 to the contactor	LC1D09 through D18	10	LAD7C1	8.70
	LC1D25, D32	10	LAD7C2	8.70
Stop button locking device	All relays except LRD01–D32, LR3D01–D32 and LR9D	10	LA7D901	2.20
Remote stop/tripping or electrical reset♦	LRD01-D32, LRD3, LR3D01-D32, LR3D3	1	LAD703■	43.70
	All relays except LRD01–D32, LR3D01–D31	1	LA7D03■	43.70
Reset by flexible cable 500 mm (19.6 in.)	LRD01-D32, LRD3, LR3D3	1	LAD7305	100.00

■ Part number to be completed by adding coil voltage code, (for example, LAD703F).

LA7D03

Table 18.51: Control Circuit Voltages for LA7D03 and LAD703

Volts	12	24	48	110	220/230	380/400	415/440
AC 50/60 Hz	J★	B	E	F	M	Q	N
DC	J	B	E	F	M	—	—

♦ The time that the LA7D03 can remain energized depends on its rest time; 1 s pulse with 9 s rest time; 5 s pulse with 30 s rest time; 10 s pulse with 90 s rest time; maximum pulse duration of 20 s with rest time of 300 s. Consumption on inrush and sealed: < 100 VA

★ Not available for LRD01–D32, LR3D01–D32.

TeSys F Overload Relay Accessories

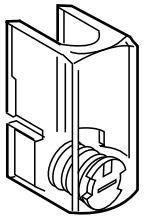
LA7F90•

Table 18.52: Mounting Plate for Overload Relay

For use with relays	Catalog Number	$ Price
LR9F5•57, F5•63, F5•67, F5•69 and F5•71	LA7F901	27.30
LR9F7•75, F7•79 and F7•81	LA7F902	38.20

These clear plastic protective shrouds are an effective means to meet international finger-safe requirements for power terminals. They are designed to be used with power cables that have been bolted to the terminal.

NOTE: *The protection shrouds do not attach to contactors or overloads utilizing DZ2F lug kits.*



LA9F70•

Table 18.53: Power Terminal Protection Shrouds, Single-Pole

For use with relays	Catalog Number	$ Price
LR9F5•57	LA9F701	42.40
LR9F5•63, F5•67, F5•69	LA9F702	61.00
LR9F5•71	LA9F705	86.00
LR9F7•75, F7•79, F7•81	LA9F703	82.00

Table 18.54: Power Terminal Protection Shrouds, 3-Pole

For use with relays	Catalog Number	$ Price
LR9F5•57, F5•63, F5•67, F5•69	LA7F701	27.30
LR9F5•71	LA7F702	38.20
LR9F7•75, F7•79, F7•81	LA7F703	49.20

Table 18.55: Connection Accessories (for Mounting Overload Relays Beneath Reversing Contactors)▼

Application		Set of 3 Bars Catalog Number	$ Price
For relays	For contactor		
LR9F5•57, F5•63, F5•67, F5•69	LC1F115	LA7F401	19.70
LR9F5•57, F5•63	LC1F150 and F185	LA7F402	21.80
LR9F5•71	LC1F265	LA7F403	27.30
LR9F7•75, F7••79	LC1F265...F400	LA7F404	30.50
LR9F7•81	LC1F400	LA7F404	30.50
LR9F7•75, F7•79, F7•81	LC1F500	LA7F405	38.20
LR9F7•81	LC1F630	LA7F406	43.70

▼ Mounting plate required.

LA7F701

Table 18.56: Marking Accessories

Description	Sold in units of:	Catalog Number	$ Price
Marker holder, snap-in	100	LA7D903	0.03 each

Main overload selection . . . . . .pages 18-2, 18-3
Dimensions . . . . . pages 18-45 to 18-47
TeSys T . . . . . pages 16-91

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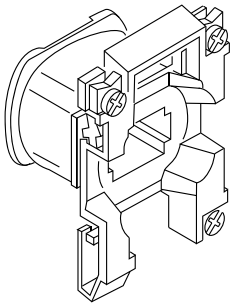
LX1D2

Table 18.57: For LC1D09–D32, LC1DT20–40 (TeSys D) Contactors and CAD Relays

Rated Nominal Voltage	Catalog Number 50/60 Hz	$ Price
12	LXD1J7	
21▲	LXD1Z7	
24	LXD1B7	**26.20**
32	LXD1C7	
36	LXD1CC7	
42	LXD1D7	
48	LXD1E7	
60	LXD1EE7	**26.20**
100	LXD1K7	
110	LXD1F7	
115	LXD1FE7	
120	LXD1G7	
127	LXD1FC7	**26.20**
200	LXD1L7	
208	LXD1LE7	
220/230	LXD1M7	
230	LXD1P7	
230/240	LXD1U7	**26.20**
277	LXD1W7	
380/400	LXD1Q7	
400	LXD1V7	
415	LXD1N7	
440	LXD1R7	**26.20**
480	LXD1T7	
575	LXD1SC7	
600	LXD1X7	**26.20**

Specifications	50/60 Hz
Average consumption - Inrush (inductance 0.75) - Sealed (inductance 0.3)	 70 VA 7 VA
Operating range@ 60° C	80–110% of nominal @ 50 Hz, 85–110% of nominal @ 60 Hz

▲ Voltage for special coils fitted in contactors with serial timer modules, with 24 V supply.

Table 18.58: For LC1D09, D12, D18—For old D2 style contactors where the catalog number includes the auxiliary contact arrangement

Rated Nominal Voltage V	Catalog Number 50 Hz	Catalog Number 60 Hz	Catalog Number 50/60 Hz	$ Price
21 ■	LX1D2Z5	LX1D2Z6	LX1D2Z7	
24	LX1D2B5	LX1D2B6	LX1D2B7	
32	LX1D2C5	—	—	**52.40**
42	LX1D2D5	—	LX1D2D7	
48	LX1D2E5	LX1D2E6	LX1D2E7	
110	LX1D2F5	LX1D2F6	LX1D2F7	
120	—	LX1D2G6	LX1D2G7	
127	LX1D2G5	—	—	**52.40**
208	—	LX1D2L6	—	
220	LX1D2M5	LX1D2M6	LX1D2M7	
230	LX1D2P5	—	LX1D2P7	
240	LX1D2U5	LX1D2U6	LX1D2U7	
256	LX1D2W5	—	—	**52.40**
277	—	LX1D2W6	—	
380	LX1D2Q5	LX1D2Q6	LX1D2Q7	
400	LX1D2V5	—	LX1D2V7	
415	LX1D2N5	—	LX1D2N7	
440	LX1D2R5	LX1D2R6	LX1D2R7	**52.40**
480	—	LX1D2T6	—	
500	LX1D2S5	—	—	
575	—	LX1D2S6	—	
600	—	LX1D2X6	—	**52.40**
660	LX1D2Y5	—	—	

Specifications	50 Hz	60 Hz	50/60 Hz
Average consumption Inrush (inductance .75)	60 VA	70 VA	70 VA at 50 or 60 Hz
Sealed (inductance .3)	7 VA	7.5 VA	8 VA at 50 or 60 Hz
Operating range at θ ≤ 55°C / 131°F	80–110 % of nominal voltage	80–110% of nominal voltage	85–110% of nominal voltage

Table 18.59: For LC1D25, D32—For old D2 style contactors where the catalog number includes the auxiliary contact arrangement

Rated Nominal Voltage (V)	Catalog Number 50 Hz	Catalog Number 60 Hz	Catalog Number 50/60 Hz	$ Price
21■	LX1D4Z5	LX1D4Z6	LX1D4Z7	
24	LX1D4B5	LX1D4B6	LX1D4B7	
32	LX1D4C5	—	—	**72.00**
42	LX1D4D5	—	LX1D4D7	
48	LX1D4E5	LX1D4E6	LX1D4E7	
110	LX1D4F5	LX1D4F6	LX1D4F7	
120	—	LX1D4G6	LX1D4G7	
127	LX1D4G5	—	—	**72.00**
208	—	LX1D4L6	—	
220	LX1D4M5	LX1D4M6	LX1D4M7	
230	LX1D4P5	—	LX1D4P7	
240	LX1D4U5	LX1D4U6	LX1D4U7	
256	LX1D4W5	—	—	**72.00**
277	—	LX1D4W6	—	
380	LX1D4Q5	LX1D4Q6	LX1D4Q7	
400	LX1D4V5	—	LX1D4V7	
415	LX1D4N5	—	LX1D4N7	
440	LX1D4R5	LX1D4R6	LX1D4R7	**72.00**
480	—	LX1D4T6	—	
500	LX1D4S5	—	—	
575	—	LX1D4S6	—	
600	—	LX1D4X6	—	**72.00**
660	LX1D4Y5	—	—	

Specifications	50 Hz	60 Hz	50/60 Hz
Average consumption - Inrush (inductance .75) - Sealed (inductance .3)	 90 VA 7.5 VA	 100 VA 8.5 VA	 100 VA at 50 or 60 Hz 8.5 VA at 50 or 60 Hz
Operating range at θ ≤ 55 °C / 131 °F	80–110% of nominal voltage	80–110% of nominal voltage	85–110% of nominal voltage

■ For use in 24 V applications involving serial timer modules refer to page 18-10.

TeSys D contactors . . . . . pages 18-4, 18-6
TeSys D overload relay accessories . . . . . page 18-16
TeSys D replacement coils . . . . . pages 18-17 to 18-19
Dimensions . . . . . pages 18-40 to 18-46

Limited Stock Replaced by TeSys Products

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Table 18.60: For Old D2 Style LC1D40, D50, D65, D80

Rated Nominal Voltage V	Catalog Number 50 Hz	Catalog Number 60 Hz	Catalog Number 50/60 Hz	$ Price
24	LX1D6B5	LX1D6B6	LX1D6B7	**41.50**
32	LX1D6C5	—	—	**41.50**
42	LX1D6D5	—	LX1D6D7	**41.50**
48	LX1D6E5	LX1D6E6	LX1D6E7	**41.50**
110	LX1D6F5	LX1D6F6	LX1D6F7	**41.50**
120	—	LX1D6G6	LX1D6G7	**41.50**
127	LX1D6G5	—	—	**41.50**
208	—	LX1D6L6	LX1D6LE7	**41.50**
220	LX1D6M5	LX1D6M6	LX1D6M7	**41.50**
230	LX1D6P5	—	LX1D6P7	**41.50**
240	LX1D6U5	LX1D6U6	LX1D6U7	**41.50**
256	LX1D6W5	—	—	**170.00**
277	—	LX1D6W6	—	**41.50**
380	LX1D6Q5	LX1D6Q6	LX1D6Q7	**41.50**
400	LX1D6V5	—	LX1D6V7	**41.50**
415	LX1D6N5	—	LX1D6N7	**41.50**
440	LX1D6R5	LX1D6R6	LX1D6R7	**41.50**
480	—	LX1D6T6	—	**41.50**
500	LX1D6S5	—	—	**170.00**
575	—	LX1D6S6	—	**41.50**
600	—	LX1D6X6	—	**41.50**
660	LX1D6Y5	—	—	**41.50**

For old style and new TeSys style contactors where the catalog number may or may not include the auxiliary contact arrangement.

Specification	50 Hz	60 Hz	50/60 Hz
Average consumption:			
-inrush (inductance 0.75)	200 VA	220 VA	245 VA
-sealed (inductance 0.3)	20 VA	22 VA	26 VA
Operating range at $\theta \leq 55^{o}C$ / 131°F	80–110% of nominal voltage		85–110% of nominal voltage

Table 18.61: For TeSys D LC1D40A, D50A, D65A, DT60A, DT80A

Rated Nominal Voltage V	Catalog Number 50 Hz	Catalog Number 60 Hz	Catalog Number 50/60 Hz	$ Price
12	LXD3J5	—	—	**41.50**
24	—	—	LXD3B7	**41.50**
32	—	—	LXD3C7	**41.50**
42	—	—	LXD3D7	**41.50**
48	—	—	LXD3E7	**41.50**
100	—	—	LXD3K7	**41.50**
110	—	—	LXD3F7	**41.50**
115	—	—	LXD3FE7	**41.50**
120	—	—	LXD3G7	**41.50**
127	—	—	LXD3FC7	**41.50**
200	—	—	LXD3L7	**41.50**
208	—	—	LXD3LE7	**41.50**
220	—	—	LXD3M7	**41.50**
230	—	—	LXD3P7	**41.50**
240	—	—	LXD3U7	**41.50**
277	—	—	LXD3W7	**41.50**
380	—	—	LXD3Q7	**41.50**
400	—	—	LXD3V7	**41.50**
415	—	—	LXD3N7	**41.50**
440	—	—	LXD3R7	**41.50**
480	—	—	LXD3T7	**41.50**
500	—	—	LXD3S7	**41.50**
575	—	—	LXD3SC7	**41.50**
600	—	—	LXD3X7	**41.50**
660	—	—	LXD3YC7	**41.50**
690	—	—	LXD3Y7	**41.50**

Specification	50 Hz	60 Hz	50/60 Hz
Average consumption:			
-inrush (inductance 0.3)	160 VA	140 VA	140 VA (Inductance: 0.9)
-sealed (inductance 0.3)	7.0 VA	7.5 VA	7.5 VA (Inductance: 0.9)
Operating range at $\theta \leq 55$ °C / 131 °F	85–110% of nominal voltage		80–115% of nominal voltage

Table 18.62: For TeSys D LC1D115, D150

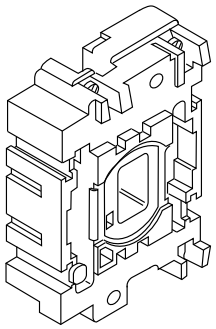
Rated Nominal Voltage V	Catalog Number 50 Hz	Catalog Number 60 Hz	Catalog Number 50/60 Hz	$ Price
24	LX1D8B5	LX1D8B6	LX1D8B7	**78.00**
32	LX1D8C5	—	LX1D8C7	**78.00**
42	LX1D8D5	—	LX1D8D7	**78.00**
48	LX1D8E5	LX1D8E6	LX1D8E7	**78.00**
110	LX1D8F5	LX1D8F6	LX1D8F7	**78.00**
115	LX1D8FE5	—	LX1D8FE7	**78.00**
120	—	LX1D8G6	LX1D8G7	**78.00**
127	LX1D8FC5	—	LX1D8FC7	**78.00**
208	—	LX1D8L6	LX1D8L7	**78.00**
220/230	LX1D8M5	LX1D8M6	LX1D8M7	**78.00**
230	LX1D8P5	—	LX1D8P7	**78.00**
240	LX1D8U5	LX1D8U6	LX1D8U7	**78.00**
277	—	LX1D8W6	LX1D8W7	**78.00**
380/400	LX1D8Q5	LX1D8Q6	LX1D8Q7	**78.00**
400	LX1D8V5	—	LX1D8V7	**78.00**
415	LX1D8N5	—	LX1D8N7	**78.00**
440	LX1D8R5	LX1D8R6	LX1D8R7	**78.00**
480	—	LX1D8T6	LX1D8T7	**78.00**
500	LX1D8S5	—	LX1D8S6	**78.00**

For old style and new TeSys style contactors where the catalog number may or may not include the auxiliary contact arrangement.

Specification	50 Hz	60 Hz	50/60 Hz
Average consumption:			
-inrush (inductance 0.8)	300 VA	300 VA	350 VA (Inductance: 0.9)
-sealed (inductance 0.3)	22 VA	22 VA	18 VA (Inductance: 0.9)
Operating range at $\theta \leq 55$ °C / 131 °F	85–110% of nominal voltage		80–115% of nominal voltage

Table 18.63: For LC1F115, F150, F185, F265, F330, F400, F500, F630, F780, F800

LX1 coils are the standard coils that are included when a voltage code is added to the contactor part number. The LX9 coils may be ordered separately for special applications. LX9 coils do not include a built-in normally open holding circuit contact; a separate auxiliary contact block with a N.O. contact should be added to the contactor. Both the LX1 and LX9 coils can be used on the previous F-line contactors.



LX1D6

Device Type	Hz	Catalog Number	Catalog Number Suffix□												
			24 V	48 V	110 V	120 V	208 V	220 V	240 V	277 V	380 V	415 V	440 V	480 V	600 V	$ Price
F115–F150	50	LX1FF•	024	048	110	127	200	220	240	264	380	415	415	500	600	**78.00**
	60	LX1FF•	020	040	092	095	162	184	187	220	316	340	360	380	475	**78.00**
	40–400	LX9FF•	—	048	110	127	200	220	220	260	380	415	415	500	—	**78.00**
F185 F225	50	LX1FG•	024	048	110	127	200	220	240	264	380	415	415	450	600	**108.00**
	60	LX1FG•	020	040	092	095	162	184	187	220	316	340	360	380	475	**108.00**
	40–400	LX9FG•	—	048	110	127	200	220	220	260	380	415	415	500	—	**108.00**
F265–F330	40–400	LX1FH•	0242	0482	1102	1272	2002	2202	2402	2772	3802	3802	4402	5002	6002	**138.00**
	40–400	LX9FH•	—	0482	1102	1272	2002	2202	2402	2772	3802	3802	. . .	5002	—	**138.00**
F400★	40–400	LX1FJ•	—	048	110	110	200	220	240	280	380	415	415	415	600	**287.00**
	40–400	LX9FJ• △	910	917	925	925	930	931	932	932	936	936	937	937	—	**287.00**
F500★	40–400	LX1FK•	—	048	110	110	200	220	240	280	380	415	415	415	600	**360.00**
	40–400	LX9FK• △	910	917	925	925	930	931	932	932	936	936	937	937	—	**360.00**
F630★	40–400	LX1FL•	—	048	110	110	200	220	240	260	380	415	415	415	600	**398.00**
	40–400	LX9FL• △	910	917	924	925	930	930	931	932	935	936	936	937	—	**483.00**
F780, FX ♦	40–400	LX1FX•	—	—	110	110	200	220	220	280	380	415	415	415	—	**795.00**
F800	50/60	LX4F8• ▼	—	—	FW	FW	—	MW	MW	—	QW	QW	QW	—	—	**725.00**

♦ LC1F780 contactors operate on 2 coils as a set. The LX1FX part number includes both coils.
★ The 600 V coils for the F400, F500 and F630 do not include an auxiliary contact for holding circuits. If required, select appropriate contacts from page 18-8.
▼ Also requires rectifier DR5TE4U for 110–240 V coils, DR5TE4S for 380–440 V coils. See Table 18.64 for pricing.
△ Coil circuit requires a separately mounted rectifier. Order from Table 18.64.
□ Complete the catalog number by adding the suffix (for example, LX1FF024).

Application Note on Contactor Drop-out Times:

Contactors using LX1, FH, FJ, FK, FL, and FX coils have longer drop-out times. For critical applications such as emergency stop functions:

- Select a fast drop-out coil (LX9), or
- Use a maintained contact Stop button, or
- Use an interposing relay.

TeSys D contactors . . . . . pages 18-4, 18-6
TeSys F contactors . . . . . pages 18-5, 18-7
TeSys D overload relay accessories . . . . . page 18-16
TeSys D replacement coils . . . . . pages 18-17 to 18-19
Dimensions . . . . . pages 18-40 to 18-47

Table 18.64: Rectifier Table

Coil	Rectifier Catalog Number	$ Price
LX9F•910	DR5TF4V	**75.00**
LX9F•917	DR5TF4V	**75.00**
LX9F•925	DR5TE4U	**75.00**
LX9F•926	DR5TE4U	**75.00**
LX9F•931	DR5TE4U	**75.00**
LX9F•936	DR5TE4S	**75.00**
LX9F•937	DR5TE4S	**75.00**
LX9F•938	DR5TE4S	**75.00**

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Table 18.65: For Old D2 LP1D09, D12, D18 ▲♦

Rated Nominal Voltage V	Catalog Number	Catalog Number Wide Range	$ Price
12	LX4D2JD	LX4D2JW	**79.00**
21■	LX4D2ZD	—	**79.00**
24	LX4D2BD	LX4D2BW	**79.00**
36	LX4D2CD	LX4D2CW	**79.00**
48	LX4D2ED	LX4D2EW	**79.00**
60	LX4D2ND	—	**79.00**
72	LX4D2SD	LX4D2SW	**79.00**
110	LX4D2FD	LX4D2FW	**79.00**
125	LX4D2GD	—	**79.00**
220	LX4D2MD	LX4D2MW	**79.00**
250	LX4D2UD	—	**79.00**
440	LX4D2RD	—	**79.00**
600	LX4D2XD	—	**79.00**

Specifications		
Average consumption	**9 W**	**11 W**
Operating range at θ–55 °C / 131 °F	80–110% of nominal voltage	70–125% of nominal voltage

Table 18.66: For Old D2 LP1D25, D32 ▲♦

Rated Nominal Voltage V	Catalog Number	Catalog Number Wide Range	$ Price
12	LX4D4JD	LX4D4JW	**110.00**
21 ■	LX4D4ZD	—	**110.00**
24	LX4D4BD	LX4D4BW	**110.00**
36	LX4D4CD	LX4D4CW	**110.00**
48	LX4D4ED	LX4D4EW	**110.00**
60	LX4D4ND	—	**110.00**
72	LX4D4SD	LX4D4SW	**110.00**
110	LX4D4FD	LX4D4FW	**110.00**
125	LX4D4GD	—	**110.00**
220	LX4D4MD	LX4D4MW	**110.00**
250	LX4D4UD	—	**110.00**
440	LX4D4RD	—	**110.00**
600	LX4D4XD	—	**110.00**

Specifications		
Average consumption	**11 W**	**13 W**
Operating range at θ ≤ 55 °C / 131 °F	80–110% of nominal voltage	70–125% of nominal voltage

▲ For old style contactors where the catalog number includes the auxiliary contact arrangement (for example, LP1D2510). The new style TeSys DC controlled contactors (for example, LC1D25BD) do not have replaceable coils.

■ For use in 24 V applications with serial timer modules. Refer to page 18-10.

♦ No replacement DC coils for TeSys D contactors.

TeSys DC Coil Specifications		
	Average consumption	**Operating range**
LC1D09-D32, LC1DT20–LC1DT40	Inrush 5.4 W	70–125% @ 60°C
	Sealed 5.4 W	
LCID••A	Inrush 19 W	75–125% @ 60°C
	Sealed 7.4 W	
	Low consumption	
LC1D09-D32, LC1DT20–LC1DT40	Inrush 2.4 W	70–125% @ 60°C
	Sealed 2.4 W	

Note: DC coils for LC1D09–D32, LC1DT20–LC1DT40, and LCID••A contactors are not replaceable.

Table 18.67: For Old D2 LP1D40, D50, D65 ▲♦

Rated Nominal Voltage V	Catalog Number	Catalog Number Wide Range	$ Price
12	LX4D6JD	LX4D6JW	
24	LX4D6BD	LX4D6BW	
36	LX4D6CD	LX4D6CW	**124.00**
48	LX4D6ED	LX4D6EW	
60	LX4D6ND	—	
72	LX4D6SD	LX4D6SW	
110	LX4D6FD	LX4D6FW	**124.00**
125	LX4D6GD	—	
220	LX4D6MD	LX4D6MW	
250	LX4D6UD	—	
440	LX4D6RD	—	**124.00**
600	LX4D6XD	—	

Specifications		
Average consumption	**22 W**	**23 W**
Operating range at θ ≤ 55 °C /131 °F	80–110% of nominal voltage	75–120% of nominal voltage

Table 18.68: For Old D2 LP1D80 and LC1D80▲

Rated Nominal Voltage V	Catalog Number	Catalog Number Wide Range ★	$ Price
12	LX4D7JD	LX4D7JW	
24	LX4D7BD	LX4D7BW	
36	LX4D7CD	LX4D7CW	**134.00**
48	LX4D7ED	LX4D7EW	
60	LX4D7ND	—	
72	LX4D7SD	LX4D7SW	
110	LX4D7FD	LX4D7FW	
125	LX4D7GD	—	**134.00**
220	LX4D7MD	LX4D7MW	
250	LX4D7UD	—	
440	LX4D7RD	—	**134.00**
600	LX4D7XD	—	

Specifications		
Average consumption	**22 W**	**23 W**
Operating range at θ ≤ 55 °C / 131 °F	80–110% nominal voltage	70–120% nominal voltage

★ Wide range coils cannot be used with contactors using both front- and side-mounting auxiliaries.

Table 18.69: For TeSys D LC1D115, 150

Rated Nominal Voltage V	Catalog Number	$ Price
24	LX4D8BD	
48	LX4D8ED	
60	LX4D8ND	**78.00**
72	LX4D8SD	
110	LX4D8FD	
125	LX4D8GD	
220	LX4D8MD	**78.00**
250	LX4D8UD	
440	LX4D8RD	

Average Consumption	Inrush 365 W, Sealed 5 W
Operating range at θ ≤ 55 °C / 131 °F	70%–120% of nominal voltage

TeSys D contactors . . . . . pages 18-4, 18-6
TeSys D overload relay accessories . . . . . page 18-16
TeSys D replacement coils . . . . . pages 18-17 to 18-19
Dimensions . . . . . pages 18-40 to 18-46

Limited Stock—Replaced by TeSys Products

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TeSys F DC Coils

LX4 coils are the standard coils when a voltage code is added to the part number. The LX9 coils may be ordered separately for special applications. LX9 coils do not include a built-in normally open holding circuit contact; a separate auxiliary contact block with a N.O. contact should be added to the contactor. Both the LX4 and LX9 coils can be used on previous F-line devices.

Table 18.70: LX4 Coils for LC1F115, F150, F185, F265, F400, F500, F630, F780, F800

Device Type	Catalog Number	● Catalog Number Suffix										
		24 V	36V	48 V	60 V	72 V	110 V	125 V	220 V	250 V	440 V	$ Price
F115, F150	LX4FF●	024	035	048	060	070	110	125	220	250	440	**78.00**
F185, F225	LX4FG●	024	035	048	060	070	110	125	220	250	440	**108.00**
F265, F330	LX4FH●	024	035	048	060	070	110	125	220	250	440	**138.00**
F400	LX4FJ●	—	—	048	060	070	110	125	220	250	440	**287.00**
	LX9FJ●♦	—	—	918	—	—	926	927	932	—	938	**287.00**
F500	LX4FK●	—	—	048	060	070	110	125	220	250	440	**360.00**
	LX9FK●♦	—	—	918	—	—	926	927	932	—	938	**360.00**
F630	LX4FL●	—	—	048	060	070	110	125	220	250	440	**398.00**
	LX9FK●♦	—	—	918	—	—	926	927	932	—	938	**398.00**
F780	LX4FX●▲	—	—	—	—	—	110	125	220	250	440	**795.00**
F800	LX4F8●■	—	—	—	—	—	FW	FW	MW	—	QW	**725.00**

▲ LC1F780 contactors operate on 2 coils as a set. The LX4FX part number includes both coils.
■ Also requires rectifier DR5TE4U, **$72.00** list price.
♦ Coil circuit requires a separately mounted resistor. Order from Table 18.71 below.

Table 18.71: LX9 Coils and Resistors

Coil	Resistor Catalog Number	Qty. Required	$ Price	Coil	Resistor Catalog Number	Qty. Required	$ Price	Coil	Resistor Catalog Number	Qty. Required	$ Price
LX9FJ918	DR2SC0047	1	**13.70**	LX9FK918	DR2SC0039	1	**13.70**	LX9FL918	DR2SC0047	2	**13.70**
LX9FJ926	DR2SC0030	1	**13.80**	LX9FK926	DR2SC0220	1	**13.70**	LX9FL925	DR2SC0270	2	**13.70**
LX9FJ927	DR2SC0390	1	**13.70**	LX9FK927	DR2SC0330	1	**13.70**	LX9FL926	DR2SC0330	2	**13.70**
LX9FJ932	DR2SC1200	1	**13.70**	LX9FK932	DR2SC1000	1	**13.70**	LX9FL931	DR2SC1000	2	**13.70**
LX9FJ938	DR2SC4700	1	**13.70**	LX9FK938	DR2SC3300	1	**13.70**	LX9FL937	DR2SC3900	2	**13.70**

TeSys F contactors . . . . . .pages 18-5, 18-7
TeSys F overload relay accessories . . . . . page 18-16
TeSys F replacement coils and parts . . . . . .pages 18-18, 18-18, 18-20
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TeSys D enclosed full-voltage starters are available in Type 1 and Type 12/3R enclosures through 50 hp at 460 V. The enclosed D-line accepts standard D-Line accessories and all Insta-Kits™ control units and control power transformer kits. Standard capacity control power transformers with built-in fuse block can be installed in the standard enclosure. For extra capacity, please refer to your local distributor or Schneider Electric sales office.

Table 18.72: Enclosed Full Voltage Non-Reversing Starters

Max. Horsepower Ratings (AC3)						Auxiliary Contacts		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
1 Phase		3 Phase							Type 1		Type 12/3R	
115	230	200 V	230 V	460 V	575V	N.O.	N.C.					
0.333	1	2	2	5	7.5	1	1	9	LE1D093A62•••••	**109.**	LE1D093A72•••••	**175.**
0.5	2	3	3	7.5	10	1	1	12	LE1D123A62•••••	**137.**	LE1D123A72•••••	**202.**
1	3	5	5	10	15	1	1	18	LE1D183A62•••••	**153.**	LE1D183A72•••••	**219.**
2	3	5	7.5	15	20	1	1	25	LE1D253A62•••••	**170.**	LE1D253A72•••••	**235.**
2	5	7.5	10	20	25	1	1	32	LE1D323A62•••••	**191.**	LE1D323A72•••••	**245.**
3	5	10	10	30	30	1	1	40	LE1D403A62•••••	**273.**	LE1D403A72•••••	**393.**
3	7.5	12	15	40	40	1	1	50	LE1D503A62•••••	**300.**	LE1D503A72•••••	**420.**
5	10	20	20	40	50	1	1	65	LE1D653A62•••••	**393.**	LE1D653A72•••••	**514.**
7.5	15	30	30	60	60	1	1	80	LE1D803A62•••••	**473.**	LE1D803A72•••••	**610.**

Table 18.73: Enclosed Full Voltage Reversing Starters

Max. Horsepower Ratings (AC3) 3 Phase				Auxiliary Contacts On Each Contactor		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200V	230 V	460 V	575 V	N.O.	N.C.		Type 1		Type 12/3R	
2	2	5	7.5	1	1	9	LE2D093A62•••••	**305.**	LE2D093A72•••••	**382.**
3	3	7.5	10	1	1	12	LE2D123A62•••••	**355.**	LE2D123A72•••••	**453.**
5	5	10	15	1	1	18	LE2D183A62•••••	**385.**	LE2D183A72•••••	**483.**
5	7.5	15	20	1	1	25	LE2D253A62•••••	**415.**	LE2D253A72•••••	**513.**
7.5	10	20	25	1	1	32	LE2D323A62•••••	**464.**	LE2D323A72•••••	**573.**
10	10	30	30	1	1	40	LE2D403A62•••••	**655.**	LE2D403A72•••••	**819.**
12	15	40	40	1	1	50	LE2D503A62•••••	**710.**	LE2D503A72•••••	**874.**
20	20	40	50	1	1	65	LE2D653A62•••••	**900.**	LE2D653A72•••••	**1030.**
30	30	60	60	1	1	80	LE2D803A62•••••	**1248.**	LE2D803A72•••••	**1412.**

Table 18.74: Catalog Number Nomenclature

Catalog Number Example: LE1D093A62 O G 7 1 07

- Base Catalog Number
- Control Power Transformer △
- Contactor/Starter Coil Voltage □
- Coil Frequency ◊
- Overload Relay Type ▽
- Overload Relay Range ☆

△Control Power Transformer

Add price from page 18-23. Select letter for primary voltage of CPT:

Voltage	No Transformer used	208	240	480	600
Code	O ▲	L	M	T	X

▲ Letter O, not zero.

Note: If control transformer is used, the only options available are 24 or 120 V as the secondary of the transformer. Also, DC voltages are not available when control power transformer is used.

□Contactor/Starter Coil Voltage

Select coil voltage from table:

Voltage	24	120	208	240	480	600
AC	B	G	L	U	T	X
DC	B	—	—	—	—	—

◊Coil Frequency

Select:
7 = dual frequency coils (50/60 Hz.)
6 = 60 Hz.
D=DC

Note: For 9 to 65 A contactors, only dual frequency coils are available; 80 A contactors, the 24–240 V coils are dual frequency only (50/60 Hz.). The 480–600 V coils are 60 Hz. only. See catalog 8502CT9901 for other restrictions.

▽Overload relay type

Select:
0 = No overload relay
1 = Class 10 Trip
2 = Class 20 Trip

Table 18.75: ☆Overload Relay Range
(Select code from the table below)

Code	Range	For use on Contactors	$ Price Adder
01	0.1–0.16	D09–D32■	**60.**
02	0.16–0.25	D09–D32■	**60.**
03	0.25–0.40	D09–D32■	**60.**
04	0.40–0.63	D09–D32■	**60.**
05	0.63–1.0	D09–D32■	**60.**
06	1.0–1.6	D09–D32■	**60.**
07	1.6–2.5	D09–D32■	**60.**
08	2.5–4	D09–D32	**60.**
10	4–6	D09–D32	**60.**
12	5.5–8	D09–D32	**60.**
13	9–13	D40, D50, D65	**107.**
14	7–10	D09–D32	**62.**
16	9–13	D12–D32	**62.**
18	12–18	D40, D50, D65	**107.**
21	12–18	D18–D32	**62.**
22	16–24	D25–D32■	**62.**
	17–25	D25–D32♦	**62.**
	17–25	D80	**107.**
25	17–25	D40, D50, D65	**107.**
30	23-28	D25–D32♦	**73.**
32	23–32	D25–D32	**73.**
32	23–32	D40, D50, D65	**107.**
40	30–40	D40, D50, D65	**107.**
50	37–50	D40, D50, D65	**107.**
53	30–38	D80	**107.**
55	30–40	D80	**107.**
57	37–50	D80	**107.**
59	48–65	D80	**107.**
61	55–70	D65–D80	**107.**
63	63–80	D65–D80	**107.**
65	48–65	D40, D50, D65	**107.**

■ Available for Class 10 only.
♦ Available for Class 20 only.

Note: If no overload relay is required, leave this portion of the catalog blank. Add appropriate price adder to the base price of the starter.

Dimensions . . . . . .page 18-48

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IEC combination starters combine the requirements of motor overload and short circuit protection in one convenient compact package. All devices provide Type 2 Coordination through 30 hp at 460 V. Devices are available in Type 1 and Type 12/3R enclosures. The IEC combination starter line accepts standard TeSys D accessories and all Insta-Kits™ pilot devices and control power transformer kits. Standard capacity control power transformers with built-in fuse block can be installed in the standard enclosure. For extra capacity, please refer to your local distributor or nearest Square D/Schneider Electric sales office.

NOTE: *Use tables and notes from page 18-21 to complete the catalog numbers.*

Table 18.76: Enclosed Full Voltage Non-Reversing Fusible Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Fuse Clip Rating		Auxiliary Contacts		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	Amperes	UL Class	N.O.	N.C.		Type 1		Type 12/3R	
2	2	5	7.5	30 A	CC	1	1	9	LE1D096B62•••••	**426.**	LE1D096B72•••••	**551.**
3	3	7.5	10	30 A	CC	1	1	12	LE1D126B62•••••	**468.**	LE1D126B72•••••	**592.**
5	5	10	15	30 A	J	1	1	18	LE1D186B62•••••	**484.**	LE1D186B72•••••	**607.**
5	7.5	15	20	30 A	J	1	1	25	LE1D256B62•••••	**500.**	LE1D256B72•••••	**623.**
7.5	10	20	25	60 A	J	1	1	32	LE1D326C62•••••	**653.**	LE1D326C72•••••	**829.**
10	10	30	30	60 A	J	1	1	40	LE1D406C62•••••	**708.**	LE1D406C72•••••	**877.**

Table 18.77: Enclosed Full Voltage Reversing Fusible Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Fuse Clip Rating		Aux. Contacts Each Contactor		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	Amperes	UL Class	N.O.	N.C.		Type 1		Type 12/3R	
2	2	5	7.5	30 A	CC	1	1	9	LE2D096B62•••••	**712.**	LE2D096B72•••••	**837.**
3	3	7.5	10	30 A	CC	1	1	12	LE2D126B62•••••	**778.**	LE2D126B72•••••	**915.**
5	5	10	15	30 A	J	1	1	18	LE2D186B62•••••	**808.**	LE2D186B72•••••	**950.**
5	7.5	15	20	30 A	J	1	1	25	LE2D256B62•••••	**833.**	LE2D256B72•••••	**980.**
7.5	10	20	25	60 A	J	1	1	32	LE2D326C62•••••	**1089.**	LE2D326C72•••••	**1281.**
10	10	30	30	60 A	J	1	1	40	LE2D406C62•••••	**1179.**	LE2D406C72•••••	**1371.**

Table 18.78: Enclosed Full Voltage Non-Reversing Circuit Breaker Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Auxiliary Contacts		Circuit Breaker Maximum Current Rating	Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	N.O.	N.C.			Type 1		Type 12/3R	
2	2	5	7.5	1	1	15 A	9	LE1D097D62•••••	**569.**	LE1D097D72•••••	**730.**
3	3	7.5	10	1	1	15 A	12	LE1D127D62•••••	**622.**	LE1D127D72•••••	**789.**
5	5	10	15	1	1	30 A	18	LE1D187E62•••••	**647.**	LE1D187E72•••••	**808.**
5	7.5	15	20	1	1	30 A	25	LE1D257E62•••••	**668.**	LE1D257E72•••••	**834.**
7.5	10	20	25	1	1	50 A	32	LE1D327F62•••••	**870.**	LE1D327F72•••••	**1088.**
10	10	30	30	1	1	50 A	40	LE1D407F62•••••	**944.**	LE1D407F72•••••	**1179.**

Table 18.79: Enclosed Full Voltage Reversing Circuit Breaker Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Auxiliary Contacts Each Contactor		Circuit Breaker Maximum Current Rating	Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	N.O.	N.C.			Type 1		Type 12/3R	
2	2	5	7.5	1	1	15 A	9	LE2D097D62•••••	**836.**	LE2D097D72•••••	**972.**
3	3	7.5	10	1	1	15 A	12	LE2D127D62•••••	**944.**	LE2D127D72•••••	**1096.**
5	5	10	15	1	1	30 A	18	LE2D187E62•••••	**1010.**	LE2D187E72•••••	**1174.**
5	7.5	15	20	1	1	30 A	25	LE2D257E62•••••	**1075.**	LE2D257E72•••••	**1251.**
7.5	10	20	25	1	1	50 A	32	LE2D327F62•••••	**1403.**	LE2D327F72•••••	**1631.**
10	10	30	30	1	1	50 A	40	LE2D407F62•••••	**1522.**	LE2D407F72•••••	**1770.**

Table 18.80: Enclosed Full Voltage Non-Reversing Non-Fused Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Auxiliary Contacts		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	N.O.	N.C.		Type 1		Type 12/3R	
2	2	5	7.5	1	1	9	LE1D096A62•••••	**416.**	LE1D096A72•••••	**541.**
3	3	7.5	10	1	1	12	LE1D126A62•••••	**458.**	LE1D126A72•••••	**532.**
5	5	10	15	1	1	18	LE1D186A62•••••	**474.**	LE1D186A72•••••	**597.**
5	7.5	15	20	1	1	25	LE1D256A62•••••	**490.**	LE1D256A72•••••	**613.**
7.5	10	20	25	1	1	32	LE1D326A62•••••	**643.**	LE1D326A72•••••	**819.**
10	10	30	30	1	1	40	LE1D406A62•••••	**698.**	LE1D406A72•••••	**867.**

Table 18.81: Enclosed Full Voltage Reversing Non-Fused Combination Starters

Max. Horsepower Ratings (AC3) 3 Phase				Aux. Contacts Each Contactor		Current Rating of Contactor	Catalog Number	$ Price	Catalog Number	$ Price
200 V	230 V	460 V	575 V	N.O.	N.C.		Type 1		Type 12/3R	
2	2	5	7.5	1	1	9	LE2D096A62•••••	**702.**	LE2D096A72•••••	**827.**
3	3	7.5	10	1	1	12	LE2D126A62•••••	**768.**	LE2D126A72•••••	**905.**
5	5	10	15	1	1	18	LE2D186A62•••••	**798.**	LE2D186A72•••••	**940.**
5	7.5	15	20	1	1	25	LE2D256A62•••••	**823.**	LE2D256A72•••••	**970.**
7.5	10	20	25	1	1	32	LE2D326A62•••••	**1079.**	LE2D326A72•••••	**1271.**
10	10	30	30	1	1	40	LE2D406A62•••••	**1169.**	LE2D406A72•••••	**1361.**

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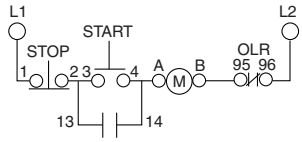

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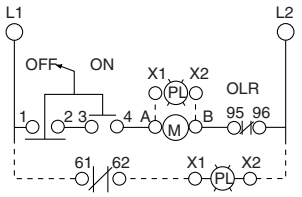

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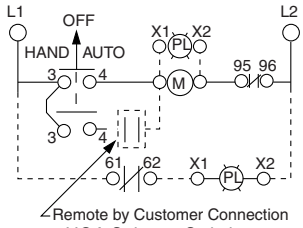

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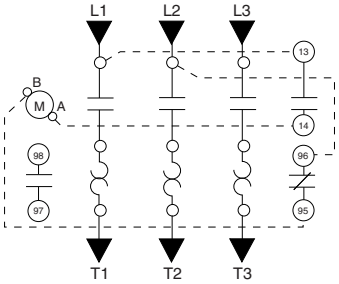
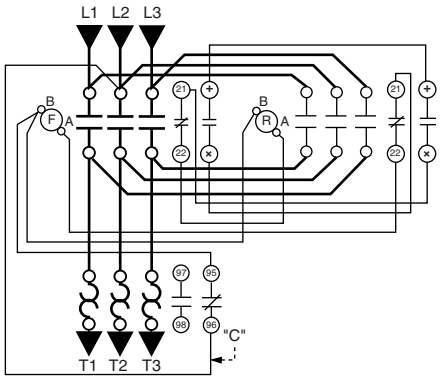


D-Line AC Magnetic Starter
2-3 Poll



D-Line AC Magnetic Reversing Starter
3-Pole

Factory Modifications and Insta-Kits™ Selection

Add the factory modification code to the end of the catalog number created from page 18-21. With the use of Insta-Kits™, only one operator scheme is allowed. Only the combinations of operators and pilot lights shown below can be ordered.

Pilot lights will be at the coil voltage indicated in the catalog number for the starter.

Table 18.82: Factory Modifications

Description	Factory Modification Code▲	$ Price	Insta-Kits (for field installation)	$ Price
Control Units Only				
For-Rev-Stop Push Button	A06L	**131.**	LA9CA06LT	**71.00**
Start/Stop Push Button	A06G	**65.**	LA9CA06GT	**32.80**
I/O (Start/Stop) Push Button	N/A	—	N/A	—
I/O Push Button (double touch)	A06I	**83.**	LA9CA06IO	**41.50**
Emergency Stop	N/A	—	N/A	—
Hand-Off-Auto Selector Switch	A06E	**65.**	LA9CA06ET	**32.80**
On/Off Selector Switch	A06D	**65.**	LA9CA06DT	**41.50**
Start/Mushroom Head Stop Push Button	A06X	**65.**	LA9CA06XT	**63.00**
Pilot Lights only				
LED Pilot light, 24, 120 or 240 V	A16S	**134.**	LA9CA16ST★	**66.00**
Green-Red Pilot Light, Direct Supply, 24 or 120 V ■	A06S	**112.**	LA9CA06ST★	**62.00**
Green-Red Transformer Pilot Light, 120, 208/240, 480 or 600 V ■	A06F	**207.**	LA9CA06FT★	**113.00**
Available Combination of Control Units and Pilot Lights				
Hand-Off-Auto Selector Switch w/24, 120, or 240 V LED Pilot Light	A16U	**213.**	LA9CA16UT★	**177.00**
Start/Stop Push Button w/ 24, 120 or 240 V LED Pilot Light	A16V	**213.**	LA9CA16VT★	**177.00**
On/Off Selector w/ 24, 120 or 240 V LED Pilot Light	A16W	**213.**	LA9CA16WT★	**177.00**
Start/Stop Push Button w/ Green-Red Transformer Pilot Light	A06N	**177.**	LA9CA06NT★	**95.00**
Start/Stop Push Button w/Green-Red Pilot Light	A06V	**177.**	LA9CA06VT	**95.00**
Hand-Off-Auto Selector Switch w/Green-Red Pilot Light	A06U	**273.**	LA9CA06UT	**97.00**
Hand-Off-Auto Selector Switch w/Green-Red Transformer Pilot Light	A06J	**273.**	LA9CA06JT★	**147.00**
On/Off Selector w/Green-Red Pilot Light	A06W	**177.**	LA9CA06WT	**95.00**
On/Off Selector w/Green-Red Transformer Pilot Light	A06H	**273.**	LA9CA06HT★	**147.00**
Control Power Transformer				
Standard VA, 2 Fuses in Primary, 1 Fuse in Secondary	A206P	**260.**	♦	—
50 VA extra, 2 Fuses in Primary, 1 Fuse in Secondary	A207P	**456.**	♦	—
100 VA extra, 2 Fuses in Primary, 1 Fuse in Secondary	A208P	**634.**	♦	—

▲ Add these forms to the catalog number selected on page 18-21. The numbers as shown are for use in NEMA 1 Enclosures. For uses in NEMA 12/3R change the 6 to a 7 (ex A06U becomes A07U). Price remains the same. The change DOES NOT apply to control power transformer forms.

■ Pilot lights are wired such that the light is on when the contactor is energized. For non-LED type pilot lights, a green lens is installed on the unit when shipped. A red lens is included for use as applicable.

♦ Select Insta-Kits™ from table below.

Table 18.83: Insta-Kits™ Selection

Total VA	Insta-Kits™ Catalog Number	$ Price
50	LA9TFD32★	**140.00**
100	LA9TFD80★	**246.00**
150	LA9TFD15★	**343.00**

★ Complete the part number for the Insta-Kits™ by selecting the voltage code from the appropriate tables below.

Table 18.84: Voltage Codes for Pilot Lights

Voltage (Vac)	24	120	208/240	480	600
Code	B	G	M	T	X

Table 18.85: Voltage Codes for Control Power Transformers

Primary Voltage	120	208	240	480	600	208	240	480	600
Secondary Voltage	24					120			
Code	E	D	C	B	A	L	M	T	X

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3-Pole Non-Reversing Mini-Contactors

LC1K09●

Table 18.86: AC Operating Coils

Maximum Horsepower Ratings						Maximum Current		Type of Connection	Auxiliary Contacts		Catalog Number	$ Price
1 Ø		3 Ø				Inductive AC3 (A)	Resistive AC1 (A)		N.O.	N.C.		
115 V hp	230 V hp	200 V hp	230 V hp	460 V hp	575 V hp							
0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1	—	LC1K0610 ▲ ■	**57.**
									—	1	LC1K0601 ▲■	**57.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1	—	LC1K0910 ▲■	**75.**
									—	1	LC1K0901 ▲■	**75.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1	—	LC1K1210 ▲■	**86.**
									—	1	LC1K1201 ▲■	**86.**

Table 18.87: Coil Voltage Codes for AC Contactors

Up to and including 240 V coil with integral suppression device available. Add **2** to the code required (for example, J7**2**). Price adder $10.00.

Vac 50/60 Hz	12	24	42	48	110	120	127	200/208	220/230	230	230/240	277	380/400	400/415	440	480	660/690
Code	J7	B7	D7	E7	F7	G7	FC7	L7	M7	P7	U7	UE7	Q7	N7	R7	T7	Y7

Table 18.88: DC Operating Coils

0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1	—	LP1K0610 ▲■	**75.**
									—	1	LP1K0601 ▲■	**75.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1	—	LP1K0910 ▲■	**92.**
									—	1	LP1K0901 ▲■	**92.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1	—	LP1K1210 ▲■	**106.**
									—	1	LP1K1201 ▲■	**106.**

▲ See Table 18.89:
For TeSys K contactors with spring terminal clamps, add a **3** before the coil voltage code (for example, LC1K06103G7).
For TeSys K contactors with solder pin terminals, add a **5** before the coil voltage code (for example, LC1K09105B7).
For TeSys K contactors with slip-on terminals, add a **7** before the coil voltage code (for example, LC1K12107M7).

■ Complete the catalog number with the appropriate coil voltage code (for example, LC1K0610**G7**).

LP4K09●

Table 18.89: Coil Voltage Codes for DC Contactors

Coil with integral suppression device available. Add **3** to the code required (for example, JD**3**). Price adder $10.00 ▲

Vdc	12	20	24	36	48	60	72	100	110	125	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	LD	MD	MPD	MUD	UD

▲ 3 W inrush.

Table 18.90: DC–Low Consumption Operating Coils (devices have built-in transient suppression)

0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1	—	LP4K0610 ▲■	**92.**
									—	1	LP4K0601 ▲■	**92.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1	—	LP4K0910 ▲■	**110.**
									—	1	LP4K0901 ▲■	**110.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1	—	LP4K1210 ▲■	**126.**
									—	1	LP4K1201 ▲■	**126.**

▲ See Table 18.91:
For TeSys K contactors with spring terminal clamps, add a **3** before the coil voltage code (for example, LC1K06103G7).
For TeSys K contactors with solder pin terminals, add a **5** before the coil voltage code (for example, LC1K09105B7).
For TeSys K contactors with slip-on terminals, add a **7** before the coil voltage code (for example, LC1K12107M7).

■ Complete the catalog number with the appropriate coil voltage code (for example, LC1K0610**G7**).

LR2K0316

Table 18.91: Coil Voltage Codes for DC Contactors—Low Consumption ▲

Vdc	12	24	48	72
Code	JW3	BW3	EW3	SW3

▲ 1.8 inrush sealed.

Table 18.92: Overload Relays for 3-Pole Contactors with Screw-Clamp Terminals

Class 10, Relay setting range–A	Catalog Number	$ Price
0.1 to 0.16	LR2K0301	**59.**
0.16 to 0.23	LR2K0302	**59.**
0.23 to 0.36	LR2K0303	**59.**
0.36 to 0.54	LR2K0304	**59.**
0.54 to 0.8	LR2K0305	**59.**
0.8 to 1.2	LR2K0306	**59.**
1.2 to 1.8	LR2K0307	**59.**
1.8 to 2.6	LR2K0308	**59.**
2.6 to 3.7	LR2K0310	**59.**
3.8 to 5.5	LR2K0312	**59.**
5.5 to 8	LR2K0314	**59.**
8 to 11.5	LR2K0316	**59.**
10 to 14	LR2K0321	**59.**

LR2K overload relays:
- AC or DC protection
- Ambient compensated bimetallic
- Class 10
- Single phase sensitivity
- Manual or auto reset
- Full load current dial

E164862
CCN NLDX
(screw terminals)

LR43364
Class 3211 04

E164862
CCN NLDX2
(slip-on & solder-pin terminals)

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3-Pole Reversing Mini-Contactors

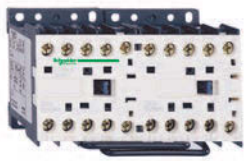
LC2K09107

Table 18.93: AC Operating Coils

Maximum Horsepower Ratings						Maximum Current		Type of Connection	Auxiliary Contacts		Catalog Number	$ Price
1 Ø		3 Ø				Inductive AC3 A	Resistive AC1 A					
115V hp	230V hp	200V hp	230V hp	460V hp	575V hp				N.O.	N.C.		
0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1 —	— 1	LC2K0610 ▲■ LC2K0601 ▲■	**130.** **130.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1 —	— 1	LC2K0910 ▲■ LC2K0901 ▲■	**167.** **167.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1 —	— 1	LC2K1210 ▲■ LC2K1201 ▲■	**191.** **191.**

Table 18.94: Coil Voltage Codes for AC Contactors

Up to and including 240 V coil with integral suppression device available. Add **2** to the code required. Example: J7**2**. Price adder $20.00.

Vac 50/60 Hz	12	24	42	48	110	120	127	200/208	220/230	230	230/240	277	380/400	400/415	440	480	660/690
Code	J7	B7	D7	E7	F7	G7	FC7	L7	M7	P7	U7	UE7	Q7	N7	R7	T7	Y7

LP2K0910

Table 18.95: DC Operating Coils

0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1 —	— 1	LP2K0610 ▲■ LP2K0601 ▲■	**167.** **167.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1 —	— 1	LP2K0910 ▲■ LP2K0901 ▲■	**202.** **202.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1 —	— 1	LP2K1210 ▲■ LP2K1201 ▲■	**232.** **232.**

Table 18.96: Coil Voltage Codes for DC Contactors

Coil with integral suppression device available. Add **3** to the code required. Example: JD**3**. Price adder $20.00.

Vdc	12	20	24	36	48	60	72	100	110	125	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	LD	MD	MPD	MUD	UD

Table 18.97: DC–Low Consumption Operating Coils (devices have built-in transient suppression)

0.5	1.5	1.5	1.5	3	3	6	15	Screw-clamp	1 —	— 1	LP5K0610 ▲■ LP5K0601 ▲■	**202.** **202.**
0.5	1.5	2	3	5	5	9	20	Screw-clamp	1 —	— 1	LP5K0910 ▲■ LP5K0901 ▲■	**238.** **238.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	1 —	— 1	LP5K1210 ▲■ LP5K1201 ▲■	**274.** **274.**

Table 18.98: Coil Voltage Codes for DC Contactors—Low Consumption

Vdc	12	24	48	72
Code	JW3	BW3	EW3	SW3

▲ For TeSys K contactors with spring terminal clamps, add a **3** before the coil voltage code (for example, LP2K09103BD).
For TeSys K contactors with solder pin terminals, add a **5** before the coil voltage code (for example, LP5K09105BW3).
For TeSys K contactors with slip-on terminals, add a **7** before the coil voltage code (for example, LC2K06107B7).

■ Complete the catalog number with the appropriate coil voltage code (for example, LC1K0610G7).

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LC2K090045

Table 18.99: AC Operating Coils

Maximum Horsepower Ratings						Maximum Current		Type of Connection	Power Poles		Catalog Number	$ Price
1 Ø		3 Ø				Inductive AC3 (A)	Resistive AC1 (A)		N.O.	N.C.		
115 V hp	230 V hp	200 V hp	230 V hp	460 V hp	575 V hp							
4-Pole Mini Contactor												
0.5	1.5	2	3	5	5	9	15	Screw-clamp	4 2	— 2	LC1K09004 ▲■ LC1K09008 ▲■	**75.** **81.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LC1K12004 ▲■	**86.**
4-Pole Mechanically Interlocked Contactors												
0.5	1.5	2	3	5	5	9	20	Screw-clamp	4	—	LC2K09004 ▲■	**167.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LC2K12004 ▲■	**191.**

Table 18.100: Coil Voltage Codes for AC Contactors

Up to and including 240 V coil with integral suppression device available. Add **2** to the code required. Example: J7**2**. Price adder $10.00 ($20.00 for mechanically interlocked contactors)

Vac 50/60 Hz	12	24	42	48	110	120	127	200/208	220/230	230	230/ 240	277	380/400	400/415	440	480	660/690
Code	J7	B7	D7	E7	F7	G7	FC7	L7	M7	P7	U7	UE7	Q7	N7	R7	T7	Y7

Table 18.101: DC Operating Coils

4-Pole Mini Contactor											
0.5	1.5	2	3	5	5	9	15	Screw-clamp	4 2	— 2	LP1K09004 ▲■ LP1K09008 ▲■	**92.** **98.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LP1K12004 ▲■	**106.**
4-Pole Mechanically Interlocked Contactors												
0.5	1.5	2	3	5	5	9	20	Screw-clamp	4	—	LP2K09004 ▲■	**202.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LP2K12004 ▲■	**232.**

Table 18.102: Coil Voltage Codes for DC Contactors

Coil with integral suppression device available. Add **3** to the code required. Example: **JD3**. Price adder $10.00 ($20.00 for mechanically interlocked contactors)

Vdc	12	20	24	36	48	60	72	100	110	125	200	220	230	240	250
Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	LD	MD	MPD	MUD	UD

Table 18.103: DC–Low Consumption Operating Coils (devices have built-in transient suppression)

4-Pole Mini Contactor											
0.5	1.5	2	3	5	5	9	15	Screw-clamp	4 2	— 2	LP4K09004 ▲■ LP4K09008 ▲■	**110.** **116.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LP4K12004 ▲■	**126.**
4-Pole Mechanically Interlocked Contactors												
0.5	1.5	2	3	5	5	9	20	Screw-clamp	4	—	LP5K09004 ▲■	**238.**
0.5	1.5	3	3	7.5	10	12	20	Screw-clamp	4	—	LP5K12004 ▲■	**274.**

Table 18.104: Coil Voltages for DC Contactors—Low Consumption

Vdc	12	24	48	72
Code	JW3	BW3	EW3	SW3

▲ For TeSys K contactors with spring terminal clamps, add a **3** before the coil voltage code (for example, LC1K09103L7).
For TeSys K contactors with solder pin terminals, add a **5** before the coil voltage code (for example, LP4K06015JW3).
For TeSys K contactors with slip-on terminals, add a **7** before the coil voltage code (for example, LP2K090047BD).

■ Complete the catalog number with the appropriate coil voltage code (for example, LC1K0610G7).

Overload Relays . . . . . page 18-24
Accessories . . . . . page 18-27
Dimensions . . . . . page 18-49

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LA1KN11

Table 18.105: Instantaneous Auxiliary Contact Blocks

Clip-on front mounting, 1 block per contactor and 2 blocks per pair of mechanically interlocked contactors.				
Type of connection	Auxiliary Contacts		Catalog Number	$ Price
	N.O.	N.C.		
Screw clamp	2	—	LA1KN20	14.20
	—	2	LA1KN02	14.20
	1	1	LA1KN11	14.20
	4	—	LA1KN40 ▲	27.30
	3	1	LA1KN31 ▲	27.30
	2	2	LA1KN22 ▲	27.30
	1	3	LA1KN13 ▲	27.30
	—	4	LA1KN04 ▲	27.30
Slip-on 1 x 0.250 in. or 2 x 0.110 in.	2	—	LA1KN207	14.20
	—	2	LA1KN027	14.20
	1	1	LA1KN117	14.20
	4	—	LA1KN407 ▲	27.30
	3	1	LA1KN317 ▲	27.30
	2	2	LA1KN227 ▲	27.30
	1	3	LA1KN137▲	27.30
	—	4	LA1KN047 ▲	27.30

▲ Block of 4 contacts cannot be used with LP4K or LP5K contactors.

LA1KN22

Table 18.106: Electronic Time Delay Auxiliary Contact Blocks

Clip-on front mounting, 1 block per contactor and 2 blocks per pair of mechanically interlocked contactors.					
Voltage (V)	Type	Timing Range (S)	Contacts	Catalog Number	$ Price
24–48 Vac or Vdc	On-delay	1–30	SPDT	LA2KT2E	32.80
110–240 Vac	On-delay	1–30	SPDT	LA2KT2U	32.80

Note: Relay outputs, with single pole double throw, 240 Vac/Vdc, 2 A max.
Maximum switching capacity 250 VA / 150 W
Operating temperature: –10 to + 60°C (14 to 140°F)
Reset time: 1.5 s during time delay, 0.5 after time delay

Table 18.107: Suppressor Module with Incorporated LED Indicator

Clip-on front mounting				
Voltage range	Type	Sold in lots of	Catalog Number	$ Price each
12–24 Vac/Vdc	Varistor	5	LA4KE1B ■	9.80
32–48 Vac/Vdc	Varistor	5	LA4KE1E ■	9.80
50–129 Vac/Vdc	Varistor	5	LA4KE1FC ■	9.80
130–250 Vac/Vdc	Varistor	5	LA4KE1UG ■	9.80
12–24 Vdc	Diode + Zener	5	LA4KC1B ♦	9.80
32–48 Vdc	Diode + Zener	5	LA4KC1E ♦	9.80
220–250 Vac	RC	5	LA4KA1U ★	9.80

■ Protection by limitation of the transient voltage to 2 Uc maximum. Maximum reduction of the transient voltage peaks. Slight time delay on drop-out (1.1–1.5 times normal).
♦ No overvoltage or oscillation frequency. Polarized component. Slight time delay on drop-out (1.1–1.5 times normal).
★ Protection by limitation of the transient voltage to 3 Uc maximum and limitation of the oscillation frequency. Slight time delay on drop-out (1.2 times normal).

LA2KT2U

Table 18.108: Paralleling Links

Description	Sold in lots of	Catalog Number	$ Price each
For 2 poles with screw-clamp terminals	4	LA9E01	2.20
For 4 poles with screw-clamp terminals	2	LA9E02	3.50

Table 18.109: Power Connectors

Description	Sold in lots of	Catalog Number	$ Price each
Set of 6 power connections for reversing contactors with screw-clamp terminals	100	LA9K0969	6.20
Set of 4 power connections for changeover contactors with screw-clamp terminals	100	LA9K0970	6.20

Table 18.110: Marking Strips

Description	Sold in lots of	Catalog Number	$ Price each
Clips onto front of the contactor	100	LA9D90	.06

Table 18.111: Accessories for Overload Relays

Description	Type of Connection	Catalog Number	$ Price
Terminal block for separate clip-on mounting of the overload relay onto 35 mm omega rail (AM1DP200)	Screw-clamp	LA7K0064	11.90

E164862
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TeSys™ U Simple Motor Starter

Refer to Catalog **8502CT0201**

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The TeSys U motor starter is integrated, making it simple to choose and install. It consists of a control unit snapped in a power base. TeSys U can be configured to fit specific applications as well. Optional accessories include a reverser, a current limiter, predictive maintenance options, and communication options.

For detailed information about TeSys U, visit our website.

1 Power Base

2 Control Unit

3 Function Modules
Auxiliary Contacts

\+ = TeSys U Motor Starter

Selecting TeSys U Motor Starters in Three Steps

Power Base

Table 18.112: Step 1. Select Power Base (Only two different bases up to 32 A)

Control Connection	Max. Current (A)	Three Phase (HP max.)				Single Phase (HP max.)		Self-Protected Power Base	
		200/208 V	220/240 V	460 V	575/600 V	120 V	240 V	Catalog Number	$ Price
With screw terminations	12	3	3	7.5	10	1.5	2	LUB12	**246.00**
	32	10	10	20	25	2	5	LUB32	**345.00**
Without screw terminations	12	3	3	7.5	10	1.5	2	LUB120•	**276.00**
	32	10	10	20	25	2	5	LUB320•	**375.00**

• For use with reversng modules or communication modules with prewired connector

Control Unit

Table 18.113: Step 2. Select Control Unit □

Setting Range (A)	Standard 3-phase Class 10 trip ▼	$ Price	Advanced 3-phase Class 10 trip ▼	$ Price	Advanced single-phase Class 10 trip ▼	$ Price	Advanced 3-phase Class 20 trip ▼	$ Price
0.15–0.6	LUCAX6••	**120.00**	LUCBX6••	**150.00**	LUCCX6••	**150.00**	LUCDX6••	**150.00**
0.3–1.4	LUCA1X••	**120.00**	LUCB1X••	**150.00**	LUCC1X••	**150.00**	LUCD1X••	**150.00**
1.25–5.0	LUCA05••	**120.00**	LUCB05••	**150.00**	LUCC05••	**150.00**	LUCD05••	**150.00**
3–12	LUCA12••	**120.00**	LUCB12••	**150.00**	LUCC12••	**150.00**	LUCD12••	**150.00**
4.5–18	LUCA18••	**120.00**	LUCB18••	**150.00**	LUCC18••	**150.00**	LUCD18••	**150.00**
8–32	LUCA32••	**120.00**	LUCB32••	**150.00**	LUCC32••	**150.00**	LUCD32••	**150.00**

▼ Complete the catalog number by adding appropriate code from voltage code table below (for example, LUCAX6FU).
△ The control unit contains solid-state overload relay and control power source for TeSys U. For more details on the different control units, their functions, and placement on the power base, see 18-29

Table 18.114: Voltage Codes

Volts	24	48–72	110–240
DC	BL□	—	—
AC	B	—	—
DC or AC	—	ES◊	FU

□ DC voltage with range of 0.90 to 1.10 of nominal.
◊ 48–72 Vdc; 48 Vac

Auxiliary Contact

Table 18.115: Step 3. Select Auxiliary Contacts (optional)

Terminals	Contact Indicates	Contact Normal Status	Contact State for Each Mode▲						Catalog Number	$ Price
			Off	Ready	Run	Short Circuit Trip	Overload Trip (Manual Reset)	Overload Trip (Remote/ Auto Reset)■		
Auxiliary Contact Blocks										
Screw	Ready condition	N.O.	O	I	I	O	O	I	LUA1C11	**34.5**
	Fault condition	N.C.	I	I	I	O	O	I		
Screw	Ready condition	N.O.	O	I	I	O	O	I	LUA1C20	
	Fault condition	N.C.	O	O	O	I	I	O		
Auxiliary Contact Function Modules										
Screw	Pole state	2 N.O.	O	O	I	O	O		LUFN20	**34.5**
Screw	Pole state	1 N.O. and 1 N.C.	O I	O I	I O	O I	O I		LUFN11	
Screw	Pole state	2 N.C.	1	I	O	I	I		LUFN02	

▲ I indicates closed contact; O indicates open contact
■ Requires multifunction or advanced control unit plus fault differentiation module LUFDA10.

Table 18.116: Accessories

Accessory	Quick Description	For details & selection, see:
Current limiter	Increases the breaking capacity to 130kA @ 460 V	Table 18.123
Reverser	Stacked or side mounted (LU6MB0••• only)	Table 18.119
Line phase barrier	Required for use as a self-protected combination starter (UL508E)	Table 18.118
Multifunction control unit	Has functions for monitoring and predictive maintenance	Table 18.124
Function modules	Fault differentiation, thermal overload, motor load indication	Table 18.125
Communication modules	Integrates into existing networks, major portocols are available	Table 18.126
Soft starter + Tesys U	Use Altistart U01soft starter with TeSys U	Table 18.132
Powerbus	Use TeSys U with a prewired system	Table 18.128
Configuration and connection accessories	PowerSuite software, busbar, external handle	Table 18.129

Accessories . . . . . pages 18-29 to 18-31
Dimensions . . . . . page 18-50

E164862
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I11 Discount Schedule

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Table 18.117: Control Units and Functions

Standard

Advanced

Multifunction

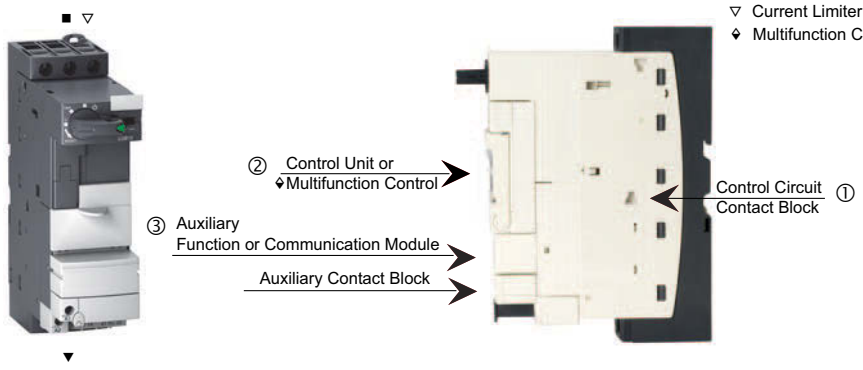
Reference	LUCA	LUCB	LUCC	LUCD	LUCM
Protection type					
Class 10	■	■			■
Class 20				■	■
Class 5–30					■
Single Phase: LUCC Class 10 only			■		■
Protection functions					
Short circuit	■	■	■	■	■
Over current	■	■	■	■	■
Thermal overload	■	■	■	■	■
Phase loss	■	■		■	■
Phase imbalance	■	■		■	■
Ground fault	■	■	■	■	■
Underload, long start, jam		▫	▫	▫	■
Control functions					
Manual reset	■				
Automatic or local/remote reset		▫	▫	▫	■
Fault differentiation		▫	▫	▫	■
Thermal alarm		▫	▫	▫	■
Motor load display		▫	▫	▫	■
Fault history					■
Alarm threshold adjustment					■
Tripping test		■	■	■	■

■ = built-in the control unit
▫ = works with the related function modules (see Table 18.119 on page 30)

Power Base and Plug-in Accessories

See below where to install accessories on the power base. Only one accessory can be installed in each location.

■ Line Phase Barrier
▼ Reverser Unit mounts under power base
▽ Current Limiter attaches above power base
♦ Multifunction Control Unit



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Line Phase Barrier

Reverser Unit Assembled under the Power Base

Control Unit Multifunction

Alarm Differentiation

Parallel Wiring

Motor Load Indicator

Table 18.118: Line Phase Barrier (optional) ▲

Description	Catalog Number	$ Price
Incoming line phase barrier to allow the TeSys U to be used as a self protected combination starter according to UL508E	LU9SP0	**15.00**

▲ See page 18-29 for placement on the power base.

Table 18.119: Reverser

Control Connection	Max. Current (A)	Three Phase (HP max.)				Self-Protected Starter Base	
		200/208 V	220/240 V	460 V	575 V	Catalog Number	$ Price
With screw terminations	12	3	3	7.5	10	LU2B12■	**488.00**
	32	10	10	20	25	LU2B32■	**720.00**

■ Voltage code required.

Table 18.120: Select Control Unit Options★▼

Setting Range (A)	Standard 3-phase Class 10 trip ♦	$ Price	Advanced 3-phase Class 10 trip ♦	$ Price	Advanced single-phase Class 10 trip ♦	$ Price	Advanced 3-phase Class 20 trip ♦	$ Price
0.15–0.6	LUCAX6••	**120.00**	LUCBX6••	**150.00**	LUCCX6••	**150.00**	LUCDX6••	**150.00**
0.3–1.4	LUCA1X••	**120.00**	LUCB1X••	**150.00**	LUCC1X••	**150.00**	LUCD1X••	**150.00**
1.25–5.0	LUCA05••	**120.00**	LUCB05••	**150.00**	LUCC05••	**150.00**	LUCD05••	**150.00**
3–12	LUCA12••	**120.00**	LUCB12••	**150.00**	LUCC12••	**150.00**	LUCD12••	**150.00**
4.5–18 ♦	LUCA18••	**120.00**	LUCB18••	**150.00**	LUCC18••	**150.00**	LUCD18••	**150.00**
8–32 ♦	LUCA32••	**120.00**	LUCB32••	**150.00**	LUCC32••	**150.00**	LUCD32••	**150.00**

♦ Complete the catalog number by adding the appropriate code from Table 18.121 (for example, LUCAX6FU).
★ Control units for 4.5–18 and 8–32 can be used **only** with 32 A rated power bases (LUB32 / LU2B32).
▼ The control unit contains solid-state overload relay and control power source for TeSys U.
For more details on the different control units, their functions, and placement on the power base see page 18-29.

Table 18.121: Voltage Codes

Volts	24	48–72	110–240
DC	BL△□	—	—
AC	B	—	—
DC or AC	—	ES◊	FU

△ Voltage code to use for a power base with a communication module.
□ DC voltage with range of 0.90 to 1.10 of nominal.
◊ 48–72 Vdc; 48 Vac

Table 18.122: Reversing Modules for Field Addition

Mounting	Catalog No.	$ Price	Wiring Adapter	$ Price
Beneath	LU2MB0	**192.00**	LU9MR1C	**31.50**
Beside	LU6MB0	**222.00**	LU9MR1	**15.00**

Note: For LU2MB0 and LU6MB0, voltage code required; must match control unit.

Table 18.123: Current Limiter ☆▽

Accessory	Application	Technical Data	Mounting	Catalog Number	$ Price
Current limiter/isolator	Additional current limiting aspects for the starter	130 kA at 460 V 60 kA at 575 V	Direct mounting to LUB• and LU2B•	LUALB1	**171.00**
Limiter cartridge	Replacement cartridge for LUALB1	130 kA at 460 V 65 kA at 575 V	—	LUALF1	**78.00**

☆ Increases the breaking capacity of the motor starter.
▽ See page 18-29 for placement on the power base.

Table 18.124: Control Unit Multifunction ◒✱

Setting Range (A)	Multifunction programmable	$ Price
0.15–0.6	LUCMX6BL	**615.00**
0.3–1.4	LUCM1XBL	
1.25–5.0	LUCM05BL	
3–12	LUCM12BL	
4.5–18	LUCM18BL	
8–32	LUCM32BL	

◒ Offers motor management system capabilities. For more details see the LUCM on page 18-31.
✱ See page 18-29 for placement on the power base.

Table 18.125: Function Modules ♦◑

Module	Description	For use with:	Operation Requirements	Catalog Number	$ Price
Fault differentiation with manual reset (thermal overload)	Provides indication between an overload trip and a short circuit trip.	Advanced control units only	24–250 Vac or Vdc (power from control unit)	LUFDH11	**156.00**
Fault differentiation with auto reset				LUFDA10	**156.00**
Thermal overload pre-alarm	Signals when the motor current reaches 1.05 of the full load setting on the control unit.	Advanced control units only	24–250 Vac or Vdc (power from control unit)	LUFW10	**156.00**
Motor load indication	Provides a signal proportional to the average currents in the three phases divided by the full load current setting of the control unit. The output corresponds to a load status of 0–2 times the full load setting of the control unit.	Advanced or multi-function control units	4–20 mA (requires separate 24 Vdc power supply)	LUFV2	**188.00**
Parallel wiring	Provides a convenient way to reduce control wiring and allow for connecting starters to a communications network by providing 24 Vdc for the starters.	Advanced or multi-function control units(24 Vdc only) and LU9BN11C or LU9MRC prewired connector	LU9G02 splitter box and PLC network	LUFC00	**57.00**

♦ Offers customization for specific application requirements.
◑ See page 18-29 for placement on the power base.

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AS-Interface

Modbus

DeviceNet

Profibus

CANopen

Table 18.126: Communication Modules ✪ ◪

Module	Description	For use with:	Operation Requirements	Catalog Number	$ Price
AS-Interface Communication	Allows the TeSys U starter to be connected directly to the network using AS-Interface protocols.	Advanced or multi-function control units (24 Vdc only) and LU9BN11C or LU9MRC prewired connector	Requires separate 24 Vdc power supply and AS-Interface network	ASILUFC5	188.00
AS-Interface V2 Communication	Allows the TeSys U starter to be connected directly to the network using AS-Interface V2 protocols.	Advanced or multi-function control units (24 Vdc only) and LU9BN11C or LU9MRC prewired connector	Requires separate 24 Vdc power supply and AS-Interface V2 network	ASILUFC51	188.00
Modbus™ Communication Protocol	Allows the TeSys U starter to be connected directly to the network using Modbus protocols.	Advanced or multi-function control units (24 Vdc only) and LU9BN11C or LU9MRC prewired connector	Requires separate 24 Vdc power supply	LULC033	218.00
Advantys™ STB Communication	Allows the TeSys U starter to be connected to the network using the Advantsys STB protocol	Advanced or multi-function control units (24 Vdc only) and LU9BN11L or LU9MRL prewired connector	Requires separate 24 Vdc power supply	LULC15	218.00
CANopen Communication	Allows the TeSys U starter to be connected to the network using the CANopen protocol	Advanced or multi-function control units (24 Vdc only) and LU9BN11L or LU9MRL prewired connector	Requires separate 24 Vdc power supply	LULC08	218.00
Beckoff Communication	Allows the TeSys Ustarter to be connected to the network using the Beckoff protocol	Advanced or multi-function control units (24 Vdc only) and LU9BN11L or LU9MRL prewired connector	Requires separate 24 Vdc power supply	LULC14	218.00
Profibus Communication	Allows the TeSys U starter to be connected to the network using the Profibus protocol	Advanced or multi-function control units (24 Vdc only) and LU9BN11L or LU9MRL prewired connector	Requires separate 24 Vdc power supply	LULC07	218.00
DeviceNet™ Communication	Allows the TeSys U starter to be connected to the network using the Device Net protocol	Advanced or multi-function control units (24 Vdc only) and LU9BN11L or LU9MRL prewired connector	Requires separate 24 Vdc power supply	LULC09	218.00

✪ Communication capabilities can be integrated into existing automation architecture via a variety of protocols.
◪ See 18-29 for placement on the power base.

Configuration and Connection Accessories

Table 18.127: Control Circuit Accessories ◊

Accessory	Application	Technical Data	Mounting		Catalog Number	$ Price
Control circuit contact block	Switches control circuit power via LUB• handle (NEC430-74 compliance)	5 A at 600 Vac 5 A at 250 Vdc	Side mounting to LUB• and LU2B• only		LUA8E20	71.00
Through-the-door operating mechanism	Use to enclose TeSys LUB• only.	NEMA 1, 12 Black w/ trip indication	Kit		LU9APN21	140.00
		NEMA 1, 12 Red/Yellow w/ trip indication	Kit		LU9APN22	140.00
		NEMA 3R, 4, 4X Red/Yellow without trip indication	Kit		LU9APN24	161.00
Control circuit filters	Use with electronic or triac output controllers	Up to 150 Vac max.	Directly to coil terminals	Non-reversing	LUA4F11	39.30
				Reversing	LUA4F12	39.30
Angle bracket	Support shaft, for use with LUB•	—	—		GVAPK12	19.00

◊ See page 29 for placement on the power base.

Table 18.128: PowerSuite Configuration Software and Accessories

Item ▲	Catalog Number	$ Price ■
PowerSuite software	VW3A8104	225.00
PC connection kit	VW3A8106	113.00
Pocket PC connection kit	VW3A8111	143.00

▲ For complete details on all components included with each item, refer to catalog **8502CT0201**.
■ Items under discount schedule CP4C.

Powerbus

Table 18.129: GV2 Cabling Accessories—Bus Bars

Description	Application	Pitch	Standard Pack	Catalog Number	$ Price Each
3-Pole, 63 A Bus Bar	For feeding 2 GV2 starters or TeSys U controllers	45	1	GV2G245	23.30
		54	1	GV2G254	23.30
		72	1	GV2G272	23.30
	For feeding 3 GV2 starters or TeSys U controllers	45	1	GV2G345	28.70
		54	1	GV2G354	28.70
	For feeding 4 GV2 starters or TeSys U controllers	45	1	GV2G445	34.20
		54	1	GV2G454	34.20
		72	1	GV2G472	34.20
	For feeding 5 GV2 starters or TeSys U controllers	54	1	GV2G554	34.20

Additional accessories and components are available, including:

- Mounting accessories
- Gateways
- Cabling accessories
- Magelis™ remote display unit

For the complete line of TeSys U-Line motor starter accessories and all technical details (specifications, wiring diagrams, etc.) pertaining to the product line, refer to Catalog 8502CT0201.

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Altistart Drive and TeSys U Motor Starter

Table 18.130: Soft Start / Soft Stop Unit for 0.75 to 15 kW Motors (can be combined with the TeSys U starter)

Motor		Starter		
Motor Power▲		Nominal Current	Catalog Number	$ Price
230 V	460 V			
HP	HP	A		
3-phase supply voltage: 200 ... 480 V 50/60 Hz				
1	2	6	ATSU01N206LT	**133.00**
1.5	3			
2	5	9	ATSU01N209LT	**152.00**
3	7.5	12	ATSU01N212LT	**175.00**
5	10	22	ATSU01N222LT	**219.00**
7.5	15			
10	20	32	ATSU01N232LT	**300.00**

▲ Standard motor power ratings, HP power ratings indicated according to standard UL 508.

ATSU01••

Table 18.131: Accessories

Description	Used for Starter	Catalog Number	$ Price
Power connector between ATSU 01N2••LT and TeSys U	ATSU01N2••T	VW3G4104	**10.00**

Table 18.132: TeSys U Starter and Soft Start Unit Combinations

Motor Power		Soft Starter	TeSys U	
Voltage			Power Base	Control Unit ■
200 V	460 V			
HP	HP			
1	2	ATSU01N206LT	LUB 12	LUC•05BL
1.5	3	ATSU01N206LT		LUC•12BL
2	5	ATSU01N209LT		LUC•12BL
3	—	ATSU01N212LT		LUC•12BL
—	7.5	ATSU01N212LT		LUC •18BL
5	10	ATSU01N222LT		LUC•18BL
7.5	15	ATSU01N222LT	LUB 32	LUC•32BL
10	20	ATSU01N232LT		LUC•32BL

■ Depending on the configuration of the chosen TeSys U starter, replace the • with **A** for standard, **B** for advanced, and **M** for multifunction. See page 18-28 for a complete list of available control units. Control voltage must be 24 Vdc.

E231693
CCN NLDX

LR96921
Class 3211 06

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GV2ME

GV2P21 with GV2GH7 installed

GV3P

GV7RE20

New!

The GV family of products are 3-pole, horsepower rated, UL 508 listed manual starters. They include a manual disconnect, class 10 ambient-compensated thermal overload relay, and instantaneous, magnetic trip mechanism in one compact unit.

Any GV manual starter can be used alone for local manual control of a motor with individual full-load currents up to 220 A. The GV products may also be used in group motor installations in accordance with National Electric Code article 430-53. Group motor installations give you greater panel density for smaller size and require fewer parts and less wiring for installation when compared to conventional panel designs.

The GV2P and GV3P products also have an additional UL 508 type E rating as a stand-alone, self-protected manual combination starter. The UL 508 type E rating requires the addition of line side insulating barrier GV2GH7 for the GV2P, or GV3G66 for the GV3P. The GV2P and GV3P self-protected manual combination starters may also be combined with specific size contactors from the LC1D product family for a UL 508 Type F combination starter construction. These products have a UL-listed short circuit current rating from 10–100 kA depending on application size and voltage. See the Schneider Electric website for more information.

How to Order

To order a basic motor starter, select the model number (GV2ME••, GV2P••, or GV3P••) with the appropriate thermal setting from the table below. The thermal trip range and setting should be determined from the motor nameplate full-load current.

Table 18.133: GV2, GV3

Thermal Setting (A)	Maximum Horsepower Ratings								Group Motor Applications	GV2/3M push button		GV2/3P rotary handle	
	1 Ø			3 Ø									
	120 V hp	208 V hp	240 V hp	120 V hp	208 V hp	240 V hp	480 V hp	600 V hp	Max. Fuse or Circuit Breaker	Catalog Number	$ Price	Catalog Number	$ Price
0.11–0.16	—	—	—	—	—	—	—	—	450 A	GV2ME01▲	**159.**	GV2P01	**212.**
0.16–0.25	—	—	—	—	—	—	—	—	450 A	GV2ME02▲	**159.**	GV2P02	**212.**
0.25–0.40	—	—	—	—	—	—	—	—	450 A	GV2ME03▲	**159.**	GV2P03	**212.**
0.40–0.63	—	—	—	—	—	—	—	—	450 A	GV2ME04▲	**180.**	GV2P04	**233.**
0.63–1	—	—	—	—	—	—	—	0.5	450 A	GV2ME05▲	**180.**	GV2P05	**233.**
1–1.6	—	—	1/10	—	—	—	0.75	0.75	450 A	GV2ME06▲	**180.**	GV2P06	**233.**
1.6–2.5	—	1/6	1/6	—	0.5	0.5	1	1.5	450 A	GV2ME07▲	**180.**	GV2P07	**233.**
2.5–4	1/8	0.25	1/3	—	0.75	0.75	2	3	450 A	GV2ME08▲	**180.**	GV2P08	**233.**
4–6.3	0.25	0.5	0.5	0.75	1	1.5	3	5	450 A	GV2ME10▲	**180.**	GV2P10	**233.**
6–10	0.5	1	1.5	1	2	3	5	7.5	450 A	GV2ME14▲	**180.**	GV2P14	**233.**
9–14	0.75	2	2	2	3	3	10	10	450 A	GV2ME16▲	**224.**	GV2P16	**278.**
13–18	1	2	3	2	5	5	10	15	450 A	GV2ME20▲	**224.**	GV2P20	**278.**
17–23	1.5	3	3	3	5	7.5	15	20	450 A	GV2ME21▲	**224.**	GV2P21	**278.**
20–25	2	—	—	—	7.5	7.5	15	20	450 A	GV2ME22▲	**224.**	GV2P22	**278.**
24–32	2	5	5	5	7.5	10	20	25	450 A	GV2ME32	**224.**	GV2P32	**278.**
9–13	0.5	—	1.5	—	3	3	7.5	10	—	—	—	GV3P13	**404.**
12–18	0.75	—	2	—	5	5	10	15	—	—	—	GV3P18	**404.**
17–25	1.5	—	3	—	5	7.5	15	20	—	—	—	GV3P25	**404.**
23–32	2	—	5	—	7.5	10	20	25	—	—	—	GV3P32	**404.**
30–40	3	—	—	—	10	—	25	30	—	—	—	GV3P40	**504.**
37–50	—	—	7.5	—	10	15	30	40	—	—	—	GV3P50	**504.**
48–65	5	—	10	—	15	20	40	50	—	—	—	GV3P65	**504.**

▲ For spring terminals add **3** to the catalog number (for example, GV2ME01**3**). GV2ME32 is not available with spring terminals. For ring terminals, add **6**.

Table 18.134: GV7

Thermal Setting (A)	Maximum Horsepower Ratings						Toggle Operator			
	1 Ø		3 Ø				Standard Interrupt		High Interrupt	
	115 V hp	230 V hp	200 V hp	230 V hp	460 V hp	575 V hp	Catalog Number	$ Price	Catalog Number	$ Price
12–20	—	—	—	5	10	15	GV7RE20	**417.**	GV7RS20	**813.**
15–25	—	—	—	7.5	15	20	GV7RE25	**417.**	GV7RS25	**813.**
25–40	—	—	—	10	30	30	GV7RE40	**417.**	GV7RS40	**813.**
30–50	—	—	—	15	30	40	GV7RE50	**417.**	GV7RS50	**813.**
48–80	—	—	—	30	60	75	GV7RE80	**417.**	GV7RS80	**813.**
60–100	—	—	—	30	75	100	GV7RE100	**456.**	GV7RS100	**891.**
90–150	—	—	—	50	100	150	GV7RE150	**502.**	GV7RS150	**978.**
132–220	—	—	—	75	150	200	GV7RE220	**502.**	GV7RS220	**978.**

Specifications: page 18-36
Accessories: pages 18-34 to 18-35
Dimensions: pages 18-52 to 18-55

Motor Protector Circuit Breakers

Motor protector circuit breakers provide built-in thermal and magnetic protection. They are used in two-device motor feeder solutions to provide protection against short circuits, overloads, and phase imbalance.

Table 18.135: Two-Device Solutions—Electronic Motor Protector Circuit Breakers with UL Ratings: H-Frame (150A), J-Frame (250 A), and L-Frame (600 A)■ (refer to discount schedule DE2)

Electronic Trip Unit Type	Frame	Sensor Rating	Trip Unit	Full Load Ampere Rating (FLA)	Isd (x FLA)	G Interrupting		J Interrupting		L Interrupting	
						Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Standard♦	H-Frame	30	2.2 M	14-25	5-13 x FLA	HGL36030M38X	**1608.**	HJL36030M38X	**1658.**	HLL36030M38X	**1812.**
		50		14-42	5-13 x FLA	HGL36050M38X	**1938.**	HJL36050M38X	**1998.**	HLL36050M38X	**2191.**
		100		30-80	5-13 x FLA	HGL36100M38X	**2229.**	HJL36100M38X	**2298.**	HLL36100M38X	**2506.**
		150		58-130	5-13 x FLA	HGL36150M38X	**2701.**	HJL36150M38X	**2785.**	HLL36150M38X	**3057.**
	J-Frame	250		114-217	5-13 x FLA	JGL36250M38X	**3105.**	JJL36250M38X	**3201.**	JLL36250M38X	**3253.**
	L-Frame	400	2.3 M	190-348	5-13 x FLA	LGL36400M38X	**6041.**	LJL36400M38X	**6160.**	LLL36400M38X	**6468.**
		600		312-520	5-13 x FLA	LGL36600M38X	**8429.**	LJL36600M38X	**8604.**	LLL36600M38X	**9156.**

■ Two-device solutions (these electronic motor protector circuit breakers include short circuit and overload protection):
—1 contactor, plus
—1 electronic motor circuit protector with a Micrologic 2.2 M

♦ The standard trip unit offers Class 5, 10, and 20 and phase unbalance or phase loss protection.

E164864
CCN NLRV

LR81630
Class 3211 05

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GVAU116

Table 18.136: Voltage Trips

Only one trip or fault signaling contact can be installed per GV2/GV3 device.					
Description	**Characteristics**	**Voltage**	**Frequency**	**Catalog Number▲**	**$ Price**
Voltage trips GV2 & GV3P	Undervoltage or Shunt trip (external mounting, 1 block right side only)	24 V	50 Hz	GVA•025	
			60 Hz	GVA•026	
		48 V	50 Hz	GVA•055	
			60 Hz	GVA•056	
		100–110 V	50/60 Hz	GVA•107	
		110–115 V	50 Hz	GVA•115	
			60 Hz	GVA•116	
		120–127 V	50 Hz	GVA•125	
		127 V	60 Hz	GVA•115	
		200 V	50 Hz	GVA•207	
		200–220 V	60 Hz	GVA•207	**81.00**
		220–240 V	50 Hz	GVA•225	
			60 Hz	GVA•226	
		380–400 V	50 Hz	GVA•385	
			60 Hz	GVA•386	
		415–440 V	50 Hz	GVA•415	
		415 V	60 Hz	GVA•416	
		440 V	60 Hz	GVA•385	
		480 V	60 Hz	GVA•415	
		500 V 600 V	50 Hz 60 Hz	GVA•505	

▲ To order an undervoltage trip: replace the bullet (•) with a **U** (for example, GVA**U**025).
To order a shunt trip: replace the bullet (•) with an **S** (for example, **GVAS025**).

GVAE11

Table 18.137: Auxiliary Contact Blocks

Description	Mounting Location	Max. No. of Blocks	Contact Type	Sold in lots of	Catalog Number	$ Price
Instantaneous auxiliary contacts GV2 + GV3P	Front■□	1	N.O. or N.C.♦	1	GVAE1	**21.80**
			N.O. + N.C.	10	GVAE11▼	**35.70**
			N.O. + N.O.	1	GVAE20▼	**35.70**
	Left Hand Side	2	N.O. + N.C.	1	GVAN11▼	**35.70**
			N.O. + N.O.	1	GVAN20▼	**35.70**
Fault signaling contact + instantaneous auxiliary contact GV2 + GV3P	Left Hand Side★	1	N.O. (fault) + N.O.	1	GVAD1010	**54.00**
			N.O. (fault) + N.C.	1	GVAD1001	**54.00**
			N.C. (fault) + N.O.	1	GVAD0110	**54.00**
			N.C. (fault) + N.C.	1	GVAD0101	**54.00**
Short circuit signaling contact GV2 + GV3P	Left Hand Side	1	SPDT	1	GVAM11	**35.70**

■ Mounting of a **GVAE** contact block or a **GV2AK00** visible isolation block on **GV2P**.
♦ Choice of N.C. or N.O. contact operation, depending on which way the reversible block is mounted.
★ The **GVAD** is always mounted next to the starter.
▼ For spring terminals, add **3** to the catalog number (for example, **GVAE113**).
△ One trip or one fault signaling can be fitted per GV3.
□ Cannot be used with **GV2GH7** insulator.

GVAD0101

Table 18.138: Voltage Trips–Technical Data (GV2AU, GV2AS)

Rated Voltage—660 Vac					
Model	**Inrush**	**Sealed**	**Pick-Up Voltage**	**Drop-Out Voltage**	**Operating Time◊**
GVAU	12 VA / 8 W	3.5 VA / 1.1 W	0.8—1.1	0.35—0.7	10—15 ms
GVAS	14 VA / 10.5 W	5 VA / 1.6 W	0.7—1.1	0.2—0.75	10—15 ms

◊ From the loss of voltage at the trip terminals to the opening of the starter contacts.

Table 18.139: GV3P Accessories

Accessory	Application / Use With	Catalog Number	$ Price
Through-the-door operating mechanism (Qty: 1)	NEMA 1, 12, Black with trip indication, for use with GV3P	GV3APN01	**136.00**
	NEMA 1, 12, Red/Yellow, with trip indication, for use with GV3P	GV3APN02	**136.00**
	NEMA 3R, 4, 4X Red/Yellow without trip indication, for use with GV3P	GV3APN04	**149.00**
Angle bracket (Qty: 1)	Support shaft, for use with GV2P and GV3P	GVAPK12	**19.00**
Hard bracket (Qty: 1)	—	GVAPH03	**30.00**
Set of 3-pole 115 A busbars (tap-offs: 2, pitch: 64 mm)	GV3P••	GV3G264	**25.00**
Set of 3-pole 115 A busbars (tap-offs: 3, pitch: 64 mm)	GV3P••	GV3G364	**45.00**
Cover "Larger Spacing" UL 508 type E (Only one cover required on supply side)	GV3P••	GV3G66	**18.00**
IP 20 cover (Two covers required per starter)	GV3P••	LAD96570	**12.00**
Padlocking device For use with up to 4 padlocks (not supplied) Ø 6 mm shank maximum	GV3P•• GV3P•••	GV2V03	**15.00**

GVAN11

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GV7AC01

Table 18.140: Auxiliary Contact Blocks (auxiliary contact functions depends on location inside the device)

Description	Mounting Location	Max. No. of Blocks	Contact Type	Catalog Number	$ Price
Standard					
Instantaneous	Inside Device	2 per device	N.O. + N.C.	GV7AE11	35.70
Trip Indication		1 per device	N.O. + N.C.		
Fault Indication		1 per device	N.O. + N.C.		
Low Level					
Instantaneous	Inside Device	2 per device	N.O. + N.C.	GV7AB11	35.70
Trip Indication		1 per device	N.O. + N.C.		
Fault Indication		1 per device	N.O. + N.C.		

GV7RE20

Table 18.141: Voltage Trips

Description	Mounting Location	Max. No. of Blocks	Voltage		Catalog Number	$ Price
Undervoltage Trip	Inside Device	1 per device	48 Vac	50 Hz	GV7AU055	64.00
			110–130 Vac	50/60 Hz	GV7AU107	
			200–240 Vac	50/60 Hz	GV7AU207	
			380–440/480 Vac	50/60 Hz	GV7AU387	
			525 Vac	50 Hz	GV7AU525	
Shunt Trip	Inside Device	1 per device	48 Vac	50 Hz	GV7AS055	64.00
			110–130 Vac	50/60 Hz	GV7AS107	
			200–240 Vac	50/60 Hz	GV7AS207	
			380–440/480 Vac	50/60 Hz	GV7AS387	
			525 Vac	50 Hz	GV7AS525	
Fault Indication	Inside Device	1 per device	24–130		GV7AD111	72.00
			110–415		GV7AD112	

GV7AD111

Table 18.142: Wiring Accessories

Description	Application	Catalog Number	$ Price
Box Lugs	Sold in lots of 3 for GV7R•20–150☆	GV7AC021	19.70 each
	Sold in lots of 3 for GV7R•220☆	GV7AC022	24.90 each
Phase Barriers, Bus Bars & Shrouds			
Terminal Extension Kit	Increases center distance between phases to 45 mm	GV7AC03	46.70
Terminal Shroud Kit	Covers terminal connections for touch safe protection	GV7AC01	41.90
Phase Barriers	Provides maximum phase separation at connection points	GV7AC04	31.10
Insulating Barriers	Provides insulation between connectors and backplate	GV7AC05	24.90
Busbars and Covers	Connect to LC1F115–185 contactor	GV7AC06	46.70
	Connect to LC1F225–265 contactor	GV7AC07	46.70
Operating Handles and Accessories			
Black rotary operating handle with black legend plate (mounts directly on device)		GV7AP03	86.00
Red rotary operating handle with yellow legend plate (mounts directly on device)		GV7AP04	86.00
Conversion accessory to mount the device directly on panel door		GV7AP05	14.00
Black rotary operating handle with black legend plate and extension kit (185–600 mm)		GV7AP01	102.00
Red rotary operating handle with yellow legend plate and extension kit (185–600 mm)		GV7AP02	102.00
Padlocking device for toggle handle (max. 38 mm padlocks)		GV7V01	14.00

☆ Wire size: GV7AC021 = 14 to 3/0 AWG; GV7AC022 = 14 AWG to 350 kcmil.

GV7AS055

GV7AP03

Table 18.143: Operating Handles
For use with GV2, GV3, and TeSys U through-the-door operating mechanisms

Accessory	Description	Catalog Number	$ Price
Operating Handle (Qty: 1)	NEMA 1, 12, Black with trip indication	GVAPB54	31.00
	NEMA 1, 12, Red/Yellow, with trip indication	GVAPR54	31.00
	NEMA 3R, 4, 4X Red/Yellow without trip indication	GVAPR65	37.00

GVAPB54

Dimensions . . . . . pages 18-52 to 18-55

GVAPR54

GV7AC021

GV7V01

GV7AE11

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- 45 mm wide (same dimensions as GV2ME)
- Available with screw clamp and spring type terminals
- Mounts directly to LC1D09–D32 contactors (with use of GV2AF3 or GV2AF4)
- Meets application needs for fusible starter
- Uses GV2AE instantaneous contact blocks to open control circuits
- DIN rail mounted

LS1D30

Table 18.144: LS1 Fuseholders

Description	Fuse Type	Dimensions		Use In	Catalog Number	$ Price
		in.	mm			
Spring terminals, 3-pole	CC, KTK-R	0.41 x 1.5	10.3 x 38	US Markets	LS1D303	**86.**
Screw clamp terminals, 3-pole	CC, KTK-R	0.41 x 1.5	10.3 x 38	US Markets	LS1D30	**86.**
Spring terminals, 3-pole	aM, gG	0.39 x 1.5	10 x 38	European Markets	LS1D323	**101.**
Screw clamp terminals, 3-pole	aM, gG	0.39 x 1.5	10 x 38	European Markets	LS1D32	**86.**
Auxiliary main pole adder	aM, gG	0.39 x 1.5	10 x 38	European Markets	LA8D324▲	**65.**

▲ Can be mounted on left-hand or right-hand side of the 3-pole LS1D32 block.

Table 18.145: Specifications

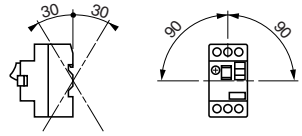
Type	LS1D30, LS1D303	LS1D32, LS1D323, LS1DT32
Max. voltage	600 V 3 Phase	
Max. current	30 A	
Conforming to standards	IEC 60947-1, 60947-2, 60947-4-1, EN60204, BS4841, UL 508, CSA 222.2 No. 14, NFC 63-650, 63-120, 79-130, VDE 0113, 0660	
Product approvals	UL, CSA	BV
Protective treatment	"TH"	"TH"
Ambient air temperature—operation	-58 to 158° F (-50 to +70° C)	
Wiring	**Number of conductors and cross sectional area (c.s.a.)**	
Solid cable	2 x 16–8 AWG (1–6 mm^2)	
Flexible cable without cable end	2 x 14–8 AWG (1–6 mm^2)	
Flexible cable with cable end	2 x 16–10 AWG (1–4 mm^2)	
Resistance to mechanical impact conforming to IEC 60947-1 §7-1-6	0.5 J	
Tightening torque	15 in-lb (1.7 N•m)	
Sensitivity to phase failure	No	
Operating Positions		
Rated voltage—600 V	600 V	
Rated thermal current	25 A (GV2), 63 A (GV3)	
Mechanical life (varies by application)	GV2: 100,000 operations	

Table 18.146: Environmental Specifications and Approvals

Shock resistance	30 g (conforming to IEC 600 68-2-27)
Vibration resistance	5 g (5 to 150 Hz) (IEC 600 68-2-26)
Ambient temperature	–40 to 176 °F (–40 to +80 °C) for storage –4 to 140 °F (–20 to +60 °C) open operation –4 to 104 °F (–20 to +40 °C) enclosed operation
Maximum operating rate	25 operations per hour
Operating current of magnetic trip	Approximately 13 times the maximum thermal trip (non-adjustable setting)

File E164864
CNN NLRV

File LR81630
Class 3211 05

CE

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GV2GH7

Table 18.147: GV2 Mounting Accessories

Description	Application	Standard Pack ■	Catalog Number	$ Price
Common mounting plate	For GV2 plus any 3-pole LC1D09 thru LC1D25 contactor. (supplied with GV1G02 connector)	1	GK2AF01	**21.60**
Adapter plate	For screw mounting of GV2M	10	GV2AF02	**7.10**
Combination block	Interconnect for GV2 plus any 3-pole LC1K or LP1K contactor	10	GV2AF01	**14.00**
	Interconnect GV2 and LC1D09 thru D32	10	GV2AF3	**3.20**
	Interconnect GV2 and LC1D09 thru D32 mounted on LAD31	10	GV2AF4	**3.20**
7.5 mm compensation plate	To allow mounting of GV2M and GV2P on a common bus bar	10	GV1F03	**5.40**
Mounting plate	For mounting GV2ME or GV2P and contactor LC1D09 thru D32	10	LAD31	**6.20**
		10	LAD311	**12.30**

Table 18.148: GV2 Cabling Accessories—Bus Bars

Description	Application	Pitch	Standard Pack ■	Catalog Number	$ Price
3-Pole, 63 A Bus Bar	For feeding 2 GV2 starters	45	1	GV2G245	**23.30**
		54	1	GV2G254	**23.30**
		72	1	GV2G272	**23.30**
	For feeding 3 GV2 starters	45	1	GV2G345	**28.70**
		54	1	GV2G354	**28.70**
	For feeding 4 GV2 starters	45	1	GV2G445	**34.20**
		54	1	GV2G454	**34.20**
		72	1	GV2G472	**34.20**
	For feeding 5 GV2 starters	54	1	GV2G554	**34.20**

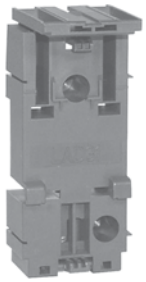

LAD31

Table 18.149: GV2 Other Cabling Accessories

Description	Application	Standard Pack ■	Catalog Number	$ Price
Terminal blocks	Top feed for use with bus bars	1	GV1G09	**34.20**
	Bottom feed, to be used with bus bars; can be fitted with GV1L3 current limiter	1	GV2G05	**34.20**
Protective end cover	To cover unused bus bar outlets	5	GV1G10	**3.60**
3-pole flexible connector	For connecting a GV2 to an LC1D09 thru D25 contactor	10	GV1G02	**14.30**
Conduit adapter (1/2" NPT)	—	1	GV2AK1	**16.20**
Incoming line insulator	For GV2P when used in UL 508 Type E applications▲	10	GV2GH7	**15.00**

▲ Cannot be used with front-mounted auxiliary contact block.

Table 18.150: GV2 Other Accessories

Description	Application	Standard Pack ■	Catalog Number	$ Price
Visible isolation block—GV2P	Front mounting, 3-pole visible isolation on incoming side of GV2P	1	GV2AK00	**71.40**
Current limiter—GV2M	Increases interrupt capacity when attached to GV2M	1	GV1L3	**117.00**
Through-the-door operating mechanism	NEMA 1, 12, Black with trip indication, for use with GV2P	1	GV2APN01	**131.00**
	NEMA 1, 12, Red/Yellow with trip indication, for use with GV2P	1	GV2APN02	**131.00**
	NEMA 3R, 4, 4X, Red/Yellow without trip indication, for use with GV2P	1	GV2APN04	**144.00**
Angle bracket	Support shaft, for use with GV2P	1	GVAPK11	**19.00**
Hard bracket	—	1	GVAPH02	**30.00**

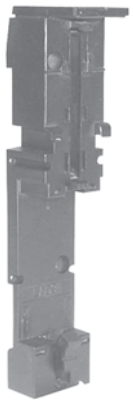
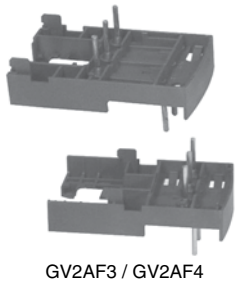

LAD311

Table 18.151: GV2 Enclosures

Description	Mounting	Rating	Catalog Number	$ Price
Enclosures for GV2M with or without accessories (maximum of 1 accessory on right and left) Enclosures are not UL or CSA listed.	Surface mounting	NEMA 1, IP41 IP55	GV2MC01 GV2MC02	**54.00** **78.00**
	Flush mounting	NEMA 1, IP41 IP55	GV2MP01 GV2MP02	**31.10** **54.00**
	Flush mounting reduced width (max. of 1 accessory on right)	NEMA 1, IP41 IP55	GV2MP03 GV2MP04	**27.90** **49.70**

Table 18.152: GV2 Enclosures Accessories

Description	Type		Standard Pack■	Catalog Number	$ Price
Padlocking device for GV2M (when padlocked, starter is automatically in Off position)	—		1	GV2V01	**26.90**
Mushroom head stop push button (40 mm, red) ♦	Spring return		1	GV2K011	**35.90**
	Latching	Key release (Ronis key no. 455)	1	GV2K021	**104.00**
		Turn to Release	1	GV2K031	**52.00**
	Latching / Padlockable Turn to Release		1	GV2K04	**117.00**
Sealing kit	For enclosures GV2MC01 and GV2MP01		10	GV2E01	**18.00**
Pilot Light (neon)	110 V	Green	10	GV2SN13	**26.90**
	110 V	Red	10	GV2SN14	
	110 V	Orange	10	GV2SN15	
	110 V	White	10	GV2SN17	
	220/240 V	Green	10	GV2SN23	
	220/240 V	Red	10	GV2SN24	
	220/240 V	Orange	10	GV2SN25	
	220/240 V	White	10	GV2SN27	
	380/440 V	Green	10	GV2SN33	
	380/440 V	Red	10	GV2SN34	
	380/440 V	Orange	10	GV2SN35	
	380/440 V	White	10	GV2SN37	


GV2AF3 / GV2AF4

■ Orders must specify multiples of quantities listed.
♦ Supplied with IP55 sealing kit.

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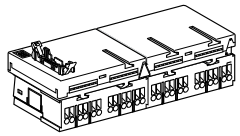
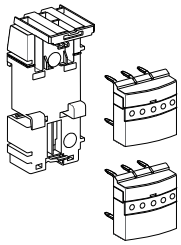
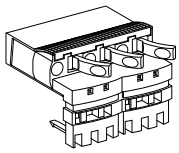
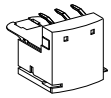

APP2R4H1


LAD35


LAD3B


LAD33

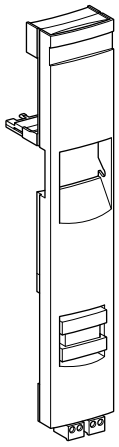

APP2D1•

Table 18.153: Splitter Boxes

A total of up to eight starters is permissible after extensions. Use multiple quantities of the same catalog number to create the desired line-up.

Description	Type of Control-Command Connection on Control System Side	No. of I/O per Starter	No. of Starters per Unit	Catalog Number	$ Price
50 A power splitter box	—	—	2	LAD322	**52.00**
			4	LAD324	**93.00**
50 A power and control splitter box	1 x HE10 8I/8O	1I/1O	4	APP2R4H1	**124.00**
	1 x HE10 16I and 1 x HE10 8O	2I/1O	4	APP2R4H2	**124.00**
	via module APP1C••• ▲	—	2	APP2R2E	**124.00**
			4	APP2R4E	**124.00**
	AS-Interface	2I/1O	2	APP2R2AS	**124.00**
		1I/1O	4	APP2R4AS	**124.00**

▲ Connection to an APP1C••• module via APP2CX adapter (LAD35).

Table 18.154: Power Connection Components for One Starter

Description	Kit Consists Of:	Catalog Number	$ Price
Assembly and power connection kit	One LAD31 plate for GV2ME and two LAD34 power connection modules	LAD351	**21.00**
Reversing kit ■	One set of bus bars and one mechanical interlock	LAD32	**20.70**

■ To create a TeSys D reverser, use two LC1D contactors, one assembly and power connection kit, and one reversing kit.

Table 18.155: Power Connection Accessories for One Starter

Description	Max. Connection Cross-Section	Use	Catalog Number	$ Price
Upstream terminal block (50 A max)	16 mm^2 (6 AWG)	Power supply for one or two power splitter boxes	LAD3B	**83.00**
Downstream terminal block (50 A max)	6 mm^2 (10 AWG)	Connection of motor cables	LAD331	**5.00**

Table 18.156: Control Connection Module for One Starter

Description	D-Line Coil Voltage	Type of Coil Control Relay	Type of Starter	Catalog Number	$ Price
Control connection module (integrating contact block GVAE20)	12–240 Vac or 24–125 Vdc	Electromechanical ♦	Non-reversing	APP2D1	**41.40**
			Reversing	APP2D2	**72.00**
	24–48 Vdc	Without relay ★	Non-reversing	APP2D1D	**31.10**
			Reversing	APP2D2D	**31.10**

♦ Relay supplied mounted on the front panel of the control connection.
★ The use of TeSys D low consumption contactors is recommended.

Table 18.157: Spare or Replacement Parts

Description	Type of Control-Command Connection on Control System Side	No. of I/O per Starter	No. of Starters	Sold in Lots of	Catalog Number	$ Price
Plate for mounting a GV2ME manual starter	—	—	1	10	LAD31	**6.20**
			1	10	LAD311	**12.30**
Power connection module	—	—	1	10	LAD341	**7.50**
Control-command splitter box (single, for mounting on a power splitter box)	1 x HE10 8I/8O	1I/1O	4	1	APP2R4H3	**11.30**
	1 x HE10 16I and 1 x HE10 8O	2I/1O	4	1	APP2R4H4	**11.30**
	Per module APP1C••• ▼	—	2	1	APP2R2C	**11.30**
			4	1	APP2R4C	**11.30**
	AS-Interface	2I/1O	2	1	APP2R2A	**11.30**
		1I/1O	4	1	APP2R4A	**11.30**
Replacement electromechanical relay (for control connection module)		—	1	10	APP2ER	**7.50**

▼ Connection to an APP1C••• module via APP2CX adapter (LAD35).

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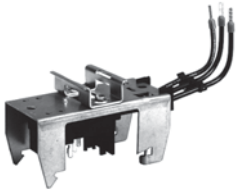
The AK5 pre-fabricated bus bar system provides a quick and easy method of mounting control devices. All components are finger safe, UL Listed, CSA approved and CE marked. Although the AK5 system can be screw mounted onto any type of support, it **must be mounted** on the AM1DL201 DIN rail when component mounting plates incorporating a tap-off are used. When using tap-offs, the nominal operating current of the bus bar (160 A @ 35°) must not be exceeded.

AK5JB143

Table 18.158: 160 A, 3-Phase Busbar System

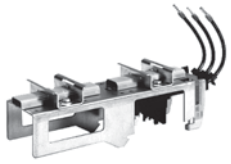
Maximum number of mounting plates						Length		Catalog Number	$ Price
Tap-off		Standard Width Plate		Extension Plate					
1.42 in.	36 mm	2.13 in.	54 mm	2.80 in.	71 mm	in.	mm		
6		4		2		13.39	344	AK5JB143	**210.00**
9		6		3		17.64	452	AK5JB144	**266.00**
12		8		4		21.85	560	AK5JB145	**286.00**
15		10		5		26.05	668	AK5JB146	**345.00**
24		16		8		38.69	992	AK5JB149	**393.00**
27		18		9		42.90	1100	AK5JB1410	**540.00**



AK5PA231

Table 18.159: Mounting Plate Tap-off (plugs into busbar mounted on AM1DL201 DIN rail)

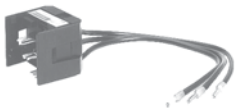
Width		Thermal Current Amperes	Application		Catalog Number	$ Price
in.	mm					
2.13	54	25 A	GV2 with	LUS or LUB 12 and 32	AK5PA231	**98.00**
2.13	54	25 A		contactor	AK5PA232	**120.00**
4.25	108	25 A		reversing contactor	AK5PA232S	**206.00**



AK5PA232S

Table 18.160: Bus Tap-off (plugs into busbar for wiring to a separately mounted device)

Width		Thermal Current Amperes	Length of Leads		Catalog Number	$ Price
in.	mm		in.	mm		
1.42	36	32 A	9.84	250	AK5 PC33	**23.00**
1.42	36	32 A	39.37	1000	AK5 PC33L	**37.80**



AK5PC33

Table 18.161: Extension Plates

Used to mount wider components. Bolt to standard mounting plates (after DIN rails are removed).

Width		Application	Catalog Number	$ Price
in.	mm			
2.80	71	GV & Reversing contactor	AK5PE27	**26.30**

Table 18.162: Mounting Rail (must be used for mounting plates with tap-offs)

Description	Depth	Length	Catalog Number	$ Price
	mm	mm		
75 mm Omega Rail	15	2000	AM1DL201	**41.10**

AM1DL201

Table 18.163: Approvals: IEC 439, UL, CSA, DNV, LROS

File E161251
CCN NMTR

File LR 89150
Class 6228-01

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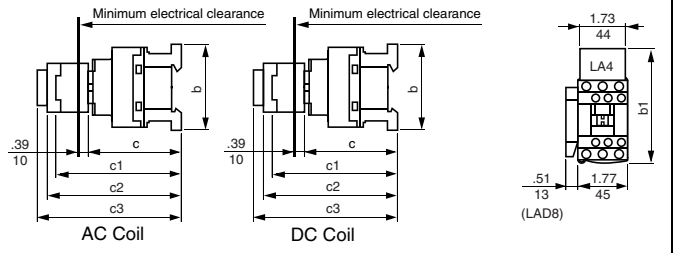
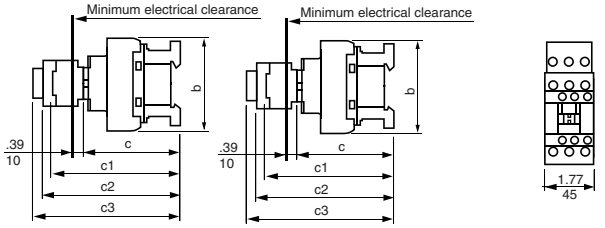
Table 18.164: TeSys D Contactors AC Control Circuits

LC1D09 to D18 (3-pole) and LC1DT12 to LC1DT40 (4 pole)



LC1D25 to D38 (3-pole)

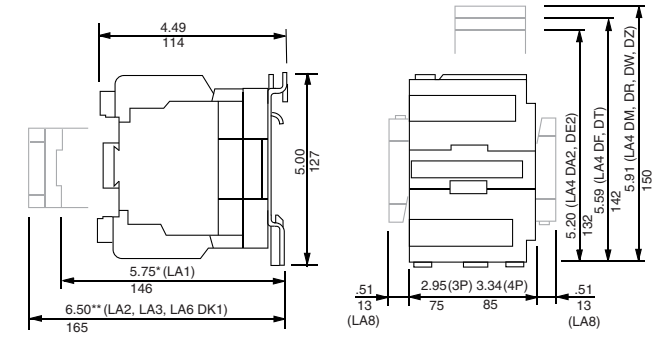


b	AC coil, without add-on accessories	3.03 (77)	3.89 (99)	3.14 (80)	3.36 (85)	3.89 (99)	3.34 (85)	3.89 (99)	3.58 (91)	4.13 (105)
	DC coil	—	—	—	—	—	—	—	—	—
b1	AC coil, with LAD4BB ■	3.70 (94)	4.21 (107)	3.75 (95.5)	3.85 (98)	4.21 (107)	3.85 (98)	—	—	—
	AC coil, with LA4D*2 ■	4.33 (110) ▲	4.84 (123) ▲	4.30 (111.5) ▲	4.48 (114) ▲	4.84 (123) ▲	4.48 (114)	—	—	—
	AC coil, with LA4DF, DT ■	4.68 (119) ▲	5.19 (132) ▲	4.76 (120.5) ▲	4.84 (123) ▲	5.19 (132) ▲	5.02 (129)	—	—	—
	AC coil, with LA4DR, DW, DL ■	4.96 (126) ▲	5.67 (139) ▲	5.0 (127.5) ▲	5.11 (130) ▲	5.47 (139) ▲	7.48 (190)	—	—	—
c	AC coil, without cover or add-on blocks	3.30 (84)	3.30 (84)	3.30 (84)	3.54 (90)	3.54 (90)	3.54 (90)	3.54 (90)	3.85 (98)	3.85 (98)
	AC coil, with cover, without add-on blocks	3.38 (86)	3.38 (86)	3.38 (86)	3.62 (92)	3.62 (92)	3.62 (92)	3.62 (92)	3.93 (100)	3.93 (100)
	DC coil, without cover or add-on blocks	3.66 (93)	3.66 (93)	3.66 (93)	3.89 (99)	3.89 (99)	—	—	—	—
	DC coil, with cover, without add-on blocks	3.76 (95)	3.76 (95)	3.76 (95)	3.97 (101)	3.97 (101)	3.90 (99)	3.90 (99)	4.21 (107)	4.21 (107)
c1	AC coil, with LADN or C (two or four contacts)	4.60 (117)	4.60 (117)	4.60 (117)	4.84 (123)	4.84 (123)	4.84 (123)	4.84 (123)	5.15 (131)	5.15 (131)
	DC coil, with LADN or C (two or four contacts)	4.96 (126)	4.96 (126)	4.96 (126)	5.19 (132)	5.19 (132)	4.84 (123)	4.84 (123)	5.15 (131)	5.15 (131)
c2	AC coil, with LAD6K10	5.07 (129)	5.07 (129)	5.07 (129)	5.31 (135)	5.31 (135)	5.31 (135)	5.31 (135)	5.62 (143)	5.62 (143)
	DC coil, with LAD6K10	5.43 (138)	5.43 (138)	5.43 (138)	5.66 (144)	5.66 (144)	5.31 (135)	5.31 (135)	5.62 (143)	5.62 (143)
c3	AC coil, with LADT,R,S	5.39 (137)	5.39 (137)	5.39 (137)	5.62 (143)	5.62 (143)	5.62 (143)	5.62 (143)	5.94 (151)	5.94 (151)
	AC coil, with LADT,R,S and sealing cover	5.55 (141)	5.55 (141)	5.55 (141)	5.78 (147)	5.78 (147)	5.78 (147)	5.78 (147)	6.10 (155)	6.10 (155)
	DC coil with LADT,R,S	5.76 (146)	5.76 (146)	5.76 (146)	5.98 (152)	5.98 (152)	5.62 (143)	5.62 (143)	5.94 (151)	5.94 (151)
	DC coil with LADT,R,S and sealing cover	5.90 (150)	5.76 (146)	5.76 (146)	6.14 (156)	6.14 (156)	5.78 (147)	5.78 (147)	6.10 (155)	6.10 (155)

▲ Including LAD4BB
■ Not applicable to devices with DC coils

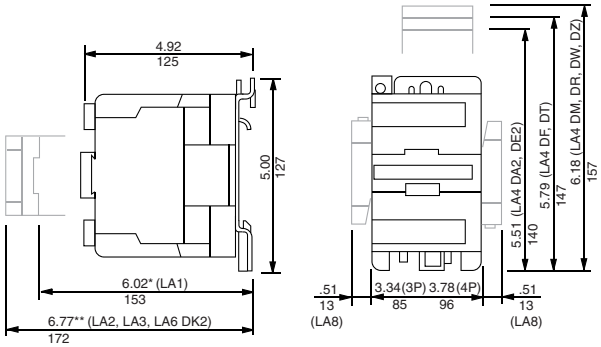
Table 18.165: AC Coil

LC1D40, D50, D65 (3P), LC1D65004 (4P)



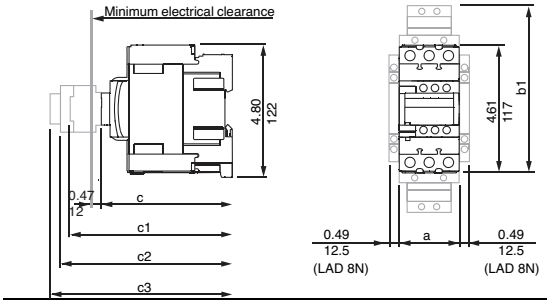
*except LA1DN10, DN01 = 136
** +4 mm with lead sealing device

LC1D80004 (4P)



*except LA1DN10, DN01 = 136
** +4 mm with lead sealing device

LC1 D40A–D65A (3P), LC1 DT60A–DT80A (4P) AC OR DC



LC1		D40A–D65A in. (mm)	DT60A–DT80A in. (mm)	D40008 in. (mm)
a		2.17 (55)	2.76 (70)	3.35 (85)
b1	with LA4 D•2	—	—	5.31 (135)
	with LA4 DB3 or LAD 4BB3	5.35 (136)	—	—
	with LA4 DF, DT	6.18 (157)	—	5.59 (142)
	with LA4 DM, DW, DL	6.54 (166)	—	5.91 (150)
c	without cover or add-on blocks	4.65 (118)	4.65 (118)	4.92 (125)
	with cover, without add-on blocks	4.72 (120)	4.72 (120)	—
c1	with LAD N (1 contact)	—	—	5.47 (139)
	with LAD N or C (2 or 4 contacts)	5.91 (150)	5.91 (150)	5.79 (147)
c2	with LAD 6K10 or LA6 DK	6.42 (163)	6.42 (163)	6.26 (159)
c3	with LAD T, R, S	6.73 (171)	6.73 (171)	6.57 (167)
	with LAD T, R, S and sealing cover	6.89 (175)	6.89 (175)	6.73 (171)

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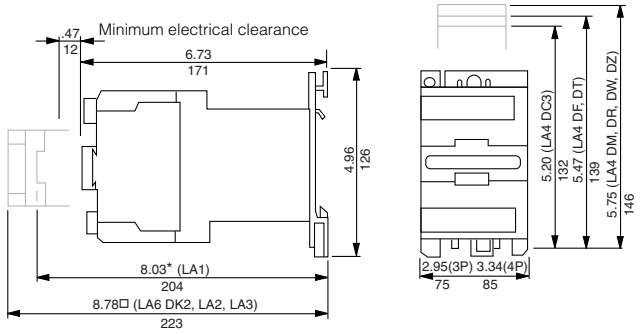
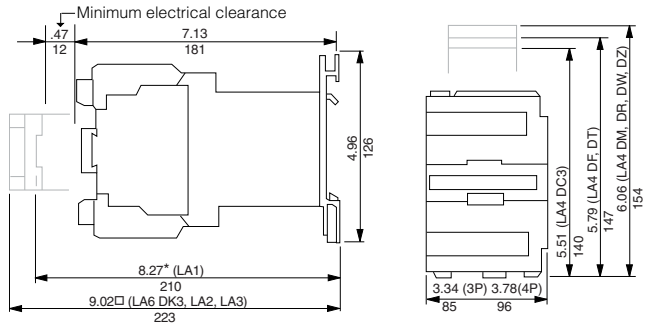
Table 18.166: DC Coil

LC1D40, D50, D65 (3P), LC1D650004, (4P)



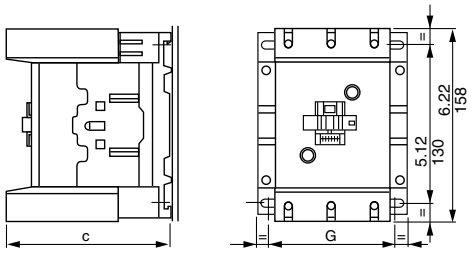
*except LA1DN10, DN01 = 136
□ + 4 mm with lead sealing device

LC1D80 (3P), LC1D800004(4P)



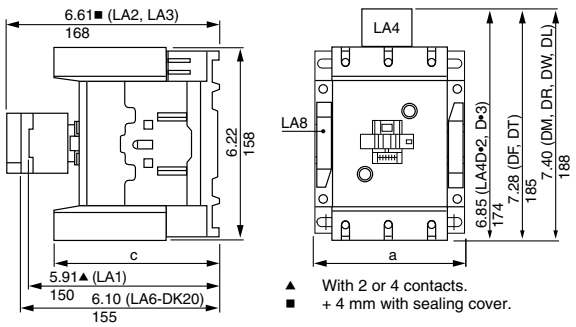
*except LA1DN10, DN01 = 143
□ + 4 mm with lead sealing device

LC1D115, D150



LC1	D115	D1156	D150	D1506
c	5.12 (132)	4.53 (115)	5.12 (132)	4.53 (115)
G (3-poles)	3.78/4.33 (96/110)	3.78/4.33 (96/110)	3.78/4.33 (96/110)	3.78/4.33 (96/110)
G (4-poles)	5.12/5.67 (130/144)	5.12/5.67 (130/144)	—	—

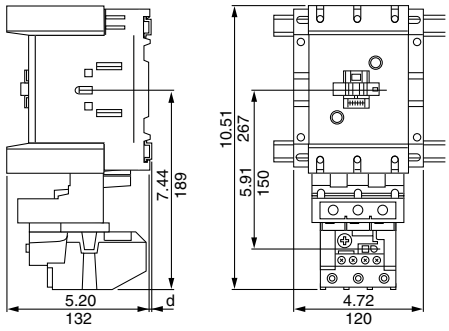
LC1D115, D150



▲ With 2 or 4 contacts.
■ + 4 mm with sealing cover.

LC1	C	A
D115, D150	5.12 (132)	4.72 (120)
D115004	5.12 (132)	6.10 (155)
D1156, D1506	4.53 (115)	4.72 (120)
D1150046	4.53 (115)	6.10 (155)

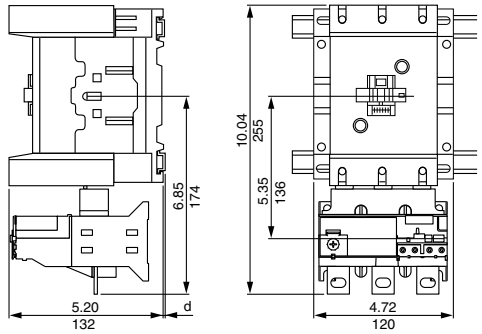
LR2D4 bimetallic overload relay
Direct mounting beneath contactors
LC1D115 and D150



35 mm DIN rail dimensions

	AM1DP200 and DR200	AM1DE••• and ED•••
d	0.10 (2.5)	.41 (10.5)

LR9D solid-state overload relay
Direct mounting beneath contactors
LC1D115 and D150



35 mm DIN rail dimensions

	AM1DP200 and DR200	AM1DE••• and ED•••
d	0.10 (2.5)	.41 (10.5)

Note: All dimensions are in Inches (mm).

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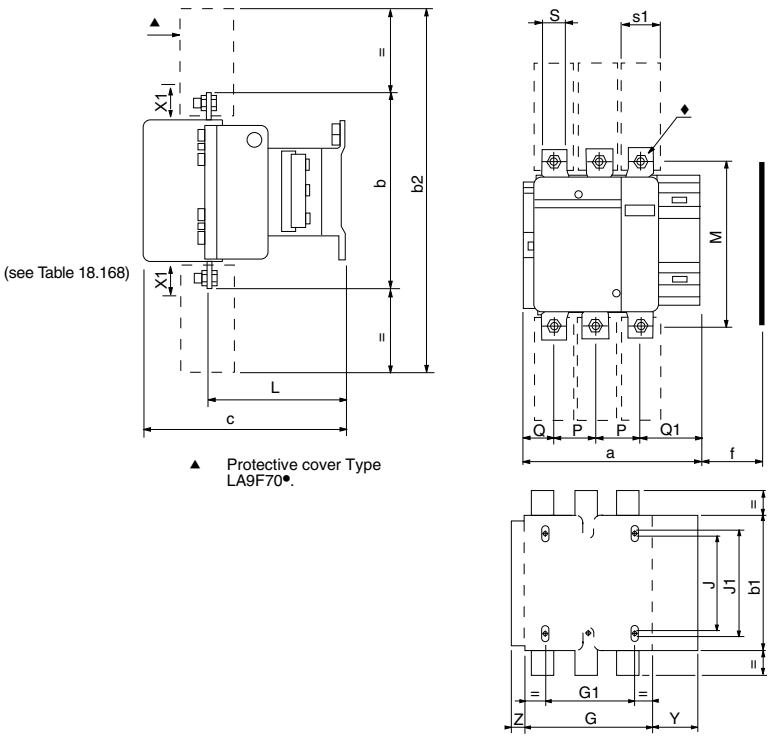
LC1F115 to F330



All dimensions shown in mm.
To convert to inches, divide by 25.4.

Table 18.167: LC1F115–F330 Dimensions

LC1	F115		F150		F185		F265		F330	
	3-Pole	4-Pole	3-Pole	4-Pole	3-Pole	4-Pole	3-Pole	4-Pole	3-Pole	4-Pole
a	163.5	200.5	163.5	200.5	168.5	208.5	201.5	243.5	213	261
b	162	162	170	170	174	174	203	203	206	206
b1	137	137	137	137	137	137	145	145	145	145
b2	265	265	301	301	305	305	370	370	375	375
c	165■	165■	165■	165■	176	176	207	207	219	219
f	131	131	131	131	130	130	147	147	147	147
G	106	143	106	143	111	151	142	190	154.5	202.5
G1	80	80	80	80	80	80	96	96	96	96
J	106	106	106	106	106	106	106	106	106	106
J1	120	120	120	120	120	120	120	120	120	120
L	107	107	107	107	113.5	113.5	141	141	145	145
M	147	147	150	150	154	154	178	178	181	181
P	37	37	40	40	40	40	48	48	48	48
Q	29.5	29.5	26.5	26	29	29	39	34	43	43
Q1	60	60	57.5	55.5	59.5	59.5	66.5	66.5	74	74
S	15	15	20	20	20	20	25	25	25	25
S1	27	27	34	34	34	34	38	38	44.5	44.5
Y	44	44	44	44	44	44	38	38	38	38
Z	13.5	13.5	13.5	13.5	13.5	13.5	21.5	21.5	20.5	20.5

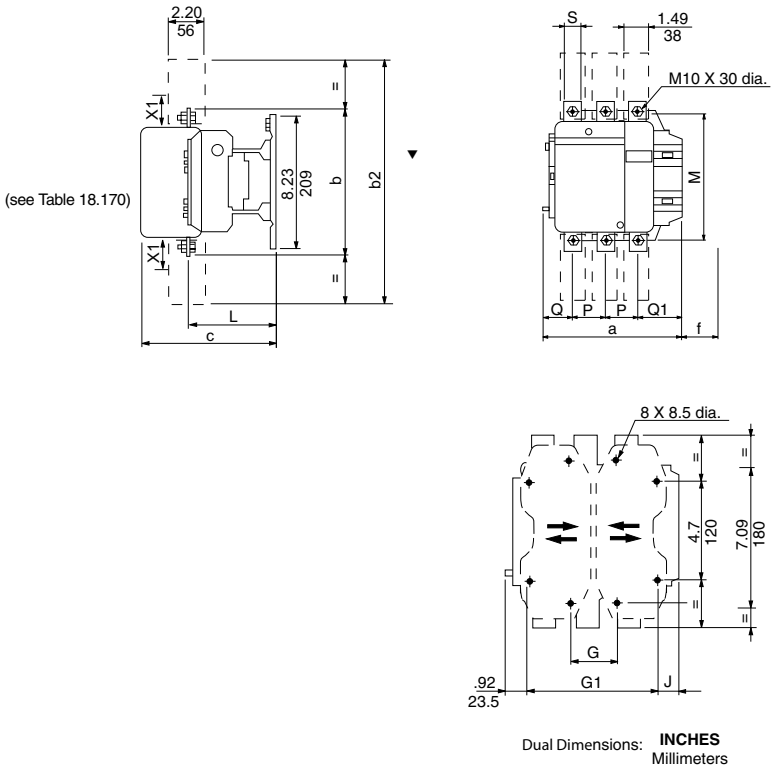
■ +6 mm with time delay block (for F115 and F150).
♦ Optimal terminal shroud
f = minimum distance required for coil removal.

Table 18.168: LC1F115–F330 Voltage

	220/380 V	415/440 V	500 V	660 V	1000 V
LC1F115, F150	20	25	30	40	20
LC1F185	20	25	30	40	30
LC1F265	20	25	40	50	40
LC1F330	25	35	40	50	50

X1: Minimum clearance according to the operational voltage and the breaking capacity.

LC1F400 to F500



Dual Dimensions: **INCHES**
Millimeters

Table 18.169: LC1F400–F500 Dimensions

LC1	F400			F500		
	2-Pole	3-Pole	4-Pole	2-Pole	3-Pole	4-Pole
a	213	213	261	233	233	288
b	206	206	206	238	238	238
b2	375	375	375	400	400	400
c	213	213	213	226	226	226
f	119	119	119	141	141	141
G★	80	80	80	80	80	140
G min.	66	66	66	66	66	66
G max.	102	102	150	120	120	175
G1★	170	170	170	170	170	230
G1 min.	156	156	156	156	156	156
G1 max.	192	192	240	210	210	265
J	19.5	19.5	67.5	39.5	39.5	34.5
L	145	145	145	146	146	146
M	181	181	181	208	208	208
P	48	48	48	55	55	55
Q	69	43	43	76	46	46
Q1	96	74	74	102	77	77
S	25	25	25	30	30	30

★ Supplied
▼ Protective cover
f = Minimum distance required for coil removal.

Table 18.170: LC1F400–F500 Voltage

	220/230 V	415/440 V	500 V	660 V	1000 V
LC1F400	30	40	40	50	60
LC1F500	40	45	50	60	60

X1: Minimum clearance according to the operational voltage and the breaking capacity.

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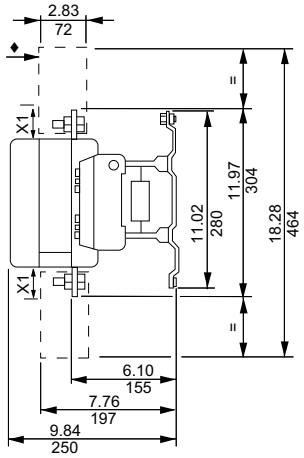
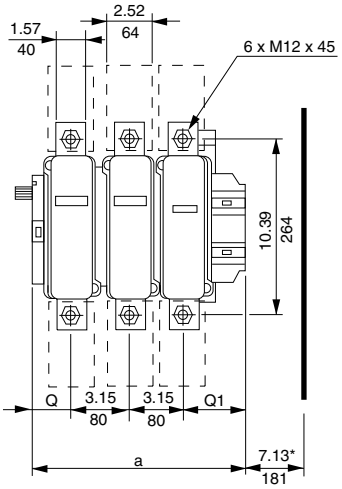
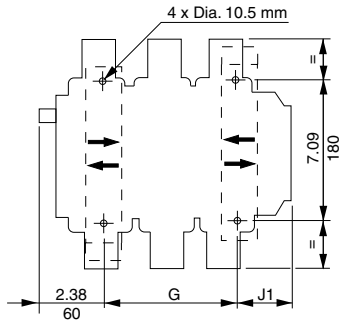
Table 18.171: LC1F Dimensions

LC1F630 and LC1F800





Dual Dimensions: **INCHES**
Millimeters

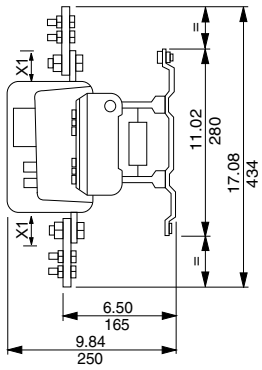


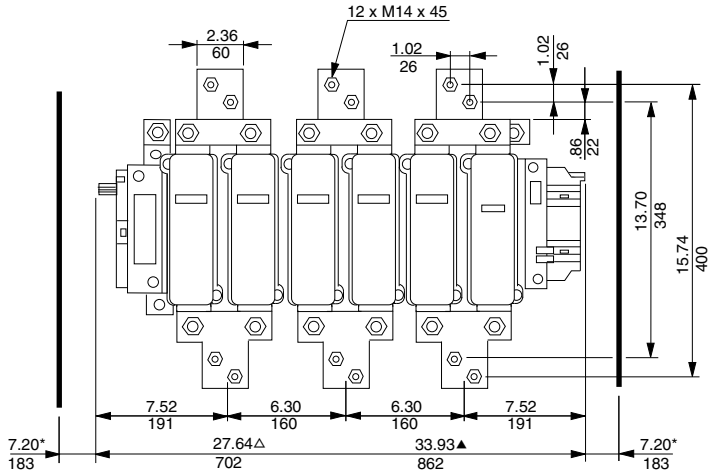
	LC1F630	a		G supplied		G min.		G max.		J1		Q		Q1	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
* = minimum distance required for coil removal. ♦ Protective terminal cover.	2 P	12.17	309	7.09	180	3.94	100	7.68	195	2.70	68.5	4.02	102	5.00	127
	3 P	12.17	309	7.09	180	3.94	100	7.68	195	2.70	68.5	2.36	60	3.50	89
	4 P	15.31	389	9.45	240	5.91	150	10.83	275	2.70	68.5	2.36	60	3.50	89

X1:Minimum clearance according to the operational voltage and the breaking capacity.

Voltage (V)	380	415/440	500	660	1000
X1 in mm	60	60	60	70	80

LC1F780, F7804



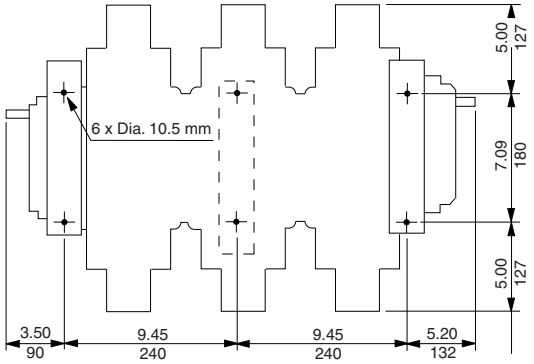


X1: Minimum clearance according to the operational voltage and the breaking capacity.

Voltage (V)	380	415/440	660	1000
X1 in mm	90	100	120	120

△ Overall length (3 poles)
▲ Overall length (4 poles)
*minimum distance required for coil removal.

LC1F780 mounting



LC1F7804 mounting

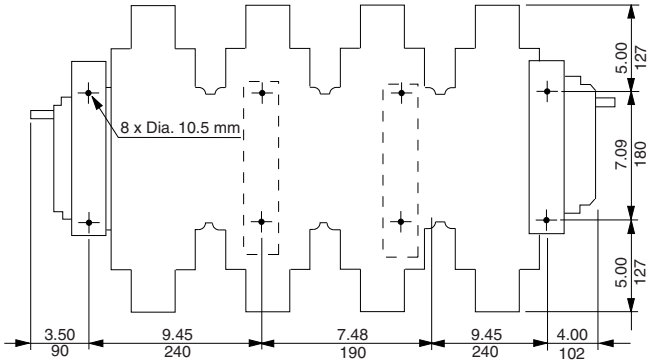


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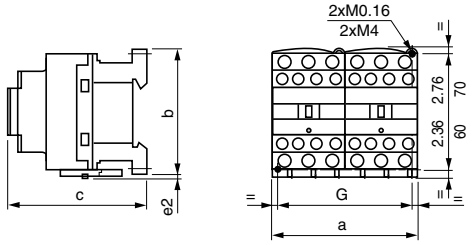
Table 18.172: Reversing Contactor Dimensions

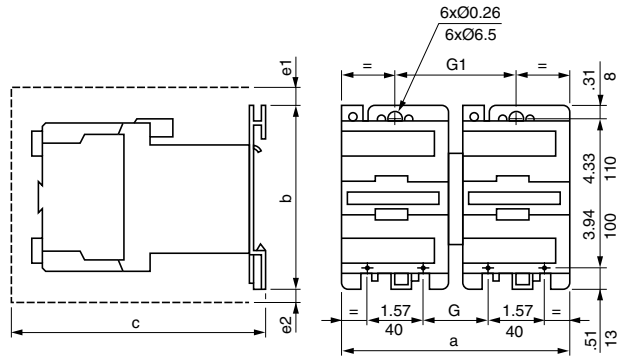
LC2D09–D32
LC2DT20–DT60
2 x LC1DT20–DT60



LC2 or 2 x LC1	a	b	c	G
	in. (mm)	in. (mm)	in. (mm)	in. (mm)
DT20 and DT25	3.54 (90)	3.34 (85)	3.54 (90)	3.14 (80)
DT32 to DT60	3.54 (90)	3.58 (91)	3.85 (98)	3.14 (80)

c, e2: includes cabling.

2 x LP1D40, D65, D80, D95

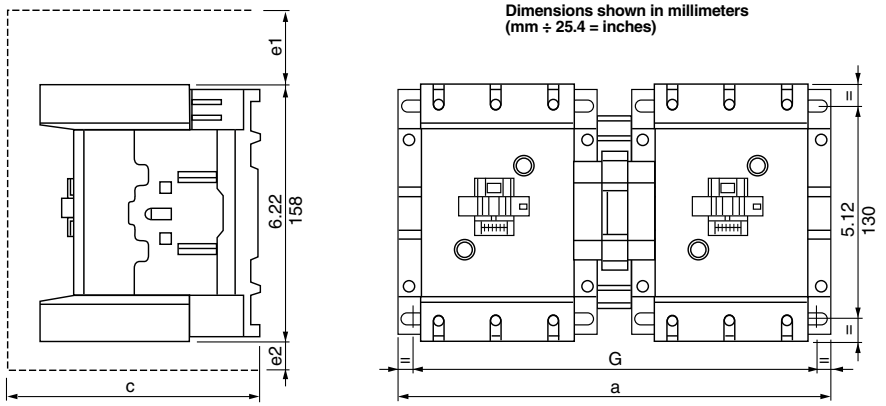


LC2 or 2 x LC1	a	b	c	e1	e2	G	G1
	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
D40 to D65	7.16 (182)	5.0 (127)	7.4 (190)	1.19 (5)	0.43 (11)	2.2 (57)	3.8 (97)
D80 and D95	8.14 (207)	5.0 (127)	8.4 (215)	0.51 (13)	0.78 (20)	3.7 (96)	4.3 (111)

c, e1 and e2: includes cabling.

LC2D115 and D150
2 x LC1D115 and D150
Panel mounted with 1/4 in. screw

Dimensions shown in millimeters
(mm ÷ 25.4 = inches)



LC2 or 2 x LC1 (3-pole)	a	c	e1	e2	G
D115, D150	266	148	56	18	242/256
LC2 or 2 x LC1 (4-pole)	**a**	**c**	**e1**	**e2**	**G**
D115	334	148	—	60	310/324

c, e1 and e2 includes cabling

NOTE: *For dimensions of TeSys F reversing contactors, please refer to catalog 8502CT9901.*

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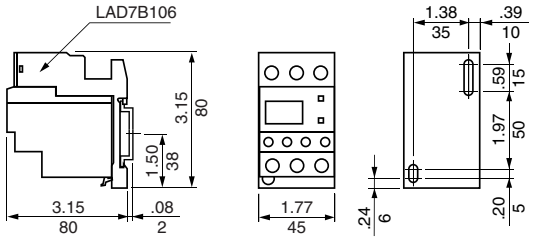
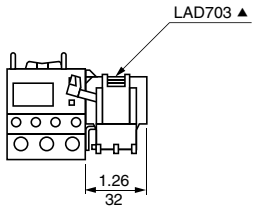
Table 18.173: TeSys D Overload Relay Dimensions

LRD-01-35
Independent mounting on 50 mm centers or on rail AM1DP200 or DE200

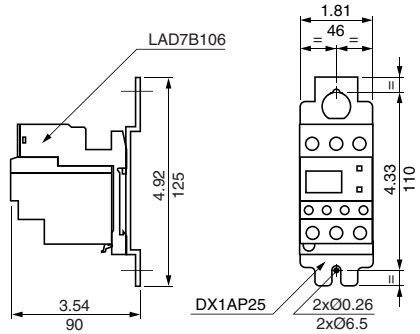


Remote tripping or electrical reset

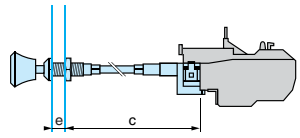


▲ Can only be mounted on RH side of relay LRD-01 to 35

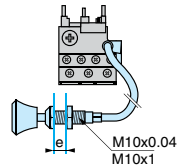
Independent mounting on 110 mm centers



LRD, LR2D and LR9D
Reset by flexible cable LA7D305 and LAD7305
Mounting with cable straight

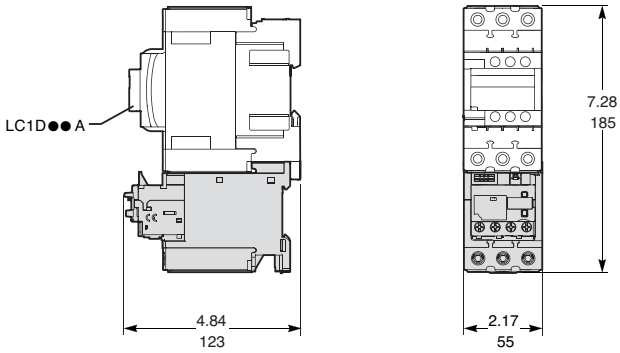


Mounting with cable bent

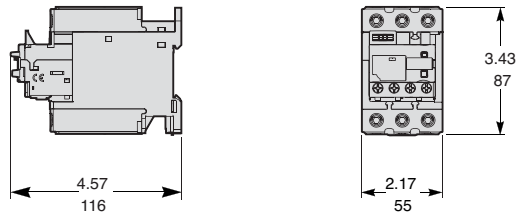


c: up to 21.6 in. (550 mm)
e: up to 0.79 in. (20 mm)

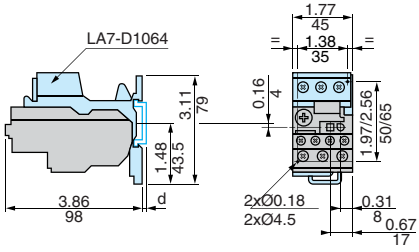
LRD3●●
Beneath LC1D●●A contactor



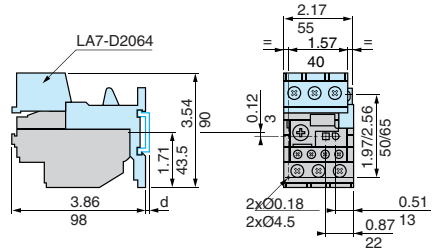
Separate mounting



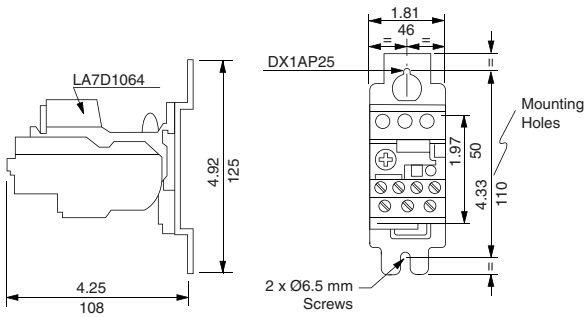
LR2D1, LR3D1
Separate mounting at 50 mm (1.97 in.) centers or on AM1DP200 or DE200 rail



LR2D2, LR3D2
Separate mounting at 50 mm (1.97 in.) centers or on AM1DP200 or DE200 rail



LR2D1, LR3D1
Separate mounting at 110 mm (4.33 in.) centers



LR2D2, LR3D2
Separate mounting at 110 mm (4.33 in.) centers

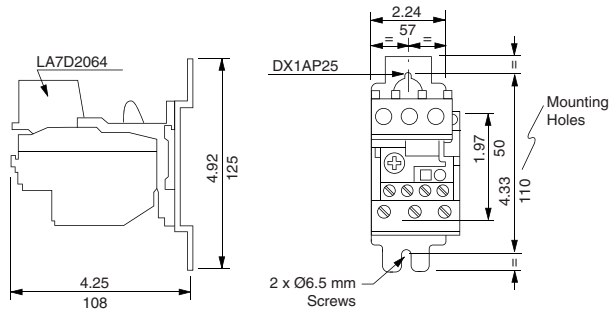


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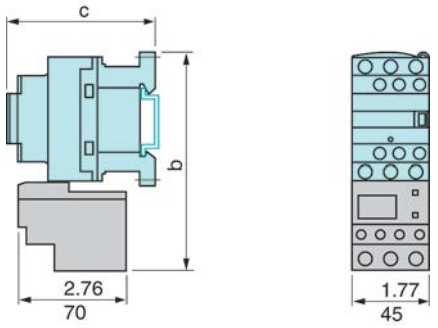
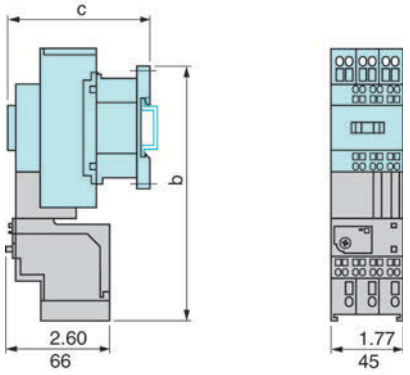
Table 18.174: TeSys D Thermal Overload Relay Dimensions, in. (mm)

LRD-01-35
Direct mounting beneath contactors with screw



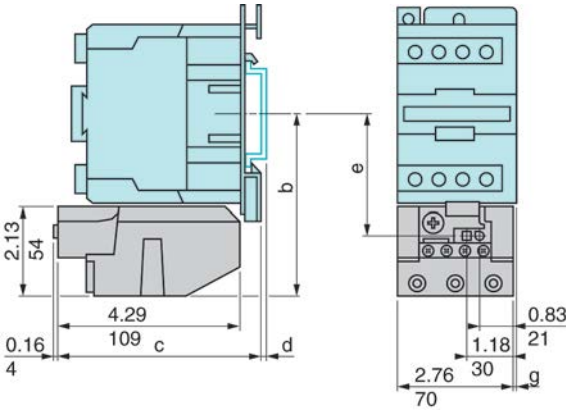
LC1•	D09–D18	D25–D38
b	4.84 (123)	5.39 (137)
c	See Catalog 8502CT9901 pages 122, 123.	

LRD-013-353
Direct mounting beneath contactors with spring terminal connections



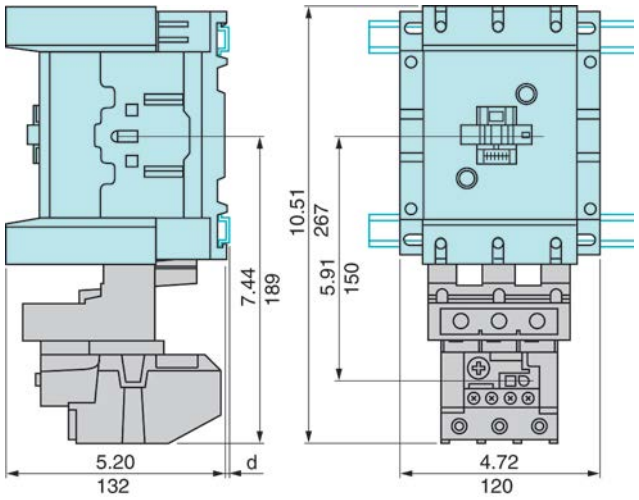
LC1•	D093–383
b	4.84 (123)
c	See Catalog 8502CT9901 pages 122, 123.

LRD-3•••
Direct mounting beneath contactors
LC1-D40 to D95 and LP1-D40 to D80



AM1•	DL201	DL200				
d	0.28 (7)	0.67 (17)				
		b	c	e	g(3P)	g(4P)
AC Control Circuit						
LC1D80		4.55 (115.5)	4.88 (124)	3.03 (76.9)	0.37 (9.5)	0.87 (22)
LC1D95		4.55 (115.5)	4.88 (124)	3.03 (76.9)	0.37 (9.5)	—
DC Control Circuit						
LC1D40, LP1D40		4.37 (111)	6.93 (176)	2.85 (72.4)	0.18 (4.5)	0.51(13)
LC1D50		4.37 (111)	6.93 (176)	2.85 (72.4)	0.18 (4.5)	—
LC1D65, LP1D65		4.37 (111)	6.93 (176)	2.85 (72.4)	0.18 (4.5)	0.51(13)
LC1D80, D95, LP1D80		4.55 (115.5)	7.06 (179.4)	3.03 (76.9)	0.37 (9.5)	0.87(22)

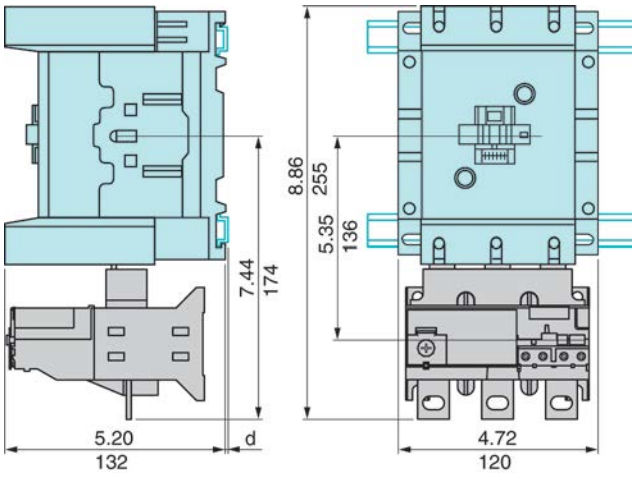
LRD4•••
Direct mounting beneath contactors LC1D115 and D150



	AM1DL200 and DR200	AM1DE200 and ED•••
d	0.10 (2.5)	0.41 (10.5)

▲ For additional specifications and selection information, see catalog **8502CT9901**

LR9D
Direct mounting beneath contactors LC1D115 and D150



	AM1DP200 and DR200	AM1DE200 and ED•••
d	0.10 (2.5)	0.41 (10.5)

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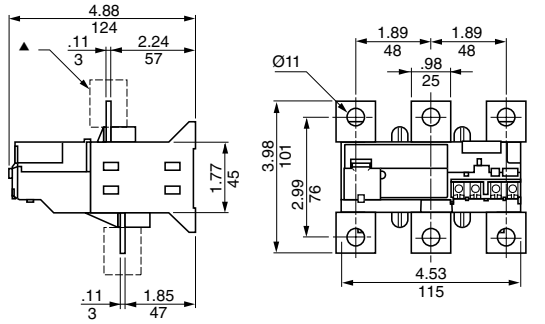
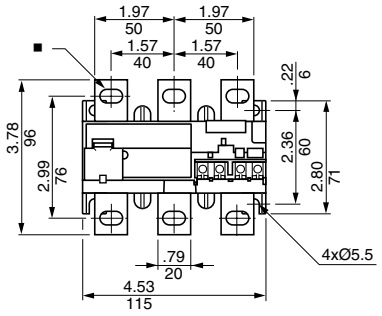
Table 18.175: TeSys F Overload Relay Dimensions

LR9F5•71

Common side view



LR9F5•57, F5•63, F5•67, F5•69

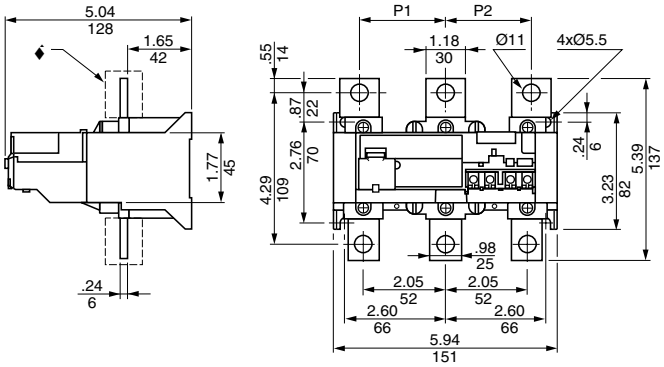


▲ Terminal shroud LA9F70•

■ 6.5 x 13.5 for LR9F5•57 and 8.5 x 13.5 for LR9F5•63, F5•67, F5•69

LR9F7•75, F7•79, F7•81

Common side view

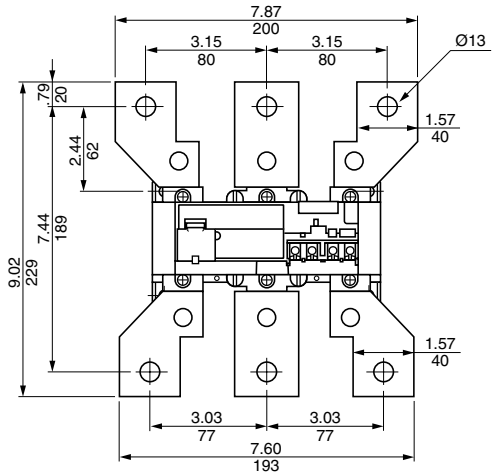


	P1	P2
LR9F7•75	48	48
LR9F7•79, F7•81	55	55

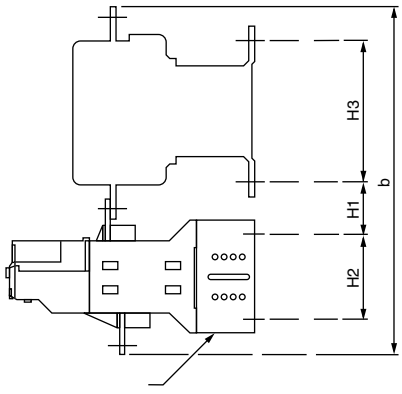
♦ Terminal shroud LA9-F70•

LR9F7•81

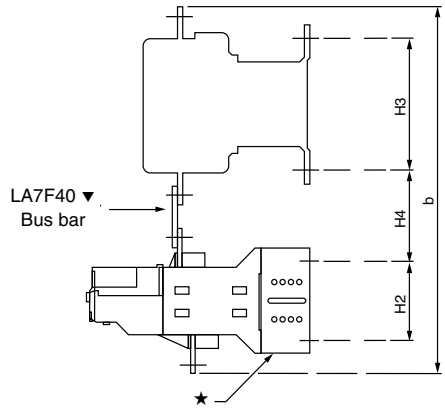
(for mounting beneath LC1F630)



Direct mounting beneath contactor LC1F



Direct mounting beneath reversing contactors or star-delta contactors



LC1 contactors	With LR9 relays	b	H1	H2	H3	LC1 contactors	With LR9 relays	b	H4	H2	H3
F115	F5•57, F5•63, F5•67, F5•69	240	30	76	120	F115	F5•57, F5•63, F5•67, F5•69	279	60	76	120
F150	F5•57, F5•63, F5•67, F5•69	246	30	76	120	F150	F5•57, F5•63, F5•67, F5•69	283	60	76	120
F185	F5•57, F5•63, F5•67, F5•69	250	30	76	120	F185	F5•57, F5•63, F5•67, F5•69	285	60	76	120
F225	F5•71	273	40	76	120	F225	F5•71	319	80	76	120
	F7•75, F7•79	308	50	108.8	120		F7•75, F7•79	360	100	108.8	120
F265	F5•71	279	40	76	120	F265	F5•71	332	90	76	120
	F7•75, F7•79	314	60	108.8	120		F7•75, F7•79	363	100	108.8	120
F330	F7•75, F7•79	317	60	108.8	120	F330	F7•75, F7•79	364	100	108.8	120
F400	F7•75, F7•79, F7•81	317	60	108.8	180	F400	F7•75, F7•79, F7•81	364	100	108.8	180
F500	F7•75, F7•79, F7•81	346	70	108.8	180	F500	F7•75, F7•79, F7•81	390	110	108.8	180
F630	F7•81	510	110	108.8	180	F630	F7•81	509	120	108.8	180

★ Relay mounting plate, see page 18-16.

▼ Connection accessories, see page 18-16.

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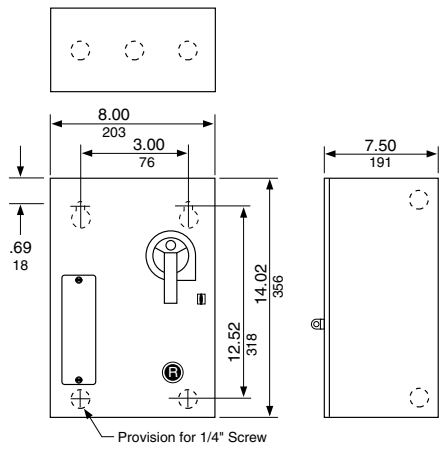
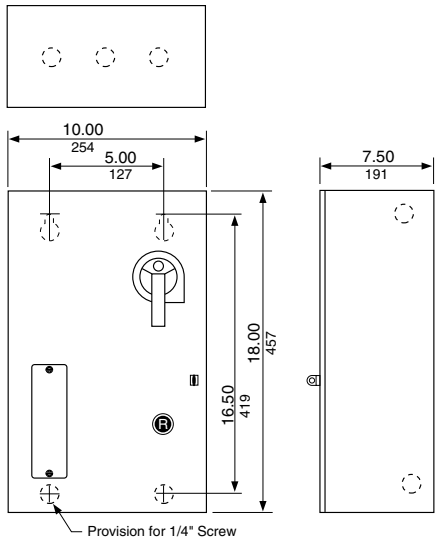
Table 18.176: TeSys D Combination Starter Dimensions, Reversing and Non-Reversing

NEMA 1

D09–25 (FVNR)

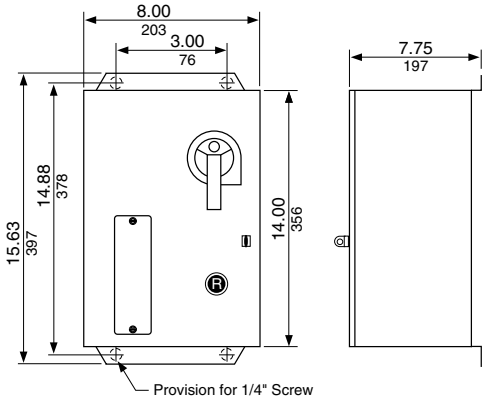


D09–40 (FVR); D32-40 (FVNR)



NEMA 12/3R

D09–25 (FVNR)



D09–40 (FVR); D32—40 (FVNR)

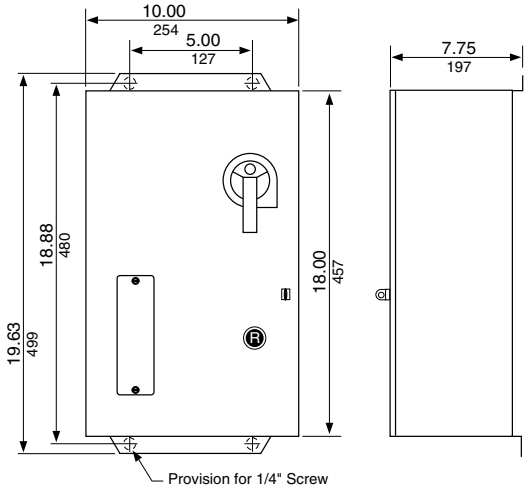
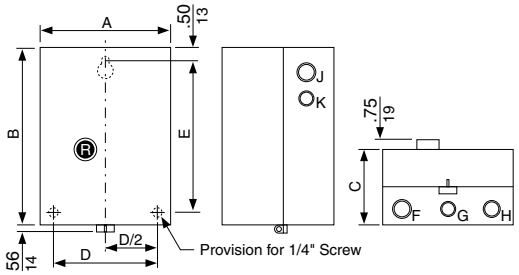


Table 18.177: Non-Combination Starter Dimensions

Non-Combination Starters



		Type 1										Type 12/3R	
Non-Reversing	Reversing	A	B	C	D	E	F	G	H	J	K	D	E
D09-32	—	6.77	10.04	6.25	5.38	9.00	1–1.25	0.5–0.75	—	1–0.25	0.5–0.75	5.38	11.37
D40-65	D09-32	8.66	10.83	7.21	7.25	9.75	1.25–1.5	0.5–0.75	1–1.25	1–0.25	0.5–0.75	5.38	12.15
D80	D40-80	10.63	13.98	7.21	9.22	12.94	1.25–1.5	0.5–0.75	1–1.25	1–1.25	0.5–0.75	5.38	15.30

Note: **All dimensions in inches.**

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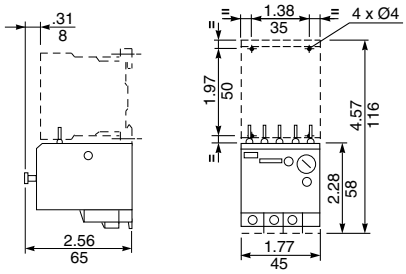
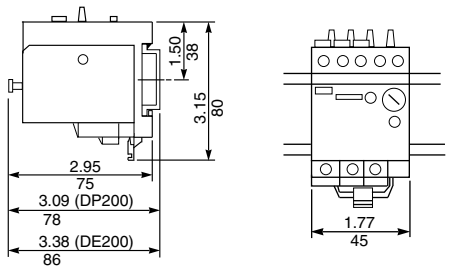
Table 18.178: TeSys K Contactor Dimensions

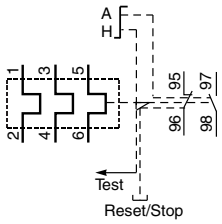
LR2K
Direct mounting under the contactor



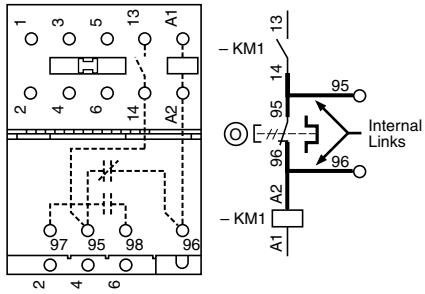
Separate mounting with LA7-K0064 terminal block on 35 mm rail (AM1DP200 or AM1DE200)



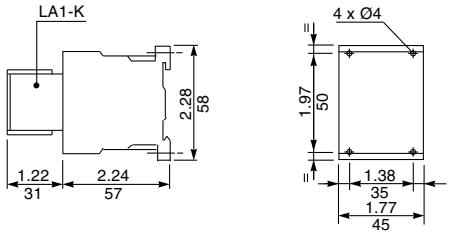
Three-phase



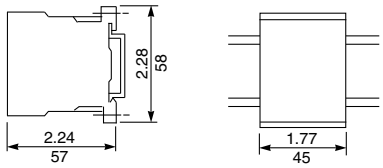
Wiring Scheme



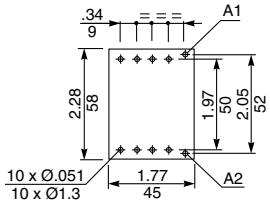
LC1, LP1, LP4K
Mini-contactors
On baseplate



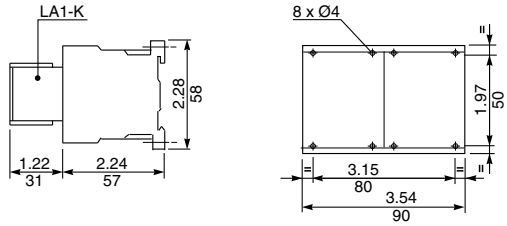
On AM1DP200 or DE200 rail (35 mm)



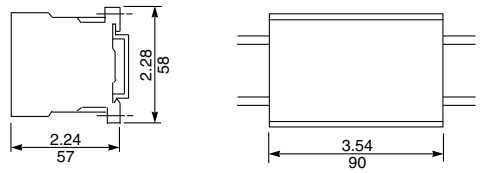
On printed circuit board



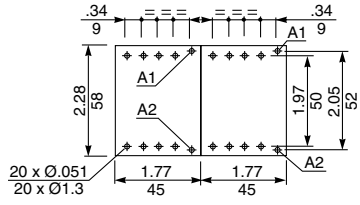
LC2, LC8, LP2, LP5K
Reversing mini-contactors
On baseplate



On AM1DP200 or DE200 rail (35 mm)



On printed circuit board for reversing contactors or 2 mini-contactors side-by-side



LA2KT
Electronic time delay contact blocks

Dual Dimensions: **INCHES**
Millimeters

On mini-contactors or reversing mini-contactors

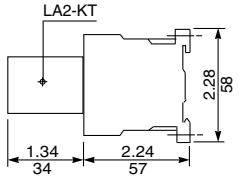


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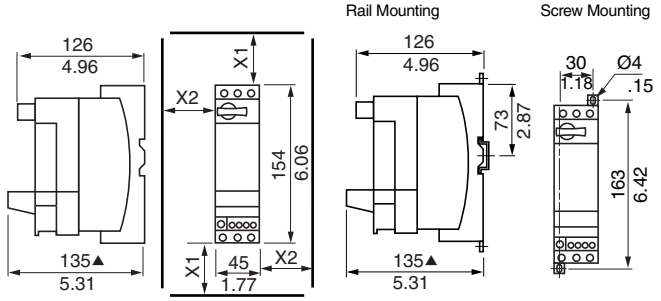
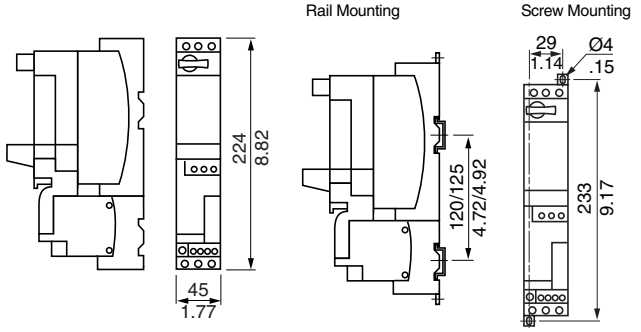
Table 18.179: TeSys U Starter Dimensions

Starter Controllers

Non-Reversing



Reversing



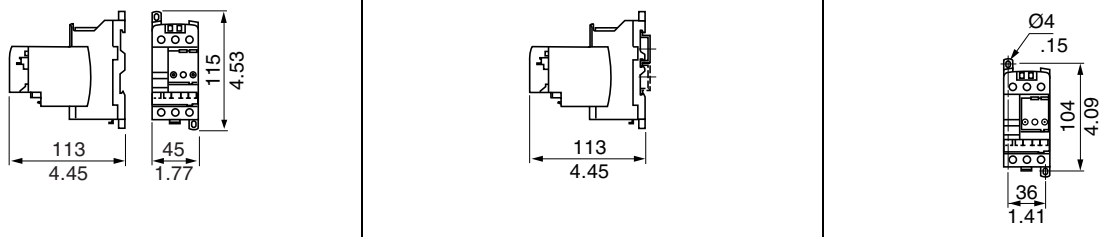
Note: Minimum electrical clearance:
X1: 35 mm for Ue = 440 V; and 70 mm for Ue = 500 and 690 V
X2: 0

▲ Maximum depth (with Modbus™ communication module)

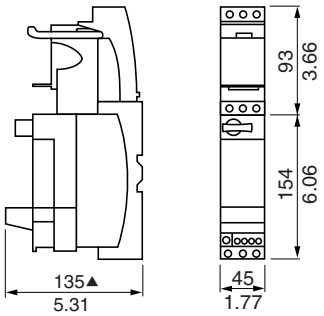
Reversing Block for Mounting Separately from Power Base

Rail Mounting

Screw Mounting



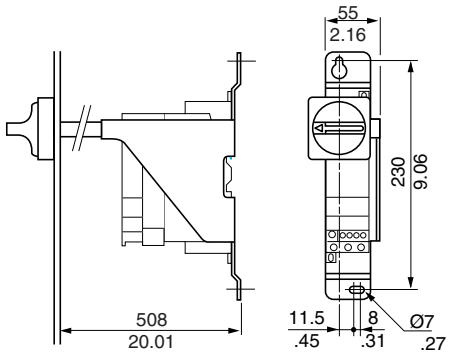
Limiter Disconnector LUALB1



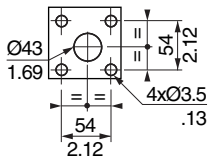
▲ Maximum depth (with Modbus communication module)

Door interlock Mechanisms

LU9AP00



Door Cut-out



Dual Dimensions: **INCHES**
Millimeters

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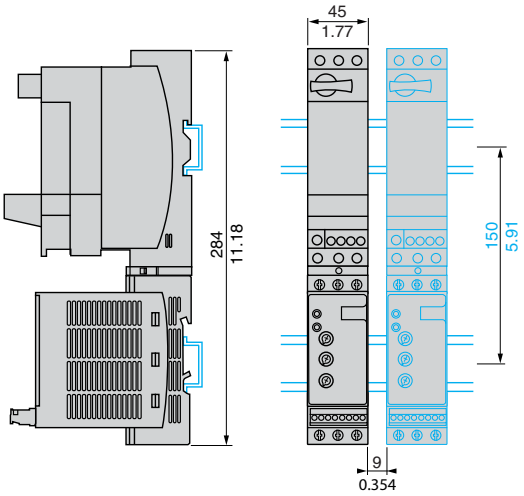
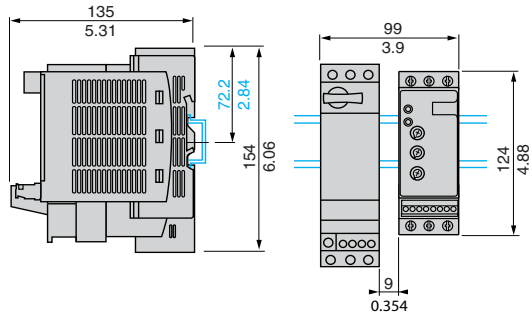
Table 18.180: Altistart U01 and TeSys U Soft Starters

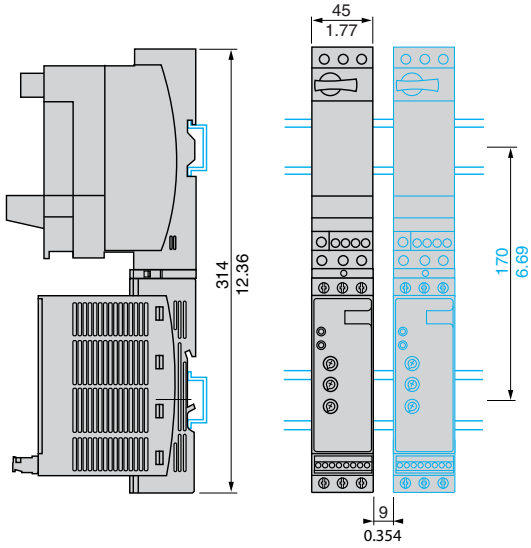
TeSys U Combination (non-reversing power base) and ATSU01N212LT
Mounting on (35mm) rail with VW3 G4104 connector



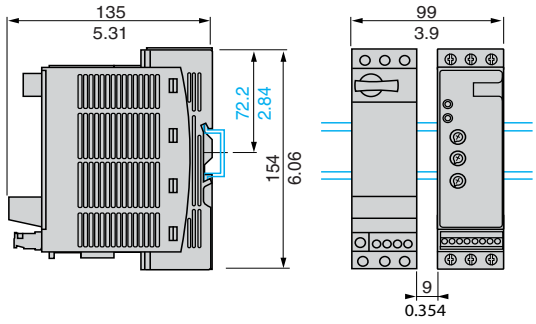
TeSys U Combination (non-reversing or reversing power base) and ATSU01N2206LT to ATSU01N212LT
Side-by-side mounting



TeSys U Combination (non-reversing power base) and ATSU01N222LT to ATSU01N232LT
Mounting on (35mm) rail with VW3G4104 connector



TeSys U Combination (non-reversing or reversing power base) and ATSU01N222LT to ATSU01N232LT
Side-by-side mounting



VW3G4104 Power Connector

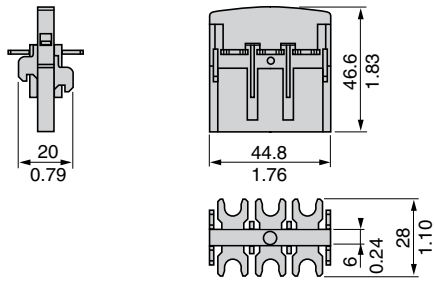


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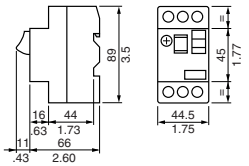
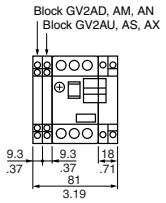
Table 18.181: TeSys GV2 and GV3 Manual Starter and Protector Dimensions

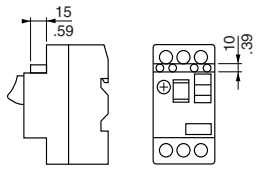
GV2M



GV2AD, AM, AN, AU, AS, AX

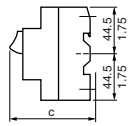


GV2AE

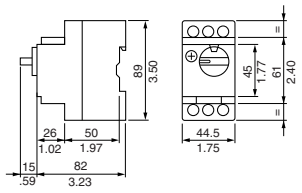


Mounting of GV2M

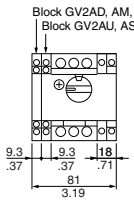
On 35 mm ⊔ rail
C = 78.5 mm (3.09") on AM1DP200 (35 x 7.5 mm)
C = 86 mm (3.39") on AM1DE200, ED200 (35 x 15 mm)



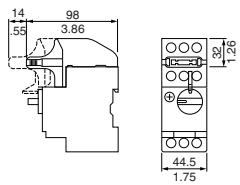
GV2P



GV2AD, AM, AN, AU, AS, AX

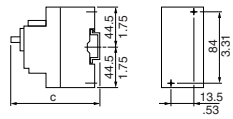


GV2AK00



Mounting of GV2P

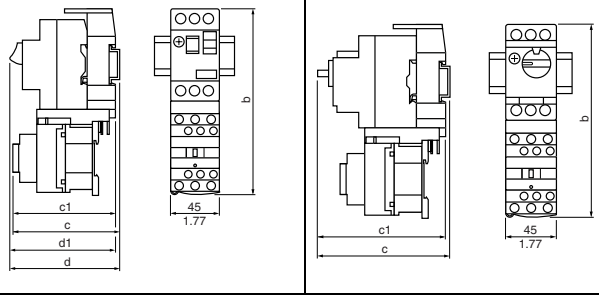
On 35 mm ⊔ rail
C = 98.5 mm (3.88") on AM1DP200
(35 x 7.5 mm)
C = 106 mm (4.17") on AM1DE200, ED200
(35 x 15 mm)



GV2AF4 + LAD31

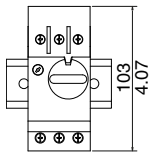
Combination GV2ME + TeSys D range contactor

Combination GV2P + TeSys D range contactor



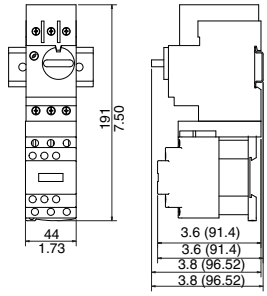
GV2P + GV2GH7

for UL 508 Type E application



GV2P + GV2GH7 + TeSys D contactor

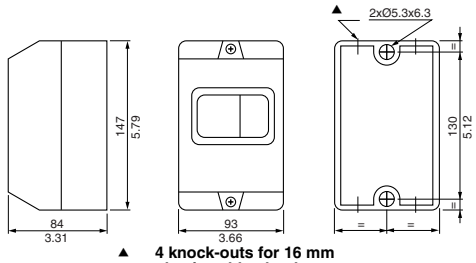
for UL 508 Type E application



GV2ME +	LC2D09 to D18	LC2D25 and D32
b	7.4 (188.6)	7.8 (199)
c1	3.6 (92.7)	3.9 (99)
c	3.9 (98.2)	4.11 (104.5)
d1	3.9 (98.3)	3.9 (98.3)
d	4.1 (103.8)	1.4 (103.8)

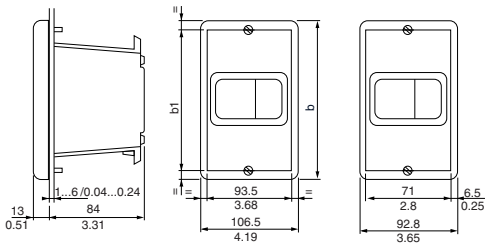
GV2P +	LC2D09 to D18	LC2D25 and D32
b	6.61 (168.1)	7.9 (199.5)
c1	4.6 (116.8)	4.6 (116.8)
c	4.8 (122.3)	4.8 (122.3)
—	—	—
—	—	—

Surface mounting enclosure GV2MC0●



▲ **4 knock-outs for 16 mm plastic cable glands or no. 16 conduit.**

Flush mounting enclosure GV2MP0● (bracket cut-out)



GV2	b		b1	
	in.	mm	in.	mm
MP01, MP02	5.51	140	5.00	127
MP03, MP04	5.24	133	4.61	117

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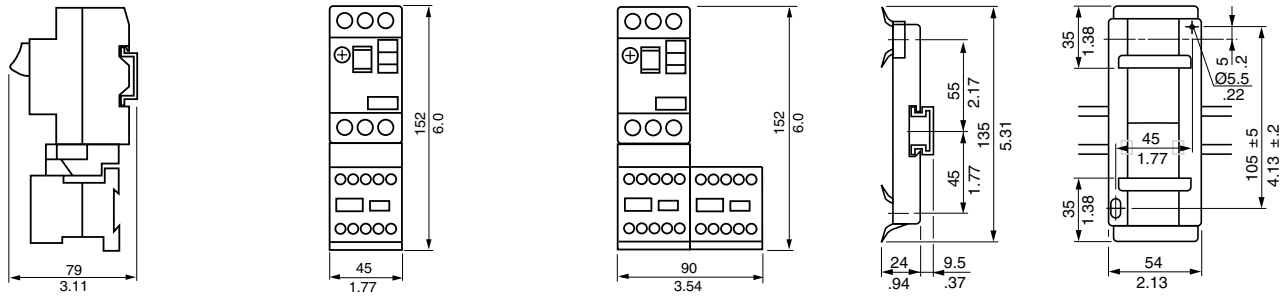
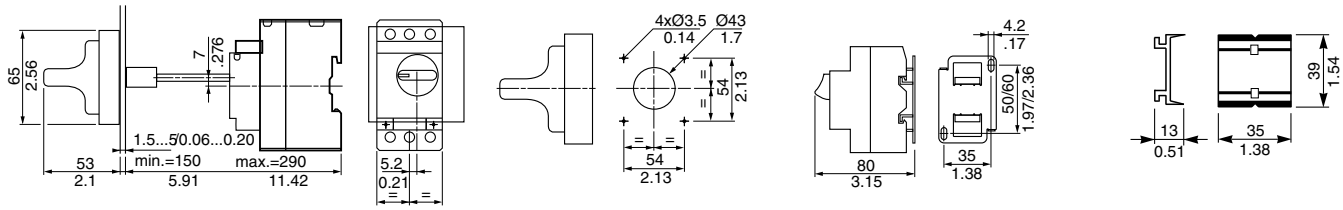
Table 18.182: TeSys GV2 and GV3 Manual Starter and Protector Dimensions (cont'd)

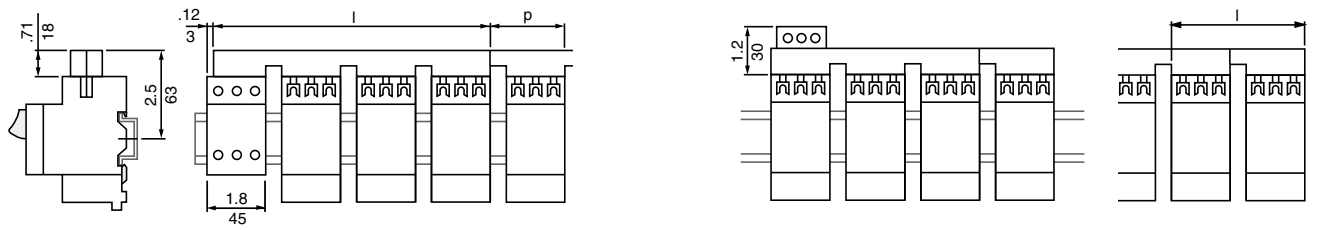
GV2M with GK2AF01 and LC1K	GV2M with GV2AF01 and LC1K	GV2M with GV2AF01 and LC2K	Adapter Plate GK2AF01
Dimensions (mm)			



Mounting external operator GV2AP0•	Door cut-out	GV2M on panel with GV2AF02 adapter plate	7.5 mm height compensation plate GV1F03



Sets of bus bars, GV2G445, GV2G454, GV2G472 with terminal block GV2G05	Sets of bus bars with terminal block GV1G09	Sets of bus bars GV2G245, GV2G254, GV2G272

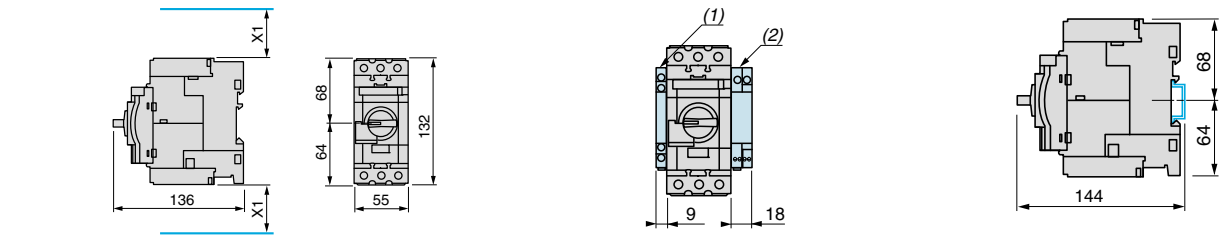


		I	P
GV2G445	0.16 x 1.8 in. (4 x 45 mm)	7.0 in. (179 mm)	1.8 in. (45 mm)
GV2G454	0.16 x 2.1 in. (4 x 54 mm)	8.1 in. (206 mm)	2.1 in. (54 mm)
GV2G472	0.16 x 1.8 in. (4 x 45 mm)	10.2 in. (260 mm)	2.8 in. (72 mm)

		I
GV2G245	0.08 x 1.8 in. (2 x 45 mm)	3.5 in. (89 mm)
GV2G254	0.08 x 2.1 in. (2 x 54 mm)	3.9 in. (98 mm)
GV2G272	0.08 x 2.8 in.(2 x 72 mm)	4.6 in. (116 mm)
GV2G354	0.12 x 2.1 in. (3 x 54 mm)	6.0 in. (152 mm)

GV3P

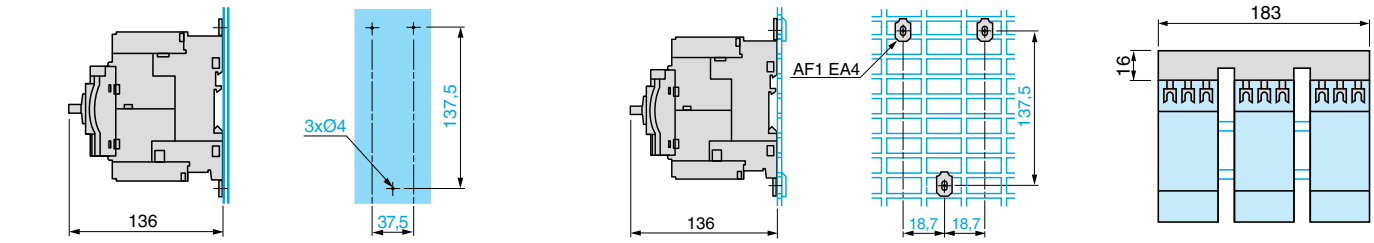
Dimensions	Mounting on rail AM1 DE200 or AM1 ED201



X1 = Electrical clearance (ISC max)
40 mm for Ue < 500 V; 50 mm for Ue < 690 V

Blocks GV AN••, GV AD••, GV AM11
Block GV3 AU•• and GV3 AS••

Mounting on panel, using M4 screws	Mounting on pre-slotted mounting plate AM1PA



Note: Leave a space of 9 mm between 2 manual motor protectors: either an empty space or side-mounting add-on contact blocks.
Horizontal mounting is possible: please consult your regional sales office.

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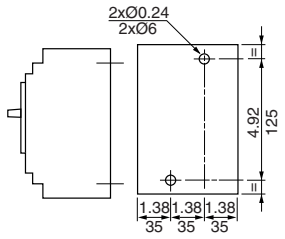
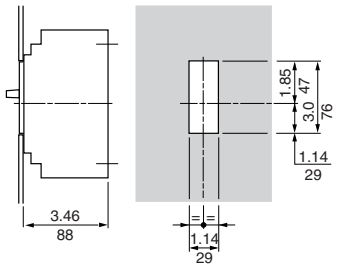
Table 18.183: TeSys GV7 Manual Starter and Protector Dimensions

1 GV7R

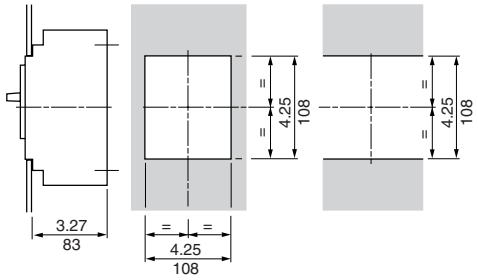
Panel Mounting



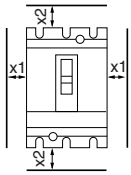
Flush Mounting



Side by Side

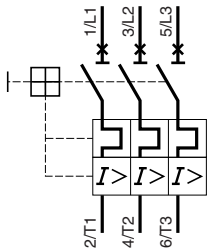


Minimum Clearance		x1	x2
		in. (mm)	in. (mm)
Painted or insulated metal plate, insulation or insulated bar		0 (0)	1.18 (30)
Bare metal plate	U ≤ 440 V	0.20 (5)	1.38 (35)
	440 V < U < 600 V	0.39 (10)	1.38 (35)
	U ≥ 600 V	0.79 (20)	1.38 (35)



Note: Minimum distance between 2 units mounted side by side = 0.

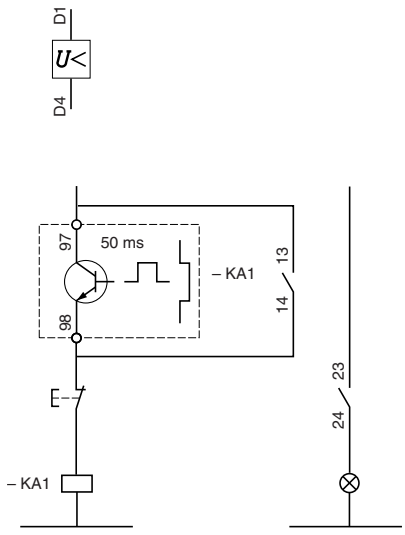
Motor Controllers GV7R



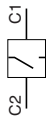
Add-on Auxiliary Contacts, GV7AE11, GV7AB11

Note: A self-adhesive label, supplied with the contact, can be affixed to the front face of the starter to allow personalized marking according to the function of the contact or contacts.

GV7AU•••



GV7AS•••



GV7AD111, AD112

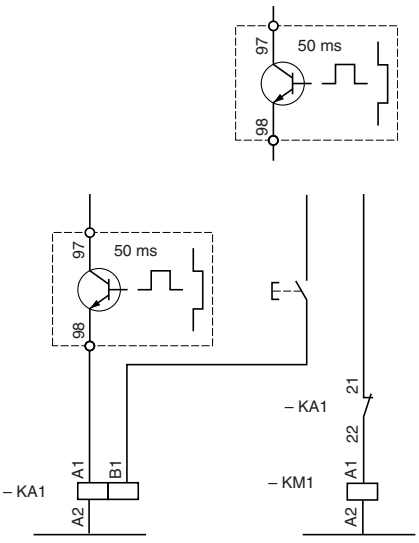


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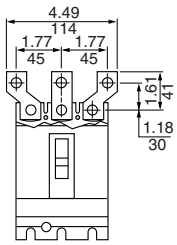
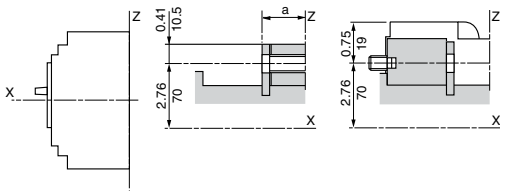
Table 18.184: TeSys GV7 Manual Starter and Protector Dimensions (cont'd)

GV7AC03

Spreaders



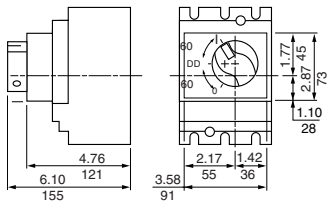
Cabling | Smooth Terminals | Connectors



	a (in./mm)
GV7R●	0.77/19.5
GV7R●220	0.85/21.5

GV7AP03, GV7A04

Direct Rotary Handle



Flush Mounting

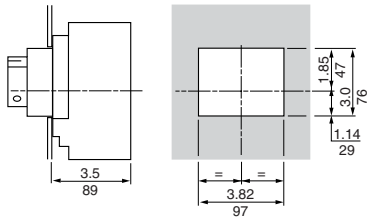


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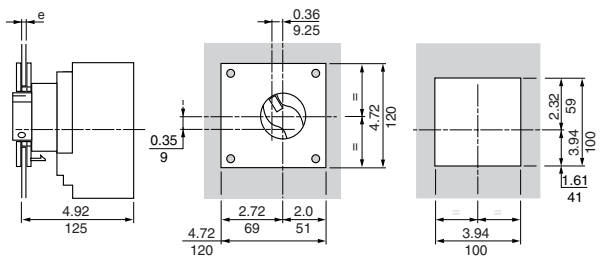
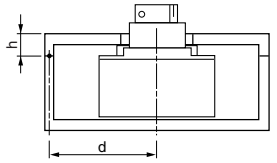
Table 18.185: TeSys GV7 Manual Starter and Protector Dimensions (cont'd)

GV7AP03 or GV7AP04, GV7AP05

Direct Rotary Handle	Front Fuse Center	Enclosure Vewed from Top

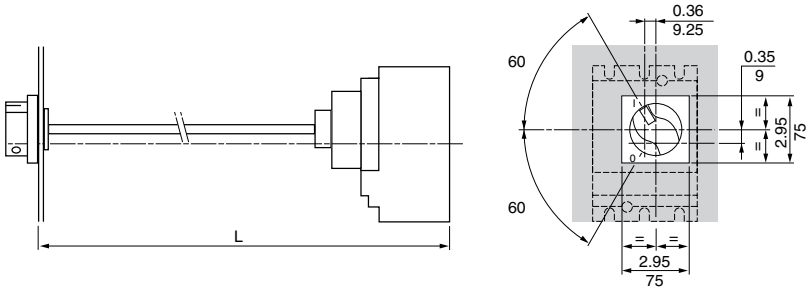




Door cutouts require a minimum distance between the center of the manual motor protector and the door hinge point (h) of
d ≥ 3.94 in (100 mm) + (h x 5)

GV7AP01, GV7AP02

Extended Rotary Handle



L: 7.28 in. (185 mm) minimum, 23.62 in. (600 mm) maximum.
The shaft of the extended rotary handle GV7AP01 or GV7AP02 must be cut to length: L – 4.96 in. (126 mm)

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TeSys U Self-Protected combination starters combine the requirements of motor overload and short-circuit protection into one compact package. These next-generation starters offer superior performance, efficiency, and a unique modular design to fit your needs with optional communication and predictive maintenance capabilities. They are UL listed, easy to install and maintain.

In order to select a TeSys U Self-Protected combination starter, follow the 5-step process described below.

1. Choose a base configuration

Table 18.186: Base Configurations

Ratings				Type 1/12/3R enclosure				Type 4/4X enclosure			
Motor Voltage (V)	Max. HP		Max. Current (A)	Non-reversing starter		Reversing starter		Non-reversing starter		Reversing starter	
	Single phase	Three-phase		Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price	Base Configuration Number	$ Price
115	1.5		12	LE1U16	**1917.00**	LE2U16	**2673.00**	LE1U19	**2112.00**	LE2U19	**2868.00**
230	2										
200		3									
230		3									
460		7.5									
575		10									
115	2		32	LE1U36	**2115.00**	LE2U36	**2871.00**	LE1U39	**2310.00**	LE2U39	**3066.00**
230	5										
200		10									
230		10									
460		20									
575		25									

Type 1/12/3R enclosure

Type 4/4Xenclosure

2. Choose Thermal Overload Relay (Plug-in Control Unit)

The thermal overload relay is a control unit that plugs into the TeSys U starter. No tool is needed to install or remove the control unit.

If you do not wish to select the thermal overload relay at this time, select Thermal Overload Relay Type codes N1 or N3 in function of the motor configuration (single phase or 3-phase) in Table 18.187. A thermal overload relay can be selected and ordered later on independently before installation.

In order to select a thermal overload relay, you must follow the next 2 steps. First, select the thermal overload protection type code in Table 18.187. Secondly, select the full load amperage code in Table 18.188.

2.1 Choose the thermal overload protection type.

Table 18.187: Thermal Overload Protection Types

	Advanced Control Unit			Multifunction Control Unit	No Control Unit (Ordered later on independently)	
					Single Phase	3-Phase
$ Price	180.00			738.00	—	
Thermal Overload Protection Type Code	A▲	B▲	C▲	D▲	N1	N3
Protection Type						
Single phase, Class 10	■					
3-phase, Class 10		■				
3-phase, Class 20			■			
3-phase, Selectable Class 5–30				■		
Protection Functions						
Short circuit	■	■	■	■		
Over current	■	■	■	■		
Thermal overload	■	■	■	■		
Phase loss		■	■	■		
Phase imbalance		■	■	■		
Ground fault	■	■	■	■		
Underload, long start, jam	♦	♦	♦	■		
Control Functions						
Automatic or local/remote reset	♦	♦	♦	■		
Fault differentiation	♦	♦	♦	■		
Thermal alarm	♦	♦	♦	■		
Motor load display	♦	♦	♦	■		
Fault history				■		
Alarm threshold adjustment				■		
Tripping test	■	■	■	■		

▲ Complete the Thermal Overload Relay Selection by adding the full load amperage code after the thermal overload protection type code.
■ Built-in Control Unit.
♦ Available when combined with appropriate Function module.

2.2 Choose the Motor Full Load Amperage

Table 18.188: Full Load Amperage Code

Full Load Amperage Setting Range (A)	Full Load Amperage Code
0.15–0.6	A
0.3–1.4	B
1.25–5.0	C
3–12	D
4.5–18	E
8–32	F

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3 Choose the Control Power Source

Table 18.189: Control Power Source Code

Control Circuit Source	System Type	Motor Voltage		Control Voltage		Control Power Source Code	$ Price
		Voltage	Voltage Type	Voltage	Voltage Type		
Common Control	Single Phase	120	AC	120	AC	G7	—
		240	AC	240	AC	U7	—
	Three-Phase	208	AC	208	AC	LE7	—
		240	AC	240	AC	U7	—
Separate Control	Single Phase	120	AC	24	AC	B7▲	—
		120	AC	24	DC	BD▲	—
		120	AC	120	AC	G7▲	—
		240	AC	24	AC	B7▲	—
		240	AC	24	DC	BD▲	—
		240	AC	120	AC	G7▲	—
	Three-Phase	208	AC	24	AC	B7▲	—
		208	AC	24	DC	BD▲	—
		208	AC	120	AC	G7▲	—
		240	AC	24	AC	B7▲	—
		240	AC	24	DC	BD▲	—
		240	AC	120	AC	G7▲	—
		480	AC	24	AC	B7▲	—
		480	AC	24	DC	BD▲	—
		480	AC	120	AC	G7▲	—
		600	AC	24	AC	B7■	—
		600	AC	24	DC	BD■	—
		600	AC	120	AC	G7■	—
Factory Installed Control Power Transformer ♦	Single Phase	120	AC	24	AC	V89	**698.**
		240	AC	120	AC	V80	**698.**
		240	AC	24	AC	V82	**698.**
	Three-Phase	208	AC	24	AC	V90	**698.**
		208	AC	120	AC	V84	**698.**
		240	AC	24	AC	V82	**698.**
		240	AC	120	AC	V80	**698.**
		480	AC	24	AC	V83	**698.**
		480	AC	120	AC	V81	**698.**
		600	AC	24	AC	V91	**698.**
		600	AC	120	AC	V86	**698.**
Factory Installed Power Supply ★	Single Phase	120	AC	24	DC	BD1	**698.**
		240	AC	24	DC	BD2	**827.**
	Three-Phase	208	AC	24	DC	BD2	**827.**
		240	AC	24	DC	BD2	**827.**
		480	AC	24	DC	BD2	**827.**
		600	AC	24	DC	BD6	**1072.**

▲ Form S must be added at the end of the catalog number.
■ Form S6 must be added at the end of the catalog number. Current limiter is provided and factory installed.
♦ Two fuses in primary and one fuse in secondary provided as standard.
★ Fuse holder with 2 fuses provided as standard.

