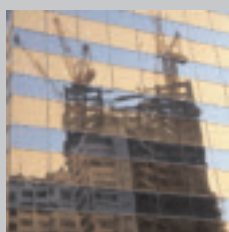




# power distribution & CONTROL

Residential  
Commercial  
Industrial



**SIEMENS**

## When Waiting Is Not An Option, ModPro Plus Delivers.



# modpro PLUS

ModPro Plus™ means shorter turn-around for standard and modified NEMA control products. Instead of waiting on the factory, our ModPro Plus distributors can turn your order around as quickly as the same day.

We offer a wide variety of high quality products and modifications including combination and non-combination starters that are guaranteed for trouble-free operation.

**For more information or to contact a sales representative, call, e-mail, or visit our website.**

# SIEMENS

# Reliable Products From The Technology Leader

## Technology Enabling Reliability.

When it comes to ready availability, easy installation, and fewer callbacks, you need a manufacturer you can trust. Our products and systems are engineered to take on the most demanding conditions, always available day after day. Combined with a world-class service and maintenance network, complete support is always there, 24/7.

### RESIDENTIAL



For product offerings see  
**Sections 1 – 6**

### COMMERCIAL



For product offerings see  
**Sections 2 – 14**

### INDUSTRIAL



For product offerings see  
**Sections 3 – 16**

- 1 Load Centers**
- 2 Meter Centers**
- 3 Safety Switches**
- 4 Disconnect Switches**
- 5 Enclosed Circuit Breakers**
- 6 Circuit Breakers**
- 7 Transformers**
- 8 Power Monitoring**
- 9 TVSS**
- 10 Panelboards**
- 11 Lighting Controls**
- 12 Switchboards**
- 13 Switchgear**
- 14 Busway Systems**
- 15 Motor Control Centers**
- 16 Control Products**
- 17 Standby Generators**
- 18 Technical**
- 19 Product Index**

Detailed Table of Contents  
located at beginning of each section

## Important

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, the matter should be referred to the local Siemens sales office. The contents of this catalog shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

**Prevent their destination from being your home.**

AFCIs should be your family's first line-of-defense against arc faults.



# combination AFCI

Fires initiated by arc faults can strike at any time. Often, they burn undetected for a considerable period before breaking into the open.

Siemens assures your safety with the latest advanced Combination AFCI. After decades of scientific testing, the Combination AFCI is NEC regulated and UL approved, protecting against series arcs, line-to-ground and line-to-neutral arcs. It offers the most advanced technology currently available for combating the hidden threat of fires resulting from arc faults.

Maybe it's time you think about electrical fires – and your family's safety.

**For more information or to contact a sales representative, call, e-mail, or visit our web site.**

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# SIEMENS

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# EQ® and Ultimate Load Centers

## Limited Warranty Program

General

### Siemens Residential Circuit Breaker And Load Center Limited Warranty Program

#### I. Lifetime Limited Warranty on Branch Circuit Breakers (15-225A)

Siemens warrants its type QP, QPH, QPP, QT (twin), and HQP branch circuit breakers to be free from defects in material and workmanship under normal care and proper usage in a domestic residential installation, for the lifetime of the Siemens load center in which it is installed. If the circuit breaker fails within the warranty period because of a defect in material or workmanship, Siemens will replace the inoperative breaker free of charge upon return to place of purchase.

#### II. Ten Year Limited Warranty on EQ and Ultimate Load Centers (100-225A)

Siemens warrants its type EQ and Ultimate factory installed main breaker and main lug single phase load centers, when used with Siemens circuit breakers described in item I, above, to be free from defects in material and workmanship under normal care and proper usage in a domestic residential installation, for a period of 10 years from the date of installation. If the load center fails within the warranty period because of a defect in material or workmanship, Siemens will, at its option, repair or replace the inoperative part or parts upon return to the place of purchase.

#### III. This warranty applies to the items described in I. and II. above, which were purchased and installed after February 1, 1994.

#### IV. Additional Information

Notice requirements and limitations applicable to Siemens warranties are:

A. Siemens must be given prompt notice of any defect or failure of any product covered by the warranty. Notice must be accompanied by verification of date of purchase or installation.

B. Any product authorized for return by Siemens, or its authorized distributors, under this warranty must be sent freight costs prepaid. Siemens will deliver repaired or replaced products to the buyer, freight costs prepaid. Repaired or replaced products shall be warranted for the unexpired portion of the warranty period.

C. Any warranties granted or liabilities assumed hereunder will not apply to products that have been damaged, altered, repaired or operated otherwise than in conformity within the requirements for safe operation and maintenance.

D. THERE ARE NO OTHER WARRANTIES WHICH EXTEND BEYOND THOSE EXPRESSLY SET FORTH HEREIN AND THIS WARRANTY AND SIEMENS' OBLIGATIONS AND LIABILITIES HEREUNDER ARE IN LIEU OF, AND SIEMENS DISCLAIMS ALL OTHER WARRANTIES AND GUARANTEES AND ALL OTHER LIABILITIES THEREFORE EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL SIEMENS BE LIABLE FOR ANY OTHER DAMAGES, EITHER DIRECT, INCIDENTAL, CONSEQUENTIAL OR OTHERWISE.

E. With respect to products purchased by consumers of the United States for personal use, the implied warranties, including but not limited to the warranties of merchantability and of fitness for a particular purpose, are not excluded but are limited to the duration of the applicable warranty period. Some states do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to buyer. Similarly, some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to buyer. This warranty gives buyer specific legal rights, and buyer may also have other rights which may vary from state to state.

F. This Warranty covers domestic residential use of Siemens products described in I. and II. above and excludes any commercial applications.

The Absolute Confidence Warranty™



# EQ® and Ultimate Load Centers

## Series-Connected System

### How Series-Connected Circuit Breakers Save Component Cost

The National Electrical Code states in article 110.9:

**110.9 Interrupting Rating.** *Equipment intended to break current at fault levels shall have an interrupting rating sufficient for the system voltage and the current which is available at the line terminals of the equipment.*

*Equipment intended to break current at other than fault levels shall have an interrupting rating at system voltage sufficient for the current that must be interrupted.*

There are two ways to satisfy this Code requirement. Either method offers the necessary protection but method two is a less costly alternative to method one.

Method one is to select circuit breakers with individual interrupting ratings equal to or greater than the available fault current at the service entrance.

Method two is to select circuit breakers with a series combination rating equal to or greater than the available fault current at the service entrance.

#### Single Family Homes

In single family homes, the available fault current normally does not exceed 10,000 amperes. In this situation a load center with a main and branch breakers with interrupting ratings of 10kA, RMS symmetrical will satisfy this Code requirement.

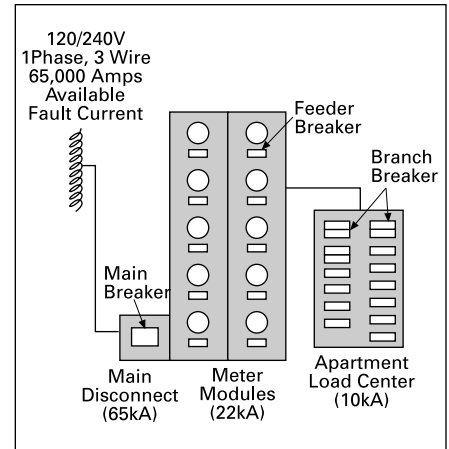
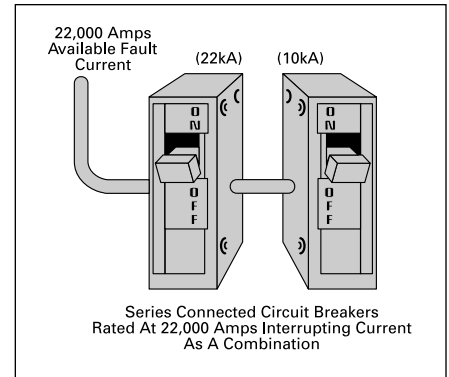
In some instances the available fault current may exceed 10,000 amperes but rarely will it exceed 22,000 amperes. In these instances a load center with a main circuit breaker with an interrupting rating of 22kA RMS symmetrical would be required. The branch breakers in method one would be required to be fully rated 22kA breakers while in method two the branch breakers could be 10kA breakers.

#### Apartments, Condominiums, Commercial

In larger installations the available fault current will normally be above 10,000 amperes so series combination ratings become much more important. In these installations it is not uncommon to see three breaker series combinations. An example would be 65kA available with an 800 amp service disconnect (MD6 rated 65kA) ahead of a 125 amp feeder disconnect (QPH rated 22kA) ahead of branch breakers in the load center (QP rated 10kA).

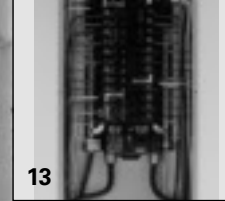
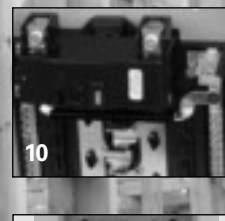
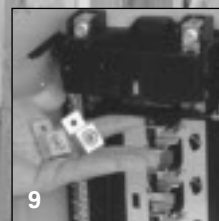
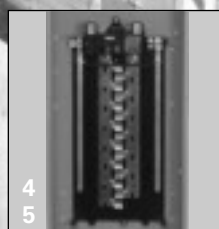
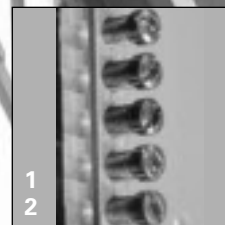
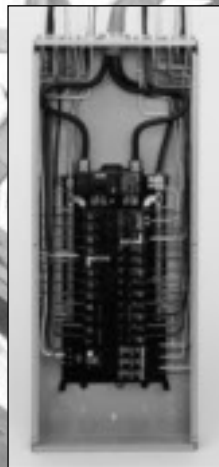
Series ratings are a part of the rating and marking of the equipment in which the downstream breakers are installed. Section 240.86 of the NEC requires this marking to be on the equipment and the only acceptable combinations in a given device are those combinations marked on the device.

## General



The Siemens Ultimate Load Center is the highest quality, most feature rich design in the industry. Features of the Ultimate Load Center include:

1. The patented INSTA-WIRE™ neutral / ground system allows for faster installation because the screws arrive backed out, ready for wire insertion.
2. The patented Visible neutral / ground system aids in the insertion of conductors.
3. All main lug devices are provided with a factory installed ground bar.
4. Main lug and main breaker panels are provided with split neutrals which can be isolated by removing a tie strap, turning one side into a ground bar.
5. Inboard neutrals allow the installation of neutral and ground conductors right next to the breaker.
6. Mounting tabs on the trim hold it in place on the load center, freeing up both hands to drive the trim screws.
7. Combination head screws on the neutrals, grounds, trim, upper pan, and bond screw provide installation flexibility.
8. The patented pre-positioned bond screw eliminates bond strap / screw assemblies, and reduces the risk of losing components in the field.
9. All devices are convertible from main lug to main breaker or vice versa with the addition of main breaker or main lug kits.
10. All main breakers are straight in wired – no back feeding required.
11. A rigid, sturdy base pan provides the ruggedness required the most harsh applications.
12. The outdoor enclosure has a slide hinge door for the easiest of installation and can be removed by backing out only one screw.
13. All indoor Ultimate Load Centers are invertible for bottom feed applications.
14. Indoor load center trims are now available in white.





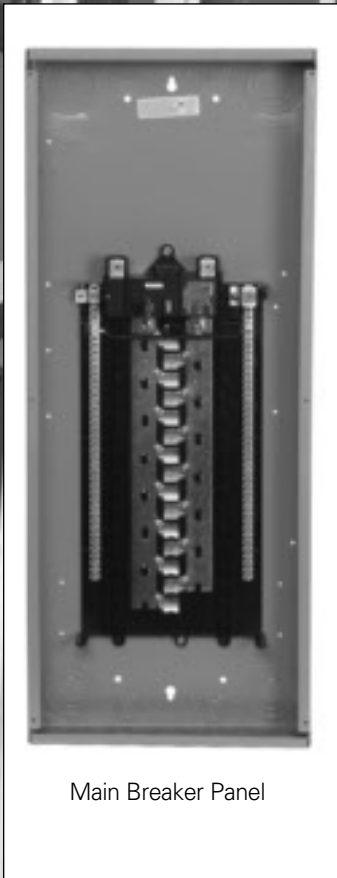
The Ultimate Load Center product line provides a wide array of variation to meet any application need.

The following offering is available in the Ultimate product line:

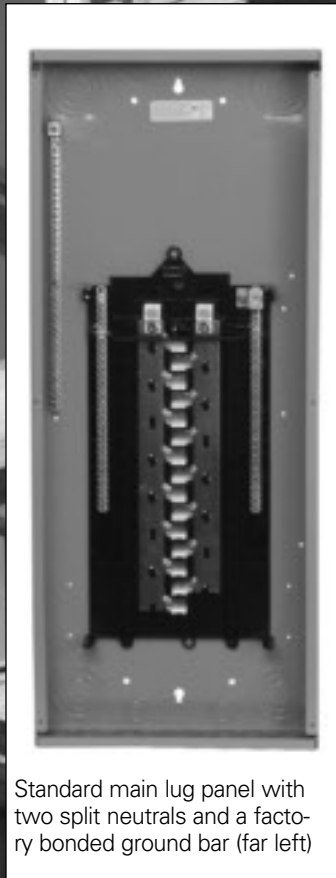
- 12-42 Circuits / Spaces
- Indoor and outdoor enclosures
- 100 to 225 Amp
- Main lug and main breaker
- Two different main lug configurations (see below)
- Gray or white trim colors
- Value packs – a mix of branch breakers provided with the load center

Other load centers outside the Ultimate product line include:

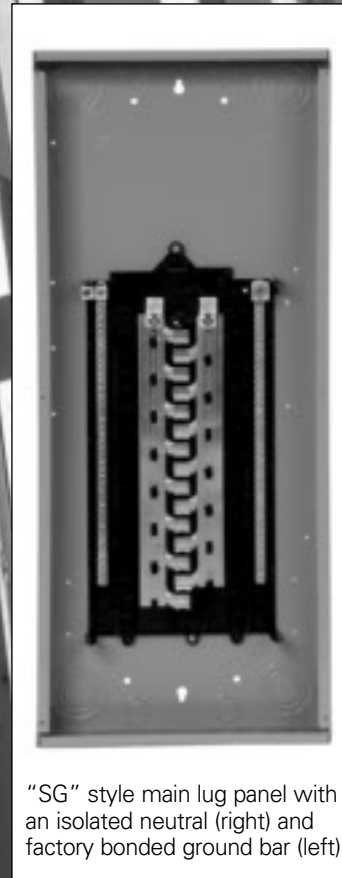
- Circuit breaker enclosures
- Small circuit (2-10) load centers
- Riser panels for high rise applications
- 3-Phase load centers
- High amp load centers (400A)
- Specialty load centers (generator standby panels, spa panels, renovation panels, and trailer panels)



Main Breaker Panel



Standard main lug panel with two split neutrals and a factory bonded ground bar (far left)



“SG” style main lug panel with an isolated neutral (right) and factory bonded ground bar (left)

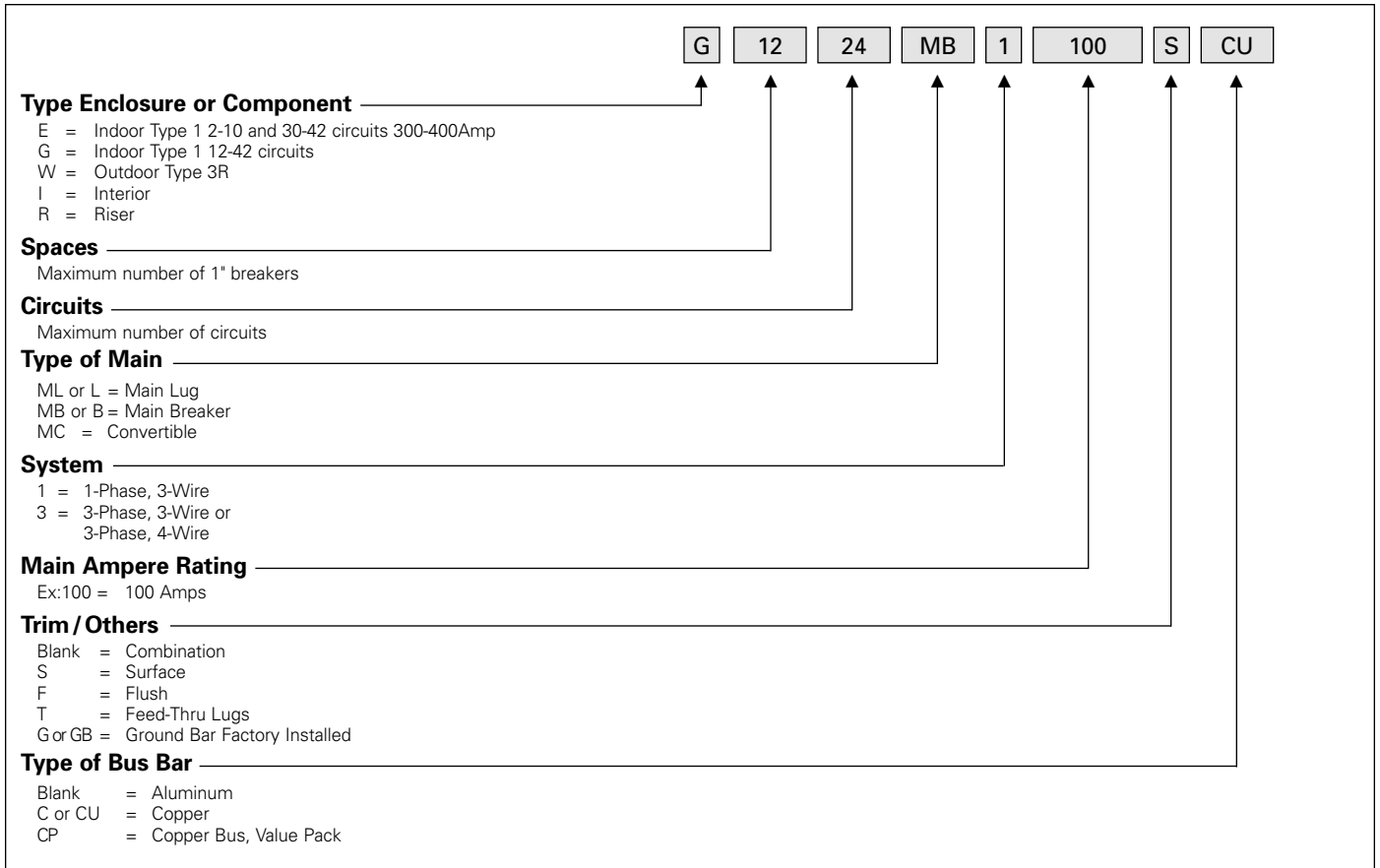
# EQ® and Ultimate Load Centers

## Catalog Numbering System

Reference

### Catalog Numbering System

LOAD CENTERS & CIRCUIT BREAKERS 1



### Products Shown In Sections 1 and 2 Of This Speedfax Meet Or Exceed The Following Standards.

- UL50 — Electric Cabinets and Boxes
- UL67 — Electric Panelboards
- UL414 — Meter Sockets
- UL486 — Wire Connectors
- UL489 — Molded-Case Circuit Breakers
- UL869 — Service Equipment
- UL943 — Ground Fault interrupters (Class A — Personnel Protection)
- Federal Specification W-P-115b — Panel Power Distribution
- Federal Specification W-C-375B — Circuit Breakers
- NEC
- NEMA 250

### Underwriters' Laboratories, Inc. Reference File Numbers:

- EQ Meter Combinations (complying with EUSERC specifications) are Listed by UL under file #E10703
- Uni-Pak (complying with EUSERC specifications) are Listed by UL under file #E10703
- Underground pull box (complying with EUSERC specifications) are Listed by UL under file #E10703
- Series Connected Circuit Breaker Information is recognized by UL under file #E10848(N)
- Pushmatic Circuit Breakers are Listed by UL under file #E10848
- EQ Load Centers, Uni-Pak and Modular Metering are Listed by UL under file #E10703

- EQ Load Centers, Uni-Pak and Modular Metering Accessories are UL recognized components found under file #E10703, Volume 6 and 7. (Also referenced under the recognized components directory — section QEUY2)
- EQ Circuit Breakers are Listed by UL under file #E82615
- Modular metering disconnects are Listed by UL under file #E25506
- EQ Main Lug Load Centers (where noted) and accessories are Certified by CSA under file #LL85900

# The Ultimate Load Centers

## Single Phase Main Lug and Main Breaker Load Centers<sup>®</sup>

**Selection**

Main Breaker/Convertible Load Centers<sup>①</sup>

Aluminum or Copper Bus  
60/75°C Rated 22,000A IR<sup>②</sup>

12-42 Circuits / 100-225 Amperes

Branch Circuits				Indoor Enclosure — NEMA Type 1					Outdoor Enclosure — NEMA Type 3R			
Main Ampere Rating	Max No. of 1-Pole		Max. 2-Pole	Aluminum Bus Catalog Number	List Price \$	Copper Bus <sup>®</sup> Catalog Number	List Price \$	Enclosure Height (inches) <sup>③</sup>	Copper Bus <sup>®</sup> Catalog Number	List Price \$	Enclosure Height (inches) <sup>④</sup>	
	Spaces	Circuits										
<b>1-Phase, 3-Wire SN</b>												
100	12	24	6	G1224B1100	463.00	G1224B1100CU	499.00	18	W1224B1100CU	602.00	21	
100	16	24	8	G1624B1100	499.00	G1624B1100CU	546.00	21	W1624B1100CU	616.00	23	
100	20	20	10	G2020B1100	520.00	G2020B1100CU	581.00	24	W2020B1100CU	642.00	29	
100	24	24	12	—	—	G2424B1100CU	668.00	24	—	—	—	
100	30	30	14	—	—	G3030B1100CU	733.00	30	—	—	—	
125	24	24	12	G2424B1125 <sup>NEW</sup>	627.00	—	—	—	—	—	—	
150	16	30	8	G1630B1150	863.00	—	—	24	—	—	—	
150	20	30	10	G2030B1150	946.00	G2030B1150CU	1007.00	30	—	—	—	
150	24	30	12	G2430B1150	986.00	—	—	30	—	—	—	
150	30	30	14	G3030B1150	1016.00	G3030B1150CU	1093.00	36	—	—	—	
200	8	16	4	—	—	—	—	—	W0816B1200CT	925.00	27	
200	20	40	10	G2040B1200	946.00	G2040B1200CU	1007.00	30	W2040B1200CU	1076.00	29	
200	24	40	12	G2440B1200	1004.00	—	—	30	—	—	—	
200	30	40	14	G3040B1200	1149.00	G3040B1200CU	1223.00	36	W3040B1200CU	1366.00	35	
200	40	40	20	G4040B1200	1308.00	G4040B1200CU	1429.00	39	W4040B1200CU	1534.00	38	
225	42	42	21	—	—	G4242B1225CU <sup>®</sup>	1697.00	42	W4242B1225CU <sup>®</sup>	1793.00	42	

Single phase factory installed 22kA IR main circuit breaker offers 22/10kA IR series combination rating when using 10kA IR Type QP, QT, QPF, QE, QN and QAF branch breakers.

Main Lug/Convertible Load Centers<sup>⑤</sup>

Aluminum or Copper Bus<sup>®</sup>  
60/75°C Rated 100,000A IR

12-42 Circuits / 125-225 Amperes

Branch Circuits				Indoor Enclosure — NEMA Type 1					Outdoor Enclosure — NEMA Type 3R			
Main Ampere Rating	Max No. of 1-Pole		Max. 2-Pole	Aluminum Bus Catalog Number	List Price \$	Copper Bus <sup>®</sup> Catalog Number	List Price \$	Enclosure Height (inches) <sup>③</sup>	Copper Bus <sup>®</sup> Catalog Number	List Price \$	Enclosure Height (inches) <sup>④</sup>	
	Spaces	Circuits										
<b>1-Phase, 3-Wire SN</b>												
125	12	12	6	G1212L1125 <sup>⑥</sup>	194.00	G1212L1125CU <sup>⑥</sup>	230.00	21	W1212L1125CU <sup>⑥</sup>	302.00	21	
125	12	24	6	G1224L1125 <sup>⑥</sup>	253.00	G1224L1125CU <sup>⑥</sup>	290.00	21	W1224L1125CU <sup>⑥</sup>	379.00	21	
125	16	24	8	G1624L1125	309.00	G1624L1125CU	358.00	21	W1624L1125CU	463.00	23	
125	20	20	10	G2020L1125	361.00	G2020L1125CU	424.00	24	—	—	—	
125	24	24	12	G2424L1125	410.00	—	—	30	W2424L1125CU <sup>NEW</sup>	560.00	27	
125	24	40	12	—	—	G2440L1125CU	470.00	30	—	—	—	
125	30	40	14	—	—	G3040L1125CU	534.00	30	W3040L1125CU	685.00	35	
125	40	40	20	—	—	G4040L1125CU <sup>NEW</sup>	—	39	—	—	—	
150	20	30	10	G2030L1150	437.00	G2030L1150CU	486.00	30	W2030L1150CU	595.00	29	
200	8	16	4	—	—	—	—	—	W0816L1200CT	494.00	27	
200	12	24	6	—	—	G1224L1200CU <sup>⑥</sup>	424.00	24	W1224L1200CU <sup>⑥</sup>	518.00	27	
200	20	40	10	G2040L1200	532.00	G2040L1200CU	591.00	30	W2040L1200CU	705.00	29	
200	24	40	12	G2440L1200	563.00	G2440L1200CU	624.00	30	—	—	—	
200	30	30	14	G3030L1200	545.00	G3030L1200CU	627.00	36	—	—	—	
200	30	40	14	G3040L1200	605.00	G3040L1200CU	681.00	36	W3040L1200CU	778.00	35	
200	40	40	20	G4040L1200	905.00	G4040L1200CU	1004.00	39	W4040L1200CU	1086.00	38	
225	12	24	6	—	—	—	—	—	W1224L1225CU <sup>NEW</sup>	685.00	29	
225	42	42	21	—	—	G4242L1225CU <sup>®</sup>	1029.00	42	W4242L1225CU <sup>®</sup>	1411.00	42	

SG Series Main Lug/Convertible Load Centers<sup>⑦</sup>

Aluminum or Copper Bus  
60/75°C Rated 100,000A IR<sup>②</sup>

12-40 Circuits / 125-200 Amperes

Branch Circuits				Indoor Enclosure — NEMA Type 1			
Main Ampere Rating	Max No. of 1-Pole		Max. 2-Pole	Copper Bus <sup>®</sup> Catalog Number	List Price \$	Enclosure Height (inches) <sup>③</sup>	
	Spaces	Circuits					
<b>1-Phase, 3-Wire SN</b>							
125	12	24	6	G1224L1125CUSG	290.00	21	
125	16	24	8	G1624L1125CUSG	358.00	24	
125	20	30	10	G2030L1125CUSG	424.00	24	
125	24	30	12	G2430L1125CUSG	433.00	30	
150	20	30	10	G2030L1150CUSG	486.00	30	
200	30	40	14	G3040L1200CUSG	681.00	36	
200	40	40	20	G4040L1200CUSG	1004.00	39	

① Suitable for use as service entrance equipment.  
 ② May be installed on higher rated systems when protected by a circuit breaker with a higher AIR rating. See equipment markings.  
 ③ Indoor enclosures are 14 5/16" wide by 3 15/16" deep.  
 ④ Outdoor enclosures are 14 1/2" wide by 4 1/4" deep.  
 ⑤ 125A load centers will accept MBK100A and MBK125A 150A load centers will accept MBK150A 200A load centers will accept MBK150A and MBK200A 225A load centers will accept MBK150A, MBK200A, and MBK225A.

⑥ Suitable for use as service entrance equipment when not more than six main disconnecting means are provided and when not used as a lighting and appliance branch circuit panelboard. See article 408.14 of the NEC.  
 ⑦ Factory installed 100% neutral with factory bonded 100% ground. No neutral tie strap.  
 ⑧ All 225 amp load centers are provided with tin plated copper bus bars.  
 ⑨ Copper bus load centers are recommended for those applications where the environment may be severe (i.e. farm and coastal areas).

⑩ <sup>NEW</sup> Adding a "W" to the end of the load center catalog number (example: G3040L1200CUW) will change the trim color to white. Slight price increase as well as a 2-3 week lead time required. Pallet quantities only.

# The Ultimate Load Centers

## Value Pack Load Centers<sup>②</sup>

**Selection**

Value pack load centers offer a standard load center and an assortment of branch breakers<sup>®</sup>. The offering of value packs and the breakers included are listed in the table below.

LOAD CENTERS & CIRCUIT BREAKERS

Catalog Number	Load Center	Breakers Included	List Price \$
G2020B1100CP	G2020B1100CU	(6) Q120	659.00
G3030B1100CP	G3030B1100CU	(6) Q120, (6) Q115	900.00
G1224L1125CP	G1224L1125CU	(6) Q120	432.00
G1624L1125CP	G1624L1125CU	(6) Q120	468.00
G3030B1150CP	G3030B1150CU	(6) Q120, (1) Q230, (1) Q250	1323.00
G3040B1200CP	G3040B1200CU	(6) Q120, (1) Q230, (1) Q250	1415.00
G3040B1200CPP	G3040B1200CU	(6) Q120, (1) Q230, (1) Q240	1415.00
G3040L1200CP	G3040L1200CU	(6) Q120, (1) Q230, (1) Q250	928.00
G3040L1200CPP	G3040L1200CU	(6) Q120, (1) Q230, (1) Q240	964.00
G3040L1200CP1	G3040L1200CU	(6) Q120, (6) Q115, (1) Q230, (1) Q250	1061.00
G4040B1200CP	G4040B1200CU	(6) Q120, (1) Q230, (1) Q250	1631.00
G4040B1200CPP	G4040B1200CU	(6) Q120, (1) Q230, (1) Q240	1429.00
G4040B1200CP1	G4040B1200CU	(6) Q115, (6) Q120, (1) Q230, (1) Q250	1759.00
G4040B1200CUSGP	G4040L1200CUSG	MBK200A <sup>③</sup> , (6) Q120, (1) Q230, (1) Q250	1698.00
G4040L1200CPP	G4040L1200CU	(6) Q120, (1) Q230, (1) Q240	1004.00
W3040B1200CP	W3040B1200CU	(6) Q120, (6) Q115, (1) Q230, (1) Q250	1613.00
W3040L1200CP	W3040L1200CU	(6) Q120, (6) Q115, (1) Q230, (1) Q250	1025.00
W4040B1200CP	W4040B1200CU	(6) Q120, (6) Q115, (1) Q230, (1) Q250	1780.00
W4040L1200CP	W4040L1200CU	(6) Q120, (1) Q230, (1) Q250	1331.00

## Ultimate Load Center Accessories<sup>⑤</sup>

Catalog Number	Description	List Price \$	Pack Qty.
ECHS000	Hub cover plate	38.00	1
ECHS075	¾" Hub	39.50	1
ECHS100	1" Hub	39.50	1
ECHS125	1¼" Hub	39.50	1
ECHS150	1½" Hub	39.50	1
ECHS200	2" Hub	69.00	1
ECHS250	2½" Hub	109.00	1
ECGB5	5 pos ground bar	18.40	1
ECGB10	10 pos ground bar	21.00	1
MBK100A <sup>④</sup>	100A main breaker kit	230.00	1
MBK125A <sup>④</sup>	125A main breaker kit	473.00	1
MBK150A <sup>④</sup>	150A main breaker kit	588.00	1
MBK200A <sup>④</sup>	200A main breaker kit	588.00	1
MBK225A <sup>④</sup>	225A main breaker kit	588.00	1
ECLKB1 <sup>⑦</sup>	2/0 lug kit with bonding means for Ultimate load centers	26.50	1
ECLK1-2	#2-1/0 neutral lug	13.90	1
ECLK2	#4-2/0 neutral lug	18.40	1
ECQFL2	Door lock	89.00	1
ECCP1	Directory cards	616.00	100
ECTS2	Trim screws	9.80	6
ECQF3	Filler plates	14.20	5

Notes:

① MBK200A factory installed.

② All value packs provided with copper bus bars.

③ Breakers are shipped inside a sleeve located in the load center.

④ "New" items to be available Spring 2007.

⑤ See accessory pages at end of section for complete accessory listing.

⑥ MBK100A only for use on 100 or 125A load centers / MBK125A only for use on 125A load centers / MBK150A only for use on 150A, 200 or 225A load centers / MBK200A only for use on 200 or 225A load centers / MBK225A only for use on 225A load centers.

⑦ ECLKB1 installed on left side neutral bar when the tie strap is removed. A tang is provided allowing that lug and neutral assembly to be bonded to the enclosure.

## Ultimate Load Center Lug Data

Terminals	Wire	Torque
A, B, N <sup>⑧</sup>	300 kcmil-4 AWG	275 lb.-ins.
A, B, N <sup>⑨</sup> G	2/0-4 AWG	110 lb.-ins.
Neutral-Ground Bars (Use Type GB Ground Bar Accessory Kit)	10-14 Cu/10-12 Al	20 lb.-ins.
	8 AWG	25 lb.-ins.
	6-4 AWG	35 lb.-ins.
Ground Conductors Only	(2) or (3) 14 AWG	20 lb.-ins.
	(2) 12-10 AWG	20 lb.-ins.
Main Lug/Main Breaker to Bus Connection (1/4-20 nut)		45 lb.-ins.
Bonding Screw		45 lb.-ins.

⑧ 150, 200 & 225 amp load centers.

⑨ 100 & 125 amp load centers.

# EQ® Load Centers

## Small Circuit Load Centers

100,000A IR

4-16 circuits, 100-125 Amperes

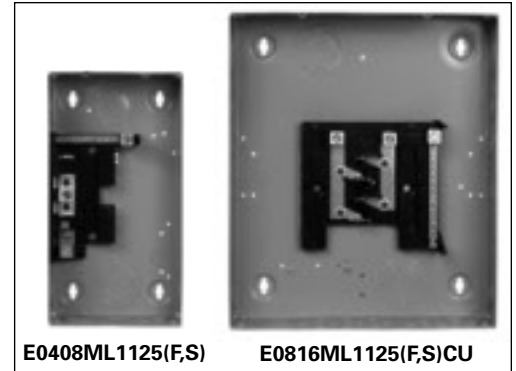
1-Phase, 3-Wire, SN 120/240 Volts AC

### Features/Applications

EQ Load Centers with main lugs feature a combination trim box in one package.

- Interiors offer removal in seconds
- Single phase
- One piece bus bar construction designed for use only with circuit breakers
- UL Listed
- UL listed on 60/75°C conductors (see equipment markings for applications)
- Positive load side circuit breaker hook rails
- Outdoor Type 3R devices use HS Type hubs

### Selection/Wiring Diagrams



1  
LOAD CENTERS &  
CIRCUIT BREAKERS

## Main Lugs with Aluminum Bus<sup>⑥</sup>

Branch Circuits				Indoor Enclosure — NEMA Type 1						Outdoor Enclosure — NEMA Type 3R					
Amp Rating	Max. 1-Pole No. of Spaces	No. of Circuits	QP Max. 2-Poles	Catalog Number — Replace Suffix F (Flush) with S for Surface Mounting	List Price \$	Std. Pkg.	Dimensions (inches)			Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
							H	W	D				H	W	D
100	12	24	6	E1224ML1100FG <sup>①</sup>	261.00	1	14 3/4	12 3/8	3 7/8	—	—	—	—	—	—
125	4	8	2	E0408ML1125F <sup>②③④</sup>	81.00	5	12 5/8	6 5/8	3 1/2	W0408ML1125 <sup>③④⑤</sup>	150.00	5	12 1/4	6	4 1/4
125	4	8	2	—	—	—	—	—	—	W0408L1125SPA50 <sup>③④⑥</sup>	600.00	1	12 1/4	6	4 1/4
125	4	8	2	—	—	—	—	—	—	W0408L1125SPA60 <sup>③④⑥</sup>	630.00	1	12 1/4	6	4 1/4
125	8	16	4	E0816ML1125F <sup>⑤</sup>	145.00	1	14 3/4	12 3/8	3 7/8	—	—	—	—	—	—

## Main Lug and Main Breaker with Copper Bus<sup>⑥⑨</sup>

100,000A IR

4-16 circuits, 100-225 Amperes

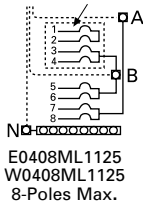
1-Phase, 3-Wire, SN 120/240 Volts AC

### Features

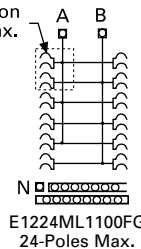
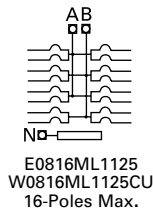
Branch Circuits				Indoor Enclosure — NEMA Type 1						Outdoor Enclosure — NEMA Type 3R					
Amp Rating	Max. 1-Pole No. of Spaces	No. of Circuits	QP Max. 2-Poles	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)			Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
							H	W	D				H	W	D
100	10	20	4	E1020MB1100FCGP <sup>⑦⑧</sup>	494.00	1	14 3/4	12 3/8	3 7/8	—	—	—	—	—	—
100	12	24	6	E1224ML1100FCU	265.00	1	14 3/4	12 3/8	3 7/8	—	—	—	—	—	—
125	8	16	4	E0816ML1125FCU <sup>⑤</sup>	158.00	1	14 3/4	12 3/8	3 7/8	W0816ML1125CU <sup>⑤</sup>	264.00	1	14 3/4	12 1/8	4 1/4
125	8	16	4	E0816ML1125SCU	154.00	1	14 3/4	12 3/8	3 7/8	—	—	—	—	—	—
225	4	6	2	—	—	1	—	—	—	W0406ML1225CU <sup>②</sup>	396.00	1	23	10	4 1/8
200	4	4	2	—	—	1	—	—	—	W0404MB1200CT <sup>⑧⑩</sup>	823.00	1	20	11 1/8	4 3/4

### Wiring Diagrams

Main Breaker Position When Used - 100A Max.



Main Breaker Position When Used-70A Max.



- ① 70 amp maximum breaker.
- ② Will not accommodate 2-pole GFCI or circuit breaker with shunt trip.
- ③ Suitable for use as service equipment when a main breaker (100A maximum) is back-fed in a branch position and used with main breaker retainer clip (Cat. No. ECMBR1).
- ④ 100 amp maximum breaker.

- ⑤ Suitable for use as service entrance equipment when a main breaker (125A maximum) is back-fed in a branch position and used with main breaker retainer clip (Cat. No. ECMBR1).
- ⑥ Suitable for use as service entrance when not more than six main disconnecting means are provided, and when not used as lighting and appliance branch circuit panelboard. Check local codes and restrictions.
- ⑦ Two Q115 and one Q230 breaker included.

- ⑧ W0408L1125SPA50 provided with factory installed QF50 and ground bar. W0408L1125SPA60 provided with factory installed QF260 and ground bar.
- ⑨ Copper Bus load centers are recommended for those applications where the environment may be severe (i.e. farm and coastal areas).
- ⑩ 2" HS Type hub provided.
- ⑪ Type QNR main breaker factory installed.

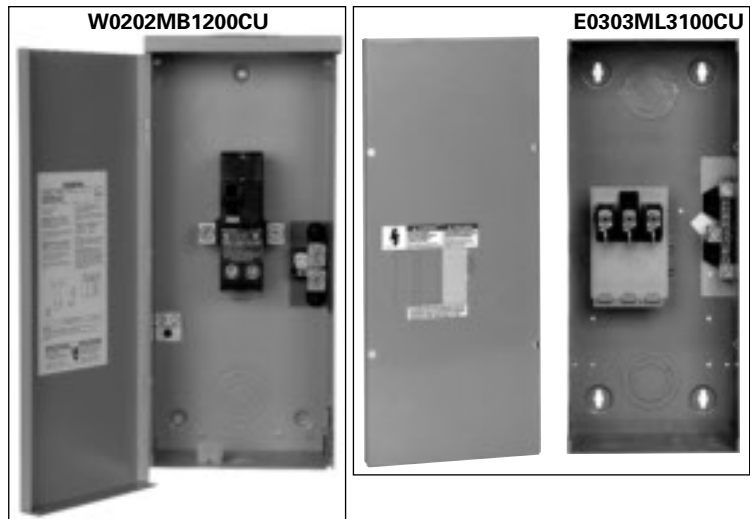
# EQ® Load Centers

## Circuit Breakers Enclosures

## Selection/Wiring Diagrams

### Features

- Circuit breaker enclosures range from 60A to 225A, indoor and outdoor models
- Designed for use exclusively with QP, QT, QPH, HOP, BO, BOH, HBO, QPP, QPPH, HQPP, QJ2, QJH2 and QJ2-H circuit breakers
- UL listed
- Suitable for use as service entrance equipment
- UL listed for 60/75°C conductors (See equipment markings for applications)



Breaker Used			Indoor Enclosure — NEMA Type 1						Outdoor Enclosure — NEMA Type 3R					
Frame Type	Ampere Rating	No. of Poles	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)			Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
						Height	Width	Depth				Height	Width	Depth
<b>1-Phase, 3-Wire SN — 120/240 Volts AC</b>														
QP, QPH, HQP	60	2	E0204ML1060S <sup>①</sup>	76.00	5	9 7/8	5 1/8	2 5/8	W0204ML1060 <sup>①</sup>	141.00	5	8	5	4 1/4
	60	2	E0204ML1060F <sup>②</sup>	116.00	5	9 7/8	5 1/8	2 5/8	—	—	—	—	—	—
	100	2	E0202MB1100 <sup>NEW</sup>	306.00	1	17 1/8	7 3/8	4 5/16	W0202MB1100CU <sup>③</sup>	364.00	1	17.4	7.3	4.3
	125	2	E0204ML1125SCU	121.00	1	17 1/8	7 1/8	4 1/4	W0204ML1125CU	189.00	1	17 1/8	7 3/8	4 5/16
QN, QNH, HQN	200	2	— <sup>④</sup>	—	—	—	—	—	W0202ML1200CU	468.00	1	19 3/4	8.4	4.6
	200	2	E0202MB1200 <sup>NEW</sup>	718.00	—	19 3/8	8 1/2	4	W0202MB1200CU <sup>③</sup>	902.00	1	19 3/4	8.4	4.6
QPP, QPPH, HQPP, QP	225	1-4	—	—	—	—	—	—	W0406ML1225CU <sup>③</sup>	396.00	1	23	10	4 1/8
			—	—	—	—	—	—	—	—	—	—	—	—
QJ2, QJH2, QJ2-H	150	2	—	—	—	—	—	—	WB2150B <sup>⑤</sup>	949.00	1	27	7 3/8	4 15/16
	200	2	—	—	—	—	—	—	WB2200B <sup>⑤</sup>	949.00	1	27	7 3/8	4 15/16
	225	2	—	—	—	—	—	—	WB2225 <sup>②</sup>	418.00	1	27	7 3/8	4 5/16
<b>3-Phase, 3-Wire 240 Volts AC or 3-Phase, 4-Wire SN — 120/208 Volts AC, 120/240, 240 Volts AC</b>														
QP, QPH, HQP	100	2-3	E0303ML3100S <sup>③</sup>	189.00	1	17 1/8	7 1/8	4 1/4	W0303ML3100 <sup>③</sup>	249.00	1	17 1/8	7 3/8	4 5/16
BO, BOH, HBO	100	2-3	EB3100S <sup>③</sup>	189.00	1	17 1/8	7 1/8	4 1/4	WB3100 <sup>③</sup>	249.00	1	17 1/8	7 3/8	4 5/16
QJ2, QJH2, QJ2-H	225	2-3	EB3225F <sup>②</sup>	226.00	1	27	10 1/8	5 1/8	WB3225 <sup>②</sup>	459.00	1	27	10 1/8	5 9/16

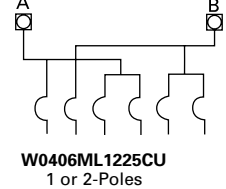
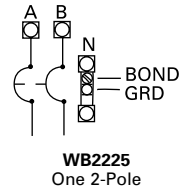
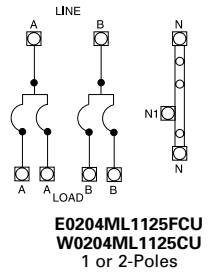
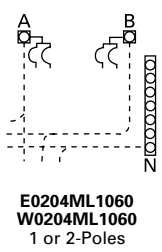
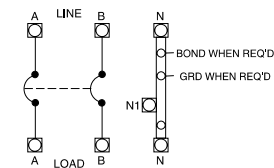
① Will not accommodate 2-pole GFCI or circuit breaker with shunt trip.  
 ② 42,000A IR maximum. Copper wire only at 225A.

③ Will not accommodate GFCI or circuit breaker with shunt trip.  
 ④ Main breaker factory installed.

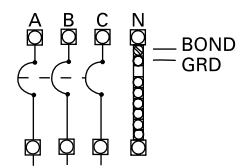
⑤ QJ2 frame circuit breaker installed, rated 10,000A IR.

### Wiring Diagrams

#### 1-Phase, 3-Wire



#### 3-Phase, 4-Wire



- E0303ML3100CU
- EB3100
- W0303ML3100CU
- WB3100
- EB3225
- WB3225
- 2 or 3-Poles

# EQ® Load Centers

## 3-Phase Main Breaker with Copper Bus<sup>④⑤</sup>

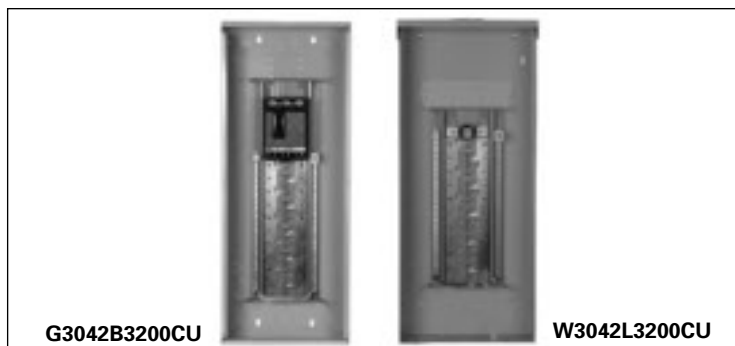
Selection

10,000A IR<sup>①③</sup>

30–42 Circuits, 100–225 Amperes

3-Phase, 3-Wire, 240 Volt AC — or — 3-Phase, 4-Wire

120/240 – or – 120/208 Volts AC



1  
LOAD CENTERS &  
CIRCUIT BREAKERS

Branch Circuits				Indoor Enclosure — NEMA Type 1					Outdoor Enclosure — NEMA Type 3R				
Ampere Rating	Max. 1-Pole No. of Spaces	No. of Circuits	Max. 2-Poles	Catalog Number	List Prices \$	Dimensions (inches)			Catalog Number	List Prices \$	Dimensions (inches)		
						Height	Width	Depth			Height	Width	Depth
100	30	30	14	G3030B3100CU <sup>②</sup>	1288.00	30	14 3/8	3 15/16	—	—	—	—	—
150	24	42	14	G2442B3150CU	2112.00	36	14 3/8	3 15/16	W2442B3150CU	2301.00	34	14 1/4	4 1/2
200	30	42	14	G3042B3200CU	2209.00	36	14 3/8	3 15/16	W3042B3200CU	2393.00	37	14 1/4	4 1/2
200	42	42	20	G4242B3200CU	2326.00	42	14 3/8	3 15/16	W4242B3200CU	2639.00	43	14 1/4	4 1/2
225	42	42	20	G4242B3225CU	2326.00	42	14 3/8	3 15/16	W4242B3225CU	2639.00	43	14 1/4	4 1/2

① May be installed on higher rated systems when protected by a circuit breaker with a higher A IR rating. See equipment markings.

③ Back-fed main breaker.

When 22,000 IR or 42,000 IR main circuit breakers are required, add the suffix “-22” or “-42” respectively. List price adder applies.

⑤ Standard Package Quality = 1.

④ Copper bus load centers are recommended for those applications where the environment may be severe (i.e. farm and coastal areas) or where a premium panel is desired.

## 3-Phase Main Lug with Copper Bus<sup>③④</sup>

100,000A IR

12–42 circuits, 125–225 Amperes

3-Phase, 3-Wire, 240 Volt AC — or — 3-Phase, 4-Wire SN

120/240 – or – 120/208 Volts AC

Branch Circuits				Indoor Enclosure — NEMA Type 1					Outdoor Enclosure — NEMA Type 3R				
Amp Rating	Max. 1-Pole No. of Spaces	No. of Circuits	Max. 2-Poles	Catalog Number	List Price \$	Dimensions (inches)			Catalog Number	List Price \$	Dimensions (inches)		
						Height	Width	Depth			Height	Width	Depth
125	12	24	6	G1224L3125CU <sup>①②</sup>	390.00	21	14 3/8	3 15/16	W1224L3125CU <sup>①②</sup>	532.00	21	—	—
150	18	36	9	G1836L3150CU <sup>①②</sup>	537.00	24	14 3/8	3 15/16	W1836L3150CU <sup>①②</sup>	685.00	25	14 1/4	4 1/2
150	24	42	12	G2442L3150CU <sup>②</sup>	648.00	30	14 3/8	3 15/16	W2442L3150CU <sup>②</sup>	859.00	28	14 1/4	4 1/2
200	12	24	6	G1224L3200CU <sup>②</sup>	520.00	24	14 3/8	3 15/16	W1224L3200CU <sup>①②</sup>	666.00	22	14 1/4	4 1/2
200	18	36	8	G1836L3200CU	621.00	30	14 3/8	3 15/16	—	—	—	—	—
200	24	42	12	G2442L3200CU <sup>②</sup>	720.00	30	14 3/8	3 15/16	W2442L3200CU <sup>②</sup>	859.00	31	14 1/4	4 1/2
200	30	42	14	G3042L3200CU <sup>②</sup>	767.00	36	14 3/8	3 15/16	W3042L3200CU <sup>②</sup>	909.00	34	14 1/4	4 1/2
225	42	42	20	G4242L3225CU <sup>②</sup>	977.00	42	14 3/8	3 15/16	W4242L3225CU <sup>②</sup>	1612.00	42	14 1/4	4 1/2

① Suitable for use as service equipment when not more than six main disconnecting means are provided and when not used as a lighting and appliance branch circuit panelboard. See article 408 of the NEC.

② Suitable for use as service equipment when a main breaker (100A maximum) is back-fed in a branch position, and used with main breaker retainer clip (Cat. No. MBR-1).

③ Standard Package Quantity = 1.

④ Copper bus load centers are recommended for those applications where the environment may be severe (i.e. farm and coastal areas) or where a premium panel is desired.

## Lug Data

### 3-Phase Load Centers

Terminals	Wire	Torque
A, B, C	See Marking on Breaker	
N <sup>①</sup>	250 kcmil-4 AWG	340 lb.-ins.
A, B, C & N <sup>②</sup>	300 kcmil-6 AWG	340 lb.-ins.
N <sup>②</sup>	2/0-4 AWG	135 lb.-ins.
G <sup>①</sup>	2/0-4 AWG	45 lb.-ins.
Branch Breakers	See Marking on Breaker	
Type “LK” Subfeed Lug Kit	See Marking on Lug Kit	

① 150, 200 & 225 amp load centers.

② 100 & 125 amp load centers.

Terminals	Wire	Torque
Neutral-Ground (Use Type GB Ground Bar Kit Accessory)	14–10 AWG 8 AWG 6 AWG 4 AWG	20 lb.-ins. 25 lb.-ins. 35 lb.-ins. 45 lb.-ins.
Ground Conductors Only	(2) or (3) 14–10 AWG	20 lb.-ins.
LK1-2 (Accessory)	2/0-2 AWG	45 lb.-ins.
LK2 (Accessory)	2/0-4 AWG	135 lb.-ins.
LK3 (Accessory)	300 kcmil-1 AWG	340 lb.-ins.

③ Main lug load centers.

# EQ® Load Centers

## Main Breaker<sup>①</sup>

300–400 Ampere

### Features

- UL listed for 60/75°C conductors.  
See equipment markings for applications.
- Copper bus standard.
- Factory installed lock on indoor enclosure.