4 Choose Communication Type

If you do not need communication capabilities, select communication code N.

If a Communication protocol is selected, Control Voltage must be 24 Vdc (Control Power Source Codes BD, BD1, BD2 or BD6 only. Refer to Table 18.189).

If additional I/O is needed with communication, select communication code N in Table 18.190 and choose between Forms W10, W11, W12, W13 and W14 in Table 18.204.

Table 18.190: Communication Code

Communication Protocol	Communication Code	$ Price
Modbus	M	**262.00**
Modbus TCP/IP	E	**712.00**
CANopen	C	**262.00**
DeviceNet	D	**262.00**
Beckoff	B	**262.00**
Profibus	P	**262.00**
Advantys STB	A	**262.00**
AS-interface	J	**226.00**
AS-interface V2	K	**226.00**
No Communication	N	—

5 Choose Factory Modifications

When choosing Factory modifications, the Form code must be added at the end of the catalog number. If several forms are selected, they must be arranged in alphabetical order. There are two types of Forms available: abbreviated forms and standard forms.

5.1 Abbreviated Forms

Abbreviated forms are defined combinations of the most commonly ordered standard forms and are part of the profiled configurations with short lead time. For example, abbreviated form CP1 is a combination of standard forms C and P51.

Abbreviated forms cannot be mixed with other standard forms, with the exceptions of forms S and S6. If your combination of forms is not available as an abbreviated form, use only standard forms and arrange them in alphabetical order. For example, LE1U16BDG7NCP1S is a valid catalog number with the abbreviated form CP1. If you want to add standard Form P68, the valid catalog number becomes LE1U16BDG7NCP51P68S. LE1U16BDG7NCP1P68S is invalid because abbreviated form CP1 cannot be used with standard form P68.

Table 18.191: Abbreviated Forms

Factory Modifications	Form	$ Price
Hand/Off/Auto Selector Switch + Red ON LED Standard Pilot Light	CP1	**344.00**
Hand/Off/Auto Selector Switch + Green ON LED Standard Pilot Light	CP2	**344.00**
Hand/Off/Auto Selector Switch + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	C12	**516.00**
Hand/Off/Auto Selector Switch + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	C21	**516.00**
Start/Stop Push Buttons + Red ON LED Standard Pilot Light	AP1	**344.00**
Start/Stop Push Buttons + Green ON LED Standard Pilot Light	AP2	**344.00**
Start/Stop Push Buttons + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	A12	**516.00**
Start/Stop Push Buttons + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	A21	**516.00**
ON/OFF Selector Switch + Red ON LED Standard Pilot Light	C61	**344.00**
ON/OFF Selector Switch + Green ON LED Standard Pilot Light	C62	**344.00**
ON/OFF Selector Switch + Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	C66	**516.00**
ON/OFF Selector Switch + Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	C67	**516.00**
Red ON LED Standard Pilot Light + Green OFF LED Standard Pilot Light	P12	**344.00**
Green ON LED Standard Pilot Light + Red OFF LED Standard Pilot Light	P21	**344.00**

5.2 Standard Forms

Table 18.192: Push Button Forms

Factory Modifications	Form	$ Price
Start/Stop	A	**172.00**
Forward/Reverse/Stop	A1	**172.00**
ON/OFF	A3	**172.00**
Miscellaneous	A11	**172.00**
Stop	A13	**172.00**
Start Push Button + Stop Mushroom Head	A22	**172.00**
Emergency Stop Mushroom Head	A31	**172.00**
Turn-To-Release Emergency Stop Mushroom Head	A32	**172.00**

Table 18.193: Selector Switch Forms

Factory Modifications	Form	$ Price
Hand/Off/Auto	C	**172.00**
Start/Stop	C1	**172.00**
ON/Auto	C2	**172.00**
ON/OFF	C6	**172.00**
Hand/Auto	C8	**172.00**
Forward/OFF/Reverse	C14	**172.00**
Forward/Reverse	C20	**172.00**
Three position	C34	**172.00**
Two position	C35	**172.00**
Keyed Hand/Off/Auto	C36	**376.00**
Keyed Start/Stop	C37	**376.00**
Keyed ON/Auto	C38	**376.00**
Keyed ON/OFF	C39	**376.00**
Keyed Forward/Off/Reverse	C43	**376.00**
Keyed Forward/Reverse	C47	**376.00**

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Table 18.194: 22mm Standard LED Pilot Light Forms

Factory Modifications	Form	$ Price
Red ON	P51	**172.00**
Green OFF	P52	**172.00**
White — Not Factory wired	P54	**172.00**
Blue — Not Factory wired	P56	**172.00**
Amber Overload Trip	P68	**172.00**
Yellow SSC Trip	P69	**172.00**
Red OFF	P91	**172.00**
Green ON	P92	**172.00**
Green Forward/Reverse	P95	**344.00**
Red Forward/Reverse	P96	**344.00**

Table 18.195: 22mm Push-To-Test LED Pilot Light Forms

Factory Modifications	Form	$ Price
Red ON	P42	**223.00**
Red OFF	P43	**223.00**
Green ON	P45	**223.00**
Green OFF	P46	**223.00**
Blue — Not Factory wired	P66	**223.00**
White — Not Factory wired	P67	**223.00**
Green Forward/Reverse	P79	**446.00**
Red Forward/Reverse	P80	**446.00**
Amber Overload Trip	P88	**223.00**
Yellow SSC Trip	P89	**223.00**

Table 18.196: Separate Control Forms

Factory Modifications	Form	$ Price
Separate Control for starters with line voltage less or equal to 480 V	S	—
Separate Control for starters with line voltage equalt to 600 V — Current Limiter is factory installed.	S6	**205.00**

Table 18.197: Additional Capacity Forms

NOTE: *Fuses are provided. Two fuses in primary and one fuse in secondary.*

Factory Modifications	Form	$ Price
50VA additional capacity	T10	**215.00**
100VA additional capacity	T11	**372.00**

Table 18.198: Auxiliary Contact Forms

Factory Modifications	Form	$ Price
2 N.O.	U8	**41.00**
1 N.O. and 1 N.C.	U9	**41.00**
2 N.C.	U10	**41.00**
1 N.C. fault signaling contact and 1 N.O. contact indicating starter is in "ready" state	U6	**41.00**
1 N.O. fault signaling contact and 1 N.O. contact indicating starter is in "ready" state	U7	**41.00**

Table 18.199: Auxiliary Relay Forms

NOTE: *Auxiliary Relays are not factory wired.*

Factory Modifications	Form	$ Price
4 poles screw clamp Control Relay — 4 N.O.	R1740	**485.00**
4 poles screw clamp Control Relay — 3 N.O. and 1 N.C.	R1731	**485.00**
4 poles screw clamp Control Relay — 2 N.O. and 2 N.C.	R1722	**485.00**
Programmable Timer Relay	K1070	**449.00**

Table 18.200: Enclosure Forms

Factory Modifications	Form	$ Price
Oversized enclosure — Only available for Type 1/12/3R	G28	**$425.00**
Plain Blank Door — No covered pre-stamped holes	G30	**TAG**

Table 18.201: Miscellaneous Forms

Factory Modifications	Form	$ Price
Nameplate — 2"x1/2" screwed	A241	**43.00**
Nameplate — 3"x1" screwed	A242	**43.00**
Unwired Terminal Block	G50▲	**57.00**
Wired Terminal Block	G56▲■	**116.00**
Wire markers	G105	**675.00**
Padlock attachment	G122	**75.00**
Transient suppressor	U11	**47.00**
Black IP65 Through the door Rotary Disconnect Handle	G40	**50.00**
Special factory orders	SPL	**TAG**
Custom control wiring	Y217	**TAG**
Solid neutral Terminal Block	N	**116.00**

▲ Add number of terminal block points required. Number must be in increments of 5.
■ Wiring diagram must be provided by customer.

Table 18.202: Increase Short Circuit Current Rating Forms

Factory Modifications	Form	$ Price
130 kA @480 V — Current Limiter factory installed	Y1261	**205.00**

Table 18.203: Soft Starter Forms

NOTE: *Motor Voltage must be equal to or less than 480 Vac and Control Voltage must be 24 Vdc (Control Power Source Codes BD, BD1, or BD2 only. Refer to Table 18.189).*

Factory Modifications	Form	$ Price
Motor FLA ≤ 6A	H1	**160.00**
6 < Motor FLA ≤ 9A	H2	**182.00**
9 < Motor FLA ≤ 12A	H3	**210.00**
12 < Motor FLA ≤ 22A	H4	**263.00**
22 < Motor FLA ≤ 32A	H5	**360.00**

Table 18.204: Distributed 6 Input/6 Output Modicon STB with communication Forms

NOTE: *Distributed I/O Modicon STB is factory wired.*

Factory Modifications	Form	$ Price
DeviceNet Bus	W10	**1340.00**
Modbus TCP Bus	W11	**1417.00**
Ethernet IP Bus	W12	**1503.00**
CANOpen Bus	W13	**1298.00**
Profibus Bus	W14	**1251.00**

Table 18.205: Starter Status Indication Forms

Factory Modifications	Form	$ Price
Fault Differentiation Module — Manual Reset	U1	**187.00**
Fault Differentiation Module — Automatic or remote reset	U2	**187.00**
Thermal Overload Alarm Module	U3	**187.00**
Motor Load Indication Module	U4	**226.00**

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Section 19

Push Buttons and Operator Interface

Type O Compact Light
(p. 19-11)

XVL Compact Light
(p. 19-11)

Type J Compact Light
(p. 19-10)

16 mm XB6
(p. 19-12)

22 mm XB4
(p. 19-23)

22 mm XB5
(p. 19-42)

XB5R Wireless, Batteryless Push Button (p. 19-63)

XB5S Biometric Switch
(p. 19-65)

30 mm Type K
(p. 19-67)

30 mm Type SK
(p. 19-77)

30 mm Type KX
(p. 19-94)

Type KY Enclosure
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Product Panorama

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22 and 30 mm Most Common Complete Operators

XB4, XB5 (22 mm) and Class 9001 Type K, SK (30 mm) most common complete operators assembled with contact blocks and and light modules. Start-Stop, Hand-Off-Auto, and other configurations are offered in this simplified quick selector. 19-8

Compact Pilot Lights

The Compact Pilot Light ranges include the **XVL** miniature LED type; the **Type O** low-cost incandescent; and the **Type J** incandescent, push-to-test types. 19-10

16 mm Push Buttons

XB6 16 mm Push Buttons, selector switches, and pilot lights with a plastic bezel are intended for high density panels such as laboratory and test fixtures. 19-12

22 mm Push Buttons

XB4 22 mm Push Buttons, selector switches, and pilot lights with a metal bezel are designed for industrial applications, and combine ease of installation and robustness. 19-23
XB5 22 mm Push Buttons, the plastic version of the XB4 unit, is particularly suited to applications requiring a resistance to chemical agents and/or double electrical insulation. 19-42
XB5R Plastic and XB4R Metal Wireless, Batteryless Push Buttons 19-63
XB5S Biometric Switches 19-65

30 mm Push Buttons

Class 9001 Type K Chrome-Plated Oiltight/Watertight Push Buttons are intended primarily for machine tool and heavy-duty industrial applications. 19-67
Class 9001 Type SK Non-Metallic Watertight operators are designed for use in highly corrosive areas. 19-77
Class 9001 Type KX operators are Square-Shaped Multifunction Control Units that mount in a Type K mounting hole. This highly versatile line saves space by combining push buttons and pilot lights into one common operator. 19-94

Control Stations and Enclosures

XAL control stations are available pre-assembled or custom assembled. These control stations use push buttons and pilot lights from the **XB5** 22 mm range. **XAP** enclosures are available in glass reinforced polyester, die cast metal and flush mount. 19-100
Type B Standard Duty Control Stations in 1, 2, and 3 button configurations are available as predetermined complete stations. 19-103
Class 9001 Type KY/SKY Heavy Duty Control Stations are ideally suited for commercial and industrial applications. Available in die cast metal, stainless steel, painted sheet steel, and reinforced polyester. 19-105

Tower Lights

Tower Lights and Beacons. XVB, XVC, XVE, and XVP tower lights and beacons provide long distance indication of the operation status or sequences of a machine with with lights or buzzers. 19-107

Pendant Stations

Our full line of pendant stations for most crane and hoist applications range from the light to medium duty **BW** and **XAC** pendants to the heavy duty **SKYP** pendants. 19-117

Foot Switches

The **Type A** foot switch is a heavy duty industrial foot switch which can be used in a variety of industrial applications. 19-124

Rotary Cam Switches

K2 and **K30–K150 Rotary Cam Switches**. Miniature, Custom, and Power Switching Cam Switches provide an inexpensive and versatile means of switching from 10 A logic control through 150 A power switching. 19-126

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Family	XVL	Type O	Type J	XB6
	XVLA1•• XVLA2•• XVLA3••			
Type of Product	**Mini Pilot Light**	**Compact Pilot Light**	**Compact Pilot Light**	**16 mm Push Button (plastic)**
Mounting Hole Diameter	8 mm / 12 mm	17.5 mm (0.68 in)	17.5 mm (0.68 in)	16.2 mm
Approvals	UL Recognized File E164353, CCN NKCR CSA File LR44078, Class 3211-03	UL Recognized File E179183, CCN NKCR CSA File LR25490, Class 3211-03	UL File E78403, CCN NKCR CSA File LR25490, Class 3211-03	UL File E164353, CCN NKCR CSA File LR44087 Class 3211-03
Conforming to Standards	CE Marked RoHS Compliant IEC337-2 NF C 63-140 VDE 0660-200	CE Marked RoHS Compliant	CE Marked RoHS Compliant	CE Marked RoHS Compliant EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-5 EN/IEC 60204-1 and EN/ISO 13850: 2006 (trigger action and mechanical latching Emergency Stop push buttons) JIS C 4520 and 853 UL 508 and CSA C22-2 no. 14 Gost CCC
Degree of Protection	IP40 (IP65 with seal)	NEMA 13	NEMA 4, 13	IP65 NEMA 1, 4, 4X, 12
Electric Shock Protection				
Electrical Consumption				
LED	25 mA			6-30 Vac/Vdc: 15 mA 48–120 Vac: 20 mA
Rated Operational Characteristics				AC-15; B300 Ue = 240 Vac and Ie = 1.5A Ue = 120 Vac and Ie = 3 A Continuous 5 A DC-13; R300 Ue = 250 Vdc and Ie = 0.1 A Ue = 125 Vdc and Ie = 0.22 A
Connection Type	XVLA1** and XVLA2** = 2.8mm x 0.5mm Faston XVLA3** = Screw Terminals	Faston	Screw Terminal —	Quick Connect/ Solder Tabs 0.11 x 0.02 in. (2.8 x 0.5 mm)
Cable Size	1 x 1.5 mm² max.		2 x 14 AWG (copper only)	
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Family	XB4	XB5	9001K	9001SK	9001KX

Type of Product	*22 mm Push Button (metal)	*22 mm Push Button (plastic)	**30 mm Push Button (metal)	**30 mm Push Button (plastic)	**30 mm Push Button (metal, square)
Mounting Hole Diameter	22.5 mm	22.5 mm	31 mm (1.22 in)	31 mm (1.22 in)	31 mm (1.22 in)
Approvals	UL Listed File E164353, CCN NKCR UL Recognized File E164353. CCN NKCR2 CSA File LR44087. Class 3211-03	UL Listed File E164353, CCN NKCR UL Recognized File E164353., CCN NKCR2 CSA File LR44087. Class 3211-03	UL File E78403. CCN NKCR CSA File LR25490. Class 3211-03	UL File E78403. CCN NKCR CSA File LR25490. Class 3211-03	UL File E78403. CCN NKCR CSA File LR25490. Class 3211-03
Conforming to Standards	CE Marked RoHS Compliant EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, EN/IEC 60947-5-5 EN/IEC 60204-1 and EN/ISO 13850: 2006 (trigger action and mechanical latching emergency stop push buttons) EN/IEC 60364-5-53 (emergency switching of mechanical latching push buttons) — JIS C 4520 UL 508 CSA C22.2 No.14 GOST CCC	CE Marked RoHS Compliant EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, EN/IEC 60947-5-5 EN/IEC 60204-1 and EN/ISO 13850: 2006 (trigger action and mechanical latching emergency stop push button). EN/IEC 60364-5-53 (emergency switching of mechanical latching push buttons) EN81-1 (emergency stop trigger action and mechanical latching push buttons with mechanical state indicator) JIS C 4520 UL 508 CSA C22.-2 No.14 GOST CCC	CE Marked RoHS Compliant EN/IEC 60947-1 EN/IEC60947-5-1 EN/IEC60947-5-4 JIS C 4520 and 852 UL 508 CSA C22.2 No.14	CE Marked RoHS Compliant EN/IEC 60947-1 EN/IEC60947-5-1 EN/IEC60947-5-4 JIS C 4520 and 852 UL 508 CSA C22.2 No.14	CE Marked RoHS Compliant
Degree of Protection	IP65 IP66 for booted NEMA 1, 2, 3, 4, 12, 13	IP65 IP66 for booted NEMA 1, 2, 3, 3R, 4, 4X, 12, 13	IP66 NEMA 1, 2, 3, 3R, 4, 12, 13	IP66 NEMA 1, 2, 3, 3R, 4, 4X, 12, 13	IP66 NEMA 1, 2, 3, 3R, 4, 12, 13
Electric Shock Protection	Class I	Class I	Class II	Class II	Class II
Electrical Consumption					
LED	24 Vac/Vdc: 18 mA 120 Vac: 14 mA 240 Vac: 14 mA	24 Vac/Vdc: 18 mA 120 Vac: 14 mA 240 Vac: 14 mA	Incandescent and LED bulbs see ratings on page 19-86	Incandescent and LED bulbs see ratings on page 19-86	
Rated Operational Characteristics	AC-15; B600 Ue = 600 Vac and Ie = 1.2 A Ue = 240 Vac and Ie = 3A Ue = 120 Vac and Ie = 6A Continuous 10 A	AC-15; B600 Ue = 600 Vac and Ie = 1.2 A Ue = 240 Vac and Ie = 3 A Ue = 120 Vac and Ie = 6 A Continuous 10 A	AC-15; A600 Continuous 10 A	AC-15; A600 Continuous 10 A	AC-15; A600 Continuous 10 A
	DC-13; Q600 Ue = 600 Vdc and Ie = 0.1 A Ue = 250 Vdc and Ie = 0.27 A Ue = 125 Vdc and Ie = 0.55 A	DC-13; Q600 Ue = 600 Vdc and Ie = 0.1 A Ue = 250Vdc and Ie = 0.27 A Ue = 125 Vdc and Ie = 0.55 A	DC-13; Q600 Ue = 600 Vdc and Ie = 0.1 A Ue = 250 Vdc and Ie = 0.27 A Ue = 125 Vdc and Ie = 0.55 A	DC-13; Q600 Ue = 600 Vdc and Ie = 0.1 A Ue = 250 Vdc and Ie = 0.27 A Ue = 125 Vdc and Ie = 0.55 A	DC-13; Q600 Ue = 600 Vdc and Ie = 0.1 A Ue = 250 Vdc and Ie = 0.27 A Ue = 125 Vdc and Ie = 0.55 A
Connection Type	IP20 Fingersafe Screw or Spring Terminal		IP20 Fingersafe Screw Terminal		
	Screw Terminal:	Spring Terminal:			
Cable Size	1 x 24 AWG (0.22 mm²) min. 2 x 14 AWG (2.5 mm²) max. 2 x 16 AWG (1.5 mm²) max.	1 x 24 AWG (0.22 mm²) min. 2 x 14 AWG (2.5 mm²) max. 2 x 16 AWG (1.5 mm²) max.	1 x 24 AWG (0.22 mm²) min. 2 x 16 AWG (1.5 mm²) max	1 x 24 AWG (0.22 mm²) min. 2 x 16 AWG (1.5 mm²) max	1 x 24 AWG (0.2 2mm²) min. 2 x 16 AWG (1.5 mm²) max
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Family	XAL	XAP	9001B	9001KY/SKY
	XALD02	XAPA1100 XAPA1104	NEMA 1 Surface Mounting 9001BG•• NEMA 4 9001BW••	NEMA 1 Flush Mounting 9001BF•• NEMA 7 and 9 9001BR••	9001KYSS3 9001KY3 9001KYAF3 9001SKY2
Type of Product/Material	XALD—Polycarbonate XALK—Polycarbonate	XAPA—glass filled polyester XAPG—die cast zinc XAPE—anodized aluminum	9001BG—plastic cover 9001BF—stainless steel 9001BW—die cast zinc 9001BR—cast aluminum	9001KYAF—sheet steel 9001KYSS—stainless steel 9001KY—die cast zinc 9001KZ—die cast zinc 9001SKY—Polyester
Number of holes	1 to 3	0 to 16	1 to 3	1 to 6
Type of Operators	XB5 (22mm)	XB5 (22mm)	Built in	9001K/SK (30mm)
Available without Operators	Yes	Yes	No	Yes
Available with Operators	Yes	No	Yes	Yes
Approvals	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211-03	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211-03	UL File E78403 CCN NKCR CSA File LR 25490 Class 3211-03	UL File E78403 CCN NKCR CSA File LR 25490 Class 3211-03
Conforming to Standards	CE Marked EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, JIS C 4520 UL 508 CSA C22.2 No.14	CE Marked EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, JIS C 4520 UL 508 CSA C22.2 No.14	CE Marked EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, JIS C 4520 UL 508 CSA C22.2 No.14	CE Marked EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC 60947-5-4, JIS C 4520 UL 508 CSA C22.2 No.14
Cable Entry	No. 13 knock out	XAPA—undrilled XAPG—Tapped 3/4NPT XAPE—flush mount (n/a)	9001BG—1/2 &3/4 knockout 9001BF—N/A 9001BW—1/2-14NPT 9001BR—1/2-14NPT	9001KYAF—customer provided 9001KYSS—G conduit hub 9001KY—customer provided 9001KZ—1/2 & 3/4 knockout 9001SKY—G conduit hub
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Family	9001BW	XACA2	XACA0	9001SKYP

Type of Product	2-Button Pendant	2-Button Pistol Grip Pendant	General Purpose Pendant	Heavy Duty Pendant
Number of operators	2	2	2, 3, 4, 6, 8, 12	2, 4, 6, 8, 10
Approvals	UL File E78403 CNN NKCR CSA File LR25490 Class 3211-03	UL File E164353 CNN NKCR CSA File LR 44087 Class 3211-03	UL File E164353 CNN NKCR CSA File LR 44087 Class 3211-03	UL File E78403 CNN NKCR CSA File LR25490 Class 3211-03
Conforming to Standards	CE Marked	EN/IEC 60947-5-1, EN/IEC 60204-32, EN/IEC 60947-5-5, and EN/ISO 13850 (for versions with trigger action emergency stop) UL 508 CSA C22-2 No. 14 RoHS compliant	EN/IEC 60947-5-1, EN/IEC 60204-32, EN/IEC 60947-5-5, and EN/ISO 13850 (for versions with trigger action emergency stop) UL 508 CSA C22-2 No. 14 RoHS compliant	CE Marked
Degree of Protection	NEMA 1, 3, 3R, 4, 4X	NEMA 1, 4, 4X, 5 IP65 IK08	NEMA 1, 4, 4X, 5 IP65 IK08	NEMA 1,2, 3, 4, 4X, 12, 13
Housing Material	Polycarbonate / PET Polyester Blend	Yellow Polypropylene	Yellow Polypropylene	Yellow Polycarbonate
Rated Operational Characteristics ▲	AC - B600	AC-15: A600 or Ue = 600V, Ie = 1.2A or Ue = 240V, Ie = 3A	AC-15: A600 or Ue = 600V, Ie = 1.2A or Ue = 240V, Ie = 3A	SKRU2-SKRU5 AC - B300 DC - P600
	DC - P600	DC-13: Q600 or Ue = 600V. Ie = 0.1A or Ue = 250V, Ie = 0.27A	DC-13: Q600 or Ue = 600V. Ie = 0.1A or Ue = 250V, Ie = 0.27A	SKRU1, 10, 11 AC - A600 DC - P600
Thermal Current	Continuous 5A	Continuous 10A	Continuous 10A	—
Connection Type	1/2 in. NPT screw clamp terminals	8–26 mm cable entry screw clamp terminals	8–26 mm cable entry screw clamp terminals	NPT threaded conduit entry screw clamp terminals
Cable Size	—	1 x 0.5 mm² (20AWG) min. 2 x 1.5 mm² (16AWG) max. 1 x 2.5 mm² (14AWG) max.	1 x 14 AWG (copper only)	—
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▲ OSHA Section 1910.179, *Overhead and Gantry Cranes*, limits voltage at pendant push buttons to 150 Vac or 300 Vdc max.

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Family	XVB L	XVB C	XVP	XVE
Type of Product	Beacon	Tower Light	Tower Light	Tower Light and Beacon
Diameter	70mm	70 mm	50 mm	70 mm
Features	Product for Customer Configuration	Product for Customer Configuration	Product for Customer Configuration	Product for Customer Configuration
Approvals	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211 03	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211 03	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211 03	UL File E164353 CCN NKCR CSA File LR 44087 Class 3211 03
Conforming to Standards	CE Marked IEC/EN 60947-5-1 UL 508 CSA 22.2 No 14	CE Marked IEC/EN 60947-5-1 UL 508 CSA 22.2 No 14	CE Marked IEC/EN 60947-5-1 UL 508 CSA 22.2 No 14	CE Marked IEC/EN 60947-5-1 UL 508 CSA 22.2 No 14
Degree of Protection	IP65	IP65	IP65	IP42
Light Source	LED / Incandescent	LED / Incandescent	LED / Incandescent	LED / Incandescent
Electrical Consumption				
LED Steady	24 Vac/dc: < 30 mA 120–230 Vac: < 30 mA		24 Vac/dc: < 80 mA 120–230 Vac: < 30mA	24V ac/dc: < 25mA 120–230 Vac: I< 25 mA
LED Flashing with Buzzer	24 Vac/dc: < 40 mA 120–230 Vac: < 15mA 1 Hz (1 flash per second)		24 V ac/dc: < 40mA 120–230 Vac: < 15 mA 1 Hz (1 flash per second)	24 V ac/dc: < 30mA 120–230Vac: < 25 mA 1 Hz (1 flash per second)
Strobe (Energized)	24 Vdc: 5 Joules unit < 430 mA; 10 J unit: < 850 mA 120 Vac: 5 Joules unit: < 130 mA; 10 J unit: < 260 mA 230 Vac: 5 Joules unit: < 105 mA; 10 J unit: < 210 mA 1 Hz (1 flash per second)		24 Vdc: ≤40mA 120 Vac: ≤20mA 230 Vac: ≤11mA 1 Hz (1 flash per second)	24 Vdc: ≤85 mA 120 Vac: ≤35 mA 230 Vac: ≤25 mA 1 Hz (1 flash per second)
Audible Sounders	12–48 Vac/dc: < 20 mA 120–230 Vac: < 50 mA 90 decibels at 1 meter —		24 Vdc: ≤15 mA 120 Vac: ≤15 mA 230 Vac: ≤12mA 55 to 85 decibels at 1 meter	85 decibels at 1 meter — — —
Connection Type	Screw Clamp	Screw Clamp	Screw Clamp	Screw Clamp
Cable Size	1 x 16 AWG (1.5 mm²) With Cable End	1 x 16 AWG (1.5 mm²) With Cable End	2 x 16 AWG (1.5 mm²) With Cable End	2 x 16 AWG (1.5 mm²) With Cable End
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Family	XVC 4	XVC 6	XVC 1	XVS	XVR
Type of Product	Tower Light	Tower Light	Tower Light	Siren and Electronic Alarm	Rotating Mirror Beacon
Diameter	40 mm	60 mm	100 mm	—	84/106/120/130 mm
Features	All devices are pre-assembled and pre-wired			Adjustable Tones XVS14BMW, 0 to 105 decibels, 43 tones XVS72BM●●, 0 to 90 decibels, 16 tones	All devices are pre-assembled and pre-wired. XVR12●●●S includes buzzer: 70 to 90 decibels
Approvals	UL Recognized E164353 CNN NKCR	UL Recognized E164353 CNN NKCR	UL Recognized E164353 CNN NKCR	UL Recognized E164353 CNN UCST	UL Recognized E164353 CNN NKCR
	CSA LR44087 Class 3211-03	CSA LR44087 Class 3211-03	CSA LR44087 Class 3211-03	CSA LR44087 Class 3211-03	CSA LR44087 Class 3211-03
Conforming to Standards	CE Marked	CE Marked	CE Marked	CE Marked	CE Marked
	EN61000-6-2	EN61000-6-2	EN61000-6-2	—	EN61000-6-2
	EN61000-6-3	EN61000-6-3	EN61000-6-3	—	EN61000-6-4
	—	EN61000-6-4	EN61000-6-4	—	—
	UL 508	UL 508	UL 508	UL 508	UL 508
	CSA 22.2 No. 14	CSA 22.2 No. 14	CSA 22.2 No. 14	CSA 22.2 No. 14	CSA 22.2 No. 14
Degree of Protection	IP54	IP54	IP54	IP53 / IP54	IP23 / IP65 / IP66
Light Source	LED	LED	LED	—	LED
Electrical Consumption					
LED Steady	24 V: 1 unit = 40mA; 2 unit = 80mA; 3 unit = 120mA 4 unit = 160mA; 5 unit = 200mA		24 V: 1 unit = 100mA; 2 unit = 200mA; 3 unit = 300mA 4 unit = 400mA; 5 unit = 500mA	—	XVR08, XVR10, XVR12, and XVR13 (without buzzer) 12 Vac/dc: 360mA 24 Vac/dc: 180mA
LED Flashing ** with Buzzer	**24 V: 1 unit = 90 mA; 2 unit = 130 mA; 3 unit = 170 mA 4 unit = 210 mA; 5 unit = 250 mA 0.7 to 3 Hz (1 flash per 0.7 to 3 seconds)		24 V: 1 unit = 150mA; 2 unit = 250mA; 3 unit = 350mA 4 unit = 450mA; 5 unit = 550mA 3 to 3.5 Hz (1 flash per 3 to 3.5 seconds)	—	XVR12 with buzzer: 12 Vac/dc: 400 mA 24 Vac/dc: 230 mA 3 Hz (1 flash per 3 seconds)
Strobe (Energized)	—	—	—	—	—
Audible Sounders	*70 to 85 decibels at 1 meter*	70 to 85 decibels at 1 meter	60 to 85 decibels at 1 meter	XVS14BMW 12 Vdc: 350mA 24 Vdc: 400 mA 105 decibels at 1 meter	—
		—	—	XVS72BM 12 Vdc: 280 mA 24 Vdc: 190 mA 90 decibels at 1 meter	—
Connection Type	Pre-Wired, Color-Coded Wires **cable length:** 600mm XVC4●● 900mm XVC4●●K 500mm XVC4●●5S	Pre-Wired, Color-Coded Wires **cable length:** 600mm XVC6●● 850mm XVC6●●K 550mm XVC6●●5S 850mm XVC6●●5SK	Pre-Wired, Color-Coded Wires **cable length:** 500mm XVC1●●K 500mm XVC1●●SK 550mm XVC6●●5S 850mm XVC6●●5SK	XVS14BMW Pre-Wired, Color-Coded Wires **cable length:** 500mm XVS14 XVS72BM●● **Not** Pre-Wired	Pre-Wired cable length: 500mm XVR08●●● 400mm XVR10●●● 400mm XVR12●●● 400mm XVR13●●●
Cable Size	22 AWG (0.33 mm²)	22 AWG (0.33 mm²)	22 AWG (0.33 mm²)	—	18 AWG (0.75 mm²)
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	← **For Tower Lights catalog numbers:** ●○ first dot denotes voltage selection ○● second dot denotes color selection →				

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XB4–XB5 Common Operators, Complete with Contact Blocks

Refer to Catalog **DIA4ED2060507BEN-US**

Table 19.1: BLACK—Start Push Buttons (flush head)

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		1 N.O.	XB4BA21	**38.50**	ZBY2303	**3.40**
XB5 Double Insulated		1 N.O.	XB5AA21	**38.50**	ZBY2303	**3.40**

Table 19.2: BLACK—Off-On Selector Switch

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		1 N.O.	XB4BD21	**51.00**	ZBY2367	**3.40**
XB5 Double Insulated		1 N.O.	XB5AD21	**51.00**	ZBY2367	**3.40**

Table 19.3: RED—120 Vac LED—On Pilot Light

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		120 Vac Red LED	XB4BVG4	**72.00**	ZBY2311	**3.40**
XB5 Double Insulated		120 Vac Red LED	XB5AVG4	**72.00**	ZBY2311	**3.40**

Table 19.4: RED—40 mm Mushroom Stop (Push-Pull)

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		1 N.C.	XB4BT42	**68.00**	ZBY9330	**3.40**
XB5 Double Insulated		1 N.C.	XB5AT42	**68.00**	ZBY9330	**3.40**

When ordering, please specify:

- Quantity
- Type or Catalog Number

Table 19.5: RED—Stop Push Buttons (extended head)

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		1 N.C.	XB4BL42	**38.50**	ZBY2304	**3.40**
XB5 Double Insulated		1 N.C.	XB5AL42	**38.50**	ZBY2304	**3.40**

Table 19.6: Hand-Off-Auto Selector Switch

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		2 N.O.	XB4BD33	**68.00**	ZBY2387	**3.40**
XB5 Double Insulated		2 N.O.	XB5AD33	**68.00**	ZBY2387	**3.40**

Table 19.7: GREEN—120 Vac LED—Off Pilot Light

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
XB4 Die Cast Chrome		120 Vac Green LED	XB4BVG3	**72.00**	ZBY2312	**3.40**
XB5 Double Insulated		120 Vac Green LED	XB5AVG3	**72.00**	ZBY2312	**3.40**

Table 19.8: RED—40 mm Mushroom Emergency Stop (Trigger Action, Turn-to-Release)

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate 60 mm Round	$ Price
XB4 Die Cast Chrome		1 N.O. / 1 N.C.	XB4BS8445	**165.00**	ZBY9330	**3.40**
XB5 Double Insulated		1 N.O./ 1 N.C.	XB5AS8445	**165.00**	ZBY9330	**3.40**

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Table 19.9: BLACK—Start Push Buttons

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)			KR1BH13	**89.00**	KN201	**4.40**
30 mm Corrosion Resistant (Non-Metallic)			SKR1BH13	**89.00**	KN101SP	**4.40**

Table 19.10: BLACK—Off-On Selector Switch

Operator Style	Description	Contact Sequence (Contact Block Included)	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		1 0 0 1	KS11BH13	**106.00**	KN244	**2.90**
30 mm Corrosion Resistant (Non-Metallic)			SKS11BH13	**106.00**	KN144SP	**2.90**

Table 19.11: RED—120 Vac—On Pilot Light

Operator Style	Description	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		KP1R31	**153.00**	KN203	**4.40**
30 mm Corrosion Resistant (Non-Metallic)		SKP1R31	**153.00**	KN103SP	**4.40**

Table 19.12: RED—120 Vac—On Push-To-Test Pilot Light

Operator Style	Description	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		KT1R31	**197.00**	KN203	**4.40**
30 mm Corrosion Resistant (Non-Metallic)		SKT1R31	**197.00**	KN103SP	**4.40**

Table 19.13: RED—Stop Push Buttons

Operator Style	Description	Contact Block	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)			KR1RH13	**89.00**	KN202	**4.40**
30 mm Corrosion Resistant (Non-Metallic)			SKR1RH13	**89.00**	KN102RP	**4.40**

Table 19.14: BLACK—Hand-Off-Auto Selector Switch

Operator Style	Description	Contact Sequence (Contact Block Included)	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		1 0 0 0 0 1	KS43BH13	**106.00**	KN260	**4.40**
30 mm Corrosion Resistant (Non-Metallic)			SKS43BH13	**106.00**	KN160SP	**4.40**

Table 19.15: GREEN—120 Vac—Off Pilot Light

Operator Style	Description	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		KP1G31	**153.00**	KN204	**4.40**
30 mm Corrosion Resistant (Non-Metallic)		SKP1G31	**153.00**	KN104SP	**4.40**

Table 19.16: GREEN—120 Vac—Off Push-To-Test Pilot Light

Operator Style	Description	Type	$ Price	Legend Plate	$ Price
30 mm Industrial (Metal)		KT1G31	**197.00**	KN204	**4.40**
30 mm Corrosion Resistant (Non-Metallic)		SKT1G31	**197.00**	KN104RP	**4.40**

When ordering, please specify:

- Quantity
- Class Number (if appropriate)
- Type or Catalog Number

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XVLA1••

XVL Miniature LED

Table 19.17: Specifications

Conforming to standards	IEC 337-2, NF C 63-140, VDE 0660-200
Degree of protection	IP40 (IP65 with seal) conforming to IEC 529 and NF C 20-010
Current consumption	25 mA
Cabling	XVLA1••, XVLA2••: tags for 2.8 x 0.5 mm Faston connectors, also for soldered connections. XVLA3••: threaded connectors, clamping, capacity: min. 1 x 0.2 mm^2, max. 1 x 1.5 mm^2

XVLA2••

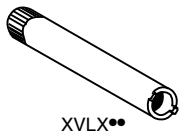
Table 19.18: With Black Bezel, Raised LED

Description	Supply Voltage DC	Color	Catalog Number	$ Price Each
Ø 8 mm ▲ with integral ballast resistor and reverse polarity protection diode Degree of protection IP40 LED pilot lights Ø 8 mm, with black bezel, visible LED XVLA1••	12 V	Green Red Amber	XVLA123 XVLA124 XVLA125	**32.80**
	24 V	Green Red Amber	XVLA133 XVLA134 XVLA135	

XVLA3••

Table 19.19: With Integral Lens Cap, Covered LED

Description	Supply Voltage DC	Color	Catalog Number	$ Price Each
Ø 8 mm▲ with integral ballast resistor and reverse polarity protection diode Degree of protection IP40 Ø 8 mm, with lens incorporated, LED XVLA2	12 V	Green Red Amber	XVLA223 XVLA224 XVLA225	**32.80**
	24 V	Green Red Amber	XVLA233 XVLA234 XVLA235	
Ø 12 mm ■ with integral ballast resistor and reverse polarity protection diode Degree of protection IP40 Ø 12 mm, with lens incorporated, LED XVLA3	12 V	Green Red Amber	XVLA323 XVLA324 XVLA325	**52.00**
	24 V	Green Red Amber	XVLA333 XVLA334 XVLA335	



XVLX••

▲ Quick connects (2.8 x 0.5 mm).
■ Screw termination.

Table 19.20: Accessories

Description		Catalog Number	$ Price Each
Tightening tools (Sold singly)	For Ø 8 mm pilot lights	XVLX08	**18.60**
	For Ø 12 mm pilot lights	XVLX12	**24.00**
Seals (IP65) (Sold in lots of 10)	For Ø 8 mm pilot lights	XVLZ911	**0.65**
	For Ø 12 mm pilot lights	XVLZ912	

XVLZ91•

Class 9001 Type O, NEMA 13 Pilot Lights

Type O

Table 19.21: Instrument Type Incandescent Pilot Lights—Type O NEMA 13

Voltage Vac/Vdc	Avg. Current (A)	Red Lens Type♦	Green Lens Type♦	Amber Lens Type♦	Clear Lens Type♦	Yellow Lens Type♦	White Lens Type♦	Fluted Blue Lens Type♦	$ Price
12	.170	OR12	OG12	OA12	OC12	OY12	OW12	—	
24	.073	OR24	OG24	OA24	OC24	OY24	OW24	FB24	**28.70**
120	.025	OR120	OG120	OA120	OC120	OY120	OW120	FB120	

♦ To order, add prefix 9001 to the beginning of the catalog number.

Table 19.22: Replacement Lamps—Class 9001, Type O

Voltage	Sylvania Lamp Number	Square D Part Number	$ Price
12 V	12PSB	2550105003	
24 V	24PSB	2550105004	**16.50**
120 V	120PSB	2550105005	

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Standard, Push-To-Test, and Remote Test Pilot Lights

Class 9001 Type J compact pilot lights are designed to be mounted in a 0.69 in. (11•16 in. or 17.5 mm) diameter mounting hole. Each terminal accepts up to two 14 AWG wires (CU only). Type J compact pilot lights meet NEMA 4 (watertight) and NEMA 13 (oiltight). Type JT push-to-test pilot lights have contacts built into the encapsulated body. Type JTR remote test pilot lights have dual inputs for one push remote testing—all you need is a push button with a current rating equal to or greater than the total lamp draw. Type JTR remote test pilot lights can also be energized from two separate input signals of the same voltage and polarity. This is done by wiring the Test terminal to the second input signal.

Type JP1R29

Table 19.23: Standard Pilot Light ▲

Style/Voltage	Color Cap■						Lamp	Replacement Lamp	$ Price
	None	$ Price	Red	Green	Yellow	$ Price			
Transformer, 110–120 V, 50–60 Hz	JP1	**143.00**	JP1R29	JP1G29	JP1Y29	**153.00**	6.3 V, 0.15 A	2550101020	**12.50**
Incandescent, 120 Vac/Vdc	JP38	**116.00**	JP38R29	JP38G29	JP38Y29	**126.00**	120 V, 0.015 A	2550101040	**12.50**
Incandescent, 24–28 Vac/Vdc	JP35	**116.00**	JP35R29	JP35G29	JP35Y29	**126.00**	28 V, 0.040 A	2550101024	**12.50**
LED, 24–28 Vac	—	—	JP35LRR29	JP35LGG29	JP35LYY29	**153.00**	28 V, 0.03 A	—	—
LED, 24–28 Vdc	—	—	JP35DRR29	JP35DGG29	JP35DYY29	**153.00**	28 V, 0.03 A	—	—
LED, 120 Vac	—	—	JP38LRR29	JP38LGG29	JP38LYY29	**153.00**	28 V, 0.03 A	—	—
Replacement LED, 120 Vac Red	—	—	—	—	—	—	—	6508805207	**43.00**
Replacement LED, 120 Vac Yellow	—	—	—	—	—	—	—	6508805208	**43.00**
Replacement LED, 120 Vac Green	—	—	—	—	—	—	—	6508805209	**43.00**

Table 19.24: Push-To-Test Pilot Light ▲

Style/Voltage	Color Cap■						Lamp	Replacement Lamp	$ Price
	None	$ Price	Red	Green	Yellow	$ Price			
Transformer, 110–120 V, 50–60 Hz	JT1	**185.00**	JT1R29	JT1G29	JT1Y29	**195.00**	6.3 V, 0.15 A	2550101020	**12.50**
Incandescent, 120 Vac/Vdc	JT38	**158.00**	JT38R29	JT38G29	JT38Y29	**168.00**	120 V, 0.015 A	2550101040	**12.50**
Incandescent, 24-28 Vac/Vdc	JT35	**158.00**	JT35R29	JT35G29	JT35Y29	**168.00**	28 V, 0.040 A	2550101024	**12.50**
LED, 24–28 Vac	—	—	JT35LRR29	JT35LGG29	JT35LYY29	**195.00**	28 V, 0.03 A	—	—
LED, 24–28 Vdc	—	—	JT35DRR29	JT35DGG29	JT35DYY29	**195.00**	28 V, 0.03 A	—	—
LED, 120 Vac	—	—	JT38LRR29	JT38LGG29	JT38LYY29	**195.00**	28 V, 0.03 A		—
Replacement LED, 120 Vac Red	—	—	—	—	—	—	—	6508805207	**43.00**
Replacement LED, 120 Vac Yellow	—	—	—	—	—	—	—	6508805208	**43.00**
Replacement LED, 120 Vac Green	—	—	—	—	—	—	—	6508805209	**43.00**

Table 19.25: Color Caps, Class 9001 Type J

Color	Replacement Color Caps	
	Plastic■	$ Price
Red	R29	**9.90**
Green	G29	
Amber	A29	
Blue	L29	
White	W29	
Yellow	Y29	

Table 19.26: Legend Plates

Description			Maximum Number of Lines	Maximum Number of Characters	Catalog Number■	$ Price
	Blank	Black Field Red Field	2	8	JN100 JN100R	**4.40**
	Special Marking (Specify Marking)	Black Field Red Field			JN199 JN199R	**18.50**
	Blank	Aluminum Field	2	16	JN700	**4.40**
	Special Marking (Specify Marking)	Aluminum Field			JN799	**18.50**

▲ Other voltages are available. Refer to Catalog 9001CT0001.
■ To order, add prefix 9001 to the beginning of the catalog number.

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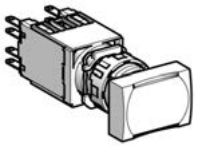

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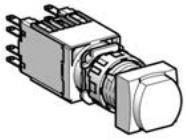

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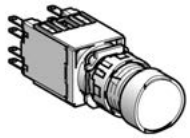

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Table 19.27: Illuminated Push Buttons (12–24 Vac/Vdc LED included)
Complete Units with Quick Connectors/Solder Tabs

Type of Operator	Type of Contact		Color	Rectangular	Square	Round	$ Price
	N.O.	N.C.		Catalog Number			
Flush, spring return	1	—	White	XB6DW1B1B	XB6CW1B1B	XB6AW1B1B	44.40
			Green	XB6DW3B1B	XB6CW3B1B	XB6AW3B1B	
			Yellow	XB6DW5B1B	XB6CW5B1B	XB6AW5B1B	
			Blue	XB6DW6B1B	XB6CW6B1B	XB6AW6B1B	
	—	1	Red	XB6DW4B2B	XB6CW4B2B	XB6AW4B2B	44.40
	1	1	White	XB6DW1B5B	XB6CW1B5B	XB6AW1B5B	52.00
			Green	XB6DW3B5B	XB6CW3B5B	XB6AW3B5B	
			Red	XB6DW4B5B	XB6CW4B5B	XB6AW4B5B	
			Yellow	XB6DW5B5B	XB6CW5B5B	XB6AW5B5B	
			Blue	XB6DW6B5B	XB6CW6B5B	XB6AW6B5B	
Flush, maintained	1	—	White	XB6DF1B1B	XB6CF1B1B	XB6AF1B1B	44.40
			Green	XB6DF3B1B	XB6CF3B1B	XB6AF3B1B	
			Yellow	XB6DF5B1B	XB6CF5B1B	XB6AF5B1B	
			Blue	XB6DF6B1B	XB6CF6B1B	XB6AF6B1B	
	—	1	Red	XB6DF4B2B	XB6CF4B2B	XB6AF4B2B	44.40
	1	1	White	XB6DF1B5B	XB6CF1B5B	XB6AF1B5B	52.00
			Green	XB6DF3B5B	XB6CF3B5B	XB6AF3B5B	
			Red	XB6DF4B5B	XB6CF4B5B	XB6AF4B5B	
			Yellow	XB6DF5B5B	XB6CF5B5B	XB6AF5B5B	
			Blue	XB6DF6B5B	XB6CF6B5B	XB6AF6B5B	
Extended, spring return	1	—	White	XB6DE1B1B	XB6CE1B1B	XB6AE1B1B	44.40
			Green	XB6DE3B1B	XB6CE3B1B	XB6AE3B1B	
			Yellow	XB6DE5B1B	XB6CE5B1B	XB6AE5B1B	
			Blue	XB6DE6B1B	XB6CE6B1B	XB6AE6B1B	
	—	1	Red	XB6DE4B2B	XB6CE4B2B	XB6AE4B2B	44.40
	1	1	White	XB6DE1B5B	XB6CE1B5B	XB6AE1B5B	52.00
			Green	XB6DE3B5B	XB6CE3B5B	XB6AE3B5B	
			Red	XB6DE4B5B	XB6CE4B5B	XB6AE4B5B	
			Yellow	XB6DE5B5B	XB6CE5B5B	XB6AE5B5B	
			Blue	XB6DE6B5B	XB6CE6B5B	XB6AE6B5B	

Table 19.28: Illuminated Push Buttons (120 Vac LED included)
Complete Units with Quick Connectors/Solder Tabs

Type of Operator	Type of Contact		Color	Rectangular	Square	Round	$ Price
	N.O.	N.C.		Catalog Number			
Flush, spring return	1	—	White	XB6DW1G1B	XB6CW1G1B	XB6AW1G1B	44.40
			Green	XB6DW3G1B	XB6CW3G1B	XB6AW3G1B	
			Yellow	XB6DW5G1B	XB6CW5G1B	XB6AW5G1B	
			Blue	XB6DW6G1B	XB6CW6G1B	XB6AW6G1B	
	—	1	Red	XB6DW4G2B	XB6CW4G2B	XB6AW4G2B	44.40
	1	1	White	XB6DW1G5B	XB6CW1G5B	XB6AW1G5B	52.00
			Green	XB6DW3G5B	XB6CW3G5B	XB6AW3G5B	
			Red	XB6DW4G5B	XB6CW4G5B	XB6AW4G5B	
			Yellow	XB6DW5G5B	XB6CW5G5B	XB6AW5G5B	
			Blue	XB6DW6G5B	XB6CW6G5B	XB6AW6G5B	
Flush, maintained	1	—	White	XB6DF1G1B	XB6CF1G1B	XB6AF1G1B	44.40
			Green	XB6DF3G1B	XB6CF3G1B	XB6AF3G1B	
			Yellow	XB6DF5G1B	XB6CF5G1B	XB6AF5G1B	
			Blue	XB6DF6G1B	XB6CF6G1B	XB6AF6G1B	
	—	1	Red	XB6DF4G2B	XB6CF4G2B	XB6AF4G2B	44.40
	1	1	White	XB6DF1G5B	XB6CF1G5B	XB6AF1G5B	52.00
			Green	XB6DF3G5B	XB6CF3G5B	XB6AF3G5B	
			Red	XB6DF4G5B	XB6CF4G5B	XB6AF4G5B	
			Yellow	XB6DF5G5B	XB6CF5G5B	XB6AF5G5B	
			Blue	XB6DF6G5B	XB6CF6G5B	XB6AF6G5B	
Extended, spring return	1	—	White	XB6DE1G1B	XB6CE1G1B	XB6AE1G1B	44.40
			Green	XB6DE3G1B	XB6CE3G1B	XB6AE3G1B	
			Yellow	XB6DE5G1B	XB6CE5G1B	XB6AE5G1B	
			Blue	XB6DE6G1B	XB6CE6G1B	XB6AE6G1B	
	—	1	Red	XB6DE4G2B	XB6CE4G2B	XB6AE4G2B	44.40
	1	1	White	XB6DE1G5B	XB6CE1G5B	XB6AE1G5B	52.00
			Green	XB6DE3G5B	XB6CE3G5B	XB6AE3G5B	
			Red	XB6DE4G5B	XB6CE4G5B	XB6AE4G5B	
			Yellow	XB6DE5G5B	XB6CE5G5B	XB6AE5G5B	
			Blue	XB6DE6G5B	XB6CE6G5B	XB6AE6G5B	

Legends . . . . . pages 19-20 and 19-22

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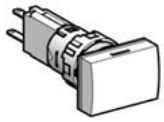
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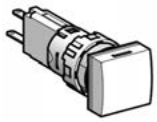
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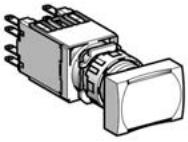
XB6AV••B

Table 19.29: Pilot Lights (12–24 Vac/Vdc LED included)
Complete Units with Quick Connectors/Solder Tabs

Color	Rectangular	Square	Round	$ Price
	Catalog Number			
White	XB6DV1BB	XB6CV1BB	XB6AV1BB	27.30
Green	XB6DV3BB	XB6CV3BB	XB6AV3BB	
Red	XB6DV4BB	XB6CV4BB	XB6AV4BB	
Yellow	XB6DV5BB	XB6CV5BB	XB6AV5BB	
Blue	XB6DV6BB	XB6CV6BB	XB6AV6BB	

Table 19.30: Pilot Lights (120 Vac LED)
Complete Units with Quick Connectors/Solder Tabs

Color	Rectangular	Square	Round	$ Price
	Catalog Number			
White	XB6DV1GB	XB6CV1GB	XB6AV1GB	27.30
Green	XB6DV3GB	XB6CV3GB	XB6AV3GB	
Red	XB6DV4GB	XB6CV4GB	XB6AV4GB	
Yellow	XB6DV5GB	XB6CV5GB	XB6AV5GB	
Blue	XB6DV6GB	XB6CV6GB	XB6AV6GB	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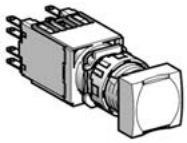
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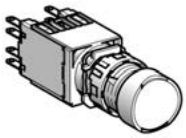
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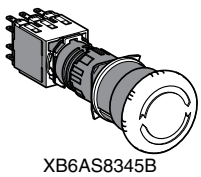
Table 19.31: Push Buttons (Non-Illuminated)
Complete Units with Quick Connectors/Solder Tabs

Type of Push	Type of Contact		Color	Rectangular	Square	Round	$ Price
	N.O.	N.C.		Catalog Number			
Flush, spring return	1	—	White	XB6DA11B	XB6CA11B	XB6AA11B	26.20
			Black	XB6DA21B	XB6CA21B	XB6AA21B	
			Green	XB6DA31B	XB6CA31B	XB6AA31B	
			Yellow	XB6DA51B	XB6CA51B	XB6AA51B	
			Blue	XB6DA61B	XB6CA61B	XB6AA61B	
	—	1	Black	XB6DA22B	XB6CA22B	XB6AA22B	26.20
			Red	XB6DA42B	XB6CA42B	XB6AA42B	
	1	1	White	XB6DA15B	XB6CA15B	XB6AA15B	34.10
			Black	XB6DA25B	XB6CA25B	XB6AA25B	
			Green	XB6DA35B	XB6CA35B	XB6AA35B	
			Red	XB6DA45B	XB6CA45B	XB6AA45B	
			Yellow	XB6DA55B	XB6CA55B	XB6AA55B	
			Blue	XB6DA65B	XB6CA65B	XB6AA65B	

Table 19.32: Trigger Action Emergency Stop Mushroom Head Push Buttons (Color Red)▲

Shape of Head	Type of Push	Type of Contact		Diameter of Head (mm)	Catalog Number	$ Price
		N.O.	N.C.			
	Turn-to-release	—	1	30	XB6AS8342B	65.00
		1	1	30	XB6AS8345B	73.00
	Key release	—	1	30	XB6AS9342B■	78.00
		1	1	30	XB6AS9345B■	87.00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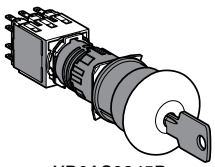
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▲ Complies with EN418/ISO13850 standards for Emergency Stop push buttons when used with circular Legend Plate ZB6Y7330 (see page 19-22)
■ Ronis 200 key

Table 19.33: Circular Legends, 45 mm

Description	Color	Text	Catalog Number	$ Price
Circular legends, 45 mm	Yellow	Blank	ZB6Y7001	3.40
		Emergency stop	ZB6Y7330	

Legends . . . . . pages 19-20 and 19-22

ZB6Y7330

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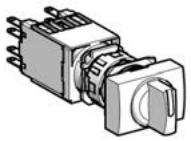
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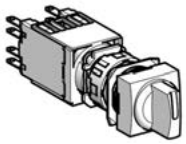
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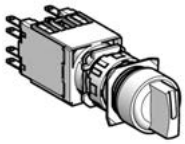
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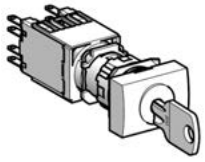
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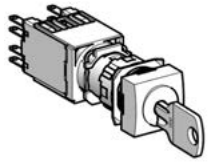
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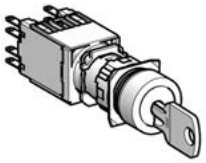
XB6AG••B

Table 19.34: Selector Switches (Switching Angle: Handle: 60°, Key: 70°)
Complete Units with Quick Connectors/Solder Tabs

Type of Operator	Type of Contact		Number and Type of Positions		Rectangular	Square	Round	$ Price
	N.O.	N.C.			Catalog Number			
Handle	1	—	2-maintained		XB6DD221B	XB6CD221B	XB6AD221B	**29.70**
	1	1	2-maintained		XB6DD225B	XB6CD225B	XB6AD225B	**37.60**
			3-maintained		XB6DD235B	XB6CD235B	XB6AD235B	**37.60**
	2	—	3-maintained		XB6DD233B	XB6CD233B	XB6AD233B	**37.60**
Key	1	1	2-maintained		XB6DGC5B	XB6CGC5B	XB6AGC5B	**68.00**
			2-maintained		XB6DGB5B	XB6CGB5B	XB6AGB5B	**68.00**
			3-maintained		XB6DGH5B	XB6CGH5B	XB6AGH5B	**68.00**
	2	—	3-maintained		XB6DGH3B	XB6CGH3B	XB6AGH3B	**68.00**

Note: Indicates key withdrawal position.

Table 19.35: Selector Switch Sequence

2 Position Selector Switch		
		Contact block guide ▲
O	X	1 N.O. (left or right)
X	O	1 N.C. (left or right)
O X	X O	1 N.O. and 1 N.C.

3 Position Selector Switch			
			Contact block guide ▲
O	O	X	1 N.O. (left)
X	O	X	2 N.O. wired in **parallel** (side by side)
X	O	O	1 N.O. (right)
O	X	X	1 N.C. (right)
X	X	O	1 N.C. (left)
O	X	O	2 N.C. wired in **series** (side by side)

▲ As viewed from the front of the panel.

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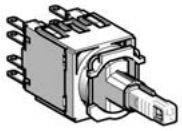

ZB6ZB••B

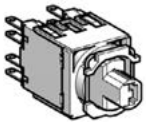

ZB6ZH••B

Table 19.36: Contact Blocks and Light Modules for Illuminated Push Buttons▲

Description	Supply Voltage	Type of Contact N.O.	Type of Contact N.C.	Color of Light Source	Catalog Number	$ Price
Quick connectors/solder tabs						
Integral LED ■	12–24 Vac/Vdc	1	—	White Green Yellow Blue	ZB6ZB11B ZB6ZB31B ZB6ZB51B ZB6ZB61B	**28.00**
		—	1	Red Yellow	ZB6ZB42B ZB6ZB52B	**28.00**
		1	1	White Green Red Yellow Blue	ZB6ZB15B ZB6ZB35B ZB6ZB45B ZB6ZB55B ZB6ZB65B	**35.20**
	120 Vac	1	—	White Green Yellow Blue	ZB6ZG11B ZB6ZG31B ZB6ZG51B ZB6ZG61B	**28.00**
		—	1	Red Yellow	ZB6ZG42B ZB6ZG52B	**28.00**
		1	1	White Green Red Yellow Blue	ZB6ZG15B ZB6ZG35B ZB6ZG45B ZB6ZG55B ZB6ZG65B	**35.20**
Direct for incandescent bulb (not included)★	≤24 Vac/Vdc	1	—	—	ZB6ZH01B	**23.80**
		—	1	—	ZB6ZH02B	**23.80**
		1	1	—	ZB6ZH05B	**31.00**

ZB6Z•B

Table 19.37: Contact Blocks for Push Buttons and Selector Switches

Description	Type of Contact N.O.	Type of Contact N.C.	Catalog Number	$ Price
Quick connectors/solder tabs				
Contact blocks with mounting base	1	—	ZB6Z1B	**9.40**
	—	1	ZB6Z2B	**9.40**
	2	—	ZB6Z3B	**16.60**
	—	2	ZB6Z4B	**16.60**
	1	1	ZB6Z5B	**16.60**

ZB6E••B

ZB6E•0B

Table 19.38: Light Modules for Pilot Lights

Description	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Quick connectors/solder tabs△				
Integral LED♦	12–24 Vac/Vdc	White Green Red Yellow Blue	ZB6EB1B ZB6EB3B ZB6EB4B ZB6EB5B ZB6EB6B	**16.60**
	120 Vac	White Green Red Yellow Blue	ZB6EG1B ZB6EG3B ZB6EG4B ZB6EG5B ZB6EG6B	**16.60**
With resistor for 95 V neon bulb (not included) ★▼	110 Vac	—	ZB6EG0B	**15.60**
	230 Vac	—	ZB6EM0B	**15.60**
Direct supply for 0.6 W max. incandescent bulb (not included)★	≤24 Vac/Vdc	—	ZB6EH0B	**14.40**

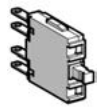
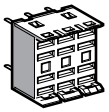

ZB6E•B

Table 19.39: Separate Contact Blocks (Maximum of 3 contacts per mounting base.)

Contact Material	For use with mounting base	Type of Contact N.O.	Type of Contact N.C.	Catalog Number	$ Price
Silver alloy	Quick connectors/solder tabs	1	—	ZB6E1B	**7.20**
		—	1	ZB6E2B	**7.20**
Gold flashed	Quick connectors/solder tabs	1	—	ZB6E1E	**12.40**
		—	1	ZB6E2E	**12.40**

▲ Illuminated selector switches can be assembled by using a contact block/light module assembly in conjunction with a selector switch head, supplied without handle, and a transparent handle. See page 19-16.
■ The LED must be the same color as the push button cap.
♦ The LED must be the same color as the lens.
★ Order bulbs separately. See page 19-22.
▼ Neon bulb can only be used with a red, yellow, or white cap.
△ Electrical components with connection by printed circuit board pins are available. See page 19-22.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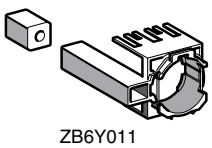
ZB6Y011

Table 19.40: Accessories for Printed Circuit Board Installations

Description	for use with	Catalog Number
Plug-in Socket Adapter	contact blocks and light modules	ZB6Y010
Body Bracket	plug-in socket adapter	ZB6Y011

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ZB6DW•

ZB6CE•

ZB6AF•

Table 19.41: Heads for Illuminated Push Buttons
(To combine with complete bodies and contact blocks, see page 19-15)

Type of Push	Color	Rectangular	Square	Round	$ Price
		Catalog Number			
Flush, spring return	White	ZB6DW1	ZB6CW1	ZB6AW1	
	Green	ZB6DW3	ZB6CW3	ZB6AW3	
	Red	ZB6DW4	ZB6CW4	ZB6AW4	**14.40**
	Yellow	ZB6DW5	ZB6CW5	ZB6AW5	
	Blue	ZB6DW6	ZB6CW6	ZB6AW6	
	5 colors ▲	ZB6DW9	ZB6CW9	ZB6AW9	**16.40**
Flush, maintained	White	ZB6DF1	ZB6CF1	ZB6AF1	
	Green	ZB6DF3	ZB6CF3	ZB6AF3	
	Red	ZB6DF4	ZB6CF4	ZB6AF4	**14.40**
	Yellow	ZB6DF5	ZB6CF5	ZB6AF5	
	Blue	ZB6DF6	ZB6CF6	ZB6AF6	
	5 colors ▲	ZB6DF9	ZB6CF9	ZB6AF9	**16.40**
Extended, spring return	White	ZB6DE1	ZB6CE1	ZB6AE1	
	Green	ZB6DE3	ZB6CE3	ZB6AE3	
	Red	ZB6DE4	ZB6CE4	ZB6AE4	**14.40**
	Yellow	ZB6DE5	ZB6CE5	ZB6AE5	
	Blue	ZB6DE6	ZB6CE6	ZB6AE6	
	5 colors▲	ZB6DE9	ZB6CE9	ZB6AE9	**16.40**

▲ Five different color caps included with head (white, green, red, yellow, and blue).

ZB6DV•

ZB6CV•

ZB6AV•

Table 19.42: Heads for Pilot Lights
(To combine with light modules, see page 19-15.)

Color	Rectangular	Square	Round	$ Price
	Catalog Number			
White	ZB6DV1	ZB6CV1	ZB6AV1	
Green	ZB6DV3	ZB6CV3	ZB6AV3	
Red	ZB6DV4	ZB6CV4	ZB6AV4	**8.20**
Yellow	ZB6DV5	ZB6CV5	ZB6AV5	
Blue	ZB6DV6	ZB6CV6	ZB6AV6	
5 colors ■	ZB6DV9	ZB6CV9	ZB6AV9	**10.20**

■ Five different color caps included with head (white, green, red, yellow, and blue).

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Non-Illuminated Operators

ZB6DA•

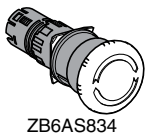
ZB6CA•

ZB6AA•

Table 19.43: Heads for Push Buttons (To combine with complete bodies and contact blocks, see page 19-15.)

Type of Push	Color	Rectangular	Square	Round	$ Price
		Catalog Number			
Flush, spring return	White	ZB6DA1	ZB6CA1	ZB6AA1	14.40
	Black	ZB6DA2	ZB6CA2	ZB6AA2	
	Green	ZB6DA3	ZB6CA3	ZB6AA3	
	Red	ZB6DA4	ZB6CA4	ZB6AA4	
	Yellow	ZB6DA5	ZB6CA5	ZB6AA5	
	Blue	ZB6DA6	ZB6CA6	ZB6AA6	
	6 colors▲	ZB6DA9	ZB6CA9	ZB6AA9	16.40

▲ Five different color caps included with head (white, green, red, yellow, and blue).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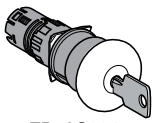
ZB6AS934

Table 19.44: Mushroom Heads for Trigger Action Push Buttons (30 mm)■

Shape of Head	Type of Push	Cap Color	Catalog Number	$ Price
	Turn-to-release	Red	ZB6AS834	49.60
	Key release	Red	ZB6AS934♦	62.60

Table 19.45: Circular Legends, 45 mm

Description	Color	Text	Catalog Number	$ Price
Circular legends, 45 mm	Yellow	Blank	ZB6Y7001	3.40
		Emergency stop	ZB6Y7330	

■ Complies with EN418/ISO13850 standards for Emergency Stop push buttons when used with circular Legend Plate ZB6Y7330 (see page 19-22)
♦ Ronis 200 key

ZB6Y7330

Non-Illuminated Selector Switches

ZB6DD••

ZB6CD••

ZB6AD••

Table 19.46: Heads for Non-Illuminated Selector Switches▲♦ (To combine with complete bodies and contact blocks, see page 19-15.)

Number and Type of Positions		Color of Handle	Rectangular	Square	Round	$ Price
			Catalog Number			
Switching angle: maintained positions 60°, spring return positions 45°						
2-maintained		Black	ZB6DD22	ZB6CD22	ZB6AD22	17.60
2-maintained		Black	ZB6DD28■	ZB6CD28■	ZB6AD28■	
3-maintained		Black	ZB6DD23	ZB6CD23	ZB6AD23	
2-spring return to center		Black	ZB6DD24	ZB6CD24	ZB6AD24	
3-spring return to center		Black	ZB6DD25	ZB6CD25	ZB6AD25	
3-spring return from right to center		Black	ZB6DD26	ZB6CD26	ZB6AD26	
3-spring return from left to center		Black	ZB6DD27	ZB6CD27	ZB6AD27	

▲ For bodies with 2 contact blocks, maximum.
■ Switching angle: maintained positions 90°.
♦ See selector switch sequence charts on page 19-19.

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Table 19.47: Heads for Non-Illuminated Selector Switches▲♦
(To combine with complete bodies and contact blocks, see page 19-15.)

ZB6DD••

ZB6CD••

ZB6AD••

Number and Type of Positions		Color of Handle	Rectangular	Square	Round	$ Price
			Catalog Number			
Switching angle: maintained positions 60°, spring return positions 45°						
2-maintained		Black	ZB6DD22	ZB6CD22	ZB6AD22	
2-maintained		Black	ZB6DD28■	ZB6CD28■	ZB6AD28■	
3-maintained		Black	ZB6DD23	ZB6CD23	ZB6AD23	
2-spring return to center		Black	ZB6DD24	ZB6CD24	ZB6AD24	**17.60**
3-spring return to center		Black	ZB6DD25	ZB6CD25	ZB6AD25	
3-spring return from right to center		Black	ZB6DD26	ZB6CD26	ZB6AD26	
3-spring return from left to center		Black	ZB6DD27	ZB6CD27	ZB6AD27	

▲ For bodies with 2 contact blocks, maximum.
■ Switching angle: maintained positions 90°.
♦ See selector switch sequence charts on page 19-14.

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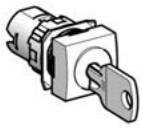
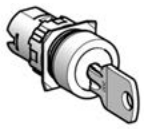
Table 19.48: Heads for Ronis Key Operated Selector Switches ▲
(To combine with complete bodies and contact blocks, see page 19-15.)

ZB6DG•


ZB6CG•


ZB6AG•

Number and Type of Positions		Key Withdrawal	Rectangular	Square	Round	$ Price
			Catalog Number			
Switching angle: maintained positions 70°, spring return positions 45°						
2-maintained		Right-hand position	ZB6DGA	ZB6CGA	ZB6AGA	
		Center position	ZB6DGB	ZB6CGB	ZB6AGB	
		Both positions	ZB6DGC	ZB6CGC	ZB6AGC	
2-spring return from right to center		Center position	ZB6DGL	ZB6CGL	ZB6AGL	
3-maintained		Left-hand position	ZB6DGD	ZB6CGD	ZB6AGD	
		Center position	ZB6DGE	ZB6CGE	ZB6AGE	
		Left-hand and center positions	ZB6DGF	ZB6CGF	ZB6AGF	
		Right-hand position	ZB6DGG	ZB6CGG	ZB6AGG	45.60
		All 3 positions	ZB6DGH	ZB6CGH	ZB6AGH	
		Left-hand and right-hand positions	ZB6DGJ	ZB6CGJ	ZB6AGJ	
		Right-hand and center positions	ZB6DGK	ZB6CGK	ZB6AGK	
3-spring return from right to center		Left-hand position	ZB6DGQ	ZB6CGQ	ZB6AGQ	
		Center position	ZB6DGR	ZB6CGR	ZB6AGR	
		Left-hand and center positions	ZB6DGS	ZB6CGS	ZB6AGS	
3-spring return to center		Center position	ZB6DGT	ZB6CGT	ZB6AGT	

Note: Indicates key withdrawal position.
▲ Ronis 200 key standard.

Table 19.49: Selector Switch Sequence (using contact block assemblies, page 19-15)

2 Position Selector Switch		
		Contact block guide ■
O	X	1 N.O. (left or right)
X	O	1 N.C. (left or right)
O X	X and O	1 N.O. 1 N.C.

3 Position Selector Switch			
			Contact block guide ■
O	O	X	1 N.O. (left)
X	O	X	2 N.O. wired in **parallel** (side by side)
X	O	O	1 N.O. (right)
O	X	X	1 N.C. (right)
X	X	O	1 N.C. (left)
O	X	O	2 N.C. wired in **series** (side by side)

■ As viewed from the front of the panel.

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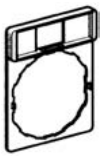
ZB6YD20

Table 19.50: Standard Legend Plate (24 X 28 mm) for 8 X 21 mm Legend ▲

Description	Background Color of Legend	Catalog Number	$ Price
Without legend insert	—	ZB6YD20	**2.00**
With blank legend insert	White or yellow	ZB6YD21	**3.40**
	Black or red	ZB6YD22	**3.40**

ZB6Y2178

ZB6Y2304

Table 19.51: 8 x 21 mm Marked Legends (for 24 x 28 mm legend holder ZB6YD20) ▲

Color	Marking		Catalog Number	$ Price
White Text Red Background (Stop and Fault) Black Background (all others)	International	O-I	ZB6Y2178	**1.60**
		I-II	ZB6Y2179	
		I-O-II	ZB6Y2186	
		◄—O—►	ZB6Y2190	
	English	HAND-O-AUTO	ZB6Y2387	
		CLOSE	ZB6Y2314	
		DOWN	ZB6Y2308	
		FORWARD	ZB6Y2305	
		FAULT	ZB6Y2334	
		LEFT	ZB6Y2310	
		OFF	ZB6Y2312	
		ON	ZB6Y2303	
		OPEN	ZB6Y2313	
		RESET	ZB6Y2323	
		REVERSE	ZB6Y2306	
		RIGHT	ZB6Y2309	
		RUN	ZB6Y2311	
		STOP	ZB6Y2304	
		UP	ZB6Y2307	

▲ Additional legend plate sizes and markings are available in Catalog **9001CT1102**.

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Table 19.52: Push Button Caps—Marked

ZB6YD•10

ZB6YC•10

ZB6YA•10

ZB6YD•17

ZB6YD•19

ZB6YC•19

ZB6YA•19

Ink Marking Color: White on colored cap Black on white cap	Color	Rectangular	Square	Round	$ Price
		Catalog Number			
For non-illuminated push buttons					
0	White	ZB6YD100	ZB6YC100	ZB6YA100	
	Black	ZB6YD200	ZB6YC200	ZB6YA200	
1	White	ZB6YD101	ZB6YC101	ZB6YA101	
	Black	ZB6YD201	ZB6YC201	ZB6YA201	
2	White	ZB6YD102	ZB6YC102	ZB6YA102	
	Black	ZB6YD202	ZB6YC202	ZB6YA202	
3	White	ZB6YD103	ZB6YC103	ZB6YA103	
	Black	ZB6YD203	ZB6YC203	ZB6YA203	
4	White	ZB6YD104	ZB6YC104	ZB6YA104	
	Black	ZB6YD204	ZB6YC204	ZB6YA204	
5	White	ZB6YD105	ZB6YC105	ZB6YA105	
	Black	ZB6YD205	ZB6YC205	ZB6YA205	
6	White	ZB6YD106	ZB6YC106	ZB6YA106	
	Black	ZB6YD206	ZB6YC206	ZB6YA206	
7	White	ZB6YD107	ZB6YC107	ZB6YA107	
	Black	ZB6YD207	ZB6YC207	ZB6YA207	
8	White	ZB6YD108	ZB6YC108	ZB6YA108	
	Black	ZB6YD208	ZB6YC208	ZB6YA208	
9	White	ZB6YD109	ZB6YC109	ZB6YA109	
	Black	ZB6YD209	ZB6YC209	ZB6YA209	
ON	White	ZB6YD117	ZB6YC117	ZB6YA117	
	Green	ZB6YD317	ZB6YC317	ZB6YA317	
OFF	Black	ZB6YD224	ZB6YC224	ZB6YA224	
	Red	ZB6YD424	ZB6YC424	ZB6YA424	
I	White	ZB6YD111	ZB6YC111	ZB6YA111	
	Green	ZB6YD311	ZB6YC311	ZB6YA311	
O	Black	ZB6YD210	ZB6YC210	ZB6YA210	
	Red	ZB6YD410	ZB6YC410	ZB6YA410	
R	Black	ZB6YD226	ZB6YC226	ZB6YA226	4.20
	Blue	ZB6YD626	ZB6YC626	ZB6YA626	
START	White	ZB6YD140	ZB6YC140	ZB6YA140	
	Green	ZB6YD340	ZB6YC340	ZB6YA340	
STOP	Black	ZB6YD241	ZB6YC241	ZB6YA241	
	Red	ZB6YD441	ZB6YC441	ZB6YA441	
II	White	ZB6YD112	ZB6YC112	ZB6YA112	
	Black	ZB6YD212	ZB6YC212	ZB6YA212	
III	White	ZB6YD113	ZB6YC113	ZB6YA113	
	Black	ZB6YD213	ZB6YC213	ZB6YA213	
+	White	ZB6YD114	ZB6YC114	ZB6YA114	
	Black	ZB6YD214	ZB6YC214	ZB6YA214	
-	White	ZB6YD115	ZB6YC115	ZB6YA115	
	Black	ZB6YD215	ZB6YC215	ZB6YA215	
UP	White	ZB6YD127	ZB6YC127	ZB6YA127	
	Black	ZB6YD227	ZB6YC227	ZB6YA227	
DOWN	White	ZB6YD128	ZB6YC128	ZB6YA128	
	Black	ZB6YD228	ZB6YC228	ZB6YA228	
CLOSE	White	ZB6YD132	ZB6YC132	ZB6YA132	
	Black	ZB6YD232	ZB6YC232	ZB6YA232	
⬆	White	ZB6YD119	ZB6YC119	ZB6YA119	
	Black	ZB6YD219	ZB6YC219	ZB6YA219	
⬇	White	ZB6YD120	ZB6YC120	ZB6YA120	
	Black	ZB6YD220	ZB6YC220	ZB6YA220	
➡	White	ZB6YD121	ZB6YC121	ZB6YA121	
	Black	ZB6YD221	ZB6YC221	ZB6YA221	
⬅	White	ZB6YD122	ZB6YC122	ZB6YA122	
	Black	ZB6YD222	ZB6YC222	ZB6YA222	

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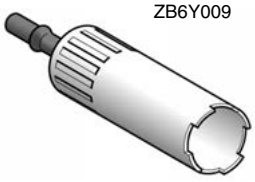
ZB6Y009

ZB6Y002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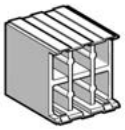
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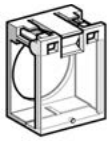
ZB6Y005

ZB6Y007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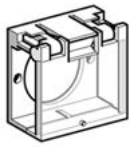
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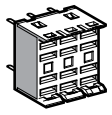
ZB6YD20

ZB6Y2178

ZB6Y2304

ZB6Y7330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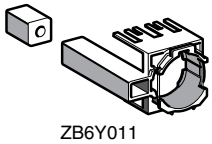
ZB6Y011

Table 19.53: Accessories

Description	Application	Catalog Number	$ Price
Body	Fitting contact blocks	ZB6Y009	**2.00**
Bezel tightening tool + bulb extractor	Fixing the switch and changing bulbs	ZB6Y905	**4.20**
Three piece tool kit	—	ZB6Y019	**12.40**
Nut	Fixing head to panel	ZB6Y002	**2.00**
Adaptor	Flush mounting a circular head push button or pilot light in Ø 22 mm cut-out	ZB6YA002	**6.20**
Shroud	Protecting contacts against touching	ZB6Y001	**3.40**
Protective cover	Circular and square head push buttons and switches	ZB6YA001	**16.60**
	Rectangular head push buttons and switches	ZB6YD001	**16.60**
Female Quick connector/Solder tab	Sold in lots of 100 pieces	ZB6Y004	**0.42**
Blanking plug	Plugging an unused knockout	ZB6Y005	**4.20**
Ronis key, 2 pieces	Key operated selector switches and emergency stop mushroom	ZB6Y007	**6.20**
Incandescent bulbs, bayonet T1 1/4	6 V	ZB6YA006	**2.00**
	12 V	ZB6YJ012	**2.00**
	28 V▲	ZB6YB028	**2.00**
Neon bulbs	110/230 V ■	ZB6YG095	**4.20**

▲ 28 V bulb supplied, for use on 24 V.
■ 95 V bulb supplied, for use on 110/230 V.

Table 19.54: Standard Legend Plate (24 X 28 mm) for 8 X 21 mm Legend ▲

Description	Background Color of Legend	Catalog Number	$ Price
Without legend insert	—	ZB6YD20	**2.00**
With blank legend insert	White or yellow	ZB6YD21	**3.40**
	Black or red	ZB6YD22	**3.40**

Table 19.55: 8 x 21 mm Marked Legends (for 24 x 28 mm legend holder ZB6YD20) ▲

Color	Marking		Catalog Number	$ Price
White Text Red Background (Stop and Fault) Black Background (all others)	International	O-I	ZB6Y2178	**1.60**
		I-II	ZB6Y2179	
		I-O-II	ZB6Y2186	
		◄—O—►	ZB6Y2190	
	English	HAND-O-AUTO	ZB6Y2387	
		CLOSE	ZB6Y2314	
		DOWN	ZB6Y2308	
		FORWARD	ZB6Y2305	
		FAULT	ZB6Y2334	
		LEFT	ZB6Y2310	
		OFF	ZB6Y2312	
		ON	ZB6Y2303	
		OPEN	ZB6Y2313	
		RESET	ZB6Y2323	
		REVERSE	ZB6Y2306	
		RIGHT	ZB6Y2309	
		RUN	ZB6Y2311	
		STOP	ZB6Y2304	
		UP	ZB6Y2307	

▲ Additional legend plate sizes and markings are available in Catalog **9001CT0001**.

Table 19.56: Circular Legends, 45 mm

Description	Color	Text	Catalog Number	$ Price
Circular legends, 45 mm	Yellow	Blank	ZB6Y7001	**3.40**
		Emergency stop	ZB6Y7330	

Table 19.57: Accessories for Printed Circuit Board Installations

Description	for use with	Catalog Number
Plug-in Socket Adapter	contact blocks and light modules	ZB6Y010
Body Bracket	plug-in socket adapter	ZB6Y011

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XB4BA31

XB4BA4322

XB4BP51

XB4BL42

XB4BC21

XB4BL73415

XB4BL73731p5

XB4BA731327

Table 19.58: Non-Illuminated Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Cap Color	Catalog Number	Components	$ Price
	Flush	1	—	—	Black	XB4BA21	(ZB4BZ101 + ZB4BA2)	38.50
					Green	XB4BA31	(ZB4BZ101 + ZB4BA3)	
					Yellow	XB4BA51	(ZB4BZ101 + ZB4BA5)	
					Blue	XB4BA61	(ZB4BZ101 + ZB4BA6)	
		—	1	—	Red	XB4BA42	(ZB4BZ102 + ZB4BA4)	38.50
		1	1	—	Black	XB4BA25	(ZB4BZ105 + ZB4BA2)	56.00
					Green	XB4BA35	(ZB4BZ105 + ZB4BA3)	
					Red	XB4BA45	(ZB4BZ105 + ZB4BA4)	
					Yellow	XB4BA55	(ZB4BZ105 + ZB4BA5)	
					Blue	XB4BA65	(ZB4BZ105 + ZB4BA6)	
	Flush	1	—	"I" (white)	Green	XB4BA3311	(ZB4BZ101 + ZB4BA331)	44.70
	Flush	—	1	"O" (white)	Red	XB4BA4322	(ZB4BZ102 + ZB4BA432)	44.70
	Flush with clear silicone boot (color of pusher unobscured)	1	—	—	Black	XB4BP21	(ZB4BZ101 + ZB4BP2)	53.00
					Green	XB4BP31	(ZB4BZ101 + ZB4BP3)	
					Yellow	XB4BP51	(ZB4BZ101 + ZB4BP5)	
					Blue	XB4BP61	(ZB4BZ101 + ZB4BP6)	
		—	1	—	Red	XB4BP42	(ZB4BZ102 + ZB4BP4)	53.00
	Extended	—	1	—	Red	XB4BL42	(ZB4BZ102 + ZB4BL4)	38.50
		1	1	—	Red	XB4BL45	(ZB4BZ105 + ZB4BL4)	56.00
	Mushroom head Ø 40 mm	1	—	—	Black	XB4BC21	(ZB4BZ101 + ZB4BC2)	56.00

Table 19.59: Two Button Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Degree of Protection	Catalog Number	Components	$ Price
	One flush green push* One extended red push**	1	1	**"I" (white) ***"O" (white)	IP66 IP69K	XB4BL73415	(ZB4BZ105 + ZB4BL7341)	69.00

Table 19.60: Two Button Push Buttons, Momentary + one white central pilot light (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Degree of Protection	Pilot Light Voltage	Catalog Number	$ Price
Protected LED	One flush green push* One extended red push** One white central pilot light block	1	1	**"I" (white) ***"O" (white)	IP66 IP69K	24	XB4BW73731B5	130.00
						120	XB4BW73731G5	
						240	XB4BW73731M5	

Table 19.61: Three Button Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Degree of Protection	Marking and Cap Color	Catalog Number	$ Price
	Two flush pushes + one central projecting red push*	2	1	IP66 IP69K	White "I" on green background White "II" on green background *White "Stop" on red background	XB4BA731327	120.00
					Black "➡" on white background White "⇦" on black background *White "Stop" on red background	XB4BA711237	

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Caps. . . . . .page 19-39

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Table 19.62: Non-Illuminated Emergency Stop and Emergency Off Mushroom Head Push Buttons, Ø 40 mm, Red (screw clamp terminal connections)

XB4BT845

XB4BS9445

XB4BS542

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Catalog Number	Components	$ Price
	Trigger action push-pull▲	1	1	XB4BT845	(ZB4BZ105 + ZB4BT84)	101.00
	Trigger action turn-to-release▲	1	1	XB4BS8445	(ZB4BZ105 + ZB4BS844)	165.00
		1	2	XB4BS84441	(ZB4BZ141 + ZB4BS844)	
	Trigger action Key release ▲ (No. 455)	1	1	XB4BS9445	(ZB4BZ105 + ZB4BS944)	165.00
	Push-pull	—	1	XB4BT42	(ZB4BZ102 + ZB4BT4)	68.00
	Turn-to-release	—	1	XB4BS542	(ZB4BZ102 + ZB4BS54)	110.00
	Key release (No. 455)	—	1	XB4BS142	(ZB4BZ102 + ZB4BS14)	147.00

▲ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator. For emergency stop applications, always use a trigger action push button (per EN/IEC 13850).

Table 19.63: Non-Illuminated Selector Switches and Key Switches (screw clamp terminal connections)■

XB4BD33

XB4BJ33

XB4BG33

Shape of Head	Type of Operator	Type of Contact N.O.	Type of Contact N.C.	Number and Type of Positions		Catalog Number	Components	$ Price
	Standard lever, black	1	—	2-maintained		XB4BD21	(ZB4BZ101 + ZB4BD2)	51.00
		1	1	2-maintained		XB4BD25	(ZB4BZ105 + ZB4BD2)	68.00
		2	—	3-maintained		XB4BD33	(ZB4BZ103 + ZB4BD3)	68.00
				3-momentary to center		XB4BD53	(ZB4BZ103 + ZB4BD5)	75.00
	Extended lever, black	1	—	2-maintained		XB4BJ21	(ZB4BZ101 + ZB4BJ2)	51.00
		2	—	3-maintained		XB4BJ33	(ZB4BZ103 + ZB4BJ3)	68.00
				3-momentary to center		XB4BJ53	(ZB4BZ103 + ZB4BJ5)	75.00
	Key (No. 455)	1	—	2-maintained		XB4BG21	(ZB4BZ101 + ZB4BG2)	123.00
						XB4BG41	(ZB4BZ101 + ZB4BG4)	123.00
				2-momentary to left		XB4BG61	(ZB4BZ101 + ZB4BG6)	123.00
		2	—	3-maintained		XB4BG03	(ZB4BZ103 + ZB4BG0)	141.00
						XB4BG33	(ZB4BZ103 + ZB4BG3)	141.00

Note: The symbol ⚷ indicates key withdrawal position(s).

■ See page 19-29 for contact configurations.

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Table 19.64: Pilot Lights with Protected LED™ (screw clamp terminal connections) ▲

XB4BVB5

Shape of Head	Supply Voltage	Color	Catalog Number	Components	$ Price
Protected LED	24 Vac/Vdc	White	XB4BVB1	(ZB4BVB1 + ZB4BV013)	72.00
		Green	XB4BVB3	(ZB4BVB3 + ZB4BV033)	
		Red	XB4BVB4	(ZB4BVB4 + ZB4BV043)	
		Yellow	XB4BVB5	(ZB4BVB5 + ZB4BV053)	
		Blue	XB4BVB6	(ZB4BVB6 + ZB4BV063)	
	110–120 Vac	White	XB4BVG1	(ZB4BVG1 + ZB4BV013)	72.00
		Green	XB4BVG3	(ZB4BVG3 + ZB4BV033)	
		Red	XB4BVG4	(ZB4BVG4 + ZB4BV043)	
		Yellow	XB4BVG5	(ZB4BVG5 + ZB4BV053)	
		Blue	XB4BVG6	(ZB4BVG6 + ZB4BV063)	

Table 19.65: Pilot Lights for BA9s Bulb (screw clamp terminal connections)

XB4BV64

XB4BV33

Shape of Head	Supply Voltage	Color	Catalog Number	Components	$ Price
Direct supply, for BA9s (incandescent, LED, neon) V ≤ 250 V, 2.4 W bulb (bulb not included)					
	≤ 250 Vac/Vdc	White	XB4BV61	(ZB4BV6 + ZB4BV01)	51.00
		Green	XB4BV63	(ZB4BV6 + ZB4BV03)	
		Red	XB4BV64	(ZB4BV6 + ZB4BV04)	
		Yellow	XB4BV65	(ZB4BV6 + ZB4BV05)	
Transformer type with 1.2 VA, 6 V secondary. BA9s incandescent bulb included					
	110–120 Vac 50/60 Hz	White	XB4BV31	(ZB4BV3 + ZB4BV01)	117.00
		Green	XB4BV33	(ZB4BV3 + ZB4BV03)	
		Red	XB4BV34	(ZB4BV3 + ZB4BV04)	
		Yellow	XB4BV35	(ZB4BV3 + ZB4BV05)	

Table 19.66: Illuminated Push Buttons, Momentary (screw clamp terminal connections) ▲

XB4BW33B5

XB4BW3465

XB4BW3545

Shape of Head	Description	Type of Contact N.O.	Type of Contact N.C.	Supply Voltage	Color of Push	Catalog Number	Components	$ Price
Flush								
Protected LED		1	1	24 Vac/Vdc	White	XB4BW31B5	(ZB4BW0B15 + ZB4BW313)	119.00
					Green	XB4BW33B5	(ZB4BW0B35 + ZB4BW333)	
					Red	XB4BW34B5	(ZB4BW0B45 + ZB4BW343)	
					Yellow	XB4BW35B5	(ZB4BW0B55 + ZB4BW353)	
					Blue	XB4BW36B5	(ZB4BW0B65 + ZB4BW363)	
				110–120 Vac	White	XB4BW31G5	(ZB4BW0G15 + ZB4BW313)	119.00
					Green	XB4BW33G5	(ZB4BW0G35 + ZB4BW333)	
					Red	XB4BW34G5	(ZB4BW0G45 + ZB4BW343)	
					Yellow	XB4BW35G5	(ZB4BW0G55 + ZB4BW353)	
					Blue	XB4BW36G5	(ZB4BW0G65 + ZB4BW363)	
	Direct supply for BA9s 2.4 W max. bulb not included	1	1	≤ 250 Vac/Vdc	White	XB4BW3165	(ZB4BW065 + ZB4BW31)	99.00
					Green	XB4BW3365	(ZB4BW065 + ZB4BW33)	
					Red	XB4BW3465	(ZB4BW065 + ZB4BW34)	
					Yellow	XB4BW3565	(ZB4BW065 + ZB4BW35)	
	Transformer type 1.2 VA, 6 V secondary. BA9s incandescent bulb included	1	1	110–120 Vac 50/60 Hz	White	XB4BW3135	(ZB4BW035 + ZB4BW31)	163.00
					Green	XB4BW3335	(ZB4BW035 + ZB4BW33)	
					Red	XB4BW3435	(ZB4BW035 + ZB4BW34)	
					Yellow	XB4BW3535	(ZB4BW035 + ZB4BW35)	
				230–240 Vac 50/60 Hz	White	XB4BW3145	(ZB4BW045 + ZB4BW31)	163.00
					Green	XB4BW3345	(ZB4BW045 + ZB4BW33)	
					Red	XB4BW3445	(ZB4BW045 + ZB4BW34)	
					Yellow	XB4BW3545	(ZB4BW045 + ZB4BW35)	
Extended								
Protected LED		1	1	24 Vac/Vdc	White	XB4BW11B5	(ZB4BW0B15 + ZB4BW113)	113.00
					Green	XB4BW13B5	(ZB4BW0B35 + ZB4BW133)	
					Red	XB4BW14B5	(ZB4BW0B45 + ZB4BW143)	
					Yellow	XB4BW15B5	(ZB4BW0B55 + ZB4BW153)	
					Blue	XB4BW16B5	(ZB4BW0B65 + ZB4BW163)	
				110–120 Vac	White	XB4BW11G5	(ZB4BW0G15 + ZB4BW113)	113.00
					Green	XB4BW13G5	(ZB4BW0G35 + ZB4BW133)	
					Red	XB4BW14G5	(ZB4BW0G45 + ZB4BW143)	
					Yellow	XB4BW15G5	(ZB4BW0G55 + ZB4BW153)	
					Blue	XB4BW16G5	(ZB4BW0G65 + ZB4BW163)	

▲ For 240 V LED, replace the last “B” or “G” in the catalog number with an “M”. For example, XB4BV**B**1 (24 V) becomes XB4BV**M**1 (240 V—AC only).

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ZB4BA0

ZB4BA4

ZB4BA38

ZB4BP18

ZB4BL1

ZB4BA36

ZB4BA331

ZB4BA334

ZB4BL432

Table 19.67: Non-Illuminated Operators, Momentary—Unmarked

Shape of Head	Type of Push	Cap Color	Catalog Number	$ Price
	Flush, without color cap ▲	—	ZB4BA0	11.00
	Flush, with set of 6 color caps	White Black Green Red Yellow Blue	ZB4BA9	13.00
	Flush	White	ZB4BA1	13.00
		Black	ZB4BA2	
		Green	ZB4BA3	
		Red	ZB4BA4	
		Yellow	ZB4BA5	
		Blue	ZB4BA6	
		Gray	ZB4BA8	
	Flush with transparent cap, for insertion of legend ■	White	ZB4BA18	16.00
		Green	ZB4BA38	
		Red	ZB4BA48	
		Yellow	ZB4BA58	
		Blue	ZB4BA68	
	Booted Flush (clear silicone) Cap color unobscured	White	ZB4BPA1	25.80
		Black	ZB4BPA2	
		Green	ZB4BPA3	
		Red	ZB4BA4	
		Yellow	ZB4BPA5	
		Blue	ZB4BPA6	
	Booted Extended (clear silicone) Cap color unobscured	White	ZB4BP1	25.80
		Black	ZB4BP2	
		Green	ZB4BP3	
		Red	ZB4BP4	
		Yellow	ZB4BP5	
		Blue	ZB4BP6	
	Booted (colored silicone) Cap color unobscured	White	ZB4BP1S	25.80
		Black	ZB4BP2S	
		Green	ZB4BP3S	
		Red	ZB4BP4S	
		Yellow	ZB4BP5S	
		Blue	ZB4BP6S	
	Booted (clear silicone) for insertion of legend ■ Cap color unobscured	White	ZB4BP18	29.00
		Green	ZB4BP38	
		Red	ZB4BP48	
		Yellow	ZB4BP58	
		Blue	ZB4BP68	
	Extended	White	ZB4BL1	13.00
		Black	ZB4BL2	
		Green	ZB4BL3	
		Red	ZB4BL4	
		Yellow	ZB4BL5	
		Blue	ZB4BL6	
	Guarded Head	White	ZB4BA16	35.00
		Black	ZB4BA26	
		Green	ZB4BA36	
		Red	ZB4BA46	
		Yellow	ZB4BA56	
		Blue	ZB4BA66	

▲ Color cap to be ordered separately, see page 19-39.
■ For legend ordering information, see page 19-39.

Table 19.68: Non-Illuminated Operators, Momentary—Premarked

Shape of Head	Type of Push	Marking Text	Marking Color	Cap Color	Catalog Number	$ Price
	Flush	I	White	Green	ZB4BA331	18.60
			Black	White	ZB4BA131	
		START	White	Green	ZB4BA333	
			Black	White	ZB4BA133	
		ON	White	Green	ZB4BA341	
			Black	White	ZB4BA141	
		RESET	White	Black	ZB4BA222	
		JOG	White	Black	ZB4BA245	
		O	White	Red	ZB4BA432	
				Black	ZB4BA232	
		STOP	White	Red	ZB4BA434	
				Black	ZB4BA234	
		OFF	White	Red	ZB4BA435	
				Black	ZB4BA235	
		↑ ♦	Black	White	ZB4BA334	
			White	Black	ZB4BA335	
	Extended	O	White	Red	ZB4BL432	18.60
				Black	ZB4BL232	
		STOP	White	Red	ZB4BL434	
				Black	ZB4BL234	
		OFF	White	Red	ZB4BL435	
				Black	ZB4BL235	

♦ Cap supplied not clipped-in, allowing orientation of arrow in any one of 4 directions: ↑, ↓, ← or →

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ZB4BH02

Table 19.69: Non-Illuminated Push-on/Push-off Operators

Shape of Head	Type of Push	Color of Push	Catalog Number	$ Price
	Flush	White	ZB4BH01	17.60
		Black	ZB4BH02	
		Green	ZB4BH03	
		Red	ZB4BH04	
		Yellow	ZB4BH05	
		Blue	ZB4BH06	
	Extended	White	ZB4BH1	17.60
		Black	ZB4BH2	
		Green	ZB4BH3	
		Red	ZB4BH4	
		Yellow	ZB4BH5	
		Blue	ZB4BH6	

ZB4BA73133

ZB4BA71124

Table 19.70: Three Head Operators, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
Premarked						
Two flush + one central projecting red push marked "Stop"	Two flush	"I" "II"	Green Green	IP66 IP69K	ZB4BA73132	60.00
		"←" "→"	Green Green		ZB4BA73133	
		"↑" "↓"	Green Green		ZB4BA73134	
		"+" "-"	Green Green		ZB4BA73135	
		"+" "-"	White White		ZB4BA71115	
		"←" "→"	White Black		ZB4BA71123	
		"↑" "↓"	White Black		ZB4BA71124	
		"↑" "↓"	Black Black		ZB4BA72124	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB4BA791	51.00

ZB4BA7121

ZB4BL7341

Table 19.71: Two Head Operators, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
No Marking						
	Two flush	—	Green Red	IP66 IP69K	ZB4BA7340	37.20
		—	White Black		ZB4BA7120	
	One flush One extended	—	Green Red		ZB4BL7340	
Premarked						
	Two flush	"I" "O"	Green Red	IP66 IP69K	ZB4BA7341	41.40
		"I" "O"	White Black		ZB4BA7121	
	One flush One extended	"I" "O"	Green Red		ZB4BL7341	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB4BA79	35.00

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ZB4BC24

ZB4BC2

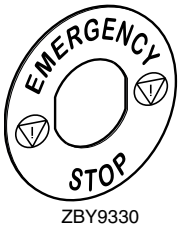
ZB4BR2

ZB4BS834

ZB4BT4

ZB4BS64

ZB4BS74



ZBY9330

Table 19.72: Mushroom Heads, Momentary

Shape of Head	Diameter of Head	Color of Head	Catalog Number	$ Price
	30 mm	Black	ZB4BC24	29.40
		Green	ZB4BC34	
		Red	ZB4BC44	
		Yellow	ZB4BC54	
		Blue	ZB4BC64	
	40 mm	Black	ZB4BC2	29.40
		Green	ZB4BC3	
		Red	ZB4BC4	
		Yellow	ZB4BC5	
		Blue	ZB4BC6	
	60 mm	Black	ZB4BR2	35.00
		Green	ZB4BR3	
		Red	ZB4BR4	
		Yellow	ZB4BR5	
		Blue	ZB4BR6	

Table 19.73: Mushroom Heads for Maintained Push Buttons

Shape of Head	Type of Push	Diameter of Head	Color	Catalog Number	$ Price
	Trigger action Push-pull ▲	40 mm	Red	ZB4BT84	54.00
	Trigger action Turn-to-release ▲	30 mm	Red	ZB4BS834	112.00
		40 mm	Red	ZB4BS844	112.00
			Red marked “EMO”	ZB4BS84430	118.00
		60 mm	Red	ZB4BS864	112.00
	Trigger action Key release (No. 455) ▲	30 mm	Red	ZB4BS934	112.00
		40 mm	Red	ZB4BS944 ■	112.00
		60 mm	Red	ZB4BS964	112.00
	Push-pull	40 mm	Black	ZB4BT2	40.40
			Red	ZB4BT4	
		60 mm	Black	ZB4BX2	46.00
			Red	ZB4BX4	
	Turn-to-release	30 mm	Black	ZB4BS42	78.00
			Red	ZB4BS44	
		40 mm	Black	ZB4BS52	78.00
			Red	ZB4BS54	
			Red marked “EMO”	ZB4BS5430	85.00
			Yellow	ZB4BS55	78.00
			Yellow marked “Robot Stop”	ZB4BS5550	85.00
		60 mm	Black	ZB4BS62	90.00
			Red	ZB4BS64	
	Key release (No. 455)	30 mm	Black	ZB4BS72	112.00
			Red	ZB4BS74	
		40 mm	Black	ZB4BS12	112.00
			Red	ZB4BS14 ■	
		60 mm	Black	ZB4BS22	112.00
			Red	ZB4BS24	

▲ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator. For emergency stop applications, always use a trigger action push button (per EN/IEC 13850).

■ Other key numbers:
—key no. 421E: add the suffix 12 to the catalog number.
—key no. 458A: add the suffix 10 to the catalog number.
—key no. 520E: add the suffix 14 to the catalog number.
—key no. 3131A: add the suffix 20 to the catalog number.
Example: The catalog number for a head with key No. 421E for a 2 position maintained, lockable selector switch, with key withdrawal from the left-hand position, becomes: ZB4BG212.

Table 19.74: Circular Legends for Emergency Stop Mushroom Heads (yellow background)

Diameter	Text	Catalog Number	$ Price
60 mm	Blank	ZBY9101	3.40
	EMERGENCY STOP	ZBY9330	
90 mm	Blank	ZBY8101	
	EMERGENCY STOP	ZBY8330	

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ZB4BD4
Standard Lever

ZB4BJ3
Extended Lever

ZB4BG8

Table 19.75: Non-Illuminated Selector Switches ■

Color	Number and Type of Positions		Standard Lever ▲	Extended Lever	$ Price
			Catalog Number		
Black	2-maintained		ZB4BD2	ZB4BJ2	**24.00**
Black	2-momentary from right to left		ZB4BD4	ZB4BJ4	**29.40**
Black	3-maintained		ZB4BD3	ZB4BJ3	**24.00**
Black	3-momentary to center		ZB4BD5	ZB4BJ5	**29.40**
Black	3-momentary from left to center		ZB4BD7	ZB4BJ7	**29.40**
Black	3-momentary from right to center		ZB4BD8	ZB4BJ8	**29.40**

▲ For colored lever, add the following code to the end of part number: 01–white, 03–green, 04–red, 05–yellow, 06–blue (Example: ZB4BD**04**).

Table 19.76: Non-Illuminated Key Switches ■

Type of Operator	Number and Type of Positions		Catalog Number	$ Price
Key (No. 455) ♦	2-maintained		ZB4BG2	**90.00**
			ZB4BG02	
			ZB4BG4	
	2-momentary from right to left		ZB4BG6	
	3-maintained		ZB4BG0	
			ZB4BG3	
			ZB4BG03	
			ZB4BG04	
			ZB4BG5	
			ZB4BG9	
			ZB4BG09	
	3-momentary from left to center		ZB4BG1	**116.00**
			ZB4BG01	
	3-momentary to center		ZB4BG7	
	3-momentary from right to center		ZB4BG8	
			ZB4BG05	
			ZB4BG08	

Note:
The symbol ⚷ indicates the key withdrawal position(s).

■ See Table 19.77 for contact configurations.
♦ Other key numbers:

—key no. 421E: add the suffix 12 to the catalog number.
—key no. 458A: add the suffix 10 to the catalog number.
—key no. 520E: add the suffix 14 to the catalog number.
—key no. 3131A: add the suffix 20 to the catalog number.

Example: For a head with key no. 421E for a 2 position maintained, lockable selector switch, with key withdrawal from the left-hand position, order ZB4BG212.

Table 19.77: Sequence of Contacts on Selector Switch Bodies

Unit Type		Selector Switches														
		2-position						3-position								
Note: L=Left, C=Center, R=Right, O=Open, X=Closed		315°			45°			315°			0°			45°		
Operator Plunger Position	Up															
	Down															
Contact Block Location		L	C	R	L	C	R	L	C	R	L	C	R	L	C	R
Contacts	N/O	O	O	O	X	X	X	X	X	O	O	O	O	O	X	X
	N/C	X	X	X	O	O	O	O	O	X	X	X	X	X	O	O

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Selector Switch Sequence (Table 19.91) . . . . . .page 19-33

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ZB4BD922

Table 19.78: Potentiometer Operator (with Mounting Collar)

Shape of Head	Description	Application	Catalog Number	$ Price
	For potentiometer with shaft length 1.73 to 1.97 in. (45 to 50 mm) (potentiometer not included)	For shaft Ø 1/4 in. (6.35 mm)	ZB4BD922	**142.00**
		For shaft Ø 0.24 in. (6 mm)	ZB4BD912	

XD4PA12

Table 19.79: Joysticks (54 mm, Extended Operating Shaft) ▲

Description	Contact Operation	Action	Catalog Number	$ Price
2 direction	1 step 1 N.O. contact per direction	Maintained	XD4PA12	**250.00**
		Momentary	XD4PA22	
4 direction	1 step 1 N.O. contact per direction	Maintained	XD4PA14	**316.00**
		Momentary	XD4PA24	

▲ Do not use standard contact blocks ZBE10• (single) or ZBE20• (double).

Table 19.80: Legends for Joysticks

Description	For use with	Color	Catalog Number	$ Price
Legends 30 x 48 mm for customer engraving	2 direction	Black one side Red reverse	ZBG2201	**3.40**
		White one side Yellow reverse	ZBG2401	
Legends 48 x 48 mm for customer engraving	4 direction	Black one side Red reverse	ZBG4201	
		White one side Yellow reverse	ZBG4401	

ZB4BD28

Table 19.81: Two Position Toggle Switch

Shape of Head	Color	Type of Positions	Catalog Number	$ Price
	Black	Maintained	ZB4BD28	**46.60**
	Black	Momentary	ZB4BD48	

XB4BA8•1

Table 19.82: Reset Operators, Flush, Adjustable Shaft

Shape of Head	Travel		Actuation Distance		Color	Catalog Number	$ Price
	in.	mm	in.	mm			
	0.39	10	0.24–0.63	6–16	Black	XB4BA821	**30.10**
					Red	XB4BA841	
					Blue	XB4BA861	
			0.63–1.02	16–26	Black	XB4BA822	**30.10**
					Red	XB4BA842	
					Blue	XB4BA862	
	0.55	14	1.18–5.12	30–130	Black	XB4BA921	**36.10**
					Red	XB4BA941	
					Blue	XB4BA961	
			5.12–10.12	130–257	Black	XB4BA922	**45.10**
					Red	XB4BA942	
					Blue	XB4BA962	

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ZB4BV063

ZB4BV04

ZB4BV043S

ZB4BV6

ZB4BV•

ZB4BV••

Table 19.83: Pilot Light Heads

Shape of Head	For Use with Body Comprising Light Module Type	Color of Lens	Catalog Number	$ Price
	Protected LED™ only	White Green Red Yellow Blue	ZB4BV013 ZB4BV033 ZB4BV043 ZB4BV053 ZB4BV063	**7.60**
	Protected LED only Fresnel (jeweled) lens ▲	White Green Red Amber Blue	ZB4BV013S ZB4BV033S ZB4BV043S ZB4BV053S ZB4BV063S	**7.60**
	For BA9s incandescent bulb, neon or LED only ■	White Green Red Yellow Blue Clear	ZB4BV01 ZB4BV03 ZB4BV04 ZB4BV05 ZB4BV06 ZB4BV07	**7.60**
	For BA9s incandescent bulb, neon or LED Fresnel (jeweled) lens ■	White Green Red Amber Blue Clear	ZB4BV01S ZB4BV03S ZB4BV04S ZB4BV05S ZB4BV06S ZB4BV07S	**7.60**

▲ For use in bright ambient conditions, for example, in sunlight.

Table 19.84: Complete Bodies (Mounting Collar + Light Module for BA9s Incandescent Bulb, Neon or LED)

Description	Light Source	Supply Voltage (V)	Catalog Number	$ Price
Screw clamp terminal connections				
Direct supply	BA9s bulb 2.4 W max. Not included ■	≤250	ZB4BV6	**38.60**
Direct supply	BA9s incandescent bulb included	24 v 2 Watt	ZB4BV624	**49.20**
Direct supply	BA9s incandescent bulb included	120 v 2.4 Watt	ZB4BV6120	**49.20**
Transformer type **1.2 VA, 6 V secondary**	BA9s incandescent bulb included	110–120 Vac 50/60 Hz	ZB4BV3	**98.00**
		230–240 Vac 50/60 Hz	ZB4BV4	
		400–50 Hz	ZB4BV5	
		440–480 Vac 60 Hz	ZB4BV8	
		550–600 Vac 60 Hz	ZB4BV9	

■ Order bulb separately; see page 19-40. For BA9 LED, see page 19-120.

Table 19.85: Complete Bodies (Mounting Collar + Light Module with Protected LED™) ♦

Light Source	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Screw clamp terminal connections ★				
Protected LED™	12 Vac/Vdc	White Green Red Yellow Blue	ZB4BVJ1 ZB4BVJ3 ZB4BVJ4 ZB4BVJ5 ZB4BVJ6	**57.00**
	24 Vac/Vdc	White Green Red Yellow Blue	ZB4BVB1 ZB4BVB3 ZB4BVB4 ZB4BVB5 ZB4BVB6	**57.00**
	24–120 Vac/Vdc	White Green Red Yellow Blue	ZB4BVBG1 ZB4BVBG3 ZB4BVBG4 ZB4BVBG5 ZB4BVBG6	**57.00**
	110–120 Vac	White Green Red Yellow Blue	ZB4BVG1 ZB4BVG3 ZB4BVG4 ZB4BVG5 ZB4BVG6	**57.00**
Flashing Protected LED™	24 Vac/Vdc	White Green Red Yellow Blue	ZB4BV18B1 ZB4BV18B3 ZB4BV18B4 ZB4BV18B5 ZB4BV18B6	**66.00**
	110–120 Vac	White Green Red Yellow Blue	ZB4BV18G1 ZB4BV18G3 ZB4BV18G4 ZB4BV18G5 ZB4BV18G6	**66.00**

♦ For 240 V LED, replace the last “B” or “G” in the catalog number with an “M”. For example, ZB4BV**B**1 (24 V) becomes ZB4BV**M**1 (240 V).
★ For Quick-Connect version, add “3” to the end of the catalog number Example: ZB4BVJ13 (Quick-Connect size 1 x 1/40" or 2 x 0.110").

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ZB4BW333

ZB4BW563

ZB4BW113

ZB4BW33

ZB4BW14

ZB4BW643

ZB4BH033

ZB4BH63

Table 19.86: Heads for Momentary Illuminated Push Buttons

Shape of Head	Type of Push	Color	Catalog Number	$ Price
Only use with Protected LED™ light modules				
	Flush	White	ZB4BW313	**18.60**
		Green	ZB4BW333	
		Red	ZB4BW343	
		Yellow	ZB4BW353	
		Blue	ZB4BW363	
	Flush with clear silicone boot	White	ZB4BW513	**31.00**
		Green	ZB4BW533	
		Red	ZB4BW543	
		Yellow	ZB4BW553	
		Blue	ZB4BW563	
	Flush for insertion of legend	White	ZB4BA18	**16.00**
		Green	ZB4BA38	
		Red	ZB4BA48	
		Yellow	ZB4BA58	
		Blue	ZB4BA68	
	Extended	White	ZB4BW113	**13.00**
		Green	ZB4BW133	
		Red	ZB4BW143	
		Yellow	ZB4BW153	
		Blue	ZB4BW163	
	Mushroom (40 mm)	Clear	ZB4BW413	**29.40**
		Green	ZB4BW433	
		Red	ZB4BW443	
		Yellow	ZB4BW453	
		Blue	ZB4BW463	
Only use with light modules for a BA9s incandescent bulb, neon or LED				
	Flush	White	ZB4BW31	**18.60**
		Green	ZB4BW33	
		Red	ZB4BW34	
		Yellow	ZB4BW35	
		Blue	ZB4BW36	
		Clear	ZB4BW37	
	Extended	White	ZB4BW11	**13.00**
		Green	ZB4BW13	
		Red	ZB4BW14	
		Yellow	ZB4BW15	
		Blue	ZB4BW16	
		Clear	ZB4BW17	

Table 19.87: Heads for Maintained Illuminated Push Buttons

Shape of Head	Type of Push	Color of Lens	Catalog Number	$ Price
Only use with Protected LED light modules				
	Push/Pull Mushroom (40 mm)	Clear	ZB4BW613	**46.00**
		Green	ZB4BW633	
		Red	ZB4BW643	
		Yellow	ZB4BW653	
		Blue	ZB4BW663	

Table 19.88: Illuminated Push-On/Push-Off Operators

Shape of Head	Type of Push	Color of Lens	Catalog Number	$ Price
Only use with Protected LED light modules				
	Flush	White	ZB4BH013	**24.80**
		Green	ZB4BH033	
		Red	ZB4BH043	
		Yellow	ZB4BH053	
		Blue	ZB4BH063	
	Extended	White	ZB4BH13	**19.60**
		Green	ZB4BH33	
		Red	ZB4BH43	
		Yellow	ZB4BH53	
		Blue	ZB4BH63	

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ZB4BW7A3741

ZB4BW7A1721

ZB4BK1343

Table 19.89: Two Button with Clear Pilot Light, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
No Marking						
Protected LED	Two flush	—	Green Red	IP66 IP69K	ZB4BW7A3740	**48.00**
		—	White Black		ZB4BW7A1720	
Protected LED	One flush One extended	—	Green Red		ZB4BW7L3740	
Premarked						
Protected LED	Two flush	"I" "O"	Green Red	IP66 IP69K	ZB4BW7A3741	**52.00**
		"I" "O"	White Black		ZB4BW7A1721	
Protected LED	One flush One extended	"I" "O"	Green Red		ZB4BW7I3741	
Protected LED	Two flush	"⬆" "⬇"	White Black		ZB4BW7A1724	
Protected LED	Two flush	"+" "-"	White Black		ZB4BW7A1715	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB4BW7A9	**35.00**

Table 19.90: Illuminated Selector Switches, Standard Lever

Shape of Head	Number and Type of Positions		Catalog Number ▼	$ Price
Only use with Protected LED light modules				
	2-maintained		ZB4BK12•3	**35.00**
	2-momentary from right to left		ZB4BK14•3	**51.00**
	3-maintained		ZB4BK13•3	**35.00**
	3-momentary to center		ZB4BK15•3	**51.00**
	3-momentary from right to center		ZB4BK18•3	**51.00**
	3-momentary from left to center		ZB4BK17•3	**51.00**

▼ Designate color as follows: 1—white, 3—green, 4—red, 5—yellow, 6—blue.

Table 19.91: Sequence of Contacts on Illuminated Selector Switch Bodies

Unit Type		Selector Switches									
		2-position				3-position					
		315°		45°		315°		0°		45°	
Operator Plunger Position	Up										
	Down										
Contact Block Location		L	R	L	R	L	R	L	R	L	R
Contacts	N/O	O	O	X	X	X	O	O	O	O	X
	N/C	X	X	O	O	O	X	X	X	X	O

Note: L=Left, R=Right, O=Open, X=Closed

2 Position Selector Switch			3 Position Selector Switch			
		Contact block guide				Contact block guide
O	X	1 N.O. (left or right)	O	O	X	1 N.O. (left)
X	O	1 N.C. (left or right)	X	O	X	2 N.O. wired in **parallel** (side by side)
O	X	1 N.O.	X	O	O	1 N.O. (right)
		and	O	X	X	1 N.C. (right)
X	O	1 N.C.	X	X	O	1 N.C. (left)
			O	X	O	2 N.C. wired in **series** (side by side)

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ZB4BZ101

Table 19.92: Contact Blocks (Mounting Collar with Contact Blocks)

Description	Type of Contact		Catalog Number	$ Price
	N.O.	N.C.		
Screw clamp terminal connections	1	—	ZB4BZ101	**22.00**
	—	1	ZB4BZ102	**22.00**
	2	—	ZB4BZ103	**38.20**
	—	2	ZB4BZ104	**38.20**
	1	1	ZB4BZ105	**38.20**
	1	2	ZB4BZ141	**55.00**

For Quick-Connect version add "3" to the end of the catalog number Example: ZB4BZ1013 (Quick-Connect size 1 x 0.250" or 2 x 0.110").
For Ring Tongue compatible blocks add "9" to the end of the catalog number (Example: ZB4BZ1029).
Electrical components with connection by printed circuit board pins are available. Refer to Catalog **9001CT0001**.
Electrical components with connection by plug-in connector are available. Refer to Catalog **9001CT0001**.

ZB4BW0••3

ZB4BW06•

ZB4BW0•5

Table 19.93: Complete Bodies (Mounting Collar + Single Contact Block + Light Module with Protected LED™)

Light Source	Type of Contact △		Color	Supply Voltage □		$ Price
	N.O.	N.C.		24 Vac/Vdc	110–120 Vac	
				Catalog Number		
Screw clamp terminal connections						
Protected LED™	1	—	White	ZB4BW0B11	ZB4BW0G11	**73.00**
			Green	ZB4BW0B31	ZB4BW0G31	
			Red	ZB4BW0B41	ZB4BW0G41	
			Yellow	ZB4BW0B51	ZB4BW0G51	
			Blue	ZB4BW0B61	ZB4BW0G61	
	—	1	White	ZB4BW0B12	ZB4BW0G12	**73.00**
			Green	ZB4BW0B32	ZB4BW0G32	
			Red	ZB4BW0B42	ZB4BW0G42	
			Yellow	ZB4BW0B52	ZB4BW0G52	
			Blue	ZB4BW0B62	ZB4BW0G62	
	2	—	White	ZB4BW0B13	ZB4BW0G13	**90.00**
			Green	ZB4BW0B33	ZB4BW0G33	
			Red	ZB4BW0B43	ZB4BW0G43	
			Yellow	ZB4BW0B53	ZB4BW0G53	
			Blue	ZB4BW0B63	ZB4BW0G63	
	1	1	White	ZB4BW0B15	ZB4BW0G15	**90.00**
			Green	ZB4BW0B35	ZB4BW0G35	
			Red	ZB4BW0B45	ZB4BW0G45	
			Yellow	ZB4BW0B55	ZB4BW0G55	
			Blue	ZB4BW0B65	ZB4BW0G65	

△ Can be fitted with additional contact blocks, see page 19-35.
□ For 240V LED, replace the "B" or "G" with "M". (Example: change "ZB4BW0**B**11 (24V) to ZB4BW0**M**11 (240V))

Table 19.94: Mounting Collar, Contact Block and Light Module (with screw clamp terminal connections) ◊

Supply	Light Source	Supply Voltage	Type of Contact ◊		Color of Light Source	Catalog Number	$ Price
			N.O.	N.C.			
Screw clamp terminal connections							
Direct supply	BA9s 2.4 W max. bulb Not included ◊	≤ 250 Vac/Vdc	1	—	—	ZB4BW061	**55.00**
			—	1	—	ZB4BW062	**55.00**
			2	—	—	ZB4BW063	**71.00**
			1	1	—	ZB4BW065	**71.00**
Transformer type 1.2 VA, 6 V secondary	BA9s incandescent bulb included	110–120 Vac 50/60 Hz	1	—	—	ZB4BW031	**114.00**
			1	1	—	ZB4BW035	**130.00**
		230–240 Vac 50/60 Hz	1	—	—	ZB4BW041	**114.00**
			1	1	—	ZB4BW045	**130.00**
		440–480 Vac 60 Hz	1	—	—	ZB4BW081	**114.00**
			1	1	—	ZB4BW085	**130.00**

◊ Order bulb separately, see page 19-40.
☆ Can be fitted with additional contact blocks, see page 19-35.

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ZB4BZ009

Table 19.95: Body/Mounting Collar

For use with	Catalog Number	$ Price
Electrical block (contact or light module)	ZB4BZ009	**5.40**

Table 19.96: Add-On Contact Block (with screw clamp terminal connections) ★▼

ZBE101

Description		Type of Contact N.O.	Type of Contact N.C.	Catalog Number	$ Price
Standard **single** contact blocks▲■		1	—	ZBE101	**16.40**
		—	1	ZBE102	**16.40**
Standard **double** contact blocks▲■		2	—	ZBE203	**33.20**
		—	2	ZBE204	**33.20**
		1	1	ZBE205	**33.20**
Special contact blocks for low power switching ♦		1	—	ZBE1016	**32.80**
		—	1	ZBE1026	**32.80**
Low-power switching	Dusty environment ♦ (IP5X, 50 µm dust)	1	—	ZBE1016P	**32.80**
		—	1	ZBE1026P	**32.80**
Staggered contacts	Early make N/O	1	–	ZBE201	**16.40**
	Late break N/C	—	1	ZBE202	**16.40**
	Overlapping N/O+N/C	1	1	ZB4BZ106	**32.80**
	Staggered N/O+N/O	—	2	ZB4BZ107	**32.80**

▲ For Quick-Connect version add "3" to the end of the catalog number Example: ZBE1013 (Quick-Connect size 1 x 0.250" or 2 x 0.110").
■ For Ring Tongue compatible blocks add "9" to the end of the catalog number (Example: ZBE1029).
♦ Cannot stack additional contact blocks onto these blocks.

ZBE203

Table 19.97: Light Modules (with screw clamp terminal connections) ★▼

ZBVB•

Description	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Protected LED	12 Vac/Vdc	White	ZBVJ1	**52.00**
		Green	ZBVJ3	
		Red	ZBVJ4	
		Yellow	ZBVJ5	
		Blue	ZBVJ6	
	24 Vac/Vdc	White	ZBVB1	**52.00**
		Green	ZBVB3	
		Red	ZBVB4	
		Yellow	ZBVB5	
		Blue	ZBVB6	
	110–120 Vac	White	ZBVG1	**52.00**
		Green	ZBVG3	
		Red	ZBVG4	
		Yellow	ZBVG5	
		Blue	ZBVG6	
	24–120 Vac/Vdc	White	ZBVBG1	**52.00**
		Green	ZBVBG3	
		Red	ZBVBG4	
		Yellow	ZBVBG5	
		Blue	ZBVBG6	
	230–240 Vac	White	ZBVM1	**52.00**
		Green	ZBVM3	
		Red	ZBVM4	
		Yellow	ZBVM5	
		Blue	ZBVM6	
Direct supply for BA9s 2.4 W max. bulb Not included △	≤ 250 Vac/Vdc	—	ZBV6	**33.20**

★ Electrical components with connection by printed circuit board pins are available. Refer to Catalog **9001CT0001** for more details.
▼ Electrical components with connection by plug-in connector are available. Refer to Catalog **9001CT0001** for more details.
△ See page 19-40 for bulb information.

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ZB4BZ009

ZBE1015

ZB4BZ1015

Table 19.98: Spring Terminal Products for XB4 22 mm Push Buttons

Body/Mounting Collar

For use with	Catalog Number	$ Price
Contact block or light module	ZB4BZ009	**5.40**

Contact Blocks ▲

Spring Terminal Connections, Contacts for Standard Applications					
Description	Type of contact	N/O	N/C	Catalog Number	$ Price
Contact blocks	Single	1	–	ZBE1015	**18.00**
		–	1	ZBE1025	**18.00**
	Single with body/mounting collar	1	–	ZB4BZ1015	**24.00**
		–	1	ZB4BZ1025	**24.00**
		2	–	ZB4BZ1035	**42.00**
		–	2	ZB4BZ1045	**42.00**
		1	1	ZB4BZ1055	**42.00**

Light Modules ▲

Spring Terminal Connections				
Description	Supply voltage	Color of light source	Catalog Number	$ Price
Integral LED (to combine with heads for integral LED) Protected LED	12 Vac/Vdc	White	ZBVJ15	**57.00**
		Green	ZBVJ35	**57.00**
		Red	ZBVJ45	**57.00**
		Orange	ZBVJ55	**57.00**
		Blue	ZBVJ65	**57.00**
	24 Vac/Vdc	White	ZBVB15	**57.00**
		Green	ZBVB35	**57.00**
		Red	ZBVB45	**57.00**
		Orange	ZBVB55	**57.00**
		Blue	ZBVB65	**57.00**
	110–120 Vac	White	ZBVG15	**57.00**
		Green	ZBVG35	**57.00**
		Red	ZBVG45	**57.00**
		Orange	ZBVG55	**57.00**
		Blue	ZBVG65	**57.00**
	230–240 Vac	White	ZBVM15	**57.00**
		Green	ZBVM35	**57.00**
		Red	ZBVM45	**57.00**
		Orange	ZBVM55	**57.00**
		Blue	ZBVM65	**57.00**

▲ Additional blocks **cannot** be attached to the back of these contact blocks or light modules. However, spring terminal contact blocks can be mounted behind screw terminal contact blocks.

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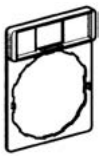
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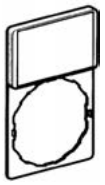
ZBY•101

ZBY2303

ZBZ33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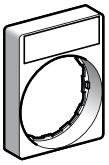
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ZBZ5

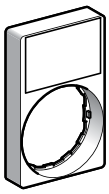
ZBY6H10•

Table 19.99: Standard (30 x 40 mm) Legend Holders for 8 x 27 mm Legends

Description	Legend		Catalog Number	$ Price
	Color	Text		
Without legend ▲	—	—	ZBZ32	**2.00**
With blank legend (for engraving)	Black or red background	—	ZBY2101	**3.40**
	White or yellow background	—	ZBY4101	
Custom Legend (Specify Engraving) 2 lines of 11 characters (including spaces) maximum per line	Black background	White	ZBY2002	**14.20**
	Red background	White	ZBY2004	
	White background	Black	ZBY4001	
	Yellow background	Black	ZBY4005	
With legend marked with international language	Black or red background ■	O (black background)	ZBY2146	**3.40**
		O (red background)	ZBY2931	
		I	ZBY2147	
		II	ZBY2148	
		O-I	ZBY2178	
		I-II	ZBY2179	
		I-O-II	ZBY2186	
With legend marked with English language	Black or red background■	AUTO	ZBY2115	**3.40**
		AUTO-HAND	ZBY2364	
		AUTO-O-HAND	ZBY2385	
		CLOSE	ZBY2314	
		DOWN	ZBY2308	
		EMERGENCY STOP	ZBY2330	
		FAST	ZBY2328	
		FORWARD	ZBY2305	
		FOR-REV	ZBY2371	
		HAND	ZBY2316	
		HAND-OFF-AUTO	ZBY2387	
		INCH	ZBY2321	
		JOG	ZBY2382	
		LEFT	ZBY2310	
		OFF	ZBY2312	
		OFF-ON	ZBY2367	
		ON	ZBY2311	
		OPEN	ZBY2313	
		POWER ON	ZBY2326	
		RESET (red background)	ZBY2323	
		RESET (black background)	ZBY2322	
		REVERSE	ZBY2306	
		RIGHT	ZBY2309	
		RUN	ZBY2334	
		SLOW	ZBY2327	
		START	ZBY2303	
		STOP	ZBY2304	
		STOP-START	ZBY2366	
		UP	ZBY2307	

▲ For marked legends, see page 19-38.
■ Start functions: white letters on black background. Stop functions: white letters on red background (unless otherwise specified above).

Table 19.100: Large (30 x 50 mm) Legend Holders for 18 x 27 mm Legends

Description ♦	Color	Catalog Number	$ Price
Without legend insert	—	ZBZ33	**2.00**
With blank legend insert	Black or red background	ZBY6101	**3.40**
	White or yellow background	ZBY6102	

Table 19.101: 30 x 40 mm legend holder (flush mounting with bezel) for 8 x 27 mm legends

Description ♦	Color	Catalog Number	$ Price
Without legend	—	ZBZ34	**2.00**
With blank legend	Black or red background	ZBY2H101	**3.40**
	White or yellow background	ZBY4H101	**3.40**

Table 19.102: 30 x 50 mm legend holder (flush mounting with bezel) for 18 x 27 mm legends

Description ♦	Color	Catalog Number	$ Price
Without legend	—	ZBZ35	**4.20**
With blank legend	Black or red background	ZBY6H101	**5.40**
	White or yellow background	ZBY6H102	**5.40**

♦ For custom Legends, see page 19-38.

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Table 19.103: Marked Legends for 8 x 27 mm (for 30 x 40 mm legend holders ZBZ32)

ZBY02178

ZBY02303

Color	Marking	Text	Catalog Number	$ Price
Black or red background ▲	International	O (black background)	ZBY02146	
		O (red background)	ZBY02931	
		I	ZBY02147	
		II	ZBY02148	1.70
		O-I	ZBY02178	
		I-II	ZBY02179	
		I-O-II	ZBY02186	
	English	AUTO	ZBY02115	
		AUTO-HAND	ZBY02364	
		AUTO-O-HAND	ZBY02385	
		CLOSE	ZBY02314	
		DOWN	ZBY02308	
		EMERGENCY STOP	ZBY02330	
		FAST	ZBY02328	
		FORWARD	ZBY02305	
		FOR-REV	ZBY02371	
		HAND	ZBY02316	
		HAND-OFF-AUTO	ZBY02387	
		INCH	ZBY02321	
		JOG	ZBY02382	
		LEFT	ZBY02310	
		OFF	ZBY02312	1.70
		OFF-ON	ZBY02367	
		ON	ZBY02311	
		OPEN	ZBY02313	
		POWER ON	ZBY02326	
		RESET (red background)	ZBY02323	
		RESET (black background)	ZBY02322	
		REVERSE	ZBY02306	
		RIGHT	ZBY02309	
		RUN	ZBY02334	
		SLOW	ZBY02327	
		START	ZBY02303	
		STOP	ZBY02304	
		STOP-START	ZBY02366	
		UP	ZBY02307	

▲ Start functions: white letters on black background. Stop functions: white letters on red background (unless otherwise specified above).

Table 19.104: Legends for Customer Engraving (inserts only)

Description	For use with	Color	Text Color	Catalog Number	$ Price
8 x 27 mm	30 x 40 mm legend holders	Black or red background	White	ZBY0101	1.70
		White or yellow background	Black	ZBY0102	
18 x 27 mm	30 x 50 mm legend holders	Black or red background	White	ZBY5101	
		White or yellow background	Black	ZBY5102	

Table 19.105: Legends for Factory Engraving (inserts only)

Description	For use with	Color	Text Color	Catalog Number	$ Price
8 x 27 mm Custom Legend/Insert Only (Specify Engraving) 2 lines of 11 characters (including spaces) maximum per line (**Example:** ZBY01002 marked "Robot")	30 x 40 mm legend holders	Black background	White	ZBY01002	12.20
		Red background	White	ZBY01004	
		White background	Black	ZBY01001	
		Yellow background	Black	ZBY01005	
18 x 27 mm Custom Legend/Insert Only (Specify Engraving) 3 lines of 11 characters (including spaces) maximum per line (**Example:** ZBY05002 marked "Robot")	30 x 50 mm legend holders	Black background	White	ZBY05002	12.20
		Red background	White	ZBY05004	
		White background	Black	ZBY05001	
		Yellow background	Black	ZBY05005	

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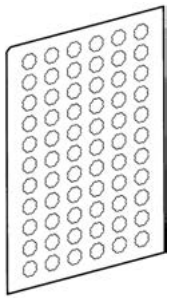

ZBY1101

ZBA•

ZBL•

ZBA•33

Table 19.106: Sheets of Legends for Push Buttons, Switches, and Pilot Lights

Description	Marking	Text	Catalog Number	$ Price
Sheets of 66 circular peel-off transparent self-adhesive legends	Blank		ZBY1101	**6.20**
	International	O	ZBY1146	**10.40**
		I	ZBY1147	
		II	ZBY1148	
		III	ZBY1149	
		STOP	ZBY1304	
		→	ZBY1912	
	English	HAND	ZBY1316	**10.40**
		OFF	ZBY1312	
		ON	ZBY1311	
		START	ZBY1303	
SiS Label Software	Legend Design Software: English, French, German, Spanish, Italian		XBY2U	**104.00**

Table 19.107: Push Button Caps—Unmarked

For use with	Type of Push	Color	Catalog Number	$ Price
ZB4BA0 push button heads	Flush	White	ZBA1	**2.00**
		Black	ZBA2	
		Green	ZBA3	
		Red	ZBA4	
		Yellow	ZBA5	
		Blue	ZBA6	
		6 colors ▲	ZBA9	**4.20**
	Extended	White	ZBL1	**2.00**
		Black	ZBL2	
		Green	ZBL3	
		Red	ZBL4	
		Yellow	ZBL5	
		Blue	ZBL6	
		6 colors ▲	ZBL9	**4.20**

▲ Set of 6 different colored caps: white, black, green, red, yellow, blue.

Table 19.108: Push Button Caps—Marked

For use with	Type of Push	Marking		Cap Color	Catalog Number	$ Price
		Text ■	Color			
ZB4BA0 push button heads	Flush		White	Green	ZBA331	**4.20**
			Black	White	ZBA131	
			White	Green	ZBA333	
			Black	White	ZBA133	
			White	Green	ZBA341	
			Black	White	ZBA141	
			Black	White	ZBA343	
			White	Black	ZBA344	
		♦ Ⓣ	White	Green	ZBA345	
		♦ Ⓣ	White	Black	ZBA245	
		◇	White	Green	ZBA346	
		↑	Black	White	ZBA334 ★	
			White	Black	ZBA335 ★	
			White	Red	ZBA432	
				Black	ZBA232	
			White	Red	ZBA434	
				Black	ZBA234	
			White	Red	ZBA435	
				Black	ZBA235	
			White	Blue	ZBA639	

■ Start functions: white letters on black background. Stop functions: white letters on red background (unless otherwise specified).
♦ Double injection molded marking.
★ Cap supplied not clipped-in, allowing orientation of arrow in any one of 4 directions: ↑, ↓, ← or →

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ZBA7235

ZBA7331

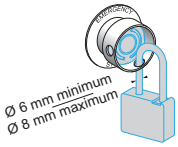
ZBA7432

ZBA79

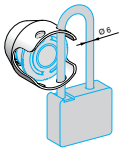
Table 19.109: Multiple-head and XB5R Push Button Caps▲

For use with	Type of Push	Marking	Cap Color	Catalog Number	$ Price
Double push button heads Tripe push button heads ZB4RZA0 ZB5RZA0	Flush	Unmarked	White	ZBA71	4.00
		"I" black		ZBA7131	5.30
		"➡" black		ZBA7134	5.30
		"+" black		ZBA7138	5.30
		Unmarked	Black	ZBA72	4.00
		"O" white		ZBA7232	5.30
		"+" white		ZBA7233	5.30
		"➡" white		ZBA7235	5.30
		"I" white		ZBA7237	5.30
		Unmarked	Green	ZBA73	4.00
		"I" white		ZBA7331	5.30
		"+" white		ZBA7333	5.30
		"⬆" white		ZBA7335	5.30
		"II" white		ZBA7336	5.30
		Unmarked	Red	ZBA74	4.00
		"O" white		ZBA7432	5.30
		Unmarked	Yellow	ZBA75	4.00
		Unmarked	Blue	ZBA76	4.00
		Assorted	10 colors■	ZBA79	3.00

▲ Sold in lots of 10.
■ Set of 10 different caps: white, black, green, red, yellow, blue, white "I" on green background, black "I" on white background, white "O" on red background, white "O" on black background.



ZBZ3605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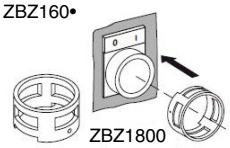
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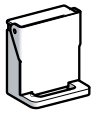
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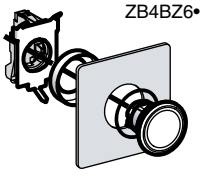
ZB4BZ011

Table 19.110: Accessories

Description	Application	Color	Catalog Number	$ Price
Padlocking kit Conforming to EN/ISO 13850 ▼ (See legends below)	For Emergency Stop function only, with the following Ø 40 trigger-action push buttons: XB4BT8• XB4BS8• XB4BS9• ZB4BT8• ZB4BS8• ZB4BS9•	Yellow	ZBZ3605	108.00
Metal guards Padlockable	For Emergency Stop function only with the following Ø 40 mm trigger-action push buttons: XB4BT8• XB4BS8• XB4BS9• ZB4BT8• (except ZB5AT8643M) ZB4BS8• ZB4BS9•	Chromium Plated	ZBZ1600	108.00
		Black	ZBZ1602	
		Red	ZBZ1604	
		Yellow	ZBZ1605	
		Blue	ZBZ1606	
Metal guard	For XB4 illuminated push buttons	Chromium-plated	ZBZ1800	108.00
Plastic guards★	Round Guard for ZB4BS5430, 2.5" dia EMO Mushroom Operators	Yellow	ZB4BZ1905	25.80
	Narrow Flange Guard for ZB4BS5430 or ZB4BS84430 EMO Mushroom Operators△	Yellow	ZB4BZ2005	
	Trigger Action Guard for ZB4BS84430, 3" dia EMO Mushroom Operators	Yellow	ZB4BZ2105	
Padlockable flaps	For push buttons	Black	ZB4BZ62	32.80
		Red	ZB4BZ64	
Mounting kit	For push buttons ZB4B• with flush mounting bezel head For 30 mm mounting hole. Minimum quantity 10		ZB4BZ011	16.60
Metal blanking plug, round chromium plated ♦	For Ø 22 mm control and signalling units		ZB4SZ3	11.00
Plastic blanking plug, round black with mounting nut	For Ø 22 mm control and signalling units		ZB5SZ3	11.00

Description	Marking	Color	Catalog Number	$ Price
Ø 60 mm Legend for padlocking device ZBZ3605	Without	Yellow	ZBY9101T	3.40
	EMERGENCY STOP	Yellow	ZBY9330T	

♦ Requires a ZB4BZ009 body/mounting collar for mounting, see page 19-35.
★ For additional information, refer to publication **9001DB0601R6/06**.
▼ Standard circular legends are not compatible with this product. Use special legends ZBY• •T listed above.
△ Maximum panel thickness is 2.5 mm.

DL1CE•••

DL1CF•••

XBFX13

ZBZ8

Table 19.111: BA9s Bulbs and Associated Accessories

Description	Characteristics	Catalog Number	$ Price
Replacement bulbs (Type BA9s) Incandescent	6 V, 1.2 W	DL1CB006	11.00
	12 V, 2 W	DL1CE012	
	24 V, 2 W	DL1CE024	
	120–130 V, 2.4 W	DL1CE130	
Neon bulbs	120–130 V, 1.8 mA	DL1CF110	15.20
	230–240 V, 1,8 mA	DL1CF220	
Bulb extractor	—	XBFX13	11.00
Lens cap tightening tool	Illuminated push buttons with flush push	ZBZ8	6.20
Power driver bits for mounting and wiring (package of 5)	Cross headed screw (POZIDRIV type 1)	ZB4BZ905	52.00
Mounting Adapter	For mounting 22 mm push button in 30 mm KO	ZBZ41	10.40

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ZBZ•8

ZBDD2

ZBG455

ZBG455P

ZBP0

ZBA709

ZBV01•3

ZBV01•

Table 19.112: Bellows Seals for Harsh Environments (IP 69K) ▲

Description	For use with	Color & Material	Sold in Lots of	Catalog Number	$ Price
Bellows seals for harsh environments (Humidity, dust, high-pressure cleaning)	Any Harmony XB4 metal, mushroom head push button ★, Ø 40 mm or Ø 60 mm (except ZB4BR•16)	Red Silicone	2	ZBZ48	12.40
		Black EPDM	2	ZBZ28	
		Yellow EPDM	2	ZBZ58	

▲ Only when mounted on control stations. Use special legends ZBY• •T.

Table 19.113: Boot for Standard Selector Switch Handle

Description	For use with	Catalog Number	$ Price
Boot for standard handle	ZB4BD••	ZBD D2	12.40

Table 19.114: Replacement Keys

Description	Key Number	Catalog Number	$ Price
Set of 2 keys	455	ZBG455	11.00
	421E	ZBG421E	
	458A	ZBG458A	
	520E	ZBG520E	
	3131A	ZBG3131A	
Set of 2 keys, One of which is supplied booted (rubber boot)	455	ZBG455P	23.40
	421E	ZBG421EP	
	458A	ZBG458AP	
	520E	ZBG520EP	
	3131A	ZBG3131AP	

Table 19.115: Clear Boots

Description	For use with	Material	Catalog Number	$ Price
Single boots	Booted push buttons with circular head	Silicone	ZBP0	12.40
	Booted push buttons with circular head used in food industry applications		ZBP0A	12.40
Double boots	Double-headed push buttons, two flush		ZBA708	10.80
	Double-headed push buttons, one flush + one projecting		ZBA709	10.80
Triple boot	Triple-headed push buttons, two flush + one projecting		ZBA710	10.80

Table 19.116: Colored boots

Description	Color	Catalog Number	$ Price
Single boot (can be replaced without dismantling the head)	Black	ZB2 BP012	13.00
	Green	ZB2 BP013	
	Red	ZB2 BP014	
	Yellow	ZB2 BP015	
	Blue	ZB2 BP016	

Table 19.117: Lens Caps

For use with	Color	Catalog Number	$ Price
Lens caps for Protected LED™ light modules			
Pilot lights	White	ZBV0113	5.40
	Green	ZBV0133	
	Red	ZBV0143	
	Yellow	ZBV0153	
	Blue	ZBV0163	
Illuminated push buttons with flush push	White	ZBW9113	5.40
	Green	ZBW9133	
	Red	ZBW9143	
	Yellow	ZBW9153	
	Blue	ZBW9163	
Illuminated push buttons with extended push	White	ZBW9313	5.40
	Green	ZBW9333	
	Red	ZBW9343	
	Yellow	ZBW9353	
	Blue	ZBW9363	
Lens caps for BA9 light modules			
Pilot lights	White	ZBV011	5.40
	Green	ZBV013	
	Red	ZBV014	
	Yellow	ZBV015	
	Blue	ZBV016	
	Clear	ZBV017	
Illuminated push buttons with flush push	White	ZBW911	5.40
	Green	ZBW913	
	Red	ZBW914	
	Yellow	ZBW915	
	Blue	ZBW916	
	Clear	ZBW917	
Illuminated push buttons with extended push	White	ZBW931	5.40
	Green	ZBW933	
	Red	ZBW934	
	Yellow	ZBW935	
	Blue	ZBW936	
	Clear	ZBW937	

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XB5AA31

XB5AA4322

XB5AP51

XB5AL42

XB5AC21

XB5AL73415

XB5AW73731●5

XB5AA731327

Table 19.118: Non-Illuminated Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Cap Color	Catalog Number	Components	$ Price
	Flush	1	—	—	Black	XB5AA21	(ZB5AZ101 + ZB5AA2)	38.50
					Green	XB5AA31	(ZB5AZ101 + ZB5AA3)	
					Yellow	XB5AA51	(ZB5AZ101 + ZB5AA5)	
					Blue	XB5AA61	(ZB5AZ101 + ZB5AA6)	
		—	1	—	Red	XB5AA42	(ZB5AZ102 + ZB5AA4)	38.50
		1	1	—	Black	XB5AA25	(ZB5AZ105 + ZB5AA2)	56.00
					Green	XB5AA35	(ZB5AZ105 + ZB5AA3)	
					Red	XB5AA45	(ZB5AZ105 + ZB5AA4)	
					Yellow	XB5AA55	(ZB5AZ105 + ZB5AA5)	
					Blue	XB5AA65	(ZB5AZ105 + ZB5AA6)	
	Flush	1	—	"I" (white)	Green	XB5AA3311	(ZB5AZ101 + ZB5AA331)	44.70
	Flush	—	1	"O" (white)	Red	XB5AA4322	(ZB5AZ102 + ZB5AA432)	44.70
	Flush with clear silicone boot (color of pusher unobscured)	1	—	—	Black	XB5AP21	(ZB5AZ101 + ZB5AP2)	53.00
					Green	XB5AP31	(ZB5AZ101 + ZB5AP3)	
					Yellow	XB5AP51	(ZB5AZ101 + ZB5AP5)	
					Blue	XB5AP61	(ZB5AZ101 + ZB5AP6)	
		—	1	—	Red	XB5AP42	(ZB5AZ102 + ZB5AP4)	53.00
	Extended	—	1	—	Red	XB5AL42	(ZB5AZ102 + ZB5AL4)	38.50
		1	1	—	Red	XB5AL45	(ZB5AZ105 + ZB5AL4)	38.50
	Mushroom head Ø 40 mm	1	—	—	Black	XB5AC21	(ZB5AZ101 + ZB5AC2)	56.00

Table 19.119: Two Button Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Degree of Protection	Catalog Number	Components	$ Price
	One flush green push* One extended red push**	1	1	*"I" (white) ***"O" (white)	IP66 IP69K	XB5AL73415	(ZB5AZ105 + ZB5AL7341)	80.75

Table 19.120: Two Button Push Buttons, Momentary + one white central pilot light (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Marking	Degree of Protection	Pilot Light Voltage	Catalog Number	$ Price
Protected LED	One flush green push* One extended red push** One white central pilot light block	1	1	*"I" (white) ***"O" (white)	IP66 IP69K	24	XB5AW73731B5	123.50
						120	XB5AW73731G5	
						240	XB5AW73731M5	

Table 19.121: Three Button Push Buttons, Momentary (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact N.O.	Type of Contact N.C.	Degree of Protection	Marking and Cap Color	Catalog Number	$ Price
	Two flush pushes + one central projecting red push*	2	1	IP66 IP69K	White "I" on green background White "II" on green background *White "Stop" on red background	XB5AA731327	114.00
					Black "➡" on white background White "⇦" on black background *White "Stop" on red background	XB5AA711237	

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XB5AS9445

XB5AT42

XB5AS542

Table 19.122: Non-Illuminated Emergency Stop and Emergency Off Mushroom Head Push Buttons, Ø 40 mm (Red) (screw clamp terminal connections)

Shape of Head	Type of Push	Type of Contact		Catalog Number	Components	$ Price
		N.O.	N.C.			
	Trigger action push-pull▲	1	1	XB5AT845	(ZB5AZ105 + ZB5AT84)	101.00
	Trigger action turn-to-release▲	1	1	XB5AS8445	(ZB5AZ105 + ZB5AS844)	165.00
		—	2	XB5AS8444	(ZB5AZ104 + ZB5AS844)	
	Trigger action Key release (No. 455)▲	1	1	XB5AS9445	(ZB5AZ105+ ZB5AS944)	165.00
	Push-pull	—	1	XB5AT42	(ZB5AZ102 + ZB5AT4)	68.00
	Turn-to-release	—	1	XB5AS542	(ZB5AZ102 + ZB5AS54)	110.00
	Key release (No. 455)	—	1	XB5AS142	(ZB5AZ102 + ZB5AS14)	147.00

▲ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator. For emergency stop applications, always use a trigger action push button (per EN/IEC 13850).

Table 19.123: Non-Illuminated Selector Switches and Key Switches (screw clamp terminal connections) ■

XB5AD33

XB5AJ33

XB5AG33

Shape of Head	Type of Operator	Type of Contact		Number and Type of Positions		Catalog Number	Components	$ Price
		N.O.	N.C.					
	Standard lever, black	1	—	2-maintained		XB5AD21	(ZB5AZ101 + ZB5AD2)	51.00
		1	1	2-maintained		XB5AD25	(ZB5AZ105 + ZB5AD2)	68.00
		2	—	3-maintained		XB5AD33	(ZB5AZ103 + ZB5AD3)	68.00
				3-momentary to center		XB5AD53	(ZB5AZ103 + ZB5AD5)	75.00
	Extended lever, black	1	—	2-maintained		XB5AJ21	(ZB5AZ101 + ZB5AJ2)	51.00
		2	—	3-maintained		XB5AJ33	(ZB5AZ103 + ZB5AJ3)	68.00
				3-momentary to center		XB5AJ53	(ZB5AZ103 + ZB5AJ5)	75.00
	Key (No. 455)	1	—	2-maintained		XB5AG21	(ZB5AZ101 + ZB5AG2)	123.00
						XB5AG41	(ZB5AZ101 + ZB5AG4)	123.00
				2-momentary to left		XB5AG61	(ZB5AZ101 + ZB5AG6)	123.00
		2	—	3-maintained		XB5AG03	(ZB5AZ103 + ZB5AG0)	141.00
						XB5AG33	(ZB5AZ103 + ZB5AG3)	141.00

■ See 19-49 for contact configurations.
Note: The symbol ⚷ indicates key withdrawal position(s)

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XB5AVB1

XB5AV63

XB5AV34

XB5AW31B5

XB5AW3465

XB5AW3335

Table 19.124: Pilot Lights with Protected LED™ (screw clamp terminal connections) ▲

Shape of Head	Supply Voltage	Color	Catalog Number	Components	$ Price
Protected LED	24 Vac/Vdc	White	XB5AVB1	(ZB5AVB1 + ZB5AV013)	72.00
		Green	XB5AVB3	(ZB5AVB3 + ZB5AV033)	
		Red	XB5AVB4	(ZB5AVB4 + ZB5AV043)	
		Yellow	XB5AVB5	(ZB5AVB5 + ZB5AV053)	
		Blue	XB5AVB6	(ZB5AVB6 + ZB5AV063)	
	110–120 Vac	White	XB5AVG1	(ZB5AVG1 + ZB5AV013)	72.00
		Green	XB5AVG3	(ZB5AVG3 + ZB5AV033)	
		Red	XB5AVG4	(ZB5AVG4 + ZB5AV043)	
		Yellow	XB5AVG5	(ZB5AVG5 + ZB5AV053)	
		Blue	XB5AVG6	(ZB5AVG6 + ZB5AV063)	

Table 19.125: Pilot Lights for BA9s Bulb (screw clamp terminal connections)

Shape of Head	Supply Voltage	Color	Catalog Number	Components	$ Price
Direct supply, for BA9s (incandescent, LED, neon) V ≤ 250 V, 2.4 W bulb (bulb not included) ■					
	≤ 250 Vac/Vdc	White	XB5AV61	(ZB5AV6 + ZB5AV01)	51.00
		Green	XB5AV63	(ZB5AV6 + ZB5AV03)	
		Red	XB5AV64	(ZB5AV6 + ZB5AV04)	
		Yellow	XB5AV65	(ZB5AV6 + ZB5AV05)	
Transformer type with 1.2 VA, 6 V secondary. BA9s incandescent bulb included					
	110–120 Vac 50/60 Hz	White	XB5AV31	(ZB5AV3 + ZB5AV01)	117.00
		Green	XB5AV33	(ZB5AV3 + ZB5AV03)	
		Red	XB5AV34	(ZB5AV3 + ZB5AV04)	
		Yellow	XB5AV35	(ZB5AV3 + ZB5AV05)	

Table 19.126: Illuminated Push Buttons, Momentary (screw clamp terminal connections) ▲

Shape of Head	Description	Type of Contact N.O.	Type of Contact N.C.	Supply Voltage	Color of Push	Catalog Number	Components	$ Price
Flush								
Protected LED		1	1	24 Vac/Vdc	White	XB5AW31B5	(ZB5AW0B15 + ZB5AW313)	119.00
					Green	XB5AW33B5	(ZB5AW0B35 + ZB5AW333)	
					Red	XB5AW34B5	(ZB5AW0B45 + ZB5AW343)	
					Yellow	XB5AW35B5	(ZB5AW0B55 + ZB5AW353)	
					Blue	XB5AW36B5	(ZB5AW0B65 + ZB5AW363)	
				110–120 Vac	White	XB5AW31G5	(ZB5AW0G15 + ZB5AW313)	119.00
					Green	XB5AW33G5	(ZB5AW0G35 + ZB5AW333)	
					Red	XB5AW34G5	(ZB5AW0G45 + ZB5AW343)	
					Yellow	XB5AW35G5	(ZB5AW0G55 + ZB5AW353)	
					Blue	XB5AW36G5	(ZB5AW0G65 + ZB5AW363)	
	Direct supply for BA9s 2.4 W max. bulb **not** included	1	1	≤ 250 Vac/Vdc	White	XB5AW3165	(ZB5AW065 + ZB5AW31)	99.00
					Green	XB5AW3365	(ZB5AW065 + ZB5AW33)	
					Red	XB5AW3465	(ZB5AW065 + ZB5AW34)	
					Yellow	XB5AW3565	(ZB5AW065 + ZB5AW35)	
	Transformer type 1.2 VA, 6 V secondary. BA9s incandescent bulb included	1	1	110–120 Vac 50/60 Hz	White	XB5AW3135	(ZB5AW035 + ZB5AW31)	163.00
					Green	XB5AW3335	(ZB5AW035 + ZB5AW33)	
					Red	XB5AW3435	(ZB5AW035 + ZB5AW34)	
					Yellow	XB5AW3535	(ZB5AW035 + ZB5AW35)	
				230–240 Vac 50/60 Hz	White	XB5AW3145	(ZB5AW045 + ZB5AW31)	163.00
					Green	XB5AW3345	(ZB5AW045 + ZB5AW33)	
					Red	XB5AW3445	(ZB5AW045 + ZB5AW34)	
					Yellow	XB5AW3545	(ZB5AW045 + ZB5AW35)	
Extended								
Protected LED		1	1	24 Vac/Vdc	White	XB5AW11B5	(ZB5AW0B15 + ZB5AW113)	113.00
					Green	XB5AW13B5	(ZB5AW0B35 + ZB5AW133)	
					Red	XB5AW14B5	(ZB5AW0B45 + ZB5AW143)	
					Yellow	XB5AW15B5	(ZB5AW0B55 + ZB5AW153)	
					Blue	XB5AW16B5	(ZB5AW0B65 + ZB5AW163)	
				110–120 Vac	White	XB5AW11G5	(ZB5AW0G15 + ZB5AW113)	113.00
					Green	XB5AW13G5	(ZB5AW0G35 + ZB5AW133)	
					Red	XB5AW14G5	(ZB5AW0G45 + ZB5AW143)	
					Yellow	XB5AW15G5	(ZB5AW0G55 + ZB5AW153)	
					Blue	XB5AW16G5	(ZB5AW0G65 + ZB5AW163)	

▲ For 240V LED, replace the "B" or "G" with "M". (Example: XB5APV**B1** (24 V) to XB5APV**M1** (240 Vac only))
■ For bulb information, refer to page 19-61

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Table 19.127: Non-Illuminated Operators, Momentary—Unmarked

ZB5AA0

ZB5AA5

ZB5AL3

ZB5AP1

ZB5CA2

Shape of Head	Type of Push	Cap Color	Catalog Number	$ Price
	Flush, without color cap ▲	—	ZB5AA0	11.00
	Flush, with set of 6 color caps	6 colors ■	ZB5AA9	13.00
	Flush	White	ZB5AA1	13.00
		Black	ZB5AA2	
		Green	ZB5AA3	
		Red	ZB5AA4	
		Yellow	ZB5AA5	
		Blue	ZB5AA6	
		Gray	ZB5AA8	
	Flush with transparent cap, for insertion of legend ♦	White	ZB5AA18	16.00
		Green	ZB5AA38	
		Red	ZB5AA48	
		Yellow	ZB5AA58	
		Blue	ZB5AA68	
	Extended	White	ZB5AL1	13.00
		Black	ZB5AL2	
		Green	ZB5AL3	
		Red	ZB5AL4	
		Yellow	ZB5AL5	
		Blue	ZB5AL6	
	Booted Flush (clear) Cap color unobscured	White	ZB5APA1	25.80
		Black	ZB5APA2	
		Green	ZB5APA3	
		Red	ZB5APA4	
		Yellow	ZB5APA5	
		Blue	ZB5APA6	
	Booted Extended (clear) Cap color unobscured	White	ZB5AP1	25.80
		Black	ZB5AP2	
		Green	ZB5AP3	
		Red	ZB5AP4	
		Yellow	ZB5AP5	
		Blue	ZB5AP6	
	Booted (colored) Cap color unobscured	White	ZB5AP1S	25.80
		Black	ZB5AP2S	
		Green	ZB5AP3S	
		Red	ZB5AP4S	
		Yellow	ZB5AP5S	
		Blue	ZB5AP6S	
	Booted (clear) for insertion of legend ♦ Cap color unobscured	White	ZB5AP18	29.00
		Green	ZB5AP38	
		Red	ZB5AP48	
		Yellow	ZB5AP58	
		Blue	ZB5AP68	
	Flush Plunger (with high guard)	White	ZB5AA14	32.20
		Black	ZB5AA24	
		Green	ZB5AA34	
		Red	ZB5AA44	
		Yellow	ZB5AA54	
		Blue	ZB5AA64	
	Flush	White	ZB5CA1	27.00
		Black	ZB5CA2	
		Green	ZB5CA3	
		Red	ZB5CA4	
		Yellow	ZB5CA5	
		Blue	ZB5CA6	
	Extended	White	ZB5CL1	27.00
		Black	ZB5CL2	
		Green	ZB5CL3	
		Red	ZB5CL4	
		Yellow	ZB5CL5	
		Blue	ZB5CL6	
	Heads only Recessed (high guard)	White	ZB5 AA16	32.20
		Black	ZB5 AA26	
		Green	ZB5 AA36	
		Red	ZB5 AA46	
		Yellow	ZB5 AA56	
		Blue	ZB5 AA66	
	Heads only Recessed (high guard)	White	ZB5 CA16	
		Black	ZB5 CA26	
		Green	ZB5 CA36	
		Red	ZB5 CA46	
		Yellow	ZB5 CA56	
		Blue	ZB5 CA66	

▲ Order color cap separately, see page 19-60.
■ Six colored caps included with head (white, black, green, red, yellow, blue).
♦ For legend ordering information see page 19-60.

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ZB5AA331

ZB5AA432

ZB5AL232

ZB5AC24

ZB5AC2

ZB5AR4

Table 19.128: Non-Illuminated Operators, Momentary—Premarked

Shape of Head	Type of Push	Marking		Cap Color	Catalog Number	$ Price
		Text	Color			
	Flush		White	Green	ZB5AA331	18.60
			Black	White	ZB5AA131	
			White	Green	ZB5AA333	
			Black	White	ZB5AA133	
			White	Green	ZB5AA341	
			Black	White	ZB5AA141	
			White	Green	ZB5AA345	
			White	Red	ZB5AA432	
				Black	ZB5AA232	
			White	Red	ZB5AA434	
				Black	ZB5AA234	
			White	Red	ZB5AA435	
				Black	ZB5AA235	
			Black	White	ZB5AA343	
			White	Black	ZB5AA344	
		↑ ▲	Black	White	ZB5AA334	
			White	Black	ZB5AA335	
	Extended		White	Red	ZB5AL432	18.60
				Black	ZB5AL232	
			White	Red	ZB5AL434	
				Black	ZB5AL234	
			White	Red	ZB5AL435	
				Black	ZB5AL235	
	Flush		White	Green	ZB5CA331	32.00
			White	Red	ZB5CA432	32.00

▲ Cap supplied not clipped-in, allowing orientation of arrow in any one of 4 directions: ↑, ↓, ← or →

Table 19.129: Mushroom Heads, Momentary

Shape of Head	Diameter of Head	Color of Head	Catalog Number	$ Price
	30 mm	Black	ZB5AC24	29.40
		Green	ZB5AC34	
		Red	ZB5AC44	
		Yellow	ZB5AC54	
		Blue	ZB5AC64	
	40 mm	Black	ZB5AC2	29.40
		Green	ZB5AC3	
		Red	ZB5AC4	
		Yellow	ZB5AC5	
		Blue	ZB5AC6	
	60 mm	Black	ZB5AR2	35.00
		Green	ZB5AR3	
		Red	ZB5AR4	
		Yellow	ZB5AR5	
		Blue	ZB5AR6	

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ZB5AH04

Table 19.130: Non-Illuminated Push-on/Push-off Operators

Shape of Head	Type of Push	Color of Push	Catalog Number	$ Price
	Flush	White	ZB5AH01	17.60
		Black	ZB5AH02	
		Green	ZB5AH03	
		Red	ZB5AH04	
		Yellow	ZB5AH05	
		Blue	ZB5AH06	
	Extended	White	ZB5AH1	17.60
		Black	ZB5AH2	
		Green	ZB5AH3	
		Red	ZB5AH4	
		Yellow	ZB5AH5	
		Blue	ZB5AH6	
	Flush	White	ZB5CH01	35.20
		Black	ZB5CH02	
		Green	ZB5CH03	
		Red	ZB5CH04	
		Yellow	ZB5CH05	
		Blue	ZB5CH06	

ZB5AL7341

Table 19.131: Two Head Operators, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
No Marking						
	Two flush	—	Green Red	IP66 IP69K	ZB5AA7340	35.50
		—	White Black		ZB5AA7120	
	One flush One extended	—	Green Red		ZB5AL7340	
Premarked						
	Two flush	"I" "O"	Green Red	IP66 IP69K	ZB5AA7341	39.50
		"I" "O"	White Black		ZB5AA7121	
	One flush One extended	"I" "O"	Green Red		ZB5AL7341	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB5AA79	33.25

ZB5AA7121

Table 19.132: Three Head Operators, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
Premarked						
Two flush + one central projecting red push marked "Stop"	Two flush	"I" "II"	Green Green	IP66 IP69K	ZB5AA73132	57.00
		"←" "→"	Green Green		ZB5AA73133	
		"↑" "↓"	Green Green		ZB5AA73134	
		"+" "-"	Green Green		ZB5AA73135	
		"+" "-"	White White		ZB5AA71115	
		"←" "→"	White Black		ZB5AA71123	
		"↑" "↓"	White Black		ZB5AA71124	
		"↑" "↓"	Black Black		ZB5AA72124	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB5AA791	48.50

ZB5AA73133

ZB5AA71124

Caps. . . . . .page 19-60

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ZB5AS844

ZB5AS934

ZB5AT4

ZB5AS54

ZB5AS64

ZBY9330

Table 19.133: Mushroom Heads for Maintained Push Buttons

Shape of Head	Type of Push	Diameter of Head	Color	Catalog Number	$ Price
	Trigger action Push-pull ■	40 mm	Red	ZB5AT84	**54.00**
	Trigger action Turn-to-release ■	30 mm	Red	ZB5AS834	**112.00**
		40 mm	Red	ZB5AS844	**112.00**
	Trigger action Key release (No. 455) ■	30 mm	Red	ZB5AS934	**112.00**
		40 mm	Red	ZB5AS944 ▲	**112.00**
		60 mm	Red	ZB5AS964	**112.00**
	Push-pull	30 mm	Black	ZB5AT24	**40.40**
			Red	ZB5AT44	
		40 mm	Black	ZB5AT2	**40.40**
			Red	ZB5AT4	
		60 mm	Black	ZB5AX2	**46.00**
			Red	ZB5AX4	
	Turn-to-release	30 mm	Black	ZB5AS42	**78.00**
			Red	ZB5AS44	
		40 mm	Black	ZB5AS52	**78.00**
			Red	ZB5AS54	
			Yellow	ZB5AS55	
		60 mm	Black	ZB5AS62	**90.00**
			Red	ZB5AS64	
	Key release (No. 455)	30 mm	Black	ZB5AS72	**112.00**
			Red	ZB5AS74	
		40 mm	Black	ZB5AS12	**112.00**
			Red	ZB5AS14 ▲	
		60 mm	Black	ZB5AS22	**112.00**
			Red	ZB5AS24	

▲ Other key numbers:
—key no. 421E: add the suffix 12 to the catalog number.
—key no. 458A: add the suffix 10 to the catalog number.
—key no. 520E: add the suffix 14 to the catalog number.
—key no. 3131A: add the suffix 20 to the catalog number.
Example: The catalog number for a Ø 40 mm red mushroom head for a trigger action, maintained push button, with release by key no. 421E becomes: ZB5AS94412.

■ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator. For emergency stop applications, always use a trigger action push button (per EN/IEC 13850).

Table 19.134: Circular Legends for Emergency Stop Mushroom Heads (yellow background)

Diameter	Text	Catalog Number	$ Price
60 mm	Blank	ZBY9101	**3.40**
	EMERGENCY STOP	ZBY9330	
90 mm	Blank	ZBY8101	
	EMERGENCY STOP	ZBY8330	

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ZB5AD•
Standard Lever

ZB5AJX•
Extended Lever

ZB5AG•

Table 19.135: Non-Illuminated Selector Switches

Color	Number and Type of Positions		Standard Lever ▲ Catalog Number	Extended Lever Catalog Number	$ Price
Black	2-maintained		ZB5AD2	ZB5AJ2	**24.00**
Black	2-momentary from right to left		ZB5AD4	ZB5AJ4	**29.40**
Black	3-maintained		ZB5AD3	ZB5AJ3	**24.00**
Black	3-momentary to center		ZB5AD5	ZB5AJ5	**29.40**
Black	3-momentary from left to center		ZB5AD7	ZB5AJ7	**29.40**
Black	3-momentary from right to center		ZB5AD8	ZB5AJ8	**29.40**

▲ For colored lever, add the following code to the end of catalog number: 01—white, 03—green, 04—red, 05—yellow, 06—blue (Example: ZB5AD204).

Table 19.136: Non-Illuminated Key Switches

Type of Operator	Number and Type of Positions		Catalog Number ■	$ Price
Key (No. 455)	2-maintained		ZB5AG2	
			ZB5AG4	
			ZB5AG02	
	2-momentary from right to left		ZB5AG6	
	3-maintained		ZB5AG0	**90.00**
			ZB5AG3	
			ZB5AG5	
			ZB5AG9	
			ZB5AG09	
	3-momentary from left to center		ZB5AG1	
	3-momentary to center		ZB5AG7	
	3-momentary from right to center		ZB5AG8	**116.00**
			ZB5AG08	
			ZB5AG05	

Note: The symbol ⚷ indicates key withdrawal position(s).

■ Other key numbers:
—key no. 421E: add the suffix 12 to the catalog number.
—key no. 458A: add the suffix 10 to the catalog number.
—key no. 520E: add the suffix 14 to the catalog number.
—key no. 3131A: add the suffix 20 to the catalog number.
—key no. 8D1: add the suffix D to the catalog number.
Example: The catalog number for a head with key no. 421E for a 2 position maintained, lockable selector switch, with key withdrawal from the left-hand position, becomes: ZB5AG212

Table 19.137: Sequence of Contacts on Selector Switch Bodies

Unit Type		Selector Switches														
		2-position						3-position								
		315°			45°			315°			0°			45°		
Operator Plunger Position	Up															
	Down															
Contact Block Location		L	C	R	L	C	R	L	C	R	L	C	R	L	C	R
Contacts	N/O	O	O	O	X	X	X	X	X	O	O	O	O	O	X	X
	N/C	X	X	X	O	O	O	O	O	X	X	X	X	X	O	O

Note: L=Left, C=Center, R=Right, O=Open, X=Closed

Selector Switch Sequence (Table 19.91) . . . . . .page 19-33

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XB5AA

Table 19.138: Reset Operators

Shape of Head	Actuation Distance		Text	Color	Catalog Number	$ Price
	in	mm				
Flush	**Adjustable Shaft▲**					
	0.67–4.72	17–120	Without	Green	XB5AA831	**37.60**
				Red	XB5AA841	
				Blue	XB5AA861	
			O	Red	XB5AA84101	**45.40**
			R	Blue	XB5AA86102	**45.40**
	4.72–10.12	120–257	Without	Green	XB5AA832	**43.40**
				Red	XB5AA842	
				Blue	XB5AA862	
			O	Red	XB5AA84201	**50.00**
			R	Blue	XB5AA86202	**50.00**
Extended						
	0.67–4.72	17–120	O	Red	XB5AL84101	**45.40**
	4.72–10.12	120–257	O	Red	XB5AL84201	**50.00**

▲ Shaft only (short) is W40437632 (Price = $20.00)

XD5PA12

Table 19.139: Potentiometer Operator (with Mounting Collar)

Shape of Head	Description	Application	Catalog Number	$ Price
	For potentiometer with shaft length 1.73 to 1.97 in. (44 to 50 mm) (potentiometer not included)	For shaft Ø 0.25 in. (6.35 mm)	ZB5AD922	**142.00**
		For shaft Ø 0.24 in. (6 mm)	ZB5AD912	

Table 19.140: Joystick (54 mm, Extended Operating Shaft) ■

Description	Contact Operation	Action	Catalog Number	$ Price
2 direction	1 step 1 N.O. contact per direction	Maintained	XD5PA12	**250.00**
		Momentary	XD5PA22	
4 direction	1 step 1 N.O. contact per direction	Maintained	XD5PA14	**316.00**
		Momentary	XD5PA24	

■ Do not use standard contact blocks ZBE10• (single) or ZBE20• (double)

Table 19.141: Legends for Joystick

Description	For use with		Catalog Number	$ Price
Legends 30 x 48 mm for engraving	2 direction	Black one side Red reverse	ZBG2201	**3.40**
		White one side Yellow reverse	ZBG2401	
Legends 48 x 48 mm for engraving	4 direction	Black one side Red reverse	ZBG4201	
		White one side Yellow reverse	ZBG4401	

XB5DS•

Table 19.142: Hour Counters ♦

Characteristics	Supply Voltage	Catalog Number	$ Price
Indication 0–9999.9 (IP40 NEMA 1)	12–24 Vdc or Vac, 50/60 Hz	XB5DSB	**383.00**
	120 Vac, 60 Hz	XB5DSG	
	230–240 Vac, 50 Hz	XB5DSM	

XB5KS•

Table 19.143: Buzzer ♦

Characteristics	Supply Voltage	Catalog Number	$ Price
85 db buzzer:4kHz, continuous or intermittent (IP40 NEMA 1)	24 Vdc or Vac, 50/60 Hz	XB5KSB	**183.00**
	120 Vac, 60 Hz	XB5KSG	
	230–240 Vac, 50 Hz	XB5KSM	

♦ UR E191025, XHNR2 and XHNR8.

ZB5AD28

Table 19.144: Two Position Toggle Switch

Shape of Head	Color	Type of Positions	Catalog Number	$ Price
	Black	Maintained	ZB5AD28	**46.60**
	Black	Momentary	ZB5AD48	

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ZB5AV053

ZB5AV01

ZB5CV063

Table 19.145: Pilot Light Heads

Shape of Head	For use with Body Comprising Light Module Type	Color of Lens	Catalog Number	$ Price
	Protected LED™ only	White	ZB5AV013	7.60
		Green	ZB5AV033	
		Red	ZB5AV043	
		Yellow	ZB5AV053	
		Blue	ZB5AV063	
	Protected LED only Fresnel (jeweled) lens ▲	White	ZB5AV013S	7.60
		Green	ZB5AV033S	
		Red	ZB5AV043S	
		Amber	ZB5AV053S	
		Blue	ZB5AV063S	
	For BA9s incandescent bulb, neon or LED only ■	White	ZB5AV01	7.60
		Green	ZB5AV03	
		Red	ZB5AV04	
		Yellow	ZB5AV05	
		Blue	ZB5AV06	
		Clear	ZB5AV07	
	For BA9s incandescent bulb, neon or LED Fresnel (jeweled) lens ■	White	ZB5AV01S	7.60
		Green	ZB5AV03S	
		Red	ZB5AV04S	
		Amber	ZB5AV05S	
		Blue	ZB5AV06S	
		Clear	ZB5AV07S	
	Protected LED only	White	ZB5CV013	27.00
		Green	ZB5CV033	
		Red	ZB5CV043	
		Yellow	ZB5CV053	
		Blue	ZB5CV063	

▲ For use in bright ambient conditions (i.e., sunlight).
■ Order bulb separately; see page 19-40. For BA9 LED, see page 19-120.

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ZB5AV6

ZB5AV3

ZB5AV••

Table 19.146: Complete Bodies (Mounting Collar + Light Module for BA9s Incandescent Bulb, Neon or LED)

Description	Light Source	Supply Voltage (V)	Catalog Number	$ Price
Screw clamp terminal connections				
Direct supply	BA9s bulb 2.4 W max. Not included ▲	≤250	ZB5AV6	**38.60**
Direct supply	BA9s incandescent bulb included	24 V 2 W	ZB5AV624	**49.20**
Direct supply	BA9s incandescent bulb included	120 V 2.4 W	ZB5AV6120	**49.20**
Transformer type 1.2 VA, 6 V secondary	BA9s incandescent bulb included	110–120 Vac 50/60 Hz	ZB5AV3	**98.00**
		230–240 Vac 50/60 Hz	ZB5AV4	
		400–50 Hz	ZB5AV5	
		440–480 Vac 60 Hz	ZB5AV8	
		550–600 Vac 60 Hz	ZB5AV9	

▲ Order bulb separately, see page 19-61.

Table 19.147: Complete Bodies (Mounting Collar + Light Module with Protected LED™) ■ ♦

Light Source	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Screw clamp terminal connections				
Protected LED™	12 Vac/Vdc	White	ZB5AVJ1	**57.00**
		Green	ZB5AVJ3	
		Red	ZB5AVJ4	
		Yellow	ZB5AVJ5	
		Blue	ZB5AVJ6	
	24 Vac/Vdc	White	ZB5AVB1	**57.00**
		Green	ZB5AVB3	
		Red	ZB5AVB4	
		Yellow	ZB5AVB5	
		Blue	ZB5AVB6	
	24–120 Vac/Vdc	White	ZB5AVBG1	**57.00**
		Green	ZB5AVBG3	
		Red	ZB5AVBG4	
		Yellow	ZB5AVBG5	
		Blue	ZB5AVBG6	
	110–120 Vac	White	ZB5AVG1	**57.00**
		Green	ZB5AVG3	
		Red	ZB5AVG4	
		Yellow	ZB5AVG5	
		Blue	ZB5AVG6	
Flashing Protected LED™	24 Vac/Vdc	White	ZB5AV18B1	**66.00**
		Green	ZB5AV18B3	
		Red	ZB5AV18B4	
		Yellow	ZB5AV18B5	
		Blue	ZB5AV18B6	
	110–120 Vac	White	ZB5AV18G1	**66.00**
		Green	ZB5AV18G3	
		Red	ZB5AV18G4	
		Yellow	ZB5AV18G5	
		Blue	ZB5AV18G6	

■ For Quick-Connect version, add “3” to the end of the catalog number Example: ZB5AVJ13 (Quick-Connect size 1 x 0.250" or 2 x 0.110").
♦ For 240 V LED, replace the “B” or “G” with “M”. (Example: ZB5AV**B**1 (24V) to ZB5AV**M**1 (240V))

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ZB5AW313

ZB5AW363

ZB5AW143

ZB5CW313

ZB5AW33

Table 19.148: Heads for Momentary Illuminated Push Buttons

Shape of Head	Type of Push	Color	Catalog Number	$ Price
Only use with Protected LED™ light modules				
	Flush	White	ZB5AW313	**18.60**
		Green	ZB5AW333	
		Red	ZB5AW343	
		Yellow	ZB5AW353	
		Blue	ZB5AW363	
	Flush with clear boot	White	ZB5AW513	**31.00**
		Green	ZB5AW533	
		Red	ZB5AW543	
		Yellow	ZB5AW553	
		Blue	ZB5AW563	
	Flush for insertion of legend	White	ZB5AA18	**16.00**
		Green	ZB5AA38	
		Red	ZB5AA48	
		Yellow	ZB5AA58	
		Blue	ZB5AA68	
	Extended	White	ZB5AW113	**13.00**
		Green	ZB5AW133	
		Red	ZB5AW143	
		Yellow	ZB5AW153	
		Blue	ZB5AW163	
	Flush for insertion of legend	White	ZB5CW313	**27.00**
		Green	ZB5CW333	
		Red	ZB5CW343	
		Yellow	ZB5CW353	
		Blue	ZB5CW363	
	Extended	White	ZB5CW113	**27.00**
		Green	ZB5CW133	
		Red	ZB5CW143	
		Yellow	ZB5CW153	
		Blue	ZB5CW163	
Only use with light modules for a BA9s incandescent bulb, neon or LED				
	Flush	White	ZB5AW31	**18.60**
		Green	ZB5AW33	
		Red	ZB5AW34	
		Yellow	ZB5AW35	
		Blue	ZB5AW36	
		Clear	ZB5AW37	
	Extended	White	ZB5AW11	**13.00**
		Green	ZB5AW13	
		Red	ZB5AW14	
		Yellow	ZB5AW15	
		Blue	ZB5AW16	
		Clear	ZB5AW17	

Table 19.149: Illuminated Push-on/Push-off Operators

Shape of Head	Type of Push	Color of Lens	Catalog Number	$ Price
Only use with Protected LED light modules				
	Flush	White	ZB5AH013	**24.80**
		Green	ZB5AH033	
		Red	ZB5AH043	
		Yellow	ZB5AH053	
		Blue	ZB5AH063	
	Extended	White	ZB5AH13	**19.60**
		Green	ZB5AH33	
		Red	ZB5AH43	
		Yellow	ZB5AH53	
		Blue	ZB5AH63	

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ZB5AW7A3741

ZB5AW7A1721

Table 19.150: Two Button with Clear Pilot Light, Momentary

Shape of Head	Description	Marking	Cap Color	Degree of Protection	Catalog Number	$ Price
No Marking						
Protected LED	Two flush	—	Green Red	IP66 IP69K	ZB5AW7A3740	45.60
		—	White Black		ZB5AW7A1720	
Protected LED	One flush One extended	—	Green Red		ZB5AW7L3740	
Premarked						
Protected LED	Two flush	"I" "O"	Green Red	IP66 IP69K	ZB5AW7A3741	49.50
		"I" "O"	White Black		ZB5AW7A1721	
Protected LED	One flush One extended	"I" "O"	Green Red		ZB5AW7I3741	
Protected LED	Two flush	"⬆" "⬇"	White Black		ZB5AW7A1724	
Protected LED	Two flush	"+" "-"	White Black		ZB5AW7A1715	
Without caps						
	Two flush without caps	—	—	IP66 IP69K	ZB5AW7A9	42.75

ZB5AW7•

Table 19.151: Heads for Maintained Illuminated Push Buttons

Shape of Head	Type of Push	Color	Catalog Number	$ Price
Only use with Protected LED light modules				
	Turn-to-Release Mushroom (40 mm)	White Green Red Yellow Blue	ZB5AW713 ZB5AW733 ZB5AW743 ZB5AW753 ZB5AW763	63.00

ZB5AT8643M

Table 19.152: Emergency Stop, Trigger Action and Mechanical Latching Push Button with Mechanical State Indicator for Elevator Inspection Box Applications—Heads Only

Shape of Head	Type of Reset	Color	Catalog Number	$ Price
	Push-pull (40 mm)	Red	ZB5AT8643M	124.00

NOTE: *ZB5AT8643M not to be used with ZBZ16* guard.*

ZB5AK1213

Table 19.153: Illuminated Selector Switches, Standard Lever

Shape of Head	Number and Type of Positions		Catalog Number ★	$ Price
Only use with Protected LED light modules				
	2-maintained		ZB5AK12★3	35.00
	2-momentary from right to left		ZB5AK14★3	51.00
	3-maintained		ZB5AK13★3	35.00
	3-momentary to center		ZB5AK15★3	51.00
	3-momentary from right to center		ZB5AK18★3	51.00
	3-momentary from left to center		ZB5AK17★3	51.00

★ Designate color as follows: 1—white, 3—green, 4—red, 5—yellow, 6—blue

ZB5AK1463

Table 19.154: Sequence of Contacts on Selector Switch Bodies

Unit Type		Selector Switches														
		2-position						3-position								
		315°			45			315°			0°			45°		
Operator Plunger Position	Up															
	Down															
Contact Block Location		L	C	R	L	C	R	L	C	R	L	C	R	L	C	R
Contacts	N/O	O	O	O	X	X	X	X	X	O	O	O	O	O	X	X
	N/C	X	X	X	O	O	O	O	O	X	X	X	X	X	O	O

Note: L=Left, C=Center, R=Right, O=Open, X=Closed

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Caps . . . . . page 19-60

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NOTE: *For the Quick-Connect version, add the numeral **3** to the end of the catalog number.*
Example: ZB5AZ1013 (Quick-Connect size 1 x 0.250" or 2 x 0.110").

ZB5AZ101

Table 19.155: Contact Blocks (Mounting Collar with Contact Blocks) ▲■♦

Description	Type of Contact		Catalog Number	$ Price
	N.O.	N.C.		
Screw clamp terminal connections	1	—	ZB5AZ101	22.00
	—	1	ZB5AZ102	22.00
	2	—	ZB5AZ103	38.20
	—	2	ZB5AZ104	38.20
	1	1	ZB5AZ105	38.20
	1	2	ZB5AZ141	55.00

▲ For Ring Tongue compatible blocks add "9" to the end of the catalog number (Example: ZB5AZ1029).
■ Electrical components with connection by printed circuit board pins are available. Refer to Catalog **9001CT0001** for more information.
♦ Electrical components with connection by plug-in connector are available. Refer to Catalog **9001CT0001** for more information.

Table 19.156: Complete Bodies (Mounting Collar + Single Contact Block + Light Module with Protected LED™)

ZB5AW0••1

Light Source	Type of Contact ▼		Color	Supply Voltage ★		$ Price
	N.O.	N.C.		24 Vac/Vdc	110–120 Vac	
				Catalog Number		
Screw clamp terminal connections						
Protected LED™	1	—	White	ZB5AW0B11	ZB5AW0G11	73.00
			Green	ZB5AW0B31	ZB5AW0G31	
			Red	ZB5AW0B41	ZB5AW0G41	
			Yellow	ZB5AW0B51	ZB5AW0G51	
			Blue	ZB5AW0B61	ZB5AW0G61	
	—	1	White	ZB5AW0B12	ZB5AW0G12	73.00
			Green	ZB5AW0B32	ZB5AW0G32	
			Red	ZB5AW0B42	ZB5AW0G42	
			Yellow	ZB5AW0B52	ZB5AW0G52	
			Blue	ZB5AW0B62	ZB5AW0G62	
	2	—	White	ZB5AW0B13	ZB5AW0G13	90.00
			Green	ZB5AW0B33	ZB5AW0G33	
			Red	ZB5AW0B43	ZB5AW0G43	
			Yellow	ZB5AW0B53	ZB5AW0G53	
			Blue	ZB5AW0B63	ZB5AW0G63	
	1	1	White	ZB5AW0B15	ZB5AW0G15	90.00
			Green	ZB5AW0B35	ZB5AW0G35	
			Red	ZB5AW0B45	ZB5AW0G45	
			Yellow	ZB5AW0B55	ZB5AW0G55	
			Blue	ZB5AW0B65	ZB5AW0G65	

★ For 240V LED, replace the "B" or "G" with "M". (Example: change "ZB5AW0**B**11 (24 V) to ZB5AW0**M**11 (240 V))

ZB5AW065

ZB5AW035

Table 19.157: Mounting Collar, Contact Block and Light Module (with screw clamp terminal connections) ▼

Supply	Light Source	Supply Voltage	Type of Contact ▼		Color of Light Source	Catalog Number	$ Price
			N.O.	N.C.			
Screw clamp terminal connections							
Direct supply	BA9s 2.4 W max. bulb Not included △	≤250 Vac/Vdc	1	—	—	ZB5AW061	55.00
			—	1	—	ZB5AW062	55.00
			2	—	—	ZB5AW063	71.00
			1	1	—	ZB5AW065	71.00
Transformer type 1.2 VA, 6 V secondary	BA9s incandescent bulb included	110–120 Vac 50/60 Hz	1	—	—	ZB5AW031	114.00
			1	1	—	ZB5AW035	130.00
		230–240 Vac 50/60 Hz	1	—	—	ZB5AW041	114.00
			1	1	—	ZB5AW045	130.00
		440–480 Vac 60 Hz	1	—	—	ZB5AW081	114.00
			1	1	—	ZB5AW085	130.00

▼ Can be fitted with additional contact blocks, see page 19-56.
△ Order bulb separately, see page 19-61.

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ZB5AZ009

Table 19.158: Body/Mounting Collar

For use with	Catalog Number	$ Price
Electrical block (contact or light module)	ZB5AZ009	5.40

ZBE101

Table 19.159: Add-On Contact Block (with screw clamp terminal connections) ★▼

Description		Type of Contact		Catalog Number	$ Price
		N.O.	N.C.		
Standard **single** contact blocks▲■		1	—	ZBE101	16.40
		—	1	ZBE102	16.40
Standard **double** contact blocks▲■		2	—	ZBE203	33.20
		—	2	ZBE204	33.20
		1	1	ZBE205	33.20
Special contact blocks for low-power switching ♦		1	—	ZBE1016	32.80
		—	1	ZBE1026	32.80
Low-power switching	Dusty environment ♦ (IP5X, 50 µm dust)	1	—	ZBE1016P	32.80
		—	1	ZBE1026P	32.80
Staggered contacts	Early make N/O	1	–	ZBE201	16.40
	Late break N/C	—	1	ZBE202	16.40
	Overlapping N/O+N/C	1	1	ZB4BZ106	32.80
	Staggered N/O+N/O	—	2	ZB4BZ107	32.80

▲ For Quick-Connect version add "3" to the end of the catalog number (Example: ZBE1013) (Quick-Connect size 1 x 0.250" or 2 x 0.110").
■ For Ring Tongue compatible blocks add "9" to the end of the catalog number (Example: ZBE1029).
♦ Cannot stack additional contact blocks onto these blocks.

ZBE203

Table 19.160: Light Modules (with screw clamp terminal connections)★▼

Description	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Protected LED™	12 Vac/Vdc	White	ZBVJ1	52.00
		Green	ZBVJ3	
		Red	ZBVJ4	
		Yellow	ZBVJ5	
		Blue	ZBVJ6	
	24 Vac/Vdc	White	ZBVB1	52.00
		Green	ZBVB3	
		Red	ZBVB4	
		Yellow	ZBVB5	
		Blue	ZBVB6	
	110–120 Vac	White	ZBVG1	52.00
		Green	ZBVG3	
		Red	ZBVG4	
		Yellow	ZBVG5	
		Blue	ZBVG6	
	24–120 Vac/Vdc	White	ZBVBG1	52.00
		Green	ZBVBG3	
		Red	ZBVBG4	
		Yellow	ZBVBG5	
		Blue	ZBVBG6	
	230–240 Vac	White	ZBVM1	52.00
		Green	ZBVM3	
		Red	ZBVM4	
		Yellow	ZBVM5	
		Blue	ZBVM6	
Direct supply for BA9s (2.4 W max. bulb not included—see page 19-61)	≤ 250 Vac/Vdc	—	ZBV6	33.20

★ Electrical components with connection by printed circuit board pins are available. Refer to Catalog **9001CT0001** for more details.
▼ Electrical components with connection by plug-in connector are available. Refer to Catalog **9001CT0001** for more details.

ZBVB•

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ZB5AZ009

ZBE1015

ZB5AZ1015

Table 19.161: Spring Terminal Products for XB5 22 mm Push Buttons

Body/Mounting Collar

For Use With	Catalog Number	$ Price
Contact block or light module	ZB5AZ009	**5.40**

Contact Blocks ▲

Spring Terminal Connections, Contacts for Standard Applications

Description	Type of Contact	N/O	N/C	Catalog Number	$ Price
Contact blocks	Single	1	–	ZBE1015	**18.00**
		–	1	ZBE1025	**18.00**
	Single with body/mounting collar	1	–	ZB5AZ1015	**24.00**
		–	1	ZB5AZ1025	**24.00**
		2	–	ZB5AZ1035	**42.00**
		–	2	ZB5AZ1045	**42.00**
		1	1	ZB5AZ1055	**42.00**

Light Modules ▲

Spring Terminal Connections

Description	Supply Voltage	Color of Light Source	Catalog Number	$ Price
Integral LED (to combine with heads for integral LED) Protected LED	12 Vac/Vdc	White	ZBVJ15	**57.00**
		Green	ZBVJ35	**57.00**
		Red	ZBVJ45	**57.00**
		Orange	ZBVJ55	**57.00**
		Blue	ZBVJ65	**57.00**
	24 Vac/Vdc	White	ZBVB15	**57.00**
		Green	ZBVB35	**57.00**
		Red	ZBVB45	**57.00**
		Orange	ZBVB55	**57.00**
		Blue	ZBVB65	**57.00**
	110–120 Vac	White	ZBVG15	**57.00**
		Green	ZBVG35	**57.00**
		Red	ZBVG45	**57.00**
		Orange	ZBVG55	**57.00**
		Blue	ZBVG65	**57.00**
	230–240 Vac	White	ZBVM15	**57.00**
		Green	ZBVM35	**57.00**
		Red	ZBVM45	**57.00**
		Orange	ZBVM55	**57.00**
		Blue	ZBVM65	**57.00**

▲ Additional blocks **cannot** be attached to the back of these contact blocks or light modules.

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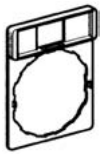
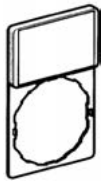

ZBZ32

ZBY•101

ZBY2303

ZBZ33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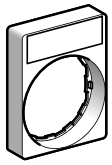
ZBZ4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ZBZ5

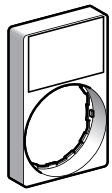
ZBY6H10•

Table 19.162: Standard (30 x 40 mm) Legend Holders for 8 x 27 mm Legends

Description	Legend		Catalog Number	$ Price
	Color	Text		
Without legend insert ▲	—	—	ZBZ32	2.00
With blank legend insert (for engraving)	Black or red background	—	ZBY2101	3.40
	White or yellow background	—	ZBY4101	
Custom legend plate and insert (specify engraving) 2 lines of 11 characters (including spaces) maximum per line	Black background	White	ZBY2002	14.20
	Red background	White	ZBY2004	
	White background	Black	ZBY4001	
	Yellow background	Black	ZBY4005	
With international language marked legend	Black or red background ■	O (black background)	ZBY2146	3.40
		O (red background)	ZBY2931	
		I	ZBY2147	
		II	ZBY2148	
		O-I	ZBY2178	
		I-II	ZBY2179	
		I-O-II	ZBY2186	
With English language marked legend	Black or red background ■	AUTO	ZBY2115	3.40
		AUTO-HAND	ZBY2364	
		AUTO-O-HAND	ZBY2385	
		CLOSE	ZBY2314	
		DOWN	ZBY2308	
		EMERGENCY STOP	ZBY2330	
		FAST	ZBY2328	
		FORWARD	ZBY2305	
		FOR-REV	ZBY2371	
		HAND	ZBY2316	
		HAND-OFF-AUTO	ZBY2387	
		INCH	ZBY2321	
		JOG	ZBY2382	
		LEFT	ZBY2310	
		OFF	ZBY2312	
		OFF-ON	ZBY2367	
		ON	ZBY2311	
		OPEN	ZBY2313	
		POWER ON	ZBY2326	
		RESET (red background)	ZBY2323	
		RESET (black background)	ZBY2322	
		REVERSE	ZBY2306	
		RIGHT	ZBY2309	
		RUN	ZBY2334	
		SLOW	ZBY2327	
		START	ZBY2303	
		STOP	ZBY2304	
		STOP-START	ZBY2366	
		UP	ZBY2307	

▲ For legends, see page 19-59.
■ Start functions: white letters on black background. Stop functions: white letters on red background (unless otherwise specified above).

Table 19.163: Large (30 x 50 mm) Legend Holders for 18 x 27 mm Legends

Description ♦	For use with	Color	Catalog Number	$ Price
Without legend insert	Circular and square heads	—	ZBZ33	2.00
With blank legend insert	Circular and square heads	Black or red background	ZBY6101	3.40
		White or yellow background	ZBY6102	

Table 19.164: 30 x 40 mm legend holder (flush mounting with bezel) for 8 x 27 mm legends

Description ♦	Color	Catalog Number	$ Price
Without legend	—	ZBZ34	2.00
With blank legend	Black or red background	ZBY2H101	3.40
	White or yellow background	ZBY4H101	

Table 19.165: 30 x 50 mm legend holder (flush mounting with bezel) for 18 x 27 mm legends

Description ♦	Color	Catalog Number	$ Price
Without legend	—	ZBZ35	4.20
With blank legend	Black or red background	ZBY6H101	5.40
	White or yellow background	ZBY6H102	

♦ For custom legends, please see page 19-59

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ZBY02178

ZBY02303

Table 19.166: Marked Legends for 8 x 27 mm (for 30 x 40 mm legend holders ZBZ32)

Color	Marking	Text	Catalog Number	$ Price
Black or red background▲	International	O (black background)	ZBY02146	1.70
		O (red background)	ZBY02931	
		I	ZBY02147	
		II	ZBY02148	
		O-I	ZBY02178	
		I-II	ZBY02179	
		I-O-II	ZBY02186	
	English	AUTO	ZBY02115	1.70
		AUTO-HAND	ZBY02364	
		AUTO-O-HAND	ZBY02385	
		CLOSE	ZBY02314	
		DOWN	ZBY02308	
		EMERGENCY STOP	ZBY02330	
		FAST	ZBY02328	
		FORWARD	ZBY02305	
		FOR-REV	ZBY02371	
		HAND	ZBY02316	
		HAND-OFF-AUTO	ZBY02387	
		INCH	ZBY02321	
		JOG	ZBY02382	
		LEFT	ZBY02310	
		OFF	ZBY02312	
		OFF-ON	ZBY02367	
		ON	ZBY02311	
		OPEN	ZBY02313	
		POWER ON	ZBY02326	
		RESET (red background)	ZBY02323	
		RESET (black background)	ZBY02322	
		REVERSE	ZBY02306	
		RIGHT	ZBY02309	
		RUN	ZBY02334	
		SLOW	ZBY02327	
		START	ZBY02303	
		STOP	ZBY02304	
		STOP-START	ZBY02366	
		UP	ZBY02307	

▲ Start functions: white letters on black background. Stop functions: white letters on red background (unless otherwise specified above).

Table 19.167: Legends for Customer Engraving (inserts only)

Description	For use with	Color	Text Color	Catalog Number	$ Price
8 x 27 mm	30 x 40 mm legend holders	Black or red background	White	ZBY0101	1.70
		White or yellow background	Black	ZBY0102	
18 x 27 mm	30 x 50 mm legend holders	Black or red background	White	ZBY5101	
		White or yellow background	Black	ZBY5102	

Table 19.168: Legends for Factory Engraving (inserts only)

Description	For use with	Color	Text Color	Catalog Number	$ Price
8 x 27 mm Custom legend/insert only (specify engraving) 2 lines of 11 characters (including spaces) maximum per line **Example**: ZBY01002 marked "Robot"	30 x 40 mm legend holders	Black background	White	ZBY01002	12.20
		Red background	White	ZBY01004	
		White background	Black	ZBY01001	
		Yellow background	Black	ZBY01005	
18 x 27 mm Custom legend/insert only (specify engraving) 3 lines of 11 characters (including spaces) maximum per line **Example**: ZBY05002 marked "Robot"	30 x 50 mm legend holders	Black background	White	ZBY05002	12.20
		Red background	White	ZBY05004	
		White background	Black	ZBY05001	
		Yellow background	Black	ZBY05005	

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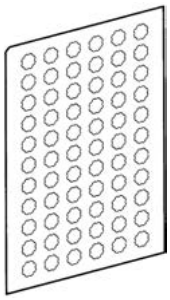
ZBY1101

Table 19.169: Sheets of Legends for Push Buttons, Switches, and Pilot Lights

Description	Marking	Text	Catalog Number	$ Price
Sheets of 66 circular peel-off transparent self-adhesive legends	Blank–Round		ZBY1101	6.20
	Blank–Square legends		ZBCY1101	6.20
	International	O	ZBY1146	10.40
		I	ZBY1147	
		II	ZBY1148	
		III	ZBY1149	
		STOP	ZBY1304	
		→	ZBY1912	
	English	HAND	ZBY1316	10.40
		OFF	ZBY1312	
		ON	ZBY1311	
		START	ZBY1303	
SiS Label Software	Legend Design Software: English, French, German, Spanish, Italian		XBY2U	104.00

Table 19.170: Push Button Caps—Unmarked

ZBA•

ZBL•

For use with	Type of Push	Color	Catalog Number	$ Price
ZB5AA0 push button heads	Flush	White	ZBA1	2.00
		Black	ZBA2	
		Green	ZBA3	
		Red	ZBA4	
		Yellow	ZBA5	
		Blue	ZBA6	
		6 colors ▲	ZBA9	4.20
	Extended	White	ZBL1	2.00
		Black	ZBL2	
		Green	ZBL3	
		Red	ZBL4	
		Yellow	ZBL5	
		Blue	ZBL6	
		6 colors ▲	ZBL9	4.20

Table 19.171: Push Button Caps—Marked

ZBA•33

For use with	Type of Push	Marking		Cap Color	Catalog Number	$ Price
		Text	Color			
ZB5AA0 push button heads	Flush	I ■	White	Green	ZBA331	4.20
			Black	White	ZBA131	
		START ■	White	Green	ZBA333	
			Black	White	ZBA133	
		ON	White	Green	ZBA341	
			Black	White	ZBA141	
		UP ■	Black	White	ZBA343	
		DOWN■	White	Black	ZBA344	
		⏉ ■	White	Green	ZBA345	
		⏉	White	Black	ZBA245	
		⏀	White	Green	ZBA346	
		↑	Black	White	ZBA334♦	
			White	Black	ZBA335♦	
		O■	White	Red	ZBA432	
				Black	ZBA232	
		STOP■	White	Red	ZBA434	
				Black	ZBA234	
		OFF	White	Red	ZBA435	
				Black	ZBA235	
		R■	White	Blue	ZBA639	

▲ Set of 6 different colored caps: white, black, green, red, yellow, blue.
■ Double injection molded marking.
♦ Cap supplied not clipped-in, allowing orientation of arrow in any one of 4 directions: ↑, ↓, ← or →

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ZBA7235

ZBA7331

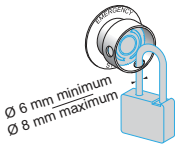
ZBA7432

ZBA79

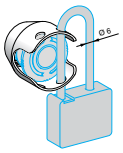
Table 19.172: Multiple-head and XB5R Push Button Caps■

For use with	Type of Push	Marking	Cap Color	Catalog Number	$ Price
Double push button heads Tripe push button heads ZB4RZA0 ZB5RZA0	Flush	Unmarked	White	ZBA71	4.00
		"I" black		ZBA7131	5.30
		"➡" black		ZBA7134	5.30
		"+" black		ZBA7138	5.30
		Unmarked	Black	ZBA72	4.00
		"O" white		ZBA7232	5.30
		"+" white		ZBA7233	5.30
		"➡" white		ZBA7235	5.30
		"I" white		ZBA7237	5.30
		Unmarked	Green	ZBA73	4.00
		"I" white		ZBA7331	5.30
		"+" white		ZBA7333	5.30
		"⬆" white		ZBA7335	5.30
		"II" white		ZBA7336	5.30
		Unmarked	Red	ZBA74	4.00
		"O" white		ZBA7432	5.30
		Unmarked	Yellow	ZBA75	4.00
		Unmarked	Blue	ZBA76	4.00
		Assorted	10 colors♦	ZBA79	3.00

▲ Sold in lots of 10.
■ Set of 10 different caps: white, black, green, red, yellow, blue, white "I" on green background, black "I" on white background, white "O" on red background, white "O" on black background.



ZBZ3605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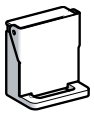
ZB4BZ6•

Table 19.173: Accessories

Description	Application	Color	Catalog Number	$ Price
Padlocking kit Conforming to EN / ISO 13850 ▼ (See legends below)	For Emergency Stop function only, with the following Ø40 mm trigger-action push buttons: XB5AT8• XB5AS8• XB5AS9• ZB5AT8• ZB5AS8• ZB5AS9•	Yellow	ZBZ3605	108.00
Metal guards Padlockable	For Emergency stop function only with the following Ø40 mm trigger-action push buttons: XB5AT8• XB5AS8• XB5AS9• ZB5AT8• (except ZB5AT8643M) ZB5AS8• ZB5AS9•	Chromium Plated	ZBZ1600	108.00
		Black	ZBZ1602	
		Red	ZBZ1604	
		Yellow	ZBZ1605	
		Blue	ZBZ1606	
Plastic guards★	Round Guard for ZB5AS5430 EMO Mushroom Operators	Yellow	ZB4BZ1905	25.80
	Narrow Flange Guard for ZB5AS5430 or ZB5AS84430 EMO Mushroom Operators△	Yellow	ZB4BZ2005	
	Trigger Action Guard for ZB5AS84430 EMO Mushroom Operators	Yellow	ZB4BZ2105	
Padlockable flaps	For push buttons	Black	ZB4BZ62	32.80
		Red	ZB4BZ64	
Plastic blanking plug, round♦	For Ø22 mm units with round heads	Black	ZB5SZ3	11.00
Plastic blanking plug, square♦	For Ø22 mm units with square heads	Black	ZB5SZ5	11.00
Square insert	To give square appearance to ZB5A round heads	Black	ZB5AZ31	2.00
Mounting nut	Operator	—	ZB5AZ901	4.40
Tool	For tightening mounting nut ZB5AZ901	—	ZB5AZ905	12.40
Plate	Anti-rotation of head	—	ZB5AZ902	2.00
Ø60 mm Legend for padlocking device ZBZ3605	Without	Yellow	ZBY9101T	3.40
	EMERGENCY STOP	Yellow	ZBY9330T	

♦ Mounting nut included with blanking plug.
★ For additional information, refer to publication **9001DB0601R6/06**.
▼ Standard circular legends are not compatible with this product. Use special legends ZBY• •T listed above.
△ Maximum panel thickness is 2.5 mm.

ZB4SZ3

ZB5SZ3

DLCE•••

DL1CF•••

XBFX13

ZBZ8

Table 19.174: BA9s Bulbs and Associated Accessories

Description	Characteristics	Catalog Number	$ Price
Replacement bulbs (Type BA9s) Incandescent	6 V, 1.2 W	DL1CB006	11.00
	12 V, 2 W	DL1CE012	
	24 V, 2 W	DL1CE024	
	120–130 V, 2.4 W	DL1CE130	
Neon bulbs	120–130 V	DL1CF110	15.20
	230–240 V	DL1CF220	
Bulb extractor	—	XBFX13	11.00
Lens cap tightening tool	Illuminated push buttons with flush push	ZBZ8	6.20
Power driver bits for mounting and wiring (package of 5)	Cross headed screw (POZIDRIV type 1)	ZB4BZ905	52.00
Mounting Adapter	For mounting 22 mm push button in 30 mm knockout	ZBZ41	10.40

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ZBZ•8

Table 19.175: Bellows Seals for Harsh Environments (IP 69K) ▲

Description	For use with	Color & Material	Sold in Lots of	Catalog Number	$ Price
Bellows Seals for harsh environments (Humidity, dust, high-pressure cleaning)	XB5 plastic mushroom head push button ▲, Ø40 mm or Ø60 mm	Red Silicone	2	ZBZ48	12.40
		Black EPDM	2	ZBZ28	
		Yellow EPDM	2	ZBZ58	

▲ Only when mounted on control stations. Use special legends ZBY• •T.

ZBDD2

Table 19.176: Boot for standard selector switch handle

Description	For use with	Catalog Number	$ Price
Boot for standard handle	ZB5A••	ZBDD2	12.40

ZBG455

ZBG455P

Table 19.177: Replacement Keys

Description	Key Number	Catalog Number	$ Price
Set of 2 keys	455	ZBG455	11.00
	421E	ZBG421E	
	458A	ZBG458A	
	520E	ZBG520E	
	3131A	ZBG3131A	
Set of 2 keys, One of which is supplied booted (rubber boot)	455	ZBG455P	23.40
	421E	ZBG421EP	
	458A	ZBG458AP	
	520E	ZBG520EP	
	3131A	ZBG3131AP	

ZBP0

Table 19.178: Clear Boots

Description	For use with	Material	Catalog Number	$ Price
Single boots	Booted push buttons with circular head	Silicone	ZBP0	12.40
	Booted push buttons with circular head used in food industry applications		ZBP0A	12.40
Double boots	Double-headed push buttons, two flush		ZBA708	10.80
	Double-headed push buttons, one flush + one projecting		ZBA709	10.80
Triple boot	Triple-headed push buttons, two flush + one projecting		ZBA710	10.80

ZBA709

Table 19.179: Colored boots

Description	Color	Catalog Number	$ Price
Single boot (can be replaced without dismantling the head)	Black	ZB2 BP012	13.00
	Green	ZB2 BP013	
	Red	ZB2 BP014	
	Yellow	ZB2 BP015	
	Blue	ZB2 BP016	

ZBV01•3

Table 19.180: Lens Caps

For use with	Color	Catalog Number	$ Price
Lens caps for Protected LED™ light modules			
Pilot lights	White	ZBV0113	5.40
	Green	ZBV0133	
	Red	ZBV0143	
	Yellow	ZBV0153	
	Blue	ZBV0163	
Illuminated push buttons with flush push	White	ZBW9113	5.40
	Green	ZBW9133	
	Red	ZBW9143	
	Yellow	ZBW9153	
	Blue	ZBW9163	
Illuminated push buttons with extended push	White	ZBW9313	5.40
	Green	ZBW9333	
	Red	ZBW9343	
	Yellow	ZBW9353	
	Blue	ZBW9363	
Circular lens caps for BA9s light modules			
Pilot lights	White	ZBV011	5.40
	Green	ZBV013	
	Red	ZBV014	
	Yellow	ZBV015	
	Blue	ZBV016	
	Clear	ZBV017	
Illuminated push buttons with flush push	White	ZBW911	5.40
	Green	ZBW913	
	Red	ZBW914	
	Yellow	ZBW915	
	Blue	ZBW916	
	Clear	ZBW917	
Illuminated push buttons with extended push	White	ZBW931	5.40
	Green	ZBW933	
	Red	ZBW934	
	Yellow	ZBW935	
	Blue	ZBW936	
	Clear	ZBW937	
Square lens caps for Protected LED light modules (ZB5C operators only)			
Pilot lights	White	ZBCV0113	9.40
	Green	ZBCV0133	
	Red	ZBCV0143	
	Yellow	ZBCV0153	
	Blue	ZBCV0163	
Illuminated push buttons with flush push	White	ZBCW9113	9.40
	Green	ZBCW9133	
	Red	ZBCW9143	
	Yellow	ZBCW9153	
	Blue	ZBCW9163	
Illuminated push buttons with extended push	White	ZBCW9313	9.40
	Green	ZBCW9333	
	Red	ZBCW9343	
	Yellow	ZBCW9353	
	Blue	ZBCW9363	

ZBV01•

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XB5RFA02

ZBRT1

ZB4RZA0

ZB5RTA4

Table 19.181: Ready-to-use Packs▲

Description	Transmitter Type	Voltage Receiver V	Receiver Type	Catalog Number	$ Price
Packs include: - 1 push button/transmitter - 1 receiver The push button and receiver are factory-paired■	Ø 22 mm plastic head + 1 set of 10 different colored caps	∿/⎓ 24 to 240	Programmable receiver with: - 2 relay outputs type RT 3A♦	XB5RFA02	**510.00**
	Ø 22 mm metallic head + 1 set of 10 different colored caps			XB4RFA02	**510.00**
	Ø 22 mm plastic head	⎓ 24	Non-programmable receiver with: - 1 relay output type RT 3A★	XB5RFB01	**210.00**
	Ø 22 mm metallic head			XB4RFB01	**210.00**
Packs include: - 1 push button/transmitter in handy box▼ - 1 receiver The push button and receiver are factory-paired■	Ø 22 mm plastic head + 1 set of 10 different colored caps	∿/⎓ 24 to 240	Programmable receiver with: - 2 relay outputs type RT 3A♦	XB5RMA04	**590.00**
	Ø 22 mm metallic head + 1 operator head	⎓ 24	Non-programmable receiver with: - 1 relay output type RT 3A★	XB5RMB03	**290.00**

Table 19.182: Transmitter Components for Wireless, Batteryless Push Buttons

Description	Type of Push	Cap Color	Catalog Number	$ Price
Transmitter for wireless, batteryless push buttons△ □	–	–	ZBRT1	**110.00**
Spring return push button heads for transmitter ZBRT1	Plastic	Without cap◊	ZB5RZA0	**18.60**
	Metal	Without cap◊	ZB4RZA0	
Wireless, batteryless push buttons including: - a transmitter fitted with mounting collar - a spring return push button head with clipped-in cap☆	Plastic	White	ZB5RTA1	**130.00**
		Black	ZB5RTA2	
		Green	ZB5RTA3	
		Green with white "I"	ZB5RTA331	
		Red	ZB5RTA4	
		Red with white "O"	ZB5RTA432	
		Yellow	ZB5RTA5	
		Blue	ZB5RTA6	
	Metal	White	ZB4RTA1	**130.00**
		Black	ZB4RTA2	
		Green	ZB4RTA3	
		Green with white "I"	ZB4RTA331	
		Red	ZB4RTA4	
		Red with white "O"	ZB4RTA432	
		Yellow	ZB4RTA5	
		Blue	ZB4RTA6	

▲ Wireless and batteryless push button and receiver, factory-paired.
■ For additional components, these devices can be field-paired.
♦ Supplied with output function set to momentary. Outputs programmable to maintained and Start-Stop.
★ Non-programmable momentary output function.
▼ Supplied with a magnet.
△ Mounting collar ZB5AZ009 (plastic) or ZB4BZ009 (metal) to be ordered separately.
□ Only heads ZB4RZA0 and ZB5RZA0 are mechanically compatible.
◊ Cap to be ordered separately: see Table 19.184 on page 19-64.
☆ This cap is fitted by Schneider Electric and cannot be removed (risk of damage).

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ZBRRA

ZBA7235

ZBA7331

ZBA7432

ZBA79

ZBRM01

XALD02H7

ZBRA1

Table 19.183: Programmable Receivers

Description	Output Type	Voltage Receiver V	Catalog Number	$ Price
Programmable receivers equipped with: - 2 buttons (“Scroll-through”, “Ok”) - 6 indicating LEDs (power ON, outputs, signal strength)	4 PNP outputs, 200 mA / 24 V	⎓ 24	ZBRRC	**430.00**
	2 relay outputs type RT 3A▲	∿/⎓ 24 to 240	ZBRRA	**430.00**

Table 19.184: Caps for Harmony Push Button Heads ZB5RZA0 and ZB4RZA0

Description	Background Color	Marking	Sold in lots of	Catalog Number	$ Price
Sets of 10 different colored caps with identical marking■	White	Without	10	ZBA71	**4.00**
		“I” (black)	10	ZBA7131	**5.30**
		“⇧” (black)	10	ZBA7134	**5.30**
		“+” (black)	10	ZBA7138	**5.30**
	Black	Without	10	ZBA72	**4.00**
		“O” (white)	10	ZBA7232	**5.30**
		“+” (white)	10	ZBA7233	**5.30**
		“⇩” (white)	10	ZBA7235	**5.30**
		“I” (white)	10	ZBA7237	**5.30**
	Green	Without	10	ZBA73	**4.00**
		“I” (white)	10	ZBA7331	**5.30**
		“+” (white)	10	ZBA7333	**5.30**
		“⇧” white	10	ZBA7335	**5.30**
		“II” (white)	10	ZBA7336	**5.30**
	Red	Without	10	ZBA74	**4.00**
		“O” (white)	10	ZBA7432	**5.30**
	Yellow	Without	10	ZBA75	**4.00**
	Blue	Without	10	ZBA76	**4.00**
Set of 10 different colored caps with different markings■	White, black, green, red, yellow, blue, white “I” on green background, black “I” on white background, white “O” on red background, white “O” on black background		10	ZBA79	**3.00**

Table 19.185: Boxes for Wireless, Batteryless Push Buttons

Description	For use with:	Marking	Sold in lots of	Catalog Number	$ Price
Handy box, plastic, empty ♦ ★	Mobile wireless,batteryless push buttons	1 cut-out	1	ZBRM01	**80.00**
Empty enclosures ▼	Mounted or on-board wireless,batteryless push buttons	1 cut-out	1	XALD01H7	**32.80**
		2 cut-outs	1	XALD02H7	**38.20**

Table 19.186: Accessories

Description	For use with:	Marking	Sold in lots of	Catalog Number	$ Price
External antenna △	Between transmitter and receiver, used to increase the range and/or get around obstacles	∿/⎓ 24 to 240 V - 5m cable - 1 power-ON LED - 2 LEDs reception/transmission	1	ZBRA1	**170.00**
Mounting collar	–	Plastic	10	ZB5AZ009	**5.40**
		Metal	10	ZB4BZ009	**5.40**
Legend plate, 27 x 8 mm, for engraving	For adhering to handy box ZBRM01	Self-adhesive, blank, black background	10	ZBY0101T	**1.70**

▲ Supplied with output function set to momentary Outputs programmable to maintained and Start-Stop.
■ Cap can be clipped-in at 90° steps, through 360°.
♦ Cannot be used for wired contacts (no cable gland outlet).
★ Supplied with a magnet.
▼ Box equipped with cable gland outlets, compatible with Harmony ZB5 push button heads.
△ Not wired to the receiver.

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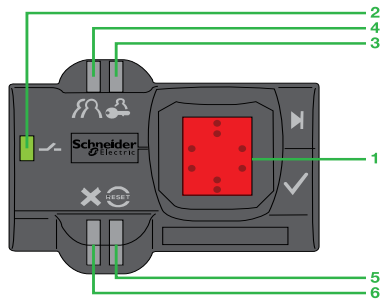

XB5 S•B••••

ZB5 SZ70

ZB5SZ72

Biometric Switches

The fingerprint-reading biometric switch is designed for use in industry to restrict access to systems or machines. No interface is required to program or operate the switch: it is an independent unit.

Two types of products are available:

- Maintained biometric switches, Type XB5S1B, with two fixed states
- Momentary biometric switches, Type XB5S2B, with pulse output

The biometric switch is aimed at two types of users:

- The administrator who manages the registration and deletion of fingerprints
- The operator who, once registered, uses the product as a control unit

The product is of monolithic design (a single plastic housing) and is mounted by a nut (hand-tightened without the need for tools) in a standard 22 mm diameter hole. It operates on a 24 Vdc supply.

The product connects to the power supply and to the control output (relay or PLC) with a 2 meter cable or with an M12 connector.

It can be installed on a flat, horizontal, or vertical surface.

Two protective covers are available (see table below)

- One to protect the active face of the sensing screen. This cover is attached with a self-adhesive hinge
- One made of 12 gauge stainless steel — designed to cover the entire switch — which protects the entire switch from the outdoor environment (rain, sleet, snow, sunlight, UV protection). It also gives some protection from someone trying to break into the switch

Description

The product consists of a dark gray housing, with the following on its front face:

- A sensing screen **(1)** that allows the registration of fingerprints and subsequent recognition of the registered fingerprints
- A green LED output state indicator **(2)**, which illuminates when the output is activated (N.O. solid state contact)
- An orange LED **(3)**, indicating an administrator's Registration mode
- An orange LED **(4)**, indicating an operator's Registration mode
- A red Reset LED **(5)**, which indicates in Delete mode that the administrator is deleting all or part of the memory
- A red LED **(6)** which flashes to indicate an unrecognized fingerprint or incorrect operation

Table 19.187: Complete Units

Description	Output	Connection	Catalog Number	$ Price
Maintained biometric switch, 24 Vdc	PNP	2 m cable	XB5S1B2L2	**580.00**
		M12 connector	XB5S1B2M12	**595.00**
Momentary biometric switch, 24 Vdc with 0.5 s output pulse	PNP	2 m cable	XB5S2B2L2	**580.00**
		M12 connector	XB5S2B2M12	**595.00**

Table 19.188: Accessories

Description	Function	Catalog Number	$ Price
Protective cover, translucent and self-adhesive	Protection of the sensing screen	ZB5SZ70	**10.00**
Mounting nut, Ø 22 mm	Replacement part	ZB5SZ71	**6.00**
Legend plate, 28 x 7 mm, self-adhesive, blank, with black background, for engraving		ZBY0101T	**1.70**
Mounting adapter	Allows this product to mount in a 30 mm mounting hole	ZBZ41	**10.40**
Stainless-steel protective cover	Protects switch from outside elements and vandalism	ZB5SZ72	**220.00**

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Table 19.189: Biometric Switch Specifications

Biometric Switch, Types XB5S1B•••• and XB5S2B••••		
Product certifications		UL, CSA, CE IEC 61000-6-2 / IEC 61000-6-4
Degree of protection	Conforming to EN/IEC 60529	IP 65, NEMA 1, 2, 3, 3R, 12
Ambient air temperature	Storage	-25 to +70°C
	Operation	-5 to +50°C
Vibration resistance	Conforming to IEC 60068-2-6	1 gn, 9 to 500 Hz. Amplitude 3 mm, 5 to 9 Hz
Electric shock resistance	Conforming to IEC60068-2-27	50 gn, duration 11 ms
Connection method	Cable	Length: 2 m, 3-wire, pre-wired
	Connector	M12
Materials	Housing	Polyamide PA66
	Cable	PvR 3 x 0.34 mm^2
Memory capacity		200 records (100 users, operators, or administrators, each registering 2 fingerprints)
Output state indicator		Green LED
Short-circuit protection		By gG fuse, 250 mA
Rated supply voltage		24 Vdc with protection against reverse polarity
Voltage limits (including ripple)		20–30 Vdc
Switching capacity		≤ 200 mA with protection against overloads and short-circuits
Residual voltage, closed state		≤ 1 V
No-load current consumption		≤ 50 mA
Delays	First-up	< 2 s
	Response time	< 1 s
	Recovery time	< 1 s

NOTE: *Momentary switch has 0.5 s output pulse.*

Figure 19.1: Connections

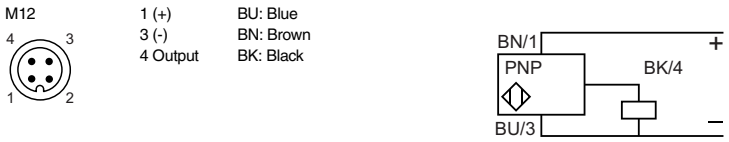
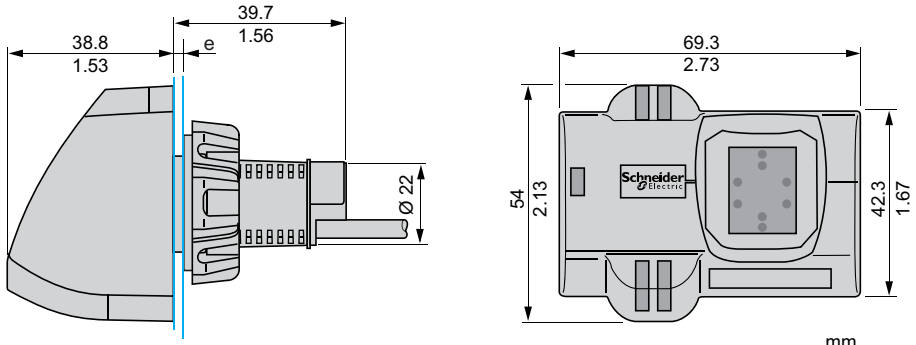


Figure 19.2: Dimensions

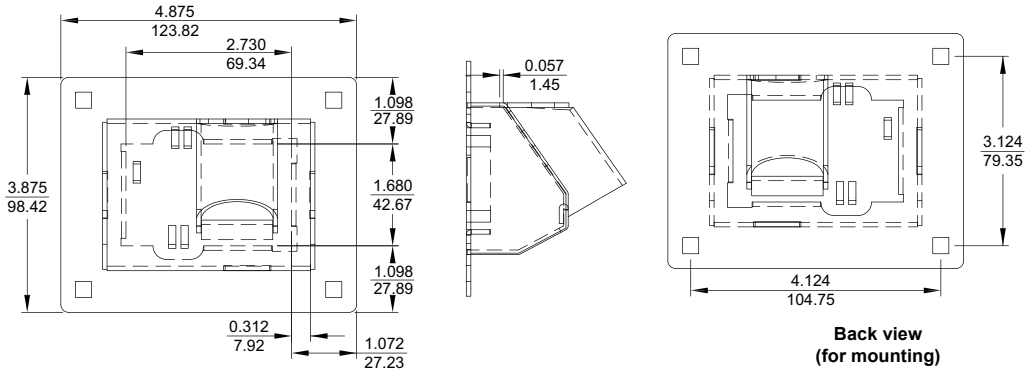
XB5 Biometric Switch



e = 1 to 6 mm
(0.04 to 0.24 in.)

Dim. = mm / in.

Stainless-Steel Cover



Back view (for mounting)

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Table 19.190: Non-Illuminated Momentary Push Button Operators UL Types 4, 13/NEMA 4, 13

For use in hazardous locations—See page 19-87.
Contact blocks and legend plate not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description		Color	Operator with 1 N.O. and 1 N.C. Contact (KA1)	$ Price	Operator with 1 N.O. Contact (KA2)	Operator with 1 N.C. Contact (KA3)	$ Price	Operator Only with No Contacts	$ Price
9001KR1B	Full Guard	Black	KR1BH13		KR1BH5	KR1BH6		KR1B	
		Red	KR1RH13		KR1RH5	KR1RH6		KR1R	
		Green	KR1GH13		KR1GH5	KR1GH6		KR1G	
		Universal ▲	KR1UH13		KR1UH5	KR1UH6		KR1U	
		Other ■	KR1■H13		KR1■H5	KR1■H6		KR1■	
9001KR3B	No Guard	Black	KR3BH13		KR3BH5	KR3BH6		KR3B	
		Red	KR3RH13		KR3RH5	KR3RH6		KR3R	
		Green	KR3GH13		KR3GH5	KR3GH6		KR3G	
		Universal ▲	KR3UH13	**89.00**	KR3UH5	KR3UH6	**66.00**	KR3U	**38.60**
		Other ■	KR3■H13		KR3■H5	KR3■H6		KR3■	
9001KR2B	Extended Guard	Black	KR2BH13		KR2BH5	KR2BH6		KR2B	
		Red	KR2RH13		KR2RH5	KR2RH6		KR2R	
		Green	KR2GH13		KR2GH5	KR2GH6		KR2G	
		Universal ▲	KR2UH13		KR2UH5	KR2UH6		KR2U	
		Other■	KR2■H13		KR2■H5	KR2■H6		KR2■	
9001KR4B	1-3/8 in. (35 mm) Diameter Mushroom Button	**Snap-In Plastic Mushroom Button**							
		Black	KR4BH13		KR4BH5	KR4BH6	**112.00**	KR4B	**81.00**
		Red	KR4RH13		KR4RH5	KR4RH6	**112.00**	KR4R	**81.00**
		Red ♦	KR4R05H13	**138.00**	KR4R05H5	KR4R05H6	**119.00**	KR4R05	**86.00**
		Green	KR4GH13		KR4GH5	KR4GH6	**112.00**	KR4G	**81.00**
		Other ★	KR4★H13		KR4★H5	KR4★H6	**112.00**	KR4★	**81.00**
		Black	KR24BH13		KR24BH5	KR24BH6		KR24B	
		Red	KR24RH13	**138.00**	KR24RH5	KR24RH6	**112.00**	KR24R	**81.00**
		Green	KR24GH13		KR24GH5	KR24GH6		KR24G	
		Other★	KR24★H13		KR24★H5	KR24★H6		KR24★	
9001KR24BM	1-1/2 in. (40 mm) Diameter Mushroom Button	**Screw-in Metal Mushroom Button with Set Screw Security**							
		Black	—		—	—		9001KR24BM	
		Red	—	—	—	—	—	9001KR24RM	**90.00**
		Green	—		—	—		9001KR24GM	
9001KR5B	2-1/4 in. (57 mm) Diameter Mushroom Button	**Snap-In Plastic Mushroom Button**							
		Black	KR5BH13		KR5BH5	KR5BH6	**112.00**	KR5B	**81.00**
		Red	KR5RH13		KR5RH5	KR5RH6	**119.00**	KR5R	**81.00**
		Red ♦	KR5R05H13 ♦	**138.00**	KR5R05H5 ♦	KR5R05H6 ♦	**112.00**	KR5R05 ♦	**86.00**
		Green	KR5GH13		KR5GH5	KR5GH6	**112.00**	KR5G	**81.00**
		Other★	KR5★H13		KR5★H5	KR5★H6	**112.00**	KR5★	**81.00**
		Black	KR25BH13		KR25BH5	KR25BH6		KR25B	
		Red	KR25RH13	**138.00**	KR25RH5	KR25RH6	**112.00**	KR25R	**81.00**
		Green	KR25GH13		KR25GH5	KR25GH6		KR25G	
		Other★	KR25★H13		KR25★H5	KR25★H6		KR25★	
9001KR25BM	2-3/8 in. (60 mm) Diameter Mushroom Button	**Screw-in Metal Mushroom Button with Set Screw Security**							
		Black	—		—	—		9001KR25BM	
		Red	—	—	—	—	—	9001KR25RM	**101.00**
		Green	—		—	—		9001KR25GM	

▲ The universal push button operators contain one each of the following color inserts: black, red, green, yellow, orange, blue and white.
■ See Table 19.191 for color code.
♦ Knob has the words "Emergency Stop" in raised letters highlighted in white for readability.
★ See Table 19.191 for color code.

Table 19.191: Color Codes

Color	KR1, 2, 3 Place Color Code in Type Number ■	KR4, 5, 24, 25 Place Color Code in Type Number ★
Blue	L	L
Yellow	Y	Y
White	W	—
Orange	S	S
Gray	E	—

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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Table 19.192: 30 mm Multifunction Operators

NOTE: When ordering, add prefix 9001 to the catalog number.

Description ∗		Color	With 2 N.C. Contacts (1 KA3, 1 KA5)	With 1 N.O. & 1 N.C. Contact (1 KA1)	$ Price	Without Contacts ☆	$ Price
Non-Illuminated Push-Pull Mushroom Operators							
KR9R94H13 Set Screw Style	Position, Plastic Head 1-5/8 in. (40 mm), Screw-0n Momentary Pull Maintained Neutral Momentary Push ⬙	Red Green Other ▼	KR8RH25 KR8GH25 KR8▼H25	— — —	**142.00**	KR8R KR8G KR8▼	**86.00**
	2 Position, Plastic Head 1-5/8 in. (40 mm), Screw-0n Maintained Pull Maintained Push ◑	Red ◒ Green Other ▼	— — —	KR9RH13 KR9GH13 KR9▼H13	**188.00**	KR9R KR9G KR9▼	**129.00**
	2 Position , Plastic Head 1-5/8 in. (40 mm), Screw-0n Head with Set Screw Maintained Pull Maintained Push ◑	Red	—	KR9R94H13	**194.00**	KR9R94	**134.00**
9001KR9RM94	2 Position, Metal Head 1-1/2 in. (40 mm) Diameter	Black Red Green	— — —	—	— — —	9001KR9BM94 9001KR9RM94 9001KR9GM94	**138.00**
9001KR9RM95	2 Position, Metal Head 2-3/8 in. (60 mm) Diameter	Black Red Green	— — —	—	— — —	9001KR9BM95 9001KR9RM95 9001KR9GM95	**149.00**

Description		Color	With 1 N.O. & 1 N.C. Contact (KA1)	$ Price	With 2 N.O. & 2 N.C. Contacts (KA2)	$ Price	Without Contacts	$ Price
Non-Illuminated Turn-to-Release Mushroom Operators								
9001KR16H2 Trigger Action	2 Position, Plastic Head Turn-to-Release Trigger Action	Red	KR16H13	**172.00**	KR16H2	**218.00**	KR16	**113.00**

9001KR9P1
1.625 in. Diameter Knob
For 1-3/8 in. or 2-1/4 in. Diameter Knob ∗
Includes Type KN379
Legend Plate Marked
Pull To Start Push To Stop

Screw-On Plastic Illuminated Push-Pull Mushroom Operators

Description ∗	Voltage	With Red Knob and 2 N.C. Contacts (1 KA3, 1 KA5)	With Other Color Knob and 2 N.C. Contacts (1 KA3, 1 KA5)	$ Price	With Other Color Knob Without Contacts ☆	$ Price
3 Position Illuminated Momentary Pull Maintained Neutral Momentary Push⬙	110-120 V, 50-60 Hz Other—Transformer, LED, Flashing □ Other—Full Voltage, Resistor, Neon ◊	KR8P1RH25 KR8P△RH25 KR8P△RH25	KR8P1▼H25 KR8P△▼H25 KR8P△▼H25	**267.00** **267.00** **215.00**	KR8P1▼ KR8P△▼ KR8P△▼	**201.00** **201.00** **171.00**
Description ∗	**Voltage**	**With Red◒ Knob and 1 N.O. & 1 N.C. Contact (KA1)**	**With Other Color Knob and 1 N.O. & 1 N.C. Contact (KA1)**	**$ Price**	**With Other Color Knob Without Contacts**	**$ Price**
2 Position Illuminated Maintained Pull Maintained Push	110–120 V, 50–60 Hz Other—Transformer, LED, Flashing □ Other—Full Voltage, Resistor, Neon ◊	KR9P1RH13 KR9P△RH13 KR9P△RH13	KR9P1▼H13 KR9P△▼H13 KR9P△▼H13	**316.00** **316.00** **257.00**	KR9P1▼ KR9P△▼ KR9P△▼	**243.00** **243.00** **215.00**

▼ Choose one color from the Color Codes table here, and insert the color code in Type number. **Example: KR9** with a yellow knob = **KR9Y**

△ Add the voltage assembly code as chosen from page 19-86. **Example: KR8P** with a 277 V 50–60 Hz voltage = **KR8P8**

□ The knob must be the same color as the LED light module chosen, for example, for a green LED, use a green knob.

◊ On neon light modules, use clear knobs only.

☆ These operators can be ordered complete with contact blocks. For maximum block usage, see page 19-88. Add the "H" number chosen from page 19-88 to the end of the operator Type number and add the cost of the "H" number to the operator cost.

▽ KR11UH1 has 1 KA1 (1 N.O., 1 N.C.) and KR12UH1H1 has 2 KA1 (2 N.O., 2 N.C.).

◒ To obtain a red knob with "Push Emergency Stop" printed on the red knob—substitute "R05" in place of "R" and add **$2.10** to the price.

∗ For 1-3/8 in. or 2-1/4 in. Dia. Knob:
a) Order Type -20 or -21 knob from page 19-92.
b) Order 9001K54 adapter (no charge)—allows Type -20 or -21 knob to fit on push pull operators. Voids UL and NEMA 6 rating.
c) Can order assembled operator by adding color code to Type -20 or -21. **Example: 9001KR9R** would be **9001KR9R20** or **9001KR9R21**. No price adder.

⬙ See page 19-67 for contact sequences.

◑ See Table 19.193.

Table 19.193: Color Codes

Color	KR8, KR9
Black ✪	B
Red	R
Green	G
Blue	L
Yellow	Y
White	W
Orange ✪	S
Clear	C
Amber	A
Gray	—

✪ These colors are not available on illuminated push-pull operators.

Table 19.194: Contact Sequences

9001 KR8RH1 or H13				
		Pull	Ctr	Push
(KA1)	KA3	X	O	O
	KA2	O	O	X

9001 KR8RH25			
KA3	X	O	O
KA5	X	X	O
KA2	O	O	X

NOTE: To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.

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Table 19.195: Illuminated Momentary Push Button Operators UL Types 4, 13/NEMA 4, 13

For use in hazardous locations—See page 19-87.
Legend plate and contact block not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description		Voltage and Frequency	Style	With Red Color Cap and 1 N.O. and 1 N.C. Contact (KA1)	With Green Color Cap and 1 N.O. and 1 N.C. Contact (KA1)	$ Price □	With Other Color Cap Without Contact Block ▲	$ Price ◊
9001K1L1	Full Guard Illuminated Push Button Clear Plastic Top	110–120 V, 50–60 Hz	Transformer	K1L1RH13	K1L1GH13	**231.00**	K1L1▼	**184.00**
		220–240 V, 50–60 Hz	Transformer	K1L7RH13	K1L7GH13	**231.00**	K1L7▼	**184.00**
		24–28 Vac/Vdc	Full Voltage	K1L35RH13	K1L35GH13	**198.00**	K1L35▼	**138.00**
		For other voltages see Table ■	Transformer or Flashing	K1L■RH13	K1L■GH13	**231.00**	K1L■▼	**184.00**
			Full Voltage	K1L■RH13	K1L■GH13	**198.00**	K1L■▼	**138.00**
			Resistor or Neon♦	K1L■RH13	K1L■GH13	**198.00**	K1L■▼	**138.00**
			LED ★	K1L■RH13	K1L■GH13	**231.00**	K1L■▼	**184.00**
9001K3L1	Full Guard Illuminated Push Button Metal Top	110–120 V, 50–60 Hz	Transformer	K3L1RH13	K3L1GH13	**231.00**	K3L1▼	**184.00**
		220–240 V, 50–60 Hz	Transformer	K3L7RH13	K3L7GH13	**231.00**	K3L7▼	**184.00**
		24–28 Vac/Vdc	Full Voltage	K3L35RH13	K3L35GH13	**198.00**	K3L35▼	**138.00**
		For other voltages see Table ■	Transformer or Flashing	K3L■RH13	K3L■GH13	**231.00**	K3L■▼	**184.00**
			Full Voltage	K3L■RH13	K3L■GH13	**198.00**	K3L■▼	**138.00**
			Resistor or Neon ♦	K3L■RH13	K3L■GH13	**231.00**	K3L■▼	**138.00**
			LED ★	K3L■RH13	K3L■GH13	**231.00**	K3L■▼	**184.00**
9001K2L1	No Guard Illuminated Push Button	110–120 V, 50–60 Hz	Transformer	K2L1RH13	K2L1GH13	**217.00**	K2L1▼	**153.00**
		220–240 V, 50–60 Hz	Transformer	K2L7RH13	K2L7GH13	**217.00**	K2L7▼	**153.00**
		24–28 Vac/Vdc	Full Voltage	K2L35RH13	K2L35GH13	**184.00**	K2L35▼	**125.00**
		For other voltages see Table ■	Transformer or Flashing	K2L■RH13	K2L■GH13	**217.00**	K2L■▼	**153.00**
			Full Voltage	K2L■RH13	K2L■GH13	**184.00**	K2L■▼	**125.00**
			Resistor or Neon ♦	K2L■RH13	K2L■GH13	**184.00**	K2L■▼	**125.00**
			LED ★	K2L■RH13	K2L■GH13	**217.00**	K2L■▼	**153.00**
9001K2LR20	1-3/8 in. (35 mm) Illuminated Mushroom, Screw-On Plastic Head	110–120 V, 50–60 Hz	Transformer	K2L1R20H13	K2L1G20H13	**217.00**	Order K2L ■▼ Above △	
		220–240 V, 50–60 Hz	Transformer	K2L7R20H13	K2L7G20H13	**217.00**		
		24–28 Vac/Vdc	Full Voltage	K2L35R20H13	K2L35G20H13	**184.00**		
		For other voltages see Table ■	Transformer or Flashing	K2L■R20H13	K2L■G20H13	**217.00**		
			Full Voltage	K2L■R20H13	K2L■G20H13	**184.00**		
			Resistor or Neon ♦	K2L■R20H13	K2L■G20H13	**184.00**		
			LED ★	K2L■R20H13	K2L■G20H13	**217.00**		
9001K2LR21	2-1/4 in. (57 mm) Illuminated Mushroom, Screw-On Plastic Head	110–120 V, 50–60 Hz	Transformer	K2L1R21H13	K2L1G21H13	**217.00**	Order K2L ■▼ Above △	
		220–240 V, 50–60 Hz	Transformer	K2L7R21H13	K2L7G21H13	**217.00**		
		24–28 Vac/Vdc	Full Voltage	K2L35R21H13	K2L35G21H13	**184.00**		
		For other voltages see Table ■	Transformer or Flashing	K2L■R21H13	K2L■G21H13	**217.00**		
			Full Voltage	K2L■R21H13	K2L■G21H13	**184.00**		
			Resistor or Neon ♦	K2L■R21H13	K2L■G21H13	**184.00**		
			LED ★	K2L■R21H13	K2L■G21H13	**217.00**		

▲ These operators can be ordered complete with contact blocks. For maximum block usage, see page 19-88. Add the "H" number chosen from page page 19-88 to the end of the operator type number and add the cost of the "H" number to the operator cost.
■ Add the voltage assembly code as chosen from Table 19.248 or Table 19.249 on page 19-86. **Example:** K2L▲ with 240 Vac/Vdc = K2L25
♦ On neon light modules, use clear color caps only.
★ The cap must be the same color as the LED light module chosen, e.g., for red LED, use red color cap.
▼ Add the color code as chosen from the color cap table. **Example:** K2L25♦ with a blue 13◆6 mushroom button = K2L25L20
△ The only difference between a no guard (K2L♦) operator and mushroom button operator is the color cap.
□ Price includes operator, light module, contact block, and color cap.
◊ Price includes operator, light module, and color cap.

Table 19.196: Color Caps

Color	Color Codes		
	▼ K1L, K2L, K3L	▼ 1-3/8 in. Mushroom	▼ 2-1/4 in. Mushroom
Red	R	R20	R21
Green	G	G20	G21
Blue	L	L20	L21
Yellow	Y	Y20	Y21
White	W	W20	W21
Clear	C	C20	C21
Amber	A	A20	A21

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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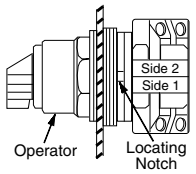
Table 19.197: 2-Position Selector Switches

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Contact Block Required					1 — Contact Closed 0 — Contact Open			
Contact Block Position	Quantity and Type KA1 or KA2 or KA3			Mount on Side KA1 or KA2 or KA3			Left	Right	Left	Right
 Top View	KA1	or	KA3	KA1 #2	or	KA3 #2	1	0	0	1
			KA2			KA2 #2	0	1	1	0
	KA1	or	KA3	KA1 #1	or	KA3 #1	1	0	0	1
			KA2			KA2 #1	0	1	1	0
19-73							E		D	

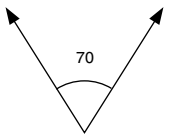
Non-Illuminated Operators	Cat. No.	Cat. No.	$ Price
Manual Return ▲, Operator Only (without contact blocks)			
Without Knob	KS11	KS12	**42.80**
With Knob (select style and color from Table 19.198 below)	KS11*	KS12*	**42.80**
Key Operated with E10 Key (Code1,2,3)	KS11K**	KS12K**	**138.00**
Operator with Contact Blocks and Standard black knob			
With 1 KA1 on Side #2	KS11BH13	—	**106.00**
With 1 KA1 on Side #1	KS11BH1	—	**106.00**
With 1 KA1 on Side #1 and 1 KA1 on side #2	KS11BH2	—	**152.00**
Spring Return from Left ▲, Operator Only (without contact blocks)			
Without Knob	KS25	—	**71.00**
With Knob (select style and color from Table 19.198)	KS25*	—	**71.00**
Key Operated with E10 Key (Code 2 only)★	KS25K2	—	**167.00**
Spring Return from Right ▲, Operator Only (without contact blocks)			
Without Knob	—	KS34	**71.00**
With Knob (select style and color from Table 19.198 below)	—	KS34*	**71.00**
Key Operated with E10 Key (Code 1 only)	—	KS34K1	**167.00**

Illuminated Operators	Cat. No.	Cat. No.	$ Price
Manual Return ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	K11J1	K12J1	**158.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K11J1R	K12J1R	**167.00**
With Other Color Knob and other voltage Light Module ■ ♦	K11J■♦	K12J■♦	**167.00**
Spring Return from Left ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	K25J1	—	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K25J1R	—	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	K25J■♦	—	**197.00**
Spring Return from Right ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	—	K34J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	—	K34J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	—	K34J■♦	**197.00**

▲ These operators can be ordered complete with contact blocks. Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208 Vac = K25J3.
♦ Add the knob color code from Table 19.198. For LED, knob color must match LED.
★ Add the key withdrawal code from Table 19.199.

Table 19.198: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		$ Price
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	
Black	B	B11	FB	B25	
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	**9.90**
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	



2 Position

Table 19.199: ★ Key Withdrawal Codes

Code	Position
1	Left Only
2	Right Only
3	Left and Right

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories, see pages 19-85 through 19-92.*

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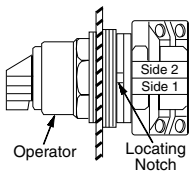
Table 19.200: 3-Position Selector Switches

NOTE: *When ordering, add prefix 9001 to the catalog number.*



Top View

Contact Block Required					1 - Contact Closed 0- Contact Open								
Contact Block Position	Quantity and Type			Mount on Side	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right
KA1	or	KA3 / KA2	KA1 #2	or	KA3 #2	1 0 0	1 0 0	0 0 1	1 0 0	1 0 0	1 0 0	1 0 0	0 1 0	1 1 0
					KA2 #2	0 1 1	0 0 1	0 1 0	0 1 0	0 0 1	0 1 1	0 1 1	1 0 0	0 0 1
KA1	or	KA3 / KA2	KA1 #1	or	KA3 #1	0 0 1	1 0 0	0 0 1	1 0 0	0 1 0	0 0 1	1 0 1	0 0 1	0 1 1
					KA2 #1	1 1 0	0 0 1	0 1 0	0 1 0	0 0 1	1 0 0	0 1 0	0 1 0	1 0 0

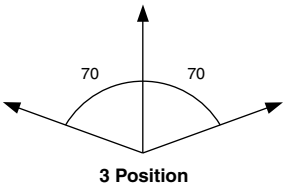
19-73	B	C	D	E	F	G	J	L	M	
Non-Illuminated Operators	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**$ Price**
Manual Return, Operator Only (without contact blocks) ▲										
Without Knob	KS42	KS43	KS44	KS45	KS46	KS47	KS49	KS401	KS402	**43.00**
With Knob (select style and color from table 19.168 below)	KS42♦	KS43♦	KS44♦	KS45♦	KS46♦	KS47♦	KS49♦	KS401♦	KS402♦	**53.00**
Key Operated with E10 Key (Code 4 through 10) ▼	KS42K▼	KS43K▼	KS44K▼	KS45K▼	KS46K▼	KS47K▼	KS49K▼	KS401K▼	KS402K▼	**138.00**
Operator with Contact Blocks and Standard black knob ★										
With 1 KA1 on Side #2 (H13)	KS42BH13	KS43BH13	KS44BH13	KS45BH13	KS46BH13	KS47BH13	KS49BH13	KS401BH13	KS402BH13	**106.00**
With 1 KA1 on Side #1 (H1)	KS42BH1	KS43BH1	KS44BH1	KS45BH1	KS46BH1	KS47BH1	KS49BH1	KS401BH1	KS402BH1	**106.00**
With 1 KA1 on Side #1 and 1 KA1 on side #2 (H2)	KS42BH2	KS43BH2	KS44BH2	KS45BH2	KS46BH2	KS47BH2	KS49BH2	KS401BH2	KS402BH2	**152.00**
Spring Return from Left to Center, Operator Only (without contact blocks) ▲										
Without Knob	KS62	KS63	KS64	KS65	KS66	KS67	KS69	KS601	KS602	**71.00**
With Knob (select style and color from table 19.168 below)	KS62♦	KS63♦	KS64♦	KS65♦	KS66♦	KS67♦	KS69♦	KS601♦	KS602♦	**81.00**
Key Operated with E10 Key (Code 5, 6 or 9 only)▼	KS62K▼	KS63K▼	KS64K▼	KS65K▼	KS66K▼	KS67K▼	KS69K▼	KS601K▼	KS602K▼	**167.00**
Spring Return from Right to Center, Operator Only (without contact blocks) ▲										
Without Knob	KS72	KS73	KS74	KS75	KS76	KS77	KS79	KS701	KS702	**71.00**
With Knob (select style and color from table 19.168 below)	KS72♦	KS73♦	KS74♦	KS75♦	KS76♦	KS77♦	KS79♦	KS701♦	KS702♦	**81.00**
Key Operated with E10 Key (Code 4, 5 or 7 only)	KS72K▼	KS73K▼	KS74K▼	KS75K▼	KS76K▼	KS77K▼	KS79K▼	KS701K▼	KS702K▼	**167.00**
Spring Return from Both Sides to Center, Operator Only (without contact blocks) ▲										
Without Knob	KS52	KS53	KS54	KS55	KS56	KS57	KS59	KS501	KS502	**71.00**
With Knob (select style and color from table 19.168 below)	KS52♦	KS53♦	KS54♦	KS55♦	KS56♦	KS57♦	KS59♦	KS501♦	KS502♦	**81.00**
Key Operated with E10 Key (Code 4, 5 or 7 only)	KS52K▼	KS53K▼	KS54K▼	KS55K▼	KS56K▼	KS57K▼	KS59K▼	KS501K▼	KS502K▼	**167.00**

Illuminated Operators	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**$ Price**
Manual Return, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	K42J1	K43J1	K44J1	K45J1	K46J1	K47J1	K49J1	K401J1	K402J1	**158.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K42J1R	K43J1R	K44J1R	K45J1R	K46J1R	K47J1R	K49J1R	K401J1R	K402J1R	**167.00**
With Other Color Knob and other voltage Light Module ■ ♦	K42J■♦	K42J■♦	K44J■♦	K45J■♦	K46J■♦	K47J■♦	K49J■♦	K401J■♦	K402J■♦	**158.00**
Spring Return from Left to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	K62J1	K63J1	K64J1	K65J1	K66J1	K67J1	K69J1	K601J1	K602J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K62J1R	K63J1R	K64J1R	K65J1R	K66J1R	K67J1R	K69J1R	K601J1R	K602J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	K62J■♦	K62J■♦	K64J■♦	K65J■♦	K66J■♦	K67J■♦	K69J■♦	K601J■♦	K602J■♦	**167.00**
Spring Return from Right to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	K72J1	K73J1	K74J1	K75J1	K76J1	K77J1	K79J1	K701J1	K702J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K72J1R	K73J1R	K74J1R	K75J1R	K76J1R	K77J1R	K79J1R	K701J1R	K702J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	K72J■♦	K72J■♦	K74J■♦	K75J■♦	K76J■♦	K77J■♦	K79J■♦	K701J■♦	K702J■♦	**167.00**
Spring Return from Both Sides to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	K52J1	K53J1	K54J1	K55J1	K56J1	K57J1	K59J1	K501J1	K502J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	K52J1R	K53J1R	K54J1R	K55J1R	K56J1R	K57J1R	K59J1R	K501J1R	K502J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	K52J■♦	K53J■♦	K54J■♦	K55J■♦	K56J■♦	K57J■♦	K59J■♦	K501J■♦	K502J■♦	**167.00**

▲ These operators can be ordered complete with contact blocks.00 Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208Vac = K25J3.
♦ Add the knob color code from Table 19.201. For LED, knob color must match LED.
★ For other color knobs replace the B with knob color code from Table 19.201.
▼ Add the key withdrawal code from table Table 19.202. Example: KS43K▼ with key withdrawal in the right position only = KS43K6.

Table 19.201: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	$ Price
Black	B	B11	FB	B25	**9.90**
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	



3 Position

Table 19.202: ▼ Key Withdrawal Codes

Code	Position
4	Left Only
5	Center Only
6	Right Only
7	Left and Center
8	Left and Right
9	Center and Right
10	Left, Center, and Right

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories, see pages 19-85 through 19-92.*

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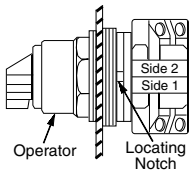
Table 19.203: 4-Position Selector Switches

NOTE: When ordering, add prefix 9001 to the catalog number.

Contact Block Required						
Contact Block Position	Quantity and Type KA1 or KA2 or KA3			Mount on Side KA1 or KA2 or KA3		1—Contact Closed 0—Contact Open
 Top View	KA1	or	KA3	KA1 #2	or	KA3 #2 — 1 0 0 0
			KA2			KA2 #2 — 0 0 1 0
	KA1	or	KA3	KA1 #1	or	KA3 #1 — 0 0 0 1
			KA2			KA2 #1 — 0 1 0 0
Cam (see page 19-73)						H

Non-Illuminated Operators	Cat. No.	$ Price
Manual Return ▲, Operator Only (without contact blocks)		
Without Knob	KS88	42.80
With Knob (select style and color from table 19.168 below)	KS88♦	53.00
Key Operated with E10 Key (Codes 11, 12, 13, 14, 15)	KS88K★	138.00

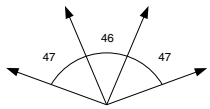
Illuminated Operators	Cat. No.	$ Price
Manual Return ▲, Operator Only (without contact blocks)		
Without Knob, 110-120V 50-60 Hz Transformer	KS88J1	158.00
With Standard Red Knob, 110-120V 50-60 Hz Transformer	KS88J1R	167.00
With Other Color Knob and other voltage Light Module ■ ♦	KS88J■♦	158.00

▲ These operators can be ordered complete with contact blocks. Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208Vac = K25J3.
♦ Add the knob color code from table 19.204. For LED, knob color must match LED.
★ Add the key withdrawal code from Table 19.205.

Table 19.204: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		$ Price
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	
Black	B	B11	FB	B25	9.90
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	

Table 19.205: ★ Key Withdrawal Codes

Code	Position
	 4 Position
11	1 and 4
12	4 only
13	1 only
14	1, 2, 3 and 4
15	2, 3, and 4

Potentiometers with Dial Plate

Table 19.206: Potentiometers with Dial Plate (not UL listed)—Maximum Voltage 300 Vac

Power	Description	Ratings	Type	$ Price
2 W	Operator Only, for Single Potentiometer	NEMA 4, 13	K20	201.00
	Operator with Single Potentiometer		K21	287.00
	Operator Only, for Tandem Potentiometer		K22	314.00
	Operator with Tandem Potentiometer		K23	399.00

Table 19.207: Potentiometer Suffixes

Single Potentiometer			
Suffix ▼	Resistance	Suffix ▼	Resistance
01	50 Ω	07	5 kΩ
02	100 Ω	08	10 kΩ
04	500 Ω	09	25 kΩ
05	1 kΩ	13	500 kΩ
39	2 kΩ	37	750 kΩ
06	2.5 kΩ	14	1 MΩ

Tandem Potentiometer		
Suffix ▼	Resistance	
	Front	Rear
82	1 kΩ	1 kΩ

▼ For the complete part number, add the suffix from Table 19.207 to the catalog number from Table 19.206. Example: 9001K2105.

Any potentiometer with a shaft 7/8" long and 1/4" diameter may be used with these operators

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories. See pages 19-85 through 19-92.*

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Shown below is a simplified method of selecting a selector switch to meet almost any combination of contact sequences.

Step No. 1

Determine the contact sequence(s) required. Set up a target table like the one shown for the example below.

Contact Sequence 0—contact open 1—contact closed	↖	↑	↗
A	1	0	0
B	0	1	0
C	0	0	1

Step No. 2

Look for a cam type common to all sequences in Table 19.208, Table 19.209, or Table 19.210. For the example above, Table 19.209 would be used. For the contact sequences A (1 0 0), B (0 1 0) and C (0 0 1) of the example above, cam types F and L are common to all three sequences.

Step No. 3

Next, use the cam type common to all the sequences (if several cam types are common, choose one) to find the operator type number. Go to the proper page number as indicated in the table below:

Number of Positions	Push Button Line	Page Number
2	Type K, Type SK, Type KX	19-70, 19-80, 19-88, 19-95, 19-97
3	Type K, Type SK, Type KX	19-71, 19-81, 19-88, 19-95, 19-97
4	Type K, Type SK, Type KX	19-72, 19-82, 19-93

If for the example above a manual return operator with a standard black knob is required and:

The F cam type is chosen, the operator type number is:

- Type K—Class 9001 Type KS46B (from page19-71)
- Type SK—Class 9001 Type SKS46B (from page 19-81)
- Type KX—Class 9001 Type KXSDFB (from page 19-97)

The L cam type is chosen, the operator type number is:

- Type K—Class 9001 Type KS401B (from page 19-71)
- Type SK—Class 9001 Type SKS401B (from page 19-81)
- Type KX—Class 9001 Type KXSDLB (from page 19-97)

Step No. 4:

Determine the contact blocks required by using the same table in Step No. 2.

If, for the example above, the F cam type is chosen:

- Use a 9001KA3 mounted on side no. 2 for sequence A (1 0 0).
- Use a 9001KA3 mounted on side no. 1 for sequence B (0 1 0).
- Use a 9001KA2 mounted on side no. 1 or 2 for sequence C (0 0 1).

If, for the example above, the L cam type is chosen:

- Use a 9001KA2 mounted on side no. 2 for sequence A (1 0 0).
- Use a 9001KA2 mounted on side no. 1 or a 9001KA3 mounted on side no. 2 for sequence B (0 1 0).
- Use a 9001KA3 mounted on side no. 1 for sequence C (0 0 1).

One Type KA1 double circuit block can be used in place of one Type KA2 single circuit block plus one Type KA3 single circuit block mounted on the same side.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Table 19.208: 2 Position Selector Switch

If you require contact sequence— ↖	↗	Use Cam Type	Use Contact Block Type	Mount on side no. (See page 19-88)
1	0	E	KA3	1 or 2
		D	KA2	1 or 2
0	1	E	KA2	1 or 2
		D	KA3	1 or 2

Table 19.209: 3 Position Selector Switch

If you require contact sequence— ↖	↑	↗	Use Cam Type	Use Contact Block Type	Mount on side no. (See page 19-88)
1	0	0	G M	KA2	1
			L	KA2	2
			C E	KA3	1
			B C E F G J	KA3	2
			B G J	KA5▲	2
0	1	0	D E J L	KA2	1
			D E	KA2	2
			F	KA3	1
			L	KA3	2
0	0	1	C F	KA2	1 or 2
			B D G L	KA3	1
			D	KA3	2
			B	KA5▲	1
			M	KA2	2
1	1	0	B	KA2	1
			C F	KA5▲	1 or 2
			M	KA3	2
0	1	1	B G J	KA2	2
			G	KA5▲	1
			L	KA5▲	2
			M	KA3	1
1	0	1	J	KA3	1
			D E J L	KA5▲	1
			D E	KA5▲	2

Table 19.210: 4 Position Selector Switch

If you require contact sequence— ↖	↖	↗	↗	Use Cam Type	Use Contact Block Type	Mount on side no. (See page 19-88)
1	0	0	0	H	(A) KA3	2
0	1	0	0	H	(B) KA2	1
0	0	1	0	H	(C) KA2	2
0	0	0	1	H	(D) KA3	1
1	0	0	1	H	A & D Wired in Parallel	
1	1	0	0	H	A & B Wired in Parallel	
0	1	1	0	H	B & C Wired in Parallel	
0	0	1	1	H	C & D Wired in Parallel	
1	1	1	0	H	A, B & C Wired in Parallel	
0	1	1	1	H	B, C & D Wired in Parallel	
1	0	1	0	H	A & C Wired in Parallel	
0	1	0	1	H	B & D Wired in Parallel	
1	1	0	1	H	KA5▲	2
1	0	1	1	H	KA5▲	1

▲ Type KA5 must be the last block on either side. If more than one KA5 is required on either side—contact your local Square D sales office.

Note: For Outline Dimensions see Catalog **9001CT1103**

KA1 = KA3 + KA2

When ordering, please specify:

- Quantity
- Class Number
- Type or Catalog Number

For "H" Numbers . . . . . .page 19-88

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Table 19.211: Pilot Lights—UL Types 4, 13/NEMA 4 & 13

For use in hazardous locations—See page 19-87.
Legend plates not included.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

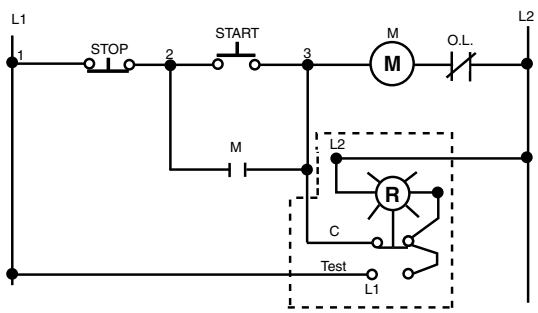
Description	Voltage	Style	With Red Fresnel Color Cap	With Green Fresnel Color Cap	With Other Color Cap	$ Price	Without Color Cap	$ Price
Standard Pilot Light (Plastic Fresnel Color Cap Shown)	110–120 V, 50–60 Hz 220–240 V, 50–60 Hz 24–28 Vac/Vdc	Transformer Transformer Full Voltage	KP1R31 KP7R31 KP35R31	KP1G31 KP7G31 KP35G31	KP1■ KP7■ KP35■	**153.00** **153.00** **125.00**	KP1 KP7 KP35	**143.00** **143.00** **116.00**
	For other voltages see page 19-86.	Transformer, Flashing or LED ♦ Full Voltage, Neon or Resistor ★	KP▲R31 KP▲R31	KP▲G31 KP▲G31	KP▲■ KP▲■	**153.00** **125.00**	KP▲ KP▲	**143.00** **116.00**
Push-To-Test Pilot Light (Glass Color Cap Shown)	110–120 V, 50–60 Hz 220–240 V, 50–60 Hz 24–28 Vac/Vdc	Transformer Transformer Full Voltage	KT1R31 KT7R31 KT35R31	KT1G31 KT7G31 KT35G31	KT1■ KT7■ KT35■	**197.00** **197.00** **167.00**	KT1 KT7 KT35	**185.00** **185.00** **158.00**
	For other voltages see page 19-86.	Transformer, Flashing or LED ♦ Full Voltage, Neon or Resistor ★	KT▲R31 KT▲R31	KT▲G31 KT▲G31	KT▲■ KT▲■	**197.00** **167.00**	KT▲ KT▲	**185.00** **158.00**
Remote Test Pilot Light (Glass Color Cap Shown)	120 Vac Only 24–28 Vac Only for other voltages	Resistor ▼ Full Voltage ▼	KTR38R31 KTR35R31	KTR38G31 KTR35G31	KTR38■ KTR35■	**197.00** **197.00**	KTR38 KTR35	**185.00** **185.00**
	See page 19-86.▼	Full Voltage or Resistor ▼	KTR▲R31	KTR▲G31	KTR ▲■	**197.00**	KTR▲	**185.00**

▲ Add the voltage assembly code as chosen from Table 19.248 or Table 19.249 on 19-86. **EXAMPLE: KT▲R31 with 208 Vac red LED = KT37LRR31**
■ Add the color code as chosen from Table 19.212. **EXAMPLE: KP1■ with a blue fresnel cap = KP1L31**
♦ The cap must be the same color as the LED light module chosen, e.g., for green LED, use green color cap.
★ On neon light modules, use clear color caps only.
▼ On remote test pilot lights use only full voltage or resistor voltage assembly codes. Do not choose LED, neon or transformer codes. For AC use only.

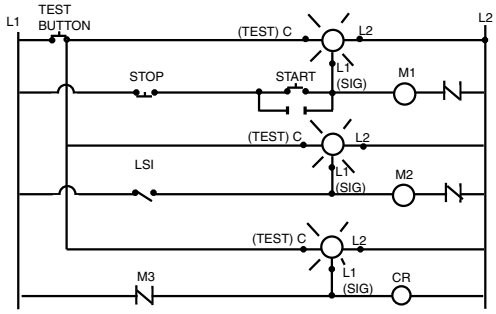
Table 19.212: Color Caps

Color	Plastic Fresnel	Plastic Domed	Glass
Amber	A31	A9	A6
Blue	L31	L9	L6
Clear	C31	C9	C6
Green	G31	G9	G6
Red	R31	R9	R6
White	W31	W9	W6
Yellow	Y31	Y9	Y6

Typical Wiring Diagram



Push-To-Test Pilot Light



Remote Test Pilot Light

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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Without Latch

With Latch

Table 19.213: Joy Stick Operators—UL Types 4, 13/NEMA 4, 13 for use in hazardous locations. See page 19-87. Contact blocks and legend plate not included unless noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description				Operator With Contacts	$ Price	Operator Without Contacts ▲	$ Price
3 Position—Center Off	Momentary Contact—Spring Return to Center	Without Latch		K71H7	326.00	K71	252.00
		With Latch		K70H7		K70	
	Maintained Contact	Without Latch		K73H7		K73	
		With Latch		K72H7		K72	
3 Position—Center Off	Momentary Contact—Spring Return to Center	Without Latch		K31H8	326.00	K31	252.00
		With Latch		K30H8		K30	
	Maintained Contact	Without Latch		K33H8		K33	
		With Latch		K32H8		K32	
5 Position—Center Off	Momentary Contact—Spring Return to Center	Without Latch		K35H2	435.00	K35	309.00
		With Latch		K34H2		K34	
	Maintained Contact	Without Latch		K37H2		K37	
		With Latch		K36H2		K36	

▲ These operators can be ordered complete with contact blocks—a total of four (4) contact blocks can be used. Add the "H" number chosen from page 19-88 to the operator type number and add the cost of the "H" number to the operator cost.

Table 19.214: Contact Arrangements

Operator Positions		Contact Block Type	Contact Block Location	Contact	Handle position (with reference to Nib) 1	2	OFF	3	4
	3	KA3	POS 1 (3)	A	—	1	0	—	0
		KA3	POS 2 (4)	A	—	0	0	—	1
	3	KA2	POS 1 (3)	B	1	—	0	0	—
		KA2	POS 2 (4)	B	0	—	0	1	—
	5	KA1	POS 1 (3)	A	0	1	0	0	0
				B	1	0	0	0	0
		KA1	POS 2 (4)	A	0	0	0	0	1
				B	0	0	0	1	0

(1) Contact Closed (0) Contact Open

The joy stick operator is ideal for applications where only one circuit is to be energized at one time. The three position joy stick closes one circuit in each Up-Down or Right-Left position with all circuits open in center position. The five position operator closes one circuit in each Up, Down, Left and Right position with all circuits open in center position.

Momentary contact operators are spring return to the center position. Maintained operators remain in position and must be returned manually. Operators with latch cannot be operated until the latch button in center of handle is pressed.

Selector Push Button
9001KQ

For use in hazardous locations—See page 19-87. Legend plate and contact block not included.
Inserts are field convertible. For colors not listed, order operator without insert, plus separate color insert from page 19-92. Up to two Type KA contact blocks can be mounted in tandem (total of four blocks). Selector push buttons cannot be illuminated.

Table 19.215: Selector Push Button Operators—UL Types 4, 13/NEMA 4, 13

Contact Block Required		Two Position Operators									
		0—Contact Open 1—Contact Closed F—Free D—Depressed									
Quantity and Type	Mount on Side	Left FD	Right FD	Left FD	Right FD	Left FD	Right FD	Left FD	Right FD	Left FD	Right FD
1 KA1	#2	0 0	1 0	0 0	1 0	0 0	1 1	1 1	1 0	1 0	0 0
		0 1	0 1	0 1	0 0	0 1	0 0	0 0	0 1	0 1	0 1
1 KA1	#1	0 0	1 1	0 0	1 0	1 1	0 0	1 0	1 1	1 1	0 0
		0 1	0 0	0 1	0 0	0 0	0 1	0 1	0 0	0 0	0 1
Cam ♦		P		R		S		T		Y	
Color Insert		Type		Type		Type		Type		Type	$ Price
Without Insert ■ Black		KQ11		KQ12		KQ13		KQ14		KQ15	80.
		KQ11B		KQ12B		KQ13B		KQ14B		KQ15B	81.

Order Contact Blocks From Pages 19-85 and 19-87.

■ Order color inserts from page 19-92.
♦ Cams are not interchangeable.

Key Operated Push Button
9001KR

For use in hazardous locations. See page 19-87. Key operated push buttons are used wherever unauthorized use of a push button is discouraged. Examples are locking a Start push button in the extended position or locking a Stop push button in the depressed position. The operator can also be locked in the flush position—holding all contacts open. Up to two Type KA contact blocks can be mounted in tandem (total of four blocks).
Legend Plate and Contact Block Not Included ("X" = locked position) ★

Table 19.216: Key Operated Push Button – UL Types 4, 13/NEMA 4, 13

Description	Lockable Positions Extended	Flush	Depressed	Type	$ Price
Push button operable only with key in lock. Key is removable in locked position only.	X	—	—	KR131	125.00
	—	X	—	KR132	
	—	—	X	KR133	
	X	X	X	KR137	
Push button operable with or without key in lock. Push button can be locked with key only. Key removable in both locked or unlocked position.	X	—	—	KR141	
	—	X	—	KR142	
	—	—	X	KR143	
	X	X	X	KR147	
To lock the unit, rotate the key with the button in the extended position. Then, push the button to lock it in the position indicated at right. Key is removable only in this position.	—	X	—	KR152	
	—	—	X	KR153	

★ All key operated push buttons are furnished as standard with Square D no. E10 key change. See catalog **9001CT0001** for other key changes.

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Table 19.217: Illuminated and Non-Illuminated Dual Operators Meets UL Type 13/NEMA 13 and UL Type 6/NEMA 6, which UL and NEMA consider an equivalent to UL Type 4/NEMA 4. For use in hazardous locations—See page 19-87. Legend plate and contact blocks not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

9001KR7U

9001KR11U

Description	Color	With 2 N.O. Contacts (2 KA2)	With 1 N.O. & 1 N.C. Contact (KA2, KA3)	$ Price	Without Contacts ★	$ Price
Momentary Dual Function	Universal ▲ Green-Red Other ■	KR6UH7 KR6GRH7 KR6■H7	KR6UH37 KR6GRH37 KR6■H37	138.00	KR6U KR6GR KR6■	81.00
Momentary Interlocked Dual Function	Universal▲ Green-Red Other ■	KR67UH7 KR67GRH7 KR67■H7	KR67UH37 KR67GRH37 KR67■H37	184.00	KR67U KR67GR KR67■	125.00
Maintained Interlocked Dual Function	Universal ▲ Green-Red Other ■	KR7UH7 KR7GRH7 KR7■H7	KR7UH37 KR7GRH37 KR7■H37	184.00	KR7U KR7GR KR7■	125.00
Description	**Color**		**Contacts (KA1)**	**$ Price**	**Without Contacts ★**	**$ Price**
Both Buttons Maintained Interlocked Assembly	Universal ♦ Other ★	—	KR11UH1 KR11★H1	178.00	KR11U KR11★	120.00
One Button Momentary One Button Maintained Interlocked Assembly	Universal ♦ Other★	—	KR12UH1H1 KR12★H1H1	273.00	KR12U KR12★	162.00

▲ Universal for KR6, KR67, KR7 includes 2 inserts each of black, red and green.
■ Choose one color for each button. R = red, G = green, B = Black. **Example: 9001KR6 with left red and right black = 9001KR6RB.** See Table 19.193.
♦ Universal for KR11, KR12 includes 2 each of black, red, green, yellow, orange, blue, white.
★ Choose one color for each button from Table 19.193 and insert color code in type number. **Example: 9001KR11 with top button gray and bottom button orange = 9001KR11ES**

Emergency Break-Glass Operator 9001K15

Table 19.218: Emergency Break-Glass Operator—UL 4, 13/NEMA 4, 13▼

Type	$ Price
K15	125.00

Operator is held in a depressed position by a glass disc. When the glass disc is broken with the hammer, button returns to a normal extended position. Package of 5 discs included with operator.

▼ For enclosed versions see page 19-106.

Table 19.219: 9001K15 Replacement Parts

Description	Part Number	$ Price
Yellow bumper	3105211101	14.30
Hammer and chain	3105206750	57.30
Lower ring nut	6512232801	16.70
Top ring nut	9001K40	4.40
Package of 5 replacement discs	9001K57	16.70
Clip to hold hammer	2540902240	2.60

Rocker Arm Operating

Table 19.220: Rocker Arm Operating Lever

Type	$ Price
K50	77.00

Allows two standard push buttons to be operated independently of each other. Price does not include push buttons or legend plates. Order push buttons and legend plates from pages 19-67, 19-89, and 19-90—specify which marking is to be inverted.

Push-on Push-off Module 9001K85

Table 19.221: Alternate Action—Push-on, Push-off Module

Type	$ Price
K85	42.80

This module can be added to standard 9001 Type K, KX, SK or T momentary push button operators. Contact blocks mounted behind this module (maximum of 2) are held in the depressed position when the operator is pressed once, and released to their normal position when the operator is pressed again. For a N.C. circuit, use a 9001KA3 or the N.C. contact of either a 9001KA1 or 9001KA4. For a N.O. circuit, use the N.O. contact of either a 9001KA4 or 9001KA6.

Time Delay Push Button 9001KRD

Table 19.222: Off Delay Push Button—UL Types 4, 13/NEMA 4, 13

Description	Type (All Colors)			
	Full Guard	Extended Guard	No Guard	$ Price
Timed Contact 1 N.O. and 1 N.C.	KRD1UH1	KRD2UH1	KRD3UH1	277.00
Timed Contact 2 N.O. and 2 N.C.	KRD1UH2	KRD2UH2	KRD3UH2	514.00

Timing period is adjustable from 0.1 second to 60 seconds and begins after button has been released. Devices include a pack of seven color inserts for color coding the push button. See 19-92 for Universal color insert. Contacts are quick make-quick break.

Note: When mounted in top or bottom hole of a Type K enclosure, device requires one additional space below or above operator. When mounted other than in top or bottom hole, device may require two additional spaces, one above and one below operator. Closing plates must be installed on unused holes.

Table 19.223: Wobble Stick
For easy operation of any standard push button.

Type	$ Price
K8	42.80

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Table 19.224: Non-Illuminated Momentary Push Button Operators UL Types 4, 4X, 13/NEMA 4, 4X, 13. For use in hazardous locations—See page 19-87. Contact blocks and legend plate not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description	Color	Operator with 1 N.O. and 1 N.C. Contact (KA1)	$ Price	Operator with 1 N.O. Contact (KA2)	Operator with 1 N.C. Contact (KA3)	$ Price	Operator Only No Contacts ▼	$ Price
9001SKR1B Full Guard	Black	SKR1BH13	**89.00**	SKR1BH5	SKR1BH6	**66.00**	SKR1B	**38.60**
	Red	SKR1RH13	**89.00**	SKR1RH5	SKR1RH6	**66.00**	SKR1R	**38.60**
	Green	SKR1GH13	**89.00**	SKR1GH5	SKR1GH6	**66.00**	SKR1G	**38.60**
	Universal ▲	SKR1UH13	**89.00**	SKR1UH5	SKR1UH6	**66.00**	SKR1U	**38.60**
	Other ■	SKR1■H13	**89.00**	SKR1■H5	SKR1■H6	**66.00**	SKR1■	**38.60**
9001SKR3B No Guard	Black	SKR3BH13	**89.00**	SKR3BH5	SKR3BH6	**66.00**	SKR3B	**38.60**
	Red	SKR3RH13	**89.00**	SKR3RH5	SKR3RH6	**66.00**	SKR3R	**38.60**
	Green	SKR3GH13	**89.00**	SKR3GH5	SKR3GH6	**66.00**	SKR3G	**38.60**
	Universal ▲	SKR3UH13	**89.00**	SKR3UH5	SKR3UH6	**66.00**	SKR3U	**38.60**
	Other ■	SKR3■H13	**89.00**	SKR3■H5	SKR3■H6	**66.00**	SKR3■	**38.60**
9001SKR2B Extended Guard	Black	SKR2BH13	**89.00**	SKR2BH5	SKR2BH6	**66.00**	SKR2B	**38.60**
	Red	SKR2RH13	**89.00**	SKR2RH5	SKR2RH6	**66.00**	SKR2R	**38.60**
	Green	SKR2GH13	**89.00**	SKR2GH5	SKR2GH6	**66.00**	SKR2G	**38.60**
	Universal ▲	SKR2UH13	**89.00**	SKR2UH5	SKR2UH6	**66.00**	SKR2U	**38.60**
	Other ■	SKR2■	**89.00**	SKR2■H5	SKR2■H6	**66.00**	SKR2■	**38.60**
9001SKR4B 1-3/8 in. (35 mm) Mushroom Button	**Snap-In Mushroom Button**							
	Black	SKR4BH13	**138.00**	SKR4BH5	SKR4BH6	**112.00**	SKR4B	**81.00**
	Red	SKR4RH13	**138.00**	SKR4RH5	SKR4RH6	**112.00**	SKR4R	**81.00**
	Red ♦	SKR4R05H13	**142.00**	SKR4R05H5	SKR4R05H6	**119.00**	SKR4R05	**86.00**
	Green	SKR4GH13	**138.00**	SKR4GH5	SKR4GH6	**112.00**	SKR4G	**81.00**
	Other ★	SKR4★H13	**138.00**	SKR4★H5	SKR4★H6	**112.00**	SKR4★	**81.00**
	Screw-On Mushroom Button with Set Screw Security							
	Black	SKR24BH13	**138.00**	SKR24BH5	SKR24BH6	**112.00**	SKR24B	**81.00**
	Red	SKR24RH13	**138.00**	SKR24RH5	SKR24RH6	**112.00**	SKR24R	**81.00**
	Green	SKR24GH13	**138.00**	SKR24GH5	SKR24GH6	**112.00**	SKR24G	**81.00**
	Other ★	SKR24★H13	**138.00**	SKR24★H5	SKR24★H6	**112.00**	SKR24★	**81.00**
9001SKR5 2-1/4 in. (57 mm) Mushroom Button	**Snap-In Mushroom Button, Plastic Head**							
	Black	SKR5BH13	**138.00**	SKR5BH5	SKR5BH6	**112.00**	SKR5B	**81.00**
	Red	SKR5RH13	**138.00**	SKR5RH5	SKR5RH6	**112.00**	SKR5R	**81.00**
	Red ♦	SKR5R05H13	**142.00**	SKR5R05H5	SKR5R05H6	**119.00**	SKR5R05	**86.00**
	Green	SKR5GH13	**138.00**	SKR5GH5	SKR5GH6	**112.00**	SKR5G	**81.00**
	Other ★	SKR5★H13	**138.00**	SKR5★H5	SKR5★H6	**112.00**	SKR5★	**81.00**
	Screw-On Mushroom Button with Set Screw Security, Plastic Head							
	Black	SKR25BH13	**138.00**	SKR25BH5	SKR25BH6	**112.00**	SKR25B	**81.00**
	Red	SKR25RH13	**138.00**	SKR25RH5	SKR25RH6	**112.00**	SKR25R	**81.00**
	Green	SKR25GH13	**138.00**	SKR25GH5	SKR25GH6	**112.00**	SKR25G	**81.00**
	Other ★	SKR25★H13	**138.00**	SKR25★H5	SKR25★H6	**112.00**	SKR25★	**81.00**

Table 19.225: Color Codes

Color	■ SKR1, 2, 3 Place Color Code in Type Number	★ SKR4, 5, 24, 25 Place Color Code in Type Number
Blue	L	L
Yellow	Y	Y
White	W	—
Orange	S	S
Gray	E	—

▲ The universal push button operators include one each of the following color inserts: black, red, green, yellow, orange, blue and white.
■ See Table 19.225.
♦ Knob has the words “Emergency Stop” in raised letters highlighted in white for readability.
★ See Table 19.225.
▼ These operators can be ordered complete with contact blocks. For maximum block usage, see page 19-88. Add the “H” number chosen from page 19-88 to the end of the operator type number and add the cost of the “H” number to the operator cost.

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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Table 19.226: 30 mm Multifunction Operators
UL Types 4, 4X, 13/NEMA 4, 4X, 13

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Non-Illuminated Push-Pull Screw-on Mushroom Operators, Plastic Head

	Description	Color	With 2 N.C. Contacts (1 KA3, 1 KA5)	With 1 N.O./1 N.C. Contact (1 KA1)	$ Price	Without Contacts ◒	$Price
9001SKR9R Non-Illuminated 1-5/8 in. Diameter Knob Includes Type KN179WP Legend Plate Marked Pull To Start Push To Stop	**3 Position**						
	Momentary Pull-Maintained Neutral-Momentary Push ▽	Red	SKR8RH25	—	**142.00**	SKR8R	**86.00**
		Green	SKR8GH25	—		SKR8G	
		Other □	SKR8□H25	—		SKR8□	
	2 Position△						
	Maintained Pull-Maintained Push	Red	—	SKR9RH13	**188.00**	SKR9R	**129.00**
		Green	—	SKR9GH13		SKR9G	
		Other □	—	SKR9□H13		SKR9□	

Non-Illuminated Turn-to-Release Mushroom Operators

	Description	Color	With 1 N.O. Contact (KA1)	$ Price	With 2 N.O./2 N.C. Contacts (2 KA1)	$ Price	Without Contacts	$Price
9001SKR16H2	2 Position, Plastic Head Turn-to-Release Trigger Action	Red	SKR16H13	**172.00**	SKR16H2	**218.00**	SKR16	**113.00**

Screw-On Plastic Illuminated Push-Pull Mushroom Operators

Illuminated	Description	Voltage	With Red Knob and 2 N.C. Contacts (1 KA3, 1 KA5)	With Other Color Knob and 2 N.C. Contacts	$ Price	With Other Color Knob Without Contacts ◒	$ Price
9001SKR9P1 Illuminated 1-5/8 in. Diameter Knob Includes Type KN179WP Legend Plate Marked Pull to Start Push To Stop	**3 Position**						
	Momentary Pull-Maintained Neutral-Momentary Push ◆	110–120 V, 50–60 Hz	SKR8P1RH25	SKR8P1□H25	**267.00**	SKR8P1□	**201.00**
		Other—Transformer, LED, Flashing ☆	SKR8P◊RH25	SKR8P◊□H25		SKR8P◊□	
		Other—Full Voltage, Resistor, Neon ▽	SKR8P◊RH25	SKR8P◊□H25	**215.00**	SKR8P◊□	**171.00**
	Description	**Voltage**	**With Red △ Knob and 1 N.O. & 1 N.C. Contact (KA1)**	**With Other Color Knob and 1 N.O. & 1 N.C. Contact (KA1)**	**$ Price**	**With Other Color Knob Without Contacts**	**$ Price**
	2 Position						
	Maintained Pull-Maintained Push	110–120 V, 50–60 Hz	SKR9P1RH13	SKR9P1□H13	**316.00**	SKR9P1□	**243.00**
		Other—Transformer, L.E.D., Flashing ☆	SKR9P◊RH13	SKR9P◊□H13		SKR9P◊□	
		Other—Full Voltage, Resistor, Neon ▽	SKR9P◊RH13	SKR9P◊□H13	**257.00**	SKR9P◊□	**215.00**

△ To obtain a red knob with "Push Emergency Stop" printed on the red knob—substitute R05 in place of "R" and add **$2.10** to the price.

□ Choose one color from Table 19.227 and insert the color code in the Type number. **Example: SKR9□ with a yellow knob = SKR9Y**

◊ Add the voltage assembly code as chosen from page 19-86. **Example: SKR8P◊ with 277 V 50–60 Hz = SKR8P8**

☆ The knob must be the same color as the LED light module chosen; e.g., for green LED, use green knob.

▽ On neon light modules, use clear knobs only.

◒ These operators can be ordered complete with contact blocks. For maximum block usage, see page 19-88. Add the "H" number chosen from page 19-88 to the end of the operator type number and add the cost of the "H" number to the operator cost.

✱ SKR11UH1 has 1 KA1(1 N.O., 1 N.C.) and SKR12UH1H1 has 2 KA1 (2 N.O., 2 N.C.).

◆ For positions, refer to Tables 19.228 and 19.229.

Table 19.227: Color Codes

Color	SKR11, SKR12	SKR8, SKR9
Black ◑	B	B
Red	R	R
Green	G	G
Blue	L	L
Yellow	Y	Y
White	W	W
Orange ◑	S	S
Clear	—	C
Amber	—	A
Gray	E	—

◑ These colors are not available on illuminated push-pull operators.

Table 19.228: Positions for 9001SKR8RH1 or H13

		9001SKR8RH1 or H13		
		PULL	CTR	PUSH
(KA1)	KA3	X	O	O
	KA2	O	O	X

Table 19.229: Positions for 9001SKR8H25

	9001SKR8H25		
	PULL	CTR	PUSH
KA3	X	O	O
KA5	X	X	O
KA2	O	O	X

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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Table 19.230: Illuminated Push Button Operators
UL Types 4, 4X, 13/NEMA 4, 4X, 13
For use in hazardous locations—See page 19-87.
Legend plate not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description		Voltage and Frequency	Style	With Red Color Cap and 1 N.O. and 1 N.C. Contact (KA1)	With Green Color Cap and 1 N.O.and 1 N.C. Contact (KA1)	$ Price □	With Other Color Cap Without Contact Blocks ▲	$ Price ◊
9001SK1L1	Full Guard Illuminated Push Button	110–120 V, 50–60 Hz	Transformer	SK1L1RH13	SK1L1GH13	**231.00**	SK1L1	**158.00**
		220–240 V, 50–60 Hz	Transformer	SK1L7RH13	SK1L7GH13	**231.00**	SK1L7	**158.00**
		24–28 Vac/Vdc	Full Voltage	SK1L35RH13	SK1L35GH13	**198.00**	SK1L35	**129.00**
		For other voltages See Table ■	Transformer, Flashing	SK1L■RH13	SK1L■GH13	**231.00**	SK1L ■	**158.00**
			Full Voltage	SK1L■RH13	SK1L■GH13	**198.00**	SK1L ■	**129.00**
			Resistor, Neon ♦	SK1L■RH13	SK1L■GH13	**198.00**	SK1L ■	**129.00**
			LED ▼	SK1L■RH13	SK1L■GH13	**231.00**	SK1L ■★	**158.00**
9001SK2L1	No Guard Illuminated Push Button	110–120 V, 50–60 Hz	Transformer	SK2L1RH13	SK2L1GH13	**217.00**	SK2L1	**143.00**
		220–240 V, 50–60 Hz	Transformer	SK2L7RH13	SK2L7GH13	**217.00**	SK2L7	**143.00**
		24–28 Vac/Vdc	Full Voltage	SK2L35RH13	SK2L35GH13	**184.00**	SK2L35	**116.00**
		For other voltages See Table ■	Transformer, Flashing	SK2L■RH13	SK2L■GH13	**217.00**	SK2L ■	**143.00**
			Full Voltage	SK2L■RH13	SK2L■GH13	**184.00**	SK2L ■	**116.00**
			Resistor, Neon ♦	SK2L■RH13	SK2L■GH13	**184.00**	SK2L ■	**116.00**
			LED▼	SK2L■RH13	SK2L■GH13	**217.00**	SK2L ■★	**143.00**
9001SK2L1R20	1-3/8 in. (35 mm) Illuminated Mushroom, Screw-On Plastic Head	110–120 V, 50–60 Hz	Transformer	SK2L1R20H13	SK2L1G20H13	**217.00**	Order SK2L■★△	
		220–240 V, 50–60 Hz	Transformer	SK2L7R20H13	SK2L7G20H13	**217.00**		
		24–28 Vac/Vdc	Full Voltage	SK2L35R20H13	SK2L35G20H13	**184.00**		
		For other voltages See Table ■	Transformer, Flashing	SK2L■R20H13	SK2L■G20H13	**217.00**		
			Full Voltage	SK2L■R20H13	SK2L■G20H13	**184.00**		
			Resistor, Neon ♦	SK2L■R20H13	SK2L■G20H13	**184.00**		
			LED ▼	SK2L■R20H13	SK2L■G20H13	**217.00**		
9001SK2L1R21	2-1/4 in. (57 mm) Illuminated Mushroom, Screw-On Plastic Head	110–120 V, 50–60 Hz	Transformer	SK2L1R21H13	SK2L1G21H13	**217.00**	Order SK2L■★△	
		220–240 V, 50–60 Hz	Transformer	SK2L7R21H13	SK2L7G21H13	**217.00**		
		24–28 Vac/Vdc	Full Voltage	SK2L35R21H13	SK2L35G21H13	**184.00**		
		For other voltages See Table ■	Transformer, Flashing	SK2L■R21H13	SK2L■G21H13	**217.00**		
			Full Voltage	SK2L■R21H13	SK2L■G21H13	**184.00**		
			Resistor, Neon ♦	SK2L■R21H13	SK2L■G21H13	**184.00**		
			LED ▼	SK2L■R21H13	SK2L■G21H13	**217.00**		

▲ These operators can be ordered complete with contact blocks. For maximum block usage, see page 19-88. Add the "H" number chosen from page 19-88 to the end of the operator type number and add the cost of the "H" number to the operator cost.
■ Add the voltage assembly code as chosen from page 19-86. **EXAMPLE: SK2L■ with 240 Vac/Vdc = SK2L25.**
♦ On neon light modules, use clear color caps only.
★ The cap must be the same color as the LED light module chosen e.g., for red LED, use red color cap.
▼ Add the color code as chosen from the color cap table below. **EXAMPLE: SK2L25▼ with a blue 1-3/8 in. mushroom button = SK2L25L20.**
△ The only difference between a no guard (SK2L) operator and mushroom button operator is the color cap.
□ Price includes operator, light module, contact blocks and color cap.
◊ Price includes operator, light module and color cap.

Table 19.231: Color Caps

Color	Color Codes		
	SK1L/SK2L	1-3/8 in. (35 mm) Mushroom	2-1/4 in. (57 mm) Mushroom
Red	R	R20	R21
Green	G	G20	G21
Blue	L	L20	L21
Yellow	Y	Y20	Y21
White	W	W20	W21
Clear	C	C20	C21
Amber	A	A20	A21

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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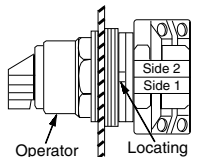
Table 19.232: 2-Position Selector Switches

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Contact Block Required					1—Contact Closed 0—Contact Open			
Contact Block Position	Quantity and Type KA1 or KA2 or KA3		Mount on Side KA1 or KA2 or KA3		↖ Left	↗ Right	↖ Left	↗ Right
 Top View	KA1 or KA3	KA2	KA1 #2	KA3 #2	1	0	0	1
				KA2 #2	0	1	1	0
	KA1 or KA3	KA2	KA1 #1	KA3 #1	1	0	0	1
				KA2 #1	0	1	1	0
Cam (see page 19-73)					**E**		**D**	

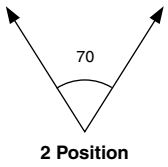
Non-Illuminated Operators	Type	Type	$ Price
Manual Return ▲, Operator Only (without contact blocks)			
Without Knob	SKS11	SKS12	**42.80**
With Knob (select style and color from Table 19.233 below)	SKS11♦	SKS12♦	**53.00**
Operator with Contact Blocks and Standard black knob			
With 1 KA1 on Side #2	SKS11BH13	—	**106.00**
With 1 KA1 on Side #1	SKS11BH1	—	**106.00**
With 1 KA1 on Side #1 and 1 KA1 on side #2	SKS11BH2	—	**152.00**
Spring Return from Left ▲, Operator Only (without contact blocks)			
Without Knob	SKS25	—	**71.00**
With Knob (select style and color from Table 19.233 below)	SKS25♦	—	**81.00**
Spring Return from Right ▲, Operator Only (without contact blocks)			
Without Knob	—	SKS34	**71.00**
With Knob (select style and color from Table 19.233 below)	—	SKS34♦	**81.00**

Illuminated Operators	Type	Type	$ Price
Manual Return ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	SK11J1	SK12J1	**158.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK11J1R	SK12J1R	**167.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK11J■♦	SK12J■♦	**167.00**
Spring Return from Left ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	SK25J1	—	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK25J1R	—	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK25J■♦	—	**197.00**
Spring Return from Right ▲, Operator Only (without contact blocks)			
Without Knob, 110-120V 50-60 Hz Transformer	—	SK34J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	—	SK34J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	—	SK34J■♦	**197.00**

▲ These operators can be ordered complete with contact blocks. Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208Vac = K25J3
♦ Add the knob color code from Table 19.233. For LED, knob color must match LED.

Table 19.233: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		$ Price
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	
Black	B	B11	FB	B25	**9.90**
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	



2 Position

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories. See pages 19-85 through 19-92.*

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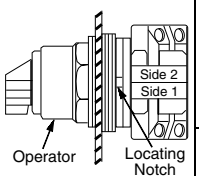
Table 19.234: 3-Position Selector Switches

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Contact Block Required				1 — Contact Closed 0 — Contact Open								
Contact Block Position	Quantity and Type	Mount on Side		Center	Center	Center	Center	Center	Center	Center	Center	Center
 Top View	KA1 or KA3 / KA2	KA1 #2 or	KA3 #2	1 0 0	1 0 0	0 0 1	1 0 0	1 0 0	1 0 0	1 0 0	0 1 0	1 1 0
			KA2 #2	0 1 1	0 0 1	0 1 0	0 1 0	0 0 1	0 1 1	0 1 1	1 0 0	0 0 1
	KA1 or KA3 / KA2	KA1 #1 or	KA3 #1	0 0 1	1 0 0	0 0 1	1 0 0	0 1 0	0 0 1	1 0 1	0 0 1	0 1 1
			KA2 #1	1 1 0	0 0 1	0 1 0	0 1 0	0 0 1	1 0 0	0 1 0	0 1 0	1 0 0
Cam (see page 19-73)				B	C	D	E	F	G	J	L	M

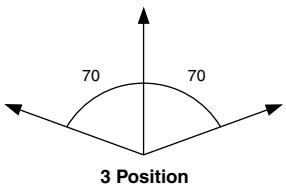
Non-Illuminated Operators	Type	Type	Type	Type	Type	Type	Type	Type	Type	$ Price
Manual Return, Operator Only (without contact blocks) ▲										
Without Knob	SKS42	SKS43	SKS44	SKS45	SKS46	SKS47	SKS49	SKS401	SKS402	**42.80**
With Knob (select style and color from Table 19.235 below)	SKS42♦	SKS43♦	SKS44♦	SKS45♦	SKS46♦	SKS47♦	SKS49♦	SKS401♦	SKS402♦	**53.00**
Operator with Contact Blocks and Standard black knob ★										
With 1 KA1 on Side #2 (H13)	SKS42BH13	SKS43BH13	SKS44BH13	SKS45BH13	SKS46BH13	SKS47BH13	SKS49BH13	SKS401BH13	SKS402BH13	**106.00**
With 1 KA1 on Side #1 (H1)	SKS42BH1	SKS43BH1	SKS44BH1	SKS45BH1	SKS46BH1	SKS47BH1	SKS49BH1	SKS401BH1	SKS402BH1	**106.00**
With 1 KA1 on Side #1 and 1 KA1 on side #2 (H2)	SKS42BH2	SKS43BH2	SKS44BH2	SKS45BH2	SSKS46BH2	SKS47BH2	SKS49BH2	SKS401BH2	SKS402BH2	**152.00**
Spring Return from Left to Center, Operator Only (without contact blocks) ▲										
Without Knob	SKS62	SKS63	SKS64	SKS65	SKS66	SKS67	SKS69	SKS601	SKS602	**71.00**
With Knob (select style and color from Table 19.235 below)	SKS62♦	SKS63♦	SKS64♦	SKS65♦	SKS66♦	SKS67♦	SKS69♦	SKS601♦	SKS602♦	**81.00**
Spring Return from Right to Center, Operator Only (without contact blocks) ▲										
Without Knob	SKS72	SKS73	SKS74	SKS75	SKS76	SKS77	SKS79	SKS701	SKS702	**71.00**
With Knob (select style and color from Table 19.235 below)	SKS72♦	SKS73♦	SKS74♦	SKS75♦	SKS76♦	SKS77♦	SKS79♦	SKS701♦	SKS702♦	**81.00**
Spring Return from Both Sides to Center, Operator Only (without contact blocks) ▲										
Without Knob	SKS52	SKS53	SKS54	SKS55	SKS56	SKS57	SKS59	SKS501	SKS502	**71.00**
With Knob (select style and color from Table 19.235 below)	SKS52♦	SKS53♦	SKS54♦	SKS55♦	SKS56♦	SKS57♦	SKS59♦	SKS501♦	SKS502♦	**81.00**

Illuminated Operators	Type	Type	Type	Type	Type	Type	Type	Type	Type	$ Price
Manual Return, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	SK42J1	SK43J1	SK44J1	SK45J1	SK46J1	SK47J1	SK49J1	SK401J1	SK402J1	**158.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK42J1R	SK43J1R	SK44J1R	SK45J1R	SK46J1R	SK47J1R	SK49J1R	SK401J1R	SK402J1R	**167.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK42J■♦	SK43J■♦	SK44J■♦	SK45J■♦	SK46J■♦	SK47J■♦	SK49J■♦	SK401J■♦	SK402J■♦	**167.00**
Spring Return from Left to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	SK62J1	SK63J1	SK64J1	SK65J1	SK66J1	SK67J1	SK69J1	SK601J1	SK602J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK62J1R	SK63J1R	SK64J1R	SK65J1R	SK66J1R	SK67J1R	SK69J1R	SK601J1R	SK602J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK62J■♦	SK63J■♦	SK64J■♦	SK65J■♦	SK66J■♦	SK67J■♦	SK69J■♦	SK601J■♦	SK602J■♦	**197.00**
Spring Return from Right to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	SK72J1	SK73J1	SK74J1	SK75J1	SK76J1	SK77J1	SK79J1	SK701J1	SK702J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK72J1R	SK73J1R	SK74J1R	SK75J1R	SK76J1R	SK77J1R	SK79J1R	SK701J1R	SK702J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK72J■♦	SK73J■♦	SK74J■♦	SK75J■♦	SK76J■♦	SK77J■♦	SK79J■♦	SK701J■♦	SK702J■♦	**197.00**
Spring Return from Both Sides to Center, Operator Only (without contact blocks) ▲										
Without Knob, 110-120V 50-60 Hz Transformer	SK52J1	SK53J1	SK54J1	SK55J1	SK56J1	SK57J1	SK59J1	SK501J1	SK502J1	**185.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK52J1R	SK53J1R	SK54J1R	SK55J1R	SK56J1R	SK57J1R	SK59J1R	SK501J1R	SK502J1R	**197.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK52J■♦	SK53J■♦	SK54J■♦	SK55J■♦	SK56J■♦	SK57J■♦	SK59J■♦	SK501J■♦	SK502J■♦	**197.00**

▲ These operators can be ordered complete with contact blocks. Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208Vac = K25J3.
♦ Add the knob color code from Table 19.235 below. For LED, knob color must match LED.
★ For other color knobs replace the B with knob color code from Table 19.235 below.

Table 19.235: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		$ Price
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	
Black	B	B11	FB	B25	**9.90**
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	



3 Position

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories. See pages 19-85 through 19-92.*

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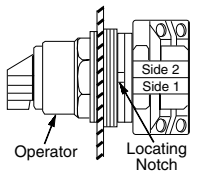
Table 19.236: 4-Position Selector Switches

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Contact Block Required						1 — Contact Closed 0 — Contact Open			
Contact Block Position	Quantity and Type			Mount on Side					
 Top View	KA1	or	KA3	KA1 #2	or	KA3 #2	1	0	0	0
			KA2			KA2 #2	0	0	1	0
	KA1	or	KA3	KA1 #1	or	KA3 #1	0	0	0	1
			KA2			KA2 #1	0	1	0	0
Cam (see page 19-73)							H			

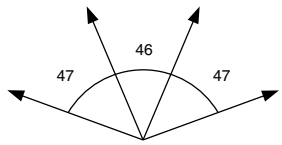
Non-Illuminated Operators	Type	$ Price
Manual Return ▲, Operator Only (without contact blocks)		
Without Knob	SKS88	**42.80**
With Knob (select style and color from Table 19.237 below)	SKS88♦	**52.65**

Illuminated Operators	Type	$ Price
Manual Return ▲, Operator Only (without contact blocks)		
Without Knob, 110-120V 50-60 Hz Transformer	SK88J1	**158.00**
With Standard Red Knob, 110-120V 50-60 Hz Transformer	SK88J1R	**167.00**
With Other Color Knob and other voltage Light Module ■ ♦	SK88J■♦	**167.00**

▲ These operators can be ordered complete with contact blocks. Add the "H code" from page 19-88 as needed for your application.
■ Add the voltage assembly code as chosen from page 19-86. Example: K25J■ with 208Vac = K25J3
♦ Add the knob color code from Table 19.237. For LED, knob color must match LED

Table 19.237: Selector Switch Assembly Code and Knob Cat. No.

Color	Standard Knob		Gloved Hand Knob		$ Price
	♦ Knob Code	Cat. No.	♦ Knob Code	Cat. No.	
Black	B	B11	FB	B25	**9.90**
Red	R	R8	FR	R24	
Green	G	G8	FG	G24	
Yellow	Y	Y8	FY	Y24	
Blue	L	L8	FL	L24	
White	W	W8	FW	W24	
Amber	A	A8	FA	A24	
Clear	C	C8	FC	C24	



4 Position

Potentiometers with Dial Plate

Table 19.238: Potentiometers with Dial Plate (not UL listed)—Maximum Voltage 300 Vac

Power	Description	Ratings	Type	$ Price
2 W	Operator Only, for Single Potentiometer	NEMA 4, 13	SK20	**201.00**
	Operator with Single Potentiometer		SK21	**287.00**
	Operator Only, for Tandem Potentiometer		SK22	**314.00**
	Operator with Tandem Potentiometer		SK23	**399.00**

Table 19.239: Potentiometer Suffixes

Single Potentiometer			
Suffix ★	**Resistance**	**Suffix ★**	**Resistance**
01	50 Ω	07	5 kΩ
02	100 Ω	08	10 kΩ
04	500 Ω	09	25 kΩ
05	1 kΩ	13	500 kΩ
39	2 kΩ	37	750 kΩ
06	2.5 kΩ	14	1 MΩ

Tandem Potentiometer		
Suffix ★	**Resistance**	
	Front	**Rear**
82	1 kΩ	1 kΩ

★ For the complete part number, add the suffix from Table 19.239 to the catalog number from Table 19.238. Example: 9001K2105.

Any potentiometer with a shaft 7/8 in. long and 1/4 in. diameter may be used with these operators.

NOTE: *To select and order Contact Blocks, Light Modules, Knobs, and Accessories. See pages 19-85 through 19-92.*

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Table 19.240: Pilot Lights—UL Types 4, 4X, 13/NEMA 4, 4X, 13. For use in hazardous locations, see page 19-87. Legend plate not included.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description		Voltage	Style	With Red Fresnel Color Cap	With Green Fresnel Color Cap	With Other Color Cap	$ Price	Without Color Cap	$ Price
9001SKP1	Standard Pilot Light (Fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKP1R31	SKP1G31	SKP1■	153.00	SKP1	143.00
		220–240 V, 50–60 Hz	Transformer	SKP7R31	SKP7G31	SKP7■	153.00	SKP7	143.00
		24–28 Vac/Vdc	Full Voltage	SKP35R31	SKP35G31	SKP35■	125.00	SKP35	116.00
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKP▲R31	SKP▲G31	SKP▲■	125.00	SKP▲	116.00
			Full Voltage, Neon or Resistor★	SKP▲R31	SKP▲G31	SKP▲■	125.00	SKP▲	116.00
9001SKT1	Push-To-Test Pilot Light (Fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKT1R31	SKT1G31	SKT1■	197.00	SKT1	185.00
		220–240 V, 50–60 Hz	Transformer	SKT7R31	SKT7G31	SKT7■	197.00	SKT7	185.00
		24–28 Vac/Vdc	Full Voltage	SKT35R31	SKT35G31	SKT35■	167.00	SKT35	158.00
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKT▲R31	SKT▲G31	SKT▲■	197.00	SKT▲	158.00
			Full Voltage, Neon or Resistor★	SKT▲R31	SKT▲G31	SKT▲■	197.00	SKT▲	158.00
9001SKTR38	Remote Test Pilot Light (Fresnel color cap shown)	120 Vac Only	Resistor	SKTR38R31	SKTR38G31	SKTR38■	197.00	SKTR38	185.00
		24–28 Vac Only	Full Voltage	SKTR35R31	SKTR35G31	SKTR35■	197.00	SKTR35	185.00
		For other voltages see Tables ▲■▼	Full Voltage or Resistor ▼	SKTR▲R31	SKTR▲G31	SKTR▲■	197.00	SKTR▲	185.00

▲ Add the voltage assembly code as chosen from Table 19.248 or Table 19.249 on page 19-86.
EXAMPLE: SKT♦R31 with 208 Vac red LED voltage = SKT37LRR31.

■ Add the color code as chosen from the color cap table below.
EXAMPLE: SKP1♦ with a blue fresnel cap = SKP1L31.

♦ The cap must be the same color as the LED light module chosen, e.g., for a green LED, use a green color cap.

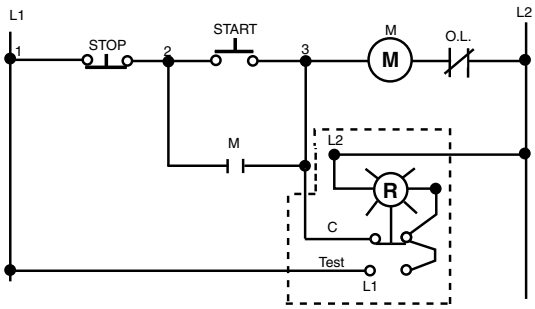
★ On neon light modules, use clear color caps only.

▼ Use only full voltage or resistor voltage assembly codes on remote test pilot lights. Do not choose LED, neon or transformer codes. For AC use only.

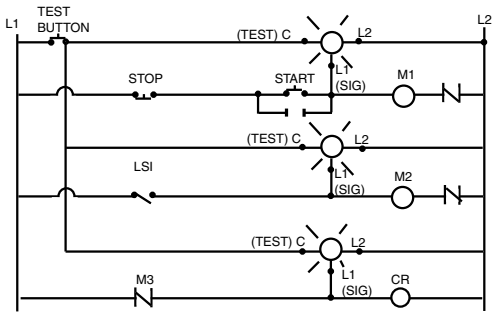
Table 19.241: Color Caps

Color	■ Plastic Fresnel	■ Plastic Domed
Amber	A31	A9
Blue	L31	L9
Clear	C31	C9
Green	G31	G9
Red	R31	R9
White	W31	W9
Yellow	Y31	Y9

Typical Wiring Diagram



Push-To-Test Pilot Light



Remote Test Pilot Light

NOTE: *To select and order contact blocks, light modules, and accessories, see pages 19-85 through 19-92.*

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Table 19.242: Multifunction Operators—UL Types 4, 4X, 13/NEMA 4, 4X, 13

For use in hazardous locations—See page 19-87.
Legend plate and contact blocks not included unless otherwise noted.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Interlocked Assembly	Description	Color	Contacts	$ Price	Without Contacts	$ Price
9001SKR11U	Interlocked Assembly Both Buttons Maintained	Universal ▲	SKR11UH1	178.00	SKR11U	120.00
		Other ■	SKR11■H1		SKR11■	
	Interlocked Assembly One Button Momentary	Universal ▲	SKR12UH1H1	273.00	SKR12U	162.00
	Interlocked Assembly One Button Maintained	Other ■	SKR12■H1H1		SKR12■	

▲ Universal for SKR11,12 includes 2 each of black, red, green, yellow, orange, blue, white.
■ Choose one color for each button. R = red, G = green, B = Black.
Example: 9001SKR11 with top button gray and bottom button orange = 9001SKR11ES. See Table 19.227

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The Class 9001 Type KA contact blocks are Fingersafe® contact blocks (meeting VDE 0106 Part 100). They have one screw mounting and captive (backed out) plus/minus terminal screws. These contact blocks are double-break, direct-acting contacts. Because of the wiping action of these contacts, they are suitable for use with programmable controllers. All contact blocks listed below accept up to 2 #12–#24 AWG solid or stranded wires. Recommended tightening torque for screw terminals is 7 lb-in.

Table 19.243: Standard Contact Blocks

Description	Symbol	Type	$ Price
(Clear Cover)	Direct-Acting	KA1	**42.80**
(Green Cover)		KA2	**21.50**
(Red Cover)	Direct-Acting	KA3	**21.50**
(Clear Cover)	N.O. Contact Early Closing	KA4	**42.80**
(Red Cover)	N.C. Contact Late Opening	KA5	**21.50**
(Green Cover)	N.O. Contact Early Closing	KA6	**21.50**

Table 19.244: Additional Circuit Arrangements

Sequencing ▲ N.O. Contact of KA4 closes before N.O. Contact on KA1	KA4 KA1	Order One Type KA4 and One Type KA1	**85.60**
Overlapping ▲ N.O. Contact of KA4 closes before N.C. Contact of KA5 Opens	KA4 KA5	Order One Type KA4 and One Type KA5	**64.30**

▲ For push buttons or two-position selector switches only. For sequencing or overlapping contacts on other operators, refer to catalog **9001CT0001**.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Symbol	Contact Blocks with Binder Head Screws (not Fingersafe)			Gold Flashed Contacts with Standard Pressure Wire Terminals	
	Type	Quantity ■	$ Price	Type	$ Price
	KA21	25–Up	**42.80**	KA31	**71.00**
	KA22	25–Up	**21.50**	KA32	**35.60**
	KA23	25–Up	**21.50**	KA33	**35.60**
N.O. Early Closing	KA24	25–Up	**42.80**	KA34	**71.00**
N.C. Contact Late Opening	KA25	25–Up	**21.50**	KA35	**35.60**

■ Minimum order quantity is 25. The price represents one individual contact block.

Contact blocks listed below are not Fingersafe, but provide:

- Terminals that accept ring tongue/fork tongue connectors
- Short single circuit contact blocks (0.75" deep vs. 0.97" deep on the Fingersafe)
- Same as old style Series G product available prior to March, 1989.
- For assembled operators, use form Y238 (add to catalog number as suffix, for example: 9001KRU1H13Y238)

Table 19.245: Contact blocks (not Fingersafe)

Symbol	Type	$ Price	Symbol	Type	$ Price
	KA1G	**42.80**	N.O. Contact Early Closing	KA4G	**42.80**
	KA2G	**21.50**	N.C. Contact Late Opening	KA5G	**21.50**
	KA3G	**21.50**	N.O. Contact Early Closing	KA6G	**21.50**

Table 19.246: Contact blocks with Quick-Connect terminals (not Fingersafe)

Symbol	Type	$ Price
	KA12	**35.60**
	KA13	**35.60**

Dimensions . . . . . Catalog 9001CT0001

Table 19.247: Maximum Current Ratings for Control Circuit Contacts—Types KA1–KA6, KA21–KA25, KA31–KA35, KA1G–KA6G

V	AC						Volts	DC				
	Inductive (NEMA / UL Type A600) 35% Power Factor					Resistive 75% Power Factor Make, Break and Continuous Amperes		Inductive and Resistive (NEMA Q600)				
	Make		Break		Continuous Carrying Amperes			Make and Break				Continuous Carrying Amperes
	Amperes	VA	Amperes	VA				KA1	KA2 KA3	KA4	KA5 KA6	
120	60	7200	6.0	720	10	10	125	0.55	0.55	—	—	2.5
240	30		3.0				250	0.27	0.27	—	—	
480	15		1.5				600	0.10	0.10	—	—	
600	12		1.2									

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For use in hazardous locations—See page 19-87.

- With neon type light modules, use a **clear** color cap only.
- With LED light modules, use either a clear color cap or a cap the same color as the LED.

Table 19.248: Standard Light Modules for Types K, SK, and KX Control Units ■

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Voltage	Description	Light Module		Voltage Assembly Code	Rating	Replacement Lamp	
		Type	$ Price			Part Number ■	$ Price
All	Full Voltage (without Bayonet Base Lamp)	KM40	**78.00**	40	—	None	—
6 Vac/Vdc	Full Voltage	KM31	**86.00**	31	.9 VA	2550101020	**12.45**
6 Vac/Vdc	LED Red	KM31LR	**116.00**	31LR		6508805201	**42.75**
6 Vac/Vdc	LED Green	KM31LG	**116.00**	31LG		6508805203	**42.75**
6 Vac/Vdc	LED Yellow	KM31LY	**116.00**	31LY		6508805202	**28.50**
12–14 Vac/Vdc	Full Voltage	KM32	**86.00**	32	1.2 VA	2550101037	**12.45**
12–14 Vac/Vdc	LED Red	KM32LR	**116.00**	32LR		6508805201	**42.75**
12–14 Vac/Vdc	LED Green	KM32LG	**116.00**	32LG		6508805203	**42.75**
12–14 Vac/Vdc	LED Yellow	KM32LY	**116.00**	32LY		6508805202	**28.50**
18 Vac/Vdc	Resistor	KM33	**86.00**	33	1.4 VA	2550101037	**12.45**
24–28 Vac/Vdc	Full Voltage	KM35	**86.00**	35	1.2 VA	2550101002	**12.45**
24–28 Vac/Vdc	LED Red	KM35LR	**116.00**	35LR	.28 VA	6508805210	**42.75**
24–28 Vac/Vdc	LED Green	KM35LG	**116.00**	35LG	.28 VA	6508805212	**42.75**
24–28 Vac/Vdc	LED Yellow	KM35LY	**116.00**	35LY	.28 VA	6508805211	**42.75**
24–28 Vac/Vdc	LED White	KM35LW	**116.00**	35LW	.28 VA	6508805214	**42.75**
24–28 Vac/Vdc	LED Blue	KM35LL	**116.00**	35LL	.28 VA	6508805213	**42.75**
48 Vac/Vdc	Full Voltage	KM36	**86.00**	36	2.6 VA	2550101025	**12.45**
110–120 V, 50–60 Hz	LED Red	KM1LR	**143.00**	1LR		6508805201	**42.75**
110–120 V, 50–60 Hz	LED Green	KM1LG	**143.00**	1LG		6508805203	**42.75**
110–120 V, 50–60 Hz	LED Yellow	KM1LY	**143.00**	1LY		6508805202	**42.75**
110–120 V, 50–60 Hz	Transformer	KM1	**116.00**	1	2.4 VA	2550101020	**12.45**
110–120 V, 50–60 Hz	Flashing	KMF1	**116.00**	F1	.85 VA	2550101036	**16.50**
120 Vac/Vdc	Full Voltage/Resistor	KM38	**86.00**	38	3.0 VA	2550101027	**12.45**
120 Vac/Vdc	Neon ▲	KM11	**86.00**	11	0.2 VA	2550101013	**32.85**
120 Vac/Vdc	LED Red	KM38LR	**116.00**	38LR	1.4 VA	6508805210	**42.75**
120 Vac/Vdc	LED Green	KM38LG	**116.00**	38LG	1.4 VA	6508805212	**42.75**
120 Vac/Vdc	LED Yellow	KM38LY	**116.00**	38LY	1.4 VA	6508805211	**42.75**
120 Vac/Vdc	LED White	KM38LW	**116.00**	38LW	1.4 VA	6508805214	**42.75**
120 Vac/Vdc	LED Blue	KM38LL	**116.00**	38LL	1.4 VA	6508805213	**42.75**
208–220 V, 50–60 Hz	Transformer	KM3	**116.00**	3	2.5 VA	2550101020	**12.45**
208–220 V, 50–60 Hz	LED Red	KM3LR	**143.00**	3LR		6508805201	**42.75**
208–220 V, 50–60 Hz	LED Green	KM3LG	**143.00**	3LG		6508805203	**42.75**
208–220 V, 50–60 Hz	LED Yellow	KM3LY	**143.00**	3LY		6508805202	**42.75**
208–220 V, 50–60 Hz	LED White	KM3LW	**143.00**	3LW		6508805215	**42.75**
208–220 V, 50–60 Hz	LED Blue	KM3LL	**143.00**	3LL		6508805216	**42.75**
220–240 V, 50–60 Hz	Transformer	KM7	**116.00**	7	2.0 VA	2550101020	**12.45**
220–240 V, 50–60 Hz	LED Red	KM7LR	**143.00**	7LR		6508805201	**42.75**
220–240 V, 50–60 Hz	LED Green	KM7LG	**143.00**	7LG		6508805203	**42.75**
220–240 V, 50–60 Hz	LED Yellow	KM7LY	**143.00**	7LY		6508805202	**42.75**
220–240 V, 50–60 Hz	LED White	KM7LW	**143.00**	7LW		6508805215	**42.75**
220–240 V, 50–60 Hz	LED Blue	KM7LL	**143.00**	7LL		6508805216	**42.75**
240 Vac/Vdc	Resistor	KM25	**86.00**	25	6.0 VA	2550101027	**12.45**
240 Vac/Vdc	Neon ▲	KM12	**86.00**	12	0.3 VA	2550101013	**32.85**
277 V, 50–60 Hz	Transformer	KM8	**116.00**	8	2.4 VA	2550101020	**12.45**
380–480 V, 50–60 Hz	Transformer	KM5	**116.00**	5	2.8 VA	2550101020	**12.45**
480 Vac/Vdc	Neon ▲	KM14	**86.00**	14	0.5 VA	2550101013	**32.85**
550–600 V, 50–60 Hz	Transformer	KM6	**116.00**	6	2.5 VA	2550101020	**12.45**

▲ Not for use on KX operators.
■ For use with all operators except KX and remote test pilot.

NOTE: *Light modules are available in other voltages. For additional information, refer to Catalog* **9001CT0001**.

For use in hazardous locations—See page 19-87.

- Reduces the depth of illuminated push buttons with contact blocks by over 33%.
- With LED light modules, use a cap that is the same color as the LED.

Table 19.249: Shallow Depth Light Modules For Types K and SK Control Units ♦

Voltage	Description	Light Module		Voltage Assembly Code	Rating	Replacement Lamp	
		Type	$ Price			Part Number	$ Price
24–28 Vac/Vdc	Full Voltage	KM55	**86.00**	55	1.2 VA	2550101002	**12.45**
	LED Red	KM55LR	**116.00**	55LR	0.5 VA	6508805204	**42.75**
	LED Green	KM55LG		55LG		6508805206	
	LED Yellow	KM55LY		55LY		6508805205	
110–120 Vac/Vdc	Full Voltage	KM58	**86.00**	58	3.0 VA	2550101027	**12.45**
	LED Red	KM58LR	**116.00**	58LR	0.5 VA	6508805204	**42.75**
	LED Green	KM58LG		58LG		6508805206	
	LED Yellow	KM58LY		58LY		6508805205	

♦ For use with all operators except KX and remote test pilot.

File CCN E78403 NKCR — File Class LR25490 3211 03 — marked

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Hazardous locations do not always require the use of explosion-proof equipment like the Class 9001 Type BR control stations. Selecting the most appropriate device for the location can save you money. For more information on the types of hazardous locations, contact your local electrical inspector.

Table 19.250: Square D Offering According to Class, Division, and Group

For			Use
Class	Division	Group(s)	
I	1	A	1. Intrinsically Safe System
I	1	B, C, D	1. 9001 BR station
			2. Intrinsically Safe System
I	2	A	1. 9001 K, SK, KX control stations with restrictions ▲
			2. Intrinsically Safe System
I	2	B, C, D	1. 9001 BR station
			2. 9001 K, SK, KX control stations with restrictions ▲
			3. Intrinsically Safe System
II	1	E, F, G	1. 9001 BR station
			2. Intrinsically Safe System
II	2	E, F	1. 9001 BR station
			2. 9001 K, SK, KX control stations with restrictions ▲
			3. Intrinsically Safe System
II	2	G	1. 9001 BR station
			2. 9001 K, SK, KX control stations with restrictions ■
			3. Intrinsically Safe System
III	1, 2	—	1. 9001 BR Station
			2. 9001 K, SK, KX control stations with restrictions ■
			3. Intrinsically Safe System

▲ Any Class 9001 Type K, SK or KX operator can be used in an area classified as Class I, Division 2 hazardous locations, if:
1. Only logic (KA40 series) or power (KA50 series) reed contact blocks are used.
2. All Type K and SK illuminated operators are UL approved for use in Class I Division 2 areas. ♦
3. Type KX illuminated operators do not use 4 lamp light modules, or 2 lamp light modules other than the transformer type. ♦
4. The operators are mounted in any NEMA 4 & 13 enclosures.

■ Any Class 9001 Type K, SK, or KX operator mounted in a Class 9001 Type KY, KYSS, KYAF, SKY enclosure may be used, except potentiometer operators.

♦ Add Form Y243 to single lamp Push-To-Test pilot lights.

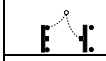
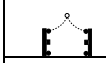
Note: For ▲ and ■: UL Listed: File E10054(N), CCN NOIV.

Table 19.251: Hazardous Locations (see page 19-87)

Types K, SK — File CCN E10054(N) NOIV — File Class LR26817 3218 02

NOTE: *When ordering, add prefix 9001 to the catalog number. All contact blocks listed below accept #12–18 solid or stranded wire.*

Table 19.252: Hermetically Sealed Logic Reed Contact Blocks △
Suitable for use on low energy level circuits

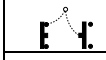
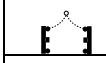
Description	Symbol	Type	$ Price
		KA41	86.00
		KA42	42.80
		KA43	42.80
		KA44	86.00
		KA45	86.00

Max. Vac/Vdc	Maximum Load		
	Resistive	Inductive	Continuous
32/30	.25 A	.10 A	.5 A
120/100	8 VA	3 VA	.5 A

The maximum number of logic and/or power reed contact blocks per operator is as indicated on individual selection tables for standard contact blocks, **except**:

- On 3 position selector switches with cams C, D, E, F, G, L, or M, mount reed blocks on **one side only** (either side), maximum 2 in tandem.
- On 4 position selector switches, mount reed blocks on **one side only** (either side), maximum 2 in tandem.
- On joysticks or on Type KR8 or SKR8 push-pull operators, mount reed blocks on **one side only** (either side), maximum 2 in tandem.

Table 19.253: Hermetically Sealed Power Reed Contact Blocks △

Description	Symbol	Type	$ Price
		KA51	143.00
		KA52	101.00
		KA53	101.00
		KA54	143.00
		KA55	143.00

Volts	AC NEMA C300 ★				
	Make		Break		Continuous Carrying Amperes
	A	VA	A	VA	
120	10.00	1200	1.000	120	3.0
240	5.00		.500		

Volts	DC NEMA Q150 ▼				
	Make		Break		Continuous Carrying Amperes
	A	VA	A	VA	
115	.50	58	.50	58	3.0

Note: The power reed contact blocks can be used with standard industrial relays and starters through NEMA Size 4. Minimum voltage is 5 V and the minimum current is 1 mA.

★ Inductive Rating—35% Power Factor.
▼ Inductive and Resistive Ratings
△ Not for use in pendant stations.

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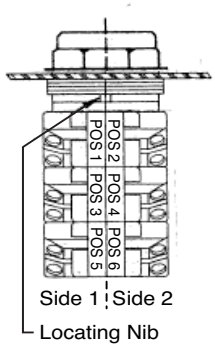
Example: A Type KR1B push button with 2 Type KA1 contact blocks would be Class 9001 Type KR1BH2.



The design of the Class 9001 Type KA contact blocks allows them to be mounted side by side and/or in tandem. This enables you to specify an operator and a particular arrangement of contact blocks (shipped completely assembled) with a single Type number.

Table 19.254: "H" Codes

Suffix No. (Add to Operator Type)	$ Price	Positions					
		1	2	3	4	5	6
H1	**28.50**	KA1					
H2	**57.00**	KA1	KA1				
H3	**86.00**	KA1	KA1	KA1			
H4	**114.00**	KA1	KA1	KA1	KA1		
H5	**14.30**	KA2					
H6	**14.30**	KA3					
H7	**28.50**	KA2	KA2				
H8	**28.50**	KA3	KA3				
H9	**57.00**	KA4	KA1				
H10	**42.80**	KA4	KA5				
H11	**86.00**	KA1	KA1		KA1		
H12	**57.00**	KA2	KA3	KA2	KA3		
H13	**28.50**		KA1				
H14	**14.30**		KA3				
H15	**42.80**	KA2	KA3	KA2			
H16	**42.80**	KA2	KA3		KA3		
H17	**71.00**	KA1	KA1	KA2			
H18	**71.00**	KA3	KA1	KA3		KA3	
H19	**143.00**	KA1	KA1	KA1	KA1	KA1	
H21	**28.50**	KA2	KA3				
H23	**171.00**	KA1	KA1	KA1	KA1	KA1	KA1
H24	**42.80**	KA1	KA2				
H25	**28.50**	KA5	KA3				

NOTE: *For "H" Codes not shown in this table, contact your local Schneider Electric Customer Care Center.*

Table 19.255: Dimensions When Using Contact Blocks

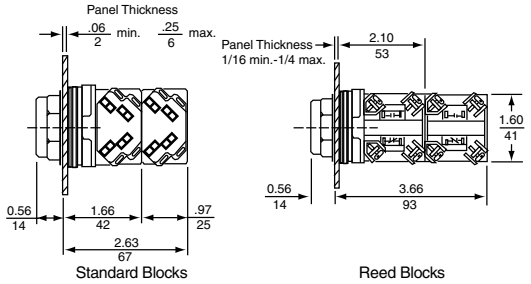


Table 19.256: Basic Operators (Without Color Caps, Mushroom Buttons, Knobs, Selector Switch Cams, Contact Blocks, Light Modules, or Legend Plates)

Description	For UL Types/NEMA		$ Price
	1, 3R, 4, 12, 13	4, 4X, 13	
Non-Illuminated Push Button (Extended Guard)	KR2	SKR2	**38.55**
Non-Illuminated Push Button (No Guard)	KR3	SKR3	**38.55**
Non-Illuminated Push Button (Mushroom Button/Screw-On)	KR20	SKR20	**38.55**
Non-Illuminated Dual Push Button (Momentary)	KR6	—	**78.00**
Non-Illuminated Dual Push Button (Momentary Interlocked)	KR67	—	**121.50**
Non-Illuminated Dual Push Button (Maintained Interlocked)	KR7	—	**121.50**
Momentary Pull—Maintained Neutral—Momentary Push	KR8 ▲★	SKR8 ▲	**75.00**
Maintained Pull—Maintained Push	KR9 ▲★	SKR9 ▲	**120.00**
Illuminated Push Button (Full Guard—Plastic Top)	K1L ■	SK1L ■	**42.75**
Illuminated Push Button and Push-To-Test (No Guard)	K2L ■ ♦	SK2L ■ ♦	**28.65**
Illuminated Push Button (Full Guard—Metal Top)	K3L ■	—	**42.75**
Standard Pilot Light	KP	SKP	**28.65**
3 Position Maintained Selector Switch	KS4 ▲	SKS4 ▲	**36.30**
3 Position Spring Return Both Sides To Center—Selector Switch	KS5 ▲	SKS5 ▲	**64.80**
3 Position Spring Return Left To Center—Selector Switch	KS6 ▲	SKS6 ▲	**64.80**
3 Position Spring Return Right To Center—Selector Switch	KS7 ▲	SKS7 ▲	**64.80**

▲ Operator can be converted to an illuminated operator by removing the liner (6512240601) and adding a light module.

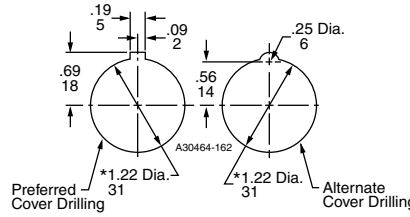
■ Operator can be converted to a non-illuminated operator by adding liner (6512240601).

♦ Operator includes jumper wires for push-to-test conversion.

★ These operators can be supplied with 1-3/8 in or 2-1/4 in dia. mushroom buttons. For 1-3/8 in.: add ( ) 20 to type number. The ( ) refers to the color chosen—see page 19-92. For 2-1/4 in.: Add ( ) 21 to type number. The ( ) refers to the color chosen—see page 19-92. Voids UL and NEMA 6 Rating.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Mounting Hole for All Types K, SK, and KX Control Units



*Units also mount in 1.20 dia. 30

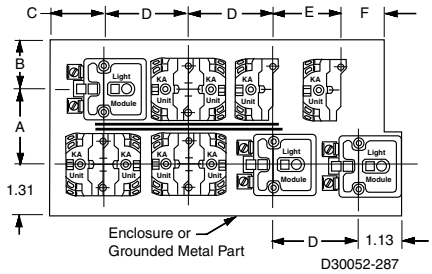
Dual Dimensions: **INCHES** Millimeters

Hole Punch: Use Greenlee Tool #60242 to punch mounting hole and notch.

Maximum Contact Block Usage

(Includes Types K, SK and KX)

- **2 blocks mounted side by side only:** Any 2, 3 or 4 position **spring return** selector switch (non-illuminated, illuminated or keyed).
- **2 blocks mounted in tandem on one side only:** Any 2 operator interlocked push button.
- **2 blocks mounted in tandem (total of four blocks):** Any selector push button, keyed push button, 2, 3, or 4 position **maintained** selector switch (non-illuminated, illuminated or keyed), push-pull operators (non-illuminated or illuminated), joy stick, dual push button.
- **3 blocks mounted in tandem (total of six blocks):** Single momentary push buttons (non-illuminated or illuminated).



Min. Centerline Spacing, Type K & SK Control Units

Legend Plate	Operator	Centerline Spacing (in.)					
		A	B	C	D	E	F
Legend Plate Orientation Position #1							
KN2 KN5	Standard Push Button	1.75	1.31	1.44	2.25	1.69	0.88
	1.375 in. Dia. Mushroom	1.75	1.31	1.44	2.25	1.69	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.75	1.31	1.44	2.25	1.69	0.88
KN3	Standard Push Button	2.00	1.31	1.44	2.25	1.75	0.88
	1.375 in. Dia. Mushroom	2.00	1.31	1.44	2.25	1.75	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	2.00	1.31	1.44	2.25	1.75	0.88
KN4	Standard Push Button	1.94	1.31	1.44	2.25	1.62	0.88
	1.375 in. Dia. Mushroom	1.94	1.31	1.44	2.25	1.62	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.74	1.31	1.44	2.25	1.62	0.88
KN6	Standard Push Button	2.38	1.62	1.44	2.25	2.25	1.12
	1.375 in. Dia. Mushroom	2.38	1.62	1.44	2.25	2.25	1.12
	2.25 in. Dia. Mushroom	2.38	1.62	1.44	2.25	2.25	1.12
	Selector Switch Knobs	2.38	1.62	1.44	2.25	2.25	1.12
Legend Plate Orientation Position #2							
KN2 KN5	Standard Push Button	1.62	1.31	1.44	2.25	1.75	0.88
	1.375 in. Dia. Mushroom	1.62	1.31	1.44	2.25	1.75	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.62	1.31	1.44	2.25	1.75	0.88
KN3	Standard Push Button	1.75	1.31	1.44	2.25	2.00	0.88
	1.375 in. Dia. Mushroom	1.75	1.31	1.44	2.25	2.00	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.75	1.31	1.44	2.25	2.00	0.88
KN4	Standard Push Button	1.62	1.31	1.44	2.25	1.94	1.00
	1.375 in. Dia. Mushroom	1.62	1.31	1.44	2.25	1.94	1.00
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.62	1.31	1.44	2.25	1.94	1.00
KN6	Standard Push Button	2.25	1.31	1.62	2.38	2.38	0.88
	1.375 in. Dia. Mushroom	2.25	1.31	1.62	2.38	2.38	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.62	2.38	2.38	1.12
	Selector Switch Knobs	2.25	1.31	1.62	2.38	2.38	0.88

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Table 19.257: Legend Plates

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Standard Markings	Plastic Legend Plates for use with Types K and SK Operators									Aluminum Legend Plates for use with Type K Operators		
	1-3/4" Square			2-1/4" Square			2-1/2" Square			Black Legend	Black Legend	Blue Legend
	Silver Legend with Black Letters	White Legend with Black Letters	Black Legend with White Letters	Silver Legend with Black Letters	White Legend with Black Letters	Black Legend with White Letters	Silver Legend with Black Letters	White Legend with Black Letters	Black Legend with White Letters			
For Push Button or Pilot Light										**KN200**	**KN300**	**KN800**
Blank	KN200SP	KN200WP	KN200BP	KN100SP	KN100WP	KN100BP	KN700SP	KN700WP	KN700BP	KN200	KN300	KN800
Blank (red)	KN200RP ■	KN200RP ■	KN200RP ■	KN100RP ■	KN100RP ■	KN100RP ■	KN700RP ■	KN700RP ■	KN700RP ■	KN200R ▲	KN300R ▲	KN800R ▲
Start	KN201SP	KN201WP	KN201BP	KN101SP	KN101WP	KN101BP	KN701SP	KN701WP	KN701BP	KN201	KN301	KN801
Stop	KN202RP ■	KN202RP ■	KN202RP ■	KN102RP ■	KN102RP ■	KN102RP ■	KN702RP ■	KN702RP ■	KN702RP ■	KN202 ▲	KN302 ▲	KN802 ▲
On	KN203SP	KN203WP	KN203BP	KN103SP	KN103WP	KN103BP	KN703SP	KN703WP	KN703BP	KN203	KN303	KN803
Off	KN204RP ■	KN204RP ■	KN204RP ■	KN104RP ■	KN104RP ■	KN104RP ■	KN704RP ■	KN704RP ■	KN704RP ■	KN204 ▲	KN304 ▲	KN804 ▲
Emerg. Stop	KN205RP ■	KN205RP ■	KN205RP ■	KN105RP ■	KN105RP ■	KN105RP ■	KN705RP ■	KN705RP ■	KN705RP ■	KN205 ▲	KN305 ▲	KN805 ▲
Forward	KN206SP	KN206WP	KN206BP	KN106SP	KN106WP	KN106BP	KN706SP	KN706WP	KN706BP	KN206	KN306	KN806
Reverse	KN207SP	KN207WP	KN207BP	KN107SP	KN107WP	KN107BP	KN707SP	KN707WP	KN707BP	KN207	KN307	KN807
Close	KN208SP	KN208WP	KN208BP	KN108SP	KN108WP	KN108BP	KN708SP	KN708WP	KN708BP	KN208	KN308	KN808
Open	KN209SP	KN209WP	KN209BP	KN109SP	KN109WP	KN109BP	KN709SP	KN709WP	KN709BP	KN209	KN309	KN809
Down	KN210SP	KN210WP	KN210BP	KN110SP	KN110WP	KN110BP	KN710SP	KN710WP	KN710BP	KN210	KN310	KN810
Up	KN211SP	KN211WP	KN211BP	KN111SP	KN111WP	KN111BP	KN711SP	KN711WP	KN711BP	KN211	KN311	KN811
Fast	KN212SP	KN212WP	KN212BP	KN112SP	KN112WP	KN112BP	KN712SP	KN712WP	KN712BP	KN212	KN312	KN812
Slow	KN213SP	KN213WP	KN213BP	KN113SP	KN113WP	KN113BP	KN713SP	KN713WP	KN713BP	KN213	KN313	KN813
High	KN214SP	KN214WP	KN214BP	KN114SP	KN114WP	KN114BP	KN714SP	KN714WP	KN714BP	KN214	KN314	KN814
Low	KN215SP	KN215WP	KN215BP	KN115SP	KN115WP	KN115BP	KN715SP	KN715WP	KN715BP	KN215	KN315	KN815
Inch	KN216SP	KN216WP	KN216BP	KN116SP	KN116WP	KN116BP	KN716SP	KN716WP	KN716BP	KN216	KN316	KN816
In	KN217SP	KN217WP	KN217BP	KN117SP	KN117WP	KN117BP	KN717SP	KN717WP	KN717BP	KN217	KN317	KN817
Jog	KN218SP	KN218WP	KN218BP	KN118SP	KN118WP	KN118BP	KN718SP	KN718WP	KN718BP	KN218	KN318	KN818
Jog For.	KN219SP	KN219WP	KN219BP	KN119SP	KN119WP	KN119BP	KN719SP	KN719WP	KN719BP	KN219	KN319	KN819
Jog Rev.	KN220SP	KN220WP	KN220BP	KN120SP	KN120WP	KN120BP	KN720SP	KN720WP	KN720BP	KN220	KN320	KN820
Lower	KN221SP	KN221WP	KN221BP	KN121SP	KN121WP	KN121BP	KN721SP	KN721WP	KN721BP	KN221	KN321	KN821
Out	KN222SP	KN222WP	KN222BP	KN122SP	KN122WP	KN122BP	KN722SP	KN722WP	KN722BP	KN222	KN322	KN822
Reset	KN223SP	KN223WP	KN223BP	KN123SP	KN123WP	KN123BP	KN723SP	KN723WP	KN723BP	KN223	KN323	KN823
Run	KN224SP	KN224WP	KN224BP	KN124SP	KN124WP	KN124BP	KN724SP	KN724WP	KN724BP	KN224	KN324	KN824
Start Jog	KN225SP	KN225WP	KN225BP	KN125SP	KN125WP	KN125BP	KN725SP	KN725WP	KN725BP	KN225	KN325	KN825
Test	KN226SP	KN226WP	KN226BP	KN126SP	KN126WP	KN126BP	KN726SP	KN726WP	KN726BP	KN226	KN326	KN826
Raise	KN227SP	KN227WP	KN227BP	KN127SP	KN127WP	KN127BP	KN727SP	KN727WP	KN727BP	KN227	KN327	KN827
Decrease	KN228SP	KN228WP	KN228BP	KN128SP	KN128WP	KN128BP	KN728SP	KN728WP	KN728BP	KN228	KN328	KN828
Increase	KN229SP	KN229WP	KN229BP	KN129SP	KN129WP	KN129BP	KN729SP	KN729WP	KN729BP	KN229	KN329	KN829
Left	KN230SP	KN230WP	KN230BP	KN130SP	KN130WP	KN130BP	KN730SP	KN730WP	KN730BP	KN230	KN330	KN830
Right	KN231SP	KN231WP	KN231BP	KN131SP	KN131WP	KN131BP	KN731SP	KN731WP	KN731BP	KN231	KN331	KN831
Cycle Start	KN232SP	KN232WP	KN232BP	KN132SP	KN132WP	KN132BP	KN732SP	KN732WP	KN732BP	KN232	KN332	KN832
Feed Start	KN233SP	KN233WP	KN233BP	KN133SP	KN133WP	KN133BP	KN733SP	KN733WP	KN733BP	KN233	KN333	KN833
Cycle Stop	KN234SP	KN234WP	KN234BP	KN134SP	KN134WP	KN134BP	KN734SP	KN734WP	KN734BP	KN234	KN334	KN834
Motor Run	KN236SP	KN236WP	KN236BP	KN136SP	KN136WP	KN136BP	KN736SP	KN736WP	KN736BP	KN236	KN336	KN836
Motor Stop	KN237SP	KN237WP	KN237BP	KN137SP	KN137WP	KN137BP	KN737SP	KN737WP	KN737BP	KN237	KN337	KN837
Power On	KN238SP	KN238WP	KN238BP	KN138SP	KN138WP	KN138BP	KN738SP	KN738WP	KN738BP	KN238	KN338	KN838
Pull To Start	N/A	N/A	N/A	KN179SP	KN179WP	KN179BP	KN779SP	KN779WP	KN779BP	N/A	KN379	N/A
Push To Stop												
For Selector Switch or Selector Push Button												
For.-Rev.	KN239SP	KN239WP	KN239BP	KN139SP	KN139WP	KN139BP	KN739SP	KN739WP	KN739BP	KN239	KN339	KN839
Hand-Auto.	KN240SP	KN240WP	KN240BP	KN140SP	KN140WP	KN140BP	KN740SP	KN740WP	KN740BP	KN240	KN340	KN840
High-Low	KN241SP	KN241WP	KN241BP	KN141SP	KN141WP	KN141BP	KN741SP	KN741WP	KN741BP	KN241	KN341	KN841
Jog-Run	KN242SP	KN242WP	KN242BP	KN142SP	KN142WP	KN142BP	KN742SP	KN742WP	KN742BP	KN242	KN342	KN842
Man.-Auto.	KN243SP	KN243WP	KN243BP	KN143SP	KN143WP	KN143BP	KN743SP	KN743WP	KN743BP	KN243	KN343	KN843
Off-On	KN244SP	KN244WP	KN244BP	KN144SP	KN144WP	KN144BP	KN744SP	KN744WP	KN744BP	KN244	KN344	KN844
On-Off	KN245SP	KN245WP	KN245BP	KN145SP	KN145WP	KN145BP	KN745SP	KN745WP	KN745BP	KN245	KN345	KN845
Open-Close	KN246SP	KN246WP	KN246BP	KN146SP	KN146WP	KN146BP	KN746SP	KN746WP	KN746BP	KN246	KN346	KN846
Raise-Lower	KN247SP	KN247WP	KN247BP	KN147SP	KN147WP	KN147BP	KN747SP	KN747WP	KN747BP	KN247	KN347	KN847
Run-Jog	KN248SP	KN248WP	KN248BP	KN148SP	KN148WP	KN148BP	KN748SP	KN748WP	KN748BP	KN248	KN348	KN848
Slow-Fast	KN250SP	KN250WP	KN250BP	KN150SP	KN150WP	KN150BP	KN750SP	KN750WP	KN750BP	KN250	KN350	KN850
Start-Stop	KN251SP	KN251WP	KN251BP	KN151SP	KN151WP	KN151BP	KN751SP	KN751WP	KN751BP	KN251	KN351	KN851
Up-Down	KN253SP	KN253WP	KN253BP	KN153SP	KN153WP	KN153BP	KN753SP	KN753WP	KN753BP	KN253	KN353	KN853
Low-High	KN254SP	KN254WP	KN254BP	KN154SP	KN154WP	KN154BP	KN754SP	KN754WP	KN754BP	KN254	KN354	KN854
Stop-Start	KN255SP	KN255WP	KN255BP	KN155SP	KN155WP	KN155BP	KN755SP	KN755WP	KN755BP	KN255	KN355	KN855
Left-Right	KN256SP	KN256WP	KN256BP	KN156SP	KN156WP	KN156BP	KN756SP	KN756WP	KN756BP	KN256	KN356	KN856
On-Auto	KN276SP	KN276WP	KN276BP	KN176SP	KN176WP	KN176BP	KN776SP	KN776WP	KN776BP	KN276	KN376	KN876
Auto-Off-Hand	KN258SP	KN258WP	KN258BP	KN158SP	KN158WP	KN158BP	KN758SP	KN758WP	KN758BP	KN258	KN358	KN858
For.-Off-Rev.	KN259SP	KN259WP	KN259BP	KN159SP	KN159WP	KN159BP	KN759SP	KN759WP	KN759BP	KN259	KN359	KN859
Hand-Off-Auto.	KN260SP	KN260WP	KN260BP	KN160SP	KN160WP	KN160BP	KN760SP	KN760WP	KN760BP	KN260	KN360	KN860
Man.-Off-Auto.	KN262SP	KN262WP	KN262BP	KN162SP	KN162WP	KN162BP	KN762SP	KN762WP	KN762BP	KN262	KN362	KN862
Open-Off-Close	KN263SP	KN263WP	KN263BP	KN163SP	KN163WP	KN163BP	KN763SP	KN763WP	KN763BP	KN263	KN363	KN863
Up-Off-Down	KN264SP	KN264WP	KN264BP	KN164SP	KN164WP	KN164BP	KN764SP	KN764WP	KN764BP	KN264	KN364	KN864
Low-Off-High	KN265SP	KN265WP	KN265BP	KN165SP	KN165WP	KN165BP	KN765SP	KN765WP	KN765BP	KN265	KN365	KN865
Jog-Stop-Run	KN267SP	KN267WP	KN267BP	KN167SP	KN167WP	KN167BP	KN767SP	KN767WP	KN767BP	KN267	KN367	KN867
High-Low-Off	KN270SP	KN270WP	KN270BP	KN170SP	KN170WP	KN170BP	KN770SP	KN770WP	KN770BP	KN270	KN370	KN870
High-Off-Low	KN277SP	KN277WP	KN277BP	KN177SP	KN177WP	KN177BP	KN777SP	KN777WP	KN777BP	KN277	KN377	KN877
Auto-Man.-Off	KN278SP	KN278WP	KN278BP	KN178SP	KN178WP	KN178BP	KN778SP	KN778WP	KN778BP	KN278	KN378	KN878

▲ Legend plate has red background with silver letters.
■ Legend plate has red background with black letters.

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Table 19.258: Legend Plates–Special Marking

Legend Plate	Description		Type	$ Price
KN100( )P (Plastic) ▲ 2.25 in Square	Standard Markings		See page 19-89	4.40
	Special Marking ■	Silver Field, Black Letters	KN199SP	18.50
		White Field, Black Letters	KN199WP	
		Red Field, Black Letters	KN199RP	
		Black Field, White Letters	KN199BP	
KN200 Aluminum	Standard Markings		See page 19-89	4.40
	Special Marking ■	Black Field	KN299	18.50
		Red Field	KN299R	
KN200( )P (Plastic) ▲ 1.7 in. Square	Standard Markings		See page 19-89	4.40
	Special Marking ■	Silver Field, Black Letters	KN299SP	18.50
		White Field, Black Letters	KN299WP	
		Red Field, Black Letters	KN299RP	
		Black Field, White Letters	KN299BP	
KN300 Aluminum	Standard Markings		See page 19-89	4.40
	Special Marking ■	Black Field	KN399	18.50
		Red Field	KN399R	
KN400 Aluminum	Blank		KN400	8.60
	Any Marking ■		KN499	22.80
KN500 Aluminum	Standard Markings		Select from Table 19.263	4.40
	Special Marking ■	Black Field	KN599	18.50
		Green Red Field	KN519	
KN600 Aluminum	Blank	Black Field	KN600	9.90
		Red Field	KN600R	
	Any Marking ■	Black Field	KN699	22.80
		Red Field	KN699R	
KN700( )P (Plastic) ▲ 2.5 in. Square	Standard Markings		Select from page 19-89	4.40
	Special Marking ■	Silver Field, Black Letters	KN799SP	18.50
		White Field, Black Letters	KN799WP	
		Red Field, Black Letters	KN799RP	
		Black Field, White Letters	KN799BP	
KN800 Aluminum	Standard Markings		Select from page 19-89	4.40
	Special Marking ■	Blue Field	KN899	18.50
		Red Field	KN899R	
KN900 Aluminum	Blank		KN900	4.40
	Any Marking ■		KN999	18.50

▲ Other colors available (see Table 19.259).
■ Specify marking required.

Table 19.259: Plastic Legend Plates—Other Colors

	Plate Color	Letter Color	1.7 in. Square	2.25 in. Square	2.5 in. Square	$ Price
Blank Legend Plates	Yellow	Black	KN200YP	KN100YP	KN700YP	4.40
	Green	White	KN200GP	KN100GP	KN700GP	
	Blue		KN200LP	KN100LP	KN700LP	
	Red		KN200CP	KN100CP	KN700CP	
Special Engraved Legend Plates	Yellow	Black	KN299YP	KN199YP	KN799YP	18.50
	Green	White	KN299GP	KN199GP	KN799GP	
	Blue		KN299LP	KN199LP	KN799LP	
	Red		KN299CP	KN199CP	KN799CP	

Table 19.260: Maximum Number of Lines and Characters for Type KN Legend Plates

Type	KN100	KN200	KN300	KN400	KN500	KN600	KN700	KN800	KN900
Max. No. of Characters per Line	16	14	18	18	8 per field	22	17	18	18 per pos.
Max. No. of Lines	2	1	3	2	2 per field	4	2	2	1 per pos.

Note: The maximum number of characters and lines is a practical maximum, based on a minimum size of characters to facilitate easy reading.

Table 19.261: Circular Legends for Emergency Stop Mushroom Heads (yellow background)

Diameter	Text	Catalog Number	$ Price
60 mm	—	9001KN9100	4.40
	EMERGENCY STOP	9001KN9330	
90 mm	—	9001KN8100	
	EMERGENCY STOP	9001KN8330	

▲ Legend plate has red background with silver letters.
■ Legend plate has red background with black letters.

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NOTE: *When ordering, add prefix 9001 to the catalog number.*

Legend Plate Position #1

Table 19.262: Min. Centerline Spacing, Type K & SK Control Units

Legend Plate	Operator	Centerline Spacing (in.) A	B	C	D	E	F
Legend Plate Orientation Position #1							
KN2 KN5	Standard Push Button	1.75	1.31	1.44	2.25	1.69	0.88
	1.375 in. Dia. Mushroom	1.75	1.31	1.44	2.25	1.69	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.75	1.31	1.44	2.25	1.69	0.88
KN3	Standard Push Button	2.00	1.31	1.44	2.25	1.75	0.88
	1.375 in. Dia. Mushroom	2.00	1.31	1.44	2.25	1.75	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	2.00	1.31	1.44	2.25	1.75	0.88
KN4	Standard Push Button	1.94	1.31	1.44	2.25	1.62	0.88
	1.375 in. Dia. Mushroom	1.94	1.31	1.44	2.25	1.62	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.74	1.31	1.44	2.25	1.62	0.88
KN6	Standard Push Button	2.38	1.62	1.44	2.25	2.25	1.12
	1.375 in. Dia. Mushroom	2.38	1.62	1.44	2.25	2.25	1.12
	2.25 in. Dia. Mushroom	2.38	1.62	1.44	2.25	2.25	1.12
	Selector Switch Knobs	2.38	1.62	1.44	2.25	2.25	1.12

Legend Plate Position #2

Legend Plate	Operator	Centerline Spacing (in.) A	B	C	D	E	F
Legend Plate Orientation Position #2							
KN2 KN5	Standard Push Button	1.62	1.31	1.44	2.25	1.75	0.88
	1.375 in. Dia. Mushroom	1.62	1.31	1.44	2.25	1.75	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.62	1.31	1.44	2.25	1.75	0.88
KN3	Standard Push Button	1.75	1.31	1.44	2.25	2.00	0.88
	1.375 in. Dia. Mushroom	1.75	1.31	1.44	2.25	2.00	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.75	1.31	1.44	2.25	2.00	0.88
KN4	Standard Push Button	1.62	1.31	1.44	2.25	1.94	1.00
	1.375 in. Dia. Mushroom	1.62	1.31	1.44	2.25	1.94	1.00
	2.25 in. Dia. Mushroom	2.25	1.31	1.44	2.25	2.25	1.12
	Selector Switch Knobs	1.62	1.31	1.44	2.25	1.94	1.00
KN6	Standard Push Button	2.25	1.31	1.62	2.38	2.38	0.88
	1.375 in. Dia. Mushroom	2.25	1.31	1.62	2.38	2.38	0.88
	2.25 in. Dia. Mushroom	2.25	1.31	1.62	2.38	2.38	1.12
	Selector Switch Knobs	2.25	1.31	1.62	2.38	2.38	0.88

Table 19.263: Special Legend Plates

Type KN500 (For Use with Dual Function Operators: KR6, KR7 and KR67) Standard Markings		
Type	**Green**	**Red**
KN500	Blank	Blank
KN501	Start	Stop
KN502	On	Off

Type	Black	Black
KN520	Blank	Blank
KN521	Start	Stop
KN522	On	Off
KN523	Forward	Reverse
KN524	Up	Down
KN525	High	Low
KN526	Open	Close

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Table 19.264: Padlock Attachments

	Used On	Description	Type	$ Price
	Type K non-illuminated push button — Standard or mushroom (KR4, KR5 mushroom buttons only).	Holds button in depressed position and can be padlocked.	K4	**42.80**
	Types K and SK non-illuminated push buttons with or without protective boots.	Holds button in depressed position when padlocked.	K5	**71.00**
			K97	**42.80**
	Types K and SK non-illuminated push buttons, cover type attachment. KR, SKR	Attachment can be padlocked. Does not hold button in depressed position.	K6	**42.80**
	Types K and SK push buttons, cover type attachment.	Spring loaded cover cannot be padlocked. Does not hold button in depressed position.	K60	**57.00**
	Types K and SK push-pull operator and illuminated push buttons. KR8, KR9	Holds button in depressed position and can be padlocked.	K62	**71.00**
	KR11U and **KR12U** Interlocked Assembly	Holds maintained button in depressed position and can be padlocked.	K96	**42.80**
	Type KR9 & SKR9 Push-Pull operators— Non-Illuminated and Illuminated	Holds button in depressed position. Can be padlocked.	K162	**59.00**

Table 19.265: Mushroom Button Guards

Aluminum Mushroom Guard for 1.375 in. Mushroom Button Operator (KR4, KR24)	Yellow Plastic Extended Mushroom Guard for 1.375 in. and 1.625 in. Mushroom Button Operators	Aluminum Mushroom Guard for 2.25 in. Mushroom Button Operator

Type	$ Price	Type	Used On	$ Price	Type	Used On	$ Price
K48	**57.00**	K56■	KR4, SKR4	**57.00**	K68	KR5	**57.00**
		K56♦M▲	KR8, KR9, SKR8, SKR9	**68.00**	K685	KR25	**68.00**

▲ The mushroom guard has finger holes for push-pull operators.
■ B=Black G=Green R=Red Y=Yellow
♦ R=Red Y=Yellow

***NOTE:** When ordering, add prefix 9001 to the catalog number.*

Table 19.266: Padlock Attachments

	Used On	Description	Type	$ Price
	Types K and SK selector switches and potentiometers (will not work with gloved-hand knob).	Cover type attachment that can be padlocked to keep unauthorized personnel from tampering with the operator.	K7	**42.80**
	Types K and SK selector switches and potentiometers (will not work with gloved-hand knob).	Same as 9001K7 but with spring loaded lockout cover.	K107	**56.00**
	Types K and SK illuminated push buttons (with or without guard) and key operated push buttons.	Cover type attachment that can be padlocked to keep unauthorized personnel from tampering with the operator.	K108	**42.80**
	Types K and SK illuminated push buttons (with or without guard) and key operated push buttons.	Same as 9001K108 but with spring loaded lockout cover.	K109	**57.00**
	Types K and SK maintained push-pull operators using 1.375 in. dia. mushroom buttons (-20 series as shown on page 19-92).	Cover type attachment that holds mushroom button in depressed position and can be padlocked.	K110	**54.00**

Table 19.267: Protective Boots

KU1

KU17

KU37

KU27

Note: These Type KU protective boots are recommended for very dirty environments or severe hose down, but they are not required for UL Type 4 rating on the Type K operators or UL Type 4 or 4X rating on the Type SK operators. The K1 wrench (see page 19-93) is required for installation of these boots.

For Non-Illuminated Push Buttons★			Clear Color for	Type	$ Price
Color	Type	$ Price			
Black	KU1	**28.70**	Standard knob selector switch	KU17	**42.80**
Red	KU2		Gloved-hand cap for use on standard knob selector switch	KU18	**42.80**
Blue	KU3				
Brown	KU4		Standard pilot light and maintained contact push buttons	KU27	**42.80**
Green	KU5				
Yellow	KU6				
Clear	KU7		Push-to-test and illuminated push button without guard	KU37	**42.80**
Clear	KU8	**42.80**			
(Provides Full Guard)			Illuminated push button with guard	KU47	**57.00**

★ Use KU27 for maintained contact push buttons.

Table 19.268: Closing Plates

Description	Type	$ Price
Gray	K51▼	**14.30**
Black	K52▼	

▼ Meets UL and NEMA 1, 2, 3, 4, 4X, 6, 12 and 13.

Dimensions see catalog 9001CT0001

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Table 19.269: Accessories

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description	Color	Type	Package Qty.	$ Price Each
Color inserts for KR1, KR2, KR3, SKR1, SKR2, SKR3, KR11, KR12, SKR11, SKR12, KRD, T, TRD	Black Blue Gray Green Orange Red	T8BK T8BE T8GY T8GN T8OE T8RD	10	.72
	Universal ▲	T8U	7	5.70
	White	T8WH	10	.70
	Yellow	T8YW		
1.375 in. Snap-in Mushroom knob for KR4 and SKR4 ♦	Black Blue Green Orange Red	K16B K16L K16G K16S K16R	1	42.80
	Red ■	K16R05		47.60
	Yellow	K16Y		42.80
2-1/4 in. Snap-in Mushroom knob for KR5 and SKR5 ★	Black Blue Green Orange Red	K17B K17L K17G K17S K17R	1	42.80
	Red ■	K17R05		42.80
	Yellow	K17Y		42.80
1-3/8 in. Screw-on Mushroom knob for KR24 and SKR24▼	Black Blue Green Orange Red Yellow	K92B K92L K92G K92S K92R K92Y	1	42.80
2-1/4 in. Screw-on Mushroom knob for KR25 and SKR25 △	Black Blue Green Orange Red Yellow	K93B K93L K93G K93S K93R K93Y	1	42.80
Push-Pull Knobs for KR8, KR9, SKR8, SKR9 Operators	Amber Black □ Blue Clear Green Orange □ Red	A22 B23 L22 C22 G22 S23 R22	1	9.90
	Red ▽	R2205		15.80
	White Yellow	W22 Y22		9.90
Color Inserts for Dual Function Operators KR6, KR7, KR67	Black Green Red	B19 G19 R19	10	1.40
	Universal ◊	U19		8.60
Standard Color Caps for Illuminated Push Buttons K1L, K2L, K3L, SK1L, SK2L	Amber Blue Clear Green Red White Yellow	A7 L7 C7 G7 R7 W7 Y7	1	9.90
Knob for KR9R94	Red	R94	1	9.90
Metal Knob for KR24	Red Green Black	K92RM K92GM K92BM	1	51.00
Metal Knob for KR25	Red Green Black	K93RM K93GM K93BM	1	63.00
Metal Knob for KR9 (40 mm)	Red Green Black	K94RM K94GM K94BM	1	51.00
Metal Knob for KR9 (60 mm)	Red Green Black	K95RM K95GM K95BM	1	63.00

Description	Color	Type	Package Qty.	$ Price Each
1-3/8 in. Mushroom Knob for Illuminated Push Buttons K2L, SK2L ☆	Amber Blue Clear Green Red White Yellow	A20 L20 C20 G20 R20 W20 Y2	1	9.90
2-1/4 in. Mushroom Knob for Illuminated Push Buttons K2L, SK2L ☆	Amber Blue Clear Green Red White Yellow	A21 L21 C21 G21 R21 W21 Y21	1	9.90
Plastic Fresnel Pilot Light Lens for KP, KT, SKP, SKT	Amber Blue Clear Green Red White Yellow	A31 L31 C31 G31 R31 W31 Y31	1	9.90
Domed Plastic Pilot Light Lens for KP, KT, SKP, SKT	Amber Blue Clear Green Red White Yellow	A9 L9 C9 G9 R9 W9 Y9	1	9.90
Glass Pilot Light Lens for KP, KT	Amber Blue Clear Green Red White Yellow	A6 L6 C6 G6 R6 W6 Y6	1	9.90
Standard Selector Switch Knob for K and SK Selector Switches	Amber Black □ Blue Clear Green Orange □ Red White Yellow	A8 B11 L8 C8 G8 S11 R8 W8 Y8	1	9.90
Gloved-Hand Selector Switch Knob for K and SK Selector Switches	Amber Black □ Blue Clear Green Orange □ Red White Yellow	A24 B25 L24 C24 G24 S25 R24 W24 Y24	1	9.90
Color Inserts for KQ and TQ Selector Push Buttons	Black Blue Green Orange Red White Yellow	T5BK T5BE T5GN T5OE T5RD T5WH T5YW	10	1.40
	Cam	**Type**	**$ Price Each**	
Selector Switch Cams	B C D E F G H J L M	K13B K13C K13D K13E K13F K13G K13H K13J K13L K13M	6.30	

▲ Includes one each of the following color inserts: Black, Red, Green, Yellow, Orange, Blue, and White.
■ "EMERGENCY STOP" is in raised letters and hot stamped white across the front of the mushroom button.
♦ The mushroom button cap listed here may be assembled to a 9001KR1U or SKR1U to form a 9001KR4 or SKR4.
★ The mushroom button cap listed here may be assembled to a 9001KR1U or SKR1U to form a 9001KR5 or SKR5.
▼ The mushroom button cap listed here may be assembled to a 9001KR20 to form a 9001KR24 or SKR20 to form a 9001SKR24.
△ The mushroom button cap listed here may be assembled to a 9001KR20 to form a 9001KR25 or a SKR20 to form a 9001SKR25.
□ These color caps are opaque and are for use on non-illuminated operators only.
◊ Includes two of each of the following color inserts: Black, Red, and Green.
☆ May be used on KR8 and KR9 operators. Order mushroom button and K54 adapter (no charge) from page 19-88. Using the K54 adapter voids Type 6 rating.
▽ Red knob with "Push Emergency Stop" marked on top of knob.

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NOTE: When ordering, add prefix 9001 to the catalog number.

Table 19.270: Ring Nuts

Used On	Type	Used On	Type	$ Price
K1L	K44	SK1L	SK44	18.50
K30-K37	K45	—	—	4.40
K70-K73	K45	—	—	4.40
K20, K21, K22, K23	K45	SK20, SK21, SK22, SK23	SK45	4.40
K20, K21, K22, K23 ♦	SK46	SK20, SK21, SK22, SK23 ♦	SK46	4.40
K2L	K49	SK2L	SK49	4.40
K3L (complete)	K111	—	—	18.50
K3L (metal top only)	6515802701	—	—	12.00
KP, KTR	K41	SKP, SKTR	SK41	4.40
KR1	K41	SKR1	SK41	4.40
KR11	K42	SKR11	SK42	4.40
KR12 ▲	K42	SKR12 ▲	SK42	4.40
KR12 ■	K41	SKR12 ■	SK41	4.40
KR13, 14, 15	K55	—	—	4.40
KR2	K42	SKR2	SK42	4.40
KR20	K49	—	—	4.40
KR24	K49	—	—	4.40
KR25	K49	SKR25	SK49	4.40
KR3	K40	SKR3	SK40	4.40
KR4	K41	SKR4	SK41	4.40
KR5	K41	SKR5	SK41	4.40
KR6	K47	—	—	4.40
KR67	K47	—	—	4.40
KR7	K47	—	—	4.40
KR8	K58	SKR8	6509704401	4.40
KR9	K41	SKR9	SK41	4.40
KS	K45	SKS	SK45	4.40
KS ♦	SK46	SKS ♦ SKRU11 SKRU1,2,3,4,5,10	SK46 SK41 SK40	4.40
KT	K49	SKT	SK49	4.40

▲ Maintained button of two button operator.
■ Momentary button of two button operator.
♦ Secondary ring nut (holds knob on selector switch or potentiometer).

Table 19.271: Replacement Lamps For Series A–F (black) Light Modules

Light Module Type	Lamp Number (ANSI)	Square D Replacement Lamps	
		Part Number	$ Price
KM1	GE44★	—	—
KM2	GE1490	2550101003	12.45
KM3	GE44★	—	—
KM4	GE1490	2550101003	12.45
KM5	GE44★	—	—
KM6	GE44★	—	—
KM7	GE44★	—	—
KM8	GE44★	—	—
KM9	GE755	2550101020	12.45
KM11	CMDK1A5	2550105014	33.00
KM12	CMDK1A5	2550105014	33.00
KM13	CMDK1A5	2550105014	33.00
KM14	CMDK1A5	2550105014	33.00
KM15	CMDK1A5	2550105014	33.00
KM21	SYL12PSB	2550105003	16.50
KM22	SYL12PSB	2550105003	16.50
KM23	SYL28PSB	2550105008	16.50
KM25	SYL120PSB	2550105005	16.50
KM31	SYL6PSB	2550105007	16.50
KM32	SYL12PSB	2550105003	16.50
KM34	SYL24PSB	2550105004	16.50
KM35	SYL28PSB	2550105008	16.50
KM36	SYL48PSB	2550105009	16.50
KM37	SYL60PSB	2550105010	16.50
KM38	SYL120PSB	2550105005	16.50

★ GE44 and GE755 are interchangeable (GE755 gives longer life). If a GE44 lamp is ordered, a GE755 (2550101020) will be substituted. For a replacement lamp in a current series light module see the light module listing on page 19-86.

Table 19.272: Repair Parts

Description	Part Number	$ Price
E10 Key	2941101100	9.90
Gray cap for KR11, KR12, SKR11, or SKR12	3105217001	13.80
Clear plastic top (only) for 9001K44 & SK44 Ring Nut	4487D63XI	7.95
Gasket for Type K and SK Push-Pull Knob	6509701801	1.95
Gasket for Plastic Illuminated Lens	6509701901	3.90
Gasket for Type K and SK selector switch knob	3105406401	1.95
Black Compensating Gasket (Type K and SK Operators	6509702001	3.90
Liner for Non-Illuminated Operators	6509704901	N/C
Locking Thrust Washer	6512231201	3.90
Nylon Spacer	6509705001	5.10
Locking Thrust Washer (Std. Type SK Operator)	6512240601	3.90
Push-Pull Mushroom Adapter▼	K54	N/C
Rubber Boot for Joystick	6512243201	7.20
Knob on Joysticks without latch	4458D20X3	12.90
Knob for SK Potentiometer	3105404408	10.65
Fingersafe™ Cover for 9001KM	6508804101	3.00

▼ Allows Type -20 and -21 mushroom color caps to be used on push-pull operators. Use of 9001K54 voids Type 6 rating.

Table 19.273: KU Replacement Ring Nuts (Threaded Inside and Out)

Used On	Part Number	$ Price
KU1 through KU8, KU27, KU37, KU47	3105204101	4.35
KU17, KU18	3105205901	10.65

Table 19.274: Interlock

For mechanically interlocking two push buttons so that only one button can be depressed at a time. A Type K3 attachment is furnished with the **9001 KR11, KR12, SKR11, SKR12, SKRU1** and **SKRU11** operators. However, these are maintained operators and the **K3** interlock serves to release one of the buttons when the other is depressed. When used with momentary contact buttons, the **K3** interlock **does not** hold the buttons in the depressed position. It simply prevents pushing both buttons at the same time.
The Type **K3** interlock is mounted behind the operators. Operators not included.

Type	$ Price
K3	28.65

Table 19.275: Screwdriver

Used to tighten mounting screws on contact blocks and light modules.

Type	$ Price
K69	35.50

Table 19.276: Wrenches

K95

K1

Where Used	Type	$ Price
For tightening ring nuts on 22 and 30 mm control units	K95	42.75
For tightening threaded protective caps	K1	71.40

NOTE: *For more information, see Instruction Bulletin No. 30072-100-10.*

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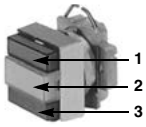
Table 19.277: Push Buttons—Single, with Contacts

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description	Button Color	Legend Marking	Contacts	Voltage	Type	$ Price
Non-Illuminated	Green	Start	1 N/O	—	KXRA133	**64.00**
	Red	Stop	1 N/C	—	KXRA134	**64.00**
	Amber	blank	2 C/O	—	KXRAAH2	**138.00**
	Green	blank	2 C/O	—	KXRAGH2	**138.00**
	Blue	blank	2 C/O	—	KXRALH2	**138.00**
Illuminated	Amber	blank	1 C/O	24	KXRB34AH1	**184.00**
	Green	blank	1 C/O	24	KXRB34GH1	**184.00**
	Red	blank	1 C/O	24	KXRB34RH1	**184.00**
	Amber	blank	1 C/O	110/120	KXRB1AH1	**217.00**
	Green	blank	1 C/O	110/120	KXRB1GH1	**217.00**
	Red	blank	1 C/O	110/120	KXRB1RH1	**217.00**

Table 19.278: Push Buttons—Dual, with Contacts

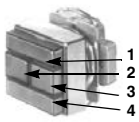
Description	Top Button (#1)	Lower Button (#2)	Contacts	Type	$ Price
Momentary	Start (Green)	Stop (Red)	2 C/O	KXRC111	**171.00**
Momentary	Start (Green)	Stop (Red)	1 N/O, 1 N/C	KXRC136	**129.00**
Momentary	Up (Green)	Down (Green)	2 N/O	KXRD140	**135.00**
Momentary	blank (Blue)	blank (Blue)	2 N/O	KXRDLLH7	**139.00**
Maintained▲	Start (Green)	Stop (Red)	1 C/O	KXRE115	**171.00**
Maintained ▲	On (Blue)■	Off (Blue)■	3 C/O	KXRELLH3	**273.00**
Maintained ▲	On (Blue)■	Off (Blue)■	3 C/O	KXRELLH3	**273.00**
Maintained ▲	On (Blue)■	Off (Blue)■	2 C/O	KXRELLH2	**277.00**



Pilot Light at
110–120 V, 50–60 Hz
Transformer

Table 19.279: Push Buttons—Dual with One Pilot Light and Contacts

Description	Top Button (#1)	Middle Lens (#2)	Lower Button (#3)	Contacts	Voltage	Type	$ Price
Momentary	Start (Green)	On (Red)	Stop (Red)	2 C/O	110/120	KXRG117	**314.00**
Momentary	Start (Green)	On (Red)	Stop (Red)	1 N/O, 1 N/C	110/120	KXRG137	**270.00**
Maintained ▲	Start (Green)	On (Red)	Stop (Red)	1 C/O	110/120	KXRJ119	**329.00**



Pilot Lights at
110–120 V, 50–60 Hz
Transformer

Table 19.280: Push Buttons—Dual with Two Pilot Lights and Contacts

Description	Top Button (#1)	Left Lens (#2)	Right Lens (#3)	Lower Button (#4)	Contacts	Voltage	Type	$ Price
Momentary	Start (Green)	On (Red)	Off (Green)	Stop (Red)	2 C/O	110/120	KXRL121	**485.00**
Momentary	Start (Green)	On (Red)	Off (Green)	Stop (Red)	1 N/O, 1 N/C	110/120	KXRL138	**441.00**
Momentary	Start (Green)	On (Red)	Off (Green)	Stop (Red)	2 C/O	24	KXRL34GRGRH2	**451.00**
Momentary	Start (Green)	On (Red)	Off (Green)	Stop (Red)	1 N/O, 1 N/C	24	KXRL34GRGRH37	**494.00**

▲ Maintained operators are mechanically interlocked
■ Text is vertical

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Table 19.281: Selector Switches—with Contacts

NOTE: *When ordering, add prefix 9001 to the catalog number.*

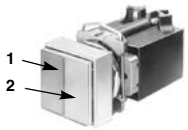
Description	Legend	Knob	Contacts			Type	$ Price
2-position, maintained	Off-On	Black	1	0		KXSA125	**99.00**
			0	1			
2-position, maintained	Off-On	Black	1	0		KXSA139	**78.00**
3-position, maintained	Hand-Off-Auto	Black	1	0	0	KXSD126	**99.00**
			0	0	1		

110–120 V, 50–60 Hz Transformer

Table 19.282: Pilot Lights

Description	Voltage	Lens 1*	Lens 2*	Lens 3*	Lens 4*	Type	$ Price
Single	24	Amber				KXPA35A	**125.00**
Single	24	Red				KXPA35R	**125.00**
Single	24	Green				KXPA35G	**125.00**
Single	24	White				KXPA35W	**125.00**
Single	110/120	Amber				KXPA1A	**153.00**
Single	110/120	Red				KXPA1R	**153.00**
Single	110/120	Green				KXPA1G	**153.00**
Single	110/120	White				KXPA1W	**153.00**
Dual	24	Amber	Amber			KXPB34AA	**219.00**
Dual	24	Red	Red			KXPB34RR	**219.00**
Dual	24	Green	Green			KXPB34GG	**219.00**
Dual	24	White	White			KXPB34WW	**219.00**
Dual	24	Red	Green			KXPB34RG	**219.00**
Dual	110/120	Amber	Amber			KXPB1AA	**278.00**
Dual	110/120	Red	Red			KXPB1RR	**278.00**
Dual	110/120	Green	Green			KXPB1GG	**278.00**
Dual	110/120	White	White			KXPB1WW	**278.00**
Dual	110/120	Red	Green			KXPB1RG	**278.00**
Quad	24	White	Amber	Green	Red	KXPC34WAGR	**552.00**
Quad	110/120	White	Amber	Green	Red	KXPC1WAGR	**552.00**
Quad	110/120	White	Blue	Green	Red	KXPC1WLGR	**552.00**

* Lenses are blank (no markings)



110–120 V, 50–60 Hz. Transformer

110–120 V, 50–60 Hz Transformer

Table 19.283: Potentiometers

Description	Power	Resistance	Type	Price
Single	2 W	3.2 kΩ	KXBB06	**287.00**
Single	2 W	5 kΩ	KXBB07	**287.00**
Single	2 W	10 kΩ	KXBB08	**287.00**
Tandem	2 W	5 kΩ / 5 kΩ	KXBD83	**399.00**

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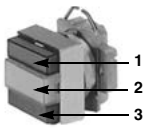
Table 19.284: Push Buttons—without Contacts ▲

***NOTE:** When ordering, add prefix 9001 to the catalog number.*

Push Button	Action	Lens Color (1)	Lens Color (2)	Type	Price
Single Push Button					
Non-Illuminated	Momentary	Amber	—	KXRAA	**38.60**
		Green	—	KXRAG	**38.60**
		Blue	—	KXRAL	**38.60**
		Red	—	KXRAR	**38.60**
		White	—	KXRAW	**38.60**
Illuminated 24 V	Momentary	Amber	—	KXRB35A	**125.00**
		Green	—	KXRB35G	**125.00**
		Blue	—	KXRB35L	**125.00**
		Red	—	KXRB35R	**125.00**
		White	—	KXRB35W	**125.00**
Illuminated 110/120 V	Momentary	Amber	—	KXRB38A	**125.00**
		Green	—	KXRB38G	**125.00**
		Blue	—	KXRB38L	**125.00**
		Red	—	KXRB38R	**125.00**
		White	—	KXRB38W	**125.00**
Dual Push Button					
Non-Illuminated	Momentary + Interlock	Green	Red	KXRCGR	**77.00**
		White	White	KXRCWW	**77.00**
		Green	Green	KXRCGG	**77.00**
	Maintained + Interlock	Green	Red	KXREGR	**120.00**
		White	White	KXREWW	**120.00**
		Green	Green	KXREGG	**120.00**

Table 19.285: Dual Push Button with Pilot Light—without Contacts ▲



Action	Voltage	Lens Color (1)	Lens Color (2)	Lens Color (3)	Lens Color (4)	Type	Price
With One Pilot Light							
Momentary	24 Vac/dc	Red	White	Green	—	KXRG35RWG	**188.00**
	24 Vac/dc	Green	White	Green	—	KXRG35GWG	**188.00**
	110/120 Vac/dc	Red	White	Green	—	KXRG38RWG	**188.00**
	110/120 Vac/dc	Green	White	Green	—	KXRG38GWG	**188.00**
Momentary + Interlock	24 Vac/dc	Red	White	Green	—	KXRH35RWG	**221.00**
	24 Vac/dc	Green	White	Green	—	KXRH354GWG	**221.00**
	110/120 Vac/dc	Red	White	Green	—	KXRH38RWG	**221.00**
	110/120 Vac/dc	Green	White	Green	—	KXRH38GWG	**221.00**
Maintained + Interlock	24 Vac/dc	Red	White	Green	—	KXRJ35RWG	**243.00**
	24 Vac/dc	Green	White	Green	—	KXRJ35GWG	**243.00**
	110/120 Vac/dc	Red	White	Green	—	KXRJ38RWG	**243.00**
	110/120 Vac/dc	Green	White	Green	—	KXRJ38GWG	**243.00**
With Two Pilot Lights							
Momentary	24 Vac/dc	Red	White	White	Green	KXRL35RWWG	**324.00**
	24 Vac/dc	Red	Red	Green	Green	KXRL35GGRR	**324.00**
	110/120 Vac/dc	Red	White	White	Green	KXRL38RWWG	**324.00**
	110/120 Vac/dc	Red	Red	Green	Green	KXRL38GGRR	**324.00**
Momentary + Interlock	24 Vac/dc	Red	White	White	Green	KXRM35RWWG	**368.00**
	24 Vac/dc	Red	Red	Green	Green	KXRM35RRGG	**368.00**
	110/120 Vac/dc	Red	White	White	Green	KXRM38RWWG	**368.00**
	110/120 Vac/dc	Red	Red	Green	Green	KXRM38RRGG	**368.00**

▲ Order contact blocks separately (See Table 19.287 on Page 19-97)

Accessories . . . . . Page 19-99

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Table 19.286: Selectors—without Contacts ▲

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Description		Voltage	Knob Color	Type	$ Price
2-Position, Maintained	Non-Illuminated	—	Black	KXSAEB	**53.00**
	Illuminated	24 Vac/dc	Red	KXSJE35R	**138.00**
	Illuminated	24 Vac/dc	Green	KXSJE35G	**138.00**
	Illuminated	24 Vac/dc	White	KXSJE35W	**138.00**
	Illuminated	120 Vac/dc	Red	KXSJE38R	**138.00**
	Illuminated	120 Vac/dc	Green	KXSJE38G	**138.00**
	Illuminated	120 Vac/dc	White	KXSJE38W	**138.00**
	Key (Withdraw L)	—	N/A	KXSRE1	**140.00**
	Key (Withdraw R)	—	N/A	KXSRE2	**138.00**
	Key (Withdraw Both)	—	N/A	KXSRE3	**138.00**
3-Position, Maintained	Non-Illuminated	—	Black	KXSDCB	**53.00**
	Key (Withdraw C)	—	N/A	KXSVC5	**138.00**
	Key (Withdraw All)	—	N/A	KXSVC10	**138.00**
4-Position, Maintained	Non-Illuminated	—	Black	KXSHHB	**58.00**

▲ Order contacts separately (See Table 19.287)

Table 19.287: Contact Blocks—Purchase Separately

	Description	Type	$ Price
(Clear Cover)	1 N/O, 1 N/C	KA1	**42.80**
(Green Cover)	1 N/O	KA2	**21.50**
(Red Cover)	1 N/C	KA3	**21.50**
(Clear Cover)	1 N/C, 1 N/O (Early Make)	KA4	**42.80**
(Red Cover)	1 N/C (Late Break)	KA5	**21.50**
(Green Cover)	1 N/O (Early Make)	KA6	**21.50**

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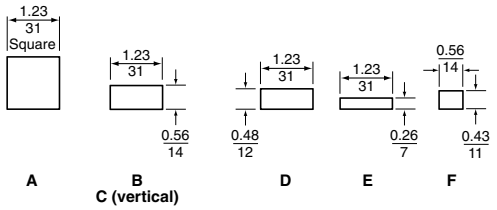
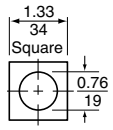
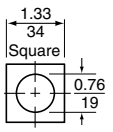
NOTE: When ordering, add prefix 9001 to the catalog number.

Table 19.288: Legend Plates for Push Buttons or Pilot Lights

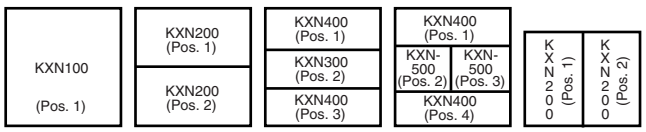
Marking	Used On						$ Price
	 A B C (vertical) D E F						
	A	B	C	D	E	F	
	KXRA, KXRB KXRN, KXRP KXPA, KXPC KXTA, KXTB KXTE	KXRC, KXRD KXRE, KXRF	KXPB KXTD ♦	KXRG, KXRH KXRJ, KXRK▲	KXRG, KXRH KXRJ, KXRK KXRL, KXRM KXTC ■	KXRL, KXRM KXTC ▲	
Blank	KXN100	KXN200	KXN200	KXN300	KXN400	KXN500	4.40
Start	KXN101	KXN201	KXN201V	KXN301	KXN401	KXN501	
Stop	KXN102	KXN202	KXN202V	KXN302	KXN402	KXN502	
On	KXN103	KXN203	KXN203V	KXN303	KXN403	KXN503	
Off	KXN104	KXN204	KXN204V	KXN304	KXN404	KXN504	
Emerg. Stop	KXN105	KXN205	KXN205V	KXN305	KXN405	KXN505	
Forward	KXN106	KXN206	KXN206V	KXN306	KXN406	KXN506	
Reverse	KXN107	KXN207	KXN207V	KXN307	KXN407	KXN507	
Close	KXN108	KXN208	KXN208V	KXN308	KXN408	KXN508	
Open	KXN109	KXN209	KXN209V	KXN309	KXN409	KXN509	
Down	KXN110	KXN210	KXN210V	KXN310	KXN410	KXN510	
Up	KXN111	KXN211	KXN211V	KXN311	KXN411	KXN511	
Jog	KXN118	KXN218	KXN218V	KXN318	KXN418	KXN518	
Reset	KXN123	KXN223	KXN223V	KXN323	KXN423	KXN523	
Run	KXN124	KXN224	KXN224V	KXN324	KXN424	KXN524	
Cycle Start	KXN132	KXN232	KXN232V	KXN332	KXN432	KXN532	
Motor Run	KXN136	KXN236	KXN236V	KXN336	KXN436	KXN536	
Power On	KXN138	KXN238	KXN238V	KXN338	KXN438	KXN538	
Special-Marking	KXN199	KXN299	KXN299V	KXN399	KXN499	KXN599	18.50

▲ These legend inserts are for the pilot lights in the center of the operator.
■ These legend inserts are for the push button portion of the operator.
♦ These legend inserts have vertical printing.

Table 19.289: Legend Plates for Selector Switches

Marking	Used On		$ Price
	 KXN-600	 KXN-700	
	KXSA, KXSB, KXSC, KXSD, KXSE, KXSF, KXSG, KXSH, KXSJ, KXSK, KXSL, KXSM, KXSN, KXSO, KXSP, KXSQ	KXSR, KXSS, KXST, KXSV, KXSW, KXSX, KXSY, KXSZ	
Blank	KXN600	KXN700	4.40
For.-Rev.	KXN639	KXN739	
Hand-Auto	KXN640	KXN740	
Man-Auto	KXN643	KXN743	
Off-On	KXN644	KXN744	
On-Off	KXN645	KXN745	
Open-Close	KXN646	KXN746	
Start-Stop	KXN651	KXN751	
Auto-Off-Hand	KXN658	KXN758	
Hand-Off-Auto	KXN660	KXN760	
Man-Off-Auto	KXN662	KXN762	
Special Marking	KXN699	KXN799	18.50

Dual Dimensions: **INCHES** Millimeters



KXRA, KXRB KXRN, KXRP KXPA, KXPC KXTA, KXTB | KXRC, KXRD KXRE, KXRF | KXRG, KXRH KXRJ, KXRK | KXRL, KXRM KXTC | KXPB, KXTD

Table 19.290: Letter Height For Standard Legends

	in.	mm
KXN100	1/4	6
KXN200	3/16	4.75
KXN300	3/16	4.75
KXN400	3/16	4.75
KXN500	3/16	4.75
KXN600	1/8	3
KXN700	1/8	3

Table 19.291: Maximum Number of Lines and Characters For Type KXN Legend Inserts

Letter Height		Number of …	KXN199	KXN299 Horizontal	KXN299 Vertical	KXN399	KXN499	KXN599
in.	mm							
1/4	6	Characters per Line	7	7	3	7	7	3
		Lines per Legend Insert	4	2	4	1	1	1
3/16	4.75	Characters per Line	9	9	4	9	9	4
		Lines per Legend Insert	5	2	6	2	1	2
1/8	3	Characters per Line	14	14	5	14	14	6
		Lines per Legend Insert	8	4	9	3	2	3

Table 19.292: Maximum Number of Lines and Characters for Type KXN699 and KXN799 Legend Plates

Position	Letter Height		Characters Per Marking Area	
	in.	mm	A and C	B
	3/16	4.75	6	6
	1/8	3	8	9
	3/16	4.75	10	5
	1/8	3	13	7

All Type KX push buttons and pilot lights have a blank insert as standard. These blank inserts can be custom marked using a marking pen, a mechanical lettering set, press letters, or a tape lettering machine that marks a tape which can then be transferred to the blank insert.

To have legend inserts installed into the operators, order the operator as normal and then indicate where to install the legend inserts using the numbered positions shown on the operator ordered.

Example:
9001KXRL1GRGRH2 with a
9001KXN 401 in position 1
9001KXN 503 in position 2
9001KXN 504 in position 3
9001KXN 402 in position 4

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Table 19.293: Closing Plate

	Type	$ Price
UL Types 4, 13/NEMA 4, 13 Square Closing Plate (Chrome Plated) Same size as KX bezel	KXAK52	**14.30**

Table 19.294: Boots

	For Use On	Type	$ Price
	All KX** push buttons and pilot lights	KXAKU7	**28.70**
	All KX** selector switches and potentiometers	KXAKU17B	**42.80**

Table 19.295: Shrouds

	Description	For Use On	Color	Type	$ Price
	Full Shroud	All push buttons and pilot lights	Red	KXAK41R	**7.20**
			Black	KXAK41B	**7.20**
	Short Shroud	Any KX operator	Red	KXAK40R	**7.20**
			Black	KXAK40B	**7.20**

Table 19.296: Lamp and Lens Removal Kit

	Type	$ Price
Used to remove lamp and lens on all illuminated operators and pilot lights.	KXALLRT	**21.50**

__NOTE:__ When ordering, add prefix 9001 to the catalog number.

Table 19.297: Button Covers

Description	For Use On	Color	Type	Code	$ Price
Includes 2-KXN200	KXPB KXTD	Red Green Amber Blue White	KXAC28▲ KXAC28▲ KXAC28▲ KXAC28▲ KXAC28▲	R■ G■ A■ L■ W■	**9.90**
Includes KXN400	KXTC (Position 1 & 4)	Red Green Amber Blue White	KXAR4 KXAG4 KXAA4 KXAL4 KXAW4	R G A L W	**9.90**
Includes KXN500	KXTC (Position 2 & 3) ó	Red Green Amber Blue White	KXAR5 KXAG5 KXAA5 KXAL5 KXAW5	R G A L W	**9.90**
Includes 1–KXN100	KXPC	Red Green Amber Blue White	KXAC48♦ KXAC48♦ KXAC48♦ KXAC48♦ KXAC48♦	R★ G★ A★ L★ W★	**9.90**
Includes KXN100	KXRA KXRB	Red Green Amber Blue White	KXAR1 KXAG1 KXAA1 KXAL1 KXAW1	R G A L W	**6.60**
Includes KXN100	KXRN KXRP	Red Green Amber Blue White	KXARM1 KXAGM1 KXAAM1 KXALM1 KXAWM1	R G A L W	**17.10**
▼ Includes KXN200	KXRC KXRD KXRE KXRF	Red Green Amber Blue White	KXAR2 KXAG2 KXAA2 KXAL2 KXAW2	R G A L W	**9.90**
Includes KXN300	KXRG (Position 2) KXRH (Position 2) KXRJ (Position 2) KXRK (Position 2)	Red Green Amber Blue White	KXAR3 KXAG3 KXAA3 KXAL3 KXAW3	R G A L W	**9.90**
Includes KXN400	KXRG (Position 1 & 3) KXRH (Position 1 & 3) KXRJ (Position 1 & 3) KXRK (Position 1 & 3) KXRL (Position 1 & 4) KXRM (Position 1 & 4)	Red Green Amber Blue White	KXAR4 KXAG4 KXAA4 KXAL4 KXAW4	R G A L W	**9.90**
Includes KXN500	KXRL (Position 2 & 3) KXRM (Position 2 & 3)	Red Green Amber Blue White	KXAR5 KXAG5 KXAA5 KXAL5 KXAW5	R G A L W	**9.90**
Includes KXN100	KXPA	Red Green Amber Blue White	KXAR8 KXAG8 KXAA8 KXAL8 KXAW8	R G A L W	**9.90**
Includes KXN100	KXTA KXTB	Red Green Amber Blue White	KXAR1 KXAG1 KXAA1 KXAL1 KXAW1	R G A L W	**9.90**

▲ Each KXAC28 includes a clear cover and 1 each of all colors. If the same color is required for position #1and #2 of the KXPB operator, order 2 of Type KXAC28.

■ When specifying color codes—the first will be installed in #1 and the second in #2. The price for BOTH color codes is **$6.60**.

♦ Each KXAC48 includes a clear cover and 1 each of all colors. If the same color is required for position #1and #2 of the KXPC operator, order 2 of Type KXAC48.

★ When specifying color codes—the first will be installed in #1, the second in #2, the third in #3 and the fourth in #4. The price for ALL FOUR color codes is **$6.60**.

▼ Two required per operator. When ordering an assembled operator—specify two code numbers.The first code will be assembled into #1 and the second code will be assembled into #2.

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XALD101H29H7

XALK174H7

XALD211H29H7

XALD321H29H7

Table 19.298: Start or Stop Function
Polycarbonate; Light gray base, RAL7035; Dark gray lid, RAL7016

Description	Type of Push	Type of Contact		Marking	Catalog Number	$ Price
		N.O.	N.C.			
Marking on Legend Holder						
1 momentary push button	Flush black	1	—	Start	XALD101H29H7	**73.00**
	Flush red	—	1	Stop	XALD111H29H7	**73.00**
Marking on Legend Holder						
1 mushroom head push button Ø 40 mm, momentary	Red	—	1	Stop on red legend	XALD164H29H7	**84.00**

Table 19.299: Emergency Stop or Emergency Off Function
Polycarbonate; Light gray base, RAL7035; Yellow lid, RAL1012

Description	Type	Type of Contact		Catalog Number	$ Price
		N.O.	N.C.		
1 mushroom head push button Ø 40 mm, red Turn-to-release	Standard ▲	—	1	XALK174H7	**117.00**
	Trigger action ■	—	1	XALK178H7	**147.00**
1 mushroom head push button Ø 40 mm, red Key release (Key No. 455)	Standard ▲	—	1	XALK184H7	**147.00**
	Trigger action ■	—	1	XALK188H7	**147.00**
1 mushroom head push button Ø 40 mm, red Push-pull	Standard ▲	—	1	XALK194H7	**99.00**

▲ Emergency Off (IEC 60364-5-53)
■ Emergency Stop (EN / IEC 13850)

Table 19.300: Start-Stop Function
Polycarbonate; Light gray base, RAL7035; Dark gray lid, RAL7016

Description	Type of Push	Type of Contact		Text	Catalog Number	$ Price
		N.O.	N.C.			
2 momentary push buttons	1 flush black	1	—	Start	XALD211H29H7	**73.00**
	1 flush red	—	1	Stop		
	1 flush black	1	—	Forward	XALD251H29H7	**73.00**
	1 flush black	1	—	Reverse		

Table 19.301: Three Function
Polycarbonate; Light gray base, RAL7035; Dark gray lid, RAL7016

Description	Type of Push	Type of Contact		Text	Catalog Number	$ Price
		N.O.	N.C.			
3 momentary push buttons (no markings)	1 flush black 1 flush red 1 flush black	1	—	Open	XALD351H29H7	**143.00**
		—	1	Stop		
		1	—	Close		
		1	—	Forward	XALD311H29H7	**143.00**
		—	1	Stop		
		1	—	Reverse		
		1	—	Up	XALD321H29H7	**143.00**
		—	1	Stop		
		1	—	Down		

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XALD02H7

Table 19.302: Empty Enclosures ▲

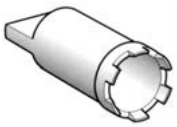
Polycarbonate

Description	Number of Holes	Catalog Number	$ Price
For normal environments, CSA approved and UL Listed (with stainless steel lid mounting screws)			
Light gray base RAL7035 Dark gray lid RAL7016	1	XALD01H7	**32.80**
	2	XALD02H7	**38.20**
	3	XALD03H7	**49.00**
	4	XALD04H7	**71.00**
	5	XALD05H7	**87.00**
Light gray base RAL7035 Yellow lid RAL1012	1	XALK01H7	**35.40**

ZENL1111

ZALV••

ZB5SZ3



ZB5AZ905

XAPA1100

XAPA1104

Table 19.303: Electrical Block and Accessories (for mounting on metal plate at back of enclosure) ▲

Description	Type	Color	Catalog Number	$ Price
Electrical blocks with screw clamp terminal connections				
Metal-plate-mounting contact blocks	N.O. contact	—	ZENL1111	**16.60**
	N.C. contact	—	ZENL1121	**16.40**
Light blocks with Protected LED™	24 Vac/Vdc	White	ZALVB1	**52.00**
		Green	ZALVB3	
		Red	ZALVB4	
		Yellow	ZALVB5	
		Blue	ZALVB6	
	120 Vac	White	ZALVG1	**52.00**
		Green	ZALVG3	
		Red	ZALVG4	
		Yellow	ZALVG5	
		Blue	ZALVG6	
	230 Vac	White	ZALVM1	**52.00**
		Green	ZALVM3	
		Red	ZALVM4	
		Yellow	ZALVM5	
		Blue	ZALVM6	

▲ For customer assembly using XB5 operators and standard screw-terminal contact blocks, see Push Buttons—ZB5 22 mm starting on page 19-45. Either mounting method can be used: contact block ZENL mounting on metal plate, or contact block ZBE mounting on operator with mounting collar.

Table 19.304: Accessories for electrical blocks

Description	Application	Catalog Number	$ Price
Blanking plug	Ø 22 mm units	ZB5SZ3	**11.00**
Nut	Head mounting	ZB5AZ901	**4.40**
Grounding terminal	Grounding	XALZ09	**5.40**
Key	For tightening nut	ZB5AZ905	**12.40**

Table 19.305: Undrilled Enclosures, Glass-Reinforced Polyester

Type		H x W Dimensions IN	H x W Dimensions mm	Catalog Number	$ Price
NEMA 4, 4X, 13 Usable depth 3.27 in. (83 mm)	Without hinges	3.34 x 5.75	85 x 146	XAPA1100	**110.00**
		3.34 x 8.90	85 x 226	XAPA2100	**180.00**
		5.95 x 9.49	151 x 241	XAPA3100	**284.00**
	With hinges	5.95 x 9.49	151 x 241	XAPA4100	**378.00**
Undrilled Grounding Plate	Sheet steel with ground screw	For XAPA1100		XAPZ100	**22.00**
		For XAPA2100		XAPZ200	**24.60**
		For XAPA3100 and 4100		XAPZ300	**32.00**

Table 19.306: Drilled Insulated Enclosures, Glass-Reinforced Polyester ■

Type	Number of Knockouts 22 mm	Number of Rows Vertical	Number of Rows Horizontal	H x W Dimensions IN	H x W Dimensions mm	Catalog Number	$ Price
NEMA 4, 4X, 13 Usable depth 3.27 in. (83 mm) 1.58 in. (40 mm) centerline spacing of holes	1	1	1	3.35 X 5.75	85 X 146	XAPA1110	**114.00**
	2	1	2	3.35 X 5.75	85 X 146	XAPA1120	**114.00**
	4	2	2	3.35 X 5.75	85 X 146	XAPA1104	**114.00**
	8	2	4	3.35 X 8.90	85 X 226	XAPA2108	**182.00**
	16	4	4	5.94 X 9.49	151 X 241	XAPA3116	**390.00**
Drilled Grounding Plate		Sheet steel with ground screw		For XAPA1110		XAPZ110	**22.00**
				For XAPA1120		XAPZ120	**22.00**
				For XAPA1104		XAPZ104	**22.00**
				For XAPA2108		XAPZ208	**24.60**
				For XAPA3116		XAPZ316	**32.00**

■ Uses standard XB5 products from pages 19-42 through 19-62. Do not use ZENL style contact blocks.

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XAPG39400

Table 19.307: Undrilled Die Cast Enclosures (Painted Gray RAL7032)

Type	Material	Usable Depth		H x W x D Dimensions		Catalog Number	$ Price
		IN	mm	IN	mm		
NEMA 4, 13	Zinc	1.93	49	3.15 x 3.15 x 2.03	80 x 80 x 51.5	XAPG19100	**110.00**
				5.12 x 3.15 x 2.03	130 x 80 x 51.5	XAPG29100	**120.00**
				6.89 x 3.15 x 2.03	175 x 80 x 51.5	XAPG39100	**142.00**
		2.93	74.5	3.15 x 3.15 x 3.03	80 x 80 x 77	XAPG19400	**110.00**
				5.12 x 3.15 x 3.03	130 x 80 x 77	XAPG29400	**120.00**
				6.89 x 3.15 x 3.03	175 x 80 x 77	XAPG39400	**142.00**
				8.66 x 3.15 x 3.03	220 x 80 x 77	XAPG49400	**174.00**
	Aluminum	2.93	2.93	12.20 x 3.35 x 3.03	310 x 85 x 77	XAPG59400	**262.00**

XAPG29703

XAPE302

Table 19.308: Drilled Die Cast Enclosures (Painted Gray RAL7032) ▲

Type	Material	Usable Depth		Number of 22 mm holes	H x W x D Dimensions		Catalog Number	$ Price
		IN	mm		IN	mm		
NEMA 4, 13 1.18 in. (30 mm) centerline spacing of holes for horizontal mount	Zinc	1.93	49	2	3.15 x 3.15 x 2.03	80 x 80 x 51.5	XAPG19702	**120.00**
				3	5.12 x 3.15 x 2.03	130 x 80 x 51.5	XAPG29703	**142.00**
				4	6.90 x 3.15 x 2.03	175 x 80 x 51.5	XAPG39704	**174.00**
		2.93	74.5	2	3.15 x 3.15 x 3.03	80 x 80 x 77	XAPG19802	**120.00**
				3	5.12 x 3.15 x 3.03	130 x 80 x 77	XAPG29803	**142.00**
				4	6.90 x 3.15 x 3.03	175 x 80 x 77	XAPG39804	**174.00**
NEMA 4, 13 1.58 in. (40 mm) centerline spacing of holes for vertical mount	Zinc	1.93	1.93	1	3.15 x 3.15 x 2.03	80 x 80 x 51.5	XAPG19201	**110.00**
				2	5.12 x 3.15 x 2.03	130 x 80 x 51.5	XAPG29202	**120.00**
				3	6.90 x 3.15 x 2.03	175 x 80 x 51.5	XAPG39203	**142.00**
		2.93	74.5	1	3.15 x 3.15 x 3.03	80 x 80 x 77	XAPG19501	**110.00**
				2	5.12 x 3.15 x 3.03	130 x 80 x 77	XAPG29502	**120.00**
				3	6.90 x 3.15 x 3.03	175 x 80 x 77	XAPG39503	**142.00**
				4	8.66 x 3.15 x 3.03	220 x 80 x 77	XAPG49504	**174.00**
	Aluminum	2.93	74.5	5	12.20 x 3.35 x 3.03	310 x 85 x 77	XAPG59505	**268.00**

▲ Can use either XB4 or XB5 products.

XAPE303

Table 19.309: Drilled Flush Plates ■

Type	Material	Number of 22 mm holes	H x W x D Dimensions		Catalog Number	$ Price
			IN	mm		
NEMA 4, 13 1.18 in. (30 mm) centerline spacing of holes	Anodized Aluminum	1	2.83 x 2.83	72 x 72	XAPE301	**52.00**
		2	4.13 x 2.83	105 x 72	XAPE302	**60.00**
		3	5.43 x 2.83	138 x 72	XAPE303	**68.00**
		4	6.73 x 2.83	171 x 72	XAPE304	**82.00**
		5	8.03 x 2.83	204 x 72	XAPE305	**98.00**

■ Can use either XB4 or XB5 products.

Table 19.310: Optional Back Box (for finger protection, if required)

Type	Material	For Use With	Catalog Number	$ Price
Protective rear covers	Insulating Fiberglass	Flush plate XAPE301	XAPE901	**32.80**
		Flush plate XAPE302	XAPE902	
		Flush plate XAPE303	XAPE903	
		Flush plate XAPE304	XAPE904	
		Flush plate XAPE305	XAPE905	**60.00**

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NEMA 1
Surface Mounting
Type BG201

NEMA 1
Flush Mounting
(w/o pullbox)
Type BF201

NEMA 4
Type BW243

NEMA 7 and 9
Type BR103

Table 19.311: Control Stations

NOTE: *When ordering, add prefix 9001 to the catalog number.*

No. of Buttons	Nameplate Markings and Features	Contact Symbol ▲	Surface Mounting NEMA1		Stainless Steel Flush Plate ■		Watertight and Dusttight NEMA4		For Hazardous Locations NEMA 7 & 9 ♦	
			Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
1	Start	1	BG101	**86.00**	BF101	**116.00**	BW146	**270.00**	BR101	**363.00**
	Stop	3	BG102	**86.00**	BF102	**116.00**	BW147	**270.00**	—	—
	Stop (Mushroom Button)	3	BG103	**99.00**	—	—	BW151	**287.00**	BR103	**378.00**
	Stop (Lockout)	3	BG104	**129.00**	—	—	BW148	**270.00**	BR104	**363.00**
	Universal (w/o legend insert)	16	BG107	**83.00**	BF107	**111.00**	BW159	**269.00**	BR107	**360.00**
	Off-On (Selector Switch)	19	BG111	**86.00**	—	—	—	—	—	—
	Hand-Off-Auto (Selector Switch)	17	BG112	**86.00**	—	—	—	—	—	—
	Universal Selector Switch (w/o legend insert)	19 or 17	BG114	**83.00**	—	—	—	—	—	—
2	Start-Stop	145	BG201	**86.00**	BF201	**116.00**	BW240	**270.00**	BR204	**363.00**
	Start-Stop (for latching Applications)	146	BG202	**107.00**	—	—	BW252	**270.00**	BR202	**363.00**
	Start-Stop (Mushroom on Stop)	145	BG203	**99.00**	—	—	BW250	**287.00**	BR203	**378.00**
	Start-Stop (Lockout on Stop)	145	BG204	**129.00**	—	—	BW241	**270.00**	BR204	**363.00**
	Start-Stop (Mushroom on both)	145	BG205	**116.00**	—	—	BW246	**300.00**	BR205	**392.00**
	Forward-Reverse	146	BG206	**107.00**	—	—	BW242	**270.00**	—	—
	Open-Close	146	BG207	**107.00**	—	—	BW244	**270.00**	—	—
	Up-Down	146	BG208	**107.00**	BF208	**135.00**	BW243	**270.00**	BR208	**363.00**
	Raise-Lower	146	BG209	**107.00**	—	—	BW253	**270.00**	—	—
	On-Off	145	BG210	**86.00**	BF210	**116.00**	BW245	**270.00**	—	—
	On-Off	146	BG211	**107.00**	BF211	**135.00**	BW254	**270.00**	—	—
	Universal (w/o legend inserts)	25	BG214	**78.00**	—	—	BW260	**264.00**	BR214	**356.00**
	Start-Stop (Maintained Contact)	10	BG215	**129.00**	BF215	**158.00**	BW255	**314.00**	BR215	**405.00**
	On -Off (Maintained Contact)	10	BG216	**129.00**	BF216	**158.00**	BW256	**314.00**	BR216	**405.00**
	Universal (Maintained contact w/o legend inserts)	10	BG218	**122.00**	—	—	—	—	BR218	**399.00**
3	Fast-Slow-Stop	109	BG301	**171.00**	—	—	—	—	—	—
	Forward-Reverse-Stop	109	BG302	**171.00**	—	—	—	—	—	—
	Opn-Close-Stop	109	BG303	**171.00**	BF303	**207.00**	—	—	—	—
	Raise-Lower-Stop	109	BG304	**171.00**	—	—	—	—	—	—
	Up-Down-Stop	109	BG305	**171.00**	BF305	**207.00**	—	—	—	—
	Start-Jog-Stop	109	BG316	**171.00**	—	—	—	—	—	—
	Universal (w/o legend inserts)	8	BG307	**162.00**	—	—	—	—	—	—
	Start-Stop, Red Pilot Light: 120Vac/dc	145 & 121	BG308	**314.00**	BF308	**342.00**	—	—	—	—

▲ See Table 19.314 on page 19-104.
■ Uses standard 2.0 or 2.13 in. deep wall boxes, single gang for Types BF1 and BF2, two gang for Type BF3
♦ Also rated for Class I, Division I and II, Groups B, C, or D; Class II, Division I and II, Groups E, F, or G

Table 19.312: Accessories

Description	Color	Type	$ Price
Mushroom Caps for NEMA 1	Red	B301	**14.30**
Mushroom Caps for NEMA 4	Red	B303	**14.30**
Lockout Kit for NEMA 1	—	B321	**42.80**
Pilot Light Lenses, NEMA 1 Surface Mount	Red	B331	**10.70**
Pilot Light Lenses, NEMA 1 Surface Mount	Green	B332	**10.70**
Pilot Light Lenses, NEMA 1 Flush Mount	Red	B341	**10.70**
Pilot Light Lenses, NEMA 1 Flush Mount	Green	B342	**10.70**
Replacement Covers for BW240 ▼	—	BWD219	**17.90**
Replacement Covers for BW241 ★▼	—	BWD220	**35.60**
Replacement Covers for BW242-BW260 ▼	—	BWD219	**17.90**

★ Includes factory installed lockout on the cover.
▼ Replacement case/covers are not avaiulable for Type BR devices.