E3030MB1400SCU



**Selection**

### 1Ø, 3-Wire

120/240 Volts AC

		Branch Circuits Type QP		Indoor Enclosure — NEMA Type 1 (22,000A IR) <sup>②</sup>						Outdoor Enclosure — NEMA Type 3R (22,000A IR) <sup>②</sup>					
Ampere Rating	Max. 1-Pole	Max. 2-Poles	Catalog Number <sup>③</sup>	List Price \$	Std. Pkg.	Dimensions (inches)			Trim Style	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
						Height	Width	Depth					Height	Width	Depth <sup>④</sup>
300	42	20	E4242MB1300FCU	6263.00	1	58	20	6	Flush	—	—	—	—	—	—
300	42	20	E4242MB1300SCU	6263.00	1	58	20	6	Surface	—	—	—	—	—	—
400	30	14	E3030MB1400SCU	5751.00	1	52	20	6	Surface	W3030MB1400CU	6800.00	1	52	20	6
400	42	20	E4242MB1400FCU	6263.00	1	58	20	6	Flush	W4242MB1400CU	7408.00	1	58	20	6
400	42	20	E4242MB1400SCU	6263.00	1	58	20	6	Surface	—	—	—	—	—	—

### 3Ø, 3-Wire

240 Volts AC — or — 3-Phase, 4-Wire SN, 120/208 Volts AC

		Branch Circuits Type QP		Indoor Enclosure — NEMA Type 1 (22,000A IR) <sup>②</sup>						Outdoor Enclosure — NEMA Type 3R (22,000A IR) <sup>②</sup>					
Ampere Rating	Max. 1-Pole	Max. 2-Poles	Catalog Number <sup>③</sup>	List Price \$	Std. Pkg.	Dimensions (inches)			Trim Style	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
						Height	Width	Depth					Height	Width	Depth <sup>④</sup>
300	42	20	E4242MB3300SCU	6601.00	1	58	20	6	Surface	—	—	—	—	—	—
400	30	14	E3030MB3400SCU	5956.00	1	52	20	6	Surface	—	—	—	—	—	—
400	42	20	E4242MB3400FCU	6601.00	1	58	20	6	Flush	W4242MB3400CU	7672.00	1	58	20	6
400	42	20	E4242MB3400SCU	6601.00	1	58	20	6	Surface	—	—	—	—	—	—

## Main Lug

400 Ampere

### 1Ø, 3-Wire

120/240 Volts AC

		Branch Circuits Type QP		Indoor Enclosure — NEMA Type 1 (22,000A IR)						Outdoor Enclosure — NEMA Type 3R (22,000A IR)					
Ampere Rating	Max. 1-Pole	Max. 2-Poles	Catalog Number <sup>③</sup>	List Price \$	Std. Pkg.	Dimensions (inches)			Trim Style	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
						Height	Width	Depth					Height	Width	Depth <sup>④</sup>
400	24	12	—	—	—	—	—	—	—	W0606ML1400CU <sup>⑤</sup>	2275.00	1	43	20	6
400	30	14	E3030ML1400SCU	1871.00	1	41	20	6	Surface	W3030ML1400CU	2590.00	1	43	20	6
400	42	20	E4242ML1400FCU	2066.00	1	47	20	6	Surface	—	—	—	—	—	—
400	42	20	E4242ML1400SCU	2066.00	1	47	20	6	Flush	W4242ML1400CU	2777.00	1	47	20	6

### 3Ø, 3-Wire

240 Volts AC — or — 3-Phase, 4-Wire SN, 120/208 Volts AC

		Branch Circuits Type QP		Indoor Enclosure — NEMA Type 1 (22,000A IR) <sup>②</sup>						Outdoor Enclosure — NEMA Type 3R (22,000A IR) <sup>②</sup>					
Ampere Rating	Max. 1-Pole	Max. 2-Poles	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)			Trim Style	Catalog Number	List Price \$	Std. Pkg.	Dimensions (inches)		
						Height	Width	Depth					Height	Width	Depth <sup>④</sup>
400	30	14	E3030ML3400SCU	2050.00	1	41	20	6	Surface	—	—	—	—	—	—
400	42	20	E4242ML3400FCU	2134.00	1	47	20	6	Flush	W4242ML3400CU	2850.00	1	47	20	6
400	42	20	E4242ML3400SCU	2134.00	1	47	20	6	Surface	—	—	—	—	—	—

① UL listed as suitable for use as service equipment.

② 65,000A IR on 600A.

③ Where noted suffix S = Surface, F = Flush.

④ Does not include 2" rainhead overhang.

⑤ Accepts up to six QN style breakers.

⑥ Suitable for use as service entrance equipment when more than six main disconnecting means are provided and when not used as a lighting and appliance panelboard.



# Load Centers

## Special Application Load Centers

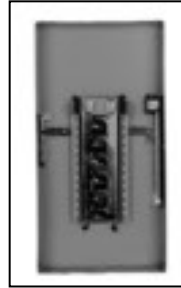
Selection

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



### Standby Power Panels

These panels feature two back-fed main breakers that are mechanically interlocked to allow only one main breaker to be "on" at a time. Additional branch circuit spaces allow critical circuits to be controlled through this panel.



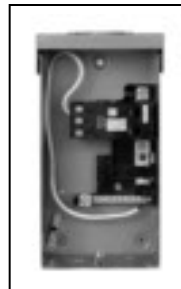
### Renovation Panel

Ideal for older home renovation projects where the distance between the studs is narrower than current construction practices. The narrower panel eliminates the need to 'notch' out the existing studs.



### Trailer Panels

These feed-through panels are UL listed as Service Equipment and are ideal for serving mobile homes located on private lots. The panels either have factory or field added main breakers with subfeed lugs. Additional breaker positions allow connection of external circuits such as lights, pumps, etc.



### Spa Panels

Spa Panels are ideal for outdoor applications requiring the use of ground fault protection, such as hot tubs. A factory installed 2-Pole GFCI breaker is provided, along with 2 extra circuits.

### Spa Panels

Main Amp	No. of Spaces <sup>①</sup>	Max. Circuits	Catalog Number	Dimensions <sup>②</sup>			List Price \$
				Height	Width	Depth	
125	2	4	W0408L1125SPA50 <sup>③</sup>	12¼	16½	4¼	600.00
125	2	4	W0408L1125SPA60 <sup>③</sup>	12¼	16½	4¼	630.00

### Renovation Panels - 3-Wire 120/240V AC

Main Amp	No. of Spaces <sup>①</sup>	Max. Circuits	Catalog Number	Dimensions <sup>②</sup>			List Price \$
				Height	Width	Depth	
100	10	20	E1020MB1100FCGP <sup>④</sup>	14¾	12½	3⅞	494.00
100	12	24	E1224ML1100FCU	14¾	12½	3⅞	265.00

### Standby Power Panels - 3-Wire 120/240V AC<sup>⑤</sup>

Utility Main	Generator Main	No. of Spaces <sup>①</sup>	Max. Circuits	Indoor Type 1 Catalog Number	Dimensions <sup>②</sup>			List Price \$
					Height	Width	Depth	
60	60	12	24	G1224B6060GC <sup>⑥</sup>	21	14¾	4	758.00
100	60	12	24	G1224B10060GC <sup>⑥</sup>	21	14¾	4	945.00
100	60	12	24	W1224B10060GC <sup>⑦</sup>	21	14¾	4	1139.00

### Outdoor<sup>⑧</sup> Trailer Panels - 120/240V AC 208Y/120V AC

Amps Max	No. of Spaces	Max. Circuits	Indoor Type 1 Catalog Number	Dimensions <sup>②</sup>			Main Breaker		List Price \$
				Height	Width	Depth			
200	4	8	W0404MB1200CT <sup>⑨</sup>	20	11½	4¾	QN2200R	Factory	823.00
200	8	16	W0816L1200CT <sup>⑩</sup>	29	14¾	4½	MBK	Field	494.00
200	8	16	W0816B1200CT <sup>⑪</sup>	29	14¾	4½	MBK200A	Factory	925.00

① HS hub provision provided. Closure plate included.

② Dimensions shown are representative of outside box length, width, and depth and do not include allowances for mounting bumps, endwalls, covers, hubs, or hardware protrusions. Dimensions are subject to change.

③ For Main breaker applications, field - add an MBK150A or MBK200A.

④ W0404MB1200CT shipped with ECHS200 hub instead of closure plate.

⑤ These branch breaker provisions are in addition to the two factory installed main breakers.

⑥ Indoor Type 1 Enclosure.

⑦ Outdoor Type 3R Enclosure.

⑧ Two Q115 and one Q230 provided.

⑨ 50 Amp, 2-pole GFCI breaker installed.

⑩ 60 Amp, 2-pole GFCI breaker installed.

⑪ 200A factory installed main breaker included.

⑫ 100A factory installed main breaker included.

⑬ **NEW** See Standby Generator Section 17 for a complete line of manual transfer interlock kits which can convert most load centers and meter combinations into standby power panels.

# EQ® Load Centers

## Riser Panel Load Centers

Riser Panel Load Centers are ideal for high rise applications. The shifted interior provides room for conductors to pass through the load center®. The tap kits allow the installer to tap off from those conductors to power the panel.®

### Features

- UL Listed
- Convertible from main lug to main breaker®
- Easily removable interior
- Copper bus bars

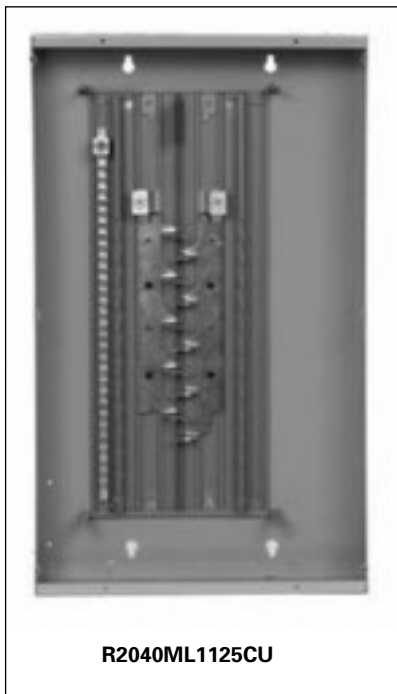
The Riser Gutter Tap Kit (ECRLK250) allows the installer to tap off of the main conductors, eliminating the need to cut completely through the conductor. The tap kit accepts 250-1/0 on the main conductor side and 250-6 on the tap side. One ECRLK250 comes with 3 lug kits.

### Selection

The Riser Gutter (RAG24) is used to convert any load center 24" or larger into a riser panel.

### Features

- UL Listed
- Single and 3-phase applications
- Compatible with any single or 3-phase Siemens load center 24" or higher
- Flush trim included
- Load center mounting hardware and pass thru bushing included
- Catalog number — **RAG24**



Amp Rating	Max 1-pole No. of Spaces	No. of Circuits	QP Max. 2-Poles	Catalog Number	List Price \$	Dimensions		
						H	W	D
125	12	24	6	<b>R1224ML1125CU</b>	<b>465.00</b>	18	14¼	4
125	20	40	10	<b>R2040ML1125CU</b>	<b>550.00</b>	24	14¼	4

**Notes:**

1. The riser panels are single phase only, but can be fed from single or 3-phase systems running through the gutter trough area.
2. Tap lug kits not included.
3. Use main breaker kit MBK125.
4. Use ECGB series of ground bars for field grounds.

# AC Disconnects

## 1-Phase, NEMA 3R Rated

Selection

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



### Steel AC Disconnects<sup>①②</sup>

Ampere Rating	Disconnect Type	Catalog Number	Horse Power Rating	Dimensions			List Price \$	Pallet Qty.①
				Height	Width	Depth		
30	Fused Pullout	WF2030	3	7¼	5	2½	145.00	360
60	Fused Pullout	WF2060	10	9	5	2½	145.00	360
60	Non-fused Pullout	WN2060	10	7¼	5	2½	145.00	360
60	Non-automatic Switch	WNAS2060	10	7¼	5	2½	173.00	360

### Plastic AC Disconnects<sup>①②</sup>

Ampere Rating	Disconnect Type	Catalog Number	Horse Power Rating	Dimensions			List Price \$	Pallet Qty.①
				Height	Width	Depth		
30	Fused Pullout	WF2030PL	3	7¼	5	2½	221.00	216
60	Fused Pullout	WF2060PL	10	7¼	5	2½	221.00	216
60	Non-fused Pullout	WN2060PL	10	7¼	5	2½	201.00	360
60	NEW Non-Fused Pullout	WN2060PLX	10	8	5¼	3½	211.00	288
60	NEW Non-automatic switch	WNAS2060PL	10	7¼	5	2½	201.00	360

### Steel AC Disconnects with 15 Amp GFCI Receptacle<sup>①②</sup>

Ampere Rating	Disconnect Type	Catalog Number	Horse Power Rating	Dimensions			List Price \$	Pallet Qty.①
				Height	Width	Depth		
30	Fused Pullout	WF2030GFCI	3	9	6½	5⅝	471.00	112
60	Fused Pullout	WF2060GFCI	10	9	6½	5⅝	471.00	112
60	Non-fused Pullout	WN2060GFCI	10	7¼	5¼	5⅝	436.00	144
60	Non-automatic Switch	WNAS2060GFCI	10	7¼	5¼	5⅝	471.00	144

### Wire Range Table

Connector	Copper		Aluminum	
	Solid	Stranded	Solid	Stranded
Line	#14-8	#14-3	#12-8	#12-3
Load	#14-8	#14-3	#12-8	#12-3
Neutral	#12-8	#12-2	#12-8	#12-2
Equip. Grnd	#12-8	#12-2	#12-8	#12-2

① Add a "BP" to the end of the catalog number to order in pallet quantities, example: WN2060BP.

② Accepts Class H Fuse

# Load Centers

## Load Center replacement and OEM Interiors

Selection

LOAD CENTERS & CIRCUIT BREAKERS

### 1ø: Small Circuit Main Lug Interiors

Amps	Catalog Number <sup>②</sup>	Spaces	Circuits	Dimensions		List Price \$
				Height	Width	
60	I0204ML1125	2	2	5.06	2.12	31.50
60	I0303ML3100	3	3	5.06	3.12	59.00
125	I0408ML1125	4	8	4.51	6.61	57.00
125	I0816ML1125CU	8	16	6.19	6.81	109.00
125	I0816ML1125CUSP	8	16	6.19	6.81	109.00
200	I0202L1200	4	4	3.88	7.13	67.00
200	I1220L1200CT	12	20	9.00	7.00	165.00

### Ultimate 1ø: High Circuit Main Lug Interiors with Neutral Bars<sup>④</sup>

Amps	Catalog Number <sup>②</sup>	Spaces	Circuits	Dimensions		List Price \$
				Height	Width	
125	I1224L1125CU	12	24	10.80	9.80	132.00
125	I1624L1125CU	16	24	12.80	9.80	154.00
125	I3040L1125CU	30	40	20.80	9.80	198.00
200	I0816L1200CT <sup>③</sup>	8	16	10.80	9.80	165.00
200	I1224L1200CU	12	24	10.80	9.80	188.00
200	I1632L1200CU	16	32	14.80	9.80	202.00
200	I2040L1200CU	20	40	12.80	9.80	231.00
200	I3040L1200CU	30	40	14.80	9.80	343.00
200	I4040L1200CU	40	40	24.80	9.80	376.00
225	I4242L1225CU	42	42	26.80	9.80	496.00

### Rock Solid 1ø: High Circuit Main Lug Interiors (no neutrals)<sup>④</sup>

Amps	Catalog Number <sup>②</sup>	Spaces	Circuits	Dimensions		List Price \$
				Height	Width	
125	IR1224L1125	12	24	10.80	7.40	99.00
125	IR1632L1125	16	32	12.80	7.40	122.00
125	IR2040L1125CU	20	40	14.80	7.40	144.00
125	IR3040L1125	30	40	20.80	7.40	166.00
200	IR0816L1200TR <sup>③</sup>	8	16	10.80	7.40	132.00
200	IR2040L1200CU	20	40	14.80	7.40	188.00
200	IR2440L1200	24	40	16.80	7.40	210.00
200	IR3040L1200CU	30	40	20.80	7.40	231.00
200	IR4040L1200CU	40	40	24.80	7.40	298.00
225	IR4242L1225CU	42	42	26.80	7.40	385.00

### Ultimate 1ø: Parallel Lug Interiors with Neutral Bars

Amps	Catalog Number <sup>②</sup>	Spaces	Circuits	Dimensions		List Price \$
				Height	Width	
200	CTI2040L1200CU	20	40	14.80	9.80	418.00
200	CTI2440L1200CU	24	40	16.80	9.80	441.00
200	CTI3040L1200CU	30	40	20.80	9.80	496.00

### 3ø: Main Lug Interiors

Amps	Catalog Number <sup>②</sup>	Spaces	Circuits	Dimensions		List Price \$
				Height	Width	
125	I1224L3125CU	12	24	10.50	8.70	254.00
200	I1224L3200CU	12	24	10.50	8.70	276.00
200	I1836L3200CU	18	36	13.50	8.70	330.00
200	I2442L3200CU	24	42	16.50	8.70	385.00
200	I3042L3200CU	30	42	19.50	8.70	518.00
225	I4242L3225CU	42	42	25.50	8.70	606.00

### Lug Data

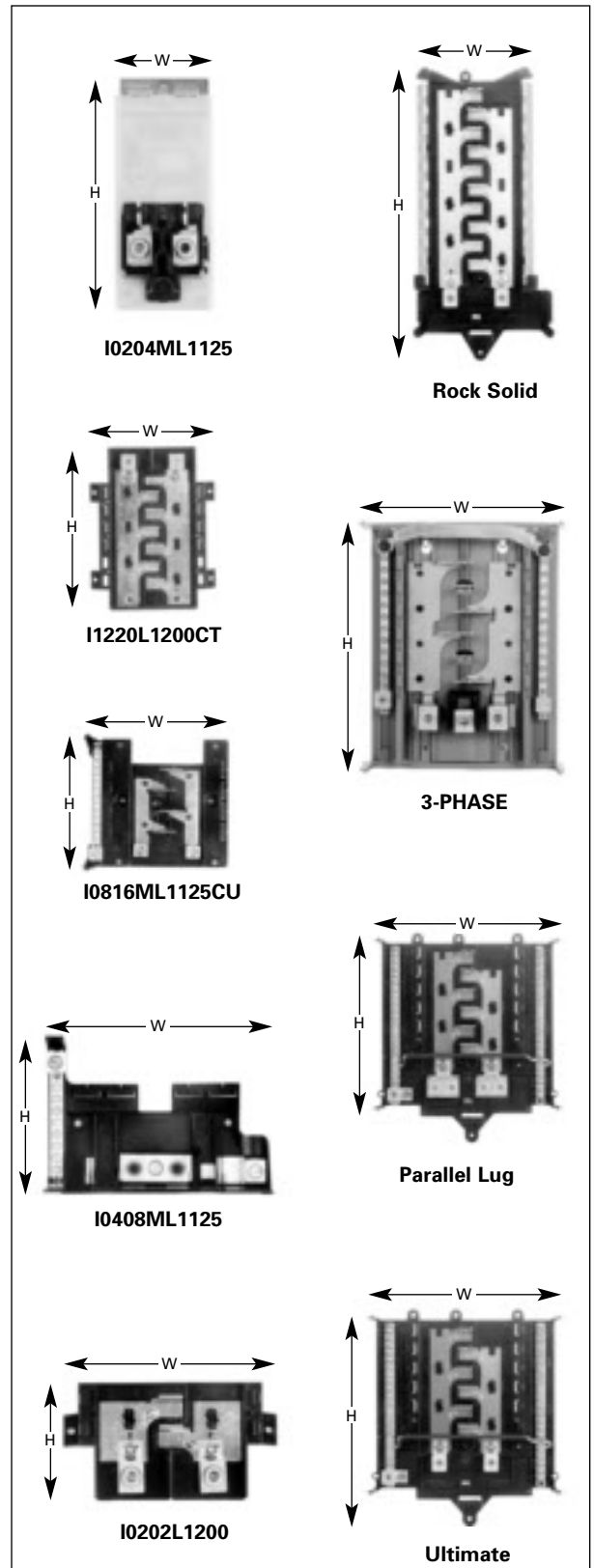
Interior	Amperage	Wire range	Torque
I0204ML1060	60	2/0 - 4 AWG	45 lb. - ins.
I0303ML3100	100	2/0 - 4 AWG	45 lb. - ins.
I1224ML1100	100	2/0 - 4 AWG	45 lb. - ins.
I0408ML1125	125	2/0 - 4 AWG	45 lb. - ins.
I0816ML1125CU/CUSP	60	2/0 - 4 AWG	45 lb. - ins.
Ultimate	125	2/0 - 4 AWG	110 lb. - ins.
Ultimate	200/225	300 kcmil - 4 AWG	110 lb. - ins.
Rock Solid	125	2/0 - 4 AWG	110 lb. - ins.
Rock Solid	200/225	300 kcmil - 4 AWG	275 lb. - ins.
Three Phase	125	300 kcmil - 6 AWG	340 lb. - ins.
Three Phase	200/225	300 kcmil - 6 AWG	340 lb. - ins.

① UL Recognized Components.

② The letters "CU" in any catalog number represent copper bus bars.

③ Feed thru lugs provided.

④ Convertible to main breaker using the MBK main breaker kits.



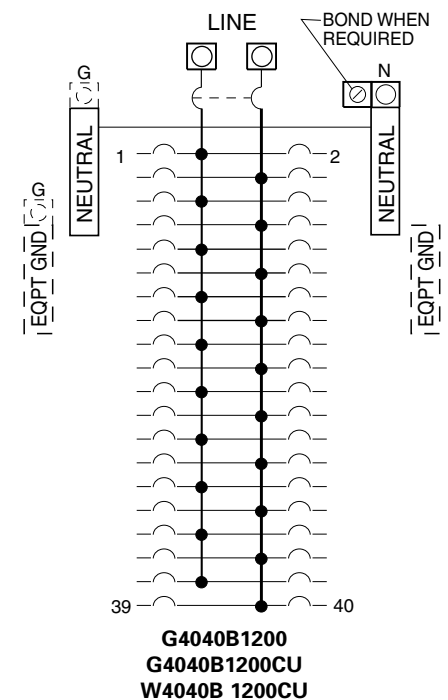
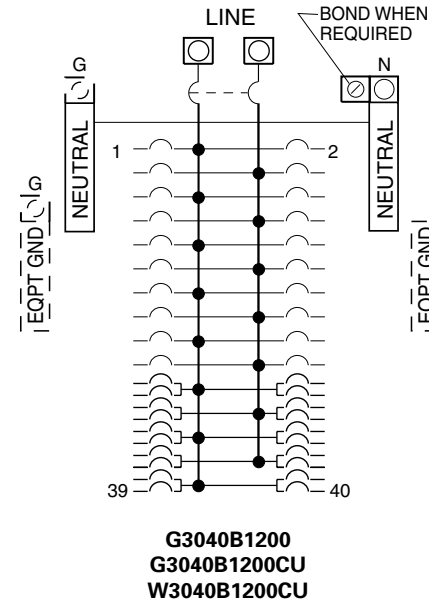
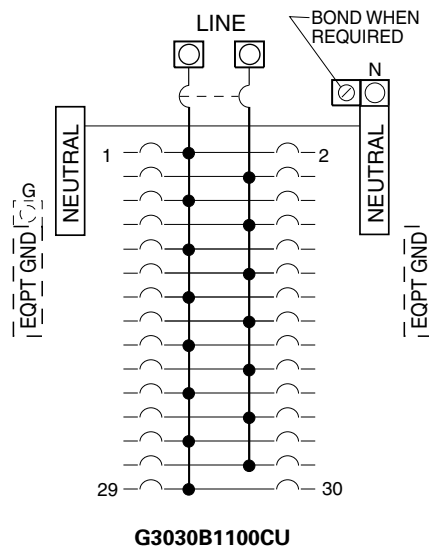
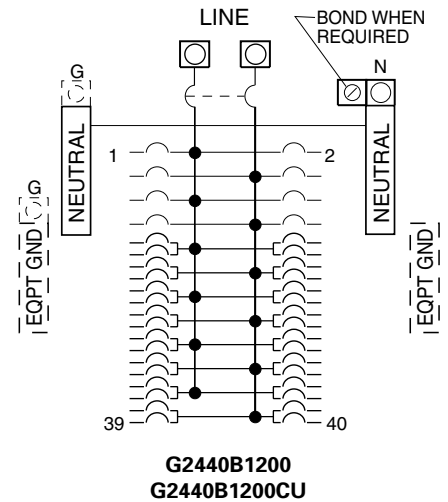
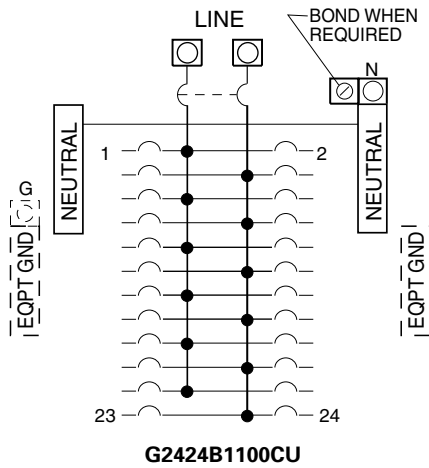
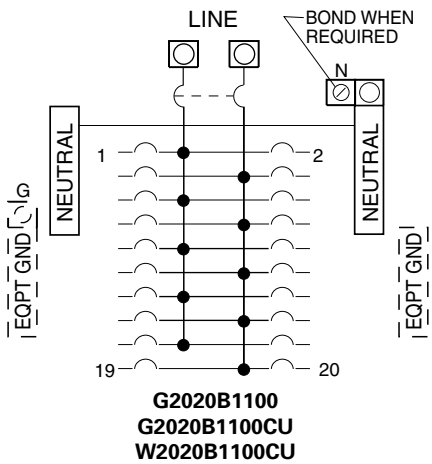
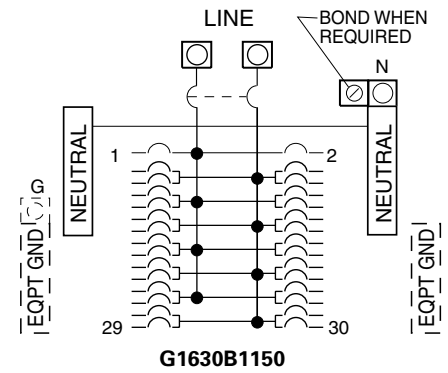
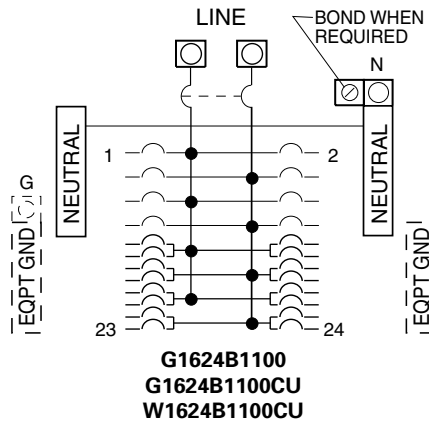
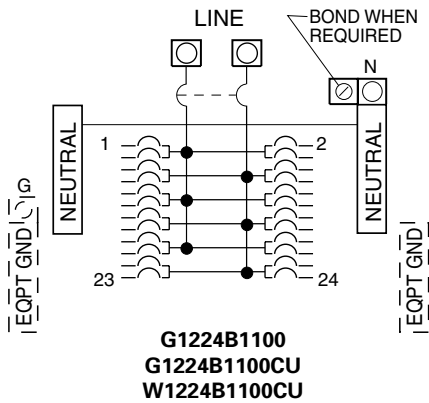
# Ultimate Load Centers

## Main Breaker Wiring Diagrams

## Wiring Diagrams

All load centers comply fully with NEC and UL requirements for Class CTL.  
Single Main – 1-Phase, 3-Wire

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



# Ultimate Load Centers

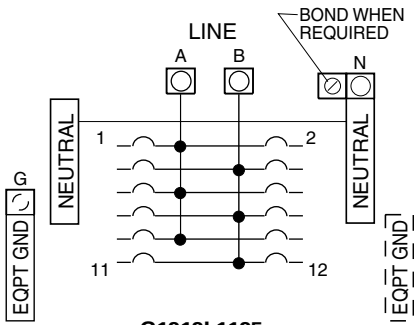
## Main Lug Wiring Diagrams

## Wiring Diagrams

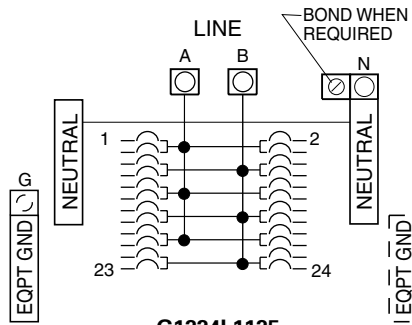
All load centers comply fully with NEC and UL requirements for Class CTL.  
Single Main - 1-Phase, 3-Wire