Table 19.313: Interchangeable Push Button Legend Inserts

Marking	For NEMA 1 Surface Mount	For NEMA 4 or 7/9 Lever Type	For NEMA 4 Round Button	For NEMA4 Mushroom Button	$ Price
Start	B101	B161	B259	B282	**3.60**
Stop	B102	B162	B260	B283	**3.60**
Fast	B103	—	—	—	**3.60**
Slow	B104	—	—	—	**3.60**
Forward	B105	—	B255	—	**3.60**
Reverse	B106	—	B256	—	**3.60**
Open	B107	—	B263	—	**3.60**
Close	B108	—	B264	—	**3.60**
Raise	B109	—	B261	—	**3.60**
Lower	B110	—	B262		**3.60**
Up	B111	—	B253	B276	**3.60**
Down	B112	—	B254	B277	**3.60**
On	B115	B175	B257	—	**3.60**
Off	B116	B176	B258	—	**3.60**
Hand	B117	—	B265	—	**3.60**
Auto	B118	—	B266	—	**3.60**
Jog	B119	—	—	—	**3.60**
Blank (Black)	B129	B189	B251	B251	**3.60**
Blank (Red)	B129R	B189R	B252	B252	**3.60**

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Electrical Contact Ratings . . . . . page 19-104

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Type BGC214

(Type BGC contact block assemblies include cover.)

Type BGB214

BOC361

Table 19.314: Replacement Interiors For Type B Standard Duty Push Button Stations

NOTE: *When ordering, add prefix 9001 to the catalog number.*

For Control Station Types	Contact Symbol	Contact Block Assembly ▲ Type	$ Price	Terminal Block Wiring Receptacle Type	$ Price
BF101–BF107	16	BOC107	**39.20**	BFB107	**42.80**
BF111–BF114	19 or 17	BOC114	**39.20**	BFB114	**42.80**
BF121–BF123	121	BOC123	**147.00**	BFB123	**42.80**
BF201–BF214	25	BOC214	**35.60**	BFB214	**42.80**
BF215–BF218	10	BOC218	**78.00**	BFB214	**42.80**
BF221–BF224	7 or 19 & 121	BOC224	**234.00**	BFB224	**64.00**
BF225–BF226	17 or 19 & 16	BOC226	**57.00**	BFB226	**64.00**
BF301–BF307	8	BOC214 & BOC107	**35.60** **39.20**	BFB214 & BFB107	**42.80** **42.80**
BF308–BF309	25 & 121	BOC214 & BOC123	**35.60** **147.00**	BFB214 & BFB123	**42.80** **42.80**
BF310–BF313	10 & 121	BOC218 & BOC123	**78.00** **147.00**	BFB214 & BFB123	**42.80** **42.80**
BF314–BF315	17 or 19 & 25	BOC214 & BOC114	**35.60** **39.20**	BFB214 & BFB114	**42.80** **42.80**
BG101–BG107	16	BGC107	**39.20**	BGB107	**42.80**
BG111–BG114	17 or 19	BGC114	**39.20**	BGB114	**42.80**
BG121–BG123	121	BGC123	**147.00**	BGB123	**42.80**
BG201–BG214	25	BGC214	**35.60**	BGB214	**42.80**
BG215–BG218	10	BGC218	**78.00**	BGB214	**42.80**
BG221–BG224	17 or 19 & 121	BGC224	**234.00**	BGB224	**64.00**
BG225–BG226	17 or 19 & 16	BGC226	**57.00**	BGB226	**64.00**
BG301–BG307 BG316–BG326	8	BGC307	**39.20**	BGB307	**57.00**
BG308–BG309	25 & 121	BGC309	**212.00**	BGB309	**86.00**
BG310–BG313	10 & 121	BGC313	**242.00**	BGB309	**86.00**
BG314–BG315	17 or 19 & 25	BGC315	**75.00**	BGB315	**86.00**
BR101–BR107	16	BOC107	**39.20**	BFB107	**42.80**
BR202–BR214	25	BOC214	**35.60**	BFB214	**42.80**
BR215–BR219	10	BOC218	**78.00**	BFB214	**42.80**
BW101–BW107	16	BOC107	**39.20**	BFB107	**42.80**
BW202–BW214	25	BOC214	**35.60**	BFB214	**42.80**
BW215–BW218	10	BOC218	**78.00**	BFB214	**42.80**
BW146–BW159	16	BOC360	**126.00**		
BW240–BW260	25	BOC361	**126.00**		
BW255–BW258	10	BOC362	**126.00**		

Note: Contact block assemblies for all Type BG stations include cover and contact block. Replacement contact block assemblies and terminal block wiring receptacles for push buttons have provision for 1 N.O. & 1 N.C. circuit on each button. Unneeded circuits need not be wired.

▲ Order separate legend plates, if required, from listing on page 19-103.

C-Shaped Mounting Bracket for 9001BR Interior	
Catalog Number	$ Price
3110112001	**8.70**

Table 19.315: Electrical Contact Ratings ■

AC—NEMA B600							DC—NEMA P600		
Volts	Inductive 35% Power Factor					Resistive 75% Power Factor	Volts	Inductive and Resistive	
	Make		Break		Continuous Carrying Amperes	Make, Break and Continuous Carrying Amperes		Make and Break Amperes	Continuous Carrying Amperes
	A	VA	A	VA					
120	30.5	3600	3.75	360	5	5	120	1.1	5
240	15	3600	1.5	360	5	5	240	0.55	5
480	7.5	3600	.75	360	5	5	600	0.2	5
600	6	3600	.6	360	5	5			

■ OSHA Regulation, Section 1910.70, Overhead and Gantry Cranes, limits the voltage of pendant push buttons to 150 Vac or 300 Vdc.

Contact Symbols

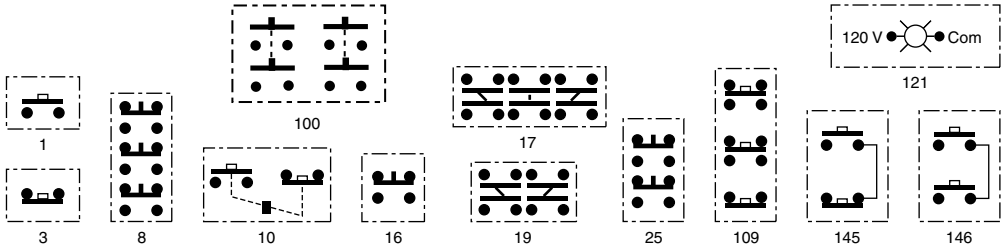

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Table 19.316: Empty Enclosures (for Customer Assembly)

NOTE: When ordering, add prefix 9001 to the catalog number.

UL Types 1, 3 and 13/ NEMA 1, 3, and 13	UL Types 1, 3, 4 and 13/ NEMA 1, 3, 4 and 13	UL Types 1, 3, 4, 4X and 13/ NEMA 1, 3, 4, 4X and 13

No of Holes	Sheet Steel		Die Cast Zinc		Stainless Steel (304)		Polymeric (Plastic)	
	Type	$ Price	Type	$ Price	Type	$ Price	Type	$ Price
1	KYAF1	143.00	KY1	143.00	KYSS1	257.00	SKY1	171.00
2	KYAF2	158.00	KY2 ▲	158.00	KYSS2	270.00	SKY2	201.00
3	KYAF3	185.00	KY3 ▲	185.00	KYSS3	372.00	SKY3	228.00
4	KYAF4	228.00	KY4 ▲	228.00	KYSS4	485.00	SKY4	269.00
6	KYAF6	287.00	KY6	287.00	KYSS6	714.00	SKY6	287.00

▲ Only KN200 series legend plates will fit upright on these enclosures with their long axis vertical.

NOTE: *See Table 19.319 on Page 19-106 for Assembled Control Stations*

KYG1Y
(mushroom head not included)

Table 19.317: Guarded Enclosures

UL Types 1, 3, 4 and 13/ NEMA 1, 3, 4 and 13				
No of Holes	Die Cast Zinc			
	Cover Color	Box Color	Type	$ Price
1	Gray	Gray	KYG1 ■	150.00
1	Yellow	Gray	KYG1Y ■	

■ Includes 1" NPT threaded conduit opening.

NOTE: *See Table 19.319 on Page 19-106 for Assembled Control Stations*

K26

Table 19.318: Stainless Steel (302) NEMA 1 Flush Plates ♦

No of Holes	Description	Type	$ Price
1	1 Hole flush plate, cover screws, insulating liners	K25	28.70
2	2 Hole flush plate, cover screws, insulating liners	K26	42.80
3	3 Hole flush plate, cover screws, insulating liners	K27	57.00
4	4 Hole flush plate, cover screws, insulating liners	K28	86.00

♦ To be used with a standard 2 x 3 in. general purpose switch box. A 2.5 in. deep switch box should be used if two Type KA contact blocks are mounted side by side. If two Type KA contact blocks are mounted in tandem, a 3.5 in. deep box should be used.

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Table 19.319: Assembled Control Stations

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Type KYK31

Type KYSS300

Type SKY201

Type KYG1Y2

No of Holes	Operator Style and Features	Type	$ Price	Consists of			
				Enclosure	Operators	Contact Blocks	Legend Plates
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13 Die Cast Zinc Enclosure▲							
1	Selector Switch (3 Pos Maintained)	KYK111	**243.**	KY1	KS43B	KA1	Hand-Off-Auto
	Selector Switch (2 Pos Maintained)	KYK110	**243.**	KY1	KS11B	KA1	Off-On
	Push Button (Momentary)	KYK11	**228.**	KY1	KR1B	KA1	Start
	Push Button (Momentary)	KYK13	**228.**	KY1	KR1R	KA1	Stop
	Mushroom Button (Momentary)	KYK14	**270.**	KY1	KR4R	KA1	Stop
	Push Button (with Lockout)	KYK15	**270.**	KY1	KR3R, K4	KA1	Stop
	Break Glass Operator	KYK116	**329.**	KY1	K15	KA1	To Stop—Break Glass
	Break Glass Operator (Red Enclosure)	KYK117	**329.**	KY1S1	K15	KA1	To Stop—Break Glass
2	2 Push Buttons (Lockout on Stop)	KYK224	**372.**	KY2	KR1B, KR3R, K4	KA1, KA1	Jog-Stop
	2 Push Buttons	KYK218	**329.**	KY2	KR1B, KR3R	KA1, KA1	On-Off
	2 Push Buttons	KYK26	**329.**	KY2	KR1B, KR1B	KA1, KA1	Open-Close
	2 Push Buttons	KYK25	**329.**	KY2	KR1B, KR1B	KA1, KA1	Up-Down
	2 Push Buttons	KYK21	**329.**	KY2	KR1B, KR3R	KA1, KA1	Start-Stop
	2 Push Buttons (with Sealed Contacts) ★	KYK223	**527.**	KY2	KR1B, KR3R	KA51, KA51	Start-Stop
	2 Push Buttons (Lockout on Stop)	KYK23	**372.**	KY2	KR1B, KR3R, K4	KA1, KA1	Start-Stop
	2 Push Buttons (Maintained/Interlocked)	KYK27	**329.**	KY2	KR11GR	KA1	Start-Stop
	1 Push Button, 1 Mushroom Button	KYK22	**372.**	KY2	KR1B, KR4R	KA1, KA1	Start-Stop
3	3 Push Buttons	KYK31	**441.**	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Forward; Reverse; Stop
	3 Push Buttons (Lockout on Stop)	KYK326	**485.**	KY3	KR1B, KR1B, KR3R, K4	KA1, KA1, KA1	Forward; Reverse; Stop
	3 Push Buttons (With Sealed Contacts & Lockout on Stop) ★	KYK322	**783.**	KY3	KR1B, KR1B, KR3R, K4	KA51, KA51, KA51	Forward; Reverse; Stop
	3 Push Buttons	KYK33	**441.**	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Open; Close; Stop
	Red 120v Pilot Light, 2 Push Buttons	KYK317	**471.**	KY3	KP1R31, KR1B, KR3R	KA2, KA3	Start; Stop
	3 Push Buttons	KYK32	**441.**	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Up; Down; Stop
	3 Push Buttons (Lockout on Stop)	KYK325	**485.**	KY3	KR1B, KR1B, KR3R, K4	KA1, KA1, KA1	Up ; Down; Stop
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13—Stainless Steel (304) ■							
1	Push Button (Momentary)	KYSS101	**342.**	KYSS1	KR1B	KA1	Start
	Push Button (Momentary)	KYSS103	**320.**	KYSS1	KR1B	KA3	Stop
	Selector Switch (2 Pos Maintained)	KYSS110	**356.**	KYSS1	KS11B	KA1	Off-On
	Selector Switch (3 Pos Maintained)	KYSS111	**356.**	KYSS1	KS43B	KA1	Hand-Off-Auto
2	2 Push Buttons	KYSS201	**422.**	KYSS2	KR1B, KR3R	KA1, KA3	Start; Stop
	2 Push Buttons (Lockout on Stop)	KYSS203	**491.**	KYSS2	KR1B, KR3R, K5	KA1, KA3	Start; Stop
	2 Push Buttons (Maintained with Interlock)	KYSS210	**441.**	KYSS2	KR11U	KA1, KA1	Start; Stop
	2 Push Buttons	KYSS205	**441.**	KYSS2	KR1B, KR1B	KA1, KA1	Up; Down
UL Types 1, 3, 4. 4X and 13/NEMA 1, 3, 4, 4X and 13—Stainless Steel (304) ♦							
1	Push Button (Momentary)	KYSK101	**342.**	KYSS1	SKR1B	KA1	Start
	Push Button (Momentary)	KYSK103	**320.**	KYSS1	SKR3R	KA3	Stop
	Selector Switch (2 Pos Maintained)	KYSK110	**356.**	KYSS1	SKS11B	KA1	Off-On
	Selector Switch (3 Pos Maintained)	KYSK111	**356.**	KYSS1	SKS43B	KA1	Hand-Off-Auto
2	2 Push Buttons	KYSK201	**422.**	KYSS2	SKR1B, SKR3R	KA1, KA3	Start; Stop
	2 Push Buttons (Lockout on Stop)	KYSK203	**491.**	KYSS2	SKR1B, SKR3R, K5	KA1, KA3	Start; Stop
	2 Push Buttons (Maintained with Interlock)	KYSK210	**441.**	KYSS2	SKR11U	KA1, KA1	Start; Stop
	2 Push Buttons	KYSK205	**441.**	KYSS2	SKR1B, SKR1B	KA1, KA1	Up; Down
UL Types 1, 3, 4. 4X and 13/NEMA 1, 3, 4, 4X and 13—Polymeric (Plastic) ♦							
	Selector Switch (3 Pos Maintained)	SKY111	**270.**	SKY1	SKS43B	KA1	Hand-Off-Auto
1	Selector Switch (2 Pos Maintained)	SKY110	**270.**	SKY1	SKS11B	KA1	Off-On
	Selector Switch (2 Pos Maintained with Sealed Contacts) ★	SKY122	**372.**	SKY1	SKS11B	KA51	Off-On
	Push Button (with Lockout)	SKY105	**306.**	SKY1	SKR3R, K5	KA3	Stop
2	2 Push Buttons	SKY201	**350.**	SKY2	SKR1B, SKR3R	KA1, KA3	Start-Stop
	2 Push Buttons (Lockout on Stop)	SKY203	**422.**	SKY2	SKR1B, SKR1R, K5	KA1, KA3	Start-Stop
	2 Push Buttons (With Sealed Contacts) ★	SKY223	**570.**	SKY2	SKR1B, SKR3R	KA51, KA51	Start-Stop
	2 Push Buttons (With Sealed Contacts) ★	SKY222	**570.**	SKY2	SKR1B, SKR3R	KA51, KA51	On-Off
	2 Push Buttons	SKY205	**372.**	SKY2	SKR1B, SKR1B	KA1, KA1	Up-Down
3	3 Push Buttons	SKY302	**464.**	SKY3	SKR1B, SKR1B, SKR3R	KA1, KA1, KA3	Up-Down-Stop
	3 Push Buttons	SKY303	**464.**	SKY3	SKR1B, SKR1B, SKR3R	KA1, KA1, KA3	Open-Close-Stop
	Red 120v Pilot Light, 2 Push Buttons	SKY315A	**531.**	SKY3	SKP1R31, SKR1B, SKR3R	KA1, KA3	Start-Stop
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13 Die Cast Zinc Enclosures with Integral Guard							
1	Guarded Enclosure (grey) with 120V Red LED Pilot Light	KYG11 ▼	**250.**	KYG1	KP38LRR9	—	order separately
	Guarded Enclosure (grey) with 120V Green LED Pilot Light	KYG12 ▼	**250.**	KYG1	KP38LGG9	—	order separately
	Guarded Enclosure (Yellow Cover) with Red Push-Pull Mushroom	KYG1Y1 ▼	**275.**	KYG1Y	KR9R	KA3	Push to Stop/ Pull to Start
	Guarded Enclosure (Yellow Cover) with Red Turn-To Release Mushroom	KYG1Y2 ▼	**275.**	KYG1Y	KR16	KA3	Emergency Stop

▲ Uses 9001K metal operators and metal legend plates.
■ Uses 9001K metal operators and plastic legend plates.
♦ Uses 9001SK plastic operators and plastic legend plates.
★ Control Station consists of components that are UL listed for use in Class 1, Division 2, Groups A, B, C, or D.
▼ Includes 1" NPT threaded conduit opening.

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XVR 08●●●

XVR 10●●●

XVR 12●●●

XVR 13●●●

XVR ZR1

XVR Z081

XVC Z13

XVC Z23

Table 19.320: XVR Pre-Wired Rotating Mirror Beacons

Diameter (mm)	Sound Option	Enclosure Rating	Voltage	Color	Catalog Number	$ Price
Ø 84	Without buzzer	IP 23 (IP 65 with accessories)	12 Vac/Vdc	Red	XVR 08J04	180.00
				Orange	XVR 08J05	
				Green	XVR 08J03	
				Blue	XVR 08J06	
			24 Vac/Vdc	Red	XVR 08B04	
				Orange	XVR 08B05	
				Green	XVR 08B03	
				Blue	XVR 08B06	
Ø 106	Without buzzer	IP 23 (IP 55 with accessories)	12 Vac/Vdc	Red	XVR 10J04	207.00
				Orange	XVR 10J05	
				Green	XVR 10J03	
				Blue	XVR 10J06	
			24 Vac/Vdc	Red	XVR 10B04	
				Orange	XVR 10B05	
				Green	XVR 10B03	
				Blue	XVR 10B06	
Ø 120	Without buzzer	IP 23	12 Vac/Vdc	Red	XVR 12J04	198.00
				Orange	XVR 12J05	
				Green	XVR 12J03	
				Blue	XVR 12J06	
			24 Vac/Vdc	Red	XVR 12B04	
				Orange	XVR 12B05	
				Green	XVR 12B03	
				Blue	XVR 12B06	
Ø 120	With buzzer	IP 23	12 Vac/Vdc	Red	XVR 12J04S	216.00
				Orange	XVR 12J05S	
				Green	XVR 12J03S	
				Blue	XVR 12J06S	
			24 Vac/Vdc	Red	XVR 12B04S	
				Orange	XVR 12B05S	
				Green	XVR 12B03S	
				Blue	XVR 12B06S	
Ø 130	Without buzzer	IP 23 Resistant to vibration	12 Vdc	Red	XVR 13J04	270.00
				Orange	XVR 13J05	
			24 Vdc	Red	XVR 13B04	
				Orange	XVR 13B05	

Table 19.321: XVR Accessories

Description	Diameter (mm)	Height (mm)	Catalog Number	$ Price
Reflecting prism	84	—	XVR ZR1	36.00
	106	—	XVR ZR2	
	120/130	—	XVR ZR3	
Rubber base to increase the IP degree of protection	84	—	XVR Z081	
	106	—	XVR Z082	
Mount tube and base	106, 120 and 130	300	XVC Z13	270.00
L-shape mounting bracket	84, 106 and 120	—	XVC Z23	27.00

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XVC 4B5

XVC 4B35S

XVC Z11

XVC Z01

XVC 1B5K
XVC 1B5SK

XVC Z13

XVC Z23

Table 19.322: XVC4 Tower Lights — 40 mm diameter (1.5 inches)

Description	Light source (included)	Voltage	Signaling colors ▲		Catalog Number	$ Price
			Steady	Flashing		
With support tube mounting						
Without buzzer	LED for steady light only	24 Vdc	R	–	XVC 4B1	**157.50**
			R, O	–	XVC 4B2	**198.00**
			R, O, G	–	XVC 4B3	**229.50**
			R, O, G, B	–	XVC 4B4	**283.50**
			R, O, G, B, C	–	XVC 4B5	**352.50**
		100-240 Vac	R	–	XVC 4M1	**181.50**
			R, O	–	XVC 4M2	**228.00**
			R, O, G	–	XVC 4M3	**264.00**
			R, O, G, B	–	XVC 4M4	**379.50**
			R, O, G, B, C	–	XVC 4M5	**379.50**
With buzzer + flashing light	LED for steady or flashing light ■	24 Vdc	R	R	XVC 4B15S	**240.00**
			R, O	R, O	XVC 4B25S	**271.50**
			R, O, G	R, O, G	XVC 4B35S	**309.00**
			R, O, G, B	R, O, G, B	XVC 4B45S	**378.00**
			R, O, G, B, C	R, O, G, B, C	XVC 4B55S	**441.00**
		100-240 Vac	R	R	XVC 4M15S	**276.00**
			R, O	R, O	XVC 4M25S	**312.00**
			R, O, G	R, O, G	XVC 4M35S	**355.50**
			R, O, G, B	R, O, G, B	XVC 4M45S	**435.00**
			R, O, G, B, C	R, O, G, B, C	XVC 4M55S	**507.00**
For base mounting						
Without buzzer	LED for steady light only	24 Vdc	R	–	XVC 4B1K	**117.00**
			R, O	–	XVC 4B2K	**154.50**
			R, O, G	–	XVC 4B3K	**189.00**
			R, O, G, B	–	XVC 4B4K	**255.00**
			R, O, G, B, C	–	XVC 4B5K	**331.50**

Table 19.323: Accessories for XVC4

Description	Diameter mm	Minimum height to be added mm	Catalog Number	$ Price
Die-cast metal mounting base (for use with XVC4●● and XVC4●●5S with support tube)	90	32	XVC Z11	**39.00**
Plastic mounting base (for use with XVC4, XVC4●● and XVC4●●5S — customer must discard the support tube)	84	24.5	XVC Z01	**64.50**

Table 19.324: XVC Tower Lights — 100 mm diameter (4 inches)

Description	Light source (included)	Voltage Vdc	Signaling colors ▲		Catalog Number	$ Price
			Steady	Flashing		
For base mounting						
Without buzzer With flashing light	LED for steady or flashing light ■	24	R	R	XVC 1B1K	**631.50**
			R, O	R, O	XVC 1B2K	**685.50**
			R, O, G	R, O, G	XVC 1B3K	**739.50**
			R, O, G, B	R, O, G, B	XVC 1B4K	**793.50**
			R, O, G, B, C	R, O, G, B, C	XVC 1B5K	**847.50**
		100-240 Vac	R	R	XVC 1M1K	**726.00**
			R, O	R, O	XVC 1M2K	**787.50**
			R, O, G	R, O, G	XVC 1M3K	**850.50**
			R, O, G, B	R, O, G, B	XVC 1M4K	**912.00**
			R, O, G, B, C	R, O, G, B, C	XVC 1M5K	**975.00**
With buzzer + flashing light	LED for steady or flashing light ■	24	R	R	XVC 1B1SK	**703.50**
			R, O	R, O	XVC 1B2SK	**757.50**
			R, O, G	R, O, G	XVC 1B3SK	**811.50**
			R, O, G, B	R, O, G, B	XVC 1B4SK	**865.50**
			R, O, G, B, C	R, O, G, B, C	XVC 1B5SK	**919.50**
		100-240 Vac	R	R	XVC 1M1SK	**808.50**
			R, O	R, O	XVC 1M2SK	**871.50**
			R, O, G	R, O, G	XVC 1M3SK	**933.00**
			R, O, G, B	R, O, G, B	XVC 1M4SK	**996.00**
			R, O, G, B, C	R, O, G, B, C	XVC 1M5SK	**1057.50**

▲ Signaling colors: R = Red, G = Green, O = Orange, B = Blue, C = Clear. The colors are listed in the mounting order of the illuminated units from top to bottom.

■ Flashing light function selected by wiring or programming.

Table 19.325: Accessories for XVC1

Description	Diameter mm	Height mm	Catalog Number	$ Price
Mount tube and base	140	300	XVC Z13	**270.00**
L-shape mount bracket	—	—	XVC Z23	**27.00**

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XVC 6B5K

XVC 6B55SK

XVC Z02

XVC Z12

Table 19.326: XVC6 Tower Lights, 60 mm diameter (2.375 inches)

Description	Light source (included)	Voltage	Signaling colors ▲		Catalog Number	$ Price
			Steady	Flashing		
With support tube mounting						
Without buzzer	LED for steady light only	24 Vdc	R	–	XVC 6B1	**169.50**
			R, O	–	XVC 6B2	**211.50**
			R, O, G	–	XVC 6B3	**252.00**
			R, O, G, B	–	XVC 6B4	**303.00**
			R, O, G, B, C	–	XVC 6B5	**426.00**
		100-240 Vac	R	–	XVC 6M1	**195.00**
			R, O	–	XVC 6M2	**243.00**
			R, O, G	–	XVC 6M3	**289.50**
			R, O, G, B	–	XVC 6M4	**348.00**
			R, O, G, B, C	–	XVC 6M5	**489.00**
With buzzer + flashing light	LED for steady or flashing light ■	24 Vdc	R	R	XVC 6B15S	**252.00**
			R, O	R, O	XVC 6B25S	**292.50**
			R, O, G	R, O, G	XVC 6B35S	**315.00**
			R, O, G, B	R, O, G, B	XVC 6B45S	**378.00**
			R, O, G, B, C	R, O, G, B, C	XVC 6B55S	**472.50**
		100-240 Vac	R	R	XVC 6M15S	**289.50**
			R, O	R, O	XVC 6M25S	**336.00**
			R, O, G	R, O, G	XVC 6M35S	**363.00**
			R, O, G, B	R, O, G, B	XVC 6M45S	**435.00**
			R, O, G, B, C	R, O, G, B, C	XVC 6M55S	**543.00**
For base mounting						
Without buzzer	LED for steady light only	24 Vdc	R	–	XVC 6B1K	**132.00**
			R, O	–	XVC 6B2K	**163.50**
			R, O, G	–	XVC 6B3K	**214.50**
			R, O, G, B	–	XVC 6B4K	**283.50**
			R, O, G, B, C	–	XVC 6B5K	**378.00**
		100-240 Vac	R	–	XVC 6M1K	**151.50**
			R, O	–	XVC 6M2K	**187.50**
			R, O, G	–	XVC 6M3K	**246.00**
			R, O, G, B	–	XVC 6M4K	**325.50**
			R, O, G, B, C	–	XVC 6M5K	**435.00**
With buzzer + flashing light	LED for steady or flashing light ■	24 Vdc	R	R	XVC 6B15SK	**205.50**
			R, O	R, O	XVC 6B25SK	**252.00**
			R, O, G	R, O, G	XVC 6B35SK	**283.50**
			R, O, G, B	R, O, G, B	XVC 6B45SK	**346.50**
			R, O, G, B, C	R, O, G, B, C	XVC 6B55SK	**426.00**
		100-240 Vac	R	R	XVC 6M15SK	**237.00**
			R, O	R, O	XVC 6M25SK	**289.50**
			R, O, G	R, O, G	XVC 6M35SK	**327.00**
			R, O, G, B	R, O, G, B	XVC 6M45SK	**399.00**
			R, O, G, B, C	R, O, G, B, C	XVC 6M55SK	**490.50**

Table 19.327: Accessories for XVC6

Description	Diameter mm	Minimum height to be added mm	Catalog Number	$ Price
Die-cast metal mounting base for XVC6B• and XVC6B•5S with support tube.	100	30	XVC Z02	**27.00**
Stamped metal mounting base for XVC6B• K and XVC6B•5SK	84	21.6	XVC Z12	**45.00**

▲ Signaling colors: R = Red, G = Green, O = Orange, B = Blue, C = Clear. The colors are listed in the mounting order of the illuminated units from top to bottom.

■ Flashing light function selected by wiring or programming.

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XVBL3•

XVBL4B•

XVBL6B•
5 Joule

XVBL8B•
10 Joule

Table 19.328: XVB Beacons with Steady Light

Description	Light Source and Voltage	Color	Catalog Number	$ Price
Complete unit, includes: 1 lens unit 1 base unit (direct or tube mounting)	Bulb (10 W max) not included 250 V max (must order bulb separately ♦)	Green	XVBL33	114.00
		Red	XVBL34	
		Amber	XVBL35	
		Blue	XVBL36	
		Clear	XVBL37	
		Yellow	XVBL38	

Table 19.329: XVB Beacons with Flashing Light (one flash per second)

Description	Light Source and Voltage	Color	Catalog Number	$ Price
Complete unit, includes: 1 lens unit 1 base unit (direct or tube mounting)	Bulb (10 W max) not included 24 Vac 24–48 Vdc (must order bulb separately ♦)	Green	XVBL4B3	193.50
		Red	XVBL4B4	
		Amber	XVBL4B5	
		Blue	XVBL4B6	
		Clear	XVBL4B7	
		Yellow	XVBL4B8	
	Bulb (10 W max) not included 48–230 Vac (must order bulb separately ♦)	Green	XVBL4M3	
		Red	XVBL4M4	
		Amber	XVBL4M5	
		Blue	XVBL4M6	
		Clear	XVBL4M7	
		Yellow	XVBL4M8	

Table 19.330: XVB Beacons with 10 Joule Strobe (2.75 in./70 mm diameter) ▲

Description	Light Source and Voltage	Color	Catalog Number ■	$ Price
Complete unit, includes: 1 lens unit 1 base unit (direct or tube mounting)	Strobe 24 Vac/Vdc (includes bulb)	Green	XVBL8B3	366.00
		Red	XVBL8B4	
		Amber	XVBL8B5	
		Blue	XVBL8B6	
		Clear	XVBL8B7	
		Yellow	XVBL8B8	
	Strobe 120 Vac (includes bulb)	Green	XVBL8G3	
		Red	XVBL8G4	
		Amber	XVBL8G5	
		Blue	XVBL8G6	
		Clear	XVBL8G7	
		Yellow	XVBL8G8	

▲ **Important:** Discharge tube elements are not suitable for continuous-operation signaling due to temperature rise caused by the discharge tube.
■ For 5 Joule units, specify XVBL6••, instead of XVBL8•• (**$190.00**).
♦ For bulbs, see Table 19.336 on page 19-112.

NOTE: *There are no replacement lenses for strobes.*

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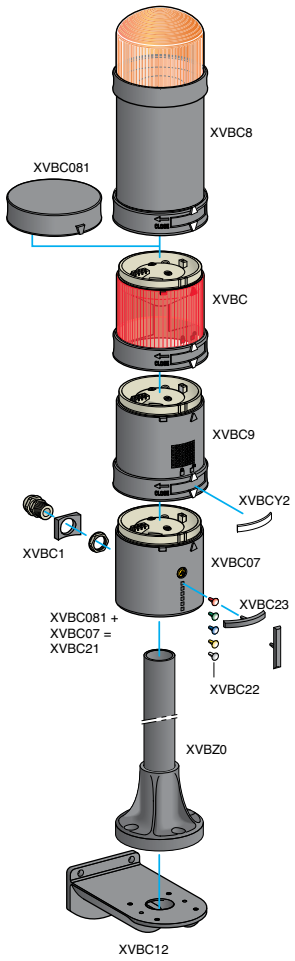

Table 19.331: XVB Lens Units for Steady Light

Description	Light Source and Voltage	Color	Catalog Number	$ Price
Illuminated lens unit	Bulb (10 W max) not included 250 Vac/Vdc max (must order bulb separately ■)	Green	XVBC33	60.60
		Red	XVBC34	
		Orange	XVBC35	
		Blue	XVBC36	
		Clear	XVBC37	
		Yellow	XVBC38	

Table 19.332: XVB Lens Unit for Flashing Light

Description	Light Source and Voltage	Color	Catalog Number	$ Price
Illuminated lens unit	Bulb (10 W max) not included 24 Vac 24–48 Vdc (must order bulb separately ■)	Green	XVBC4B3	141.00
		Red	XVBC4B4	
		Orange	XVBC4B5	
		Blue	XVBC4B6	
		Clear	XVBC4B7	
		Yellow	XVBC4B8	
	Bulb (10 W max) not included 48–230 Vac (must order bulb separately ■)	Green	XVBC4M3	
		Red	XVBC4M4	
		Orange	XVBC4M5	
		Blue	XVBC4M6	
		Clear	XVBC4M7	
		Yellow	XVBC4M8	

Note: There are no replacement lenses units for the XVBC8•• strobes.

Table 19.333: XVB Lens Units with 10 Joule Strobe

Description	Light Source and Voltage	Color	Catalog Number ▲	$ Price
Lens unti with integral 10 Joule strobe	Strobe 24 Vac/Vdc (includes bulb)	Green	XVBC8B3	313.50
		Red	XVBC8B4	
		Orange	XVBC8B5	
		Blue	XVBC8B6	
		Clear	XVBC8B7	
		Yellow	XVBC8B8	
	Strobe 120 Vac (includes bulb)	Green	XVBC8G3	
		Red	XVBC8G4	
		Orange	XVBC8G5	
		Blue	XVBC8G6	
		Clear	XVBC8G7	
		Yellow	XVBC8G8	

▲ For 5 Joule units, specify XVBC6••, instead of XVBC8•• ($155.00).
■ For bulbs, see Table 19.336 on page 19-112.

Table 19.334: Audible Sounder Units

Description	Supply Voltage	Catalog Number	$ Price
Sounder unit 90 dB at 1 m	12–48 Vac/Vdc	XVBC9B	217.50
Adjustable from 75–90 dB Continuous or intermittent modes	120–230 Vac	XVBC9M	342.00

Table 19.335: Base Units + Cover

Description	Catalog Number	$ Price
Base unit + cover for direct or tube mounting, bottom or side cable entry (includes gasket)	XVBC21	60.60

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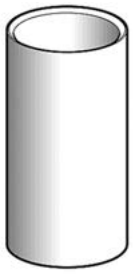
XVBZ0•



XVBC020

XVBC12

Table 19.336: XVB Accessories

Description	Characteristics		Catalog Number		$ Price
	in.	mm			
Black tube with integral black plastic mounting base (includes gasket)	4.72	120	XVBZ02	XVBZ02A ▲	**18.75**
	15.75	400	XVBZ03	XVBZ03A ▲	**37.50**
	31.50	800	XVBZ04	XVBZ04A ▲	**75.00**
Support tube concealment cover	3.94	100	XVBC020		**11.70**
	15.75	400	XVBC030		**34.50**
	31.50	800	XVBC040		**62.10**
Wall mount bracket (metal)	For direct mounting on base unit or with tulip XVBC11 + tube XVBC0•		XVBC12		**48.45**
Incandescent bulbs bayonet type BA 15d, 10 Watts	12 Vac/Vdc		DL1BLJ		**8.10**
	24 Vac/Vdc		DL1BLB		
	48 Vac/Vdc		DL1BLE		
	120 Vac/Vdc		DL1BLG		
	230 Vac/Vdc		DL1BLM		
Incandescent bulbs bayonet type BA 15d, 7 Watts	12 Vac/Vdc		DL1BEJ		
	24 Vac/Vdc		DL1BEB		
	48 Vac/Vdc		DL1BEE		
	120 Vac/Vdc		DL1BEG		
	230 Vac/Vdc		DL1BEM		
Steady-On LED bulbs bayonet type BA 15d (sold as single) ■	24 Vac/Vdc	White	DL1BDB1		**108.00**
		Green	DL1BDB3		
		Red	DL1BDB4		
		Blue	DL1BDB6		
		Yellow	DL1BDB8		
		Amber	DL1BDB5		
	120 Vac	White	DL1BDG1		
		Green	DL1BDG3		
		Red	DL1BDG4		
		Blue	DL1BDG6		
		Yellow	DL1BDG8		
		Amber	DL1BDG5		
Flashing LED bulbs	24 Vac/Vdc	White	DL1BKB1		**139.50**
		Green	DL1BKB3		
		Red	DL1BKB4		
		Amber	DL1BKB5		
		Blue	DL1BKB6		
		Yellow	DL1BKB8		
	120 Vac	White	DL1BKG1		
		Green	DL1BKG3		
		Red	DL1BKG4		
		Amber	DL1BKG5		
		Blue	DL1BKG6		
		Yellow	DL1BKG8		
Adapter for side entry through base unit	With CM12 (p. 13.5) cable gland, for cable size of 0.4 to 0.55 in. (10 to 14 mm) diameter		XVBC14		**7.80**
Conduit adapter	1/2 in. NPT (for customer supplied tubing)		XVBC00		**3.15**

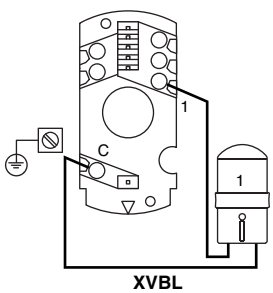
▲ Aluminum tube.
■ For 240 Vac, replace the B or G in the catalog number with M—for example, DL1BD**M**1. For flashing LEDs, refer to catalog 9001CT0001.

Table 19.337: XVB Accessories

Description	Characteristics	Catalog Number	$ Price
Set of colored markers	6 colors	XVBC22	**3.15**
Set of 5 legend holders	Identification of stacked units on base	XVBC23	**12.45**

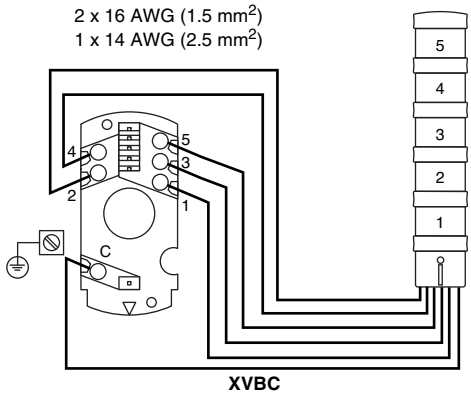
Wiring Diagrams, Base Units

Screw terminals
Torque to 4.4 in-lb (0.5 N•m)



XVBL

2 x 16 AWG (1.5 mm^2)
1 x 14 AWG (2.5 mm^2)



XVBC

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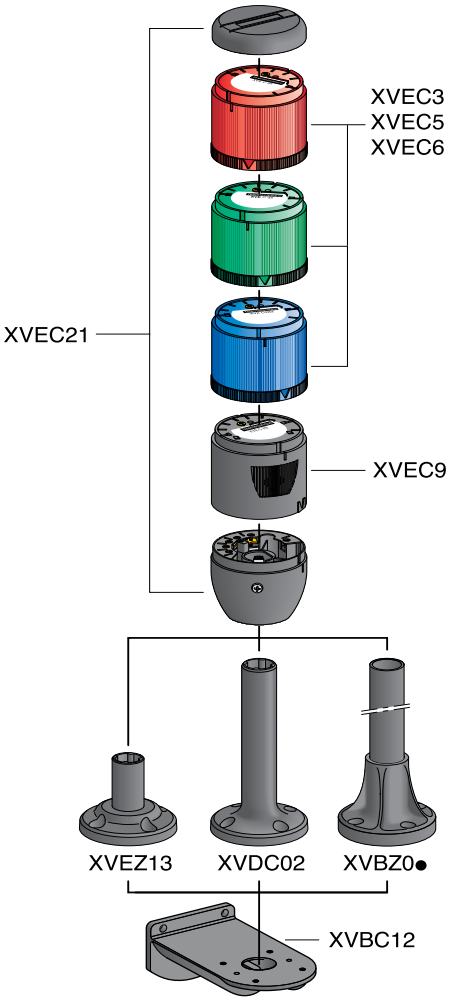

Table 19.338: XVE Lens Units with Steady Light

Description	Light source	Supply voltage	Color of lens	Catalog Number	$ Price
Lens units only for BA 15d base fitting bulb	5 W max. (must order bulb separately ▲)	24 Vac/Vdc to 240 Vac/Vdc (Maximum)	Green	XVEC33	24.00
			Red	XVEC34	
			Orange	XVEC35	
			Blue	XVEC36	
			Clear	XVEC37	
Illuminated units	Integral LED on printed board circuit (separate bulb not required)	24 Vac/Vdc	Green	XVEC2B3	60.00
			Red	XVEC2B4	
			Orange	XVEC2B5	
			Blue	XVEC2B6	
			Clear	XVEC2B7	
		120 Vac	Green	XVEC2G3	
			Red	XVEC2G4	
			Orange	XVEC2G5	
			Blue	XVEC2G6	
			Clear	XVEC2G7	

▲ Order clear incandescent bulb separately. See Table 19.336 on Page 19-112.

Table 19.339: XVE Lens Units with Flashing LED

Description	Light source	Supply voltage	Color of lens	Catalog Number	$ Price
Illuminated units	Integral LED on printed board circuit (separate bulb not required)	24 Vac/Vdc	Green	XVEC5B3	90.00
			Red	XVEC5B4	
			Orange	XVEC5B5	
			Blue	XVEC5B6	
			Clear	XVEC5B7	
		120 Vac	Green	XVEC5G3	
			Red	XVEC5G4	
			Orange	XVEC5G5	
			Blue	XVEC5G6	
			Clear	XVEC5G7	

Table 19.340: XVE Lens Units with Strobe Light

Description	Light source	Supply voltage	Color of lens	Catalog Number	$ Price
Lens units with integral 1 Joule strobe light	Discharge tube, 1 Joule (separate bulb not required)	24 Vac/Vdc	Green	XVEC6B3	105.00
			Red	XVEC6B4	
			Orange	XVEC6B5	
			Blue	XVEC6B6	
			Clear	XVEC6B7	
		120 Vac	Green	XVEC6G3	
			Red	XVEC6G4	
			Orange	XVEC6G5	
			Blue	XVEC6G6	
			Clear	XVEC6G7	

Table 19.341: XVE Audible Sounder Units

Description		Supply Voltage	Catalog Number	$ Price
Audible Sounder Units	85dB	24 Vac/Vdc	XVEC9B	90.00
		120 Vac	XVEC9G	
		230/240 Vac	XVEC9M	

Table 19.342: XVE Base Units and Covers

Discription	Catalog Number	$ Price
Base unit + snap on cover for NEMA and UL Type 12, IP42 rating	XVEC21	24.00
Base unit + screw mounting cover for IP54 rating (includes 5 O-ring seals for lens units and 1 gasket for base unit)	XVEC21P	30.00

Table 19.343: XVE Accessories

Description	Height under base unit in. (mm)	Color	Catalog Number	$ Price
Plastic mounting bases	0.78 (20)	Black	XVEZ13	12.00
	3.93 (100)	Black	XVDC02	15.00
Mounting bases comprising: Ø 25 mm aluminium support tube + black plastic mounting support	3.15 (80)	Black aluminium	XVBZ02	18.75
		Aluminium	XVBZ02A	
	15.7 (400)	Black aluminium	XVBZ03	37.50
		Aluminium	XVBZ03A	
	31.5 (800)	Black aluminium	XVBZ04	75.00
		Aluminium	XVBZ04A	
Description	**Electrical characteristics**		**Catalog Number**	**$ Price**
Clear incandescent bulbs with BA 15d base fitting for lens units type XVE C3p	4 W, z 24 Vac/Vdc		DL1BEBS	6.15
	5 W, z 120 Vac/Vdc		DL1EDGS	
	5 W, z 230 Vac/Vdc		DL1BEMS	
Description			**Catalog Number**	**$ Price**
Wall mount bracket (metal)			XVBC12	48.45

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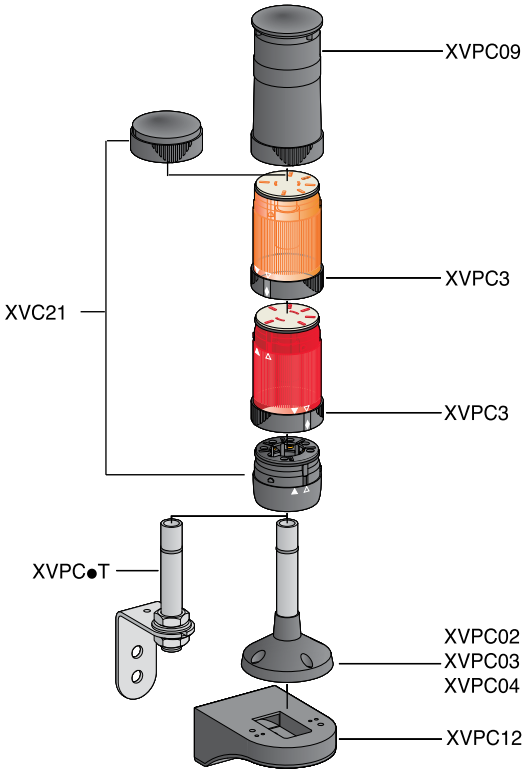

Table 19.344: Base Units + Covers

Description	Color	Catalog Number	$ Price
Base unit and cover	Black	XVPC21	**48.00**
Base unit and cover	Off-white	XVPC21W	
Base unit and cover (with ring-tongue compatible terminal)	Off-white	XVPC21WR	

Table 19.345: XVP Lens Units

Description	Ring Color	Light Source and Voltage	Lens Color	Catalog Number	$ Price
Steady or Flashing					
50 mm steady lens unit (See Table 19.347 on page 19-115 and Table 19.348 on page 19-115 for LEDs and incandescent bulbs)	Black	Bulb (7 W max) not included 250 V (must order bulb separately ▲)	Green Red Amber Blue Clear Yellow	XVPC33 XVPC34 XVPC35 XVPC36 XVPC37 XVPC38	**43.50**
	Off-white	Bulb (7 W max) not included 250 V max (must order bulb separately ▲)	Green Red Amber Blue Clear Yellow	XVPC33W XVPC34W XVPC35W XVPC36W XVPC37W XVPC38W	
Strobe					
Lens unit with integral strobe	Black	Strobe 24 Vdc 0.3 Joule (separate bulb not required)	Green Red Amber Blue Clear Yellow	XVPC6B3 XVPC6B4 XVPC6B5 XVPC6B6 XVPC6B7 XVPC6B8	**186.00**
		Strobe 120 Vac 0.6 Joule (separate bulb not required)	Green Red Amber Blue Clear Yellow	XVPC6G3 XVPC6G4 XVPC6G5 XVPC6G6 XVPC6G7 XVPC6G8	
	Off-white	Strobe 24 Vdc 0.3 Joule (separate bulb not required)	Green Red Amber Blue Clear Yellow	XVPC6B3W XVPC6B4W XVPC6B5W XVPC6B6W XVPC6B7W XVPC6B8W	
		Strobe 120 Vac 0.6 Joule (separate bulb not required)	Green Red Amber Blue Clear Yellow	XVPC6G3W XVPC6G4W XVPC6G5W XVPC6G6W XVPC6G7W XVPC6G8W	

▲For bulbs see Table 19.336 on page 19-112.

Table 19.346: XVP Audible Sounder Units

Description	Ring Color	Supply Voltage	Catalog Number	$ Price
50 mm sounder unit (IP40 NEMA 1)	Black	24 Vdc	XVPC09B	**156.00**
		120 Vac	XVPC09G	
		230 Vac	XVPC09M	
Ten tone selections, 75–85 dB at 1 m	Off-white	24 Vdc	XVPC09BW	
		120 Vac	XVPC09GW	
		230 Vac	XVPC09MW	

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DL1BEJ

DL1BDB1

Table 19.347: XVP LED Bulbs

Description	Voltage	Color	Catalog Number	$ Price
Steady-On LED bulb	24 Vac/Vdc	White Green Red Amber Blue Yellow	DL1BDB1 DL1BDB3 DL1BDB4 DL1BDB5 DL1BDB6 DL1BDB8	**108.00**
	120 Vac	White Green Red Amber Blue Yellow	DL1BDG1 DL1BDG3 DL1BDG4 DL1BDG5 DL1BDG6 DL1BDG8	
Flashing LED bulb	24 Vac/Vdc	White Green Red Amber Blue Yellow	DL1BKB1 DL1BKB3 DL1BKB4 DL1BKB5 DL1BKB6 DL1BKB8	**139.50**
	120 Vac	White Green Red Amber Blue Yellow	DL1BKG1 DL1BKG3 DL1BKG4 DL1BKG5 DL1BKG6 DL1BKG8	
Incandescent bulbs Bayonet type BA 15d, 7 W	12 Vac/Vdc 24 Vac/Vdc 48 Vac/Vdc 120 Vac/Vdc 230 Vac/Vdc	Clear Clear Clear Clear Clear	DL1BEJ DL1BEB DL1BEE DL1BEG DL1BEM	**8.10**

XVPC03T

Table 19.348: XVP Accessories

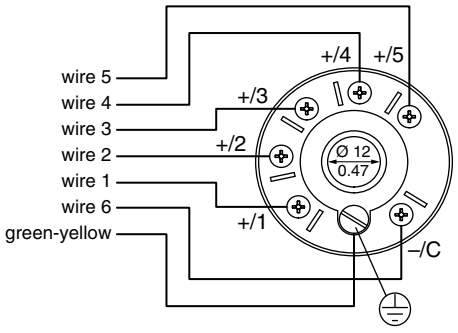
Description	Color	Characteristics		Catalog Number	$ Price
		IN	mm		
Mounting tube with bracket	Silver	4	100	XVPC02T	**32.55**
		10	250	XVPC03T	**40.35**
		16	400	XVPC04T	**48.00**
Mounting tube with tulip base	Black	4	100	XVPC02	**32.55**
		10	250	XVPC03	**48.00**
		16	400	XVPC04	**48.00**
	Off-white	4	100	XVPC02W	**40.35**
		10	250	XVPC03W	**40.35**
		16	400	XVPC04W	**48.00**
Wall mounting bracket (plastic)	Black	—		XVPC12	**15.60**
	Off-white	—		XVPC12W	
Bulb mounting and removal tool	—	—		XVPCX13	**7.80**

XVPC02

XVPC12

Wiring Diagram

Cable Connections, Supply line maximum: 1.5 mm^2 (16 AWG)



XVPC21

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XVS14BMW

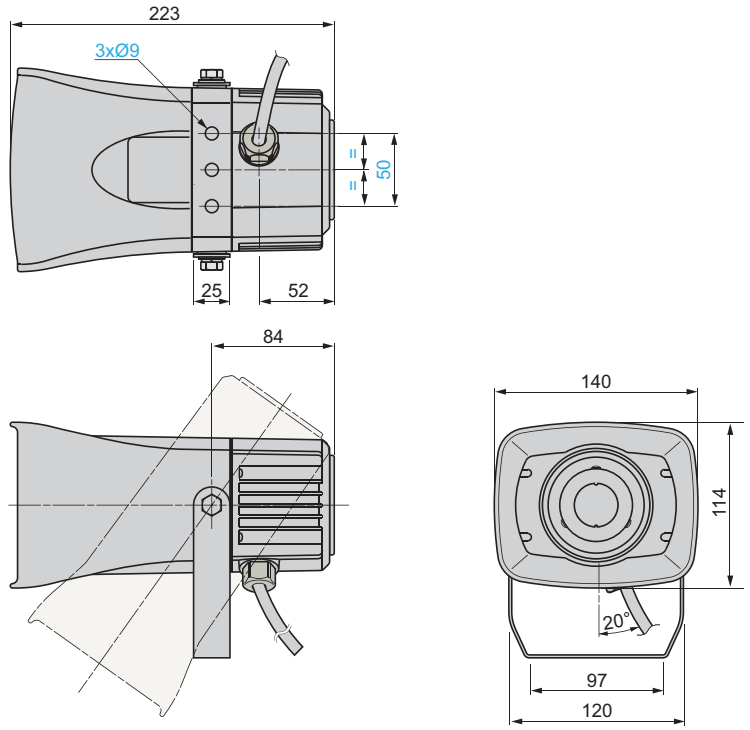
Table 19.349: XVS Sirens and Electronic Alarms

Description	Voltage	Color	Catalog Number	$ Price
Multisound siren 105 dB, 43 tones	12/24 Vdc	White	XVS 14BMW	**360.00**
Electronic alarms 90 dB, 16 tones Panel Mount DIN72	12/24 Vac/Vdc	PNP, Black	XVS 72BMBP	**180.00**
		PNP, White	XVS 72BMWP	
		NPN, Black	XVS 72BMBN	
		NPN, White	XVS 72BMWN	

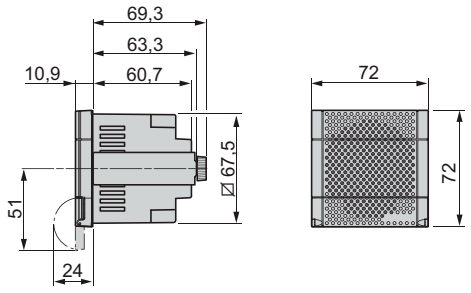
XVS72BM

Table 19.350: Dimensions (mm)

XVS 14BMW



XVS 72BM●●



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This pre-assembled, two-button station now comes complete with internal and external strain relief. Oversized finger grips on the rear of the enclosure make it easy to grip and operate.

- Well suited for standard hoist applications
- Push button legend inserts
- Field-installable mushroom button
- Full cover gasket, to exclude harmful contaminants

BW90 / BW100

Table 19.351: BW90 and BW100 Pendant Stations – with cord connector and strain relief

Description	Legend Insert Markings	Mechanical Interlock	Enclosure Color			$ Price	Contact Symbol	Replacement Interior ■		
			Yellow	Black	Red			9001 Type	Contact Symbol	$ Price
Single Speed	Up-Down	Yes	BW92Y	BW92B	BW92R	**136.00**	146	BOC368	146	**90.00**
	Forward-Reverse	Yes	BW93Y	BW93B	BW93R		146	BOC368	146	
	On-Off ▲	Yes	BW94Y	BW94B	BW94R	**180.00**	10	BOC358	147	
	Start-Stop	No	BW95Y	BW95B	BW95R	**136.00**	145	BOC359	25	
	Start-Stop ▲	Yes	BW96Y	BW96B	BW96R	**180.00**	10	BOC358	147	
	On-Off ▲	No	BW97Y	BW97B	BW97R	**136.00**	146	BOC359	25	
	Up-Down	Yes	BW98Y	BW98B	—	**147.00**	100	—	—	—
	without Inserts	Yes	BW90YU	BW90BU	BW90RU	**130.00**	147	BOC366	25	**90.00**
	without Inserts	No	BW91YU	BW91BU	BW91RU		25	BOC359	25	
	without Inserts ▲	Yes	BW94YU	BW94BU	BW94RU	**172.00**	147	BOC358	147	
Two Speed	without Inserts	Yes	BW100YU	BW100BU	BW100RU	**195.00**	150	BOC367	150	**158.00**
	Up-Down	Yes	BW102Y	BW102B	BW102R	**202.00**	150	BOC367	150	

▲ Maintained Contact
■ Includes gasket

Y236

Table 19.352: Hanger Bracket

Description	Form	$ Price
External Bracket (cannot be field installed)	Y236	**10.50**

Table 19.353: Interchangeable Legend Inserts ♦

Marking	Type	$ Price
Start	B259	**3.60**
Stop	B260	
Forward	B255	
Reverse	B256	
Open	B263	
Close	B264	
Raise	B261	
Lower	B262	
Up	B253	
Down	B254	
On	B257	
Off	B258	
Blank - black	B251	
Blank - red	B252	

♦ Order must specify a quantity of 10 or multiples of 10.

Table 19.354: Replacement Enclosures

Description	Color	Type	$ Price
Box & Cover with 4 screws	Yellow	BWRY	**54.00**
	Red	BWRR	
	Black	BWRB	

BWSR

Table 19.355: Strain Relief Replacement

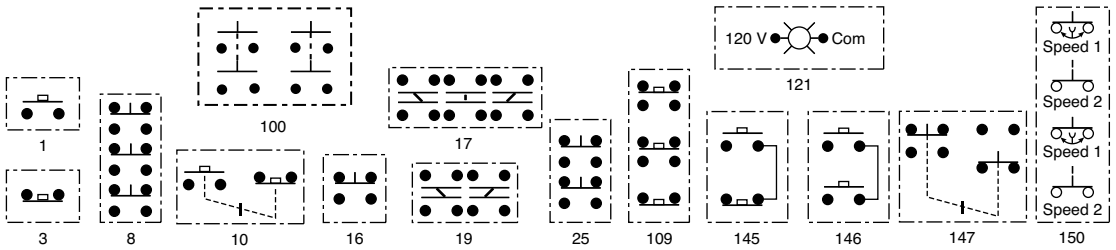
Description	Type	$ Price
Strain Relief Replacement	BWSR	**10.00**

Table 19.356: Electrical Contact Ratings ★

Volts	AC—NEMA B600						DC—NEMA P600		
	Inductive 35% Power Factor					Resistive 75% Power Factor	Volts	Inductive and Resistive	
	Make		Break		Continuous Carrying Amperes	Make, Break and Continuous Carrying Amperes		Make and Break Amperes	Continuous Carrying Amperes
	A	VA	A	VA					
120	30.5	3600	3.75	360	5	5	120	1.1	5
240	15	3600	1.5	360	5	5	240	0.55	5
480	7.5	3600	.75	360	5	5	600	0.2	5
600	6	3600	.6	360	5	5			

★ OSHA Regulation, Section 1910.70, Overhead and Gantry Cranes, limits the voltage of pendant push buttons to 150 Vac or 300 Vdc.

Contact Symbols



NOTE: *When ordering, add prefix 9001 to the catalog number.*

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XAC Standard Duty Pistol Grips, Enclosures, Contact Blocks

Refer to Catalog **9001CT1001**

XAC pendant stations are designed for standard- or medium-duty control circuit applications.

- Single- or two-speed versions
- Double insulated
- Shock and corrosion resistant
- 2, 4, 6, 8, 12 element versions
- Ease of operation

XACA201

XACA06

XACA03 with operators

Table 19.357: Pistol Grip Stations

Description	Speeds	Function 1 speed/2 speed	Catalog Number	$ Price
1 N.O. contact per operator 2 Mechanically interlocked operators	1		XACA201▲	**150.00**
2 N.O. (staggered) contacts per operator 2 Mechanically interlocked operators	2		XACA207▲	**222.00**
1 N.O. + 1 N.C. 2 Mechanically interlocked operators	1		XACA205▲	**187.00**
1 N.O. contact per direction 1 Mechanically interlocked 2 way toggle	1		XACD21A0101■	**167.00**
1 N.O. + 1 N.O. staggered 1 Mechanically interlocked 2 way toggle	2		XACD21A1231■	**451.00**
1 N.O. & 1 N.C. contact per direction 1 Mechanically interlocked 2 way toggle	1		XACD21A0105■	**202.00**
1 N.C. + 1 N.O. + 1 N.O. staggered 1 Mechanically interlocked 2 way toggle	2		XACD21A1241■	**480.00**

▲ These units are available with factory installed E-stops. Add a "3" to the end of the catalog number for standard E-stop or add a "4" for a trigger action E-stop.

■ These units are available with a factory installed E-stop. Use XACD22••• for a standard E-stop or XACD24••• for a trigger action E-stop.

Note: Legends are required to achieve NEMA4 rating.

Table 19.358: General Purpose Pendants♦★

Enclosures	Catalog Number	$ Price
2 hole enclosure	XACA02H7	**192.00**
3 hole enclosure	XACA03H7	**220.00**
4 hole enclosure	XACA04H7	**250.00**
6 hole enclosure	XACA06H7	**306.00**
8 hole enclosure	XACA08H7	**382.00**
12 hole enclosure	XACA12H7	**478.00**

♦ Standard enclosures include internal mounting plate, cable sleeve for 8 to 26 mm, internal cable clamp, suspension ring and cable tie.

★ For ordering information on custom built XACA pendants, visit our website at www.Schneider-Electric.us.

To place a custom pendant order, use the worksheet on page 19-121 as a guide. Orders must be placed through the Product Selector in Quote to Cash. There is a 10% charge for assembly.

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ZB2BE10

XENG37

Table 19.359: Contact Blocks for Operators in Cover

Description	Wiring Diagram	Catalog Number	$ Price
1 N.O./spring return/1 speed	—	ZB2BE101	16.40
1 N.C./spring return/1 speed	—	ZB2BE102	
1 N.O. early close & 1 N.C. & 1 N.O./spring return/2 speed	Figure 1	XENG1191	49.00
1 N.C. & 2 N.O./spring return/1 speed	Figure 2	XENG1491	
1 N.O. & 1 N.O. latching/1 speed/interlocked	Figure 3	XENG3781	
1 N.O. & 1 N.C. latching/1 speed/interlocked	Figure 4	XENG3791	
3 N.C.—all ⊕ direct acting	Figure 5	XENT1192	

XENG1191

XACS10

Table 19.360: Contact Blocks for Operators in Base of Enclosure ▲

1 N.O./1 speed	XACS101	28.60
1 N.C./1 speed	XACS102	
2 N.O./1 speed	XACS103	38.20
2 N.C./1 speed	XACS104	
1 N.O. & 1 N.C./1 speed	XACS105	

▲ Cannot be used with **XACA03** pendant.

Wiring Diagrams

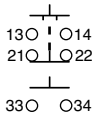

Figure 1

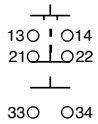

Figure 2

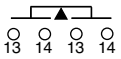

Figure 3

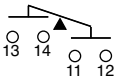

Figure 4

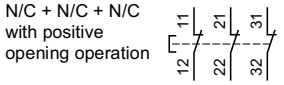

Figure 5

Table 19.361: Operators ■

Description	Color	Catalog Number	$ Price
Booted push button	White	XACA9411	8.20
	Black	XACA9412	
	Green	XACA9413	
	Red	XACA9414	
	Yellow	XACA9415	
	Blue	XACA9416	
	Brown	XACA9419	

Booted Push Button

Table 19.362: Mushroom Operators

Description	Mushroom Size	Color	Catalog Number	$ Price
Mushroom head, momentary	30 mm	Red	ZA2BC44	36.80
Mushroom head, push to maintain/turn-to-release	30 mm	Red	ZA2BS44	79.00
	40 mm	Red	ZA2BS54	
Mushroom head, push to maintain/turn-to-release (trigger action)♦	30 mm	Red	ZA2BS834	112.00
	40 mm	Red	ZA2BS844	
Mushroom head, push to maintain/key turn-to-release	30 mm	Red	ZA2BS74	
	40 mm	Red	ZA2BS14	
Mushroom head, push to maintain/key turn-to-release (trigger action)♦	40 mm	Red	ZA2BS944	

Mushroom Head

Table 19.363: Selector Switches and Wobble Stick

Description	Color	Catalog Number	$ Price
Selector switch/2 position—maintained★	Black	ZA2BD2	30.00
Selector switch/3 position—maintained★	Black	ZA2BD3	
Selector switch/2 position—maintained key operated—key removal from LT or RT position★	NA	ZA2BG4	112.00
Selector switch/3 position—maintained key operated—key removal from LT or RT position★	NA	ZA2BG5	
Wobble stick (bottom mounting recommended)	Black	ZA2BB2	102.00
	Red	ZA2BB4	

Selector Switch

Table 19.364: Pilot Light Components

Description	Color	Catalog Number	$ Price
Direct supply base/without lamp (for 6 to 120 V applications) (AC/DC) ▼	—	ZB2BV006	24.60

Selector Switch
(key operated)

■ Booted push buttons are for cover mounting only. All other operators can be mounted on cover or bottom.
♦ Trigger action mushroom heads are tamper proof in that a change of contact state is not possible by teasing or floating the operator.
★ Not for use with XEN G contact blocks.
▼ For lamps, see page 19-120.

Wobble Stick

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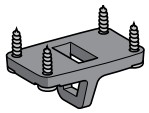
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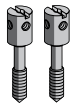
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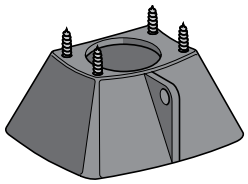
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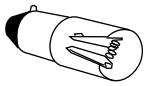
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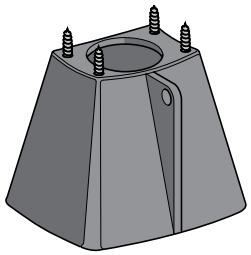
(Incandescent)


XACA983

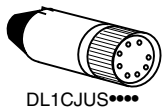

DL1CJUS••••
(LED)

Table 19.365: Enclosure Accessories

Description	Catalog Number	$ Price
Blank hole plug	ZB2SZ3	**13.60**
Mechanical interlock (momentary). For use with XAC booted operators only	XACA009	**8.20**
Screw adapter for self-supporting cable	XACB961	**6.80**
Low suspension ring for single row station	XACA971	**19.20**
Protective guard for bottom mounted mushroom head	XACA982	
Protective guard for bottom mounted selector switch or key switch	XACA983	**27.40**

Table 19.366: Lamps

Type	Voltage	Watts	Catalog Number	$ Price
Replacement bulbs (Type BA9s) Incandescent	6 Vac/Vdc	1.2	DL1CB006	**11.00**
	12 Vac/Vdc	2.0	DL1CE012	
	24 Vac/Vdc	2.0	DL1CE024	
	48 Vac/Vdc	2.4	DL1CE048	
	130 Vac/Vdc	2.6	DL1CE130	

Table 19.367: LED, BA9s Base

Type	Color	Voltage	Catalog Number	$ Price
LED, BA9s base for Direct Supply blocks	Green	6 Vac/Vdc	DL1CJUS0063	**25.00**
	Red	6 Vac/Vdc	DL1CJUS0064	
	Amber	6 Vac/Vdc	DL1CJUS0065	
	Green	24 Vac/Vdc	DL1CJUS0243	
	Red	24 Vac/Vdc	DL1CJUS0244	
	Amber	24 Vac/Vdc	DL1CJUS0245	
	White	24 Vac/Vdc	DL1CJ0241	
	Blue	24 Vac/Vdc	DL1CJ0246	
	Green	120 Vac/Vdc	DL1CJUS1203	
	Red	120 Vac/Vdc	DL1CJUS1204	
	Amber	120 Vac/Vdc	DL1CJUS1205	

Table 19.368: PVC Standard Legend Plates 30 x 40 mm

Text▲	Catalog Number	$ Price	Text▲	Catalog Number	$ Price	Text▲	Catalog Number	$ Price
Bridge Forward	ZB2BY2343		Left	ZB2BY2310		Stop	ZB2BY2304	
Bridge Reverse	ZB2BY2344		Low	ZB2BY2336		Stop Start	ZB2BY2366	
Close	ZB2BY2314		Lower	ZB2BY2337		Trolley Right	ZB2BY2345	
Down	ZB2BY2308		Man Auto	ZB2BY2372		Trolley Left	ZB2BY2346	
Emergency Stop	ZB2BY2330		Off	ZB2BY2312		Up	ZB2BY2307	
Fast	ZB2BY2328		On	ZB2BY2311		Up Down	ZB2BY2370	
Forward	ZB2BY2305		Off On	ZB2BY2367		Up-O-Down	ZB2BY2389	
For Rev	ZB2BY2371		Open	ZB2BY2313		North	6516002379	
For-O-Rev	ZB2BY2384		Open Close	ZB2BY2376		South	6516002380	
Hand Off Auto	ZB2BY2387	**4.20**	Open-O-Close	ZB2BY2388	**4.20**	East	6516002381	**4.20**
High	ZB2BY2338		Out	ZB2BY2339		West	6516002382	
High Low	ZB2BY2369		Power On	ZB2BY2326				
Hoist Down	ZB2BY2342		Raise	ZB2BY2335				
Hoist Up	ZB2BY2341		Reset▲	ZB2BY2323				
In	ZB2BY2503		Reverse	ZB2BY2306				
Inch	ZB2BY2321		Right	ZB2BY2309				
Jog For	ZB2BY2381		Run	ZB2BY2334				
Jog Rev	ZB2BY2380		Slow	ZB2BY2327				
Jog Run	ZB2BY2365		Start	ZB2BY2303				

▲ All nameplates are black with white lettering except “Stop”, “Emergency Stop” and “Reset” which are red with white lettering. For black “Reset” change final digit of catalog number to 2.

Type	Description		Catalog Number	$ Price
PVC blank legend	Blank	Black or red background—30 mm x 40 mm	ZB2BY2101	**4.20**
	Blank	Yellow or white background—30 mm x 40 mm	ZB2BY4101	
PVC custom engraved	Special engraving■	Black background, white letters—30 mm x 40 mm	ZB2BY2002	**17.80**
	Special engraving■	White background, black letters—30 mm x 40 mm	ZB2BY4001	

■ Please specify lettering when ordering. Two lines with 11 characters (including spaces) maximum on each plate.

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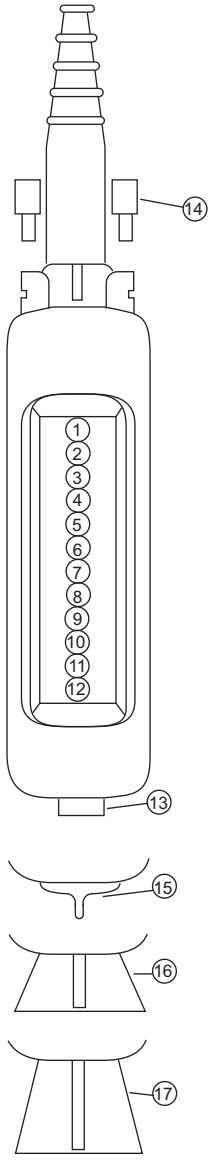
Type XACA Worksheet



Use this worksheet to assist in component selection. Custom orders for XACA pendant stations must be placed through the Product Selector in Quote to Cash. There is a 10% charge for assembly.

XACA Order Guide Instructions

Custom built pendant stations

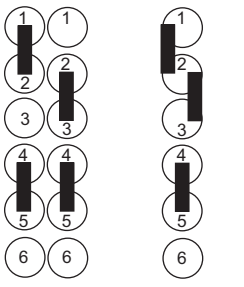
1. Determine the number of operators needed, then choose an enclosure with a corresponding number of holes.
2. Select the type of operator, contact block, and appropriate nameplate for each function required.
3. Check for special functions that may be required. These items could include mechanical interlocks, adapters for self-supporting cable, lower support rings, protective guards, etc.

Catalog number of enclosure **XACA** ☐ ☐ ☐ ☐

Functions (optional)	Mechanical interlock (draw a vertical line between the 2 units to be interlocked ▲)	Legends	Contact blocks and pilot light bodies	Push button Pilot light or Blanking plug
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			

▲ Mechanical interlock XACA009 — Number of XACA009 required

Mechanical Interlock (XACA009)



Unit mounted in base of station (facing downwards)

	13			

Attachments

Position	Type	Catalog No.
14	Adapters for self-supporting cable type BBAP (available only with cable sleeve Ø8–26 mm)	**XACB961**
15	Lower support ring	**XACA971**
16	Protective guard for base mounted selector switch or 40 mm emergency-stop push button	**XACA982**
17	Protective guard for key switch	**XACA983**

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This line of pendant stations consists of polymeric enclosures (2 through 10 units), push button units (1 through 5 speed) and laminated legend plates. All enclosures have an extra single unit space near the top which permits the installation of a toggle switch, a Type SK operator or pilot light, or a warning label. All enclosures come with a stainless steel hanger bracket and internal strain relief post. Enclosures are yellow and have a threaded opening in the top.

NOTE: *When ordering, add prefix 9001 to the catalog number.*

Table 19.369: Enclosure Catalog Numbers

Number of Buttons	Conduit Entrance Size	Enclosure Only▲ Cat. No.	$ Price	Enclosure For Assembled Station■ Cat. No.	$ Price
2	3/4"-14 NPT	SKYP2	**189.00**	SKYP20	♦
4	3/4"-14 NPT	SKYP4	**239.00**	SKYP40	
6	1"-11 1/2 NPT	SKYP6	**287.00**	SKYP60	
8	1 1/4"-11 1/2 NPT	SKYP8	**356.00**	SKYP80	
10	1 1/4"-11 1/2 NPT	SKYP10	**428.00**	SKYP100	

▲ Class 9001 SK push-to-test pilot lights and remote test pilot lights will not fit in these enclosures.

■ Assembled pendant stations consist of an enclosure, operators and legend plates. All custom orders must include the pendant key sheet available as shown on page 19-123.

♦ The price of an assembled pendant SKYP station includes the enclosure and components plus a 10% assembly charge. (Example: 9001 SKYP2 ($189), + SKRU1 ($129), + SKN201 ($8.60) = $326.60 + 10% = $360.

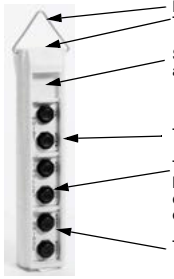


Table 19.370: Push Button Units

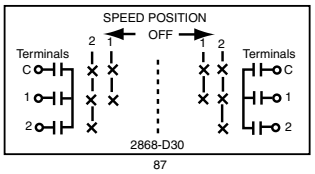
	Number of Buttons per Unit	Description	Contact Symbol – See Below	Cat. No.★	$ Price
	2	Single Speed – Momentary Interlocked	7	SKRU1	**129.00**▼
	2	Single Speed – Momentary Non-Interlocked	5	SKRU10	**107.00**▼
	2	Single Speed – Maintained Interlock	10	SKRU11	**149.00**▼
	2	Two Speed – Momentary Interlocked	87	SKRU2	**270.00**△
	2	Three Speed – Momentary Interlocked	88	SKRU3	**320.00**△
	2	Four Speed – Momentary Interlocked	89	SKRU4	**341.00**△
	2	Five Speed – Momentary Interlocked	90	SKRU5	**356.00**△

★ Types SKRU 1, 10 and 11 use Type KA contact blocks. Types SKRU 2 thru 5 are factory enclosed contact blocks.

▼ Boot part number is 9001KU1.

△ Boot part number is 9001KU37.

Figure 19.3: Multispeed Contact Symbols (X = Contact Closed)



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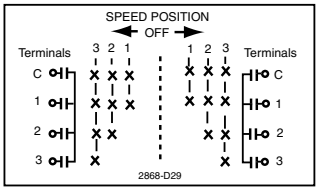

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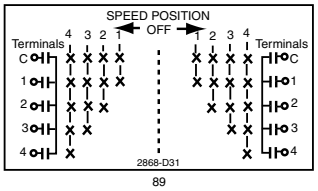

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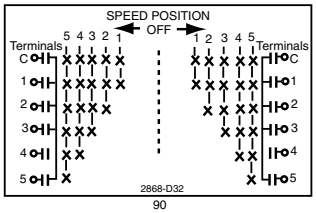

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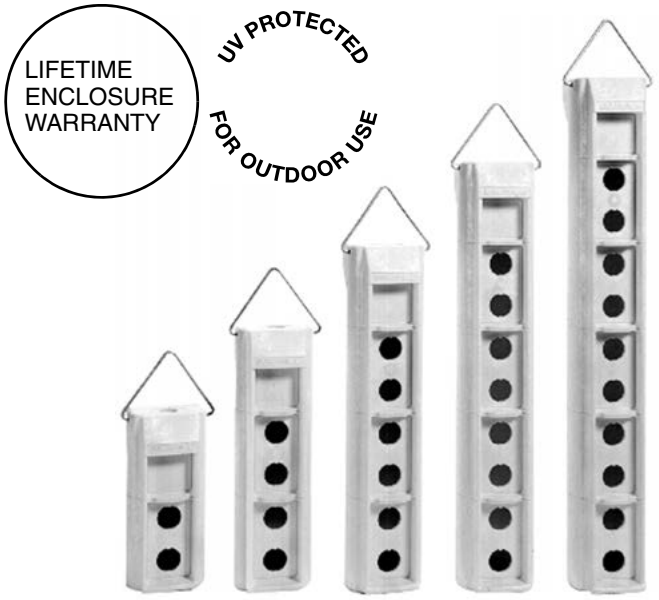


Table 19.371: Legend Plate Catalog Numbers

	Where Used	Marking	Cat. No.	$ Price
	For SKRU1 through SKRU11	Blank-Blank Hoist: Up-Down Trolley: East-West Trolley: Fwd.-Rev. Trolley: North-South Bridge: Fwd.-Rev. Bridge: East-West Bridge: North-South Start-Stop Reset-Stop Aux Hoist: Up-Down Power: On-Off	SKN200◒ SKN201 SKN202 SKN203 SKN204 SKN205 SKN206 SKN207 SKN208 SKN209 SKN210 SKN211	**8.60**
		Specify Marking	SKN299◒	**37.20**
	With toggle switch□ in top space of enclosure	Blank Off-On On-Off	SKN500☆ SKN544☆ SKN545☆	**12.90**
		Specify Marking	SKN599☆	**27.00**
	With 9001SK◊ operator or pilot light in top space of enclosure	Blank On Off Emerg. Stop Run Power On Off-On	SKN100▽ SKN103 SKN104 SKN105 SKN124 SKN138 SKN144	**4.40**
		Specify Marking	SKN199▽	**18.50**

□ Can be supplied by Square D as Class 9001 Type SKSTS1- includes boot for NEMA Type 4X.

◊ See 9001SK on pages 19-77 thru 19-84.

☆ Includes legend plate, gasket and ground plate to be used with toggle switch.

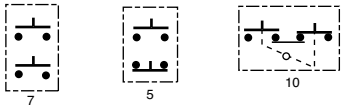
▽ Tri-laminated legend plate having a yellow or red background on a black core.

◒ 19 characters each side max.

Table 19.372: Closing Plate Catalog Number

	Cat. No.	$ Price
	SK52	**14.30**

Figure 19.4: Single Speed Contact Symbols


7 5 10

Worksheet for Custom Assembled Pendant . . . . . Page 19-123

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Type SKYP Worksheet

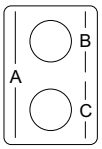
Control Products

Use this worksheet to assist in component selection. SKYP Custom Pendant orders must be placed through the Product Selector in Quote to Cash. There is a 10% charge for assembly.

Class **9001** Type **SKYP -_____**

1. Operator or Closing Plate. Example - SKRU1
2. Legend Plate Type Number Example - SKN201
3. Legend Plate Marking ▲ – Used Only if Special Marking is Required Example:
   Line 2 - SKN299
   Line 3 - A.) Hoist
   B.) FWD
   C.) REV

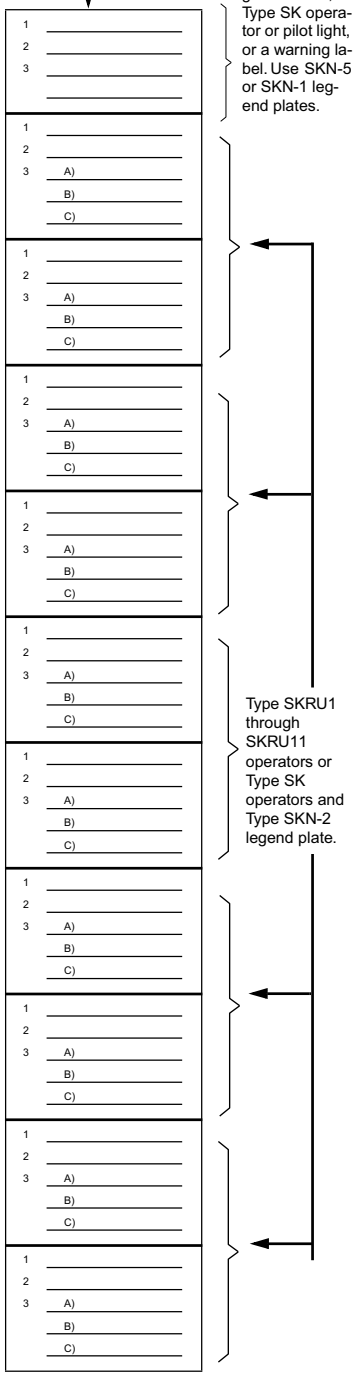
When operator and legend plate use 2 adjacent holes - specify same in both locations. Example:



1 SKRU1
2 SKN201
3 _____

1 SKRU1
2 SKN201
3 _____

TYPE NUMBER KEY



ENCLOSURES – NEMA 4X, 13

Size	Conduit Entrance Size	Enclosure for Assembled Station ▲ Type
2 Button	$^{3}/_{4}$" -14 NPT	SKYP20
4 Button	$^{3}/_{4}$" -14 NPT	SKYP40
6 Button	1" -14 NPT	SKYP60
8 Button	$1^{1}/_{4}$" -11 $^{1}/_{2}$	SKYP80
10 Button	$1^{1}/_{4}$" -11 $^{1}/_{2}$	SKYP100

▲ Assembled pendant stations consist of an enclosure, operators, and legend plates.

PUSH BUTTON UNITS – NEMA / UL 4X, 13

Number of Buttons per Unit	Description	Contact Symbol	Type
2	Single Speed - Momentary Interlocked	7	SKRU1
2	Single Speed - Momentary Non-Interlocked	5	SKRU10
2	Single Speed - Maintained Interlocked	10	SKRU11
2	Two Speed - Momentary Interlocked	87	SKRU2
2	Three Speed - Momentary Interlocked	88	SKRU3
2	Four Speed - Momentary Interlocked	89	SKRU4
2	Five Speed - Momentary Interlocked	90	SKRU5

LEGEND PLATES – NEMA / UL 4X, 13

Where Used	Marking	Type
For SKRU1 through SKRU11	Blank-Blank Hoist: Up-Down Trolley: East-West Trolley: Fwd.-Rev. Trolley: North-South Bridge: Fwd.-Rev. Bridge: East-West Bridge: North-South Start-Stop Reset-Stop Specify Marking	SKN200④ SKN201 SKN202 SKN203 SKN204 SKN205 SKN206 SKN207 SKN208 SKN209 SKN299④
With Toggle Switch ① in Top Space of Enclosure	Blank Off-On On-Off Specify Marking	SKN500 ② SKN544 ② SKN545 ② SKN599 ②
With Type SK Operator ▲ or Pilot Light in Top Space of Enclosure	Blank On Off Emerg. Stop Run Power On Off-On Specify Marking Specify Marking (Red Background)	SKN100 ③ SKN103 SKN104 SKN105 SKN124 SKN138 SKN144 SKN199 ③ SKN199R ③

① Available as 9001SKSTS1
② Includes legend plate, gasket and ground plate to be used with toggle switch.
③ Tri-laminated legend plate having a yellow or red background on a black core.
④ 19 characters each side.
▲ Class 9001 Type SK Push-To-Test Pilot lights and Remote Test Pilot lights will not fit in these enclosures.

CLOSING PLATE

Type
SK52

The price of the total station consists of the price of each individual component plus a 10% charge for assembly.

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Heavy Duty Industrial Foot Switches—Oiltight, Watertight, Dusttight and Driptight Enclosure, NEMA 2, 4 and 13

⚠ DANGER

HAZARDOUS APPLICATIONS

Do not use foot switches on machines without point-of-operation protection.

Failure to follow these instructions will result in death, serious injury, or equipment damage.

AW2
Type AW Foot Switch with Top Pedal Shield and Side Shields

Foot Switch Selection

Foot switches are used to control many industrial processes, while leaving the operator's hands free to perform other functions. The type or model of foot switch suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications more than one foot switch may be required, as when two or more persons are operating a machine. In these cases, safe practice and regulations require that the foot switches be wired in series making it necessary that each operator's foot switch be actuated before the machine will cycle.

Only the user can be aware of all the conditions and factors present during setup, operation and maintenance of the machine; therefore, only the user can determine which foot switch(es) can be properly used. When selecting a foot switch for a particular application, the user should refer to the applicable ANSI standards and OSHA regulations. The National Safety Council's Accident Prevention Manual also provides much useful information.

AW132
Type AW with Oversized Pedal Shield and Side Shields

In some applications, such as power presses, additional operator protection such as point-of-operation guarding must be provided when a foot switch is used as an actuator. This is necessary since the operator's hands and other parts of the body are free to enter the pinch point area and serious injury can occur. The shielding provided on foot switches cannot protect an operator from injury. For this reason the foot switch cannot be substituted for or take the place of point-of-operation protection.

A Trilingual Danger Sign regarding the need for point-of-operation protection is supplied with each foot switch. The sign incorporates three languages: English, Spanish and French. Additional copies of the sign are available by contacting your Square D sales office.

AW124

Type AW Fully Shielded Foot Switch with Oversized Pedal Shield, Side Shields and Safety Door. The Safety Door is interlocked with the pedal to prevent operation due to shock or vibration. It prevents accidental pedal operation by requiring a simple but intentional motion to lift the door before inserting the foot.

AW117
Type AW with Oversized Pedal Shield, Side Shields and Safety Door

Operating Temperature: –30 to +60 °C (–22 to +140 °F)

NOTE: *When ordering, add prefix "9002" to the catalog number.*

Table 19.373: Foot Switch Catalog Numbers

Description	Features	Fully Shielded with Oversized Pedal Shield, Side Shields and Safety Door		With Oversized Pedal Shield and Side Shields		With Pedal Shield and Side Shields		UNSHIELDED (See Warning note★)	
		Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price	Cat. No.	$ Price
Single Pole■ Double Throw	Spring Return With Mechanical Latch	AW117 —	**750.00** —	AW132 —	**750.00** —	AW2 AW7	**363.00** **527.00**	AW1 —	**396.00** —
Two Pole ■ Double Throw	Spring Return With Mechanical Latch	AW124▲ —	**903.00** —	AW133 —	**903.00** —	AW14 AW15	**527.00** **692.00**	AW13 —	**575.00** —
Two Stage ■ (One Pole Each Stage) Table 1	Spring Return With Mechanical Latch in 1st Stage With Mechanical Latch in 2nd Stage	AW119 — —	**930.00** — —	AW134 — —	**930.00** — —	AW6 AW9 AW10	**543.00** **705.00** **705.00**	AW5 — —	**590.00** — —
Four Stage ■ (One Pole Each Stage) Table 2	Spring Return	AW123	**1295.00**	—	—	AW22	**912.00**	AW21	**995.00**
Single Pole Single Throw	Maintained Contact—Push On/Push Off	—	—	—	—	AW12	**527.00**	AW11	**575.00**
Replacement Cover Assembly	—	AC5	**363.00**	AC7	**363.00**	AC8♦	**140.00**	AC1	**153.00**

▲ 2 N.O. and 2 N.C. isolated, direct acting contacts.

■ A single pole snap switch that contains two double break contact elements (1 N.O. and 1 N.C.) must be used on circuits of same polarity. A double pole snap switch contains two electrically separated sets of contact elements allowing use on circuits of opposite polarity. Each set that contains two double break contact elements (1 N.O. and 1 N.C.) must be used on circuits of same polarity.

♦ For replacement cover drilled to accept latch. For Series C foot switches order AC9. Price is **$182.00** No replacement cover available for Series A or B devices drilled to accept latch. AC8 is spring return only.

★ WARNING: These foot switches must not be used to operate machines or equipment where the possibility of operator injury exists. Typical uses include Emergency Stop functions, "Dead Man" controls, signal functions (lights, bells, etc.).

AW1
Type AW Foot Switch without Pedal Shield

File CCN E42259 NKCR

File Class LR25490 184 N 13.1U

For **replacement parts** for Class 9002 Type AW: See instruction bulletin 65013-010-31.
For **contact symbol tables**, see page 19-125

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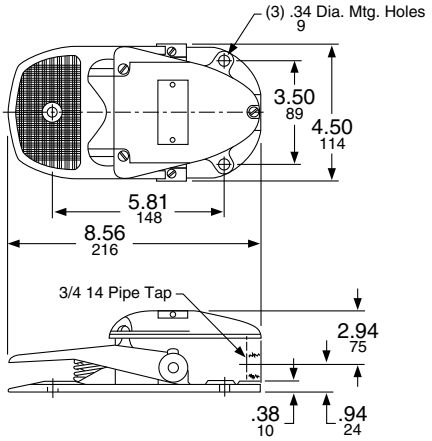
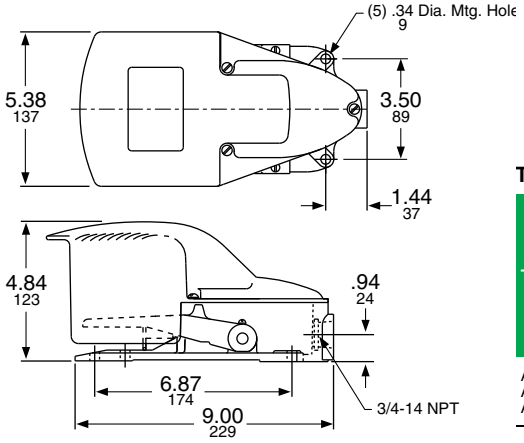


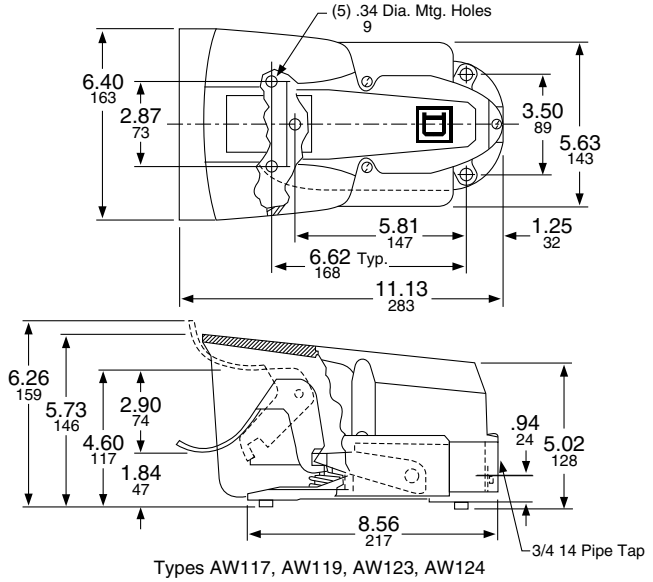
Types AW1, AW5, AW11, AW13 and AW21



Types AW2, AW6, AW12, AW14 and AW22

Dual Dimensions: **INCHES** Millimeters

Approximate Dimensions



Types AW117, AW119, AW123, AW124
Types AW132, AW133 and AW134 (without safety door)

Table 19.374: Maximum Current Ratings For Control Circuit Contacts

Type	Volts	AC Amperes			Volts	DC Amperes		
		Inductive 35% Power Factor		Resistive 75% Power Factor		Inductive and Resistive		
						Make and Break		
		Make	Break	Make, Break and Continuous		Single Throw	Double Throw	Continuous
AW1 through AW10, AW117, AW119, AW132	120 240 480 600	40 20 10 8	15 10 6 5	15 10 6 5	125 250 600	2.0 0.5 0.1	0.5 0.2 0.02	15 15 15
AW13, AW14, AW15, AW133	120 240 480 600	30 15 7.5 6	3 1.5 0.75 0.6	3 1.5 0.75 0.6	125 250 600 —	1.0 0.3 0.1 —	0.2 0.1 — —	10 10 10 —
AW11, AW12	115 230	36 18	6 3	— —	125 250	2.2 1.1	— —	— —
AW21, AW22, AW123	120 240 480 600	15.0 7.5 3.75 3.0	1.5 0.75 0.375 0.3	10 10 10 10	— — — —	— — — —	— — — —	— — — —
AW124	120 240 480 600	60 30 15 12	6 3 1.5 1.2	10 10 10 10	120 240 600	1.1 0.55 0.2	— — —	10 10 10

Note: Double throw switches are rated 250 Vdc maximum.

Table 19.375: Contact Symbol—Two Stage

Snap Switch		Pedal		
Unit	Circuit	Up	Half Down	Full Down
1	A1 B1	0 1	1 0	1 0
2	A2 B2	1 0	1 0	0 1

Note: 0 = Open 1 = Closed

Table 19.376: Contact Symbol—Four Stage

Snap Switch		Pedal Position				
Unit	Circuit	Up → Down				
1	1A1	0	0	1	1	1
	1B1	1	1	0	0	0
	2A1	0	1	1	1	1
	2B1	1	0	0	0	0
2	1A2	1	1	1	0	0
	1B2	0	0	0	1	1
	2A2	1	1	1	1	0
	2B2	0	0	0	0	1

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Table 19.377: Rotary Cam Switches

Applications		Used in building control panels and consoles, Type K cam switches allow control of processes and utilities in industry and buildings, and direct control for simple machines.					
Functions	Off-On/On-Off switches	1 to 6-pole	1 to 6-pole				
	Stepping switches	2 to 12-position, 1 to 4-pole	–				
	Changeover switches	1 to 5-pole	1 to 4-pole				
	Measurement switches	Voltmeter and ammeter	–				
	Reversing switches	2 and 3-pole	2 and 3-pole				
	Reversing star-delta switches	Star-delta	Star-delta				
	Pole change switches	2 and 3-speed	2-speed				
Conventional rated thermal current (Ith)		20 A	32 A	50 A	63 A	115 A	150 A
Rated insulation voltage (Ui)		690 V	690 V	690 V	690 V	690 V	690 V
Electrical operating characteristics		AC-3 - 3-phase	AC-3 - 3-phase	AC-3 - 3-phase	AC-3 - 3-phase	AC-3 - 3-phase	AC-3 - 3-phase
		230 V - 2.2 kW - 8.3 A	230 V - 5.5 kW	230 V - 7.5 kW	230 V - kW	230 V - 5 kW	230 V - 22 kW
		AC - 15	AC - 15	AC - 15	–	–	–
		230 V - 4 A	230 V - 14 A	230 V - 6 A			
Front plate degree of protection		IP 40	IP 40				
		IP 65 (with seal)					
Product composition		Complete switches and custom	Complete switches				
		Adaptable sub-assemblies					
Compatibility		Ø 22 control and signalling units	–				
Mounting	Front mounting	Multi-fixing	By 4 holes on 48 mm centers			By 4 holes on 68 mm centers	
		Single Ø 22 hole					
	Rear mounting	Screw fixing, 4 holes on 36 mm centers	Screw fixing, 4 holes on 48 mm centers			Screw fixing, 4 holes on 68 mm centers	
Front plate dimensions (mm)		45 x 45	64 x 64			88 x 88	
		60 x 60 (adaptable sub-assemblies)					
Operating heads		Black and red standard and long handles	Black standard handle Metallic legend, black marking				
		Key operator					
		Metallic head					
		Metallic legend with black marking or					
		black legend with white marking					
Approvals		UL-CSA	cULus EN/IEC 60947-3				
		EN/IEC 60947-3					
		EN/IEC 60947-5-1					
Type		Type K2	Type K30–K150				
Cam switch model ▲		**Class 9003, K2**	**K30**	**K50**	**K63**	**K115**	**K150**

Instructions for the Key Sheet on page 19-127

1. From the chart below, choose the switching angle as determined on the key sheet (see page 19-127). This identifies the angular location and the position numbers for the various positions of the rotary cam switch. **Zero degrees or straight up is always position 1**. Use these position numbers when completing the target table.
2. Terminals on the cam switch have the same numbers as the terminal numbers on the target table. **Contact 1-2 is a single contact.**

NOTE: *When indicating a contact closure, place "X" within the square as shown in the contact sequence example.*

Explanation of the Contact Sequence Example Below

1. Contact 1-2 is open in all positions except position 2.
2. Contact 3-4 is closed from the 2nd through the 4th position. The contact does not open while switching from one position to another.
3. Contacts 5-6 and 7-8 overlap between positions 2 and 3.
4. Contact 9-10 is closed in positions 2 and 3. It is open momentarily while switching between positions 2 and 3.
5. Contact 11-12 closes mementarily when switching from position 2 to positiion 3. This contact is not closed in position 2 or position 3.

NOTE: *Position 1 is an off position*

Table 19.378: Switching Angle Chart

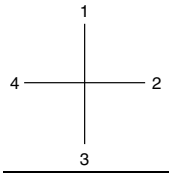
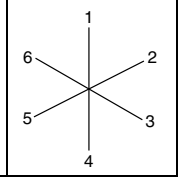
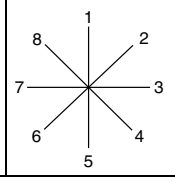
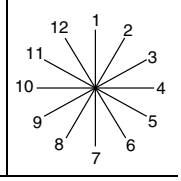
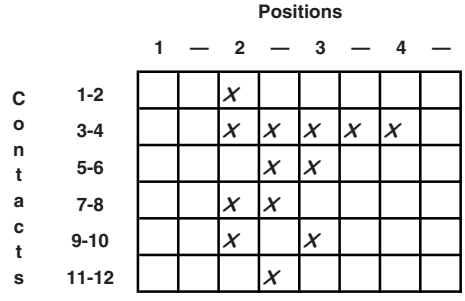
90 °	60 °	45 °	30 °
			

Figure 19.5: Contact Sequence Example



▲ Incomplete part numbers. Contact your local supplier for assistance.

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See Instructions on page 19-126.

Customer			F,O. NO.	
Date		P.O. Number	Qty	

To order custom cam switches:

1. Indicate the contact size at right (9003 K2)
2. Indicate the desired switching angle at right. **If the switching angle is not indicated, the factory will determine the angle from the table to the right.**
3. From the example shown on page 19-126, fill in the target table on page 19-128.
4. Indicate the operator/handle type.
5. If the operator/handle bezel has a legend and legend marking is desired, indicate the legend marking on the back of this form.
6. If a separate legend is required, indicate the legend type on the right and the marking on the back of this form.

Switching Angle	Maximum Number of Positions	See Ordering Instructions at Left
90 °	4	2-3
60 °	6	4-5
45 °	8	6-7
30 °	12	8-12

Contact size	Class 9003	Type	**K** 2
Switching angle		Type	
Operator/Handle type	Class 9003	Type	
Separate legend	Class 9003	Type	

NOTE: *See page 19-126 for target table explanation*

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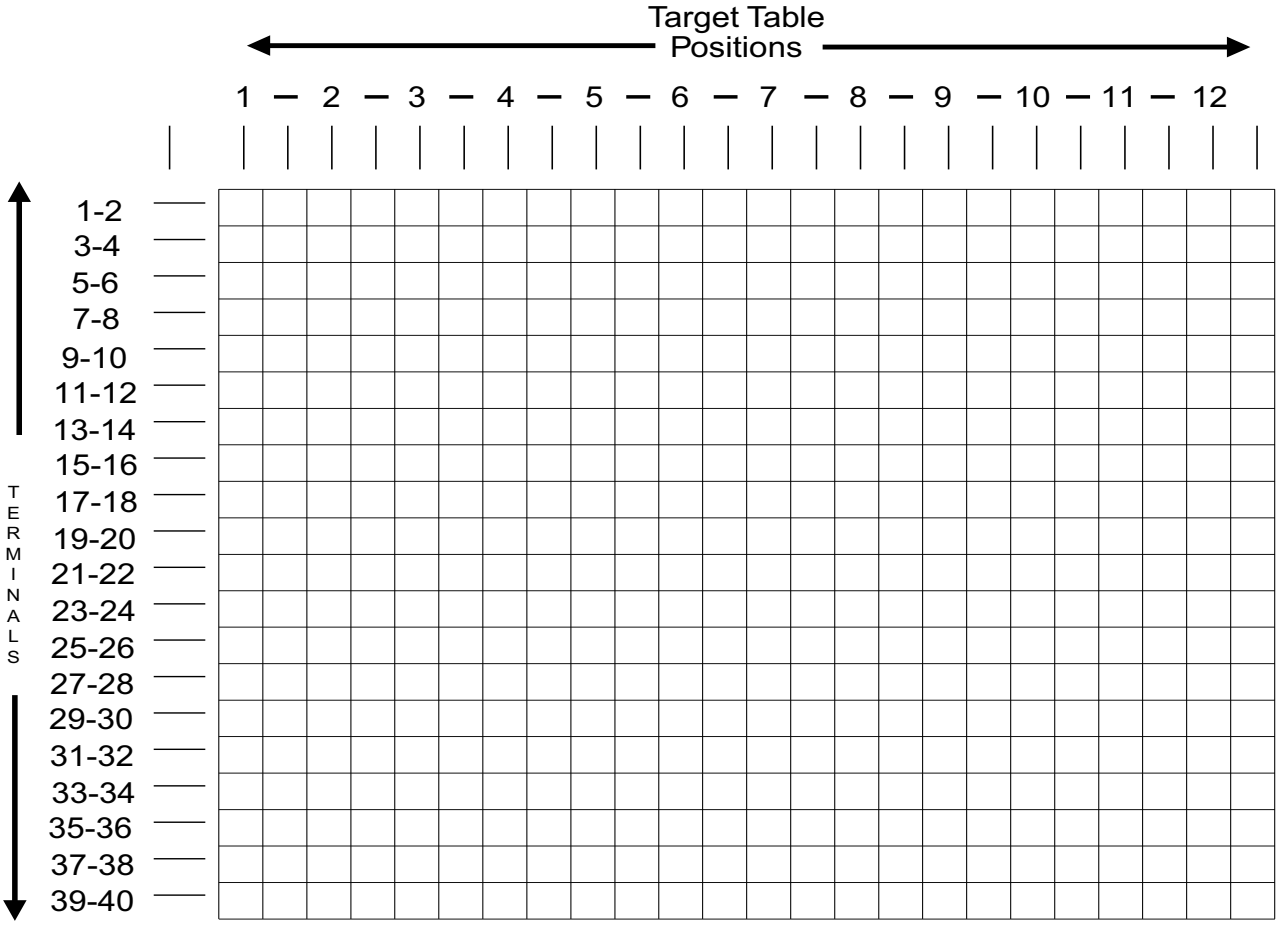
Figure 19.6: Target Table



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Section 20

Electronic Sensors and Machine Cabling

Photoelectric Sensors, p. 20-2

Proximity Sensors, p. 20-5

Ultrasonic Sensors, p. 20-10

Osisense Photoelectric Sensors

XUB Tubular	**20-2**
XUM Miniature	**20-4**
XUK and XUX Compact	**20-4**

Osisense Inductive Proximity Sensors

XS Plastic Rectangular	**20-5**
XS General Purpose Tubular	**20-6**
XS Basic and Basic Plus Series	**20-8**

Osisense Capacitive Proximity Sensors

XT Proximity	**20-9**

Ultrasonic Sensors

Accessories	**20-10**
XUV Label Sensor	**20-10**
XXV18—Barrel, Ø18 mm	**20-10**
Virtu™ VM1—Dual Mount, Ø 18 mm and Flat Format	**20-11**
Virtu™ VM18—Barrel, Ø18 mm	**20-11**
Virtu™ 30—Barrel, Ø30 mm	**20-12**
SM900 (1, 2, and 8 m)	**20-12**

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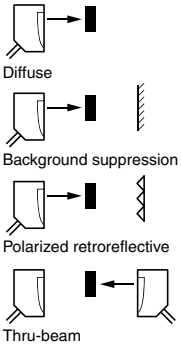
Table 20.1: XUB Tubular Sensors



A single product that adapts to most environments.

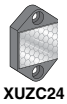
For multi-mode models (XUB0, XUM0, XUK0, and XUX0) that are programmable to function as Diffuse, Diffuse/Background Suppression, Polarized Retroreflective, or Thru-Beam Receivers, consult the factory.

XUB Tubular Sensors		XUB•A 18 mm plastic	XUB•B 18 mm metal
Usable sensing distance	Proximity diffuse (adjustable)	0.6 m (2.0 ft)	0.6 m (2.0 ft)
	Polarized retroreflective	2 m (6.6 ft)	2 m (6.6 ft)
	Retroreflective	4 m (13.1 ft)	4 m (13.1 ft)
	Thru-beam	15 m (49 ft)	15 m (49 ft)
Mounting (mm)		M 18 x 1	M 18 x 1
Enclosure: M (metal), P (plastic) / Dimensions (mm) Ø x L or W x H x D		P / M 18 x 46	P / M 18 x 46
Setup LEDs		—	—
Temperature range		–25 to +55 °C (–13 to +131 °F)	
Degree of protection (conforming to IEC 60529):		IP65, IP67 (XUK: IP65)	

Table 20.2: Sensors for DC Applications (Solid State Output: Transistor)

Connection			Precabled, PvR, 2 m ♦ Catalog No.	M12 connector Catalog No.	Precabled, PvR, 2 m ♦ Catalog No.	M12 connector Catalog No.
Receiver or Transmitter/Receiver, 3-wire PNP ▲	Proximity diffuse, adjustable	N.O.	XUB5APANL2	XUB5APANM12	XUB5BPANL2	XUB5BPANM12
		N.C.	XUB5APBNL2	XUB5APBNM12	XUB5BPBNL2	XUB5BPBNM12
	Polarized retroreflective	N.O.	XUB9APANL2	XUB9APANM12	XUB9BPANL2	XUB9BPANM12
		N.C.	XUB9APBNL2	XUB9APBNM12	XUB9BPBNL2	XUB9BPBNM12
	Retroreflective	N.O.	XUB1APANL2	XUB1APANM12	XUB1BPANL2	XUB1BPANM12
		N.C.	XUB1APBNL2	XUB1APBNM12	XUB1BPBNL2	XUB1BPBNM12
	Thru-beam	N.O.	XUB2APANL2R	XUB2APANM12R	XUB2BPANL2R	XUB2BPANM12R
		N.C.	XUB2APBNL2R	XUB2APBNM12R	XUB2BPBNL2R	XUB2BPBNM12R
Transmitter			XUB2AKSNL2T	XUB2AKSNM12T	XUB2AKSNL2T	XUB2AKSNM12T
Supply voltage limits, min/max (V) including ripple			10–36	10–36	10–36	10–36
Switching frequency (Hz)			500	500	500	500
Common characteristics for DC versions			Switching capacity, max (mA): 100 / Overload and short-circuit protection / LED output state			

▲ For version with NPN output, change "P" to "N". For example: XUB1A**P**ANL2 would become XUB1A**N**ANL2.
■ These sensors do not incorporate overload or short-circuit protection. A 0.4 A fast-acting fuse must be connected in series with the load.
♦ For a 5 m cable, change L2 to L5. For example, XUMB5APAN**L2** becomes XUMB5APAN**L5**.


XUZC24

XUZC50

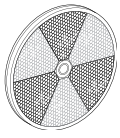

XUZC80

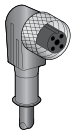
Table 20.3: Metal Body Sensors for Two-Wire AC ■ or DC Applications (Solid-State Output: Transistor)

Connection			Precabled, PvR, 2 m ♦ Catalog No.	1/2"-20UNF Connector Catalog No.
System	Diffuse with adjustable background suppression	NO	XU8M18MA230	XU8M18MA230K
		NC	XU8M18MB230	XU8M18MB230K
	Diffuse	NO	XU5M18MA230	XU5M18MA230K
		NC	XU5M18MB230	XU5M18MB230K
New!	Polarized retrofeflective ★	NO	XU9M18MA230	XU9M18MA230K
		NC	XU9M18MB230	XU9M18MB230K
	Thru-beam▼	NO	XU2M18MA230	XU2M18MA230K
		NC	XU2M18MB230	XU2M18MB230K
Rated supply voltage (Vac/Vdc)			24–240	24–240
Switching frequency (Hz)			25	25
Switching capacity (mA) ■			10–200	10–200

★ A 50 x 50 mm reflector XUZC50 is included with a polarized retroreflective system.
▼ Includes a thru-beam transmitter and receiver.

XUZA118

XUZA218


XZCP1241L2

XZCP1141L2

Table 20.4: Accessories

		mm	Catalog No.
Reflectors		24 x 21	XUZC24
		Ø 80	XUZC80
		50 x 50	XUZC50
		Material	**Catalog No.**
Mounting brackets for XUB		Die Cast Zinc	XUZA118
		Plastic	XUZA218
		90°	**Straight**
		Catalog No.	**Catalog No.**
Cables, 2 m, without LED △ Suitable plug-in female connectors, including pre-wired versions	**M8 (4-Pin)**	XZCP1041L2	XZCP0941L2
	M12 (4-pin)	XZCP1241L2	XZCP1141L2
	1/2"-20UNF	XZCP1965L2	XZCP1865L2

△ For 5 or 10 meter lengths, replace 2 in the cable catalog number with 5 or 10.

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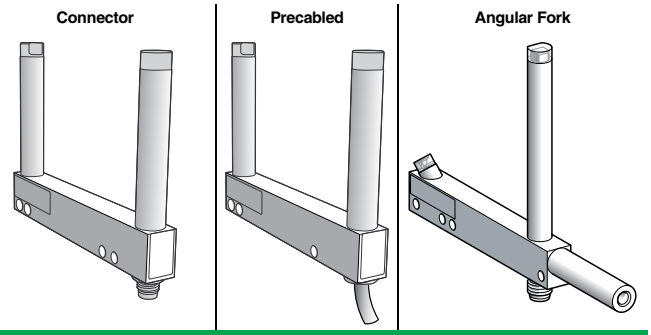
Table 20.5: XUVR / XUVA Optical fork without adjustment

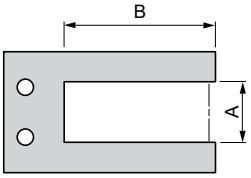
New!



Sensing Characteristics		Thru-beam	
Sensing range, mm (in.)		2–180 (0.08 –7.09)	
Sensing frequency		4000 Hz	
Minimum size of object detected, mm (in.)	Passageway 2–120 mm	0.8 (0.03)	1.2 (0.05)
	Passageway ≥ 150 mm	1 (0.04)	1.5 (0.06)
Fork type		XUVR•	XUVA•
Power Requirements			
Supply voltage		12–24 Vdc	
Max. load		100 mA with overload and short-circuit protection	
Environmental			
Operating temperature range		–10 to +60 °C (+14 to +140 °F)	
Environmental protection ratings		IP65 and IP67	
Construction			
Materials Case		Painted aluminum and polyamide	

Catalog numbers of forks type XUVR•

3-Wire
NO or NC function
PNP or NPN ouput



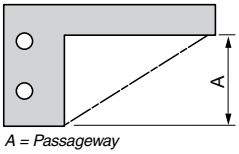
A = Passageway
B = Depth

Passageway (A)	Function	Output	Catalog Number
Connection—Precabled, length 2 m. Depth (B): 40 mm (1.18 in.)			
30 mm (1.18 in.)	NO	PNP	XUVR0303PANL2
Connection—M8, 3-Pin. Depth (B): 60 mm (2.36 in.)			
50 mm (1.97 in.)	NO	PNP	XUVR0605PANM8
		NPN	XUVR0605NANM8
	NC	PNP	XUVR0605PBNM8
		NPN	XUVR0605NBNM8
80 mm (3.15 in.)	NO	PNP	XUVR0608PANM8
		NPN	XUVR0608NANM8
	NC	PNP	XUVR0608PBNM8
		NPN	XUVR0608NBNM8
Connection—M8, 3-Pin. Depth (B): 120 mm (4.72 in.)			
120 mm (4.72 in.)	NO	PNP	XUVR1212PANM8
		NPN	XUVR1212NANM8
	NC	PNP	XUVR1212PBNM8
		NPN	XUVR1212NBNM8
180 mm (7.09 in.)	NO	PNP	XUVR1218PANM8
		NPN	XUVR1218NANM8
	NC	PNP	XUVR1218PBNM8
		NPN	XUVR1218NBNM8

Catalog numbers of forks type XUVA•

Connection—M8 connector, 3-Pin

3-wire
NO function
PNP ouput



A = Passageway

Passageway (A)	Function	Output	Catalog Number
50 mm (1.97 in.)	NO	PNP	XUVA0505PANM8
80 mm (3.15 in.)	NO	PNP	XUVA0808PANM8
120 mm (4.72 in.)	NO	PNP	XUVA1212PANM8
150 mm (5.91 in.)	NO	PNP	XUVA1515PANM8

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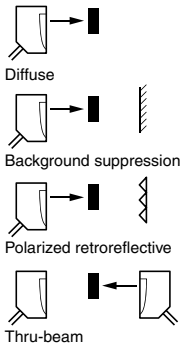
Table 20.6: XUM Miniature, XUK and XUX Compact



A single product that adapts to most environments.

For multi-mode models (XUB0, XUM0, XUK0, and XUX0) that are programmable to function as Diffuse, Diffuse/Background Suppression, Polarized Retroreflective, or Thru-Beam Receivers, consult the factory.

Sensors		XUM Miniature Design	XUK Compact Design 50 x 50	XUX Compact Design
Usable sensing distance	Proximity diffuse (adjustable sensitivity)	1 m (3.28 ft)	1 m (3.2 ft) ▲	2.1 m (6.8 ft)
	Polarized retroreflective	5 m (16.40 ft)♦	5 m (16.4 ft) ▲	11 m (36 ft)
	Retroreflective	—	7 m (23.0 ft) ▲	14 m (46 ft)
	Thru-beam	15 m (49.21 ft)	30 m (98 ft) ▲	40 m (131.2 ft)
Mounting (mm)		direct: mounting centers 25.5, M3 screws	direct: mounting centers 40 x 40, M4 screws	direct: mounting centers 30/36 to 40/50/74, M5 screws
Enclosure: M (metal) P (plastic) / Dimensions (mm) Ø x L or W x H x D		P / 10.8 x 34 x 20	P / 18 x 50 x 50	P / 30 x 92 x 71
Setup LEDs		⊗	⊗	⊗
Common characteristics		LED output state indicator and power on LED (⊗): yes		

▲ Excess gain of 2.

Sensors for DC Applications (Solid State Output: Transistor)			Catalog No.					
Connection			Precabled, PVC, 2 m	M8 connector	Precabled, PVC, 2 m	M12 connector	Screw terminals, ISO 16 cable gland	M12 connector
Transmitter			XUM2AKCNL2T	XUM2AKCNM8T	XUK2AKSNL2T	XUK2AKSNM12T	XUX0AKSAT16T	XUX0AKSAM12T
Receiver or Transmitter/ Receiver, 3-wire PNP ■	Proximity diffuse, adjustable	N.O.	—	—	XUK5APANL2	XUK5APANM12	XUX5APANT16	XUX5APANM12
		N.C.	—	—	XUK5APBNL2	XUK5APBNM12	XUX5APBNT16	XUX5APBNM12
		N.O./N.C. convertible	XUM5APCNL2	XUM5APCNM8	—	—	—	—
	Polarized retroreflective	N.O.	—	—	XUK9APANL2	XUK9APANM12	XUX9APANT16	XUX9APANM12
		N.C.	—	—	XUK9APBNL2	XUK9APBNM12	XUX9APBNT16	XUX9APBNM12
		N.O./N.C. convertible	XUM9APCNL2	XUM9APCNM8	—	—	—	—
	Retroreflective	N.O.	—	—	XUK1APANL2	XUK1APANM12	XUX1APANT16	XUX1APANM12
		N.C.	—	—	XUK1APBNL2	XUK1APBNM12	XUX1APBNT16	XUX1APBNM12
	Thru-beam	N.O.	—	—	XUK2APANL2R	XUK2APANM12R	XUX2APANT16R	XUX2APANM12R
		N.C.	—	—	XUK2APBNL2R	XUK2APBNM12R	XUX2APBNT16R	XUX2APBNM12R
		N.O./N.C. convertible	XUM2APCNL2R	XUM2APCNM8R	—	—	—	—
Supply voltage limits, min/max (V) including ripple			10–30	10–30	10–30	10–30	10–36	10–36
Switching frequency (Hz)			1000	1000	250	250	250	250
Common characteristics for DC versions			indicator (⊗): yes / power on LED (⊗): yes					
Multi-current/multi-voltage sensors for AC/DC applications, 20–264 Vac/Vdc, including ripple (relay output, 1 C/O, 3 A)								
Connection			—	—	Precabled, 2 m	—	Screw terminals ISO 16 cable gland	—
Transmitter			—	—	XUK2ARCNL2T	—	XUX0ARCTT16T	—
Receiver or Transmitter/ Receiver	Diffuse	N.O. + N.C.	—	—	XUK5ARCNL2	—	XUX5ARCNT16	—
	Polarized retroreflective	N.O. + N.C.	—	—	XUK9ARCNL2	—	XUX9ARCNT16	—
	Retroreflective	N.O. + N.C.	—	—	XUK1ARCNL2	—	XUX1ARCNT16	—
	Thru-beam	N.O. + N.C.	—	—	XUK2ARCNL2R	—	XUX2ARCNT16R	—
Switching frequency (Hz)			—	—	20	—	20	—
LED output state indicator(⊗) / power on LED (⊗)			—	—	⊗ / ⊗	—	⊗ / ⊗	—

■ For version with NPN output, change "P" to "N". For example, XUM5A**P**CNL2 would become XUM5A**N**CNL2.
♦ With XUZC50 reflector.

Note: M8 is not Snap-C compatible.
See page 20-2 for suitable plug-in cables with female connectors.

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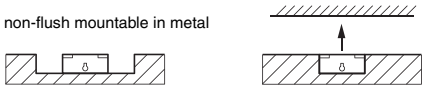
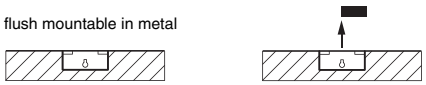
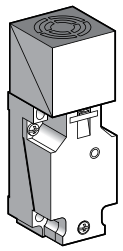
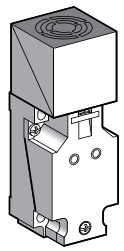
Sensor	Flush mountable in metal	Non-flush mountable in metal
A single product that automatically adapts to most environments. **Accurate position detection via teach mode.** non-flush mountable in metal  flush mountable in metal 		

New! General Purpose, Plastic Case, Limit Switch Style, 5-Position Turret Head

Table 20.7: General Specifications

Product certifications	UL, CSA, CE
Degree of protection conforming to IEC 60529	IP67
Operating temperature	–25 to +70 °C (–13 to +158 °F)

DC Supply

Table 20.8: Catalog Numbers

Nominal sensing distance Sn, mm (in.)		15 (0.59)	Increased range 20 (0.79)	15 (0.59)	20 (0.79)	Increased range 40 (1.57)	20 (0.79)
4-wire ⎓	PNP, NO + NC	XS7C40PC440H7	XS7C40PC449H7	—	XS8C40PC440H7	XS8C40PC449H7	—
(complementary outputs)	NPN, NO + NC	XS7C40NC440H7	XS7C40NC449H7	—	XS8C40NC440H7	XS8C40NC449H7	—
2-wire ⎓	NO	—	—	XS7C40DA210H7	—	—	XS8C40DA210H7
(non-polarized)	NO or NC programmable	—	—	XS7C40DP210H7	—	—	XS8C40DP210H7
Weight, kg (lb)		0.220 (0.49)	0.220 (0.49)	0.220 (0.49)	0.220 (0.49)	0.220 (0.49)	0.220 (0.49)

Table 20.9: Supplemental Specifications

Connection ▲		Screw terminals, clamping capacity: 2 or 4 x 1.5 mm^2 (16 AWG) ■					
Operating zone, mm (in.)		**0–12 (0–0.47)**	**0–16 (0–0.63)**	**0–12 (0–0.47)**	**0–16 (0–0.63)**	**0–32 (0–1.26)**	**0–16 (0–0.63)**
Repeat accuracy		≤3% of effective sensing distance (Sr)					
Differential travel		3–20% of effective sensing distance (Sr)					
Status indication	Output	Yellow LED		Yellow LED	Yellow LED		Yellow LED
	Supply on	Green LED		—	Green LED		—
Rated supply voltage		12–48 Vdc with protection against reverse polarity					
Voltage limits (including ripple)		10–58 Vdc					
Current consumption, no-load		≤ 10 mA		—	≤ 10 mA		—
Switching capacity with overload and short-circuit protection		0–200 mA		1.5–100 mA	0–200 mA		1.5–100 mA
Residual current, open state		—		≤ 0.5 mA	—		≤ 0.5 mA
Voltage drop, closed state		≤ 2 V		≤ 4 V	≤ 2 V		≤ 4 V
Maximum switching frequency		1000 Hz		1500 Hz	1000 Hz	500 Hz	800 Hz
Delays	First-up	≤ 5 ms		≤ 5 ms	≤ 5 ms	≤ 5 ms	≤ 5 ms
	Response	≤ 0.3 ms		≤ 2 ms	≤ 0.3 ms	< 1 ms	≤ 2 ms
	Recovery	≤ 0.7 ms		≤ 5 ms	≤ 0.7 ms	< 1 ms	≤ 7 ms

Plug-in, AC or DC supply

Table 20.10: Catalog Numbers

		AC	**AC/DC**	**AC**	**AC/DC**
Nominal sensing distance Sn, mm (in.)		15 (0.59)		20 (0.79)	
2-wire AC	NO or NC programmable	XS7C40FP260H7	—	XS8C40FP260H7	—
2-wire AC or DC universal model	NO or NC programmable	—	XS7C40MP230H7	—	XS8C40MP230H7
Weight, kg (lb)		0.220 (0.49)	0.220 (0.49)	0.220 (0.49)	0.220 (0.49)

Table 20.11: Supplemental Specifications

Connection		Screw terminals, clamping capacity 2 x 1.5 mm^2 (16 AWG) ▲■			
Operating zone, mm (in.)		0–12 (0–0.47)		0–16 (0–0.63)	
Repeat accuracy		≤3% of effective sensing distance (Sr)			
Differential travel		3–20% of effective sensing distance (Sr)			
Output state indication		Yellow LED			
Rated supply voltage with protection against reverse polarity		24–240 Vac, 50/60 Hz	24–240 Vac, 50/60 Hz or 24–210 Vdc	24–240 Vac, 50/60 Hz	24–240 Vac, 50/60 Hz or 24–210 Vdc
Voltage limits (including ripple)		20–264 Vac	20–264 Vac or Vdc	20–264 Vac	20–264 Vac or Vdc
Current consumption, no-load		—			
Switching capacity ♦		5–500 mA (2 A inrush) ♦	5–300 mA AC or 5–200 mA DC ♦	5–500 mA (2 A inrush) ♦	5–300 mA AC or 5–200 mA DC ♦
Residual current, open state		≤ 1.5 mA	0.8 mA on 24 V 1.5 mA on 120 V	≤ 1.5 mA	0.8 mA on 24 V 1.5 mA on 120 V
Voltage drop, closed state		≤ 5.5 V			
Maximum switching frequency		25 Hz	**AC**: 25 Hz; **DC**: 50 Hz	25 Hz	**AC**: 25 Hz; **DC**: 50 Hz
Delays	First-up	≤ 120 ms			
	Response	≤ 30 ms			
	Recovery	≤ 20 ms			

▲ Delete H7 suffix for PG13 conduit entry.
■ Cable gland not included with sensor. For suitable metric version PG13 cable gland (XSZPE13), see page 2/131 of 9006CT1007.
♦ These sensors do not incorporate overload or short-circuit protection. A 0.4 mA fast-acting fuse (XUZE04) must be connected in series with the load.

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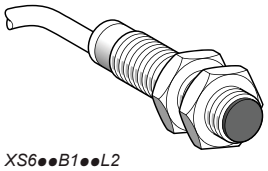
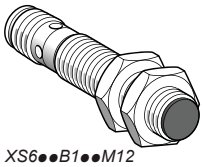
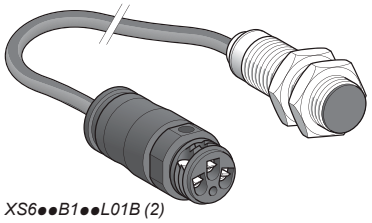


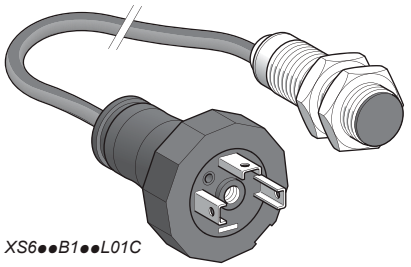
XS6●●B1●●L2



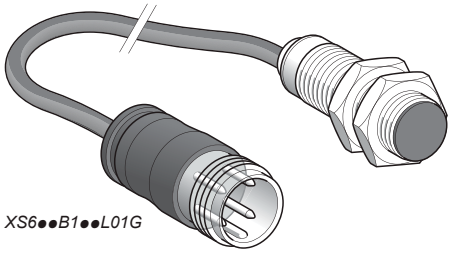
XS6●●B1●●M12



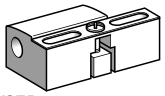
XS6●●B1●●L01B (2)



XS6●●B1●●L01C



XS6●●B1●●L01G



XSZB●●●

New!

Table 20.12: General Purpose, Long Case, Increased Range, Flush Mountable, 3-Wire DC, Solid-State Output

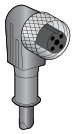
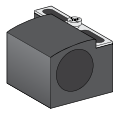
Sensors, 3-wire 12–48 V ⎓, long case model						
Sensing Distance Sn, mm (in.)	Function	Output	Connection	Weight kg	Weight (lb)	Catalog No.
Ø 8, threaded M8 x 1						
2.5 (0.10)	NO	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS608B1PAL2
			M12 connector	0.015	(0.03)	XS608B1PAM12
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS608B1NAL2
			M12 connector	0.015	(0.03)	XS608B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS608B1PBL2
			M12 connector	0.015	(0.03)	XS608B1PBM12
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS608B1NBL2
			M12 connector	0.015	(0.03)	XS608B1NBM12
Ø 12, threaded M12 x 1						
4 (0.16)	NO	PNP	Precabled (2 m) ▲	0.075	(0.17)	XS612B1PAL2
			M12 connector	0.020	(0.04)	XS612B1PAM12
		NPN	Precabled (2 m) ▲	0.075	(0.17)	XS612B1NAL2
			M12 connector	0.020	(0.04)	XS612B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.075	(0.17)	XS612B1PBL2
			M12 connector	0.020	(0.04)	XS612B1PBM12
		NPN	Precabled (2 m) ▲	0.075	(0.17)	XS612B1NBL2
			M12 connector	0.020	(0.04)	XS612B1NBM12
Ø 18, threaded M18 x 1						
8 (0.31)	NO	PNP	Precabled (2 m) ▲	0.100	(0.22)	XS618B1PAL2
			M12 connector	0.040	(0.09)	XS618B1PAM12
			Remote screw term. connector	0.100	(0.22)	XS618B1PAL01B ■
			Remote DIN 43650 connector	0.100	(0.22)	XS618B1PAL01C
			Remote M18 connector	0.100	(0.22)	XS618B1PAL01G
		NPN	Precabled (2 m) ▲	0.100	(0.22)	XS618B1NAL2
			M12 connector	0.040	(0.09)	XS618B1NAM12
			Remote screw term. connector	0.100	(0.22)	XS618B1NAL01B ■
			Remote DIN 43650 connector	0.100	(0.22)	XS618B1NAL01C
	NC	PNP	Precabled (2 m) ▲	0.100	(0.22)	XS618B1PBL2
			M12 connector	0.040	(0.09)	XS618B1PBM12
			Remote screw term. connector	0.100	(0.22)	XS618B1PBL01B ■
			Remote DIN 43650 connector	0.100	(0.22)	XS618B1PBL01C
		NPN	Precabled (2 m) ▲	0.100	(0.22)	XS618B1NBL2
			M12 connector	0.040	(0.09)	XS618B1NBM12
			Remote screw term. connector	0.100	(0.22)	XS618B1NBL01B ■
			Remote DIN 43650 connector	0.100	(0.22)	XS618B1NBL01C
Ø 30, threaded M30 x 1.5						
15 (0.59)	NO	PNP	Precabled (2 m) ▲	0.205	(0.45)	XS630B1PAL2
			M12 connector	0.145	(0.32)	XS630B1PAM12
			Remote screw term. connector	0.205	(0.45)	XS630B1PAL01B ■
			Remote DIN 43650 connector	0.205	(0.45)	XS630B1PAL01C
			Remote M18 connector	0.205	(0.45)	XS630B1PAL01G
		NPN	Precabled (2 m) ▲	0.205	(0.45)	XS630B1NAL2
			M12 connector	0.145	(0.32)	XS630B1NAM12
			Remote screw term. connector	0.205	(0.45)	XS630B1NAL01B ■
			Remote DIN 43650 connector	0.205	(0.45)	XS630B1NAL01C
	NC	PNP	Precabled (2 m) ▲	0.205	(0.45)	XS630B1PBL2
			M12 connector	0.145	(0.32)	XS630B1PBM12
			Remote screw term. connector	0.205	(0.45)	XS630B1PBL01B ■
			Remote DIN 43650 connector	0.205	(0.45)	XS630B1PBL01C
			Remote M18 connector	0.205	(0.45)	XS630B1PBL01G
		NPN	Precabled (2 m) ▲	0.205	(0.45)	XS630B1NBL2
			M12 connector	0.145	(0.32)	XS630B1NBM12
			Remote screw term.connector	0.205	(0.45)	XS630B1NBL01B ■
			Remote DIN 43650 connector	0.205	(0.45)	XS630B1NBL01C

▲ For a 5 m cable replace L2 with **L5**; for a 10 m cable replace L2 with **L10**. For example, XS608B1PA**L2** becomes XS608B1PA**L5** with a 5 m cable.

■ Protective cable gland included with remote screw terminal connector.

Table 20.13: Accessories

Description	For use with sensors	Weight kg	Weight (lb)	Catalog No.
90° metal mounting brackets	Ø 8	0.006	(0.01)	9006PA08
	Ø 12	0.006	(0.01)	9006PA12
	Ø 18	0.010	(0.02)	9006PA18
	Ø 30	0.020	(0.02)	9006PA30

Description	Cables 90°	Cables Straight	Mounting Bracket with Indexing Pin for Tubular Sensors
Plug-in female connectors, including pre-wired versions 2 m, without LED			
	Catalog No.	Catalog No.	
M8	XZCP0666L2	XZCP0566L2	
M12	XZCP1241L2	XZCP1141L2	
U20	XZCP1965L2	XZCP1865L2	

	Catalog No.
M12	XSZB112
M18	XSZB118
M30	XSZB130

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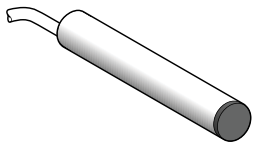
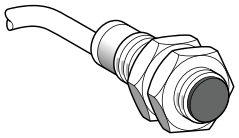
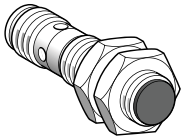


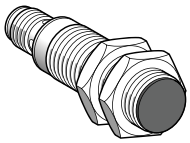
XS506B1●●L2



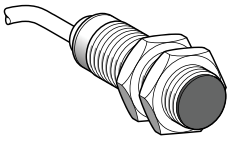
XS508B1●●L2



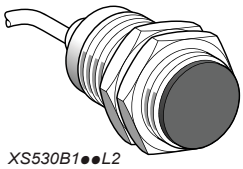
XS512B1●●M12



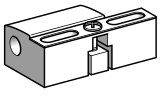
XS518B1●●M12



XS518B1●●●L2



XS530B1●●L2



XSZB1●●

New!

Table 20.14: Sensors, 3-wire 12–24 Vdc, Short Case Model

Sensing Distance Sn, mm (in.)	Function	Output	Connection	Weight kg	Weight (lb)	Catalog Number
Ø 6.5, plain						
1.5 (0.06)	NO	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS506B1PAL2
			M8 connector	0.025	(0.06)	XS506B1PAM8
			M12 connector	0.025	(0.06)	XS506B1PAM12
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS506B1NAL2
			M8 connector	0.025	(0.06)	XS506B1NAM8
	NC	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS506B1PBL2
			M8 connector	0.025	(0.06)	XS506B1PBM8
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS506B1NBL2
			M8 connector	0.025	(0.06)	XS506B1NBM8
Ø 8, threaded M8 x 1						
1.5 (0.06)	NO	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS508B1PAL2
			M8 connector	0.025	(0.06)	XS508B1PAM8
			M12 connector	0.025	(0.06)	XS508B1PAM12
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS508B1NAL2
			M8 connector	0.025	(0.06)	XS508B1NAM8
			M12 connector	0.025	(0.06)	XS508B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.035	(0.08)	XS508B1PBL2
			M8 connector	0.025	(0.06)	XS508B1PBM8
			M12 connector	0.025	(0.06)	XS508B1PBM12
		NPN	Precabled (2 m) ▲	0.035	(0.08)	XS508B1NBL2
			M8 connector	0.025	(0.06)	XS508B1NBM8
			M12 connector	0.025	(0.06)	XS508B1NBM12
Ø 12, threaded M12 x 1						
2 (0.08)	NO	PNP	Precabled (2 m) ▲	0.075	(0.17)	XS512B1PAL2
			M12 connector	0.035	(0.08)	XS512B1PAM12
		NPN	Precabled (2 m) ▲	0.075	(0.17)	XS512B1NAL2
			M12 connector	0.035	(0.08)	XS512B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.075	(0.17)	XS512B1PBL2
			M12 connector	0.035	(0.08)	XS512B1PBM12
		NPN	Precabled (2 m) ▲	0.075	(0.17)	XS512B1NBL2
			M12 connector	0.035	(0.08)	XS512B1NBM12
Ø 18, threaded M18 x 1						
5 (0.20)	NO	PNP	Precabled (2 m) ▲	0.120	(0.26)	XS518B1PAL2
			M12 connector	0.060	(0.13)	XS518B1PAM12
		NPN	Precabled (2 m) ▲	0.120	(0.26)	XS518B1NAL2
			M12 connector	0.060	(0.13)	XS518B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.120	(0.26)	XS518B1PBL2
			M12 connector	0.060	(0.13)	XS518B1PBM12
		NPN	Precabled (2 m) ▲	0.120	(0.26)	XS518B1NBL2
			M12 connector	0.060	(0.13)	XS518B1NBM12
Ø 30, threaded M30 x 1.5						
10 (0.39)	NO	PNP	Precabled (2 m) ▲	0.205	(0.45)	XS530B1PAL2
			M12 connector	0.145	(0.32)	XS530B1PAM12
		NPN	Precabled (2 m) ▲	0.205	(0.45)	XS530B1NAL2
			M12 connector	0.145	(0.32)	XS530B1NAM12
	NC	PNP	Precabled (2 m) ▲	0.205	(0.45)	XS530B1PBL2
			M12 connector	0.145	(0.32)	XS530B1PBM12
		NPN	Precabled (2 m) ▲	0.205	(0.45)	XS530B1NBL2
			M12 connector	0.145	(0.32)	XS530B1NBM12

▲ For a 5 m cable replace L2 with **L5**; for a 10 m cable replace L2 with **L10**.
Example: XS508B1PAL2 becomes **XS508B1PAL5** with a 5 m cable.

Table 20.15: Accessories

Description	For use with sensors	Weight kg	Weight (lb)	Catalog Number
Mounting brackets	Ø 6.5 (plain)	0.005	(0.01)	XSZB165
	Ø 8	0.006	(0.01)	XSZB108
	Ø 12	0.006	(0.01)	XSZB112
	Ø 18	0.010	(0.02)	XSZB118
	Ø 30	0.020	(0.02)	XSZB130

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New!

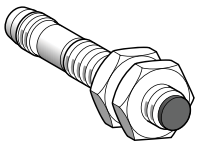
Table 20.16: Basic Plus, XS•••B3

Basic, Tubular, Flush-Mountable, Increased Range, 3-Wire DC, Solid-State Output

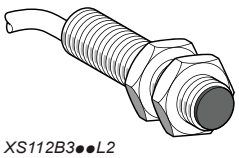
Sensing Characteristics	Ø 6.5 Plain Flush Mountable	Ø M8 Flush Mountable	Ø M12 Flush Mountable	Ø M18 Flush Mountable	Ø M30 Flush Mountable
Sensing range	2 mm (0–0.08 in.)	2 mm (0–0.08 in.)	4.0 mm (0–0.15 in.)	8.0 mm (0.31 in.)	15.0 mm (0.59 in.)
Switching frequency	2500 Hz	2500 Hz	2500 Hz	1000 Hz	500 Hz
Shock resistance	50 gn, duration 11 ms	50 gn, duration 11 ms	50 gn, duration 11 ms	50 gn, duration 11 ms	50 gn, duration 11 ms
Vibration resistance (10–55 Hz)	25 gn, amplitude ± 2 mm	25 gn, amplitude ± 2 mm	25 gn, amplitude ± 2 mm	25 gn, amplitude ± 2 mm	25 gn, amplitude ± 2 mm
Power Requirements					
Supply voltage	12–24 (10–36 max) Vdc with protection against reverse polarity, overload, and short circuit				
Switching capacity	50 mA	50 mA	100 mA		
Specifications		XS1••B3••M8, XS1••B3••M12, XS1••B3••L2			
Operating zone	Ø 6.5 and Ø 8	0–2.0 mm (0–0.07 in.)			
	Ø 12	0–4.0 mm (0–0.15 in.)			
	Ø 18	0–8.0 mm (0–0.31 in.)			
	Ø 30	0–15 mm (0–0.59 in.)			
Degree of protection	Conforming to IEC 60529	IP65 and IP67			
Operating temperature		–25 to +70 °C (–13 to +158 °F)			
Materials	Case	Nickel-plated brass			
	Cable (XS1••B3••L• only)	PvR 3 x 0.34 mm^2 (22 AWG), except Ø 6.5 and Ø 8: 3 x 0.11 mm^2 (27 AWG)			
Vibration resistance	Conforming to IEC 60068-2-6	25 gn, amplitude ± 2 mm (10 to 55 Hz)			
Shock resistance	Conforming to IEC 60068-2-27	50 gn, duration 11 ms			
Rated supply voltage		12–24 Vdc with protection against reverse polarity			
Switching capacity		≤ 200 mA with overload and short-circuit protection			
Maximum switching frequency	Ø 6.5, Ø 8, and Ø 12	2500 Hz			
	Ø 18	1000 Hz			
	Ø 30	500 Hz			

Sensing Distance Sn, mm (in.)	Function	Output	Connection	Sold in lots of	Weight kg	Weight (lb)	Catalog Number
Ø 8, threaded M8 x 1							
Three-wire 12–24 V ⎓, flush mountable							
2 (0.07)	NO	PNP	Precabled (2 m) ▲	1	0.070	(0.15)	XS108B3PAL2
			M8 connector	1	0.030	(0.06)	XS108B3PAM8
			M12 connector	1	0.060	(0.13)	XS108B3PAM12
		NPN	Precabled (2 m) ▲	1	0.070	(0.15)	XS108B3NAL2
			M8 connector	1	0.030	(0.06)	XS108B3NAM8
			M12 connector	1	0.060	(0.13)	XS108B3NAM12
	NC	PNP	Precabled (2 m) ▲	1	0.070	(0.15)	XS108B3PBL2
			M8 connector	1	0.030	(0.06)	XS108B3PBM8
			M12 connector	1	0.060	(0.13)	XS108B3PBM12
		NPN	Precabled (2 m) ▲	1	0.070	(0.15)	XS108B3NBL2
			M8 connector	1	0.030	(0.06)	XS108B3NBM8
			M12 connector	1	0.060	(0.13)	XS108B3NBM12
Ø 12, threaded M12 x 1							
Three-wire 12–24 Vdc, flush mountable							
4 (0.15)	NO	PNP	Precabled (2 m) ▲	1	0.090	(0.19)	XS112B3PAL2
			M12 connector	1	0.030	(0.06)	XS112B3PAM12
		NPN	Precabled (2 m) ▲	1	0.090	(0.19)	XS112B3NAL2
			M12 connector	1	0.030	(0.06)	XS112B3NAM12
	NC	PNP	Precabled (2 m) ▲	1	0.090	(0.19)	XS112B3PBL2
			M12 connector	1	0.030	(0.06)	XS112B3PBM12
		NPN	Precabled (2 m) ▲	1	0.090	(0.19)	XS112B3NBL2
			M12 connector	1	0.030	(0.06)	XS112B3NBM12
Ø 18, threaded M18 x 1							
Three-wire 12–24 V ⎓, flush mountable							
8 (0.31)	NO	PNP	Precabled (2 m) ▲	1	0.110	(0.24)	XS118B3PAL2
			M12 connector	1	0.060	(0.13)	XS118B3PAM12
		NPN	Precabled (2 m) ▲	1	0.110	(0.24)	XS118B3NAL2
			M12 connector	1	0.060	(0.13)	XS118B3NAM12
	NC	PNP	Precabled (2 m) ▲	1	0.110	(0.24)	XS118B3PBL2
			M12 connector	1	0.060	(0.13)	XS118B3PBM12
		NPN	Precabled (2 m) ▲	1	0.110	(0.24)	XS118B3NBL2
			M12 connector	1	0.060	(0.13)	XS118B3NBM12
Ø 30, threaded M30 x 1.5							
Three-wire 12–24 V ⎓, flush mountable							
15 (0.59)	NO	PNP	Precabled (2 m) ▲	1	0.180	(0.39)	XS130B3PAL2
			M12 connector	1	0.130	(0.28)	XS130B3PAM12
		NPN	Precabled (2 m) ▲	1	0.180	(0.39)	XS130B3NAL2
			M12 connector	1	0.130	(0.28)	XS130B3NAM12
	NC	PNP	Precabled (2 m) ▲	1	0.180	(0.39)	XS130B3PBL2
			M12 connector	1	0.130	(0.28)	XS130B3PBM12
		NPN	Precabled (2 m) ▲	1	0.180	(0.39)	XS130B3NBL2
			M12 connector	1	0.130	(0.28)	XS130B3NBM12

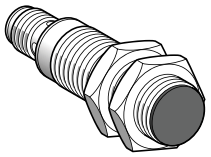
▲ For a 5 m cable replace L2 with L5; for a 10 m cable replace L2 with L10. Example: XS106B3PA**L2** becomes XS106B3PA**L5** with a 5 m cable.



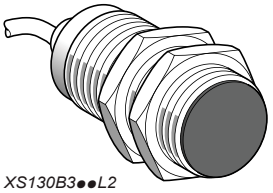
XS108B3••M8



XS112B3••L2



XS118B3••M12



XS130B3••L2

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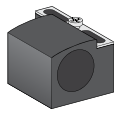
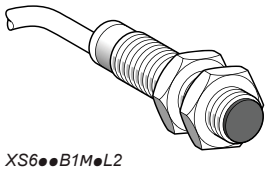
Table 20.17: Acessories, Basic Plus, XS•••B3

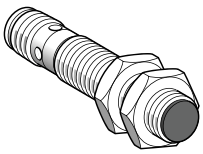
Mounting Bracket			Mounting Bracket w/ Indexing Pin for Cylindrical Sensors		
	Sensor Body	**Catalog No.**		**Diameter**	**Catalog No.**
	M8	9006PA08		M6	XSZB165
	M12	9006PA12		M8	XSZB108
	M18	9006PA18		M12	XSZB112
	M30	9006PA30		M18	XSZB118
				M30	XSZB130
Cables	See M8 and M12 connector cables on page 20-6.				

New!

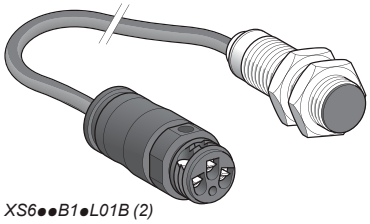
Table 20.18: General Purpose, Long Case, Tubular, Increased Range, Flush Mountable, 2-Wire AC or DC



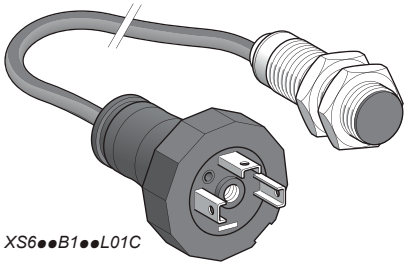
XS6••B1M•L2



XS6••B1••U20

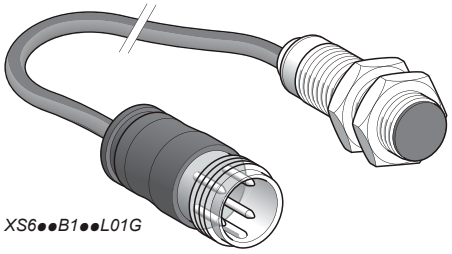


XS6••B1•L01B (2)

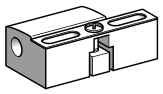


XS6••B1••L01C

New!



XS6••B1••L01G



XSZB1••

Sensors, 2-wire 24–240 V ≂, long case model					
Sensing Distance Sn, mm (in.)	**Function**	**Connection**	**Catalog Number**	**Weight kg**	**(lb)**
Ø 12, threaded M12 x 1					
4 (0.16)	NO	Precabled (2 m) ▲	XS612B1MAL2	0.075	(0.17)
		1/2"-20UNF connector	XS612B1MAU20	0.025	(0.06)
	NC	Precabled (2 m) ▲	XS612B1MBL2	0.075	(0.17)
		1/2"-20UNF connector	XS612B1MBU20	0.025	(0.06)
Ø 18, threaded M18 x 1					
8 (0.31)	NO	Precabled (2 m) ▲	XS618B1MAL2	0.100	(0.22)
		1/2"-20UNF connector	XS618B1MAU20	0.060	(0.13)
		Remote screw terminal connector	XS618B1MAL01B ♦	0.100	(0.22)
		Remote DIN 43650A connector	XS618B1MAL01C	0.100	(0.22)
		Remote M18 connector	XS618B1MAL01G	0.100	(0.22)
	NC	Precabled (2 m) ▲	XS618B1MBL2	0.100	(0.22)
		1/2"-20UNF connector	XS618B1MBU20	0.060	(0.13)
		Remote screw terminal connector	XS618B1MBL01B ♦	0.100	(0.22)
		Remote DIN 43650A connector	XS618B1MBL01C	0.100	(0.22)
		Remote M18 connector	XS618B1MBL01G	0.100	(0.22)
Ø 30, threaded M30 x 1.5					
15 (0.59)	NO	Precabled (2 m) ■	XS630B1MAL2	0.205	(0.45)
		1/2"-20UNF connector	XS630B1MAU20	0.145	(0.32)
		Remote screw terminal connector	XS630B1MAL01B ♦	0.205	(0.45)
		Remote DIN 43650A connector	XS630B1MAL01C	0.205	(0.45)
		Remote M18 connector	XS630B1MAL01G	0.205	(0.45)
	NC	Precabled (2 m) ■	XS630B1MBL2	0.205	(0.45)
		1/2"-20UNF connector	XS630B1MBU20	0.145	(0.32)
		Remote screw terminal connector	XS6 30B1MBL01B ♦	0.205	(0.45)
		Remote DIN 43650A connector	XS6 30B1MBL01C	0.205	(0.45)
		Remote M18 connector	XS6 30B1MBL01G	0.205	(0.45)

Accessories				
Description	**For use with sensors**	**Catalog Number**	**Weight kg**	**(lb)**
Mounting brackets	Ø 12	XSZB112	0.006	(0.01)
	Ø 18	XSZB118	0.010	(0.02)
	Ø 30	XSZB130	0.020	(0.04)

▲ For a 5 m cable, replace **L2** with **L5**; for a 10 m cable, replace **L2** with **L10**.
Example: XS612B1MA**L2** becomes XS612B1MA**L5** with a 5 m cable.
■ Available in ø8 plastic with double insulation. See page 2/30 of 9006CT1007.
♦ Protective cable gland included with remote screw terminal connector.

New!

Table 20.19: Osisense Capacitive Proximity Sensors, Cylindrical Stainless Steel, DC

Ø M12 threaded M12 x 1

Ø M18 threaded M18 x 1

Ø M30 threaded M30 x 1.5

Sensing Characteristics			
Sensing Range	2 mm (0.078 in.)	5 mm (0.197 in.)	10 mm (0.394 in.)
Switching Frequency	300	200	150
Shock Resistance	Conforming to IEC 60068-2-27: 30 gn, 11 ms		
Vibration Resistance	Conforming to IEC 60068-2-6 10 gn, +/- 1 mm (10–55 Hz)		
Power Requirements			
Supply Voltage	30 mm: 24 Vdc (12–30 Vdc limits)		32 mm: 24–240 Vac (20–264 Vac limits)
Max. Load	200 mA		
Environment			
Operating Temperature Range	–25 +70 °C (–13 +158 °F)		
Product Certification	CE, ETL		
Environmental Protection Ratings	IP67, NEMA 4X (Indoor Use Only), IP65 (Ø M12 PCM and Ø18 PCM)		
Connection	Precabled, PvC (2 m)		

Catalog Numbers			
Housing Material	Stainless Steel	Nickel Plated Brass	
Cable (flush mountable)	**Catalog No.**	**Catalog No.**	**Catalog No.**
3-wire / PNP / N.O. function	XT112S1PAL2	XT118B1PAL2	XT130B1PAL2
3-wire / NPN / N.O. function	XT112S1NAL2	XT118B1NAL2	XT130B1NAL2
4-wire / PNP / N.O./N.C. function	XT112S1PCL2	XT118B1PCL2	XT130B1PCL2
Connector (flush mountable)		**M12**	
4-wire / PNP / N.O./N.C. function	XT112S1PCM12	XT118B1PCM12	XT130B1PCM12

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Table 20.20: XUV Label Sensor

Sensing Characteristics	
Nominal Sensing Distance	3 mm (0.12 in.)
Switching Frequency	500 Hz
Power Requirements	
Supply Voltage	12–24 Vdc (10–30 Vdc limits)
Max. Load	100 mA
Environmental	
Operating Temperature Range	+5 to +55 °C (+41 to +131 °F)
Environmental Protection Ratings	IP65, NEMA 4X (indoor use only), 5, 12, 12k, 13
Construction	
Flat Profile Dimensions (W x H x D)	92.5 x 47.3 x 16.0 mm (3.64 x 1.86 x 0.63 in.)
Housing Material	Aluminium
Transducer	Glass Epoxy
Connection	**Catalog No.**
M8 Connector	XUVU06M3KCNM8
Precabled (2 m)	XUVU06M3KCNL2

Table 20.21: XXV 18 mm Ultrasonic Sensor

Sensing Characteristics		
Nominal Sensing Distance		2 mm to 50.8 mm (0.08 in. to 2.0 in.)
Switching Frequency		80 Hz
Power Requirements		
Supply Voltage		12–24 Vdc
Max. Load		200 mA
Environmental		
Operating Temperature Range		0 to 60 °C (32 to 140 °F)
Environmental Protection Ratings		NEMA Type 4 and 13, and IP67
Construction		
Barrel Dimensions (Ø x L)		18 x 1 x 43.2 mm (0.71 x 0.04 x 1.70 in.)
Housing Material		Nickel Plated Brass
Transducer		Glass Epoxy
Connection		**Catalog No.**
Cable		**Precabled, PvC (2 m)**
PNP	N.O.	XXV18B1PAL2
	N.C.	XXV18B1PBL2
NPN	N.O.	XXV18B1NAL2
	N.C.	XXV18B1NBL2
Connection		**M12**
PNP	N.O.	XXV18B1PAM12
	N.C.	XXV18B1PBM12
NPN	N.O.	XXV18B1NAM12
	N.C.	XXV18B1NBM12

Table 20.22: Sensor Accessories

Teachable Pushbutton Accessory for Virtu Series
Catalog No.
XXZPB100

Python AC/DC Power Convertor
Catalog No.
XXZPM100M12

Table 20.23: Mounting Brackets

Body Type	Catalog No.
M12	9006PA12
M18	9006PA18
M30	9006PA30

Table 20.24: Accessories

XUZC24

XUZC50

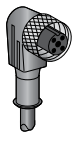
XUZC80

		mm	Catalog No.
Reflectors		24 x 21	XUZC24
		Ø 80	XUZC80
		50 x 50	XUZC50
		Material	**Catalog No.**
Mounting Brackets for XUB		Die Cast Zinc	XUZA118
		Plastic	XUZA218
		90°	**Straight**
		Catalog No.	**Catalog No.**
Cables (PUR), 2 m, without LED ★ Suitable plug-in female connectors, including pre-wired versions	**M8 (4-Pin)**	XZCP1041L2	XZCP0941L2
	M12 (4-pin)	XZCP1241L2	XZCP1141L2
	1/2- 20UNF	XZCP1965L2	XZCP1865L2

★ For 5 or 10 meter lengths, replace 2 in the cable catalog number with 5 or 10.

XUZA118

XUZA218



XZCP1241L2

XZCP1141L2

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Table 20.25: Specifications and Catalog Numbers

Virtu™ VM1 and VM18

Specifications						
Sensing Characteristics						
Sensing Range	51–508 mm (2–20 in.)					
Max. Switching Frequency	300 Hz					
Power Requirements						
Supply Voltage	12–24 Vdc					
Supply Current	40 mA (excluding load)					
Environmental Ratings						
Operating Temperature	–30 to 70 °C (–22 to 158 °F)					
Environment	NEMA 4X (indoor use only), IP67					
Construction						
VM18 Barrel, ØxL	18 x 1 x 77.62 mm (0.709 x 3.06 in.)					
VM1 Dual Mount	Ø 18 mm and Flat Format 43.7 x 18 x 59.7 mm (1.72 x 0.70 x 2.35 in.)					
Housing Material	PBT Resin					
Transducer	Glass Epoxy					
Output Type	**Catalog Number**					
	Output		**Cable**		**Quick Disconnect**	
			Dual Mount	**Barrel**	**Dual Mount**	**Barrel**
Proximity	PNP Sourcing	N.O.	VM1PNO	VM18PNO	VM1PNOQ	VM18PNOQ
		N.C.	VM1PNC	VM18PNC	VM1PNCQ	VM18PNCQ
	NPN Sinking	N.O.	VM1NNO	VM18NNO	VM1NNOQ	VM18NNOQ
		N.C.	VM1NNC	VM18NNC	VM1NNCQ	VM18NNCQ
	PNP Sourcing	N.O.	VM1PTO	VM18PTO	VM1PTOQ	VM18PTOQ
		N.C.				
	NPN Sinking	N.O.	VM1NTO	VM18NTO	VM1NTOQ	VM18NTOQ
		N.C.				
Dual-Level Pump In Normally Open	Off at loss of echo and at powerup	PNP	VM1PPI0000	VM18PPI0000	VM1PPI0000Q	VM18PPI0000Q
		NPN	VM1NPI0000	VM18NPI0000	VM1NPI0000Q	VM18NPI0000Q
	On at loss of echo and at powerup	PNP	VM1PPI1000	VM18PPI1000	VM1PPI1000Q	VM18PPI1000Q
		NPN	VM1NPI1000	VM18NPI1000	VM1NPI1000Q	VM18NPI1000Q
	Hold on loss of echo, Off at powerup	PNP	VM1PPI2000	VM18PPI2000	VM1PPI2000Q	VM18PPI2000Q
		NPN	VM1NPI2000	VM18NPI2000	VM1NPI2000Q	VM18NPI2000Q
Dual-Level Pump Out Normally Open	Off at loss of echo and at powerup	PNP	VM1PPO0000	VM18PPO0000	VM1PPO0000Q	VM18PPO0000Q
		NPN	VM1NPO0000	VM18NPO0000	VM1NPO0000Q	VM18NPO0000Q
	On at loss of echo and at powerup	PNP	VM1PPO1000	VM18PPO1000	VM1PPO1000Q	VM18PPO1000Q
		NPN	VM1NPO1000	VM18NPO1000	VM1NPO1000Q	VM18NPO1000Q
	Hold on loss of echo, Off at powerup	PNP	VM1PPO2000	VM18PPO2000	VM1PPO2000Q	VM18PPO2000Q
		NPN	VM1NPO2000	VM18NPO2000	VM1NPO2000Q	VM18NPO2000Q
Analog	**Voltage 0–10 Vdc with Temperature Compensation** For Direct/Inverse models, change VD or VI to VA.					
	Direct, 0 V at loss of echo and at powerup		VM1VD0000	VM18VD0000	VM1VD0000Q	VM18VD0000Q
	Inverse, 0 V at loss of echo and at powerup		VM1VI0000	VM18VI0000	VM1VI0000Q	VM18VI0000Q
	Direct, 10 V at loss of echo and at powerup		VM1VD1000	VM18VD1000	VM1VD1000Q	VM18VD1000Q
	Inverse, 10 V at loss of echo and at powerup		VM1VI1000	VM18VI1000	VM1VI1000Q	VM18VI1000Q
	Direct, hold on loss of echo, 0 V at powerup		VM1VD2000	VM18VD2000	VM1VD2000Q	VM18VD2000Q
	Inverse, hold on loss of echo, 0 V at powerup		VM1VI2000	VM18VI2000	VM1VI2000Q	VM18VI2000Q
	Direct, hold on loss of echo, 10 V at powerup		VM1VD3000	VM18VD3000	VM1VD3000Q	VM18VD3000Q
	Inverse, hold on loss of echo, 10 V at powerup		VM1VI3000	VM18VI3000	VM1VI3000Q	VM18VI3000Q
	Current 4–20 mA with Temperature Compensation For Direct/Inverse models, change CD or CI to CA					
	Direct, 4 mA at loss of echo and at powerup		VM1CD0000	VM18CD0000	VM1CD0000Q	VM18CD0000Q
	Inverse, 4 mA at loss of echo and at powerup		VM1CI0000	VM18CI0000	VM1CI0000Q	VM18CI0000Q
	Direct, 20 mA at loss of echo and at powerup		VM1CD1000	VM18CD1000	VM1CD1000Q	VM18CD1000Q
	Inverse, 20 mA at loss of echo and at powerup		VM1CI1000	VM18CI1000	VM1CI1000Q	VM18CI1000Q
	Direct, hold on loss of echo, 4 mA at powerup		VM1CD2000	VM18CD2000	VM1CD2000Q	VM18CD2000Q
	Inverse, hold on loss of echo, 4 mA at powerup		VM1CI2000	VM18CI2000	VM1CI2000Q	VM18CI2000Q
	Direct, hold on loss of echo, 20 mA at powerup		VM1CD3000	VM18CD3000	VM1CD3000Q	VM18CD3000Q
	Inverse, hold on loss of echo, 20 mA at powerup		VM1CI3000	VM18CI3000	VM1CI3000Q	VM18CI3000Q

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Table 20.26: Specifications and Catalog Numbers

Virtu™ 30 mm

M30
30 mm (1 or 2 m)

M30
30 mm (8 m)

Specifications								
Sensing Characteristics								
Sensing Range	102–1000 mm (4–39 in.)		51 mm to 1 m (2–39 in.); 119 mm to 2 m (4.7–79 in.)			304.8 mm to 8 m (12–315 in.)		
Sensing Frequency	180 kHz		200 kHz			75 kHz		
Power Requirements								
Supply Voltage	12–24 Vdc discrete, 15–24 Vdc analog		12–24 Vdc discrete; 15–24 Vdc analog			12–24 Vdc discrete; 15–24 Vdc analog		
Supply Current	40 mA discrete, 90 mA analog (excluding load)		80 mA (excluding load)			80 mA (excluding load)		
Environmental Ratings								
Operating Temperature	0 to 70 °C (32 to 158 °F)		0 to 50 °C (32 to 122 °F) discrete –20 to 60 °C (–4 to 140 °F) analog			–20 to 60 °C (–4 to 140 °F) TF option: –40 to 60 °C (–40 to 140 °F)		
Environment	NEMA 4X (indoor use only), IP67		NEMA 4X (indoor use only), IP67			NEMA 4X (indoor use only), IP67		
Construction								
Barrel, ØxL	30 x 1 x 95.26 mm (1.18 x 3.75 in.)		30 x 1 x 95 mm (1.18 x 3.74 in.)			30 x 1 x 116 mm (9.18 x 4.58 in.)		
Housing Material	PBT Resin		PEI Resin			PEI Resin		
Transducer	Glass Epoxy		Silicon Rubber or Fluorosilicone			Glass Epoxy		
Output Type			**1 m / 2 m**			**8 m**		
	Description	**Catalog No.**	**Description**		**Catalog No.**	**Description**	**Catalog No.**	
Proximity Output	PNP Sourcing N.O.	XX6V3A1PAM12	**1 m**	Connector	SM950A100000	**Cable**	SM900A800000	
	PNP Sourcing N.C.	XX6V3A1PBM12		Cable	SM900A100000			
	NPN Sinking N.O.	XX6V3A1NAM12	**2 m**	Connector	SM950A400000	**Connector**	SM950A800000	
	NPN Sinking N.C.	XX6V3A1NBM12		Cable	SM900A400000			
	Connector		**Cable 1 m ▲**		**PNP, NO**	**Cable 8 m**	**PNP, NO**	
Dual-Level Pump In	Normally Open		Pump-out latch		SM902A100000	Pump-out latch	SM902A800000	
	Hold on loss of echo; Off on power up		Pump-out latch w/alarm		SM902A1560000	Pump-out latch w/alarm	SM902A8560000	
	PNP	XX2V3A1PGM12	Pump-out latch, w/setpoint		SM902A1760000	Pump-out latch, w/setpoint	SM902A8760000	
	NPN	XX2V3A1NGM12	Pump-in latch		SM902A110000	Pump-in latch	SM902A810000	
	Off on loss of echo; Off on power up		Pump-in latch w/alarm		SM902A1460000	Pump-in latch w/alarm	SM902A8460000	
	PNP	XX2V3A1PFM12	Pump-in latch, w/setpoint		SM902A1660000	Pump-in latch, w/setpoint	SM902A8660000	
	NPN	XX2V3A1NFM12	Dual setpoint		SM902A1260000	Dual setpoint	SM902A8260000	
Dual-Level Pump Out	Hold on loss of echo; Off on power up		Dual alarm		SM902A1360000	Dual alarm	SM902A8360000	
	PNP	XX2V3A1PJM12	**Connector**		**PNP, NO**	**Connector**	**PNP, NO**	
	NPN	XX2V3A1NJM12	Pump-out latch		SM952A100000	Pump-out latch	SM952A800000	
	Off on loss of echo; Off on power up		Pump-out latch w/alarm		SM952A1560000	Pump-out latch w/alarm	SM952A8560000	
	PNP	XX2V3A1PHM12	Pump-out latch, w/setpoint		SM952A1760000	Pump-out latch, w/setpoint	SM952A8760000	
	NPN	XX2V3A1NHM12	Pump-in latch		SM952A110000	Pump-in latch	SM952A810000	
			Pump-in latch w/alarm		SM952A1460000	Pump-in latch w/alarm	SM952A8460000	
			Pump-in latch, w/setpoint		SM952A1660000	Pump-in latch, w/setpoint	SM952A8660000	
			Dual setpoint		SM952A1260000	Dual setpoint	SM952A8260000	
			Dual alarm		SM952A1360000	Dual alarm	SM952A8360000	
	Quick Disconnect		**Cable 1 m ▲**			**Cable 8 m**		
Analog	**0–20 mA**	**Catalog No.**	**Voltage**		**Catalog No.**	**Voltage**	**Catalog No.**	
	Direct/Inverse slope	XX9V3A1C4M12	Auto slope		SM906A180000	Auto slope	SM906A880000	
	Direct output	XX9V3A1D4M12	Direct slope		SM906A110000	Direct slope	SM906A810000	
	Inverse output	XX9V3A1E4M12	Inverse slope		SM906A100000	Inverse slope	SM906A800000	
	4–20 mA		**Current**			**Current**		
	Direct/Inverse slope	XX9V3A1C2M12	Auto slope		SM906A190000	Auto slope	SM906A890000	
	Direct output	XX9V3A1D2M12	Direct slope		SM906A130000	Direct slope	SM906A830000	
	Inverse output	XX9V3A1E2M12	Inverse slope		SM906A120000	Inverse slope	SM906A820000	
	0–5 Vdc		**Connector**			**Connector**		
	Direct/Inverse slope	XX9V3A1F3M12	**Voltage**			**Voltage**		
	Direct output	XX9V3A1G3M12	Auto slope		SM956A180000	Auto slope	SM956A880000	
	Inverse output	XX9V3A1H3M12	Direct slope		SM956A110000	Direct slope	SM956A810000	
	0–10 Vdc		Inverse slope		SM956A100000	Inverse slope	SM956A800000	
	Direct/Inverse slope	XX9V3A1F1M12	**Current**			**Current**		
	Direct output	XX9V3A1G1M12	Auto slope		SM956A190000	Auto slope	SM956A890000	
	Inverse output	XX9V3A1H1M12	Direct slope		SM956A130000	Direct slope	SM956A830000	
			Inverse slope		SM956A120000	Inverse slope	SM956A820000	

▲ For the 2 m version, change model from SMxxx**A1**xxxxx to SMxxx**A4**xxxxx.

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Section 21
Limit Switches

Encapsulated Miniature

9007MS, 21-8

Industrial Snap Switches

9007A, p. 21-6

Modular, Miniature and Compact

XCMD, 21-14

XCKD, 21-14

XCKP, 21-14

XCKT, 21-15

Compact General Duty

XCKL, 21-22

9007C, p. 21-32

Heavy Duty Industrial

9007C, p. 21-26

XCKJ, 21-40

Severe Duty

9007T, 21-37

L100, 21-39

Part Numbers

9007A and 9007C	Basic snap switch without enclosures with or without operators	**21-6**
9007MS and 9007ML	Encapsulated switches with NEMA 6P rating and 10 A contacts	**21-8**
XCMD	Osisense miniature metal modular	**21-14**
XCMN	Osisense compact non-modular	**21-14**
XCKD	Osisense compact metal modular	**21-14**
XCKP	Osisense compact plastic modular	**21-14**
XCKT	Osisense compact plastic with 2 side-cable entries and modular head	**21-15**
XCDR	Osisense compact metal with manual reset	**21-15**
XCPR	Osisense compact plastic with manual reset	**21-15**
ZCE, ZCY	Osisense component heads and lever arms	**21-16**
ZCD, ZCMC, ZCMD, ZCP, ZCPE	Osisense component bodies, cable plug assemblies, and conduit entries	**21-17**
XCKN, XCNR	Osisense compact, plastic, non-modular	**21-18**
XCKS	Standard body, plastic, double insulated	**21-19**
XCKL	Compact general duty, metal, with direct opening contacts	**21-22**
XCKJ	Precision switches with direct acting contacts to meet most international standards	**21-26**
9007C	Heavy duty, oiltight, watertight switches, with compact types available	**21-32**
9007T and 9007FT	Severe duty, oiltight mill and foundry switches with 20 A contacts	**21-37**
L100/L300	Severe duty, oiltight mill and foundry switches with up to 3 circuits	**21-39**

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Design	Miniature				Compact		
Catalog number	9007 A/O	9007 MS/ML	XCMN	XCMD	XCKP	XCKD	XCKL
Page	21-6	21-8	21-14	21-14	21-14	21-14	21-22
Enclosure	Open, plastic	Metal body, metal head	Plastic, double insulated	Metal	Plastic, double insulated	Metal	Metal
Features	A variety of operators are available.	Bottom or side cable entry. Full range of operating heads. See page 21-8.	Mounting by the body or by the head				1 conduit entry
Modularity	Selected operators	Operator	—	Head, body, lever, and connector			Head, body, and lever
Conforming to standards			—	—	CENELEC: EN 50047		—
Body dimensions (w x h x d), mm (in.)	29.0 x 63.5 x 21.0 (1.14 x 2.5 x 0.83)	40.1 x 44.4 x 15.8 (1.58 x 1.75 x 0.62)	30 x 50 x 16 (1.18 x 1.97 x 0.63)		31 x 65 x 30 (1.22 x 2.56 x 1.18)		52 x 72 x 30 (2.05 x 2.83 x 1.18)
Head	Linear	Linear or rotary	Linear movement, plunger Rotary movement, lever Rotary movement, multi-directional ▲ Same heads for ranges XCMD, XCKD, XCKP and XCKT				Linear movement, plunger Rotary movement, lever Rotary movement, multi-directional ▲
Contact blocks							
2 snap action contacts ⊕	—	—	N.C. + N.O.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.
2 snap action contacts	—	—	N.C. + N.O.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.
3 snap action contacts ⊕	—	—	—	N.C. + N.C. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.
3 snap action contacts	—	—	—	N.C. + N.C. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.
4 snap action contacts ⊕	—	—	—	N.C. + N.C. + N.O. + N.O.	—	—	—
4 snap action contacts	—	—	—	N.C. + N.C. + N.O. + N.O.	—	—	—
2 slow break contacts break before make ⊕	—	—	—	N.C. + N.O.	N.C. + N.O.	N.C. + N.O.	N.C. + N.O.
2 slow break contacts break before make	—	—	—	N.C. + N.O.	N.C. + N.O.	N.C. + N.O.	N.C. + N.O.
2 slow break contacts make before break ⊕	—	—	—	—	N.O. + N.C.	N.O. + N.C.	N.O. + N.C.
2 slow break contacts make before break	—	—	—	—	N.O. + N.C.	N.O. + N.C.	N.O. + N.C.
2 slow break contacts simultaneous ⊕	—	—	—	—	N.C. + N.C.	N.C. + N.C.	N.C. + N.C.
2 slow break contacts simultaneous	—	—	—	—	N.O. + N.O.	N.O. + N.O.	N.O. + N.O.
3 slow break contacts break before make ⊕	—	—	—	N.C. + N.C. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.
3 slow break contacts break before make	—	—	—	N.C. + N.C. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.
2 snap action contacts	N.C. + N.O., N.O. + N.O.	N.C. + N.O.	—	—	—	—	—
4 snap action contacts	N.C. + N.C., N.O. + N.O.	—	—	—	—	—	—
Insulation voltage (Ui) / thermal current (Ithe)	See page 21-6	300 Vac/Vdc 10 A (standard)	Screw terminal 2 contacts: 400 V/6 A	Pre-cabled 2 contacts: 400 V/6 A 3 contacts: 400 V/4 A 4 contacts: 400 V/3 A	Screw terminal: 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A Connector: Integral M12, 4-pin: 250 V/3 A	Screw terminal: 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A Connector: Integral M12, 5-pin: 60 V/4 A	Screw terminal: 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A
Enclosure rating IP = IEC enclosure rating IK = EN shock test standard	None	NEMA Types 1, 2, 4, 6, 6P, 12, 13 IP67	NEMA Types 1, 2, 13 IP 65, IK 04	NEMA Types 1, 2, 4X, 6, 12 IP 66, IP 67, IP 68, IK 06	NEMA Types 1, 2, 4, 6, 6P, 12, 13 IP 66, IP 67, IK 04	NEMA Types 1, 2, 4, 6, 12, 13 IP 66, IP 67, IK 06	NEMA Types 1, 2, 4, 6, 6P, 12, 13 IP 66, IK 06
Electrical connection	Screw terminal or Faston® connector	Pre-wired cable or M12 connector	Pre-wired cable	Pre-cabled. Connector: Integral or remote M12 or remote 7/8" 16UN	Screw terminal: M16, M20, Pg 11, PG 13, 1/2" NPT, or PF 1/2 Connector: Integral M12		Screw terminal: M20 or 1/2" NPT

▲ Flexible operators do not guarantee direct (positive) opening operation.

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Design	Standard Duty Industrial			Severe Duty Mill and Foundry	
Catalog number	9007C	XCKJ	XCKS	9007T/FT	L100/L300
Page	21-32	21-32	21-19	21-37	21-39
Enclosure	Metal, diecast, zinc alloy	Metal	Plastic, double insulated	Metal	Metal
Features	Plug-in body	Fixed or plug-in body, -40 °C (-40 °F) or +120 °C (+248 °F) versions	—	Extra heavy duty contact ratings	• Extra heavy duty contact ratings • High temperature option, unique in the marketplace
Modularity	Head, body, and lever			Lever	
Conforming to standards / Product certifications	UL 508, C22-2-14-95, NEMA 250, IEC 60947, EN 60947-1, EN 60947-5-1	CENELEC: EN 50041	CENELEC: EN 50041	NEMA A600 UL508 UL Listed, CSA Certified	NEMA A600 UL508 UL Listed, CSA Certified
Body dimensions (w x h x d), mm (in.)	Standard: 39 x 102 x 45 (1.54 x 4.02 x 1.77) Compact: 39 x 80 x 45 (1.54 x 3.15 x 1.77)	40 x 77 x 44 (1.57 x 3.03 x 1.73) 42.5 x 84 x 36 (1.67 x 3.31 x 1.42)	40 x 72.5 x 36 (1.57 x 2.85 x 1.42)	58.7 x 114.3 x 64.5 (2.31 x 4.5 x 2.54)	58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10)
Head	Linear movement, plunger Rotary movement, lever Multi-directional movement (wobble stick, cat whisker) ♦	Linear movement, plunger Rotary movement, lever Rotary movement, multi-directional ♦	Linear movement, plunger Rotary movement, lever Rotary movement, multi-directional ♦	Rotary movement, lever	Rotary movement, lever
Contact blocks				—	Various options available for L100, 2- and 3-pole devices.
2 snap action contacts →	—	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	—	—
2 snap action contacts	—	N.C. + N.O.; N.C. + N.C.	N.C. + N.O.; N.C. + N.C.	—	—
3 snap action contacts →	—	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	—	—
3 snap action contacts	—	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	—	—
4 snap action contacts →	—	—	—	—	—
4 snap action contacts	—	—	—	—	—
2 slow break contacts break before make →	—	N.C. + N.O.	—	—	—
2 slow break contacts break before make	—	N.C. + N.O.	—	—	—
2 slow break contacts make before break →	—	N.O. + N.C.	—	—	—
2 slow break contacts make before break	—	N.O. + N.C.	—	—	—
2 slow break contacts simultaneous →	—	N.C. + N.C.	—	—	—
2 slow break contacts simultaneous	—	N.O. + N.O.	N.O. + N.O.	—	—
3 slow break contacts break before make →	—	N.C. + N.C. + N.O. ; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	—	—
3 slow break contacts break before make	—	N.C. + N.C. + N.O. ; N.C. + N.O. + N.O.	N.C. + N.C. + N.O.; N.C. + N.O. + N.O.	—	—
1 slow break contact Form Y1561 ▲ →	1 N.C	—	—	—	—
2 snap action contacts	1 N.O. + 1 N.C.	2 C/O	2 C/O	1 N.C. + 1 N.O.■ convertible sequence	1 N.C. + 1 N.O.■ Some conversions possible
4 snap action contacts	2 N.O. + 2 N.C. ; 2 N.O. + 2 N.C. , neutral position; 2 N.O. + 2 N.C. , two stage	—	—	—	—
Insulation voltage (Ui) and thermal current (Ithe)	Ui = 600 V, except: 9007C62, 9007C66, 9007C68 (Ui = 250 V) and 9007C84, 9007C86 (Ui = 125 V) Ithe = 10 A, except: 9007C84, 9007C86 (Ithe = 2.5 A)	**Screw terminal** 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A **Connector** Integral M12, 5-pin: 60 V / 4 A Integral 7/8" 16UN: 250 V / 6 A	**Screw terminal** 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A	600 V 20 A (AC/DC)	600 V 20 A (AC), 5 A (DC)
Enclosure rating IP = IEC enclosure rating IK = EN shock test standard	IP 67 conforming to IEC 60529, NEMA Types 2, 4, 6, 6P, 12, 13	NEMA Types 1, 2, 4, 12 IP 66, IK 07	IP 65, IK 03	NEMA Types 1, 2, 4, 12, 13 IP65, 66, 67	NEMA Types 1, 4, 13 IP65, 66
Electrical connection	**Cable entry** 1/2"-14 NPT, M20 x 1.5 ISO cable entry **Connector** Integral 5-pin mini-connector	**Screw terminal** M20 x 1.5, PG13, or 1/2" PT **Connector** Integral M12 or 7/8" 16UN	**Screw terminal** M20 x 1.5 or PG13	**Cable entry** 1/2" NPT or PG13.5	**Cable entry** 1/2" NPT or 3/4" NPT Other options available **Connector** 7/8" 16UN or Cannon MS3102E20-AP or equal; other options available

▲ Single pole only. Refer to page 21-29 for details.
■ For other contact options, see catalog 9006CT1007.
♦ Flexible operators do not guarantee direct (positive) opening operation.

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Table 21.1: Enclosure Ratings

Type	NEMA Style											IEC Style		
	1	2	3	4	4X	6	6P	7	9	12	13	IP65	IP66	IP67
9007C	▲	▲		▲		▲	▲			▲	▲	▲	▲	▲
9007CR	▲	▲		▲		▲	▲	▲	▲	▲	▲			
9007FT	▲	▲		▲						▲	▲	▲	▲	▲
L100/L300	▲			▲							▲	▲	▲	
9007MS/ML ♦	▲	▲	▲	▲		▲	▲			▲	▲			▲
9007T	▲	▲		▲						▲	▲	▲	▲	▲
XCKJ	▲	▲	▲	▲						▲			▲	
XCKL	▲	▲	▲	▲						▲			▲	
XCKN & XCNR					▲					▲		▲		
XCKP & XCKT ■	▲			▲						▲		▲		
XCKS, XCMN												▲		
XCMD, XCKD					▲		▲			▲	▲		▲	▲

▲ Indicates NEMA or IEC Type Rating available for each product.
■ For indoor use only—not UV protected.
♦ Enclosure ratings are NEMA 1, 2, 3, 4, 6, 6P, 12, and 13 except for option 21 (low force) which is NEMA 1 only. The 9007 MS/ML05 (omni-directional operation) enclosure ratings are NEMA 1, 2, 12, and 13

Table 21.2: Sealing

Type		Material
9007C, CR	Standard shaft seals on lever types	Fluorocarbon rubber (FKM)
	Plunger and wobble stick boots	Neoprene; Fluorocarbon optional
	All other seals	Nitrile (Buna N); Fluorocarbon optional
R.B.Denison™ L		PVC
9007T and FT	Shaft seal	Nitrile (Buna N)
	Cover gasket	Nitrile (Buna N)
	Base plate gasket	Cellulose fiber laminate
XCKJ, XCKL, XCKS		Nitrile (Buna N)
XCMD, XCKD, XCKP, XCKT, XCKN, XCNR		Nitrile (Buna N) and silicon

Table 21.3: Ambient Temperature Ranges

The low temperatures listed below are based on the absence of freezing moisture or water. Care should be taken to avoid sub-freezing temperatures where dripping or splashing water is present and to avoid bringing a cold switch into a warm humid atmosphere and then back into sub-freezing temperatures. The water or moisture can freeze around the switch lever arm or plunger and cause jamming.

Type	Low Temperature	High Temperature at Full Rated Load
9007 C		
Lever Type	-20 °F (-28.9 °C)	+185 °F (+85 °C)
Plunger & Wobble Stick Type	0 °F (-17.8 °C)	+185 °F (+85 °C)
9007 FT★, T	-10 °F (-23 °C)	+185 °F (+85 °C)
HL100/HL300	0 °F (-17.8 °C)	+350 °F (+177 °C)
L100/L300	0 °F (-17.8 °C)	+200 °F (+93 °C)
9007 MS/ML	-4 °F (-20 °C)	+221 °F (+105 °C)
XCKJ, XCKL, XCKP, XCKT	-13 °F (-25 °C)	+158 °F (+70 °C)
XCMN, XCKN, XCNR	-13 °F (-25 °C)	+158 °F (+70 °C)
XCKS	-13 °F (-25 °C)	+158 °F (+70 °C)
XCMD	-13 °F (-25 °C)	+158 °F (+70 °C)

★ The Type FT will withstand hot falling sand up to +300°F (+149 °C); **however,** ambient temperature for the FT switch is the same as the Type T above (+185 °F, +85 °C). **Do not use in higher temperature ambients.**

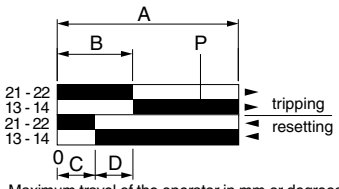
Some switches are available with higher or lower temperature limits, by selecting special versions or special options. Refer to the respective product sections for further information.
(Ex.: 9007MS/ML, see page 21-9.)

Table 21.4: Electrical Contact Ratings

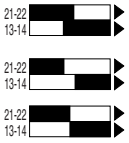
AC—NEMA A600						DC			
	Max. Current—35% Power Factor						Maximum Current		
Volts	Make		Break		Continuous Carrying Amperes	Volts	Make or Break		Continuous Carrying Amperes
	A	VA	A	VA			A	VA	
120	60	7200	6	720	10	125	1.1/0.55 ▼	138/69 ▼	5/2.5 ▼
240	30	7200	3	720	10	—	—	—	—
480	15	7200	1.5	720	10	250	0.27	67.5	2.5
600	12	7200	1.2	720	10	600	0.10	60	2.5

▼ Type C52 compact unit ratings at 125 Vdc—same ratings as C54, CF53 and CR53 at other voltages.

Table 21.5: Contact Function Diagrams



A=Maximum travel of the operator in mm or degrees.
B=Tripping travel of the contact.
C=Reset travel.
D=B-C=Differential travel.
P=Point from which positive opening is assured

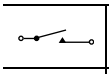


Make-before-break (overlapping) SPDT
The normally open contact closes before the normally closed contact opens.

Break-before-make (offset) SPDT
The normally closed contact opens before the normally open contact closes.

Simultaneous make and break—SPDT
The normally closed contact opens at the same time as the normally open contact closes.

Table 21.6: Wiring Diagrams

												
Form A	Form B	Form C	Form AA	Form BB	Form CC	Form X	Form Y	Form Zb	Form Z	Form XX	Form YY	Form ZZ
SPST-NO	SPST-NC	SPDT	DPST-NO	DPST-NC	DPDT	SPST-NO-DB	SPST-NC-DB	SPDT-DB Isolated Contacts	SPDT-DB	DPST-NO-DB	DPST-NC-DB	DPDT-DB

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Contact Configurations—Direct opening contacts meet IEC 60947-5-1 requirements.

For contacts used in safety applications (end of travel, emergency stop device, etc.) the assurance of direct opening is required (see IEC 204, EN 60204 or NF C 79-130) after each test. The opening of the contact must be verified by testing with an impulse voltage (2500 V).

Table 21.7: Maximum Current Ratings for Control Circuit Contacts—All Types

Switch Type	Contacts	Direct Opening Contacts Meet IEC 60947-5-1 Requirements ⊕	AC—50 or 60 Hz						DC			AC/DC
			V	Inductive 35% Power Factor				Resistive 75% Power Factor	V	Inductive and Resistive		Continuous Carrying Amperes
				Make		Break		Make and Break Amperes		Make and Break Amperes		
				A	VA	A	VA			Single Pole	Double Pole	
L100/L300	SPDT with 2 or 3 Contacts Form Z	No	120 240 480 600	150 75 37.5 30	18000 18000 18000 18000	20 12.5 6.25 5	2400 3000 3000 3000	6 3 1.5 1.2	125 250 600 —	1.1 0.55 0.2 —	—	20/5
XCKD 2 Contacts	SPDT Form Zb	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5
XCKD 3 Contacts	3 Pole Form Zb	Yes	120 240	30 15	3600 3600	3 1.5	360 360	3 1.5	125 250	0.22 0.11	—	5/1.0
XCKJ Plug-in	SPDT Form Z	No	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10
	2 SPDT Form ZZ	No	480 600	15 12	7200 7200	1.5 1.2	720 720	1.5 1.2	600 —	0.1 —	—	10 10
XCKJ Non-plug-in	SPDT Form Zb	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5 10
	2 SPDT Form ZZ	No	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5 10
XCKL	SPDT Form Zb	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10
XCKN	2 Pole	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5
XCKP 2 Contacts	SPDT Form Zb	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5
XCKP 3 Contacts	3 Pole Form Zb	Yes	120 240	30 15	3600 3600	3 1.5	360 360	3 1.5	125 250	0.22 0.11	—	5/1.0
XCKT 2 Contacts	SPDT Form Zb	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5
XCKT 3 Contacts	3 Pole Form Zb	Yes	120 240	30 15	3600 3600	3 1.5	360 360	3 1.5	125 250	0.22 0.11	—	5/1.0
XCMD 2-4 Contacts	2,3 or 4 Pole Form Zb	Yes	120 240	30 15	3600 3600	3 1.5	360 360	3 1.5	125 250	0.22 0.11	—	5/1.0
XCMN 2 Contacts	SPDT Form Zb	Yes	120 240	30 15	3600 3600	3 1.5	360 360	3 1.5	125 250	0.22 0.11	—	5/1.0
XCNR	2 Pole	Yes	120 240	60 30	7200 7200	6 3	720 720	6 3	125 250	0.55 0.27	—	10/2.5
9007AO1, AC	SPST, Form X or Y (rated 0.5 hp @ 110 and 200 Vac) SPDT, Form Z	No	120 240 480 600	40 20 10 8	4800 4800 4800 4800	15 10 6 5	1800 2400 2880 3000	15 10 6 5	125 250 600 —	0.5 0.25 0.05 —	0.25 0.1 — —	15
9007AO2, AO6, AB, AP	SPST, Form X or Y (rated 0.5 hp @ 110 and 200 Vac) SPDT, Form Z	No	120 240 480 600	40 20 10 8	4800 4800 4800 4800	15 10 6 5	1800 2400 2880 3000	15 10 6 5	125 250 600 —	2.0 0.5 0.1 —	0.5 0.2 0.02 —	15
9007CO3, CO6, CB, CC, CP	DPST Form AA or BB DPDT Form ZZ	No	120 240 480 600	30 15 7.5 6	3600 3600 3600 3600	3 1.5 0.75 0.6	360 360 360 360	3 1.5 0.75 0.6	125 250 600 —	1.0 0.3 0.1 —	0.2 0.1 — —	10
9007C	SPST Form Y1561 Slow break	Yes	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	125 250 600 —	0.55 0.27 0.1 —	—	10/2.5
	SPDT Form Z	No	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	125 250 600 —	0.55 0.27 0.1 —	0.22 0.11 — —	10/2.5
	DPDT Form ZZ	No	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	125 250 600 —	0.22 0.11 — —	0.22 0.11 — —	10/1.0
9007MS	SPDT Form C	No	120 240	60.0 30.0	7200 7200	6.0 3.0	720 720	—	—	—	—	10 (AC) / 5 (Res. @ 28 Vdc)
9007ML	SPDT Form Z	No	120 240	60.0 30.0	7200 7200	6.0 3.0	720 720	—	—	—	—	10 (AC) / 5 (Res. @ 28 Vdc)
9007T and FT	SPDT Quick Make and Break Form Z	No	120 240 480 600	150 75 37.5 30	18000 18000 18000 18000	20 12.5 6.25 5	2400 3000 3000 3000	20 12.5 6.25 5.0	125 250 600 —	5.0 1.0 0.2 —	—	20
	All Slow Make and Break Form Z	No	120 240 480 600	60 30 15 12	7200 7200 7200 7200	6 3 1.5 1.2	720 720 720 720	6 3 1.5 1.2	—	—	—	20

Electrical Symbols For Contacts	Form Za: the 2 contacts are the same polarity.	Form Zb: the 2 contacts are electrically separate.
Symbols for Direct Opening	⊕ Simplified Version	⊕ Complete symbol

Note: Alternate Current Ratings—Several product lines offer special versions or options with alternate contact configurations or contact materials, which may result in current ratings that differ from those listed above. Refer to the respective product sections for further information.

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Industrial Snap Switches Without Enclosures

Industrial snap switches have been incorporated in many Square D products such as timers, specialty push buttons, foot switches, operating mechanisms, door interlocks, motor control centers, limit switches, and many other control products.

Type AO2

Type AB21

Type AP222
with 2358C22G6
mushroom button

Recommended Actuator: An adjustable actuator is recommended. If nonadjustable actuator is used, a resilient type or a mechanical stop should be used to prevent "bottoming" of button mechanism.

Adjustable Actuator Overtravel: Minimum recommended overtravel in both trip and reset directions is 0.015 in.

Adjustable Actuator Total Travel: Maximum differential limit plus 0.030 in. (Example: 0.076 in. for Type AO2.)

Nonadjustable Actuator Total Travel: Fully retracted—at least 0.139 in. for Type AO1 and 0.160 in. for Types AO2 and CO3 from mounting surface. Fully engaged—at least 0.061 in. but not closer than 0.045 in. from mounting surface.

Contact Configurations: Single-pole snap switches that contain two double-break contact elements (1 N.O. and 1 N.C.) must be used on circuits of the same polarity. Double-pole snap switches contain two electrically separated sets of contact elements allowing use on circuits of opposite polarity. Each set contains two double-break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of the same polarity.

Table 21.8: Quick Make and Break—600 Volts Max. AC and DC

Operator Style	Contact Arrangement	Type
Basic Snap Switch	1 N.O. 1 N.C.	AO1
	1 N.C.	AO1A
	1 N.O.	AO1B
	1 N.O. 1 N.C.	AO2
		AO6 (Plug-in)
	1 N.C.	AO2A
	1 N.O.	AO2B
	2 N.O. 2 N.C.	CO3
	2 N.O.	CO6 (Plug-in)
	Two Stage 2 N.O. 2 N.C.	CO7
Rigid Roller Lever Style	1 N.O. 1 N.C. 7/32" width roller	AB21 (RH)
		AB22 (LH)
		AB41 (without side mtg. bracket)
	1 N.O. 1 N.C. 15/32" width roller	AB23 (RH)
		AB24 (LH)
	2 N.O. 2 N.C. 7/32" width roller	CB31 (RH)
		CB41 (without side mtg. bracket)
	2 N.O. 2 N.C. 15/32" width roller	CB33 (RH)
		CB34 (LH)
Rigid Roller Lever Style One Way Roller	1 N.O. 1 N.C.	AB25 (RH)
		AB26 (LH)
	2 N.O. 2 N.C.	CB35 (RH)
		CB36 (LH)

Operator Style	Contact Arrangement	Type
Cabinet Door Style	1 N.O. 1 N.C.	AC1
	2 N.O. 2 N.C.	CC1
Plunger Style Panel Mounting	1 N.O. 1 N.C.	AP221
	2 N.O. 2 N.C.	CP221
	Operator Only	AP201 □
Roller Plunger Style Panel Mounting Non-Oiltight	1 N.O. 1 N.C.	AP321
	2 N.O. 2 N.C.	CP321
		CP324 △
	Operator Only	AP301 □
		AP304 △□
Roller Plunger Style Panel Mounting Oiltight	1 N.O. 1 N.C.	AP323
		AP325 △
	2 N.O. 2 N.C.	CP323
		CP325 △
	Operator Only	AP303 □
		AP305 △□
Mushroom Button Style Panel Mounting	1 N.O. 1 N.C.	AP222
	2 N.O. 2 N.C.	CP222
	Operator Only	AP202 □

△ Roller turned 90° from standard (perpendicular to mounting holes).
□ For use with Type AO and CO basic switches.

Table 21.9: Maximum Current Ratings For Control Contacts—All Types

Switch Type	Contacts ◊	AC—50 or 60 Hz						DC			AC or DC
		Voltage	Inductive 35% Power Factor				Resistive 75% Power Factor	Voltage	Inductive and Resistive		
			Make		Break		Make and Break Amperes		Make and Break Amperes		Continuous Carrying Amperes
			A	VA	A	VA			Single Pole	Double Pole	
AO1, AC	SPDT	120	40	4800	15	1800	15	125	0.5	0.25	15
	Form Z	240	20	4800	10	2400	10	250	0.25	0.1	15
	SPST	480	10	4800	6	2880	6	600	0.05	—	15
	Form X or Y	600	8	4800	5	3000	5	—	—	—	15
AW, AO2, and AO6, AB, AP	SPDT	120	40	4800	15	1800	15	125	2.0	0.5	15
	Form Z	240	20	4800	10	2400	10	250	0.5	0.2	15
	SPST	480	10	4800	6	2880	6	600	0.1	0.02	15
	Form X or Y	600	8	4800	5	3000	5	—	—	—	15
AW, CO3, and CO6, CB, CC, CP	DPDT	120	30	3600	3	360	3	125	1.0	0.2	10
	Form ZZ	240	15	3600	1.5	360	1.5	250	0.3	0.1	10
	DPST	480	7.5	3600	0.75	360	0.75	600	0.1	—	10
	Form AA or BB	600	6	3600	0.6	360	0.6	—	—	—	10

◊ Do **not** meet IEC 60947-5-1 requirements for direct opening contacts.

Acceptable Wire Size . . . . . 14–22 AWG
Recommended Terminal Clamp Torque . . . . . 6–9 lb-in (0.7–1.0 N•m)

File E42259
CCN NKCR2

File LR25490
Class 3211-03

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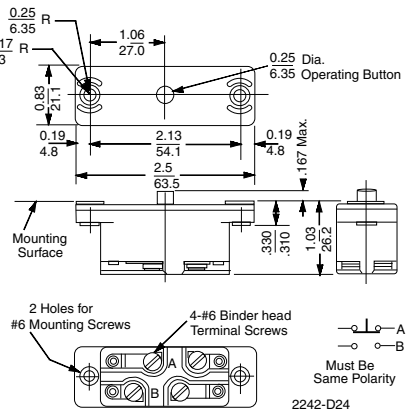
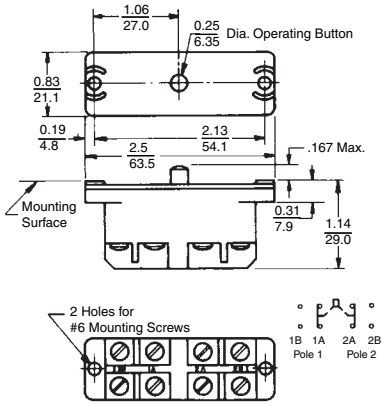
Approximate Dimensions and Operating Data, 9007AO, CO, AP, and CP

9007AO, Single-Pole Snap Switch



9007CO, Two-Pole Snap Switch



Dual Dimensions inches / mm

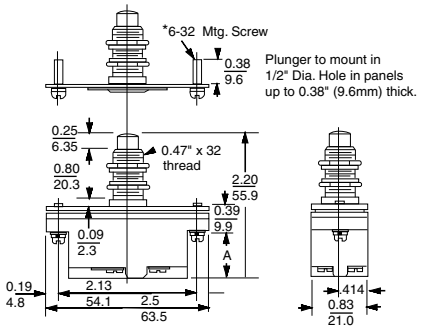
	Operating Data, in. (mm)	
	AO1, 1A, 1B	AO2, 2A, 2B
Pre-travel	0.057–0.074 (1.4–1.8)	0.057–0.074 (1.4–1.8)
Differential	0.015–0.025 (0.6–0.6)	0.035–0.046 (0.9–1.16)
Total travel	0.103–0.125 2.6–3.2)	0.103–0.125 (2.6–3.2)
Operating force	7–11 oz (0.05–0.08 N)	10–14 oz (0.07–0.1 N)
Shipping weight	0.25 lb (0.11 kg)	0.25 lb (0.11 kg)

	Operating Data, in. (mm)	
	CO3	C07
Pre-travel 1st stage	0.057–0.074 (1.4–1.8)	0.035–0.060 (0.9–1.5)
Pre-travel 2nd stage	—	0.060–0.085 (1.5–2.1) ▲
Differential	0.025–0.046 (0.6–1.16)	0.010–0.020 (0.25–0.50)
Total travel	0.103–0.125 (2.6–3.2)	—
Operating force	7–12 oz (0.05–0.084 N)	7–12 oz (0.05–0.084 N)
Shipping weight	0.25 lb (0.11 kg)	0.25 lb (0.11 kg)

▲ Separation between first and second stage trip points is 0.020–0.025 (0.5–0.6).

9007AP201, 221, and CP221

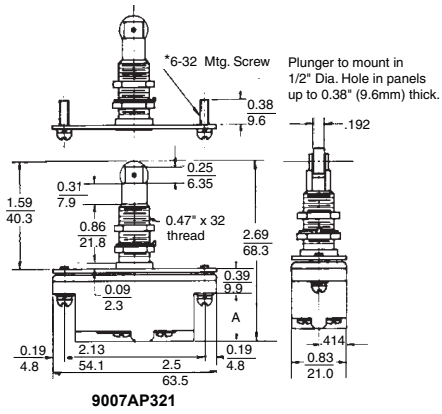
9007AP201



9007AP221

9007AP301, 303, 304, 305, 321, 323, 324, 325, and CP321, 323, 324, 325

9007AP301



9007AP321

Type	Dimension A
AP221	0.70 (17.8)
CP221	0.80 (20.3)

	Operating Data, in. (mm)	
	AP221	CP221
Pretravel	0.070–0.089 (1.8–2.2)	0.070–0.089 (1.8–2.2)
Differential	0.035–0.046 (0.9–1.2)	0.025–0.046 (0.9–1.2)
Overtravel	0.161–0.180 (4.1–4.6)	0.161–0.180 (4.1–4.6)
Total travel	0.231–0.269 (5.8–6.8)	0.231–0.269 (5.8–6.8)
Operating force	10–14 oz (0.07–0.1 N)	7–12 oz (0.05–0.08 N)
Shipping weight	0.25 lb (0.11 kg)	0.25 lb (0.11 kg)

Type	Dimension A
AP321, 323, 324, 325	0.70 (17.8)
CP321, 323, 324, 325	0.80 (20.3)

	Operating Data, in. (mm)			
	AP321, 324	AP323, 325	CP321, 324	CP323, 325
Pretravel	0.060–0.150 (1.5–3.8)	0.060–0.150 (1.5–3.8)	0.060–0.150 (1.5–3.8)	0.060–0.150 (1.5–3.8)
Differential	0.035–0.046 (0.9–1.2)	0.035–0.046 (0.9–1.2)	0.025–0.046 (0.9–1.2)	0.035–0.046 (0.9–1.2)
Total travel	0.200–0.340 (5.1–8.6)	0.200–0.340 (5.1–8.6)	0.200–0.340 (5.1–8.6)	0.200–0.340 (5.1–8.6)
Operating force	20 oz (0.14 N)	28 oz (0.2 N)	26 oz (0.18 N)	28 oz (0.2 N)

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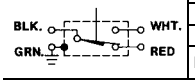
9007MS

The heavy-duty, miniature MS limit switch is completely encapsulated and intended for difficult applications such as machine tools, earth moving equipment, and general transportation. 9007MS04S0084

The switch has 40 mm mtg hole centers.

Table 21.10: Specifications

Temperature range (The minimum temperatures listed are based on the absence of freezing moisture or water.)	-4 °F to +221 °F (-20 °C to +105 °C) For -40 °F / -40 °C minimum temperature, see Forms 21 and 80 in Table 21.13 on page 21-9.
Enclosure rating	NEMA 1, 2, 4, 6, 6P, 12, 13, IP67
Vibration resistance	10 G (75–1200 Hz)
Shock resistance	35 G
Contact Characteristics	
Rated thermal current	10 A (standard)
Rated insulation voltage	300 Vac and Vdc (standard)
Gold contact switching ratings	0.1A, 24 Vdc; 0.24 VA
Cable	#18 AWG SJTO

MS Circuit—Form C	Electrical Ratings/SPDT Form C (MS Type)			
	Silver Contacts			Gold Contacts
1 N.O.–1 N.C.	Vac	Make	Break	
	120	60 A	6 A	100 mA @ 125 Vac 30 mA 28 Vdc
	240	30 A	3 A	
	10.0 Amperes Continuous			
	DC Contact Rating: 5 A (Res), 28 Vdc			

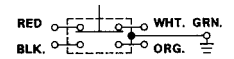
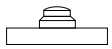
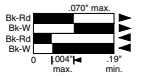
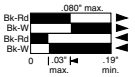
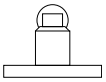
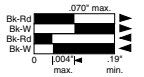
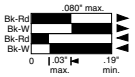
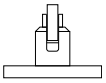
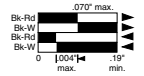
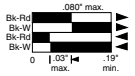
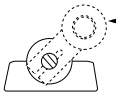
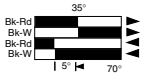
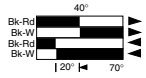
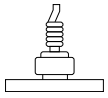
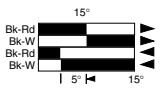
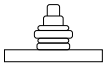
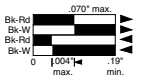
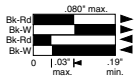
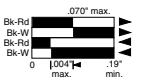
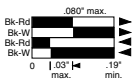
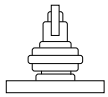
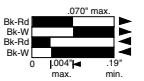
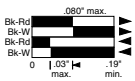
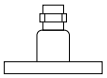
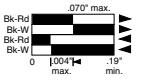
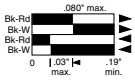
ML Circuit—Form Z	Electrical Ratings/SPDT-DB Form Z (ML Type)		
	Silver Contacts		
1 N.O.–1 N.C.	Vac	Make	Break
	120	60 A	6 A
	240	30 A	3 A
	10.0 Amperes, Continuous		
	DC Contact Rating: 5 A (Res), 28 Vdc		

Table 21.11: Selection (append prefix 9007 to the catalog number)

Description / Functional Diagram ■	MS	ML	Operating Force/Torque	Contact Form	Contact Type	Catalog Number ▲
Top plunger						
			80 oz	SPDT Form C	Silver	MS01S0100
			80 oz	SPDT Form C	Gold	MS01G0100
			80 oz	SPDT Form Z	Silver	ML01S0100
Parallel roller plunger						
			80 oz	SPDT Form C	Silver	MS02S0100
			80 oz	SPDT Form C	Gold	MS02G0100
			80 oz	SPDT Form Z	Silver	ML02S0100
Cross roller plunger						
			80 oz	SPDT Form C	Silver	MS03S0100
			80 oz	SPDT Form C	Gold	MS03G0100
			80 oz	SPDT Form Z	Silver	ML03S0100
Rotary lever, CW and CCW						
 ← Not included (see Table 21.14 on page 21-9)			48 oz-in	SPDT Form C	Silver	MS04S0100
			48 oz-in	SPDT Form C	Gold	MS04G0100
			48 oz-in	SPDT Form Z	Silver	ML04S0100
Omnidirectional—wire whisker (NEMA 1, 2, 12, 13 only)						
			15 oz-in	SPDT Form C	Silver	MS05S0100
			15 oz-in	SPDT Form C	Gold	MS05G0100
Bushing mounted—top plunger						
			80 oz	SPDT Form C	Silver	MS06S0100
			80 oz	SPDT Form C	Gold	MS06G0100
			80 oz	SPDT Form Z	Silver	ML06S0100
Bushing mounted—parallel roller plunger						
			80 oz	SPDT Form C	Silver	MS07S0100
			80 oz	SPDT Form C	Gold	MS07G0100
			80 oz	SPDT Form Z	Silver	ML07S0100
Bushing mounted—cross roller plunger						
			80 oz	SPDT Form C	Silver	MS08S0100
			80 oz	SPDT Form C	Gold	MS08G0100
			80 oz	SPDT Form Z	Silver	ML08S0100
Adjustable top plunger						
			80 oz	SPDT Form C	Silver	MS09S0100
			80 oz	SPDT Form C	Gold	MS09G0100
			80 oz	SPDT Form Z	Silver	ML09S0100

▲ For available options and part number explanations, see page 21-9. Add options to the end of the catalog number. Up to three options may be added, if applicable.

■ If the application includes oil, booted switches are recommended. See page 21-9.

File CCN E42259 NKCR

File Class LR 25490 3211-03

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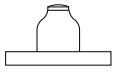
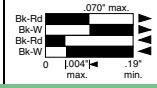
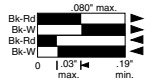
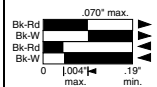
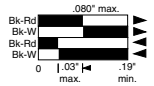
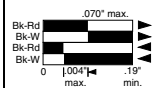
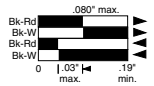
Table 21.12: Selection—Booted Devices (append prefix 9007 to the catalog number)

Description / Functional Diagram	MS	ML	Operating Force/Torque	Contact Form	Contact Type	Catalog▲ Number ■
Booted top plunger						
			80 oz	SPDT Form C	Silver	MS10S0100
			80 oz	SPDT Form C	Gold	MS10G0100
			80 oz	SPDT Form Z	Silver	ML10S0100
Booted parallel roller plunger						
			80 oz	SPDT Form C	Silver	MS12S0100
			80 oz	SPDT Form C	Gold	MS12G0100
			80 oz	SPDT Form Z	Silver	ML12S0100
Booted cross roller plunger						
			80 oz	SPDT Form C	Silver	MS13S0100
			80 oz	SPDT Form C	Gold	MS13G0100
			80 oz	SPDT Form Z	Silver	ML13S0100

▲ See available options below. Add to the end of the catalog number. Up to three options may be added, if applicable.
■ This catalog number is for devices with a standard cable and no options.See Table 21.13 for other cable length selections and general options.

Shown with side entrance cable, option 06

Table 21.13: Cable Length and General Options Designators: 9007MS01Sxxyy

Replace xx and yy in the catalog number above with the designators in the tables below.
Some combinations of cable lengths and options are unavailable; consult Schneider Electric.

Cable Length (xx)▲	Designator
No cable ♦	00
3 ft—standard	01
6 ft	02
9 ft	03
12 ft	04
18 ft	05
33 ft	13

♦ Use with options 54, 55, and 82.

General Options (yy) ▲	Designator
#16 AWG SJTO cable (MS only)	02
Side entrance #18 AWG SJTO cable	06
Gray #18 AWG SJTO cable	10
#18 AWG individual conductors	11
Male 4 pin mini-connector with 3 ft cable (MS only)	12
Low force (18 oz), low temp (-40 °F / -40 °C), NEMA 1 only	21
High Pre-travel—adds 0.030	30
Male 4 pin micro-connector in housing (DC type) (MS only)	54
Male 5 pin micro-connector (DC type) (ML only)	55
Low temperature (-40 °F / -40 °C), 9007MS04 (NEMA 1 only)	80
Tapped holes in top of plunger housing (MS and ML)	81
Male 4 pin micro-connector in housing (AC type) (MS only)	82
Black #18 AWG SJTO cable (ML only)	83
Male 4-pin micro-connector in housing (AC type) (no cable	84

Lever

Table 21.14: Style 7 Levers—0.75 in. (19 mm) diameter, nylon or steel roller (9007 prefix is not required on lever catalog numbers)

Length		Catalog Number 1/4 in. (6 mm) Wide		Catalog Number 1/2 in. (13 mm) Wide		Catalog Number 3/4 in. (19 mm) Wide	Catalog Number 1 in. (25 mm) Wide
inch	(mm)	Nylon	Steel	Nylon	Steel	Nylon	Nylon
0.875	(22.23)	7A2N	7A2	7B2N	7B2	7F2N	7J2N
1.375	(34.93)	7A3N	—	7B3N	—	7F3N	7J3N
1.5	(38.10)	7A1N	7A1	7B1N	—	7F1N	7J1N
1.75	(44.45)	7A7N	—	7B7N	—	7F7N	7J7N
2.00	(50.8)	7A4N	—	7B4N	—	7F4N	7J4N

Note: Lever tightening torque for mounting the lever on the shaft: minimum **17 lb-in**.
Other levers available. See catalog 9006CT1007. For inside (reverse) roller option at no charge, replace 7 with 7X. (Ex: 7A2N changes to 7XA2N.)

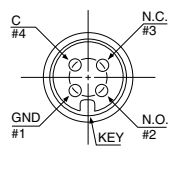
9007MS04S0084

Table 21.15: Specialty Arms (9007 prefix is not required on lever catalog numbers)

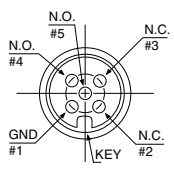
Description	Catalog Number
Style 7D adjustable length 1-3/8" to 3-3/8"—0.75" diameter, 1/4" wide, metal roller	7D
Style 7DN adjustable length 1-3/8" to 3-3/8"—0.75" diameter, 1/4" wide, nylon roller	7DN
Style 7S spring nylon, 6" rod, 0.3" diameter	7S
Style 7N nylon rod, 5" long, 0.3" diameter	7N

Note: Lever tightening torque for mounting the lever on the shaft: minimum **17 lb-in**.

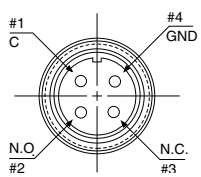
Male plug (face) pin-outs



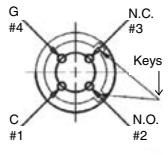
Option 54 (MS only)—DC



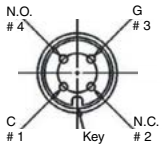
Option 55 (ML only)—DC



Option 12 (MS only)—AC or DC (3 Amps)



Option 82 (MS only)—AC



Option 84 (MS only)—AC

Note: DC connectors are rated 3 A, 250 Vac/Vdc.

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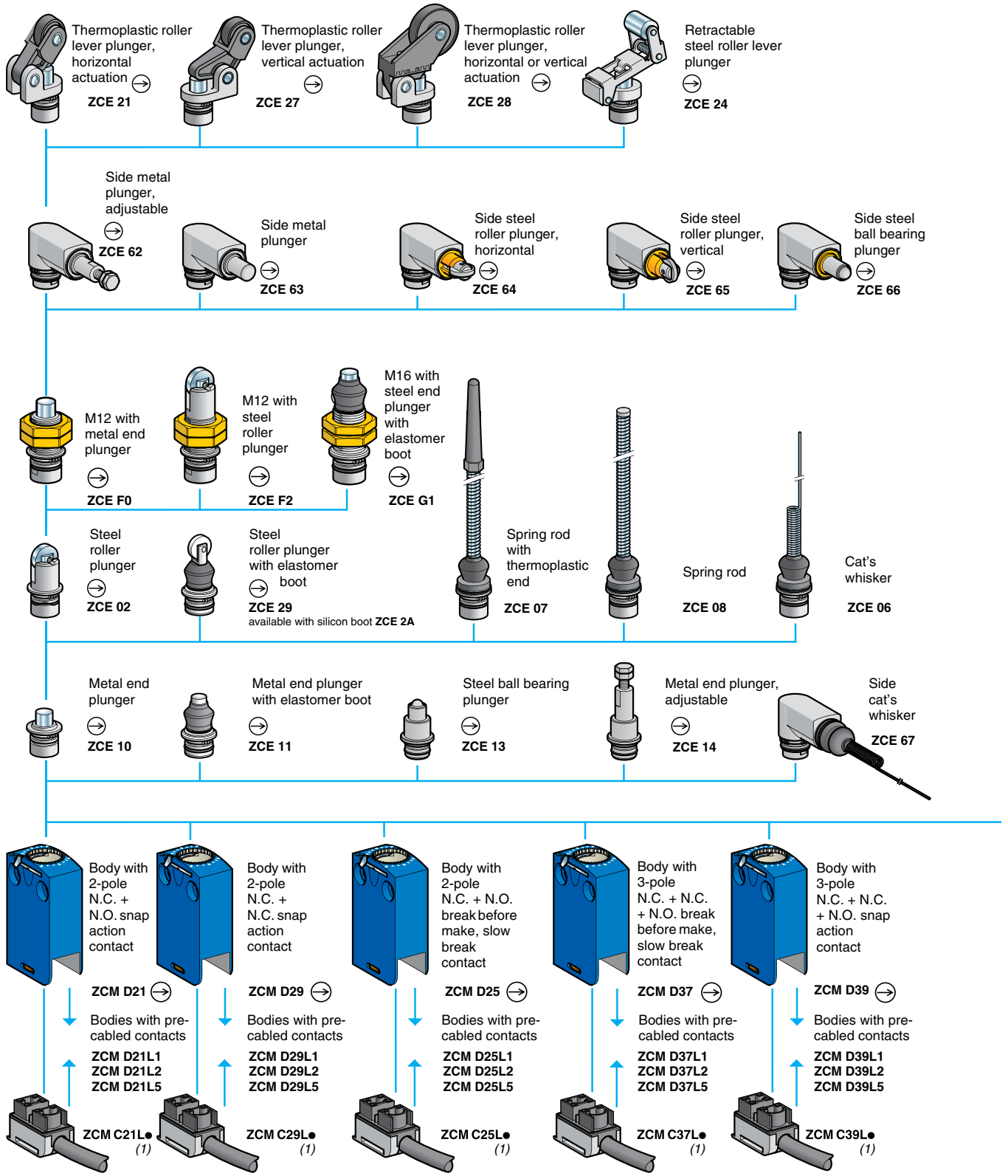

1. Pre-cabled connection components: replace the "•" in the catalog number with the required cable length in meters, either 1, 2, 3, 5, 7 or 10.
Example: ZCMC21L• becomes ZCMC21L7 for a 7 m (23.0 ft) cable.
Note: only cable lengths of 1, 2 and 5 m (3.3, 6.6, and 16.4 ft) are available for pre-cabled connection components ZCMC37L• and ZCMC39L•.

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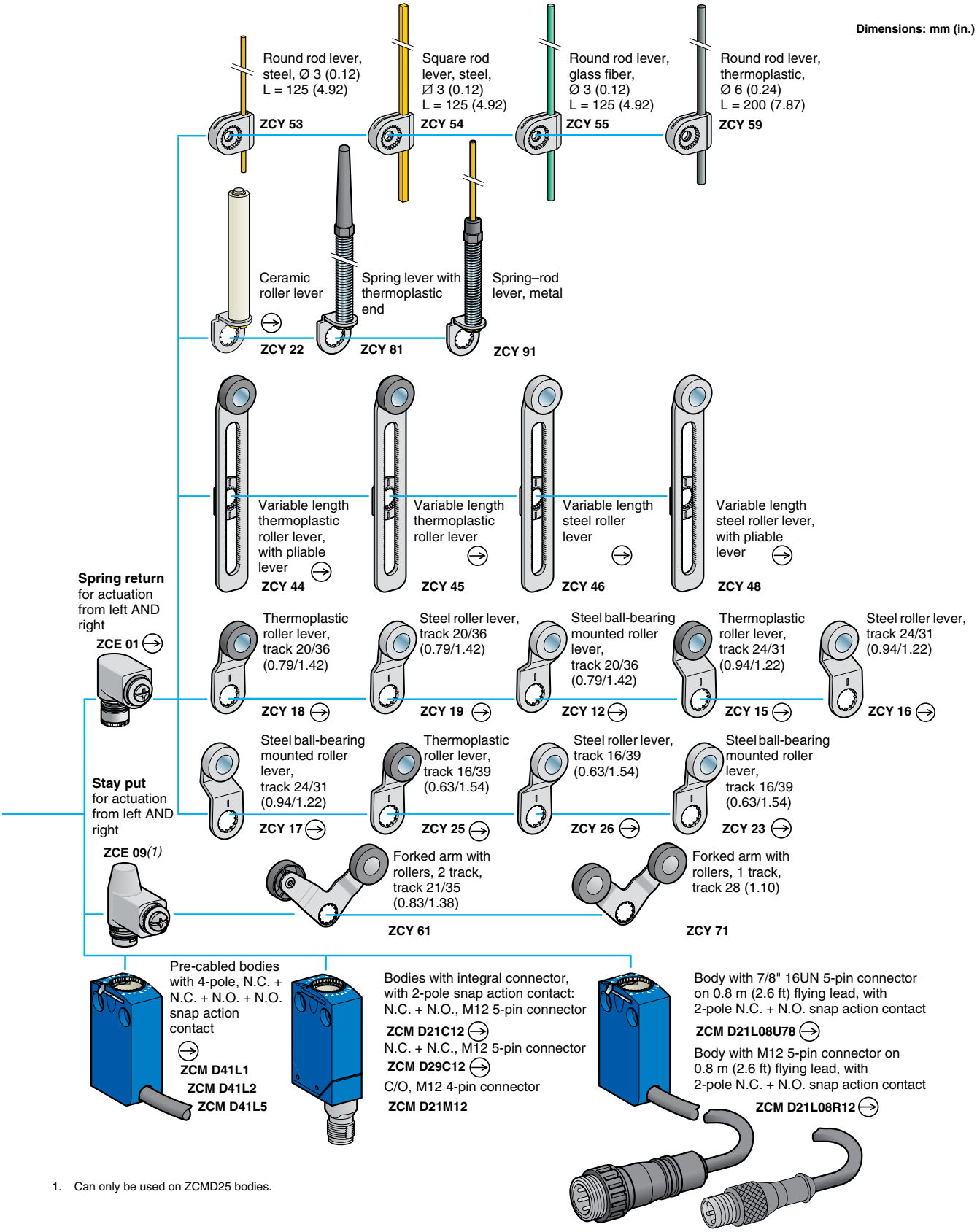
Dimensions: mm (in.)



1. Can only be used on ZCMD25 bodies.

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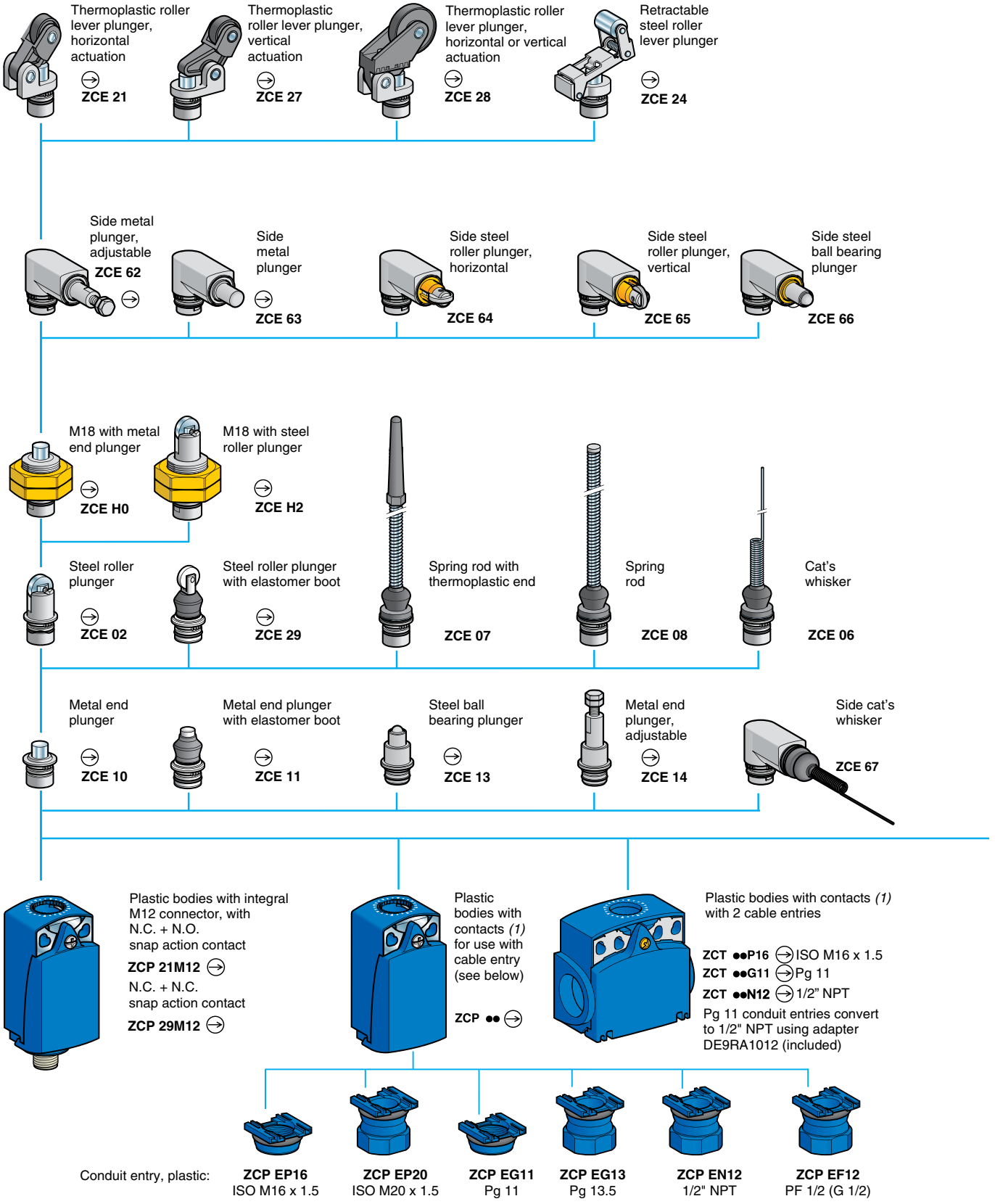

1. For further details, see catalog 9006CT1007.

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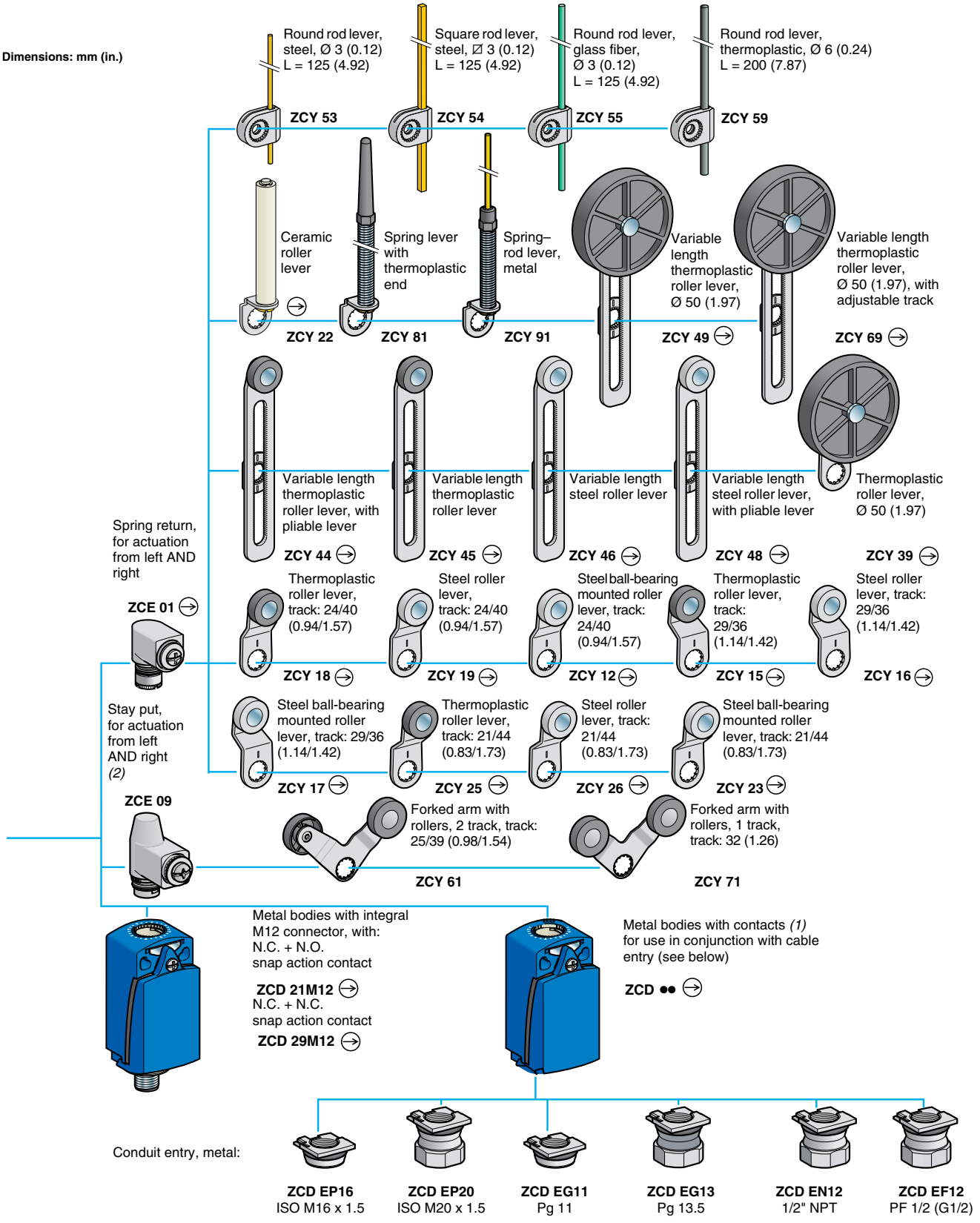
Dimensions: mm (in.)



1. For further details, see catalog 9006CT1007.

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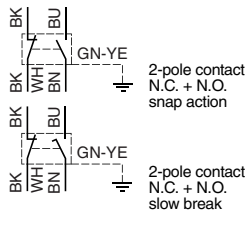
Miniature, Precabled Limit Switches, Metal

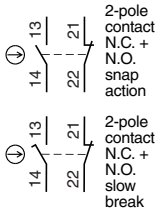
Table 21.16: XCMD Modular and XCMN Non-Modular

OsiSense XCMD, XCMN	Steel Roller Plunger	Plastic Roller Lever	Variable Length Plastic Roller Lever	M12 Head Steel Roller Plunger	Cat Whisker	End Plunger (non-modular)
						
Actuation speed (m/s)	0.5	1.5	1.5	0.1	1	0.5
Switches conforming to IEC 60947-5-1 section 3 ⊕	yes	yes	yes	yes	no	yes
Degree of protection conforming to IEC 60529	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP65
Rated operational characteristics	Vac 15; B 300 (Ue = 240 V, Ie = 1.5 A) / Vdc 13; R 300 (Ue = 250 V, Ie = 0.1 A)					
Cable entry	pre-cabled, adjustable direction, length = 1 m (other lengths available on request)					pre-cabled length = 1 m
Mounting holes—in. (mm)	0.79 (20)	0.79 (20)	0.79 (20)	0.79 (20)	0.79 (20)	0.79 (20)
Body dimensions—in. (mm), W x D x H	1.18 x 0.63 x 2.32 (30 x 16 x 59)	1.18 x 0.63 x 2.32 (30 x 16 x 59)	1.18 x 0.63 x 2.32 (30 x 16 x 59)	1.18 x 0.63 x 2.32 (30 x 16 x 59)	1.18 x 0.63 x 2.32 (30 x 16 x 59)	1.18 x 0.63 x 2.32 (30 x 16 x 59)
Ordering information	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
2-pole, N.C. + N.O. snap action	XCMD2102L1	XCMD2115L1	XCMD2145L1	XCMD21F2L1	XCMD2106L1	XCMN2110L1
2-pole, N.C. + N.O. break before make, slow break	XCMD2502L1	XCMD2515L1	XCMD2545L1	XCMD25F2L1	XCMD2506L1	—

Exploded view . . . . . page 21-10

Compact, Modular Limit Switches, Metal or Plastic

Table 21.17: XCKD and XCKP Compact, 30 mm Wide, Conforming to Standard EN 50047

OsiSense XCKP	Metal End Plunger	Plastic Roller Lever Horizontal Actuation	M18 Head Metal End Plunger	Plastic Roller Lever	Variable Length Plastic Roller Lever	Rubber Roller Lever Ø 50 mm	Cat Whisker
							
Actuation speed (m/s)	0.5	1	0.5	1.5	1.5	1.5	1
Switches conforming to IEC 60947-5-1 section 3 ⊕	yes	yes	yes	yes	yes	yes	no
Degree of protection conforming to IEC 50 529	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67	IP66 and IP67
Rated operational characteristics	Vac 15; A 300 (Ue = 240 V, Ie = 3 A) / Vdc 13; Q 300 (Ue = 250 V, Ie = 0.27 A)						
Cable entry	1 tapped entry for 1/2" NPT						
Mounting holes (mm)	20	20	M18 x 1	20	20	20	20
Body dimensions (mm) W x D x H	30 x 30 x 73	30 x 30 x 73	30 x 30 x 73	30 x 30 x 73	30 x 30 x 73	30 x 30 x 73	30 x 30 x 73
Ordering information	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
XCKD Metal, 30 mm Wide							
2-pole, N.C.+ N.O. snap action	XCKD2110N12	XCKD2121N12	XCKD21H0N12	XCKD2118N12	XCKD2145N12	XCKD2139N12	XCKD2106N12
2-pole, N.C.+ N.O. break before make, slow break	XCKD2510N12	XCKD2521N12	XCKD25H0N12	XCKD2518N12	XCKD2545N12	XCKD2539N12	XCKD2506N12
XCKP Plastic, 30 mm Wide, Double Insulated							
2-pole, N.C.+ N.O. snap action	XCKP2110N12	XCKP2121N12	XCKP21H0N12	XCKP2118N12	XCKP2145N12	XCKP2139N12	XCKP2106N12
2-pole, N.C.+ N.O. break before make, slow break	XCKP2510N12	XCKP2521N12	XCKP25H0N12	XCKP2518N12	XCKP2545N12	XCKP2539N12	XCKP2506N12

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Compact Limit Switches with 2 Cable Entries and Modular Head

Table 21.18: XCKT Compact, Plastic, 2 Cable Entries, Standard, 40 mm

OsiSense XCKT	**Metal End Plunger**	**Metal Roller Plunger**	**Plastic Roller Lever**
2-pole contact N.C. + N.O. snap action			
Actuation speed (m/s)	0.5	0.5	1.5
Switches conforming to IEC 60947-5-1 section 3	yes	yes	yes
Degree of protection conforming to IEC 60529	IP66 and IP67	IP66 and IP67	IP66 and IP67
Rated operational characteristics	Vac 15; A 300 (Ue = 240 V, Ie = 3 A) / Vdc 13; Q 300 (Ue = 250 V, Ie = 0.27 A)		
Cable entry	Two Pg 11 cable entries. One 1/2" NPT adapter, DE9RA1012, is included.		
Mounting holes—in. (mm)	0.79 or 1.57 (20 or 40)	0.79 or 1.57 (20 or 40)	0.79 or 1.57 (20 or 40)
Body dimensions—in. (mm), W x D x H	2.36 x 1.18 x 2.4 (60 x 30 x 61)	2.36 x 1.18 x 2.4 (60 x 30 x 61)	2.36 x 1.18 x 2.4 (60 x 30 x 61)
Ordering information	**Cat. No.**	**Cat. No.**	**Cat. No.**
Complete switch 2-pole, N.C. + N.O. snap action	XCKT2110N12	XCKT2102N12	XCKT2118N12

Modular, Compact Limit Switches with Manual Reset

Table 21.19: XCDR and XCPR Compact, Metal or Plastic, with Manual Reset, 30 mm

OsiSense XCDR and XCPR		**Metal End Plunger**	**Plastic Roller Lever Horizontal Actuation**	**Plastic Roller Lever Vertical Actuation**
Actuation speed (m/s)		0.5	1	1
Switches conforming to IEC 60947-5-1 section 3		yes	yes	yes
Degree of protection conforming to IEC 60529		IP66 and IP67	IP66 and IP67	IP66 and IP67
Rated operational characteristics		Vac 15; A 300 (Ue = 240 V, Ie = 3 A) / Vdc 13; Q 300 (Ue = 250 V, Ie = 0.27 A)		
Cable entry		1 tapped entry for 1/2" NPT		
Mounting holes—in. (mm)		0.79 (20)	0.79 (20)	0.79 (20)
Body dimensions—in. (mm), W x D x H		1.18 x 1.18 x 3.74 (30 x 30 x 95)	1.18 x 1.18 x 3.74 (30 x 30 x 95)	1.18 x 1.18 x 3.74 (30 x 30 x 95)
Ordering information		**Cat. No.**	**Cat. No.**	**Cat. No.**
XCDR Metal				
Complete switch	2-pole, N.C. + N.O. snap action	XCDR2110N12	XCDR2121N12	XCDR2127N12
	2-pole, N.C. + N.O. break before make, slow break	XCDR2510N12	XCDR2521N12	XCDR2527N12
XCPR Plastic, Double Insulated				
Complete switch	2-pole, N.C. + N.O. snap action	XCPR2110N12	XCPR2121N12	XCPR2127N12
	2-pole, N.C. + N.O. break before make, slow break	XCPR2510N12	XCPR2521N12	XCPR2527N12

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Common Head and Levers for XCMD, XCKD, XCKP, XCKT

Table 21.20: Metal Plunger and Multi-Directional Heads

Metal End Plunger	**Metal End Plunger with Elastomer Protective Boot**	**Steel Roller Plunger**	**Retractable Steel Roller Lever**	**Plastic Roller Lever, Horizontal Actuation**	**Plastic Roller Lever, Vertical Actuation**
Cat. No.	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
ZCE10	ZCE11	ZCE02	ZCE24	ZCE21	ZCE27

Bushing Mounted	Bushing Mounted	Bushing Mounted	Bushing Mounted			
M12 Head Metal Plunger■	**M18 Head Metal Plunger▲**	**M12 Head Steel Roller Plunger▲**	**M18 Head Steel Roller Plunger▲**	**Spring Lever**	**Spring Lever with Plastic End**	**Cat Whisker**
Cat. No.	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
ZCEF0	ZCEH0	ZCEF2	ZCEH2	ZCE08	ZCE07	ZCE06

Table 21.21: Metal Rotary Heads and Levers

Rotary Head without Lever, Spring Return, for Actuation from RH or LH Side	**Rotary Head without Lever, Stay Put, for Actuation from RH or LH Side ♦**	**Plastic Roller Lever, Track: 24/31 mm (ZCMD) 29/36 mm (ZCD/P/T)■**	**Steel Roller Lever, Track: 24/31 mm (ZCMD) 29/36 mm (ZCD/P/T)■**	**Plastic Roller Lever, Track: 16/39 mm (ZCMD) 21/44 mm (ZCD/P/T)■**	**Steel Roller Lever, Track: 16/39 mm (ZCMD) 21/44 mm (ZCD/P/T)■**	**Plastic, Roller Lever, Track: 20/36 mm (ZCMD) 24/40 mm (ZCD/P/T)▲**
Cat. No.	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
ZCE01	ZCE09	ZCY15	ZCY16	ZCY25	ZCY26	ZCY18

Steel Roller Lever, for Track: 20/36 mm (ZCMD) 24/40 mm (ZCD/P/T)▲	**Ceramic Roller Lever**	**Variable Length, Rigid Plastic Roller Lever**	**Variable Length, Bendable Plastic Roller Lever**	**Variable Length, Rigid Steel Roller Lever**	**Variable Length, Bendable Steel Roller Lever**	**Metal Spring Lever**
Cat. No.	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
ZCY19	ZCY22	ZCY45	ZCY44	ZCY46	ZCY48	ZCY91

					Recommended for Use with ZCE09 Head	Recommended for Use with ZCE09 Head
Plastic Roller Lever Ø 50 mm	**Adjustable Plastic Roller Lever Ø 50 mm**	**Square Steel Rod Lever, ☑ 3 mm, length = 125 mm**	**Round, Glass Fiber Rod Lever, Ø 3 mm length = 125 mm**	**Round Plastic Rod Lever, Ø 6 mm, length = 200 mm**	**Forked Lever Arm with 2 Tracks: 25/39 mm**	**Forked Lever Arm with 1 Track: 32 mm**
Cat. No.	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
ZCY39	ZCY49	ZCY54	ZCY55	ZCY59	ZCY61	ZCY71

▲ Recommended for use with body ZCD... / ZCP... / ZCT...
■ Recommended for use with body: ZCMD...
♦ Can only be used on ZCMD25 bodies.

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NOTE: *Metal components must be used with metal bodies. Plastic components must be used with plastic bodies.*

Table 21.22: Miniature, Metal Body/Contact Assemblies

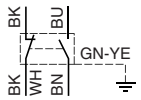
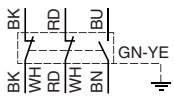
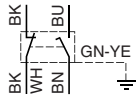
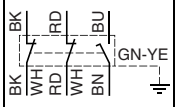
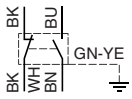
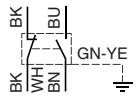
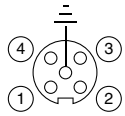
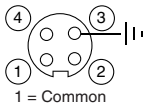
Type of contact	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.C. Snap action	3-pole N.C. + N.C. + N.O. Snap action	4-pole N.C. + N.C. + N.O. + N.O. Snap action	2-pole N.C. + N.O. Slow break	3-pole N.C. + N.C. + N.O. Slow break	2-pole N.C. + N.O. Snap action 5-pin connector	1 SPDT contact Snap action 4-pin connector
								
	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
Metal body	ZCMD21	ZCMD29	ZCMD39	ZCMD41	ZCMD25	ZCMD37	ZCMD21C12	ZCMD21M12

Table 21.23: Connection of Miniature Body/Contact Assemblies

Specific pre-cabled connection components



1 – 2 = N.C.
3 – 4 = N.O.
5 = Ground



1 = Common
2 = N.C.
3 = Ground
4 = N.O.

Length (m)	Cat. No.	Cat. No.	Cat. No.		Cat. No.	Cat. No.
1	ZCMC21L1	ZCMC29L1	ZCMC39L1		ZCMC25L1	ZCMC37L1
2	ZCMC21L2	ZCMC29L2	ZCMC39L2		ZCMC25L2	ZCMC37L2
5	ZCMC21L5	ZCMC29L5	ZCMC39L5		ZCMC25L5	ZCMC37L5

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Table 21.24: Compact, Metal or Plastic Body/Contact Assemblies

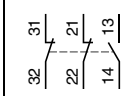
Type of contact	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.O. Snap action	3-pole N.C. + N.C. + N.O. Snap action	2-pole N.C. + N.O. Slow break	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.O. Snap action	2-pole N.C. + N.O. Slow break
									
	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
Metal	ZCD21	ZCD29	ZCD39	ZCD25	—	ZCD21M12	—	—	—
Plastic	ZCP21	ZCP29	ZCP39	ZCP25	ZCP21D44	—	ZCP21M12	ZCT21P16	ZCT25P16

Table 21.25: Connection of Compact Body/Contact Assemblies

Interchangeable cable entry							
	ISO M16	ISO M20	Pg 11	Pg 13.5	1/2" NPT	PF 1/2 NPSF	Deutsch Connector
	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
Metal	ZCDEP16	ZCDEP20	ZCDEG11	ZCDEG13	ZCDEN12	ZCDEF12	—
Plastic	ZCPEP16	ZCPEP20	ZCPEG11	ZCPEG13	ZCPEN12	ZCPEF12	ZCPED44

Note: Plastic conduit entries shown. Order **plastic** conduit entries for **plastic** bodies (XCKP/ZCP).
Order **metal** conduit entries (chrome color) for **metal** bodies (XCKD/ZCD). *Metal conduit entries do not fit on plastic bodies.*

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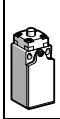
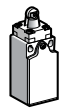
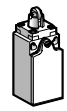
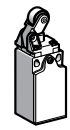
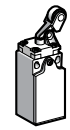
Table 21.26: XCKN Compact Plastic, Non-Modular, 30 mm Wide

Osisense Limit Switches

2 pole
snap action

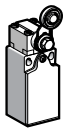
2 pole
break before make, slow break

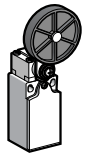
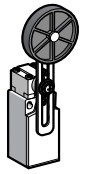






		Metal end plunger	Plastic roller plunger for lateral cam approach	Plastic roller plunger for cross cam approach	Thermoplastic roller-lever plunger	
					Horizontal actuation in 1 direction	Vertical actuation in 1 direction
Switch actuation		On end	By 30° cam			
Type of actuation						
Maximum actuation speed		0.5 m/s (1.64 ft/s)	0.3 m/s (0.99 ft/s)		0.1 m/s (3.28 ft/s)	
Minimum force of torque	For tripping	15 N (3.37 lb)	12 N (2.70 lb)		6 N (1.35 lb)	
	For positive opening	30 N (6.75 lb)	20 N (4.50 lb)		10 N (2.25 lb)	
Weight, kg (lb)		0.065 (0.143)	0.065 (0.143)	0.065 (0.143)	0.070 (0.154)	0.070 (0.154)
Ordering Information (sold in packs of 20)		**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
2 pole N.C. + N.O. snap action		XCKN2110P20	XCKN2102P20	XCKN2103P20	XCKN2121P20	XCKN2127P20
2 pole N.C. + N.O., break before make, slow break		XCKN2510P20	XCKN2502P20	XCKN2503P20	XCKN2521P20	XCKN2527P20
2 pole N.C. + N.C. snap action		XCKN2910P20	XCKN2902P20	XCKN2903P20	XCKN2921P20	XCKN2927P20

2 pole
snap action

2 pole
break before make, slow break



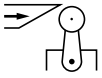
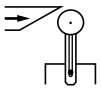
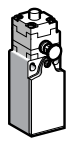
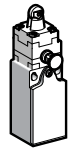
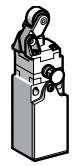
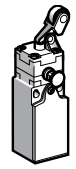
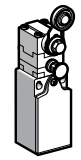
		Rotary, thermoplastic roller-lever	**Rotary, variable length thermoplastic roller-lever**	**Rotary, thermoplastic roller-lever, Ø 50 mm**	**Rotary, variable length, thermoplastic roller-lever, Ø 50 mm**	**Multi-directional, spring rod**	**Multi-directional, cat's whisker**
Switch actuation		By 30° cam				By any moving part	
Type of actuation							
Maximum actuation speed		1.5 m/s (4.92 ft/s)				1 m/s (3.28 ft/s), any direction	
Minimum force of torque	For tripping	0.1 N•m (0.89 lb-in)				0.13 N•m (0.11 lb-in)	
	For positive opening	0.15 N•m (1.33 lb-in)				–	
Weight, kg (lb)		0.085 (0.187)	0.090 (0.198)	0.110 (0.243)	0.115 (0.254)	0.085 (0.187)	0.075 (0.165)
Ordering Information (sold in packs of 20)		**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
2 pole N.C. + N.O. snap action		XCKN2118P20	XCKN2145P20	XCKN2139P20	XCKN2149P20	XCKN2108P20	XCKN2106P20
2 pole N.C. + N.O., break before make, slow break		XCKN2518P20	XCKN2545P20	XCKN2539P20	XCKN2549P20	XCKN2508P20	XCKN2506P20
2 pole N.C. + N.C. snap action		XCKN2918P20	XCKN2945P20	XCKN2939P20	XCKN2949P20	XCKN2908P20	XCKN2906P20

Table 21.27: XCNR Compact Plastic, Non-Modular, with Manual Reset, 30 mm Wide

2 pole N.C. + N.O.

2 pole N.C. + N.C.

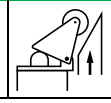
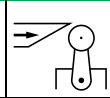
		Metal end plunger	Plastic roller plunger	Thermoplastic roller-lever plunger		Rotary head, thermoplastic roller-lever plunger
				Horizontal actuation in 1 direction	Vertical actuation in 1 direction	
Switch actuation		On end	By 30° cam			
Type of actuation						
Maximum actuation speed		0.5 m/s (1.64 ft/s)	0.3 m/s (0.99 ft/s)	0.1 m/s (3.28 ft/s)		1.5 m/s (4.92 ft/s)
Minimum force of torque	For tripping	15 N (3.37 lb)	12 N (2.70 lb)	6 N (1.35 lb)		0.1 N•m (0.89 lb-in)
	For positive opening	30 N (6.74 lb)	20 N (4.50 lb)	10 N (2.25 lb)		0.15 N•m (1.33 lb-in)
Weight, kg (lb)		0.080 (0.18)	0.080 (0.18)	0.085 (0.19)	0.090 (0.20)	0.100 (0.22)
Ordering Information (sold in packs of 20)		**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
2 pole N.C. + N.O.snap action		XCNR2110P20	XCNR2102P20	XCNR2121P20	XCNR2127P20	XCNR2118P20
2 pole N.C. + N.O. break before make, slow break		XCNR2510P20	XCNR2502P20	XCNR2521P20	XCNR2527P20	XCNR2518P20
2 pole N.C. + N.C. snap action		XCNR2910P20	XCNR2902P20	XCNR2921P20	XCNR2927P20	XCNR2918P20

Table 21.28: Cable Entries and Contact Configurations

Cable entry	M20	Order with suffix P20 for 1 entry tapped to M20 x 1.5 mm for ISO cable entry. Clamping capacity 7 to 13 mm (0.28 to 0.51 in.)
	Pg 11	Replace P20 suffix with G11suffix, 18.6 x 1.41
	1/2" NPT	Replace P20 suffix with G11 suffix. Order 1/2" NPT adapter DE91012
	Other cable entries	For other cable entries, including complete switches with ISO M16 x 1.5 or PF 1/2 (G 1/2) cable entry, please consult your local sales office.
Other contact configurations		For other 2- and 3-pole configurations, please consult your local sales office.
Function diagrams		See catalog 9006CT1007.

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XCKS Standard Body, Plastic, Double Insulated

Table 21.29: Environmental Specifications

Conforming to standards	Products	IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14
	Machine assemblies	IEC 60204-1, EN 60204-1
Approvals		UL, CSA, CCC
Ambient air temperature	For operation	- 25 to +70 °C (-13 to +158 °F)
	For storage	- 40 to +70 °C (-40 to +158 °F)
Vibration resistance	Conforming to IEC 60068-2-6	25 gn (10–500 Hz)
Shock resistance	Conforming to IEC 60068-2-27	50 gn (11 ms)
Electric shock protection		Class II conforming to IEC 61140 and NF C 20-030
Degree of protection		IP 65 conforming to IEC 60529; IK 03 conforming to EN 50102
Repeat accuracy		0.05 mm on the tripping points, with 1 million operating cycles for head with end plunger
Cable entry	Depending on model	Tapped entry for PG 13 conduit thread. To convert to 1/2" NPT, use adapter **DE9RA1212**. For ISO M20 x 1.5, add **H29** to the end of the catalog number. Example: **XCKS101** becomes **XCKS101H29**.
Materials		Plastic (body and head)

Table 21.30: Selection, Plunger and Rotary Heads

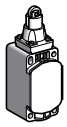
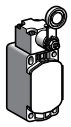
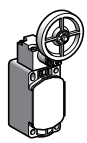
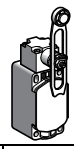
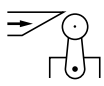
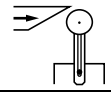
	Form B ▲	Form C ▲	Form A ▲				Form D ▲
13 21 / 14 22 **2-pole N.C. + N.O. snap action**							
13 21 / 14 22 **2-pole N.C. + N.O. break before make, slow break**							
11 21 / 12 22 **2-pole N.C. + N.C.**	**Metal end plunger**	**Steel roller plunger**	**Thermoplastic roller lever ♦**	**Elastomer roller lever, Ø 50 mm (1.97 in.) ♦**	**Variable length thermoplastic roller lever ♦**	**Variable length elastomer roller lever, Ø 50 mm (1.97 in.) ♦**	**Round thermoplastic rod lever, Ø 6 mm (0.24 in.) ★ ▼**
Ordering Information ■	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**	**Cat. No.**
2-pole N.C. + N.O. snap action (XE2SP2151)	XCKS101 ⊖	XCKS102 ⊖	XCKS131 ⊖	XCKS139	XCKS141	XCKS149	XCKS159
2-pole N.C. + N.O. break before make, slow break (XE2NP2151)	XCKS501 ⊖	XCKS502 ⊖	XCKS531 ⊖	XCKS539	XCKS541	XCKS549	XCKS559
2-pole N.C. + N.C. snap action (XE2SP2141)	ZCKS9 + ZCKD01 ⊖	ZCKS9 + ZCKD02 ⊖	ZCKS9 + ZCKD31 ⊖	ZCKS9 + ZCKD39	ZCKS9 + ZCKD41	ZCKS9 + ZCKD49	ZCKS9 + ZCKD59
2-pole N.C. + N.C. simultaneous, slow break (XE2NP2141)	ZCKS7 + ZCKD01 ⊖	ZCKS7 + ZCKD02 ⊖	ZCKS7 + ZCKD31 ⊖	ZCKS7 + ZCKD39	ZCKS7 + ZCKD41	ZCKS7 + ZCKD49	ZCKS7 + ZCKD59
Weight, kg (lb)	0.095 (0.209)	0.105 (0.231)	0.145 (0.320)	0.150 (0.331)	0.155 (0.342)	0.155 (0.342)	0.150 (0.331)
Contact operation	⊖ N.C. contact with positive opening operation, when properly mounted and using a conforming operator.			—			

Table 21.31: Specifications

Switch actuation		**On end**	**By 30° cam**			**By any moving part**
Type of actuation						
Maximum actuation speed		0.5 m/s (1.64 ft/s)		1.5 m/s (4.92 ft/s)		1 m/s (3.28 ft/s)
Minimum force or torque	For tripping	15 N (3.37 lb)	12 N (2.70 lb)	0.15 N•m (1.33 lb-in)		
	For positive opening	45 N (10.12 lb)	36 N (8.09 lb)	0.3 N•m (2.66 lb-in)	—	—
Cable entry		1 entry tapped M20 x 1.5 mm for ISO cable entry, clamping capacity 7 to 13 mm (0.28 to 0.51 in.) To convert PG 13 to 1/2" NPT, use adapter **DE9RA1212**. For ISO M20 x 1.5, add **H29** to the end of the catalog number. Example: **XCKS101** becomes **XCKS101H29**.				

▲ Form conforming to EN 50041. See page 6/92 of catalog 9006CT1007.
■ Switches with gold contacts or eyelet type connections: please consult your local sales office.
♦ Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
★ Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.
▼ Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

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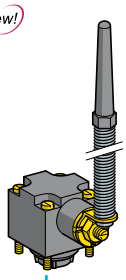
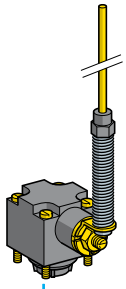
New!



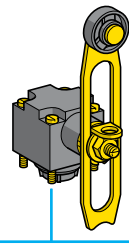
Spring-rod lever with thermoplastic end *(1)*

ZCKD81



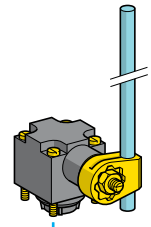
Spring-rod lever, metal *(1)*

ZCKD91



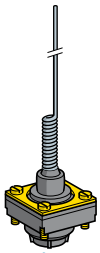
Variable-length thermoplastic roller lever *(1)*

ZCKD41



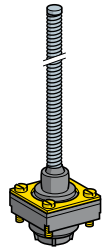
Round rod lever, thermoplastic,Ø 6 mm*(1)*

ZCKD59



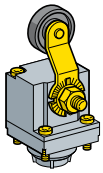
Cat's whisker

ZCKD06



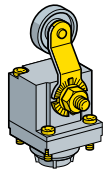
Spring rod

ZCKD08



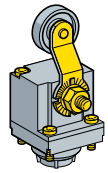
Thermoplastic roller lever *(1)*

ZCKD15 →



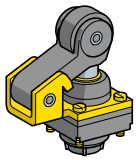
Steel roller lever *(1)*

ZCKD16 →



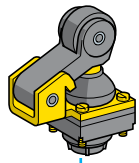
Steel ball bearing mounted roller lever *(1)*

ZCKD17 →



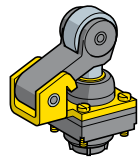
Thermoplastic roller lever, 1 direction of actuation

ZCKD21 →



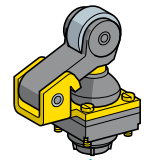
Thermoplastic roller lever plunger with protective boot, 1 direction of actuation

ZCKD219 →



Steel roller lever plunger, 1 direction of actuation

ZCKD23 →

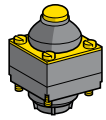


Steel roller lever plunger with protective boot, 1 direction of actuation

ZCKD239 →

Metal end plunger

ZCKD10 →

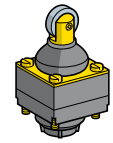


Metal end plunger with protective boot

ZCKD109 →

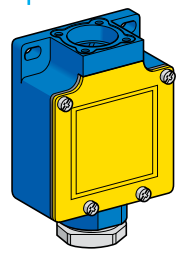
Steel roller plunger

ZCKD02 →



Steel roller plunger with protective boot

ZCKD029 →



Body with 2-pole contact and one 1/2" NPT cable entry using the included adapter, DE9RA1012

ZCKL1 / L5 / L6 / L7 →
ZCKL8H7

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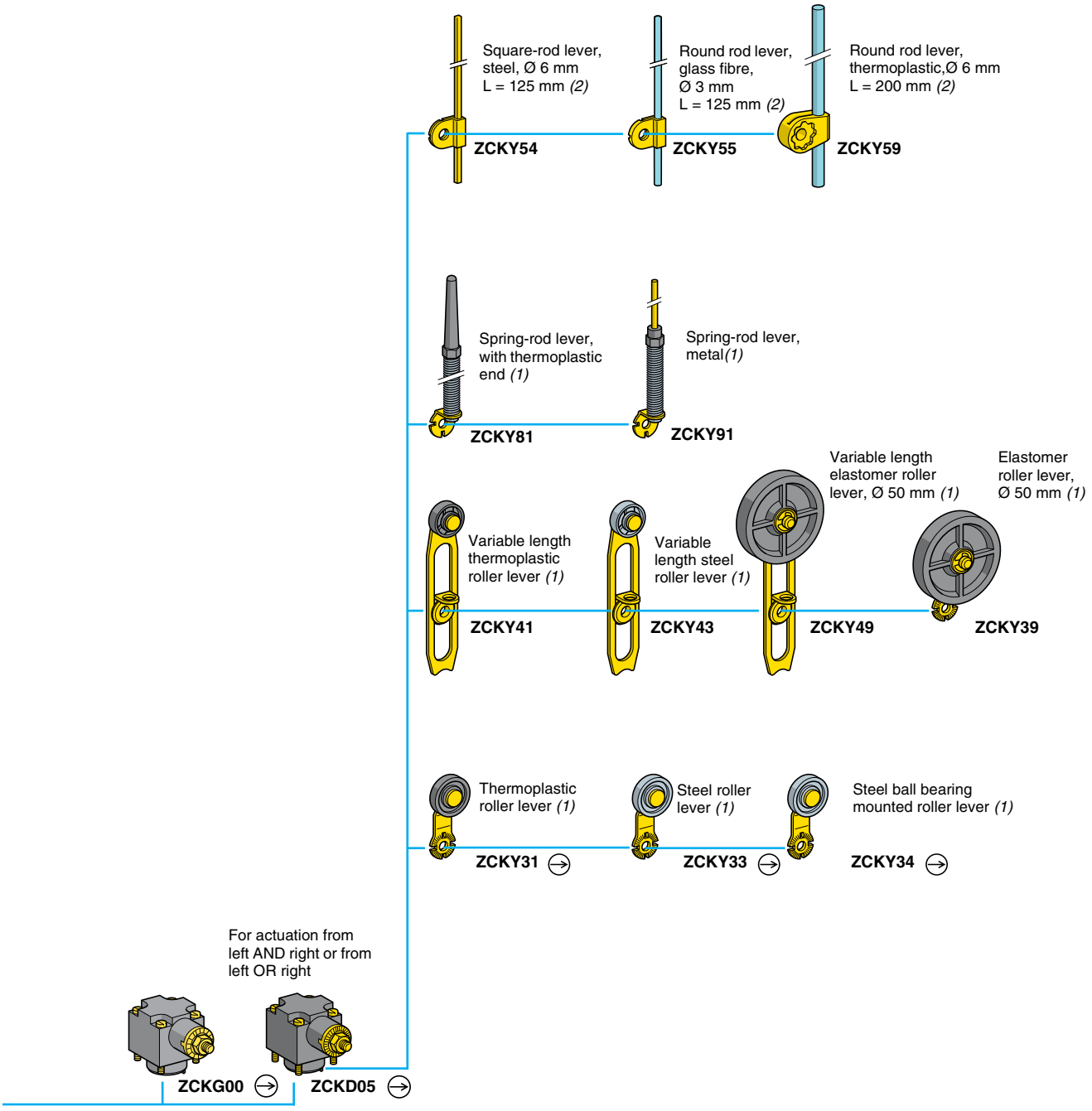
New!



⊖ Head assuring positive opening operation when used with a conforming lever.
(1) Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
(2) Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.

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XCKL

XCKL is a compact, general-duty limit switch for applications such as machine tools and material handling.

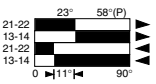
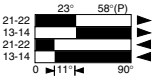
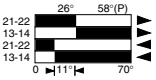
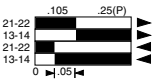
XCKL110H7

Table 21.32: Specifications

Rated Power (conforms to IEC 947-5-1, duty categories AC15 and DC13)	
Temperature range	-13 to +158 °F (-25 to +70 °C) The minimum temperatures listed are based on the absence of freezing moisture or water.
Enclosure rating	NEMA Type 1, 2, 3, 4, 12
	IP66
Vibration resistance	25 G (10–500 Hz), conforming to IEC 68-2-6
Shock resistance	50 G, conforming to IEC 68-2-27
Repeatability	0.002 in. (0.05 mm)
Cable entry	Standard: Pg 11 with DE9RA1012 adapter for 1/2" NPT conduit entry
Contact Characteristics	
Rated thermal current	10 A
Rated insulation voltage	300 Vac and dc (A300 and Q300)
Contact resistance (max.)	25 mΩ
Cable (max.)	2 x #16 AWG (1.5 mm^2) per terminal
Short circuit protection (customer supplied)	10 A fuse type SC. Outside U.S. use gl or N.

Complete Switches

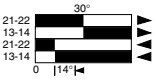
Table 21.33: Lever Operated

Description ▲	Functional Diagram	Operating Torque/Force	Contact Configuration	Catalog Number
Programmable head CW and/or CCW–snap action Delrin® roller lever–adjustable in 5° or 45° in increments (reversible mounting).		14.2 oz-in	SPDT (N.O. + N.C.) snap	XCKL10011H7
		14.2 oz-in	SPDT (N.O. + N.C.) slow	XCKL50011H7
Adjustable length roller lever–adjustable in 5° or 45° increments (reversible mounting).		14.2 oz-in	SPDT (N.O. + N.C.) snap	XCKL10041H7
		14.2 oz-in	SPDT (N.O. + N.C.) slow	XCKL50041H7
CW and CCW, Delrin roller lever		21.3 oz-in	SPDT (N.O. + N.C.) snap	XCKL115H7
		21.3 oz-in	SPDT (N.O. + N.C.) slow	XCKL515H7
One way lever-Delrin roller		25.3 oz-in	SPDT (N.O. + N.C.) snap	XCKL121H7
		25.3 oz-in	SPDT (N.O. + N.C.) slow	XCKL521H7

XCKL10011H7

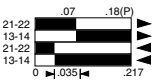
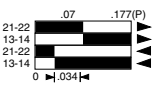
XCKL115H7

Table 21.34: Omnidirectional

Description ▲	Functional Diagram	Operating Torque/Force	Contact Configuration	Catalog Number
Wobble stick-steel rod		1.84 oz-in	SPDT (N.O. + N.C.) snap	XCKL106H7
		1.84 oz-in	SPDT (N.O. + N.C.) slow	XCKL506H7

XCKL110H7

Table 21.35: Plunger Operated

Description ▲	Functional Diagram	Operating Torque/Force	Contact Configuration	Catalog Number
Rod plunger		35.6 oz	SPDT (N.O. + N.C.) snap	XCKL110H7
		35.6 oz	SPDT (N.O. + N.C.) slow	XCKL510H7
Roller plunger		35.6 oz	SPDT (N.O. + N.C.) snap	XCKL102H7
		35.6 oz	SPDT (N.O. + N.C.) slow	XCKL502H7

XCKL102H7

▲ Diagrams shown are for XCKL1•••.

Exploded view . . . . . page 21-20
Lever arms . . . . . page 21-23

File CCN E39281 NKCR

File Class LR44087 3211-03

Acceptable Wire Sizes: 14–24 AWG
Recommended Terminal Clamp Torque: 13 lb-in

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ZCKL1H7, ZCKL5H7

ZCKG00H7

ZCKD15,16,17H7

ZCKD10H7

ZCKD02H7

ZCKD21,23H7

ZCKY43H7

ZCKY11H7

ZCKY71H7

ZCKY51H7

ZCKY91H7

ZCKY81H7

Table 21.36: Bodies—Electric

Components	Contacts	Catalog Number
Body: Single pole, double break, 1 N.O. + 1 N.C. Snap action, positive opening, same polarity	Silver	ZCKL1H7
	Gold Flashed	ZCKL18H7
Body: Single pole, double break, 1 N.O. + 1 N.C. Slow make, slow break isolated	Silver	ZCKL5H7

Table 21.37: Rotary Heads

Components		Catalog Number
Programmable head ■ CW and/or CCW	Select lever arm separately	ZCKG00
Offset Delrin roller lever ▲		ZCKD15
Offset steel roller lever ▲		ZCKD16
Offset ball-bearing roller lever ▲		ZCKD17

▲ Replacement arms are not available separately. Order complete head as a replacement.
■ See page 21-22.

Table 21.38: Plunger Heads

Description	Catalog Number
Rod plunger	ZCKD10
Booted rod plunger	ZCKD109
Roller plunger	ZCKD02
Booted roller plunger	ZCKD029
One-way lever—Delrin roller	ZCKD21
Steel roller	ZCKD23

Table 21.39: Omnidirectional Heads

Description	Catalog Number
Cat whisker—steel rod ♦	ZCKD06
Wobble spring—steel spring ♦	ZCKD08

♦ Replacement cat whiskers and wobble extensions are not available separately. Order complete head as a replacement.

Table 21.40: Replacement Parts

Description	Catalog Number
Contact block for ZCKL1	XESP2151
Contact block for ZCKL5	XENP2151
Gold flashed contact block for ZCKL18	XESP2158
Pg 11 to 1/2" NPT conduit entry adapter	DE9RA1012

Table 21.41: Levers (for use with ZCKG00 heads only—these arms will not fit ZCKD heads)

Description	Size	Adjustment ▼ Increments	Catalog Number
Delrin roller	0.9 in. diameter, 0.2 in. wide, 1.6 in. long	5° or 45°	ZCKY11
Steel roller	0.9 in. diameter, 0.2 in. wide, 1.6 in. long	5° or 45°	ZCKY13
Ball bearing roller	0.9 in. diameter, 0.2 in. wide, 1.6 in. long	5° or 45°	ZCKY14
Adjustable length Delrin roller ★	0.74 in. diameter, 0.2 in. wide, 4.2 in. long (max.)	5° or 90°	ZCKY41
Steel roller	0.74 in. diameter, 0.2 in. wide, 4.2 in. long (max.)	5° or 90°	ZCKY43
Steel rod, square ★	1/8 in. side, 5.4 in. long (max.)	5° or 45°	ZCKY51
Fiberglass rod, round ★	1/8 in. diameter, 5.4 in. long (max.)	5° or 45°	ZCKY52
Steel rod, round ★	1/8 in. diameter, 5.4 in. long (max.)	5° or 45°	ZCKY53
Plastic rod, round ★	1/4 in. diameter, 8.4 in. long (max.)	5° or 45°	ZCKY59
Fork, 2 track Delrin roller	0.9 in. diameter, 0.2 in. wide for ZCKE092	5° or 45°	ZCKY71
Coil spring lever ★	4.41 in. (112 mm)	5° or 45°	ZCKY81
Spring rod lever ★	7.05 in. (179 mm)	5° or 45°	ZCKY91

★ Flexible operators do not guarantee positive opening operation.
▼ Reverse mounting (for ZCKG00 head)—The higher increment (45° or 90°) is a positive opening contact feature which ensures no loss of mechanical effort between the actuation point and the moving contact bridge of the N.C. contact even if the lever is loosely mounted on the head shaft.

Acceptable Wire Sizes: 14–24 AWG

Recommended Terminal Clamp Torque: 13 lb-in

Building a Complete Switch

Complete Switch =
Body (with contact assembly)
+ Head
+ Lever

Examples:

Body	Head	
ZCKL1H7 +	ZCKD15 =	**XCKL115H7**

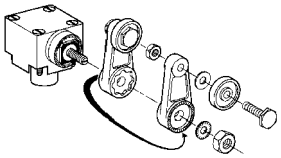
Body	Head	
ZCKL5 H7+	ZCKD02 =	**XCKL502H7**

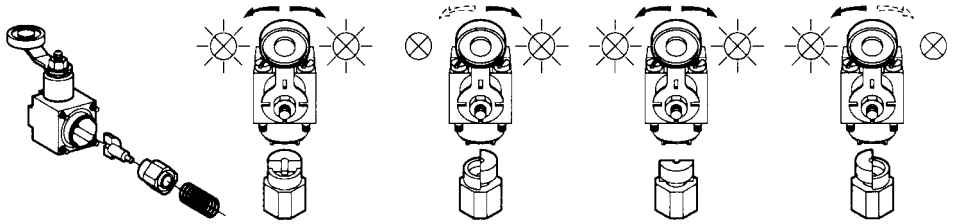
Body	Head	Lever	
ZCKL1H7 +	ZCKG00 +	ZCKY11 =	**XCKL10011H7**

Note: Some combinations are not available as complete switches.

ZCKG00 Programming

The ZCKG00 head is field convertible to CW, CCW, or CW/CCW.


Reverse Lever Mounting



File CCN 42259 NKCR

File Class LR25490 3211 03

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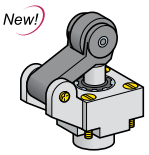
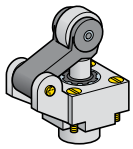


New!

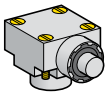
Thermoplastic roller lever plunger, 1 direction of actuation

ZCKE21



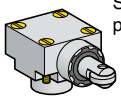
Steel roller lever plunger, 1 direction of actuation

ZCKE23



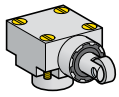
Side metal plunger

ZCKE63



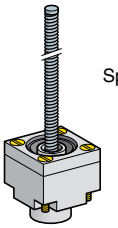
Side steel roller plunger, horizontal *(1)*

ZCKE64



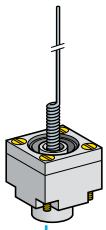
Side steel roller plunger, horizontal *(1)*

ZCKE65



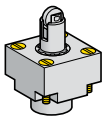
Spring rod

ZCKE08



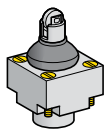
Cat's whisker

ZCKE06



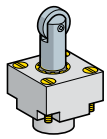
End reinforced steel roller plunger

ZCKE67



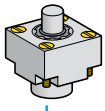
End steel roller plunger with protective boot

ZCKE629



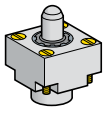
End steel roller plunger

ZCKE62



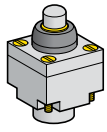
End metal plunger

ZCKE61



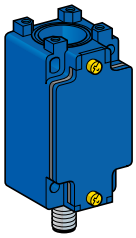
End steel ball bearing plunger

ZCKE66



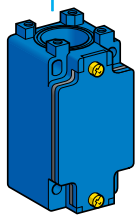
End metal plunger with protective boot

ZCKE619



Body with 2-pole contact, fixed, 1 step, M12 connector *(2)*

ZCKJ1D / J5D / J6D / J7D
ZCKJ8D



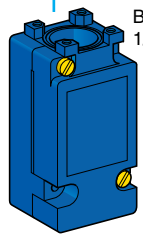
Body with contact, cable entry for 1/2" NPT fixed, 1 step *(2) (3)*

ZCKJD3●
ZCKJ1 / J5 / J6 / J7 / J9H7

Body with contact, cable entry for 1/2" NPT fixed, 1 step *(2) (3)*

ZCKJ2 / J8H7
Body with contact, cable entry for 1/2" NPT fixed, 2 step *(2) (3)*

ZCKJ4H7
2 CO snap action



Body with contact, cable entry for 1/2" NPT plug-in, 1 or 2 step *(2) (3)*

ZCKJ11 / J21 / J41H7

(1) Cannot be used with bodies ZCKJ4H7 and ZCKJ41H7.
(2) For further information, see page 21-27.
(3) For a cable entry tapped ISO M20 x 1.5, change H7 to H29. Example: ZCKJ1**H7** becomes ZCKJ1**H29**.
For a cable entry tapped Pg 13.5, delete H7 from the catalog number. Example: JCKJ1H7 becomes ZCKJ1.

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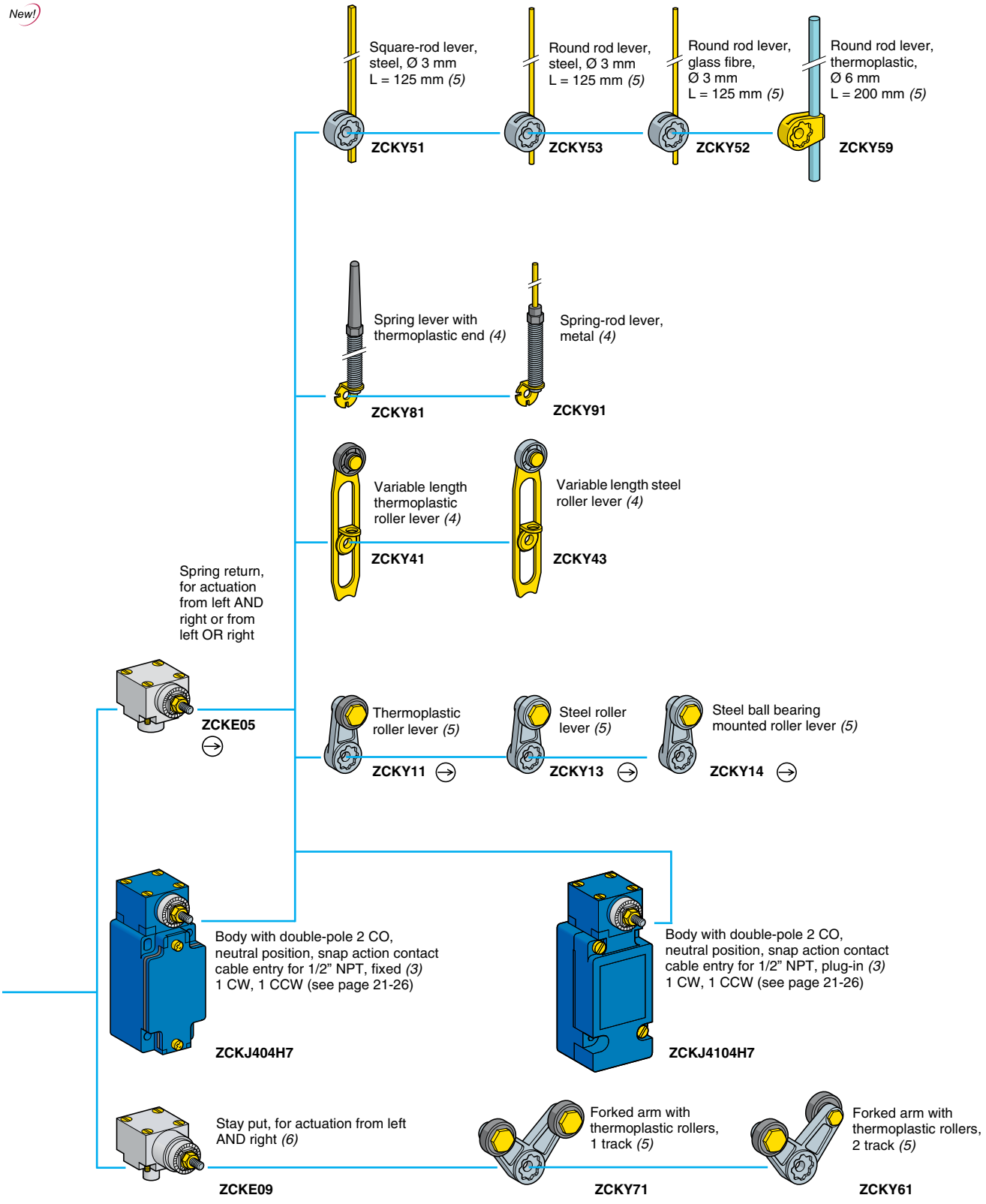
New!



Ⓣ Head assuring positive opening operation when used with a conforming lever.
(4) Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
(5) Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.
(6) Suitable for bodies with contacts ZCKJ1 / J2 / J31 / J39H7.

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XCKJ fixed body type precision switches with an SPDT configuration have direct opening contacts to meet most international standards.

XCKJ10511H7

XCKJ10541H7

XCKJ161H7

XCKJ110511H7

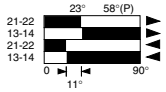
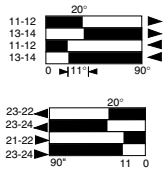
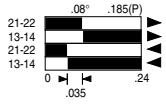
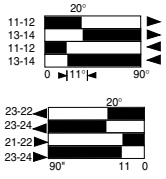
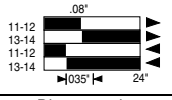
XCKJ1167H7

XCKJ167H7

Table 21.42: Specifications

Rated Power (conforms to IEC 947-5-1, duty categories AC15 and DC13)	
Temperature range	–13 to +158 °F (–25 to +70 °C); optional –40 to +248 °F (–40 to +120 °C). The minimum temperatures listed are based on the absence of freezing moisture or water.
Enclosure rating	NEMA 1,2,3,4,12; IEC Type IP66
Vibration resistance	25 G (10–500 Hz), conforming to IEC 68-2-6
Shock resistance	50 G, conforming to IEC 68-2-27
Repeatability (max.)	0.0004 in. (0.01 mm)
Cable entry	1/2" NPT standard
Contact Characteristics	
Rated thermal current	10 A, conforming to UL 508, CSA C22-2 No.14, IEC 337-1, NFC 63-140, VDE 0660-200
Rated insulation voltage	Non-plug-in: 300 Vac (A300) and DC (Q300) Plug-in: 600 Vac (A600) and DC (Q600)
Contact resistance (max)	Non-plug-in: 25 m Ω Plug-in: 45 m Ω
Cable (max.)	2 x 16 AWG (1.5 mm^2) per terminal—1 x #16 AWG for 2 SPDT (2 N.O., 2 N.C.)
Short circuit protection	10 A fuse type SC; Form I Class J or equivalent. Outside US use type gl or N.

Table 21.43: Complete Switches, XCKJ

Description and Functional Diagram	Operating Torque	Contact Type		Direct Opening ⊖	Catalog Number
Non-plug-in Housings					
Lever operated	**Delrin roller lever adjustable in 5° or 45° increments (reversible mountings)**				
	33.3 oz-in	SPDT	(N.O. + N.C.)	Y ▲	XCKJ10511H7
	33.3 oz-in	2 SPDT	(2 N.O. + 2 N.C.)	N	XCKJ20511H7
	**Adjustable length—Delrin roller lever adjustable in 5° or 90° increments**				
	33.3 oz-in	SPDT	(N.O. + N.C.)	N	XCKJ10541H7
	33.3 oz-in	2 SPDT	(2 N.O. + 2 N.C.)	N	XCKJ20541H7
	Adjustable length—1/8 in. diameter steel rod adjustable in 5° or 45° increments				
	33.3 oz-in	SPDT	(N.O. + N.C.)	N	XCKJ10553H7
	Adjustable length—1/4 in. plastic rod adjustable in 5° or 45° increments				
	33.3 oz-in	SPDT	(N.O. + N.C.)	N	XCKJ10559H7
Neutral Position **One SPDT contact switch per direction. Past 20° CW, contact 1 (11-12 / 13-14) switches.** **Past 20° CCW, contact 2 (21-22 / 23-24) switches. Levers not included.**					
	26.6 oz-in	2 SPDT (2 N.O. + 2 N.C.)		N	ZCKJ404H7
Plunger Operated	Rod plunger 48 oz	SPDT	(N.O. + N.C.)	Y ▲	XCKJ161H7
	Steel roller plunger 48 oz	SPDT	(N.O. + N.C.)	Y ▲	XCKJ167H7
Plug-in Housings					
Lever Operated	**Delrin roller lever adjustable in 5° or 45° increments (reversible mountings)**				
	33.3 oz-in	SPDT	(N.O. + N.C.)	N	XCKJ110511H7
	Adjustable length Delrin roller lever adjustable in 5° or 90° increments				
	33.3 oz-in	SPDT	(N.O. + N.C.)	N	XCKJ110541H7
Neutral Position **One SPDT contact switch per direction. Past 20° CW, contact 1 (11-12 / 13-14) switches. Past 20° CCW, contact 2 (21-22 / 23-24) switches.** **Levers not included.**					
	26.6 oz-in	2 SPDT	(2 N.O. + 2 N.C.)	N	ZCKJ4104H7
Plunger Operated	Rod plunger 48 oz	SPDT	(N.O. + N.C.)	N	XCKJ1161H7
	Steel roller plunger 48 oz	SPDT	(N.O. + N.C.)	N	XCKJ1167H7

▲ Direct opening contacts meet IEC 947-5-1 requirements for positive opening contacts. ⊖

Exploded view . . . . . page 21-24

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ZCKJ1H7
Non-plug-in

Table 21.44: Non-plug-in

Silver Contacts (10 A)				Direct Opening ⊖	Catalog Number
1 Step	SPDT	(N.O. + N.C.)	Snap action	Y▲	ZCKJ1H7
1 Step	SPDT	(isolated N.O. + N.C.)	Slow break-before-make	Y▲	ZCKJ5H7
1 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ2H7
2 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ4H7
Gold Flashed Contacts (low power circuits max. 12 V, 0.1 A)					
1 Step	SPDT	(N.O. + N.C.)	Snap action	Y▲	ZCKJ18H7
1 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ28H7
High Temperature: +248 °F (+120 °C)					
1 Step	SPDT	(N.O. + N.C.)	Snap action	Y▲	ZCKJ15H7
1 Step	2 SPDT	(N.O. + N.C.)	Snap action	N	ZCKJ25H7
Neutral Position	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ4045H7

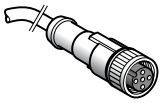
ZCKJ11H7
Plug-in

Table 21.45: Plug-in

Silver Contacts (10 A)				Direct Opening ⊖	Catalog Number
1 Step	SPDT	(N.O. + N.C.)	Snap action	N	ZCKJ11H7
1 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ21H7
2 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ41H7
High Temperature: +248 °F (+120 °C)					
1 Step	SPDT	(N.O. + N.C.)	Snap action	N	ZCKJ115H7
1 Step	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ215H7
Neutral Position	2 SPDT	(2 N.O. + 2 N.C.)	Snap action	N	ZCKJ41045H7

Table 21.46: Wiring Options

	Catalog Number	Pins	Suffix
Mini style male receptacle	ZCKJ1/J11/J5H7	5 pins	547
(For example, to order a ZCKJ1H7 body with a mini-style connector option, the part number is ZCKJ1547.)	ZCKJ2/J4/J21/J41H7	9 pins	947



XZCP1141L*
Cable

Table 21.47: Plug and Cable Assemblies

Matching plug and cable assemblies for the mini style receptacle options may be ordered as follows:

Description	Cable Length	Pins	Matches Receptacle Option	Catalog Number
Plug and cable	3 ft	5	547	BH2053
	6 ft			BH2056
	12 ft			BH20512
	3 ft	9	947	BH2093
	6 ft			BH2096
	12 ft			BH20912
Pre-wired connector, female	6.56 ft	4	XCSDMR•L / XCSDMP•L	XZCP1141L2
	16.40 ft			XZCP1141L5
	32.81 ft			XZCP1141L10

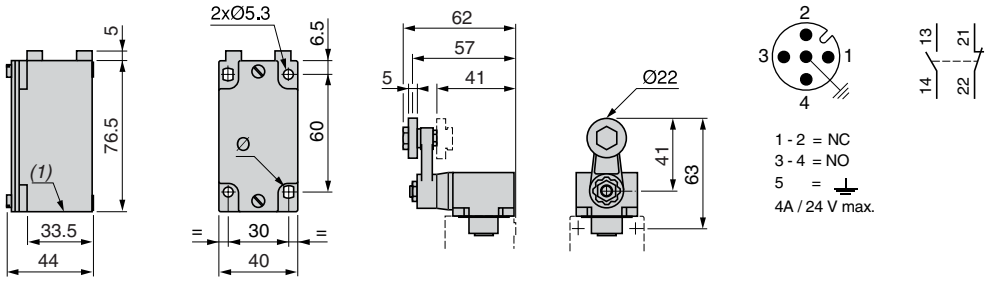
▲ Direct opening contacts meet IEC 947-5-1 requirements for positive opening contacts when using ⊖ head.

Building a Complete Switch

Complete Switch = Body (with contact assembly) **+ Head + Lever**
Example:

Body		Head		Lever		
ZCKJ1H7	+	ZCKE05	+	ZCKY11	=	XCKJ10511H7

Non-Plug-in Body ZCKJ1H7	Rotary Head ZCKE05 with Operating Lever ZCKY11	ZCKJ*D



File CCN E39281 NKCR

File Class LR44087 3211-03

Acceptable Wire Sizes: 14–24 AWG
Recommended Terminal Clamp Torque: 13 lb-in

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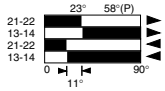
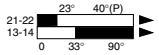
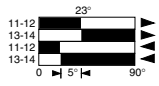
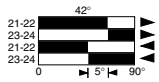
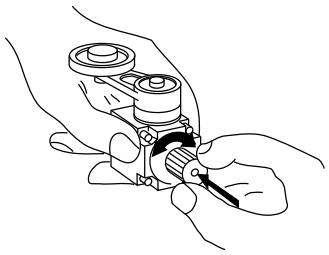
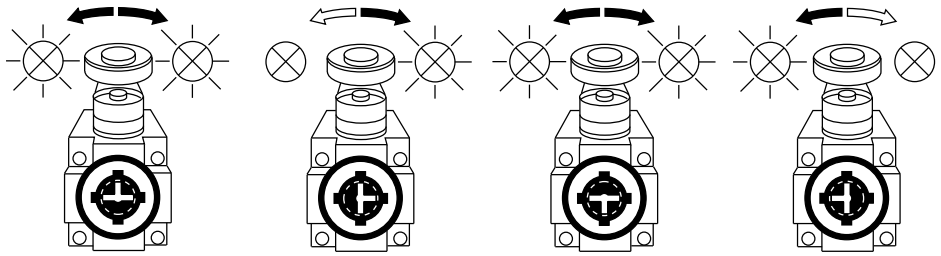
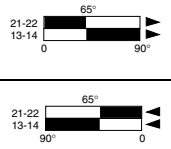
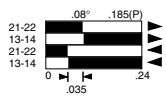
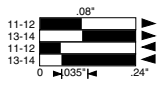
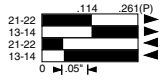
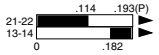
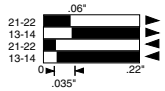
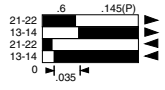
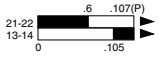
Table 21.48: Lever-Operated Heads

Contact Operation with Switch Bodies:	1 Step ZCKJ1▲ / J11 / J2 / J21H7	2 Step ZCKJ4 / J41H7	1 Step ZCKJ5H7 ▲	Operating Force/Torque	Catalog Number
Standard operation 1 Step CW and/or CCW				33 oz-in, 0.25 N	ZCKE05
2 Step 11-12, 13-14 first step					
21-22, 23-24 second step					
ZCKE05 Programming					
					
	CW and CCW	**CW**	**CW and CCW**	**CCW**	
Maintained operation				33 oz-in, 0.25 N	ZCKE09

Note: Neutral position head ZCKE04 is not available separately. Order the head and body subassemblies from page 21-26.

Table 21.49: Plunger-Operated Heads

Contact Operation with Switch Bodies:	1 Step ZCKJ1▲ / J11 / J2 / J21 / H7	2 Step ZCKJ4 / J41H7	1 Step ZCKJ5H7 ▲	Operating Force/Torque	Catalog Number
Top rod plunger				48 oz 18 N	ZCKE61
Ball-bearing top plunger				48 oz 18 N	ZCKE66
Steel roller plunger				48 oz 18 N	ZCKE67
One-way Delrin roller based on actuation by 30° cam				48 oz 18 N	ZCKE21
One way steel roller based on actuation by 30° cam				48 oz 18 N	ZCKE23
Side rod plunger				48 oz 18 N	ZCKE63
Side steel roller-plunger, horizontal based on actuation by 30° cam				48 oz 18 N	ZCKE64
Side steel roller-plunger, vertical based on actuation by 30° cam				48 oz 18 N	ZCKE65

▲ Direct opening ⊖ when used with any head on this page except ZCKE09 (maintained operation).

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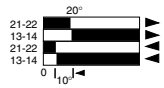
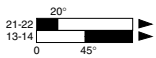
Table 21.50: Omnidirectional Heads

Contact Operation with Switch Bodies:	1 Step ZCKJ1, J11,J2,J21	2 Step ZCKJ4, J41	1 Step ZCKJ5	Operating Force/Torque	Catalog Number
Cat whisker-steel ▲				18.4 oz-in, 0.13 N	ZCKE06
Wobble coil springs ▲				18.4 oz-in, 0.13 N	ZCKE08

▲ Flexible operators do not guarantee direct (positive) opening operation.

Table 21.51: Operating Heads—for extended temperature ranges

Description		Catalog Number	
		Low temperature ■ -40 °F to +158 °F (-40 °C to +70 °C)	High temperature ■ -13 °F to +248 °F (-25 °C to +120 °C)
Lever operated	Standard operations	ZCKE056	ZCKE055
	Maintained operations	ZCKE096	ZCKE095
Plunger operated	Top rod plunger	ZCKE616	ZCKE615
	Ball-bearing top plunger	ZCKE666	ZCKE665
	Top roller plunger	ZCKE676	ZCKE675
	One way Delrin roller	ZCKE216	ZCKE215
	One way steel roller	ZCKE236	ZCKE235
	Side rod plunger	ZCKE636	ZCKE635
	Side steel roller plunger-horizontal	ZCKE646	ZCKE645
	Side steel roller plunger-vertical	ZCKE656	ZCKE655
Omnidirectional	Cat whisker	ZCKE066	ZCKE065
	Wobble coil spring	ZCKE086	ZCKE085

■ The minimum temperatures listed are based on the absence of freezing moisture or water.

Non-plug-in Style Contact Block

XE2SP2151

ZCKY11/13/14

ZCKY43/41

ZCKY51/52/53/59

ZCKY61

ZCKY71

ZCKY81

ZCKY91

Table 21.52: Replacement Parts

Description (see page 21-27 for contact description)	Direct Opening ⊕	Catalog Number
Contact block for ZCKJ1H7	Y	XE2SP2151
Contact block for ZCKJ2H7	N	XESP2021
Contact block for ZCKJ4H7	N	XESP2031
Contact block for ZCKJ5H7	Y	XE2NP2151
Contact block for ZCKJ18H7 (gold flashed)	Y	XE2SP2158
Contact block for ZCKJ28H7 (gold flashed)	N	XESP2028
Plug-in module for ZCKJ11H7 (includes contact block)	N	ZCKJ01H7
Plug-in module for ZCKJ21 (includes contact block)	N	ZCKJ02H7
Plug-in module for ZCKJ41 (includes contact block)	N	ZCKJ04H7
Base receptacle for ZCKJ11H7	—	ZCKJ019H7
Base receptacle for ZCKJ21H7	—	ZCKJ029H7
Base receptacle for ZCKJ41H7	—	ZCKJ029H7

Table 21.53: Lever Arms

Description	Adjustment Increments	Catalog Number
Adjustable or Flexible Operators ♦		
Adjustable Delrin roller, 0.74 in. diameter, 0.2 in. wide, 3 in. long (max.)	5° or 90°	ZCKY41
Adjustable steel roller, 0.74 in. diameter, 0.2 in. wide, 3 in. long (max.)	5° or 90°	ZCKY43
Adjustable rod-square, steel, 1/8 in. side, 5.4 in. long (max.)	5° or 45°	ZCKY51
Adjustable rod-round, fiberglass, 1/8 in. diameter, 5.4 in. long (max.)	5° or 45°	ZCKY52
Adjustable rod-round, steel, 1/8 in. diameter, 5.4 in. long (max.)	5° or 45°	ZCKY53
Adjustable rod-round, plastic, 1/4 in. diameter, 8.4 in. long (max.)	5° or 45°	ZCKY59
Coil spring lever	5° or 90°	ZCKY81
Spring rod lever	5° or 90°	ZCKY91
Reverse Mounting		
Delrin roller 0.9 in. diameter, 0.2 in. wide, 1.6 in. long ⊕	5° or 45° ★	ZCKY11
Steel roller 0.9 in. diameter, 0.2 in. wide, 1.6 in. long ⊕	5° or 45° ★	ZCKY13
Ball bearing roller 0.9' diameter, 0.2 in. wide, 1.6 in. long ⊕	5° or 45° ★	ZCKY14
Fork, 2 track, Delrin roller, 0.9 in.diameter, 0.2 in. wide for ZCK-E09	5° or 45° ★	ZCKY61
Fork, 1 track, Delrin roller, 0.9 in. diameter, 0.2 in. wide for ZCK-E09	5° or 45° ★	ZCKY71

♦ Adjustable and flexible operators do not guarantee positive opening operation.
★ Reverse mounting: The higher increment (45°) is a direct (positive) opening contact feature which ensures no loss of mechanical effort between the actuation point and the moving contact bridge of the direct (positive) contact (N.C.) even if the lever is loosely mounted.

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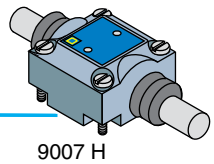
New!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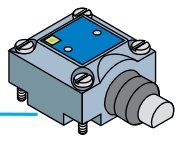
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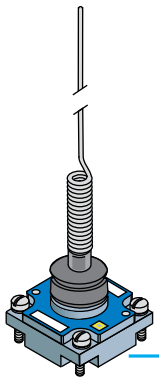
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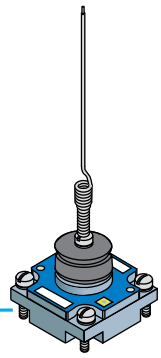
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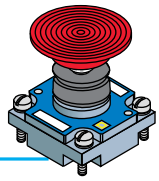
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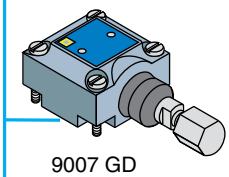
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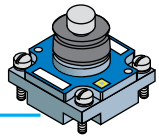
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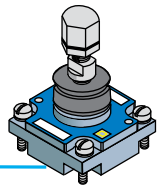
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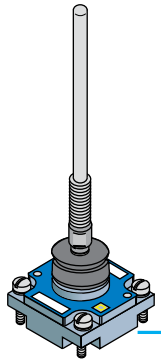
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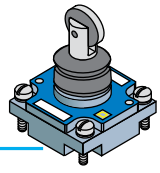
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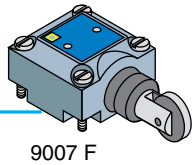
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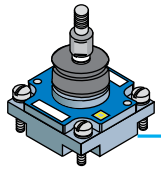
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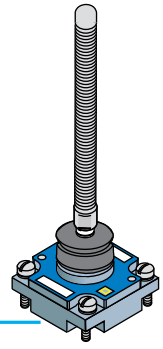
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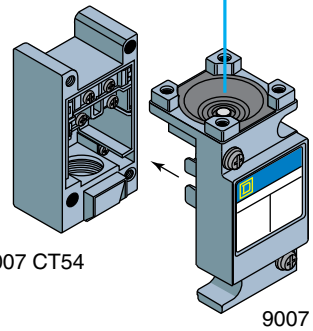
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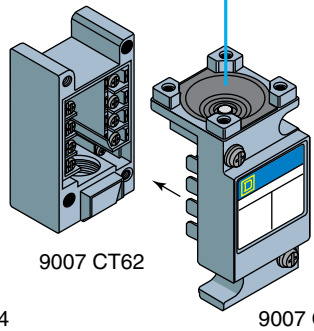
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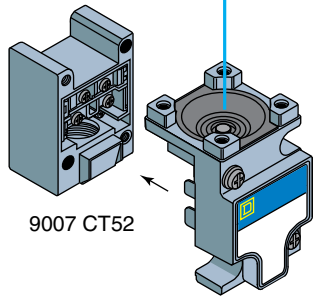
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9007 CO52

NOTE: *Order the mushroom operator cap from Table 21.56 on page 21-33.*

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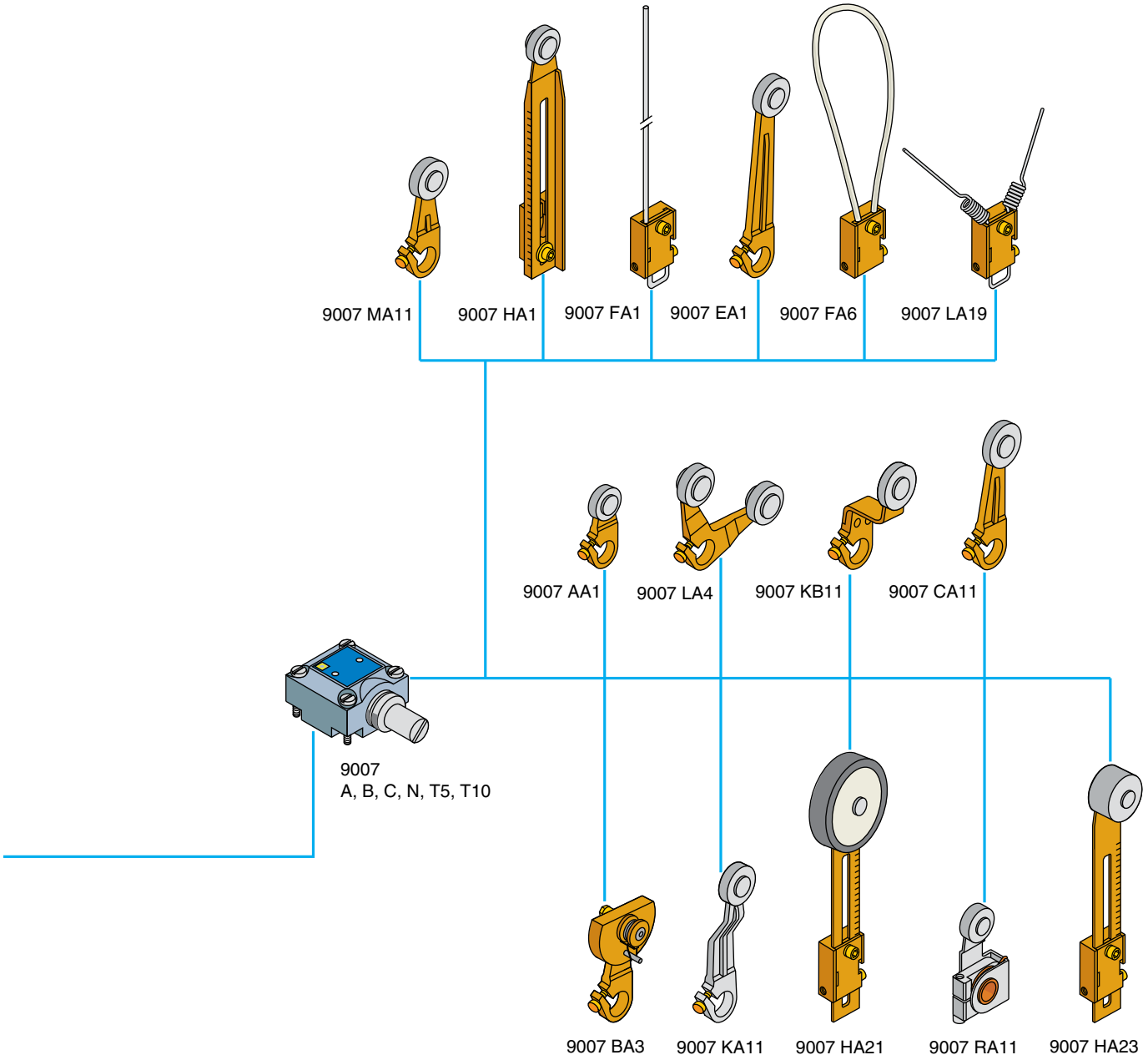
New!



NOTE: *Head 9007C is for use with levers LA19 and LA4.*

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Oiltight, Watertight Switches—Standard and Compact Bodies

Table 21.54: All Type C Switches Rated NEMA 6P and UL Type 6P

Select Turret Head

Rotary Lever Arm

Select Basic Switch	Contacts	Standard Pre-travel Spring Return CW & CCW ▲	Low Differential Spring Return CW & CCW ▲	Neutral Position: Standard Pre-travel Spring Return CW & CCW	Neutral Position: Low Differential Spring Return CW & CCW	Light Operating Torque Spring Return CW & CCW ▲	Maintained Contact CW (Trip) CCW (Reset)	Side Plunger: Side Roller-Plunger Spring Return Vertical Roller ■ Type	Side Plunger: Side Push-Rod Plunger Spring Return	Side Plunger: Side Push-Rod Plunger Adjustable ♦ Spring Return	Side Plunger: Side Push-Rod Plunger Maintained Contact
		Type	Type	Type	Type	Type	Type	Type	Type	Type	Type
Standard Box Plug-in	1 N.O. 1 N.C.	C54B2	C54A2	—	—	C54N2	C54C	C54F	C54G	C54GD	C54H
	2 N.O. 2 N.C.	C62B2	C62A2	—	—	C62N2	C62C	C62F	C62G	C62GD	C62H
	2 N.O.–2 N.C. Neutral Position	—	—	C68T10	C68T5	—	—	—	—	—	—
	2 N.O.–2 N.C. Two Stage	C66B2	C66A2	—	—	C66N2	—	C66F	C66G	C66GD	—
Compact Box Plug-in	1 N.O. 1 N.C.	C52B2	C52A2	—	—	C52N2	C52C	C52F	C52G	C52GD	C52H
UL Listed for Hazardous Location Division I Class I Groups B, C, D Class II Groups E, F, G	1 N.O. 1 N.C.	CR53B2	CR53A2	—	—	CR53N2	CR53C	CR53F	CR53G	CR53GD	CR53H
	2 N.O. 2 N.C.	CR61B2	CR61A2	—	—	CR61N2	CR61C	CR61F	CR61G	CR61GD	CR61H
	2 N.O.–2 N.C. Neutral Position	—	—	CR67T10	CR67T5	—	—	—	—	—	—
	2 N.O. –2 N.C. Two Stage	CR65B2	CR65A2	—	—	CR65N2	—	CR65F	CR65G	CR65GD	—
Head Only (Example: 9007B)		**B**	**A**	**T10**	**T5**	**N**	**C**	**F**	**G**	**GD**	**H**
Nominal Operating Data	Pre-travel	10°	5°	10°	5°	10°	45°	0.08 in. (2 mm)			0.14 in. (3.6 mm)
	Pre-travel Two Stage: First Stage	10°	5°	—	—	10°	—	0.08 in. (2 mm)			—
	Pre-travel Two Stage: First to Second Stage	2-1/2°	1-1/2°	—	—	2-1/2°	—	0.02 in. (0.5 mm)			—
	Total Travel	90°	90°	90°	90°	90°	90°	0.25 in. (6.3 mm)			0.25 in. (6.3 mm)
	Differential	4°	2°	4°	2°	4°	—	0.03 in. (0.8 mm)			—
	Reverse Overtravel	90°	90°	90°	90°	90°	—	—			—
	Operating Torque/Force—1 Pole & 2 Pole	4 lb-in (0.45 N•m)	4 lb-in (0.45 N•m)	4 lb-in (0.45 N•m)	4 lb-in (0.45 N•m)	25 oz-in (0.18 N•m)	3 lb-in (0.34 N•m)	4 lb (0.45 N•m)			7 lb (0.80 N•m)
	Repeat Accuracy — Linear travel of cam (1-1/2 in. lever arm)	± 0.002 in. (0.05 mm)	± 0.001 in. (0.03 mm)	± 0.002 in. (0.05 mm)	± 0.002 in. (0.05 mm)	± 0.002 in. (0.05 mm)	± 0.002 in. (0.05 mm)	0.001 in. (0.3 mm)			—
Plug-in Replacement Units		**To order the basic switch and head without the plug-in receptacle base, substitute the letters "CO" for the first "C" in the type number. Example:** Open type replacement for Type C54B2 is Type **CO54B2.**									

Acceptable Wire Sizes: 12–22 AWG

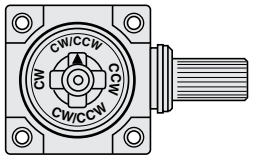
Recommended Terminal Clamp Torque: 7 lb-in (0.80 N•m)

▲ These devices are factory set to operate the contacts in **both** the **CW and CCW** directions. **Mode of operation** is field convertible to CW only or CCW only. **To order factory converted devices**—for CCW only operation, change the "2" at the end of the type number to "1" (Example: C54B**2** becomes C54B**1**); for CW only operation, delete the "2" at the end of the type number (Example: C54B**2** becomes C54B).

■ Can be converted to horizontal roller type in the field. To order horizontal roller version add the letter "H" at the end of the equivalent vertical roller version type number (Example: C54F would become C54F**H**).

♦ To lock the nut in the desired position, crimp the slot near the bottom of the nut.

Selection Mode Arrow



Mode Change—Lever Arm Type

Mode of operation is easily convertible to clockwise, counterclockwise, or both. Simply point the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW. All parts are captive.

Exploded view . . . . . page 21-30
Lever arms . . . . . page 21-34, 21-35
Electrical ratings . . . . . page 21-5
Special features . . . . . page 21-35, 21-36

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Table 21.55: All Type C Switches Rated NEMA 6P And UL Type 6P

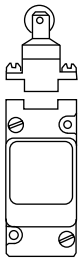
Select Turret Head		Top Plunger				Wobble Stick					Plug-In	
		Top Roller-Plunger Spring Return	Top Push-Rod Plunger Spring Return	Top Push-Rod Plunger Adjustable ■ Spring Return	Palm Operated ▲	Universal ★	Wobble Stick Delrin ♦ Extension ★	Wobble Stick Wire Extension ★	Wobble Stick Coil Spring Extension ★	Cat Whisker	Plug-in Unit without Head	Plug-in Receptacle Only
Select Basic Switch	Contacts	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type	Type
Standard Box Plug-in	1 N.O. 1 N.C.	C54D	C54E	C54ED	C54R▲	C54JKC	C54J	C54K	C54KC	C54L	CO54	CT54
	2 N.O. 2 N.C.	C62D	C62E	C62ED	C62R▲	C62JKC	C62J	C62K	C62KC	C62L	CO62	CT62
	2 N.O.–2 N.C. Neutral Position	—	—	—	—	—	—	—	—	—	CO68	CT62
	2 N.O.–2 N.C. Two Stage	C66D	C66E	C66ED	C66R▲	C66JKC	C66J	C66K	C66KC	C66L	CO66	CT62
Compact Box Plug-in	1 N.O. 1 N.C.	C52D	C52E	C52ED	C52R▲	C52JKC	C52J	C52K	C52KC	C52L	CO52	CT52
UL Listed for Hazardous Location Division I Class I Groups B, C, D Class II Groups E, F, G	1 N.O. 1 N.C.	CR53D	CR53E	CR53ED	CR53R▲	CR53JKC	CR53J	CR53K	CR53KC	CR53L	—	—
	2 N.O. 2 N.C.	CR61D	CR61E	CR61ED	CR61R▲	CR61JKC	CR61J	CR61K	CR61KC	CR61L	—	—
	2 N.O.–2 N.C. Neutral Position	—	—	—	—	—	—	—	—	—	—	—
	2 N.O.–2 N.C. Two Stage	CR65D	CR65E	CR65ED	CR65R▲	CR65JKC	CR65J	CR65K	CR65KC	CR65L	—	—
Head Only		D	E	ED	R ▲	JKC	J	K	KC	L	—	—
Nominal Operating Data	Pre-travel	0.08 in. (2 mm)				10° (Any Direction)				20°	—	—
	Pre-travel Two Stage First Stage	0.08 in. (2 mm)				10° (Any Direction)				20°	—	—
	Pre-travel Two Stage First to Second Stage	0.01 in. (0.06 mm)				4°				5°	—	—
	Total Travel	0.25 in. (6.3 mm)				90°				90°	—	—
	Differential	0.02 in. (0.5 mm)				3°				6°	—	—
	Reverse Overtravel	—				—				—	—	—
	Operating Torque/ Force— 1 Pole and 2 Pole	3 lbs. (0.34 N•m)				3 lb-in (0.34 N•m)				7 oz-in (0.05 N•m)	—	—
	Repeat Accuracy — Linear travel of cam	± 0.001 in. (0.03 mm)				—				—	—	—
Plug-in Replacement Units		To order the basic switch and head without the plug-in receptacle base, substitute the letters CO for the first C in the Type number. Example: Open type replacement for Type C54D is Type CO54D.										
Acceptable Wire Sizes: 12–22 AWG Recommended Terminal Clamp Torque: 7 lb-in (0.80 N•m)		▲ Mushroom button must be ordered separately. See Table 21.56. ■ To lock the nut in the desired position, crimp the slot near the bottom of the nut. ♦ Delrin® is a registered trademark of DuPont. Not for use outdoors. ★ Wobble stick extensions are available separately for the universal head or as replacements for complete devices. See Table 21.57.										

Table 21.56: Mushroom Button For Palm Operated Turret Head

Color	1-3/8 in. Dia. Button Type No.	2-1/4 in. Dia. Button Type No.
Black	2358C6G3	2358C22G2
Red	2358C6G2	2358C22G3
Green	2358C6G6	2358C22G6
Yellow	2358C6G8	2358C22G8

Table 21.57: Wobble Stick Extensions

Description	Catalog Number
Delrin extension	9007WJ
Wire extension	9007WK
Coil spring extension	9007WKC

Type C — File CCN E42259 NKCR — File Class LR25490 3211-03

Type CR — File CCN E10054 NOIV — File Class LR26817 3218-02

Compact Body

Hazardous Location

Standard Body

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Lever Arms for 9007AW and 9007C Heavy Duty / Industrial Limit Switches

Standard roller is hardened oil-impregnated sintered iron. Bold-face Type numbers indicate the most commonly used lever arms.

Table 21.58: Cast Zinc Lever Arms

Cast Lever Arm

Length of Arm (A)	Roller							
	Standard 3/4" Dia. (B) 1/4" Wide (C)	Standard 3/4" Dia. (B) 5/8" Wide (C)	Standard 5/8" Dia. (B) 1/4" Wide (C)	Standard 5/8" Dia. (B) 5/8" Wide (C)	Nylon 3/4" Dia. (B) 1/4" Wide (C)	Nylon 5/8" Dia. (B) 1/4" Wide (C)	Nylon 5/8" Dia. (B) 5/8" Wide (C)	Nylon ▲ 1" Dia. (B) 5/8" Wide (C)
	Type	Type	Type	Type	Type	Type	Type	Type
7/8"	—	—	**AA1**	AA2	—	AA8	AA17	—
1-3/8"	**BA11**	BA12	**BA1**	BA2	BA18	BA8	BA17	BA13
1-1/2"	**MA11**	MA12	**MA1**	MA2	**MA18**	MA8	MA17	MA13
2"	**CA11**	CA12	**CA1**	CA2	CA18	CA8	CA17	CA13
2-1/2"	**DA11**	DA12	**DA1**	DA2	DA18	DA8	DA17	DA13
3"	**EA11**	EA12	**EA1**	EA2	EA18	EA8	EA17	EA13

Length of Arm (A)	Nylon 1" Dia. (B) 1/4" Wide (C)	Ball Bearing 11/16" Dia. (B) 1/4" Wide (C)	Standard 3/4" Dia. (B) 1/4" Wide (C) Roller on Opposite Side to Standard	Standard 5/8" Dia. (B) 1/4" Wide (C) Roller on Opposite Side to Standard	Standard 5/8" Dia. (B) 5/8" Wide (C) Roller on Opposite Side to Standard	Without Roller	Standard 3/4" Dia. (B) 1/4" Wide (C) (Countersunk Roller Pin)	Cable Operated With Eyebolt (3/8" I.D.) Instead of Roller
	Type	Type	Type	Type	Type	Type	Type	Type
7/8"	—	AA9	—	AA5	AA6	AA0	—	—
1-3/8"	BA4	BA9	BA15	BA5	BA6	BA0	—	—
1-1/2"	MA4	MA9	MA15	MA5	MA6	MA0	MA31	MA22
2"	CA4	CA9	CA15	CA5	CA6	CA0	CA31	—
2-1/2"	DA4	DA9	DA15	DA5	DA6	DA0	DA31	—
3"	EA4	EA9	EA15	EA5	EA6	EA0	—	—

▲ Recommended in place of Types BA7, CA7, DA7, EA7 and MA7 lever arms with steel rollers. If necessary, the latter arms can be furnished at an additional cost.

Table 21.59: Flat Steel Lever Arms

Flat Steel Lever Arm

Length of Arm (A)	Standard Roller 5/8" Dia. (B) 1/4" Wide (C)	Standard Roller 5/8" Dia. (B) 5/8" Wide (C)	Nylon Roller 3/4" Dia. (B) 1/4" Wide (C)	Nylon Roller 1" Dia. (B) 1/4" Wide (C)	No Roller
	Type	Type	Type	Type	Type
7/8"	AA1S	AA2S	—	—	AA0S
1-3/8"	BA1S	BA2S	—	BA4S	BA0S
1-1/2"	—	—	MA18S	—	—
2"	CA1S	CA2S	—	CA4S	CA0S
2-1/2"	DA1S	DA2S	—	DA4S	DA0S
3"	EA1S	EA2S	—	EA4S	EA0S

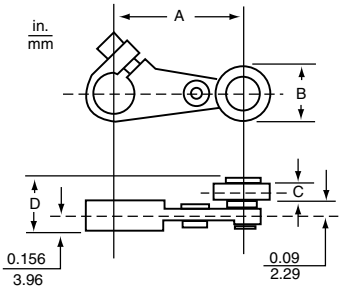
Table 21.60: 90° Forked Cast Zinc Lever Arms

90° Forked Arm 1-1/2" Length

Roller Position	Standard Rollers 3/4" Dia. (B) 1/4" Wide (C)	Standard) Rollers 5/8" Dia. (B) 1/4" Wide (C	Nylon Rollers 3/4" Dia. (B) 1/4" Wide (C)	Nylon Rollers 3/4" Dia. (B) 1" Wide (C)	Ball Bearing Rollers 11/16" Dia. (B) 1/4" Wide (C)
	Type	Type	Type	Type	Type
Rollers on Same Side	LA4	LA1	LA16	LA10	LA7
R.H. Roller on Opposite Side	LA5	LA2	LA17	LA11	LA8
L.H. Roller on Opposite Side	LA6	LA3	LA18	LA12	LA9

Approximate shipping weights range from 1/8 to 1/4 lb.

Cast Zinc Lever Arm Dimensions



A = Length of Lever Arm
B = Roller Diameter
C = Roller Width
D = C + 5/16"

See the tables on this page for A, B, and C dimensions.

Table 21.61: One-Way Cast Zinc Roller Lever Arm

One-Way Roller Lever Arm

Length of Arm	Roller, 1-1/4" Dia. (B) 1/4" Wide (C)	
	Cast Arm	Flat Steel Arm
	Type	Type
1-3/8"	BA3	BA3S
1-1/2"	MA3	—
2"	CA3	CA3S
2-1/2"	DA3	DA3S
3"	EA3	EA3S

Table 21.62: One-Way Lever Arms

One-Way Lever Arm

Length of Arm	Roller			Rod Type
	Standard 3/4" Dia. (B) 1/4" Wide (C)	Nylon 3/4" Dia. (B) 1/4" Wide (C)	Ball Bearing 1-1/16" Dia. (B) 1/4" Wide (C)	
	Type	Type	Type	Type
1-1/2"	RA11	RA18	RA9	—
5"	—	—	—	FA2

Table 21.63: Offset-style Cast Zinc Lever Arms

Offset Lever Arm	Dia. (B)	Width (C)	Type
	Standard Roller		
2" Length 7/16" Offset	5/8	1/4	**KA1**
	5/8	5/8	KA2
	3/4	1/4	KA11
	3/4	5/8	KA12
	Ball Bearing		
	11/16	1/4	KA9
	Nylon		
	3/4	1/4	KA18
	3/4	1	KA21
1-1/2" Length 7/8" Offset	Standard Roller		
	3/4	1/4	KB11
	3/4	1/4	KB15 ■

■ Roller inside.

Table 21.64: Rod Type Lever Arms

Rod, in. (mm)	Type
10 (254) Stainless Steel Rod	**FA1**
12 (304) Spring Rod, Steel	**FA3**
18 (304) Spring Rod, Steel	FA4
12 Spring Rod, Delrin	**FA5**
Looped Delrin Rod	FA6
90° Forked Rod 2-1/2" Spring Rods, Steel	LA19

Dimensions . . . . . page 21-35
For more information on LA19, refer to catalog 9006CT1007.

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Lever Arms

Standard roller is hardened oil-impregnated sintered iron.
Bold-face type numbers indicate the most commonly used lever arms.

Table 21.65: Adjustable Length Lever Arms

Description	Lever Arm, Length Adjustable from 7/8" to 4"								
	Roller								
	Without Roller	Standard 5/8" Dia. 1/4" Wide	Standard 5/8" Dia. 5/8" Wide	Nylon 5/8" Dia. 1/4" Wide	Ball Brg. 11/16" Dia. 1/4" Wide	Nylon ▲ 1" Dia. 5/8" Wide	Delrin 1-5/8" Dia. 1/4" Wide	Nylon 2" Dia. 1/4" Wide	Rubber Tire 2-1/8" Dia. 1/2" Wide
	Type	Type	Type	Type	Type	Type	Type	Type	Type
Non-bendable	HA0	**HA1**	**HA2**	**HA4**	HA24	HA22	—	—	—
Bendable	HA9	**HA5**	HA6	HA8	HA25	HA23	HA20	HA26	HA21

▲ Recommended in place of Types HA3 and HA7 lever arms with steel rollers. If necessary these arms can be furnished at an additional cost.

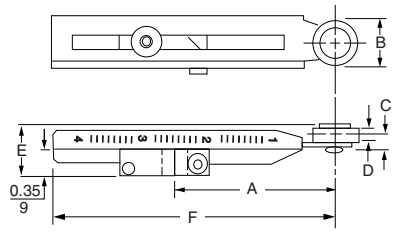
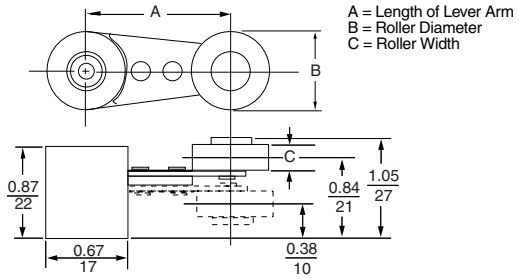


Table 21.66: 360° Angular Adjustable Lever Arms

Length of Arm	Standard 5/8" Dia. 1/4" Wide		Standard 3/4" Dia. 1/4" Wide	Nylon 5/8" Dia. 1/4" Wide	Nylon 3/4" Dia. 1/4" Wide	Ball Bearing 11/16" Dia. 1/4" Wide
	Roller Outside	Roller Inside	Roller Outside			Roller Outside
	Type	Type	Type	Type	Type	Type
7/8"	AA1M	AA5M	AA11M	AA8M	AA18M	AA9M
1-3/8"	BA1M	BA5M	BA11M	BA8M	BA18M	BA9M
1-1/2"	MA1M	MA5M	MA11M	MA8M	MA18M	MA9M
2 "	CA1M	CA5M	CA11M	CA8M	CA18M	CA9M
2-1/2"	DA1M	DA5M	DA11M	DA8M	DA18M	DA9M
3 "	EA1M	EA5M	EA11M	EA8M	EA18M	EA9M

Note: Roller can be changed in the field from roller outside to roller inside position or vice versa.
Approximate shipping weights range from 1/8 to 1/4 lb.



A = Length of Lever Arm
B = Roller Diameter
C = Roller Width

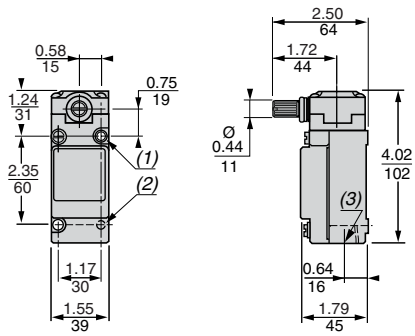
Special Features

Table 21.67: Special Features (do not apply to Type CR unless noted)—Field Installable

Description		Part Number
Conduit Seal Only Conduit seal fits in conduit entrance and excludes liquids	5 hole seal 9 hole seal	3103248801 3103281501
Adapters		
Switch with adapter plate permitting substitution of any Type C switch with standard box for any Type T switch with Style B baseplate		Form Y147
Adapter plate kit only (plate plus mounting screws) for above		Class 9007 Type BT1
Adapter plate to allow direct substitution of Type C plunger switches for Type B plug-in plunger switches—**use only** if there is a problem in lining up cam tracks	Standard Box Compact Box	Class 9007 Type CT10 ■ Type CT13 ♦
Adapter plate kit permitting direct substitution of any Type C lever arm switch with standard box for **ANY** Type AW lever arm switch		Class 9007 Type CT11
Metric conduit-connection adapter—male 1/2" NPT on one end, female 20 mm on the other end		Class 9007 Type CT12

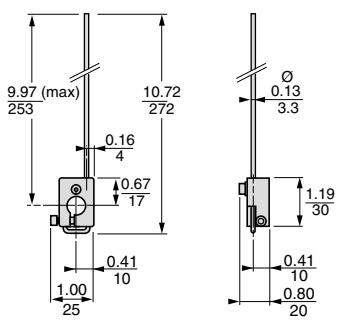
■ Dimensions: 0.22 x 2.94 x 1.54 in.
♦ Dimensions: 0.22 x 2.07 x 1.54 in.

Rotary lever arms
9007C•••• A, B, C, N, T5, T10

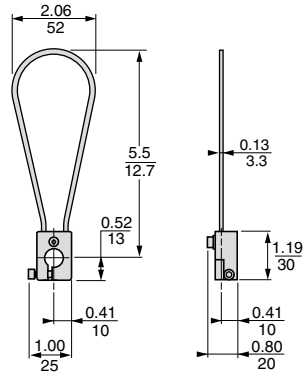


Dual dimensions: in. / mm

Rod type lever arms
9007FA1



9007FA9



1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.

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Table 21.68: Special Features (do not apply to Type CR unless noted)—Not Field Installable, Except Where Noted

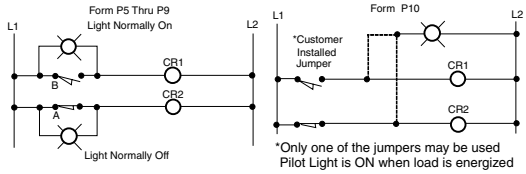
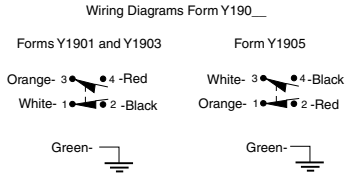
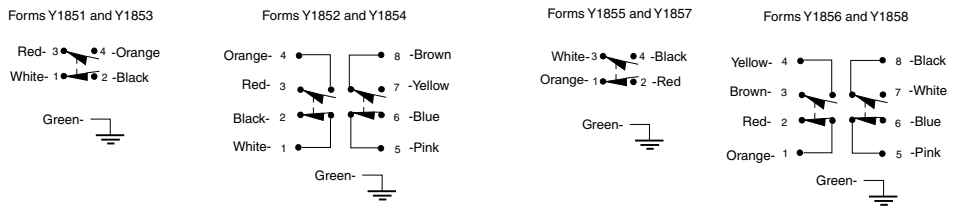
Special Features	Form
Optional Shaft Equipped With 9007T / 9007FT Hub: Any lever arm Type C, CF or CR switch can be furnished with an optional shaft and hub combination which will accept the lever arms normally used with Type T and FT limit (position) switches. To order, add S9 as suffix to the device type number. For example, to order a 9007 C54B2 with this modification, order as a 9007 C54B2-S9. For details about the switches and lever arms that can be furnished with this modification, see catalog **9007CT1007**.	Add **S9** as a suffix to the catalog number
Hub Only: Can be field installed on any Type C lever type switch.	Cat. No. 9007S9
LED Pilot Light, 24-120 Volts AC or DC on Plug-In Type Switch (Type C52, C54, C62, C64, C66, or C68):	
	
Addition of LED pilot light in parallel with N.O. contact (light normally on)	P5
Addition of LED pilot light in parallel with N.C. contact (light normally off)	P6
Addition of two LED pilot lights, one in parallel with N.O. contact (light normally on), one in parallel with N.C. contact (light normally off)	P7
Addition of two LED pilot lights in parallel with N.O. contacts (lights normally on) (Types C62, C64, C66 or C68 only)	P8
Addition of two LED pilot lights in parallel with N.C. contacts (lights normally off) (Types C62, C64, C66, or C68 only)	P9
Addition of one isolated LED pilot light (light on when load is energized) (Type C54 only. Not available with Y1901.)	P10
Pre-Wired Receptacle — Plug-in limit (position) switch furnished with pre-wired mini 5 pin male receptacle. For use with Brad Harrison female portable plug No. 41306, 41307, or 41308 (or equal). (Not available with P10 or for hazardous locations.)	Y1901
Single Pole — Same as Y1901 but with different wire color coding	Y1905
Tamperproof Screws—Complete Switch Only — Same as Y1901 but with tamperproof screws on head and body	Y1903
Other versions with different wiring diagrams per automotive requirements are available. Contact your local Schneider Electric field office.	
Mating plug and cables available. 	
Potted Limit (Position) Switch Or Plug-In Receptacle Only:	
With Individual Wires • **Single pole** plug-in limit (position) switch or receptacle pre-wired with **five #16 wires** 5 ft long and wire entry completely sealed with epoxy resin • **Double pole** plug-in limit (position) switch or receptacle pre-wired with **nine #16 wires** 5 ft long and wire entry completely sealed with epoxy resin	Y1841 Y1842
With STOWA Cord • **Single pole** plug-in limit (position) switch or receptacle pre-wired with **five conductor #16 STOWA cord** 8 ft long and wire entry completely sealed with epoxy resin • Same as Y1851 but with different wire color coding • **Double pole** plug-in limit (position) switch or receptacle pre-wired with **nine conductor #16 STOWA cord** 8 ft long and wire entry completely sealed with epoxy resin • Same as Y1852 but with different wire color coding	Y1851 Y1855 Y1852 Y1856
Tamperproof Screws—Complete Switch Only	
With Individual Wires • Same as Y1841 but with tamperproof screws on head and body • Same as Y1842 but with tamperproof screws on head and body	Y1843 Y1844
With STOWA Cord • Same as Y1851 but with tamperproof screws on head and body • Same as Y1852 but with tamperproof screws on head and body • Same as Y1855 but with tamperproof screws on head and body • Same as Y1856 but with tamperproof screws on head and body	Y1853 Y1854 Y1857 Y1858
Other versions with different wiring diagrams for automotive requirements are available.	
	
Low Temperature—Lever Types Only: Limit (Position) switch will operate in an ambient temperature range of -40 to +185 °F (standard limit switch ambient temperature range is -20 to +185 °F). Minimum temperature is based on the absence of freezing moisture or water.	Y128
Fluorocarbon Rubber (FKM) Gaskets And Seals	
Substitute fluorocarbon rubber gaskets and seals on: Lever arm type, standard box (shaft seals on lever arm types are fluorocarbon rubber as standard) Lever arm type, compact box (shaft seals on lever arm types are fluorocarbon rubber as standard) Plunger type, standard box Plunger type, compact box Substitute fluorocarbon rubber boot only on plunger type switches	Y140 Y140 Y140 Y140 Y1401
Note: Fluorocarbon rubber has been shown to resist sunlight aging problems.	
Direct Acting Contacts ⓘ Substitution of direct acting contact unit for snap switch of single-pole switch: One pole, normally closed, slow-make slow-break, direct acting contact mechanism substituted for standard snap switch on Types C52, C54, CF53, and CR53 devices. This mechanism was designed for use in emergency overtravel applications. The movable contact of this basic switch unit is acted upon directly by the actuating mechanism of the limit switch—it does not depend on the force exerted by a snap-switch blade or a spring to open the circuit. Because these contacts are slow-make slow-break, they are best suited for applications where they are not actuated during normal operation, but only if abnormal overtravel is encountered. ★ The direct acting contacts described above come standard on the 9007CLS1 hoist overtravel switch. Direct Acting Contact Mechanism (shown without cover)	Y1561

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Table 21.69: Complete with Base Plate, Without Lever Arm (bold type numbers indicate the most commonly used switches)

		Universal Type						
Select the Operating Sequence		**No. 1**	**No. 2**	**No. 3★**	**No. 4**	**No. 5**	**No. 6**	**No. 7★**
		Single-Pole Double-Throw Spring-Return CW Only	Single-Pole Double-Throw Spring-Return CW Only	Single-Pole Double-Throw Maintained Contact	Single-Pole Double-Throw Spring-Return Neutral Position	Single-Pole Double-Throw Spring-Return CCW Only	Single-Pole Double-Throw Spring-Return CCW Only	Single-Pole Double-Throw Maintained
Select the Basic Switch		Initial Position and CCW A B CW A B	Initial Position and CCW Initial Position and CCW A B Inter-mediate Pos. CW Final Pos. CW A B A B	Spring return of arm to initial position, contact position maintained until operated in reverse direction CCW CW A B A B If high speed cam or snap-back is present **use No. 12**	Initial Position A B CCW CW A B A B	Initial Position and CW A B CCW A B	Initial Position and CW A B Intermediate Position CCW Final Position CCW A B A B	If high speed cam or snap-back is present **use No. 12** A B CW A B
	Base Plate	**Type**	**Type**	**Type**	**Type**	**Type**	**Type**	**Type**
Surface Mounting	A	TUA1	TUA2	TUA3	TUA4	TUA5	TUA6	TUA7
	B	**TUB1**	TUB2	TUB3	**TUB4**	**TUB5**	TUB6	TUB7
	C	TUC1	TUC2	TUC3	TUC4	TUC5	TUC6	TUC7
	D	TUD1	TUD2	TUD3	TUD4	TUD5	TUD6	TUD7
Nominal Operating Data: Pre-travel		14°	Int. Pos. 9°, Final 16°	7°	6°	14°	Int. Pos. 9°, Final 16°	10°
Nominal Operating Data: Total-travel		88°	88°	81°	81°	88°	88°	85°
Nominal Operating Data: Differential		12°	5°	7°	5°	12°	5°	12°
Nominal Operating Data: Oper. Torque		12 lb-in	12 lb-in	12 lb-in	12 lb-in	12 lb-in	12 lb-in	2.5 lb-in
Nominal Operating Data: Repeat Accuracy ■		±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.
To convert sequences, remove the base plate, positioning plate and latches. Reassemble the positioning plate and latches as shown.								

		Universal Type					Standard Type		
Select Operating Sequence		**No. 8★**	**No. 9**	**No. 10**	**No. 11**	**No. 12**	**No. 1**	**No. 2**	**No. 3**
		Single-Pole Maintained Double-Throw Neutral Position	Single-Pole Double-Throw Spring-Return Slow Make Slow Break	Single-Pole Double-Throw Spring-Return Slow Make Slow Break	Single-Pole Double-Throw Spring-Return Slow Make Slow Break	Single-Pole Double-Throw Maintained	Single-Pole Double-Throw Spring-Return CW & CCW	Single-Pole Double-Throw Spring-Return CW & CCW	Single-Pole Double-Throw Spring-Return CW & CCW Slow Make Slow Break
Select Basic Switch		Initial Position If high speed cam or snap-back is present **use No. 12** A B CCW CW A B A B	Initial Position and CCW A B CW A B	Initial Position A B CCW CW A B A B	Initial Position and CW A B CCW A B	CCW A B CW A B	Initial Position A B CCW & CW A B	Initial Position A B CW & CCW Intermediate Position Final Position A B A B	Initial Position A B CW & CCW A B
	Base Plate	**Type**	**Type**	**Type**	**Type**	**Type**	**Type**	**Type**	**Type**
Surface Mounting	A	TUA8	TUA9	TUA10	TUA11	TUA12	TSA1	TSA2	TSA3
	B	TUB8	TUB9	TUB10	TUB11	**TUB12**	**TSB1**	TSB2	TSB3
	C	TUC8	TUC9	TUC10	TUC11	TUC12	TSC1	TSC2	TSC3
	D	TUD8	TUD9	TUD10	TUD11	TUD12	TSD1	TSD2	TSD3
Nominal Operating Data: Pre-travel		6°	12°	3°	12°	45°	14°	Int. Pos. 9°, Final 16	9°
Nominal Operating Data: Total-travel		81°	87°	81°	87°	90°	89°	89°	89°
Nominal Operating Data: Differential		10°	0°	0°	0°	0°	12°	Int. Pos. 5.5°, Final 7.5°	5°
Nominal Operating Data: Oper. Torque		2.5 lb-in	12 lb-in	12 lb-in	12 lb-in	8 lb-in	10 lb-in	10 lb-in	10 lb-in
Nominal Operating Data: Repeat Accuracy ■		±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.	±0.004 in.
To convert sequences, remove the base plate, positioning plate and latches. Reassemble the positioning plate and latches as shown.						Not Adjustable			

▲ Pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to the free travel of the lever arm at the initial position.

■ Linear travel of cam on 1-1/2 in. lever arm.

♦ Remove the spring from the positioning plate.

★ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present. The application should be checked and No. 12 sequence substituted where possible.

Note: To obtain a Type FT Foundry Switch, change the "T" at the beginning of the equivalent Type number to "FT" (for example, TUB1 changes to FTUB1).

Lever arms. . . . . .page 21-38

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Class 9007 Type T and FT, Oiltight

9007TUB4

9007FTUB4

Table 21.70: Lever Arms for Types T and FT Limit Switches or Type C with S9 Hub

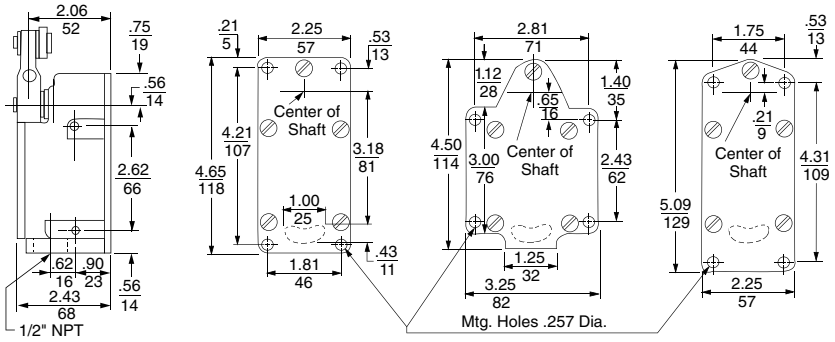
Description				Type		
Type of Arm	Length of Arm (in.)	Roller Position	Roller Width	Roller Dia. (in.)		
				3/4	1	1-3/8
Straight	1-1/2	Front or Back	1/4	B1	B2	B3
	1-1/2	Front or Back	1/2	B12	B13	B14
	2-1/2	Front or Back	1/4	B7	B8	B9
	2-1/2	Front or Back	1/2	B22	B23	B24
	2-7/8	None	None	Without Roller B21	—	—
	5	Front or Back	1/4	B19	—	—
	Adj.	Does not include a lever arm clamp or rod. Lever arm clamp is required—use 9007 R16 or R17, plus a customer-supplied rod.	1/4	R18	R19	R20
Offset	1-1/2	Inside Offset	1/4	C1	C2	C3
		Outside Offset	1/4	D1	D2	D3
	1-7/8	Outside Offset	1/4	E4	E5	E6
		Inside Offset	1/4	F4	F5	F6
120° Forked	1-1/2	Rollers on Same Side	1/4	J1	J2	—
	1-1/2	LH Roller on Opposite Side	1/4	K1	K2	—
	1-1/2	RH Roller on Opposite Side	1/4	N1	N2	—
90° Forked	1-1/2	Rollers on Same Side	1/4	X1	X2	—
	1-1/2	RH Roller on Opposite Side	1/4	Y1	Y2	—
	1-1/2	LH Roller on Opposite Side	1/4	Z1	Z2	—
Cable Operated	1-1/2	None	None	Y3		
	2-1/2	With eyebolt (1/4 in. I.D.) instead of roller	None	B27		
Rod	Adj.	Clamp for 3/16 in. Rod (rod not included)	None	R16		
	Adj.	Clamp for 1/4 in. Key Stock (key stock not included)	None	R17		
Weld-On	3-1/2	None	None	G10		
1-Way Roller	1-1/2	Outside Offset	1/4	D4		
Conveyor Side Guide	8-7/16	1-1/2 in. dia. 3-3/4 in. Delrin roller. For use with Type T and FT only.		R21		
		7/8 in. dia. 3-3/4 in. Delrin roller. For use with Type T, FT, or C with S9.		R22		

Table 21.71: Separate Base Plates

Style	Mounting Holes	Part Number
A	None▲	2934D32G1
B	End	2934D14G1
C	Side	2934D33G1
D	End	2934D34G1

▲ No mounting holes in base plate. Side mounting holes in switch case must be used.

For all Type T and FT:
Acceptable Wire Sizes: 14–18 AWG
Recommended Terminal Clamp Torque: 13–16 lb-in



Style A Baseplate Shown **Style B** **Style C** **Style D**

Dual Dimensions: INCHES Millimeters

File 42259
CCN NKCR

File LR25490
Class 3211 03

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R.B.Denison™ Lox-Switch™ L

L300WS2M1

Table 21.72: General Specifications

Temperature range	0 to +200 °F (-17 to +93 °C) standard. For high and low temperature options, see Table 21.79 on page 21-40. Minimum temperatures are based on the absence of freezing moisture or water.
Enclosure rating	NEMA 1, 4, and 13; IP 65, 66
Vibration resistance	30G max. (10–55Hz)
Repeatability	.03°
Cable entry	1/2" NPT standard double circuit, 3/4" NPT triple circuit
Contact Characteristics	
Rated thermal current	20 A
Rated insulation voltage	600 Vac and Vdc
Wire (max.)	1 x 12 AWG or 2 x 14 AWG per screw terminal

Table 21.73: Switching Ratings: A600 (AC), P600 (DC)

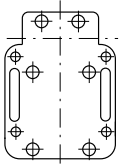
Contact Rating Designation	Maximum current (A)												Maximum VA	
	120 V		125 V		240 V		250 V		480 V		≤ 600 V			
(M=Make, B=Break)	M	B	M	B	M	B	M	B	M	B	M	B	M	B
A600 (AC)	60	6.00	—	—	30	3.00	—	—	15	1.50	12	1.20	7200	720
P600 (DC)	—	—	1.1	1.1	—	—	0.55	0.55			0.2	0.2	138	138

Table 21.74: Type L Selection

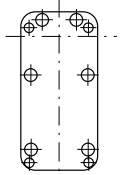
Other selections are available. Refer to catalog 9006CT1007.

Mounting Plates, L100 and L300 Models

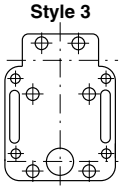
Style 1



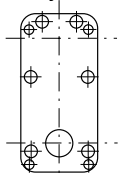
Style 2

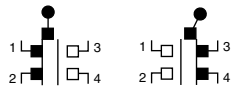
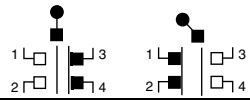
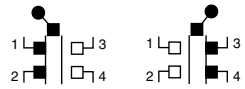
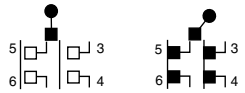
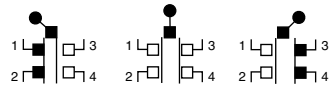
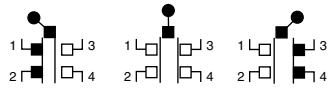
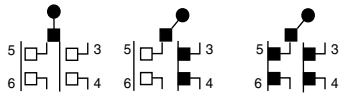
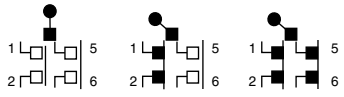
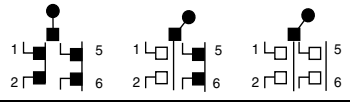
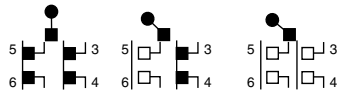
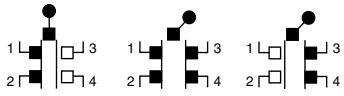


Style 3



Style 4



Description	Contact Diagram	Operating Torque	Cat. No.
Snap-action CW Spring return		190 oz-in (1.34 N•m)	L100WS2M1
		190 oz-in (1.34 N•m)	L300WS2M1
Snap-action CCW Spring return		190 oz-in (1.34 N•m)	L100WS2M2
		190 oz-in (1.34 N•m)	L300WS2M2
Maintained contact ▲ CW and CCW Snap action		45 oz-in (0.32 N•m)	L100WS2M3
		45 oz-in (0.32 N•m)	L300WS2M3
Snap action CW Spring return		190 oz-in (1.34 N•m)	L100WDR2M4
		190 oz-in (1.34 N•m)	L300WDR2M4
Neutral position ▲ N.O.-CW, N.O.-CCW Spring return Snap action		170 oz-in (1.2 N•m)	L100WNS2M26
		170 oz-in (1.2 N•m)	L300WNS2M26
Neutral position ▲ N.O.-CW, N.O.-CCW Maintained in CW only		170 oz-in (1.2 N•m)	L100WNSL2M29
		170 oz-in (1.2 N•m)	L300WNSL2M29
2 Step Sequence CW Spring return, Snap action, 2 N.O.		150 oz-in (1.06 N•m)	L525WDR2M56
2 Step Sequence CCW Spring return, Snap action, 2 N.O.		150 oz-in (1.06 N•m)	L525WDL2M57
2 Step Sequence CW Spring return, Snap action, 2 N.C.		150 oz-in (1.06 N•m)	L525WDL2M58
2 Step Sequence CCW Spring return, Snap action, 2 N.C		150 oz-in (1.06 N•m)	L525WDR2M59
2 Step Sequence CW Spring return Snap action N.O./N.C		150 oz-in (1.06 N•m)	L100WS0S2M60

▲ The lever must not be allowed to snap freely from any overtravel position.

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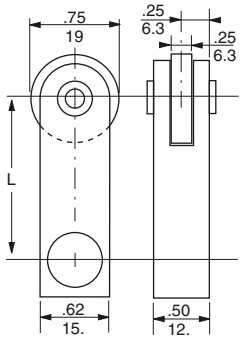
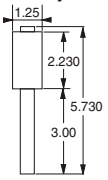
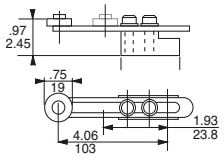


Style A



Rolling Pin



Adjustable Roller

Ministyle male receptacle

Straight male receptacle

90° angle male receptacle

Interpreting the Catalog Numbers

Use the table below to interpret the catalog numbers of the L100/L300 switches. Do **not** generate new catalog numbers from the table. If the required contact sequence is not listed, contact your local field office.

The only modifications to the existing catalog numbers are:

- Mounting Plates—Style 1, 2, 3 or 4
- Front Covers—Metal, transparent plastic, or transparent plastic with a neon light.
- Special Features—Select from catalog **9006CT1007** and add to the type number.

Style	Housing			Function		Mounting Plate	Front Cover		Contact Arrangement	
L	**1**	**0**	**0**	**W**	**S**	**2**	**P**	**F**		

Housing	
Standard (mill)	**100**
Extra heavy duty (foundry)	**300**

Function	
Two circuit single operation	**WS**
Two circuit dual operation	**WD**
Triple circuit	**WT**
Neutral	**WN**

Mounting Plate
1
2
3
4

Front Cover	
M	Standard metal
PF	Transparent plastic
GF	Transparent plastic with neon light

Contact Arrangement: See catalog **9006CT1007**

Table 21.75: Steel Roller Lever Arms
(0.25 in. wide, 0.75 in. dia.)

Length (L)		Lever Number
in.	mm	
1.50	(38.1)	AA
2.00	(50.8)	AH
2.50	(63.5)	AO
2.75	(69.8)	AK
3.00	(76.2)	AB
4.00	(101.6)	AM
6.00	(152.4)	AR

Table 21.76: Lever Arm Options

Description	Suffix
1 in. diameter roller	1
1-1/4 in. diameter roller	4
1-1/2 in. diameter roller	2
Nylon roller	N
Ball bearing roller (3/4 in. diameter)	R
Stainless steel roller pin nylon roller	NS
Ex: AB1; ABR	

Table 21.77: Rolling Pin
For use with 2 step switches for conveyor or belt applications

Length (L), In. (mm)		Lever Number
2.25 (75.1)		AL1650
2.25 (75.1)	(Teflon for high temperature applications)	AL16501
3 (50.8)		AL1802

Table 21.78: Roller, Adjustable
from 2 to 4 in. (0.25 in. wide, 0.75 in. diameter)

Length (L), In. (mm)	Lever Number
Adjustable 2 to 4 (50.8 to 101.6)	AL2820

Table 21.79: Housing options ▲

Description	Examples	Prefix Adder or Modifier
3/4" conduit opening: Available on 2 circuit switches. Standard on 3 circuit switches.	L100WS2M1 changes to **G**L100WS2M1	G
High temperature 0 to +350 °F ★ Metal front cover only	L100WS2M1 changes to **H**L100WS2M1	H
Low temperature -20 to +200 °F ★	L100WS2M1 changes to **T**L100WS2M1	T
High shock. Available only on operating sequences 1, 2, 4, 5, 7-11, 13, 14.	L100WS2M1 changes to L**526**WS2M1 L300WS2M1 changes to L**326**WS2M1	526/326
Gold contacts	L100WS2M1 changes to L**522**WS2M1 L300WS2M1 changes to L**322**WS2M1	522/322

Table 21.80: Wiring

Description		Examples	Prefix Adder or Modifier
Straight male receptacle 4 pin ■	Factory prewired	L100WS2M1 changes to **P**L100WS2M1	P
90° Angle male receptacle 4 pin ■	Factory prewired—facing right	L100WS2M1 changes to **AP**L100WS2M1	AP
Ministyle male receptacle ♦	8 A max., 5 pin (double circuit) 7 A max., 7 pin (triple circuit)	L100WS2M1 changes to **B**L100WS2M1	B B
Potted and prewired	5 wires, 6 ft long 5 wires, 12 ft long 5 wires 18 ft long	L100WS2M1 changes to L100WS2M1**P** L100WS2M1 changes to L100WS2M1**P12** L100WS2M1 changes to L100WS2M1**P18**	P P12 P18

Table 21.81: Accessories

Description		Catalog Number
Sealed female plug and cable for P and AP receptacles		
4 pins, 16 AWG STO cable, 60 °C	4 ft	1010004
	6 ft	1010006
	10 ft	10100010
Sealed female plug and cable for ministyle receptacle (B)		
5 pins, 16 AWG STO cable, 105 °C	3 ft cable	BH2053
	6 ft cable	BH2056
	12 ft cable	BH20512

Table 21.82: Front covers

Description	Designator
Standard metal	M
Transparent plastic cover with metal frame	PF
Transparent plastic cover with metal frame and Neon indicator light (not connected)	GF

Example: L100WS2M1 changes to L100WS2**PF**1

▲ Other options available—contact your Schneider Electric representative for details.
■ Receptacle is a 4 pin male APL/PL-SWTS, Cannon part # MS3102E20-4P-F79 or equal.
♦ Ministyle male receptacles are: **5-pin**, Brad Harrison #41310 (or equal); **7-pin**, Brad Harrison #42805 (or equal)
★ The minimum temperatures listed are based on the absence of freezing moisture or water.

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Section 22

Pressure, Vacuum, and Float Switches

Electronic Pressure Sensors
XMLG (p. 22-4), **XMLK** (p. 22-4), **XMLF** (p. 22-8)

9012G
Industrial Pressure Switch
p. 22-13

9012G Machine Tool
Pressure Switch
p. 22-14

XMLA Electromechanical
Pressure Switch
p. 22-10

9016G
Vacuum Switch
p. 22-19

9013F
Water Pump Switch
p. 22-21

9013G
Air Compressor Switch
p. 22-22

9036D
Open Tank Float Switch
p. 22-23

9037H
Closed Tank Float Switch
p. 22-25

Electronic—Industrial

	Electronic Pressure Sensors	XMLG	**22-4**
New!	Electronic Pressure Transmitters	XMLK	**22-6**
	Electronic Pressure Sensors	XMLF	**22-8**

Electromechanical—Industrial

Pressure Switches	XMLA, B, C, D Compact International	**22-10**
	9012G General Industrial	**22-13**
	9012G Machine Tool	**22-14**
	9012G Dual Stage and Differential	**22-15**
Vacuum Switches	9016GAW, GAR	**22-19**

Electromechanical—Commercial

Vacuum Switches	9016GVG	**22-19**
Pressure Switches	9013FHG—Air Compressor	**22-20**
	9013FRG, FSG, FYG—Water Pump	**22-21**
	9013G—Air Compressor	**22-22**
Float Switches	9036D, G—Open Tank	**22-23**
	9036FG—Open Tank	**22-24**
	9037E—Closed Tank	**22-24**
	9037H—Closed Tank	**22-25**
	9038A—Alternators, Open Tank	**22-26**
	9038C—Alternators, Closed Tank	**22-26**
	9038D—Alternators, Closed Tank	**22-27**

Accessories and Renewal Parts

Accessories and Renewal Parts Kits	Class 9998, for Class 9012–9038	**22-28**

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Application	Electronic			Electromechanical Control		
Product Family	**XMLG**	**XMLK**	**XMLF**	**XMLA, B, C, D**	**9012G**	**9016G**
Type of Installation/ Application	Control circuits	Control circuits Pumping applications	Control circuits	Control circuits	Control circuits	Control/power circuits
Fluids Controlled	Air, water, hydraulic oils, corrosive fluids	Air, fresh water, 0 to + 80 °C (32 to 176 °F)	Air, water, hydraulic oils, corrosive fluids			
Type of Operation and Features	Pressure/vacuum switches and transmitters Analog output 4–20 mA or 0–10 V	Pressure transmitters Analog output, 4–20 mA or 0–10 V	Pressure/vacuum switches and transmitters Configurable units with digital display Analog output 4–20 mA Regulation between 2 trip points (adjustable differential)	Pressure/vacuum switches Detection of single trip point (nonadjustable differential) Regulation between 2 trip points (adjustable differential)	Pressure switches Detection of single trip point (nonadjustable differential) Regulation between 2 trip points (adjustable differential) 2-stage	Vacuum switches Regulation between 2 trip points (adjustable differential)
Size/Range	–14.5 to 5800 psi	0 to 25 bar or 0 to 300 psi, depending on the model	–14.5 to 8700 psi	–14.5 to 7250 psi	0.2 to 9000 psi	0 to 29 in. of Hg
Type of Output	Analog, 4–20 mA or 0–10 V Digital, PNP or NPN normally closed (N.C.) output	Analog, 4–20 mA or 0–10 V	Analog, 4–20 mA Digital, PNP or NPN, 200 mA, relay output 2 A	Snap action contacts SPDT or DPDT 10 A continuous	Snap action contacts SPDT or DPDT 10 A continuous	Snap action contacts SPDT 10 A continuous DPST horsepower rated
Electrical Connection	M12 connector or Integrated quick connection	M12, DIN 43650 A or Metri-Pack connector ▲	M12 connector, Snap-C compatible SAE 7/8-16 UN2A	Cable entry for Pg 13 (DIN PG13.5) cable gland, ISO M20, 1/2" NPT, and 1/2" PF	1/2" -14 NPT Cable entry 20 mm	**9016G**: 1/2" -14 NPT Cable entry 20 mm 9016GVG **NEMA Type 1 and 3R**: 3 knockouts for 1/2 in. conduit **NEMA Type 7 and 9**: 2 conduit entries, 3/4"-14 NPT
Fluid Connection	G 1/4" BSP internal, 1/4" NPT internal SAE 7/16"-20 UNF female	G 1/4 A (male) conforming to ISO7 or 1/4"-18 NPT male ▲	G 1/4" BSP internal, 1/4" NPT internal SAE 7/16"-20 UNF female	G 1/4" BSP internal, 1/4" NPT internal 1/4"-18 NPT external	1/4" - 18 NPTF internal 7/16"-20 UNF-2B internal G 1/4" BSP internal G 1/4"-19 BSP internal	G 1/4" BSP internal, 1/4" NPT internal 1/4"-18 NPT external
Fluid Characteristics	Hydraulic oils, air, fresh water, sea water, corrosive fluids from –15 to +125 °C (5 to +257 °F)	Air, fresh water, 0 to + 80 °C (32.0 to 176.0 °F)	Hydraulic oils, air, fresh water, sea water, corrosive fluids from –15 to +80 °C (5 to +176 °F)	Hydraulic oils, air, fresh water, sea water, steam, corrosive fluids, viscous products, 32 to 320 °F (0 to 160 °C) depending on the model	Hydraulic oils, air, fresh water, sea water, corrosive fluids from –26 to +120 °C (–15 to +250 °F) depending on the model	Hydraulic oils, air, fresh water, sea water, from –26 to +120 °C (–15 to +250 °F) depending on the model
Enclosure Rating	IP66, IP67 conforming to IEC/EN 60529, NEMA 4	IP65 conforming to IEC/EN60529, NEMA 4	IP67 conforming to IEC/EN 60529, NEMA 4/6/12/13	Screw terminal models: IP66 conforming to IEC 529, NEMA 4	NEMA Type 4, 4X, 7, 9, 13	**9016G**: NEMA Type 4, 4X, 7, 9, 13 **9016GVG**: NEMA Type 1
Dimensions of Case, in. (mm) width x height x depth	dia. 0.90 x 2.76 (dia. 22.8 x 70.1 mm)	dia. 1.40 x 3.10 (dia. 36 x 79.5)	1.81 x 4.45 x 2.28 in. (46 x 113 x 58 mm)	4.45 x 1.38 x 2.95 in. (113 x 35 x 75 mm) NEMA 4: 3.50 x 3.60 x 2.63 in. (89 x 91 x 67 mm)	NEMA 1: 2.06 x 5.03 x 2.75 in. (52 x 128 x 70 mm) NEMA 4: 3.50 x 3.60 x 2.63 in. (89 x 91 x 67 mm)	Control circuit: same as 9012G Power circuit: same as 9013G
Conforming to Standards	CE, IEC/EN 60947-1, IEC/EN 60947-5-1, EN 50081-1, EN 50082-2, EN 61000-6-2	CE, IEC/EN 60947-1, IEC/EN 60947-5-1 EN 50081-1, EN 50082-2, EN 61000-6-2	CE, IEC/EN 60947-1, IEC/EN 60947-5-1, EN 50081, EN 50082, EN 61000-6-2, EN 61000-4-2/3/4/5/6/8/11	CE, IEC/EN 60947-5-1, VDE 0660-200, UL 508, CSA C22-2 No. 14	NEMA A600 UL508	NEMA A600 UL508
Certifications	UL Listed, CSA Certified	UL: File E97729, CCN NKPZ CSA: File 240515, Class 3211-03	UL Listed, CSA Certified	UL B300 - R300 Listed. CSA B300 - R300, (BV, GL, RINA, LROS pending)	UL Listed, CSA Certified	UL Listed, CSA Certified
Catalog Number	XMLG	XMLK	XMLF	XMLA, XMLB, XMLC, XMLD	9012GA, 9012GC, 9012GG, 9012GH, 9012GK, 9012GM, 9012GR, 9012GS, 9012GT, 9012GN, 9012GP, 9012GQ	9016GA, 9016GV

▲ For other connections, consult the Sensor Competency Center.

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Application	Electromechanical Pressure Switches		Electromechanical Float Switches			

Product Family	9013F	9013G	9036D, 9036F	9036G	9037	9038
Type of Installation/ Application	Power circuits	Power circuits	Power circuits	Power circuits	Power circuits	Power circuits
Fluids Controlled	Fresh water, air		Fresh or sea water, hydraulic oils; suitable for corrosive fluids except for cast iron bushing (shown above)			
Type of Operation and Features	Pressure switches Detection of single trip point (fixed differential) Regulation between 2 trip points (adjustable differential)	Pressure switches Regulation between 2 trip points (adjustable differential)	Liquid level control in **Open** tanks—either pumping in or pumping out of tank	Liquid level control in **Open** tanks—either pumping in or pumping out of tank	Liquid level control in **Closed** tanks for condensate, return heating water, fuel oil, etc.	Liquid level control in **Open** or **Closed** tanks—two pumps alternate, and both pumps run in peak demand Non-alternating option also available
Size/Range (psi)	6 to 200 psi	10 to 250 psi	Light duty	Medium duty	—	—
Type of Output	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2-pole, snap action contacts HP rated	2 sets of 2-pole, snap action contacts HP rated
Electrical Connection	2 open side entries, 0.88 in. diameter, with two flats	**NEMA Type 1 and 3R**: 3 knockouts for 1/2 in. conduit **NEMA Type 7 and 9**: 2 conduit entries, 3/4"-14 NPT	4 screw terminals **NEMA Type 1**: 2 open side entries, 0.88 in. diameter, with two flats **NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry **9036FG**: 2 cable entries, 0.88 in. (22.4 mm) with 0.84 in. (21.3 mm) across flat	4 screw terminals **NEMA Type 1**: 3 knockouts for 1/2 in. conduit entry **NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry	4 screw terminals **NEMA Type 1**: 2 open side entries, 0.88 in. diameter, with two flats **NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry	8 screw terminals **NEMA Type 1**: 4 knockouts for 1/2 in. (9038 AG) or 3/4 in. conduit entry **NEMA Type 4, 7, 9**: 2 cable entries, 3/4-14 conduit entry
Fluid Connection	1/4" NPSF internal, 1/4" NPT external, plus other options	1/4" NPSF internal, 1/4" NPT external	Open tank	Open tank	Closed tank	Open tank (9038A) Closed tank (9038C, D)
Fluid Characteristics	Fresh water, air		Fresh water, sea water, hydraulic oils (and corrosive fluids, depending on the model) with a density ≥ 0.8			
Enclosure Rating	NEMA Type 1 NEMA Type 3R IP20	NEMA Type 1, 3R, 7, 9 IP20	NEMA Type 1, 4 , 7, 9	NEMA Type 1, 4 , 7, 9	NEMA Type 1, 4 , 7, 9	NEMA Type 1, 4 , 7, 9
Dimensions of Case width x height x depth in. (mm)	3.76 x 2.8 x 2.78 in. (95.5 x 71.12 x 70.6 mm)	3.68 x 3.85 x 3.44 in. (93.47 x 97.79 x 87.37 mm)	See page 22-23	See page 22-23	See pages 22-24, 22-25	See page 22-26
Conforming to Standards	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
Certifications	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified	UL Listed, CSA Certified
Catalog Number	9013FS, 9013FR, 9013FH, 9013FT, 9013FY	9013GS, 9013GH, 9013GM	9036DG, 9036DW, 9036DR, 9036FG	9036GG, 9036GW, 9036GR	9037EG, 9037EW, 9037ER, 9037HG, 9037HW, 9037HR	9038AG, 9038AW, 9038AR, 9038CG, 9038CW, 9038CR, 9038DG, 9038DW, 9038DR

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XMLG pressure transmitters and pressure switches are characterized by their ceramic pressure-measuring cell. The deformation caused by the pressure is transmitted to the resistors of a Wheatstone bridge silk-screened on the ceramic. The change in resistance is then processed by the integrated electronics, providing either a digital or analog output signal.

Table 22.1: Specifications

Enclosure Rating	IP66, IP67 conforming to IEC/EN 60529, NEMA 4
Ambient Temperature (Operation)	-15 to +85 °C (+5 to +185 °F)
Media Temperature	-15 to +125 °C (+5 to +257 °F)
Precision (Linearity, Repeat Accuracy, Hysteresis)	Transmitters: <0.3%; pressure/vacuum switches: <1%
Repeat Accuracy (PNP/NPN output)	0.1% of the measuring range
Current Consumption	Transmitters: < 20 mA Pressure/vacuum switches: < 4 mA
Maximum Load Current	Transmitters: < 20mA Pressure/vacuum switches: 150 mA switching capacity
Rated Voltage	12/24 V for transmitters and pressure/vacuum switches
Voltage Limits	24 V for transmitters and pressure/vacuum switches
Fluids Controlled	Hydraulic oils, air, fresh/sea water, corrosive fluids from -15 to +125 °C (+5 to +257 °F)
Materials in Contact with Fluid	Ceramic Al_2O_3, stainless steel type AISI 303, Viton® FPM, PPS (leakage protection for P> 40 bar)
Output Response Time	< 2 ms

XMLG•••D
M12 Connector

Table 22.2: Interpretation of the Catalog Number (example: XMLG100D23TQ)

XMLG	100		D	2	3	TQ
Units without Display, 22.8 mm diameter	**Rated Pressure Range**		**Electrical Connection**	**Output**	**Fluid Connection**	**Bulk Pack**
	Code	**psi** / **bar**				
	M01	–14.5 to 0 / –1 to 0	**D**: M12	**1**: DC Analog, 4–20 mA, shunt calibration	**1**: G 1/4 A (BSP male)	
	001	0 to 14.5 / 0 to 1	**Q**: Integrated quick connect	**2**: Analog, 4–20 mA	**3**: 1/4" NPT male	
	006	0 to 87.0 / 0 to 6		**3**: Solid state, NPN	**7**: 7/16-20 UNF male	
	010	0 to 145 / 0 to 10		**4**: Solid state, PNP		
	016	0 to 232.1 / 0 to 16		**7**: Analog, 0–10 V (bulk packs only)		
	025	0 to 362.5 / 0 to 25		**11**: DC Analog, 0–10 V shunt calibration		
	100	0 to 1450 / 0 to 100				
	160	0 to 2329.6 / 0 to 160				
	250	0 to 3625 / 0 to 250				
	400	0 to 5800 / 0 to 400				

NOTE: *Use this table only to interpret the catalog number. Some combinations are not available.*

XMLG•••Q
Quick Connect

Table 22.3: Selection

Rated Pressure Range		Fluid Connection	Electrical Connection	Catalog Number ▲■	
				Analog Output, 4–20 mA	Analog Output, 0–10 Vdc
-14.5 to 0 psi	-1 to 0 bar	1/4" NPT Male	M12	XMLGM01D23	XMLGM01D73
0 to 14.5 psi	0 to 1 bar			XMLG001D23	XMLG001D73
0 to 87 psi	0 to 6 bar			XMLG006D23	XMLG006D73
0 to 145 psi	0 to 10 bar			XMLG010D23	XMLG010D73
0 to 232 psi	0 to 16 bar			XMLG016D23	XMLG016D73
0 to 362.5 psi	0 to 25 bar			XMLG025D23	XMLG025D73
0 to 1450 psi	0 to 100 bar			XMLG100D23	XMLG100D73
0 to 2320 psi	0 to 160 bar			XMLG160D23	XMLG160D73
0 to 3625 psi	0 to 250 bar			XMLG250D23	XMLG250D73
0 to 5800 psi	0 to 400 bar			XMLG400D23	XMLG400D73

▲ For devices with a switch output or 0–10 Vdc analog output, contact the Sensor Competency Center at 1-800-435-2121.

■ For a bulk package (25 units), add TQ to the end of the catalog number. The minimum order quantity is 50 units (two bulk packs). When ordering, specify the individual number of units, NOT the number of bulk packs. Minimum order quantity for factory ordered individual items (non-stock) is 50 pieces.

NOTE: *For units with a solid-state output, the settings must be specified for each order.*

Table 22.4: Wiring Configurations (M12)

Output	Pin 1	Pin 3	Pin 4
Analog, 4–20 mA	+ Power supply	Output	—
Analog, 0–10 Vdc	+ Power supply	Output	Ground
Solid State, NPN	+ Power supply	Ground	Output
Solid State, PNP	+ Power supply	Ground	Output

UL E164865
CCN NKPZ

LR 44087
Class 3211-03

For wiring diagrams, refer to Table 22.5 on page 22-5.

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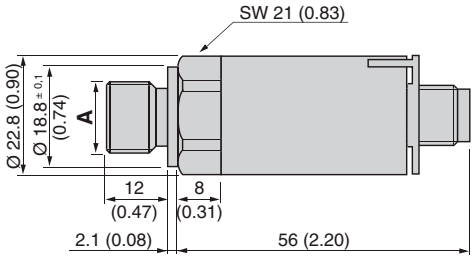
For connectors and cables, see Table 22.15 on page 22-9.

Figure 22.1: Dimensions, in. (mm)

XMLG●●●D●●, M12 x 1 Connection



Dimension A	
XMLG•••D2••1	G 1/4 A (BSAP Male)
XMLG•••D2••3	1/4" NPT Male
XMLG•••D2••7	7/16-20 UNF Male

XMLG●●●Q●●, Integrated Quick Connection

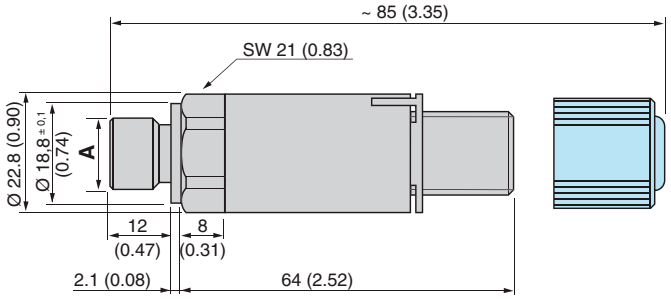
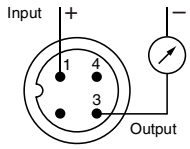
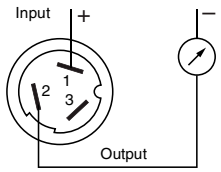
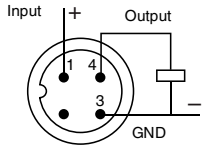
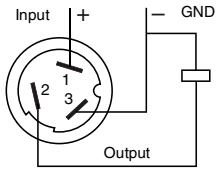
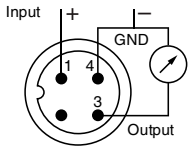
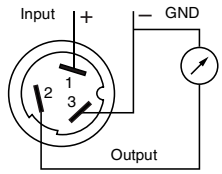
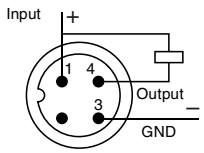
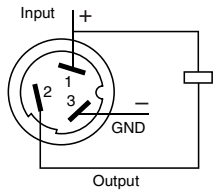


Table 22.5: Connector Wiring

Pressure Transmitters		Electronic Pressure Switches	
M12	**Integrated Quick Connection**	**M12**	**Integrated Quick Connection**
2-wire (4–20 mA)	**2-wire (4–20 mA)**	**3-wire (PNP)**	**3-wire (PNP)**
			
3-wire (0–10 V)	**3-wire (0–10 V)**	**3-wire (NPN)**	**3-wire (NPN)**
			

For wiring configurations, refer to Table 22.4 on page 22-4.

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New!

Type XMLK pressure transmitters are characterized by their ceramic pressure-measuring cell. The deformation caused by the pressure is transmitted to the resistors of a Wheatstone bridge silk-screened on the ceramic. The change in resistance is then processed by the integrated electronics to provide an analog output signal.

XMLK•••••C
DIN 43650A Connector

XMLK•••••D
M12 Connector

XMLK•••••P
Metri-Pack Connector

Table 22.6: Environmental Specifications

Enclosure Rating		IP65 conforming to IEC/EN 60529, NEMA 4
Ambient Air Temperature	**For Operation**	0 to + 80 °C (32 to 176 °F)
	For Storage	–25 to + 85 °C (13 to 185 °F)
Precision (Resolution)		Combined sum of linearity, hysteresis, and repeat accuracy <± 0.5% of the measuring range
		Setting tolerance of zero point and measuring range limit < ± 1% of the measuring range
Repeat Accuracy		± 0.3% of the measuring range
Current Consumption		4–20 mA: < 20 mA 0–10 V: < 6 mA
Rated Supply Voltage		24 Vdc
Voltage Limits		4–20 mA: 8–33 V ⎓ 0–10 V: 16.2–33 V ⎓
Fluids or Products Controlled		Air, fresh water (0 to + 80 °C / 32 to 176 °F)
Materials in Contact with Fluid		Steel, type AISI 303 (stainless steel) nitrile (NBR)
Output Response Time		< 2 ms

Table 22.7: Interpretation of the Catalog Number

XMLK	100			P	2	D	2	3	TQ
Units Without Display	**Rated Pressure**			**Unit of Pressure**	**O-Ring**	**Electrical Connection**	**Output**	**Fluid Connection**	**Bulk Pack**
	Code	**psi**	**bar**						
36 mm (1.42 in.) diameter	006		0–6	B: bar	2: NBR (Nitrile)	C: DIN 43650A	2: Analog, 4–20 mA	1: G 1/4 A (male)	
	010		0–10	P: psi		D: M12	7: Analog, 0-10 V	3: 1/4"-18 NPT (male)	
	016		0–16			P: Metri-Pack			
	025		0–25						
	100	0–100							
	150	0–150							
	200	0–200							
	300	0–300							

NOTE: *Use this table only to interpret the catalog number. Some combinations are not available.*

Table 22.8: Selection

Rated Pressure Range	Catalog Number ▲					
	4–20 mA Analog Output			0–10 Vdc Analog Output		
	DIN	M12	Metri-Pack	DIN	M12	Metri-Pack
Bar Version, G 1/4 A Male Fluid Connector						
0–6 bar (0–87 psi)	XMLK006B2C21	XMLK006B2D21	—	XMLK006B2C71	XMLK006B2D71	—
0–10 bar (0–145 psi)	XMLK010B2C21	XMLK010B2D21	—	XMLK010B2C71	XMLK010B2D71	—
0–16 bar (0–232 psi)	XMLK016B2C21	XMLK016B2D21	—	XMLK016B2C71	XMLK016B2D71	—
0–25 bar (0–362.5 psi)	XMLK025B2C21	XMLK025B2D21	—	XMLK025B2C71	XMLK025B2D71	—
PSI Version, 1/4"-18 NPT Male Fluid Connector						
0–100 psi (0–6.9 bar)	XMLK100P2C23	XMLK100P2D23	XMLK100P2P23	XMLK100P2C73	XMLK100P2D73	XMLK100P2P73
0–150 psi (0–10.3 bar)	XMLK150P2C23	XMLK150P2D23	XMLK150P2P23	XMLK150P2C73	XMLK150P2D73	XMLK150P2P73
0–200 psi (0–13.8 bar)	XMLK200P2C23	XMLK200P2D23	XMLK200P2P23	XMLK200P2C73	XMLK200P2D73	XMLK200P2P73
0–300 psi (0–.20.7 bar)	XMLK300P2C23	XMLK300P2D23	XMLK300P2P23	XMLK300P2C73	XMLK300P2D73	XMLK300P2P73

▲ For a bulk package (25 units), add TQ to the end of the catalog number. The minimum order quantity is 50 units (two bulk packs). When ordering, specify the individual number of units, **not** the number of bulk packs. Minimum order quantity for factory ordered individual items (non-stock) is 50 pieces.

Table 22.9: Wiring Configurations (M12)

Output	Pin 1	Pin 3	Pin 4
Analog, 4–20 mA	+ Power supply	Output	—
Analog, 0–10 Vdc	+ Power supply	Output	Ground
Solid State, NPN	+ Power supply	Ground	Output
Solid State, PNP	+ Power supply	Ground	Output

UL E164865
CCN NKPZ

LR 44087
Class 3211-03

For wiring diagrams, refer to Table 22.5 on page 22-5.

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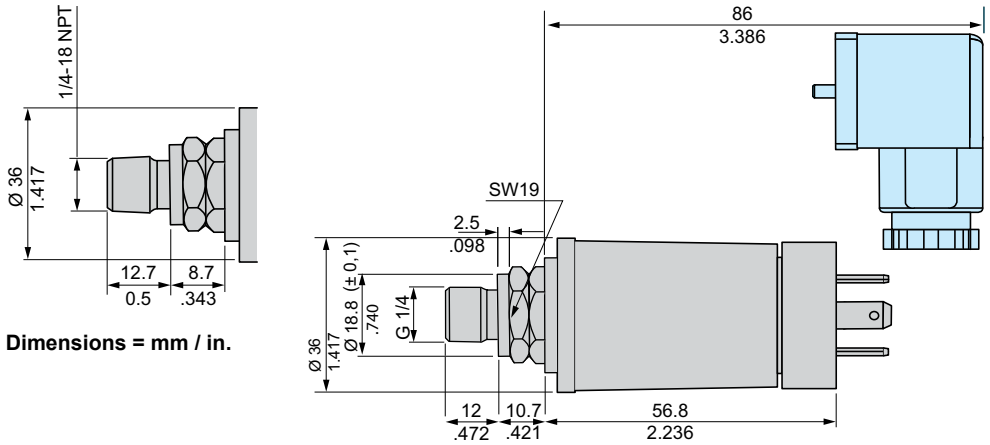
For connectors and cables, see Table 22.15 on page 22-9.

Table 22.10: Dimensions

XMLK, DIN connector

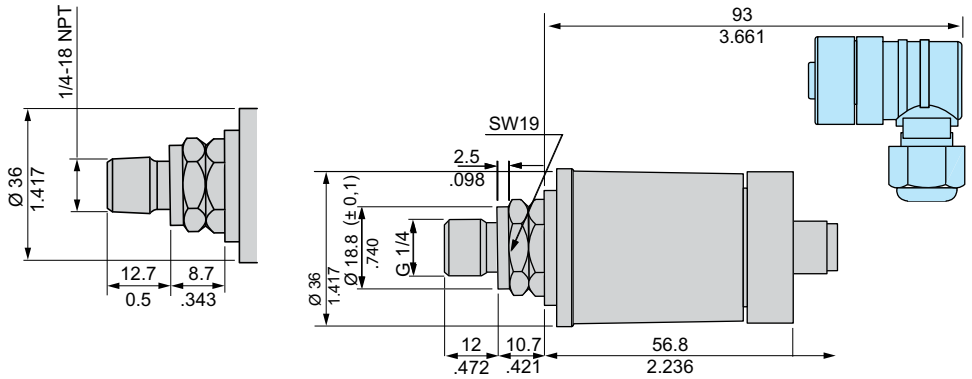
NPT	G 1/4 A (male)



Dimensions = mm / in.

XMLK, M12 connector

NPT	G 1/4 A (male)



XMLK, Metri-Pack connector

NPT	G 1/4 A (male)

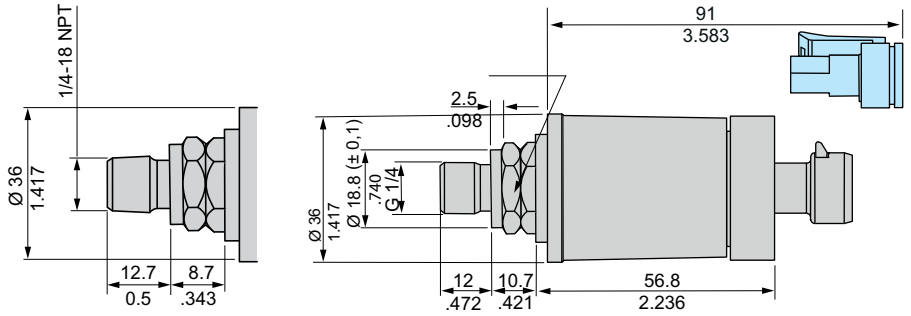
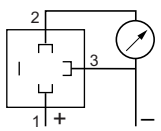
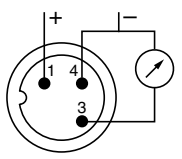
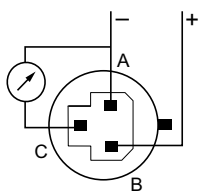


Table 22.11: Connector Wiring

DIN 43650A	M12	Metri-Pack
		

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XMLF is a user-friendly electronic pressure switch with an easy-to-read four digit display and finger-operated adjustment buttons for scrolling up and down through the menu functions. Burst pressure is six times the nominal pressure (up to 1,800 bar or 26,100 psi).

- DC versions are protected against reverse polarity, short circuit, and overvoltage.
- DC versions are double insulated.
- Response time display: 3 levels (slow-normal-fast).

Available in four versions:

- Universal sensor with 1 analog output (4–20 mA) and 1 digital output
- Universal sensor with 1 analog output (1–10 V) and 1 digital output
- Dual stage sensor, 2 digital outputs, 24 Vdc (17-33 Vdc)
- Electronic pressure switch with relay output, 120 Vac (102–132 Vac)

The XMLF electronic pressure switch can be set without any tools once connected to a 24 Vdc power supply. It is ergonomically designed to be easy to hold and to set. The pressure connection is on the bottom of the switch and the electrical connector on the top, giving the switch a slim, straight-through profile. It has built-in water hammer resistance. It is available in AC and DC versions, each of which feature a 4-digit LED display. It is programmable to display either bar or psi. Digital solid state outputs are programmable as NPN or PNP, and N.O. or N.C.

Window mode (FEN) allows the switch to operate between selected minimum and maximum settings. Outputs change state when the pressure ranges outside the window settings.

Table 22.12: Specifications

Enclosure Rating		IP67 NEMA 4, 6, 12, 13
Ambient Air Temperature for Operation		DC Models: –25 to +80 °C (–13 to + 176 °F) AC Models: –25 to +80 °C (–13 to + 176 °F)
Media Temperature		–15 to +80 °C (+5 to + 176 °F)
Precision	**Analog Output**	≤0.6% of the measurement range, output offset < 200 mV
	Digital Output	≤0.6% of the measurement range
Repeat Accuracy (PNP/NPN output)		≤0.5% of the measurement range
Maximum Load Current		**DC:** 200 mA for 17–33 Vdc; **AC:** 2.5A AC15 C300

Table 22.13: Interpretation of the Catalog Number (example: XMLF100D2026)

XMLF	**100**			**D**	**2**	**02**	**6**
Configurable	**Rated pressure**			**Electrical Connection**	**With Viewing Window**	**Output**	**Fluid Connection**
	Code	**psi**	**bar**				
	M01	-14.5 to 0	-1 to 0	D: M12 DC only E: 7/8-16 UN2A AC only		01: DC Analog 4–20 mA, shunt calibration 02: DC Analog 4–20 mA, digital single stage 11: DC Analog 0–10 V, shunt calibration 12: DC Analog 0–10 V, digital single stage 03: DC digital dual stage 04: AC Relay 120 V	5: 1/4" BSP female 6: 1/4" NPTF female 9: SAE 7/16-20 UNF female
	002	0 to 36.25	0 to 2.5				
	010	0 to 145	0 to 10				
	016	0 to 232	0 to 16				
	025	0 to 362.5	0 to 25				
	040	0 to 580	0 to 40				
	070	0 to 1015	0 to 70				
	100	0 to 1450	0 to 100				
	160	0 to 2320	0 to 160				
	250	0 to 3625	0 to 250				
	400	0 to 5800	0 to 400				
	600	0 to 8700	0 to 600				

NOTE: *Use this table only to interpret the catalog number. Some combinations are not available.*

Table 22.14: Selection

Catalog Number	Range	Output	Pressure Connection	Electrical Connection
AC Versions				
XMLF010E2046	0 to 145 psi	Relay (2.5 A)	1/4" NPT Female	SAE7/8-16UNF
XMLF070E2046	0 to 1015 psi	Relay (2.5 A)	1/4" NPT Female	SAE7/8-16UNF
DC Versions				
XMLFM01D2026	-14.5 to 0 psi	Analog with single stage	1/4" NPT Female	M12
XMLF010D2026	0 to 145 psi		1/4" NPT Female	M12
XMLF070D2029	0 to 1015 psi		SAE7/16-20 Female	M12
XMLF400D2029	0 to 5800 psi		SAE7/16-20 Female	M12
XMLF010D2039	0 to 145 psi	Dual stage Relay (2.5 A)	SAE7/16-20 Female	M12
XMLF070D2039	0 to 1015 psi		SAE7/16-20 Female	M12
XMLF400D2039	0 to 5800 psi		SAE7/16-20 Female	M12
XMLF010D2036	0 to 145 psi		1/4" NPT Female	M12
XMLF070D2036	0 to 1015 psi		1/4" NPT Female	M12

File E164865
CCN NKPZ

File LR44087
Class 3211-03

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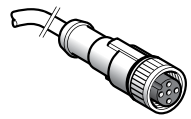
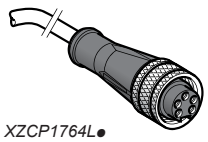

XZCP1141L●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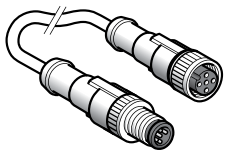
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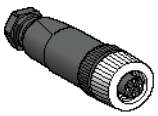
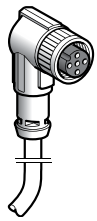

XZCC12FDM40B

XZCC43FCP40B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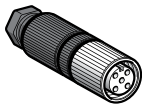
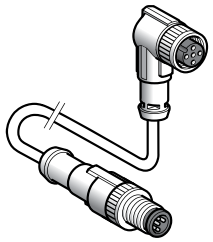

XZCC12FDM40V


XZCR1512041C●

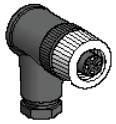

XZCC12FCM40B

Table 22.15: Connectors and Cables

Description		Cable Length m (ft)	Weight g (oz)	Catalog Number
Phoenix Contact QUICKON connector ▲		—	—	XMLGZ001
Pre-wired M12 female connector with cable	**Straight black PUR**	2 (6.6)	115 (4.06)	XZCP1141L2
		5 (16.4)	270 (9.52)	XZCP1141L5
		10 (32.8)	520 (18.34)	XZCP1141L10
	Straight yellow PVC	2 (6.6)	90 (3.17)	XSZCD101Y
		5 (16.4)	190 (6.70)	XSZCD102Y
		10 (32.8)	370 (13.05)	XSZCD103Y
	90°	2 (6.6)	115 (4.06)	XZCP1241L2
		5 (16.4)	270 (9.52)	XZCP1241L5
		10 (32.8)	520 (18.34)	XZCP1241L10
Pre-wired 7/8" 16UN, female connector with cable	**Straight**	2 (6.6)	185 (6.53)	XZCP1764L2
		5 (16.4)	460 (16.23)	XZCP1764L5
		10 (32.8)	900 (31.75)	XZCP1764L10
M12–M12 jumper cables with straight male connector, for splitter box	**Straight female connector**	1 (3.3)	65 (2.29)	XZCR1511041C1
		2 (6.6)	95 (3.35)	XZCR1511041C2
	90° female connector	1 (3.3)	65 (2.29)	XZCR1512041C1
		2 (6.6)	95 (3.35)	XZCR1512041C2

▲ Connector incorporating IDCs (insulation displacement connectors) for quick, direct, in-line connection to cable without a screwdriver or soldering iron.

Table 22.16: Accessories

Description		Weight g (oz)	Catalog Number
M12 female connector, metal clamping ring, with screw terminal connections	Straight	20 (0.71)	XZCC12FDM40B
	Elbowed	20 (0.71)	XZCC12FCM40B
DIN 43650A female connector, with screw terminal connections		35 (1.23)	XZCC43FCP40B
Sealing gasket		15 (0.48)	XMLZL010
Mounting bracket		37 (1.19)	XMLZL008
Cooler for versions with 1/4" BSP fluid connection		370 (11.90)	XMLZL009

Table 22.17: Wiring Configurations

Version	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
AC (5-pin E)	Power supply	Power supply	Ground	+ Relay	– Relay
DC (4-pin D), analog or single stage	+ Power supply	4–20 mA	– Power supply	Single stage	
DC (4-pin D), dual stage	+ Power supply	Second stage	– Power supply	First stage	

Table 22.18: Electrical Connections

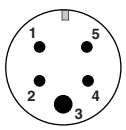
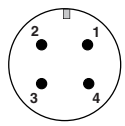
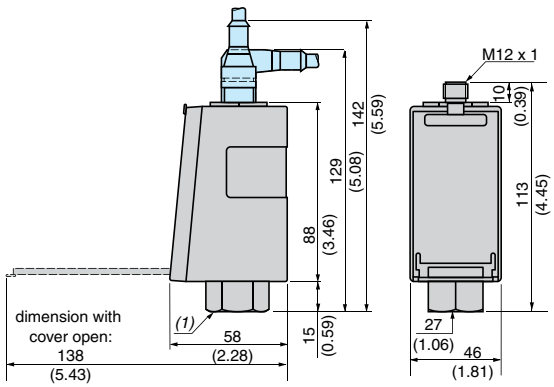
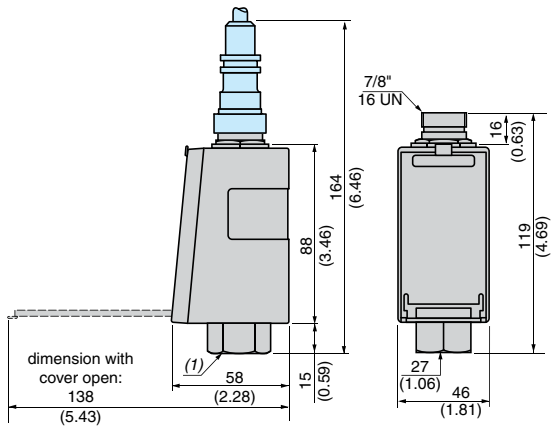
	AC Connector	DC Connector	
Wiring	 1. L1 Power 2. L2 Power 3. Ground 4. Relay 5. Relay		**Analog** 1. + Power Supply 2. 4–20 mA 3. – Power Supply 4. Solid State, PNP or NPN **Dual Stage** 1. + Power Supply 2. 2nd Stage Solid-State Output 3. – Power Supply 4. 1st Stage Solid-State Output
Rated Supply Voltage	120 Vac (102–132 Vac), N.O. – N.C. Relays, Output 2.5 A, 5 Wire	24 Vdc (17–33 Vdc), Analog PNP–NPN, N.O. Outputs, 4 Wire	
		24 Vdc (17–33 Vdc), Analog + Shunt Calibration, 4 Wire	
		24 Vdc (17–33 Vdc), Dual Stage N.O. –N.C., PNP–NPN Outputs, 4 Wire	
Display	The display shows the pressure in the circuit up to a value of twice the maximum pressure size of the device (for example, XMXF.6000… displays values up to 1200 bar). If the pressure is higher than 130% of the pressure range, the display blinks. The display shows two digits after the decimal point from –1 to 2.5 bar (–14.5 to 36.25); one digit after the decimal from 10 to 70 bar (145 to 1015); and no digits after the decimal from 100 to 600 bar (1450 to 8700). In all cases, the display shows no values below 2% at the beginning of the scale.		

Figure 22.2: XMLF•••D2•••



(1) Female fluid entry:
XMLF••• D2••5, XMLF••• E2••5: G 1/4 A (BSP)
XMLF••• D2••6, XMLF••• E2••6: 1/4" NPTF
XMLF••• D2••9, XMLF••• E2••9: SAE 7/16-20UNF

Figure 22.3: XMLF•••E2•••



Dimensions: in. (mm)

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XMLA, XMLB, XMLC, XMLD International Pressure Switches

Refer to Catalog **9012CT9701**

XML international pressure switches meet IEC, Cenelec, UL, and CSA standards. They are CE marked.

- Fixed differential (XMLA), adjustable differential single-pole (XMLB) or double-pole (XMLC), and dual stage (XMLD)
- Range listed is on increasing pressure (psi, bar, kPa)
- External pressure setting window available
- 1 N.O.–1 N.C. snap acting contacts standard
- Temperature range: –13 to +158 °F (–25 to +70 °C)
- Enclosure rating: IP65 with plug-in connector, IP66 with terminal connections
- Operating rate: up to 120 operations per minute for diaphragm and 60 per minute for piston
- Media connection: 1/4" NPT
- Conduit connection: 1/2" NPT

XMLB

XMLD

Table 22.19: Specifications

Enclosure Rating		Screw terminal models: IP66 conforming to IEC/EN 60529 Connector models: IP65 conforming to IEC/EN 60529
Ambient Temperature	**Operation**	–25 to +70 °C (–13 to +158 °F)
	Storage	–40 to +70 °C (–40 to 158 °F)
Repeat Accuracy		< 2%
Fluids Controlled		Hydraulic oils, air, fresh water, sea water, 32 to 320 °F (0 to +160 °C), depending on the model Steam, corrosive fluids, viscous products, 32 to 320 °F (0 to +160 °C), depending on the model
Operating Rate (operating cycles/minute)		Piston version switches: up to 60 cycles/minute for temperatures above 32 °F (0 °C) Diaphragm version switches: up to 120 cycles/minute for temperatures above 32 °F (0 °C)
Operational Characteristics		∿ AC-15; B300 (Ue = 240 V, Ie = 1.5 A; Ue = 120 V, Ie = 3 A) ⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1) conforming to IEC 947-5-1 Appendix A, EN 60 947-5-1
Type of Contacts		Silver tipped contacts XMLA & XMLB: 1 C/O single-pole contact (4 terminal), snap action XMLC: 2 C/O single-pole contacts (8 terminals), simultaneous snap action XMLD: 2 C/O single-pole contacts (8 terminals), staggered snap action
Resistance Across Terminals		< 25 mΩ conforming to NF C 93-050 method A or IEC 255-7 category 3
Terminal Referencing		Conforming to CENELEC EN 50013
Short-Circuit Protections		10 A cartridge fuse type gG (gI) recommended
Connection		Screw clamp terminals Clamping capacity, min: 1 x 0.2 mm^2, max: 2 x 2.5 mm^2

Table 22.20: Component Materials in Contact with Fluid

Pressure Switch Catalog Number	Zinc Alloy	Stainless Steel	Brass	Steel	Nitrile	PTFE	FPM, FKM	Aluminum
XMLAM01V•••• / XML•M02V••••	X	X ▲	—	—	X	—	—	—
XMLBM03S••••	—	X ▲	—	—	—	X	—	—
XML•M05A••••	X	X ▲	—	—	X	—	—	—
XMLBL05S••••	—	X ■	—	—	—	X	—	—
XML•L35R••••	—	X ■	—	X	—	—	X	—
XML•L35S••••	—	X ■	—	—	—	X	—	—
XML•001S••••	—	X ■	—	—	—	X	—	—
XML•002A••••	X	—	—	—	X	—	—	—
XML•002B••••	—	—	—	X	—	—	X	—
XMLA004A••••	X	—	—	—	X	—	—	—
XMLB004A••••	X	—	—	—	X	—	—	—
XML•004B••••	—	—	—	X	—	—	X	—
XML•010A••••	X	—	—	—	X	—	—	—
XML•010B••••	—	—	X	—	—	—	X	—
XML•020A•••• / XML•035A••••	X	—	—	—	X	—	—	X
XML•020B•••• / XML•035B••••	—	—	X	—	—	—	X	—
XML•070D•••• / XML•160D••••	—	—	X	X	—	X	X	—
XML•300D••••	—	—	X	X	—	X	X	—
XML•500D••••	—	—	X1	X	—	X	X	—

▲ X2GNiMo 17-12-2 (AISI 316L)
■ X8GNiS 18-09 (AISI 303)

Table 22.21: Interpretation of the Catalog Number (example: XMLD070D1S13)

XML D 070 D 1 S 1 3

	Contacts	Rated Pressure			Actuator	Scale	Electrical Connection	Output	Fluid Connection	
	A Fixed differential, single-pole contact	**Code**	**psi**	**bar**	***Diaphragm***	**1** Without	**S** Without connector (not available on solid-state devices)	**1** Contacts	**Fluid**	**Electrical**
	B Adjustable differential, single-pole contact	**L05**	0 to 0.725	0 to 0.05	**A** Hydraulic oil, air, fresh water, sea water (0 to 70 °C)	**2** With	**C** Square / DIN 43650		**1** 1/4 Gas	Type 13 (PG 13,5)
	C 2 adjustable differential, single-pole contacts, simultaneous	**L35**	0 to 5.075	0 to 0.35	**B** Hydraulic oil, fresh water, sea water (0 to 160 °C)		**D** M12 Micro connector		**2** 1/4 Gas	ISO M20
	D 2 fixed differential, single-pole contacts, staggered	**M01**	-14.5 to -4.06	-1 to -0.28	**C** Corrosive fluids				**3** 1/4 in. NPTF	1/2 in. NPT
		M02	-14.5 to -2.03	-1 to -0.14	**P** Viscous fluids				**4** PT 1/4 (JIS B0203)	1/2 in. PF (JIS B0202)
		M03	-2.9 to -.029	-0.2 to -0.02	**R** Hydraulic oil, air (0 to 160 °C)					
		M05	-7.25 to 72.5	-0.5 to 5	**S** Fresh/sea water, corrosive fluids (0 to 160 °C)					
		001	0 to 14.5	0 to 1	***Vacuum***					
		002	0 to 36.25	0 to 2.5	**V** Hydraulic oil, air, fresh water, sea water (0 to 70 °C)					
		004	0 to 58	0 to 4	**T** Hydraulic oil, air, fresh water, sea water (0 to 160 °C)					
		010	0 to 145	0 to 10	***Piston***					
		020	0 to 290	0 to 20	**D** Hydraulic oil					
		035	0 to 507.5	0 to 35	**E** Fresh / sea water					
		040	0 to 580	0 to 40						
		070	0 to 1015	0 to 70						
		160	0 to 2320	0 to 160						
		300	0 to 4350	0 to 300						
		500	0 to 7250	0 to 500						

NOTE: *Use this table only to interpret the catalog number. Some combinations are not available.*

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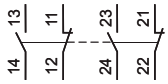
Terminal Diagrams

XMLA, XMLB

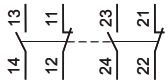
1 C/O single-pole contact, snap action

XMLC

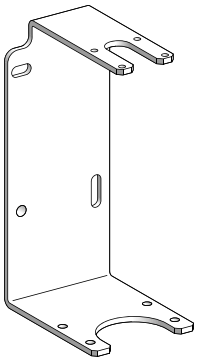


2 C/O single-pole contacts, simultaneous snap action

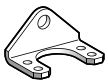
XMLD



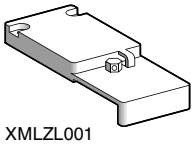
2 C/O single-pole contacts, snap action (1 per stage)



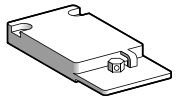
XMLZL006



XMLZL002



XMLZL001



XMLZL011

Table 22.22: Fixed Differential Catalog Numbers

Range on Increasing Pressure (psi)	Approximate Differential Across Range	Maximum Allowable Pressure	Catalog Number
Fixed, 1 Single-Pole Contact (XMLA)			
-4.06 to -14.5	3.5	130.5	XMLAM01V2S13
0.435 to 14.5	0.29 low / 0.58 high	32.62	XMLA001S2S13
2.17 to 36.25	1.88	130.5	XMLA002A2S13
5.8 to 58	5.07	130.5	XMLA004A2S13
8.7 to 145	7.25	326.25	XMLA010A2S13
10.2 to 290	5.8 low / 14.5 high	652.5	XMLA020A2S13
21.75 to 507.5	18.12	1160	XMLA035A2S13
72.5 to 1015	43.5 low / 108.75 high	2320	XMLA070D2S13
145 to 2320	79.75 low / 261 high	5220	XMLA160D2S13
290 to 4350	239.25 low / 507.5 high	9787.5	XMLA300D2S13
435 to 7250	290 low / 652.5 high	16312.5	XMLA500D2S13
Fixed, 2 Single-Pole Contacts, Staggered (XMLD)			
0.84 to 5.07	0.44	32.62	XMLDL35S1S13
-1.74 to -14.5	1.45	130.5	XMLDM02V1S13
1.74 to 14.5	0.44 low / 1.02 high	32.62	XMLD001S1S13
4.93 to 36.25	2.03 low / 2.76 high	130.5	XMLD002B1S13
5.8 to 58	2.18 low / 2.76 high	130.5	XMLD004B1S13
17.4 to 145	6.53 low / 8.7 high	326.25	XMLD010B1S13
2.14 to 20	10.15 low / 18.85 high	652.5	XMLD020B1S13
63.8 to 507.5	21.75 low / 37.7 high	1160	XMLD035B1S13
136.3 to 1015	72.5 low / 137.75 high	2320	XMLD070D1S13
239.25 to 2320	127.6 low / 290 high	5220	XMLD160D1S13
522 to 4350	246.5 low / 609 high	9787.5	XMLD300D1S13
594.5 to 7250	304.5 low / 942.5 high	16312.5	XMLD500D1S13

Table 22.23: Adjustable Differential Catalog Numbers

Range on Increasing Pressure (psi)	Approximate Differential Across Range	Maximum Allowable Pressure	Catalog Number
Adjustable, 1 Single-Pole Contact (XMLB)			
0.038 to 0.72	0.02 low / 0.06 high	1.63	XMLBL05S2S13
0.65 to 5.07	0.6 low / 0.72 high	32.62	XMLBL35R2S13
-2 to -14.5	1.9	130.5	XMLBM02V2S13
-0.29 to -2.9	0.26	29	XMLBM03S2S13
-7.25 to 72.5	7.25	163.12	XMLBM05A2S13
0.72 to 14.5	0.58 low / 0.87 high	32.62	XMLB001S2S13
4.35 to 36.25	2.32 low / 3.04 high	130.5	XMLB002A2S13
3.62 to 58	2.9 low / 3.62 high	130.5	XMLB004A2S13
10.15 to 145	8.26 low / 12.32 high	326.25	XMLB010A2S13
18.9 to 290	14.5 low / 23.2 high	652.5	XMLB020A2S13
50.75 to 507.5	24.65 low / 36.97 high	1160	XMLB035A2S13
101.5 to 1015	68.15 low / 127.6 high	2320	XMLB070D2S13
145 to 2320	134.85 low / 301.6 high	5220	XMLB160D2S13
319 to 4350	281.3 low / 536.5	9787.5	XMLB300D2S13
435 to 7250	333.5 low / 762.7 high	16312.5	XMLB500D2S13
Adjustable, 2 Single-Pole Contacts, Simultaneous (XMLC)			
0.65 to 5.07	0.29 low / 0.51 high	32.62	XMLCL35S2S13
-2 to -14.5	1.89 low / 2.03 high	130.5	XMLCM02V2S13
-7.97 to 72.5	6.52	163.12	XMLCM05S2S13
0.725 to 14.5	0.43 low / 0.58 high	32.62	XMLC001S2S13
4.35 to 36.25	1.89 low / 2.47 high	130.5	XMLC002B2S13
4.35 to 58	2.18 low / 2.47 high	130.5	XMLC004B2S13
10.15 to 145	6.53 low / 10.15 high	326.25	XMLC010B2S13
18.85 to 290	10.15 low / 14.5 high	652.5	XMLC020B2S13
50.75 to 507.5	14.5 low / 21.75 high	1160	XMLC035B2S13
101.5 to 1015	65.25 low / 129.05 high	2320	XMLC070D2S13
174 to 2320	130.5 low / 304.5 high	5220	XMLC160D2S13
319 to 4350	232 low / 507.5 high	9787.5	XMLC300D2S13
435 to 7250	275.5 low / 754 high	16312.5	XMLC500D2S13

Table 22.24: Accessories for XML Pressure and Vacuum Switches

Description	For Use with Switches	Catalog Number
Rear mounting bracket For vibrations > 2 gn	XML•L35 XML•001	XMLZL006
Additional top support bracket For vibrations > 4 gn	XMLAM01 XML•M05 XMLA004 XML•010 … XML•500	XMLZL002
Lead sealable protective cover To prevent unauthorized access to the adjustment screws and the switch cover mounting screw	XMLA XMLB	XMLZL001
Lead sealable protective cover To prevent unauthorized access to adjustment screws	All models	XMLZL011

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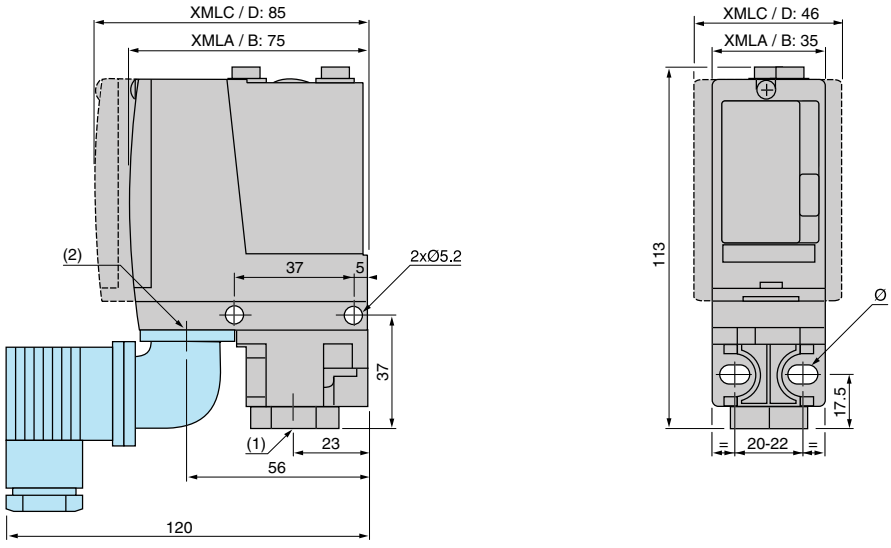
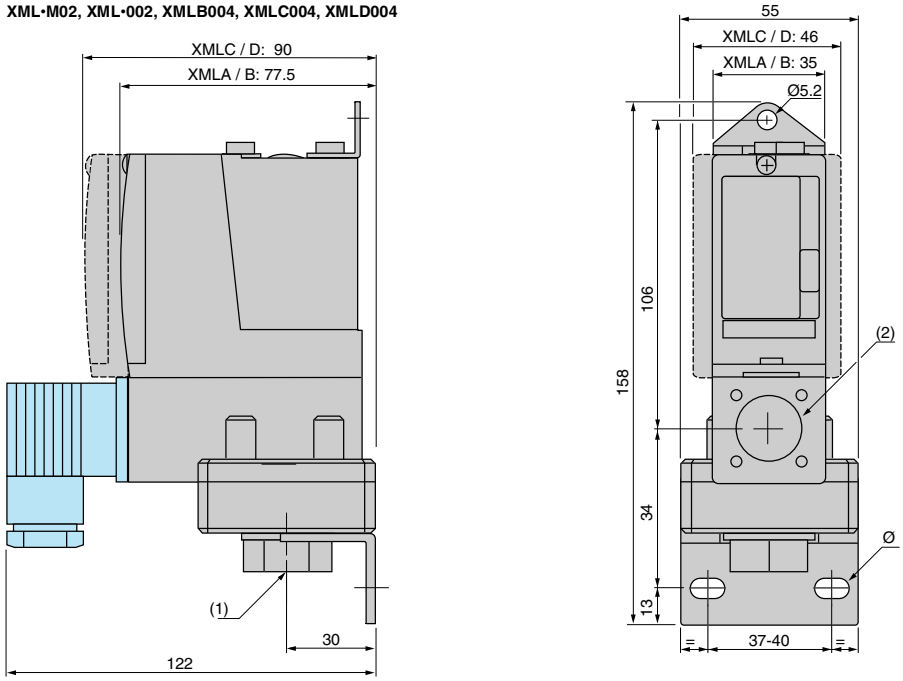
Figure 22.4: Dimensions

XMLAM01, XMLBM05, XMLCM05, XMLA004, X•ML010…500



(1) 1 fluid entry, tapped G 1/4 (BSP female) or 1/4" NPT
(2) 1 electrical connections entry, tapped M20 x 1.5 or Pg 13.5, or 1/2" NPT
Ø: 2 elongated holes Ø 5.2 x 6.7

XML•M02, XML•002, XMLB004, XMLC004, XMLD004



(1) 1 fluid entry, tapped G 1/4 (BSP female) or 1/4" NPT
(2) 1 electrical connections entry, tapped M20 x 1.5 or Pg 13.5, or 1/2" NPT
Ø: 2 elongated holes Ø 10.2 x 5.2

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NEMA 1

Table 22.25: Fixed Differential, Open Type or NEMA 1 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment

Range On Decreasing Pressure psig	Approximate Differential at Mid-Range psig▲	Maximum Allowable Pressure psig	Open Type Type	NEMA 1 Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
0.2–10	0.4 ±0.1	100	GRO1	GRG1
1–40	1.2 ±0.3	100	GRO3	GRG3
1.5–75	2.2 ±0.4	240	GRO4	GRG4
3–150	4.2 ±1	475	GRO5	GRG5
5–250	7.4 ±2	750	GRO6	GRG6
13–425	13 ±3	850	GSO1	GSG1
20–675	19 ±5	2000	GSO2	GSG2
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-Ring, Teflon® Retaining Ring				
20–1000	49 ±10	10000	GTO1	GTG1
90–2900	141 ±15	15000	GTO2	GTG2
170–5600	200 ±40	20000	GTO3	GTG3
270–9000	350 ±45	25000	GTO4	GTG4

Open Type

Table 22.26: Adjustable Differential, Open Type orNEMA 1 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment

Range On Decreasing Pressure psig	Approximate Mid-Range Differential Adds to Decreasing Set Point▲	Maximum Allowable Pressure psig	Open Type Type	NEMA 1 Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
0.2–10	0.4–0.9	100	GNO1	GNG1
1–40	1.2–3.6	100	GNO3	GNG3
1.5–75	2.2–6.6	240	GNO4	GNG4
3–150	4.2–13.2	475	GNO5	GNG5
5–250	7.4–33.6	750	GNO6	GNG6
13–425	13–37.2	850	GPO1	GPG1
20–675	19–58.8	2000	GPO2	GPG2
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-Ring, Teflon Retaining Ring				
20–1000	49–150	10000	GQO1	GQG1
90–2900	141–455	15000	GQO2	GQG2
170–5600	200–950	20000	GQO3	GQG3
270–9000	350–1400	25000	GQO4	GQG4

▲ Determines operating point on rising pressure.