1

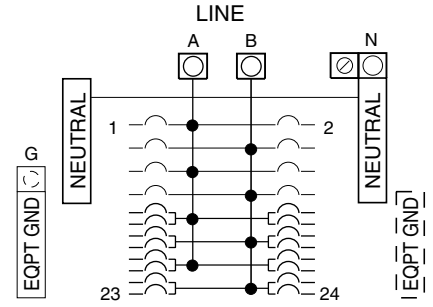
LOAD CENTERS &  
CIRCUIT BREAKERS



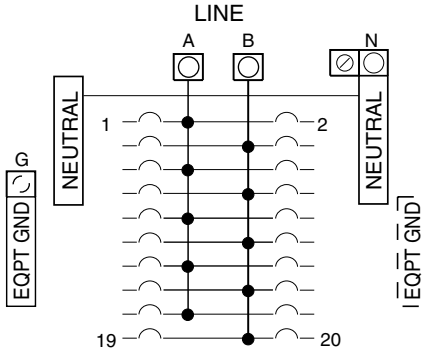
**G1212L1125**  
**G1212L1125CU**



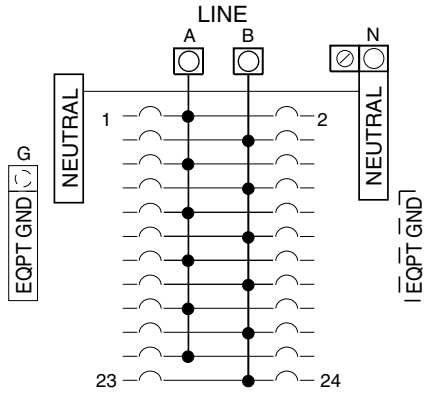
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**G1224L1125CU**  
**W1224L1125CU**  
**G1224L1200CU**  
**W1224L1200CU**



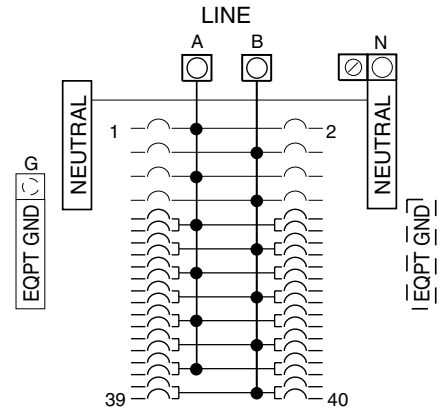
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**W1624L1125CU**



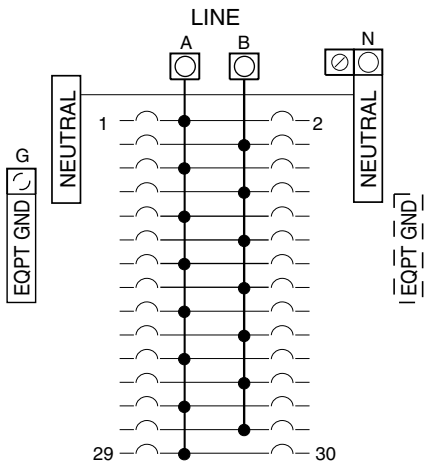
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**G2020L1125CU**



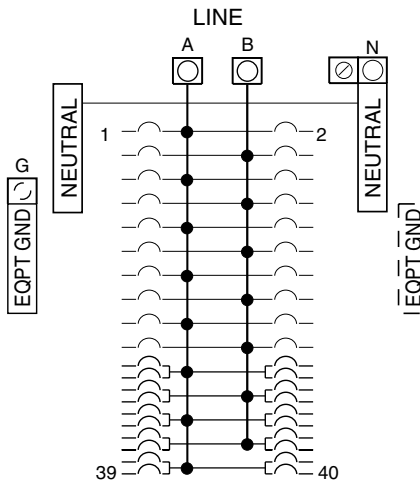
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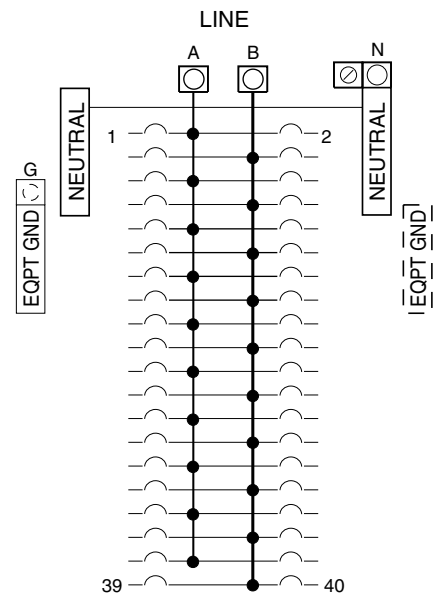
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**G2440L1200CU**  
**W2440L1200CU**



**G3030L1200**  
**G3030L1200CU**



**G3040L1200**  
**G3040L1200CU**  
**W3040L1200CU**

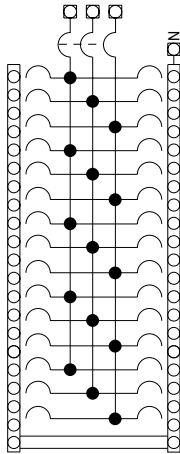


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**G4040L1200CU**  
**W4040L1200CU**

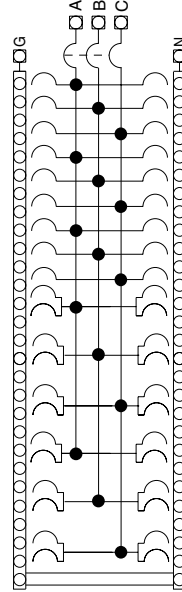
# EQ Load Centers

## 3-Phase Load Center

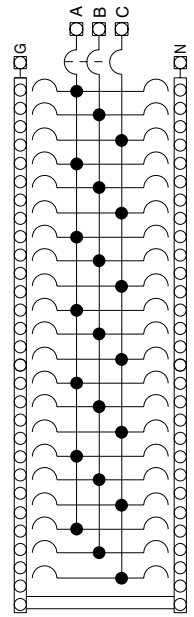
Main Breaker  
Wiring Diagrams



**G3030B3100CU**

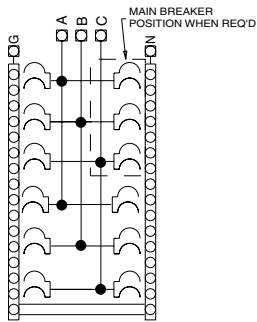


**G3042B3150CU**  
**G3042B3200CU**  
**W3042B3150CU**  
**W3042B3200CU**

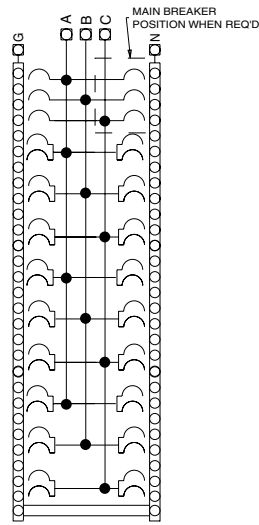


**G4242B3200CU**  
**G4242B3225CU**  
**W4242B3200CU**  
**W4242B3225CU**

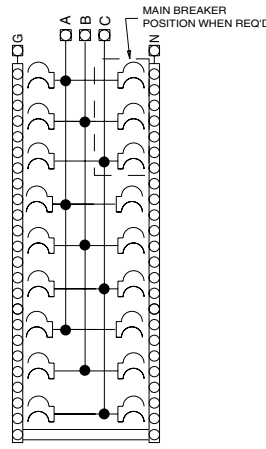
Main Lug  
Wiring Diagrams



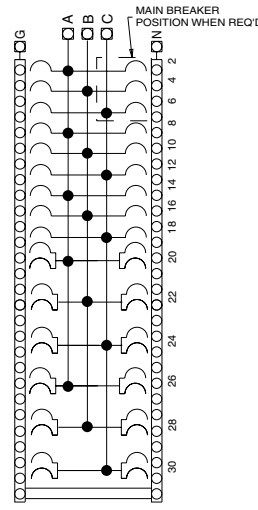
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**W1224L3200CU**



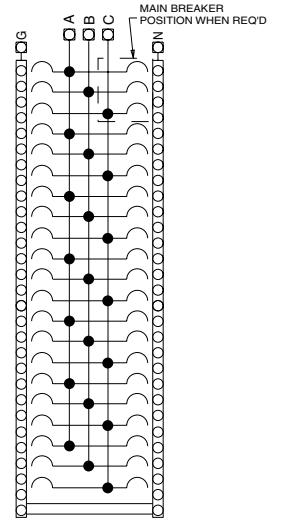
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**G2442L3200CU**  
**W2442L3150CU**  
**W2442L3200CU**



**G1836L3150CU**  
**W1836L3150CU**



**G3042L3200CU**  
**W3042L3200CU**



**G4242L3200CU**  
**G4242L3225CU**  
**W4242L3200CU**  
**W4242L3225CU**

# EQ® Load Centers

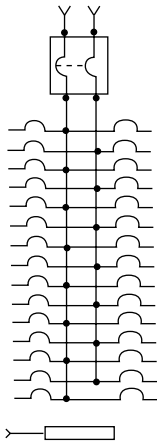
## Main Breaker 300-400 Amperes

## Wiring Diagrams

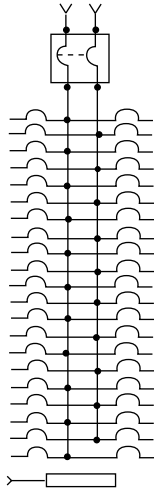
LOAD CENTERS & CIRCUIT BREAKERS

### 1 Main Breaker 300-400 Amperes

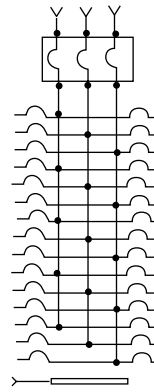
#### Wiring Diagrams



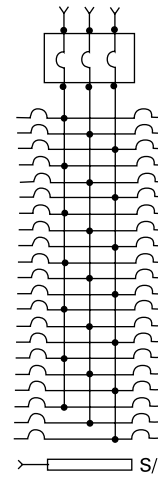
**E3030MB1400SCU**  
**W3030MB1400CU**  
30-Poles Max.



**E4242MB1300SCU**  
**E4242MB1300FCU**  
**E4242MB1400SCU**  
**E4242MB1400FCU**  
**W4242MB1400CU**  
42-Poles Max.



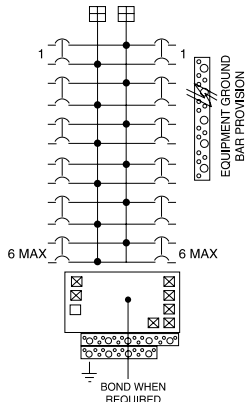
**E3030MB3400SCU**  
30-Poles Max.



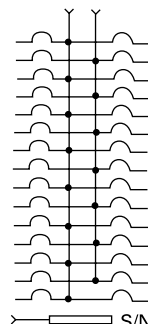
**E4242MB3300SCU**  
**E4242MB3400SCU**  
**E4242MB3400FCU**  
**W4242MB3400CU**  
42-Poles Max.

### Main Lugs 400 Ampere

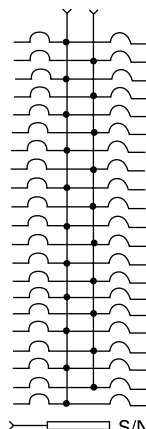
#### Wiring Diagrams



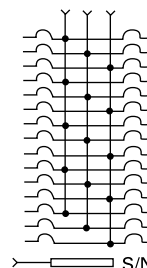
**W0606ML1400CU**  
(6) 2-Poles Max.



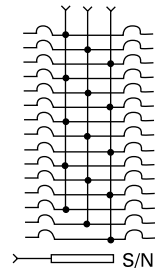
**E3030ML1400SCU**  
**W3030ML1400CO**  
30-Poles Max.



**E4242ML1400SCU**  
**E4242ML1400FCU**  
**W4242ML1400CU**  
42-Poles Max.



**E3030ML3400SCU**  
30-Poles Max.



**E4242ML3400SCU**  
**E4242ML3400FCU**  
**E4242ML3400CU**  
42-Poles Max.

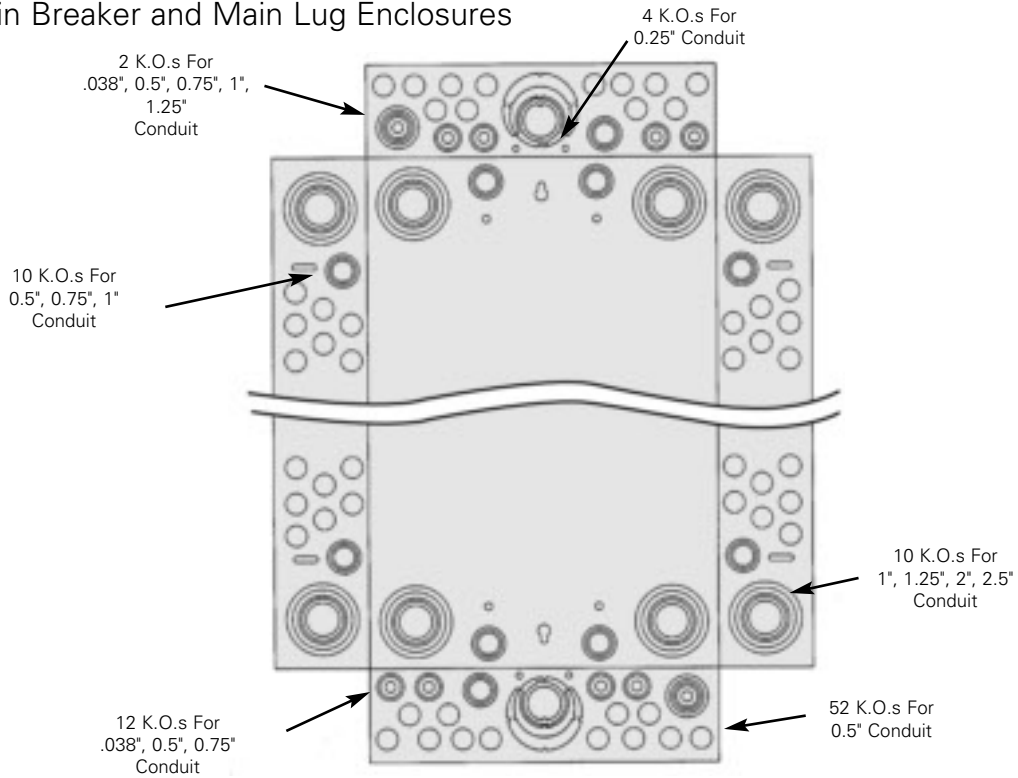


# Ultimate Load Center

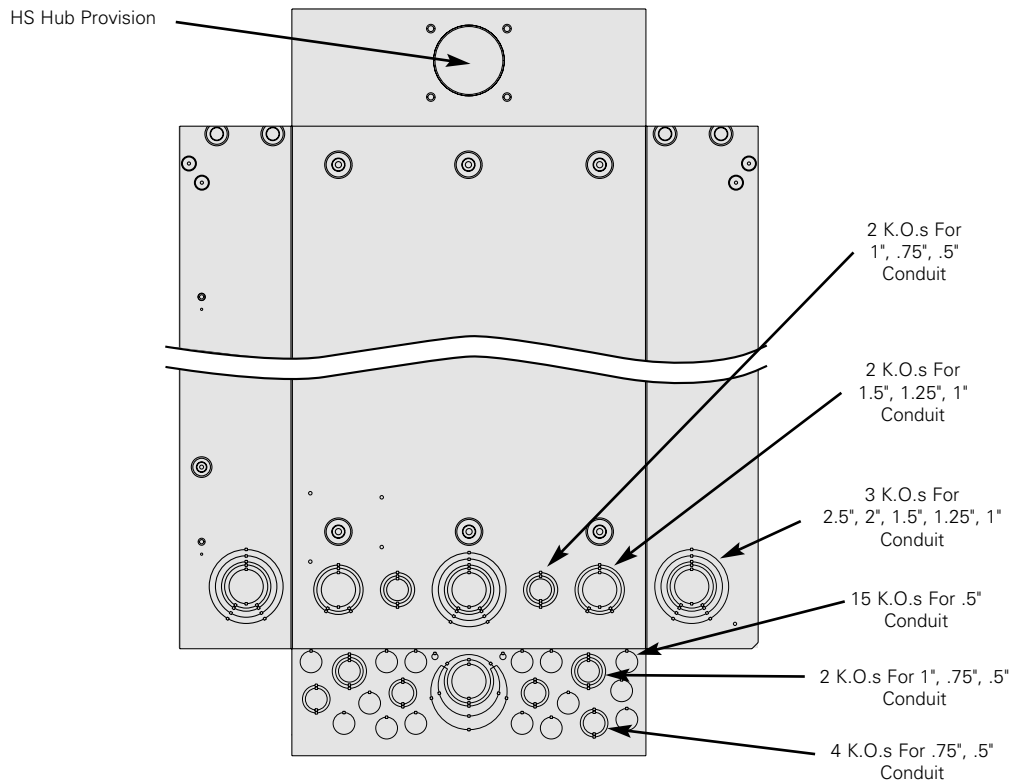
## Indoor and Outdoor Enclosures

## Knockout Diagrams

### Indoor Main Breaker and Main Lug Enclosures



### Outdoor Main Breaker and Main Lug Enclosures



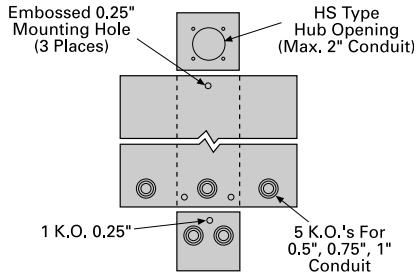
# EQ® Load Centers

## Outdoor Enclosures

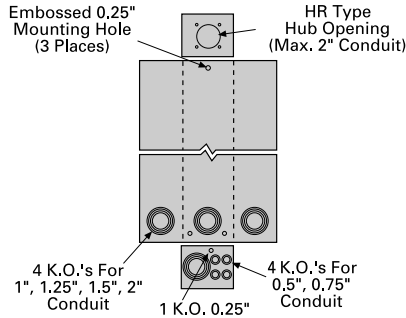
## Knockout Diagrams

### Outdoor Enclosure Knockout Diagrams

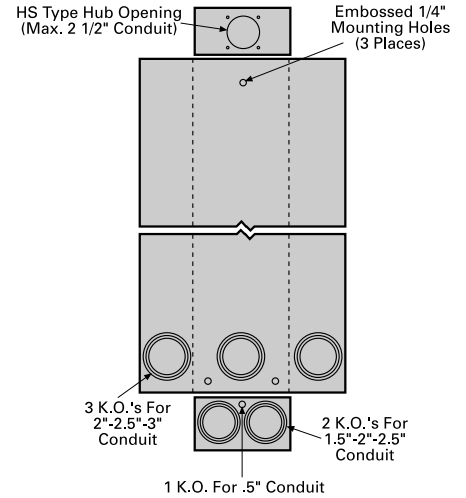
LOAD CENTERS & CIRCUIT BREAKERS



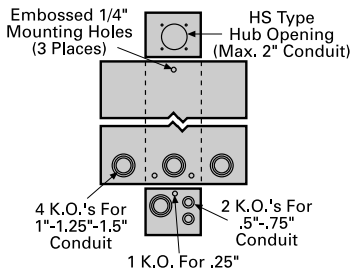
**W0204ML1060**



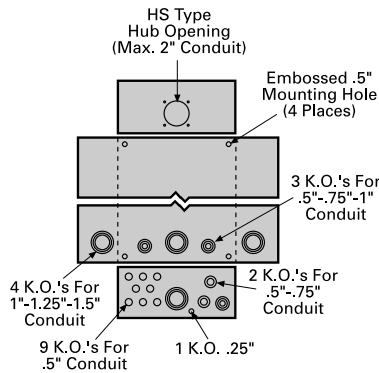
**W0204ML1125  
 W0303ML3100  
 WB3100**



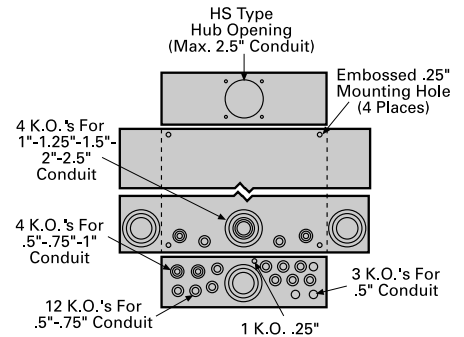
**WB2225 and WB32225**



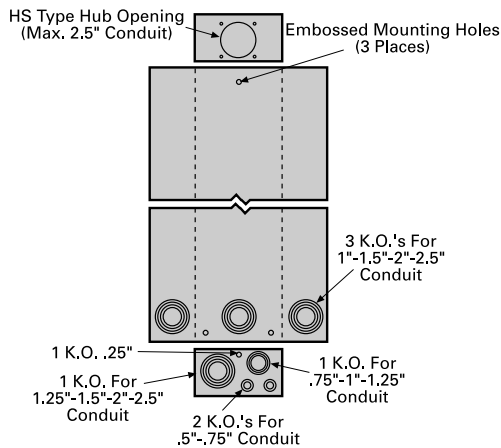
**W0408ML1125**



**W0612ML1125  
 W0816ML1125**



**100A - 225A  
 Main Breaker and Main Lug  
 Devices**



**W0406ML1125CU**

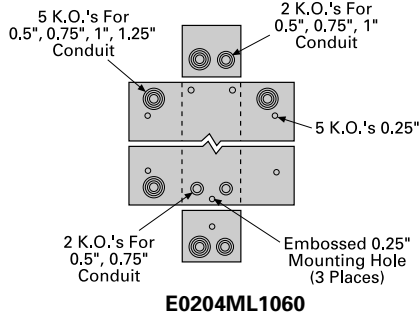
# EQ® Load Centers

## Indoor Enclosures

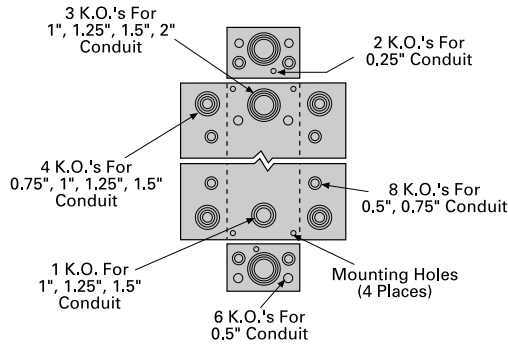
### Indoor Enclosure Knockout Diagrams

### Knockout Diagrams

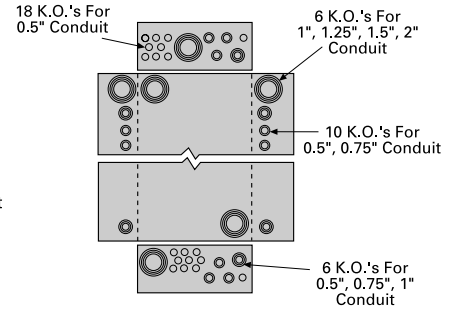
1  
LOAD CENTERS &  
CIRCUIT BREAKERS



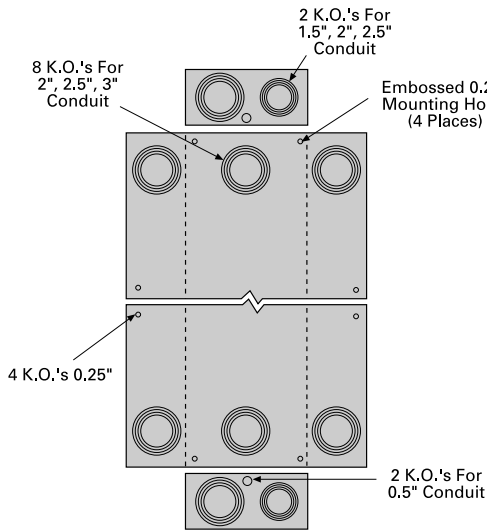
**E0204ML1060**



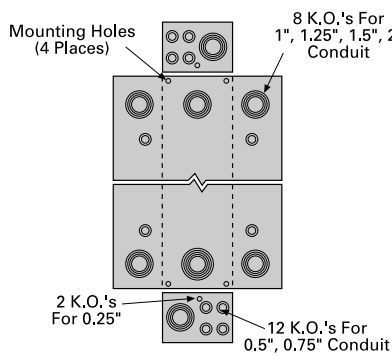
**E0408ML1125**



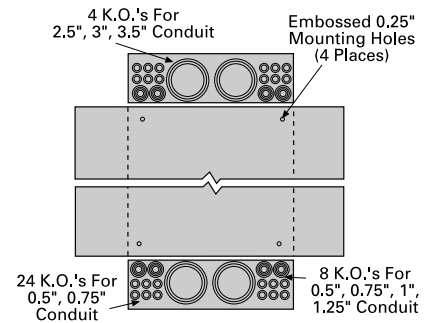
**E0612ML1125  
E0816ML1125  
E1224ML1100F**



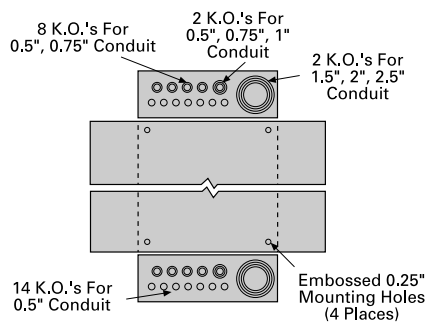
**EB3225**



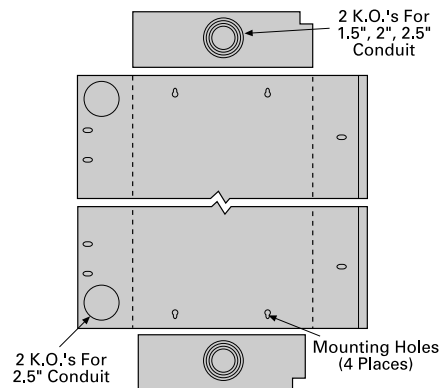
**E0303ML3100SCU  
EB3100**



**300-400A Main Breaker and Main Lug Devices**



**All Riser Panels**



**RAG24**

# Circuit Breakers

## Type QP with INSTA-WIRE

Selection

### 1-Pole Plug-In (120V AC) <sup>①⑤</sup>

Continuous Current Rating @ 40° C	Type QP		Type QPH		Type HQP	
	10,000A IR		22,000A IR		65,000A IR	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
10	Q110 <sup>®</sup> <b>NEW</b>	33.00	—	—	—	—
15	Q115 <sup>®</sup>	33.00	Q115H <sup>®</sup>	66.00	Q115HH <sup>®</sup>	123.00
20	Q120 <sup>®</sup>	33.00	Q120H <sup>®</sup>	66.00	Q120HH <sup>®</sup>	123.00
25	Q125	33.00	Q125H	66.00	Q125HH	123.00
30	Q130	33.00	Q130H	72.00	Q130HH	143.00
35	Q135	33.00	Q135H	72.00	Q135HH	143.00
40	Q140	33.00	Q140H	72.00	Q140HH	143.00
45	Q145	33.00	Q145H	72.00	Q145HH	143.00
50	Q150	33.00	Q150H	72.00	Q150HH	143.00
60	Q160	33.00	Q160H	72.00	Q160HH	143.00
70	Q170	69.00	Q170H	93.00	Q170HH	179.00