Table 22.27: Available Modifications

Modification	Applies to	Form
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel housing	GNG1, GNO1, GRG1, GRO1 only	Q1
	All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q1
Ethylene propylene diaphragm in #316 stainless steel housing	Not available on GNG1, GNO1, GRG1, GRO1. Available on all other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q3
Viton fluorocarbon diaphragm in #316 stainless steel housing	GNG1, GNO1, GRG1, GRO1 only	Q4
	All other GNG, GNO, GPG, GPO, GRG, GRO, GSG, GSO	Q4
1/4–18 NPT external thread pressure connection	GNG, GNO, GRG, GRO	Z
1/2–14 NPT external thread, 1/4–18 NPTF internal thread pressure connection. Standard actuator only.	GNG, GNO, GRG, GRO	Z16
7/16–20 UNF-2B internal thread pressure connection	GNG, GNO, GPG, GPO, GQG, GQO, GRG, GRO, GSG, GSO, GTG, GTO	Z18

Table 22.28: Class 9049 Accessories for Class 9012 Pressure Switches

Description	Applies to	Type
Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water)	9012G	A26S

Acceptable Wire Sizes . . . . . 12-22 AWG
Recommended Terminal Clamp Torque. . . . . 7 lb-in

Electrical Rating. . . . . .page 22-16
Temperature Rating. . . . . .page 22-16
Renewal Parts Kits . . . . . .page 22-28

File CCN NKPZ E12158

File Class 3211-03 LR25490

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9012GAW5
NEMA 4, 4X, 13

Class 9012 single stage pressure switches are control circuit rated devices used in pneumatic or hydraulic systems on a wide variety of machine and process applications to protect the equipment and control or monitor the system pressure.

- Type G machine tool switches are available with NEMA Type 4, 4X, and 13 (IEC IP66) enclosure ratings.
- The NEMA 7 and 9 devices are UL listed for use in the following hazardous locations: Class I, Divisions 1 and 2, Groups C and D; and Class II, Divisions 1 and 2, Groups E, F, and G.
- Enclosure materials are cast aluminum.
- To ensure repeatability and minimize setting drift, pressure settings should fall within the middle 80 percent of the pressure range.

Table 22.29: Fixed Differential ▲ NEMA 4, 4X, 13 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment

Range on Decreasing Pressure psig	■Approximate Differential at Mid-Range psig	Maximum Allowable Pressure psig	Single Pole Double Throw Type	Double Pole Double Throw Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
.2–10	0.6 ±0.1	100	GDW1	GDW21
1–40	1.6 ±0.4	100	GDW2	GDW22
1.5–75	3.0 ±0.5	240	GDW4	GDW24
3–150	6.0 ±0.8	475	GDW5	GDW25
5–250	10.0 ±1.5	750	GDW6	GDW26
13–425	16 ±3.5	850	GEW1	GEW21
20–675	27 ±5	2000	GEW2	GEW22
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring				
20–1000	59 ±9	10000	GFW1	GFW21
90–2900	170 ±15	15000	GFW2	GFW22
170–5600	289 ±55	20000	GFW3	GFW23
270–9000	495 ±70	25000	GFW4	GFW24

Table 22.30: Fixed Differential NEMA 7 & 9 Enclosure Class I & II, Division 1 & 2, Groups C, D, E, F, G

UL Listed As Industrial Control Equipment.
UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is required.

Range on Decreasing Pressure psig	■Approximate Differential at Mid-Range psig	Maximum Allowable Pressure psig	Single Pole Double Throw Type	Double Pole Double Throw Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
0.2–10	1.0 ±0.1	100	GDR1	GDR21
1–40	2.4 ±0.8	100	GDR2	GDR22
1.5–75	4.5 ±1	240	GDR4	GDR24
3–150	9 ±1.5	475	GDR5	GDR25
5–250	15 ±3	750	GDR6	GDR26
13–425	25 ±7	850	GER1	GER21
20–675	41 ±10	2000	GER2	GER22
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring				
20–1000	89 ±18	10000	GFR1	GFR21
90–2900	255 ±30	15000	GFR2	GFR22
170–5600	578 ±110	20000	GFR3	GFR23
270–9000	788 ±140	25000	GFR4	GFR24

Acceptable Wire Sizes: 12–22 AWG
Recommended Terminal Clamp Torque: 7 lb-in

Electrical Rating . . . . . page 22-16
Temperature Rating . . . . . page 22-16
Modifications . . . . . page 22-18
Accessories . . . . . page 22-18
Renewal Parts Kits . . . . . page 22-28
Dimensions . . . . . page 22-17

Table 22.31: Adjustable Differential ▲ NEMA 4, 4X, 13 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment

Range on Decreasing Pressure psig	■Adjustable Differential Approximate at Mid-Range	Maximum Allowable Pressure psig	Single Pole Double Throw Type	Double Pole Double Throw Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
.2–10	0.6–2	100	GAW1	GAW21
1–40	1.6–8	100	GAW2	GAW22
1.5–75	3.5–15	240	GAW4	GAW24
3–150	6.0–30	475	GAW5	GAW25
5–250	10.0–49	750	GAW6	GAW26
13–425	16–90	850	GBW1	GBW21
20–675	27–130	2000	GBW2	GBW22
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring				
20–1000	59–200	10000	GCW1	GCW21
90–2900	170–560	15000	GCW2	GCW22
170–5600	289–1260	20000	GCW3	GCW23
270–9000	495–1900	25000	GCW4	GCW24

Table 22.32: Adjustable Differential NEMA 7 & 9 Enclosure Class I & II, Division 1 & 2, Groups C, D, E, F, G

UL Listed As Industrial Control Equipment.
UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is required.

Range on Decreasing Pressure psig	■Adjustable Differential Approximate at Mid-Range	Maximum Allowable Pressure psig	Single Pole Double Throw Type	Double Pole Double Throw Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing				
0.2–10	1.0–2	100	GAR1	GAR21
1–40	2.4–8	100	GAR2	GAR22
1.5–75	4.5–15	240	GAR4	GAR24
3–150	9–35	475	GAR5	GAR25
5–250	15–49	750	GAR6	GAR26
13–425	25–90	850	GBR1	GBR21
20–675	41–130	2000	GBR2	GBR22
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring				
20–1000	89–200	10000	GCR1	GCR21
90–2900	255–560	15000	GCR2	GCR22
170–5600	578–1260	20000	GCR3	GCR23
270–9000	788–1900	25000	GCR4	GCR24

▲ For metric threads, add **M** after the **W** on all types (offered at an additional cost). To order a Pg13.5 electrical conduit entry and a 1/4"-19 BSP pressure connection, add M12 to the end of the catalog number, as well as adding "M" after "W" for metric threads. For example:
9012GAW1 = 1/2" NPT electrical conduit entry
9012GAWM1 = 20 x 1.5 mm electrical conduit entry
9012GAWM1M12 = Pg13.5 electrical conduit entry and 1/4-19 BSP pressure connection.

■ The differential adds to the range setting and determines the operating point on rising pressure.

File E12443 Haz. Loc. CCN NOWT G•R
File E12158 CCN NKPZ G•O, G•G, G•W
File E12158 CCN NTHT Marine Use, G•W

File LR25490 Class 3211-03 G•W, G•O, G•G
File LR26817 Class 3218-02 G*R

Complies with IEC 60957.5.1, 5C8.3.4 when protected with a Bussmann CCKTK-R-10 fuse.

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Differential-Pressure Operation

9012GGW1

Pressure switches for differential-pressure operation monitor the change in the difference between two pressures. Type G differential-pressure switches are used in applications to signal that a predetermined pressure difference has been reached as a result of a widening or increasing difference between the two pressures. They can also signal that a predetermined pressure difference has been reached as a result of a narrowing or decreasing difference between the two pressures.

Table 22.33: Differential-Pressure Switches NEMA 4, 4X, 13 Enclosures

UL Listed and CSA Certified As Industrial Control Equipment ▲

Working Pressure Range on Decreasing X (upper) Actuator	Adjustable Difference on Decreasing Pressure (adds to working pressure) Y (lower) Actuator	Adjustable Differential Actuates on Increasing Pressure (adds to adjustable difference)	Maximum Allowable Pressure psi	Single Pole Double Throw Type	Double Pole Double Throw Type
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing					
0–75	0.25–10	0.8–2	100	GGW1	GGW21
0–175	0.5–36	5–15	240	GGW4	GGW24
0–500	3–175	22–90	850	GHW1	GHW21
Piston Actuated—#440 Stainless Steel Piston. #303 Stainless Steel Housing, Viton® Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring					
0–5000	15–825	80–200	7500	GJW1	GJW21

Dual-Stage Operation

Type G dual stage pressure switches are designed for use in applications where two separate pressure operations must be controlled by a single pressure monitoring device. These controls are most commonly used where dual functions are required or in sequencing applications such as alarm, followed by shutdown.

Table 22.34: Dual-Stage Pressure Switch NEMA 4, 4X, 13 Enclosure

UL Listed and CSA Certified As Industrial Control Equipment ▲

9012GKW1

Range Setting Limits of Pressure Between Which Stage 1 Can Be Adjusted to Operate on Decreasing Pressure	Add Adjustable Spread to Range Setting to Obtain Decreasing Operating Point of Stage 2	Fixed Differential—Add to Low (Decreasing) Operating Point to Obtain Approximate High (Rising) Operating Point of Each Stage		Maximum Allowable Pressure psi	SPDT Each Stage Type
		Stage 1	Stage 2		
Diaphragm Actuated—Nitrile (Buna-N) Diaphragm, Zinc Plated Steel Housing					
.2–10	1–5	1.0 ±0.2	1.5 ±0.4	100	GKW1
1–40	4–20	4.0 ±1.0	6.0 ±1.5	100	GKW2
1.5–75	6–30	5.0 ±1.5	8.0 ±2.0	240	GKW4
3–150	12–75	8.0 ±2.0	12 ±3	475	GKW5
5–250	22–110	14 ±3	21 ±5	750	GKW6
13–425	40–180	20 ±4	30 ±7.5	850	GLW1
20–675	45–250	30 ±6	45 ±11	2000	GLW2
Piston Actuated—#400 Stainless Steel Piston. #300 Stainless Steel Housing, Viton Fluorocarbon Diaphragm and O-ring, Teflon® Retaining Ring					
20–1000	50–300	50 ±10	75 ±19	10000	GMW1
90–2900	140–800	140 ±30	210 ±52	15000	GMW2
170–5600	300–1700	275 ±60	400 ±100	20000	GMW3
270–9000	500–2500	400 ±80	800 ±150	25000	GMW4

▲ UL Marine Listed for use on vessels greater than 65 feet long where ignition protection is not required.

Ordering Dual-Stage Pressure Switches

1. Specify Class 9012 Type..., and indicate the high or low operating point for each stage within the limits shown in the above table.
   Example:
   Class 9012 Type GKW4
   Set: Stage 1 at 30 psi decreasing pressure
   Stage 2 at 50 psi decreasing pressure
   (20 psi spread)
   Differential of each stage will be approximately as shown in the table above.

2. For available modifications see page 22-18. If one or more of these modifications are desired, add the appropriate Form to the Class and Type. Arrange form letters in alphabetical order when ordering more than one modification.

Acceptable Wire Sizes . . . . . 12-22 AWG
Recommended Terminal Clamp Torque. . . . . 7 lb-in

Electrical Rating. . . . . .page 22-16
Temperature Rating. . . . . .page 22-16
Modifications . . . . . .page 22-18
Accessories . . . . . .page 22-18
Renewal Parts Kits . . . . . .page 22-28
Dimensions . . . . . .page 22-17

File E12158 CCN NKPZ
File E12158 CCN NTHT - Marine Use

File LR25490 Class 3211-03

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Table 22.35: Control Duty Circuit Ratings

Contacts	AC—50 or 60 Hz						DC			AC or DC
	V	Inductive, 35% Power Factor				Resistive 75% Power Factor	V	Inductive and Resistive		Continuous Carrying Amperes
		Make		Break				Make and Break Amperes		
		A	VA	A	VA	Make and Break Amperes		Single Throw	Double Throw	
SPDT	120	60	7200	6	720	6	120	0.55	0.22	10
	240	30	7200	3	720	3	250	0.27	0.11	10
	480	15	7200	1.5	720	1.5	600	0.10	—	10
	600	12	7200	1.2	720	1.2	—	—	—	—
DPDT	120	60	7200	6	720	6	125	0.22	0.22	10
	240	30	7200	3	720	3	250	0.11	0.11	10
	480	15	7200	1.5	720	1.5	600	—	—	10
	600	12	7200	1.2	720	1.2	—	—	—	—

Table 22.36: Type G Industrial

Contact Arrangement	Contact Symbol
1 N.O. – 1 N.C. (600 Vdc rating does not apply)	

Note: Contacts are single pole, double throw—one circuit normally open and one circuit normally closed. These circuits are not electrically separate and can not be used on opposite polarities.

Table 22.37: Temperature Ratings

	Actuator	Minimum	Maximum
Ambient	All	-23 °C (-10 °F)	+85 °C (+185 °F)
Media	Diaphragm	-40 °C (-40 °F)	+120 °C (+250 °F)
	Piston	-26 °C (-15 °F)	
	All with Forms Q4 and Q14	-26 °C (-15 °F)	

Figure 22.5: Types GAW, GBW, GCW, GDW, GEW, GFW, GKW, GLW, and GMW Machine Tool Switches (except 1, 21)

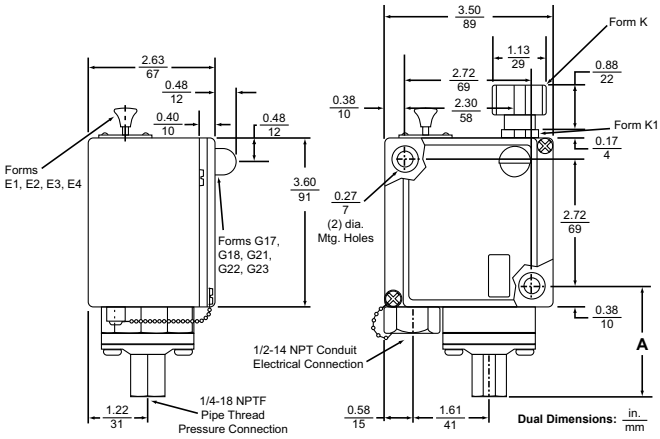


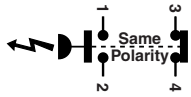
Table 22.38: Dimension A for G•W Switches

Type	Dimension A, in. (mm)
GAW, GDW, GKW 2, 4, 5, 6 22, 24, 25, 26, 52, 54, 55, 56	2.33 (59)
GBW, GEW, GLW 1, 2, 21, 22, 51, 52	2.23 (57)
GCW, GFW, GMW 1, 2, 3, 4 21, 22, 23, 24, 51, 52, 53, 54	3.15 (80)

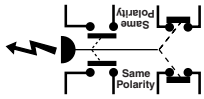
Table 22.39: Dimension A for G•R, Switches

Type / Tipo / Type	Dimension A, in. (mm)
GAR1, 2, 21, 22	2.02 (51.3)
GAR4, 5, 6, 24, 25, 26	1.42 (36.1)
GBR1, 2, 21, 22; GCR1, 21	1.32 (33.5)
GCR2, 3, 4, 22, 23, 24	2.24 (56.9)
GDR1, 2, 21, 22	2.02 (51.3)
GDR4, 5, 6, 24, 25, 26	1.42 (36.1)
GER1, 2, 21, 22; GFR1, 21	1.32 (33.5)
GFR2, 3, 4, 22, 23, 24	2.24 (56.9)

Table 22.40: Type G Machine Tool and Vacuum (except GVG)

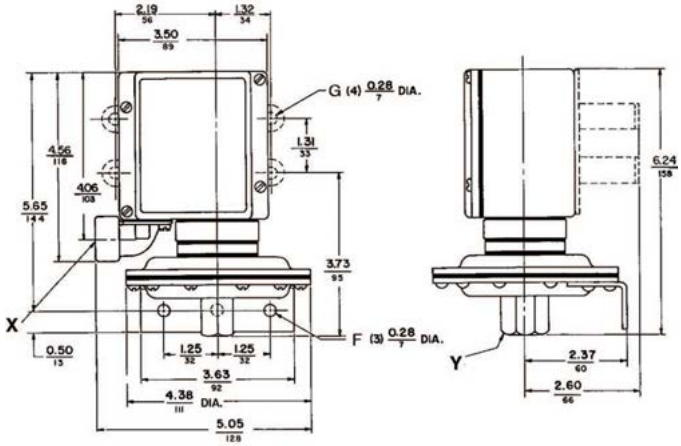
Type	Contact Arrangement	Contact Symbol
Single Pole Double Throw	1 N.O.–1 N.C.	

Note: Snap switch contains two double-break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of same polarity.

Type	Contact Arrangement	Contact Symbol
Double Pole Double Throw	2 N.O.–2 N.C.	

Note: Snap switch contains two electrically separated sets of contact elements allowing use on circuits of opposite polarity. Each set contains two double break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of the same polarity.

Figure 22.6: Types GAW, GDW, GKW 1, 21



X: Conduit connection: G•W = 1/2-14 NPT; G•WM = 20MMBGS4568, Form M12 = Pg13.5; DIN40430.
Y: Pressure connection: G•W = 1/4-18 NPTF; G•WM = 8; Form M14 = G 1/4 BS 2779; RP1/4 ISO 711; R 1/4 DIN 2999; GJ 1/4 UN1339.

Figure 22.7: Types GAR, GBR, GCR, GDR, GER, and GFR

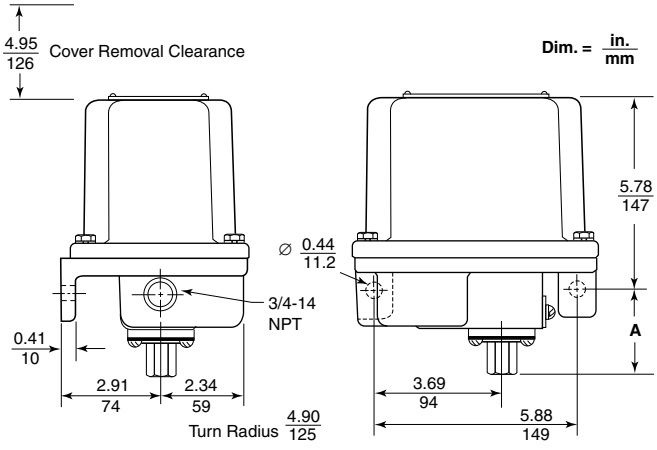


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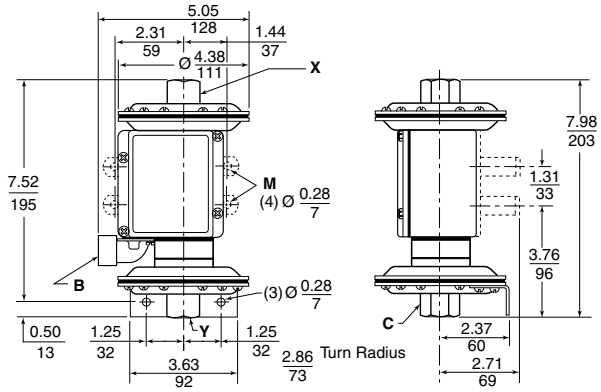
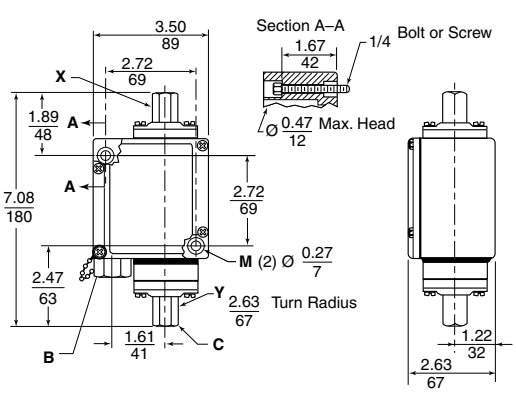
Figure 22.8: 9012G Dimensions, in. (mm)

GGW1, 21



GGW4, 24



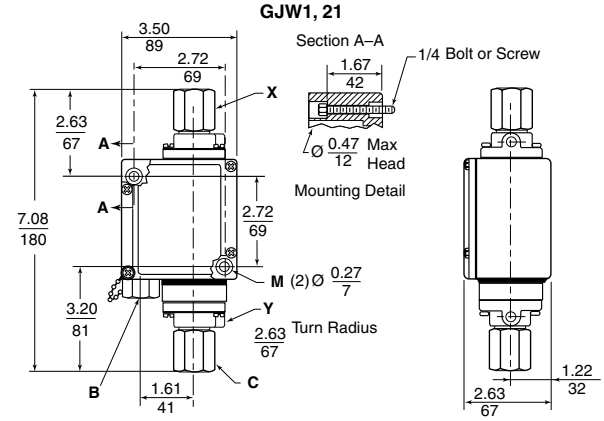
B = Conduit
Standard = 1/2-14 NPT
Options = Pg 13.5, 20 mm

C = Flange
Standard = 1/4-18 NPTF
Options = G 1/4

X = Lower pressure source

Y = Higher pressure source

GJW1, 21



GHW1, 21

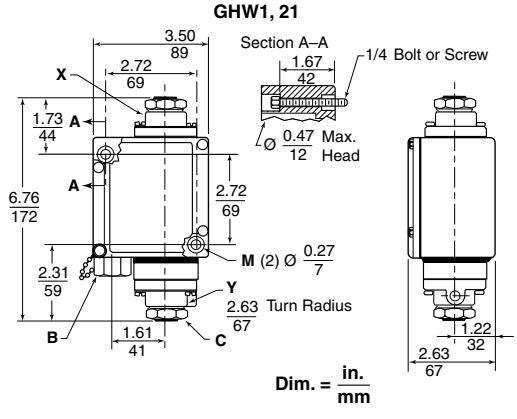


Figure 22.9: 9012GNO1, GRO1

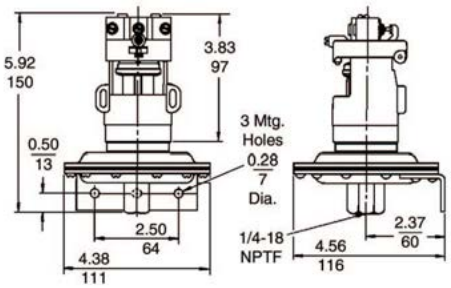


Figure 22.10: 9012GNG1, GRG1

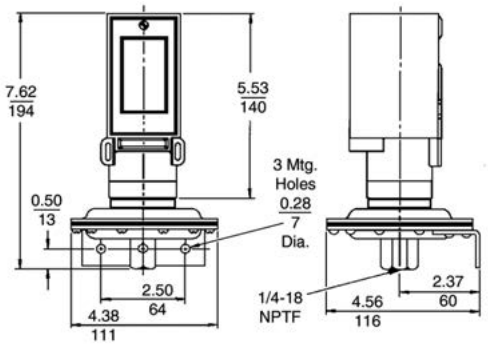


Figure 22.11: 9012GNO, GRO

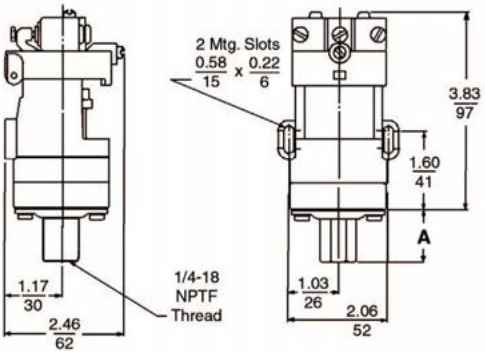
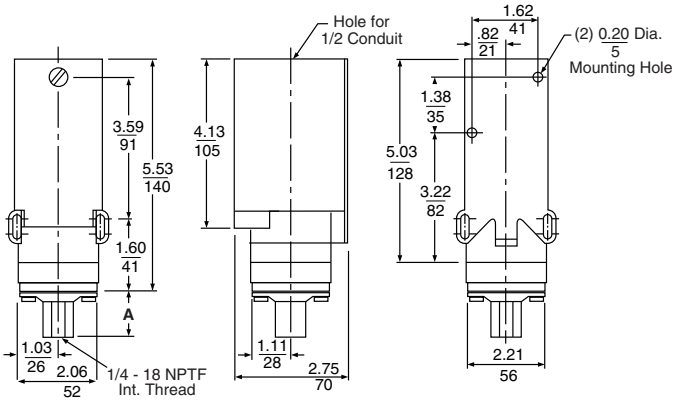


Figure 22.12: 9012GNG, GRG



Type	Dimension A, in. (mm)
GNO, GRO 3, 4, 5, 6	1.41 (35.8)
GPO, GSO 1, 2, 3	1.31 (33.3)
GQO, GTO 1, 2, 3, 4	2.24 (56.9)

Type	Dimension A, in. (mm)
GNG, GRG 3, 4, 5, 6	1.41 (35.8)
GPG, GSG 1, 2, 3	1.31 (33.3)
GQG, GTG 1, 2, 3, 4	2.24 (56.9)

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Table 22.41: Factory Modifications for Class 9012 Pressure Switches

Modification	Applies to Pressure Switch Type		Form
Lock on rising pressure, manual reset only	Available on GDW, GDWM, GEW, GEWM, GFW, GFWM only		E3
120 Vac or Vdc neon pilot light	Available on all GAW–GMW, GAWM–GFWM	with clear lens	G17
		with red lens	G18
24 Vdc only LED	For pilot light conversion kits: See 9998 PC-306–308. Complete Class and Type information required	with clear lens	G21
		with red lens	G22
24 Vdc LED pilot light with green lens	Class 9012 GAW–GMW and GAWM–GFWM, or Class 9016 GAW and Class 9025G		G23
SPDT snap switch rated 1.1 A at 125 Vdc (minimum differential doubles)	Available on GAR–GFR, GAW–GJW, GAWM–GFWM		H3
Prewired 5-pin Brad Harrison male receptacle #41310 or interchangeable Crouse-Hinds receptacle. For use with Brad Harrison female portable plug #41306, 41307, 41308, or equivalent.	Available on GAW–GJW single pole devices only		H10 or H11
Micro connector, 4-pin, for 24 Vdc pilot light	G•W (single pole only), except GAW2 and Form B2.		H17
External range adjustment (includes knob and range scale window)	GAW–GFW, GAWM–GFWM, GKW–GMW		K
External range adjustment slotted for screwdriver (includes range scale window)	GAW–GFW, GAWM–GFWM, GKW–GMW		K1
Pg 13.5 conduit thread and 1/4—19 BSP pressure connection	G•WM only		M12
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel flange	GGW1, GGW 21 only		Q1
	All other GGW, GHW only		Q1
	GAR, GAW, GDR, GDW, GAWM, GDWM, GKW1, 21 only		Q1
	All other GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW		Q1
Ethylene propylene diaphragm in #316 stainless steel flange	Available on all GGW, GHW except GGW1, 21		Q3
	Available on all GAR, GBR, GDR, GER, GAW, GBW, GDW, GEW, GAWM, GBWM, GDWM, GEWM, GKW, and GLW, except Types 1 and 21		Q3
Viton® fluorocarbon diaphragm in #316 stainless steel flange	GGW1, 21 only		Q4
	All other GGW, GHW		Q4
	GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW1, 21 only		Q4
	All other GAR, GAW, GBR, GBW, GDR, GDW, GER, GEW, GAWM, GBWM, GDWM, GEWM, GKW, GLW		Q4
Range scale window (standard with Forms K and K1)	GAW–GMW, GAWM–GFWM		V1
Special setting specified (If indicating only a fixed differential setting, specify whether this setting is on increasing or decreasing pressure.)	All 9012G		Y1
1/4"-18 NPT external thread pressure connection	GAR, GAW, GDR, GDW, GGW, GKW Not available in combination with Forms Q1, Q3, Q4.		Z
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection	GAR, GAW, GDR, GDW, GGW, GKW Not available in combination with Forms Q1, Q3, Q4.		Z16
7/16"-20 UNF-2B internal thread pressure connection	GAR–GFR; GAW–GMW Not available in combination with Forms Q1, Q3, Q4.		Z18

Table 22.42: Factory Modifications for Renewal Parts Kits for Class 9012 Pressure Switches

Suffixes for renewal parts kits, see page 22-28.

Modification	Applies to Parts Kit Type	Form
SPDT snap switch rated 1.1 A at 125 Vdc (minimum differential doubles)	PC313	H3
Standard Nitrile (Buna-N) diaphragm in #316 stainless steel flange	PC177–179, PC268, 269	Q1
	PC265–267	
Ethylene propylene diaphragm in #316 stainless steel flange	PC177–178, PC268, 269	Q3
	PC266, 267	
Viton® fluorocarbon diaphragm in #316 stainless steel flange	PC177–178, PC268, 269	Q4
	PC265–267	
1/4"-18 NPT external thread pressure connection	PC265–269	Z
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection	PC265–269	Z16
7/16"-20 UNF-2B internal thread pressure connection	PC177, 178, PC265–273	Z18

Table 22.43: Class 9049 Accessories for Class 9012 Pressure Switches

Description	Applies to Class	Type
Stainless steel surge reducer for use on oils, coolants, and hydraulic fluids (not recommended for air or water)	9012G	A26S

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Type GAW—Sensitive Control Applications

9016GAW vacuum switches are provided with double throw contacts; normally open and normally closed circuits allow these controls to be used for standard or reverse action applications.

Standard devices can be mounted from the front with the bracket provided. Two mounting screws are required for a firm attachment to any smooth, flat surface. Allowance must be made for flange projection. Controls with Form F modification include two mounting feet with 9/32" mounting holes on 3-3/4" centers. Range and Differential adjustments are internal and exposed by removal of the front cover.

Maximum allowable positive pressure: 100 psig.
Diaphragms are oil resistant, nitrile butadiene (Buna N) rubber.
Electrical Ratings and Temperature Limitations—See page 22-14 for Type G machine tool.
Dimensions—See page 22-17.

Table 22.44: Class 9016, Diaphragm Actuated

Range on Decreasing Vacuum (In. of Hg)	Adjustable Differential Adds to Range▲ (In. of Hg)	Contact Arrangement	Pipe Tap (NPTF)	Enclosure	
				NEMA 4, 4X & 13	NEMA 7 & 9 ■
				Type	Type
0–28.7	At Minimum Range: 0.8–9 At Mid-Range: 1.3–7.4	1 N.O., 1 N.C.	1/4"-18	GAW1	GAR1
0–25	5–20	1 N.O., 1 N.C.	1/4"-18	GAW2	N/A
0–28.3	At Minimum Range: 1–9 At Mid-Range: 1.7–7.4	2 N.O., 2 N.C.	1/4"-18	GAW21	GAR21
0–25	5–20	2 N.O., 2 N.C.	1/4"-18	GAW22	N/A

▲ Add Differential to Range to obtain the operating point on increasing vacuum (within vacuum limitations). The differential increases linearly over its range.
■ The minimum differential doubles with NEMA 7 & 9 enclosures.

Table 22.45: Available Modifications

Description	Form
Mounting feet (GAW1 and GAW21 only)	F
Range scale window	V1
1/4"-18 NPT external thread pressure connection	Z
1/2"-14 NPT external thread, 1/4"-18 NPTF internal thread pressure connection (standard actuator only)	Z16

File E12443 Haz Loc CCN NOWT G*R
File E12158 CCN NKPZ G*W
File E12158 CCN NTHT Marine Use, G*W

File LR25490 Type GAW only
File LR26817 Type GAR only
(NEMA 7 and 9 Haz Loc)

PUMPTROL™
Vacuum Switch

Class 9016 Type GVG1
Forms E, F

Type GVG—Power Circuit Applications

The 9016GVG1 vacuum switch is a companion to the 9036GG and 9037GG float switches commonly used on vacuum heating pumps. Electrical ratings of float and vacuum switch types are equal.

Table 22.46: Class 9016, Contacts Open on Increasing Vacuum

Cut-out Range (In. of Hg)	Approximate Adjustable Differential (In. of Hg)	Cut-in Range (In. of Hg)	Poles	Pressure Connection	NEMA 1 Enclosure
					Type
5–25	5–10	0–20	2	1/4"-18 NPSF	GVG1

Note: Maximum allowable positive pressure: 150 psig. In. of Hg = inches of mercury.

Table 22.47: Available Modifications

Description	Form
3-way lever—nameplate marked: Float only—Vacuum and Float—Continuous (factory modification only)	E
Mounting bracket (for retrofit, order 9049A53 bracket kit)	F
Reverse action—normally open contacts	R
1/4" male pipe connection (1/4"-18 NPT, external thread) (for retrofit, use 1/4" pipe nipple)	Z

Table 22.48: Electrical Ratings—9016GVG

Voltage	AC		DC
	Single Phase	Polyphase	
110 V	2 hp	3 hp	1 hp
220 V	3 hp	5 hp	1 hp
440–550 V	5 hp	5 hp	—
32 V	—	—	1/2 hp

Note: Control Circuit Rating: A600

Table 22.49: Vacuum Codes

Settings (In. of Hg)	Code
3–8	J09
16.5–25	J10
17–22	J11
18–23	J12
20–25	J13
Specify other setting (minimum order quantity is 4 pieces)	J99

Ordering Information: Specify Class 9016 Type G. Give vacuum settings within the limits of the listings above.
For Setting Codes, see Table 22.49. If special features are desired, add the appropriate Form letter to the Class and Type. Arrange the Form letters in alphabetical order when ordering more than one special feature.

File E12158
CCN NKPZ

File LR25490

Dimensions . . . . . .page 22-16

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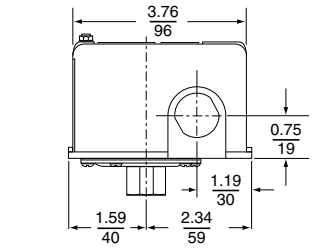
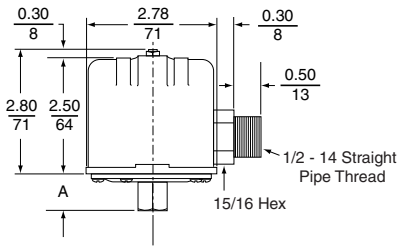
Type FHG—Pumptrol™ Compressor Pressure Switch

Class **9013** / Refer to Catalog **9013CT9701**

PUMPTROL™
Pressure Switch





Shown with Form T

Class 9013 Type FHG pressure switches are designed for the control of small electrically driven air compressors.

- Contacts open on pressure rise.
- Diaphragm actuated.
- For application data, see page 22-16.
  For repair parts kits, see page 22-28.

Table 22.50: Selection Table

Description				NEMA 1 Enclosure	
Adjustable Cut-out Range Increasing Pressure (psig)	Approximate Differential Fixed (psig)	Poles	Pressure Connection	Lower hp Type	Higher hp Type
40-100	20	2	1/4" NPSF internal	FHG2	FHG22
			3/8" NPSF internal	FHG3	—
			1/4" four way	FHG4	FHG24
			1/4" NPT external	FHG9	FHG29
70-150	30	2	1/4" NPSF internal	FHG12	FHG32
			3/8" NPSF internal	FHG13	FHG33
			1/4" four way	FHG14	FHG34
			1/4" NPT external	FHG19	FHG39
100-200	40	2	1/4" NPSF internal	FHG42	FHG52
			1/4" four way	FHG44	FHG54
			1/4" NPT external	FHG49	FHG59

Table 22.51: Special Features and Modifications for Type FHG

Description	Form
Bulk pack	▲
Addition of a second ground screw	G4■
Maintained manual cut-out lever (Auto-Off)	M1
Pulsation plug—factory order only (available only on 1/4-inch fittings, not to include 4-way)	P
1/2" conduit bushing—1/2" long thread—on left	T
Slip-on connectors (load side terminals only)	U
Slip-on connectors (line and load terminals)	U2
Factory sealed range stud	W
Two-way pressure release valve	X
Quick connect two-way pressure release valve (for use with Polyflow® tubing)	X1
Black cover	Z22

▲ For bulk package quantities and Form numbers, see Table 22.61 on page 22-21. If a Form is not specified, devices will be shipped individually packaged.
■ Can be field installed. Nameplate should then be marked with the Form letter and maintenance and ordering records corrected.

Table 22.52: Type F—Net Weight, 1-1/8 lb

Switch Type	A	
	in.	mm
FHG2, 12, 22, 32, 42, 52 FRG2, FSG2, FYG2	2-29/32	23
FHG3, 13, 33 FRG3, FSG3, FYG3	1-9/32	33
FHG9, 19, 29, 39, 49, 59 FSG9, FYG9	1-3/32	28

Table 22.53: Pressure Code (fixed differential)

Off at...	Code
80 psi	J43
100 psi	J27
110 psi	J37
115 psi	J38
120 psi	J69
125 psi	J52
135 psi	J39
140 psi	J68
155 psi	J40
150 psi	J55
175 psi	J59
Specify other pressure (minimum order quantity is 4 pieces)	J99

Note: The existence of a code does not imply that the code is available for any or all devices.

UL® File E12158 CCN NKPZ

CSA® File LR25490

Note: UL Listed control equipment. Type 4 must have Form T; otherwise these Types are component recognized. If conduit or pressure line is rigid, UL; if both are flexible, UR.

Table 22.54: Electrical Ratings For All 9013 Switches

Switch Type	Voltage	Single Phase AC	Polyphase AC ▼	DC	Control Circuit Rating
FHG2, 9, 12, 13, 14, 19, 42, 43, 44, 49	115	1-1/2 hp	2 hp	1/4 hp♦	A600
	230	2 hp	3 hp	1/4 hp♦	
FSG, FSW	460/575	—	1 hp	—	
FHG22, 29, 32, 33, 34, 39, 52, 54, 59	115	2 hp	3 hp	1/2 hp★	A600
	230	3 hp	5 hp	1/2 hp★	
FYG, FYW	460/575	—	1 hp	—	
FRG One Pole All Form H	32	—	—	—	A300
	115	1 hp	—	1/4 hp	
	230	1 hp	—	1/4 hp	
FRG Two Pole	32	—	—	1/4 hp	A300
	115	1 hp	1 hp	1/4 hp	
	230	1 hp	1 hp	1/4 hp	
All 9013G Form H	115	1 hp	—	1/2 hp	A600
	230	2 hp	—	1/2 hp	
	460/575	2 hp	—	—	
All 9013G, except Form H	115	2 hp	3 hp	1 hp	A600
	230	3 hp	5 hp	1 hp	
	460/575	5 hp	5 hp	—	

♦ DC rating does not apply to Form M4.
★ 1/4 hp with Form MI.
▼ See 1993 NEC Article 430-84

Ordering Information

1. Specify Class 9013 Type FHG.
2. Select pressure code from Table 22.53, and add the code designation to end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device as shown in Table 22.50.
3. To order special features, add the appropriate Form designation to the Class and Type. Arrange Forms in alphabetical order when specifying more than one feature or modification.

Accessories . . . . . page 22-22

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- Designed for the control of electrically driven water pumps. Diaphragm actuated.
- Type FSG is the standard water pump switch, suitable for all types of pumps: jets, submersible, reciprocating, etc.
- Type FYG is designed to meet higher horsepower and pressure requirements.
- Type FRG is reverse acting: contacts open on falling pressure.

PUMPTROL™
Pressure Switch

Table 22.55: Pressure Codes▲

Standard Action Devices		Reverse Action Devices	
Settings	Code	Settings	Code
5–21 psi	J15	8.5–5.5 psi	J17
8–20 psi	J16	10–5 psi	J36
20–40 psi	J20	22–12 psi	J22
20–50 psi	J18	22–16 psi	J19
30–50 psi	J21	35–20 psi	J70
40–60 psi	J24	40–20 psi	J23
50–70 psi	J33	50–30 psi	J35
55–85 psi	J34■	80–60 psi	J32■
60–80 psi	J25	100–80 psi	J51■
Specify other pressure	J99■	150–120 psi	J64■
		Specify other pressure	J99■

Table 22.56: Maximum Allowable Pressure for All 9013 Switches

Type	Pressure
FHG, FSG, FYG, FSW, FYW, FRG GHB, GHG, GSB, GSG GMG, GSR, GSW GHR, GHW	220 psig 300 psig 100 psig 250 psig

Table 22.57: Temperature Limitations for All 9013 Switches

Operation (Media)	Storage
Min. -36 °C (-33 °F) Max. +125 °C (+257 °F)	Min. -36 °C (-33 °F) Max. +125 °C (+257 °F)

Ordering Information

- Specify Class 9013 Type F.
- Select the pressure code from Table 22.55, and add the code designation to the end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device as shown in Tables 22.58 and 22.59.
- To order special features, add the appropriate Form letter to the Class and Type. Arrange the Form letters in alphabetical order when ordering more than one special feature.

Electrical Ratings: . . . . . page 22-20
Dimensions: . . . . . page 22-20
Renewal Parts Kits: . . . . . page 22-28

File E12158 CCN NKPZ

File LR25490

Note: Products on this page are UL Listed, however type numbers ending in 8, 10 or 20 (non rigid pressure lines) must have Form T or TI—otherwise these are UL component recognized.

▲ Existence of a code does not imply that the code is available for any or all devices.
■ Minimum order quantity is 4 pieces.
♦ Must be mounted in vertical position to maintain enclosure rating.
★ For bulk package quantities and Form numbers, see Table 22.61. If Form C•• is not specified, devices will be shipped individually packaged.
▼ Nylon pulsation plug can be field installed on types having 1/4" NPSF internal connector.
Part number 1530S6G1 is one bag of 50 plugs.

Table 22.58: Standard Action: Contacts Open On Rising Pressure

Cut-out Range (psig)	Approximate Adjustable Differential (psig)	Cut-in Range (psig)	Pressure Connection	2 Pole	
				NEMA 1	NEMA 3R♦
				Type	Type
20–65	15–30	5–45	1/4" NPSF internal	FSG2	FSW2
			1/4" NPT external	FSG9	FSW9
			1/4" bayonet (barbed)	FSG10	FSW10
			90° elbow 1/4" bayonet	FSG20	FSW20
20–50	10–30	10–30	1/4" NPSF internal	FSG22	FSW22
20–60	10–30	10–45	1/4" NPT external	FSG29	FSW29
9–30	6–20	3–10	1/4" NPSF internal	FSG42	FSW42
9–30	6–20	3–10	1/4" NPT external	FSG49	FSW49
25–80	20–30	5–60	1/4" NPSF internal	FSG52	—
			1/4" NPT external	FSG59	—
34–65	15–30	19–45	(FSG1 through 20 with Form M4 is only available in this range)		
25–80	20–30	5–60	1/4" NPSF internal	FYG2	FYW2
			1/4" NPT external	FYG9	FYW9
			1/4" bayonet (barbed)	FYG10	FYW10
			90° elbow 1/4" bayonet	FYG20	FYW20
39–80	20–30	19–60	(FYG1 through 20 with Form M4 is only available in this range)		
20–50	10–30	10–30	1/4" NPSF internal	FYG22	FYW22
20–60	10–30	10–45	1/4" NPT external	FYG29	FYW29
9–40	6–30	3–10	1/4" NPSF internal	FYG42	FYW42
9–40	6–30	3–10	1/4" NPT external	FYG49	FYW49

Table 22.59: Reverse Action: Contacts Open On Falling Pressure

Cut-in Range (psig)	Approximate Adjustable Differential (psig)	Cut-out Range (psig)	Pressure Connection	1-Pole	2-Pole
				Type	Type
23–65	15–30	8–45	1/4" NPSF internal	FRG12	FRG2
			3/8" NPSF internal	FRG13	FRG3
			1/4" NPT external	FRG19	FRG9
10–45	6–20	4–25	1/4" NPSF internal	FRG32	FRG22
			3/8" NPSF internal	FRG33	FRG23
			1/4" NPT external	FRG39	FRG29
6–14	5 Fixed	1–9	1/4" NPSF internal	FRG52	FRG42
			3/8" NPSF internal	FRG53	FRG43
			1/4" NPT external	FRG59	FRG49
40–100	20–30	20–80	1/4" NPSF internal	FRG72	FRG62
			3/8" NPSF internal	FRG73	FRG63
65–150	30–45	35–120	1/4" NPSF internal	FRG92	FRG82
			3/8" NPSF internal	FRG93	FRG83
			1/4" NPT external	FRG99	FRG89

Table 22.60: Special Features and Modifications for Type FSG, FYG & FRG Devices

Description	Applies to Types	Form
Bulk package	All Type F	★
One normally open—one normally closed contact	FRG 2-Pole only	H
Maintained manual cut-out lever (Auto-Off)	FSG, FYG	M1
Momentary manual cut-in lever (Auto-Start)	FRG2-59 only	M3
Low pressure cut-off (Auto-Start-Off) Operates at approximately 10 psig below cut-in and will turn off the pump	FSG, FYG	M4
Maintained manual cut-in lever (Auto-On)	FRG2-59 only	M5
Pulsation plug (Type 2 & 9 only)	FRG, FSG, FYG	P▼
Plastic flange (max. temp. 120 °F) (max. pressure 80 psi) Available only on Types FSG2, FYG2, FRG2, FSG•2, FYG•2, FRG•2	FSG•, FYG•, FRG• 1/4" NPSF internal only	Q8
1/2" conduit bushing, 1/2" long thread—on left	All Type F	T
Slip-on connectors (load side terminals *only*)	FSG, FYG	U
Slip-on connectors (line *and* load terminals)	FSG, FYG	U2
Black cover	FSG, FYG	Z22

Table 22.61: Bulk Package Form Numbers for 9013F Pressure Switches

Description		Bulk Package Quantity					
		16	20	40	50	400	500
Product without Forms M1, M3, M4, M5, T, X1	9013FHG (without 1/4" four-way)	—	C20		C50	—	—
	9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	—	C20	—	C50	C400	—
	9013FRG	—	C20	—	C50	—	—
	9013FSG	—	C20	—	C50	—	—
	9013FYG	—	C20	—	C50	—	—
Product with Forms M1, M3, M4, M5	9013FHG (without 1/4" four-way)	—	C20	C40	—	—	—
	9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	—	C20	C40	—	—	—
	9013FRG	—	C20	C40	—	—	—
	9013FSG	—	C20	C40	—	—	—
	9013FYG	—	C20	C40	—	—	—
Product with Forms T, X1	9013FHG (without 1/4" four-way)	C16	—	C40	—	—	—
	9013FHG4, 14, 24, 34, 44, 54 (with 1/4" four-way)	C16	—	C40	—	—	—
	9013FRG	C16	—	C40	—	—	—
	9013FSG	C16	—	C40	—	—	—
	9013FYG	C16	—	C40	—	—	—
9013FHG9 Special with Extended Flange		C16	—	—	—	—	C500

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Type G—Pumptrol Pressure Switch

Class **9013** / Refer to Catalog **9013CT9701**

Shown with Form X

PUMPTROL™

Pressure Switch

Class 9013 Type G Pumptrol pressure switches are designed to control electrically driven water pumps and air compressors. These devices cover higher electrical ratings for directly controlling motors in pump and compressor applications.

- Contacts open on pressure rise.
- Diaphragm actuated.
- For electrical ratings, see page 22-20.
  For repair parts kits, see page 22-28.

File E12158 CCN NKPZ

File E12443 CCN NOWT Haz Loc

File 25490 File 26817 Haz. Loc.

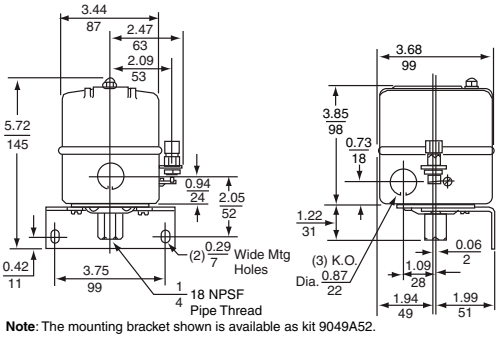
Table 22.62: Pressure Codes

Code	Pressure Setting (Close-Open), psi
J20	20–40
J21	30–50
J23	40–20 (reverse action)
J24	40–60
J25	60–80
J26	70–90
J28	70–100
J29	75–100
J30	80–100
J31	90–120
J50	135–175
J51	100–80 (reverse action)
J53	100–125
J54	110–125
J56	110–150
J57	120–150
J58	125–150
J60	125–175
J61	130–175
J62	140–175
J63	145–175
J64	150–120 (reverse action)
J65	215–250
J99	Specify the required setting

Ordering Information

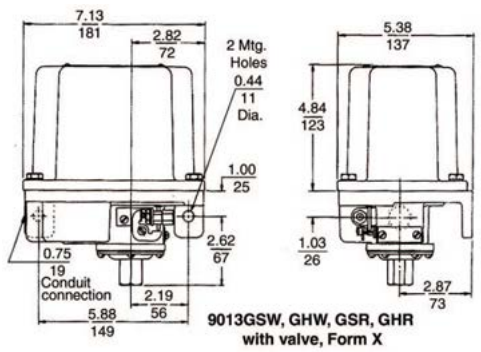
- Specify Class 9013 Type G.
- Select the pressure code from Table 22.62, and add the code to the end of the Type number. Ensure that the pressure rating of the code falls within the limits of the device. See Table 22.63.
- To order special features, add the appropriate Form letter to the Class and Type. Arrange Form letters in alphabetical order when ordering more than one special feature.

Electrical Ratings . . . . . .page 22-20



Note: The mounting bracket shown is available as kit 9049A52.

9013GHG, GSG - with or without Form X



9013GSW, GHW, GSR, GHR with valve, Form X

Table 22.63: Selection Tables

Cut-out Range (psig)	Approximate Adjustable Differential (psig)	Cut-in Range (psig)	Enclosure	Poles	NPSF Internal Pressure Connection	Type
10–35	4–8	5.5–30.5	NEMA 1 (General Purpose)	2	1/4	GMG2
20–80	15–30	5–60	NEMA 3R ▲ (Rainproof)	2	1/4	GSB2
20–80	15–30	5–60	NEMA 1 (General Purpose)	2	1/8	GSG1
					1/4	GSG2
					3/8	GSG3
20–80	20–40	5–50	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GSR1
					1/4	GSR2
					3/8	GSR3
			NEMA 4 (Watertight)		1/8	GSW1
					1/4	GSW2
					3/8	GSW3
65–200	20–40	40–170	NEMA 3R ▲ (Rainproof)	2	1/4	GHB2
65–200	20–40	40–170	NEMA 1 (General Purpose)	2	1/8	GHG1
					1/4	GHG2
					3/8	GHG3
65–200	30–50	35–150	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GHR1
					1/4	GHR2
					3/8	GHR3
			NEMA 4 (Watertight)		1/8	GHW1
					1/4	GHW2
					3/8	GHW3
80–250	25–45	32–215	NEMA 3R ▲ (Rainproof)	2	1/4	GHB5
80–250	24–45	32–215	NEMA 1 (General Purpose)	2	1/8	GHG4
					1/4	GHG5
					3/8	GHG6
80–250	40–60	30–190	NEMA 7 & 9 (Hazardous Locations)	2	1/8	GHR4
					1/4	GHR5
					3/8	GHR6
			NEMA 4 (Watertight)		1/8	GHW4
					1/4	GHW5
					3/8	GHW6

▲ Must be mounted in vertical position to maintain enclosure rating.

Table 22.64: Special Features and Modifications for Type G Devices

Description	Applies to	Form
Standard pack of 10 switches■	All Type G	C10
3-way lever (On-Auto-Off) (not compatible with Form X)	GHG, GMG, GSG	E
1 N.O., 1 N.C. contact	All Type G	H
Pulsation plug (not field replaceable.)	All Type G	P
Reverse action (Select pressure code from reverse action table on page 22-21)	All Type G	R
Slip-on connectors (load side terminals only)	All Type G	U
Slip-on connectors (line and load terminals)	All Type G	U2
Two-way pressure release valve (Not compatible with Form E)	GHB, GMG, GSB, GHG, GSG	X
	GHR, GHW, GSR, GSW	X
1/4" male pipe thread on pressure connection	All Type G	Z
1/2"-14 NPT external 1/4"-18 NPT internal♦	All Type G	Z16

■ Available on GHB, GHG, GSB, and GSG.
If Form C10 is not speciied, devices will be shipped individually packaged

♦ UL Listed industrial control equipment.

Table 22.65: Class 9049 Accessories for Class 9013 Pressure Switches

Type	Description	Applies to Class
A12	Two-way pressure release valve, replacement only. Cannot be added to switch that originally had no valve.	9013GHG, GSG, Form X only
A52	Mtg. bracket—replacing obsolete 9013A with 9013G	9013GHG, GSG
A53	Mtg. bracket—replacing obsolete 9013A with 9013G, or for current 9016GVG	9013GMG, 9016GVG
A56	Two-way pressure release valve. Replacement only. Cannot be added to switch that originally had no valve.	9013FHG, Form X only

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Type DG2

Type GG

File No. E12158
File No. E12443
Haz Loc

File LR25490
File LR26817
Haz Loc

Open Tank or Sump Applications

Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F).

For accessories, refer to page 22-28.

Table 22.66: Class 9036, 2-Pole, Single Lever Operated

Contact Operation	NEMA 1 Type	NEMA 4 Type	NEMA 7, 9 Type
Close on liquid rise	DG2	DW31	DR31
Open on liquid rise	DG2R	DW31R	DR31R
Close on liquid rise	GG2	GW1	GR1
Open on liquid rise	GG2R	GW1R	GR1R

Order the universal mounting bracket and float accessory kits separately from the Class 9049 Accessories section on page 22-28. Types GW and GR use a center-hole float. Devices with Form C use a center-hole float. All others use a tapped-at-top float.

Table 22.67: Modifications

Description	Factory Installed Form	Field Installed Class 9049 Kit
Types DG, DW, DR		
Reverse action (Type DG)	R	A58
Compensating spring (Type DG)	C	A19
Compensating spring (Type DR, DW)	C	A20
Compensating spring and reverse action	CR	Not available
Types GG, GW, GR		
Compensating spring for Type GG2	C	9049A13
Combination of compensating spring and reverse action (Type GG2)	CR	9049A13
1 N.O., 1 N.C. contact configuration	H	Not available
Combination of comp. spring & 1 N.O., 1 N.C. contact for Type GG2	CH	Not available
Reverse action (Type GR, GW)	R	Not available

Table 22.68: Class 9049 Float Accessory Specifications (oz)

Item	Type A6	Type A6S	Type A6C	Type A6CS	Type A6A	Type A6CA
Net buoyancy■ (in water) 7" float	60▲	60▲	70▲	70▲	60▲	70▲
Weight of 5 ft rod	18.5	16.9	18.5	16.9	6	6
Weight of extra ft of rod (per ft)	3.7	3.4	3.7	3.4	1.2	1.2
Total weight of stops	3 (2 stops)	3 (2 stops)	6 (4 stops)	6 (4 stops)	3 (2 stops)	6 (4 stops)

▲ Net buoyancy of float has been calculated with float 80% submerged, thus allowing 20% factor of safety.

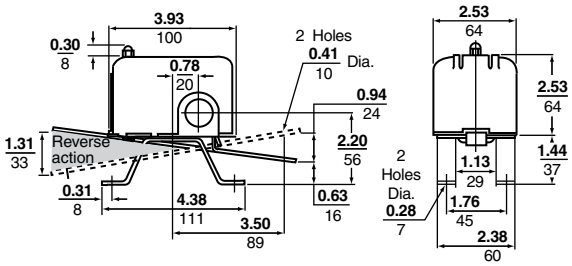
■ Buoyancy data is calculated for use in water. Consult factory for buoyancy data in media with a different specific gravity than water. **When ordering float accessories,** first specify the desired float accessory package, such as 9049A6 or 9049A6CS, then as a second item give the number of additional rod kits required. For example, for a 9049A6 with 15 ft of rod, order as follows: Item A = 9049A6, quantity = 1; Item B = 9049T1, quantity = 4.

Table 22.69: Maximum Forces at Which Switches Are Tested (oz)

Type	Force Up To Trip	Force Down To Trip	Weight Supported with Compensating Spring	Type (with or without Form H)	Lever Length Position	Force Up to Trip	Force Down to Trip	Weight Supported with Compensating Spring at Max. Adjustment (oz)
DG2	9	8	60	GG2	Short	33	39	♦
DG2 Form R	8	8	60	GG2	Long	21	27	100
DW31	8	8	66	GG2 Form R	Short	30	24	♦
DW31 Form R	8	8	66	GG2 Form R	Long	22	16	150
DR31	8	8	66	GR1, GW1	Short	24	31	80
DR31 Form R	8	8	66	GR1, GW1	Medium	22	29	72
				GR1, GW1	Long	20	27	64

♦ Compensating spring not effective in combination with Short lever length position.

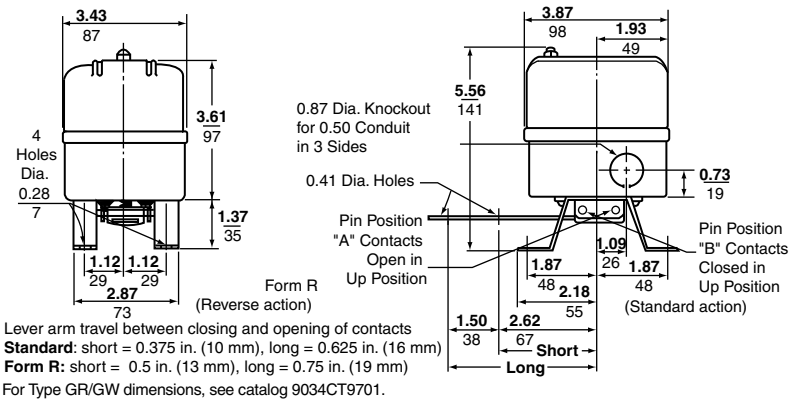
Figure 22.13: Type DG Dimensions



Float lever travel between closing and opening of contacts: short = 1 in. (25 mm), medium = 1.12 (28 mm), long = 1.25 in. (31.8)

For Type DR/DW dimensions, see catalog 9034CT9701.

Figure 22.14: Type GG Dimensions



Lever arm travel between closing and opening of contacts
Standard: short = 0.375 in. (10 mm), long = 0.625 in. (16 mm)
Form R: short = 0.5 in. (13 mm), long = 0.75 in. (19 mm)

For Type GR/GW dimensions, see catalog 9034CT9701.

Table 22.70: Electrical Ratings for All Float Switches

Applies to Class and Type	Control Circuit	Single Phase AC			Polyphase AC ★			DC		
		115 V	230 V	460/ 575 V	115 V	230 V	460/ 575 V	32 V	115 V	230 V
9036DG, DR, DW (2-pole), FG	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp
9036GG, GR, GW (2-pole)	A600	2 hp	3 hp	5 hp	3 hp	5 hp	5 hp	1/2 hp	1 hp	1 hp
9036G Form H (1 N.O., 1 N.C.)	A300	1 hp	2 hp	2 hp	—	—	—	—	1/2 hp	1/2 hp
9037EG, ER, EW; HG, HR, HW (2-pole)	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp
9038 All Devices (2-pole)	A600	2 hp	3 hp	—	3 hp	5 hp	1 hp	1/4 hp	1/2 hp	1/2 hp

★ See 1993 NEC Article 430-84

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Open Tank or Sump Applications, Float Switch, Class 9036 Type FG

The Class 9036 Type FG30 pedestal style float switch is designed for liquid level control with electric motor operated pumps either directly or through a magnetic starter. It can also be used to activate alarms in liquid level control systems. The upward or downward movement of the lever arm of the Class 9036 Type FG30 float switch controls the On and Off positions corresponding to the water level changes required to turn the pump or alarm on and off.

Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F)

9036FG
9049A60
9049A61

Table 22.71: Type FG Float Switch and Accessories

Description	Class	Type
2-pole, NEMA 1, contacts close on liquid rise	9036	FG30
Plastic center hole float (1 required)	9049	A60
33.75 inch aluminum rod, 2 float stop assemblies and attaching hardware (1 required)	9049	A61

Closed Tank, Class 9037 Type E

Type E switches are flange mounted and float movement is transmitted through a Quad-Ring® seal.

Build up the switch to meet your exact requirements from the **basic switch, float rod,** and **float** groups below. Switch may be assembled in the field to give contacts that open on liquid rise or close on liquid rise. Consult Schneider Electric for use in media with a different specific gravity than water.

Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F)

9037EG with
9049ER3 Rod Kit

Table 22.72: Class 9037 Type E

Application	Post Length L (in.)	NEMA 1 Type	NEMA 4 Type	NEMA 7 & 9 Type
For minimum water level change	2-5/8	EG8	EW8	ER8
	4-11/16	EG10	—	—
For maximum water level change	2-5/8	EG9	EW9	ER9
	4-11/16	EG13	EW13	—

Table 22.73: Class 9049 Floats for Type E Switches

Description	Type
#304 stainless steel	EF1
#316 stainless steel	EF2

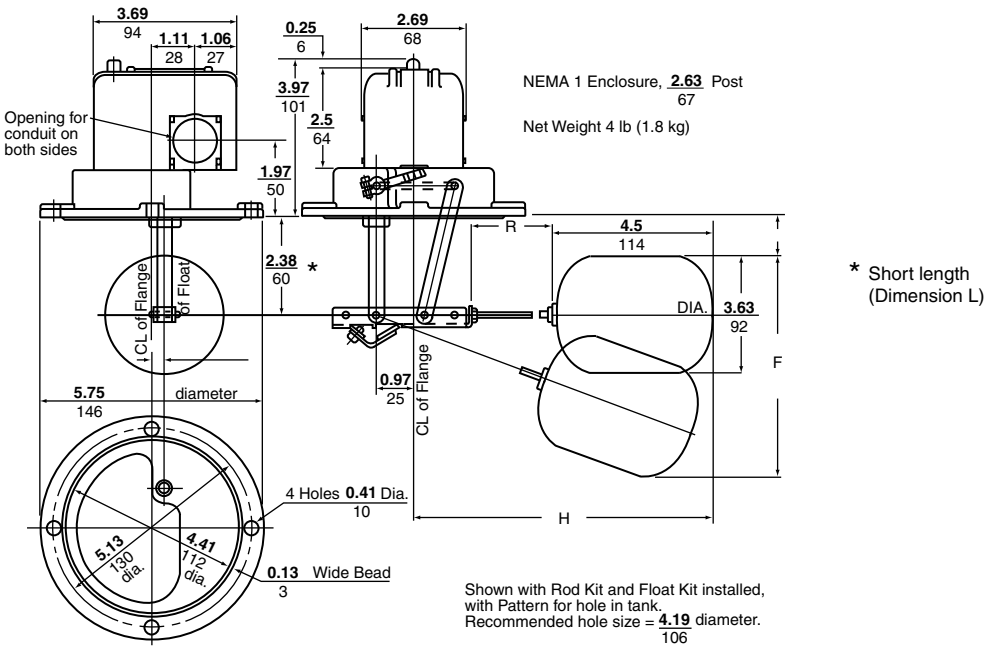
Table 22.74: Class 9049 Float Rod Kits

Type	A (in.)	F (in.)	R (in.)	H (in.)
ER1	1.00	4.75	1.75	8.25
ER2	1.00	4.75	2.5	9.00
ER3	1.00	4.75	3.50	9.50
ER5	1.00	4.75	5.25	11.75
ER7	1.00	5.00	7.25	13.75
ER12	1.00	5.75	12.25	18.75

File No.
E12158 and
E12443 Haz Loc

File 25490
except
Types ER8, ER9

Figure 22.15: Type EG Dimensions, in. (mm)
For 9037ER/EW dimensions and rod positions, see catalog 9034CT9701



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Type H switches are attached to the tank by means of a 2-1/2 in. screw-in bushing. An external pointer indicates the float position within the tank when the unit is mounted. Switches come complete with stainless steel float and rod. A Buna N Quad-Ring® seal is used between the float rod and sealing connector. Normal application is at atmospheric pressure, but where higher pressures are encountered, the switch will withstand tank pressures up to 50 psi at temperatures up to +220 °F. Occasional replacement of the Quad-Ring seal may be necessary.
Ambient temperature ratings: Min. -30 °C (-22 °F); Max. +105 °C (+220 °F)

Type HG35
Float on Right
90° Offset Rod

Table 22.75: Class 9037 Type H Contacts Close On Liquid Rise

Float Position (viewed from front of switch, facing indicator scale)	Float Rod Angle	Approximate Water Level Change (Field Adjustable) Min. (in.)	Max. (in.)	NEMA 1 Type	NEMA 4 Type	NEMA 7 & 9 Type
Right	45°	2	5	HG33	HW33	HR33
	90° Offset	2	5	HG35	HW35	HR35
			7	HG37	HW37	HR37
			8-1/4	HG39	HW39	HR39
			11-1/2	HG31	HW31	HR31
Left	45°	2	5	HG34	HW34	HR34
	90° Offset	2	5	HG36	HW36	HR36
			7	HG38	HW38	HR38
			8-1/4	HG30	HW30	HR30
			11-1/2	HG32	HW32	HR32

Note: For replacement floats, see Class 9049 Type H on page 22-28. Types shaded in gray are available with Form Z19; see Table 22.77.

Table 22.76: Type H Float Travel Distances

Float Rod Angle	R in. (mm)	H ▲ in. (mm)	f1 in. (mm) Minimum	f1 Maximum	f2 in. (mm) Minimum	f2 Maximum	F in. (mm) Minimum	F Maximum
45°	—	6.22 (158)	2.25 (57)	4.50 (114)	2.00 (52)	4.50 (110)	4.25 (108)	9.00 (229)
90° offset	3.00 (76)	4.25 (108)	2.75 (70)	4.25 (108)	2.25 (57)	4.25 (108)	5.00 (127)	7.50 (191)
	4.25 (108)	5.50 (140)	3.50 (89)	5.50 (140)	2.75 (70)	4.00 (102)	6.25 (159)	9.50 (241)
	5.00 (127)	6.25 (159)	3.75 (95)	6.25 (159)	3.00 (76)	4.50 (110)	6.75 (171)	10.75 (273)
	7.00 (178)	8.25 (210)	4.75 (121)	8.25 (210)	3.75 (95)	5.75 (146)	8.50 (216)	14.00 (356)

▲ Clearance from the centerline of the hub to the side of the tank.

File No.
E12158 and
E12443 Haz Loc

File LR25490

File LR26817
Haz Loc

Table 22.77: Available Modifications For Class 9037 Type H

Description	Form
Omit 2-1/2" tank connecting bushing	F3
Omit float	L
Reverse action, contacts open on rise	R
Viton® packing: 5 oz. float (diesel fuel) for Types shaded in gray in Table 22.75 above.	Z19
Viton packing (suitable for applications up to +250 °F)	Z20
#316 stainless steel float and Viton packing	Z21

Figure 22.16: Type HG—45° Angle Dimensions

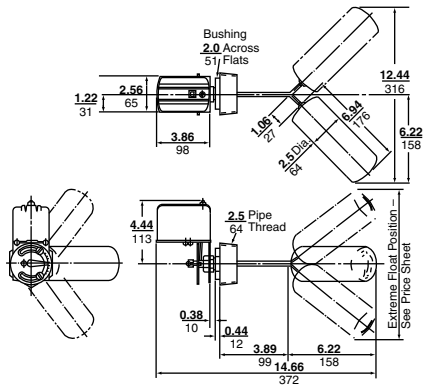


Figure 22.17: Type HG—90° Offset Dimensions

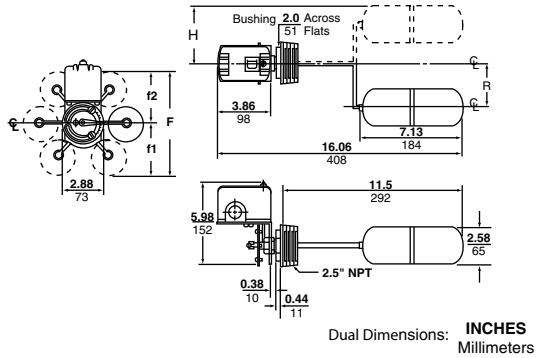


Figure 22.18: Type HR/HW—45° Angle Dimensions

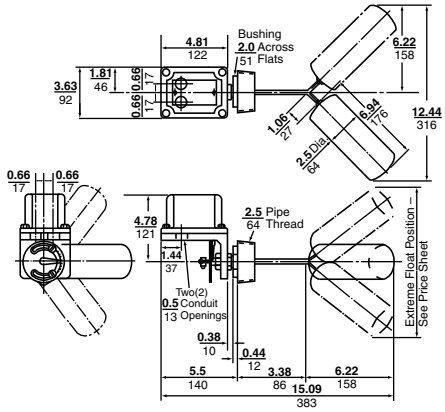
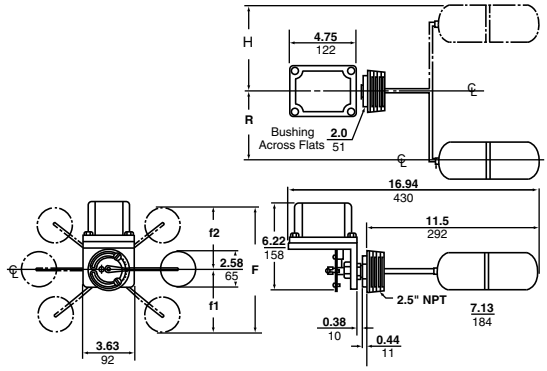


Figure 22.19: Type HR/HW—90° Offset Dimensions



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Type AG1
Mechanical Alternator, Float Operated

Type A, Open Tank

Alternators are designed to provide motor alternation in the operation of two motors.

Table 22.78: Class 9038 Type A

Application	Description	NEMA 1 Type	NEMA 4 Type	NEMA 7 and 9 Type
For open tank or sump systems using duplex pumps	Mechanical alternator float operated	AG1	AW1	AR1

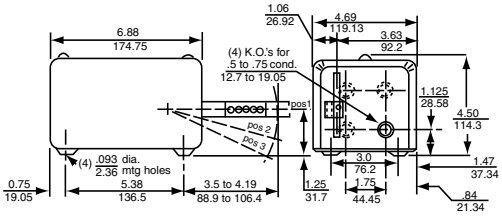
Note: For use with Class 9049 float accessories listed on page 22-28.
Type AW and AR alternators **must** use center hole floats.

Table 22.79: Operating Forces—Types AG, AR and AW

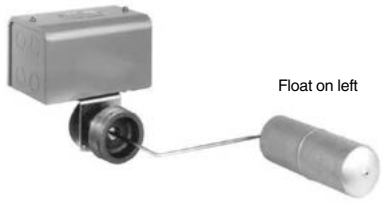
Type	Without Compensating Spring (No Form C)		With Compensating Spring (Form C)			
			Maximum Weight of Rod and Stops Supported	Length of Rod Supported at the Maximum Adjustment		
	Force Up ■	Force Down	Note: AW1 and AR1 have compensating spring standard.	Brass ▲	Stainless Steel ▲	Aluminum ▲
AG1 (min. lever ext.)	18 oz	20 oz	47 oz.	10 ft	12 ft	25 ft
AG1 (max. lever ext.)	16	17	41	8	10	21
AG1 Form R (min. lever ext.)	14	16	33	7	8	17
AG1 Form R (max. lever ext.)	11	12	30	6	7	15
AR1, AW1 (standard lever)	—	—	74	16	20	41
AR1, Form R, AW1 Form R (std. lever)	—	—	85	19	23	47

▲ Rod length has been determined using the weight of the rod material furnished on Class 9049 accessories (3/8" O.D. tubing).
Other types of rod should be weighed and compared to the Maximum Weight of Rod column in Table 22.79.
■ Add 2 oz for Form N5 High Water alarm.

Figure 22.20: Type A Dimensions, in. (mm)



Front



Type CG36

File No. E12158
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

File LR25490
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

Type C, Closed Tank, with Bushing

Flange mounted with bushing for control of liquid level within a closed tank. Build up the switch to meet your requirements from the basic switch, rod kit, and float kit groups below.

Type C switches are attached to the tank by means of a 2-1/2 in. screw-in bushing. An external pointer indicates the float position within the tank when the unit is mounted. Switches come complete with screw-in connector, stainless steel float and rod.

Table 22.80: Class 9038 Type C

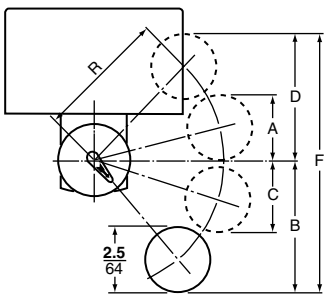
Float Position Viewed from Front of Switch Facing Indicator Scale	R in. (mm)	Approx. Water Level Change		NEMA Type 1	NEMA Type 4	NEMA Type 7, 9
		Min. (in.)	Max. (in.)	Type	Type	Type
Right	7 (178)	6.5 (165)	13 (330)	CG31	CW31	CR31
Left	7 (178)	6.5 (165)	13 (330)	CG32	CW32	CR32
Right	4.25 (108)	4 (102)	7.75 (197)	CG33	CW33	CR33
Left	4.25 (108)	4 (102)	7.75 (197)	CG34	—	CR34
Right	5 (127)	4.75 (121)	9.25 (235)	CG35	—	—
Left	5 (127)	4.75 (121)	9.25 (235)	CG36	CW36	CR36

Table 22.81: Type C Float Travel Adjustments

R in. (mm)	A in. (mm)		B in. (mm)		C in. (mm)		D in. (mm)		F in. (mm)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
7 (178) ♦	2.5 (64)	5 (127)	5 (127)	7 (178)	2 (51)	4 (102)	5 (152)	7 (178)	10 (254)	14 (495)
5 (127) ■	2.25 (57)	3.75 (95)	4 (102)	5.25 (133)	2.75 (70)	3 (76)	4 (102)	5.25 (133)	8 (203)	10.5 (267)
4.25 (108) ▲	2 (51)	3.5 (89)	3.5 (89)	4.75 (121)	2.5 (64)	3.75 (95)	3.5 (89)	4.75 (121)	7 (178)	9.5 (241)

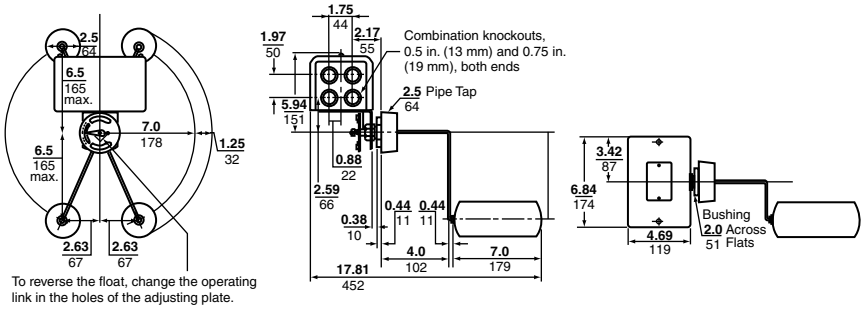
▲ CG33, CG34, CW33, CW34, CR33, CR34
■ CG35, CG36, CW35, CW36, CR35, CR36
♦ CG31, CG32, CW31, CW32, CR31, CR32

Figure 22.21: Travel Dimensions



Replacement Float:
9049HF . . . . . page 22-28

Figure 22.22: Type CG Dimensions



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Type DG Shown with Rod Kit 9049ER5 and Float Kit 9049HF3 Installed.

File No. E12158
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

File LR25490
excludes NEMA 7 & 9 products
(9038AR, CR, and DR)

Type D, Closed Tank, Top Mounted

Designed for applications where mounting is to be made at the top of a closed tank.

Table 22.82: Class 9038 Type D Contacts Close On Liquid Rise

Water Level Change	Hinge Post Dimension "V" (in.)	NEMA 1 Type	NEMA 4 Type	NEMA 7 and 9 Type
Min.	2-5/8	DG7	DW7	—
Max.		DG8	DW8	DR8
Min.	4-11/16	DG9	—	—
Max.		DG10	—	—

Table 22.83: Float Kits, For Use with Type D Switches

Size and Material Diameter x Length (in.)	Class and Type
3.625 x 4.50, #304 stainless steel	9049EF1
3.625 x 4.50, #316 stainless steel	9049EF2
2.50 x 7, #304 stainless steel	9049HF3
2.50 x 7, #316 stainless steel	9049HF4

Table 22.84: Float Rod Kit, Class 9049

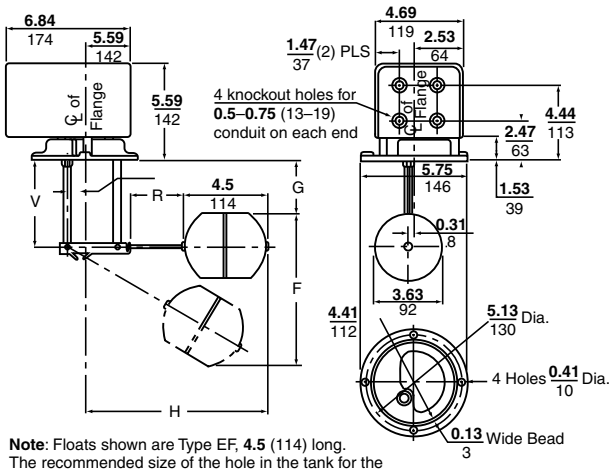
Type	R (in.)	H (in.)	G (in.)	F (in.)
ER1	1.75	8.25	3.25	8.75
ER2	2.50	9.00	3.50	10.50
ER3	3.25	9.50	3.50	11.00
ER5	5.25	11.75	3.75	12.75
ER7	7.25	13.75	4.00	14.50
ER12	12.25	18.75	4.75	19.00

Table 22.85: Available Modifications for All Mechanical Alternators

Consult Schneider Electric for use in media with a different specific gravity than water.

Description	Form
Compensating spring (Type AG)	C
Omit 2-1/2 in. connecting bushing (Type CG, CR, CW)	F3
Omit float (Type CG, CR, CW)	L
Two-level non-alternating unit	N4
Addition of a third, high-water alarm circuit (Type AG, AR, AW, CG, DG only)	N5
High-water alarm circuit, 2-pole (Type CG only)	N25
Reverse action (contacts open on Rise)	R
Viton® packing, 5 oz. float (diesel fuel) (Type CG)	Z19
Viton packing (Type CG, CR, CW)	Z20
#316 stainless steel float and Viton packing (Type CG, CR, CW)	Z21

Figure 22.23: Type DG Dimensions, in. (mm)



Note: Floats shown are Type EF, **4.5** (114) long.
The recommended size of the hole in the tank for the entry of the float and the mounting of the control is **4.19** (106).
Add **2.5** (64) to "H" if using Type HF Floats, which are **7.0** (178) long.

Table 22.86: Temperature Ratings for Class 9038

Description		Rating
Ambient Temperature		-22 to 200 °F (-30 to 93 °C)
Media	Buna-N Seal	Up to 215 °F (102 °C)
	Viton® Seal	Up to 250 °F (121 °C

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Accessories for Float Switches

To order, specify the Class and Type number of the kit.

Table 22.87: Class 9049 Accessories for Float Switches

Description			Applies to Class	Type
Compensating Spring			9036GG	A13
			9038AG	A15
			9036DR, DW	A20
Float	Dia. 3.62 in. (92 mm), length 4.5 in. (114 mm)	#304 stainless steel	9037E, 9038D	EF1
		#316 stainless steel	9037E, 9038D	EF2
	Dia. 2.5 in. (64 mm), length 7 in. (178 mm)	#304 stainless steel	9037H, 9038C	HF3
		#316 stainless steel	9037H, 9038C	HF4
Float Kit	7 in. tapped-at-top #304 stainless steel float, 5 ft rod, 2 stops	Brass rod	All 9036, 9038A	A6
		Aluminum rod	All 9036, 9038A	A6A
	7 in. center-hole #304 stainless steel float, 5 ft rod, 4 stops	Brass rod	All 9036, 9038A	A6C
		Aluminum rod	All 9036, 9038A	A6CA
	7 in. center-hole #316 stainless steel float, 5 ft stainless steel rod, 4 stainless steel stops		All 9036, 9038A	A6CS
	7 in. tapped-at-top #316 stainless steel float, 5 ft stainless steel rod, 2 stainless steel stops		All 9036, 9038A	A6S
	Replacement float—7 in. round center-hole #304 stainless steel		9049A6C, A6CA	AF1
Lever	Form R		9036DG	A58
Mounting Bracket	Replacing obsolete 9036A with 9036G		9036GG	A54
	Replacing 9036A (S or F1) with 9036G		9036GG	A55
	Universal		All 9036, 9038AG, AR, AW	UMS1
Rod	Stainless steel	1-3/4 in. long	9037E, 9038D	ER1
		2-1/2 in. long	9037E, 9038D	ER2
		3-1/4 in. long	9037E, 9038D	ER3
		5-1/4 in. long	9037E, 9038D	ER5
		7-1/4 in. long	9037E, 9038D	ER7
		12-1/4 in. long	9037E, 9038D	ER12
Rod Kit	Additional 2-1/2 ft section with connector	Brass rod	9049A6, A6C	T1
		Aluminum rod	9049A6A, A6CA	T1A
		Stainless steel rod	9049A6S, A6CS	T1S

Renewal Parts for Class 9012–9038 Devices

Renewal parts are generally available for Pump Control Products with a numerical date code—for example, 172 (first quarter, 1972)—or a current date code. Parts are no longer available for devices manufactured before 1965.

To order, specify the Class and Type number of the kit.

Table 22.88: Class 9998 Renewal Parts Kits for Class 9012–9038 Devices

Description / Equipment To Be Serviced9thl		Parts Kit Type
Actuator Assembly	9012GA, GD, GG, GK, GN, GR 5, 25, 55 Series C only	PC268▲
	9012GA, GD, GG, GK, GN, GR 6, 26, 36, 46, 56 Series C only	PC269▲
	9012GB, GE, GH1, 21, 31, 41, 51; GL, GP, GS1	PC177▲
	9012GB, GE, GH2, 22, 32, 42, 52; GL, GP, GS2	PC178▲
Contact Kit (2-Pole Contacts)	9013FHG22, 29, 32, 39, 52, 59; 9013 FYG; 9036DG, DR, DW; 9037EG, ER, EW, HG, HR, HW30–39; 9038 All Types (2 Kits Required); obsolete 9013HHGY, HSGY; HSWY; 9037HEG, HSG3, 4; 9035DG10, DW10 (This kit also contains a replacement diaphragm for pressure switches. The diaphragm fits pressure switch only.)	PC242
	9013GHG, GSG, GHR, GSR, GMG; 9036GG, GR, GW; 9037GG Series C All except Forms H & R; 9016GVG, Form R	PC205
	9013GHG, GSG, GSR, GMG; 9036GG, GR, GW; 9037GG, GR, GW Series C Form H only; 9016GVG, Form H	PC206
	9013GHG, GSG, GHR, GSR, GMG; 9036GR, GW: Series C Form R only; 9016GVG	PC207
Contact Replacement Kit	9013FHG2 thru 19, 42 thru 49, all FSG Complete contact replacement kit—includes new diaphragm	PC241
Diaphragm Assembly	9012GA, GD, GN, GR1, 21 Series C only	PC265▲
	9012GA, GD, GG, GK, GN, GR 2, 3, 22, 52 Series C only	PC266▲
	9012GA, GD, GG, GK, GN, GR4, 24, 54 Series C only	PC267▲
	Convoluted diaphragm assembly for 9013GHG, GSG: Series C	PC208
	9013GHW, GSW; and GSW, GHR: Series C	PC211
	9016 GAW-1, 21	PC233
Gasket Kit	Contains all replaceable gaskets for all 9012 open, NEMA 1, 4, 4X, 13 devices	PC184
Pilot Light, 24 Vdc	9012, 9016G Forms G7, G8, G9, G10, G21, G22	PC305
Piston Assembly	9012GC, GF, GJ, GQ, GT1, 21, 31, 41, 51 Series C only	PC270▲
	9012GC, GF, GJ, GQ, GT2, 22, 32, 42, 52 Series C only	PC271▲
	9012GC, GF, GQ, GT4, 24, 34, 44, 54 Series C only	PC273▲
Seal Kit	Buna N, for Series A devices: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36	PC337
	Viton®, for Series A devices with Form Z19 or Z20: 9037HG/HW/HR30–39; 9038CG/CW/CR31–36	PC338
Seal Tube Kit	Buna N Quad-Ring®, for Series C devices: 9037HG/HW/HR3–12; 9038CG/CW/CR1–6	PC282
	Viton Quad-Ring, for Series C devices: 9 037HG/HW/HR3–12; 9038CG/CW/CR1–6	PC333
Snap Switch	SPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ single pole; except Forms E2, E3, E4, H3: Series C only	PC313▲
	DPDT, for 9012GA, GB, GC, GD, GE, GF, GG, GH, GJ double pole; except Forms E2, E3, H6, H7: Series C only	PC314▲
Switch Mechanism	9036DR1, DW1 Series B	PC285

▲ If one of these **Form** designations appears on the pressure switch nameplate, complete the 9998 PC number by adding that same **Form suffix** from page 22-18, and add the Form price to the kit price.

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Section 23

Relays and Timers

RXM, p. 23-8

RSL, p. 23-2 /**RSB**, p. 23-3

SSR, p. 23-25

8501X, p. 23-22

CAD32, p. 23-16

9050JCK, p. 23-30

RE7, p. 23-28

ABL8, p. 23-37

REG24, REG48, REG96
p. 23-31

CA2SKE, p. 23-21

SR2, SR3, p. 23-39

RM17, RM35 p. 23-32

General Purpose Relays

Zelio™ Interface Relays	RSL, RSB	**23-2**
Zelio™ Plug-in Relays, Sockets & Access.	RXM, RPM, RUM, RPF	**23-4**
Square D™ Plug-in	Class 8501 Type K	**23-10**
Square D™ Alternating Plug-in	Class 8501 Type KA	**23-11**
Square D™ Miniature Plug-in	Class 8501 Type R	**23-12**
Square D™ Sockets	Class 8501 Type N	**23-14**
Square D™ Power	Class 8501 Type C	**23-15**

Industrial Relays

TeSys™ IEC Style Relays	TeSys D	**23-16**
	TeSys K	**23-19**
	TeSys SK	**23-21**
TeSys™ IEC Style - Alternating Relays	CA2SKE	**23-21**
Square D™ NEMA Style Relays	Class 8501 Type X™	**23-22**

Solid State Relays

Panel Mount	SSRP	**23-25**
DIN Mount	SSRD	**23-25**
SSR Accessories	SSRAH1, SSRAT1	**23-25**

Timers

Zelio™ IEC Style—17.9 mm	RE11	**23-26**
Zelio™ Panel Mounting	RE48	**23-26**
Zelio™ Miniature Plug-in	REXL	**23-26**
Zelio™ IEC Style—22.5 mm	RE7, RE8, and RE9	**23-27**
Square D™ General Purpose Plug-in	Class 9050 Type JCK	**23-30**

Control and Measurement Relays

Zelio™ Temperature Controllers—24x48	REG24	**23-31**
Zelio™ Temperature Controllers—48x48	REG48	**23-31**
Zelio™ Temperature Controllers—48x96	REG96	**23-31**
Zelio™Current Measurement Relays	RM17JC andRM35JA	**23-32**
Zelio™ Phase Measurement Relays	RM17T and RM35T	**23-33**
Zelio™ Voltage Measurement Relays	RM17U and RM35U	**23-34**
Zelio™ Level Control Relays	RM35L	**23-35**
Zelio™ Pump Control Relays	RM35BA	**23-35**
Zelio™ Speed Control Relays	RM35S	**23-36**
Zelio™ Frequency Control Relays	RM35HZ	**23-36**
Zelio™ Temperature Control Relays	RM35AT	**23-36**

Other Products

Phaseo™ DC Power Supplies	ABL1, ABL7, and ABL8	**23-37**
Zelio™ Analog Interface Modules	RM	**23-38**
Zelio™ Logic 2 Smart Relays	SR2, SR3	**23-39**
Zelio™ Solid-State Interface Modules	ABS	**23-41**
Zelio™ Electromechanical Interface	ABR	**23-42**

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RSL 1PV••

RSL 1PR••

Zelio™ Interface Relays

Zelio RSL slim interface relays save valuable panel space with a 6 mm width and have a 6 Amp general purpose load rating. Features include:

- Pre-assembled option: relay and socket are combined into one catalog number.
- Universal AC/DC sockets have built-in protection from transients and reverse polarity voltages (see catalog DIA3ED2090304EN-US for more detailed information).
- Accessories, which include isolators, ID tags, and bus jumper save valuable installation time.

Table 23.1: Zelio RSL Slim Interface: Pre-assembled Relay + Socket (sold in lots of 10)

Socket Supply Voltage (Vac/Vdc)	Socket Type				Replacement Relays
	Screw Connector		Spring Terminal		
	Catalog Number▲	$ Price ea.	Catalog Number▲	$ Price ea.	Catalog No.
12	RSL1PVJU	**12.00**	RSL1PRJU	**12.00**	RSL1AB4JD
24	RSL1PVBU	**14.60**	RSL1PRBU	**15.70**	RSL1AB4BD
48	RSL1PVEU	**14.90**	RSL1PREU	**16.10**	RSL1AB4ED
110	RSL1PVFU	**14.90**	RSL1PRFU	**16.10**	RSL1AB4ND
230	RSL1PVPU	**14.90**	RSL1PRPU	**16.10**	RSL1AB4ND

▲ Relays are mounted on sockets equipped with LED and protection circuit.

RSL 1AB••

Table 23.2: Zelio RSL Slim Interface: Relay Only (sold in lots of 10)

Relay Coil Voltage (Vdc)	Catalog Number	$ Price ea.
12	RSL1AB4JD	**6.20**
24	RSL1AB4BD	**7.70**
48	RSL1AB4ED	**7.90**
60	RSL1AB4ND	**7.90**

RSL ZVA•

RSL ZRA•

Table 23.3: Zelio RSL Slim Interface: Socket Only (sold in lots of 10)

Socket Supply Voltage (Vac/Vdc)	Socket Type				For use with relays:
	Screw Connector		Spring Terminal		
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	
12	RSLZVA1	**7.20**	RSLZRA1	**8.30**	RSL1AB4JD
24					RSL1AB4BD
48	RSLZVA2	**7.20**	RSLZRA2	**8.30**	RSL1AB4ED
60					RSL1AB4ND
110	RSLZVA3	**7.40**	RSLZRA3	**8.60**	RSL1AB4ND
230	RSLZVA4	**7.40**	RSLZRA4	**8.60**	RSL1AB4ND

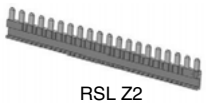
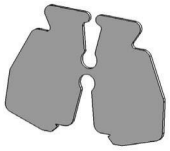

RSL Z2

Table 23.4: Socket Accessories

Description	Compatibility	Catalog Number	$ Price ea.
ID tags (2 sheets of 64 tags)	With all sockets	RSLZ5	**4.60**
Bus jumper (10 x 20-pole jumpers)	With all sockets	RSLZ2	**3.80**
Butterfly isolator (10 isolators)	With all sockets	RSLZ3	**3.70**


RSL Z3

Approvals for RSL relays:

c UL us File CCN E173076 NRNT2, NRNT8 — CSA File Class 240278 3211 04 — CE IEC 61810-1 — RoHS Compliant

Approvals for RSLZ sockets:

c UL us File CCN E172326S SWIV2 SWIV8 — CSA File Class 247510 3211 07 — CE IEC 61810-1 — RoHS Compliant

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RSB1A120JD Relay
+ RZM031FPD Socket
+ RSZE1S35M Module

RSB2A080BD Relay
+ RSZE1S48M Socket

RSB1A160BD Relay
+ RSZE1S48M Socket

Zelio™ Plug-In Interface Relays

Zelio RSB interface relays and sockets provide the optimum combination of robust performance and space saving for the most demanding applications. Relays are rated at 8 A, 12 A, and 16 A (250 Vac / 28 Vdc). Features include:

- Optional protection modules for protection against electrical spikes
- Optional plastic hold-down ejector clips
- Socket or printed circuit board installation options

Table 23.5: Relays (sold in lots of 10)

Coil Voltage	Number and type of contacts - Thermal current (Ith)					
	1 C/O -12 A Res.		1 C/O -16 A Res.		2 C/O -8 A Res.	
	Catalog Number▲	$ Price ea.	Catalog Number▲	$ Price ea.	Catalog Number▲	$ Price ea.
6 Vdc	RSB1A120RD	**3.50**	RSB1A160RD	**4.20**	RSB2A080RD	**4.20**
12 Vdc	RSB1A120JD	**3.50**	RSB1A160JD	**4.20**	RSB2A080JD	**4.20**
24 Vdc	RSB1A120BD	**3.50**	RSB1A160BD	**4.20**	RSB2A080BD	**4.20**
48 Vdc	RSB1A120ED	**3.50**	RSB1A160ED	**4.20**	RSB2A080ED	**4.20**
60 Vdc	RSB1A120ND	**3.50**	RSB1A160ND	**4.20**	RSB2A080ND	**4.20**
110 Vdc	RSB1A120FD	**3.50**	RSB1A160FD	**4.20**	RSB2A080FD	**4.20**
24 Vac	RSB1A120B7	**3.50**	RSB1A160B7	**4.20**	RSB2A080B7	**4.20**
48 Vac	RSB1A120E7	**3.50**	RSB1A160E7	**4.20**	RSB2A080E7	**4.20**
120 Vac	RSB1A120F7	**3.50**	RSB1A160F7	**4.20**	RSB2A080F7	**4.20**
220 Vac	RSB1A120M7	**3.50**	RSB1A160M7	**4.20**	RSB2A080M7	**4.20**
230 Vac	RSB1A120P7	**3.50**	RSB1A160P7	**4.20**	RSB2A080P7	**4.20**
240 Vac	RSB1A120U7	**3.50**	RSB1A160U7	**4.20**	RSB2A080U7	**4.20**

▲ To order a relay complete with socket (sold in lots of 20): add suffix S to the catalog numbers selected above.
Example: RSB 2A080RD + RSZ E1S48M becomes RSB 2A080RDS.

Table 23.6: Sockets – 12 A, 300 Vac
(sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Separate	Box lug connector	RSB1A120••	RSZE1S35M	**4.80**
		RSB1A160••■ RSB2A080••	RSZE1S48M	**5.30**

■ When using the relay with socket RSZ E1S48M, terminals must be jumpered.

Table 23.7: Protection modules (sold in lots of 10)

Description	For use with	Voltage	Catalog Number	$ Price ea.
Diode	All sockets	6–230 Vdc	RZM040W	**2.40**
RC circuit	All sockets	24–60 Vac	RZM041BN7	**4.80**
		110–240 Vac	RZM041FU7	**4.80**
Diode + green LED	All sockets	6–24 Vdc	RZM031RB	**4.20**
		24–60 Vdc	RZM031BN	**4.20**
		110–230 Vdc	RZM031FPD	**6.00**
Varistor + green LED	All sockets	6–24 Vac/Vdc	RZM021RB	**6.00**
		24–60 Vac/Vdc	RZM021BN	**6.00**
		110–230 Vac/Vdc	RZM021FP	**6.00**

Table 23.8: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Plastic hold-down ejector clip	All sockets	RSZR215	**.42**
ID tags	All sockets	RSZL300	**.30**

Approvals for RSB relays:

c UL us File CCN E173076 NRNT2, NRNT8 — CSA File Class 215736 3211 07 — CE — IEC 61810-1 — RoHS Compliant as of date code 0401

Approvals for RSB sockets:

c UL us File CCN SWIV2 E172326 — CSA File Class 212916 3211 07 — CE — IEC 61984 — RoHS Compliant as of date code 0501

RZM modules are RoHS compliant as of date code 0610.

For mounting track, see page 24-16.

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Zelio™ Plug-In Relays

Zelio RXM miniature plug-in relays and sockets provide a complete system solution in response to the most demanding applications ranging from 3A to 12A. Some of the features include:

- Test button with removable lock-down door for testing the contacts (depending on model)
- Green LED indication of relay status (depending on model)
- Mechanical indication of relay status (standard)
- Optional protection modules to protect against electrical spikes
- Bus jumpers for connecting multiple terminals reduce installation time

Table 23.9: Miniature relays without LED, with Test Button and Lock-Down Door (sold in lots of 10)

Coil Voltage	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RXM2AB1JD	5.30	RXM3AB1JD	5.70	RXM4AB1JD	6.00
24 Vdc	RXM2AB1BD	5.30	RXM3AB1BD	5.70	RXM4AB1BD	6.00
48 Vdc	RXM2AB1ED	5.30	RXM3AB1ED	5.70	RXM4AB1ED	6.00
110 Vdc	RXM2AB1FD	5.30	RXM3AB1FD	5.70	RXM4AB1FD	6.00
220 Vdc	—	—	—	—	RXM4AB1MD	6.00
24 Vac	RXM2AB1B7	5.30	RXM3AB1B7	5.70	RXM4AB1B7	6.00
48 Vac	RXM2AB1E7	5.30	RXM3AB1E7	5.70	RXM4AB1E7	6.00
120 Vac	RXM2AB1F7	5.30	RXM3AB1F7	5.70	RXM4AB1F7	6.00
230 Vac	RXM2AB1P7	5.30	RXM3AB1P7	5.70	RXM4AB1P7	6.00
240 Vac	—	—	—	—	RXM4AB1U7	6.00

RXM2AB2F7

Table 23.10: Miniature relays with LED, Test Button, and Lock-Down Door (sold in lots of 10)

Coil Voltage	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RXM2AB2JD	6.20	RXM3AB2JD	6.60	RXM4AB2JD	6.80
24 Vdc	RXM2AB2BD	6.20	RXM3AB2BD	6.60	RXM4AB2BD	6.80
48 Vdc	RXM2AB2ED	6.20	RXM3AB2ED	6.60	RXM4AB2ED	6.80
110 Vdc	RXM2AB2FD	6.20	RXM3AB2FD	6.60	RXM4AB2FD	6.80
125 Vdc	—	—	—	—	RXM4AB2GD	6.80
24 Vac	RXM2AB2B7	6.20	RXM3AB2B7	6.60	RXM4AB2B7	6.80
48 Vac	RXM2AB2E7	6.20	RXM3AB2E7	6.60	RXM4AB2E7	6.80
120 Vac	RXM2AB2F7	6.20	RXM3AB2F7	6.60	RXM4AB2F7	6.80
230 Vac	RXM2AB2P7	6.20	RXM3AB2P7	6.60	RXM4AB2P7	6.80

Table 23.11: Miniature relays with LED, without Test Button and Lock-Down Door (sold in lots of 10)

Coil Voltage	Number and type of contacts - Thermal current (Ith)					
	2 C/O -12 A Res.		3 C/O - 10 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RXM2AB3JD	5.70	—	—	RXM4AB3JD	6.30
24 Vdc	RXM2AB3BD	5.70	—	—	RXM4AB3BD	6.30
48 Vdc	RXM2AB3ED	5.70	—	—	RXM4AB3ED	6.30
110 Vdc	RXM2AB3FD	5.70	—	—	RXM4AB3FD	6.30
125 Vdc	—	—	—	—	RXM4AB3GD	6.30
24 Vac	RXM2AB3B7	5.70	—	—	RXM4AB3B7	6.30
48 Vac	RXM2AB3E7	5.70	—	—	RXM4AB3E7	6.30
120 Vac	RXM2AB3F7	5.70	—	—	RXM4AB3F7	6.30
230 Vac	RXM2AB3P7	5.70	—	—	RXM4AB3P7	6.30

Table 23.12: Miniature relays with low level contacts, without LED, with Test Button and Lock-Down Door (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	Catalog Number	$ Price ea.
12 Vdc	RXM4GB1JD	6.00
24 Vdc	RXM4GB1BD	6.00
48 Vdc	RXM4GB1ED	6.00
110 Vdc	RXM4GB1FD	6.00
24 Vac	RXM4GB1B7	6.00
48 Vac	RXM4GB1E7	6.00
120 Vac	RXM4GB1F7	6.00
230 Vac	RXM4GB1P7	6.00

RXM4GB2F7

Table 23.13: Miniature relays with low level contacts, with LED, Test Button and Lock-Down Door (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	Catalog Number	$ Price ea.
12 Vdc	RXM4GB2JD	6.80
24 Vdc	RXM4GB2BD	6.80
48 Vdc	RXM4GB2ED	6.80
110 Vdc	RXM4GB2FD	6.80
24 Vac	RXM4GB2B7	6.80
48 Vac	RXM4GB2E7	6.80
120 Vac	RXM4GB2F7	6.80
230 Vac	RXM4GB2P7	6.80
240 Vac	RXM4GB2U7	6.80

Table 23.14: Miniature relays with low level contacts, with LED, without Test Button and Lock-Down Door (sold in lots of 10)

Number and type of contacts - Thermal current (Ith)		
4 C/O -3 A Res.		
Coil Voltage	Catalog Number	$ Price ea.
12 Vdc	RXM4GB3JD	6.30
24 Vdc	RXM4GB3BD	6.30
48 Vdc	RXM4GB3ED	6.30
110 Vdc	RXM4GB3FD	6.30
125 Vdc	—	—
24 Vac	RXM4GB3B7	6.30
48 Vac	RXM4GB3E7	6.30
120 Vac	RXM4GB3F7	6.30
230 Vac	RXM4GB3P7	6.30

For sockets and accessories, see page 23-5.

Approvals for Relays:

c UL us LISTED File CCN ▲ E164862 NLDX, NLDX7

c UL us File CCN E164862 NLDX2, NLDX8

SP® File 230765 Class 3211 07

CE IEC 61810-1 RoHS Compliant

▲ When used with the appropriate socket.

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RXZE2M114M Socket + RXM4AB2P7 Relay

Table 23.15: Miniature relays (sold in lots of 100)

Coil Voltage	Number and type of contacts - Thermal current (Ith)			
	2 C/O - 12 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
Without LED, with Test Button, and Lock-Down Door				
12 Vdc	—	—	RXM4AB1JDTQ	**6.00**
24 Vdc	RXM2AB1BDTQ	**5.30**	RXM4AB1BDTQ	**6.00**
48 Vdc	—	—	RXM4AB1EDTQ	**6.00**
110 Vdc	—	—	RXM4AB1FDTQ	**6.00**
220 Vdc	—	—	RXM4AB1MDTQ	**6.00**
24 Vac	RXM2AB1B7TQ	**5.30**	RXM4AB1B7TQ	**6.00**
48 Vac	—	—	RXM4AB1E7TQ	**6.00**
120 Vac	RXM2AB1F7TQ	**5.30**	RXM4AB1F7TQ	**6.00**
230 Vac	RXM2AB1P7TQ	**5.30**	RXM4AB1P7TQ	**6.00**
With LED, Test Button, and Lock-Down Door				
24 Vdc	—	—	RXM4AB2BDTQ	**6.80**
24 Vac	RXM2AB2B7TQ	**6.20**	RXM4AB2B7TQ	**6.80**
230 Vac	RXM2AB2P7TQ	**6.20**	RXM4AB2P7TQ	**6.80**

Table 23.16: Miniature relays with LED without Test Button and Lock-Down Door (sold in lots of 100)

Coil Voltage	Number and type of contacts - Thermal current (Ith)			
	2 C/O - 12 A Res.		4 C/O - 8 A Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
24 Vdc	RXM2AB3BDTQ	**5.70**	RXM4AB3BDTQ	**6.30**
24 Vac	RXM2AB3B7TQ	**5.70**	RXM4AB3B7TQ	**6.30**
230 Vac	RXM2AB3P7TQ	**5.70**	RXM4AB3P7TQ	**6.30**

RXZE2S114M Socket + RXM4AB2F7 Relay

Table 23.17: Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Mixed	Screw clamp terminals	RXM2•••••▲ RXM4•••••▲	RXZE2M114■	**5.00**
	Box lug connector	RXM2••••• RXM4•••••	RXZE2M114M■	**5.00**
Separate	Box lug connector	RXM2•••••	RXZE2S108M♦	**5.00**
		RXM3•••••	RXZE2S111M■	**5.00**
		RXM4•••••	RXZE2S114M■	**5.00**

▲ When mounting relay RXM2••••• on socket RXZE2M••••, the thermal current must not exceed 10 A.
■ Thermal current Ith: 10 A
♦ Thermal current Ith: 12 A

Table 23.18: Protection modules (sold in lots of 10)

Description	Voltage	For use with	Catalog Number	$ Price ea.
Diode	6–250 Vdc	All sockets	RXM040W	**1.90**
RC circuit	24–60 Vac	All sockets	RXM041BN7	**1.90**
	110–240 Vac	All sockets	RXM041FU7	**1.90**
Varistor	6–24 Vac/Vdc	All sockets	RXM021RB	**1.90**
	24–60 Vac/Vdc	All sockets	RXM021BN	**1.90**
	110–240 Vac/Vdc	All sockets	RXM021FP	**1.90**

RXM041BN7

Table 23.19: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Metal hold-down clip	All sockets	RXZ400	**.50**
Plastic hold-down ejector clip	All sockets	RXZR335	**.50**
Bus jumper, 2-pole (Ith: 5 A)	All sockets with separate contacts	RXZS2	**.70**
DIN rail mounting adapter	All relays	RXZE2DA	**.70**
Panel mounting adapter	All relays	RXZE2FA	**.50**
ID tags	All relays (sheet of 108 tags)	RXZL520	**.10**
	All sockets except RXZE2M114	RXZL420	**.10**

RXZ400

Approvals for Sockets:

c UL us File CCN E172326 SWIV2, SWIV8 — CSA File 230765 Class 3211 07 — CE IEC 61984 — RoHS Compliant

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Zelio™ Plug-In Relays

Zelio RPM plug-in relays and sockets provide a complete system solution in response to the most demanding applications up to 15 A. Some of the features include:

- Test button with removable lock-down door for testing the contacts (depending on model)
- Green LED indication of relay status (depending on model)
- Mechanical indication of relay status (standard)
- Optional modules to protect against electrical spikes

RPM22F7

Table 23.20: Power relays without LED, with Test Button and Lock-Down Door (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM11JD	4.50	RPM21JD	6.00	RPM31JD	8.10	RPM41JD	10.00
24 Vdc	RPM11BD	4.50	RPM21BD	6.00	RPM31BD	8.10	RPM41BD	10.00
48 Vdc	RPM11ED	4.50	RPM21ED	6.00	RPM31ED	8.10	RPM41ED	10.00
110 Vdc	RPM11FD	4.50	RPM21FD	6.00	RPM31FD	8.10	RPM41FD	10.00
24 Vac	RPM11B7	4.50	RPM21B7	6.00	RPM31B7	8.10	RPM41B7	10.00
48 Vac	RPM11E7	4.50	RPM21E7	6.00	RPM31E7	8.10	RPM41E7	10.00
120 Vac	RPM11F7	4.50	RPM21F7	6.00	RPM31F7	8.10	RPM41F7	10.00
230 Vac	RPM11P7	4.50	RPM21P7	6.00	RPM31P7	8.10	RPM41P7	10.00

RPM42BD

Table 23.21: Power relays with LED, Test Button and Lock-Down Door (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM12JD	5.30	RPM22JD	6.80	RPM32JD	9.00	RPM42JD	10.90
24 Vdc	RPM12BD	5.30	RPM22BD	6.80	RPM32BD	9.00	RPM42BD	10.90
48 Vdc	RPM12ED	5.30	RPM22ED	6.80	RPM32ED	9.00	RPM42ED	10.90
110 Vdc	RPM12FD	5.30	RPM22FD	6.80	RPM32FD	9.00	RPM42FD	10.90
24 Vac	RPM12B7	5.30	RPM22B7	6.80	RPM32B7	9.00	RPM42B7	10.90
48 Vac	RPM12E7	5.30	RPM22E7	6.80	RPM32E7	9.00	RPM42E7	10.90
120 Vac	RPM12F7	5.30	RPM22F7	6.80	RPM32F7	9.00	RPM42F7	10.90
230 Vac	RPM12P7	5.30	RPM22P7	6.80	RPM32P7	9.00	RPM42P7	10.90

Table 23.22: Power relays with LED, without Test Button and Lock-Down Door (sold in lots of 10)

	Number and type of contacts - Thermal current (Ith)							
	1 C/O - 15 A Res.		2 C/O - 15 A Res.		3 C/O - 15 A Res.		4 C/O - 15 A Res.	
Coil Voltage	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPM13JD	5.00	RPM23JD	6.30	RPM33JD	8.30	RPM43JD	10.10
24 Vdc	RPM13BD	5.00	RPM23BD	6.30	RPM33BD	8.30	RPM43BD	10.10
48 Vdc	RPM13ED	5.00	RPM23ED	6.30	RPM33ED	8.30	RPM43ED	10.10
110 Vdc	RPM13FD	5.00	RPM23FD	6.30	RPM33FD	8.30	RPM43FD	10.10
125 Vdc	—	—	—	—	—	—	—	—
24 Vac	RPM13B7	5.00	RPM23B7	6.30	RPM33B7	8.30	RPM43B7	10.10
48 Vac	RPM13E7	5.00	RPM23E7	6.30	RPM33E7	8.30	RPM43E7	10.10
120 Vac	RPM13F7	5.00	RPM23F7	6.30	RPM33F7	8.30	RPM43F7	10.10
230 Vac	RPM13P7	5.00	RPM23P7	6.30	RPM33P7	8.30	RPM43P7	10.10

RPZF2 Socket + RPM22F7 Relay

Approvals for relays:

c UL us LISTED File CCN ▲ E164862 NLDX, NLDX7 — c UL us File CCN E164862 NLDX2, NLDX8 — CSA File 230765 Class 3211 07 — CE IEC 61810-1 — RoHS Compliant

▲ When used with the appropriate socket

Table 23.23: Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Mixed	Screw terminals	RPM1•••	RPZF1	4.30
		RPM2•••	RPZF2	5.50
		RPM3•••	RPZF3	6.30
		RPM4•••	RPZF4	7.30

Approvals for Sockets:

c UL us File CCN E172326 SWIV2, SWIV8 — CSA File 230765 Class 3211 07 — CE IEC 61984 — RoHS Compliant

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RXM041BN7

Table 23.24: Protection modules (sold in lots of 10)

Description	Voltage	For use with	Catalog Number	$ Price ea.
Diode	6–250 Vdc	RPZF1 RPZF2	RXM040W	**1.90**
		RPZF3 RPZF4	RUW240BD	**2.60**
RC circuit	24–60 Vac	RPZF1 RPZF2	RXM041BN7	**1.90**
	110–240 Vac	RPZF1 RPZF2	RXM041FU7	**2.20**
		RPZF3 RPZF4	RUW241P7	**2.20**
Varistor	6–24 Vac/Vdc	RPZF1 RPZF2	RXM021RB	**1.90**
	24–60 Vac/Vdc	RPZF1 RPZF2	RXM021BN	**1.90**
	110–240 Vac/Vdc	RPZF1 RPZF2	RXM021FP	**1.90**
	24 Vac/Vdc	RPZF3 RPZF4	RUW242B7	**2.70**
	240 Vac/Vdc	RPZF3 RPZF4	RUW242P7	**2.70**

Table 23.25: Timer module▲ (sold in lots of 1)

Description	Voltage	For Use With	Catalog Number	$ Price
On-delay timer, interval timer, repeat cycle timer/starting on-delay, repeat cycle timer/starting off-delay, off-delay timer, one-shot timer, timing on de-energization, on-delay timer	24–240 Vac/Vdc	RPZF3 RPZF4	RUW101MW	**47.10**

▲ See timer module description (selection of functions and time delays) in catalog **DIA3ED2090304EN-US**.

RPZ1DA

Table 23.26: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Metal hold-down clip (for single-pole relays)	RPZF1	RPZR235	**0.50**
DIN rail mounting adapter ■	RPM1•••	RPZ1DA	**0.70**
	RPM2•••	RXZE2DA	**0.70**
	RPM3•••	RPZ3DA	**0.70**
	RPM4•••	RPZ4DA	**0.70**
Panel mounting adapter	RPM1•••	RPZ1FA	**0.50**
	RPM2•••	RXZE2FA	**0.50**
	RPM3•••	RPZ3FA	**0.50**
	RPM4•••	RPZ4FA	**0.50**
ID tags (sheet of 108 tags)	All relays	RXZL520	**0.10**

■ Test button and lock-down door become inaccessible

RPZ3FA

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Zelio™ Plug-In Relays

Zelio RUM plug-in relays and sockets provide a complete system solution in response to the most demanding applications up to 16 A. Some of the features include:

- Test button with lock-down door for testing the contacts (depending on model)
- Green LED indication of relay status (depending on model)
- Mechanical indication of relay status (standard)
- Optional protection modules to protect against electrical spikes
- Bus jumpers for connecting multiple terminals reduce installation time

Table 23.27: Relays for standard applications without LED, with Test Button and Lock-Down Door
(sold in lots of 10)

Pins	Coil Voltage	Number and type of contacts - Thermal current (Ith)			
		2 C/O -16 A Res.		3 C/O -16 A Res.	
		Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
Cylindrical	12 Vdc	RUMC2AB1JD	10.10	RUMC3AB1JD	11.30
	24 Vdc	RUMC2AB1BD	10.10	RUMC3AB1BD	11.30
	48 Vdc	RUMC2AB1ED	10.10	RUMC3AB1ED	11.30
	60 Vdc	—	—	RUMC3AB1ND	11.30
	110 Vdc	RUMC2AB1FD	10.10	RUMC3AB1FD	11.30
	125 Vdc	—	—	RUMC3AB1GD	11.30
	220 Vdc	—	—	RUMC3AB1MD	11.30
	24 Vac	RUMC2AB1B7	10.10	RUMC3AB1B7	11.30
	48 Vac	RUMC2AB1E7	10.10	RUMC3AB1E7	11.30
	120 Vac	RUMC2AB1F7	10.10	RUMC3AB1F7	11.30
	230 Vac	RUMC2AB1P7	10.10	RUMC3AB1P7	11.30
Flat	12 Vdc	RUMF2AB1JD	10.10	RUMF3AB1JD	11.30
	24 Vdc	RUMF2AB1BD	10.10	RUMF3AB1BD	11.30
	48 Vdc	RUMF2AB1ED	10.10	RUMF3AB1ED	11.30
	110 Vdc	RUMF2AB1FD	10.10	RUMF3AB1FD	11.30
	24 Vac	RUMF2AB1B7	10.10	RUMF3AB1B7	11.30
	48 Vac	RUMF2AB1E7	10.10	RUMF3AB1E7	11.30
	120 Vac	RUMF2AB1F7	10.10	RUMF3AB1F7	11.30
	230 Vac	RUMF2AB1P7	10.10	RUMF3AB1P7	11.30

RUMF3AB2P7
Universal Relay

Table 23.28: Relays for standard applications, with LED, Test Button, and Lock-Down Door
(sold in lots of 10)

Pins	Coil Voltage	Number and type of contacts - Thermal current (Ith)			
		2 C/O -16 A Res.		3 C/O -16 A Res.	
		Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
Cylindrical	12 Vdc	RUMC2AB2JD	11.30	RUMC3AB2JD	12.50
	24 Vdc	RUMC2AB2BD	11.30	RUMC3AB2BD	12.50
	48 Vdc	RUMC2AB2ED	11.30	RUMC3AB2ED	12.50
	60 Vdc	—	—	RUMC3AB2ND	12.50
	110 Vdc	RUMC2AB2FD	11.30	RUMC3AB2FD	12.50
	125 Vdc	—	—	RUMC3AB2GD	12.50
	24 Vac	RUMC2AB2B7	11.30	RUMC3AB2B7	12.50
	48 Vac	RUMC2AB2E7	11.30	RUMC3AB2E7	12.50
	120 Vac	RUMC2AB2F7	11.30	RUMC3AB2F7	12.50
	230 Vac	RUMC2AB2P7	11.30	RUMC3AB2P7	12.50
Flat	12 Vdc	RUMF2AB2JD	11.30	RUMF3AB2JD	12.50
	24 Vdc	RUMF2AB2BD	11.30	RUMF3AB2BD	12.50
	48 Vdc	RUMF2AB2ED	11.30	RUMF3AB2ED	12.50
	110 Vdc	RUMF2AB2FD	11.30	RUMF3AB2FD	12.50
	24 Vac	RUMF2AB2B7	11.30	RUMF3AB2B7	12.50
	48 Vac	RUMF2AB2E7	11.30	RUMF3AB2E7	12.50
	120 Vac	RUMF2AB2F7	11.30	RUMF3AB2F7	12.50
	230 Vac	RUMF2AB2P7	11.30	RUMF3AB2P7	12.50

Table 23.29: Relays for standard applications with LED, without Push Button, and Lock-Down Door
(sold in lots of 10)

Pins	Coil Voltage	Number and type of contacts - Thermal current (Ith)			
		2 C/O -16 A Res.		3 C/O -16 A Res.	
		Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
Cylindrical	12 Vdc	RUMC2AB3JD	10.40	RUMC3AB3JD	11.60
	24 Vdc	RUMC2AB3BD	10.40	RUMC3AB3BD	11.60
	48 Vdc	RUMC2AB3ED	10.40	RUMC3AB3ED	11.60
	60 Vdc	—	—	RUMC3AB3ND	11.60
	110 Vdc	RUMC2AB3FD	10.40	RUMC3AB3FD	11.60
	125 Vdc	—	—	RUMC3AB3GD	11.60
	24 Vac	RUMC2AB3B7	10.40	RUMC3AB3B7	11.60
	48 Vac	RUMC2AB3E7	10.40	RUMC3AB3E7	11.60
	120 Vac	RUMC2AB3F7	10.40	RUMC3AB3F7	11.60
	230 Vac	RUMC2AB3P7	10.40	RUMC3AB3P7	11.60
Flat	12 Vdc	RUMF2AB3JD	10.40	RUMF3AB3JD	11.60
	24 Vdc	RUMF2AB3BD	10.40	RUMF3AB3BD	11.60
	48 Vdc	RUMF2AB3ED	10.40	RUMF3AB3ED	11.60
	110 Vdc	RUMF2AB3FD	10.40	RUMF3AB3FD	11.60
	125 Vdc	—	—	RUMF3AB3GD	11.60
	24 Vac	RUMF2AB3B7	10.40	RUMF3AB3B7	11.60
	48 Vac	RUMF2AB3E7	10.40	RUMF3AB3E7	11.60
	120 Vac	RUMF2AB3F7	10.40	RUMF3AB3F7	11.60
	230 Vac	RUMF2AB3P7	10.40	RUMF3AB3P7	11.60

Approvals for Relays:

c UL us LISTED File CCN ▲ E164862 NLDX, NLDX7

c UL us File CCN E164862 NLDX2, NLDX8

SP® File 230765 Class 3211 07

CE IEC 61810-1

RoHS Compliant

▲ When used with appropriate socket

For sockets and accessories, see page 23-9

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RUZ C3M Socket+
RUMC3●●●●● Relay

Table 23.30: Sockets (sold in lots of 10)

Contact terminal arrangement	Connection	Relay type	Catalog Number	$ Price ea.
Mixed ▲	Box lug connector (screw terminals)	RUMC2•••••	RUZC2M	3.50
		RUMC3•••••	RUZC3M	4.20
Separate ■		RUMC2•••••	RUZSC2M	4.50
		RUMC3•••••	RUZSC3M	5.00
		RUMF2•••••	RUZSF3M	5.60
		RUMF3•••••		

▲ The inputs are mixed with the relay coil terminals, with the outputs located on the opposite side of the socket.
■ The inputs and outputs are separated from the relay coil terminals.

RUW241P7

Table 23.31: Protection modules (sold in lots of 10)

Description	For use with	Voltage	Catalog Number	$ Price ea.
Diode	All sockets	6–250 Vdc	RUW240BD	2.20
RC circuit		110–240 Vac	RUW241P7	2.20
Varistor		24 Vac/Vdc	RUW242B7	2.70
		240 Vac/Vdc	RUW242P7	2.70

RUW101MW

Table 23.32: Timer module♦ (sold in lots of 1)

Description	For use with	Voltage	Catalog Number	$ Price
On-delay timer, interval timer, repeat cycle timer/starting on-delay, repeat cycle timer/starting off-delay, off-delay timer, one-shot timer, timing on de-energization, on-delay timer.	All sockets	24–240 Vac/Vdc	RUW101MW	47.10

♦ See timer module description (selection of functions and time delays) in catalog **8501CT0601**.

RUZS2

Table 23.33: Accessories (sold in lots of 10)

Description	For use with	Catalog Number	$ Price ea.
Metal hold-down clip	All sockets	RUZC200	1.20
Bus jumper, 2-pole (Ith: 5 A)	All sockets with separate contacts	RUZS2	0.70
ID tags	All relays (sheet of 108 tags)	RXZL520	0.10
	All sockets with separate contacts	RUZ420	0.10

RUZC200

Approvals for Sockets:

c UL us LISTED — File CCN E172326 SWIV2, SWIV8 — CSA — File Class 230765 3211 07 — CE — IEC 61810-1 — RoHS Compliant

Zelio™ RPF Power Relays

RPF Zelio power relays respond to the most demanding applications up to 30 A. Features include:

- UL Listed
- Sealed construction
- Motor load ratings: 1hp @ 120 Vac / 3hp @ 240 Vac (N/O contacts only)
- Dual DIN rail and panel mounting capability
- Short circuit rating of 5,000 A @ 240 Vac (N/O contacts only)

RPF2BJD

Table 23.34: Power relays (sold in lots of 10)

Coil Voltage	Number and type of contacts - Thermal current (Ith)			
	2 N/O - 30 A▲ Res.		2 C/O - 30 A on N.O. / 3 A on N.C. ▲ Res.	
	Catalog Number	$ Price ea.	Catalog Number	$ Price ea.
12 Vdc	RPF2AJD	10.40	RPF2BJD	10.90
24 Vdc	RPF2ABD	10.40	RPF2BBD	10.90
110 Vdc	RPF2AFD	10.40	RPF2BFD	10.90
24 Vac	RPF2AB7	10.40	RPF2BB7	10.90
120 Vac	RPF2AF7	10.40	RPF2BF7	10.90
230 Vac	RPF2AP7	10.40	RPF2BP7	10.90

▲ 30 A when mounted with 13 mm gap between two relays.
25 A when mounted side by side without a gap.

Approvals for Relays:

c UL us LISTED — File CCN E43641 NLDX, NLDX7 — CSA — File 040787 Class 3211-07 — CE — IEC 61810-1 — RoHS Compliant

For mounting track, see page 24-16

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Square D™ Plug-In Relays

8501K relays are designed for multipole switching applications at 240 Vac or lower. These relays have industry standard wiring and pin terminal arrangements which allow for their use as replacements for many competitive relays without wiring or hardware modifications.

- 12 A relays
- DPDT or 3PDT
- Manual operator/ green pilot light options
- Motor load (hp) ratings
- DPDT latching models available
- AC or DC operation
- RoHS Compliant

Table 23.35: Type KF —Flange Mounted—Spade Terminals

	Input Voltage	Contact Arrangement	Options	Type	$ Price
	AC 50/60 Hz	DPDT	None Available	KF12★	**24.60**
		3PDT		KF13★	**26.70**
	DC	DPDT	None Available	KFD12★	**24.60**
		3PDT		KFD13★	**26.70**

Table 23.36: Type KL—Latching Relay—Spade Terminals

	Input Voltage	Contact Arrangement	Options	Type	$ Price
	AC 50/60 Hz	DPDT	None Available	KL12★	**45.00**
	DC	DPDT	None Available	KLD12★	**45.00**

Table 23.37: Voltage Codes and Stocked Relays

Type	AC Voltage 50/60 Hz					Type	DC Voltage					
	6	12	24	120	240		6	12	24	48	110	125
Voltage Codes	V35	V36	V14	V20	V24	Voltage Codes	V50	V51	V53	V56	V60	V63
KP12	S	S	S	S	S	KPD12	S	S	S	S		S
KP12P14		S	S	S	S	KPD12P14		S	S		S	S
KP13		S	S	S	S	KPD13		S	S	S	S	S
KP13P14			S	S	S	KPD13P14			S			
KU12		S	S	S	S	KUD12		S				
KU12M1						KUD12M1			S			
KU12P14			S	S		KUD12P14			S			
KU12M1P14			S	S		KUD12M1P14			S			
KU13		S	S	S	S	KUD13		S	S			S
KU13M1						KUD13M1						
KU13P14			S	S		KUD13P14						
KU13M1P14			S	S	S	KUD13M1P14			S			S
KF12			S	S	S	KFD12		S	S			
KF13			S	S		KFD13			S			
KL12			S	S		KLD12		S	S			

Note: S = Stocked.
Factory order items require a minimum order quantity of 25 and have a lead time of 12 weeks.

For 8501 KP, KU, and KF:

c UL us File CCN E78351 NLDX2 NLDX8 — CSA File 211269 Class 3211 04

For 8501 KP, KU, and KL:

c UL us LISTED File CCN E78351 NLDX NLDX7 When used with the appropriate 8501NR socket.

For 8501 KL:

c UL us File CCN E78351 NLDX2 NLDX8 — CSA File 211268 Class 3211 04

Pilot Light Option—Available on Types KP and KU. Internal pilot lights are available in both AC and DC versions for positive indication of power to the coil. The pilot light is a green LED.

Manual Operator Option—Available on Type KU only. To facilitate speed circuit testing, a manual operator (test button) can be provided.

Coil VAC—3.0 VA

Coil VDC—1.4 Watts

Table 23.38: Type KP—Tubular Terminals

	Input Voltage	Contact Arrangement	Options	Type	$ Price
	AC 50/60 Hz	DPDT	None	KP12★	**39.00**
		DPDT	Pilot Light	KP12P14★	**45.00**
		3PDT	None	KP13★	**47.30**
		3PDT	Pilot Light	KP13P14★	**53.30**
	DC	DPDT	None	KPD12★	**39.00**
		DPDT	Pilot Light	KPD12P14★	**45.00**
		3PDT	None	KPD13★	**47.30**
		3PDT	Pilot Light	KPD13P14★	**53.30**

Table 23.39: Type KU—Spade Terminals

	Input Voltage	Contact Arrangement	Options	Type	$ Price
	AC 50/60 Hz	DPDT	None	KU12★	**22.70**
		DPDT	Manual Operator	KU12M1★	**26.70**
		DPDT	Pilot Light	KU12P14★	**28.70**
		DPDT	Manual Operator and Pilot Light	KU12M1P14★	**30.80**
		3PDT	None	KU13★	**24.60**
		3PDT	Manual Operator	KU13M1★	**28.70**
		3PDT	Pilot Light	KU13P14★	**30.80**
		3PDT	Manual Operator and Pilot Light	KU13M1P14★	**35.00**
	DC	DPDT	None	KUD12★	**22.70**
		DPDT	Manual Operator	KUD12M1★	**26.70**
		DPDT	Pilot Light	KUD12P14★	**28.70**
		DPDT	Manual Operator and Pilot Light	KUD12M1P14★	**30.80**
		3PDT	None	KUD13★	**24.60**
		3PDT	Manual Operator	KUD13M1★	**28.70**
		3PDT	Pilot Light	KUD13P14★	**30.80**
		3PDT	Manual Operator and Pilot Light	KUD13M1P14★	**35.00**

Table 23.40: Contact Ratings (Contacts are Silver Tin Oxide)

	AC			DC	
Type	AC Volts	Resistive 75% PF Continuous Amperes	Hp	DC Volts	Resistive Amperes
KP	120	10 ♦	1/3	28	12
	240	6.5 ■	1/2		
KU KF★	120	12	1/3	28	12
	240	12	1/2		
KL	120	10	1/3	28	10
	240	10	1/2		

Note: All 8501 K relays have a B300 rating.

- ▲ Socket is not required with Type KF relays.
- ■ 3 pole devices have a 20 A max. total (sum of currents in all 3 poles), continuous rating.
- ♦ 3 pole devices have a 30 A max. total (sum of currents in all 3 poles), continuous rating.
- ★ Voltage code must be specified to order this product. Refer to standard voltage codes listed in Table 23.37 and insert as shown in Table 23.41: How to Order.

Table 23.41: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code (See Stocked Relay Table above)	8501	KP12	V20

For sockets and accessories, see page 23-14.
For track, see page 24-16.

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Square D™ Alternating Plug-In Relays

8501KA alternating relay is designed to minimize pump and motor wear by equalizing run time between parallel components in a multi-pump system.

The relay is controlled by an external control switch. The switch may be any type of contact closure; for example the contacts of a timing relay or the closure of a float switch. The 8501KA relay also has a toggle switch that allows the operator to lock one side of the duplex system in the “on” position.

- 12 A Resistive Rating
- SPDT or DPDT
- Toggle switch for load control
- LED Load Indicators
- Horsepower Rated
- AC and DC Control
- UL Listed w/ Square D Socket
- Rohs Compliant

Table 23.42: Type KA — Alternating Relay

	Input Voltage	Contact Arrangement	Options	Type	$ Price
	AC & DC	SPDT	LED + Toggle	8501KA81•••	**93.00**
	AC & DC	DPDT	LED + Toggle + Cross Wired	8501KA82•••	**95.00**
	AC & DC	DPDT (N.C.)	LED + Toggle	8501KA112•••	**94.00**
	AC & DC	DPDT (N.O.)	LED + Toggle	8501KA112A•••	**94.00**

Table 23.43: Relay Availability

Type	AC & DC Voltage			AC Voltage
	12	24	120	240
Voltage Code	V36	V14	V20	V24
8501KA81•••			S	
8501KA82•••			S	
8501KA112•••			S	
8501KA112A•••			S	

Notes:

- AC Voltage is 50/60 Hz
- S = Stocked. “S” items have a 2 week lead time and nominimum order requirement.
- All other part numbers are considered factory order (FO) and require a minimum order quantity of 25 and have a lead-time of 18 weeks

Table 23.44: Contact Ratings

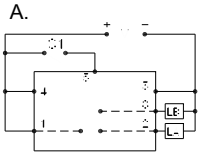
Type	AC				DC	
	AC Volts	Resistive Amperes	HP	Pilot Duty	DC Volts	Resistive Amperes
8501KA81•••	120	12	1/3	—	30	12
	240	12	1/2	B300		

Table 23.45: Alternating Functions

Diagram	Toggle Switch Position	Detail S1 = Control Switch 1 S2 = Control Switch 2 LA = Load 1 LB = Load 2
A, C & D	Alternate	Closing S1 alternates the loads between LA and LB.
	Lock 1	LA is ON and LB is OFF. S1 is not used in this mode.
	Lock 2	LA is OFF and LB is ON. S1 is not used in this mode.
B	Alternate	Closing S1 alternates the loads between LA an dLB. S2 will only control LA.
	Lock 1	S1 will control LA and S2 will control LB
	Lock 2	S1 will control LB and S2 will control LA.
	The cross wired option allows extra system load capacity through simultaneous operation of both motors when needed (LA and LB energize simultaneously when both S1 and S2 are closed–relay contacts are not isolated)	
ALL	Input voltage must applied at all times for proper alternation. Use of a solid state control switch for S1 or S2 may not initiate alternation corredtly. S1 or S2 voltage must be from the same supply as the unit’s input voltage (see wiring diagrams). Loss of input voltage resets the unit; LA becomes the lead load for the next operation.	

Wiring Diagrams and Dimensions

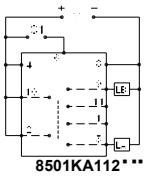
A.



8501KA81• ••

Socket = 8501NR51 or NR52

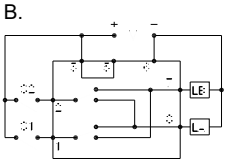
C.



8501KA112• ••

Socket = 8501NR61 or NR62

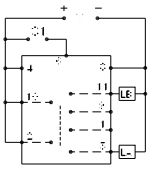
B.



8501KA82• ••

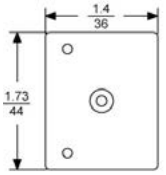
Socket = 8501NR51 or NR52

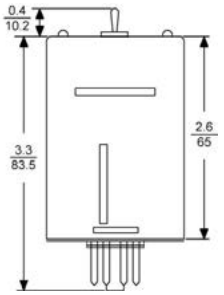
D.



8501KA112A• ••

Socket = 8501NR61 or NR62





Approvals

c UL us LISTED File Class E78351 NLDX

c UL us E78351 NLDX2

SA File Class 242675 3211-07

CE IEC 61810-1

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Square D™ Miniature Plug-in Relays

8501R miniature plug-in relays have a 10 A resistive rating, the same as the Type K plug-in relays, but are much smaller. The compact size of these relays makes them ideal for downsizing equipment and applications where space is at a premium.

- SPDT through 4PDT
- AC or DC operated
- Horsepower rated
- Socket compatible
- Manual operator/ green LED pilot light options
- Silver tin oxide contacts

Table 23.46: Contact Ratings (Contact material is Silver Tin Oxide)

Type	Voltage	Resistive Rating	Voltage	General Use Rating	Horsepower Rating
8501RS41 ▲	120 Vac	15	120 Vac	10	1/3 @120 Vac
	240 Vac	12	240 Vac	10	1/3 @240 Vac
8501RSD41▲	28 Vdc	15	28 Vdc	15	—
8501RS42▲	120 Vac	10	120 Vac	10	1/3 @120 Vac
	240 Vac	10	240 Vac	10	1/2 @240 Vac
8501RSD42▲	30 Vdc	10	28 Vdc	10	—
8501RS43▲	120 Vac	10	150 Vac	10	—
	277 Vac	10	250 Vac	6.6	—
8501RSD43▲	28 Vdc	10	28 Vdc	10	—
8501RS44▲	120 Vac	10	150 Vac	7.5	—
	277 Vac	10	250 Vac	5	—
8501RSD44▲	28 Vdc	10	28 Vdc	10	—

▲ Relays have a B300 rating with UL.

Table 23.47: Voltage Codes and Stocked Relays

Type	AC Voltage 50/60 Hz					Type	DC Voltage			
	6	12	24	120	240		6	12	24	110
Voltage Code	V35	V36	V14	V20	V24	Voltage Code	V50	V51	V53	V60
RS41			S	S		RSD41		S	S	
RS41M1						RSD41M1				
RS41P14			S	S		RSD41P14			S	
RS41M1P14			S	S		RSD41M1P14			S	
RS42		S	S	S	S	RSD42		S	S	
RS42M1						RSD42M1				
RS42P14			S	S		RSD42P14		S	S	
RS42M1P14				S		RSD42M1P14			S	
RS43			S	S		RSD43			S	
RS43M1						RSD43M1				
RS43P14				S		RSD43P14				
RS43M1P14				S		RSD43M1P14				
RS44			S	S	S	RSD44		S	S	
RS44M1						RSD44M1				
RS44P14				S		RSD44P14			S	
RS44M1P14				S		RSD44M1P14				

Note: S = Stocked.
Factory order items require a **minimum** order quantity of 25 and have a lead time of 12 weeks.

Table 23.48: SPDT with Silver Tin Oxide Contacts

Input Voltage	Options	Type	$ Price
AC 50/60 Hz	None	RS41■	29.60
	Manual Operator	RS41M1■	31.70
	Pilot Light	RS41P14■	37.20
	Manual Operator and Pilot Light	RS41M1P14■	39.30
DC	None	RSD41■	29.60
	Manual Operator	RSD41M1■	31.70
	Pilot Light	RSD41P14■	37.20
	Manual Operator and Pilot Light	RSD41M1P14■	29.60

Table 23.49: DPDT with Silver Tin Oxide Contacts

Input Voltage	Options	Type	$ Price
AC 50/60 Hz	None	RS42■	35.00
	Manual Operator	RS42M1■	37.10
	Pilot Light	RS42P14■	43.10
	Manual Operator and Pilot Light	RS42M1P14■	45.20
DC	None	RSD42■	35.00
	Manual Operator	RSD42M1■	37.10
	Pilot Light	RSD42P14■	43.10
	Manual Operator and Pilot Light	RSD42M1P14■	45.20

Table 23.50: 3PDT with Silver Tin Oxide Contacts

Input Voltage	Options	Type	$ Price
AC 50/60 Hz	None	RS43■	39.30
	Manual Operator	RS43M1■	41.40
	Pilot Light	RS43P14■	47.60
	Manual Operator and Pilot Light	RS43M1P14■	49.90
DC	None	RSD43■	39.30
	Manual Operator	RSD43M1■	41.40
	Pilot Light	RSD43P14■	47.60
	Manual Operator and Pilot Light	RSD43M1P14■	49.90

Table 23.51: 4PDT with Silver Tin Oxide Contacts

Input Voltage	Options	Type	$ Price
AC 50/60 Hz	None	RS44■	44.30
	Manual Operator	RS44M1■	46.20
	Pilot Light	RS44P14■	52.30
	Manual Operator and Pilot Light	RS44M1P14■	54.50
DC	None	RSD44■	44.30
	Manual Operator	RSD44M1■	46.20
	Pilot Light	RSD44P14■	52.30
	Manual Operator and Pilot Light	RSD44M1P14■	54.50

■ Voltage code must be specified to order this product. Refer to standard voltage codes listed in Table 23.47 and insert as shown in Table 23.53: How to Order.

Table 23.52: Application Data

Class 8501 Type		RS41	RSD41	RS42	RSD42	RS43	RSD43	RS44	RSD44
Operating Data	Pick-Up Time	20 ms Maximum		25 ms Maximum				20 ms Maximum	
	Drop-Out Time	20 ms Maximum							
	Operating Temperature	-40°C to +70°C (-40°F to +158°F)							
Coil	Duty Cycle	Continuous							
	Voltage Range	AC coils +10%, -15% of nominal DC coils +10%, -20% of nominal							
	AC Coils–Inrush	9 VA	—	6.2 VA	—	10.3 VA	—	11.9 VA	—
	AC Coils–Sealed	1.5 VA	—	1.2 VA	—	1.7 VA	—	2.1 VA	—
	DC Coils	—	0.9 watts	—	0.9 watts	—	1.4 watts	—	1.5 watts
UR	File CCN	E78351 NLDX2, NLDX8							
CSA	File Class	211268 3218 07							
CE marked		yes							
RoHS Compliant		yes							
UL Listed	File CCN	E78351♦ NLDX, NLDX7							

♦ When used with the appropriate 8501NR socket.

Table 23.53: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code (see Table 23.47)	8501	RS42	V20

For sockets and accessories, see page 23-14.
For track, see page 24-16.

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Square D™ Miniature Plug-in Relays

8501R relays are suited for use as logic elements and power switching output devices. The short stroke motion of the armature provides long mechanical life required for high speed operation of control systems. Different contact compositions allow these relays to be used in a variety of applications. Fine silver (gold flashed) and bifurcated crossbar (gold overlay silver) are suitable for high contact reliability and low level switching requirements. Silver tin oxide is best suited for inductive loads. Class I Division II sealed relays can be used in specified hazardous locations.

- 1, 3, or 5 A versions
- 4PDT
- Complete socket line
- Horsepower rated
- AC or DC operation
- Manual operator/pilot light options

8501RSD14P14V53

8501RS14M1V14

8501RSD34V51

Table 23.54: 5 A Version

5 A	Input Voltage	Options	Type	$ Price
For switching inductive loads	AC 50/60 Hz	None	RS14▲	**32.70**
		Manual Operator	RS14M1▲	**35.00**
		Pilot Light	RS14P14▲	**40.90**
		Manual Operator and Pilot Light	RS14M1P14▲	**43.10**
Contacts: Silver Tin Oxide	DC	None	RSD14▲	**27.70**
		Manual Operator	RSD14M1▲	**30.80**
		Pilot Light	RSD14P14▲	**36.80**
		Manual Operator and Pilot Light	RSD14M1P14▲	**39.00**

Table 23.55: 3 A Version

3 A	Input Voltage	Options	Type	$ Price
For low level switching	AC 50/60 Hz	None	RS4▲	**32.70**
		Manual Operator	RS4M1▲	**35.00**
		Pilot Light	RS4P14▲	**40.90**
		Manual Operator and Pilot Light	RS4M1P14▲	**43.10**
Contacts: Fine Silver (Gold Flashed)	DC	None	RSD4▲	**28.70**
		Manual Operator	RSD4M1▲	**30.80**
		Pilot Light	RSD4P14▲	**36.80**
		Manual Operator and Pilot Light	RSD4M1P14▲	**39.00**

Table 23.56: 1 A Version

1 A	Input Voltage	Type	$ Price
Best for Low Level Switching	AC 50/60 Hz	RS24▲	**53.00**
Bifurcated Silver Gold-Plated Contacts	DC	RSD24▲	**53.00**

Table 23.57: 5 A Version, Class I Division II

5 A, Hermetically Sealed	Input Voltage	Type	$ Price
5 Ampere Resistive■ Silver Tin Oxide Contacts	AC 50/60 Hz	RS34▲	**53.00**
Suitable for Class I Division 2 Locations	DC	RSD34▲	**53.00**

▲ Voltage code must be specified to order this product. Refer to standard voltage codes shown in Table 23.59.

■ Do not ground the frame.

Pilot Light Option

An internal green **pilot light** is available in both AC and DC versions for positive indication of power to the coil.

Manual Operation Option

To speed circuit testing, a manual operator (test button) can be provided. The relay can be manually switched to simulate normal operation.

NOTE: *All Type R relays with a manual operator must be used on circuits of the same polarity.*

Table 23.58: Contact Ratings (Contact material is Silver Tin Oxide)

Type	Voltage	Continuous Current Rating	Horsepower Rating
RS4 ♦ RSD4♦	120/240 Vac	3	1/10
	30 Vdc	3	—
RS14♦ RSD14♦	120/240 Vac	5	1/6
	28 Vdc	5	—
RS24 RSD24	120/240 Vac	1	1/16 (2.8 FLA)
	30 Vdc	1	—
RS34 RSD34	120/240 Vac	5	—
	30 Vdc	5	—

♦ RS4/RSD4, RS14/RSD14 have NEMA C300 pilot duty rating.

Table 23.59: AC Voltage Codes and Stocked Relays

Type	AC Voltage 50/60 Hz					
	6	12	24	48	120	240
Voltage Code	V35	V36	V14	V17	V20	V24
RS4			S		S	
RS4M1					S	
RS4P14					S	
RS4M1P14					S	
RS14		S	S		S	
RS14M1					S	
RS14P14					S	
RS14M1P14					S	S
RS24					S	
RS34					S	

Table 23.60: DC Voltage Codes and Stocked Relays

Type	DC Voltage				
	6	12	24	48	110
Voltage Code	V50	V51	V53	V56	V60
RSD4		S	S		
RSD4M1					
RSD4P14			S		
RSD4M1P14			S		
RSD14		S	S		S
RSD14M1			S		
RSD14P14		S	S		S
RSD14M1P14		S	S		
RSD24			S		
RSD34		S	S		

Note: S = Stocked.
Factory Order items require a **minimum** order quantity of 25 and have a lead time of 12 weeks.

Table 23.61: Application Data

Class 8501 Type		RS4	RSD4	RS14	RSD14	RS24	RSD24	RS34	RSD34
Operating Data	Pick-Up Time	20 ms Maximum						13 ms Max.	
	Drop-Out Time	20 ms Maximum						6 ms Max.	
	Operating Temperature Range	-40°C to +70°C (-40°F to +158°F)						-40°C to +70°C (-40°F to +158°F)	
Coil	Duty Cycle	Continuous							
	Voltage Range	**AC coils +10%, -15% of nominal and DC coils +10%, -20% of nominal**							
	AC Coils—Sealed	1.2 VA	—	1.2 VA	—	1.2 VA	—	1.2 VA	—
	AC Coils—Inrush	6.2 VA	—	6.2 VA	—	6.2 VA	—	6.0 VA	—
	DC Coils	—	0.9 watt	—	0.9 watt	—	0.9 watt	—	0.9 watt
Approvals	UR	File: E197072		CCN: NRNT2				N/A	
	C UR US	File: E197072		CCN: NRNT8 (Approved but not marked)				File: E196809 CCN: NQMJ2, NQMJ8	
	CSA	File: 211268		Class: 3218 07				File: 211268 Class: 3218 06	
	CE marked	Yes							
	RoHS Compliant	Yes							
	UL Listed	File E78351 CCN NLDX, NLDX7★							

★ When used with the appropriate 8501 NR Socket.

For sockets and accessories, see page 23-14.

For track, see page 24-16.

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Square D™ Sockets

8501NR sockets are designed for use with plug-in Class 8501 Type K, KA, and R relays, and 9050JCK timers. The 8501NR45 screw terminal sockets have pressure wire clamps that accept 1 or 2 #16–22 wires. All other sockets have pressure clamps that will accept 1 or 2 #12–22 wires.

The recommended tightening torque for all terminals is 7-8 lb-in.

- All devices stocked in central warehouse
- DIN track mount or direct panel mount
- Tubular sockets available in easy-to-wire single tier or double tier versions
- RoHS compliant

8501NR51

8501NR61

8501NR52

8501NR62

8501NR82

8501NR45

8501NR41

8501NR42

8501NH7

8501NR34

8501NR43

Table 23.62: Snapmount Sockets

For Use With Class:		Description	Socket Rating		Type	$ Price ea.	Std. Qty.▲
8501 Type	9050 Type		UL	CSA			
KP12 KPD12 KA81 KA82	JCK11–19 JCK31–39 JCK51–59 JCK60 JCK1 F JCK3 F JCK5 F	8 Pin Tubular Single Tier Screw Terminal	600 V, 10 A	300 V, 10 A	NR51	**12.30**	1
			300 V, 15 A		NR51B	**10.20**	10
		8 Pin Tubular Double Tier Screw Terminal	600 V, 5 A	300 V, 10 A	NR52■	**12.30**	1
			300 V, 16 A		NR52B■	**10.20**	10
KP13 KPD13 KA112	JCK21–29 JCK41–49 JCK70 JCK2F JCK4F	11 Pin Tubular Single Tier Screw Terminal	600 V, 5 A	300 V, 10 A	NR61	**18.50**	1
			300 V, 15 A		NR61B	**16.50**	10
		11 Pin Tubular Double Tier Screw Terminal	600 V, 5 A	300 V, 10 A	NR62■	**18.50**	1
			300 V, 16 A		NR62B■	**16.50**	10
KL KU	—	11 Pin Spade Double Tier Screw Terminal	300 V, 15 A	300 V, 15 A	NR82	**20.60**	1
					NR82B	**18.50**	10
RS41 RSD41	—	5 Pin Spade Double Tier Screw Terminal	300 V, 15 A	300 V, 15 A	NR41■	**28.70**	1
					NR41B■	**26.70**	10
RS42 RSD42	—	8 Pin Spade Double Tier Screw Terminal	300 V, 10 A	300 V, 10 A	NR42	**28.70**	1
					NR42B	**26.70**	10
RS43 RSD43	—	11 Pin Spade Double Tier Screw Terminal	300 V, 10 A	300 V, 10 A	NR43	**26.70**	1
					NR43B	**26.70**	10
RS44 RSD44	—	14 Pin Spade Double Tier Screw Terminal	300 V, 10 A	300 V, 10 A	NR34	**28.70**	1
					NR34B	**26.70**	10
RS4 RSD4 RS14 RSD14 RS24 RSD24 RS34 RSD34	—	14 Pin Spade Double Tier Screw Terminal	300 V, 10 A	300 V, 10 A	NR45	**28.70**	1
					NR45B	**26.70**	10

▲ Must be ordered in multiples of the quantity listed. Units provided in standard quantity of one are individually packaged; devices with B suffix have a standard quantity of 10 per bulk pack.
■ Finger Safe

For DIN 3 mounting track and end clamps, see page 24-16, or refer to:

- NEMA Style terminal block section of catalog 9080CT9601
- IEC Style terminal block section of catalog 9080CT9901

Table 23.63: Socket Accessories

Socket	For Use With	Description	Type	$ Price ea.	Std. Pack ♦
8501NR51	8501KP12, KPD12	Hold Down Clip	NH51	**1.00**	10
	9050JCK	Hold Down Spring	NH7	**8.30**	1
8501NR52	8501KP12, KPD12	Hold Down Clip	NH52	**1.00**	10
	9050JCK	Hold Down Spring	NH7	**8.30**	1
8501NR61	8501KP13, KPD13	Hold Down Clip	NH61	**1.00**	10
	9050JCK	Hold Down Spring	NH7	**8.30**	1
8501NR62	8501KP13, KPD13	Hold Down Clip	NH52	**1.00**	10
	9050JCK	Hold Down Spring	NH7	**8.30**	1
8501NR82	8501KU and KL	Hold Down Clip	NH82	**1.00**	10
8501NR41	8501RS41, RSD41	Hold Down Clip	Supplied with socket as standard	—	—
8501NR42	8501RS42, RSD42	Hold Down Clip	8501NH42	**1.00**	10
8501NR43	8501RS43, RSD43	Hold Down Clip	8501NH42	**1.00**	10
8501NR34	8501RS44, RSD44	Hold Down Clip	8501NH42	**1.00**	10
8501NR45	8501RS4, RSD4 8501RS14, RSD14 8501RS24, RSD24 8501RS34, RSD34	Hold Down Clip	8501NH45	**1.00**	10

♦ Must be ordered in multiples of the quantity listed.

Approvals:

c UL us File CCN E66924 SW1V2

CSA File Class 211268 3211 07

CE IEC 61984

RoHS Compliant as of date code 0639

How to Order

To Order Specify:	Catalog Number	
• Class Number • Type Number	**Class**	**Type**
	8501	NR51B

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8501CDO6V51

Square D™ Power Relays

8501C relays are ideally suited for controlling single-phase motors, electric heaters, pumps, conveyors, material handling equipment, and other applications.

- 40 A contact rating
- Motor load (hp) ratings
- Durable open-frame construction
- UL listed
- CSA certified
- CE approved
- RoHS compliant

Table 23.64: Selection Table and Application Data

Selection Table							Application Data							
Contact Arrangement	Number of Fixed Contacts		AC Operated Coil Open Type		DC Operated Coil Open Type		Maximum Contact Voltage	Resistive Ampere Rating 75% Power Factor		Maximum Single Phase Horsepower			Maximum Coil Power Consumption	
	N.O.	N.C.	Type	$ Price	Type	$ Price		277 Vac	600 V	120 V	230 V	600 V	AC Coil	DC Coil
AC Rated Contacts														
SPST	1	0	CO6▲	**32.70**	CDO6▲	**32.70**	600	40	10	2	2	2	10 VA	4 W
DPST	2	0	CO7▲	**51.30**	CDO7▲	**51.30**	600	40	5	1.5	1.5	1.5	10 VA	4 W
SPST	0	1	CO8▲	**32.70**	CDO8▲	**32.70**	600	40	10	2	2	2	10 VA	4 W
SPDT	1	1	CO15▲	**57.30**	CDO15▲	**57.30**	600	40	5	1.5	1.5	1.5	10 VA	4 W
DPDT	2	2	CO16▲	**69.60**	CDO16▲	**69.60**	600	40	5	1.5	1.5	1.5	10 VA	4 W
DC Rated Contacts								**110 V**	**220 V**					
SPST	1	0	CO21▲	**71.70**	CDO21▲	**71.70**	500	20	8	N.A.			10 VA	4 W
DPDT	2	2	CO22▲	**84.00**	CDO22▲	**84.00**	325	10	4				10 VA	4 W

▲ Voltage codes must be specified to order this product. Refer to standard voltage codes listed in Table 23.66 and insert as shown in Table 23.68: How to Order.

Table 23.65: Operating Data

Operating Voltages/ Voltage Range	AC coils – 6 through 480 volts, + 10/-15% of nominal at 25 °C DC coils – 6 through 110 volts, + 10/-20% of nominal at 25 °C
Coil Duty	Continuous duty rated coils. (Non-replaceable)
Operating Temp. Range	AC: -67 °F to +131 °F (-55 °C to +55 °C) DC: -67 °F to +131 °F (-55 °C to +55 °C)
Storage Temp. Range	-67 °F to +212 °F (-55 °C to +100 °C)

Approvals:

File E78351 CCN NLDX

File 218139 Class 3211 04

IEC 60947-4-1

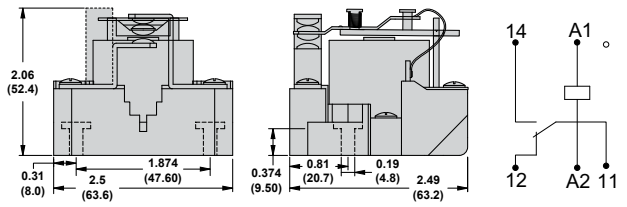
Table 23.66: Voltage Codes and Stocked Relays

Class 8501 Type	AC Voltage—50/60 Hz								Class 8501 Type	DC Voltage			
	6	12	24	120	208	240	277	480		6	12	24	110
Voltage Code	V35	V36	V14	V20	V08	V24	V04	V29	Voltage Code	V50	V51	V53	V60
CO6		S	S	S	S	S	S	S	CDO6		S	S	
CO7		S	S	S	S	S	S	S	CDO7		S	S	
CO8			S	S		S	S	S	CDO8				
CO15			S	S	S	S	S	S	CDO15			S	
CO16		S	S	S	S	S	S	S	CDO16		S	S	S
CO21				S					CDO21			S	S
CO22				S					CDO22			S	S

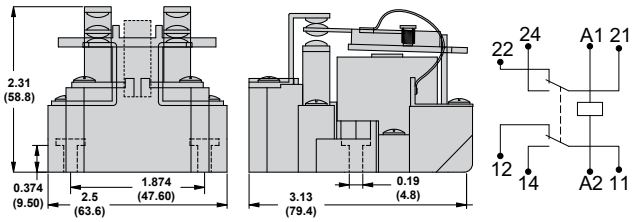
Note: S = Stocked.
Factory order items require a **minimum** order quantity of 25 and have a lead time of 12 weeks.

Approximate Dimensions and Wiring Diagrams

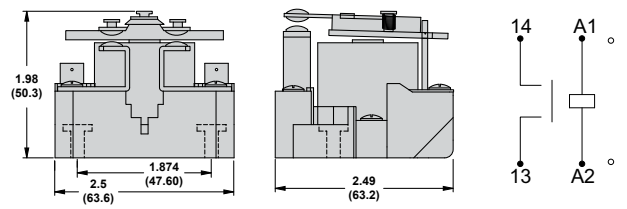
8501CO15, 8501CDO15 (SPDT)



8501CO16, 8501CDO16, 8501CO22, 8501CDO22 (DPDT)



8501CO6, 8501CDO6, 8501CO8, 8501CDO8, 8501CO21, 8501CDO21 (SPST)



8501CO7, 8501CDO7 (DPST)

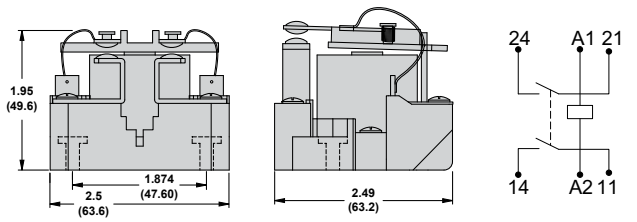


Table 23.67: Class 9991 Enclosure

Type	Description	$ Price
UE1	NEMA 1 sheet steel enclosure	**29.60**

Table 23.68: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code (See Stocked Relay Table above)	8501	CO6	V20

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TeSys™ D IEC Style Relays

CAD32

These 600 volt relays are approved for use around the world. TeSys D relays are usually mounted on 35 mm DIN 3 track, but can also be mounted directly to a panel. The fixed contacts in these relays have a NEMA A600 and Q600 ratings, in addition to the standard IEC ratings, making them suitable for use in most any control circuit. Low consumption versions of this relay are available for use with low level DC signals from a computer or a PLC. Adder decks can be added to a basic five pole relay to make it up to an 11 pole relay. The serrated silver-nickel contacts with wiping action provide excellent reliability in 12 or 24 volt control circuits. Special auxiliary contacts are available for switching low power down to 5 volts at 10 mA. Timer and mechanical latch attachments are available.

Table 23.69: Instantaneous Control Relays

Terminal Type	Number of Contacts	Contact Composition		Catalog Number	$ Price	
		Normally Open	Normally Closed		AC Coil	DC or Low Consumption Coil
Screw Clamp	5	5	0	CAD50▲	**62.00**	**110.00**
		3	2	CAD32▲	**62.00**	**110.00**
Spring Terminal	5	5	0	CAD503▲	**62.00**	**110.00**
		3	2	CAD323▲	**62.00**	**110.00**
Ring Tongue	5	5	0	CAD506▲	**62.00**	**110.00**
	5	3	2	CAD326▲	**62.00**	**110.00**

▲ Add the proper voltage code from Table 23.72 to the end of catalog number (for example, CAD50**B7**).

CAD503

Table 23.70: Instantaneous Auxiliary Contact Blocks (for use in normal operation environments)

Number of Contacts	Maximum Number per Device Clip-on Mounting		Termination Type	Contact Composition		Catalog Number	$ Price
	Front	Left Side Only		Normally Open	Normally Closed		
2	1	—	Screw Clamp	2	0	LADN20	**20.70**
				1	1	LADN11	**20.70**
				0	2	LADN02	**20.70**
			Spring Terminal	2	0	LADN203	**20.70**
				1	1	LADN113	**20.70**
				0	2	LADN023	**20.70**
	—	1 Not for DC devices	Screw Clamp	2	0	LAD8N20	**20.70**
				1	1	LAD8N11	**20.70**
				0	2	LAD8N02	**20.70**
4 ■	1	—	Screw Clamp	4	0	LADN40	**41.50**
				3	1	LADN31	**41.50**
				2	2	LADN22	**41.50**
				1	3	LADN13	**41.50**
				0	4	LADN04	**41.50**
			Spring Terminal	4	0	LADN403	**41.50**
				3	1	LADN313	**41.50**
				2	2	LADN223	**41.50**
				1	3	LADN133	**41.50**
				0	4	LADN043	**41.50**
4 ■	1	—	Screw Clamp	2 ♦	2 ♦	LADC22	**41.50**
			Spring Terminal	2 ♦	2 ♦	LADC223	**41.50**

■ Auxiliary contact blocks with four contacts cannot be used on relays with low consumption coils.
♦ Includes 1 N.O. and 1 N.C. overlapping contact.

CAD323

Table 23.71: Instantaneous Auxiliary Contacts with Dust and Damp Protected Contacts
(for use in particularly harsh industrial environments)

Number of Contacts	Maximum Number per Device	Contact Composition					Catalog Number	$ Price
	Front Mounting	Sealed		★	Normal			
2	1	2	—	—	—	—	LA1DX20	**65.00**
		—	2	—	—	—	LA1DX02	**65.00**
		2	—	2	—	—	LA1DY20	**77.00**
4 ▼	1	2	—	—	2	—	LA1DZ40	**82.00**
		2	—	—	1	1	LA1DZ31	**82.00**

★ Grounding terminal points (2 terminals jumpered together; see diagram on page 8 of Catalog **8501CT0101**).
▼ Auxiliary contact blocks with four contacts cannot be used on relays with low consumption coils.

Approvals:

File CCN E164353 NKCR

File Class LR43364 3211 03

Table 23.72: Coil Voltage Codes △

AC 50/60 Hz Coil (for additional voltage code options see page 7 of Catalog 8501CT0101).											
Volts	12	24	48	120	208	240	277	480	600		
Code	J7	B7	E7	G7	LE7	U7	W7	T7	X7		
DC Coil (coils have built in suppression as standard)											
Volts	12	24	36	48	60	72	110	125	220	250	440
Code	JD	BD	CD	ED	ND	SD	FD	GD	MD	UD	RD
DC Low Consumption Coil (coils have built in suppression as standard)											
Volts	5	12	24	48	72						
Code	AL	JL	BL	EL	SL						

△ Add the proper voltage code to the end of catalog number.

For replacement AC coils, see page 18-16. DC coils are not replaceable.

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TeSys™ D IEC Style

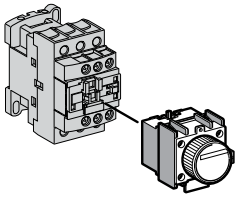

LADT

Table 23.73: Time Delay Auxiliary Contact Blocks

Number and Type of Contacts	Maximum Number per Device Front Mounting	Time Delay Type	Termination Type	Range	Catalog Number	$ Price
1 N.C. and 1 N.O.	1	On-Delay	Screw Clamp	0.1–3 s ▲	LADT0	131.00
				0.1–30 s	LADT2	131.00
				10–180 s	LADT4	131.00
				1–30 s ■	LADS2	131.00
			Spring Terminal	0.1–3 s ▲	LADT03	131.00
				0.1–30 s	LADT23	131.00
				10–180 s	LADT43	131.00
				1–30 s ■	LADS23	131.00
		Off-Delay	Screw Clamp	0.1–3 s ▲	LADR0	131.00
				0.1–30 s	LADR2	131.00
				10–180 s	LADR4	131.00
			Spring Terminal	0.1–3 s ▲	LADR03	131.00
				0.1–30 s	LADR23	131.00
				10–180 s	LADR43	131.00
(Lockout Cover, See page 7 of Catalog 8501CT0101.)						

▲ With extended scale from 0.1 to 0.6 s.
■ With switching time of 40 ms ± 15 ms between opening of the N.C. contact and closing of the N.O. contact.

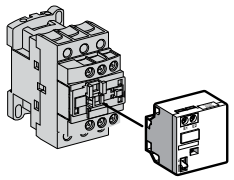

LA6DK

Table 23.74: Mechanical Latch Blocks ♦

Unlatching Control	Maximum Number per Device Front mounting	Catalog Number	$ Price
Manual or electrical	1	LA6DK10 ▼★	77.00
		LAD6K10 ▼	77.00

♦ Power should not be simultaneously applied or maintained to the mechanical latching block and the CAD relay. The duration of the control signal to the mechanical latching block and the CAD relay should be ≤ 100 ms.
★ Repair part for the preceeding version (non-TeSys) of this product. Not for use on CAD devices.
▼ Complete the catalog number by adding coil voltage code from Table 23.76. (for example, LA6DK10**B**)

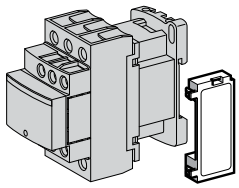

LAD4

Table 23.75: Coil Suppressor Modules

These modules clip onto the right hand side of the control relay and the electrical connection is instantly made. Adding an input module is still possible.

RC Circuits (Resistor-Capacitor)

- Effective protection for circuits highly sensitive to "high frequency" interference.
- Voltage limited to 3 Uc maximum and oscillating frequency limited to 400 Hz maximum.
- Slight increase in drop-out time (1.2 to 2 times the normal time).

For Mounting On:	Operational Voltage	Catalog Number	$ Price
CAD (Vac)	24 to 48 Vac	LAD4RCE	26.20
	110 to 240 Vac	LAD4RCU	26.20

Varistors (Peak Limiting)

- Protection provided by limiting the transient voltage value to 2 Uc maximum.
- Maximum reduction of transient voltage peaks.
- Slight increase in drop-out time (1.1 to 1.5 times the normal time).

CAD (Vac)	24 to 48 Vac	LAD4VE	26.20
	50 to 127 Vac	LAD4VG	26.20
	110 to 250 Vac	LAD4VU	26.20

Bidirectional Peak Limiting Diode

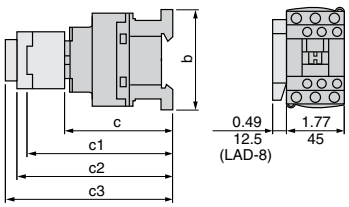
- Protection provided by limiting the transient voltage value to 2 Uc maximum.
- Maximum reduction of transient voltage peaks.

CAD (Vac)	24 Vac	LAD4TB	26.20
	72 Vac	LAD4TS	26.20

Table 23.76: Coil Voltage Codes

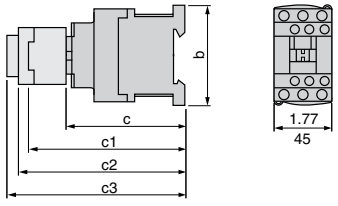
Voltage	24 Vac/Vdc	32/36 Vac/Vdc	42/48 Vac/Vdc	60/72 Vac/Vdc	100 Vac/Vdc	110/127 Vac/Vdc	220/240 Vac/Vdc	256/277 Vac/Vdc	380/415 Vac/Vdc
Voltage Code	B	C	E	EN	K	F	M	U	Q

CAD (Vac Coil)



CAD		in. (mm) 32 50	in. (mm) 323 503
b		3.03 (77)	3.90 (99)
c	Without cover or add-on blocks	3.31 (84)	3.31 (84)
	With cover, without add-on blocks	3.39 (86)	3.39 (86)

CAD (Vdc Coil) or (Low Consumption Vdc Coil)



CAD		in. (mm) 32 50	in. (mm) 323 503
b		3.03 (77)	3.90 (99)
c	Without cover or add-on blocks	3.66 (93)	3.66 (93)
	With cover, without add-on blocks	3.74 (95)	3.74 (95)

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TeSys™ D IEC Style Relays

Table 23.77: Cabling Accessory

Description			Catalog Number	$ Price
Mounting Adapter For adapting existing wiring to a new product	Without coil suppression		LAD4BB	**23.00**
	With coil suppression	24 to 48 Vac	LAD4BBVE	**23.00**
		50 to 127 Vac	LAD4BBVG	**23.00**
		110 to 250 Vac	LAD4BBVU	**23.00**

Table 23.78: Electronic Serial Timer Modules ▲

- Mounted using adaptor LAD4BB, to be ordered separately, see listing above.

On-delay Type			
Operational Voltage	**Time Delay**	**Catalog Number**	**$ Price**
24 to 250 Vac	0.1 to 2 s	LA4DT0U	**82.00**
	1.5 to 30 s	LA4DT2U	**82.00**
	25 to 500 s	LA4DT4U	**82.00**

▲ For 24 V operation, the relay must be fitted with a 21 V coil (code Z7).

Table 23.79: Auto-Man-Stop Control Modules

For local override operation tests with two-position "Auto-Man" switch and "O-I" switch

- Mounted using adaptor LAD4BB, to be ordered separately, see listing above.

Operational Voltage	Catalog Number	$ Price
24 to 100 Vac	LA4DMK	**35.00**

Table 23.80: Accessories (ordered separately)

For Connection

Description	For Mounting On:	Must be Ordered in Multiples of:	Catalog Number	$ Price ea.
For Marking				
Sheet of 64 self-adhesive blank labels 8 x 33	CAD, LAD (4 contacts), LA6DK	10	LAD21	**5.20**
Sheet of 112 self-adhesive blank labels 8 x 12	LAD (2 contacts), LADT	10	LAD22	**5.20**
For Protection				
Lockout cover	LADT, LADR	1	LA9D901	**5.50**
Relay cover preventing access to the moving contact carrier	CAD	1	LAD9ET1	**5.20**

Table 23.81: Application Data

Type		CAD (Vac)	CAD (Vdc)	CAD (Vdc) Low Consumption
Rated Insulation Voltage (Ui)	Conforming to IEC 60947-1-1 Overvoltage category III and degree of pollution 3	690 V	690 V	690 V
	Conforming to UL, CSA	600 V	600 V	600 V
Rated Impulse Withstand Voltage (Uimp)	Conforming to IEC 60947-1-1	6 kV	6 kV	6 kV
Separation of Electrical Circuits	To IEC 536 and VDE 0106	Reinforced insulation up to 400 V		
Conforming to Standards		IEC 60947-1-1, N-F C 63-140, VDE 0660, BS 4794. EN 60947-5-15		
Approvals		UL: File: E164353 CSA: File: LR43364 CE	CCN: NKCR Class: 3211 03	
Protective Treatment	Conforming to IEC 68	"TH" (Tropical Finish). See page 23 of Catalog 8501CT0101 for details.		
Degree of Protection	Conforming to VDE 0106	Front face protected against direct finger contact IP 2X		Protection against direct finger contact

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TeSys™ K IEC Style Relays

CA2KN22 • •

CA2KN403 • •

CA4KN405 •••

CA3KN407 • •

Table 23.82: Control Relays

- Mounting on 35 mm DIN 3 track or 4 screw direct mounting.
- Screws in open "ready-to-tighten" position.
- NEMA A600, Q600
- IEC AC15, DC13

Control Circuit		Type of Termination	Contact Configuration		Catalog Number ▲	$ Price
Supply	Consumption		N.O.	N.C.		
AC	4.5 VA	Screw clamp	4	0	CA2KN40 • •	**35.50**
			3	1	CA2KN31 • •	**35.50**
			2	2	CA2KN22 • •	**35.50**
		Spring Termination	4	0	CA2KN403 • •	**35.50**
			3	1	CA2KN313 • •	**35.50**
			2	2	CA2KN223 • •	**35.50**
		Faston 1 x 6.35 or 2 x 2.8	4	0	CA2KN407 • •	**35.50**
			3	1	CA2KN317 • •	**35.50**
			2	2	CA2KN227 • •	**35.50**
		Solder pins for printed circuit board	4	0	CA2KN405 • •	**35.50**
			3	1	CA2KN315 • •	**35.50**
			2	2	CA2KN225 • •	**35.50**
DC	3 W	Screw clamp	4	0	CA3KN40 • •	**49.20**
			3	1	CA3KN31 • •	**49.20**
			2	2	CA3KN22 • •	**49.20**
		Spring Termination	4	0	CA3KN403 • •	**49.20**
			3	1	CA3KN313 • •	**49.20**
			2	2	CA3KN223 • •	**49.20**
		Faston 1 x 6.35 or 2 x 2.8	4	0	CA3KN407 • •	**49.20**
			3	1	CA3KN317 • •	**49.20**
			2	2	CA3KN227 • •	**49.20**
		Solder pins for printed circuit board	4	0	CA3KN405 • •	**49.20**
			3	1	CA3KN315 • •	**49.20**
			2	2	CA3KN225 • •	**49.20**

▲ Complete catalog number by adding proper voltage code from Table 23.84 or Table 23.85 (for example, CA2KN40**G7**).

Table 23.83: Low Consumption Control Relays

Compatible with programmable controller outputs.

- LED indicator incorporated.
- Wide range coil (70 to 130% Uc), suppressor fitted as standard.
- Mounting on 35 mm DIN 3 track or 4 screw direct mounting.
- Screws in open "ready-to-tighten" position.

DC	1.8 W	Screw clamp	4	0	CA4KN40 •••	**64.00**
			3	1	CA4KN31 •••	**64.00**
			2	2	CA4KN22 •••	**64.00**
		Spring Termination	4	0	CA4KN403 •••	**64.00**
			3	1	CA4KN313 •••	**64.00**
			2	2	CA4KN223 •••	**64.00**
		Faston 1 x 6.35 or 2 x 2.8	4	0	CA4KN407 •••	**64.00**
			3	1	CA4KN317 •••	**64.00**
			2	2	CA4KN227 •••	**64.00**
		Solder pins for printed circuit board	4	0	CA4KN405 •••	**64.00**
			3	1	CA4KN315 •••	**64.00**
			2	2	CA4KN225 •••	**64.00**

▲ Complete catalog number by adding proper voltage code from Table 23.86 (for example, CA4KN40**BW3**).

Table 23.84: Coil Voltage Codes for CA2K Control Relays (0.8–1.15 Uc) (0.85–1.1 Uc)

Vac 50/60 Hz	12	24	36	42	48	110	120	127	208	*220/ 230*	230	*230/ 240*	380/ 400	400	*400/ 415*	440	480	500	*660/ 690*
Voltage Code	J7	B7	C7	D7	E7	F7	G7	FC7	L7	M7	P7	*U7*	*Q7*	V7	*N7*	R7	T7	S7	Y7

Note: Up to and including 240 V, coil with integral suppression device available: add **2** to the code required. Example: **J72**. (Price Adder **9.50**)

Table 23.85: Coil Voltage Codes for CA3K Control Relays (0.8–1.15 Uc)

Vdc	12	20	24	36	48	60	72	100	110	125	200	220	230	240	250
Voltage Code	JD	ZD	BD	CD	ED	ND	SD	KD	FD	GD	LD	MD	MPD	MUD	UD

Note: Coil with integral suppression device available: add **3** to the code required. Example: **JD3**. (Price Adder **9.50**)

Table 23.86: Coil Voltage Codes for CA4K, Low Consumption Control Relays (Wide Range Coil: 0.7–1.3 Uc)

Vdc	12	24	48	72
Voltage Code	JW3	BW3	EW3	SW3

Approvals:

File CCN NKCR 164353

File Class 3211 03 LR43364

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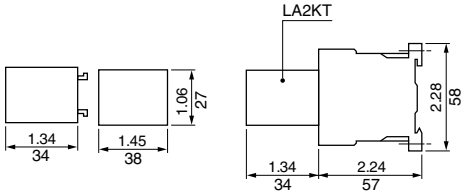
TeSys™ K IEC Style Relays

LA1KN20

LA1KN40

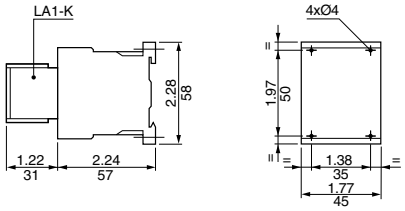
LA1KN403

LA2KT electronic time delay contact blocks

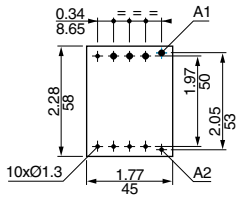


Approximate dimensions
for CA2, CA3, CA4K control relays

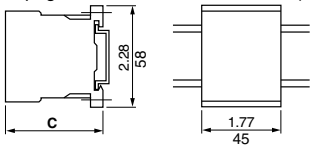
On panel



On printed circuit board



AM1DP200 or AM1DE200 mounting rail—35 mm DIN rail
(see page 22-16 for additional DIN rail)



in.
mm

c		Product
in.	mm	
2.22	59	AM1DP200
2.60	66	AM1DE200

Table 23.87: Instantaneous Auxiliary Contact Blocks ■♦

Clip-on Front Mounting, 1 Block Per Control Relay

Type of Connection	Contact Configuration N.O.	Contact Configuration N.C.	Catalog Number	$ Price
Screw Clamp	2	0	LA1KN20	**14.20**
	0	2	LA1KN02	**14.20**
	1	1	LA1KN11	**14.20**
	4	0	LA1KN40▲	**27.30**
	3	1	LA1KN31▲	**27.30**
	2	2	LA1KN22▲	**27.30**
	1	3	LA1KN13▲	**27.30**
	0	4	LA1KN04▲	**27.30**
Spring Termination	2	0	LA1KN203	**14.20**
	1	1	LA1KN113	**14.20**
	0	2	LA1KN023	**14.20**
	4	0	LA1KN403▲	**27.30**
	3	1	LA1KN313▲	**27.30**
	2	2	LA1KN223▲	**27.30**
	1	3	LA1KN133▲	**27.30**
	0	4	LA1KN043▲	**27.30**
Faston 1 x 6.35 or 2 x 2.8	2	0	LA1KN207	**14.20**
	0	2	LA1KN027	**14.20**
	1	1	LA1KN117	**14.20**
	4	0	LA1KN407▲	**27.30**
	3	1	LA1KN317▲	**27.30**
	2	2	LA1KN227▲	**27.30**
	1	3	LA1KN137▲	**27.30**
	0	4	LA1KN047▲	**27.30**

▲ Not to be used on CA4KN relays.
■ Clip-on front mounting, 1 block per control relay.
♦ Auxiliary contact module not suitable for safety circuits.

Table 23.88: Electronic Time Delay Contact Blocks

Relay output, with common point changeover contact	240 Vac/Vdc, 2 A maximum
Control voltage	0.85–1.1 Uc
Maximum switching capacity	250 VA or 150 W
Operating temperature	–10 to + 60°C (+14° F to 140° F)
Reset time	1.5 s during the time delay period, 0.5 s after the time delay.

Table 23.89: Clip-on front mounting, 1 block per control Relay

Voltage (V)	Type	Timing Range, s	Composition C.O.	Catalog No.	$ Price
AC or DC / 24 to 48	On-delay	1 to 30	1	LA2KT2E	**32.80**
AC / 110 to 240				LA2KT2U	

Note: For other electronic timers see Type RE7 and 9050 Type JCK, pages 23-28 and 23-30.

Table 23.90: Accessories (supplied separately)

Description			Sold in lots of	Catalog No.	$ Price ea.
Marker holder□	Clips on front of relay		100	LA9D90	**0.06**
Clip-on markers□	4 maximum per device	Strip of 10 identical numbers, 0 to 9	25	AB1R•□	**0.70**
		Strip of 10 identical capital letters A to Z		AB1G•□	
Suppressor modules with incorporated LED indicator	Clips onto front of relay with locating device. No tools required for connection.	For AC and DC voltages 12 to 24 V (varistor)	5	LA4KE1B★	**9.80**
		For AC and DC voltages 32 to 48 V (varistor)		LA4KE1E★	
		For AC and DC voltages 50 to 129 V (varistor)		LA4KE1FC★	
		For AC and DC voltages 130 to 250 V (varistor)		LA4KE1UG ★	
		For DC voltages 12 to 24 V (diode + Zener diode)		LA4KC1B▼	
		For DC voltages 32 to 48 V (diode + Zener diode)		LA4KC1E▼	
		For AC voltages 220 to 250 V (RC)		LA4KA1U△	

★ Protection by the limitation of the transient voltage to 2 Uc maximum. Maximum reduction of the transient voltage peaks. Slight time delay on drop-out (1.1 to 1.5 times normal).
▼ No overvoltage or oscillation frequency. Polarized component. Slight time delay on drop-out (1.1 to 1.5 times normal).
△ Protection by limitation of the transient voltage to 3 Uc max. and limitation of the oscillation frequency. Slight time delay on drop-out (1.2 times to twice normal).
□ See "Clip-in Marker Strips" in Catalog **8501CT0101** for information on completing the catalog number.

Table 23.91: Environment

Conforming to Standards		IEC 947, NF C 63-140, VDE 0660, BS 5424, CE
Approvals		UL, CSA, DEMKO, NEMKO, SEMKO, FI
Protective treatment	Conforming to IEC 68 (DIN 50016)	"TC" (Climateproof)
Degree of protection	Conforming to VDE 0106	Protection against direct finger contact
Ambient air temperature	Storage	-58 to 176 °F (-50 to 80°C)
	Operation	-13 to 122 °F (-25 to 50°C)
Maximum operating altitude	Without derating	6562 ft (2000 m)

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TeSys™ SK IEC Style Relays

CA2SK11G7

Table 23.92: IEC Style Industrial Control Relays

- Miniature size saves space.
- Mounts on 35 mm DIN 3 track
- Up to 4 poles.

Control Circuit Supply	Consumption	Type of Termination	Contact Configuration		Catalog Number	$ Price
			N.O.	N.C.		
AC	4.2 VA	Screw clamp	1	1	CA2SK11•• ▲	43.70
			2	0	CA2SK20•• ▲	
DC	2.2 W		1	1	CA3SK11•• ▲	51.00
			2	0	CA3SK20•• ▲	

▲ Use the appropriate voltage code to complete the catalog number (for example: CA2SK11**G7**)

LA1SK11

Table 23.93: Contact Adder Decks (for CA2SK20 only)

Type of Termination	Contact Configuration		Catalog Number	$ Price
	N.O.	N.C.		
Screw clamp	2	0	LA1SK20	16.90
	1	1	LA1SK11	
	0	2	LA1SK02	

Transient Suppressor Module

Dampens the voltage spike that may occur when the relay coil is de-energized. The spike may adversely affect solid state equipment near the relay. The transient suppressor module snaps into a cavity located in the side of the relay. These modules can be used with CA2SK and CA3SK relays.

Table 23.94: Transient Suppressor Module

Control Circuit Voltage	Catalog Number	$ Price
24–48 Vac 50/60 Hz, 24–48 Vdc	LA4SKEIE	21.80
110–250 Vac 50/60 Hz, 110–250 Vdc	LA4SKEIU	

Table 23.95: Coil Voltage Codes for Control Relays

Voltage	12	24	36	48	72	110	120	220	230	240	380	400	480
50/60 Hz	—	B7 ■	—	E7 ■	—	F7	G7 ■	M7 ■	P7	U7 ■	Q7	V7	T7 ■
DC	JD	BD	CD	ED	SD	—	—	—	—	—	—	—	—

■ Alternating relays CA2SKE available in these voltages only. No other voltages are available.

Alternating Relays, CA2SKE

Refer to Catalog **8501CT9701**

CA2SKE20

These alternating relays are used to alternate the use of 2 motor circuits. When the coil is energized the first time, one contact closes and will open when the coil is de-energized. When the coil is energized again, the other contact will close and will open when the coil is de-energized. The contacts from these alternators are to be used in the control circuit of the starters that are controlling pump or compressor motors.

Approvals: UL File: E164353 CCN: NKCR; CSA File: LR43364 Class: 3211 03.

Table 23.96: Alternating Relays

Coil Voltage (Voltage-Hz)	Type	$ Price
24–50/60	CA2SKE20•▲	120.00

▲ Use the appropriate voltage code to complete the catalog number (for example, CAZSK11**G7**). Only available with voltages indicated above.

Table 23.97: Contact Ratings for CA2SK, CA3SK, AND CA2SKE20 Relays

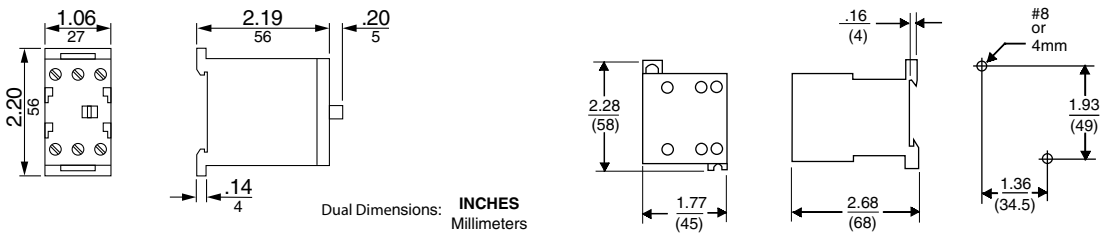
AC								DC	
Volts	Inductive 35% PF					Resistive 75% PF		Volts	Continuous Amperes
	NEMA Rating	Make		Break		Continuous Amperes	Make, Break and Continuous Amperes		
		A	VA	A	VA				
120	A600	60	7200	6	720	10	10	24	3
240		30		3				60	2
480		15		1.5				110	0.8
600		12		1.2				240	0.2

Approvals:

File CCN E164353 NKCR

File Class LR43364 3211 03

Approximate Dimensions for CA2SKE Relay



Dual Dimensions: **INCHES** Millimeters

RELAYS AND TIMERS
23

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Type XMO40
Control Relay

AC Control Relays

- Straight-through wiring
- Plug-in contact cartridges for easy contact conversion and replacement
- Contact conversion without removing terminal screws or wires
- Self-lifting pressure wire connectors
- Replaceable coil

Table 23.98: AC Control Relays

Normally Open Convertible Instantaneous Contacts	Control Relay ▲	
	Type♦	$ Price
0	XO00	**98.00**
2	XO20	**144.00**
3	XO30	**169.00**
4	XO40	**192.00**
6	XO60	**242.00**
8	XO80	**288.00**
10	XO1000	**336.00**
12	XO1200	**385.00**

▲ A maximum of 8 N.C. contacts is allowed on 9–12 pole relays.

Type XMO40
Master Relay

AC Master Relays

- 20 ampere contact rating due to use of master contact cartridges. ★
- Provisions for standard cartridges to be used in contact cavities not occupied by master cartridges in 2-8 pole AC relay.

Table 23.99: AC Master Relays

Number of N.O. 20 Ampere Convertible Contacts	Open Type■	
	Type♦	$ Price
2	XMO20	**204.00**
4	XMO40	**336.00**
6	XMO60	**457.00**

■ Attachments not permitted on this relay.

Type XO40XTE1
Timing Relay

AC Timing Relays

- Easily convertible On Delay or Off Delay
- Two adjustable timing ranges
- Repeat accuracy well above ±10%
- Convertible 1 N.O. and 1 N.C. timed contacts
- Large knob for easy adjustment of time delay
- Off Delay mode times out even after loss of power.

Table 23.100: AC Timing Relays

Timing Mode	N.O. Convertible Instantaneous Contacts	Timed Convertible Contacts		Timing Relay		$ Price
		N.O.	N.C.	0.2–60 s	5–180 s	
				Type♦	Type♦	
On Delay	0	1	1	XO00XTE1	XO00XTE2	**432.00**
	2	1	1	XO20XTE1	XO20XTE2	**480.00**
	4	1	1	XO40XTE1	XO40XTE2	**529.00**
Off Delay	0	1	1	XO00XTD1	XO00XTD2	**432.00**
	2	1	1	XO20XTD1	XO20XTD2	**480.00**
	4	1	1	XO40XTD1	XO40XTD2	**529.00**

Type XO40XL
Latching Relay

AC Latching Relays

- Mechanical latch holds all contacts switched even after removal of power from replaceable latching coil.
- Provides sequence memory in the event of power loss. Ideal for press control, process control and punch presses.
- Replaceable unlatch coil to switch contacts back to original state.

Table 23.101: AC Latching Relays

N.O. Convertible Instantaneous Contacts	Latching Relay	
	Type♦	$ Price
2	XO20XL	**313.00**
3	XO30XL	**336.00**
4	XO40XL	**360.00**
6	XO60XL	**408.00**
8	XO80XL	**457.00**

♦ Voltage Code must be specified to order these products. Refer to Table 23.104 and insert the code as shown in Table 23.107: How to Order.

Approvals:

File CCN E78403 NKCR

File Class 060905 3211 03

IEC 60947-1

Table 23.102: AC Contact Ratings

(for DC ratings, see page 23-23)

Type of Cartridge	V	Inductive 35% Power Factor						Resistive 75% Power Factor
		NEMA Rating	Make		Break		Continuous Amperes	Make, Break and Continuous Amperes
			A	VA	A	VA		
Standard or Overlapping	120 240 480 600	A600	60 30 15 12	7200	6 3 1.5 1.2	720	10	10
Master★	—	A600	Same as standard cartridge above except substitute 20 A for the continuous ampere rating					
Logic Reed	—	—	150 Vac, 150 mA, 8 W Maximum					

★ Maximum of six 8501 Type XC4 Master Cartridges may be used on only 7 and 8 pole AC Devices

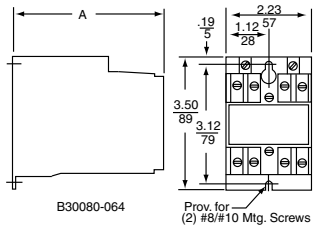
Table 23.103: Average Operating Time (ms)

Device	Pick-Up	Drop-Out
AC Relay	15	16
AC Latching Relay	15	13

Table 23.104: Voltage Codes

AC Voltages - Hz	Code
12–60	V11
24–60	V01
24–50	V12
48–60	V18
48–50	V16
120–60/110–50	V02
208–60	V08
240–60/220–50	V03
277–60	V04
480–60/440–50	V06
600–60/550–50	V07

AC Control Relays and AC Master Relays



Dual Dimensions: **INCHES**
Millimeters

Table 23.105: Dimensions and Weight

No. of Poles	Dim. A		Shipping Weight, lb
	in.	mm	
0–4	3.95	100	2.0
6–8	5.16	131	2.3
10–12	6.36	162	2.7

AC Latching Relay Dimensions

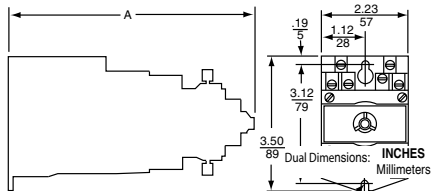


Table 23.106: Dimensions and Weight

No. ofPoles	Dim. A		Shipping Weight, lb
	in.	mm	
2–4	6.54	166	2.8
6–8	7.74	197	3.1

For replacement coils, see page 23-24.

Table 23.107: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code	8501	XO40	V02

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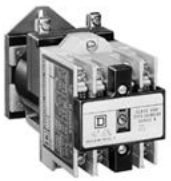
DC Control Relays



Type XDO40
Control Relay

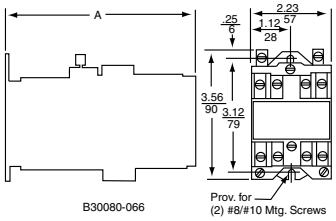
- Replaceable, highly reliable pure DC power plant: no economizing resistors, overlapping contacts or dual-wound coil.
- Utilizes the same Type XB adder decks and attachments as the AC version.
- Offers all the features of the AC relay.
- Available in up to 8 poles.
- All contact poles are usable since no overlapping contacts are needed.

Table 23.108: DC Control Relays

Normally Open Convertible Instantaneous Contacts	Control Relay	
	Type	$ Price
0	XDO00▼	**216.00**
2	XDO20▼	**264.00**
4	XDO40▼	**313.00**
6	XDO60▼	**360.00**
8	XDO80▼	**408.00**

DC Control Relay Utility Auxiliary Relay

Table 23.109: Dimensions



No. of Poles	Dim. A		Shipping Weight lb.
	in.	mm	
0–4	5.17	131	3.1
6–8	6.37	162	3.4
10–12	7.60	193	3.8

DC Timing Relays

Type XDO40XTE2
Timing Relay

- Easily convertible On Delay or Off Delay.
- Two adjustable timing ranges.
- Repeat accuracy well above ±10%.
- Convertible 1 N.O. and 1 N.C. timed contacts.
- Large knob for easy adjustment of time delay.
- Off Delay mode times out even after loss of power.

Table 23.110: DC Timing Relays

Timing Mode	Normally Open Convertible Instantaneous Contacts	Timed Convertible Contacts		Timing Relay		$ Price
				0.2–60 s	5–180 s	
		N.O.	N.C.	Type	Type	
On Delay	0	1	1	XDO00XTE1▼	XDO00XTE2▼	**522.00**
	2	1	1	XDO20XTE1▼	XDO20XTE2▼	**601.00**
	4	1	1	XDO40XTE1▼	XDO40XTE2▼	**648.00**
Off Delay	0	1	1	XDO00XTD1▼	XDO00XTD2▼	**522.00**
	2	1	1	XDO20XTD1▼	XDO20XTD2▼	**601.00**
	4	1	1	XDO40XTD1▼	XDO40XTD2▼	**648.00**

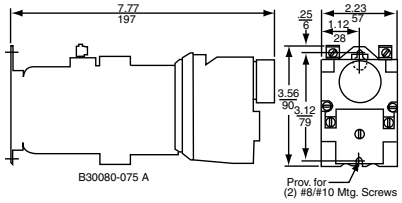


Table 23.111: DC Contact Ratings (for AC ratings, see page 23-22)

Type of Cartridge	DC Ratings					
	Volts	Inductive			Resistive	
		NEMA Rating	Make and Break Amperes 138 VA Max.	Continuous Amperes	Make and Break Amperes	Continuous Amperes
Standard	125 250	P600	1.1 0.55	5 5	4 0.8	5 5
Overlapping	125	P150	1.1	5	4	5
Logic Reed	—	—	30 Vdc, 60 ma			

Note: Do not use any 8501 Type XC4 Master Cartridges on any DC-operated device.

DC Latching Relays

Type XDO40XDL
Latching Relay

- Mechanical latch holds all contacts switched even after removal of power from replaceable latching coil.
- Provides sequence memory in the event of power loss.
- Ideal for sequencing applications such as press control, process control and punch presses.
- Replaceable unlatch coil to switch contacts back to original state.

Table 23.112: DC Latching Relays

Normally Open Convertible Instantaneous Contacts	Latching Relay	
	Type	$ Price
2	XDO20XDL▼	**485.00**
4	XDO40XDL▼	**534.00**
6	XDO60XDL▼	**582.00**
8	XDO80XDL▼	**629.00**

Note: Unlatch coil is rated for intermittent duty and should be connected through a N.O. contact of the relay if the input signal is maintained. Order one more N.O. contact than the application requires to use as a coil clearing contact.

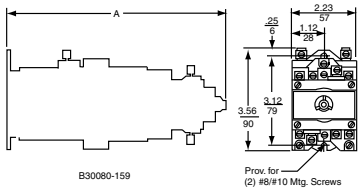


Table 23.113: Dimensions

No. of Poles	Dim. A		Shipping Weight, lb.
	in.	mm	
2–4	7.76	197	3.9
6–8	8.98	228	4.2

DC Utility Relays

Type XUDO40
Utility Relay

Ideal for utility plant applications where reliable performance and a pure DC power plant is required. In addition to the Type XDO relay features, the Type XUDO provides:

- Up to 12 poles N.O. or N.C.
- Nominal 125 Vdc coil, capable of handling 140 Vdc continuously and picking up at 105 Vdc after having been operated at 140 Vdc continuously. Other voltages with comparable operating characteristics are available.
- Enclosed device capable of operating in 145°F ambient.

Table 23.114: DC Utility Relays

Number of Convertible Contacts		Open Type	
N.O.	N.C.	Type	$ Price
4 0	0 4	XUDO40▼ XUDO04▼	**390.00**
8 0	0 8	XUDO80▼ XUDO08▼	**510.00**
12 0	0 12	XUDO1200▼ XUDO0012▼	**629.00**

Table 23.115: Average Operating Times (in ms)

Device	Pick-Up	Drop-Out
DC Relay	37	21
DC Latching Relay	37	45

Table 23.116: Voltage Codes—8501 XUDO and XDO Relays

DC Voltages for 8501 XUDO Relays ONLY	Code	DC Voltages for 8501 XDO Relays	Code
6	V50	6	V50
12	V51	12	V51
24	V53	24	V53
48	V56	32	V54
125	V63	48	V56
250	V67	72	V58
		90	V59
		115/125	V62
		230/250	V66

▼ Voltage code must be specified to order these products. Refer to Table 23.116 and insert the appropriate code as shown in Table 23.117: How to Order.