### 2-Pole Plug-In (Common-Trip 120/240V AC) <sup>①⑥</sup>

10	Q210 <sup>®</sup>	71.00	—	—	—	—
15	Q215	71.00	Q215H	147.00	Q215HH	313.00
20	Q220	71.00	Q220H	147.00	Q220HH	313.00
25	Q225	71.00	Q225H	147.00	Q225HH	313.00
30	Q230	71.00	Q230H	147.00	Q230HH	313.00
35	Q235	71.00	Q235H	147.00	Q235HH	313.00
40	Q240	71.00	Q240H	147.00	Q240HH	334.00
45	Q245	71.00	Q245H	147.00	Q245HH	334.00
50	Q250	71.00	Q250H	147.00	Q250HH	334.00
60	Q260	71.00	Q260H	147.00	Q260HH	334.00
70	Q270	145.00	Q270H	236.00	Q270HH	558.00
80	Q280	210.00	Q280H	330.00	Q280HH	689.00
90	Q290	210.00	Q290H	330.00	Q290HH	689.00
100	Q2100	210.00	Q2100H	330.00	Q2100HH	689.00
110	Q2110	433.00	Q2110H	1128.00	Q2110HH	2277.00
125	Q2125	433.00	Q2125H	1128.00	Q2125HH	2277.00



### 2-Pole Plug-In (Common-Trip 240V AC) <sup>①④⑥</sup>

15	Q215R	213.00	—	—	—	—
20	Q220R	213.00	—	—	—	—
30	Q230R	213.00	—	—	—	—
40	Q240R	213.00	—	—	—	—
50	Q250R	213.00	—	—	—	—
60	Q260R	213.00	—	—	—	—
70	Q270R	236.00	—	—	—	—
100	Q2100R	330.00	—	—	—	—

### 3-Pole Plug-In (Common-Trip 240V AC) <sup>①⑦</sup>

10	Q310 <sup>®</sup>	253.00	—	—	—	—
15	Q315	253.00	Q315H	395.00	Q315HH	527.00
20	Q320	253.00	Q320H	395.00	Q320HH	527.00
25	Q325	253.00	Q325H	395.00	Q325HH	527.00
30	Q330	253.00	Q330H	395.00	Q330HH	527.00
35	Q335	253.00	Q335H	395.00	Q335HH	527.00
40	Q340	253.00	Q340H	395.00	Q340HH	615.00
45	Q345	253.00	Q345H	395.00	Q345HH	615.00
50	Q350	253.00	Q350H	395.00	Q350HH	615.00
60	Q360	253.00	Q360H	500.00	Q360HH	660.00
70	Q370	317.00	Q370H	500.00	Q370HH	660.00
80	Q380	380.00	Q380H	560.00	Q380HH	740.00
90	Q390	380.00	Q390H	560.00	Q390HH	740.00
100	Q3100	380.00	Q3100H	560.00	Q3100HH	740.00



### QP / QPH / HQP Internal Accessories

Control Voltage AC	Catalog Number	Field/Factory Installed	List Price \$
120V Shunt Trip	add suffix ...00S01	Factory	134.00 (adder)
24V Shunt Trip	add suffix ...00S07	Factory	134.00 (adder)
120V Auxiliary Switch	add suffix ...01	Factory	74.00 (adder)
3-Pole Padlocking Device	EQLD3	Field	98.00
Handle Block	ECHBD1	Field	9.10

### Modifications

Description	Catalog Number	List Price \$
400 Hz Calibration	add suffix ...Y <sup>®</sup>	7.50 (adder)
415V 50Hz Calibration	add suffix ...E <sup>®</sup>	No adder
Marine 50°C Ambient Calibration	add suffix ...M	No adder
Fungus Proofing	add suffix ...F	10.00 (adder per pole)

■ Built to order. Allow 2-3 weeks for delivery.

① UL Listed for use with 60/75° wire through 125 amps, HACR rated.

② 1A and 1B contacts.

③ UL Listed for frequent switching applications (SWD).

120V AC Fluorescent Lighting.

④ UL Listed for use on 3-phase grounded "B" systems — 10,000 for this application.

⑤ Shipped 12 per sleeve.

⑥ Shipped 6 per sleeve.

⑦ Shipped 4 per sleeve.

® UL Listed 5 KA IR.

® Not UL Listed.

® 1 & 2-Poles only.

® **NEW** Type QP1, UL listed for 16 AWG conductors and multiple wires.

# Circuit Breakers

## Duplex, Triplex and Quadplex Plug-In Breakers

### Selection

#### Duplex Circuit Breakers

Breaker Type	Ampere Rating	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>QT</b> 1-Pole 10K AIC 120V AC	15-15	Q1515	69.00	Q1515NC <sup>①</sup>	114.00
	15-20	Q1520	69.00	Q1520NC <sup>①</sup>	114.00
	20-20	Q2020	69.00	Q2020NC <sup>①</sup>	114.00
	20-30	Q2030	69.00	—	—
	15-30 ■	Q3015	69.00	—	—
	20-30	Q3020	69.00	—	—
	30-30	Q3030	69.00	Q3030NC <sup>①</sup>	114.00
<b>SHIPPING:</b> 12 per carton, (Wt. 4.8 lbs.)					

#### Triplex Circuit Breakers

Breaker Type	Ampere Rating		Catalog Number	List Price \$
	Single Pole	Common-Trip 2-Pole		
<b>QT</b> 2-Pole 10K AIC 120/240V AC Center Common Trip	15	15	Q21515CT	134.00
	15	20	Q21520CT	134.00
	15	25	Q21525CT ■	134.00
	15	30	Q21530CT	134.00
	15	35	Q21535CT ■	134.00
	15	40	Q21540CT	134.00
	15	45	Q21545CT ■	134.00
	15	50	Q21550CT	134.00
	20	20	Q22020CT	134.00
	20	25	Q22025CT ■	134.00
	20	30	Q22030CT	134.00
	20	35	Q22035CT ■	134.00
	20	40	Q22040CT	134.00
	20	45	Q22045CT ■	134.00
	20	50	Q22050CT	134.00
	30	30	Q23030CT	128.00
	<b>SHIPPING:</b> 6 per carton, (Wt. 4.9 lbs.)			

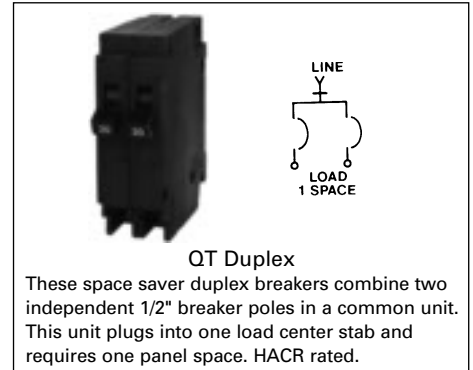
#### Quadplex Circuit Breakers

Breaker Type	Ampere Rating		Catalog Number	List Price \$
	Inside 2-Pole	Outside 2-Pole		
<b>QT</b> 2-Pole 10K AIC 120/240V AC Common Trip	15	15	Q21515CT2	139.00
	20	20	Q22020CT2	139.00
	20	30	Q23020CT2	139.00
	20	40	Q24020CT2	139.00
	30	30	Q23030CT2	139.00
	30	40	Q24030CT2	139.00
	40	40	Q24040CT2	139.00
	50	30	Q23050CT2	139.00
<b>SHIPPING:</b> 6 per carton, (Wt. 4.8 lbs.)				

#### QT Accessories

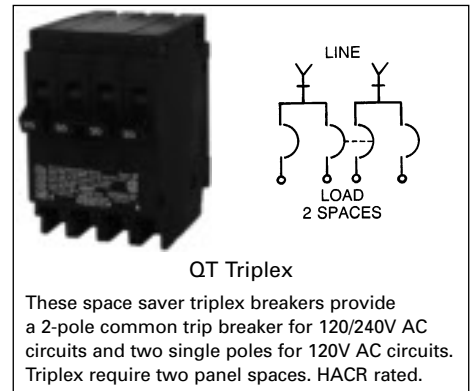
Description	Catalog Number	List Price \$
Handle Block	ECBX231M	9.70

1 LOAD CENTERS & CIRCUIT BREAKERS



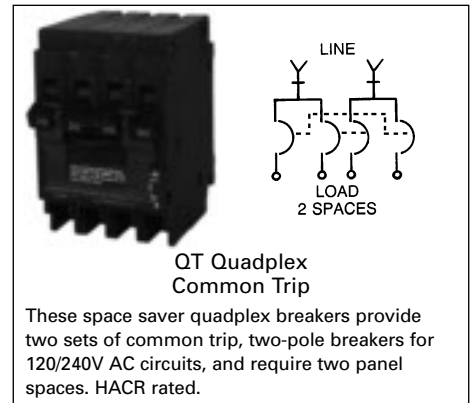
**QT Duplex**

These space saver duplex breakers combine two independent 1/2" breaker poles in a common unit. This unit plugs into one load center stab and requires one panel space. HACR rated.



**QT Triplex**

These space saver triplex breakers provide a 2-pole common trip breaker for 120/240V AC circuits and two single poles for 120V AC circuits. Triplex require two panel spaces. HACR rated.



**QT Quadplex Common Trip**

These space saver quadplex breakers provide two sets of common trip, two-pole breakers for 120/240V AC circuits, and require two panel spaces. HACR rated.

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① Non-CTL. For replacement use only in panels manufactured before 1968

# Circuit Breakers

## Arc-Fault and Ground-Fault Breakers

- UL Listed and CSA Certified
- HACR Rated
- Standard 1 inch per pole format with plug-in design

### Ground-Fault Circuit Interrupters (Class A - 5mA)<sup>Ⓢ</sup>

Ground-fault circuit interrupters (GFCI) provide Class A ground fault protection. A GFCI is a device intended for personnel protection and will de-energize the circuit when a fault current to ground is 6 milliamperes or more.

Breaker Type	Ampere Rating	10,000 A IR		22,000 A IR	
		Catalog Number	List Price \$	Catalog Number	List Price \$
<b>QPF/QPHF</b> 1-Pole 120V AC Plug-In	15	QF115 <sup>Ⓢ</sup>	255.00	QF115H <sup>Ⓢ</sup>	515.00
	20	QF120 <sup>Ⓢ</sup>	255.00	QF120H <sup>Ⓢ</sup> ■	515.00
	25	QF125■	255.00	—	—
	30	QF130	255.00	QF130H	515.00
<b>QPF/QPHF</b> 2-Pole 120/240V AC Plug-In	15	QF215	454.00	QF215H	678.00
	20	QF220	454.00	QF220H	678.00
	30	QF230	454.00	QF230H	678.00
	40	QF240	454.00	QF240H	678.00
	50	QF250	454.00	QF250H	678.00
	60	QF260	454.00	QF260H	678.00

### Ground Fault Equipment Protection (30mA)<sup>Ⓢ</sup>

Type EQF circuit breakers provide protection of equipment from damaging line-to-ground fault currents by de-energizing the circuit for all ungrounded conductors of the faulted circuit.

<b>QE/QEH</b> 1-Pole 120V AC Plug-In	15	QE115 <sup>Ⓢ</sup>	465.00	QE115H <sup>Ⓢ</sup>	777.00
	20	QE120 <sup>Ⓢ</sup>	465.00	QE120H <sup>Ⓢ</sup>	777.00
	30	QE130	465.00	QE130H	777.00
<b>QE/QEH</b> 2-Pole 120/240V AC Plug-In	15	QE215	616.00	QE215H	1016.00
	20	QE220	616.00	QE220H	1016.00
	30	QE230	616.00	QE230H	1016.00
	40	QE240	616.00	QE240H	1016.00
	50	QE250	616.00	QE250H	1016.00
	60	QE260■	616.00	QE260H■	1016.00

### Arc-Fault Circuit Interrupters (AFCI)<sup>Ⓢ</sup>

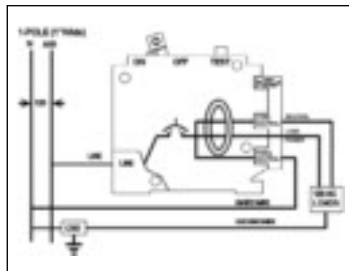
Arc-fault circuit interrupters (AFCI) detect arcing faults (an unintentional arcing condition in a circuit) that standard circuit breakers are unable to detect. An AFCI is a branch feeder device intended to mitigate the effects of arc-faults by de-energizing the circuit when an arc-fault is detected.

<b>QAF/QAFH</b> 1-Pole 120V AC	15	Q115AF <sup>Ⓢ</sup>	255.00	Q115AFH <sup>Ⓢ</sup> Ⓢ	515.00
	20	Q120AF <sup>Ⓢ</sup>	255.00	Q120AFH <sup>Ⓢ</sup> Ⓢ	515.00
<b>QAF/QAFH</b> 2-Pole 120/240V AC	15	Q215AF	454.00	Q215AFH■	660.00
	20	Q220AF	454.00	Q220AFH■	660.00

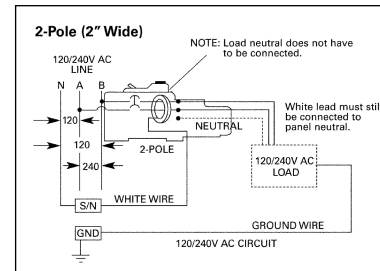
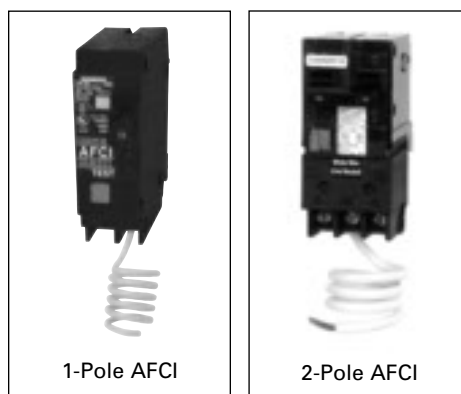
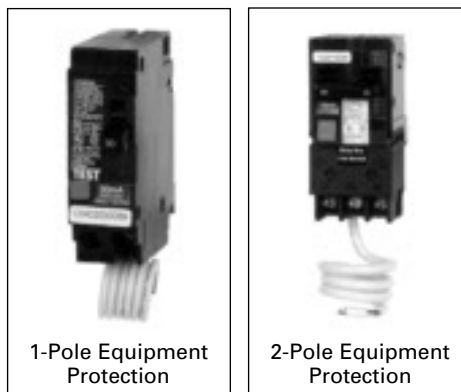
### QAF/QPF/QE Accessories

Description	Catalog Number	List Price \$
Handle Block	ECBX231M	9.70

### Wiring Diagrams



### Selection/Wiring Diagrams



■ Built to order. Allow 2-3 weeks for delivery.  
 Ⓢ UL Listed as SWD (Switching Duty) Rated, suitable for 120V AC Fluorescent Lighting.

Ⓢ White line neutral (pigtail) must be connected to the panel neutral for the device to function.

# Circuit Breakers

## Special Application Breakers

Selection

### HID Lighting

For high-intensity discharge lamp loads having in-rush currents above the instantaneous trip setting of a standard breaker.

Breaker Type	Wiring Diagram	Ampere Rating	Complete Breaker UL Unenclosed	
			Catalog Number	List Price \$
<b>QP</b> 1-Pole 120V AC	Figure 1	15	Q115HID ■	44.50
		20	Q120HID ®	44.50
		30	Q130HID	44.50
<b>QP</b> 2-Pole 120/240V AC	Figure 2	15	Q215HID	91.00
		20	Q220HID ■	91.00
		30	Q230HID ■	91.00

### Molded Case Switch

For applications that do not require overcurrent protection.

<b>QP</b> 2-Pole Plug-In 240V AC	Figure 2	30	Q230S	49.00
		60	Q260S	49.00

### No-Noise

For applications that require a reduction in the 60-cycle hum of a standard breaker.

<b>QP</b> 2-Pole 120/240V AC	Figure 2	50	Q250NN ■	72.00
		60	Q260NN	72.00
		70	Q270NN	148.00
		90	Q290NN ■	203.00

### Switching Neutrals

Used where all conductors are required to be disconnected. Neutral pole of the circuit breaker does not connect to loadcenter bus. One side is wired to neutral and the other side to the device.

<b>QG</b> 2-Wire Common Trip 120V AC	Figure 3	15	QG215	119.00
		20	QG220	119.00
		30	QG230 ■	119.00
<b>QG</b> 3-Wire Common Trip 120/240V AC	Figure 4	15	QG315 ■	172.00
		20	QG320	172.00
		30	QG330 ■	172.00

### Tungsten Lighting

For high wattage, tungsten-lamp loads having in-rush currents above the instantaneous trip setting of a standard breaker.

<b>QP</b> 1-Pole 120V AC	Figure 1	15	Q115T ® ■	32.00
		20	Q120T ®	33.00

### Water Heater

When installed in a loadcenter, the water heater circuit breaker does not make electrical connection with the loadcenter bussing. Separate metered circuit is connected to line terminals of the breaker. Used in special rate water heating areas.

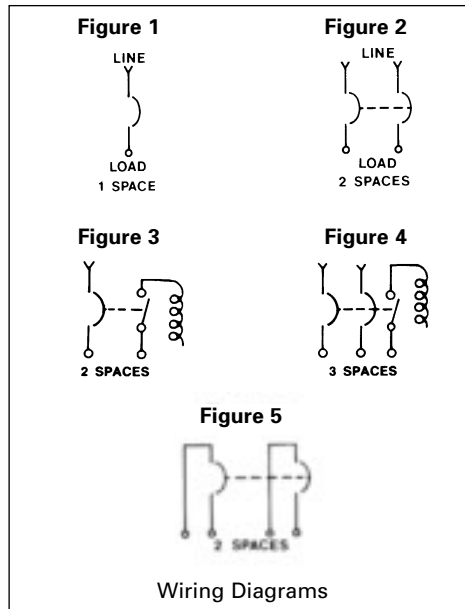
<b>QW</b> 2-Pole 120/40V AC Plug-In	Figure 5	15	QW215	91.00
		20	QW220	91.00
		30	QW230	91.00



Switching Neutral



Water Heater



Wiring Diagrams

■ Built to order. Allow 2-3 weeks for delivery.  
Note: All circuit breakers on this page are 10K AIC

® UL Listed as SWD (Switching Duty) Rated, suitable for 120V AC Fluorescent Lighting.

# Circuit Breakers

## 3/4 Inch Plug-In Breakers

Selection

### Features

- 3/4" format
- HACR Rated
- UL Classified for use in certain Square D load centers

### Type QD Circuit Breakers

The Type QD circuit breaker line is available in 1-pole and 2-pole common trip versions listed on this page.

The circuit breakers are UL Classified and UL Listed.

All QD breakers are supplied with load side connectors suitable for 60/75°C wire and are calibrated for 40°C maximum ambient applications.

### UL Classified

Siemens Type QD circuit breakers are UL Classified for use in specific Square D load centers in place of Square D Type QO® circuit breakers. A Panelboard Compatibility List packaged with each QD breaker shows which type QD circuit breakers are acceptable for use in Square D load centers.

The interrupting rating on these circuit breakers is 10,000A IR maximum and they are **not** series rated with Square D circuit breakers or equipment. This UL Classification allows a Siemens Type QD circuit breaker to be used in place of a Square D Type QO circuit breaker in those load centers that are specifically shown on the Panelboard Compatibility list. For additional information, contact your local Siemens sales engineer.



Continuous Current Rating @ 40°C	1-Pole		2-Pole	
	120V		120/240V Common Trip	
	Catalog Number	List Price \$	Catalog Number	List Price \$
15	D115 <sup>①</sup>	33.00	D215	72.00
20	D120 <sup>①</sup>	33.00	D220	72.00
30	D130	33.00	D230	72.00
40	D140	33.00	D240	72.00
50	D150	33.00	D250	72.00
60	D160	33.00	D260	72.00

### Shipping Weights

Number of Poles	Number Per Carton	Shipping Weight (lbs.)
1	16	3.8
2	8	4.2

### Panelboard Compatibility List

#### Listed Panelboards—Square D—Catalog Numbers

QO2L30F/S	QO12M100/RB	QO120-30M150/RB	QO130-40M200
QO2-4L70F/S	QO16-20M100/RB	QO124L150G	QO130200/RB
QO2-4L70TS	QO16M100/RB	QO124M150	QO130-40L200G/RB
QO2-4L70RB	QO20M100/RB	QO130L150G/RB	QO140M200/RB
QO6-12L100F/S	QO112L125G/RB	QO130M150/RB	QO16L200/RB
QO6-12L100DF/S	QO112-24L125/RB	QO16L150/RB	QO16M200/RB
QO6-12L100TF/S	QO112-24L125GWGC	QO16M150/RB	QO18-16M200FTRB
QO6-12L100DTF/S	QO116L125G	QO16-30L150/RB	QO20-40L200/RB
QO6-12L100RB	QO116-24L125G/RB	QO18-16M150FTRB	QO20-40M200TF/S
QO8-16L100F/S	QO12-24L125/RB	QO20-30M150/RB	QO20-40M200/RB
QO8-16L100DF/S	QO120-24L125G	QO20-30M150TF/S	QO24L200/RB
QO8-16L100TF/S	QO120-24L125GWGC	QO20-30L150	QO24M200/RB
QO-16L100DTF/S	QO120L125G	QO24L150/RB	QO30L200/RB
QO8-16L100RB	QO124L125G/RB	QO24M150/RB	QO30M200/RB
QO112M100/RB	QO124M125/RB	QO30L150/RB	QO30-40L200/RB
QO116M100/RB	QO16L125/RB	QO30M150/RB	QO30-40M200/RB
QO120M100/RB	QO16-12M125FTRB	QO8-16M200FT/RB	QO40M200/RB
QO124M100	QO16-24L125/RB	QO112L200G/RB	QO140M225
QO12L100DF/S	QO20L125/RB	QO120-40M200/RB	QO142L225G/RB
QO12L100RB	QO20-24L125/RB	QO120-40M200TC	
QO12-20M100/RB	QO24L125/RB	QO124M200	
QO12-20M100TF/S	QO120-30L150G	QO130L200G/RB	

For inches / millimeters conversion, see Application Data section.

① UL Listed for frequent switching applications (SWD).  
120V AC Fluorescent Lighting. One or two load conductors.



# Circuit Breakers

## Main and Branch Circuit Breakers<sup>①</sup>

## Selection

Breaker Type	Ampere Rating	Catalog Number	List Price \$	Catalog Number	List Price \$	UL Interrupting Ratings (kA)
<b>QN</b> 2-Pole 120/240V AC	150	QN2150	477.00	QN2150R <sup>②</sup>	477.00	10
	175	QN2175■	477.00	QN2175RH <sup>②</sup> ■	477.00	10
	200	QN2200	477.00	QN2200R <sup>②</sup>	477.00	10
<b>QNH</b> 2-Pole 120/240V AC	150	QN2150H	586.00	QN2150RH <sup>②</sup>	586.00	22
	175	QN2175H■	586.00	QN2175RH <sup>②</sup> ■	586.00	22
	200	QN2200H	586.00	QN2200RH <sup>②</sup>	586.00	22
<b>HQN</b> 2-Pole 120/240V AC	150	HQN2150	2514.00	HQN2150R <sup>②</sup>	2514.00	65
	175	HQN2175■	2514.00	HQN2175R <sup>②</sup> ■	2514.00	65
	200	HQN2200	2514.00	HQN2200R <sup>②</sup>	2514.00	65

Requires 4 panel spaces, 2 adjacent and 2 opposite. **SHIPPING:** 1 per carton (Wt. 3 lbs.)

### Main Breaker Kits

For use in Ultimate Load Centers <sup>③</sup>				For use in EQIII Load Centers				UL Interrupting Ratings (kA)
UL Type	Ampere Rating	Catalog Number	List Price \$	UL Type	Ampere Rating	Catalog Number	List Price \$	
EQ8681	100	MBK100A	230.00	EQ9675	100	MBK100 <sup>④</sup>	260.00	22
EQ8682	125	MBK125A	473.00	EQ9676	125	MBK125 <sup>④</sup>	513.00	22
EQ8693	150	MBK150A	588.00	EQ9683	150	MBK150 <sup>④</sup>	639.00	22
EQ8695	200	MBK200A	588.00	EQ9685	200	MBK200 <sup>④</sup>	639.00	22
EQ8696	225	MBK225A	588.00	EQ9686	225	MBK225 <sup>④</sup>	639.00	22

Breaker Type	Ampere Rating	Catalog Number	UL Interrupting Ratings (kA)	List Price \$
<b>QPJ</b> <sup>⑤</sup> 3-Pole 240V AC	125	QPJ3125	10	1226.00
	150	QPJ3150	10	1226.00
	200	QPJ3200	10	1226.00

Requires 6 spaces due to cross over design. Fits only EQIII 125-400A 3-phase load centers

**SHIPPING:** 5 per carton (Wt. 17 lbs.)

Breaker Type	Ampere Rating	Catalog Number	List Price \$	UL Interrupting Ratings (kA) Volts AC 120/240
<b>QPP</b> 2-Pole 120/240V AC	125	Q2125B	441.00	10
	150	Q2150B	441.00	10
	175	Q2175B■	441.00	10
	200	Q2200B	441.00	10
	225	Q2225B	441.00	10
<b>QPPH</b> 2-Pole 120/240V AC	125	Q2125BH	1129.00	22
	150	Q2150BH	1129.00	22
	175	Q2175BH■	1129.00	22
	200	Q2200BH	1129.00	22
	225	Q2225BH■	1129.00	22
<b>HQPP</b> 2-Pole 120/240V AC	125	Q2125BHH■	2238.00	65
	150	Q2150BHH	2238.00	65
	175	Q2175BHH■	2238.00	65
	200	Q2200BHH	2238.00	65
	225	Q2225BHH■	2238.00	65
<b>HQPPH</b> 2-Pole 120/240V AC	100	HQ2100BH■	2733.00	100
	125	HQ2125BH■	2733.00	100
	150	HQ2150BH■	2733.00	100
	175	HQ2175BH■	2733.00	100
	200	HQ2200BH■	2733.00	100
225	HQ2225BH■	2733.00	100	

Circuit breaker is 4-poles wide. For use on 200A modular and Uni-Pak<sup>®</sup> metering, and on 300-600A load centers.

**SHIPPING:** 8 per master carton (Wt. 17.5 lbs., 2 per carton)

### QN/QNH/HQN and Ultimate Main Breaker Kit Accessories (Factory installed only)

#### Shunt Trip

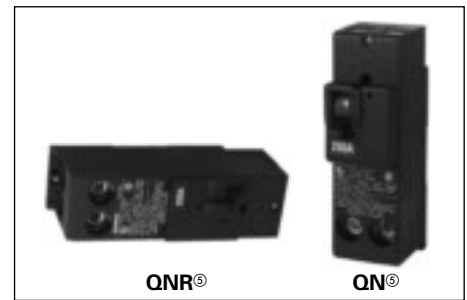
Control Voltage AC	Add Suffix	List Adder \$
120V	00S01■	275.00

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

- ① All circuit breakers on this page are common trip.
- ② Reverse handle.
- ③ Not UL Listed.
- ④ MBK100A for use in 100 and 125A load centers.  
MBK125A for use in 125A load centers.  
MBK150A for use in 150, 200 and 225A load centers.  
MBK200A for use in 200 and 225A load centers.  
MBK225A for use in 225A load centers.  
MBK175A for use in 200 and 225A load centers.

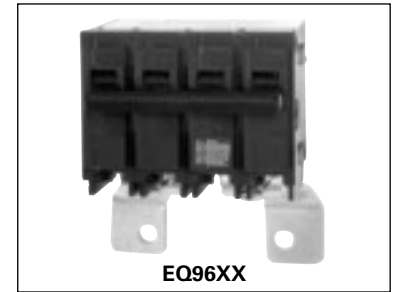
- ⑤ QNR required for horizontal applications or vertical applications where the lugs are facing up. The QN breaker is required for vertical applications where the lugs are facing down as shown.



QNR<sup>⑤</sup>

QN<sup>⑤</sup>

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



EQ96XX

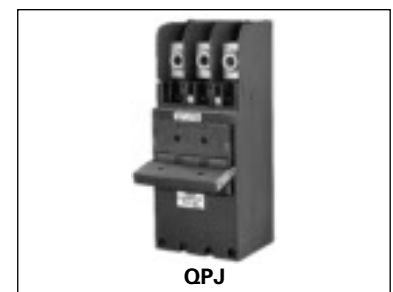


MBK  
(100,125)A

MBK  
(150,200,225)A



2-Pole QPP

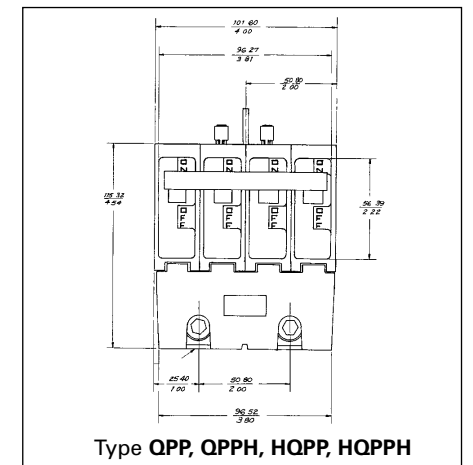
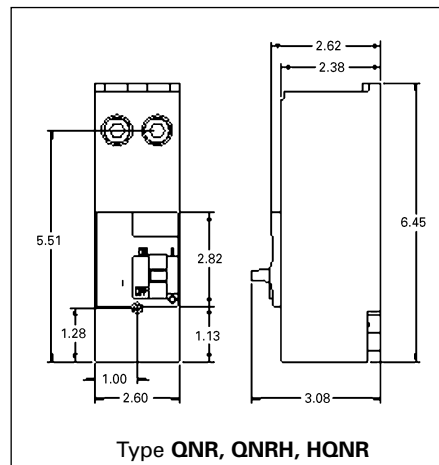
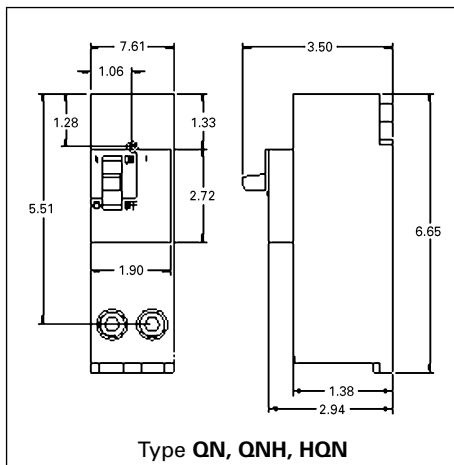
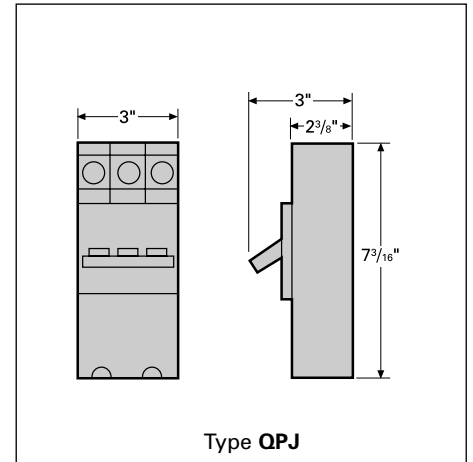
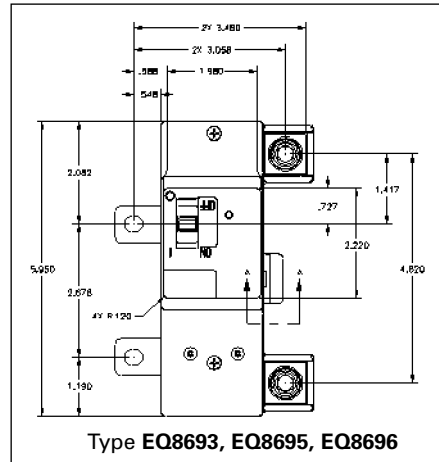
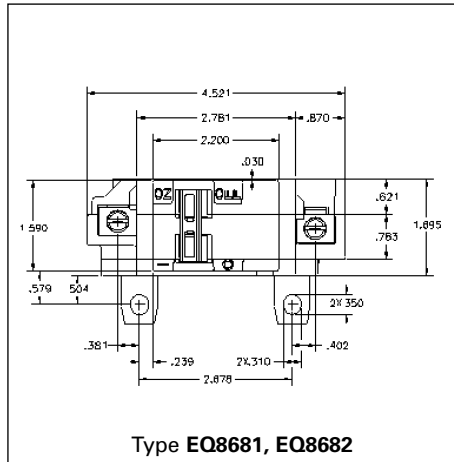
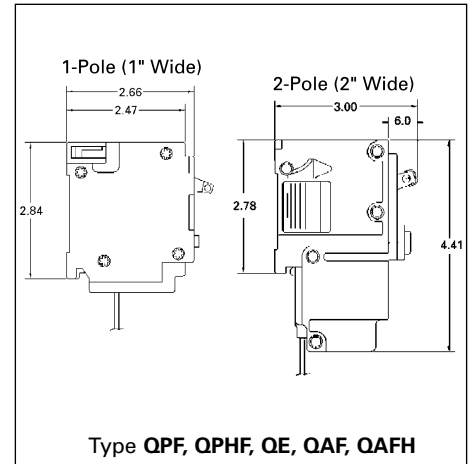
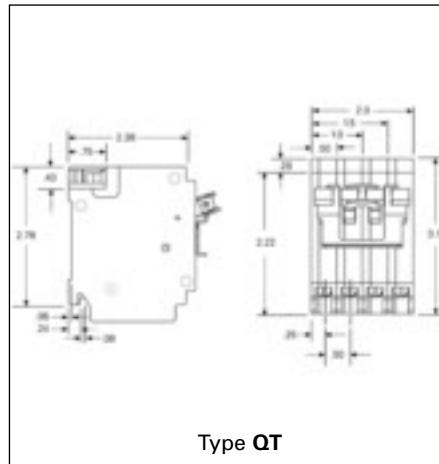
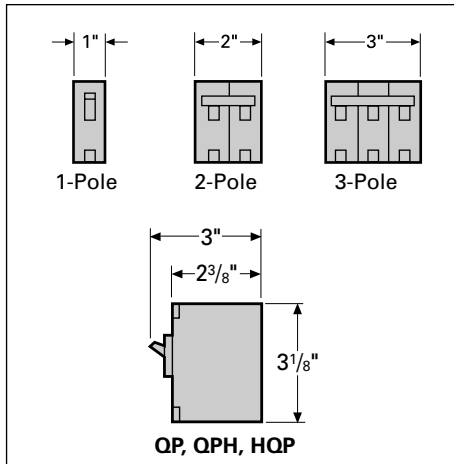


QPJ

# Circuit Breakers

## Line Diagrams

## Dimension Drawings



© All standard circuit breakers are calibrated to 40°C maximum ambient application.

# Circuit Breakers

## Lug Data

Reference

Circuit Breaker Type	Circuit Breaker Ampere Rating	Cables Per Connector	Connector Wire Range
<b>QP, QPH, HQP, Plug-in</b>	<b>LOAD SIDE</b>		
	10	2	#16 AWG Cu
	15–20	1 1	#14–#8 AWG Cu #12–#8 AWG Al
	25–35	1 1	#14–#6 AWG Cu #14–#6 AWG Al
	40–50	1 1	#8–#6 AWG Cu #8–#4 AWG Al
	55–70	1 1	#8–#4 AWG Cu #8–#2 AWG Al
	80–100	1 1	#4–#1/0 AWG Cu #2–#1/0 AWG Al
	110–125 <sup>®</sup>	1 1	#2–#1/0 AWG Cu #1/0–#2/0 AWG Al
<b>QT</b>	15–35	1 1	#14–#8 AWG Cu #12–#8 AWG Al
	40	1	#8 AWG CU-AL
	40–50	1 1	#8–#6 AWG Cu #8–#4 AWG Al
<b>QPF, QPHF</b>	15–30	1 1	#14–#10 AWG Cu #12–#8 AWG Al
	40–60	1 1	#8–#6 AWG Cu #8–#4 AWG Al
<b>QAF, QAFH</b>	15–20	1 1	#14–#12 AWG Cu #12–#10 AWG Al
<b>QD</b>	15–20	2	#14–#8 AWG Cu Only
	15–20	1	#14–#12 AWG Cu #12–#10 AWG Al
	25–35	1 1	#10–#8 AWG Cu #10–#6 AWG Al
	40–60	1 1	#8–#6 AWG Cu #8–#4 AWG Al
<b>QN, QNH, HQN</b>	150–200	1	#1–300kcmil Cu-Al
<b>EQ8681-Ultimate</b>	100	1	#4–3/0 AWG Cu-Al
<b>EQ8682-Ultimate</b>	125	1	#4–3/0 AWG Cu-Al
<b>EQ8693-Ultimate</b>	150	1	#1–300kcmil Cu-Al
<b>EQ8695-Ultimate</b>	200	1	#1–300kcmil Cu-Al
<b>EQ8696-Ultimate</b>	225	1	#1–300kcmil Cu-Al
<b>QPP, QPPH, HQPP, HQPPH</b>	125	1 1	#1 AWG Cu #2/0 AWG Al
	150	1 1	#1/0 AWG Cu #3/0 AWG Al
	175	1 1	#2/0 AWG Cu #4/0 AWG Al
	200	1 1	#3/0 AWG Cu 250kcmil AWG Al
	225	1 1	#4/0 AWG Cu 300kcmil AWG Al
	<b>EQ9675-EQIII</b>	100	1 1
<b>EQ9677-EQIII</b>	125	1 1	#1 AWG Cu #2/0 AWG Al
<b>EQ9683-EQIII</b>	150	1 1	#1/0 AWG Cu #3/0 AWG Al
<b>EQ9685-EQIII</b>	200	1 1	#3/0 AWG Cu 250kcmil AWG Al
<b>EQ9686-EQIII</b>	225	1 1	#4/0 AWG Cu 300kcmil AWG Al
<b>QPJ</b>	125–200	1	#2–300kcmil Cu-Al

1  
LOAD CENTERS &  
CIRCUIT BREAKERS

# Surge Protection

## Point-of-Entry

## Selection

### Circuit Breaker and Secondary Surge Arrester

### Circuit Breaker and TVSS

#### Features

- UL Listed
- Easy to install
- Perfect for retrofit - replaces two 1-inch breakers without losing any circuits
- A single device protects the entire electrical system from damage caused by surges

By installing a Siemens Circuit Breaker/Surge Arrester or Circuit Breaker/TVSS device in the load center of the residence, surge protection is provided for all branch circuits.®

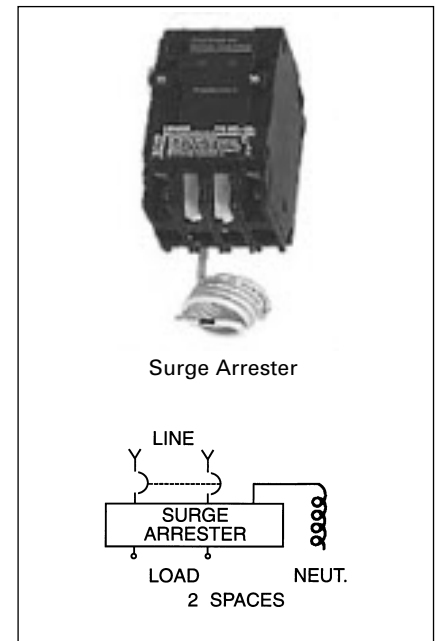
Two red LED indicator lights are provided to show that surge protection is provided for all circuits connected to the panelboard. As a Siemens exclusive feature, the device notifies the owner of loss of surge protection by tripping one or both of the circuit breakers. These breakers should be used for circuit protection of frequently used household or facility circuits because the lights and devices connected to these circuits provide an effective indication that surge protection is being provided.

Breaker Type	Ampere Rating	Catalog Number	List Price \$	Surge Type
<b>QP<sup>①②</sup></b> 1-Pole 120/240V AC 10K AIC	(2) 15	<b>QSA1515</b>	<b>261.00</b>	Surge Arrester
	(2) 20	<b>QSA2020</b>	<b>261.00</b>	Surge Arrester

The Siemens circuit breaker and transient voltage surge suppressor is comprised of a highly effective TVSS module integrated with (2) 1-pole circuit breakers. This device incorporates the robust features of our secondary circuit breaker surge arrester with a lower clamping voltage rating.

By installing a Siemens Circuit Breaker/TVSS device in the load center of the residence, surge protection is not only provided for all branch circuits, but also, fixtures, appliances, motors, and other electronic equipment in the house served by that load center.®

<b>QP<sup>①②</sup></b> 1-Pole 120/240V AC 10K AIC	(2) 20	<b>QSA2020TVSS</b>	<b>377.00</b>	TVSS
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	Circuit Breaker and Secondary Surge Arrester	Circuit Breaker and Transient Voltage Surge Suppressor
<b>Number of Poles</b>	(2) 1-Pole Circuit Breakers	(2) 1-Pole Circuit Breakers
<b>Initial Clamping Level</b>	360 Volts	240 Volts
<b>Transient Energy Rating</b>	460 Joules line-to-neutral 920 Joules line-to-line	360 Joules line-to-neutral 720 Joules line-to-line
<b>Secondary Surge Arrester Voltage Rating</b>	175V AC max. line-to-ground	-
<b>Transient Suppression Voltage Rating</b>	-	500 volts peak, line-to-neutral 1000 volts peak, line-to-line
<b>Peak Current Rating (impulse)</b>	40,000 amperes	40,000 amperes
<b>Discharge Voltage Characteristic (line-to-neutral)</b>	@ 1,500A, 600 volts @ 5,000A, 800 volts	@ 1,500A, 600 volts @ 5,000A, 800 volts
<b>Discharge Current Withstand Rating (line-to-neutral)</b>	10,000 amperes	10,000 amperes
<b>Circuit Breaker Interrupting Rating</b>	10,000A, 120/240V AC	10,000A, 120/240V AC
<b>Warranty Amount</b>	\$10,000	\$20,000
<b>Connected Appliances Warranty®</b>	No	Yes
<b>Warranty Period</b>	24 months	24 months
<b>Lightning Protection</b>	No	No

① UL Listed as SWD (Switching Duty) Rated, suitable for 120V AC Fluorescent Lighting.  
② HACR Rated

® See warranty for detailed coverage information. Does not include electronic devices.

# Surge Protection

## Point-of-Entry

## Selection

### Transient Voltage Surge Suppressor

- UL listed
- Rated for single phase panels up to 400 amps
- Audible Alarm
- Guaranteed lightning protection

**TPSA9040** shields motor-driven appliances in residential and light commercial applications against electrical power surge damage, including lightning, from entering through the main electrical service panel. Two LED lights indicate protection status. The audible alarm alerts you when protection is disrupted.

Surge Type	Catalog Number	List Price \$
TVSS	TPSA9040 <sup>Ⓞ</sup>	441.00

Single Pulse Energy Dissipation	1080 Joules
Spike Capacity	40,000 amperes
Line Voltage	102/2401 Phase 50/60Hz
Initial Clamping Level	400V
Rated Voltage	150V
Short Circuit Rating	10,000 amperes
Warranty Amount	\$20,000
Connected Appliances Warranty	Yes
Warranty Period	3 years
Lightning Protection	Yes

### Secondary Surge Arresters

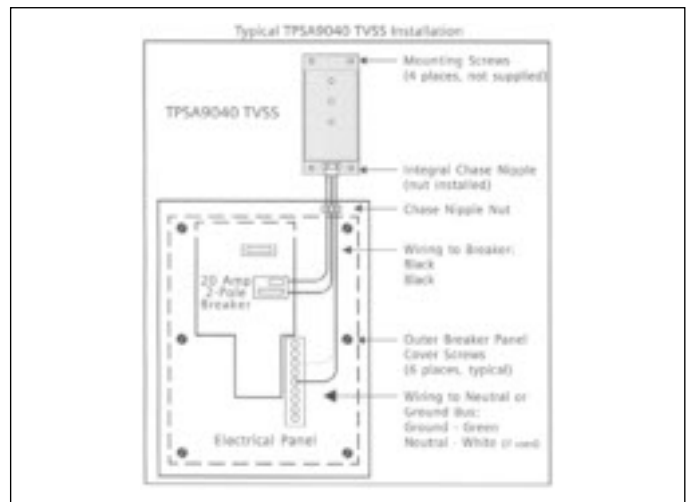
- UL listed
- Rated for single and three phase panels
- Suitable for indoor and outdoor installation

These Secondary Surge Arresters, also referred to as Lightning Arresters, are designed to protect electrical equipment from damaging effects of Spikes (+) and Notches (-) caused by lightning, utility switching, insulation arcing, electrical motor cycling, and other large or sudden changes in electrical power flow on incoming AC power lines.

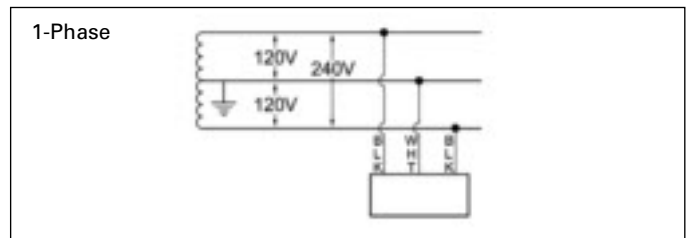
Phase	Catalog Number	List Price \$
1	TPSASA1	154.00
3	TPSESA3	531.00



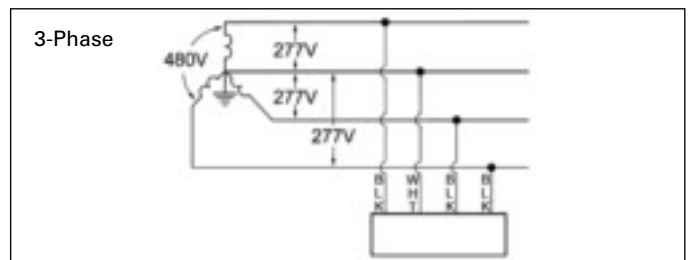
TPSA9040



TPSEA3



1-Phase



3-Phase

<sup>Ⓞ</sup> For flush mounting applications, use flush mount kit TPSA9040F.

# Surge Protection

## Point-of-Entry or Point-of-Use

*Selection*

### Telecommunication Protector

- UL listed
- Rated for RJ45 Modem/Fax/DSL protection
- Easy to install
- Guaranteed lightning protection

**TPSTEL** protects telephone or modems connected electronics in residential and light commercial applications against electrical transient damage, including lightning, from entering through the main telephone connection. To have complete protection for your equipment, home, or business, it is important to protect AC power lines and all data lines the equipment is connected through.

Surge Type	Catalog Number	List Price \$
Telco	TPSTEL	245.00

AC Surge Protection	
EMI/RFI	0.0 db
Catastrophic Surge Circuit	Yes
Spike Capacity	200 Amps
Let Through Voltage	<260V
Overcurrent Protection	Yes
Response Time	1 ns
Data Line Protected	3, 4, 5, 6 - RJ45

### Coaxial Protector

- UL listed
- Rated for CATV, DSS, TV, VCR and cable modem
- Easy to install
- Guaranteed lightning protection

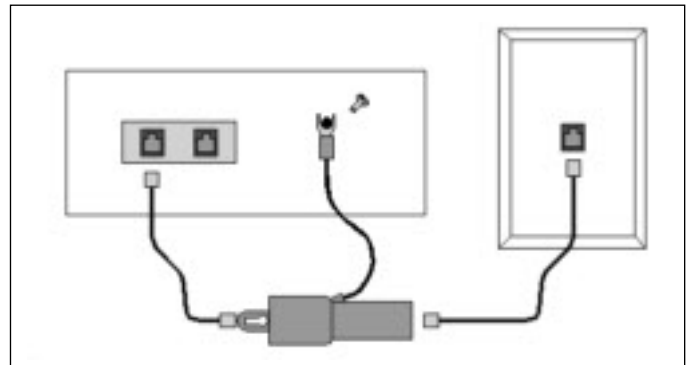
**TPSCOAX** shields coaxial connected electronics in residential and light commercial applications against electrical transient damage, including lightning, from entering through the main cable connection. To have complete protection for your equipment, home, or business, it is important to protect AC power lines and all data lines the equipment is connected through.

Surge Type	Catalog Number	List Price \$
Coaxial	TPSCOAX	245.00

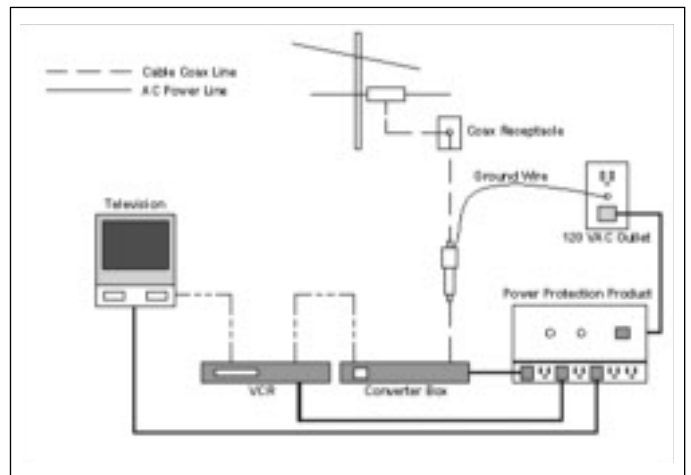
AC Surge Protection	
Frequency Range	1 mHz thru 1.45 GHz
Catastrophic Surge Circuit	Yes
Spike Capacity	200 Amps
Let Through Voltage	<85V
Overcurrent Protection	Yes
Response Time	1 ns
Insertion Loss	0db to 3.0 db



**TPSTEL**



**TPSCOAX**



# Electricenter

## Accessories<sup>⑦</sup>

## Selection

### Circuit Breaker Accessories

Catalog Number	Description	List Price \$	Pack Qty.⑥
ECQTH2	Handle Tie - Duplex	4.40	25
ECQTH3	Handle Tie - 2-Pole	97.00	50
ECQL1	Handle Blocking Device - 1" Handles	9.10	25
ECBX231M	Handle Blocking Device - 1/2" Handles	9.70	25
ECMBR2	Main Breaker Retainer - for Ultimate Load Centers	14.50	1
ECMBR1 <sup>①</sup>	Main Breaker Retainer - for EQ Load Centers	6.60	1
ECQML12 <sup>②</sup>	Mechanical Interlock	299.00	10
ECPLD1	Padlocking Device - 1-Pole Type QP, QAF, QPF, QT Duplex	10.10	1
ECPLD2	Padlocking Device - 2-Pole Type QP, QAF, QPF, QT Triplex/Quadplex	10.20	1
ECPLD125 <sup>③</sup>	Padlocking Device - 100-125A Main Breaker	8.60	1
ECPLD2R <sup>NEW</sup>	Red Padlock for 2-pole 1" breakers and quad breakers	15.30	1
ECQLN3 <sup>NEW</sup>	Padlock for QN, QNR, and 150-225A MBKA	55.00	1

### Ground Bar Kits

Catalog Number	Description	List Price \$	Pack Qty.⑥
ECGB5	Ground Bar Kit - 5 Position, #4-14 AWG Cu/Al	18.40	1
ECGB10	Ground Bar Kit - 10 Position, #4-14 AWG Cu/Al	21.00	1
ECGB101	Ground Bar Kit - 10 Position, #4-14 AWG Cu/Al, 1 Position #14-1/0 Cu/Al	27.00	1
ECGB14	Ground Bar Kit - 14 Position, #4-14 AWG Cu/Al	24.00	1
ECGB141	Ground Bar Kit - 14 Position, #4-14 AWG Cu/Al, 1 Position #14-1/0 Cu/Al	29.50	1
ECGB142	Ground Bar Kit - 14 Position, #4-14 AWG Cu/Al, 1 Position #6-2/0 Cu/Al	33.00	1
ECGB20	Ground Bar Kit - 20 Position, #4-14 AWG Cu/Al	27.00	1
ECGB201	Ground Bar Kit - 20 Position, #4-14 AWG Cu/Al, 1 Position #14-1/0 Cu/Al	33.00	1
ECGB202	Ground Bar Kit - 20 Position, #4-14 AWG Cu/Al, 1 Position #6-2/0 Cu/Al	33.00	1
ECINSGB5	Insulated Isolated Ground Bar - 5 Position	33.00	1
ECINSGB14	Insulated Isolated Ground Bar - 14 Position	42.50	1
ECINSGB20	Insulated Isolated Ground Bar - 20 Position	48.50	1
ECCS1	Collar Strap - #14-1/0 AWG Cu/Al	8.00	1
ECCS2	Collar Strap - #6 AWG - 250 kmil Cu/Al	23.00	1

### Hubs

Catalog Number	Description	List Price \$	Pack Qty.⑥
ECHS000	Closure Plate	38.00	1
ECHS075	Hub - 3/4"	39.50	1
ECHS100	Hub - 1"	39.50	1
ECHS125	Hub - 1 1/4"	39.50	1
ECHS150	Hub - 1 1/2"	39.50	1
ECHS200	Hub - 2"	69.00	1
ECHS250	Hub - 2 1/2"	109.00	1

### Load Center Conversion Kits

Catalog Number	Description	List Price \$	Pack Qty.⑥
MBK100A	Main Breaker Conversion Kit - for use in 100-125A Ultimate Load Centers	230.00	1
MBK125A	Main Breaker Conversion Kit - for use in 125A Ultimate Load Centers	473.00	1
MBK150A	Main Breaker Conversion Kit - for use in 150-225A Ultimate Load Centers	588.00	1
MBK200A	Main Breaker Conversion Kit - for use in 200-225A Ultimate Load Centers	588.00	1
MBK225A	Main Breaker Conversion Kit - for use in 225A Ultimate Load Centers	588.00	1
ECMLK125	Main Lug Conversion Kit - 100-125A Ultimate Load Centers	24.50	1
ECMLK225	Main Lug Conversion Kit - 150-225A Ultimate Load Centers	26.50	1
MCB12	300MCM Lugs and Straps for Old EQ Style Load Center	50.00	1

### Lug Kits

Catalog Number	Description	List Price \$	Pack Qty.⑥
ECLKB1 <sup>⑤</sup>	Ground Lug Kit - for Ultimate Load Centers	26.50	1
ECLK3	Neutral Lug Kit - #1-300 AWG Cu/Al	24.00	1
ECLK1-2	Neutral Lug Kit - #2-1/0 AWG Cu/Al	13.90	1
ECLK2	Neutral Lug Kit - #4-2/0 AWG Cu/Al	18.40	1
ECLK2SC	Neutral Lug Kit for Swiss Cheese style neutral/ground bar - #4-2/0 AWG Cu/Al	21.00	1
ECLK2150	Sub-Feed Lug Kit - #14-2/0 AWG Cu, #1/0 AWG Al	100.00	1
ECLK2125	Sub-Feed Lug Kit - #3-1 AWG Cu, #1/0 AWG Al	30.50	1
ECLK2225	Sub-Feed Lug Kit - #2-300	148.00	1
ECLK3125	3-Pole Sub-Feed Lug Kit - #3-1 AWG Cu, #1/0 AWG Al	42.00	1
ECLK3225	3-Pole Sub-Feed Lug Kit - #2-300 AWG	202.00	1

### Miscellaneous Load Center Accessories

Catalog Number	Description	List Price \$	Pack Qty.⑥
ECQFL2	Add-A-Lock - Flush Mount, 100-225A Ultimate Load Centers	89.00	1
ECQFL1	Add-A-Lock - Flush Mount, Replacement Only	89.00	1
ECCP1	Circuit Directory Cards - 42 Circuit	616.00	100
ECQF3 <sup>③</sup>	Filler Plate - Branch Breakers and 150-225A Ultimate Main Breaker (bag of 5)	14.20	5
QF3 <sup>③</sup>	Filler Plate - Branch Breakers and 150-225A Ultimate Main Breaker (carton of 100)	2.80	1
ECMBF125	Filler Plate - 100-125A Ultimate Main Breaker	16.20	1
ECRLK250	Gutter Tap Kit - 250-1/0 Main, 250-6 Tap	255.00	3
ECSMK1 <sup>④</sup>	Spacer Kit	25.00	4
ECTS2	Trim Screws (bag of 6 screws)	9.80	6
ECDL1	Appliance Labels	6.60	10
ECSN1	Extended screws and nuts for use on HC Hubs	10.60	4
RAG24	Riser Auxilliary Gutter. For use on Siemens Load Centers 24" or larger	362.00	1

① Not suitable for use on 15-50A, 10k AIC type QP circuit breakers.