Table 23.117: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code	8501	XDO40	V53

For Replacement coils, see page 23-24
For UL and CSA approvals, see page 23-22

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Table 23.118: Type X™ Relays

	Description	Type	$ Price
	Mechanical Latch Attachment—Mounts on any 2 through 8-pole relay (except XMO master relay). The Type XL and XDL latch attachments are identical in size and mounting provisions. The Type XLAC latch attachment has a continuous-duty-rated coil which is replaceable. **The Type XDLDC latch attachment has an intermittent–rated coil (replaceable) and should be connected through a N.O. contact of the basic relay if the input signal is maintained to the unlatch coil.** AC Latch Attachment DC Latch Attachment	 XL▲ XDL▲	 **169.00** **222.00**
	Pneumatic Timer Attachment—Mounts only on any 0 through 4-pole AC or DC relays (except XMO master relay). It provides 1 N.O. and 1 N.C. convertible timed contacts, which are the same Type XC1 cartridges used on the basic relay. Two timing ranges are available, and conversion from On Delay to Off Delay or vice versa is easy. **Off Delay** 0.2–60 seconds 5–180 seconds **On Delay** 0.2–60 seconds 5–180 seconds	 XTD1 XTD2 XTE1 XTE2	 **336.00** **336.00** **336.00** **336.00**
	Timer Lockout Cover—Fits over the time delay adjustment knob of any Type XT timing attachment. The Lockout Cover is designed to protect the time setting against accidental adjustment. It mounts directly to the timing attachment with two included screws.	XJ1	**9.00**
	Adder Decks—Adder decks are used to expand the number of poles on a relay. The basic 4-pole relay can be easily converted to an 8-pole or 12-pole relay by installing one or two adder decks. The Class 8501 Type XB20 comes with 2 convertible contact cartridges and will accept 2 additional convertible contact cartridges. The Class 8501 Type XB40 comes with 4 convertible contact cartridges. The same Type XB adder deck is used for both the middle and upper decks of the AC or DC relay. With 2 N.O. contact cartridges With 4 N.O. contact cartridges	 XB20 XB40	 **48.00** **98.00**
	Contact Cartridges—The Type X relay offers 4 Types of contact cartridges. All are color–coded for visual identification of each Type.		
	Standard Cartridge—The standard cartridge, used for most applications, has a black case.	XC1	**24.20**
	Overlapping Cartridge—Same NEMA Type A600 AC rating as standard cartridge and a NEMA Type P150 DC rating. When it is used in the N.O. mode it will close early and when used in the N.C. mode it will open late. If two or more are used together, the N.O. contacts will close before the N.C. contacts open as the relay picks up. Overlap also occurs during dropout. Overlapping cartridge has a red case. **May be ordered factory installed:** • Substitute 1 N.O. and 1 N.C. overlapping cartridges for 2 standard cartridges. • Substitute 2 N.O. and 2 N.C. overlapping cartridges for 4 standard cartridges. • Substitute 3 N.O. and 3 N.C. overlapping cartridges for 6 standard cartridges. • Substitute 4 N.O. and 4 N.C. overlapping cartridges for 8 standard cartridges.	XC2 **Form** **Y1591** **Y1592** **Y1593** **Y1594**	**24.20** **Add 24.20** **Add 24.20** **Add 24.20** **Add 24.20**
	Master Cartridge—Features the same contact ratings as the Type XC1 standard cartridge except it has a 20 ampere continuous current rating instead of 10 amperes. It can be used in circuits where a master relay is required. Master cartridge has a blue case. **Maximum of 6 master cartridges may be used on any 7 and 8-pole AC relays. Do not use any master cartridges on 9-12-pole AC or any DC-operated devices. Note: If master cartridges are added to a standard relay, attachments (latch mechanism, timers, etc.) cannot be used.**	XC4	**60.00**
	Logic Reed Cartridge—See logic reed adder deck above.		
	Mounting Track—The mounting track has pre-punched mounting holes to simplify mounting the track on the control panel. The relay mounting screws are factory installed on the track so that the relays can be hung prior to tightening the screws. 9 in. long for 4 relays 18 in. long for 8 relays 27 in. long for 12 relays 36 in. long for 16 relays	 XM4 XM8 XM12 XM16	 **19.70** **29.80** **36.40** **42.90**
	Manual Test Tool—Provides a means of manually switching the contacts of a basic relay or timing relay and holding all contacts in their switched state until the tool is removed. This simplifies the checking of control circuits without power on the coil or contacts.	XA1	**6.10**
	Transient Suppressor—Consists of an R-C circuit designed to suppress coil generated transients to approximately 200 percent of peak voltage. It is particularly useful when switching the Type X relay near solid state equipment. It is designed for use on coils up to 120 Vac.	XS1	**48.00**
	NEMA 1 Enclosure—Formed from sheet steel to provide strength and rigidity. Two conduit knockouts are located in both the top and bottom of the enclosure. The enclosure is furnished with self tapping screws for mounting the relay inside the enclosure. Accommodates a single 4 or 8-pole AC or DC relay, 12-pole AC relay, 4-pole AC latching relay, and 4-pole AC timing relay. Note: The 4-pole DC latching relay, 4-pole DC timing relay, 8-pole AC and DC latching relays and 12-pole utility auxiliary relay will not fit.	Class 9991 Type UE7	**29.60**

▲ See Mechanical Latch Attachment Voltage Codes table below:

Table 23.119: Mechanical Latch Attachment Voltage Codes

AC Voltage	Code	DC Voltage	Code
24–60	V01	6	V50
24–50	V12	12	V51
120–60/110–50	V02	18	V99
208–60	V08	24	V53
240–60/220–50	V03	48	V56
277–60	V04	72	V58
480–60/440–50	V06	90	V59
600–60/550–50	V07	115/125	V62
		230/250	V66

Table 23.120: How to Order

To Order Specify:	Catalog Number	
	Class	Type
• Class Number • Type Number • Voltage Code for mechanical latch attachment • Form for factory installed overlapping contacts	8501	XTE1

Table 23.121: Relay Coil Selection and Pricing

Device Type	Equipment To Be Serviced		Coil Prefix, or Class and Type	Hz	SUFFIX (The complete coil number consists of prefix or the Class and Type, followed by suffix.)													Coil Burden Watts	$ Price
	Class	Type			6 V	12 V	18 V	24 V	32 V	48 V	64 V	72 V	90 V	110 V	115/125 V	220 V	230/250 V		
DC	8501	XD	9998 XD	—	19	28	34	37	40	46	49	52	55	—	58	—	67	18	**168.00**
		XDL	9998 XDL	—	19	28	34B	37B	40B	46B	49B	52B	55B	—	58B	—	67B	50	**216.00**
		XUD	9998 XUD	—	19	28	—	37	—	46	—	—	—	—	58★	—	67♦	16	**168.00**

Device Type	Equipment To Be Serviced		Coil Prefix or Class and Type												Coil Volt-Amperes		$ Price
	Class	Type		—	24 V	110-115 V	120 V	208 V	220 V	240 V	277 V	380 V	440 V	480 V	550 V	600 V	In-rush	Sealed	
AC	8501	XO, XMO	9998 X ■	60	23	—	44	51	52	53	55	—	—	62	—	65	148	23	**69.00**
				50	24	44	—	52	53	—	—	—	62	—	65	—	143	25	

■ To order an unlatch coil add the letter "L" to the type number and the letter "B" to the suffix number. Example: for a 120 V 60 Hz unlatch coil order a Class 9998 Type XL44B.
♦ Not dual rated—250 Vdc only
★ 125 Vdc only

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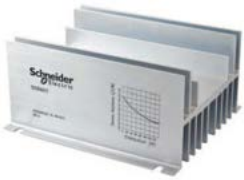
SSRPCDS25A1

SSRDCDS10A1

SSRDCDS45A1



SSRAH1

SSRAT1

Schneider Electric Solid State Relays

Solid state relays do not have any moving parts to wear out. Combined with vibration resistance, arc-less switching and the lack of acoustical noise, you have the ideal product for switching applications that demand reliable execution. For added reliability the Zelio™ SSRP and SSRD solid state relays utilize Direct Copper Bonding (DCB) technology to decrease internal temperatures and improve the overall quality of the product.

Key features include:

- Input voltage range 3 to 32 Vdc, 90 to 280 Vac
- Breaking capacities up to 125 A
- Zero voltage turn on, low EMI / RFI
- No moving parts
- Shock and Vibration resistant
- No acoustical noise
- Fast response
- Arc-less switching
- Long life (>10^9 operations)

Table 23.122: Solid State Relays

Switching	Voltage Range		Load Current Range	Catalog Number	$ Price ea.
	Input	Output			
	V	V	A		
Panel Mounted					
SCR Output Zero voltage switching	3•••32 DC	24•••280 AC	10	SSRPCDS10A1	**40.60**
			25	SSRPCDS25A1	**41.90**
			50	SSRPCDS50A1	**59.00**
	4•••32 DC	48•••530 AC	75	SSRPCDS75A2	**100.00**
		48•••660 AC	90	SSRPCDS90A3	**114.00**
			125	SSRPCDS125A3	**144.00**
	90•••280 AC	24•••280 AC	10	SSRPP8S10A1	**43.10**
			25	SSRPP8S25A1	**45.70**
			50	SSRPP8S50A1	**53.00**
		48•••530 AC	75	SSRPP8S75A2	**114.00**
		48•••660 AC	90	SSRPP8S90A3	**117.00**
			125	SSRPP8S125A3	**134.00**
MOSFET Output Instant switching	3.5•••32 DC	0•••100 DC	12	SSRPCDM12D5	**66.00**
			25	SSRPCDM25D5	**82.00**
			40	SSRPCDM40D5	**114.00**
DIN Rail Mounted					
SCR Output Zero voltage switching	4•••32 DC	24•••280 AC	10	SSRDCDS10A1	**58.00**
			20	SSRDCDS20A1	**81.00**
			30	SSRDCDS30A1	**85.00**
	3•••32 DC	24•••280 AC	45	SSRDCDS45A1	**100.00**
	90•••280 AC	24•••280 AC	10	SSRDP8S10A1	**61.00**
			20	SSRDP8S20A1	**70.00**
			30	SSRDP8S30A1	**78.00**
	90•••140 AC	24•••280 AC	45	SSRDF8S45A1	**106.00**

Table 23.123: Accessories For Panel Mount Solid State Relays

Description	For Use With Relays	Load Current Range	Catalog Number	$ Price ea.
Heat Sink	SSRPP8S••••	up to 50 A	SSRAH1	**26.00**
	SSRPCDS••••			
Pre-Cut Thermal Transfer Pad (sold in pack sof 10)	SSRPP8S••••	up to 125 A	SSRAT1	**2.30**
	SSRPCDS••••			

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Zelio ™ IEC Style—17.9 mm wide

Table 23.124: RE11 Modular Timers—17.9 mm wide (Multi-range timers offering 7 selectable ranges)

RE11RLMU

Output 1 C/O contact			
Functions	**Supply Voltages**	**Rated Current**	**Catalog Number**	**$ Price**
On delay	24 Vdc, 24–240 Vac	8A	RE11RAMU	**42.90**
Interval	24 Vdc, 24–240 Vac	8A	RE11RHMU	**42.90**
Asymmetrical repeat cycle	24 Vdc, 24–240 Vac	8A	RE11RLMU	**53.00**
Asymmetrical repeat cycle	12 Vac/Vdc	8A	RE11RLJU	**75.00**
One shot	24 Vdc, 24–240 Vac	8A	RE11RBMU	**52.00**
Off delay with control start	24 Vdc, 24–240 Vac	8A	RE11RCMU	**52.00**
Multi-function ▲	24 Vdc, 24–240 Vac	8A	RE11RMMU	**62.00**
Multi-function ▲	12–240 Vac/Vdc	8A	RE11RMMW	**75.00**
Multi-function ▲	12–240 Vac/Vdc	8A	RE11RMMWS	**75.00**
Multi-function ▲	12 Vac/Vdc	8A	RE11RMJU	**75.00**
Multi-function ■	24 Vdc, 24–240 Vac	8A	RE11RMEMU	**75.00**
Multi-function ▲	24 Vdc, 24–240 Vac	8A	RE11RMXMU	**75.00**

▲ Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr
■ Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr

Conforming to standards			IEC 61812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cULus File: E173076 CNN: NRNT
			File: E173076 CNN: NRNT7
			CSA File: 217698 Class 3211 07
			CE
			GL except RE11 RMX MU and RE11 RME MU
Ambient air temperature around the device	Storage	°F (°C)	–22 to +140 (–30 to +60)
	Operation	°F (°C)	–4 to +140 (–20 to +60)

RE11LHBM

Table 23.125: RE11 Modular Timers—17.9 mm wide (Multi-function, dual function or single function)

Functions	Supply Voltages	Rated Current	Catalog Number	$ Price
Solid state output				
On delay	24–240 Vac/Vdc	0.7A	RE11LAMW	**45.40**
Interval	24–240 Vac	0.7A	RE11LHBM	**42.90**
Off delay with control contact	24–240 Vac	0.7A	RE11LCBM	**52.00**
Asymmetrical repeat cycle	24–240 Vac	0.7A	RE11LLBM	**75.00**
Multi-function	24–240 Vac	0.7A	RE11LMBM	**62.00**

Timing ranges: 0.1–1 s, 1–10 s, 0.1–10 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr

Conforming to standards			IEC 61812-1, EN 50081-1/2, EN 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + EMC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cULus File: E173076 CNN: NRNT
			File: E173076 CNN: NRNT7
			CSA File: 217698 Class: 3211 07
			CE
Ambient air temperature around the device	Storage	°F (°C)	–22 to 140 (–30 to +60
	Operation	°F (°C)	–4 to 140 (–20 to +60)

RE48A TM12MW

Table 23.126: RE48 Panel Mount Timers (For required socket, refer to the catalog section)

Functions	Supply Voltages	Rated Current	Catalog Number	$ Price
Single function: on delay, two relay outputs	24–240 Vac/Vdc	2 x 5 A	RE48ATM12MW	**73.00**
Repeat cycle: two relay outputs	24–240 Vac/Vdc	2 x 5 A	RE48ACV12MW	**88.00**
Multi-function: on delay, one shot, off delay, repeat cycle	24–240 Vac/Vdc	2 x 5 A	RE48AML12MW	**86.00**
Multi-function: on delay and interval, two relay outputs, of which one selectable and instantaneous	24–240 Vac/Vdc	2 x 5A	RE48AMH13MW	**86.00**

Conforming to standards			IEC 61812-1, EN 50081-1/2, EM 50082-1/2, LV directives (73/23/EEC + 93/68/EEC (CE marking) + ENC directive (89/336/EEC + IEC 60669-2-3)
Approvals			cURus File: E173076 CNN: NRNT2
			File: E173076 CNN: NRNT8
			CSA File: 217698 Class: 3211 070
			CE, C-Tick, GL
			RoHS compliant as of date code 0625
Ambient air temperature around the device	Storage	°F (°C)	–40 to 158 (–40 to +70)
	Operation	°F (°C)	–4 to 122 (–20 to +50)

REXL2TMJD

Table 23.127: REXL Miniature Plug-in Timers (For required socket, refer to the catalog section)

		4 pole			2 pole		
Function	**Supply Voltages**	**Rated Current**	**Catalog Number**	**$ Price**	**Rated Current**	**Catalog Number**	**$ Price**
Single function (On-Delay	12 Vdc	3A	REXL4TMJD	**56.00**	5A	REXL2TMJD	**53.00**
	24 Vdc ♦	3A	REXL4TMBD	**56.00**	5A	REXL2TMBD	**53.00**
	24 Vac 50/60 Hz ♦	3A	REXL4TMB7	**56.00**	5A	REXL2TMB7	**53.00**
	120 Vac 50/60 Hz	3A	REXL4TMF7	**56.00**	5A	REXL2TMF7	**53.00**
	230 Vac 50/60 Hz	3A	REXL4TMP7	**56.00**	5A	REXL2TMP7	**53.00**
Timing Ranges	0.1–1 s, 1–10 s, 0.1–1 min, 1–10 min, 0.1–1 hr, 1–10 hr, 10–100 hr						

For 48 Vac supply, additional resistor 390 ohm 4 W / 24 V
♦ For 48 Vac supply, additional resistor 560 ohm 2 W / 24 V

Approvals: c UL us File CCN NRNT2, File CCN NRNT8; CSA File Class 217698 321107; CE IEC 61812-1; RoHS Compliant as of date code 0625

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Zelio ™ IEC Style—22.5 mm

RE7ML

These timers offer multi range timing from 0.05 to 300 hours, in 10 timing ranges.

Table 23.128: RE7M 6 Function and 8 Function Timers

Function	Supply Voltages	Relay Output	Catalog Number	$ Price
6 Function Timer				
On-Delay Timer Off-Delay Timer Interval Timer • start on energization • start on opening of remote control contact Repeat Cycle Timer with start during the OFF period. Repeat Cycle Timer with start during the ON period External control possible for: • start of time delay • partial stop of time delay • adjustment of time delay	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O, SPDT	RE7ML11BU	**226.00**
8 Function Timer				
Same as 6 Function Timer ▲ plus Timer for star-delta starting • with double On-Delay timing • with changeover contact to star connection	24 Vdc or Vac 110–240 Vac	2 C/O, DPDT	RE7MY13BU	**252.00**
	24–240 Vdc or Vac	2 C/O, DPDT	RE7MY13MW	**277.00**

▲ Except control of partial stop of time delay for RE7MY13BU.

RE7T

Table 23.129: RE7T On-Delay Timers

Functions	Supply Voltages	Relay Output	Catalog Number	$ Price
On-Delay Timer	24 Vdc or Vac 110–240 Vac	1 C/O, SPDT	RE7TL11BU	**138.00**
On-Delay Timer External control possible for: • start of time delay • partial stop of time delay • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110-240 Vac	1 C/O, SPDT	RE7TM11BU	**177.00**
On-Delay Timer Remote control possible for: adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O♦, DPDT	RE7TP13BU	**189.00**

RE7M

Table 23.130: RE7M Symmetrical and Asymmetrical Timers

Functions	Supply Voltages	Relay Output	Catalog Number	$ Price
Symmetrical Timers: On and Off delay times are equal.				
On-Delay and Off-Delay Timer External control possible for: • partial stop of time delay • adjustment of time delay ■ Start control via external contact only	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O, SPDT	RE7MA11BU	**194.00**
On-Delay and Off-Delay Timer Start control via external contact only	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O ♦, DPDT	RE7MA13BU	**208.00**
Asymmetrical Timers: On and Off delay times are adjusted separately.				
On-Delay and Off-Delay Timer External control possible for: • partial stop of time delay • adjustment of time delay ■ Start control via external contact only	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O, SPDT	RE7MV11BU	**214.00**

■ By external potentiometer, to be ordered separately (see page 3 of Catalog **9050CT0001** for specifications). If external potentiometer is used, the internal potentiometer is automatically disconnected.

♦ A switch on the front face of the timer allows the second contact to be used in instantaneous mode.

Table 23.131: Output Circuit Specifications for RE7

Current Limit, Ith		8 A		
Rated Operational Limits at 70°C		24 V	115 V	250 V
Conforming to IEC60947-5-1/1991 and VDE 060	AC-15 N.C. contact	3 A	3 A	3 A
	AC-15 N.O. contact	5 A	5 A	5 A
	DC-13 N.O. contact	2 A	0.2 A	0.1A
UL and CSA Current	Resistive Rating	5A		
NEMA / UL B300	Inductive Rating	3600 VA Make, 360 VA Break, 5 A Carry		

Table 23.132: Output Circuit Specifications for RE8

Maximum Switching Voltage		250 Vac/Vdc		
Current Limit Ith		8 A		
Rated Operational Limits at 150°F (70°C)		24 V	115 V	250 V
Conforming to IEC 60947-5-1/1991 and VDE 0660	AC-15	3 A	3 A	3 A
	DC-13	2 A	0.2 A	0.1 A
UL and CSA Current Ratings (Resistive)		5 A		
NEMA / UL B300 Ratings (Inductive)		3600 VA Make, 360 VA Break. 5 A Carry		

RE7, RE8, and RE9 Timers comply to the following:

Conforming to Standards		IEC 61812-1, EN 61812-1
Product Approvals		c UL us LISTED File E164353 NKCR; CSA File 089150 Class 3211-07; CE IEC 61812-1
CE Marking		RE7, RE8, and RE9 Timers conform to European regulations relating to CE Marking
Ambient Air Temperature	**Storage**	-40°F to +185°F (-40°C to +85°C)
	Operation	-4°F to +140°F (-20°C to +60°C)

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Zelio ™ IEC Style—22.5 mm

RE7R

Table 23.133: RE7R Timers Off-Delay Timers

Functions	Supply Voltages	Relay Output	Catalog Number	$ Price
On De-energization, Adjustable from 0.05 s to 10 min, in 7 Ranges				
Off-Delay Timer (Times without power)	24–240 Vdc or Vac	1 C/O SPDT	RE7RB11MW▲	**189.00**
Off-Delay Timer Remote control possible for: • adjustment of time delay■	24–240 Vdc or Vac	2 C/O DPDT	RE7RB13MW▲	**214.00**
On Opening of External Control Contact, Adjustable from 0.05 s to 300 h, in 10 Ranges				
Off-Delay Timer External control possible for: • partial stop of time delay • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7RA11BU	**164.00**
On opening of Low Level External Control Contact, Adjustable from 0.05 s to 300 h, in 10 Ranges				
Off-Delay Timer External control possible for: • partial stop of time delay • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7RM11BU	**177.00**
Off-Delay Timer	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O♦, DPDT	RE7RL13BU	**189.00**

▲ If the device has been stored de-energized for more than a month, it must be energized for about 15 seconds to activate it. Subsequently, a time of > 1 s is enough to activate the time delay.
Note: If this time is not complied with, the relay will remain energized indefinitely.

RE7P

Table 23.134: RE7P Interval Timers

Functions	Supply Voltages	Relay Output	Catalog Number	$ Price
Start on Energization				
Interval Timer	24 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7PE11BU	**151.00**
Interval Timer External control possible for: • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O ♦ DPDT	RE7PP13BU	**189.00**
Start on Opening of External Control Contact				
Interval Timer External control possible for: • partial stop of time delay • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7PM11BU	**151.00**
Interval Timer	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O ♦ DPDT	RE7PD13BU	**189.00**

RE7C

Table 23.135: RE7C Timers Symmetrical and Asymmetrical Relays

Functions	Supply Voltages	Relay Output	Catalog Number	$ Price
Symmetrical Relays with Start during Off Period				
Repeat Cycle Timer	24 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7CL11BU	**164.00**
Repeat Cycle Timer External control possible for: • adjustment of time delay ■	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	2 C/O ♦ DPDT	RE7CP13BU	**202.00**
Asymmetrical, with Separate Adjustment of On-Delay and Off-Delay				
Repeat Cycle Timer External control possible for: • start period • adjustment of time delays ■ • partial stop	24 Vdc or Vac 42–48 Vdc or Vac 110–240 Vac	1 C/O SPDT	RE7CV11BU	**214.00**

■ By external potentiometer, to be ordered separately (see page 3 of Catalog **9050CT0001** for specifications). If external potentiometer is used, the internal potentiometer is automatically disconnected.
♦ A switch on the front face of the timer allows the second contact to be used in instantaneous mode.

For conformance to standards, see page 23-32

RoHS Compliant as of date code 0626

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Zelio™ IEC Style—22.5 mm

RE8TA

Table 23.136: On-Delay (timing starts on energization), TDE

Relay Output	Supply Voltages	Timing Range ▲	Catalog Number	Standard Pack Quantity ■	$ Price
1 C/O SPDT	24 Vdc or Vac 110–240 Vac	0.1–3 s	RE8TA61BUTQ	10	**75.00**
		0.1–10 s	RE8TA11BUTQ ★	10	**75.00**
		0.3–30 s	RE8TA31BUTQ ★	10	**75.00**
		3–300 s	RE8TA21BUTQ ★	10	**75.00**
		20 s–30 min	RE8TA41BUTQ	10	**75.00**

Table 23.137: Off-Delay (timing starts on de-energization), TDD

Control Contact					
1 C/O SPDT	24 Vdc or Vac	0.1–10 s	RE8RA11BTQ ★	10	**95.00**
		0.3–30 s	RE8RA31BTQ	10	**95.00**
		3–300 s	RE8RA21BTQ ★	10	**95.00**
	110–240 Vac	0.1–10 s	RE8RA11FUTQ ★	10	**95.00**
		0.3–30 s	RE8RA31FUTQ	10	**95.00**
		3–300 s	RE8RA21FUTQ ★	10	**95.00**
		20 s–30 min	RE8RA41FUTQ	10	**95.00**
Self-Powered (Times without power)					
1 C/O SPDT	24 Vdc or Vac 110–240 Vac	0.05–0.5 s	RE8RB51BUTQ	10	**105.00**
		0.1–10 s	RE8RB11BUTQ	10	**105.00**
		0.3–30 s	RE8RB31BUTQ	10	**105.00**

★ Also available in pack of one; delete TQ from the end of the catalog number. Example: RE8TA11BU.

Table 23.138: Repeat Cycle Timer

Relay Output	Supply Voltages	Timing Range ▲	Catalog Number	Standard Pack Quantity ■	$ Price
1 C/O SPDT	24 Vdc or Vac 110–240 Vac	0.1–10 s	RE8CL11BUTQ	10	**105.00**

RE8PE

Table 23.139: Interval Timer

On Energization					
1 C/O SPDT	24 Vdc or Vac 110–240 Vac	0.1–10 s	RE8PE11BUTQ	10	**87.00**
		0.3–30 s	RE8PE31BUTQ	10	**87.00**
		3–300 s	RE8PE21BUTQ	10	**87.00**
By Control Contact					
1 C/O SPDT	24 Vdc or Vac	0.1–10 s	RE8PD11BTQ	10	**101.00**
		0.3–30 s	RE8PD31BTQ	10	**101.00**
		3–300 s	RE8PD21BTQ	10	**101.00**
	110–240 Vac	0.1–10 s	RE8PD11FUTQ	10	**101.00**
		0.3–30 s	RE8PD31FUTQ	10	**101.00**
		3–300 s	RE8PD21FUTQ	10	**101.00**
On De-Energization					
1 C/O SPDT	24 Vdc or Vac 110–240 Vac	0.05–1 s	RE8PT01BUTQ	10	**107.00**

▲ For easier adjustment, it is preferable to set the time delay between the maximum value in the range and one tenth of this value. Example: RE8TA11BUTQ timing range 0.1–10 s, recommended use 1–10 s.

■ Orders must specify standard pack quantity or multiples of that quantity.

For technical information, refer to . . . . . page 23-32.

RE9TA

Table 23.140: On-Delay Timer (Solid State Output)

Power Supply Circuit	Function	Timing Range ♦	Catalog Number	$ Price
24–240 Vac or Vdc	On-Delay	0.1–10 s	RE9TA11MW	**87.00**
		0.3–30 s	RE9TA31MW	**87.00**
		3–300 s	RE9TA21MW	**87.00**
		40 s–60 min	RE9TA51MW	**87.00**

Table 23.141: Off-Delay Timer (Solid State Output)

24–240 Vac	Off-Delay	0.1–10 s	RE9RA11MW7	**126.00**
		0.3–30 s	RE9RA31MW7	**126.00**
		3–300 s	RE9RA21MW7	**126.00**
		40 s–60 min	RE9RA51MW7	**126.00**

♦ For easier adjustment, it is preferable to set the time delay between the maximum value in the range and one tenth of this value. Example: RE9TA11MW timing range 0.1-10 s, recommended use 1-10 s.

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For technical information, refer to catalog **9050CT0001**.

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Square D™ General Purpose Plug-In

9050JCK46V20

9050JCK timing relays are designed to provide low-cost timing in a plug-in housing. The Types JCK11 thru 59 provide ±1% repeat accuracy. The Types JCK60 and 70 offer ±0.1% repeat accuracy. These timers are directly interchangeable with many other 8 and 11 pin tube base timers.

- Up to ±0.1% repeat accuracy
- Timing from 0.05 seconds to 999 hours
- Available in 5 timing modes
- DPDT contacts (2 N.O. and 2 N.C.)
- 10 A contact rating
- Transient protected
- Hold down spring available
- Variable or fixed time delay
- Horsepower rated
- RoHS compliant

Table 23.142: Variable Time Delay

Knob Adjustable Timing Range	On Delay	$ Price	Off Delay■	$ Price	Off Delay Power Trigger	$ Price	Interval	$ Price	One Shot■	$ Price	One Shot Power Trigger	$ Price	Repeat Cycle▲	$ Price
0.1–10 seconds	JCK11△	**78.00**	JCK21△	**98.00**	JCK21PT△	**98.00**	JCK31△	**78.00**	JCK41△	**98.00**	JCK41PT△	**98.00**	JCK51△	**140.00**
0.3–30 seconds	JCK12△	**78.00**	JCK22△	**98.00**	JCK22PT△	**98.00**	JCK32△	**78.00**	JCK42△	**98.00**	JCK42PT△	**98.00**	JCK52△	**140.00**
0.6–60 seconds	JCK13△	**78.00**	JCK23△	**98.00**	JCK23PT△	**98.00**	JCK33△	**78.00**	JCK43△	**98.00**	JCK43PT△	**98.00**	JCK53△	**140.00**
1.2–120 seconds	JCK14△	**78.00**	JCK24△	**98.00**	JCK24PT△	**98.00**	JCK34△	**78.00**	JCK44△	**98.00**	JCK44PT△	**98.00**	JCK54△	**140.00**
1.8–180 seconds	JCK15△	**78.00**	JCK25△	**98.00**	JCK25PT△	**98.00**	JCK35△	**78.00**	JCK45△	**98.00**	JCK45PT△	**98.00**	JCK55△	**140.00**
0.1–10 minutes	JCK16△	**87.00**	JCK26△	**107.00**	JCK26PT△	**107.00**	JCK36△	**87.00**	JCK46△	**107.00**	JCK46PT△	**107.00**	JCK56△	**147.00**
0.3–30 minutes	JCK17△	**87.00**	JCK27△	**107.00**	JCK27PT△	**107.00**	JCK37△	**87.00**	JCK47△	**107.00**	JCK47PT△	**107.00**	JCK57△	**98.00**
0.6–60 minutes	JCK18△	**87.00**	JCK28△	**107.00**	JCK28PT△	**107.00**	JCK38△	**87.00**	JCK48△	**107.00**	JCK48PT△	**107.00**	JCK58△	**98.00**
1.2–120 minutes	JCK19△	**87.00**	JCK29△	**107.00**	JCK29PT△	**107.00**	JCK39△	**87.00**	JCK49△	**107.00**	JCK49PT△	**107.00**	JCK59△	**98.00**

▲ Two dials are provided for independently adjustable repeat cycle timing ranges.
■ Initiating contact can be up to 50 feet from the timer.

Table 23.143: Fixed Time Delay

Timing Mode	Type	Timing Range (seconds)	$ Price
On Delay	JCK1F(XXXX)♦△	0.1 to 180	**78.00**
		181 to 3600	**87.00**
Off Delay ▼	JCK2F(XXXX)♦△	0.1 to 180	**98.00**
		181 to 3600	**107.00**
Off Delay with Power Trigger	JCK2F(XXXX)PT♦△	0.1 to 180	**98.00**
		181 to 3600	**107.00**
Interval	JCK3F(XXXX)♦△	0.1 to 180	**78.00**
		181 to 3600	**87.00**
One Shot▼	JCK4F(XXXX)♦△	0.1 to 180	**98.00**
		181 to 3600	**107.00**
One Shot with Power Trigger	JCK4F(XXXX)PT♦△	0.1 to 180	**98.00**
		181 to 3600	**107.00**
Repeat Cycle	JCK5F(XXXX)♦★△	0.1 to 180	**140.00**
		181 to 3600	**147.00**

♦ (XXXX) denotes the timing period in seconds.
Example: Class 9050 Type JCK1F60 is an On Delay timer fixed at 60 seconds.
★ Fixed repeat cycle timers can be supplied with the same or different On-Time and Off-Time.
▼ Initiating contact can be up to 50 feet from the timer.
△ Voltage code must be specified to order this product. Refer to standard voltage codes listed below and insert as shown in How To Order.

Class 8501 Sockets

For sockets, see page 23-14
For DIN rail, see page 24-16

For all 9050JCK timers:

With appropriate 8501NR Socket:

File CCN E78351 NLDX — File Class 214768 3211 07

Without Socket

File CCN E78351 NLDX2 — IEC 60947-1 — RoHS Compliant as of date code — 9050JCK1-5 = 0627 9050JCK6070=0648

Table 23.144: Voltage Codes

Voltage	Code
12 Vdc	V36
24 Vac/Vdc	V14
48 Vac/Vdc	V17
120 Vac/110 Vdc	V20
240–50/60 Vac	V24

Table 23.145: Contact Ratings

AC Volts	AC Amperes				hp	DC Volts	DC Amperes		
	Inductive 35% P.F.			Res. 75% P.F. Make Break and Continuous			Inductive		Res. Make Break and Continuous
	Make	Break	Continuous				Make	Break	
120	30	3	10	10	1/3	28	3	3	10
240	15	1.5	10	10	1/2				

AC15 / B300 (NO/NC)
DC13 / R300 (NO)

Type JCK60

This On Delay timer uses a 5 position rotary switch to select the timing range. The three pushbutton thumbwheels are used to select the time value.

Table 23.146: Selection and Pricing

Timing Modes	Timing Ranges		Type	$ Price
On Delay	.01s	0.05–9.99 seconds	JCK60△	**152.00**
	0.1s	00.1–99.9 seconds		
	S	001–999 seconds		
	0.1m	00.1–99.9 minutes		
	M	001–999 minutes		
	0.1h	00.1–99.9 hours		
	H	001–999 hours		

Type JCK70

Two 5 position rotary switches are used to select the timing mode and timing range. The three pushbutton thumbwheels are used to select the time value.

Table 23.147: Selection and Pricing

Timing Modes	Timing Range	Type	$ Price
On Delay Off Delay Interval One Shot Repeat Cycle□	Same as JCK60	JCK70△	**173.00**

□ The repeat cycle mode utilizes the same on-time and off-time.

Table 23.148: Class 8501 Hold Down Spring

For use on Class 9050 Type JCK Timers	Class	Type	$ Price ea.
Hold down spring holds timer in socket during heavy vibration. (See 9050JCK with 8501NH7 photo at the top of this page.)	8501	NH7	**8.30**

Table 23.149: How to Order

To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
• Class Number • Type Number • Voltage Code	9050	JCK11	V20

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REG24PTP1RHU

REG48PUN1RHU

REG96PUN1RHU

Zelio™ Temperature Controllers

The new Zelio REG temperature controllers offer seamless interfacing with solid state relays, electromechanical relays, PLCs, variable speed drives and HMI displays make them a key component to controlling the temperature in your process.

Offer includes 3 versions:

- A 24x48 mm (1/32 DIN) cost effective solution for basic temperature control needs.
- A 48x48 mm (1/16 DIN) balanced version for optimal price and functionality.
- A 96x48 mm (1/8 DIN) full-featured version for complete performance and function.

Key features include:

- Modbus communication for easy data exchange with other automation products
- Simple parameter settings
- IP66 certification enables dust resistance
- Flash memory (saves configurations)
- Compatible with a wide range of sensors
- Advanced Functions (standard): PID, fuzzy logic, auto-tuning, soft start
- Optimized programming
  - — Common software for all products in the temperature relay range (freely downloadable from www.schneider-electric.us).
  - — A single cable enables connection to both a computer and PLCs.
  - — Simple adjustment of parameters.
  - — Saving of configurations.

Table 23.150: Zelio Temperature Controllers

Input Type	Supply Voltage	Number and Type of Outputs	Alarms	Communication on Modbus	Catalog Number	$ Price
28 x 48 Size — 1/32 DIN Standard						
Thermocouple PT100 Probe	100/240 Vac	1 electromechanical relay	No	Yes	REG24PTP1RHU	**209.00**
		1 electromechanical relay	1	Yes	REG24PTP1ARHU	**186.00**
		1 solid state relay	No	Yes	REG24PTP1LHU	**216.00**
		1 solid state relay	1	No	REG24PTP1ALHU	**192.00**
		1 analog interface (4–20 mA)	No	Yes	REG24PTP1JHU	**219.00**
	24 Vac/Vdc	1 electromechanical relay	No	Yes	REG24PTP1RLU	**209.00**
		1 solid state relay	No	Yes	REG24PTP1LLU	**216.00**
		1 analog interface (4–20 mA)	No	Yes	REG24PTP1JLU	**219.00**
Voltage/current	100/240 Vac	1 electromechanical relay	No	Yes	REG24PUJ1RHU	**209.00**
		1 solid state relay	No	Yes	REG24PUJ1LHU	**216.00**
	24 Vac/Vdc	1 electromechanical relay	No	Yes	REG24PUJ1RLU	**219.00**
		1 solid state relay	No	Yes	REG24PUJ1LLU	**216.00**
48 x 48 Size — 1/16 DIN Standard						
Universal	100/240 Vac	1 electromechanical relay	2	Yes	REG48PUN1RHU	**252.00**
				No	REG48PUNL1RHU	**226.00**
		2 electromechanical relays	2	Yes	REG48PUN2RHU	**292.00**
		1 solid state relay	2	Yes	REG48PUN1LHU	**258.00**
				No	REG48PUNL1LHU	**234.00**
		1 solid state relay + 1 electromechanical relay	2	Yes	REG48PUN2LRHU	**295.00**
		1 analog interface (4–20 mA)	2	Yes	REG48PUN1JHU	**260.00**
		1 solid state relay + 1 analog interface (4–20 mA)	2	Yes	REG48PUN2LJHU	**298.00**
	24 Vac/Vdc	1 electromechanical relay	2	Yes	REG48PUN1RLU	**252.00**
		2 electromechanical relays	2	Yes	REG48PUN2RLU	**292.00**
		1 solid state relay	2	Yes	REG48PUN1LLU	**258.00**
		1 solid state relay + 1 electromechanical relay	2	Yes	REG48PUN2LRLU	**295.00**
		1 analog interface (4–20 mA)	2	Yes	REG48PUN1JLU	**260.00**
		1 solid state relay + 1 analog interface (4–20 mA)	2	Yes	REG48PUN2LJLU	**298.00**
98 x 48 Size — 1/8 DIN Standard						
Universal	100/240 Vac	1 electromechanical relay	3	Yes	REG96PUN1RHU	**336.00**
				No	REG96PUNL1RHU	**311.00**
		2 electromechanical relays	3	Yes	REG96PUN2RHU	**381.00**
		1 solid state relay	3	Yes	REG96PUN1LHU	**343.00**
				No	REG96PUNL1LHU	**317.00**
		1 solid state relay + 1 electromechanical relay	3	Yes	REG96PUN2LRHU	**383.00**
		1 analog interface (4–20 mA)	3	Yes	REG96PUN1JHU	**345.00**
		1 solid state relay + 1 analog interface (4–20 mA)	3	Yes	REG96PUN2LJHU	**385.00**
	24 Vac/Vdc	1 electromechanical relay	3	Yes	REG96PUN1RLU	**336.00**
		2 electromechanical relays	3	Yes	REG96PUN2RLU	**381.00**
		1 solid state relay	3	Yes	REG96PUN1LLU	**343.00**
		1 solid state relay + 1 electromechanical relay	3	Yes	REG96PUN2LRLU	**384.00**
		1 analog interface (4–20 mA)	3	Yes	REG96PUN1JLU	**345.00**
		1 solid state relay + 1 analog interface (4–20 mA)	3	Yes	REG96PUN2LJLU	**385.00**

Table 23.151: Temperature Controller Accessories

Description	For Use With Relays	Sold In Lots Of	Catalog Number	$ Price
Bracket for mounting on DIN rail	24 x 48 mm (1/32 DIN)	4	REG24PSOC	**21.90**
Terminal block cover	48 x 48 mm (1/16 DIN)	2	REG48PCOV	**30.30**
	96 x 48 mm (1/8 DIN)	2	REG96COV	**37.10**

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RM17JC00MW

RM35JA31MW

RM35JA32MW

Zelio™ Current Measurement Relays

Zelio Current Measurement Relays are designed to measure under and overcurrent, without external sensors. Current measurement relays enable continuous monitoring of the operation of electrical and mechanical loads such as motors and resistors. They are DIN rail mountable and the control status is indicated by an LED.

RM17JC Current Control Relay

- Monitors a.c. currents
- Designed to monitor overcurrent
- Equipped with an integrated current transfmormer

RM35JA Current Control Relays

- Selection between overcurrent or undercurrent
- Automatic d.c. or a.c. recognition
- Selectable memory function

Table 23.152:

Supply Voltage	Measurement Range		Output 5Amps	Width		Catalog Number	$ Price
	Range▲	Terminals		Inches	mm		
24–240 Vac/dc	2–20 A	N/A	1 C/O	0.69	17.50	RM17JC00MW	**130.00**
	2–20 mA	E1-M	2 C/O	1.38	35.00	RM35JA31MW	**148.00**
	10–100 mA	E2-M					
	50–500 mA	E3-M					
	0.15–1.5 A	E1-M				RM35JA32MW	**177.00**
	0.5–5 A	E2-M					
	1.5–15 A	E3-M					

▲ Above 15A, a current transformer can be connected (for RM35JA3•MW). See page 57 of the catalog for suggested wiring.

Table 23.153: Output Characteristics and Measurement Circuit Characteristics

Type of Relay		RM17JC00MW	RM35JA31MW	RM35JA32MW
Setting accuracy		Plus or minus 10% of the full scale value		
Repeat accuracy (with constant parameters)		Plus or minus 0.5%		
Hysteresis		15% of the threshold setting, fixed	5 to 50% of the threshold setting, adjustable	
Time delay accuracy (with constant parameters)		N/A	plus or minus 2%	
Time delay on pick-up		500ms	300ms	
Conforming to standards		NF EN 60255-6		
Ambient air temperature around the device	Storage	-40 to 158 degrees F (-40 to +70°C)		
	Operational	-4 to 122 degrees F (-20 to +50°C)		

Approvals:

c UL us LISTED — File CNN E173076 NRNT

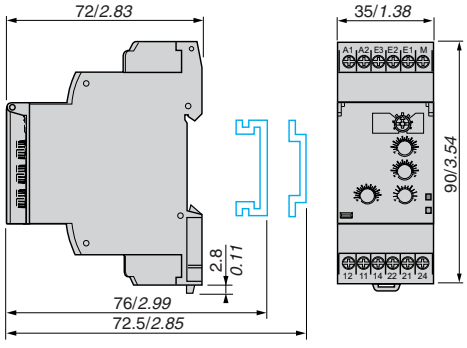
SA — File Class 217698 3211 07

CE — CE: 73/23/EEC and EMC 89/336/EEC

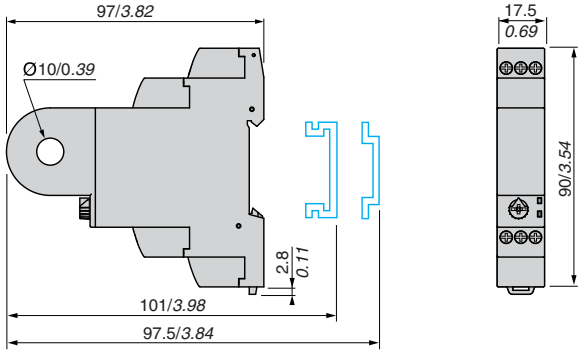
GL, C-Tick, GOST, RoHS

Approximate Dimensions

RM35JA3•MW



RM17JC00MW



1 C/O =

2 C/O =

Dual Dimensions: **INCHES** Millimeters

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RM17TG•0

RM17TA00

RM17TE00

RM35TM••MW

RM35TF30

1 C/O =

2 C/O =

2 N/O =

Zelio™ Phase Measurement Relays

Zelio Phase Measurement Relays monitor their own power supply. Relay status is indicated by an LED and they are DIN rail mountable.

RM17TG•0 measurement and control relays are for monitoring of 3-phase supplies for the correct sequencing of phases L1, L2, and L3, as well as the total loss of one or more phases.

Table 23.154: 3-Phase supply control relays

Supply Voltage	Detection Threshold	Output 5 Amps	Width		Catalog Number	$ Price
			inches	mm		
208–480 Vac	<100 Vac	1 C/O	0.69	17.50	RM17TG00	114.00
208–440 Vac		2 C/O			RM17TG20	125.00

Table 23.155: Multifunction 3-phase supply control relays

Supply Voltage	Voltage Range	Output 5 Amps	Width		Catalog Number	$ Price
			inch	mm		
208–480 Vac	Selectable voltages: 208, 220, 380, 400, 415, 440, 480	1 C/O	0.69	17.50	RM17TT00	136.00
					RM17TA00	177.00
					RM17TU00	131.00
					RM17TE00	217.00

Table 23.156: RM17TT, RM17TA, RM17TU, and RM17TE multifunction control relays monitor the following on 3-phase supplies:

Function	RM17TT	RM17TA	RM17TU	RM17TE
Sequence of phases L1, L2 and L3	Yes	Yes	Yes	Yes
Phase failure with regeneration (0.7 x selected voltage range)	Yes	Yes	Yes	Yes
Asymmetry (phase imbalance)	No	Yes	No	Yes
Undervoltage	No	No	Yes	No
Overvoltage and undervoltage	No	No	No	Yes

Table 23.157: 3-phase supply and motor temperature control relays

Supply Voltage	Measurement Range	Output 5 Amps	Width		Catalog Number	$ Price
			inch	mm		
220–480 Vac	208–480 Vac	2 N.O.	1.38	35.00	RM35TM50MW	221.00
					RM35TM250MW	231.00

Table 23.158: RM35TM control relays monitor the following on 3-phase supplies:

Function	RM35TM50MW	RM35TM250MW
Sequence of phases L1, L2 and L3	Yes	Yes
Phase failure	Yes	Yes
Motor temperature via PTC probe	Yes	Yes
Selection (with or without memory)	No	Yes
Test-reset button	No	Yes

RM35TF30 measurement and control relay is for monitoring of phase sequence, phase failure, asymmetry, undervoltage and overvoltage in window mode.

Table 23.159: Multifunction 3-phase supply control relays

Supply Voltage	Measurement Range	Output 5 Amps	Width		Catalog Number	$ Price
			inch	mm		
220–480 Vac	194–528 Vac	2 C/O	1.38	35.00	RM35TF30	273.00

Approvals:

c UL us LISTED File CNN E173076 NRNT

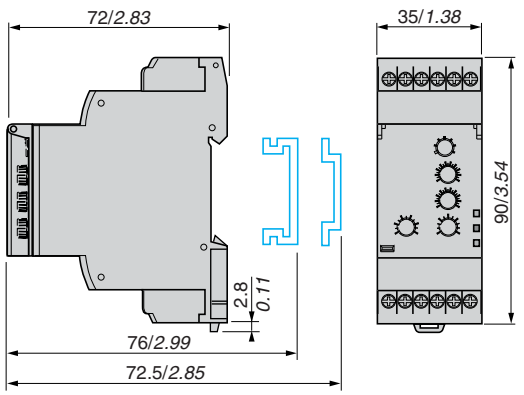
SP File Class 217698 3211 07

CE: 73/23/EEC and EMC 89/336/EEC

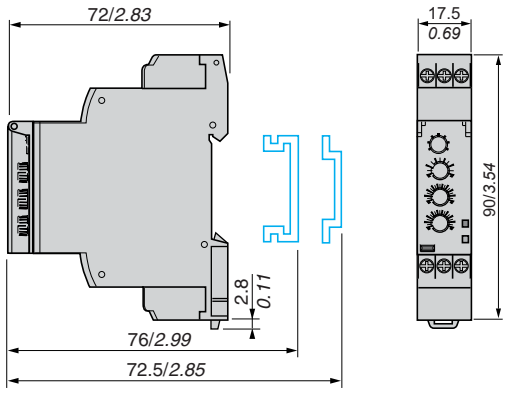
GL, C-Tick, GOST, RoHS

Approximate Dimensions

RM35•



RM17•



Dual Dimensions: **INCHES** Millimeters

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RM17UB310

RM35UB3•••

RM17UAS••

RM35UA1•MW

Zelio™ Voltage Measurement Relays

Zelio Voltage Measurement Relays are DIN rail mountable and relay status is indicated by an LED.

Single phase and d.c. voltage measurement and control relays RM17UAS•• and RM17UBE•• monitor:

- Overvoltage
- Undervoltage
- Overvoltage and undervoltage (window mode)
- Nominal voltages

Table 23.160: Single-phase and d.c. voltage control relays

Supply Voltage	Ranges Controlled	Output 5 A	Width		Catalog Number	$ Price
			in.	mm		
12 Vdc	9–15 Vdc	1 C/O	0.69	17.50	RM17UAS14▲	138.00
24–48 Vac/Vdc	20–80 Vac/Vdc				RM17UAS16▲	138.00
110–240 Vac/Vdc	65–260 Vac/Vdc				RM17UAS15▲	138.00
24–48 Vac/Vdc	20–80 Vac/Vdc				RM17UBE16■	146.00
110–240 Vac/Vdc	65–260 Vac/Vdc				RM17UBE15■	146.00

▲ Provides overvoltage or undervoltage protection.
■ Provides overvoltage and undervoltage protection in window mode.

Multifunction voltage control relays RM35UA1•MW monitor both a.c. and d.c. voltages.

- Automatic Vdc or Vac recognition
- Selection between overvoltage and undervoltage

Table 23.161: Multifunction voltage control relays

Supply Voltage	Measurement Range		Output 5 A	Width		Catalog Number	$ Price
	Range★	Terminals		in.	mm		
24–240 Vac/Vdc	0.05–0.5 V	E1-M	2 C/O	1.38	35.00	RM35UA11MW	157.00
	0.3–3 V	E2-M					
	0.5–5	E3-M					
	1–10	E1-M				RM35UA12MW	157.00
	5–50	E2-M					
	10–100	E3-M					
	15–150	E1-M				RM35UA13MW	157.00
	30–300	E2-M					
	60–600	E3-M					

3-phase voltage control relays monitor:

- Failure of one or more phases
- Voltage between phases
- Absence of neutral
- Voltage between phases and neutral
- Overvoltage and undervoltage

Table 23.162: Three-phase voltage control relays

Rated 3-Phase Supply Voltage Vac	Measurement Range	Output 5 A	Width		Catalog Number	$ Price
			in.	mm		
220–480 phase-phase	195–528 Vac	1 C/O + 1 C/O 1 per threshold	1.38	35.00	RM35UB330♦	229.00
120–277 phase-neutral	183–528 Vac	1 C/O	0.69	17.50	RM17UB310♦	189.00
120–277 phase-neutral	114–329 Vac	1 C/O + 1 C/O 1 per threshold	1.38	35.00	RM35UB3N30★	254.00

♦ Provides overvoltage and undervoltage protection between phases.
★ Provides overvoltage and undervoltage protection between phases and neutral and absence of neutral.

Approvals:

c UL us LISTED File CNN E173076 NRNT

File Class 217698 3211 07

CE: 73/23/EEC and EMC 89/336/EEC

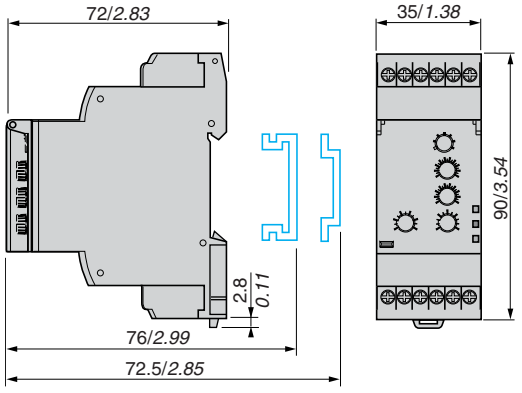
GL, C-Tick, GOST, RoHS

Approximate Dimensions

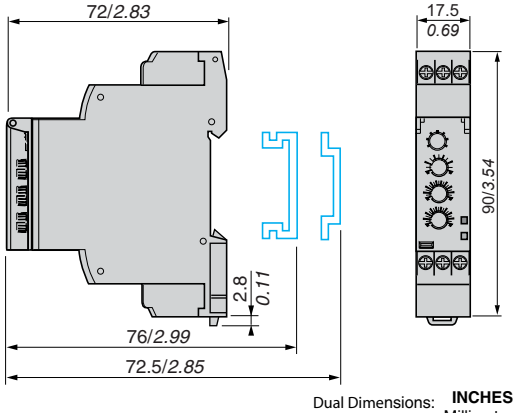
1 C/O =

2 C/O =

RM35•



RM17•



Dual Dimensions: **INCHES** Millimeters

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RM35LM33MW

RM35LV14MW

RM79696043

LA9RM201

RM79696006

RM35BA10

1 C/O =

2 C/O =

Zelio™ Level Control Relays and Zelio™ Pump Control Relays

Zelio level control relays control one or two levels with fill or empty function. The settings are protected by a sealable cover, control status is indicated by an LED, and they are DIN rail mountable. RM35LM is designed to control levels of conductive liquid, and RM35LV is designed to control levels of other materials.

Application examples for RM35LM:

- Detecting pump seal failures
- Spring, town, industrial and sea water
- Metallic salt, acid or base solutions
- Liquid fertilizers
- Non-concentrated alcohol (<40%)
- Liquids in the food-processing industry: milk, beer, coffee, etc.

Application examples for RM35LV:

- Chemically pure water
- Fuels, liquid gasses (inflammable)
- Oil, concentrated alcohol (>40%)
- Ethylene, glycol, paraffin, varnish and paints

Table 23.163: Level Control Relays

Time Delay on Crossing the Threshold	Function	Output Relay	Supply Voltage 50/60 Hz	Measurement Ranges	Catalog Number	$ Price
0.1–5 seconds, 0 + 10%	Detection by resistive probes	2 C/O, 5A	24–240 Vac/Vdc	250 Ω–5 kΩ 5 kΩ–100 kΩ 50 kΩ–1 MΩ	RM35LM33MW	115.00
	Detection by discrete sensors	1 C/O, 5A		—	RM35LV14MW	146.00

Table 23.164: Probes

Application	No. of probes	Operating temperature °F	Operating temperature °C	Maximum pressure kg/cm²	Catalog Number	$ Price
Recommended for drink vending machines and where installation space is limited (stainless steel)▲	3	176	80	2	RM79696044	78.00
Suitable for boilers, pressure vessels, and under high temperature conditions (1) (304 stainless steel)▲	1	392	25	200	RM79696014	95.00

▲ 3/8" BSP mounting thread with hexagonal head. Use a 24mm spanner for tightening.

Table 23.165: Probes

Description	Catalog Number	$ Price
Protected probe for mounting by suspension, protective shell PUC (S7) Electrode: stainless steel	RM79696043	57.00
Liquid level control probe, suspended by cable, maximum operating temperature 212°F/100°C■	LA9RM201	83.00

■ 3/8" BSP mounting head.

Table 23.166: Electrode Holders

Description	Material	Catalog Number	$ Price
Electrode for use up to 662°F (350°C)	Stainless steel isolated by ceramic	RM79696006	62.00

Pump control relay RM35BA10 can operate on a single-phase or 3-phase supply. It incorporates three functions in a signal unit:

- Over and under current measurement
- Phase presence control
- Single or three phase

It has two operating modes which are designed to control a pump via two external signal inputs (Y1 Y2). These two signals are controlled by volt-free contacts. Control inputs Y1 and Y2 can be connected to:

- Level sensor
- Level relay
- Pressure sensor
- Push button

Table 23.167: Pump Control Relay

Description	Current Range Controlled	Supply Voltage	Output	Catalog Number	$ Price
Pump Control Relay	1–10 A	208–480 Vac, 3 phase 230, single-phase	1 C/O 5 A	RM35BA10	284.00

Approvals:

c UL us LISTED File CNN E173076 NRNT

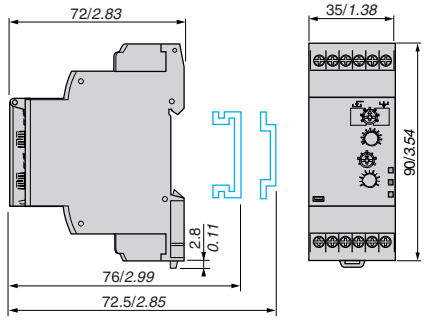
SA File Class 217698 3211 07

CE: 73/23/EEC and EMC 89/336/EEC

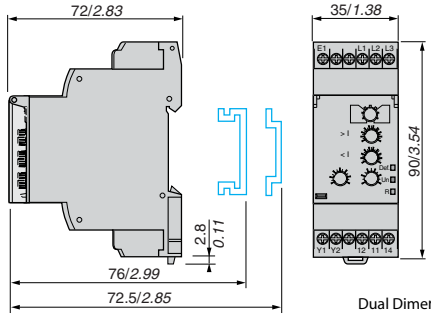
GL, C-Tick, GOST, RoHS

Approximate Dimensions

RM35LM33MW, RM35LV14MW



RM35BA10



Dual Dimensions: **INCHES** Millimeters

RELAYS AND TIMERS
23

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RM35S0MW

Zelio™ Speed Control Relays, Zelio™ Frequency Control Relays, and Zelio™ Temperature Control Relays

Zelio speed control relay RM35SOMW monitors underspeed and overspeed, with or without memory, with inhibition by an external contact. It operates with either N.O. or N.C. sensors. Adjustable time between impulses is 0.05s to 10m. Power-on inhibition time is adjustable from 0.6 to 60s. Inhibition is controlled by an external contact. Settings are protected by a sealable cover, control status is indicated by an LED, and it is DIN rail mountable.

Table 23.168: Speed Control Relay

Function	Time Delay	Measurement Input	Supply	Output	Catalog Number	$ Price
Underspeed	0.05s–10min	3-wire PNP or NPN proximity sensor	24–240 Vac/Vdc	1 C/O 5A	RM35S0MW	**217.00**
Overspeed		Namur proximity sensor 0–30 V voltage Volt-free contact				

RM35HZ21FM

Zelio frequency control relay RM35HZ monitors its own supply voltage. Settings are protected by a sealable cover, control status is indicated by an LED, and it is DIN rail mountable.

Table 23.169: Frequency Control Relay

Function	Controlled	Supply Voltage	Output	Catalog Number	$ Price
Over frequency and under frequency (50 or 60 Hz)	40–60 Hz (50 Hz) / 50–70 Hz (60 Hz)	120–277 Vac	1 C/O + 1 C/O 5A	RM35HZ21FM	**222.00**

RM35AT•0MW

Zelio temperature control relays are designed for monitoring the temperature in elevator (lift) pully rooms, in compliance with directive EN81. For use with PT100 input (customer supplied). Features adjustable control, control status is indicated by an LED, and it is DIN rail mountable.

Table 23.170: Temperature Control Relays

Function	Supply Voltage	Vac	Output	Catalog Number	$ Price
Over temperature 93 to 114°F (34 to 46°C)	24–240 Vac/Vdc	—	1 C/O 5A	RM35ATL0MW	**141.00**
Under temperature 30 to 51°F (-1 to 11°C)		—	2 N.O. 5A	RM35ATR5MW	**151.00**
Over temperature 93 to 114 °F (34 to 46°C) Under temperature 30 to 51°F (-1 to 11°C) Phase sequence Phase failure		208–480 Vac	2 N.O. 5A	RM35ATW5MW	**237.00**

Approvals:

c UL us LISTED File CNN E173076 NRNT

CSA File Class 217698 3211 07

CE: 73/23/EEC and EMC 89/336/EEC

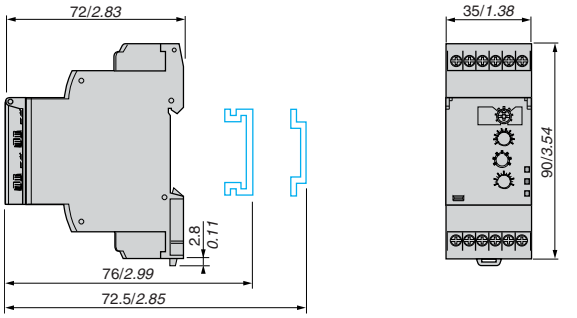
GL, C-Tick, GOST, RoHS

1 C/O =

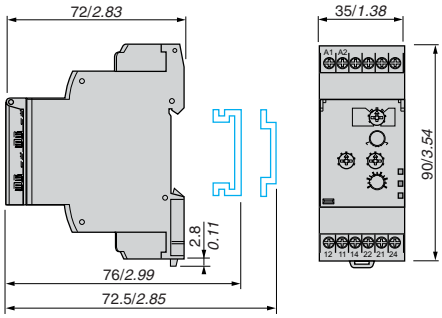
2 N/O =

Approximate Dimensions

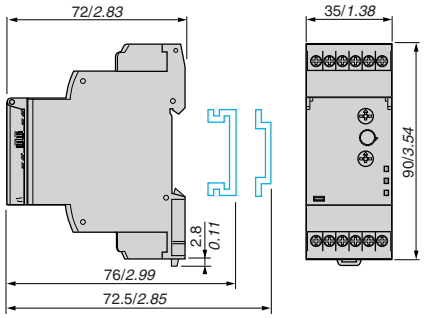
RM35S0MW



RM35HZ21FM



RM35AT••MW



Dual Dimensions: **INCHES** Millimeters

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Phaseo™ DC Power Supply

Phaseo switch mode power supplies are totally electronic and their output voltage is regulated. They offer:

- Compact size
- High degree of output voltage stability

For use with Universal power supplies, see optional function modules in catalog 8440CT0601/08, which offer a set of solutions to meet the needs for continuity of service such as:

- Immunity to microbreaks
- Voltage holding during power outages
- Voltage holding during power supply equipment failure

ABL8MEM12020

Table 23.171: Modular, Single Phase

Meets all the needs of simple automation systems with power ratings from 7 to 60 W and an output voltage of 5 Vdc, 12 Vdc, or 24 Vdc.

Input Voltage (Vac)	Output Voltage (Vdc)	Nominal Current (I)	Protection Reset	Catalog Number	$ Price
100–240	5	4	Auto	ABL8MEM05040	128.
	12	2		ABL8MEM12020	132.
	24	0.3		ABL8MEM24003	71.
		0.6		ABL8MEM24006	105.
		1.2		ABL8MEM24012	141.
		2.5		ABL7RM24025	180.

ABL8REM24030

Table 23.172: Optimum, Single Phase

The low-cost solution for applications supplied at 12 Vdc, 24 Vdc, or 48 Vdc and requiring currents between 3 and 5 A.

Input Voltage (Vac)	Output Voltage (Vdc)	Nominal Current (I)	Protection Reset	Catalog Number	$ Price
100–240	12	5	Auto	ABL7RP1205	360.
	24	3		ABL8REM24030	195.
		5		ABL8REM24050	300.
	48	3		ABL7RP4803	225.

ABL8RPS24100

Table 23.173: Universal, Single Phase

Adapts to the majority of power distribution systems with power ratings from 72 to 480 W at 24 Vdc. The same power supply can be connected phase-to-neutral (N-L1) or phase-to-phase (L1-L2) for line supplies ranging from 100 to 500 Vac. Energy reserve, diagnostics, and choice of manual or auto reset are integrated into these units.

Input Voltage (Vac)	Output Voltage (Vdc)	Nominal Current (I)	Auto-Protection Reset	Catalog Number	$ Price
100–120 / 200–500	24	3	Auto/Manual	ABL8RPS24030	270.
		5		ABL8RPS24050	360.
		10		ABL8RPS24100	525.
100–120 / 200–240		20		ABL8RPM24200	716.

ABL8WPS24200

Table 23.174: Universal, Three Phase

This three-phase, 480 to 960 W, 24 Vdc output offering is particularly suited for complex machines and processes. Energy reserve, diagnostics and choice of manual or auto reset are integrated into these units.

Input Voltage (Vac)	Output Voltage (Vdc)	Nominal Current (I)	Auto-Protection Reset	Catalog Number	$ Price
380–500	24	20	Auto/Manual	ABL8WPS24200	735.
		40		ABL8WPS24400	1173.

ABL1RPM24042

Table 23.175: Dedicated, Single Phase

Designed for integration into repetitive equipment with power ratings from 60 to 240 W and an output voltage of 12 Vdc or 24 Vdc.

Input Voltage (Vac)	Output Voltage (Vdc)	Nominal Current (I)	Protection Reset	Catalog Number	$ Price
100–240▲	12	5	Auto	ABL1REM12050	113.
	24	2.5		ABL1REM24025	93.
		4.2		ABL1REM24042	132.
100–120 / 200–240■	24	6.2		ABL1REM24062	143.
		10		ABL1REM24100	206.
100–240▲	12	8.3	Auto	ABL1RPM12083	150.
	24	4.2		ABL1RPM24042	158.
100–120 / 200–240■	24	6.2		ABL1RPM24062	173.
		10		ABL1RPM24100	270.

▲ Compatible input voltage 120-370 Vdc not indicated on the product.
■ Compatible input voltage 180-370 Vdc not indicated on the product.

ABL1RPM24100

Approvals:

c UL us LISTED File CCN E164867, NMTR, NMTR7 c UL us File CCN E164867, NMTR2, NMTR8 SA® File 238438 Class 5311-87 Class 5311-07 CE RoHS Compliant SEMI F47 Compliant for most units

See www.Schneider-Electric.us for UL and CSA compliances.
For additional information, refer to Catalog #8440CT0601R1/08.

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RMTJ40BD

RMTK90BD

RMPT70BD

RMPT13BD

RMCN22BD

Zelio™ Analog Interface Modules

The Zelio Analog range of converters is designed to convert signals emitted by sensors or electrical measurement devices, into standard electrical signals that are compatible with automation platforms and controllers. They also allow the connection distance between a sensor and a measurement device to be increased, for example, between a thermocouple and a programmable controller

Table 23.176: Converters for Type J and K type thermocouples—supply voltage 24 Vdc ± 20%, non-isolated

Type	Temperature Range		Switchable Output Signals	Catalog Number	$ Price
	°F	°C			
Type J	32–302	0–150	0–10 V, 0–20 mA, 4–20 mA	RMTJ40BD	**141.00**
	32–572	0–300	0–10 V, 0–20 mA, 4–20 mA	RMTJ60BD	**141.00**
	32–1112	0–600	0–10 V, 0–20 mA, 4–20 mA	RMTJ80BD	**141.00**
Type K	32–1112	0–600	0–10 V, 0–20 mA, 4–20 mA	RMTK80BD	**141.00**
	32–2192	0–1200	0–10 V, 0–20 mA, 4–20 mA	RMTK90BD	**141.00**

Table 23.177: Converters for Universal Pt100 probes—supply voltage 24 Vdc ± 20%, non-isolated

Type	Temperature Range		Switchable Output Signals	Catalog Number	$ Price
	°F	°C			
Pt100 2-wire, 3-wire, and 4-wire	- 40–104	- 40–40	0–10 V, 0–20 mA, 4–20 mA	RMPT10BD	**141.00**
	- 148–212	- 100–100	0–10 V, 0–20 mA, 4–20 mA	RMPT20BD	**141.00**
	32–212	0–100	0–10 V, 0–20 mA, 4–20 mA	RMPT30BD	**141.00**
	32–482	0–250	0–10 V, 0–20 mA, 4–20 mA	RMPT50BD	**141.00**
	32–932	0–500	0–10 V, 0–20 mA, 4–20 mA	RMPT70BD	**141.00**

Table 23.178: Converters for Optimum Pt100 probes▲—supply voltage 24 Vdc ± 20%, non-isolated

Type	Temperature Range		Switchable Output Signals	Catalog Number	$ Price
	°F	°C			
Pt100 2-wire, 3-wire, and 4-wire	- 40–104	- 40–40	0–10 V or 4–20 mA	RMPT13BD	**113.00**
	- 148–212	- 100–100	0–10 V or 4–20 mA	RMPT23BD	**113.00**
	32–212	0–100	0–10 V or 4–20 mA	RMPT33BD	**113.00**
	32–482	0–250	0–10 V or 4–20 mA	RMPT53BD	**113.00**
	32–932	0–500	0–10 V or 4–20 mA	RMPT73BD	**113.00**

▲ Converters dedicated to Zelio Logic smart relays.

Table 23.179: Universal Voltage/Current Converters

Type	Input signal	Output signal	Catalog Number	$ Price
Supply voltage 24 Vdc ± 20%, non-isolated	0–10 V or 4–20 mA	0–10 V or 4–20 mA	RMCN22BD	**95.00**
Supply voltage 24 Vdc ± 20%, isolated	0–10 V, ± 10 V, 0–20 mA, 4–20 mA	Switchable: 0–10 V, ± 10 V, 0–20 mA, 4–20 mA	RMCL55BD	**141.00**
	0–50 V, 0–300 V, 0–500 V DC or AC, 50/60 Hz	Switchable: 0–10 V, 0—20 mA, 4–20 mA	RMCV60BD	**154.00**
	0–1.5 A, 0–5 A, 0–15 A DC or AC, 50/60 Hz	0–10 V, 0—20 mA, 4–20 mA	RMCA61BD	**154.00**

Approvals:

c UL us LISTED File CCN E164353 NKCR

CSA File Class 089150_S_000 3211 07

CE IEC 60947-1

RoHS Compliant

Table 23.180: How to Order

To Order Specify:	Catalog Number
• Catalog Number	RMCN22BD

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Zelio™ Logic 2 Smart Relays

Zelio Logic 2 smart relays meet the demands of applications that require more flexibility than a simple relay, timer, or counter, but are too small or simple for the smallest Nano PLC. The Zelio Logic SR2 range is an exact replacement for the obsolete SR1 range, but with an expanded feature set.

Designed to accept control outputs just like a relay, Zelio Logic 2 features dual language capability, using either Function Block Diagramming (FBD) or Ladder Logic Programming (LL), and can be programmed easily by using either the front panel or by using ZelioSoft software.

Table 23.181: Compact Smart Relays with Display, DC Power Supply

Supply voltage		12 Vdc		24 Vdc					
Number of inputs/outputs		12	20	10	12	12	20	20	20
Number of inputs	Discrete inputs	8	12	6	8	8	12	12	12
	Including 0-10 V analog inputs	4	6	—	4	4	2	6	6
Number of outputs		4 relay	8 relay	4 relay	4 relay	4 transistor	8 relay	8 relay	8 transistor
Dimensions, W x D x H (mm)		71.2x59.5x107.6	124.6x59.5x107.6	71.2x59.5x107.6			124.6x59.5x107.6		
Clock		yes	yes	no	yes	yes	no	yes	yes
Catalog Number		SR2B121JD	SR2B201JD	SR2A101BD ♦	SR2B121BD	SR2B122BD	SR2A201BD ♦	SR2B201BD	SR2B202BD
$ Price		**282.00**	**398.00**	**232.00**	**282.00**	**276.00**	**358.00**	**398.00**	**392.00**

▲ Programming of smart relay in LADDER language only.
■ Please consult Schneider Electric representative for list prices.

Table 23.182: Compact Smart Relays with Display, AC Power Supply

Supply voltage		24 Vac		100–240 Vac			
Number of inputs/outputs		12	20	10	12	20	20
Number of inputs	Discrete inputs	8	12	6	8	12	12
Number of outputs		4 relay	8 relay	4 relay	4 relay	8 relay	8 relay
Dimensions, W x D x H (mm)		71.2x59.5x107.6	124.6x59.5x107.6	71.2 x 59.5 x 107.6		124.6 x 59.5 x 107.6	
Clock		yes	yes	no	yes	no	yes
Catalog Number		SR2B121B	SR2B201B	SR2A101FU ▲	SR2B121FU	SR2A201FU ▲	SR2B201FU
$ Price		**282.00**	**398.00**	**258.00**	**288.00**	**374.00**	**408.00**

♦ Programming of smart relay in LADDER language only.

Table 23.183: Compact Smart Relays without Display and without Buttons, DC and AC Power Supply

Supply voltage		24 Vdc			100–240 Vac		
Number of inputs/outputs		12	20	20	10	12	20
Number of inputs	Discrete inputs	6	8	12	6	8	12
	Including 0-10 V analog inputs	—	4	6	—	—	—
Number of outputs		4 relay	4 relay	8 relay	4 relay	4 relay	8 relay
Dimensions, W x D x H (mm)		71.2 x 59.5 x 107.6		124.6x59.5x107.6	71.2 x 59.5 x 107.6		124.6x59.5x107.6
Clock		no	yes	yes	no	yes	yes
Catalog Number		SR2D101BD ★	SR2E121BD ■	SR2E201BD ■♦	SR2D101FU ★	SR2E121FU	SR2E201FU♦
$ Price		**214.00**	**222.00**	**338.00**	**218.00**	**226.00**	**344.00**

★ Programming of smart relay in LADDER language only.
▼ To order a smart relay for a **24 Vac supply** (no analog inputs), delete the letter **D** from the end of the catalog number (**SR2E121B** and **SR2E201B**).
△ To order a smart relay without a clock, replace the letter **E** with the letter **D** (Example: SR2D201BD and SR2D201FU (these units can only be programmed in LADDER language.

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Zelio™ Logic 2 Smart Relays

Table 23.184: Modular Smart Relays ▲ with Display, DC and AC Power Supply

Supply voltage		12 Vdc	24 Vdc		24Vac		100-240 Vac	
Number of inputs/outputs		26	10	26	10	26	10	26
Number of inputs	**Discrete inputs**	16	6	16	6	16	6	16
	Including 0-10 V analog inputs	6	4	6	—	—	—	—
Number of outputs		10 relay	4 relay	10 relay	4 relay	10 relay	4 relay	10 relay
Dimensions, W x D x H (mm)		124.6x59.5x107.6	71.2x59.5x107.6	24.6x59.5x107.6	71.2x59.5x107.6	124.6x59.5x107.6	71.2x59.5x107.6	124.6x59.5x107.6
Clock		yes	yes	yes	yes	yes	yes	yes
Catalog Number		SR3B261JD	SR3B10pBD ■♦	SR3B26pBD ■♦	SR3B101B	SR3B261B	SR3B101FU	SR3B261FU
$ Price		**380.00**	—	—	**282.00**	**476.00**	**292.00**	**486.00**

▲ The modular base can be fitted with one I/O extension module. The 24 Vdc modular base can be fitted with one communication module and/or one I/O extension module.
■ Replace the p by the number **1** to order a smart relay with **relay output** or by **2** for a smart relay with **transistor output** (Example: SR3B101BD).
♦ Please consult local Schneider Electric representative for list prices.

Table 23.185: Extension Modules for Zelio Logic 2 SR3B•••••▲

		Communication		Discrete Inputs/Outputs						Analog Inputs/Outputs	
Application		MODBUS network		—						—	
Number of inputs/outputs		—		6		10		14		4	
Number of inputs	**Discrete inputs**	—		4		6		8		—	
	Analog (0–10 V, 0–20 mA, PT100)	—		—		—		—		2■	
Number of outputs	**Relay**	—		2relay		4 relay		6 relay		—	
	Analog (0-10 V)	—		—		—		—		2	
Dimensions, W x D x H (mm)		35.5x59.5x107.6		35.5x59.5x107.6		72x59.5x107.6		72x59.5x107.6		35.5x59.5x107.6	
		Cat. No.	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**
Voltage	12 Vdc	—	—	SR3XT61JD	**80.00**	SR3XT101JD	**100.00**	SR3XT141JD	**140.00**	—	—
	24 Vdc	SR3MBU01BD	**200.00**	SR3XT61BD	**106.00**	SR3XT101BD	**126.00**	SR3XT141BD	**164.00**	SR3XT43BD	**220.00**
	24 Vac	—	—	SR3XT61B	**106.00**	SR3XT101B	**126.00**	SR3XT141B	**164.00**	—	—
	100-240 Vac	—	—	SR3XT61FU	**106.00**	SR3XT101FU	**126.00**	SR3XT141FU	**164.00**	—	—

▲ The power supply of the extension modules is provided via the Zelio Logic 2 modular relays.
■ max. 1 PT 100 input

Table 23.186: Zelio Soft Software and Memory for SR2/SR3

Multilingual Programming Software		Connecting Cables						Back-up Memory			
PCCD-ROM (Windows 98, NT, 2000, XP, ME) ▲		PC Serial to Relay		PC USB to SR2CBL01		PC USB to Relay		EEPROM (< V3.0 ZelioSoft software and firmware)		EEPROM (≥V3.0 ZelioSoft software and firmware)	
Cat. No.	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**	**Cat. No.**	**$ Price**
SR2SFT01	**74.00**	SR2CBL01	**136.00**	SR2CBL06	**156.00**	SR2USB01	**160.00**	SR2MEM01	**38.00**	SR2MEM02	**30.00**

▲ CD-ROM includes Zelio Soft software, application library, self-training manual, installation instructions and user's manual

Table 23.187: Communication interface for SR2/SR3

Interface, Zelio Logic 2 Alarm Software	**Communication Interface ▲**	**Alarm Management Software**	**Zelio Logic GSM Modem**
Supply voltage	12-24 Vdc	—	24 Vdc
Description	—	PC CD-ROM (Windows 98, NT, 2000, XP)	GSM modem
Dimensions, W x D x H	72x59.5x107.6 mm	—	
Catalog Number	SR2COM01	SR2SFT02	SR2MOD02
$ Price	**230.00**	**60.00**	**545.00**

▲ Modems to be supplied by user.

Approvals:

File CCN E164866 NRAQ — File Class LR217698 2252 01

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Solid State Interface Modules

ABS2EA01EM

ABS solid state relay interface modules are for discrete digital input or output control signals exchanged in automated equipment. Features include:

- High operating rate
- 5 separate character places for marking
- Silent operation
- LED indication of the control signal state
- 35 mm DIN 3 or 32 mm DIN 1 track mountable

Table 23.188: Solid State Interface Input Modules

	Input Module Catalog Number					$ Price ea.
Input Module Catalog No.	ABS2EC01EA	ABS2EC01EB	ABS2EC01EE	ABS2EA02EF	ABS2EA02EM	**70.00**
Dimensions (WxDxH)▲	Inches: 0.37 x 2.78 x 2.91			mm: 9.5 x 70.5 x 74		
Control Circuit Characteristics						
Rated Voltage US	5 Vdc	24 Vdc	48 Vdc	120/127 60Hz	230/240 60Hz	
Maximum Voltage	6 (TTL)	28.8 Vdc	57.6 Vdc	140 Vac	264 Vac	
Maximum Current at Us	13.6 mA	12 mA	10.5 mA	17 mA	15 mA	
Internal Protection Against Reverse Polarity	Yes	Yes	Yes	N/A	N/A	
Output Circuit Characteristics						
Rated Operational Voltage Ve	5 to 48 Vdc	5 to 48 Vdc	5 to 48 Vdc	5 to 48 Vdc	5 to 48 Vdc	
Min./Max. Voltage	2/60 Vdc	2/60 Vdc	2/60 Vdc	2/60 Vdc	2/60 Vdc	
Min./Max. Switching Current	1/50 mA	1/50 mA	1/50 mA	1/50 mA	1/50 mA	
Rated Insulation Voltage	Conforming to IEC 60947-1: 300 V Conforming to IEC 0110: 250 V group C					
Approvals	UL E164353, CSA 081630, IEC 60947-1					

Table 23.189: Solid State Interface Output Modules

ABS2SA01MB

	Output Module Catalog No.				$ Price
	ABS2SC01EB — — —	— ABS2SC02EB — —	— — ABS2SA01MB —	— — — ABS2SA02MB	**80.00** **80.00** **90.00** **101.00**
Dimensions (W x D x H)▲	Inches: 0.69 x 2.78 x 2.91		mm: 17.5 x 70.5 x 74		
Control Circuit Characteristics					
Rated Voltage Us	24 Vdc	24 Vdc	24 Vdc	24 Vdc	
Maximum Voltage	28.8 Vdc	28.8 Vdc	28.8 Vdc	28.8 Vdc	
Maximum Current at Us	12 mA	12 mA	13.6 mA	13.6 mA	
Internal Protection against reverse polarity	Yes	Yes	Yes	Yes	
Output Circuit Characteristics					
Rated Operational Voltage Ve	5 to 48 Vdc	5 to 48 Vdc	24 to 240 Vac	24 to 240 Vac	
Maximum Voltage	57.6 Vdc	57.6 Vdc	264 Vac	264 Vac	
Internal Protection against reverse polarity	Yes	Yes	Yes	Yes	
External Protection	Against short-circuits for 1k, 1k (Ac) and <100 A (DC) Quick-blow fuse with very high breaking capacity: 3.15 A				
Rated insulation voltage	Conforming to IEC 60947-1: 300 V Conforming to VDE 0110: 250 V group C				
Approvals	UL E164353, CSA 081630, IEC 60947-1				

▲ Dimensions mounted on DIN 3 (7.5 mm high) track.

For Mounting Track, see page 24-16.

Table 23.190: How to Order

To Order Specify:	Catalog Number
• Catalog Number	ABS2EC01EA

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ABR1E411F

Electromechanical Interface Modules

ABR electromechanical relay modules are for discrete digital input or output control signals exchanged in automated equipment. Features include:

- High contact reliability
- LED indication of the control signal state
- 5 separate character places for marking
- 35 mm DIN 3 or 32 mm DIN 1 track mountable

Table 23.191: Input Modules

Coil Voltage	Options	1 N.O. Contact	1 C.O. Contact	2 N.O. Contacts	$ Price
		Catalog Number	Catalog Number	Catalog Number	
24 Vac/Vdc	Manual Operator and LED Indication	ABR1E118B▲	ABR1E318B▲	ABR1E418B▲	**68.00**
48 Vac/Vdc		ABR1E118E▲	ABR1E318E▲	ABR1E418E▲	
110–125 Vdc		ABR1E112F▲	ABR1E312F▲	ABR1E412F▲	
110–127 Vac 50/60 Hz		ABR1E111F▲	ABR1E311F▲	ABR1E411F▲	
230–240 Vac 50/60 Hz		ABR1E111M▲	ABR1E311M▲	ABR1E411M▲	
230–240 Vac 50/60 Hz	Manual Operator	ABR1E101M▲	ABR1E301M▲	—	
24 Vdc	LED Indication	ABR2E112B	—	—	**52.00**
48 Vdc		ABR2E112E	—	—	
120–127 Vac 60 Hz		ABR2E116F	—	—	**60.00**
230–240 Vac 50/60 Hz		ABR2E111M	—	—	
24 Vdc		—	ABR2EB312B	—	**76.00**

▲ RoHS Compliant

ABR2E112E

Table 23.192: Output Modules

Coil Voltage	Options	1 N.O. Contact	1 C.O. Contact	2 N.O. Contacts	1 N.C. & 1 N.O. Contact	$ Price
		Catalog Number	Catalog Number	Catalog Number	Catalog Number	
24 Vdc	Manual Operator	ABR1S102B■	ABR1S302B■	ABR1S402B■	ABR1S602B■	**52.00**
24 Vac/Vdc	Manual Operator and LED Indication	ABR1S118B■	ABR1S318B■	ABR1S418B■	ABR1S618B■	**70.00**
48 Vac/Vdc		ABR1S118E■	ABR1S318E■	ABR1S418E■	ABR1S618E■	
110–127 Vac 50/60 Hz		ABR1S111F■	ABR1S311F■	ABR1S411F■	ABR1S611F■	
24 Vdc	LED Indication	ABR2S112B	—	—	—	**40.10**
48 Vdc		—	ABR2SB312B	—	—	**80.00**
24 Vdc	—	ABR2S102B	—	—	—	**26.00**

■ RoHS Compliant

ABR1S111F

Table 23.193: Coil Data

Relay		ABR1E					ABR2E				ABR2EB	ABR1S				ABR2S		ABR2SB
Coil Voltage Ue	V	24 Vac/Vdc	48 Vac/Vdc	127 Vdc	127 Vac	240 Vac	24 Vdc	48 Vdc	127 Vac	240 Vac	24 Vdc	24 Vdc	24 Vdc	48 Vac/Vdc	127 Vac	24	24	24
Maximum Voltage	V	30	53	137	140	255	28.8	56	140	264	28.8	30	30	53	140	28.8	28.8	28.8
Pick-up Voltage	V	17	38	97	93	195	16.9	37.3	97	186	16.9	17	17	38	83	16.9	16.9	16.9
Minimum Sealed Current	mA	5.2	5.4	1.5	2.4	2	2	2	2.5	2.5	2	6.6	6.2	5.4	2.4	2	2	2
Maximum Sealed Current	mA	62	36	15	8	7	19.5	11	16	15	29	62	62	36	8	28	17	29

ABR2S102B

Table 23.194: Contact Ratings

Relay		ABR1E	ABR2E	ABR2EB	ABR1S	ABR2S	ABR2SB
Rated Voltage Ue	Vac	250	115	48	250	230	48
Rated Voltage Ue	Vdc	125	100	48	125	120	48
Thermal Current Ith	A	2	1	0.05	5	5	0.05
Break Rating (AC14)	A	1	0.5	1	1	1	—
Break Rating (DC13)	A	1	1	1	1	1.5	—

Table 23.195: Dimensions

Modules	Approximate Dimensions (WxDxH)♦	
	In.	mm
ABR1E, ABR2EB, ABR2SB	0.69 x 2.91 x 2.78	17.5 x 74 x 70.5
ABR2E	0.37 x 2.91 x 2.78	9.5 x 74 x 70.5
ABR2S1	0.47 x 2.91 x 2.78	12 x 74 x 70.5

♦ Dimensions mounted on DIN 3 track (7.5 mm high).

Table 23.196: Approvals

ABR1E, ABR2E	UL E164353, CSA 081630, IEC 60947-1
ABR1S, ABR2S	UL E164353, CSA 081630, IEC 60947-1

ABR1 relays are RoHS compliant as of date code 0610.

For Mounting Track, see page 24-16

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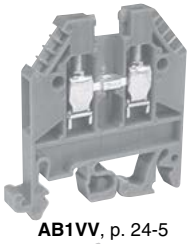
Section 24
Terminal Blocks

AB1RRN, p. 24-3

AB1AA, p. 24-10

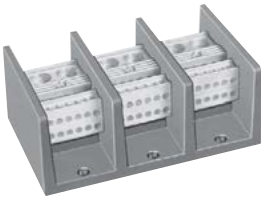


AB1VV, p. 24-5

9080GR6, p. 24-13

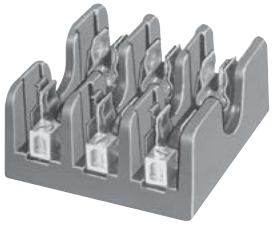
GB2, p. 24-17

9080GCB, p. 24-17

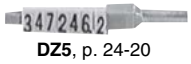


9080LB, p. 24-18

9080GF6, p. 24-14



9080FB, p. 24-19



DZ5, p. 24-20

Product Panorama

Terminal Blocks		**24-2**

Track-Mounting Terminal Blocks and Prewired Connectors

Advantys TELEFAST™ 2	ABE7 Connection Systems	**24-22**
NEMA Style	Class 9080 Type G	**24-13**
IEC Style	AB1	**24-3**

Direct-Mounting Terminal Blocks

NEMA Style	Class 9080 Type GK	**24-13**

Circuit Protectors

	Class 9080 Type GCB	**24-17**
	GB2	**24-17**

Power Distribution Blocks (Splitter Blocks)

	Class 9080 Type LB	**24-18**

Fuseholders

Panel Mounting	Class 9080 Type FB	**24-19**
NEMA Style	Class 9080 Type GF6	**24-14**
IEC Style	AB1FU, AB1SF	**24-8**
	AB1AASF	**24-10**
	AB1RRNSF	**24-4**
	DF	**24-8**

Cable Ends (Ferrules, Wire Markers)

	DZ5	**24-20**
	AZ5	**24-20**
	AR1	**24-21**
	AT1	**24-21**

Mounting Track

	9080GH (Square D)	**24-16**
	9080MH (DIN)	**24-12**

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	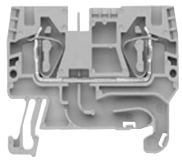	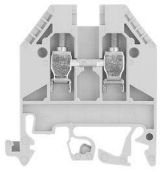	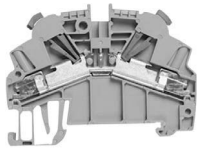	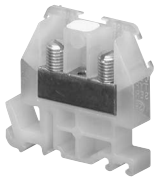
Product Family	**AB1RRN**	**AB1VV**	**AB1AA**	**9080G**
Type of product	IEC spring technology	IEC screw technology	IEC insulation displacement technology	NEMA screw technology
Mounting	DIN 3	DIN 1 and DIN 3	DIN 3	DIN 3 and Square D track ▲
Maximum rated voltage (V)	600	600	600	600 ■
Maximum rated current per UL (A)	115	375	22	255
Ambient air temperature	-40 to +266 °F (-40 to 130 °C)			-40 to +257 °F (-40 to 125 °C)
Approvals ♦	UL File 164359 CCN XCFR2	UL File 164359 CCN XCFR2	UL File 164359 CCN XCFR2	UL File E60616 CCN XCFR2
	CSA File 702070 Class 6228 01	CSA File 702070 Class 6228 01	CSA File 702070 Class 6228 01	CSA File 025490 Class 3211 07
Color	Gray Blue Green/Yellow Black	Gray Blue Green/Yellow Orange Red Green White Black	Gray Blue Green/Yellow Orange Red	Natural (White) Black Blue Green Gray Orange Red Yellow Brown

▲ 9080GK6 can be mounted directly to a panel or on Square D track.
■ 9080GT6 is 120 V.
♦ Refer to catalogs 9080CT9901R7/07 and 9080CT9601 for a complete list of certifications.

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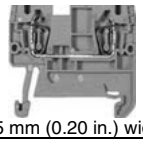
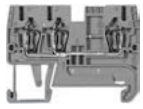
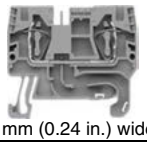
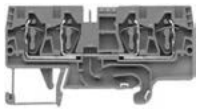
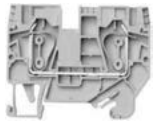
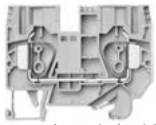
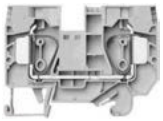
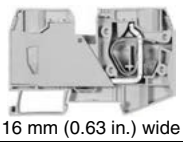
Table 24.1: Spring-Clip, AB1RRN

Description		Maximum Voltage	Maximum Current ■	Block				End Barrier♦			
				Color	Catalog Number	$ Price ea.	Std. Pack▲	Color	Catalog Number	$ Price ea.	Std. Pack▲
 5 mm (0.20 in.) wide	Spring-Clip Style Block Two Terminals Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Gray	AB1RRN235U2GR	**1.40**	100	Gray	AB1RRNAC242GR	**0.60**	10
				Blue	AB1RRN235U2BL	**1.40**	100	Blue	AB1RRNAC242BL	**0.60**	10
 5 mm (0.20 in.) wide	Spring-Clip Style Block Three Terminals Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Gray	AB1RRN235U3GR	**1.80**	100		AB1RRNAC243GR	**0.68**	10
				Blue	AB1RRN235U3BL	**1.80**	100	Blue	AB1RRNAC243BL	**0.68**	10
5 mm (0.20 in.) wide	Spring-Clip Style Block Four Terminals Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Gray	AB1RRN235U4GR	**2.30**	100	Gray	AB1RRNAC244GR	**0.75**	10
				Blue	AB1RRN235U4BL	**2.30**	100	Blue	AB1RRNAC244BL	**0.75**	10
 6 mm (0.24 in.) wide	Spring-Clip Style Block Two Terminals Solid or Stranded Copper Wire 24–10 AWG	600 V	30 A	Gray	AB1RRN435U2GR	**1.50**	100	Gray	AB1RRNAC442GR	**0.60**	10
				Blue	AB1RRN435U2BL	**1.50**	100	Blue	AB1RRNAC442BL	**0.60**	10
6 mm (0.24 in.) wide	Spring-Clip Style Block Three Terminals Solid or Stranded Copper Wire 24–10 AWG	600 V	30 A	Gray	AB1RRN435U3GR	**2.30**	100	Gray	AB1RRNAC443GR	**0.60**	10
				Blue	AB1RRN435U3BL	**2.30**	100	Blue	AB1RRNAC443BL	**0.60**	10
 6 mm (0.24 in.) wide	Spring-Clip Style Block Four Terminals Solid or Stranded Copper Wire 24–10 AWG	600 V	30 A	Gray	AB1RRN435U4GR	**2.90**	100	Gray	AB1RRNAC444GR	**0.90**	10
				Blue	AB1RRN435U4BL	**2.90**	100	Blue	AB1RRNAC444BL	**0.90**	10
 8 mm (0.31 in.) wide	Spring Clip Style Block Two Terminals Solid or Stranded Copper Wire 24–8 AWG	600 V	50 A	Gray	AB1RRN635U2GR	**2.10**	50	Gray	AB1RRNAC642GR	**0.83**	10
				Blue	AB1RRN635U2BL	**2.10**	50	Blue	AB1RRNAC642BL	**0.83**	10
 10 mm (0.39 in.) wide	Spring Clip Style Block Two Terminals Solid or Stranded Copper Wire 16–6 AWG	600 V	60 A	Gray	AB1RRN1035U2GR	**2.70**	50	Gray	AB1RRNAC1042GR	**0.90**	10
				Blue	AB1RRN1035U2BL	**2.70**	50	Blue	AB1RRNAC1042BL	**0.90**	10
 12 mm (0.47 in.) wide	Spring Clip Style Block Two Terminals Solid or Stranded Copper Wire 16–4 AWG	600 V	85 A	Gray	AB1RRN1635U2GR	**4.40**	50	Gray	AB1RRNAC1642GR	**1.20**	10
				Blue	AB1RRN1635U2BL	**4.40**	50	Blue	AB1RRNAC1642BL	**1.20**	10
 16 mm (0.63 in.) wide	Spring Clip Style Block Two Terminals Solid or Stranded Copper Wire 14–2 AWG	600 V	115 A	Gray	AB1RRN3535U2GR	**22.50**	10	None Required			
				Blue	AB1RRN3535U2BL	**22.50**	10				

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

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Table 24.1: Spring-Clip, AB1RRN (continued)

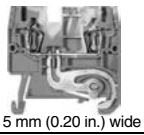
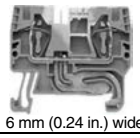
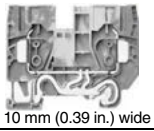
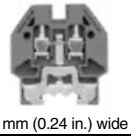
Description		Maximum Voltage	Maximum Current ■	Block				End Barrier ♦			
				Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
 5 mm (0.20 in.) wide	Spring-Clip Style Grounding Block Two Terminals Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Green / Yellow	AB1RRNTP235U2	**5.10**	100	Green	AB1RRNTPAC242	**0.60**	10
5 mm (0.20 in.) wide	Spring-Clip Style Grounding Block Four Terminals Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Green / Yellow	AB1RRNTP235U4	**7.50**	100	Green	AB1RRNTPAC244	**0.75**	10
 6 mm (0.24 in.) wide	Spring-Clip Style Grounding Block Two Terminals Solid or Stranded Copper Wire 22–10 AWG	600 V	30 A	Green / Yellow	AB1RRNTP435U2	**6.20**	100	Green	AB1RRNTPAC442	**0.60**	10
8mm (0.31 in.) wide	Spring-Clip Style Grounding Block Two Terminals Solid or Stranded Copper Wire 24–8 AWG	600 V	50 A	Green / Yellow	AB1RRNTP635U2	**6.90**	50	Green	AB1RRNTPAC642	**0.83**	10
 10 mm (0.39 in.) wide	Spring-Clip Style Grounding Block Two Terminals Solid or Stranded Copper Wire 16–6 AWG	600 V	60 A	Green / Yellow	AB1RRNTP1035U2	**7.80**	50	Green	AB1RRNTPAC1042	**0.90**	10
12 mm (0.47 in.) wide	Spring-Clip Style Grounding Block Two Terminals Solid or Stranded Copper Wire 22–10 AWG	600 V	85 A	Green / Yellow	AB1RRNTP1635U2	**9.30**	50	Green	AB1RRNTPAC1642	**1.20**	10
6 mm (0.24 in.) wide	Spring-Clip Style Diode/Fuseholder Block Solid or Stranded Copper Wire 22–10 AWG	300 V	10 A	Gray	AB1RRNSF435UGR	**4.10**	100	Gray	AB1RRNAC442GR	**0.60**	10
	Fuseholder 5x20 (Fuse not included)	Depends on fuse or diode used		Gray	AB1SF520	**6.50**	100	Not applicable			
	Fuseholder 5x20 + 24 V LED				AB1SF520B	**20.30**	100				
	Fuseholder 5x20 + 220 V LED				AB1SF520M	**20.30**	100				
	Holder for Diode (Diode not included)				AB1SV1	**6.20**	100				
	Holder with1N4007-1 Diode				AB1SV2	**15.60**	100				

Table 24.2: Miniature, AB1VV and AB1TP

5 mm (0.20 in.) wide	Miniature Block with Box Lug Solid or Stranded Copper Wire 22–14 AWG Mounts on 15 mm DIN 2 track	150 V	10 A	Gray	AB1VV215	**1.50**	100	Gray	AB1AC2	**0.62**	10
				Blue	AB1VV215BL	**1.50**	100	Blue			
5 mm (0.20 in.) wide	Miniature Block with Box Lug Solid or Stranded Copper Wire 22–10 AWG Mounts on 15 mm DIN 2 track	150 V	10 A	Gray	AB1VV415	**1.70**	100	Gray	AB1AC2	**0.62**	10
 6 mm (0.24 in.) wide	Miniature Grounding Block with Box Lug Solid or Stranded Copper Wire 22–14 AWG Mounts on 15 mm DIN 2 track	150 V	10 A	Green / Yellow	AB1TP215	**4.40**	100	Gray	AB1CT215	**0.62**	50

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.
■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation, class and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.
♦ One end-barrier is required for each assembly of like blocks.

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Table 24.3: Box Lug, AB1VV

Description		Maximum Voltage	Maximum Current ■	Block				End Barrier ♦			
				Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
5 mm (0.20 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 22–12 AWG	600 V	20 A	Gray	AB1VV235U	**1.40**	100	Gray	AB1AC24	**0.62**	50
				Blue	AB1VV235UBL	**1.40**	100	Blue	AB1AC24BL	**0.62**	50
				Orange	AB1VV235UGE	**1.40**	100	Orange	AB1AC24GE	**0.62**	50
6 mm (0.24 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 22–10 AWG	600 V	30 A	Gray	AB1VV435U	**1.50**	100	Gray	AB1AC24	**0.62**	50
				Blue	AB1VV435UBL	**1.50**	100	Blue	AB1AC24BL	**0.62**	50
				Orange	AB1VV435UGE	**1.50**	100	Orange	AB1AC24GE	**0.62**	50
				Black	AB1VV435UNO	**1.50**	100	Gray	AB1AC24	**0.62**	50
				Red	AB1VV435URO	**1.50**	100	Gray	AB1AC24	**0.62**	50
				Green	AB1VV435UVE	**1.50**	100	Gray	AB1AC24	**0.62**	50
				White	AB1VV435UBLA	**1.50**	100	Gray	AB1AC24	**0.62**	50
8 mm (0.31 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 22–8 AWG	600 V	50 A	Gray	AB1VV635U	**2.10**	100	Gray	AB1AC6	**0.62**	50
				Blue	AB1VV635UBL	**2.10**	100	Blue	AB1AC6BL	**0.62**	50
				Orange	AB1VV635UGE	**2.10**	100	Orange	AB1AC6GE	**0.62**	50
10 mm (0.39 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 16–6 AWG	600 V	65 A	Gray	AB1VVN1035U	**2.70**	50	Gray	AB1ACN10	**0.78**	10
				Blue	AB1VVN1035UBL	**2.70**	50	Blue	AB1ACN10BL	**0.78**	10
12 mm (0.47 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 12–4 AWG	600 V	85 A	Gray	AB1VVN1635U	**5.40**	50	Gray	AB1ACN16	**0.93**	10
				Blue	AB1VVN1635UBL	**5.40**	50	Blue	AB1ACN16BL	**0.93**	10
16 mm (0.63 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 10–2 AWG	600 V	95 A	Gray	AB1VVN3535U	**7.70**	20	Not required for these blocks.			
				Blue	AB1VVN3535UBL	**7.70**	20				
24 mm (0.94 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 6–2/0 AWG	600 V	175 A	Gray	AB1VVN7035U	**27.90**	20	Not required for these blocks.			
				Blue	AB1VVN7035UBL	**27.90**	20				
28 mm (1.10 in.) wide	Box-Lug Style Block Solid or Stranded Copper Wire 2/0–350 kcmil	600 V	335 A	Gray	AB1VVN15035U	**65.00**	10	Not required for these blocks.			
				Blue	AB1VVN15035UBL	**65.00**	10				

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL rating are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

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Table 24.4: Grounding, AB1TP

Description		Maximum Voltage	Block				End Barrier ♦			
			Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
5.1 mm (0.20 in.) wide	Grounding Block Solid or Stranded Copper Wire 22–10 AWG	600 V	Green/Yellow	AB1TP235U	**5.30**	100	Green	AB1AC25	**0.83**	10
6 mm (0.24 in.) wide	Grounding Block Solid or Stranded Copper Wire 22–10 AWG	600 V	Green/Yellow	AB1TP435U	**6.20**	100	Not required for this block.			
8 mm (0.31 in.) wide	Grounding Block Solid or Stranded Copper Wire 22–8 AWG	600 V	Green/Yellow	AB1TP635U	**6.90**	100	Not required for this block.			
10 mm (0.39 in.) wide	Grounding Block Solid or Stranded Copper Wire 16–6 AWG	600 V	Green/Yellow	AB1TP1035U	**7.80**	50	Not required for this block.			
12 mm (0.47 in.) wide	Grounding Block Solid or Stranded Copper Wire 12–4 AWG	600 V	Green/Yellow	AB1TP1635U	**9.30**	50	Not required for this block.			
16 mm (0.63 in.) wide	Grounding Block Solid or Stranded Copper Wire 10–2 AWG	600 V	Green/Yellow	AB1TP3535U	**13.20**	20	Not required for this block.			

Table 24.5: Two Tier, AB1ET

Description		Block				End Barrier ♦			
		Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
6 mm (0.24 in.) wide Two Tier Blocks Solid or Stranded Copper Wire 22–10 AWG 300 V 20 A ■	Standard two tier block	Gray	AB1ET435U	**4.10**	100	Gray	AB1TE	**1.10**	50
	Standard two tier block + upper-lower link	Black	AB1ET435U2	**6.20**	100				
	Standard two tier block + grounding	Green/Yellow	AB1ET435UTP	**18.60**	100				
	Standard two tier block + red 24 V LED	Red	AB1ET435UBRO	**17.10**	100				
	Standard two tier block + green 24 V LED	Red	AB1ET435UBVE	**17.10**	100				
	Standard two tier block + head to tail diodes (red)	Orange	AB1ET435UBGE	**17.10**	100				
	Standard two tier block + diode upper-lower	Red	AB1ET435UHBRO	**10.80**	100				
	Standard two tier block + diode lower-upper	Orange	AB1ET435UBHGE	**10.80**	100				
	Standard two tier block + 2 diodes	Red	AB1ET435U2DRO	**19.20**	100				

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

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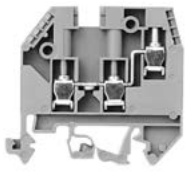
NOTE: *The blocks in Table 24.6 and Table 24.7 are used for proximity sensors.*

Table 24.6: Three Tier, AB1DD and AB1ET

Description		Maximum Voltage	Maximum Current ■	Block				End Barrier ♦			
				Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
6 mm (0.24 in.) wide	Three Tier Block Solid or Stranded Copper Wire 22–12 AWG	300 V	25 A	Gray	AB1DDP235U	**5.40**	100	Not required for these blocks.			
	Three Tier Block with 24 V LED (+) Solid or Stranded Copper Wire 22–12 AWG				AB1DDP235ULP	**10.10**	100				
	Three Tier Block with 24 V LED (-) Solid or Stranded Copper Wire 22–12 AWG				AB1DDP235ULM	**10.10**	100				
6 mm (0.24 in.) wide	Three Tier Block with ground Solid or Stranded Copper Wire 22–12 AWG			Gray with Green/Yellow	AB1DDP235T	**8.60**	100				
	Three Tier Block with 24 V LED (+) and ground Solid or Stranded Copper Wire 22–12 AWG				AB1DDP235TLP	**13.20**	100				
	Three Tier Block with 24 V LED (-) and ground Solid or Stranded Copper Wire 22–12 AWG				AB1DDP235TLM	**13.20**	100				
6 mm (0.24 in.) wide	Three Tier Block Solid or Stranded Copper Wire 22–12 AWG			Gray	AB1ET3235U	**8.60**	100				
	Three Tier Block with 24 V LED (+) and ground Solid or Stranded Copper Wire 22–12 AWG			Gray with Green/Yellow	AB1ET3235UTLP	**27.80**	100				
	Three Tier Block with 24 V LED (-) and ground Solid or Stranded Copper Wire 22–12 AWG				AB1ET3235UTLM	**27.80**	100				
	Three Tier Block with ground Solid or Stranded Copper Wire 22–12 AWG				AB1ET3235UT	**12.60**	100				

Table 24.7: Two Tier, AB1ETN

Description		Maximum Voltage	Maximum Current ■	Block				End Barrier ♦			
				Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
 6 mm (0.24 in.) wide AB1ETN335U	Two Tier Block (one terminal in and two out) Solid or Stranded Copper Wire 22–10 AWG	300 V	30 A	Gray	AB1ETN335U	**3.60**	100	Gray	AB1TEN3	**1.10**	10
	Two Tier Block (two terminals in and two out) Solid or Stranded Copper Wire 22–10 AWG			Gray	AB1ETN435U	**5.10**	100	Gray	AB1TEN4	**1.20**	10
	Grounding Block (two terminals in and two out) Solid or Stranded Copper Wire 22–10 AWG			Green/ Yellow	AB1ETNTP435U	**12.20**	100	Not required for this block.			

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

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Table 24.8: Fuse Block, AB1★

Description			Block				End Barrier ♦			
			Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
8 mm (0.31 in.) wide	Fuse Block For 5x20 or 5x25 mm fuse Solid or Stranded Copper Wire 22–10 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FUSE435U5X	**7.80**	100	Not required for these blocks.			
		With 5–12 V LED indicator	Gray	AB1FUSE435U5XJ	**16.10**	50				
		With 12–24 V LED indicator	Gray	AB1FUSE435U5XB	**16.10**	50				
		With 110–250 V neon indicator	Gray	AB1FUSE435U5XM	**16.10**	50				
10 mm (0.39 in.) wide	Fuse Block For 1/4 x 1-1/4 in. fuse Solid or Stranded Copper Wire 22–10 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FUSE435U6X	**14.40**	100	Not required for these blocks.			
		With 5–12 V LED indicator	Gray	AB1FUSE435U6XJ	**18.60**	50				
		With 12–24 V LED indicator	Gray	AB1FUSE435U6XB	**18.60**	50				
		With 110–250 V neon indicator	Gray	AB1FUSE435U6XM	**18.60**	50				
12 mm (0.47 in.) wide	Fuse Block For 5 x 20 mm fuse Solid or Stranded Copper Wire 22–6 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FU10135U	**10.80**	50	Gray	AB1TF	**1.40**	50
		With 28 V yellow LED indicator	Gray	AB1FU10135UB	**26.40**	50				
		With 250 V yellow LED indicator	Gray	AB1FU10135UU	**26.40**	50				
	Fuse Block For 5 x 25 mm fuse Solid or Stranded Copper Wire 22–6 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FU10235U	**14.00**	50	Gray	AB1TF	**1.40**	50
	Fuse Block For 5 x 30 mm fuse Solid or Stranded Copper Wire 22–6 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FU10335U	**15.60**	50	Gray	AB1TF	**1.40**	50
	Fuse Block For 1/4 x 1-1/4 in. fuse Solid or Stranded Copper Wire 22–6 AWG Maximum Voltage—600 V Maximum Current—15 A ■	Without indicator lamp	Gray	AB1FU10435U	**15.60**	50				
		With 28 V yellow LED indicator	Gray	AB1FU10435UB	**26.40**	50	Gray	AB1TF	**1.40**	50
		With 110–500 V red neon indicator	Gray	AB1FU10435UFS	**26.40**	50				
6 mm (0.24 in.) wide	Fuse / Diode Block Solid or Stranded Copper Wire 22–10 AWG Maximum Voltage—300 V Maximum Current—10 A ■	Fuse / Diode block	Gray	AB1SF435U	**3.90**	100	Gray	AB1PS4	**0.86**	10
		Removable fuse holder for 5x20 mm fuse	Gray	AB1SF520	**6.50**	100	N/A			
		Removable fuse holder for 5x20 mm fuse with 24 V red LED indicator	Gray	AB1SF520B	**20.30**	100				
		Removable fuse holder for 5x20 mm fuse with 220 V red LED indicator	Gray	AB1SF520M	**20.30**	100				
		Removable diode or resistor holder	Gray	AB1SV1	**6.20**	100				
		Removable holder With 1N4007.1 diode	Gray	AB1SV2	**15.60**	100				

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

★ For additional information, refer to Catalog **9080CT9901**

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Table 24.9: Modular Fuse Holders, DF▼

	Rated Thermal Current	Type of Fuse	Composition	Standard Pack Quantity	Catalog Number	$ Price ea.
DFCC1V DFCC3V	30 A	Class CC	1 Pole	12	DFCC1	**18.00**
			2 Poles	6	DFCC2	**36.00**
			3 Poles	4	DFCC3	**54.00**
			1 Pole △	12	DFCC1V	**22.50**
			2 Poles △	6	DFCC2V	**45.00**
			3 Poles △	4	DFCC3V	**68.00**

▼ For additional blocks and information, refer to Catalog **9080CT0801.**

△ With blown-fuse indicator.

File CNN E310269 IZLT

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Table 24.10: Other Blocks, AB1

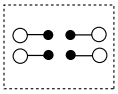
Description			Block				End Barrier♦			
			Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
12 mm (0.47 in.) wide	Block for Diodes (Diodes not included) Solid or Stranded Copper Wire 22–14 AWG		Gray	AB1D11435U	**12.50**	50	Not required for this block.			
6 mm (0.24 in.) wide	Circuit Isolation Block Solid or Stranded Copper Wire 22–10 AWG Maximum Voltage—600 V Maximum Current—20 A■	With no test sockets	Gray	AB1SC435U	**7.10**	50	Gray	AB1PS4	**0.86**	10
		With two test sockets	Gray	AB1SC435U2PT	**7.10**	50				
6 mm (0.24 in.) wide	Box Lug / Slip-on Block Solid or Stranded Copper Wire 22–12 AWG Maximum Voltage—300 V Maximum Current—10 A■	Box lug on one side. Slip-on access from top and side	Gray	AB1FV135U	**3.00**	100	Gray	AB1TC01	**1.40**	50
		Box lug on one side. Slip-on access from top	Gray	AB1FC335U	**3.90**	100	Gray	AB1TC3	**1.40**	50
		Slip-on connectors on both sides	Gray	AB1FF235U	**2.10**	100	Not required for this block.			

Table 24.11: Lug/Lug and Lug/Clamp, AB1

Description			Block				Partition			
			Color	Catalog Number	$ Price ea.	Std. Pack ▲	Color	Catalog Number	$ Price ea.	Std. Pack ▲
32 mm (1.26 in.) wide	Lug/Lug Block Solid or Stranded Copper Wire 0 AWG–350 kcmil	M10 bolt Maximum Voltage—600 V Maximum Current—230 A■	Gray	AB1BB9535	**21.30**	10	Gray	AB1CT1	**2.40**	50
42 mm (1.65 in.) wide	Lug/Lug Block Solid or Stranded Copper Wire 0 AWG– 400 kcmil	M12 bolt Maximum Voltage—600 V Maximum Current—375 A■	Gray	AB1BB18535	**27.30**	10	Gray	AB1CT2	**2.70**	50
42 mm (1.65 in.) wide	Lug/Lug Block Solid or Stranded Copper Wire 0 AWG–500 kcmil	M12 bolt Maximum Voltage—600 V Maximum Current—375 A■	Gray	AB1BB24035	**45.00**	10	Gray	AB1CT2	**2.70**	50
32 mm (1.26 in.) wide	Lug/Clamp Block Solid or Stranded Copper Wire 0 AWG–350 kcmil	M10 bolt Maximum Voltage—600 V Maximum Current—230 A■	Gray	AB1BC9535	**31.10**	10	Gray	AB1CT1	**2.40**	50
42 mm (1.65 in.) wide	Lug/Clamp Block Solid or Stranded Copper Wire 0 AWG–400 kcmil	M12 bolt Maximum Voltage—600 V Maximum Current—325 A■	Gray	AB1BC15035	**62.00**	10	Gray	AB1CT2	**2.70**	50
42 mm (1.65 in.) wide	Lug/Clamp Block Solid or Stranded Copper Wire 0 AWG–500 kcmil	M12 bolt Maximum Voltage—600 V Maximum Current—375 A■	Gray	AB1BC24035	**86.00**	10	Gray	AB1CT2	**2.70**	50

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used. The UL ratings are shown. The CSA rating may be higher or lower. Refer to the catalog for CSA ratings.

♦ One end-barrier is required for each assembly of like blocks.

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For track and accessories, see pages 24-11 and 24-12.

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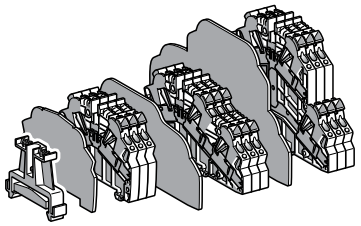
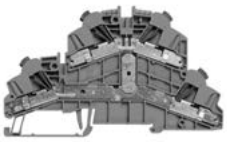
Insulation Displacement Style Terminal Blocks and Accessories





5 mm (0.20 in.) wide
AB1AA135U4●●

- Insert wires without stripping
- Available for wire sizes 30-14 AWG
- DIN 3 rail mounting
- Finger safe connections

Table 24.12: Insulation Displacement, AB1AA

Description	Maximum Voltage	Maximum Current■	Wire Size	Block					End Barrier♦			
				No. of Poles	Color	Catalog Number	$ Price ea.	Std. Pack▲	Color	Catalog Number	$ Price ea.	Std. Pack▲
Insulation Displacement Connector: Passthrough Block Solid or Stranded Copper Wire	600 V	13 A	30–18 AWG	2	Gray	AB1AA135U2GR	**1.80**	100	Gray	AB1AAAC122GR	**.62**	10
					Blue	AB1AA135U2BL	**1.80**	100	Blue	AB1AAAC122BL	**.62**	10
	600 V	13 A	18–14 AWG	2	Gray	AB1AA235U2GR	**2.00**	100	Gray	AB1AAAC122GR	**.62**	10
					Blue	AB1AA235U2BL	**2.00**	100	Blue	AB1AAAC122BL	**.62**	10
	600 V	10 A	30–18 AWG	3	Gray	AB1AA135U3GR	**2.90**	50	Gray	AB1AAAC123GR	**.78**	10
					Blue	AB1AA135U3BL	**2.90**	50	Blue	AB1AAAC123BL	**.78**	10
	600 V	10 A	18–14 AWG	3	Gray	AB1AA235U3GR	**3.00**	50	Gray	AB1AAAC123GR	**.78**	10
					Blue	AB1AA235U3BL	**3.00**	50	Blue	AB1AAAC123BL	**.78**	10
	600 V	10 A	30–18 AWG	4	Gray	AB1AA135U4GR	**5.90**	50	Gray	AB1AAAC124GR	**.93**	10
					Blue	AB1AA135U4BL	**5.90**	50	Blue	AB1AAAC124BL	**.93**	10
5 mm (0.20 in.) wide AB1AA135U2●●	600 V	10 A	18–14 AWG	4	Gray	AB1AA235U4GR	**6.00**	100	Gray	AB1AAAC124GR	**.93**	10
					Blue	AB1AA235U4BL	**6.00**	100	Blue	AB1AAAC124BL	**.93**	10
Insulation Displacement Connector: Grounding Block	600 V	13 A	30–18 AWG	2	Green/ Yellow	AB1AATP135U2	**5.90**	100	Green/ Yellow	AB1AAAC122VE	**.62**	10
												10
	600 V	13 A	18–14 AWG	2	Green/ Yellow	AB1AATP235U2	**6.20**	100	Green/ Yellow	AB1AAAC122VE	**.62**	10
												10
	600 V	13 A	30–18 AWG	2	Green/ Yellow	AB1AATP135U3	**8.10**	100	Green/ Yellow	AB1AAAC123VE	**.78**	10
	600 V	10 A	18–14 AWG	3	Green/ Yellow	AB1AATP235U3	**8.10**	50	Green/ Yellow	AB1AAAC123VE	**.78**	10
	600 V	10 A	30–18 AWG	4	Green/ Yellow	AB1AATP135U4	**13.70**	50	Green/ Yellow	AB1AAAC124VE	**.93**	10
5 mm (0.20 in.) wide AB1AATP135U3	600 V	10 A	18–14 AWG	4	Green/ Yellow	AB1AATP235U4	**14.00**	50	Green/ Yellow	AB1AAAC124VE	**.93**	10
Two Tier Block	600 V	13 A	30–18 AWG	2	Gray	AB1AAET135UGR	**4.80**	50	Gray	AB1AAAC124GR	**.93**	10
	600 V	22 A	18–14 AWG	2/2	Gray	AB1AAET235UGR	**5.10**	50	Gray	AB1AAAC124GR	**.93**	10
				2/2	Red	AB1AAET235URO	**5.10**	50	Red	AB1AAAC124GR	**.93**	10
				2/2	Orange	AB1AAET235UGE	**5.10**	50	Orange	AB1AAAC124GR	**.93**	10
				4	Red	AB1AAET235UBRO	**15.60**	50	Red	AB1AAAC124GR	**.93**	10
6 mm (0.24 in.) wide AB1AAET235●●				4	Orange	AB1AAET235UBGE	**15.60**	50	Orange	AB1AAAC124GR	**.93**	10
Fuse Block	600 V	6.3 A	30–18 AWG	2	Gray	AB1AASF135UGR	**5.00**	50	Gray	AB1AAAC123GR	**.78**	10
6 mm (0.24 in.) wide AB1AASF135U●●	600 V	6.3 A	18–14 AWG	2	Gray	AB1AASF235UGR	**5.30**	50	Gray	AB1AAAC123GR	**.78**	10
Disconnect Block	600 V	10 A	18–14 AWG	2	Gray	AB1AASC235UGR	**6.00**	50	Gray	AB1AAAC123GR	**.78**	10
					Blue	AB1AASC235UBL	**6.00**	50	Blue	AB1AAAC123BL	**.78**	10

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of the wire which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the size, insulation class, and other characteristics of the wire used.

♦ One end-barrier is required for each assembly of like blocks.

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For track and accessories, see pages 24-11 and 24-12.

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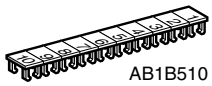
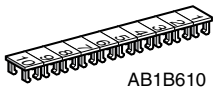
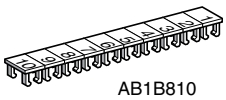
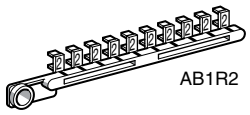
Table 24.13: Markers, AB1

	Marking	Catalog Number	$ Price ea.	Std. Pack ▲
 AB1B510 Black number on white background 5 mm (0.20 in.) wide	Blank	AB1BV5	**0.78**	25
	1–10	AB1B510		
	11–20	AB1B520		
	21–30	AB1B530		
	31–40	AB1B540		
	41–50	AB1B550		
	51–60	AB1B560		
	61–70	AB1B570		
	71–80	AB1B580		
	81–90	AB1B590		
	91–100	AB1B5100		
 AB1B610 Black number on white background 6 mm (0.24 in.) wide	Blank	AB1BV6	**0.78**	25
	1–10	AB1B610		
	11–20	AB1B620		
	21–30	AB1B630		
	31–40	AB1B640		
	41–50	AB1B650		
	51–60	AB1B660		
	61–70	AB1B670		
	71–80	AB1B680		
	81–90	AB1B690		
	91–100	AB1B6100		
	L1	AB1B6L1		
	L2	AB1B6L2		
	L3	AB1B6L3		
	+ (Red)	AB1BV6RP		
	– (Blue)	AB1BV6BM		
 AB1B810 Black number on white background 8 mm (0.31 in.) wide	Blank	AB1BV8	**0.78**	25
	1–10	AB1B810		
	11–20	AB1B820		
	21–30	AB1B830		
	31–40	AB1B840		
	41–50	AB1B850		
	51–60	AB1B860		
	61–70	AB1B870		
	71–80	AB1B880		
	81–90	AB1B890		
	91–100	AB1B8100		
 AB1R2 Black number or symbol on white background	Blank	AB1RV	**0.78**	25
	1	AB1R1		
	2	AB1R2		
	3	AB1R3		
	4	AB1R4		
	5	AB1R5		
	6	AB1R6		
	7	AB1R7		
	8	AB1R8		
	9	AB1R9		
	0	AB1R0		
	0–9	AB1R11		
	+	AB1R12		
	–	AB1R13		

▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

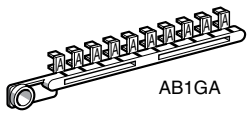
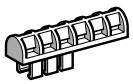
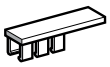
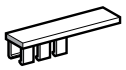
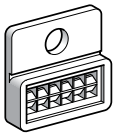
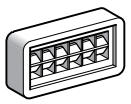
	Marking	Catalog Number	$ Price ea.	Std. Pack ▲
 AB1GA Black capital letters on white background	A	AB1GA	**0.78**	25
	B	AB1GB		
	C	AB1GC		
	D	AB1GD		
	E	AB1GE		
	F	AB1GF		
	G	AB1GG		
	H	AB1GH		
	I	AB1GI		
	J	AB1GJ		
	K	AB1GK		
	L	AB1GL		
	M	AB1GM		
	N	AB1GN		
	O	AB1GO		
	P	AB1GP		
	Q	AB1GQ		
	R	AB1GR		
	S	AB1GS		
	T	AB1GT		
	U	AB1GU		
	V	AB1GV		
	W	AB1GW		
	X	AB1GX		
	Y	AB1GY		
	Z	AB1GZ		
		AB1SR6	**0.78**	200
		AB1SA1	**0.18**	500
		AB1SA2	**0.39**	500
		AB1SA3	**0.78**	500
		AB1RT	**0.78**	500
		AR1SB2	**1.50**	100
		AR1SB3	**1.35**	50

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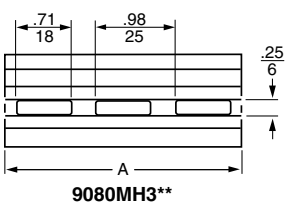
Table 24.14: DIN 3 Track – Various Lengths

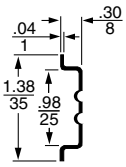
Description		Length m (in.)	Class 9080 Type	$ Price ea.	Std. ▲ Pack
Symmetrical rail 35 x 7.5 mm (1.38 in. x 0.295 in.) in compliance with EN 50022 standard (DIN 46277-3).	Galvanized steel, no mounting holes	0.08 (3)	MH203	**3.20**	10
		0.10 (4)	MH204	**3.60**	
		0.13 (5)	MH205	**4.10**	
		0.15 (6)	MH206	**4.70**	
		0.18 (7)	MH207	**5.10**	
		0.20 (8)	MH208	**5.60**	
		0.23 (9)	MH209	**6.20**	
		0.25 (10)	MH210	**6.80**	
		0.28 (11)	MH211	**7.20**	
		0.30 (12)	MH212	**7.80**	
		0.33 (13)	MH213	**8.30**	
		0.36 (14)	MH214	**8.70**	
		0.38 (15)	MH215	**9.30**	
		0.41 (16)	MH216	**9.80**	
		0.42 (17)	MH217	**10.20**	
		0.46 (18)	MH218	**10.80**	
		0.50 (19.68)	MH220	**11.60**	
		1 (39.37)	MH239	**19.70**	
		2 (78.74)	MH279	**29.60**	
	Galvanized steel, prepunched	0.08 (3)	MH303	**3.50**	
		0.10 (4)	MH304	**3.90**	
		0.13 (5 in.	MH305	**4.70**	
		0.15 (6)	MH306	**5.10**	
		0.18 (7)	MH307	**5.70**	
		0.20 (8)	MH308	**6.20**	
		0.23 (9)	MH309	**6.90**	
		0.25 (10)	MH310	**7.40**	
		0.28 (11)	MH311	**8.10**	
		0.30 (12)	MH312	**8.60**	
		0.33 (13)	MH313	**9.20**	
		0.36 (14)	MH314	**9.60**	
		0.38 (15)	MH315	**10.20**	
		0.41 (16)	MH316	**10.80**	
		0.42 (17)	MH317	**11.60**	
		0.46 (18)	MH318	**12.00**	
		0.50 (19.68)	MH320	**13.10**	
		1 (39.37)	MH339	**23.00**	
		2 (78.74)	MH379	**32.70**	
High rise track	Aluminum	1 (39.37)	MH439	**27.90**	2

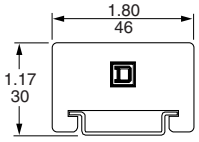
▲ Orders must specify the standard package quantity (Std. Pack) or multiples of that quantity.

Dimensions



9080MH3**





9080MHA10

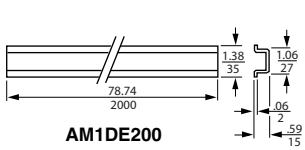
Angle bracket kit		Catalog Number	$ Price ea.	Std. ▲ Pack
For mounting 9080GH or MH track to a panel at 45° angle. Includes 2 brackets and hardware for mounting the track to the brackets.		9080MH82♦	**7.20**	1
End Clamps				
Plastic end clamp for 35 mm DIN 3 track, 8 mm (0.31 in.) wide		AB1AB8P35	**1.50**	100
Metal end clamp for 35 mm DIN 3 track, 8 mm (0.31 in.) wide		AB1AB8M35	**2.40**	100
Polycarbonate end clamp for 35 mm DIN 3 track, 8 mm (0.31 in.) wide		9080MHA10	**2.40**	50

■ Not RoHS Compliant

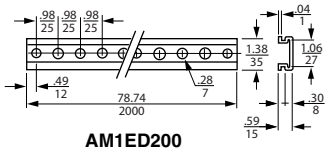
Table 24.15: Mounting Track 1 or 2 meter length

Description	Length m (in.)	Catalog Number	$ Price ea.	Std. ▲ Pack
DIN 3				
15 mm depth, 1 mm steel, zinc chromated	2 (78.74)	AM1ED200	**14.70**	10
15 mm depth, 1.5 mm steel, zinc chromated	2 (78.74)	AM1DE200	**21.80**	10
7.5 mm depth, 1 mm steel, zinc chromated EN 50022 & NF C63-015	2 (78.74)	AM1DP200	**7.80**	10
DIN 1				
Asymmetrical 32 mm track EN 50035 & NF C63-018 15 mm steel, zinc chromated	2 (78.74)	DZ5MB201	**23.20**	10
DIN 2				
Symmetrical 15 mm track EN 50045	1 (39.37)	AB1PC15	**7.50**	10

Dimensions



AM1DE200



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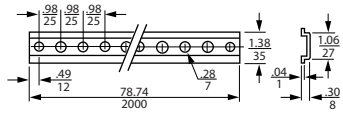

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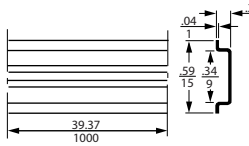
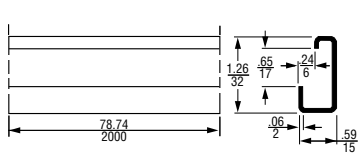


AB1PC15



DZ5MB201

End Clamps		Catalog Number	$ Price ea.	Std. ▲ Pack
Plastic end clamp for 32 mm DIN 1 track, 7.5 mm (0.30 in.) wide		AB1AB7P32	**2.60**	100
Metal end clamp for 32 mm DIN 1 track, 7.5 mm (0.30 in.) wide		AB1AB10M32	**2.60**	100
Plastic end clamp for 15 mm DIN 2 track, 7.5 mm (0.30 in.) wide		AB1AB715	**1.50**	100

RoHS Compliant

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Table 24.16: Selection Guide

Description		Maximum Voltage	Maximum Current■	Blocks				End Barriers ♦			Blocks per ft	Max. Wire Combinations
				Color	Type	$ Price ea.	Std. Pack▲	Type	$ Price ea.	Std. Pack▲		Copper Wire (stranded or solid)
	Solderless Box Lug for #22 to #8 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track. Fingersafe per DIN 57470.	600 V	60 A	Natural	GR6	**2.40**	50	GM6B	**0.78**	10	34	1 **#8** 1–4 **#16** 1 **#10** 1–5 **#18** 1–3 **#12** 1–8 **#20** 1–4 **#14** 1–10 **#22**
				Black	GRB6			GMB6B				
				Blue	GRL6			GML6B				
				Green	GRG6			GMG6B				
				Gray	GRE6			GME6B				
				Orange	GRS6			GMS6B				
				Red	GRR6			GMR6B				
				Yellow	GRY6			GMY6B				
				Brown	GRN6			GMN6B				
	Similar to a 9080GR6 except with a 9080GH91 banana test plug adapter installed. Fingersafe per DIN 57470.	600 V	60 A	Natural	GR6T	**2.90**	50	GM6B	**0.78**	10		
	Solderless Box Lug for #22 to #10 AWG wire. Can be mounted directly to a panel or can be mounted on 9080GH track.	600 V	40 A	Natural	GK6	**2.40**	50	GK6B	**0.93**	50	34	1–4 **#16** 1–4 **#16** 1 **#10** 1–5 **#18** 1–2 **#12** 1–8 **#20** 1–2 **#14** 1–10 **#22**
				Black	GKB6							
				Blue	GKL6							
				Green	GKG6							
				Gray	GKE6							
				Orange	GKS6							
				Red	GKR6							
				Yellow	GKY6							
	High Density Solderless Box Lug for #22 to #10 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track. Fingersafe per DIN 57470.	600 V	30 A	Natural	GM6	**1.80**	50	GM6B	**0.78**	10	51	1 **#10** 1–2 **#18** 1 **#12** 1–5 **#20** 1 **#14** 1–8 **#22** 1–2 **#16** 1–2 **#16**
				Black	GMB6			GMB6B				
				Blue	GML6			GML6B				
				Green	GMG6			GMG6B				
				Gray	GME6			GME6B				
				Orange	GMS6			GMS6B				
				Red	GMR6			GMR6B				
				Yellow	GMY6			GMY6B				
				Brown	GMN6			GMN6B				
	Solderless Box Lug for #18 to #4 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track.	600 V	85 A	Natural	GC6	**5.00**	50	GC6B	**1.30**	10	28	1 **#4** 1–5 **#12** 1 **#6** 1–6 **#14** 1–2 **#8** 1–6 **#16** 1–4 **#10** 1–8 **#18**
	Solderless Box Lug for #12 to #1/0 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track.	600 V	170 A	Natural	GD6	**10.10**	10	GD6B	**1.70**	10	17	1 **1/0** 1–3 **#6** 1 **#1** 1–5 **#8** 1 **#2** 1–6 **#10** 1–2 **#4** 1–7 **#12**
	Solderless Box Lug for #6 AWG to 250 kcmil wire. ★ Mounts on standard 9080GH track or 35 mm DIN 3 track.	600 V	255 A	Natural	GE6	**27.00**	10	None Required			10	1 **250 kcmil**★ 1 **4/0** 1 **#1** 1 **3/0** 1 **#2** 1 **2/0** 1 **#4** 1 **1/0** 1 **#6**

▲ Orders must specify standard package quantity or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating, and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of that wire or combination of wires (as listed in the above table) which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the number, size, insulation class, and other characteristics of the wires used. The lower of the UL and CSA ratings are shown.

♦ One end-barrier is required for each assembly of like blocks.

★ Terminals are tin plated, making them suitable for use with either copper or aluminum wire.

File CCN E60616 XCFR2 File Class 025490 3211 07 RoHS Compliant

For Standard or Custom Assemblies . . . . . page 24-15
For Mounting Track and Accessories . . . . . page 24-16
For DIN 3 track and end clamps . . . . . page 24-12

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Table 24.17: Selection Guide

Description		Maximum Voltage	Maximum Current■	Blocks			End Barriers♦			Blocks per ft	Max. Wire Combinations
				Type	$ Price ea.	Std. Pack▲	Type	$ Price ea.	Std. Pack▲		Copper Wire (stranded or solid)
	Self-Lifting Pressure Wire Connector for #18 to #12 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track. CE	600 V	40 A	GP6	**2.60**	50	GP6B	**1.00**	10	32	1 or 2 **#12** 1 or 2 **#14** 1 or 2 **#16** 1 or 2 **#18**
	Flat Terminal Connector for #22 to #12 AWG wire. Screws are #6-32 x 5/16 in. for ring or spade lugs, 5/16 in. wide maximum. Mounts on standard 9080GH track or 35 mm DIN 3 track. Fingersafe per DIN 57470. CE	600 V	40 A	GA6	**1.80**	50	GP6B	**1.00**	10	32	1 or 2 Conductors Per Screw **#12–22**
	Circuit Isolating Switch★ with self-lifting pressure connectors for #18 to #10 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track. CE	600 V	30 A	GG6	**18.00**	10	GF6B	**4.80**	10	16	1 **#10** 1 **#12** 1 **#14** 1–4 **#16** 1–4 **#18**
	Slip-on Connectors for #22 to #12 AWG wire. Tabs accept 0.250 x 0.032 in. slip-on connectors Mounts on standard 9080GH track or 35 mm DIN 3 track. CE	600 V	20 A	GS6	**4.80**	10	GF6B	**4.80**	10	16	1–2 **#12** 1–2 **#14** 1–2 **#16** 1–2 **#18** 1–2 **#20** 1–2 **#22**
	Transient Voltage Suppressors△ with box lug connectors for #18 to #10 AWG wire. Mounts on standard 9080GH track or 35 mm DIN 3 track. CE	120 V	—	GT6	**20.70**	5	GT6B	**1.70**	10	24	1 **#10** 1 **#12** 1 **#14** 1–2 **#16** 1–4 **#18**
	Fuse Block for 13/32 in. Dia. x 1-1½ in. ferrule fuse with self-lifting pressure connectors. Fuse puller is included as standard. Fuses are not included. Mounts on standard 9080GH track or 35 mm DIN 3 track. Fingersafe per DIN 57470. CE	600 V	30 A	GF6	**11.70**	10	GF6B	**4.80**	10	16	1 **#10** 1 **#12** 1 **#14** 1–4 **#16** 1–4 **#18**
	Fuse Puller▼	—	—	GH63	**2.40**	50	N/A			N/A	N/A
	Blown Fuse Indicator/ Pullers are neon pilot lights which plug on to the fuse in a standard Type GF6 fuse block.	120–240 V	—	GLP3	**11.90**	10	N/A			N/A	N/A
		277–600 V	—	GLP6	**11.90**	10	N/A				

▲ Orders must specify the standard package quantity or multiples of that quantity.

■ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating, and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of that wire or combination of wires (as listed in the above table) which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the number, size, insulation class, and other characteristics of the wires used. The lower of the UL and CSA ratings are shown below.

♦ One end-barrier is required for each assembly of like sections.

★ Not intended to make or break a live circuit. Power must be disconnected from the circuit before operation of the switch.

▼ Fuse puller is supplied as standard with Class 9080 Type GF6 fuse block. The 9080GH63 is a replacement fuse puller.

△ Modules have RC circuitry for suppressing transient voltage, generated when opening a coil circuit, to approximately 200% of the peak line voltage, when used with 120 V coils. Type GT6 is suitable for use with Square D Class 8501 Type X, K, R and C relays or Square D Type S starters and contactors, Sizes 00-2.

Terminal Blocks

	File CCN	E60616 XCFR2
	File Class	025490 3211 07

RoHS Compliant

Blown Fuse Indicator

	File CCN	E63698 JDV5
	File Class	025490 3211 07

RoHS Compliant

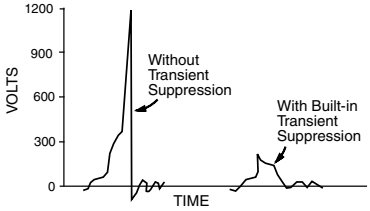

Table 24.18: How to Order

To Order Specify	Catalog Number	
	Class	Type
• Class Number • Type Number	9080	GP6

For Standard or Custom Assemblies page 24-15
For Mounting Track and Accessories page 24-16
For DIN 3 track and end clamps page 24-12

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Standard Terminal Block Assemblies

The assemblies listed in the table below consist of 6 ft (two 3 ft lengths packaged together) of terminal blocks. The terminal blocks are mounted on snap-off mounting track, which can be easily broken every 5/16 in. Every tenth terminal block is marked to aid in counting off the proper number of terminal blocks. After adding the proper end barrier and a slip-in end clamp to the blocks that were broken off, the custom assembly is ready for installation.

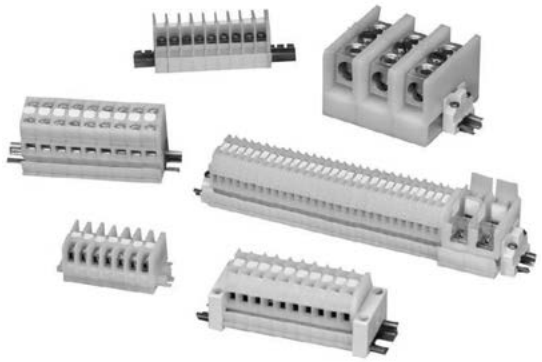

Table 24.19: Standard Terminal Block Assemblies

Description	Type	$ Price
Assembly of 188 Type GA6	GA6188BC	**530.00**
Assembly of 204 Type GR6	GR6204BC	**674.00**
Assembly of 94 Type GF6	GF694BC	**1311.00**
Assembly of 296 Type GM6	GM6296BC	**830.00**
Assembly of 188 Type GP6	GP6188BC	**653.00**

Custom Terminal Block Assemblies

Order an assembly built as required for the application. As standard, custom assemblies use 9080GH mounting track with screw on end clamps. Other options are available from the table below.

One terminal block type: The number of blocks in the assembly is added to the end of the catalog number of the desired block. Example: an assembly of **25** 9080GR6 blocks would be **9080GR625**.

More than one terminal block type in an assembly: A detailed drawing or sketch of the desired assembly must accompany the order.

Table 24.20: Custom Assembly Pricing

Block Type	$ Price Per Block/Terminal	Block Type	$ Price Per Block/Terminal
GA6	**2.80**	GK6 channel mounted	**3.30**
GC6	**6.10**	GK6 direct mounted	**2.70**
GCB01–15	**68.00**	GM6	**2.90**
GCB20–150	**84.00**	GP6	**3.50**
GD6	**12.20**	GR6	**3.30**
GE6	**31.80**	GR6T	**3.80**
GF6	**14.00**	GS6	**3.80**
GG6	**14.60**	Blank vinyl marking strip	**0.05**
		Pre-numbered (1-25 only)	**0.24**

Table 24.21: Custom Terminal Block Assemblies

Option	Suffix	Example
Substitute slip-in end clamps	**C**	9080GR625C
Substitute snap-off channel	**B**	9080GR625BC ▲
For direct mount assembly of 9080GK6 blocks	**D**	9080GK67D
Add a blank vinyl marking strip	**M**	9080GR625M
Add pre-marked (1–25 only) marking strip	**MPO**	9080GR625MPO
Mount on 35 mm DIN 3 track instead of 9080GH track	**T**	9080GR625T

▲ The 9080GH10 screw-on end clamp is **not** recommended for use with snap-off channel. It is recommended that the 9080GH11 slip-in end clamp be used. Therefore, when the suffix **B** is used, it should be followed by the suffix **C**.

Price per block from Table 24.20		
Number of blocks in the assembly x		
Subtotal (multiply # of blocks by price of blocks)		
Initial Charge for factory assemblies		
All except 9080GK6 direct mount **($7.00)**		
OR for 9080GK6 direct mount **($3.60)**		
Vinyl Marking Strips		
Adder for Suffix **M—$0.05** per block		
OR adder for Suffix **MPO—$0.24** per block		
Deduct for Suffix **C—$2.40**		
Total everything from Subtotal down		
Apply the following rounding rules to the total obtained:		
$1.00 through **$50.00**		Round to the nearest dime
over **$50.00**		Round to the nearest dollar

Table 24.22: How to Order

To Order Specify	Catalog Number	
	Class	**Type**
• Class Number • Type Number	9080	GA612

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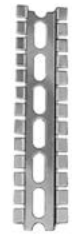
Table 24.23: 3/4 in. Mounting Track

	Style	Length (in.)	Type	$ Price ea.	Std. Pack▲
 Snap-Off Track Standard Track	Standard Track	3	GH103	**2.40**	5
		4	GH104	**2.40**	5
		5	GH105	**2.60**	5
		6	GH106	**2.60**	5
		7	GH107	**2.60**	5
		8	GH108	**3.00**	5
		9	GH109	**3.00**	5
		10	GH110	**3.30**	5
		11	GH111	**3.30**	5
		12	GH112	**3.50**	5
		13	GH113	**3.50**	5
		14	GH114	**3.80**	5
		15	GH115	**3.90**	5
		16	GH116	**4.20**	5
		17	GH117	**4.40**	5
		18	GH118	**4.80**	5
		36	GH136	**11.70**	5
		48	GH148	**15.20**	5
		72	GH172	**22.70**	5
High Rise	Snap-Off Track	36	GH236	**11.70**	20
		48	GH248	**15.20**	20
		72	GH272	**22.70**	20
	High Rise	36	GH336	**29.00**	2

Note: For additional track and appropriate end clamps, see page 24-12.

Table 24.24: Accessories

Description		Type	$ Price ea.	Std. Pack▲
End Clamps				
	Screw-on End Clamp (Not recommended for use on snap-off mounting track)	GH10	**2.40**	50
	Slip-in End Clamp (Not for use with 9080 GE6, GK6 blocks)	GH11	**.63**	50
Jumpers				
	2-pole jumper for GM6	GH700	**.59**	20
	6-pole jumper for GM6	GH710	**1.20**	10
	2-pole jumper for GK6, GR6	GH72	**.62**	20
	6-pole jumper for GK6, GR6	GH73	**1.80**	10
	2-pole jumper for GC6	GH74	**2.30**	10
	6-pole jumper for GC6	GH75	**4.30**	10
	2-pole jumper for GD6	GH76	**3.20**	10
	6-pole jumper for GD6	GH77	**8.70**	10
	2-pole jumper for GA6, GP6	GH78	**1.20**	10
	6-pole jumper for GA6, GP6	GH79	**2.00**	10
Fanning Strip				
	Snap-together fanning strip section for GA6 blocks	GH51	**3.00**	10
	Snap-together fanning strip section for GK6, GR6 blocks	GH52	**3.30**	10

▲ Orders must specify the standard package quantity or multiples of that quantity.

Table 24.25: Marking and Additional Accessories

Description		Type	$ Price ea.	Std. Pack▲
	25 ft blank vinyl marking strip	GH220	**11.90**	1
Vinyl marking strip numbered 1-25	For GK6, GR6	GH21	**4.40**	5
	For GA6, GP6	GH22	**4.40**	5
	For GM6	GH230	**4.40**	5
	Blank pin-feed marking tabs—6 x 20 (total 120) marking tabs for GD6, GR6, and GT6 blocks	GH200	**1.70**	20
	Pre-marked 01 to 50 (2 sets) plus 20 Various marking tabs (total 120 marking tabs) for GD6, GR6, and GT6 blocks	GH210	**13.10**	5
	Marking pen with permanent, fine line black ink	GH40	**8.00**	12
	Marking strip end plug for GK6, GR6, GM6, GA6, GP6, GC6, GD6, GE6, and GT6 blocks	GH60	**.39**	50
	Transition barrier between GK6 and all other G or K blocks	GH61	**.98**	50
	Cover for GR6 or GR6T blocks	GH62	**.98**	50
	Banana test plug for GR6T block	GH90	**7.40**	10
	Test plug adapter for GR6T block (included as standard with GR6T)	GH91	**1.20**	50
	Angle bracket kit—for mounting 9080GH or MH track to panel at 45° angle. Includes 2 brackets and hardware for mounting the track to the brackets	MH82	**7.20**	1
	Polycarbonate end clamp for 35 mm DIN 3 track, 8 mm (0.31 in.) wide	MHA10	**2.40**	50

Table 24.26: How to Order

To Order Specify	Catalog Number	
	Class	**Type**
• Class Number	9080	GH10
• Type Number		

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GCB100

Table 24.27: 9080GCB Thermal-Magnetic Circuit Protectors■

Maximum Current (A)	Internal Resistance ¾	Maximum Voltage	Catalog Number▲	$ Price
0.1	133	250 Vac 65 Vdc	GCB01	66.00
0.5	6.6		GCB05	
0.8	2.55		GCB08	
1.0	1.97		GCB10	
1.2	1.22		GCB12	
1.5	0.86		GCB15	
2.0	0.49		GCB20	72.00
2.5	0.31		GCB25	
3.0	0.20		GCB30	
4.0	0.10		GCB40	
5.0	0.08		GCB50	
7.0	0.03		GCB70	
10.0	<0.02	125 Vac 65 Vdc	GCB100	
15.0	<0.02		GCB150	

▲ These maximum current values assume the use of insulated copper conductors with 75°C temperature rating, and are calculated based on NEC Article 310, Table 310-16. In most cases this value is the maximum ampacity of that wire or combination of wires (as listed in the above table) which has the greatest current carrying capacity. The actual allowable current for a particular application depends on the number, size, insulation class, and other characteristics of the wires used.
■ Discount schedule CP5.

Selection

To properly select a Class 9080 Type GCB circuit protector, follow these steps:

1. Determine the inrush correction factor from Table 24.28.
2. Determine the temperature correction factor from Table 24.29.
3. Determine the sealed current of the load that is being protected.
4. Multiply the sealed current by the two correction factors and choose the closest circuit protector.

Note: Choosing a circuit protector with a value lower than the calculated value might cause nuisance tripping, while choosing the larger might provide a protector that will not properly protect the load.

File E152841
CCN QVNU2
(UL1077)

File 025490
Class 3211 07

Example: Solenoid with sealed current of 0.75 A, an inrush ratio of 1:6, and in an ambient temperature of 85°F: 0.75 x 1.5 x 1.05 = 1.18 Choose the 1.2 A protector

Tripping Time: Tripping time of the circuit protector is determined from Table 24.30. Divide the circuit protector value by the temperature correction factor from Table 24.29 to determine actual rated current referenced in Table 24.30.

Table 24.28: Table A—Inrush Ratio Correction Table

Note: For resistive loads, use inrush correction factor of 1.0.

Inrush Ratio	1:1 to 1:4	1:5	1:6	1:7	1:8
Factor	1.3	1.4	1.5	1.6	1.7

Table 24.29: Table B—Ambient Temperature Correction Table

Ambient Temperature	70°F (21.1°C)	100°F (37.8°C)	120°F (48.9°C)	140°F (60°C)	160°F (71.1°C)	180°F (82.2°C)	200°F (93.3°C)
Factor	1.0	1.1	1.2	1.3	1.4	1.5	1.6

Table 24.30: Table C—Tripping Times in Seconds at 70°F (21.1°C)

Percent rated current	100%	200%	300%	400%	500%	600%	1000%	2000% and greater
Tripping Time (s)	no trip	10–40	38	1.5–9	0.8–6	0.003–4	0.003–2	Max. 0.02

Note: When several protectors are channel mounted adjacent to each other, the "no trip" current will be 80% of rated current at 70°F.

CP5 Discount Schedule

Schneider Electric
www.schneider-electric.us

Thermal-Magnetic Circuit Protectors

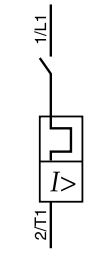
Type GB2

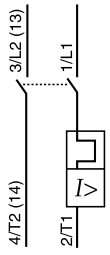
www.schneider-electric.us

GB2CB06

GB2CD

Table 24.31: GB2 Thermal-Magnetic Circuit Protectors♦

Description	Maximum Voltage	Thermal Rating	Catalog Number	$ Price ea.★
One pole Thermal Magnetic Circuit Protector 	300 Vac	0.5 A	GB2CB05	43.60
		1 A	GB2CB06	
		2 A	GB2CB07	
		3 A	GB2CB08	
		4 A	GB2CB09	
		5 A	GB2CB10	
		6 A	GB2CB12	
		8 A	GB2CB14	
		10 A	GB2CB16	
		12 A	GB2CB20	

Description	Maximum Voltage	Thermal Rating	Catalog Number	$ Price ea.★
Two pole Thermal Magnetic Circuit Protector 	300 Vac	0.5 A	GB2CD05	52.00
		1 A	GB2CD06	
		2 A	GB2CD07	
		3 A	GB2CD08	
		4 A	GB2CD09	
		5 A	GB2CD10	
		6 A	GB2CD12	
		8 A	GB2CD14	
		10 A	GB2CD16	
		12 A	GB2CD20	

♦ Discount schedule I.
★ Must order in multiples of 6
Note: For markers, use AB1( )R and AB1( )G markers from page 24-16

File Class 081630 3215 30
IEC 157-1
VDE 0660
File CCN E113720 QVNU2

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LBA365212

Table 24.32: Standard Power Distribution Blocks

Lug Wire Range ▲		Aluminum ■					
Main	Branch	One Pole		Two Pole		Three Pole	
		Type	$ Price	Type	$ Price	Type	$ Price
(1) #14–2/0	(1) #14–2/0	LBA162101	**10.40**	LBA262101	**22.10**	LBA362101	**25.70**
(1) #6–350 kcmil	(1) #6–350 kcmil	LBA163101	**53.00**	LBA263101	**81.00**	LBA363101	**107.00**
(1) #4–600 kcmil	(1) #4–600 kcmil	LBA164101	**95.00**	N/A	—	LBA364101	**183.00**
(2) #4–350 kcmil	(2) #4–350 kcmil	LBA165202	**98.00**	LBA265202	**147.00**	LBA365202	**189.00**
(2) #6–500 kcmil	(2) #4–500 kcmil	LBA1652021	**135.00**	LBA2652021	**206.00**	LBA3652021	**243.00**
(1) #14–2/0	(4) #14–4	LBA162104	**30.50**	LBA262104	**45.80**	LBA362104	**68.00**
(1) #14–2/0	(6) #14–4	N/A	—	N/A	—	LBA362106	**131.00**
(1) #6–400 kcmil	(4) #14–2	LBA163104	**56.00**	LBA263104	**84.00**	LBA363104	**113.00**
(1) #6–400 kcmil	(6) #14–2	LBA163106	**59.00**	LBA263106	**89.00**	LBA363106	**122.00**
(1) #6–400 kcmil	(8) #14–2	LBA164108	**77.00**	LBA264108	**116.00**	LBA364108	**161.00**
(1) #4–500 kcmil	(6) #14–2/0	LBA165106	**126.00**	LBA265106	**189.00**	LBA365106	**233.00**
(1) #4–500 kcmil	(12) #14–2	LBA165112	**134.00**	LBA265112	**201.00**	LBA365112	**261.00**
(2) #14–2/0	(6) #14–4	LBA163206	**60.00**	LBA263206	**90.00**	LBA363206	**122.00**
(2) #6–500 kcmil	(8) #14–2/0	LBA165208	**126.00**	LBA265208	**189.00**	LBA365208	**251.00**
(2) #6–500 kcmil	(12) #14–4	LBA165212	**135.00**	LBA265212	**206.00**	LBA365212	**261.00**

LBA161104

Table 24.33: Miniature Power Distribution Blocks

Lug Wire Range ▲		Aluminum ■					
Main	Branch	One Pole		Two Pole		Three Pole	
		Type	$ Price	Type	$ Price	Type	$ Price
(1) #14–2	(1) #14–2	LBA161101	**13.40**	N/A	—	LBA361101	**23.40**
(1) #14–2	(4) #18–10	LBA161104	**26.40**	LBA261104	**30.60**	LBA361104	**58.00**

LBC165212

Table 24.34: Copper Power Distribution Blocks

Lug Wire Range ▲		Copper ♦					
Main	Branch	One Pole		Two Pole		Three Pole	
		Type	$ Price	Type	$ Price	Type	$ Price
(1) #18–1/0	(1) #18–1/0	LBC162101	**99.00**	N/A	—	LBC362101	**201.00**
(1) #6–250 kcmil	(1) #6–250 kcmil	LBC163101	**125.00**	N/A	—	LBC363101	**233.00**
(1) #14–2/0	(4) #14–4	LBC162104	**99.00**	LBC262104	**147.00**	LBC362104	**248.00**
(1) #4–500 kcmil	(6) #14–2	LBC163106	**153.00**	LBC263106	**228.00**	LBC363106	**354.00**
(2) #14–2/0	(6) #14–4	LBC163206	**134.00**	LBC263206	**201.00**	LBC363206	**269.00**
(2) #4–500 kcmil	(8) #14–2/0	LBC165208	**297.00**	N/A	—	LBC365208	**593.00**
(2) #6–500 kcmil	(12) #14–2	LBC165212	**284.00**	N/A	—	LBC365212	**567.00**

▲ Lugs suitable for use with 75°C conductors. (#) indicates number of conductors.
■ Aluminum blocks will accept either Al or Cu conductors.
♦ Cu blocks will accept copper conductors only.

Refer to catalog for dimensions.

Certifications

File Guide E60616 XCFR2

File Class 70361 6228-01

RoHS Compliant

CE Marked

Table 24.35: Clear Plastic Covers (0.045 in. thick)

Note: There are no covers for miniature blocks.

For LBA Type	Type	$ Price ea. ★	Dim. A	Dim. B
LBA162…, LBC162	LB21	**11.30**	1.062	2.750
LBA262…, LBC262	LB22	**13.50**	1.875	2.750
LBA362…, LBC362 ▼	LB23	**15.80**	2.688	2.750
LBA163…, LBC163	LB31	**12.50**	1.782	3.813
LBA263…, LBC263	LB32	**14.70**	3.313	3.813
LBA363…. LBC363	LB33	**17.00**	4.844	3.813
LBA164…	LB41	**13.50**	2.125	4.563
LBA264…	LB42	**15.80**	4.000	4.563
LBA364…	LB43	**18.00**	5.875	4.563
LBA165…, LBC165	LB51	**14.70**	2.719	5.313
LBA265…, LBC265	LB52	**17.00**	5.656	5.313
LBA365…, LBC365	LB53	**19.20**	8.375	5.313

★ These covers must be ordered in multiples of 5. Each cover comes with two self-tapping screws.
▼ Will not work on a 9080LBA362106 block.

Application Data

Voltage Rating—Class B & C—600 V
Blocks are rated based on NEC Table 310-16 using 75°C wire.

Aluminum blocks are tin plated high conductive aluminum.
Copper blocks are tin plated high conductive copper.

Housing material:

- Miniature Blocks are made from high impact thermoplastic rated at 125°C. max. & -40°C. min.
- Full Size Blocks are made from general purpose phenolic rated at 150°C. max. & -40°C. min.

All blocks have a flammability rating of UL 94V-0.

Most blocks have a short circuit current rating for UL508A up to 200 kA for branch circuit applications. For the actual ratings, see catalog **9080CT9603R9/08.**

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Table 24.36: 250 V—Classes H and R

Rating (A) △	No. of Poles	Class H		Class R★		Lug Wire Range
		Type	$ Price	Type	$ Price	
30▲	1	FB1211	12.90	FB1211R	19.20	#14–10 Cu
	2	FB2211	21.90	FB2211R	28.40	
	3	FB3211	31.10	FB3211R	37.20	
60▲	1			FB1221R	28.40	#14–2 Cu or Al
	2	FB2221	39.20	FB2221R	45.80	
	3	FB3221	55.00	FB3221R	61.00	

Table 24.37: 600 V—Classes H and R

Rating (A) △	No. of Poles	Class H		Class R★		Lug Wire Range
		Type	$ Price	Type	$ Price	
30■	1	FB1611	24.30	FB1611R	30.60	#14–10 Cu
	2	FB2611	42.60	FB2611R	48.50	
	3	FB3611	54.00	FB3611R	60.00	
60■	1			FB1621R▼	37.20	#14–2 Cu or Al
	2	FB2621	51.00			
	3	FB3621	54.00	FB3621R	78.00	
100■	3	FB3631	147.00	FB3631R	158.00	#6–2/0 Cu or Al

Table 24.38: 600 V Series—Miniature Fuse Dimension (13/32 x 1-1/2 in.)

Rating (A) △	No. of Poles	Type M		Class CC★		Lug Wire Range
		Type	$ Price	Type	$ Price	
30▲	1	FB1611M	13.50	FB1611CC	13.50	#14–10 Cu
	2	FB2611M	19.80	FB2611CC	22.10	
	3	FB3611M	24.30	FB3611CC	24.80	

Application Information:

Base material:

- ▲ Base is high impact thermoplastic—maximum operating temperature 125°C
- ■ Base is general purpose phenolic—maximum operating temperature 150°C
- ♦ Base is high impact polyester—maximum operating temperature 130°C

Clip material:

- All 30 and 60 A fuse clips are copper alloy tin plated.
- All 100 and 200 A fuse clips are one piece aluminum with copper spring tin plated.
- All Class H, R and J fuses are standard with reinforced fuse clips.

Lug termination:

- All 30 A blocks have pressure wire connectors.
- All 60, 100 and 200 A blocks have box lug connectors.

Approvals:

- The Type M fuseholders are UL component recognized (File E40747 CCN IZLT2).
- The Type H, R, J and CC are UL Listed (File E40747 CCN IZLT).
- All fuseholders are CSA certified (File 70360 Class 6225-01).

Flammability rating of all FB fuse blocks is UL 94V-0.

RoHS Compliant

FB2221

FB3221R

Table 24.39: 600 V—Class H Only (Copper Only)

Rating (A) △	No. of Poles	Class H		Lug Wire Range
		Type	$ Price	
30■	1	FB1611	24.30	#14–10 Cu
	2	FB2611	42.60	
	3	FB3611	54.00	
100■	3	FB3631C	158.00	#6–2/0 Cu

Table 24.40: 600 V—Class J

Rating (A) △	No. of Poles	Class J		Lug Wire Range
		Type	$ Price	
30■	2	FB2611J	45.50	#2–14 AWG Cu—Al
	3	FB3611J	63.00	
60■	2	FB2621J▼	54.00	#2–14 Cu—Al
	3	FB3621J	75.00	

Table 24.41: Track Adapter

Description	Type	$ Price ea.	Std. Pack ◊
35 mm DIN 3 Track Adapter For 9080 FB*211, FB*211R, FB*611M, and FB*611CC Fuseholders	FBDIN3 ▼	4.10	100

Table 24.42: Fuse Sizes—(Diameter x Length)

A	Class of Fuse			
	Class H/R—300 V	Class H/R—600 V	Class M/CC—600 V	Class J—600 V
30	9/16 x 2 in.	13/16 x 5 in.	13/32 x 1-1/2 in.	13/16 x 2-1/4 in.
60	13/16 x 3 in.	1-1/16 x 5-1/2 in.	N/A	1-1/16 x 2-3/8 in.
100	1 x 7-7/8 in.	1 x 7-7/8 in.	N/A	N/A
200	1-1/2 x 7-1/8 in.	1-3/4 x 9-5/8 in.	N/A	N/A

★ Class R and CC fuseholders accept current limiting Class R & CC fuses only.
▼ Not in stock. Order point—Raleigh, NC.
△ Specified wire ranges are based on 75°C wire. Wires with temperature ratings other than 75°C are approved while observing NEC Article 310 wire tables for allowable ampacities of insulated conductors.
Class R, J and CC fuse blocks are tested and approved for 200,000 AIC in accordance with UL 512.
□ Can be mounted directly to a panel or on 35 mm DIN 3 track.
◊ Orders must specify the standard package quantity or multiples of that quantity.

Table 24.43: How to Order

To Order Specify	Catalog Number
• Class Number	9080
• Type Number	FB1211

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Conform to NF C 63-023 Standard
Mark and terminate wires simultaneously

Strip the wire, insert it into the cable end and crimp it.
Up to 7 markers can be used.

DZ5CE005

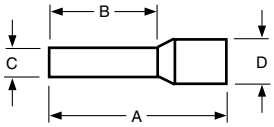

Table 24.44: Without Marking Flag

Wire Size		Sleeve color	Dimensions (mm)				Catalog Number ▲♦	$ Price ea.	Std. Pack ★
AWG	mm²		A	B	C	D			
26	0.25	Yellow	11	6.2	1.2	2.2	DZ5CE002L6	**0.16**	1000
			13	8.2			DZ5CE002		
24	0.34	Green	11	6.2			DZ5CE003L6		
			13	8.2			DZ5CE003		
22	0.50	White	11	6.2	1.4	3	DZ5CE005L6■	**0.18**	
			13	8.2			**DZ5CE005**■		
			16.8	12			DZ5CE005L12	**0.26**	
20	0.75	Blue	11	6.2	1.6	3.1	DZ5CE007L6■	**0.18**	
			13	8.2			**DZ5CE007**■		
18	1.00	Red	11.5	6.2	1.8	3.4	DZ5CE010L6■		
			13.5	8.2			**DZ5CE010**■		
			16.8	12			DZ5CE010L12	**0.28**	
16	1.50	Black	11.5	6.2	2.1	4	DZ5CE015L6■	**0.22**	
			13.5	8.2			**DZ5CE015**■		
			22.8	17.7			DZ5CE0153■	**0.42**	
14	2.00	Yellow	14.5	8.2	2.35	4.2	**DZ5CE020**	**0.24**	
14	2.50	Gray	14.5	8.2	2.7	4.6	**DZ5CE025**■		
			24	17.7			DZ5CE0253■	**0.44**	
12	4.00	Orange	17.3	9.8	3.3	5.5	DZ5CE042■	**0.42**	
			25.5	17.5			DZ5CE043■	**0.62**	
10	6.00	Green	20	11.5	3.95	7	DZ5CE062	**0.48**	100
			26	17.5			DZ5CE063	**0.66**	

DZ5CA007

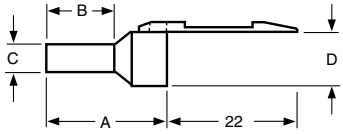

Table 24.45: With Marking Flag

26	0.25	Yellow	13	8.2	1.2	2.2	DZ5CA002	**0.26**	1000
24	0.34	Green					DZ5CA003		
22	0.50	White			1.4	3	DZ5CA005■	**0.32**	
20	0.75	Blue			1.6	3.1	**DZ5CA007**■		
18	1.00	Red	13.5		1.8	3.4	**DZ5CA010**■		
16	1.50	Black			2.1	4	**DZ5CA015**■		
14	2.50	Gray	14.5		2.7	4.6	**DZ5CA025**■		

DZ5CA042

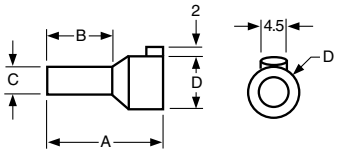

Table 24.46: Marking Flag Optional ▼

12	4.00	Orange	19.5	11.5	3.3	5.5	**DZ5CA042**■	**0.38**	1000
			25.5	17.5	3.3	5.5	DZ5CA043■	**0.46**	
10	6.00	Green	20	11.5	3.95	7	**DZ5CA062**	**0.62**	100
			26	17.5	3.95	7	DZ5CA063	**0.64**	
8	10.00	Brown	21.5	12	4.95	8.4	**DZ5CA102**	**0.72**	
			27	17.5	4.95	8.4	DZ5CA103	**0.78**	
6	16.00	White	23.5	12	6.35	9.8	**DZ5CA162**	**0.86**	
			29	17.5	6.35	9.8	DZ5CA163	**0.96**	
4	25.00	Black	30	17.5	8.15	12	**DZ5CA253**	**1.10**	
2	35.00	Red	30	16	9	13.5	DZ5CA352	**1.30**	20
			39	25	9	13.5	DZ5CA353	**1.50**	
0	50.00	Blue	36	20	11	15.7	DZ5CA502	**1.50**	
			41	25	11	15.7	DZ5CA503	**1.70**	

AZ5DE010

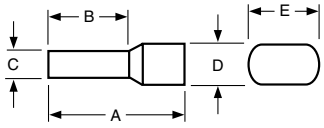

Table 24.47: Dual Wire Cable Ends

			A	B	C	D	E			
22	0.50	White	13	8	1.4	2.5	4.7	AZ5DE005	**0.24**	500
20	0.75	Blue			1.6	2.8	5.0	AZ5DE007		
18	1.00	Red	13.5		1.8	3.4	5.4	AZ5DE010		
16	1.50	Black			2.1	3.6	6.6	AZ5DE015	**0.26**	
14	2.50	Gray	24	10	2.7	4.2	7.8	AZ5DE025	**0.32**	250

▲ **Bold faced** catalog numbers are stocked in the United States.
■ These catalog numbers are UL Component Recognized (File E164872 CCN ZMMT2) provided the AT1PA crimping tool is used to crimp the cable end.
♦ CE Marked.
★ Order must specify the standard pack quantities or multiples of that quantity.
▼ Will accept an AR1SC03 cable marker from page 24-22.

RoHS
Compliant

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AR1SC01

AR1SC02

AR1SC03

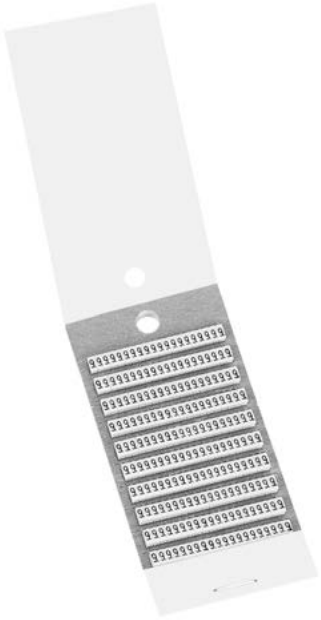

AR1MA019

Table 24.48: Cable End Markers & Accessories

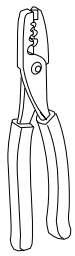
Style	Catalog Number	$ Price ea.	Std. Pack▲
Adjustable collar type marker holder for #14 to #2 wire	AR1SC01	**0.42**	
Clip-on marker holder for #18 to #16 wire (7 markers max.)	AR1SC02	**0.42**	100
Cable end marker tags for DZ5CA042 to DZ5CA253	AR1SC03	**0.12**	
Card of 200 yellow markers with black numeral 0 thru 9	AR1MA01■	**136.00**	
Card of 200 yellow markers with black letters A thru Z	AR1MB01■	**300.00**	
Card of 200 black markers with a white 0 marked on them	AR1MC010	**13.60**	
Card of 200 brown markers with a white 1 marked on them	AR1MC011	**13.60**	
Card of 200 red markers with a black 2 marked on them	AR1MC012	**13.60**	
Card of 200 orange markers with a black 3 marked on them	AR1MC013	**13.60**	
Card of 200 yellow markers with a black 4 marked on them	AR1MC014	**13.60**	
Card of 200 green markers with a black 5 marked on them	AR1MC015	**13.60**	
Card of 200 blue markers with a black 6 marked on them	AR1MC016	**13.60**	
Card of 200 violet markers with a black 7 marked on them	AR1MC017	**13.60**	1
Card of 200 gray markers with a black 8 marked on them	AR1MC018	**13.60**	
Card of 200 white markers with a black 9 marked on them	AR1MC019	**13.60**	
Card of 200 blank yellow markers	AR1MA0196	**12.20**	
Card of 200 blank green markers	AR1MA0197	**12.20**	
Card of 200 yellow markers with a black + marked on them	AR1MA0198	**12.20**	
Card of 200 yellow markers with a black—marked on them	AR1MA0199	**12.20**	
Complete set of numeral markers 0 thru 9, plus one card each of the "+" "-", yellow blanks, and green blanks/one AT1PA1 positioning tool. Each kit has 200 of each item.	AR1MA01	**136.00**	
Complete set of letter markers A thru Z, plus one card each of the "+" "-", yellow blanks, and green blanks/one AT1PA1 positioning tool. Each kit has 200 of each item.	AR1MB01	**300.00**	

Table 24.49: Cable End Tools

Description	Catalog Number	$ Price
Cable end marker positioning tool	AT1PA1	**30.20**
Automatic stripping and cutting tool for 0.8 mm to 4 mm cable, adjustable stripping length	AT1PA7	**506.00**
Crimping tool for cable ends 0.5 mm^2 to 16 mm^2	AT1PA2	**246.00**
Crimping tool for cable ends 10 mm^2 to 35 mm^2	AT1PA4	**268.00**
Organizing case for cable ends—holds stripping tool and cable ends (not supplied)	AT1HB2	**116.00**

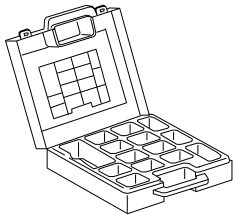
▲ Order must specify the standard pack quantities or multiples of that quantity.
■ Complete the catalog number by adding the number or letter desired.
Examples: AR1 MA015 is a card of 200 yellow markers with a black 5 marked on them.
R1 MB01T is a card of 200 yellow markers with a black T marked on them.

AT1PA1


AT1PA2

AT1PA4

AT1PA7


AT1HB2

TERMINAL BLOCKS
24

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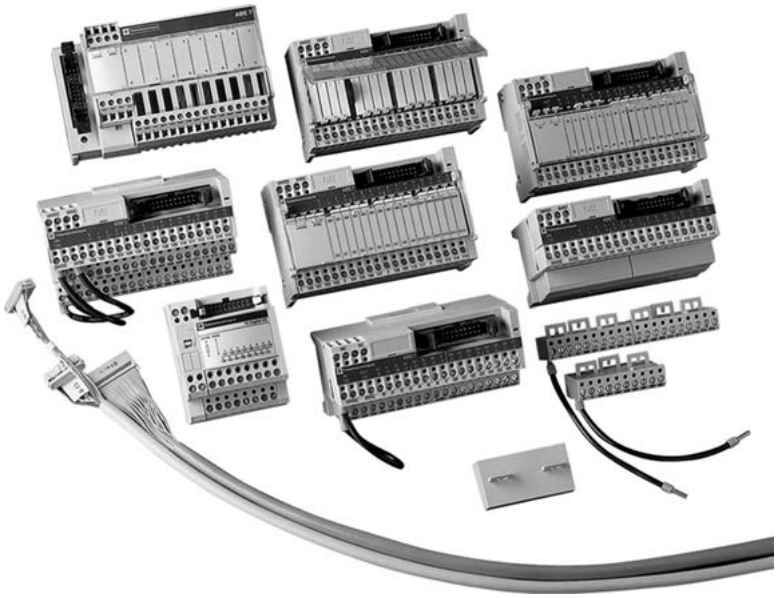


The TELEFAST 2 system is a set of products for the rapid connection of I/O modules (24 Vdc discrete, analog and counters) to Various control circuit components. These components act as a substitute for screw terminal blocks, remotely locating and partly eliminating the single wire connections. The system connects only to channels with HE10 and SUB-D connectors, or to standard terminal blocks with a cabled connector.

Variations within the listing of modules include those with and without relays (electromechanical and solid state), analog and counter modules, and special function modules.

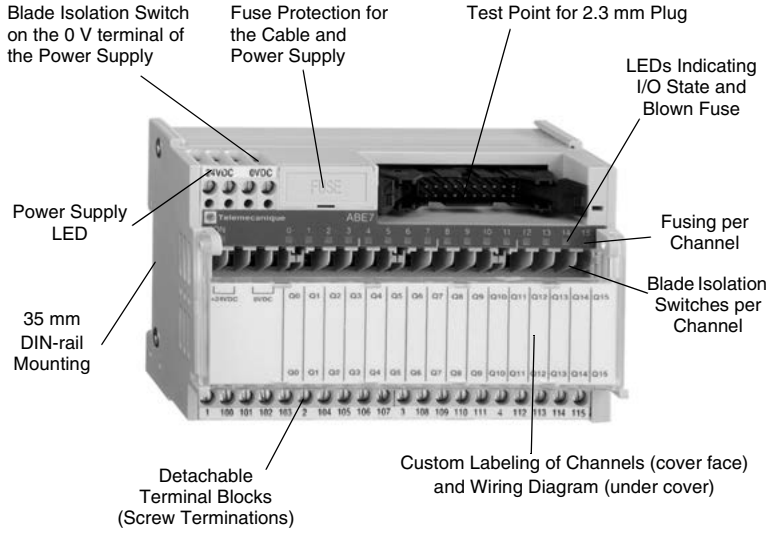
Pre-wired cables available allow you to connect directly to:

- Schneider Electric (Modicon™ family)
  - — TSX Premium™
  - — TSX Micro
  - — TSX Series 7
  - — Twido
  - — Quantum™
  - — Compact
  - — April S5000/7000
  - — NUM1020/1060
- Siemens
  - — S7 – 200/300/400
  - — S5 – 95U to 155U
- Allen-Bradley
  - — SLC500

In addition, other accessories include:

- I/O simulators
- Continuity blocks
- Label marking software
- Splitter bases (16, 23, and 32 channels)
- Mounting kits
- Detachable terminal strips
- Wiring pass-through connectors
- Fuses

Advantys TELEFAST 2 Product Features



NOTE: *Not all features available on all modules.*

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Section 25

Machine Safety Products

XPS Safety Relay (p. 25-4)

XPSMC Safety Controller (p. 25-4)

XPSMF Safety PLC (p. 25-5)

AS-Interface Safety at Work (p. 25-5)

XUSL Light Curtain (p. 25-6)

XCSDM Non-Contact Safety Interlock Switches(p. 25-7)

XY2 Cable Pull Switches (p. 25-8)

Safety Relays

XPS safety relays for controlling individual safety functions of the system. **25-4**

Safety Controller

XPSMC safety controllers for use where multiple safety relays and multiple safety functions are required, or where there is a greater interaction between the various safety functions required on the machine. **25-4**

Safety PLC

XPSMF Safety PLC for use in safety systems where multiple functions are required, or where the interaction between the various components of the safety system is more complicated. **25-5**

AS-Interface Safety at Work

AS-Interface for use where multiple safety functions and their interaction need to be monitored. All safety information is transmitted using a safety communication bus. **25-5**

Light Curtains

XUSL light curtains for use in point of operation guarding and perimeter guarding. Available in 14 mm (finger) or 30 mm (hand) minimum object sensitivity (MOS) as well as perimeter or body detection, all with a wide range of protected heights. **25-6**

Safety Interlock Switches

XCS safety interlock switches for mechanical interlocking of gates and guards. Locking and non-locking versions are available. **25-7**

Non-Contact Safety Interlock Switches

XCSDM non-contact safety interlock switches for interlocking of gates and guards, where no contact is desired between switch and actuator. **25-7**

Safety Limit Switches

XCS safety limit switches for a wide variety of safety related functions, including end of travel notification, over-travel indication, safety related positioning of machinery/tooling or component parts, as well as gates and guards. **25-8**

Cable Pull Switches

XY2 cable pull switches for Emergency Stop control around conveyors, assembly lines, and large machines. **25-8**

Palm Operators

9001 Type P palm operators for applications such as power operated presses, and two hand control applications. **See catalog MKTED208051EN-US**

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Safety-related systems are comprised of many components, and no single safety component will ensure the safety of the system. The design of the complete safety-related system and level of safety desired must be considered before choosing products. The whole safety-related system needs to be integrated as part of the initial design, not added on after the machine is built. Schneider Electric can provide a wide range of products for the protection of personnel for machine guarding applications and safety-related system architectures.

Safety PLCs—XPSMF

Safety PLCs are used where the safety-related solution is complicated, or where there are a greater number of safety inputs or outputs required. They are also used where safety inputs and outputs need to be distributed around the machine or production area.

Safety Controllers—XPSMC

Safety controllers are used in applications where multiple safety relays would be required to control the safety-related system, or where the interaction between the individual safety relays would require significant inter-wiring. The simple-to-use software allows the user to easily develop the safety-related control system, providing a cost effective solution.

Safety Relays—XPS

To tie the whole safety system together, XPS safety relays are used to monitor the safety inputs, outputs, and feedback from the system to determine when the system is safe to start and when the system should be shut down.

AS-Interface Safety at Work—AS-i

AS-Interface provides the safety solution of multiple safety relays on a communication bus that can transmit both standard and safety relevant data. The safety solution is simply configured with the easy to use configuration software.

Light Curtains—XUSL

Some machine operations may not allow gates or guards to be used, and other applications require high visibility of the process or easy accessibility. For these applications, XUSL light curtains may be the best choice and are available in many protected heights, minimum object sensitivities, and configurations.

Safety Interlock Switches—XCS

To protect operators, maintenance, and other personnel, safety systems may require the interlocking of mechanical gates or guards. We provide both locking and non-locking mechanical XCS safety interlock switches in many body styles and contact arrangements.

Non-Contact Safety Interlock Switches—XCSDM

Sometimes no contact between the safety interlock switch and its actuating key is desired, such as in food and beverage applications, so we provide several different types of XCSDM non-contact safety interlock switches.

Safety Limit Switches—XCS

In some applications, the position of components is important to the safety of the machine, and devices such as safety interlocks or light curtains are impractical. These applications are ideal for safety limit switches. They can also be used on gates and guards to verify a closed position or a fully open or overtravel position.

Cable Pull Switches—XY2

In most applications, emergency stopping is required to shut the machine down in case an emergency or problem arises. Where an individual emergency stop is required, the XB4/XB5 emergency stop push buttons are available in various types, sizes, and nameplates. On large machines or conveyors a high number of emergency stop operators may need to be installed. As more individual e-stop buttons are required, using an XY2 cable pull switch becomes a more economical solution based on ease of use, installation time, and cost effectiveness.

Palm Buttons—9001 P

Press applications demand two hand control units for operator protection that are large and easy to operate while wearing gloves. Other press applications, such as stop and inch, also need large buttons for operators wearing gloves. The 9001 P palm buttons offer a variety of operators to meet these needs.

Other products for use in safety systems

We offer many other products that are suitable for use in safety-related circuits, such as:

- XB4/XB5 emergency stop push buttons—See **Section 19**
- XV indicating banks—See **Section19**
- TeSys contactors and relays—See **Section 18**
- Limit switches with positive/direct opening N.C. contacts—See **Section 21**

All of the machine safety products discussed in this section are designed to work together to allow you to meet your various safety requirements. When properly applied, these products will allow you to meet SIL 3 per IEC 61508, Category 4 per EN 954-1 and ISO 13849-1, and performance level “e” per ISO 13849-1, and help you meet domestic and international safety requirements, standards, and codes.

The next few pages give an overview of our wide offering of machine safety products. Catalog **MKTED208051EN-US** gives a detailed description of our offering, including safety PLCs, safety controllers, safety relays, AS-Interface, safety interlocks, light curtains, safety interlocks, non contact safety interlocks, cable pull switches, and palm buttons. This catalog also provides additional information on domestic and international safety standards and codes, and much more information to help you develop safety

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Many different architectures for safety related solutions are available in Schneider Electric's product offering, from safety relays to safety PLCs. The architecture can determine what SIL level or performance level can be achieved with the safety related solution. Various architectures may have inherent benefits such as simple selection or increased levels of diagnostics, but their cost effectiveness can depend on the size and complexity of the safety related system and the features and functions required. Some of the features and benefits of these various architectures are:

XPS Safety Relays

XPS Safety Relays

- Local diagnostics (LEDs)
- Remote diagnostics (solid-state outputs)
- Plug-in connectors simplify maintenance
- Select only the safety functions needed
- Simple installation
- Simple replacement
- Proven electromechanical reliability
- No software to learn or use

XPSMC Safety Controller

XPSMC Safety Controllers

- Simplicity and flexibility
  - — 16 or 32 inputs and 10 safety outputs
  - — A wide library of predefined and certified safety functions
  - — User-friendly software configuration
  - — Reduced wiring
  - — Only one product to install and implement
- Local and remote diagnostics via serial link to PC or PLC
  - — Reduced implementation time and downtime
  - — Reduced troubleshooting time

XPSMF Safety PLC

XPSMF Safety PLCs

- Increased productivity because of:
  - — Reduced machine down time
  - — Reduced overall engineering costs incurred during installation and maintenance
  - — Reduced system complexity by having a single network solution instead of many
- XPS-MF will simplify the entire system by:
  - — Saving space
  - — Reducing wiring
  - — Increasing overall system flexibility by use of programming and device placement (network capability)
  - — Providing complex diagnostics (network capability)
  - — Saving time and money due to reduced maintenance
- SafeEthernet protocol

AS-Interface

AS-Interface Safety at Work

- Enables safety related solutions to be integrated into the distributed architecture
- Reduces wiring requirements and speeds implementation
- Allows quick and flexible connection of safety interfaces via vampire connector
- Provides simple software configuration
  - — Drag and Drop
  - — On-line diagnostics
- Provides diagnostics without additional wiring
- Lowers costs from design to operation

All of our machine safety products—such as safety interlocks, light curtains, and cable pull switches—can be used with any of the safety devices listed above. The final safety related control system could meet the safety levels indicated in Table 25.1, depending upon how the circuit is designed.

Table 25.1: Maximum Levels of the Architectures for Safety Related Solutions

	Category 4 per EN 954-1 and Performance Level "e" per ISO 13849-1	SIL 3 Per IEC 61508
XPS Safety Relays	Yes	No
XPSMC Safety Controllers	Yes	Yes
XPSMF Safety PLCs	Yes	Yes
AS-Interface Safety at Work	Yes	Yes

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XPS Safety Relays

XPS Safety Relay

XPS safety relays monitor various safety inputs, start sequences, and feedback from starters and relays to allow machinery operation only when all safety controls are in their appropriate state and are functioning properly. Inputs can be from emergency stop push buttons, cable pull switches, limit switches, light curtains, safety interlock switches, or two hand control stations.

XPS safety relays give users increased functionality and flexibility when designing equipment to meet safety requirements and standards in the U.S., for the European Safety Directive, IEC safety requirements and meet Category 4 of EN 954-1 and EN/ISO 13849-1. Most devices can be configured for single or dual channel inputs, and for either monitored start, non-monitored start, or automatic start. Removable wiring terminals or non-removable wiring terminals are available on most module types.

The XPS product family complements our broad safety product offering with modules for many specific safety functions and applications, as well as devices for use in general types of applications. There are even devices whose safety functions can be configured at the time of installation.

Preventa XPS Includes the Following Types of Safety Relay Modules:

- Specific purpose modules such as limit switch monitoring, zero speed, timing, two-hand control, press control, and others
- Multifunctional configurable devices with multiple sets of inputs whose functions can be configured from 15 pre-defined functions, allowing greater flexibility and functionality
- Broad range of devices for emergency stop applications
- Expansion modules to increase the number of safety outputs
- Many devices compatible with light curtains

Features and Benefits

- LEDs are provided to indicate power, input, output, and feedback loop status.
- Solid state outputs provide compatibility with system controllers for diagnostics, troubleshooting, and correct system operation.
- Most devices are available with either removable or non-removable terminals.
- Most devices are available with a monitored start function to detect welded contacts or incorrect status in the start function and also to detect tampering with the start circuit.
- Dual voltage devices are available for use with either 120 V or 24 V power to reduce your inventory and increase flexibility.

XPSMC Safety Controllers

XPSMC Safety Controller

The XPSMC safety controllers can be used for monitoring all of the different safety tasks for your applications in one safety controller. All of the functions of the various safety relays are built into the hardware and software. The XPSMC safety controllers meet SIL 3 per IEC 61508, Category 4 per EN 954-1 and ISO 13849-1, and performance level “e” per ISO 13849-1. The associated configuration software makes development of the safety solution simple, using drag and drop techniques to configure the safety system. Detailed diagnostics provide an in depth overview of the status of the inputs and outputs.

Features and Benefits

- Safety inputs
  - 16 or 32 safety inputs
- Safety outputs
  - Six safety semiconductor outputs
  - Two safety relay outputs, with two relay contacts each (for a total of four relay outputs)
  - One output for muting indicators
- Control outputs
  - Eight control outputs are used to supply the safety inputs in order to detect incorrect wiring or short circuits in the wiring.

Configuration Software

- The wide device library of certified safety related functions simplifies the development of safety applications.
- Using the simple to use XPSMCWIN software, the configuration can be developed without special training.

Diagnostics with PC and Software

- Using the diagnostics mode, the XPSMCWIN software provides an exhaustive overview about the status of the safety functions.
- The status of the inputs, the safety devices and the outputs are indicated by various colored indicators.

Diagnostics with LEDs in the Front Cover

- 6 LEDs indicate the status of the controller.
- 8 LEDs indicate the status of the safety outputs.
- 16 or 32 LEDs indicate the status of the safety inputs.
- Input/output errors are indicated by blinking of the corresponding LED.

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XPSMF Safety PLCs

XPSMF PLC

The XPSMF Safety PLCs are programmable logic controllers that can be interfaced with the machine control system to meet US, EN, and IEC safety requirements. All XPSMF Safety PLCs meet the requirements of SIL 3 per IEC 61508, Category 4 per EN 954-1 and ISO 13849-1, and performance level “e” per ISO 13849-1.The XPSMF can perform all of the various safety functions required in today’s machinery. These functions can be programmed by using one or more pre-defined and certified function blocks (CFB) or by creating your own configuration and function blocks.

Features and Benefits

- Increased productivity because of:
  - — Reduced machine down time
  - — Reduced overall engineering costs incurred during installation and maintenance
  - — Reduced system complexity by having a single network solution instead of many
- Saving space, reducing complexity
  - — Reducing wiring
  - — Increasing overall system flexibility by use of programming and device placement (network capability)
  - — Providing complex diagnostics (network capability)
  - — Saving time and money due to reduced engineering and maintenance

Hardware

- Certified to SIL 3 per IEC 61508, Category 4 per EN 954-1 and ISO 13849-1, and performance level “e” per ISO 13849 -1, UL/CSA
- Each Safety PLC contains two processors (redundancy)
- SafeEthernet protocol
- Standard bus communication using Ethernet
- 2 or 4 RJ45 connection points (depending on version)
- Connect hardware in any orientation
- LED diagnostics on PLC housing
- Removable terminals
- Compact range contain DIN rail attachment simplifying installation

AS-Interface Safety at Work

ASISAFEMON1B Monitor

AS-Interface, the recognized cabling system for sensors and actuators, has been enhanced. Standard process information and information relating to safety can now be transmitted over the same yellow cable. Certified to SIL 3 per IEC 61508, Category 4 per EN 954-1 and ISO 13849-1, and performance level “e” per ISO 13849-1, the AS-Interface “Safety at work” system meets the needs of the most common safety applications, such as:

- Monitoring of emergency stops with instantaneous break contacts (stop category 0)
- Monitoring of emergency stops with delayed break contacts (stop category 1)
- Monitoring of safety interlocks and limit switches with and without interlocking
- Monitoring of light curtains

Features and Benefits

- Simplicity
  - — Just add the required safety devices to the standard AS-Interface network.
- Integration
  - — Standard data and safety relevant data is transmitted over the same communication bus—no need for a separate safety network.
- Flexibility
  - — Monitor multiple devices and control multiple safety sectors.
- Diagnose
  - — From one screen, see the status of the safety interfaces and the system.
- Safety
  - — Category 4 per EN 954-1 and ISO 13849-1
  - — Performance level “e” per EN/ISO 13849-1
  - — SIL 3 per IEC 61508
- Multifunctional
  - — Monitor up to 31 safety interfaces.
  - — Available with 1 or 2 independent output groups.
- Segmentation of safety sectors
  - — Multiple safety monitors can be connected to the same AS-Interface network.
  - — Monitors can be configured to monitor different groups of safety interfaces.
- 45 mm wide housing

ASISWIN2 Configuration Software

- Drag and drop methodology
- Predefined, certified safety functions for user selection
- On-line diagnostics of AS-Interface Safety System
- Password protection

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XUSLB and XUSLD Light Curtain

XUSL Type 4 light curtains provide point of operation protection for large areas without the need for gates or guards. They allow excellent visibility of the machine or process and free access to the machine while providing protection for personnel. Light curtains are made up of an array of infrared light beams to form a protected area. Whenever one or more of the light beams is broken, the light curtain sends a stop signal to the machine safety control circuit.

XUSLB and XUSLD light curtains for point of operation safeguarding are available in either single or multiple segment configurations. Choose the one that best meets your application requirements. These versions are available in either 14 mm or 30 mm minimum object sensitivity (MOS). Fixed and floating blanking is standard on the XUSLD.

XPSLP perimeter guard light curtains detect the presence of a body as it enters a protected area. They are available in single or multiple beam systems.

Features and Benefits of All XUSL Light Curtains

- Slim and rugged design results in an esthetically pleasing small mounting footprint suitable for aggressive environments.
- Broken Beam Indicators for EVERY beam on ALL devices (patented).
  - — Makes alignment easier, reducing installation time and cost.
  - — Identifies which beams are broken.
  - — Identifies exact channel (fixed blanking) select beams.
  - — Simplifies troubleshooting and re-adjustment, reducing downtime.

XUSLB and XUSLD 2-Box Light Curtain

Two box light curtains are ideal for installations where it is desirable to mount and wire only two components, transmitter and receiver. These devices are self-contained and the receiver provides the safety outputs.

Features and Benefits

- 14 and 30 mm minimum object sensitivity (MOS)
- 14 mm MOS protection heights: 280 - 1360 mm (11.0 - 53.5 in.)
- 14 mm MOS sensing range: 7.0 m (22.9 ft.)
- 30 mm MOS protection heights: 320 - 2120 mm (12.6 - 83.5 in.)
- 30 mm MOS sensing range: 8 m or 20 m (26.2 or 65.6 ft.)
- 38 x 50 mm housing size (1.5 x 1.97 in.)
- 24 Vdc supply voltage
- Broken beam Indicators for EVERY beam on ALL devices
- Female connector cables sold separately (5 m, 10 m, 15 m, and 30 m)
- Configurable by hand held programming and diagnostic module (PDM)
- Cascadable devices available in the XUSLD versions - up to 4 segments

XUSLP Light Curtain

XUSLP Perimeter Guard for Body Detection

Perimeter guarding light curtains are used around work cells and for guarding around the perimeter of machinery. They are also used in place of gates or doors. These two box systems simplify installation, since no inter-wiring is required between the emitter and receiver. Installation is further simplified with the passive receiver version, which only needs to have the emitter wired. No wiring is required for the receiver.

Features and Benefits

- 1 to 6 beams
- Sensing distance up to 70 m (230 ft.) depending upon configuration
- Height: 750 mm (29 in.) to 1800 mm (68 in.)
- Minimum object sensitivities: 300, 400, 500, or 600 mm (11.8, 15.75, 19.69, or 23.62 in.) and single beam
- Visible, red broken beam Indicators
- Short circuit protected
- IP67
- Display for diagnosis and working mode
- No need of shielded wire up to 120 m (394 ft.)
- Restart and start interlock
- External device monitoring /machine primary control element monitoring (EDM/MPCE)
- Machine test signal (MTS)
- 3 types of coding (A, B, C) by internal switches

XUSLP Light Curtain

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XCS Safety Interlock Switches

For Gate or Guard Interlocking

XCSA Safety Interlock Switch

XCSMP

XCS safety interlock switches verify that the doors, gates, or guards are closed before a process which could be harmful to personnel can start up. The hazards to personnel can be mechanical, electrical, hydraulic, pneumatic, chemical, or thermal. The various sizes and shapes of safety interlock switches are designed for a wide variety of applications. These mechanical devices have two components: a switch and an actuating key. When the gate or guard is closed, the actuating key attached to the gate or guard is inserted into the switch, closing the safety contacts, allowing the machine to be started. When the gate or guard is opened, the actuating key is removed from the switch, and the safety interlock switch contacts open.

XCS safety interlock switches are designed to meet demanding requirements in the US and Europe, as well as the rest of the world. The flexibility of the XCS line allows one XCS device to perform the same functions as several competitor's devices. This means that fewer XCS devices may be required to cover your needs.

Specifically designed for the protection of machine operators, maintenance and other personnel, the XCS switches can be used in a wide range of applications where a gate, door or guard is a part of the safety related system.

Features and Benefits

- Simple, rapid installation saves time and labor
- Device flexibility reduces stock requirements
- Wide variety of body styles, contact arrangement, and operators meet a variety of application requirements
- Bodies available in metal or plastic
- Switches are interchangeable between new and older devices, as well as with competitor's devices
- A variety of actuating keys are suitable for all applications
- Pre-wired devices and many connector options available to make wiring and installation easier

The Following Types of Safety Interlocks are Available:

- Non-locking
- Locking with push button or key release
- Locking by electrical solenoid
- Rotary shaft operation, for use on hinges of doors
- Rotary lever for hinged guards
- Pre-wired compact body

XCSDM Non-Contact Safety Interlock Switches

For Non-Contact Gate or Guard Interlocking

XCSDMP

XCSDM4

XCSDM non-contact safety interlock switches are designed for the same functions as mechanical safety interlock switches. The difference is that the non-contact safety interlock switches are magnetically coded devices and require no contact between the switch and coded magnet. This is a benefit where door or guard mis-alignment is an issue, or where the machine designer does not want to use a mechanical device.

Benefits of Non-contact Devices:

- Food, beverage and pharmaceutical applications require that no contaminants be trapped in or around devices.
- Non-contact devices have no inherent operating force and are well-suited for applications such as lightweight or plexiglass doors, where cracking or breakage is prevalent with standard mechanical safety interlock switches.
- Wash down applications where a standard mechanical safety interlock switch would be more difficult to clean, especially in the actuating key receptacle.
- Where small size is critical or a slim profile is desired

Features and Benefits of XCSDMC, XCSDMP, and XCSDMR

- Tolerates gate or guard alignment problems
- Wider temperature range for a plastic bodied device than any competitor's products
- Multiple coded-magnet approach directions allow for maximum flexibility of mounting options
- Suitable for Category 4 safety circuits when used with a safety relay or safety controller.
- Available with or without LEDs
- Connector and cabled versions available

Features and Benefits of XCSDM3 and XCSDM4

- Meets SIL 2 and 3 per IEC 61508, Category 3 and 4 per EN 954-1 and EN/ISO 13849-1 and performance level "e" per EN/ISO 13849-1 without the need for a safety relay or safety controller
- Connector and cabled versions available
- Multicolor LEDs for diagnostics and status
- Multiple coded-magnet approach directions allow for maximum flexibility of mounting options

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Safety Limit Switches

XCS Safety Limit Switch

XCS Safety Limit Switches

Preventa XCS safety limit switches are used in machine safety systems for a wide variety of safety related functions, including end of travel notification, overtravel indication, safety related positioning of machinery/tooling or component parts, as well as interlocking gates and guards. They are often used in conjunction with safety interlock switches for mechanical and electrical redundancy on doors and guards.

Features and Benefits

- Meet US and European safety standards requiring that switches used in safety related applications have positive opening contacts
- Tamper resistant covers over mounting screw and head adjustment to reduce potential for tampering
- Red color allows easy visibility and identification of safety related limit switches
- Two body styles available:
  - — Compact, pre-wired with cable
  - — Compact, with conduit entry

XCSP/XCSD Safety Limit Switches

The XCSP (plastic body) and XCSD (metal body) safety limit switches are identical in size and features. The only difference is the enclosure and conduit entry. XCSP and XCSD safety limit switches are for use in safety related applications including end of travel notification, overtravel indication, safety related positioning of machinery/tooling or component parts, as well as interlocking gates and guards.

Features and Benefits

- Positive opening contacts standard in all devices
- Snap acting contacts
- Slow make/slow break contacts
- Several head types available
- Metal and Plastic body styles available
- Several conduit types available
- Tamper resistant cover

XCSM Safety Limit Switches

The XCSM safety limit switches come pre-wired in multiple lengths of electrical cable for simplified installation. The XCSM safety limit switches are for use in safety related applications including end of travel notification, overtravel indication, safety related positioning of machinery/tooling or component parts, as well as interlocking gates and guards.

Features and Benefits

- Positive opening contacts standard in all devices
- Snap acting contacts
- Slow make/slow break contacts
- Several head types available
- Plastic body
- Pre-wired in various cable lengths
- Tamper resistant cover

Cable Pull Switches For Emergency Stop Operation

XY2 Cable Pulls

XY2 Cable Pull Switches

XY2 cable pull switches provide emergency stop signaling at any point along a cable up to 165 feet in length. This is preferable to installing many individual emergency stop push button stations along a conveyor or around the machine, providing a more cost effective solution. Typical applications include conveyor systems, packaging, textiles, transfer machines, presses, woodworking equipment and paint lines.

Operation is based on the taut cable principle. The cable must be tight and have appropriate tension applied to set or reset the switch. Once cable tension has been set, the device will open the N.C. control contacts if either the cable is pulled or if it becomes slack due to stretching or breakage of the cable.

Normal stop versions are used where a momentary, non-emergency signal is required at any point along a cable.