② For use with Ultimate Load Center main breakers.

③ 2 filler plates required for 150-225A main breaker opening.

④ Provides 1/4" clearance between wall and load center.

⑤ For use with Ultimate Load Centers to convert left side neutral bar into a bounded ground bar, once tie-strap is removed.

⑥ The pack quantity is the number of pieces received when one catalog number is ordered. Example: When one ECQF3 is ordered, a bag of 5 plates is shipped.

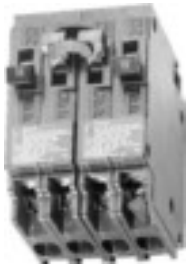
⑦ For a complete list of standby power mechanical interlock kits, see the Standby Generator Section 17.

# Electricenter

## Accessories

General

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



QT Dual Tie Handle  
**ECQTH2**



QP 2-Pole Tie Handle  
**ECQTH3**



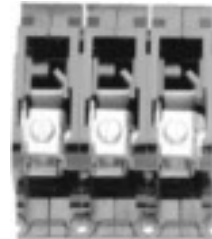
Handle Blocking  
(Lock Off) Device, **ECQL1**



Padlocking Device  
**ECPLD1**



Padlocking Device  
**ECPLD2**



Lug Kit, 3-Pole, Subfeed or  
Feed thru Applications  
**ECLK3150**



Main Breaker Retainer Kit for EQ  
Load Centers  
**ECMBR1**



Main Breaker Retainer kit for Ultimate  
Load Centers  
**ECMBR2**



Riser Lug Kit  
**ECRLK250**



Ground Bar Kit, **ECGB14**



Neutral Lug Kit, **ECLK1-2**  
wire range — #2-1 AWG  
Cu or Al



Neutral Lug Kit, **ECLK3**  
wire range — #1-300 MCM  
Neutral Lug Kit, **ECLK2**  
wire range — #4-#2/0 AWG  
Cu or Al



For use on Ground Bar only  
Collar Strap, Wire Range;  
**ECCS1; ECCS2**



Add-A-Lock  
(Flush Lock) **ECQFL1**



Filler Plate, **ECQF3**



Add-A-Lock  
(Flush Lock), **ECQFL2**  
Ultimate Load Center



Mechanical Interlock  
**ECQML12**



Add-A-Lock  
(Flush Lock), **ECQFL3**  
300-400A Load Centers



# All-Sites™ Temporary Power Outlet Panels

## Power Outlet Panel Types Available

General

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



### Surface

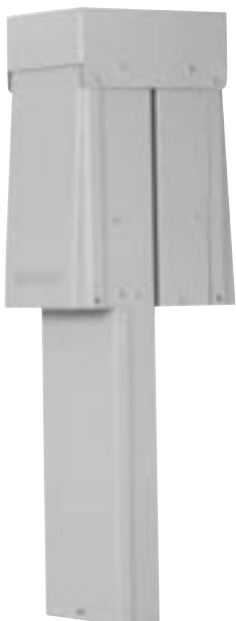
- Unmetered
- Ring Type Metered  
(Meter at top or bottom)
- Ringless Metered  
(Meter at top or bottom)
- Lighted

### Earth Mount Pedestals

- Unmetered
- Ring Type (Metered)
- Ringless Type (Metered)
- Lighted
- Cable and Telephone
- Water

### Pad Mount Pedestals

- Unmetered
- Ring Type (Metered)
- Ringless Type (Metered)
- Lighted
- Cable and Telephone
- Water



### Back to Back Earth Mount Pedestals

- Unmetered
- Ring Type (Metered)
- Ringless Type (Metered)
- Lighted
- Cable and Telephone
- Water



### Back to Back Pad Mount Pedestals

- Unmetered
- Ring Type (Metered)
- Ringless Type (Metered)
- Lighted
- Cable and Telephone
- Water

# All-Sites™ Temporary Power Outlet Panels

## Product Features

## Features

### Enclosures

- 1 Rainproof**  
Rainproof NEMA Type 3R construction.
- 2 Quality Finish**  
All sheet metal components are powder coated with the highest quality finish and fabricated with G90 galvanized steel.
- 3 Installation Ease**  
Three raised mounting embosses make installation a snap.
- 4 Removable Deadfronts**  
Easily removable upper and lower deadfronts allow easy access to internal components for ease of installation.
- 5 Theft Resistant**  
The padlock provisions and elevated upper deadfront design prevent unauthorized removal of the plugs or access to the circuit breakers.
- 6 Meters Top or Bottom**  
Metered units are available with meters at the top or bottom.
  - Ring and ringless type meter covers available.
  - Utility grade, Landis & Gyr meter socket base.
  - Units with meter at bottom are ideally suited for underground feeds.
  - Meter sockets available to 125 amps maximum.
- 7 Removable Door**  
Sloped door allows additional room for plugs, and is designed with aesthetic forms to add rigidity and sturdiness.
- 8 Overhead/Underground Feeds**  
Surface devices have provisions for overhead and underground feeds.
  - For an overhead feed, use a readily available Type RX interchangeable hub. Closure plate is factory included.
  - For an underground feed, an extensive variety of easily removable knockouts are provided.
- 9 Light Option**  
Lighted option to assist with nighttime site location and operation. Light provisions are the longest lasting and have the lowest operating cost in the industry.

### Pedestals

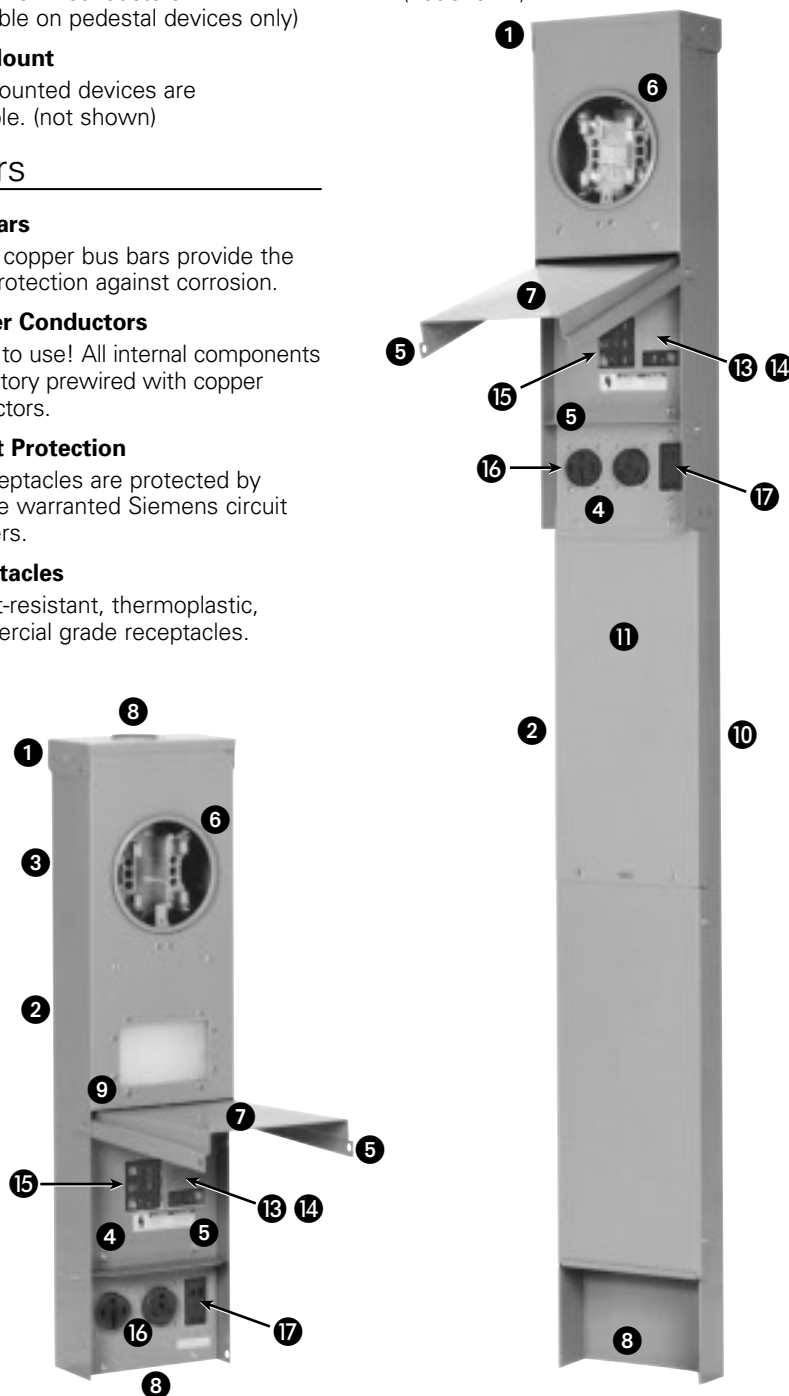
- 10 One-Piece Construction**  
Rigid, one-piece pedestal construction for all earth and pad mounted devices. Thoroughly tested for torsion and flexing resistance.
- 11 Block Assembly**  
Loop-feed block assembly provides connectors capable of accepting up to 350 kcmil conductors. (Available on pedestal devices only)
- 12 Pad Mount**  
Pad mounted devices are available. (not shown)

### Interiors

- 13 Bus Bars**  
Plated copper bus bars provide the best protection against corrosion.
- 14 Copper Conductors**  
Ready to use! All internal components are factory prewired with copper conductors.
- 15 Circuit Protection**  
All receptacles are protected by lifetime warranted Siemens circuit breakers.
- 16 Receptacles**  
Impact-resistant, thermoplastic, commercial grade receptacles.

### Interiors (continued)

- 17 GFCI Protection**  
All 125 volt, 20 amp receptacles have GFCI protection. Siemens GFCI circuit breakers are available to provide protection for 20-50 amp receptacles.
- 18 Wire Connectors**  
All wire connectors are suitable for use with copper or aluminum wire. (not shown)

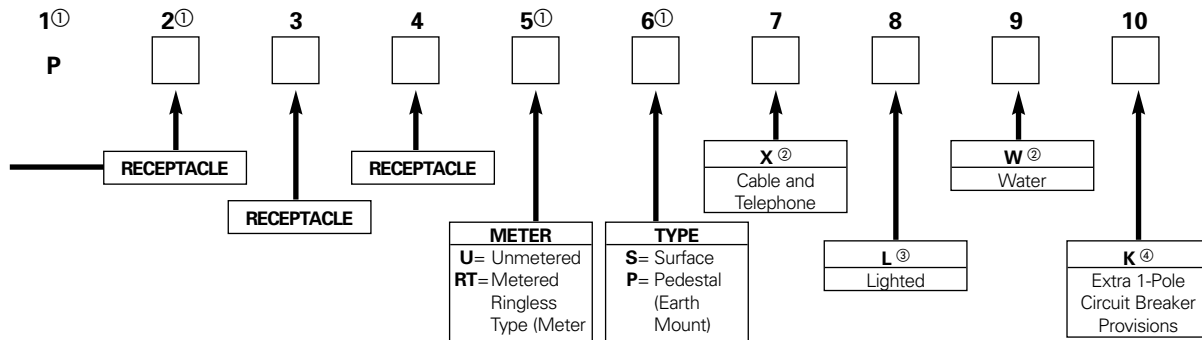


# All-Sites™ Temporary Power Outlet Panels

## Build Your Own Catalog Numbering System

Reference

1  
LOAD CENTERS &  
CIRCUIT BREAKERS



RECEPTACLE CONFIGURATION <sup>③④</sup>			
1		14 - 50R	125/250V 50A
1F		14 - 30R	125/250V 30A
2		TT30R	125V 30A
2F		L6 - 30R	250V 30A
3		6 - 20R	250V 20A
3F		L5 - 20R	125V 20A
4		5 - 20R2GFI	125V 20A
4F		5 - 20R2	125V 20A
5		L5 - 30R	125V 30A
5F			
6F			

METER	TYPE
<b>U</b> = Unmetered	<b>S</b> = Surface
<b>RT</b> = Metered Ringless Type (Meter at top)	<b>P</b> = Pedestal (Earth Mount)
<b>T</b> = Metered Ring Type (Meter at top)	<b>M</b> = Pedestal (Pad Mount)
<b>RB</b> = Metered Ringless Type (Meter at bottom)	<b>2B</b> = Pedestal (Back-to-Back, Earth Mount)
<b>B</b> = Metered Ring Type (Meter at bottom)	<b>2M</b> = Pedestal (Back-to-Back, Pad Mount)

### EXAMPLE 1: (Catalog No. P1F38FTPXL)

- Given specifications:
- 50A, 125/250V receptacle with GFCI circuit breaker
  - 30A, 125V receptacle with a standard circuit breaker
  - 20A, 125V receptacle with GFCI circuit breaker
  - Ring type meter at the top
  - Pedestal mount device
  - Cable and telephone provisions
  - Light option

- Step 1**  
Start with the power receptacle product line prefix identifier: **(P)**
- Step 2**  
Choose the first receptacle and its circuit breaker type: **(1F)**
- Step 3**  
Choose the second receptacle and its circuit breaker type: **(3)**
- Step 4**  
Choose the third receptacle and its circuit breaker type: **(8F)**
- Step 5**  
Choose the utility grade meter type: **(T)**
- Step 6**  
Choose device mounting type: **(P)**
- Step 7**  
We have a variety of options you can add to your panel, including cable and telephone, and water. Add cable and telephone option here: **(X)**
- Step 8**  
Add the light option here: **(L)**

### EXAMPLE 2: (Catalog No. P5F8FUS)

- Given specifications:
- 20A, 125V receptacle with GFCI circuit breaker
  - 20A, 250V receptacle with GFCI circuit breaker
  - Unmetered
  - Surface device

- Step 1**  
Start with the power receptacle product line prefix identifier: **(P)**
- Step 2**  
Choose the first receptacle and its circuit breaker type: **(5F)**
- Step 3**  
Choose the second receptacle and its circuit breaker type: **(7)**
- Step 4**  
Choose the utility grade meter type: **(U)**
- Step 5**  
Choose device mounting type: **(S)**

**Remember**  
If the power outlet panel you need is not listed, you can build your own catalog number using these three basic guidelines:

- No more than three receptacles per device
- Total receptacle amperage may not exceed more than 125 amps
- The receptacles must be configured following a top to bottom sequence from the catalog numbering system seen on this page

① Required fields.  
 ② For use on Pedestal Devices.  
 ③ All lighted devices require either a 5-20R2GFI receptacle or a QF120 circuit breaker. For use on unmetered or top metered devices.  
 ④ Devices with two outlets with a total amperage of 60 amps or less have factory ready provisions for an additional 1-pole circuit breaker. Devices with three outlets with a total amperage of 100 amps or less have factory ready provisions for an additional 1-pole circuit breaker.  
 ⑤ Up to 3 receptacles, and up to 125 Amps maximum permissible.  
 ⑥ The "F" next to the receptacle number denotes GFCI circuit breaker protection.

# All-Sites™ Temporary Power Outlet Panels

**Selection**

Most Common Items—See Previous Page to Build Your Own Catalog Number

LOAD CENTERS & CIRCUIT BREAKERS  
**1**

## Unmetered Surface Mount Devices

Catalog Number	List Price \$	Meter Type	Receptacle #1	Receptacle #2	Receptacle #3
P17US	382.00	Unmetered	14-50R (50A)	5-20R2GFI (20A)	N/A
P77US	333.00	Unmetered	5-20R2GFI (20A)	5-20R2GFI (20A)	N/A
P1F7US	470.00	Unmetered	14-50R (50A)	5-20R2GFI (20A)	N/A
P137US	376.00	Unmetered	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P577US	364.00	Unmetered	6-20R (20A)	5-20R2GFI (20A)	5-20R2GFI (20A)
P37US	321.00	Unmetered	TT30R (30A)	5-20R2GFI (20A)	N/A

## Metered Surface Mount Devices

Catalog Number	List Price \$	Meter Type	Receptacle #1	Receptacle #2	Receptacle #3
P77TS	447.00	Ring Type/Top	5-20R2GFI (20A)	5-20R2GFI (20A)	N/A
P577TS	553.00	Ring Type/Top	6-20R (20A)	5-20R2GFI (20A)	5-20R2GFI (20A)
P1F7TS	639.00	Ring Type/Top	14-50R (50A)	5-20R2GFI (20A)	N/A
P77RTS	442.00	Ringless/Top	5-20R2GFI (20A)	5-20R2GFI (20A)	N/A
P1F7RTS	637.00	Ringless/Top	14-50R (50A)	5-20R2GFI (20A)	N/A
P5F7TS	637.00	Ring Type/Top	6-20R (20A)	5-20R2GFI (20A)	N/A
P77BS	427.00	Ring Type/Bottom	5-20R2GFI (20A)	5-20R2GFI (20A)	N/A
P177RBS	612.00	Ringless/Bottom	14-50R (50A)	5-20R2GFI (20A)	5-20R2GFI (20A)
P77RBS	578.00	Ringless/Bottom	5-20R2GFI (20A)	5-20R2GFI (20A)	N/A
P5F77RBS	729.00	Ringless/Bottom	6-20R (20A)	5-20R2GFI (20A)	5-20R2GFI (20A)
P1F77RBS	729.00	Ringless/Bottom	14-50R (50A)	5-20R2GFI (20A)	5-20R2GFI (20A)
P17RBS	549.00	Ringless/Bottom	14-50R (50A)	5-20R2GFI (20A)	N/A

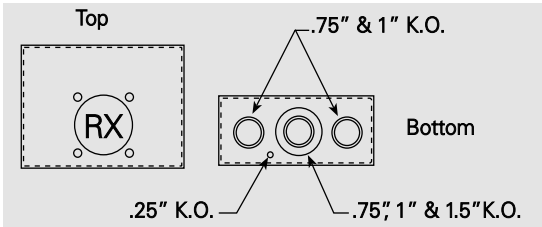
## Metered and Unmetered Pedestal Devices

Catalog Number	List Price \$	Enclosure Type	Meter Type	Receptacle #1	Receptacle #2	Receptacle #3
P137UP	722.00	Pedestal Earth Mount	Unmetered	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P37UP	568.00	Pedestal Earth Mount	Unmetered	TT30R (30A)	5-20R2GFI (20A)	N/A
P137RTP	805.00	Pedestal Earth Mount	Ringless	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P137TP	783.00	Pedestal Earth Mount	Ring Type	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P1F37UML®	1173.00	Pedestal Earth Mount	Unmetered	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P137RT2B	1101.00	Pedestal Earth Mount Back to Back	Ringless	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)
P137U2B	1170.00	Pedestal Earth Mount Back to Back	Unmetered	14-50R (50A)	TT30R (30A)	5-20R2GFI (20A)

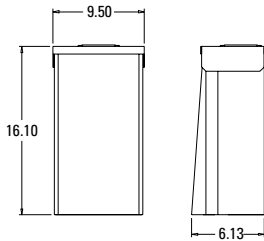
# Temporary Power Outlet Panels

## Dimension Drawings

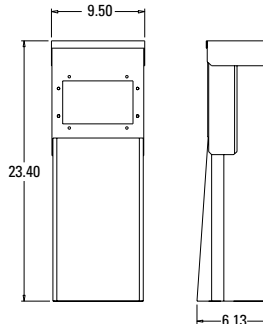
### Standard Knockout Pattern



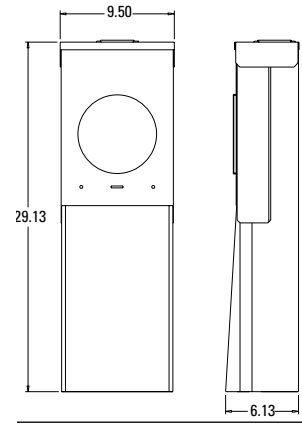
The knockout diagram shown at left is to be referenced for all surface mount devices



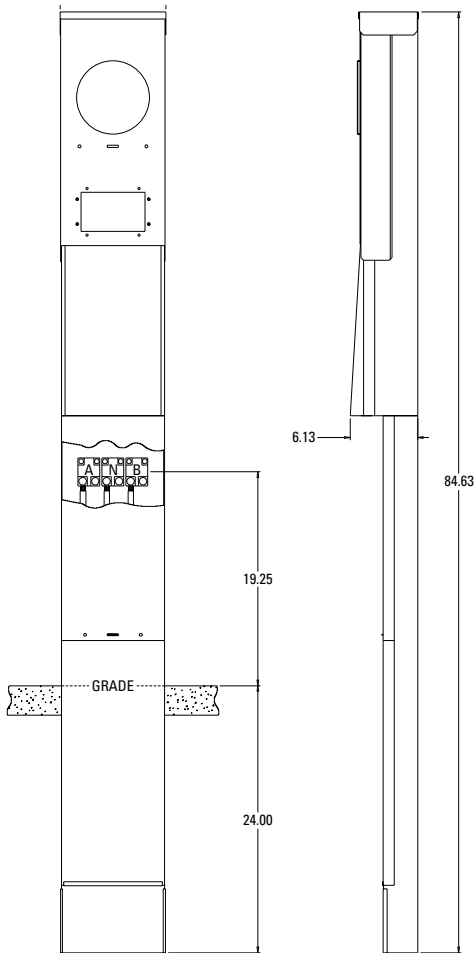
**SURFACE**



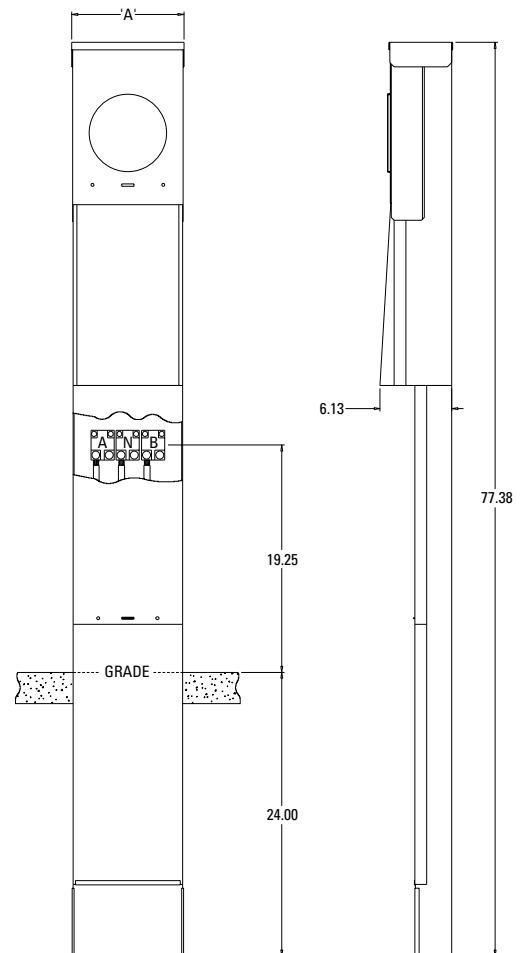
**LIGHTED SURFACE**



**METERED SURFACE**



**METERED LIGHTED PEDESTAL**

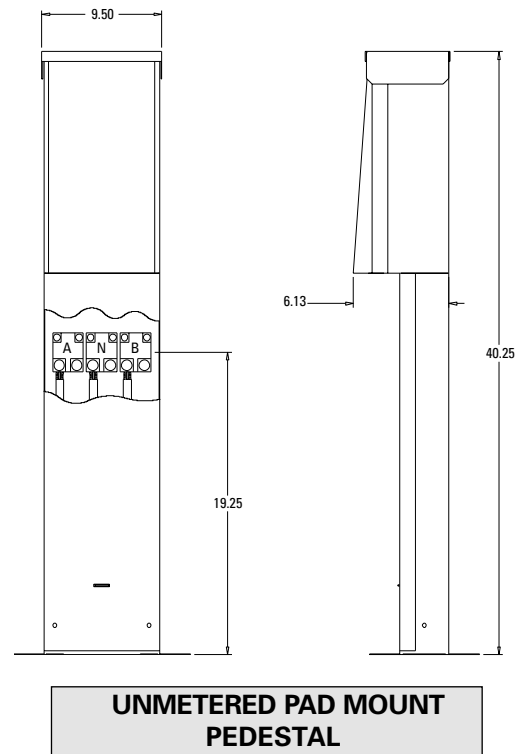
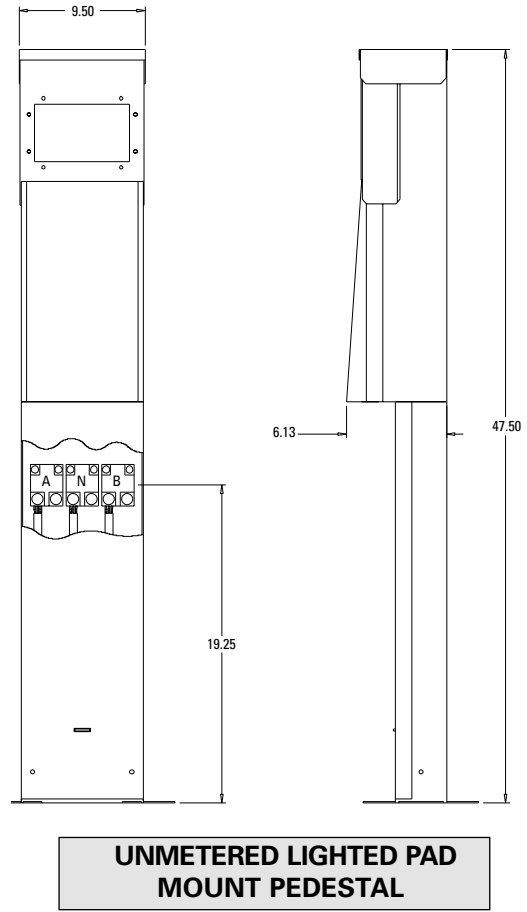
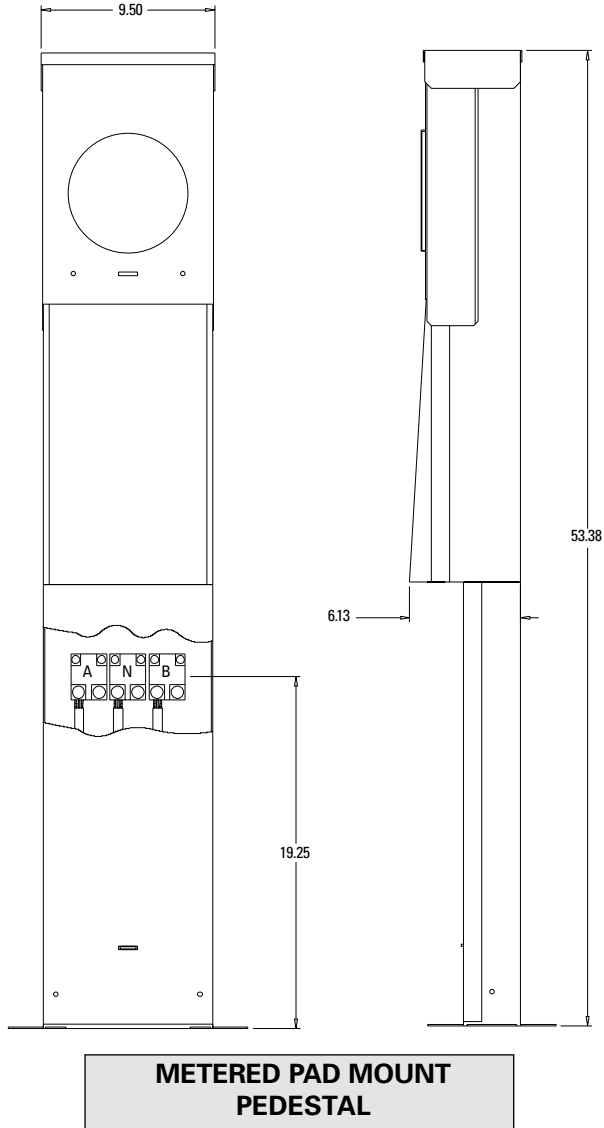