Features and Benefits

- Cable lengths: XY2CE 165 ft. and XY2CH 50 ft.
- Emergency stop versions (available in XY2CE and XY2CH)
  - — The N.C. contact opens the control circuit and mechanically latches, and will remain latched in the open position until an operator manually resets it
  - — Emergency stop versions have positive/direct opening contacts as standard
  - — Device will not reset if out of adjustment
- Normal stop versions (available in XY2CE and XY2CH)
  - — Normal stop versions are used where a momentary, non-emergency signal is required
  - — Normal stop versions do not latch contacts open or include positive opening contacts
  - — Normal stop versions are provided with snap action contacts for momentary stop

XY2CE

- 165 ft. maximum cable length
- Adjustable tripping force
- Available with 2 N.O. and 2 N.C. contacts

XY2CH

- 50 ft. maximum cable length
- Two viewing windows to aid in adjusting the switch
- Manual tripping force adjustment
- Adjustment indicator
- Traction force indicator

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Section 26

AC Drives and Soft Starts

Altivar™ 212
(26-6)

Altivar™ 312
(p. 26-7)

Altivar™ 61
(26-10)

Altivar™ 71
(p. 26-13)

Altistart™ 22
Soft Starts
(p. 26-18)

Altistart™ 48
Soft Starts
(p. 26-17)

AC Drives Overview

Panel Mounted Open AC Drive Solutions **26-2**
Soft Start Solutions **26-4**

AC Drives

New! Altivar™ 212 **26-6**
Altivar™ 312 **26-7**
Altivar™ 61 **26-10**
Altivar™ 71 **26-12**
Altivar™ 61 and 71 Options **26-14**

Enclosed Drives

New! S–Flex™ 212 Enclosed Drive Controller **26-16**

Soft Starts

Altistart™ 48 **26-17**
Altistart™ 22 **26-18**

AC Drives

Support, Training, and Documentation **26-20**

For detailed information on the complete range of open and enclosed drives and soft starts, please refer to *AC Drives and Soft Starts Price Guide*: **8800PL9701R08/11**

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Type of Motor Control		Simple Machines		Complex Machines
Key Application/Market Segment		• Conveyors • Mixers • Gate control • Machine movement • Small pumps and fans • Positive displacement pumps • Material handling		• Material working • Material handling • Packaging • Gapping, Palletizing • Forming, Embossing • Hoisting
Drives		Altivar 12	Altivar 312	Altivar 32
Distribution voltage ranges for 50/60 Hz line supply		Single-phase 100 V to 120 V Single-phase 200 V to 240 V Three-phase 200 V to 230 V	Single-phase 200 V to 240 V Three-phase 200 V to 240 V Three-phase 380 V to 500 V Three-phase 525 V to 600 V	Single-phase 200 V to 240 V Three-phase 380 V to 500 V
Horsepower ratings for three-phase motors		1/4 hp to 1 hp, 115 V/230 V single-phase input 1/4 hp to 3 hp, 208 V/230 V single-phase input 1/4 hp to 5hp, 208V/230 V	1/4 hp to 3 hp, 208 V/230 V single-phase input 1/4 hp to 20 hp, 208 V/230 V 1/2 hp to 20 hp, 400 V/480 V 1 hp to 20 hp, 525 V/600 V	1/4 hp to 3 hp, 200 V/240 V 1/2 hp to 20 hp, 380 V/500 V
Drives	Output frequency	0.5 Hz to 400 Hz	0.5 Hz to 500 Hz	0.1 Hz to 599 Hz
	Type of Control:			
	Asynchronous motor	Sensorless flux vector control Kn2 quadratic ratio for pump and fan	Sensorless flux vector control, volts per hertz, Energy saving ratio	Sensorless flux vector without speed feedback, volts/hertz (2 or 5 point or quadratic)
	Synchronous motor	—	—	Permanent magnet motor control without speed feedback
	Transient overtorque	150% to 170% of nominal motor torque	170% to 200% of the nominal motor torque	150% nominal for 60 seconds, 200% nominal for 2 seconds
Functions Number of Functions		40	5	>150 + ATV Logic
Number of I/O	Analog inputs	1	3	3
	Analog outputs	1	1	1
	Logic inputs	4	6	6 + Safe Torque Off input
	Logic/Relay outputs	1 L.O., 1 N.O./1 N.C. relay contacts	2: 1 N.O./1 N.C. + 1 N.O. relay contacts	1 L.O., 1 N.O./1 N.C., 1 N.O.
Communication	Integrated	Modbus™	Modbus™ and CANOpen	Modbus™ and CANOpen
	Available as an option	—	• DeviceNet • Profibus DP • CANOpen Daisy Chain • Ethernet TCP/IP	• CANOpen Daisy Chain • DeviceNet • Profibus DP V1 • Ethernet TCP/IP
Other Option Cards		—	—	—
Enclosure Rating		IP20	IP20, Type 1 with optional kit Type 12 available with ATV31C	IP20
Standards and Certifications		EC/EN 61800-5-1, IEC/EN 61800-3 (Environments 1 and 2, categories C1 and C3) CE, UL, CSA, C-Tick, NOM, GOST	EN 50178, EN 61800-3, EN 55011 - EN 55002: class A, class B with option, C-TICK, UL, N998, CE, CSA	IEC/EN 61800-5-1, IEC 61800-3 (1 and 2, category C2) IEC/EN 61508 SIL 1 UL508C, CSA, C-Tick, NOM, GOST, CE

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Complex, High-power Machines	Centrifugal Pumps and Fans	
• Material handling • High performance movement and regulation • Lifts, cranes, hoists • Extruders, shredders • Presses	• Pumps • Fans	
Altivar 71	**Altivar 212**	**Altivar 61**
Single-phase 230 V to 240 V Three-phase 200 V to 240 V Three-phase 380 V to 480 V Three-phase 500 V to 690 V	Three-phase 200 V to 240 V Three-phase 380 V to 480 V	Single-phase 230 V to 240 V Three-phase 200 V to 240 V Three-phase 380 V to 480 V
1 hp to 30 hp, 208 V/230 B single-phase input 1/2 hp to 100 hp, 200 V/230 V 1 hp to 1800 hp, 400 V/480 V 2 hp to 2100 hp, 575 V/690 V	1 hp to 40 hp, 208 V/230 V 1 hp to 100 hp, 400 V/480 V	1 hp to 30 hp, 208 V/230 V single-phase input 1 hp to 125 hp, 208 V/230 V 2 hp to 2500 hp, 575 V/690 V
0.5 Hz to 599 Hz up to 50 hp 0.5 Hz to 500 Hz from 50 hp to 700 hp	0 Hz to 200 Hz	0.5 Hz to 1000 Hz up to 50 hp 0.5 Hz to 500 Hz from 50 hp to 900 hp
Sensorless flux vector control (with or without sensor), volts per hertz ratio (2 or 5 points), ENA system, synchronous motor vector control with or without speed feedback	Volts per hertz or sensorless flux vector control	Volts per hertz ratio (2 or 5 points) or sensorless flux vector control, energy-saving ratio
Vector control with or without speed feedback	—	—
220% of the nominal motor torque for 2 seconds 170% for 60 seconds	Transient overload: 110% of the nominal drive current for 60 seconds	Transient overload: 110% of the nominal drive current for 60 seconds
> 150	50	> 100
2-4	2	2-4
—	1	—
6-20	3	6-20
2-4	2: 1 N.O./1 N.C. and 1 N.O. relay contacts	2-4
Modbus™ and CANopen	Modbus™, Apogee P1, BACnet, Metasys® N2	Modbus™ and CANopen
• DeviceNet • Modbus TCP/IP • Profibus DP [V1] • Ethernet IP • Modbus/Uni-Telway • Modbus Plus • Interbus S	• LonWorks	• Apogee FLN (P1) • BACnet • Modbus/Uni-Telway • LonWorks • Modbus TCP/IP • Ethernet IP • Modbus Plus • Interbus S • DeviceNet • Profibus DP [V1] • Metasys N2
Encoder interface cards, I/O extension cards, Controller Inside programmable card	—	I/O extension cards, Controller Inside programmable card, multi-pump cards
IP20, Type 1 with optional kit, Type 12 @460 Vac	IP20, Type 1 with optional kit, Type 12 @460 Vac	IP20, Type 1 with optional kit, Type 12 @460 Vac
IEC/EN 61800-5-1, IEC/EN 61800-3 (environments 1 and 2, C1 to C3), EN 55011, EN 55022, IEC/EN 61000-4-2/4-3/4-4/4-5/4-6/4-11,CE, UL, CSA, DNV, C-TICK, NOM 117, GOST, ABS	EN 50178, IEC/EN 61800-3, EN 55011, 55022: class A, class B with option, CE, UL, C-TICK, N998, UL 1995 Plenum-rated	IEC/EN 61800-5-1, IEC/EN 61800-3 (environments 1 and 2, C1 to C3), EN 55011, EN 55022, UL 1995 Plenum-rated, IEC/EN 61000-4-2/4-3/4-4/4-5/4-6/4-11, CE, UL, CSA, DNV, C-TICK, NOM 117, GOST, ABS

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Type of Motor Control		Simple Machines	Light-duty Machines	Heavy-duty Machines
Key Application/Market Segment		• Conveyors • Mixers • Gate control • Machine movement • Small pumps and fans • Positive displacement pumps	• Pumps • Fans • Turbines • Compressors • Conveyors • Conveyor belts • Lifting screws • Escalators	• Pumps • Fans • Punch presses • Band saws • Crushers • Centrifuges • Conveyors (high inertia loads)
Soft Starts		**Altistart 01** 	**Altistart 22** 	**Altistart 48**
Distribution voltage ranges for 50/60 Hz line supply		Single-phase 110 V to 480 V Three-phase 110 V to 690 V	Three-phase 208 to 600 Vac	Three-phase 230 V to 415 V Three-phase 208 V to 690 V
Horsepower ratings for three-phase motors		1/4 hp to 2 hp 115 V/230 V 1/2 hp to 30 hp, 208 V/230 V 1/2 hp to 60 hp, 400 V/480 V 30 hp to 75 hp, 575 V/600 V	3 hp to 500 hp	3 hp to 1200 hp
Drives	Output frequency	Equals input frequency	—	Equals input frequency
	Type of Control: Asynchronous motor	Reduced voltage start	Controlled starting and stopping, via voltage and torque	Reduced voltage start Reduced voltage start and torque control stop
	Synchronous motor	—	—	—
	Typical starts per hour rating	—	6	10
Functions **Number of Functions**		1	29	36
Number of I/O	Analog inputs	—	1 PTC probe	1 PTC probe
	Logic inputs	3	3	4
	Relay outputs	1	2 (N.O./N.C)	1
Communication	Integrated	—	Embedded Modbus	Modbus
	Available as an option	Combined with TeSys™ U-Line self-protected starter	—	• DeviceNet • Ethernet TCP/IP • Fipio • Profibus DP V1
Other Option Cards		—	—	—
Enclosure Rating		IP20	IP00, IP20	IP20
Standards and Certifications		EC/EN 60947-4/2, C-Tick, CSA, UL, CE, CCC	UL, CSA, CE, GOST, C-TICK, CCC, and RoHS directive	EC/EN 60947-4/2, EMC class A and B, DNV, C-Tick, GOST, CCIB, NOM, UL, CE, CCC, CSA

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Type of Motor Control	Adjustable Speed Drives Commercial HVAC & Retrofits	Soft Starts Commercial
Key Application/Market Segment	• Pumps • Fans	• Pumps • Fans • Conveyors • Centrifuges
Packaged Products	**S-Flex (Altivar 212)** 	**Enclosed 22**
Distribution voltage ranges for 50/60 Hz line supply	208 Vac, 240 Vac, 480 Vac	208 Vac, 230 Vac, 460 Vac, 575 Vac
Horsepower ratings for three-phase motors	**Variable torque** 1 hp to 40 hp, 200 V/230 V 1 hp to 100 hp, 460 V	**Type 1 and Type 12** 3 hp to 150 hp, 208 V 5 hp to 200 hp, 230 V 10 to 400 hp, 460 V 15 to 500 hp, 575 V **Type 3R or 50 °C Rated:** 3 hp to 125 hp, 208 V 5 hp to 150 hp, 230 V 10 to 400 hp, 460 V 15 to 500 hp, 575 V
Configurable options	**Configurable product** Drive with isolation/bypass Non-bypass Drive input disconnect switch Line contactor Communication options	Basic shunt tip Full featured shunt trip non-reversing isolation Reversion isolation Integral Full Voltage Bypass
Enclosure ratings	Type 1 general purpose	Type 1 general purpose Type 12 industrial use (Dust-Tight/Drip-Tight) Type 3R outdoor use
Communication	• Modbus RJ45 (included as standard) • BACnet (embedded) • LonWorks (option card) • Metasys N2 (embedded) • APOGEE FLN (P1) (embedded)	• Modbus (embedded)
Standards and Certifications	UL 508C, Seismic qualification ICC ES AC156 acceptance test protocol	Service Entrance Rating, UL Listed per UL 508 under category NKJH, Conforms to applicable NEMA ICS, NFPA, and IEC standards, Manufactured under ISO9001 standards, Factory modification E10 provides Canadian cUL certification per C22.2, No.14, Seismic qualification

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ATV212HU15N4

ATV212W075N4

ATV212HU30M3X

ATV212HD37N4

VW3A1101

VW3A1101
VW3A1102
VW3A1103
VW3A1104R10

VW3A8121

LonWorks Option Card
VW3A21212

The Altivar 212 drive is for use with three-phase asynchronous motors for variable torque pump and fan applications. Select the Altivar 212 drive using the motor nameplate voltage, the full load ampere rating = and the table below. The Altivar 212 drive includes 3 logic inputs, 2 analog inputs, 1 analog output, and 2 relay outputs (with 1 NO and 1 NO/NC contacts). The Altivar 212 drive includes an integrated 4 digit, 7 segment LED display with a 7 button keypad and includes an RJ45 Modbus port plus a four-screw terminal block for BACnet, Modbus, Metasys N2 and Apogee P1 communication protocols. LonWorks™ is available in an option card.

Table 26.1: Altivar™ 212 Selection and Pricing

AC Input Line Voltage	Three-Phase Motor Power▲		Continuous Output Current	Enclosure Rating					
				IP 20■ Open Style Product		Type 1 Conduit Kit Purchase ATV212 and Conduit Kit for Type 1 Installation		Type 12 / IP54♦★	
	HP	kW	A▲	Catalog Number	$ Price	Catalog Number	$ Price	Catalog Number	$ Price
200/240 Vac -15%, +10% Three-Phase	1	0.75	4.6	ATV212H075M3X	**309.**	VW3A31814	**45.**	—	—
	2	1.5	7.5	ATV212HU15M3X	**400.**	VW3A31814	**45.**	—	—
	3	2.2	10.6	ATV212HU22M3X	**454.**	VW3A31814	**45.**	—	—
	4	3	13.7	ATV212HU30M3X	**555.**	VW3A31815	**45.**	—	—
	5	4	18.7	ATV212HU40M3X	**618.**	VW3A31815	**45.**	—	—
	7.5	5.5	24.2	ATV212HU55M3X	**799.**	VW3A31816	**45.**	—	—
	10	7.5	32	ATV212HU75M3X	**963.**	VW3A31816	**45.**	—	—
	15	11	46.2	ATV212HD11M3X	**1225.**	VW3A31817	**45.**	—	—
	20	15	61	ATV212HD15M3X	**1532.**	VW3A31817	**45.**	—	—
	25	18.5	74.8	ATV212HD18M3X	**1795.**	VW3A31817	**45.**	—	—
	30	22	88	ATV212HD22M3X	**2188.**	VW3A9206	**65.**	—	—
	40	30	117	ATV212HD30M3X	**2806.**	VW3A9208	**135.**	—	—
380/480 Vac -15%, +10% Three-Phase	1	0.75	2.2	ATV212H075N4	**400.**	VW3A31814	**45.**	ATV212W075N4	**500.**
	2	1.5	3.7	ATV212HU15N4	**472.**	VW3A31814	**45.**	ATV212WU15N4	**590.**
	3	2.2	5.1	ATV212HU22N4	**545.**	VW3A31814	**45.**	ATV212WU22N4	**681.**
	4	3	7.2	ATV212HU30N4	**618.**	VW3A31815	**45.**	ATV212WU30N4	**772.**
	5	4	9.1	ATV212HU40N4	**654.**	VW3A31815	**45.**	ATV212WU40N4	**817.**
	7.5	5.5	12	ATV212HU55N4	**798.**	VW3A31815	**45.**	ATV212WU55N4	**998.**
	10	7.5	16	ATV212HU75N4	**946.**	VW3A31816	**45.**	ATV212WU75N4	**1183.**
	15	11	22.5	ATV212HD11N4	**1145.**	VW3A31816	**45.**	ATV212WD11N4	**1489.**
	20	15	30.5	ATV212HD15N4	**1425.**	VW3A31817	**45.**	ATV212WD15N4	**1853.**
	25	18.5	37	ATV212HD18N4	**1705.**	VW3A31817	**45.**	ATV212WD18N4	**2131.**
	30	22	43.5	ATV212HD22N4S★	**1780.**	VW3A31817	**45.**	—	—
	30	22	43.5	ATV212HD22N4	**1856.**	VW3A9206	**65.**	ATV212WD22N4	**2412.**
	40	30	58.5	ATV212HD30N4	**2284.**	VW3A9206	**65.**	ATV212WD30N4	**2855.**
	50	37	79	ATV212HD37N4	**2686.**	VW3A9207	**65.**	ATV212WD37N4	**3358.**
	60	45	94	ATV212HD45N4	**3372.**	VW3A9207	**65.**	ATV212WD45N4	**4215.**
	75	55	116	ATV212HD55N4	**3883.**	VW3A9208	**135.**	ATV212WD55N4	**4853.**
	100	75	160	ATV212HD75N4	**4433.**	VW3A9208	**135.**	ATV212WD75N4	**5541.**

UL File E116875, CSA 2278406, Plenum rated per UL 508C for UL 1995 installations. NOM, CE

▲ These horsepower, wattage and continuous ampere ratings apply to the default switching frequency and maximum 40 °C ambient. Refer to the installation manual for derating curves as a function of switching frequency, ambient temperature, and mounting conditions.

■ IP20 Altivar 212 drives can be installed as UL Type 1 with an optional conduit box by following the instructions in the Installation Manual.

♦ For ATV212W... drives with Class B EMC filter, add the letter "C" to the end of the standard catalog number and multiply $ Price by 1.3.

★ Late 3Q 2011 availability.

Table 26.2: Altivar 212 Options and Accessories

	Description	For Use on Drives	Catalog Number	$ Price
User Interface Options				
Remote LCD Display Keypad	8 line, 24 characters per line, plain text, 8 keys, rotary wheel, 60 °C IP54 rated	Altivar 212, 312, 32 Altivar 61 & 71	VW3A1101■	**115.**
Remote LCD Keypad Mounting Accessories	IP54 rated kit for remote mounting LCD keypad on enclosure door. Clear plastic door for use with VW3A1102 for IP65 rating and tamper resistant. Female / Female right angle RJ45 adaptor, to connect cable and keypad.▲	VW3A1191 VW3A1102 VW3A1101	VW3A1102■ VW3A1103■ VW3A1105■	**55.** **35.** **35.**
	Remote LCD Keypad Mounting Cables —Equipped with two RJ45 connectors 1 meter length 3 meter length 5 meter length 10 meter length	 VW3A1101 VW3A1101 VW3A1101 VW3A1101	 VW3A1104R10♦ VW3A1104R30♦ VW3A1104R50♦ VW3A1104R100♦	 **35.** **35.** **35.** **35.**
Multi-loader	Use to copy configurations between like drives, PC Soft, or SoMove PC Software	Altivar 12, 212, 312 32, 61, 71, & Altistart 22	VW3A8121	**350.**
Potentiometer	Operator, mounting collar, 2.5 kilohm, ½ watt potentiometer	Altivar 212	ATVPOT25K	**69.**
Software				
PCSoft	PC software configuring, monitoring and trouble shooting Altivar 212 drives. Requires one of two cables (noted below) to connect a PC to the RJ45 Modbus port on the drive	Altivar 212	Download at www.schneider-electric.us/drives	
	USB/RS485 cable: equipped with USB connector and RJ45 connector	Altivar & Altistart	TCSMCNAM3M002P♦	**52.**
	RS 232-RS485 converter with SUB-D & RJ45 port, cable with two RJ45 connectors	Altivar 212	VW3A8106■	**75.**
SoMobile™	Software for compatible moble phones provides wireless interface similar to the LCD display. Requires Modbus™ to Bluetooth® adaptor to connect phone and Altivar 212 drive. Modbus	Altivar 212	Download at www.schneider-electric.us/drives	
Bluetooth Adaptor	Connects to RJ45 Modbus port on the drive.	Altivar 12, 212, 312, 61, 71	VW3A8114	**85.**
Communication Option				
LonWorks Communication Card Option	Provides a four-screw terminal block for connecton to LonWorks network. Install in place of standard control board that comes mounted in the Altivar 212 drive. The I/O count is reduced to 3LI, 1 AI and 1 NO/NC relay	Altivar 212	VW3A21212	**375.**
Mounting Kit				
DIN Rail Mounting Kit	For installation on 35 mm wide DIN rail	Altivar 212H075M3X...U22M3X Altivar 212H075N4...U22N4	VW3A31852	**375.**

▲ Not required if using VW3A1102.

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ATV31C
IP54 / UL Type 12

Table 26.3: Altivar™ 312 Selection and Pricing

Input Line Voltage	Three-Phase Motor Power▲		Open Drives■		
	HP	kW	Continuous Output Current A	Catalog Number	$ Price
208/230 Vac Single-Phase	0.25	0.18	1.5	ATV312H018M2	**268.**
	0.5	0.37	3.3	ATV312H037M2	**287.**
	0.75	0.55	3.7	ATV312H055M2	**306.**
	1	0.75	4.6	ATV312H075M2	**335.**
	1.5	1.1	6.9	ATV312HU11M2	**363.**
	2	1.5	8	ATV312HU15M2	**402.**
	3	2.2	11	ATV312HU22M2	**468.**
208/230 Vac Three-Phase	0.25	0.18	1.5	ATV312H018M3	**258.**
	0.5	0.37	3.3	ATV312H037M3	**287.**
	0.75	0.55	3.7	ATV312H055M3	**306.**
	1	0.75	4.8	ATV312H075M3	**325.**
	1.5	1.1	6.9	ATV312HU11M3	**363.**
	2	1.5	8	ATV312HU15M3	**421.**
	3	2.2	11	ATV312HU22M3	**478.**
	4	3	13.7	ATV312HU30M3	**554.**
	5	—	17.5	ATV312HU40M3	**650.**
	7.5	5.5	27.5	ATV312HU55M3	**841.**
	10	7.5	33	ATV312HU75M3	**1013.**
	15	11	54	ATV312HD11M3	**1338.**
	20	15	66	ATV312HD15M3	**1721.**
400/480 Vac Three-Phase	0.5	0.37	1.5	ATV312H037N4	**363.**
	0.75	0.55	1.9	ATV312H055N4	**392.**
	1	0.75	2.3	ATV312H075N4	**421.**
	1.5	1.1	3	ATV312HU11N4	**449.**
	2	1.5	4.1	ATV312HU15N4	**497.**
	3	2.2	5.5	ATV312HU22N4	**574.**
	4	3	7.1	ATV312HU30N4	**650.**
	5	—	9.5	ATV312HU40N4	**688.**
	7.5	5.5	14.3	ATV312HU55N4	**860.**
	10	7.5	17	ATV312HU75N4	**1052.**
	15	11	27.7	ATV312HD11N4	**1386.**
	20	15	33	ATV312HD15N4	**1721.**
575/600 Vac Three-Phase♦	1	0.75	1.7	ATV312H075S6	**484.**
	2	1.5	2.7	ATV312HU15S6	**572.**
	3	2.2	3.9	ATV312HU22S6	**660.**
	5	3.7/4.0	6.1	ATV312HU40S6	**792.**
	7.5	5.5	9	ATV312HU55S6	**989.**
	10	7.5	11	ATV312HU75S6	**1209.**
	15	11	17	ATV312HD11S6	**1594.**
	20	15	22	ATV312HD15S6	**1979.**

▲ These horsepower, wattage, and continuous ampere ratings apply to 4 kHz switching frequency and maximum 50 °C ambient. Refer to the installation manual for derating curves as a function of switching frequency, ambient temperature, and mounting conditions.
■ Open type Altivar 312 Drives can be installed as UL Type 1 with optional conduit box when following instructions in the installation manual.
♦ A minimum 3% line reactor is required on all 575 V drive installations.

Table 26.4: Altivar 31 UL Type 12 / IP54 Selection and Pricing

Input Line Voltage	Three-Phase Motor Power▲		Open Drives■	IP54 / UL Type 12 Enclosed	
	kW	HP	A▲	Catalog Number	Standard $ Price
208/230 Vac Single-Phase	0.18	0.25	1.5	ATV31C018M2	**362.**
	0.37	0.5	3.3	ATV31C037M2	**387.**
	0.55	0.75	3.7	ATV31C055M2	**413.**
	0.75	1	4.6	ATV31C075M2	**452.**
	1.1	1.5	6.9	ATV31CU11M2	**490.**
	1.5	2	8	ATV31CU15M2	**543.**
	2.2	3	11	ATV31CU22M2	**632.**
400/480 Vac Three-Phase	0.37	0.5	1.5	ATV31C037N4	**490.**
	0.55	0.75	1.9	ATV31C055N4	**529.**
	0.75	1	2.3	ATV31C075N4	**568.**
	1.1	1.5	3	ATV31CU11N4	**606.**
	1.5	2	4.1	ATV31CU15N4	**671.**
	2.2	3	5.5	ATV31CU22N4	**774.**
	3	4	7.1	ATV31CU30N4	**878.**
	—	5	9.5	ATV31CU40N4	**929.**
	5.5	7.5	14.3	ATV31CU55N4	**1162.**
	7.5	10	17	ATV31CU75N4	**1420.**
	11	15	27.7	ATV31CD11N4	**1733.**
	15	20	33	ATV31CD15N4	**2151.**

▲ These horsepower, wattage, and continuous ampere ratings apply to 4 kHz switching frequency and maximum 50 °C ambient. Refer to the installation manual for derating curves as a function of switching frequency, ambient temperature, and mounting conditions.

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Table 26.5: Altivar™ 312 Options and Accessories

	Description	For Use on Drives	Catalog Number	$ Price
Software				
SoMove™ Lite This software enables the user to configure, set, debug and organize maintenance task for the ATV 312 soft starter. It can also be used to customize the integrated display terminal menus. It can be used with a direct connection or a Bluetooth® wireless connection. Free download **www.schneider-electric.us**				
Powersuite™ Test and Commissioning Software Kit	Software on CD-ROM. For use with Microsoft Windows™ 95, 98, NT, and XP operating systems for PCs	ATV312 all ranges	VW3A8104	**150.**
User Interface Kits				
USB to RJ45 Adaptor Kit	For use in connecting to a PC with a USB port	Advantys™ OTB, Altistart™ motor starters, Altivar series incl. HMI, Altivar controller	TCSMCNAM3M 002P	**52.**
Remote Keypad Options and Accessories	Remote Keypad Display Remote Keypad Display Remote Keypad Display and Mounting Kit Remote Keypad Display	ATV12 (IP54) ATV12 (IP65) ATV312 ATV312, ATV61, ATV71	— — VW3A31101 VW3A1101 ▲	— — **175.** **115.**
Cable for remote mounting LCD graphic keypad. RJ-45 connector on each end.	1 meter 3 meters 5 meters 10 meters	Any ATV61, Any ATV71 Any ATV61, Any ATV71 Any ATV61, Any ATV71 Any ATV61, Any ATV71	VW3A1104R10 VW3A1104R30 VW3A1104R50 VW3A1104R100	**35.** **35.** **35.** **45.**
Communication Options	Profibus CANopen Daisy Chain DeviceNet	ATV312 ATV312 ATV312	VW3A31207 VW3A31208 VW3A31209	**185.** **185.** **185.**
Potentiometer	Operator, mounting collar, 2.5 kilohm, ½ watt potentiometer	Altivar 312	ATVPOT25K	**69.**

▲ Refer to page 26-14 for remote mounting kit and IP65 option for this keypad.

NOTE: *Refer to Catalog MKTED211041EN-US for communication cables.*

Table 26.6: Configuration Tools

Description	Part Number	For Use on Drives	$ Price
Bluetooth® Dongle: to establish connection between Altivar drives and PC enabled with Bluetooth	VW3A8114	All	**85.**
Simple Loader: to transfer configuration between like drives. For use with the Altivar product line.	VW3A8120	ATV12, ATV312, ATV32, ATV61 and ATV71	**175.**
Multi-loader: to copy a configuration from a drive or from SoMove via an SD card, and transferring to another drive or to a PC	VW3A8121	ATV12, ATV312, ATV212, ATV32, ATV61, ATV71 and ATS22	**350.**

Table 26.7: Options—Field Installed Kits

Description		For Use on Drives	Catalog Number	$ Price
DIN Rail Mount Kit	DIN Rail Mounting Plate for 35 mm wide DIN rail	ATV312H018M2, ATV312H037M2, ATV312H055M2, ATV312H075M2, ATV312H018M3, ATV312H037M3, ATV312H055M3, ATV312H075M3	VW3A9804	**72.**
		ATV312HU11M2, ATV312HU15M2, ATV312HU11M3, ATV312HU15M3, ATV312HU22M3, ATV312H037N4, ATV312H055N4, ATV312H075N4, ATV312HU11N4, ATV312HU15N4, ATV312H075S6, ATV312HU15S6	VW3A9805	**72.**
Conduit Entrance Kit	Multiple knockout sizes Installation of conduit entrance kit and retention of vent cover on top of drive controller provides the ATV31 with UL Type 1 rating.	ATV312H018M2, ATV312H037M2, ATV312H055M2, ATV312H075M2	VW3A31812	**45.**
		ATV312H018M3, ATV312H037M3, ATV312H055M3, ATV312H075M3	VW3A31811	**45.**
		ATV312HU11M3, ATV312HU15M3	VW3A31813	**45.**
		ATV312HU11M2, ATV312HU15M2, ATV312HU22M3, ATV312H037N4, ATV312H055N4, ATV312H075N4, ATV312HU11N4, ATV312HU15N4, ATV312H075S6, ATV312HU15S6	VW3A31814	**45.**
		ATV312HU22M2, ATV312HU30M3, ATV312HU40M3, ATV312HU22N4, ATV312HU30N4, ATV312HU40N4, ATV312HU22S6, ATV312HU40S6	VW3A31815	**45.**
		ATV312HU55M3, ATV312HU75M3, ATV312HU55N4, ATV312HU75N4, ATV312HU55S6, ATV312HU75S6	VW3A31816	**45.**
		ATV312HD11M3, ATV312HD15M3, ATV312HD11N4, ATV312HD15N4, ATV312HD11S6, ATV312HD15S6	VW3A31817	**45.**
ATV28 Replacement Kit	This kit contains brackets that adapt the spacing of the ATV312 mounting holes to be equivalent to that of an ATV28 with the same rating. This will permit the ATV312 to be secured to the panel holes and mounting hardware already in place for the ATV28.	ATV312H018M2, ATV312H037M2, ATV312H055M2, ATV312H075M2 ATV312H018M3, ATV312H037M3, ATV312H055M3, ATV312H075M3	VW3A31821	**25.**
		ATV312HU11M2, ATV312HU15M2, ATV312HU11M3, ATV312HU15M3, ATV312HU22M3, ATV312H075S6, ATV312HU15S6	VW3A31822	**25.**
		ATV312HU55M3, ATV312HU75M3, ATV312HU55N4, ATV312HU75N4, ATV312HU55S6, ATV312HU75S6	VW3A31823	**25.**
Dynamic Braking Resistor Kit	DB resistors are provided in a Type 1 enclosure and are thermally protected.	ATV312H018M2–037M2 ATV312H018M3–037M3 ATV312H037N4–U40N4	VW3A66711	**422.**
		ATV312H055M2–U22M2 ATV312H055M3–U22M3 ATV312HU55N4–U75N4	VW3A66712	**633.**
		ATV312HU30M3–U40M3 ATV312HD11N4–D15N4	VW3A66713	**950.**
		ATV312HU55M3–U75M3	VW3A66714	**1266.**
		ATV312HD11M3–D15M3	VW3A66715	**1846.**

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Table 26.7: Options—Field Installed Kits (Continued)

Description			For Use on Drives	Catalog Number	$ Price
Line Reactors	230/460 V		See Price Guide 8800PL9701.		
	575 V	Open Style	ATV312H075S6	RL00202	**158.**
			ATV312HU15S6 ATV312HU22S6	RL00403	**163.**
			ATV312HU40S6 ATV312HU55S6 ATV312HU75S6 ATV312HD11S6 ATV312HD15S6	RL00803 RL00802 RL01202 RL01802 RL02502	**245.** **179.** **200.** **253.** **291.**
		Enclosed (Type 1)	ATV312H075S6	RL00212	**289.**
			ATV312HU15S6 ATV312HU22S6	RL00413	**294.**
			ATV312HU40S6 ATV312HU55S6 ATV312HU75S6 ATV312HD11S6 ATV312HD15S6	RL00813 RL00812 RL01212 RL01812 RL02512	**379.** **310.** **332.** **388.** **507.**
RFI Input Filter	For compliance with European (CE) conducted emissions standard 55022 Class B (Class A filter built into 230/460 V ATV31 drives)	Single-phase supply voltage: 200–240 V 50/60 Hz	ATV312H037M2 ATV312H055M2 ATV312H075M2	VW3A31401	**58.**
			ATV312HU11M2 ATV312HU15M2	VW3A31403	**79.**
			ATV312HU22M2	VW3A31405	**108.**
		3 phase supply voltage: 200–240 V 50/60 Hz	ATV312H018M3 ATV312H037M3 ATV312H055M3 ATV312H075M3	VW3A31402	**72.**
			ATV312HU11M3 ATV312HU15M3 ATV312HU22M3	VW3A31404	**90.**
			ATV312HU30M3 ATV312HU40M3	VW3A31406	**133.**
			ATV312HU55M3 ATV312HU75M3	VW3A31407	**189.**
			ATV312HD11M3 ATV312HD15M3	VW3A31408	**297.**
			ATV312HD11N4 ATV312HD15N4	VW3A31409	**243.**
		3 phase supply voltage: 380–500 V 50/60 Hz	ATV312H037N4 ATV312H055N4 ATV312H075N4 ATV312HU11N4 ATV312HU15N4	VW3A31404	**90.**
			ATV312HU22N4 ATV312HU30N4 ATV312HU40N4	VW3A31406	**133.**
			ATV312HU55N4 ATV312HU75N4	VW3A31407	**189.**
			ATV312HD11N4 ATV312HD15N4	VW3A31409	**243.**
Fan Kit	Installation of the fan kit enables the drive to operate in higher ambient temperatures. The fan mounts on the drive. Consult the product catalog for more information.		ATV61/71HD18M3X...HD22M3X, ATV61/71HD22N4	VW3A9404	**135.00**
			ATV61/71HD30N4...HD37N4	VW3A9405	**145.00**
			ATV61/71HD30M3X...HD45M3X	VW3A9406	**165.00**
			ATV61/71HD45N4...HD75N4	VW3A9407	**195.00**

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Altivar 61 Three-Phase Drives

Table 26.8: Selection and Pricing

Input Line Voltage	Variable Torque‘ Three-Phase Motor Power HP	kW	Continuous Output Current A	Catalog Number with LCD Keypad (Stocked)△	$ Price	Catalog Number to have ATV61 and Type 1 conduit \entry kit shipped as one line item. Field installation required (Packaged as kit at warehouse).	$ Price	Catalog Number with LED Keypad (Non-stocked)	$ Price
208/240 Vac Three Phase	1	0.75	4.8	ATV61H075M3▲★	**639.**	ATV61H075M3T1★	**684.**	ATV61H075M3Z	**544.**
	2	1.5	8	ATV61HU15M3▲★	**663.**	ATV61HU15M3T1★	**708.**	ATV61HU15M3Z	**568.**
	3	2.2	11	ATV61HU22M3▲★	**764.**	ATV61HU22M3T1★	**809.**	ATV61HU22M3Z	**669.**
	4	3	13.7	ATV61HU30M3▲★	**925.**	ATV61HU30M3T1★	**970.**	ATV61HU30M3Z	**830.**
	5	4	17.5	ATV61HU40M3▲★	**1035.**	ATV61HU40M3T1★	**1080.**	ATV61HU40M3Z	**940.**
	7.5	5.5	27.5	ATV61HU55M3▲★	**1292.**	ATV61HU55M3T1★	**1337.**	ATV61HU55M3Z	**1197.**
	10	7.5	33	ATV61HU75M3▲★	**1586.**	ATV61HU75M3T1★	**1631.**	ATV61HU75M3Z	**1491.**
	15	11	54	ATV61HD11M3X▲■★	**2011.**	ATV61HD11M3XT1■★	**2056.**	ATV61HD11M3XZ■	**1916.**
	20	15	66	ATV61HD15M3X▲■★	**2525.**	ATV61HD15M3XT1■★	**2570.**	ATV61HD15M3XZ■	**2430.**
	25	18	75	ATV61HD18M3X▲■★	**2943.**	ATV61HD18M3XT1■★	**3008.**	—	—
	30	22	88	ATV61HD22M3X▲■★	**3586.**	ATV61HD22M3XT1■★	**3651.**	—	—
	40	30	120	ATV61HD30M3X▲■★	**4599.**	ATV61HD30M3XT1■★	**4684.**	—	—
	50	37	144	ATV61HD37M3X▲■★	**5342.**	ATV61HD37M3XT1■★	**5427.**	—	—
	60	45	176	ATV61HD45M3X▲■★	**6326.**	ATV61HD45M3XT1■★	**6411.**	—	—
	75	55	221	ATV61HD55M3X■♦★	**7806.**	ATV61HD55M3XT1■★	**8266.**	—	—
	100	75	285	ATV61HD75M3X■♦★	**9379.**	ATV61HD75M3XT1■★	**9839.**	—	—
	125	90	359	ATV61HD90M3X■♦★	**11954.**	ATV61HD90M3XT1■★	**12507.**	—	—
400/480 Vac Three Phase	1	0.75	2.3	ATV61H075N4▲★	**754.**	ATV61H075N4T1★	**799.**	ATV61H075N4Z	**659.**
	2	1.5	4.1	ATV61HU15N4▲★	**857.**	ATV61HU15N4T1★	**902.**	ATV61HU15N4Z	**762.**
	3	2.2	5.8	ATV61HU22N4▲★	**999.**	ATV61HU22N4T1★	**1044.**	ATV61HU22N4Z	**904.**
	4	3	7.8	ATV61HU30N4▲★	**1125.**	ATV61HU30N4T1★	**1170.**	ATV61HU30N4Z	**1030.**
	5	4	10.5	ATV61HU40N4▲★	**1158.**	ATV61HU40N4T1★	**1203.**	ATV61HU40N4Z	**1063.**
	7.5	5.5	14.3	ATV61HU55N4▲★	**1299.**	ATV61HU55N4T1★	**1344.**	ATV61HU55N4Z	**1204.**
	10	7.5	17.6	ATV61HU75N4▲★	**1578.**	ATV61HU75N4T1★	**1623.**	ATV61HU75N4Z	**1483.**
	15	11	27.7	ATV61HD11N4▲★	**1868.**	ATV61HD11N4T1★	**1913.**	ATV61HD11N4Z	**1773.**
	20	15	33	ATV61HD15N4▲★	**2322.**	ATV61HD15N4T1★	**2367.**	ATV61HD15N4Z	**2227.**
	25	18	41	ATV61HD18N4▲★	**2795.**	ATV61HD18N4T1★	**2840.**	ATV61HD18N4Z	**2700.**
	30	22	48	ATV61HD22N4▲★	**3042.**	ATV61HD22N4T1★	**3107.**	ATV61HD22N4Z	**2947.**
	40	30	66	ATV61HD30N4▲★	**3744.**	ATV61HD30N4T1★	**3809.**	ATV61HD30N4Z	**3649.**
	50	37	79	ATV61HD37N4▲★	**4403.**	ATV61HD37N4T1★	**4468.**	ATV61HD37N4Z	**4308.**
	60	45	94	ATV61HD45N4▲★	**5528.**	ATV61HD45N4T1★	**5563.**	ATV61HD45N4Z	**5433.**
	75	55	116	ATV61HD55N4▲★	**6365.**	ATV61HD55N4T1★	**6500.**	ATV61HD55N4Z	**6270.**
	100	75	160	ATV61HD75N4▲★	**7267.**	ATV61HD75N4T1★	**7402.**	ATV61HD75N4Z	**7172.**
	125	90	179	ATV61HD90N4♦★	**7988.**	ATV61HD90N4T1★	**8448.**	—	—
	150	110	215	ATV61HC11N4♦★	**9022.**	ATV61HC11N4T1★	**9575.**	—	—
	200	130	259	ATV61HC13N4♦★	**10366.**	ATV61HC13N4T1★	**10939.**	—	—
	250	160	314	ATV61HC16N4♦★	**11711.**	ATV61HC16N4T1★	**12299.**	—	—
	350	220	427	ATV61HC22N4♦★	**13993.**	ATV61HC22N4T1★	**14581.**	—	—
	400	250	481	ATV61HC25N4♦★▼	**16475.**	ATV61HC25N4T1★	**17079.**	—	—
	500	315	616	ATV61HC31N4♦▼	**23734.**	—	—	—	—
	600	400	759	ATV61HC40N4♦▼	**31783.**	—	—	—	—
	700	500	941	ATV61HC50N4♦▼	**44235.**	—	—	—	—
	900	630	1188	ATV61HC63N4♦▼	**63935.**	—	—	—	—

▲ Option to have product treated for increased protection for dusty and corrosive environments. This product is not stocked. On 1 hp to 10 hp at 230 Vac 3 phase and up to 100 hp at 460 V, add “S337” to the end of the catalog number. On 15 hp to 60 hp at 230 Vac 3 phase, add “337” to the end of the catalog number. In both cases multiply price by 1.2 to obtain new price. With this option, exposed copper is tinned, circuit boards are conformal coated in critical areas and plastics are treated to better withstand the corrosive nature of certain oils. This option is standard on 55 kW/75 hp @ 230 Vac 3 phase and higher and 90 kW/125 hp @ 460 Vac and higher.

■ Product does not contain an EMC filter.

♦ Product ships with a DC choke that must be field mounted. A 5% line reactor may be purchased and installed in place of the DC choke. Add “D” to the end of the catalog number to receive just the AC drive and multiply the listed price by .96 to obtain new price.

★ These products can be ordered with LonWorks® or BACnet communication option card shipped as one line item. Field installation required. Add “LW” to the end of the part number to receive a LonWorks option card. Add $550 to the price. Add “BN” to the end of the part number to receive a BACnet option card. Add $225 to the price.

▼ These products do not contain a dynamic braking transistor. A separate transistor must be added for applications requiring dynamic braking.

△ When ordering replacements for Square D™ brand E-Flex™, MCC and M-Flex™ enclosed drive controllers containing the Altivar 61 drive, identify the replacement catalog number by referring to the applicable instruction manual, the side nameplate on power converter, or using the graphic keypad (menu 1.11 identification).

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Table 26.8: Altivar 61 Selection and Pricing (continued)

Input Line Voltage	Variable Torque			Catalog Number with LCD Keypad (Stocked)	$ Price
	Three-Phase Motor Power		Continuous Output Current		
	HP	kW	A		
575/690 Vac Three Phase	3	3	3.9	ATV61HU30Y▲	1889.
	4	4	5.8	ATV61HU40Y▲	1990.
	5	5.5	6.1	ATV61HU55Y▲	2099.
	7.5	7.5	9	ATV61HU75Y▲	2380.
	10	11	11	ATV61HD11Y▲	2799.
	15	15	17	ATV61HD15Y▲	3380.
	20	18.5	22	ATV61HD18Y▲	3979.
	25	22	27	ATV61HD22Y▲	4790.
	30	30	32	ATV61HD30Y▲	5780.
	40	37	41	ATV61HD37Y▲	6999.
	50	45	52	ATV61HD45Y▲	8579.
	60	55	62	ATV61HD55Y▲	10379.
	75	75	77	ATV61HD75Y▲	12199.
	100	90	99	ATV61HD90Y▲	14399.
	125	110	125	ATV61HC11Y▲■	16899.
	150	132	150	ATV61HC13Y▲■	19179.
	—	160	180	ATV61HC16Y▲■	20795.
	200	200	220	ATV61HC20Y▲■	24290.
	250	250	290	ATV61HC25Y▲■♦	28950.
	350	315	355	ATV61HC31Y▲■♦	35950.
	450	400	420	ATV61HC40Y▲■♦	46750.
	550	500	543	ATV61HC50Y▲■♦	59590.
	700	630	675	ATV61HC63Y▲■♦	78490.
	800	800	840	ATV61HC80Y▲■♦	103390.

▲ Conformal coating is standard.
■ An AC 5% line reactor is mandatory.
♦ These products do not contain a dynamic braking transistor. A separate transistor must be added for applications requiring dynamic braking.

Altivar™ 61 Single-Phase Drives

In an application where it is necessary to use a 240 V single-phase input for a 3-phase motor, the drive must be derated; therefore, the power listed on the drive nameplate will be higher than the power rating on the motor nameplate.

For more information on wire and line reactor sizing, refer to *Altivar 61 and 71 Supplementary Ratings* (30072-451-38) and Price Guide 8800PL9701 for line reactor selection and pricing.

Table 26.9: Altivar 61 Selection and Pricing

Input Line Voltage	With A 3% Line Reactor			Without A 3% Line Reactor			Catalog Number with LCD Keypad	List Price $	Catalog Number for ATV61 drive and Type 1 conduit entry kit shipped as one line item. Field installation required (packaged as kit at warehouse).	List Price $	Catalog Number with LED Keypad (Non-stocked)	List Price $
	Motor Power		Continuous Output Current	Motor Power		Continuous Output Current						
	HP	kW	A	HP	kW	A						
208/240 Vac Single Phase	—	—	—	0.5	0.37	3	ATV61H075M3▲■	639.00	ATV61H075M3T1■	684.00	ATV61H075M3Z▲	544.00
	—	—	—	1	0.75	4.8	ATV61HU15M3▲■	663.00	ATV61HU15M3T1■	708.00	ATV61HU15M3Z▲	568.00
	—	—	—	2	1.5	8	ATV61HU22M3▲■	764.00	ATV61HU22M3T1■	809.00	ATV61HU22M3Z▲	669.00
	—	—	—	3	2.2	11	ATV61HU30M3▲■	925.00	ATV61HU30M3T1■	970.00	ATV61HU30M3Z▲	830.00
	—	3	13.7	—	—	—	ATV61HU40M3▲■	1035.00	ATV61HU40M3T1■	1080.00	ATV61HU40M3Z▲	940.00
	5	4	17.5	—	—	—	ATV61HU55M3▲■	1292.00	ATV61HU55M3T1■	1337.00	ATV61HU55M3Z▲	1197.00
	7.5	5.5	27.5	5	4	17.5	ATV61HU75M3▲■	1586.00	ATV61HU75M3T1▲■	1631.00	ATV61HU75M3Z▲	1491.00
	10	7.5	33	7.5	5.5	27.5	ATV61HD15M3X▲■	2525.00	ATV61HD15M3XT1■	2570.00	ATV61HD15M3XZ▲	2430.00
	—	—	—	10	7.5	33	ATV61HD18M3X▲■	2943.00	ATV61HD18M3XT1■	3008.00	—	—
	15	11	54	—	—	—	ATV61HD22M3X▲■	3586.00	ATV61HD22M3XT1■	3651.00	—	—
	20	15	66	15	11	54	ATV61HD30M3X▲■	4599.00	ATV61HD30M3XT1■	4684.00	—	—
	25	18	75	20	15	66	ATV61HD37M3X▲■	5342.00	ATV61HD37M3XT1■	5427.00	—	—
	30	22	88	25	18	75	ATV61HD45M3X▲■	6326.00	ATV61HD45M3XT1■	6411.00	—	—

▲ Option to have product treated for increased protection for dusty and corrosive environments. This product is not stocked. On 0.5 hp to 5 hp at 230 Vac single phase, add "S337" to the end of the catalog number. On 7.5 hp to 25 hp at 230 Vac single phase, add "337" to the end of the catalog number. In both cases multiply price by 1.2 to obtain the new price. With this option, exposed copper is tinned, circuit boards are conformal coated in critical areas and plastics are treated to better withstand the corrosive nature of certain oils.
■ Product does not contain an EMC filter.

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Altivar 71 Single-Phase

In an application where it is necessary to use a 240 V single-phase input for a 3-phase motor, the drive must be derated; therefore, the power listed on the drive nameplate will be higher than the power rating on the motor nameplate.

For more information on wire and line reactor sizing, refer to Altivar 61 and 71 Supplementary Ratings (30072-451-38).

Table 26.10: Altivar 71 Selection and Pricing

Input Line Voltage	With A 3% Line Reactor			Without A 3% Line Reactor			Catalog Number with LCD Keypad■	Price $	Catalog Number to have ATV71 and Type 1 conduit entry kit shipped as one line item. Field installation required (Packaged as kit at warehouse).	Price $	Catalog Number with LED Keypad (Non-stocked)	Price $
	Motor Power		Continuous Output Current	Motor Power		Continuous Output Current						
	HP	kW	A	HP	kW	A						
208/240 Vac Single Phase	—	—	—	0.5	0.37	3	ATV71H075M3▲	652.	ATV71H075M3T1	697.	ATV71H075M3Z▲	557.
	—	—	—	1	0.75	4.8	ATV71HU15M3▲	694.	ATV71HU15M3T1	729.	ATV71HU15M3Z▲	589.
	—	—	—	2	1.5	8	ATV71HU22M3▲	796.	ATV71HU22M3T1	841.	ATV71HU22M3Z▲	701.
	—	—	—	3	2.2	11	ATV71HU30M3▲	984.	ATV71HU30M3T1	1029.	ATV71HU30M3Z▲	889.
	—	3	13.7	—	—	—	ATV71HU40M3▲	1150.	ATV71HU40M3T1	1195.	ATV71HU40M3Z▲	1055.
	5	4	17.5	—	—	—	ATV71HU55M3▲	1458.	ATV71HU55M3T1	1503.	ATV71HU55M3Z▲	1363.
	7.5	5.5	27.5	5	4	17.5	ATV71HU75M3▲	1790.	ATV71HU75M3T1	1835.	ATV71HU75M3Z▲	1695.
	10	7.5	33	7.5	5.5	27.5	ATV71HD15M3X▲♦	2850.	ATV71HD15M3XT1♦	2895.	ATV71HD15M3XZ▲	2755.
	—	—	—	10	7.5	33	ATV71HD18M3X▲♦	3422.	ATV71HD18M3XT1♦	3487.	—	—
	15	11	54	—	—	—	ATV71HD22M3X▲♦	4170.	ATV71HD22M3XT1♦	4253.	—	—
	20	15	66	15	11	54	ATV71HD30M3X▲♦	5348.	ATV71HD30M3XT1♦	5433.	—	—
	25	18	75	20	15	66	ATV71HD37M3X▲♦	6212.	ATV71HD37M3XT1♦	6297.	—	—
	30	22	88	25	18	75	ATV71HD45M3X▲♦	7356.	ATV71HD45M3XT1♦	7491.	—	—

▲ Option to have product treated for increased protection for dusty and corrosive environments. This product is not stocked. On 0.5 hp to 5 hp at 230 Vac single-phase, add "S337" to the end of the catalog number. On 7.5 hp to 25 hp at 230 Vac single-phase, add "337" to the end of the catalog number. In both cases multiply price by 1.2 to obtain new price. With this option, exposed copper is tinned, circuit boards are conformal coated in critical areas and plastics are treated to better withstand the corrosive nature of certain oils.

■ These products can be ordered with LonWorks® or BACnet communication option card shipped as one line item. Field installation required. Add "LW" to the end of the part number to receive a LonWorks option card. Add $550 to the price. Add "BN" to the end of the partnumber to receive a BACnet option card. Add $225 to the price.

♦ Product does not contain an EMC filter.

Altivar 71 Three-Phase

LCD Keypad

LED Keypad

Table 26.11: Altivar 71 Selection and Pricing

Input Line Voltage	Constant Torque			★	$ Price	Catalog Number ATV71 drive and Type 1 conduit entry kit	$ Price	Catalog Number with LED Keypad (Non-stocked)	$ Price
	Three-Phase Motor Power		Continuous Output Current						
	HP	kW	A						
208/240 Vac Three Phase	0.5	0.37	3	ATV71H037M3▲	616.	ATV71H037M3T1	661.	ATV71H037M3Z	521.
	1	0.75	4.8	ATV71H075M3▲	652.	ATV71H075M3T1	697.	ATV71H075M3Z	557.
	2	1.5	8	ATV71HU15M3▲	684.	ATV71HU15M3T1	729.	ATV71HU15M3Z	589.
	3	2.2	11	ATV71HU22M3▲	796.	ATV71HU22M3T1	841.	ATV71HU22M3Z	701.
	4	3	13.7	ATV71HU30M3▲	984.	ATV71HU30M3T1	1029.	ATV71HU30M3Z	889.
	5	4	17.5	ATV71HU40M3▲	1150.	ATV71HU40M3T1	1195.	ATV71HU40M3Z	1055.
	7.5	5.5	27.5	ATV71HU55M3▲	1458.	ATV71HU55M3T1	1503.	ATV71HU55M3Z	1363.
	10	7.5	33	ATV71HU75M3▲	1790.	ATV71HU75M3T1	1835.	ATV71HU75M3Z	1695.
	15	11	54	ATV71HD11M3X▲■	2270.	ATV71HD11M3XT1■	2315.	ATV71HD11M3XZ■	2175.
	20	15	66	ATV71HD15M3X▲■	2850.	ATV71HD15M3XT1■	2895.	ATV71HD15M3XZ■	2755.
	25	18	75	ATV71HD18M3X▲■	3422.	ATV71HD18M3XT1■	3487.	—	—
	30	22	88	ATV71HD22M3X▲■	4170.	ATV71HD22M3XT1■	4235.	—	—
	40	30	120	ATV71HD30M3X▲■	5348.	ATV71HD30M3XT1■	5433.	—	—
	50	37	144	ATV71HD37M3X▲■	6212.	ATV71HD37M3XT1■	6297.	—	—
	60	45	176	ATV71HD45M3X▲■	7356.	ATV71HD45M3XT1■	7491.	—	—
	75	55	221	ATV71HD55M3X■♦▼	8870.	ATV71HD55M3XT1■	9330.	—	—
	100	75	285	ATV71HD75M3X■♦▼	10658.	ATV71HD75M3XT1■	11211.	—	—

▲ Option to have product treated for increased protection for dusty and corrosive environments. This product is not stocked. On 0.5 hp to 10 hp at 230 Vac 3 phase and up to 100 hp at 460 V, add "S337" to the end of the catalog number. On 15 hp to 60 hp at 230 Vac 3 phase, add "337" to the end of the catalog number. In both cases multiply price by 1.2 to obtain new price. With this option, exposed copper is tinned, circuit boards are conformal coated in critical areas and plastics are treated to better withstand the corrosive nature of certain oils. This option is standard on 55 kW/75 hp @ 230 Vac 3 phase and higher & 90 kW/125 hp @ 460 Vac and higher.

■ Product does not contain an EMC filter.

♦ Product ships with a DC choke that must be field mounted. A 5% line reactor may be purchased and installed in place of the DC choke. Add "D" to the end of the catalog number to receive just the AC drive and multiply the listed price by.96 to obtain new price.

★ Also possible for use with a synchronous motor. Add "383" to the end of the catalog number and multiply the listed price by 1.2 to obtain new price.

▼ Conformal coating is standard.

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ATV71HC28N4

ATV71HC31Y

Table 26.13: Altivar™ 71 Selection and Pricing (continued)

Input Line Voltage	Constant Torque			Catalog Number with LCD Keypad (Stocked)	$ Price	Catalog Number to have ATV71 drive and Type 1 conduit entry kit shipped as one line item. Field installation required (Packaged as kit at warehouse).	$ Price	Catalog Number with LED Keypad (Non-stocked)	$ PriceW
	Three-Phase Motor Power		Continuous Output Current						
	HP	kW	A						
400/480 Vac Three Phase	1	0.75	2.3	ATV71H075N4▲♦	**794.**	ATV71H075N4T1	**839.**	ATV71H075N4Z	**699.**
	2	1.5	4.1	ATV71HU15N4▲♦	**912.**	ATV71HU15N4T1	**957.**	ATV71HU15N4Z	**817.**
	3	2.2	5.8	ATV71HU22N4▲♦	**1110.**	ATV71HU22N4T1	**1155.**	ATV71HU22N4Z	**1015.**
	4	3	7.8	ATV71HU30N4▲♦	**1250.**	ATV71HU30N4T1	**1295.**	ATV71HU30N4Z	**1155.**
	5	4	10.5	ATV71HU40N4▲♦	**1316.**	ATV71HU40N4T1	**1361.**	ATV71HU40N4Z	**1221.**
	7.5	5.5	14.3	ATV71HU55N4▲♦	**1584.**	ATV71HU55N4T1	**1629.**	ATV71HU55N4Z	**1489.**
	10	7.5	17.6	ATV71HU75N4▲♦	**1924.**	ATV71HU75N4T1	**1969.**	ATV71HU75N4Z	**1829.**
	15	11	27.7	ATV71HD11N4▲♦	**2278.**	ATV71HD11N4T1	**2323.**	ATV71HD11N4Z	**2183.**
	20	15	33	ATV71HD15N4▲♦	**2832.**	ATV71HD15N4T1	**2877.**	ATV71HD15N4Z	**2737.**
	25	18	41	ATV71HD18N4▲♦	**3408.**	ATV71HD18N4T1	**3453.**	ATV71HD18N4Z	**3313.**
	30	22	48	ATV71HD22N4▲♦	**3710.**	ATV71HD22N4T1	**3775.**	ATV71HD22N4Z	**3615.**
	40	30	66	ATV71HD30N4▲♦	**4566.**	ATV71HD30N4T1	**4631.**	ATV71HD30N4Z	**4471.**
	50	37	79	ATV71HD37N4▲♦	**5370.**	ATV71HD37N4T1	**5435.**	ATV71HD37N4Z	**5275.**
	60	45	94	ATV71HD45N4▲♦	**6742.**	ATV71HD45N4T1	**6877.**	ATV71HD45N4Z	**6647.**
	75	55	116	ATV71HD55N4▲♦	**7762.**	ATV71HD55N4T1	**7897.**	ATV71HD55N4Z	**7667.**
	100	75	160	ATV71HD75N4▲♦	**8862.**	ATV71HD71N4T1	**8997.**	ATV71HD75N4Z	**8767.**
	125	90	179	ATV71HD90N4■♦	**9742.**	ATV71HD90N4T1	**10202.**	—	—
	150	110	215	ATV71HC11N4■♦	**11002.**	—	—	—	—
	200	130	259	ATV71HC13N4■♦	**12642.**	—	—	—	—
	250	160	314	ATV71HC16N4■♦	**14282.**	—	—	—	—
	300	200	387	ATV71HC20N4■♦△	**16462.**	—	—	—	—
	400	250	481	ATV71HC25N4■♦△	**19382.**	—	—	—	—
	450	280	550	ATV71HC28N4■♦△	**23002.**	—	—	—	—
	500	310	616	ATV71HC31N4■♦△	**27922.**	—	—	—	—
	600	400	759	ATV71HC40N4■♦△	**37392.**	—	—	—	—
	700	500	941	ATV71HC50N4■♦△	**52041.**	—	—	—	—
575/690 Vac Three Phase	2	2.2	2.7	ATV71HU22Y★	**1889.**	—	—	—	—
	3	3	3.9	ATV71HU30Y★	**1990.**	—	—	—	—
	4	4	5.8	ATV71HU40Y★	**2009.**	—	—	—	—
	5	5.5	6.1	ATV71HU55Y★	**2380.**	—	—	—	—
	7.5	7.5	9	ATV71HU75Y★	**2799.**	—	—	—	—
	10	11	11	ATV71HD11Y★	**3380.**	—	—	—	—
	15	15	17	ATV71HD15Y★	**3979.**	—	—	—	—
	20	18.5	22	ATV71HD18Y★	**4790.**	—	—	—	—
	25	22	27	ATV71HD22Y★	**5780.**	—	—	—	—
	30	30	32	ATV71HD30Y★	**6999.**	—	—	—	—
	40	37	41	ATV71HD37Y★	**8579.**	—	—	—	—
	50	45	52	ATV71HD45Y★	**10379.**	—	—	—	—
	60	55	62	ATV71HD55Y★	**12199.**	—	—	—	—
	75	75	77	ATV71HD75Y★	**14399.**	—	—	—	—
	100	90	99	ATV71HD90Y★	**16899.**	—	—	—	—
	125	110	125	ATV71HC11Y★▼	**19179.**	—	—	—	—
	150	132	150	ATV71HC13Y★▼	**23795.**	—	—	—	—
	175	160	180	ATV71HC16Y★▼	**24290.**	—	—	—	—
	200	200	220	ATV71HC20Y★▼△	**28950.**	—	—	—	—
	250	250	290	ATV71HC25Y★▼△	**35950.**	—	—	—	—
	350	315	355	ATV71HC31Y★▼△	**46750.**	—	—	—	—
	450	400	420	ATV71HC40Y★▼△	**59590.**	—	—	—	—
	550	500	543	ATV71HC50Y★▼△	**78490.**	—	—	—	—
	700	630	675	ATV71HC63Y★▼△	**103390.**	—	—	—	—

▲ Option to have product treated for increased protection for dusty and corrosive environments. This product is not stocked. Up to 100 hp at 460 V, add "S337" to the end of the catalog number and multiply price by 1.2 to obtain new price. With this option, exposed copper is tinned, circuit boards are conformal coated in critical areas and plastics are treated to better withstand the corrosive nature of certain oils. This option is standard on 90 kW/125 hp @ 460 Vac and higher.

■ Product ships with a DC choke that must be field mounted. A 5% line reactor may be purchased and installed in place of the DC choke. Add "D" to the end of the catalog number to receive just the AC drive and multiply the listed price by.96 to obtain new price.

♦ Also possible for use with a synchronous motor. Add "383" to the end of the catalog number and multiply the listed price by 1.2 to obtain new price.

★ Conformal coating is standard.

▼ An AC 5% line reactor is mandatory.

△ These products do not contain a dynamic braking transistor. A separate transistor must be added for applications requiring dynamic braking.

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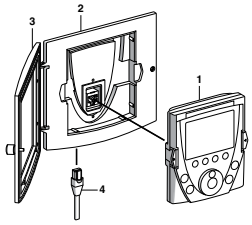
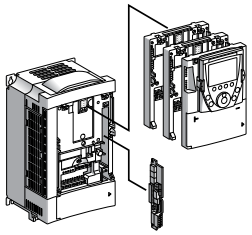


LCD Keypad Mounting Kits



Option Card Assembly

I/O Option Card

Communication Option Card

Incremental Encoder Interface Option Card

Table 26.12: Options—Field Installed

Description			For Use on Drives	Catalog No.	$ Price
Operator Interface	LCD graphic keypad: IP54 rating		any ATV61 any ATV71	VW3A1101	**115.**
	Remote mounting kit: includes bezel and mounting hardware			VW3A1102	**55.**
	Door for use with remote mount kit for IP65 rating			VW3A1103	**45.**
	Cable for remote mounting LCD graphic keypad RJ-45 connector on each end	1 meter		VW3A1104R10	**35.**
		3 meters		VW3A1104R30	**35.**
		5 meters		VW3A1104R50	**35.**
		10 meters		VW3A1104R100	**45.**
	RJ-45 female—female adaptor to connect LCD keypad and cable. Not required if using VW3A1102.			VW3A1105	**35.**
	Operator, mounting collar, 2.5 kilohm, 1/2 watt potentiometer		Altivar 61	ATVPOT25K	**69.**
PowerSuite™ Software Options	PowerSuite software on CD for PC		Altivar AC drives Altistart™ 48 TeSys™ U-line	VW3A8104	**150.**
	USB/RS485 cord set (equipped with RJ45 socket)			TCSMCNAM3M002P	**52.**
For Wireless Connection	Modbus™ to Bluetooth® Gateway and RS-485 converter		any ATV61 any ATV71	VW3A8114	**85.**
I/O Adaptor	115 Vac logic input adaptor adapts 7 logic inputs for use with user supplied 115 Vac signals		any ATV61 any ATV71	VW3A3101	**195.**
I/O Extension Option Cards	Basic I/O option card—4 logic inputs, 2 logic outputs, 1 Form C relay output, an input for PTC motor probes, a 24 Vdc output, and a 10 Vdc output		any ATV61 any ATV71	VW3A3201	**165.**
	Extended I/O option card—contains all the I/O on the Basic I/O option card plus 2 analog inputs, 2 analog outputs, 1 pulse input			VW3A3202	**195.**
CANopen Adapter	This adaptor connects to the RJ-45 port and provides a 9–pin male SUB–D connector conforming to the CANopen standard (CIA DRP 303–1)		any ATV61 any ATV71	VW3CANA71	**45.**
CANopen Connector	9-pin female SUB–D with line terminator (can be disabled). 180º cable outlet CAN–H, CAN–L, CAN–GND connection		any ATV61 any ATV71	VW3CANKCDF180T	**45.**
Incremental Encoder Interface Option Cards	with RS-422 outputs, 5 Vdc		any ATV71	VW3A3401	**85.**
	with RS-422 outputs, 15 Vdc			VW3A3402	**85.**
	with open collector outputs, 12 Vdc			VW3A3403	**85.**
	with open collector outputs, 15 Vdc			VW3A3404	**85.**
	with push–pull outputs, 12 Vdc			VW3A3405	**85.**
	with push–pull outputs, 15 Vdc			VW3A3406	**85.**
	with push–pull outputs, 24 Vdc			VW3A3407	**85.**
	Resolver			VW3A3408▲	**85.**
	Universal with SinCos, SinCos Hiperface®, SinCos EnDat® or SSI output			VW3A3409▲	**85.**
	Incremental with RS422 outputs and encoder emulation			VW3A3411▲	**85.**
Communication Option Cards	Modbus™ Plus card		any ATV61 any ATV71	VW3A3302	**550.**
	Modbus / Uni-Telway™ card			VW3A3303	**225.**
	Modbus TCP/IP daisy chain			VW3A3310D	**275.**
	Interbus® S card			VW3A3304	**550.**
	Profibus DP card			VW3A3307	**550.**
	Profibus DPv1 card			VW3A3307S371	**550.**
	DeviceNet™ card			VW3A3309	**225.**
	Ethernet/IP™ card			VW3A3316	**275.**
	LonWorks® card		any ATV61	VW3A3312	**550.**
	Metasys® N2 card			VW3A3313	**225.**
	Apogee® FLN P1 card			VW3A3314	**225.**
	BACnet card			VW3A3315	**225.**
IMC Option Card	ATV IMC drive controller card♦			VW3A3521S0	**755.**
Controller Inside Option Card	Programmable option card, conforms with IEC61131–3 programming standard.		any ATV61 any ATV71	VW3A3501■	**550.**
Water Solutions Control Card	This option card contains a variety of pre-programmed functions and features to manage multi–pump installations.		any ATV61 any ATV71	VW3A3503■	**650.**
Simple Loader	Using RJ45 port connections, the configurations of a drive can be downloaded then uploaded to compatible drive.		ATV31, ATV61, and ATV71	VW3A8120	**175.**

▲ For use with the ATV71H...383 drive ONLY.
■ The drive cannot support the VW3A3503 water solutions card and the VW3A3501 controller inside option card simultaneously.
♦ SoMachine is required to use this product.

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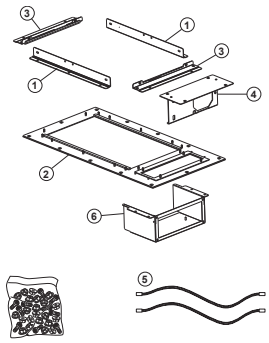
Table 26.14: Options—Field Installed (continued)



Flange Kit
VW3A9506

Description		For Use on Drives	Catalog No.	$ Price
Flange Kit	Kit includes: a metal frame, seals, mounting hardware, and a bracket to mount the fan kit so the fan can be accessed from the front of the drive template. Kit used to mount the heatsink of the drive outside of an enclosure.	ATV61/71H037M3...HU15M3 ATV61/71H075N4...HU22N4	VW3A9501	255.
		ATV61/71HU22M3...HU40M3 ATV61/71HU30N4...HU40N4	VW3A9502	279.
		ATV61/71HU55M3 ATV61/71HU55N4, HU75N4	VW3A9503	325.
		ATV61/71HU75M3 ATV61/71HD11N4	VW3A9504	358.
		ATV61/71HD11M3X..HD15M3X ATV61/71HD15N4, HD18N4	VW3A9505	419.
		ATV61/71HD18M3X..HD22M3X ATV61/71HD22N4, ATV61/71HU30Y...HD30Y	VW3A9506	438.
		ATV61/71HD30N4, HD37N4	VW3A9507	469.
		ATV61/71HD30M3X..HD45M3X	VW3A9508	469.
		ATV61/71HD45N4...HD75N4, ATV61/71HD37Y...HD90Y	VW3A9509	477.
		ATV61HD55M3X...HD75M3X ATV61HD90N4...HC11N4	VW3A9510	500.
		ATV71HD55M3X, ATV71HD90N4		
		ATV61HD90M3X, ATV61HC13N4 ATV71HD75M3X, ATV71HC11N4	VW3A9511	667.
		ATV61HC16N4, ATV61HC20Y, ATV61/71HC11Y...HC16Y, ATV71HC13N4	VW3A9512	1053.
		ATV61HC22N4, ATV71HC16N4	VW3A9513	1053.
		ATV61HC25N4…HC31N4 ATV61HC40Y ATV61/71HC25Y, HC31Y ATV71HC20N4...HC28N4 ATV71HC20Y	VW3A9514	1053.
		ATV61HC25N4…HC31N4 with VW3A7101 braking transistor ATV61HC40Y ATV61/71HC25Y, HC31Y ATV71HC20N4...HC28N4 with VW3A7101 braking transistor ATV71HC20Y	VW3A9515	1062.
Type 1 Conduit Kit	Kit includes: a metal box with conduit knockouts. The kit provides conduit landing when wall mounting the drive.	ATV61/71H037M3...HU15M3 ATV61/71H075N4...HU22N4	VW3A9201	45.
		ATV61/71HU22M3...HU40M3 ATV61/71HU30N4...HU40N4	VW3A9202	45.
		ATV61/71HU55M3 ATV61/71HU55N4, HU75N4	VW3A9203	45.
		ATV61/71HU75M3 ATV61/71HD11N4	VW3A9204	45.
		ATV61/71HD11M3X..HD15M3X ATV61/71HD15N4, HD18N4	VW3A9205	45.
		ATV61/71HD18M3X..HD22M3X ATV61/71HD22N4 ATV61/71HU30Y...HD30Y	VW3A9206	65.
		ATV61/71HD30N4, HD37N4	VW3A9207	65.
		ATV61/71HD30M3X..HD45M3X	VW3A9217	85.
		ATV61/71HD45N4..HD75N4 ATV61/71HD37Y...HD90Y	VW3A9208	135.
		ATV61HD55M3X...HD75M3X ATV61HD90N4...HC11N4	VW3A9209	460.
		ATV71HD55M3X, ATV71HD90N4, ATV61HC11N4		
		ATV61HD90M3X, ATV61HC13N4 ATV71HD75M3X, ATV71HC11N4	VW3A9210	553.
		ATV61HC16N4, ATV71HC13N4 ATV61/71HC11Y...HC16Y ATV61HC20Y	VW3A9211	573.
		ATV61HC22N4, ATV71HC16N4	VW3A9212	588.
		ATV61HC25N4...ATV61HC31N4 ATV71HC20N4...HC28N4 ATV71HC20Y ATV61/71HC25Y, HC31Y ATV61HC40Y	VW3A9213	604.
		ATV61HC25N4...HC31N4 with VW3A7101 braking transistor ATV71HC20N4...HC28N4 with VW3A7101 braking transistor ATV71HC20Y ATV61/71HC25Y, HC31Y ATV61HC40Y	VW3A9214	604.

Profibus Option Card Cover	Type 1 cover for Profibus Option Card	**230 V Drive controllers**		**480 V Drive controllers**			
		ATV61H••••▲	**ATV71H••••**	**ATV61H••••**	**ATV71H••••**		
		075M3	037M3	075N4	075N4	VW3A9201PF	101.
		U15M3	075M3	U15N4	U15N4		
		—	U15M3	U22N4	U22N4		
		U22M3	U22M3	U30N4	U30N4	VW3A9292PF	102.
		U30M3	U30M3	U40N4	U40N4		
		U40M3	U40M3	—	—		
		U55M3	U55M3	U55N4	U55N4	VW3A9203PF	104.
		—	—	U75N4	U75N4		
		U75M3	U75M3	D11N4	D11N4	VW3A9204PF	107.
		D11M3X	D11M3X	D15N4	D15N4	VW3A9205PF	112.
		D15M3X	D15M3X	D18N4	D18N4		

▲ The symbol "•" indicates the part of the number that varies with controller size or rating.

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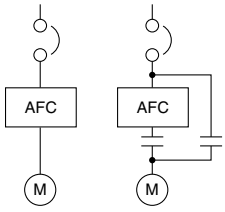
Variable Torque AC Drive—208 V, 230 V, and 460 V Ratings

S-Flex 212 Enclosed Drive Controller Type 1 Rated +14 to +104 °F (-10 to +40 °C)



Power Circuit W **Power Circuit Y**

Table 26.13: S-Flex™ 212 Enclosed Drive Controller Selection and Pricing

Input Line Voltage	HP	kW	Output Current A	Catalog Number	Standard Product List $ Price	Options: Without Bypass MOD W Price $▲	Options: Disc Switch MOD A07 Price $■	Options: Line Contactor MOD B07 Price $■
208 Vac Three-phase	1	0.75	4.8	SFD212CG2Y	**1402.**	**1048.**	**1584.**	**1480.**
	2	1.5	7.8	SFD212DG2Y	**1501.**	**1123.**	**1689.**	**1585.**
	3	2.2	11	SFD212EG2Y	**1593.**	**1193.**	**1784.**	**1682.**
	5	4	17.5	SFD212FG2Y	**1789.**	**1342.**	**1992.**	**1889.**
	7.5	5.5	25.3	SFD212GG2Y	**1957.**	**1468.**	**2177.**	**2066.**
	10	7.5	32.2	SFD212HG2Y	**2253.**	**1700.**	**2478.**	**2378.**
	15	11	48.3	SFD212JG2Y	**2758.**	**2089.**	**3023.**	**2886.**
	20	15	62.1	SFD212KG2Y	**3169.**	**2389.**	**3476.**	**3316.**
	25	18.5	78.2	SFD212LG2Y	**3865.**	**2910.**	**4240.**	**4044.**
	30	22	92	SFD212MG2Y	**4705.**	**3542.**	**5171.**	**4950.**
	40	30	120	SFD212NG2Y	**5920.**	**4911.**	**6370.**	**6294.**
230 Vac Three-phase	1	0.75	4.2	SFD212CG3Y	**1402.**	**1048.**	**1584.**	**1480.**
	2	1.5	6.8	SFD212DG3Y	**1501.**	**1123.**	**1689.**	**1585.**
	3	2.2	9.6	SFD212EG3Y	**1593.**	**1193.**	**1784.**	**1682.**
	5	4	15.2	SFD212FG3Y	**1789.**	**1342.**	**1992.**	**1889.**
	7.5	5.5	22	SFD212GG3Y	**1957.**	**1468.**	**2177.**	**2066.**
	10	7.5	28	SFD212HG3Y	**2253.**	**1700.**	**2478.**	**2378.**
	15	11	42	SFD212JG3Y	**2758.**	**2089.**	**3023.**	**2886.**
	20	15	54	SFD212KG3Y	**3169.**	**2389.**	**3476.**	**3316.**
	25	18.5	68	SFD212LG3Y	**3865.**	**2910.**	**4240.**	**4044.**
	30	22	80	SFD212MG3Y	**4705.**	**3542.**	**5171.**	**4950.**
	40	30	104	SFD212NG3Y	**5920.**	**4911.**	**6370.**	**6294.**
460 Vac Three-phase	1	0.75	2.1	SFD212CG4Y	**1250.**	**880.**	**1314.**	**1289.**
	2	1.5	3.4	SFD212DG4Y	**1317.**	**928.**	**1384.**	**1358.**
	3	2.2	4.8	SFD212EG4Y	**1419.**	**1000.**	**1491.**	**1463.**
	5	4	7.6	SFD212FG4Y	**1554.**	**1095.**	**1633.**	**1602.**
	7.5	5.5	11	SFD212GG4Y	**1690.**	**1190.**	**1776.**	**1742.**
	10	7.5	14	SFD212HG4Y	**1892.**	**1333.**	**1988.**	**1950.**
	15	11	21	SFD212JG4Y	**2227.**	**1624.**	**2361.**	**2296.**
	20	15	27	SFD212KG4Y	**2709.**	**2060.**	**2909.**	**2864.**
	25	18.5	34	SFD212LG4Y	**3229.**	**2455.**	**3467.**	**3409.**
	30	22	40	SFD212MG4Y	**3749.**	**3037.**	**3956.**	**3903.**
	40	30	52	SFD212NG4Y	**4359.**	**3641.**	**4600.**	**4538.**
	50	37	65	SFD212PG4Y	**5347.**	**4545.**	**5643.**	**5567.**
	60	45	77	SFD212QG4Y	**6257.**	**5444.**	**6603.**	**6514.**
	75	55	96	SFD212RG4Y	**7102.**	**6392.**	**7527.**	**7379.**
	100	75	124	SFD212SG4Y	**8097.**	**7293.**	**8581.**	**8413.**

▲ When ordering a unit without bypass, insert a "W" in place of the "Y" in the Catalog Number.
■ Options A07 Disconnect Switch and B07 Line Contactor are available only when a full voltage bypass standard "Y" product is selected. Options A07 and B07 are mutually exclusive.

Miscellaneous Options★

Description	Option Number	$ Price
BACnet Factory Set Up	A06	**50.**
LonWorks® Communication Card	B06	**375.**
Metasys® N2 Factory Set Up	C06	**50.**
Apogee® FLN P1 Factory Set Up	D06	**50.**
LCD Text Keypad	D07	**250.**
Modbus™ Monitoring (by Default)	N06	N/C
Seismic Qualification	S07	**215.**

★ Miscellaneous Options A06, B06, C06, and D06 are mutually exclusive. Add Misc. Option number to S-Flex 212 Catalog Number when ordering communications card factory installed.
▼ For Modbus control, see the Instruction Manual.

NOTE: *See the Instruction Bulletin for set up instructions.*

Accessories

Description	Catalog Number	$ Price
Altivar 212 PCSoft Test and Commissioning Software. For use with Microsoft Windows™ 95, 98, NT, XP, and Vista operating systems for PCs only. (Cable not included.)	VW3A2104♦	N/C
PC Cable for Test and Commissioning Software Includes 3-meter (9.8 ft.) cable, RS-485/RS-232C adaptor, and connectors	VW3A8106	**75.**
USB to RJ45 Adaptor Kit For use in connecting to a PC with a USB port	TCSMCNAM3M002P	**52.**
EZ-M Mounting Channel, 72 in. length	EZM72MC	**42.**

♦ Can be downloaded from the internet at www.Schneider-Electric.com

All S-Flex 212 Enclosed Drives are supplied with:

- Altivar™ 212 power converter
- Square D™ circuit breaker disconnect (Power Fuses for 460 V version only)
- UL 508C coordinated short circuit rating for 100,000 A
- Adjustable Frequency Controller-Off-Bypass selector switch
- Local/Remote configurable on controller
- Power On red LED
- Bypass Run green LED
- Fire/Freezestat interlock for Adjustable Frequency Drive and Bypass mode
- Form C Adjustable Frequency Controller fault auxiliary contact
- Modbus RJ-45 communication port
- Smoke Purge Function
- Bypass Run Auxiliary Contact
- Drive Run Auxiliary Contact
- Full Voltage Bypass Power Circuit with overload relay
- 120 Vac fused control power transformer

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Altistart™ 48 Soft Starts

The Altistart 48 soft start combines ease of selection with simple installation and high motor control performance. With its exclusive motor Torque Control System, the Altistart 48 helps eliminate uncontrolled motor acceleration and deceleration, a problem inherent with standard voltage—ramp soft starts. The Altistart 48 includes features to help with motor and machine protection and is available for motors ranging from 208 to 575 volts. In addition to a built–in display and programming terminal, a remote keypad option and programming software is available to ease integration and commissioning. The Altistart 48 has a built–in Modbus™ port and is offered with serial communication gateways to such popular networks as Ethernet and DeviceNet™.

Open Style Soft Starts 50–60 Hz, Three-Phase, 690 V Maximum—AC3 Duty

The Altistart 48 soft start must be selected using the table below, based on nameplate full load ampere rating of the motor. The horsepower ratings shown in table are for reference only.

Table 26.14: Altistart 48 Selection and Pricing▲

Standard Duty (Low Inertia Loads)■ Maximum Horsepower					Altistart Soft Starts		
208 V	230 V	400 kW	460 V	575 V	Rated A	Catalog Number	$ Price
3	5	5.5	10	15	17	ATS48D17Y	**780.**
5	7.5	7.5	15	20	22	ATS48D22Y	**810.**
7.5	10	11	20	25	32	ATS48D32Y	**840.**
10	—	15	25	30	38	ATS48D38Y	**900.**
—	15	18.5	30	40	47	ATS48D47Y	**950.**
15	20	22	40	50	62	ATS48D62Y	**1200.**
20	25	30	50	60	75	ATS48D75Y	**1280.**
25	30	37	60	75	88	ATS48D88Y	**1500.**
30	40	45	75	100	110	ATS48C11Y	**1700.**
40	50	55	100	125	140	ATS48C14Y	**2100.**
50	60	75	125	150	170	ATS48C17Y	**2300.**
60	75	90	150	200	210	ATS48C21Y	**2600.**
75	100	110	200	250	250	ATS48C25Y	**2900.**
100	125	132	250	300	320	ATS48C32Y	**3300.**
125	150	160	300	350	410	ATS48C41Y	**3900.**
150	—	220	350	400	480	ATS48C48Y	**4700.**
—	200	250	400	500	590	ATS48C59Y	**5400.**
200	250	315	500	600	660	ATS48C66Y	**6200.**
250	300	355	600	800	790	ATS48C79Y	**7200.**
350	350	400	800	1000	1000	ATS48M10Y	**8600.**
400	450	500	1000	1200	1200	ATS48M12Y	**10600.**

▲ Motor full load amperage (FLA) must not exceed the ampere rating of the soft start.
■ Low Inertia—Connected motor load inertia equal or less than 10 times motor rotor inertia.
High Inertia—Connected motor load inertia greater than 10 times motor rotor inertia.

NOTE: *For severe duty or high inertia loads, derate by 1 hp size.*

Table 26.15: Altistart 48 Options

Description	Catalog Number	$ Price
Remote Keypad Display Mounting Kit, including: Keypad with 3–character 7–segment display IP65 cover and seal, mounting screws, and 3 meter cable to connect keypad display to Altistart 48	VW3G48101	**165.**
Cover for power terminals—Set of 6 for ATS48C14Y and ATS48C17Y	LA9F702★	**61.**
Cover for power terminals—Set of 6 for ATS48C21Y, ATS48C25Y, and ATS48C32Y	LA9F703★	**82.**
Modbus Ethernet Gateway	TSXETG100▼	**1027.**
DeviceNet Gateway	LUFP9△	**495.**
Profibus DP Gateway	LUFP7△	**495.**
FIPIO™ Gateway	LUFP1△	**495.**
1/3 meter connection cable (RJ–45 to RJ–45)	VW3A8306R03	**20.**
1 meter connection cable (RJ–45 to RJ–45)	VW3A8306R10	**25.**
3 meter connection cable (RJ–45 to RJ–45)	VW3A8306R30	**30.**
1/3 meter splitter cable (For RJ—45 daisy chain connection)	VW3A8306TF03	**75.**
1 meter splitter cable (For RJ–45 daisy chain connection)	VW3A8306TF10	**85.**
RJ45 terminator (2 per package)	VW3A8306RC	**6.**
Modbus hub (Eight RJ–45 ports)	LU9GC3△	**208.**
Powersuite™ commissioning software on CD♦	VW3A8104□	**150.**
PowerSuite upgrade CD from most recent to new version♦	VW3A8105□	**98.**
PC connection kit. To connect PC to Altistart 48 soft start♦	VW3A8106□	**75.**
USB to RJ45 Adaptor Kit For use in connecting to a PC with a USB port	TCSMCNAM3M002P	**52.**
Size M10 Bolt Kit	W808780210111	**8.**
Size M12 Bolt Kit	W808780220111	**10.**

♦ For more information, see Data Bulletin 8806DB0001.
★ Use discount schedule I12
▼ Use discount schedule PC41
△ discount schedule I11
□ discount schedule CP4C

For additional information on Altistart 48, refer to Catalog 8636CT0201.

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Altistart™ 22 Open Style Softstarter

The Altistart 22 unit uses both voltage and torque control to provide a softstart and soft stop for three-phase asynchronous motors between 17 and 590 amps.

Table 27: ATS22 Selection and Pricing

Select the Altistart 22 softstart using the nameplate full-load ampere rating of the motor and the table below. The horsepower ratings are for reference only.

208 V	230 V	400 kW	460 V	575 V	Rated A	Softstart Reference ■ or ♦	Dimensions (inches)			Frame Size	$ Price
							W	H	D		
3	5	5.5	10	15	17	ATS22D17S6,S6U	5.1	9.8	6.6	A	**613.00**
7.5	10	11	20	25	32	ATS22D32S6,S6U	5.1	9.8	6.6	A	**654.00**
—▲	15	18.5	30	40	47	ATS22D47S6,S6U	5.1	9.8	6.6	A	**786.00**
15	20	22	40	50	63	ATS22D62S6,S6U	5.7	10.9	8.1	B	**945.00**
20	25	30	50	60	75	ATS22D75S6,S6U	5.7	10.9	8.1	B	**1083.00**
25	30	37	60	75	88	ATS22D88S6,S6U	5.7	10.9	8.1	B	**1266.00**
30	40	45	75	100	110	ATS22C11S6,S6U	5.9	13	9	C	**1468.00**
40	50	55	100	125	140	ATS22C14S6,S6U	5.9	13	9	C	**1792.00**
50	60	75	125	150	170	ATS22C17S6,S6U	5.9	13	9	C	**2056.00**
60	75	90	150	200	210	ATS22C21S6,S6U	8.1	15.6	11.8	D	**2383.00**
75	100	110	200	250	250	ATS22C25S6,S6U	8.1	15.6	11.8	D	**2714.00**
100	125	132	250	300	320	ATS22C32S6,S6U	8.1	15.6	11.8	D	**3083.00**
125	150	160	300	350	410	ATS22C41S6,S6U	8.1	15.6	11.8	D	**3573.00**
150	—	220	350	400	480	ATS22C48S6,S6U	11.9	16.8	13.4	E	**4263.00**
—	200	250	400	500	590	ATS22C59S6,S6U	11.9	16.8	13.4	E	**4862.00**

▲ Value not indicated when there is no corresponding standardized motor.
■ S6 = 208–600 line voltage, 220 V control voltage
♦ S6U = 208–600 line voltage, 110 V control voltage

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Enclosed AltisStart™ 22 Motor Controllers

Enclosed Altistart 22 (ATS22) solid-state combination motor controllers are a pre-engineered, integrated solution for reduced voltage starting and soft stopping of standard three-phase asynchronous induction (squirrel cage) motors. The Enclosed 22 controllers consist of a disconnect means and an ATS22 softstarter in a stand-alone enclosure. Enclosed 22 controllers integrate the ATS22 softstart technology into a combination package for application requirements up to 125 hp at 480 V.

- 3–50 hp, 208 V
- 5–60 hp, 230 V
- 10–125 hp, 460 V

Table 28: Catalog Number Description

Field	Digit	Characteristic	Description
—	—	Controller Class	8638 = Fused Disconnect♦ 8639 = Circuit Breaker Disconnect
01	1–3	Controller Style	22F = Altistart 22 with Class J Fuse Clips and Molded Case Switch♦ 22T = Altistart 22 with PowerPact Motor Circuit Protector 22U = Altistart 22 with PowerPact Thermal-
02	4	Horsepower	A = 3 hp B = 5 hp C = 7.5 hp D = 10 hp E = 15 hp F = 20 hp G = 25 hp H = 30 hp J = 40 hp K = 50 hp L = 60 hp M = 75 hp N = 100 hp P = 125 hp Q = 150 hp
03	5	Enclosure Type	G = UL Type 1 General Purpose A = UL Type 12K Industrial Use, Dust-Tight/Drip-Tight H = UL Type 3R Outdoor Use
04	6	Voltage	2 = 208 Vac 3 = 230 Vac 4 = 460 Vac 5 = 575 Vac
05	7	Power Circuit	B = Basic Shunt Trip S = Full-Featured Shunt Trip N = Non-Reversing Isolation R = Reversing Isolation Y = Integral Full-Voltage Bypass
06	8–10	Control Options★▼	A06 = Start-Stop Pushbuttons B06 = Forward-Off-Reverse C06 = Hand-Off-Auto (HOA) Selector Switch D06 = Stop-Run Selector Switch E06 = Hand-Auto Selector Switch/Start-Stop Pushbuttons
07	11–13	Pilot Device Options★▼	A07 = Run Light (Red), Off Light (Green) B07 = Push-to-Test Run Light (Red), Push-to-Test Off Light (Green) C07 = Run Light (Red), Off Light (Green), Tripped Light/Reset (Yellow) D07 = PTT Run Light (Red), PTT Off Light (Green), Tripped Light/Reset (Yellow)
08	14–16	Metering Options	B08 = Elapsed Run Time Meter▼
09	17–19	Miscellaneous Options	A10 = Floor Mounting Kit△ B10 = Additional 150 VA□ C10 = Power-Up On Delay Relay◊ D10 = Emergency Stop Pushbutton□ E10 = cUL Label▲ F10 = Auxiliary Run Mode Contacts G10 = Auxiliary FB Bypass Contacts☆ H10 = Auxiliary Auto Mode Contacts▽ J10 = Auxiliary Trip Indication Contacts L10 = ID Engraved Nameplate□ M10 = 10 Spare Terminal Blocks□ P10 = Permanent Wire Markers□ R10 = MOV-Surge Arrestor□ U10 = Omit Door-Mounted Keypad Display■ X10 = 50 °C Operation Z10 = Service Entrance Rating▲◒ 910 = American Recovery and Reinvestment Act (ARRA) Option

▲ Options E10 and Z10 cannot be used together.
■ If you select option U10, you must separately order the remote keypad (VW3G22101) and cable (VW3A1104R30) to commission the softstarter. Refer to the *ATS22 User Manual*, BBV51330, for serial communication programming and control capabilities.
♦ This option is not selectable with power circuit option B05.
★ Select only one option.
▼ To omit, do not include a selection in the catalog number.
△ This option is available only for enclosure size D.
□ This option is not selectable with power circuit option B05
◊ This option is not selectable wit hpower circuit option B05. This option is valid only with the following control options: C06, D06, or E06.
☆ This option is not selectable with power circuit option B05. The contacts are available only when power circuit option Y05 is selected.
▽ The contacts are not available when power circuit option R05 is selected. This option is valid only with the following control options: C06, D06, or E06.
◒ Options E10 and Z10 cannot be ordered together.

Table 29: Catalog Number Example: 863922UCG4BA06A07

Field							
—	1	2	3	4	5	6	7
8639	22U	C	G	4	B	A06	A07
Controller Class	PowerPact™ Thermal-Magnetic Circuit Breaker	7.5 hp	Type 1 General Purpose	460 Vac	Basic Shunt Trip	Start-Stop Pushbutton	Run Light (Red), Off Light (Green

Control Options (pick one)

Mod		$ Price
A06	**Start/Stop push buttons** Provides black start and red stop push buttons (3-wire control scheme).	**132.00**

Mod		$ Price
B06	**Forward-Off-Reverse selector switch** Provides three-position selector switch to select between forward, off and reverse. Uses 2-wire control.	**240.00**

Mod		$ Price
C06	**Hand-Off-Auto selector switch** Provides a three-position selector switch, 2-wire control scheme.	**132.00**

Mod		$ Price
D06	**Stop-Run selector switch** Provides a two-position selector switch.	**132.00**

Mod		$ Price
E06	**Hand-Auto selector switch and Start/Stop push buttons** Provides a two-position selector switch and start/stop push buttons (3-wire control).	**264.00**

Pilot Light Cluster Options (pick one)

Mod		$ Price
A07	**Pilot light cluster #1** Consists of red "RUN" and green "OFF" pilot lights. Provides standard red "RUN (ON)" and green "OFF" pilot lights for status annunciation.	**180.00**

Mod		$ Price
B07	**Pilot light cluster #2** Consists of red "RUN" (push-to-test) and green "OFF" (push-to-test) pilot lights. Provides push-to-test type red "RUN (ON)" and standard green "OFF" pilot lights for status annunciation.	**360.00**

Mod		$ Price
C07	**Pilot light cluster #3** Consists of red "RUN", green "OFF" and yellow "FAULT" pilot lights. Provides standard red "RUN (ON)" green "OFF" and yellow "FAULT" pilot lights for status annunciation.	**270.00**

Mod		$ Price
D07	**Pilot light cluster #4** Consists of red "RUN (ON)" (push-to-test), green "OFF" (push-to-test) and yellow "FAULT" (push-to-reset) pilot lights. Provides push-to-test type red "RUN (ON)" standard green "OFF", and push-to-reset type yellow "FAULT" for status annunciation.	**540.00**

Meter Display Options (pick one)

Mod		$ Price
BO8	**Elapsed time meter** Provides a seven-digit analog, non-resettable elapsed run time meter. Not available on Type 3R Enclosures	**348.00**

Miscellaneous Options (multiple compatible options may be selected)

Mod		$ Price
A10	**Floor mounting kit** Only available for size D enclosures.	**105.00**

Rules: Available for power options S05, N05, R05, Y05.

Mod		$ Price
B10	**150 VA additional control power capacity** Provides 150 VA additional control VA capacity for customer use.	**150.00**

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Information and Selection

For information and selection, contact your nearest Schneider Electric sales office or visit our website:
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Technical Support

Drive Product Support Group

For support and assistance, contact the Drive Product Support Group. The Drive Product Support Group is staffed from 8:00 am until 6:00 pm Eastern time to assist with product selection, start–up, and diagnosis of product or application problems.
EMERGENCY Technical phone support is available 24 hours a day, 365 days a year.

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Customer Training

Schneider Electric offers a variety of instructor-led, skill enhancing and technical product training programs for customers. For a complete list of drives/soft start training with dates, locations, and pricing, please call:

Phone: 978-975-9306
Fax: 978-975-2821

Packaged Product Documentation

Standard Documentation

Each adjustable frequency drive or soft start shipped includes one set of instruction bulletins. Each set of instruction bulletins includes installation, start–up, troubleshooting and wiring diagram information. Separate Approval and/or Record Drawings are not included.

Approval and Record Drawings

All factory orders for enclosed drives and soft starts come with factory supplied user drawings and are identified by a factory order number. The factory supplied drawing set typically includes:

- Enclosure outline drawing
- Power elementary drawing
- Control elementary drawing
- Interconnection drawing

These drawings are also available in DWG, DXF, IGS, Microcad and PDF formats upon customer request.

Product Literature

To view or download product literature, visit the Schneider Electric web site:
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Section 27

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Modicon™ PLC Products

Modicon™ TSX Micro™ PLC

Compact and cost-efficient, this mid-range PLC boasts the power and flexibility OEMs find most desirable. Optional integrated safety relays, half-size I/O and web-enabled modules provide seamless connection to supervisory maintenance systems plus minimize real estate. PCMCIA memory cards preserve your investment when expanding. Communication options include Ethernet and ASi for global access using Open standards. More details are available at **www.schneider-electric.com**.

Modicon M340™ PAC

Our latest midrange PAC is the most integrated ever! Highly requested by industrial OEMs and end users, the all-power-inside concept boasts high-performance processing and small size to create a system that provides flexibility beyond any before. With up to 3 built-in CPU communication ports, large memory options, 64 channel high-density modules, and embedded web-servers, the Modicon M340 is a powerful solution for industrial OEMs and end users demanding more productivity in their PACs. The Modicon M340 PAC supports advanced communications such as enhanced EtherNet/IP which support both EtherNet/IP, Modbus TCP/IP and daisy chain loop communications on the same 4-port, rack mounted switch module. It will also support DNP3.0 in serial or Ethernet in a rack-mounted RTU module.The Modicon M340 PAC is programmed with Unity Pro software, which allows users to dramatically reduce setup time and effort with features like drag 'n drop CANopen bus setup and standard IEC 61131-3 language selection. Designers gain fast, easy and efficient startups. More details are found on our website or in the latest Modicon M340 catalogs and brochures.More details are available at **www.schneider-electric.com**, or in catalog **DIA6ED2081007EN-US.**

Modicon Premium™ PLC

Ideally suited for discrete manufacturing, complex OEM applications as well as municipality and infrastructure applications, this cost-effective PLC line features integrated functions such as weighing, interpolated motion control, and process loops. Using the built-in Ethernet port, user-customized web page capabilities, and a range of popular Open-standard fieldbus connections the Modicon Premium enables seamless communication with enterprise systems providing low-cost remote maintenance diagnostics. More details are available at **www.schneider-electric.com**, or in catalog **MKTED208054EN-US.**

Modicon Quantum™ PLC

The Modicon Quantum PLC is our high-end, full function PLC designed for high I/O count industrial applications that require high performance such as Pharmaceutical, Petrochemical, Food & Beverage, Automotive, and others. Quantum also offers true bumpless hot standby. Quantum processors can be programmed with Unity Pro. It will also support legacy 984 ladder logic programs in the LL984 Unity Pro editor by simply importing the legacy application program. Concept™ application software and ProWORX™ 32 application software are also supported on the Quantum platform.The Unity Quantum's onboard memory can exceed 3 Mbytes. The Unity Quantums can have more than 7 Mbytes of extended memory on a PCMCIA card for data and application storage combined. They can have over 8 Mbytes of just data storage. The Quantum PLC also offers Safety PLC versions certified for use in up to SIL3 applications. This includes both standard and hot standby capability as well as redundant I/O. It programs with Unity Pro XLS. The SIL3 offer stresses both high reliability as well as high availability. More details are available at **www.schneider-electric.com**, or in catalog **MKTED208011EN-US**.

Information about the SIL3 Quantum is available in brochure **8000BR0808R03/10**.

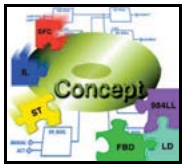
Unity™ Pro Application Software

Unity Pro is a new generation software platform for application development. Unity Pro is compatible with all Industrial End User midrange and highend controllers including Modicon M340, Premium and Quantum PLCs. Unity provides a collaborative automation environment that enables individuals and teams to work together more effectively, reducing the cost of developing and managing automation solutions. Unity Pro XLS software is used to program the SIL3 Quantum as well as all Unity-based, standard Quantums, Unity-based Premiums and M340s. Since one software package can program all the platforms, it greatly simplifies development and support issues. It integrates commercial IT technologies like Ethernet, VBA, XML and hyperlinks within the traditional control framework to enable customers to reduce the cost of automating both discrete and batch control applications. More details are available at **www.schneider-electric.com**, or in brochure **8000BR0935R02/10**.

Unity Application Generator

Unity Application Generator is an advanced design and generation software tool that integrates multiple PLCs and HMI/SCADA systems to provide an automation solution rivaling a Distributed Control System (DCS). UAG supports structured project design by providing a software tool to bridge from the process engineer to the control/automation designer (from the P&ID to the automation system). UAG will capture and re-use the Customer's best practices within application-specific libraries that reduce the dependency on experts and enable standardization and increases software robustness. Single database entry avoids duplicate effort and resulting errors. Automatic Application Generation including the automatic configuration of networks in multi device systems increases efficiency, improves software quality, speeds commissioning while simultaneously reducing project risk. Integrated change tracking and automatic documentation generation reduces engineering effort and enables system validation. UAG integrates Unity PLCs (M340/Premium/Quantum), Vijeo Citect, Connectors for leading HMI/SCADA systems, Modbus TCP/IP communication and OFS/OPC. Additional information can be found at **www.schneider-electric.com**.

Concept™ and PL7™ Application Software



Concept and PL7 comply with the IEC 61131 standard for programming software. Concept and PL7 can be programmed in four IEC languages including two text-based editors (Structured Text and Instruction List), and two graphic-based editors (Sequential Function Chart and Ladder Diagram). In addition, Concept can be programmed using the IEC compliant graphic editor for Derived Function Blocks. The Concept and PL7 software both promote productivity by using structured programming, which increases reusability while reducing maintenance costs. Concept can be used to program the Quantum, and Momentum PLCs while PL7 can be used to program the Micro and Premium. More information is available at **www.schneider-electric.com**.

ProWORX™ 32 Application Software

ProWORX 32 is the simple programming solution to program your Modicon PLCs using 984 ladder logic programming. Compatible with 584, 984, Modicon Micro, Momentum, Compact, and Quantum. Schneider Electric Automation Services maintains the tools necessary to upgrade your ProWORX 32 application to a Unity Pro application with ladder logic that is designed to mirror the 984LL application. More information can be found at **www.schneider-electric.com**.

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Magelis™ Small Panels HMI Products

The Magelis STO/STU, XBT N, XBT R, and XBT RT Small Panels have been specifically designed to satisfy the requirement for panels that are compact and easy to use. These terminals are easy to configure and work seamlessly with other Schneider Electric equipment to provide a complete automation solution, dedicated to simple or compact machines.

Magelis STO/STU

The new Magelis STO and STU panels enhance the Magelis small panels range by offering more flexibility, more communication capability, and a quick and easy revolutionary mounting system. Powered by Vijeo Designer software, these panels bring a cost-effective solution to all machine builders. The new Magelis STO & STU terminals adapt to your needs by integrating the latest technological innovations to enhance machine productivity. More information is available at **www.schneider-electric.com**.

Magelis XBT N/R

The Magelis XBT N and R matrix screen text display units accommodate up to four lines of large font (20 mm high) text for easy viewing. Rated for IEC 60529, NEMA 4X outdoor use, Class I Div II and UL508, the sturdy Magelis XBT N and R displays feature an ergonomically designed keyboard with up to 20 keys and ports to handle either point-to-point or multipoint communications. A truly global solution, the XBT N and R displays provide low-cost connectivity to all Schneider Electric PLCs using Modbus™ and Uni-Telway™ protocols, support Latin, Cyrillic, Katakana, Greek and Chinese fonts, and six languages.
More information is available at **www.schneider-electric.com**.

Magelis XBT RT

The Magelis XBT RT semi-graphic touch screens accommodate up to ten lines of 33 characters of text. Rated for NEMA 4X, Class I Div II and UL508, the sturdy Magelis XBT RT displays semi-graphic objects, bar graphs, curves, buttons, and bitmaps and has ports to handle either point-to-point or multipoint communications. With the ability to choose between touch screen and keypad combination or keypad only operation, the XBT RT, is adaptable. Like the other Magelis small panels, the XBT RT displays provide low-cost connectivity to all Schneider Electric PLCs using Modbus and Uni-Telway protocols and several major third party protocols and supports multiple languages, including Japanese, Cyrillic, Greek and Chinese. More information is available at **www.schneider-electric.com**.

Magelis Advanced Panels HMI Products

The Magelis XBT GT, GK, GH and GTW graphic terminals offer numerous connectivity options from Ethernet to USB. With their exceptional image quality and choice of touch screen and/or keypad interface, they are flexible enough for a large range of applications. When combined with Vijeo Designer configuration software, application designs are unlimited.

Magelis XBT GT

Available in six sizes (3.8, 5.7, 7.4, 10.4, 12.1 and 15 inches) and 4 function levels, the Magelis XBT GT graphical touch screen terminals are designed to fit all your HMI application needs. Some offer: multimedia capability with a large processing capacity; openness with unequalled connectivity via numerous communication ports and multilink communication for simultaneous equipment control; ease-of-use with simple installation and simple configuration with Vijeo Designer software. The entire product range is RoHS compliant. More information is available at **www.schneider-electric.com**.

Magelis XBT GK

With three models to choose from and two sizes screen sizes, 5.7 and 10.4 inches, the Magelis XBT GK offers a lot of flexibility. The XBT GK uses the same technology of the popular XBT GT but adds a keypad and industrial mouse pointer for extra control and data input that can be configured to operate simultaneously with or without the touchscreen. In a dusty or dirty environment, the keypad enables the use of the terminal, even while wearing gloves. There is an extra added safety feature where two keys can be simultaneously pressed to ensure command order security and the keys can be locked during delicate phases of an operation. Vijeo Designer, the single software package for the entire Magelis Advanced Panel range, ties the solution together. More information is available at **www.schneider-electric.com**.

Magelis XBT GH

Powered by Vijeo Designer software and based on the same technology as XBT GT, the XBT GH hand-held panel combines intuitive operation, quality, durability, mobility and safety with rugged corded mobile design and integrated safety features. More information is available at **www.schneider-electric.com**.

Magelis XBT GTW

Available in two color touch screens sizes, 8.4 and 15 inches, the Magelis XBT GTW terminals offer a Windows environment open to the Web (local and remote diagnostic and maintenance functions) and multimedia applications (streaming video on IP, Webcam management, sound and an integrated video output). With this open platform, the XBT GTW allows you to enhance your HMI applications with Vijeo Designer, while providing total access to Microsoft Office software (Excel, Word, PowerPoint, etc.) and data editing with Office Viewer or Acrobat Reader, two pre-installed applications.

The front panel USB port provides connectivity for peripherals. Numerous communication interfaces such as dual-Ethernet, multiple USB ports and slots provided for PCMCIA (15") and Compact Flash slots are available. More information is available at **www.schneider-electric.com**.

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Magelis™ HMI Products

Magelis Industrial PCs

The Magelis Industrial PC (iPC) range offers “All-In-One” or “BOX + Display” industrial PC for autonomous or distributed applications. The Magelis iPC provides the openness and ergonomics of a Windows environment in a rugged PC that is ready for tough industrial environments. With the Magelis iPC range, you will be sure to find the PC that corresponds exactly to your specifications.

“All-In-One” Solutions:

• Magelis Smart+ iPC

The new Magelis Smart+ iPC is the first industrial PC with Windows XP Pro operating system that requires no maintenance and contains no rotating parts (no hard disk or fan). The Smart+ iPC also offers all of the openness associated with Windows XP Pro. The IP65 touch screen shares the same 15" dimensions as the rest of the Magelis range. With its Intel® Celeron® M 1 GHz processor, 1 GB of RAM, and two Ethernet ports, Magelis Smart+ iPC offers great performance, and features a solid state drive (SSD) with Windows XP Pro operating system. The industrially rugged Smart+ iPC has been certified to the most demanding standards, including UL 508 for automation equipment, UL and ATEX for hazardous locations, and marine.Magelis Smart+ iPC supports Vijeo™ Designer™ HMI applications (demonstration version can be expanded to unlimited version) and is the first maintenance-free Magelis iPC to fully support the Vijeo Citect SCADA supervisor.

• Magelis Smart iPC

An extension of dedicated terminals and the industrial PC, Magelis Smart is open to the Web. It meets the demands of predefined operator dialog, display and remote diagnostics and is available in 8.4, 12, or 15 inches. Practical and reliable, the Smart has simplified connections, including: 2 Ethernet ports, one with gigabit support, 4 or 5 USB ports, 2 serial ports and a PCMCIA slot. Its also more resistant to noise and vibration with data storage on static disk (compact Flash) and no fan. The WEB Edition is ready to use as a web client or connected to the FactoryCast Web servers for remote diagnostics via the integrated Web browser. The HMI Edition (with Vijeo Designer runtime) transforms the iPC into an operator terminal.

• Magelis Compact iPC

Available in 8.4, 12, or 15”, the Magelis Compact iPC provides data storage adapted to industrial needs, Industrial HDD disk or 8 or 16 GB Flash disk (15”) only. This panel PC has several extension options, including: 1 PCI slot, dual-Ethernet ports, one with gigabit support, 4 or 5 USB ports, 2 serial ports and a PCMCIA slot. Vijeo Designer HMI software transforms the iPC into an operator terminal with the advantages of Windows® openness (HMI Edition).

More information is available at **www.schneider-electric.com**.

“BOX + Display” Solutions:

From the simple preconfigured Magelis Smart BOX or the Compact PC BOX to the Flex PC BOX with its advanced features, these BOX + Display solutions have in common a high level of design guaranteeing the best reliability possible.

• Magelis Smart BOX

The Magelis Smart BOX is preconfigured with MS Windows® and offers the same features as the “All-In-One” version.

• Magelis Compact PC BOX

The Magelis Compact PC BOX offers 1 PCI slot and the same features as the Compact IPC

• Magelis Flex PC BOX

The Magelis Flex PC BOX features:

- 2 or 4 PCI slots
- Industrial HDD 24/7 and/or 8 or 16 GB disk
- Intel® Celeron® M 440 with 1.86 GHz or Pentium Core Duo with 2 GHz 100-240 Vac or 24 Vdc power supply

PC BOX COMPONENTS

To complete the configuration:

- To convert the Flex PC BOX into an “All-In-One” PC, add a 15” or 19" Front Panel in touch version or 12 or 15" Front Panel in touch/keyboard version
- To connect a remote screen to the PC BOX (Smart, Compact, or Flex), add a 15 or 19" iDisplay in touch version or 15" iDisplay in touch /keyboard version.

More information is available at **www.schneider-electric.com**.

Vijeo™ Designer

Vijeo Designer configuration software can be used to create HMI applications designed for controlling automation systems for the Magelis HMISTO/STU/GTW/P/XBTGT/XBTGK/XBTGTW/iPC. It’s the ideal design tool for the simplest control application right up to the most complex HMI installations. It offers advanced script functions, recipe management, data management, remote access via PC web browser, e-mail and multi-protocol connectivity. More information is available at **www.schneider-electric.com**.

SCADA Products

Vijeo Citect

The flexibility of Vijeo Citect supervisory control and data acquisition (SCADA) software enables users to achieve the solution that best suits their supervision requirements for installations. Vijeo Citect offers all the functions of a modern supervisor. Its distributed client-server architecture is applicable to a multitude of applications in the most varied domains:

- Energy and infrastructures: airports, roads and tunnels, water wastewater, oil and gas, etc.
- Industries: food and beverage, mining, metals, minerals, system integrator, etc.

This development tool enables the development of any supervision application, from small stand-alone systems to large distributed redundant systems. More information is available at **www.schneider-electric.com**.

Vijeo Historian

Vijeo Historian, a data logging and reporting software, collects, compares, and records the entire flow of data on a common platform. By establishing the communication between the supervisory systems (SCADA) and database systems, such as Oracle and SQL, Vijeo Historian enables collection and management of the production data and its availability for a vast range of client processing applications. More information is available at **www.schneider-electric.com**.

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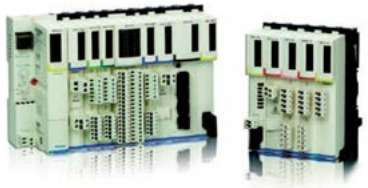
Advantys™ OTB

The open and modular new Advantys OTB distributed I/O system offers an ideal solution for IP20 distributed input/output requirements. Users can create I/O islands managed by a master controller, via a fieldbus or communication network. It includes three communication bases for the various types of fieldbus: CANopen™, Ethernet TCP/IP, or Modbus™ RS 485 serial. Discrete or analog I/O are available. More information is available in catalog **DIA3ED2040801EN-US**.

Modicon™ TM5 Expansion Module

The Modicon TM5 digital I/O module offer consists of input, mixed I/O and output electronic modules (sensor and preactuator 24 V ⎓ power supply).They complement the embedded I/O in the various M258 controllers and LMC058 motion controllers. They are used to adapt to the application requirements as closely as possible to reduce the installation and wiring costs, and they can be used with the CANopen communications head and with multiple controllers. These modules offer the following advantages: a removable terminal, spring terminals which can be used for quick, tool-free connection of the sensors and preactuators (and can help eliminate the need for periodic retightening), and hot swapping. More information is available at **www.schneider-electric.com**, or in catalog **MKTED211041EN**.

Modicon STB



The Modicon STB is a highly modular distributed I/O platform, integrated wiring solution, and power management system that delivers effective and targeted control. With an open network adaptable to most major field buses, a flexible “island” I/O structure, and simple configuration via the STBSUP1000 software, Modicon STB is the right choice. The Modicon STB distributed I/O can also be configured directly from Unity™ Pro application software. More information is available in catalog **MKTED208053EN-US**.

Advantys Telefast™ ABE7 Sub-bases, IP20

The Advantys Telefast ABE7 pre-wired system enables connection and adaptation of control signals of industrial PLC cards that are fitted with HE10 connectors. It rationalizes cabling by replacing PLC terminals and traditional terminal blocks—thus improving simplicity and economy. More information is available at **www.schneider-electric.com**.

Advantys Telefast ABE9 Passive splitter boxes, IP67

Advantys Telefast ABE9 splitter boxes eliminate long and difficult cable runs by avoiding the use of intermediate junction boxes. Due to their modularity and size, they are perfect for the requirements of your varying applications. More information is available at **www.schneider-electric.com**.

Modicon TM7 I/O Blocks, IP67

Compact and flexible, the TM7 IP67 I/O Blocks allow connection of sensors and actuators at the heart of processes or machines in severe environments. The wide range of modules provides solutions to match your exact needs. It includes connectivity to CANopen. More information is available at **www.schneider-electric.com**, or in catalog **MKTED211041EN**.

Modicon Momentum™ Distributed I/O and PLC

The small footprint and open architecture of the Momentum PLC product line make it extremely versatile for a variety of automation applications. The Momentum PLC is ideal for PC-based control, distributed control, distributed I/O, and traditional, standalone PLC control. Momentum PLC options and accessories include: I/O bases, processor adapters, option adapters and communication adapters that are interchangeable and snap together to deliver optimal flexibility throughout the control system lifecycle.

Using Ethernet as its communications backbone, the Modicon Momentum M1E Processor delivers all the performance benefits of real-time control. The open architecture of the M1E processor makes it a universal controller for distributed I/O, compatible with many of the major fieldbus and control network environments.

An integral Ethernet port in the M1E allows users to perform a wide range of functions over Ethernet, including data acquisition, peer-to-peer communications, and I/O scanning. Five embedded web pages enable the use of a standard web browser to read status and diagnostic information from the processor.

The most recent addition to the Momentum product offer is the Momentum M1E ConneXium switch. This model combines the power and functionality of the M1E processor with the communication versatility of four Modbus Ethernet TCP/IP ports.

The award winning M1E not only seamlessly connects I/O and other control devices via open standards; it delivers the performance of a full function, real-time controller for stand-alone and distributed system configurations in one money-saving unit. Additional information can be found at **www.schneider-electric.com** or in catalog **MKTED205061EN.**

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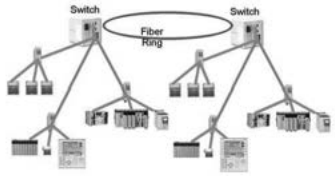
ConneXium™ Products

ConneXium™ Ethernet Products



The ConneXium line of networking products offers a complete range of Ethernet switches (managed and unmanaged), hubs, transceivers, gateways, cabling, and diagnostic monitoring software for demanding industrial environments. With fiber and redundant capabilities, along with advanced filtering and security features, ConneXium products improve the performance and security of the network. More details can be found at **www.schneider-electric.com**.

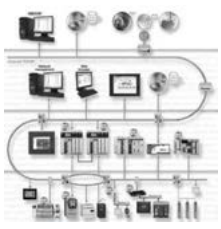
ConneXview™ Industrial Ethernet Diagnostic Software

ConneXview Industrial Ethernet diagnostic software combines the power of IT-based network management programs with Schneider Electric's Transparent Ready Ethernet expertise to provide a tool specifically designed for the automation environment. ConneXview offers automatic device discovery plus Ethernet (SNMP) and control-network device (Modbus/TCP) mapping. In addition, the software has an easy-to-use graphical interface including convenient task panels for device status, settings and alarms, and topological visual graphics. Other benefits include:

- Increased overall productivity with easy-to-use diagnostics
- Expanded functionality offered with the Device Type Editor, including adding third-party devices to the library and adding unique device names for increased recognition
- An intuitive and ergonomic design that minimizes end-user training and decreases maintenance costs

Transparent Ready™ Products

Transparent Ready™ Solutions



Transparent Ready products cover solutions in Industrial automation to electrical Distribution, and are based on universal Ethernet TCP/IP and Web technologies. They provide seamless communication between plant floor devices, like PLCs, drives, and MCCs, with corporate business systems. Use of the open Modbus TCP/IP and EtherNet/IP protocols that are the leading industrial Ethernet protocols, broadens the scope of dedicated machine diagnostics to remote management. Choosing Transparent Ready means opting for flexible, open automation architectures. More details can be found at **www.schneider-electric.com**.

Network Products

CANopen Products

CANopen is an open network that is supported by over 400 companies world wide and promoted by CAN in Automation. CANopen is standardized in the EN50325-4 and in ISO15745-2 for its device description.

The main reason for using a network is the performance and the flexibility to adapt the network exactly to the requirements of the application. CANopen provides a unique feature for the adaptation of the data transmission. Based on the producer/consumer model, CANopen allows for a data transmission broadcast, peer-to-peer, change-of-state and cyclic communication. This means it transmits data only when required or on a specified time base. Process data objects can be individually configured. Parameters can be changed at runtime.

CANopen combines ease of installation with inexpensive devices. CANopen provides an integrated equipotential bounding in the cable. Therefore, an additional cable or stranded copper ribbon to achieve the same potential on all network devices is not necessary. Installation costs are heavily reduced.

More information on CANopen and CANopen Products is available in catalog **MKTED208054EN-US**.

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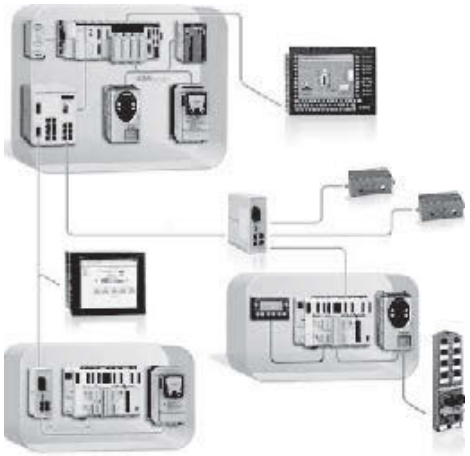
Ethernet TCP/IP Products



The recognition of Ethernet TCP/IP, both in organizations and on the internet, has made it the communication standard of today. Its wide use is leading to a reduction in connection costs, increased performance and the addition of new functions, which all combine to ensure its durability.

Ethernet TCP/IP meets the connection requirements of every application:

- Twisted pair copper cables for simplicity and low costs
- Optical fiber for immunity to interference and for long distances
- Communication redundancy, inherent in the IP (internet protocol)
- Remote point-to-point access via the telephone network or the Internet for the cost of a local call

Ethernet TCP/IP, a truly open technology, supports all type of communication:

Web pages

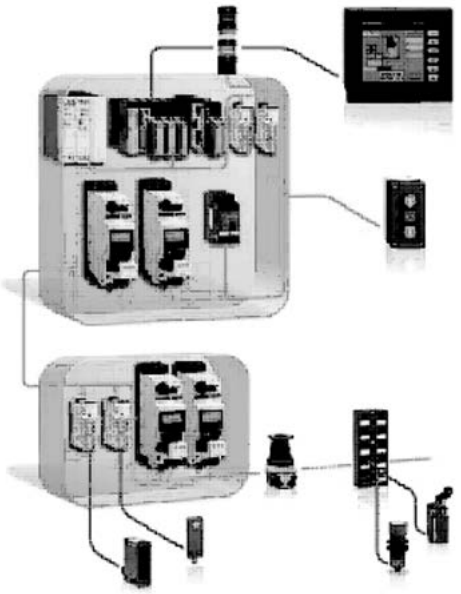
File transfer

Industrial messaging

With its high speed, the network no longer limits the performance of the application. The architecture can evolve without any difficulty. The products or devices remain compatible, ensuring the long-term durability of the system.

More information on Ethernet and Ethernet Products is available in catalog **MKTED208054EN-US**.

Actuator Sensor Interface (AS-i) Bus Products



AS-Interface (AS-i) is a versatile, low-cost, easy to-install cabling solution dedicated to distributed machines and installations as a replacement for traditional parallel wiring. AS-i technology is compatible with virtually any fieldbus or device network. AS-i is used as a quick and upgradeable industrial network—a single cable with a quick, open-ended wire system connects all the components in the automation system. It contributes significantly to improve the reliability and availability by reducing cabling errors and offering high-level electromagnetic interference immunity (EMC).

AS-i is an open network standardized in IEC 62026-2 and promoted by AS-International Association.

AS-International has over 260 members worldwide.

More information on AS-International and AS-i Products is available in catalog **MKTED208054EN-US**.

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Modicon™ M168 Programmable Logic Controller

Modicon M168 programmable logic controllers have been developed for the buildings market – offering HVAC and pump solutions for Building Management System communication networks (BACNet). Four different Modicon M168 logic controllers are available, all of which can be programmed with SoHVAC software, providing customized applications designed to control:

- Water chiller
- Heat pumps
- Compact air/air roof-top unit
- Air handling system, twin-flow enclosure
- Precision air conditioners
- Refrigerated display windows
- Compressor racks
- Pumping stations
- Booster stations
- Circulators
- Condensate/boiler feed pumps
- Cooling tower pumps

More information is available at **www.schneider-electric.com** or in catalog **DIA6ED2110101EN-US**.

Modicon M238 Logic Controller

The Modicon M238 logic controller is a compact, high-performance and fully expandable PLC. It forms a part of Flexible Machine Control approach, a key component of MachineStruxure™, which brings you maximum flexibility and ensures the most optimized control solution. Modicon M238 compact logic controllers offer an "all-in-one" solution in a compact unit (157 x 118 x 86 mm excluding expansion modules). Four models are available, with different embedded communications and supply voltages. The number of I/O can be expanded on all four models by adding up to 7 expansion modules (1) of the following type on the right-hand side of the base unit:

- Digital TM2 DDI/DDO/DMM/DRA
- Analog TM2 AMI/ALM/ARI/AMO/AVO/AMM
- Up to 3 High-speed counter TM200 HSC206DT/DF
- Up to 2 AS-Interface master module TWD NOI 10M3.

Modems or communication gateways can be connected to the serial links in order to expand the connectivity capability to include Ethernet Modbus/TCP, Profibus DP, and DeviceNet.

More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

Modicon M258 Logic Controller

The Modicon M258 logic controller is a compact, high-performance and fully expandable PLC. It forms a part of Flexible Machine Control approach, a key component of MachineStruxure, which brings you maximum flexibility and ensures the most optimized control solution. This PLC is designed for machine manufacturers (OEMs) focusing on applications such as packaging, conveying and storage, textiles and woodworking, etc. It offers high-performance solutions for speed control, counting, axis control and communication functions. The Modicon M258 logic controller's dual-core processor provides extremely high performance. Core 1 is dedicated exclusively to managing program tasks and offers the maximum resources for real-time execution of the application code. Core 2 is dedicated to executing communication tasks, which have no impact on the application performance.

More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

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Modicon™ LMC058 Motion Controller

The Modicon LMC058 motion controller is the optimum solution for axis control and positioning, including automation functions. It forms a part of Flexible Machine Control approach, a key component of MachineStruxure™, which brings you maximum flexibility and ensures the most optimized control solution The Modicon LMC058 motion controller meets the needs of a wide range of applications in all business sectors. This motion controller is designed for machine manufacturers (OEMs) who require synchronized axes, focusing on applications such as packaging, conveying and storage machines, metal and wood working machines, etc. and offers highperformance solutions for velocity control, counting, axis control and communication functions. To this end, the LMC058 master motion controller includes as standard a CANopen™ master and a CANmotion master dedicated to control of up to 8 synchronized axes, with a performance of 2 ms for 4 axes. With the Modicon LMC058 motion controllers, Lexium 32 and Lexium SD3 drives, and BSH and BDH servo motors, Schneider Electric offers a complete, high performance and cost-effective solution.

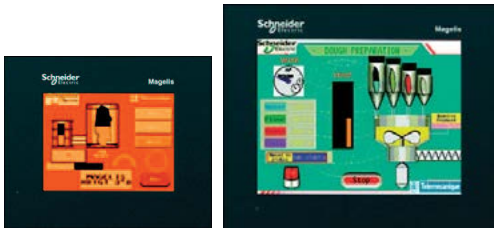
More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

Altivar™ IMC Integrated Controller Card for Altivar 61 and Altivar 71 Variable Speed Drives

The Altivar IMC integrated controller card forms a part of Flexible Machine Control approach, a key component of MachineStruxure, which brings you maximum flexibility and ensures the most optimized control solution. The Altivar IMC integrated controller card VW3 A3521S0 is a compact optimized solution developed for Altivar 61 and 71 variable speed drives. When equipped with the ATV IMC card, Altivar 61 and 71 drives become controllers capable of meeting the needs of machine manufacturers (OEMs) in applications such as textiles, hoisting, pumping or woodworking, etc. The Altivar IMC integrated controller card VW3 A3521S0 is configured and programmed using SoMachine software (see page 27-10). The expansion capability of the Altivar IMC card is based on Schneider Electric's “Flexible Machine Control” concept. The Altivar IMC card boosts the expansion capability of machines and allows us to meet the OEM market's requirements in terms of performance, simplicity of use and openness.

More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

Magelis™ XBT GC HMI Controller



The Magelis XBT GC HMI Controller offer forms a part of Flexible Machine Control approach, a key component of MachineStruxure, which brings you maximum flexibility and ensures the most optimized control solution. The Magelis HMI Controller offer brings together HMI and control functions within in a single product. This reduces the amount of equipment required and the associated costs throughout the life cycle of the machine. The XBT GC range is comprised of 6 touch screen terminals, with the following, depending on the model:

- 3.8” monochrome screen, 12 integrated inputs/6 integrated outputs (sink or source)
- 5.7” monochrome or color screen, 16 integrated inputs/16 integrated outputs (sink or source)
- A wide choice of communication interfaces: USB, serial link, CANopen and Ethernet

More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

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SoMachine™ Software Suite

SoMachine is the OEM solution software for developing, configuring and commissioning the entire machine in a single software environment, including logic, motion control, HMI and related network automation functions. SoMachine allows you to program and commission all the elements in Schneider Electric's Flexible and Scalable Control platform, the comprehensive solution-oriented offer for OEMs, which helps you achieve the most optimized control solution for each machine's requirements. Flexible and Scalable Control platforms include:

Controllers:

- HMI controllers: XBT GC, XBT GT/GK CANopen
- Logic controllers: Modicon M238, Modicon M258
- Motion Controller Modicon LMC 058
- Integrated Controller Card Altivar IMC
- TM2, TM5 and TM7 offers

HMI:

- HMI Magelis graphic panels: XBT GT, XBT GK

SoMachine is a professional, efficient, and open software solution integrating Vijeo™ Designer. It integrates also the configuring and commissioning tool for motion control devices. It features all six IEC 61131-3 languages, integrated field bus configurators, expert diagnostics and debugging, as well as outstanding capabilities for maintenance and visualization.

More information is available at **www.schneider-electric.com** or in catalog **MKTED211041EN-US**.

Twido™ Nano™

The Twido Nano PLC is a feature-rich ultra-compact controller designed especially for small control systems. Flexible, affordable, and adaptable, Twido makes it easy to build just the right control solution for your customer's application. Offering software with graphical development, the Twido Nano PLC makes it easy to create, configure, and manage applications. Communication options include CANopen, Ethernet TCP/IP, Modbus, and ASi. More information is available in catalog **DIA3ED2090202EN**.

Modicon™ Zelio™ Logic Controller

To meet the demand for applications that require more flexibility than a simple relay, timer or counter, but are too small or simple for the smallest Nano PLC, the new generation of Zelio Logic smart relays are now available. Designed to accept and control outputs just like a relay, Zelio Logic features dual language capability, using either Function Block Diagram (FBD) or Ladder Logic Programming (LL), and can easily be programmed by using either the front panel or by utilizing ZelioSoft software. This new generation of Zelio Logic smart relays provides customers with considerable gains from the design stage to the monitoring of their applications, due to its simplicity and flexibility.

More information is available at **www.schneider-electric.com** or in catalog **DIA3ED2051002EN-US**.

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Section 28

Universal Enclosures

Spacial Steel Enclosures
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Thalassa Polyester Enclosures
(p. 28-7)

ClimaSys Thermal Management System
(p. 28-8)

Product Summary

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New! Spacial Steel Enclosures

Floor-Standing and Wall-Mounting Options	28-4

New! Thalassa Polyester Enclosures

Floor-Standing and Wall-Mounting Options	28-7

New! ClimaSys Thermal Management System

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Cooling Units	28-8
Thermal Control	28-8

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New! Spacial™

Metal enclosures and boxes

From our small boxes to large modular floor-standing enclosures, with the Spacial range you can find the optimal fit for your applications. Our extensive range of easy-to-use accessories helps you save time during your projects.

Select between steel or stainless steel to better suit the installation environment. In our stainless-steel offer you can find the optimal solution where cleanliness or protection in highly corrosive environments are required.

Steel: Indoor non-clean industrial environment

The environment in industrial plants can subject electric and electronic components to dust, splashing oil, and impacts. Such environments require a range of enclosures that are suited to harsh conditions yet are easy to install.

- **Universal range**, for industry.
- **EMC (electromagnetic compatibility) range**, against electromagnetic disturbances (treated with Aluzinc).

304L - 316L stainless steel: Demanding industrial environment

Food and beverage, pharmaceutical, petrochemical, and infrastructure industries have particularly demanding hygiene and corrosion resistance requirements. Our Spacial range is available in two grades of stainless steel:

- **304L stainless steel**, for resistance to corrosion and ease of cleaning (often used in food production environments).
- **316L stainless steel, also known as "marine stainless steel,"** for very high resistance to corrosion (used in saline or chlorinated environments).
- **Range of ATEX enclosures**, for potentially explosive atmospheres.

New product family names:

Spacial S44 - S57 - S24: *Steel industrial boxes*

Spacial SDB: *Steel junction boxes IP55*

Spacial S3DC: *Steel wall-mounting enclosures*

Spacial SM: *Compact metal enclosures*

Spacial SF: *Modular metal enclosures*

Spacial S3X: *Stainless-steel wall-mounting enclosures*

Spacial SMX: *Stainless-steel monobloc floor-standing enclosures*

Spacial SFX: *Stainless-steel modular enclosures*

New! Thalassa™

Insulated enclosures and boxes

Without the right protection, harsh environments can expose your installation to chemicals or other substances.

Developed to help protect your equipment in outdoor applications or harsh conditions, our Thalassa offer ranges from boxes to floor-standing enclosures made from fiberglass reinforced polyester.

Our Thalassa industrial boxes in ABS or polycarbonate are strong, easy to install, and designed to be used in highly demanding environments.

Insulating polyester and plastic materials (ABS, polycarbonate): Outdoor infrastructures and severe industrial environments

Outdoor infrastructures and electrical installations are exposed to direct sunlight, rain, saline mist, extreme temperatures, oil splashes, chemical and corrosive agents, and are in contact with the public.

- **Universal range**, for industry.
- **Range of ATEX enclosures**, for potentially explosive atmospheres.

New product family names:

Thalassa TBS: *Insulating industrial boxes*

Thalassa TBP: *Insulating industrial boxes*

Thalassa PLS: *Insulating modular boxes IP65*

Thalassa PLM: *Polyester wall-mounting enclosures*

Thalassa PLA: *Polyester floor-standing enclosures*

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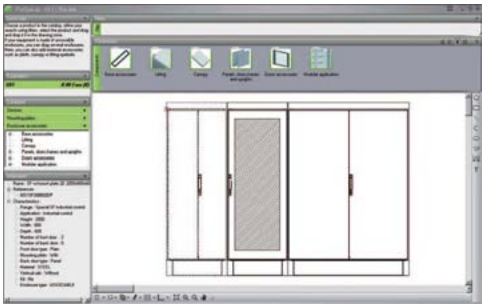
New! ClimaSys™

Thermal management

Preserving and keeping the right temperature inside your enclosure is vital for maximizing the average service life of your installed devices. With our ClimaSys offer you can find the right solution, be it ventilation, cooling or heating, including control units for temperature, humidity and much more.

New product family names:

ClimaSys CV: *Ventilation systems*
ClimaSys CU: *Cooling unit*
ClimaSys CR: *Insulated resistance heaters*
ClimaSys CC: *Thermal control*



New! Our software suite

Spacial.pro

Spacial.pro allows you to make switchboard proposals based on the standard Spacial™ offer. A full project with several sets of switchboards is quoted in minutes, with automatic creation of the bill of material and 2D drawings for front and side views.

ProClima

Calculate the right choice for your thermal management requirements, according to the environment and the electrical/electronic devices installed inside the enclosure.

Spacial.ref and Thalassa.ref

These digital rules assist you in selecting the appropriate components for your application from our extensive product range. The tool automates product and accessory selection to help save you time and money.

Table 28.1: NEMA and UL Enclosure and Component Ratings

Enclosures		Type of protection ♦												
		1	2	3	3R	3S	4	4X	5	6	6P	12	12K	13
Steel wall-mounting enclosures	S3DC	●	●	●▲	●▲		●▲	●▲				●■	●■	●■
	CRN	●	●▲	●▲	●▲		●▲		●▲			●		●
Stainless-steel wall-mounting enclosures	S3X	●	●▲	●▲	●▲		●▲	●▲	●▲			●	●■	●▲
Steel floor-standing enclosures	SM	●	●▲	●▲	●▲		●▲		●▲			●	●	●▲
Steel modular enclosures	SF	●										●	●	
Stainless-steel floor-standing enclosures	SMX	●	●▲	●▲	●▲		●▲	●▲	●▲			●	●	●▲
Stainless-steel modular enclosures	SFX	●										●	●	
Thermoplastic boxes	TBS - TBP	●		●		●	●	●						
Polyester modular boxes	PLS	●	●	●	●	●	●	●				●		●
Polyester wall-mounting enclosures	PLM	●	●	●	●	●	●	●				●		●
Polyester floor-standing enclosures	PLA	●	●	●▲	●▲		●▲	●▲	●▲			●		●

▲ 1 door
■ 2 doors

Components		Type of protection ♦												
		1	2	3	3R	3S	4	4X	5	6	6P	12	12K	13
Ventilation system	CV											●	●	
Thermal regulation system	CC											●	●	

♦ In some ranges the classification depends on the model and version. The detailed protection types are indicated in the UL certifications.

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Table 28.2: Spacial Steel Floor-Standing Enclosures

Height: mm (in)	Width: mm (in)	Depth: mm (in)	# Doors	NSYSM Welded	NSYSF Modular		Accessories, Floor-Standing Enclosures			
				Without mounting plate	Without mounting plate	2 Side panels	Mounting plate	Cable-gland plate, 1 entry	Plinth height 100 mm (3.9 in)	
									Front/back	Sides
1200 (47.2)	600 (23.6)	400 (15.7)	1	—	NSYSF12640	NSY2SP124	NSYMP126	NSYEC641	NSYSPF6100	NSYSPS4100
1200 (47.2)	600 (23.6)	600 (23.6)	1	—	NSYSF12660	NSY2SP126	NSYMP126	NSYEC661	NSYSPF6100	NSYSPS6100
1200 (47.2)	800 (31.5)	300 (11.8)	1	NSYSM12830	—	—	NSYMP128	—	NSYSPF8100	NSYSPS3100
1200 (47.2)	800 (31.5)	400 (15.7)	1	—	NSYSF12840	NSY2SP124	NSYMP128	NSYEC841	NSYSPF8100	NSYSPS4100
1200 (47.2)	800 (31.5)	600 (23.6)	1	—	NSYSF12860	NSY2SP126	NSYMP128	NSYEC861	NSYSPF8100	NSYSPS6100
1200 (47.2)	1000 (39.4)	300 (11.8)	2	NSYSM1210302D	—	—	NSYMP1210	—	NSYSPF10100	NSYSPS3100
1200 (47.2)	1200 (47.2)	400 (15.7)	2	NSYSM1212402D	—	—	NSYMP1212	—	NSYSPF12100	NSYSPS4100
1400 (55.1)	600 (23.6)	300 (11.8)	1	NSYSM14630	—	—	NSYMP146	—	NSYSPF6100	NSYSPS3100
1400 (55.1)	600 (23.6)	400 (15.7)	1	NSYSM14640	NSYSF14640	NSY2SP144	NSYMP146	NSYEC641	NSYSPF6100	NSYSPS4100
1400 (55.1)	800 (31.5)	300 (11.8)	1	NSYSM14830	—	—	NSYMP148	—	NSYSPF8100	NSYSPS3100
1400 (55.1)	800 (31.5)	400 (15.7)	1	NSYSM14840	NSYSF14840	NSY2SP144	NSYMP148	NSYEC841	NSYSPF8100	NSYSPS4100
1400 (55.1)	1000 (39.4)	400 (15.7)	2	NSYSM1410402D	—	—	NSYMP1410	—	NSYSPF10100	NSYSPS4100
1400 (55.1)	1200 (47.2)	400 (15.7)	2	NSYSM1412402D	—	—	NSYMP1412	—	NSYSPF12100	NSYSPS4100
1600 (63.0)	600 (23.6)	300 (11.8)	1	NSYSM16630	—	—	NSYMP166	—	NSYSPF6100	NSYSPS3100
1600 (63.0)	600 (23.6)	400 (15.7)	1	NSYSM16640	—	—	NSYMP166	—	NSYSPF6100	NSYSPS4100
1600 (63.0)	600 (23.6)	600 (23.6)	1	—	NSYSF16660	NSY2SP166	NSYMP166	NSYEC661	NSYSPF6100	NSYSPS6100
1600 (63.0)	600 (23.6)	800 (31.5)	1	—	NSYSF16680	NSY2SP168	NSYMP166	NSYEC681	NSYSPF6100	NSYSPS8100
1600 (63.0)	800 (31.5)	300 (11.8)	1	NSYSM16830	—	—	NSYMP168	—	NSYSPF8100	NSYSPS3100
1600 (63.0)	800 (31.5)	400 (15.7)	1	NSYSM16840	—	—	NSYMP168	—	NSYSPF8100	NSYSPS4100
1600 (63.0)	800 (31.5)	600 (23.6)	1	—	NSYSF16860	NSY2SP166	NSYMP168	NSYEC861	NSYSPF8100	NSYSPS6100
1600 (63.0)	800 (31.5)	800 (31.5)	1	—	NSYSF16880	NSY2SP168	NSYMP168	NSYEC881	NSYSPF8100	NSYSPS8100
1600 (63.0)	1000 (39.4)	300 (11.8)	2	NSYSM1610302D	—	—	NSYMP1610	—	NSYSPF10100	NSYSPS3100
1600 (63.0)	1000 (39.4)	400 (15.7)	2	NSYSM1610402D	—	—	NSYMP1610	—	NSYSPF10100	NSYSPS4100
1600 (63.0)	1200 (47.2)	300 (11.8)	2	NSYSM1612302D	—	—	NSYMP1612	—	NSYSPF12100	NSYSPS3100
1600 (63.0)	1200 (47.2)	400 (15.7)	2	NSYSM1612402D	—	—	NSYMP1612	—	NSYSPF12100	NSYSPS4100
1800 (70.9)	400 (15.7)	400 (15.7)	1	—	NSYSF18440	NSY2SP184	—	NSYEC441	NSYSPF4100	NSYSPS4100
1800 (70.9)	400 (15.7)	500 (19.7)	1	—	NSYSF18450	NSY2SP185	—	NSYEC451	NSYSPF4100	NSYSPS5100
1800 (70.9)	400 (15.7)	600 (23.6)	1	—	NSYSF18460	NSY2SP186	—	NSYEC461	NSYSPF4100	NSYSPS6100
1800 (70.9)	600 (23.6)	300 (11.8)	1	NSYSM18630	—	—	NSYMP186	—	NSYSPF6100	NSYSPS3100
1800 (70.9)	600 (23.6)	400 (15.7)	1	NSYSM18640	NSYSF18640	NSY2SP184	NSYMP186	NSYEC641	NSYSPF6100	NSYSPS4100
1800 (70.9)	600 (23.6)	500 (19.7)	1	NSYSM18650	NSYSF18650	NSY2SP185	NSYMP186	NSYEC651	NSYSPF6100	NSYSPS5100
1800 (70.9)	600 (23.6)	600 (23.6)	1	—	NSYSF18660	NSY2SP186	NSYMP186	NSYEC661	NSYSPF6100	NSYSPS6100
1800 (70.9)	600 (23.6)	800 (31.5)	1	—	—	NSY2SP188	NSYMP186	NSYEC681	NSYSPF6100	NSYSPS8100
1800 (70.9)	800 (31.5)	300 (11.8)	1	NSYSM18830	—	—	NSYMP188	—	NSYSPF8100	NSYSPS3100
1800 (70.9)	800 (31.5)	400 (15.7)	1	NSYSM18840	NSYSF18840	NSY2SP184	NSYMP188	NSYEC841	NSYSPF8100	NSYSPS4100
1800 (70.9)	800 (31.5)	500 (19.7)	1	NSYSM18850	NSYSF18850	NSY2SP185	NSYMP188	NSYEC851	NSYSPF8100	NSYSPS5100
1800 (70.9)	800 (31.5)	600 (23.6)	1	NSYSM18860	NSYSF18860	NSY2SP186	NSYMP188	NSYEC861	NSYSPF8100	NSYSPS6100
1800 (70.9)	800 (31.5)	600 (23.6)	2	—	NSYSF188602D	NSY2SP186	NSYMP188	NSYEC861	NSYSPF8100	NSYSPS6100
1800 (70.9)	1000 (39.4)	400 (15.7)	1	NSYSM181040	NSYSF181040	NSY2SP184	NSYMP1810	NSYEC1041	NSYSPF10100	NSYSPS4100
1800 (70.9)	1000 (39.4)	400 (15.7)	2	NSYSM1810402D	NSYSF1810402D	NSY2SP184	NSYMP1810	NSYEC1041	NSYSPF10100	NSYSPS4100
1800 (70.9)	1000 (39.4)	500 (19.7)	1	—	NSYSF181050	NSY2SP185	NSYMP1810	NSYEC1051	NSYSPF10100	NSYSPS5100
1800 (70.9)	1000 (39.4)	500 (19.7)	2	NSYSM1810502D	—	—	NSYMP1810	—	NSYSPF10100	NSYSPS5100
1800 (70.9)	1000 (39.4)	600 (23.6)	1	—	NSYSF181060	NSY2SP186	NSYMP1810	NSYEC1061	NSYSPF10100	NSYSPS6100
1800 (70.9)	1000 (39.4)	600 (23.6)	2	—	NSYSF1810602D	NSY2SP186	NSYMP1810	NSYEC1061	NSYSPF10100	NSYSPS6100
1800 (70.9)	1200 (47.2)	400 (15.7)	2	NSYSM1812402D	NSYSF1812402D	NSY2SP184	NSYMP1812	NSYEC1241	NSYSPF12100	NSYSPS4100
1800 (70.9)	1200 (47.2)	500 (19.7)	2	NSYSM1812502D	NSYSF1812502D	NSY2SP185	NSYMP1812	NSYEC1251	NSYSPF12100	NSYSPS5100
1800 (70.9)	1200 (47.2)	600 (23.6)	2	—	NSYSF1812602D	NSY2SP186	NSYMP1812	NSYEC1261	NSYSPF12100	NSYSPS6100
1800 (70.9)	1600 (63.0)	400 (15.7)	2	NSYSM1816402D	—	—	NSYMP1816	—	NSYSPF16100	NSYSPS4100
1800 (70.9)	1600 (63.0)	500 (19.7)	2	NSYSM1816502D	—	—	NSYMP1816	—	NSYSPF16100	NSYSPS5100
2000 (78.7)	300 (11.8)	500 (19.7)	1	—	NSYSF20350	NSY2SP205	—	NSYEC351	NSYSPF3100	NSYSPS5100
2000 (78.7)	300 (11.8)	600 (23.6)	1	—	NSYSF20360	NSY2SP206	—	NSYEC361	NSYSPF3100	NSYSPS6100
2000 (78.7)	400 (15.7)	400 (15.7)	1	—	NSYSF20440	NSY2SP204	—	NSYEC441	NSYSPF4100	NSYSPS4100
2000 (78.7)	400 (15.7)	500 (19.7)	1	—	NSYSF20450	NSY2SP205	—	NSYEC451	NSYSPF4100	NSYSPS5100
2000 (78.7)	400 (15.7)	600 (23.6)	1	—	NSYSF20460	NSY2SP206	—	NSYEC461	NSYSPF4100	NSYSPS6100
2000 (78.7)	400 (15.7)	800 (31.5)	1	—	NSYSF20480	NSY2SP208	—	NSYEC481	NSYSPF4100	NSYSPS8100
2000 (78.7)	600 (23.6)	300 (11.8)	1	NSYSM20630	—	—	NSYMP206	—	NSYSPF6100	NSYSPS3100
2000 (78.7)	600 (23.6)	400 (15.7)	1	NSYSM20640	NSYSF20640	NSY2SP204	NSYMP206	NSYEC641	NSYSPF6100	NSYSPS4100

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Table 28.2: Spacial Steel Floor-Standing Enclosures *(continued)*

Height: mm (in)	Width: mm (in)	Depth: mm (in)	# Doors	NSYSM Welded	NSYSF Modular		Accessories, Floor-Standing Enclosures			
				Without mounting plate	Without mounting plate	2 Side panels	Mounting plate	Cable-gland plate, 1 entry	Plinth height 100 mm (3.9 in)	
									Front/back	Sides
2000 (78.7)	600 (23.6)	500 (19.7)	1	NSYSM20650	NSYSF20650	NSY2SP205	NSYMP206	NSYEC651	NSYSPF6100	NSYSPS5100
2000 (78.7)	600 (23.6)	600 (23.6)	1	—	NSYSF20660	NSY2SP206	NSYMP206	NSYEC661	NSYSPF6100	NSYSPS6100
2000 (78.7)	600 (23.6)	800 (31.5)	1	—	NSYSF20680	NSY2SP208	NSYMP206	NSYEC681	NSYSPF6100	NSYSPS8100
2000 (78.7)	800 (31.5)	300 (11.8)	1	NSYSM20830	—	—	NSYMP208	—	NSYSPF8100	NSYSPS3100
2000 (78.7)	800 (31.5)	400 (15.7)	1	NSYSM20840	NSYSF20840	NSY2SP204	NSYMP208	NSYEC841	NSYSPF8100	NSYSPS4100
2000 (78.7)	800 (31.5)	500 (19.7)	1	NSYSM20850	NSYSF20850	NSY2SP205	NSYMP208	NSYEC851	NSYSPF8100	NSYSPS5100
2000 (78.7)	800 (31.5)	600 (23.6)	1	NSYSM20860	NSYSF20860	NSY2SP206	NSYMP208	NSYEC861	NSYSPF8100	NSYSPS6100
2000 (78.7)	800 (31.5)	600 (23.6)	2	—	NSYSF208602D	NSY2SP206	NSYMP208	NSYEC861	NSYSPF8100	NSYSPS6100
2000 (78.7)	800 (31.5)	800 (31.5)	1	—	NSYSF20880	NSY2SP208	NSYMP208	NSYEC881	NSYSPF8100	NSYSPS8100
2000 (78.7)	1000 (39.4)	400 (15.7)	1	—	NSYSF201040	NSY2SP204	NSYMP2010	NSYEC1041	NSYSPF10100	NSYSPS4100
2000 (78.7)	1000 (39.4)	400 (15.7)	2	NSYSM2010402D	NSYSF2010402D	NSY2SP204	NSYMP2010	NSYEC1041	NSYSPF10100	NSYSPS4100
2000 (78.7)	1000 (39.4)	500 (19.7)	1	—	NSYSF201050	NSY2SP205	NSYMP2010	NSYEC1051	NSYSPF10100	NSYSPS5100
2000 (78.7)	1000 (39.4)	500 (19.7)	2	NSYSM2010502D	NSYSF2010502D	NSY2SP205	NSYMP2010	NSYEC1051	NSYSPF10100	NSYSPS5100
2000 (78.7)	1000 (39.4)	600 (23.6)	1	—	NSYSF201060	NSY2SP206	NSYMP2010	NSYEC1061	NSYSPF10100	NSYSPS6100
2000 (78.7)	1000 (39.4)	600 (23.6)	2	—	NSYSF2010602D	NSY2SP206	NSYMP2010	NSYEC1061	NSYSPF10100	NSYSPS6100
2000 (78.7)	1000 (39.4)	800 (31.5)	1	—	NSYSF201080	NSY2SP208	NSYMP2010	NSYEC1081	NSYSPF10100	NSYSPS8100
2000 (78.7)	1200 (47.2)	400 (15.7)	2	NSYSM2012402D	NSYSF2012402D	NSY2SP204	NSYMP2012	NSYEC1241	NSYSPF12100	NSYSPS4100
2000 (78.7)	1200 (47.2)	500 (19.7)	2	NSYSM2012502D	NSYSF2012502D	NSY2SP205	NSYMP2012	NSYEC1251	NSYSPF12100	NSYSPS5100
2000 (78.7)	1200 (47.2)	600 (23.6)	2	NSYSM2012602D	NSYSF2012602D	NSY2SP206	NSYMP2012	NSYEC1261	NSYSPF12100	NSYSPS6100
2000 (78.7)	1200 (47.2)	800 (31.5)	2	—	NSYSF2012802D	NSY2SP208	NSYMP2012	NSYEC1281	NSYSPF12100	NSYSPS8100
2000 (78.7)	1600 (63.0)	400 (15.7)	2	NSYSM2016402D	NSYSF206402D	NSY2SP204	NSYMP2016	NSYEC1641	NSYSPF16100	NSYSPS4100
2000 (78.7)	1600 (63.0)	500 (19.7)	2	NSYSM2016502D	NSYSF2016502D	NSY2SP205	NSYMP2016	NSYEC1651	NSYSPF16100	NSYSPS5100
2000 (78.7)	1600 (63.0)	600 (23.6)	2	NSYSM2016602D	NSYSF2016602D	NSY2SP206	NSYMP2016	NSYEC1661	NSYSPF16100	NSYSPS6100
2200 (86.6)	400 (15.7)	600 (23.6)	1	—	NSYSF22460	NSY2SP226	—	NSYEC461	NSYSPF4100	NSYSPS6100
2200 (86.6)	600 (23.6)	600 (23.6)	1	—	NSYSF22660	NSY2SP226	NSYMP226	NSYEC661	NSYSPF6100	NSYSPS6100
2200 (86.6)	600 (23.6)	800 (31.5)	1	—	NSYSF22680	NSY2SP228	NSYMP226	NSYEC681	NSYSPF6100	NSYSPS8100
2200 (86.6)	800 (31.5)	600 (23.6)	1	—	NSYSF22860	NSY2SP226	NSYMP228	NSYEC861	NSYSPF8100	NSYSPS6100
2200 (86.6)	800 (31.5)	800 (31.5)	1	—	NSYSF22880	NSY2SP228	NSYMP228	NSYEC881	NSYSPF8100	NSYSPS8100
2200 (86.6)	1000 (39.4)	600 (23.6)	1	—	NSYSF221060	NSY2SP226	NSYMP2210	NSYEC1061	NSYSPF10100	NSYSPS6100
2200 (86.6)	1200 (47.2)	600 (23.6)	2	—	NSYSF2212602D	NSY2SP226	NSYMP2212	NSYEC1261	NSYSPF12100	NSYSPS6100
2200 (86.6)	1200 (47.2)	800 (31.5)	2	—	NSYSF2212802D	NSY2SP228	NSYMP2212	NSYEC1281	NSYSPF12100	NSYSPS8100

Table 28.3: Spacial Stainless Steel Floor-Standing Enclosures

Height: mm (in)	Width: mm (in)	Depth: mm (in)	# Doors	NSYSMX	NSYSFX Modular		Accessories, Stainless Steel		
				Without mounting plate	Without mounting plate	2 Side panels	Mounting plate	Plinth height 100 mm (3.9 in)	
								Front/back	Sides
1400 (55.1)	1000 (39.4)	300 (11.8)	2	NSYSMX141030	—	—	NSYMP1410	NSYSPXF10100H	NSYSPXS3100H
1600 (63.0)	800 (31.5)	400 (15.7)	1	NSYSMX16840	—	—	NSYMP168	NSYSPXF8100H	NSYSPXS4100H
1800 (70.9)	600 (23.6)	400 (15.7)	1	NSYSMX18640	NSYSFX18640	NSY2SPX184	NSYMP186	NSYSPXF6100H	NSYSPXS4100H
1800 (70.9)	800 (31.5)	400 (15.7)	1	NSYSMX18840	NSYSFX18840	NSY2SPX184	NSYMP188	NSYSPXF8100H	NSYSPXS4100H
1800 (70.9)	1200 (47.2)	400 (15.7)	2	NSYSMX181240	NSYSFX181240	NSY2SPX184	NSYMP1812	NSYSPXF12100H	NSYSPXS4100H
1800 (70.9)	1600 (63.0)	400 (15.7)	2	NSYSMX181640	—	—	NSYMP1813	NSYSPXF16100H	NSYSPXS4100H
2000 (78.7)	600 (23.6)	500 (19.7)	1	—	NSYSFX20650	NSY2SPX205	NSYMP206	—	—
2000 (78.7)	800 (31.5)	400 (15.7)	1	—	NSYSFX20840	NSY2SPX204	NSYMP208	—	—
2000 (78.7)	800 (31.5)	500 (19.7)	1	NSYSMX20850	—	—	NSYMP208	NSYSPXF8100H	NSYSPXS5100H
2000 (78.7)	800 (31.5)	600 (23.6)	1	—	NSYSFX20860	NSY2SPX206	NSYMP208	—	—
2000 (78.7)	1000 (39.4)	400 (15.7)	2	NSYSMX201040	—	—	NSYMP2010	NSYSPXF10100H	NSYSPXS4100H
2000 (78.7)	1000 (39.4)	600 (23.6)	2	—	NSYSFX201060	NSY2SPX206	NSYMP2010	—	
2000 (78.7)	1200 (47.2)	500 (19.7)	2	NSYSMX201250	—	—	NSYMP2012	NSYSPXF12100H	NSYSPXS5100H
2000 (78.7)	1200 (47.2)	600 (23.6)	2	—	NSYSFX201260	NSY2SPX206	NSYMP2012	—	—
2000 (78.7)	1600 (63.0)	600 (23.6)	2	NSYSMX201660	—	—	NSYMP2016	NSYSPXF16100H	NSYSPXS6100H

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CRN/CRNG

S3DC

S3X Stainless Steel

Mounting Plate

Table 28.4: Spacial Steel Wall-Mounting Enclosures

Height: mm (in)	Width: mm (in)	Depth: mm (in)	# Doors▲	Spacial Steel Wall-Mounting Enclosures			Mounting Plate
				CRN/CRNG	S3DC	S3X Stainless steel	
200 (7.9)	200 (7.9)	150 (5.9)	1	NSYCRN22150■	—	—	NSYMM22
200 (7.9)	300 (11.8)	150 (5.9)	1	NSYCRN23150■	—	—	NSYMM32
250 (9.8)	200 (7.9)	150 (5.9)	1	NSYCRN252150	—	—	NSYMM2520
300 (11.8)	200 (7.9)	150 (5.9)	1	—	NSYS3DC3215	NSYS3X3215	NSYMM32
300 (11.8)	250 (9.8)	150 (5.9)	1	NSYCRN325150	—	NSYS3X302515	NSYMM3025
300 (11.8)	250 (9.8)	200 (7.9)	1	NSYCRN325200	—	—	NSYMM3025
300 (11.8)	300 (11.8)	150 (5.9)	1	NSYCRN33150	NSYS3DC3315	NSYS3X3315	NSYMM33
300 (11.8)	300 (11.8)	200 (7.9)	1	NSYCRN33200	NSYS3DC3320	—	NSYMM33
300 (11.8)	400 (15.7)	200 (7.9)	1	NSYCRN34200	—	—	NSYMM43
300 (11.8)	450 (17.7)	150 (5.9)	1	NSYCRN345150■	—	—	NSYMM3045
400 (15.7)	300 (11.8)	150 (5.9)	1	NSYCRN43150	NSYS3DC4315	NSYS3X4315	NSYMM43
400 (15.7)	300 (11.8)	200 (7.9)	1	NSYCRN43200	NSYS3DC4320	NSYS3X4320	NSYMM43
400 (15.7)	400 (15.7)	200 (7.9)	1	NSYCRN44200	NSYS3DC4420	NSYS3X4420	NSYMM44
400 (15.7)	600 (23.6)	200 (7.9)		—	—	NSYS3X4620	NSYMM46
400 (15.7)	600 (23.6)	250 (9.8)	1	NSYCRN46250	—	—	NSYMM64
400 (15.7)	600 (23.6)	300 (11.8)	1	NSYCRN46300	—	—	NSYMM64
500 (19.7)	400 (15.7)	150 (5.9)	1	NSYCRN54150	—	—	NSYMM54
500 (19.7)	400 (15.7)	200 (7.9)	1	NSYCRN54200	NSYS3DC5420	NSYS3X5420	NSYMM54
500 (19.7)	400 (15.7)	250 (9.8)	1	NSYCRN54250	NSYS3DC5425	—	NSYMM54
500 (19.7)	500 (19.7)	200 (7.9)	1	—	NSYS3DC5520	—	NSYMM55
500 (19.7)	500 (19.7)	250 (9.8)	1	NSYCRN55250	NSYS3DC5525	—	NSYMM55
600 (23.6)	400 (15.7)	150 (5.9)	1	NSYCRN64150	—	—	NSYMM64
600 (23.6)	400 (15.7)	200 (7.9)	1	NSYCRN64200	NSYS3DC6420	NSYS3X6420	NSYMM64
600 (23.6)	400 (15.7)	250 (9.8)	1	NSYCRN64250	NSYS3DC6425	—	NSYMM64
600 (23.6)	500 (19.7)	150 (5.9)	1	NSYCRN65150	—	—	NSYMM65
600 (23.6)	500 (19.7)	200 (7.9)	1	NSYCRN65200	—	—	NSYMM65
600 (23.6)	500 (19.7)	250 (9.8)	1	NSYCRN65250	—	—	NSYMM65
600 (23.6)	600 (23.6)	200 (7.9)	1	NSYCRN66200	NSYS3DC6620	—	NSYMM66
600 (23.6)	600 (23.6)	250 (9.8)	1	NSYCRN66250	NSYS3DC6625	NSYS3X6625	NSYMM66
600 (23.6)	600 (23.6)	300 (11.8)	1	NSYCRN66300	NSYS3DC6630	—	NSYMM66
600 (23.6)	800 (31.5)	300 (11.8)	1	NSYCRN68300	—	—	NSYMM86
700 (27.6)	500 (19.7)	200 (7.9)	1	NSYCRN75200	—	—	NSYMM75
700 (27.6)	500 (19.7)	250 (9.8)	1	NSYCRN75250	NSYS3DC7525	NSYS3X7525	NSYMM75
800 (31.5)	600 (23.6)	200 (7.9)	1	NSYCRN86200	NSYS3DC8620	—	NSYMM86
800 (31.5)	600 (23.6)	250 (9.8)	1	NSYCRN86250	NSYS3DC8625	NSYS3X8625	NSYMM86
800 (31.5)	600 (23.6)	300 (11.8)	1	NSYCRN86300	NSYS3DC8630	—	NSYMM86
800 (31.5)	600 (23.6)	400 (15.7)	1	NSYCRNG86400	NSYS3DC8640	—	NSYMM86
800 (31.5)	800 (31.5)	200 (7.9)	1	NSYCRN88200	—	—	NSYMM88
800 (31.5)	800 (31.5)	250 (9.8)	1	—	NSYS3DC8825	—	NSYMM88
800 (31.5)	800 (31.5)	300 (11.8)	1	NSYCRN88300	NSYS3DC8830	NSYS3X8830	NSYMM86
800 (31.5)	1000 (39.4)	300 (11.8)	2	NSYCRNG810300D	—	—	NSYMM108
800 (31.5)	1200 (47.2)	300 (11.8)	2	NSYCRNG812300D	—	—	NSYMM128
1000 (39.4)	600 (23.6)	250 (9.8)	1	NSYCRN106250	NSYS3DC10625	—	NSYMM106
1000 (39.4)	600 (23.6)	300 (11.8)	1	NSYCRN106300	—	—	NSYMM106
1000 (39.4)	600 (23.6)	400 (15.7)	1	NSYCRNG106400	—	—	NSYMM106
1000 (39.4)	800 (31.5)	250 (9.8)	1	NSYCRN108250	NSYS3DC10825	—	NSYMM108
1000 (39.4)	800 (31.5)	300 (11.8)	1	NSYCRN108300	NSYS3DC10830	NSYS3X10830	NSYMM108
1000 (39.4)	800 (31.5)	400 (15.7)	1	NSYCRNG108400	NSYS3DC10840	—	NSYMM108
1000 (39.4)	1000 (39.4)	300 (11.8)	2	NSYCRNG1010300D	NSYS3DC101030	NSYS3X101030	NSYMM1010
1000 (39.4)	1200 (47.2)	300 (11.8)	2	NSYCRNG1012300D	—	—	NSYMM1210
1000 (39.4)	1200 (47.2)	400 (15.7)	2	NSYCRNG1012400D	—	—	NSYMM1210
1200 (47.2)	600 (23.6)	300 (11.8)	1	NSYCRNG126300	—	—	NSYMM126
1200 (47.2)	600 (23.6)	400 (15.7)	1	NSYCRNG126400	—	—	NSYMM126
1200 (47.2)	800 (31.5)	300 (11.8)	1	NSYCRNG128300	NSYS3DC12830	NSYS3X12830	NSYMM128
1200 (47.2)	800 (31.5)	400 (15.7)	1	NSYCRNG128400	NSYS3DC12840	—	NSYMM128
1200 (47.2)	1000 (39.4)	300 (11.8)	2	NSYCRNG1210300D	NSYS3DC121030	NSYS3X121030	NSYMM1210
1200 (47.2)	1000 (39.4)	400 (15.7)	2	NSYCRNG1210400D	—	—	NSYMM1210
1200 (47.2)	1200 (47.2)	300 (11.8)	2	NSYCRNG1212300D	—	—	NSYMM1212
1200 (47.2)	1200 (47.2)	400 (15.7)	2	NSYCRNG1212400D	—	—	NSYMM1212
1400 (55.1)	1000 (39.4)	300 (11.8)	2	NSYCRNG1410300D	—	—	NSYMM1410

▲ IP66 with one door, IP55 with two doors.
■ Two cable gland plates, one on top and one on bottom.

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ABS/PC Wall-Mounting Enclosure IP66—Plain Door

Table 28.5: Thalassa Polyester Wall-Mounting Enclosures

Height: mm (in)	Width: mm (in)	Depth: mm (in)	ABS/PC Wall-Mounting Enclosures IP66		Polyester Wall-Mounting Enclosures IP66				Polyester Wall-Mounting ATEX Enclosures	Mounting Plate
			Plain door	Transparent door	Plain door	Transparent door	Plain door 3-point closure	Transparent door 3-point closure		
310 (12.2)	215 (8.5)	160 (6.3)	NSYPLM32	NSYPLM32T	—	—	—	—	—	NSYMM32
308 (12.1)	255 (10 0)	160 (6.3)	—	—	NSYPLM3025	NSYPLM3025T	—	—	NSYPLMEX3025	NSYMM3025
430 (16.9)	330 (13.0)	200 (7.9)	—	—	NSYPLM43	NSYPLM43T	NSYPLM43V	NSYPLM43TV	NSYPLMEX43	NSYMM43
530 (20 9)	430 (16.9)	200 (7.9)	—	—	NSYPLM54	NSYPLM54T	NSYPLM54V	NSYPLM54TV	NSYPLMEX54	NSYMM54
647 (25.5)	436 (17.2)	250 (9.8)	—	—	NSYPLM64	NSYPLM64T	NSYPLM64V	NSYPLM64TV	NSYPLMEX64	NSYMM64
747 (29.4)	536 (21.1)	300 (11.8)	—	—	NSYPLM75	NSYPLM75T	NSYPLM75V	NSYPLM75TV	NSYPLMEX75	NSYMM75
847 (33.3)	636 (25.0)	300 (11.8)	—	—	NSYPLM86	NSYPLM86T	NSYPLM86V	NSYPLM86TV	NSYPLMEX86	NSYMM86
1056 (41.6)	852 (33.5)	350 (13.8)	—	—	NSYPLM108	NSYPLM108T	—	—	NSYPLMEX108	NSYMM108

Sealed Enclosure IP65—Plain Door

Sealed Enclosure IP65—Transparent Door

Enclosure with Open Bottom IP54—Plain Door

Table 28.6: Thalassa Polyester Floor-Standing Enclosures

Height: mm (in)	Width: mm (in)	Depth: mm (in)	# Doors	Sealed Enclosure, IP65		Enclosures with Open Bottom, IP54
				Plain door	Transparent door	Plain door
500 (19.7)	500 (19.7)	320 (12.6)	1	NSYPLA553	NSYPLA553T	NSYPLAZ553
500 (19.7)	500 (19.7)	420 (16.5)	1	NSYPLA554	NSYPLA554T	NSYPLAZ554
500 (19.7)	750 (29.5)	320 (12.6)	1	NSYPLA573	NSYPLA573T	NSYPLAZ573
500 (19.7)	750 (29.5)	420 (16.5)	1	NSYPLA574	NSYPLA574T	NSYPLAZ574
500 (19.7)	1000 (39.4)	320 (12.6)	2	NSYPLA5103	NSYPLA5103T	NSYPLAZ5103
500 (19.7)	1000 (39.4)	420 (16.5)	2	NSYPLA5104	NSYPLA5104T	NSYPLAZ5104
500 (19.7)	1250 (49.2)	320 (12.6)	2	NSYPLA5123	NSYPLA5123T	NSYPLAZ5123
500 (19.7)	1250 (49.2)	420 (16.5)	2	NSYPLA5124	NSYPLA5124T	NSYPLAZ5124
750 (29.5)	500 (19.7)	320 (12.6)	1	NSYPLA753	NSYPLA753T	NSYPLAZ753
750 (29.5)	500 (19.7)	420 (16.5)	1	NSYPLA754	NSYPLA754T	NSYPLAZ754
750 (29.5)	750 (29.5)	320 (12.6)	1	NSYPLA773	NSYPLA773T	NSYPLAZ773
750 (29.5)	750 (29.5)	420 (16.5)	1	NSYPLA774	NSYPLA774T	NSYPLAZ774
750 (29.5)	1000 (39.4)	320 (12.6)	2	NSYPLA7103	NSYPLA7103T	NSYPLAZ7103
750 (29.5)	1000 (39.4)	420 (16.5)	2	NSYPLA7104	NSYPLA7104T	NSYPLAZ7104
750 (29.5)	1250 (49.2)	320 (12.6)	2	NSYPLA7123	NSYPLA7123T	NSYPLAZ7123
750 (29.5)	1250 (49.2)	420 (16.5)	2	NSYPLA7124	NSYPLA7124T	NSYPLAZ7124
1000 (39.4)	500 (19.7)	320 (12.6)	1	NSYPLA1053	NSYPLA1053T	NSYPLAZ1053
1000 (39.4)	500 (19.7)	420 (16.5)	1	NSYPLA1054	NSYPLA1054T	NSYPLAZ1054
1000 (39.4)	750 (29.5)	320 (12.6)	1	NSYPLA1073	NSYPLA1073T	NSYPLAZ1073
1000 (39.4)	750 (29.5)	420 (16.5)	1	NSYPLA1074	NSYPLA1074T	NSYPLAZ1074
1000 (39.4)	1000 (39.4)	320 (12.6)	2	NSYPLA10103	NSYPLA10103T	NSYPLAZ10103
1000 (39.4)	1000 (39.4)	420 (16.5)	2	NSYPLA10104	NSYPLA10104T	NSYPLAZ10104
1000 (39.4)	1250 (49.2)	320 (12.6)	2	NSYPLA10123	NSYPLA10123T	NSYPLAZ10123
1000 (39.4)	1250 (49.2)	420 (16.5)	2	NSYPLA10124	NSYPLA10124T	NSYPLAZ10124
1250 (49.2)	500 (19.7)	320 (12.6)	1	NSYPLA1253	NSYPLA1253T	NSYPLAZ1253
1250 (49.2)	500 (19.7)	420 (16.5)	1	NSYPLA1254	NSYPLA1254T	NSYPLAZ1254
1250 (49.2)	750 (29.5)	320 (12.6)	1	NSYPLA1273	NSYPLA1273T	NSYPLAZ1273
1250 (49.2)	750 (29.5)	420 (16.5)	1	NSYPLA1274	NSYPLA1274T	NSYPLAZ1274
1250 (49.2)	1000 (39.4)	320 (12.6)	2	NSYPLA12103	NSYPLA12103T	NSYPLAZ12103
1250 (49.2)	1000 (39.4)	420 (16.5)	2	NSYPLA12104	NSYPLA12104T	NSYPLAZ12104
1250 (49.2)	1250 (49.2)	320 (12.6)	2	NSYPLA12123	NSYPLA12123T	NSYPLAZ12123
1250 (49.2)	1250 (49.2)	420 (16.5)	2	NSYPLA12124	NSYPLA12124T	NSYPLAZ12124
1500 (59.1)	500 (19.7)	320 (12.6)	1	NSYPLA1553	NSYPLA1553T	NSYPLAZ1553
1500 (59.1)	500 (19.7)	420 (16.5)	1	NSYPLA1554	NSYPLA1554T	NSYPLAZ1554
1500 (59.1)	750 (29.5)	320 (12.6)	1	NSYPLA1573	NSYPLA1573T	NSYPLAZ1573
1500 (59.1)	750 (29.5)	420 (16.5)	1	NSYPLA1574	NSYPLA1574T	NSYPLAZ1574
1500 (59.1)	1000 (39.4)	320 (12.6)	2	NSYPLA15103	NSYPLA15103T	NSYPLAZ15103
1500 (59.1)	1000 (39.4)	420 (16.5)	2	NSYPLA15104	NSYPLA15104T	NSYPLAZ15104
1500 (59.1)	1250 (49.2)	320 (12.6)	2	NSYPLA15123	NSYPLA15123T	NSYPLAZ15123
1500 (59.1)	1250 (49.2)	420 (16.5)	2	NSYPLA15124	NSYPLA15124T	NSYPLAZ15124

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New! Ventilation systems with filters

Specially recommended for installations in which the ambient temperature is lower than the desired temperature inside the enclosure, a high protection rating is required: IP54 or IP55, and the surrounding environment is relatively clean, allowing air to enter the enclosure.

- 38 to 850 m^3/h.
- 5 input voltages: AC: 400/440 V, 230 V, 115 V (50/60 Hz), DC: 48 V and 24 V.
- Broad range of accessories (filters, IP55 and EMC covers, anti-vandalism kit).

New! Cooling units

Cooling units control the temperature inside the enclosure to help ensure the correct operation of the components, regardless of the outside temperature, by separating the internal and external air circuits and reducing the humidity of the enclosure.

- Cooling power from 1100 W to 2700 W.
- According to the input voltage: 230 V (50/60 Hz); 3 X 400/440 V (50/60 Hz); 115 V (50/60 Hz).
- RAL 7035 gray and stainless steel.
- A minimum height of 1800 mm (70.9 in) and door width of 800 mm (31.5 in) or side panel width of 600 mm (23.6 in) is required to install a SLIM cooling unit in a Spacial enclosure.

New! Thermal control

Thermostats control the temperature inside the enclosure and send a signal when maximum or minimum temperature values have been reached.

- Temperature control: adjustable thermostats; single or double.
- Relative humidity control: adjustable humidistat.
- Temperature and relative humidity control: adjustable hygrotherm.

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Section 29
Advanced Products

EVlink™ Electric Vehicle Charging Stations

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Outdoor Wall-Mount (p. 29-2)

Outdoor Pedestal (Dual Unit) (p. 29-2)

Wiser™ Energy Efficiency Solutions

Thermostats (p. 29-6)

Ethernet Gateway (p. 29-8)

Load Control (p. 29-7)

Load Control Relays (p. 29-7)

In-Home Display (p. 29-6)

Residential Solar Power Solutions

Conext™ Grid Tie Inverter (p. 29-9)

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EVlink™ Electric Vehicle Charging Stations

Our Electric Vehicle Supply Equipment (EVSE) provides power to recharge the on-board vehicle batteries in Electric Vehicles (EV) and Plug-in Hybrid Electric Vehicles (PHEV). The EVSE units are Level 2 type which can charge the vehicle batteries in as little as 3-6 hours, depending on the vehicle type and level of battery charge. The EVSE will typically be fed from a 208 V or 240 V source, two-pole 40 A circuit breaker or disconnect and will be able to provide 30 A of current to the vehicle's on-board charger. All units meet or exceed SAE J1772▲ and UL standards for electric vehicle supply equipment.

Schneider Electric EVSE features include:

- Integral Ground Fault Protection at 5 mA
- User friendly interface to indicate power on/off, charging, system detected faults etc.
- Heavy duty cord and connector which meet SAE J1772 standards
- Automatic reset and restart after ground fault or main power loss
- Radio Frequency Identification (RFID) authentication available for outdoor units■
- Available in indoor/outdoor, wall and pedestal mount, single and dual charger models
- Optional advanced metering functionality available to collect and monitor energy and demand profile data♦

EV2430WS

EV230WSR

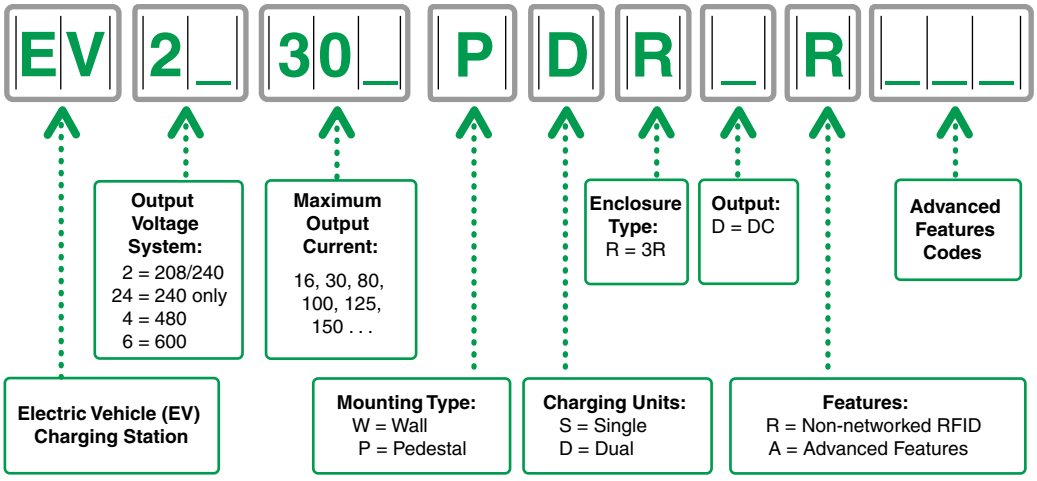
EV230PSRR

EV230PDRR

Coming in 2012:

- Charging Station with advanced communications and networking
- DC fast charging station which can charge 80% of EV in less than 30 minutes

Please stay tuned at www.schneider-electric.us/go/evlink



▲ SAE J1772—standard for Electric Vehicles that defines common connectors and interfaces at various power levels for PHEV and EV established by Society of Automotive Engineers for North America.

■ RFID—localized RFID in which the programming for the addition or removal of subscribers is done at the EVSE location.

♦ Energy monitoring and metering options are available and can be added to provide networking and communication through an optional power meter enclosure. Please consult your local Schneider Electric sales representative for selection information or call 1-888-778-2733.

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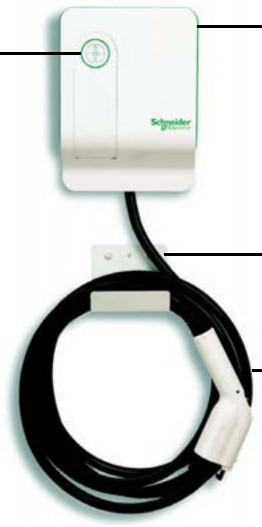
Indoor Charging Stations (Residential Applications)

Interface:

- Segmented charge and delay charge progress indicator
- Stop Button and indicator
- Power status and system detected fault indicator
- Delay button and indicator

Protection:

- Integral Ground Fault Protection at 5 mA
- Ground fault function tested before each charge cycle begins
- Auto restart after ground fault or main power loss



Enclosure:

- Non-metallic
- Indoor wall-mount (stud, drywall, or masonry wall)

Cable Holder:

- Supports and helps organize the cable
- Mounted independently from the enclosure

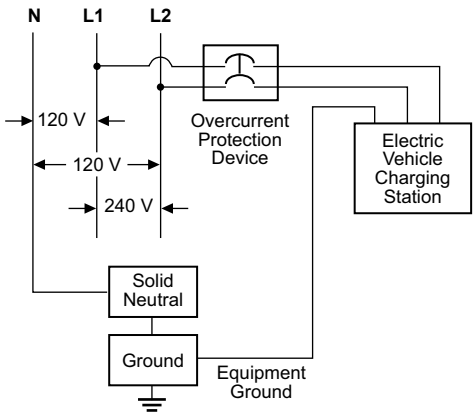
Connector and Cord:

- Complies with SAE J1772
- Cable length: 18 ft. (5.5 m)

Table 29.1: Indoor Charging Station—Wall-mounted

Output Voltage System	Output Current	Mounting	Enclosure Type	Number of Charging Units	Catalog Number	$ Price
240 Vac only	30 A	Wall	1	1	EV2430WS	**1200.00**

120/240 Vac Only



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Outdoor Charging Stations

Protection:
- Integral Ground Fault Protection at 5 mA
- Ground fault function tested before each charge cycle begins
- Auto restart after ground fault or main power loss

Authentication:
- Localized RFID solution (optional)

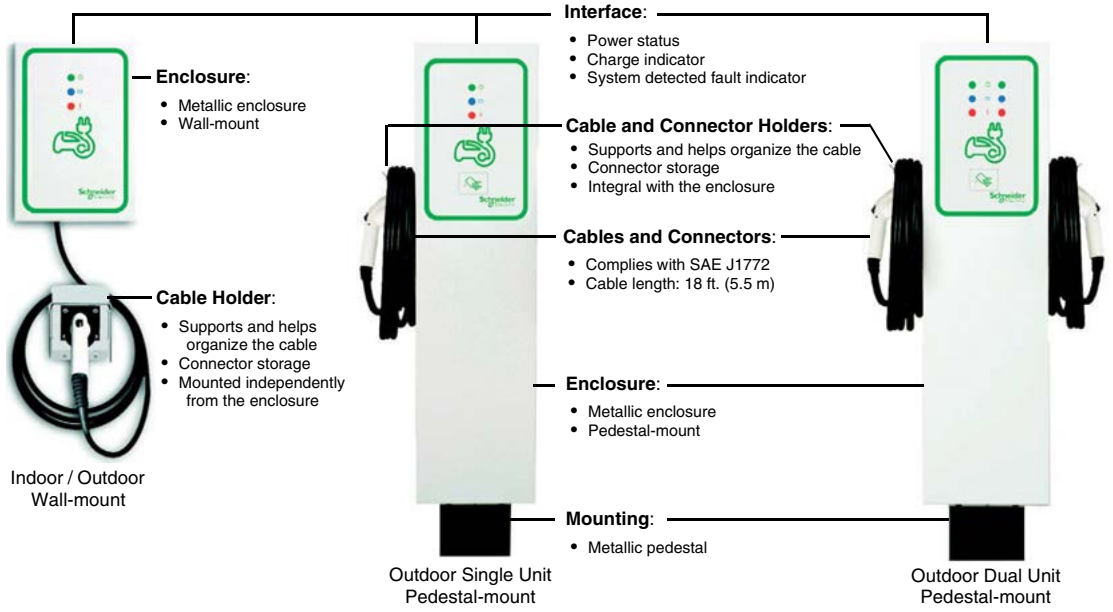

Table 29.2: Outdoor Charging Stations

Output Voltage System	Application	Output Current	Mounting	Enclosure Type	Number of Charging Units	Catalog Number	$ Price
208–240 Vac	Indoor/Outdoor	30 A	Wall	3R	Single	EV230WSR	**1800.00**
208–240 Vac	Outdoor	30 A	Pedestal	3R	Single	EV230PSR	**2400.00**
208–240 Vac	Outdoor	30 A	Pedestal	3R	Dual▲	EV230PDR	**4000.00**

▲ Output current per charge unit

Table 29.3: Outdoor Charging Stations with RFID Access

Output Voltage System	Application	Output Current	Mounting	Enclosure Type	Number of Charging Units	Catalog Number	$ Price
208–240 Vac	Indoor/Outdoor	30 A	Wall	3R	Single	EV230WSRR	**2400.00**
208–240 Vac	Outdoor	30 A	Pedestal	3R	Single	EV230PSRR	**3000.00**
208–240 Vac	Outdoor	30 A	Pedestal	3R	Dual■	EV230PDRR	**4600.00**

■ Output current per charge unit

Table 29.4: RFID Accessories♦

Description	Catalog Number	$ Price
RFID Handheld Programmer	EVRFIDHP	**240.00**
RFID Authentication Cards (Quantity of 10)	EVRFIDKF10	**110.00**

♦ Required for charging stations with RFID Access

EVRFIDHP

EVRFIDKF10

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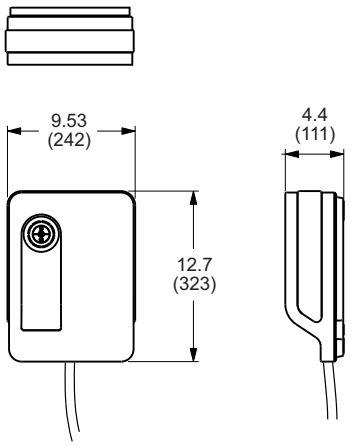
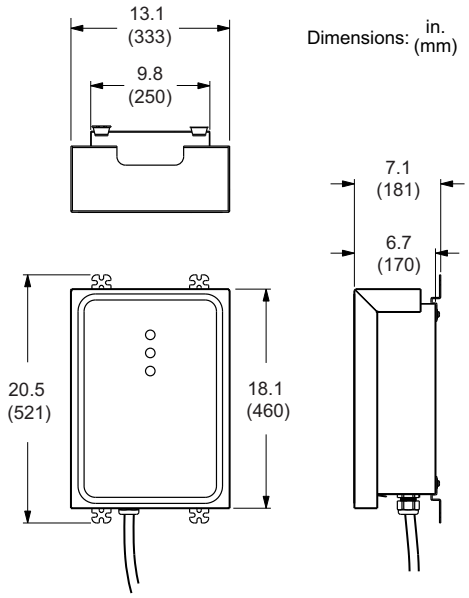
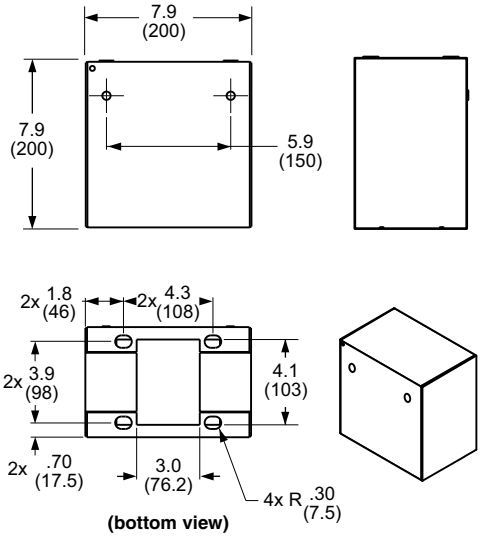
Dimensions



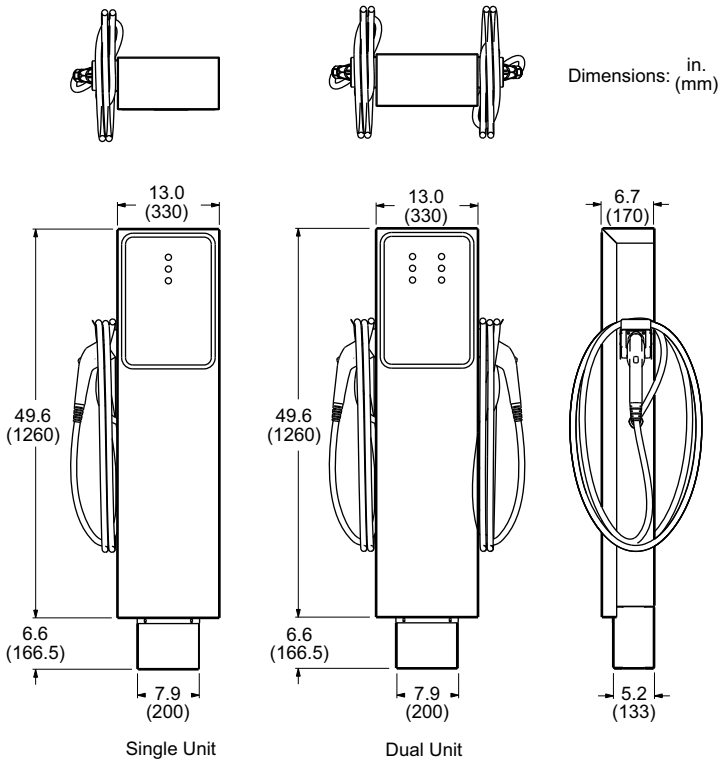
Indoor Wall-mount



Indoor/Outdoor Wall-mount



Pedestal Base



Pedestal Mounted Charging Stations

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Energy Efficiency Solutions Overview

Our Wiser Energy Efficiency products can give you information about your home's energy consumption and provide ways to conveniently automate energy use. Information displays can be conveniently located and easily integrated with Smart Grid energy programs. In addition, these devices provide useful information displays such as time and temperature.

HVAC thermostats, an in-home display, and load controls are designed to integrate into a seamless energy control system, allowing you to easily **Make the Most of Your Energy**SM.

Schneider Electric Energy Efficiency Products:

- Use industry standard radio interfaces. Products are certified to the ZigBee® Smart Energy protocol
- Provide easy to use, conveniently located controls
- Signal energy with vivid color display screens
- Are designed to be integrated into Smart Grid energy efficiency programs
- Are certified to UL916, and UL489 (as applicable)
- Incorporate convenience features, such as remote thermostat control, time-of-day display, remote load control, and load scheduling
- Load controls are available in outdoor configurations

Color Based Energy Signaling

EER20100

Wiser In-Home Display (IHD)

- Internal rechargable battery for power outages and convenience
- Integrates with remote measurement devices, and graphically displays energy use and signals based on demand
- Schedules Wiser components, such as load controls, load relays, and smart plugs
- Controls Wiser thermostats from remote locations
- Automatically sets time from the network
- Displays time
- Displays outdoor temperature (optional components required)

Table 29.5: Wiser In-Home Display (IHD)

Model	Industry Specifications	Power	$ Price
EER20100	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205 • ZigBee® Smart Energy	100–240 Vac 50–60 Hz	**550.00**

EER56000
EER56100

Wiser Programmable Communicating Thermostats (PCT)

- Offers four programmable temperature changes per day for up to seven days
- Supports demand response through ZigBee® Smart Energy Profile
- Integrates with remote measurement devices, and graphically displays energy use and signals based on demand
- Schedules Wiser components, such as load controls, load relays, and smart plugs
- Automatically sets time from the network
- Displays outdoor temperature (optional components required)
- No batteries required, operates in four wire installations

Table 29.6: Wiser Programmable Communicating Thermostats (PCT)

Model	Industry Specifications	Power	$ Price
EER56000	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205-M1983 • ZigBee® Smart Energy • Single stage conventional heat/cool • Heat pump (two stage heat / single stage cool) • Dual fuel heat pump (two stage heat / single stage cool)	100–240 Vac 50–60 Hz	**550.00**
EER56100	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205-M1983 • ZigBee® Smart Energy • Single stage conventional heat/cool • Two stage conventional (two stage heat / two stage cool) • Heat pump and geothermal heat pump (two stage heat / single stage cool) • Two-speed heat pump and two-speed geothermal heat pump (three stage heat / two stage cool) • Dual fuel heat pump and geothermal dual fuel heat pump • Humidifier and dehumidifier control	100–240 Vac 50–60 Hz	**720.00**

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EER40200

Wiser Smart Plug

- Supports demand response through ZigBee® Smart Energy Profile
- Plugs into 120 V electrical outlets
- Measures power used by electrical outlet loads
- Provides scheduling and remote control when used with the EER20100 Wiser In-Home Display or the EER56000/EER56100 Wiser Programmable Communicating Thermostats

Table 29.7: Wiser Smart Plug

Model	Industry Specifications	Power	$ Price
EER40200	• UL Standard 508 and UL 244A • Canadian Standard CAN/CSA C22.2, No. 14-05 • ZigBee® Smart Energy	100–240 Vac 50–60 Hz	**340.00**

EER42200
EER42300

Wiser Load Control Relays

- Supports demand response through ZigBee® Smart Energy Profile
- Low voltage 120 and 240 V relays
- Measures power used by electrical outlet loads
- Provides scheduling and remote control when used with the EER20100 Wiser In-Home Display or the EER56000/EER56100 Wiser Programmable Communicating Thermostats
- EER42300 provides isolated contact outputs

Table 29.8: Wiser Load Control Relays

Model	Industry Specifications	Power	$ Price
EER42200	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205-M1983 • ZigBee® Smart Energy • Supply voltage: 100–250 Vac, 50/60 Hz	30 A, 240 Vac 30 A, 28 Vdc 2 hp, 240 Vac 1 hp, 120 Vac	**405.00**
EER42300	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205-M1983 • ZigBee® Smart Energy • Supply voltage: 100–250 Vac, 50/60 Hz	5 A, 240 Vac 5 A, 28 Vdc 240 VA, 240 Vac	**375.00**

EER260LLCR

Wiser Large Load Control

- Supports demand response through ZigBee® Smart Energy Profile
- Used with Square D™ QOPL-ILC circuit breaker devices, ordered separately
- Measures branch circuit loading (current transformer required, ordered separately)
- Provides remote control when used with the EER20100 In-Home Display or the EER56000/EER56100 Wiser Programmable Communicating Thermostats
- Provides remote disconnect switch functions

Table 29.9: Wiser Large Load Control

Model	Industry Specifications	Load Contacts	$ Price
EER260LLCR	• UL489 • ZigBee® Smart Energy • 120 / 240 Vac, 1P/2P, 50/60 Hz	QOPL-ILC circuit breaker (see Table 29.10)	**405.00**
EER260LLCCT1	• 1P 60 A current transformer	—	**50.00**
EER260LLCCT2	• 2P 60 A current transformer	—	**100.00**

EER260LLCCT1
EER260LLCCT2

Table 29.10: QOPL-ILC Circuit Breakers

Catalog Number	Rating (A)	No. of Poles	AIC Rating (kA)
QO115PLILC	15	1	10
QO120PLILC	20	1	10
QO230PLILC	30	2	10
QO240PLILC	40	2	10
QO250PLILC	50	2	10
QO260PLILC	60	2	10

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EER21100
EER21200

Wiser Ethernet Gateway

- Allows for software monitoring, programming, and control of Wiser Energy Efficiency products via the internet
- Used with the Wiser Head End Server system

Table 29.11: Wiser Ethernet Gateway

Model	Industry Specifications	$ Price
EER21100	• ZigBee® Router type device • UL power adapter • ZigBee® Smart Energy • Supply voltage: 100–240 Vac, 50/60 Hz	**395.00**
EER21200	• ZigBee® Coordinator type device • UL power adapter • ZigBee® Smart Energy • Supply voltage: 100–240 Vac, 50/60 Hz	**395.00**

EER57000

EER57100

EER57200

Wiser Accessories

- Trim ring can be used to conceal mounting imperfections, such as holes and paint lines from previous installations
- External temperature sensor provides temperature measurements when used with Wiser thermostats
- Auxiliary power supply permits Wiser thermostats to be used in specialized four wire installations

Table 29.12: Wiser Accessories

Model	Name	Industry Specifications	$ Price
EER57000	Trim Ring	—	**50.00**
EER57100	Auxiliary Power Supply	• UL Standard 916 • Canadian Standard CAN/CSA C22.2, No. 205-M1983	**75.00**
EER57200	External Temperature Sensor	—	**90.00**

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Conext™ Series
Grid Tie Inverter

Conext™ Series Grid Tie Inverters

The Conext™ Grid Tie Solar Inverter (Conext Series) converts photovoltaic (PV) electricity produced by solar modules into utility grade power that can be used by the home or sold to a local electrical utility. Offering high performance, clean aesthetics, innovative features, and easy installation, the Conext Series provides great value in a compact high-frequency design. The Conext Series may be installed as a single inverter for a single PV array or in a multiple inverter configuration for large PV systems or three-phase applications.

Features

- An NEC compliant, integrated Square D™ DC/AC disconnect eliminates the need for external DC (PV) disconnects and in some jurisdictions, AC disconnects
- Large heatsink offers excellent heat dispersion without the need for a cooling fan
- Liquid Crystal display provides instantaneous information—power level, daily and lifetime energy production, PV array voltage and current, utility voltage and frequency, time online “selling”, system troubleshooting messages, and installer-customized screens
- User-enabled Fast Sweep™ Maximum Power Point Tracking (MPPT) increases energy harvest in shaded installations
- LCD vibration sensor allows the tap of a finger to turn backlight on and easily cycle through display screens
- FCC Class B compliance

Installation

- Flexible Module selection due to wide PV input MPPT tracking voltage range
- Lightweight and versatile mounting bracket
- Easy access DC (PV) and AC (Utility) terminal blocks simplify wiring
- Rugged NEMA 3R inverter enclosure allows reliable indoor and outdoor installations
- Simple communications set-up for daisy-chained single phase and three-phase installation

Servicability

- Sealed inverter enclosure can be quickly separated from the wiring box allowing DC/AC connections to remain intact during a service event
- Ten-year standard warranty

Table 29.13: Conext™ Inverters

Product	Description	Part Number	$ Price
Conext TX 2800 NA	2.8 kW inverter 208/240 V	RNW-878-2801	**2040.00**
Conext TX 3300 NA	3.3 kW inverter 208/240 V	RNW-878-3301	**2410.00**
Conext TX 3800 NA	3.8 kW inverter 208/240 V	RNW-878-3801	**2575.00**
Conext TX 5000 NA	5.0 kW inverter 208/240 V	RNW-878-5001	**3250.00**

Table 29.14: Residential Grid-Tie Solar Package

System Voltage	Kilowatts	Amps	DC Disconnect	Inverter	AC Disconnect	Suggested Load Center▲
250 Vdc	2.8	30	HU361RB	878-2801	D221NRB	QO130M200
250 Vdc	3.3	60	HU362RB	878-3301	D222NRB	QO140M225
250 Vdc	3.3	100	HU363RB	878-3301	D223NRB	QONQ42MS400
600 Vdc	3.8	30	HU361RB	878-3801	D221NRB	QO130M200
600 Vdc	5.0	60	HU362RB	878-5001	D222NRB	QO140M225
600 Vdc	5.0	100	HU363RB	878-5001	D223NRB	QONQ42MS400

▲ Consult Digest Section 1 for other load center options, covers, accessories, and circuit breakers.

NOTE: *See Digest Section 3 for additional PV switch offerings including the new UL98B 1000 Vdc PV disconnect.*

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Table 29.15: Specifications

Electrical Specifications (Output)				
Product Model	Conext TX 2800 NA	Conext TX 3300 NA	Conext TX 3800 NA	Conext TX 5000 NA
Nominal output power	2800 W / 2650 W	3300 W / 3100 W	3800 W / 3500 W	5000 W / 4500 W
AC output voltage (nominal)	240/208 Vac	240/208 Vac	240/208 Vac	240/208 Vac
AC output voltage range	Auto detect 240 to 208 Vac			
AC frequency (nominal)	60 Hz			
AC frequency range	59.3 to 60.5 Hz			
Max. continuous output current	11.8/13.0 A rms	14.0/15.2 A rms	16.0/16.8 A rms	21/22 A rms
Max. output over-current protection	15 A rms	20 A rms	25 A rms	30 A rms
Max. utility back-feed current	0 A			
Total harmonic distortion (THD)	THD < 3%			
Power factor	>0.99 (at rated power), >0.95 (full power range)			
Utility monitoring, islanding protection	UL 1741-2010. Ed.2 / IEEE1547			
Output characteristics	Current Source			
Output current waveform	True Sine Wave			
Electrical Specifications (Input)				
Max. Array open-circuit voltage	600 Vdc			
MPPT voltage range (CEC & CSA)	195-550 Vdc	195-550 Vdc	195-550 Vdc	240-550 Vdc
Max. input current	15.5 Adc / 14.9 Adc	18 Adc / 17.5 Adc	20.8 Adc / 19.5 Adc	22 Adc / 20 Adc
Max. array short-circuit current	24 Adc			
Reverse-polarity protection	Short-circuit diode			
Ground-fault protection	GF detection, I_{DIF} > 1A			
Max. Peak efficiency	95.2% / 95.2%	95.6% / 95.3%	96.3% / 96%	96.7% / 96.4%
CEC Efficiency	94.5% / 94.5%	95% / 94.5%	95.5% / 95.5%	96.0% / 95.5%
Night-time power consumption	1 W			
General Specifications				
Mounting	Wall mount (mounting bracket included)			
Input and output terminal	AC and DC terminals accept wires sizes #14 to #6 AWG			
PV / Utility disconnect	Eliminates need for external PV (DC) disconnect. Complies with NEC requirements.			
Cooling	Convection cooled, fan not required			
Display	Backlit, two-line, 16-character liquid crystal display provides instantaneous power, daily and lifetime energy production, PV array voltage and current, utility voltage and frequency, time online “selling”, faults messages, and installer-customizable screens			
Communications	Integrated RS232 and Xanbus™ RJ45 communication ports			
Wiring box	PV, utility, ground, and communications connections. The inverter can be separated from the wiring box.			
Warranty	Ten-year standard			
Part number (negative ground)	878-2801	878-3301	878-3801	878-5001
Environmental Specifications				
Operating Temperature Range	-13°F to 149°F (-25°C to 65°C)			
Enclosure Type	NEMA 3R (Outdoor Rated)			
Inverter Weight	31.8 kg (70.1 lbs)	32.2 kg (71 lbs)	36.5 kg (80.5 lbs)	38.9 kg (85.8 lbs)
Inverter dimensions (H x W x D)	89.3 x 40.3 x 18.5 cm 35.2 x 15.9 x 7.3 in.	89.3 x 40.3 x 18.5 cm 35.2 x 15.9 x 7.3 in.	98.8 x 40.3 x 18.5 cm 38.9 x16 x 7.3 in.	98.8 x 40.3 x 18.5 cm 38.9 x 16 x 7.3 in.
Shipping dimensions (H x W x D)	107.0 x 57.7 x 26.0 cm 42.1 x 22.7 x 10.2 in.	107.0 x 57.7 x 26.0 cm 42.1 x 22.7 x 10.2 in.	116.5 x 57.7 x 26.0 cm 45.8 x 22.7 x 10.2 in.	116.5 x 57.7 x 26.0 cm 45.8 x 22.7 x 10.2 in.
Regulatory Approvals				
CSA Certified to UL 1741-2010 Ed.2 (Include IEEE 1547)—inverters, converters, controllers and interconnection system equipment for use with distributed energy resources; and CSA C22.2 No 107.1 FCC Class B general use power supplies.				

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Conductor Ampacity Based on the 2011 National Electrical Code®

Ampacity based on NEC Table 310.15(B)(16) (Formerly Table 310.16) – Allowable Ampacities of Insulated Conductors Rated Up to and Including 2000 Volts, 60° Through 90°C (140° Through 194°F), Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F)*

For conduit fill see 2011 NEC Annex C.

For Information on Temperature Ratings of Terminations to Equipment See NEC 110 .14(C).

Size	Temperature Rating of Conductor. [See Table 310.104(A).]						Size
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
AWG or kcmil	Types TW, UF	Types RHW, THHW, THW, THWN, XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RH, RHW, THHW, THW, THWN, XHHW, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	AWG or kcmil
	Copper			**Aluminum or Copper-Clad Aluminum**			
18	—	—	14	—	—	—	—
16	—	—	18	—	—	—	—
14**	15	20	25	—	—	—	—
12**	20	25	30	15	20	25	12**
10**	30	35	40	25	30	35	10**
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4
3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	195	230	260	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500
600	350	420	475	285	340	385	600
700	385	460	520	315	375	425	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	445	800
900	435	520	585	355	425	480	900
1000	455	545	615	375	445	500	1000
1250	495	590	665	405	485	545	1250
1500	525	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	555	655	750	470	560	630	2000

* Refer to 310.15(B)(2)(a) for the ampacity correction factors where the ambient temperature is other than 30°C (86°F).
** See Section 240.4 (D) for conductor overcurrent protection limitations.

Ratings for 120/240 volts, 3-Wire, Single-Phase Dwelling Services— See NEC Table 310.15 (B)(7)

These are permitted ratings for Dwelling Unit service and feeder conductors which carry the total load of the dwelling.

Rating (amps)	100	110	125	150	175	200	225	250	300	350	400
Copper	4	3	2	1	1/0	2/0	3/0	4/0	250 kcmil	350 kcmil	400 kcmil
Aluminum	2	1	1/0	2/0	3/0	4/0	250 kcmil	300 kcmil	350 kcmil	500 kcmil	600 kcmil

NEC 210.19 Conductors — Minimum Ampacity and Size

(A) Branch Circuit Not More Than 600 Volts.
(1) General. Branch-circuit conductors shall have an ampacity not less than the maximum load to be served. Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size, before the application of any adjustment or correction factors, shall have an allowable ampacity not less than the noncontinuous load plus 125 percent of the continuous load.

Correction Factors

Based on NEC Table 310.15(B)(2)(a)[Formerly Table 310(16)] – Ambient Temperature Correction Factors Based on 30°C (86°F)

Ambient Temperature (°C)	Temperature Rating of Conductor			Ambient Temperature (°F)
	60°C	75°C	90°C	
10 or less	1.29	1.20	1.15	50 or less
11–15	1.22	1.15	1.12	51–59
16–20	1.15	1.11	1.08	60–68
21–25	1.08	1.05	1.04	69–77
26–30	1.00	1.00	1.00	78–86
31–35	0.91	0.94	0.96	87–95
36–40	0.82	0.88	0.91	96–104
41–45	0.71	0.82	0.87	105–113
46–50	0.58	0.75	0.82	114–122
51–55	0.41	0.67	0.76	123–131
56–60	—	0.58	0.71	132–140
61–65	—	0.47	0.65	141–149
66–70	—	0.33	0.58	150–158
71–75	—	—	0.50	159–167
76–80	—	—	0.41	168–176
81–85	—	—	0.29	177–185

Adjustment Factors – See NEC Table 310.15 (B)(3)(a)

Where the number of current-carrying conductors in a raceway or cable exceeds three, the allowable ampacities shall be reduced as shown in the following table:

Number of Conductors***	Percent of Values in Table 310.15(B)(16) through Table 310.15(B)(19) as Adjusted for Ambient Temperature if Necessary
4 through 6	80
7 through 9	70
10 through 20	50
21 through 30	45
31 through 40	40
41 and Above	35

*** Number of conductors is the total number of conductor in the raceway or cable adjusted in accordance with 310.15 (B)(5) and (6).

NEC 210.20(A) Continuous and Noncontinuous Loads

Where a branch-circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load.

NEC 240.4 Protection of Conductors

Conductors, other than flexible cords, flexible cables, and fixture wires, shall be protected against overcurrent in accordance with their ampacities specified in 310.15, unless otherwise permitted or required in 240.4(A) through (G).

NEC 240.4 (D) Small Conductors

Unless specifically permitted in 240.4(E) or (G), the overcurrent protection shall not exceed that required by (D)(1) through (D)(7) after any correction factors for ambient temperature and number of conductors have been applied.

NEC 430.22(A) Direct-Current Motor-Rectifier Supplied.

For dc motors operating from a rectified power supply, the conductor ampacity on the input of the rectifier shall not be less than 125 percent of the rated input current to the rectifier. For dc motors operating from a rectified single-phase power supply, the conductors between the field wiring output terminals of the rectifier and the motor shall have an ampacity of not less than the following percentages of the motor full-load current rating:

(1) Where a rectifier bridge of the single-phase, half-wave type is used, 190 percent.

(2) Where a rectifier bridge of the single-phase, full-wave type is used, 150 percent.

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