**METERED PEDESTAL**

1  
LOAD CENTERS &  
CIRCUIT BREAKERS

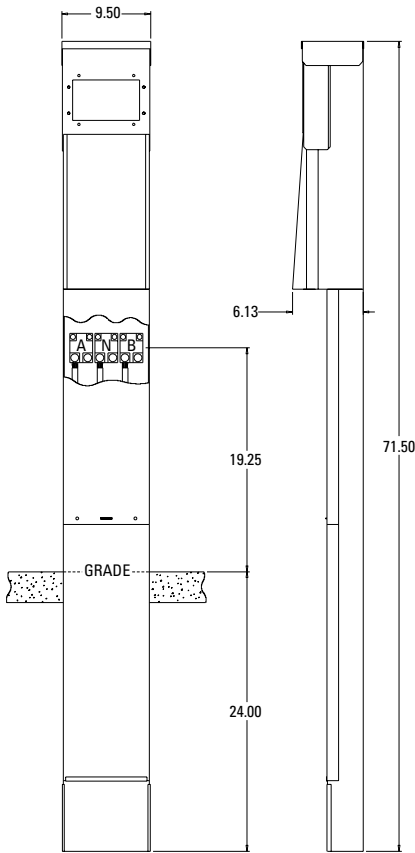
# Temporary Power Outlet Panels

## Dimension Drawings

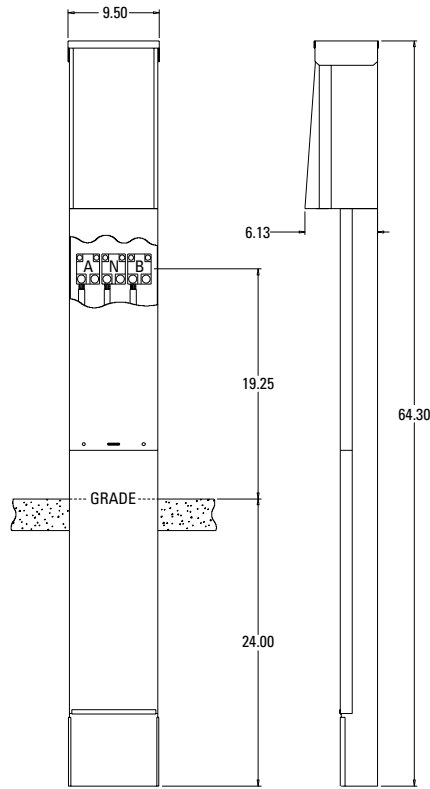


# Temporary Power Outlet Panels

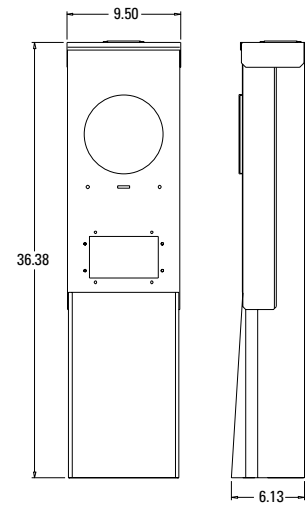
## Dimension Drawings



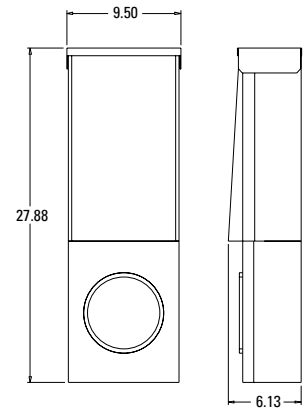
**UNMETERED LIGHTED PEDESTAL**



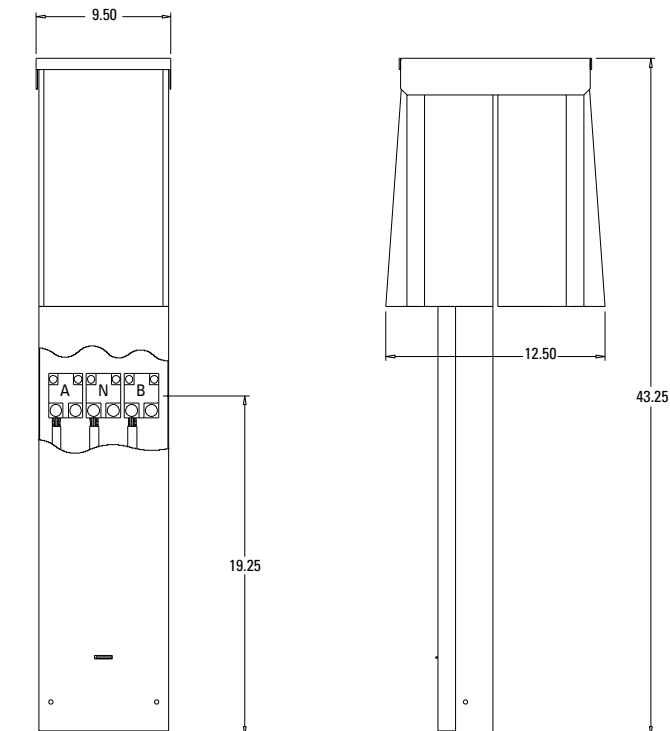
**UNMETERED PEDESTAL**



**METER LIGHTED SURFACE**



**METER AT BOTTOM SURFACE**

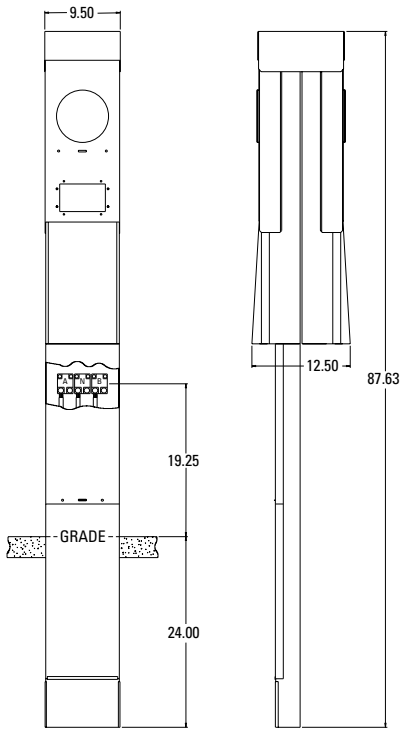


**UNMETERED PAD MOUNT  
BACK-TO-BACK-PEDESTAL**

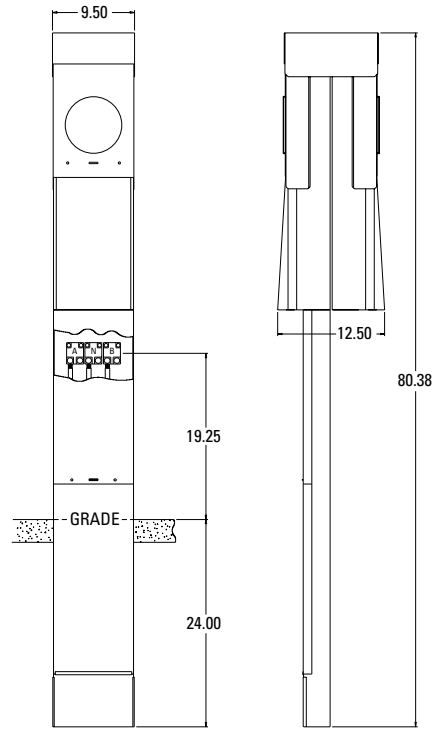
# Temporary Power Outlet Panels

*Dimension Drawings*

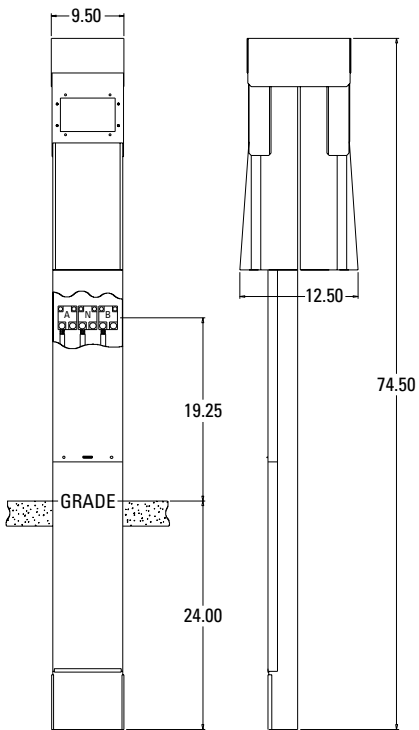
1  
LOAD CENTERS &  
CIRCUIT BREAKERS



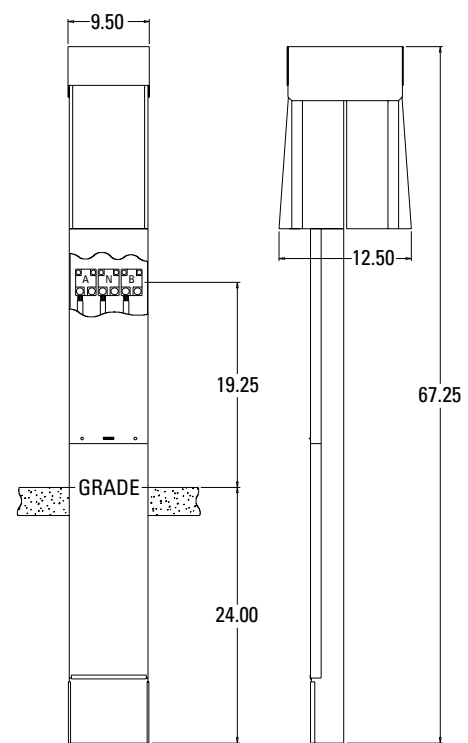
**METERED LIGHTED  
BACK-TO-BACK PEDESTAL**



**METERED BACK-TO-BACK  
PEDESTAL**



**UNMETERED LIGHTED  
BACK-TO-BACK PEDESTAL**

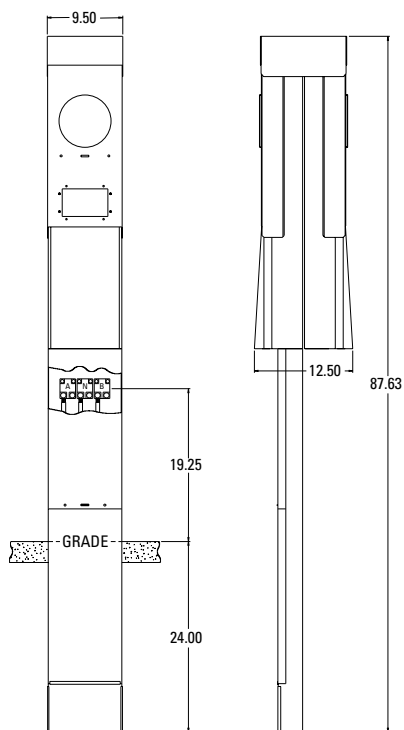


**UNMETERED BACK-TO-BACK  
PEDESTAL**

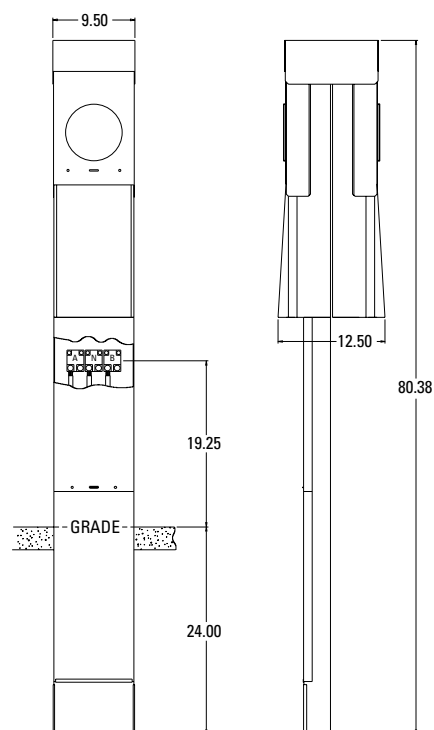


# Temporary Power Outlet Panels

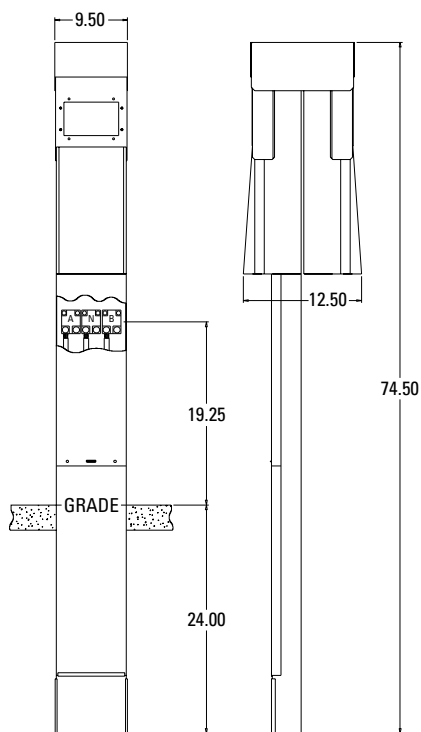
## Dimension Drawings



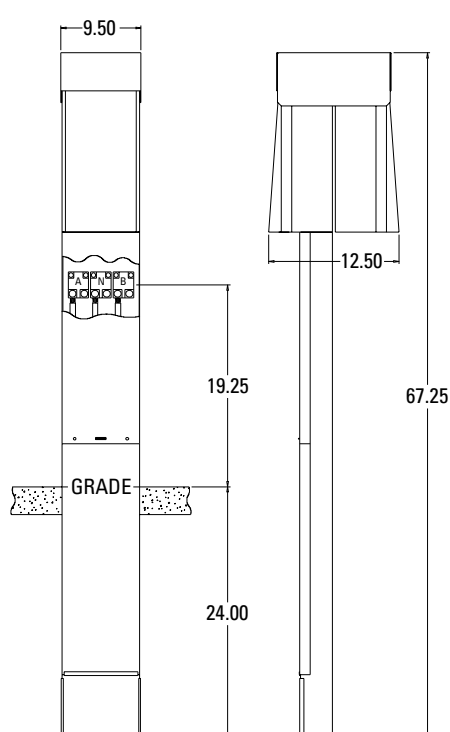
**METERED LIGHTED  
BACK-TO-BACK PEDESTAL**



**METERED BACK-TO-BACK  
PEDESTAL**



**UNMETERED LIGHTED  
BACK-TO-BACK PEDESTAL**



**UNMETERED BACK-TO-BACK  
PEDESTAL**

# Notes

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# Meter Centers

## Meter Mounting Devices

General

### General Information

#### Materials:

16 gauge, galvanized steel, G-90

#### Enclosures:

NEMA 3R

#### Finish:

Steel - Light gray, baked on powder polyester

#### Latches:

All swing latches are stainless steel

#### Block Material:

Glass reinforced polyester

#### Terminals:

Residential - Tin-plated aluminum extrusions 6061-T6

Commercial - Tin-plated copper and or tin plated aluminum

#### Accessories:

All hubs, closure plates, and 5th terminals, if included, are factory installed.

#### Standards:

Products cataloged herein meet or exceed the following standards:

UL 486B, UL 414, NEMA 250,

ANSI C12.7 UL File #30413

Siemens meter mounting devices utilize the high quality Landis & Gyr design known throughout the utility industry for more than 50 years. Siemens meter sockets are built for safety, ease of installation, and long term quality. That is why we use stainless steel hardware, polyester powder coat paint for long lasting protection, and Type G-90 galvanized steel for all of our enclosures. It is also why we use an all-copper current path in our commercial sockets. All of this means that the Siemens' Landis & Gyr brand is recognized throughout the industry as the quality leader.

#### Features:

- All enclosures feature type G90 galvanized steel with a durable polyester powder coat finish

- Residential single position sockets (types SUAT) feature a quad neutral as a standard feature
- Most commercial sockets include a ground lug & some models are available with line & load lugs installed
- Lever bypass sockets feature the Landis & Gyr type HQ socket which is recognized by utilities as the industry standard for durability & quality
- Siemens features one of the most complete and comprehensive meter socket lines available from any manufacturer

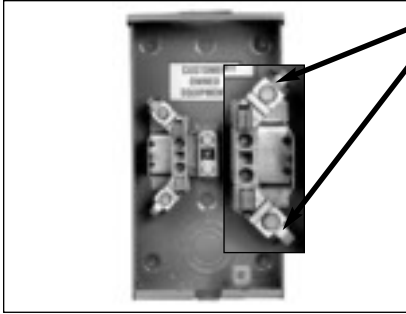


# Meter Centers

## Meter Socket Bypass Types

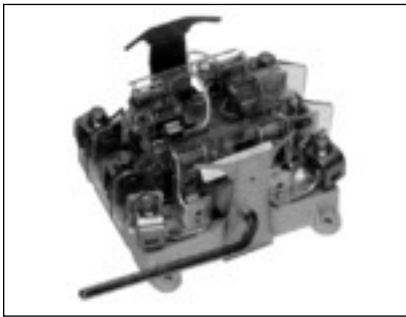
General

There are several different bypass types used in the meter socket industry. The type of bypass used is dependent upon each individual utilities' requirements for that application. The illustrations and photos below will explain some of the basic bypass types seen in section 2 of the Siemens' speedfax. This page is meant for informative purposes only and is not meant to imply or convey the use of any particular bypass or inter-changing of any types of bypass for any application. The local utility should always be contacted to ensure approval of equipment prior to installation. The types of bypasses listed below are for utility use only.



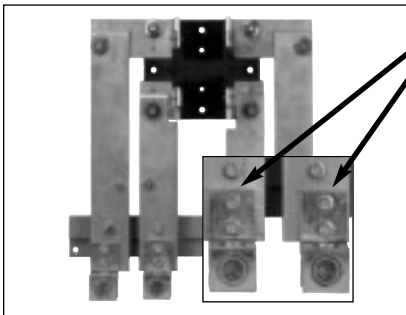
### Horn Bypass:

Small tabs or "horns" on the line and load side of the meter socket act as electrical connection points for the utility to install a bypassing means- usually a specially produced wire or "jumper" designed for this specific application.



### Lever Bypass:

A lever is used to rotate a plated copper blade between the line and load jaws. The Landis & Gyr lever bypass HQ socket also clamps on the meter when the bypass is dis-engaged. The bypass must be engaged to remove the meter then dis-engaged after the meter is installed. The bypass acts as an alternate path for current flow which helps to mitigate any arcing if the meter is being removed. This also ensures a constant current flow should the meter need to be removed.



### Test Block Bypass:

Test Block Bypass sockets (TBB) have the line and load connectors mounted parallel to one another. This provides for a provision to bypass the meter by placing a jumper on the line and load bus. Note that this type of bypass is used primarily by those utilities subscribing to the EUSERC metering standards.

# Meter Centers

## Single Position Meter Sockets—Residential Types<sup>④</sup>

Selection



SUAT111-0PGP



SUAT111-0GF



SUAT111-0MXA

### 135 Amp Continuous Meter Mounting Equipment, Ringless Type, 1-Phase, 3-Wire 600V 1 Position

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs	No. of Jaws	5th Jaw	Hub	KO Fig.	Notes	List Price \$
	H	W	D									
<b>HORN BYPASS</b>												
SUAT111-0PZA	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1	①	99.05
SUAT111-0PDN	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1	⑥	106.50
SUAT111-0PGP	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1	②	107.57
SUAT111-0PQG	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1		95.85
<b>NO BYPASS</b>												
SUAT111-0JCA	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1		108.63
SUAT111-0G	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1		104.37
SUAT111-PG	11.7	8.0	3.7	135	UG	#14-2/0	4	EC659-0121	None	1		99.05
SUAT111-0MXA	11.7	8.0	3.7	135	OH/UG	#14-2/0	5	Installed	RX Opening	1	①	101.18
SUAT111-0GF	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1	③ ⑦	92.66

### 135 Amp Continuous Meter Mounting Equipment, Ring Type, 1-Phase, 3-Wire 600V 1 Position

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs	No. of Jaws	5th Jaw	Hub	KO Fig.	Notes	List Price \$
	H	W	D									
<b>NO BYPASS</b>												
SUAT121-0GWR	11.7	8.0	3.7	135	OH/UG	#14-2/0	4	EC659-0121	RX Opening	1	⑤	103.31
SUAT121-BGWR	11.7	8.0	3.7	135	OH	#14-2/0	4	EC659-0121	EC38597 Inst.	1	⑤	106.50
SUAT121-PGWR	11.7	8.0	3.7	135	UG	#14-2/0	4	EC659-0121	None	1	⑤	99.05
SUAT121-BM	11.7	8.0	3.7	135	OH	#14-2/0	5	Installed	EC38597 Inst.	1		103.31
SUAT121-0BCO	11.7	8.0	3.7	135	OH/UG	#14-2/0	5	Installed	RX Opening	1	⑧	108.63
SUAT121-BBCO	11.7	8.0	3.7	135	OH	#14-2/0	5	Installed	EC38597 Inst.	1	⑧	107.57
SUAT121-PBCO	11.7	8.0	3.7	135	UG	#14-2/0	5	Installed	None	1	⑧	108.63

Contact utility or sales office for approval by your local utility prior to installation.

① Includes 7/16" Barrel lock KO for utility security lock.

② Includes 7/8" Barrel lock KO for utility security lock.

③ Stainless steel latch and hasp.

④ All devices on this page come with a ground lug. Quad neutrals are standard on every SUAT1, SUAT3, & SUAT4 device.

⑤ Sealing ring included.

⑥ For Duquense Light & Power.

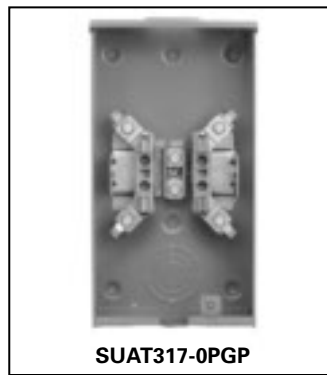
⑦ Approved for Florida Meter Group - overhead only.

⑧ For use in the Consolidated Edison territory.

# Meter Centers

## Single Position Meter Sockets—Residential Types ④

Selection



2  
METER  
CENTERS

### 200 Amp Continuous/250 Amp Max Meter Mounting Equipment, Ringless Type, 1-Phase, 3-Wire 600V 1 Position

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs (kcmil)	No. of Jaws	5th Jaw	Hub	KO Fig.	Notes	List Price \$
	H	W	D									
<b>HORN BYPASS</b>												
SUAT317-OPGP	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	②	203.42
SUAT317-OPDN	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	⑪	202.35
SUAT317-0FP	14.8	8.0	4.5	200	OH	#6-350	5	Installed	RX Opening	2	②	203.42
SUAT317-0PZA	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	①	138.45
SUAT317-0PQG	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2		138.45
SUAT317-0PCV	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	⑬	223.65
SUAT417-XPOG	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	3A		187.44
SUAT417-XFP	14.8	11.0	4.5	200	OH/UG	#6-350	5	Installed	RX CL. Plate	3A	②	203.42
SUAT417-0POG	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX Opening	3A		214.07
SUAS877-PPDN	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	6	⑪ ⑨	264.12
SUAS877-PPZA	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	6	① ⑨	267.32
SUAS877-PPGP	14.0	13.0	5.1	200	UG-SW	#6-350	5	EC659-0121	None	6	② ⑨	275.84
SUAS877-PPZ	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	6	⑨	264.12
SUAS817-PPGP	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	8	② ⑫	275.84
SUAS877-PPCV	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	8	⑬	290.75
<b>NO BYPASS</b>												
SUAT317-0MXA	14.8	8.0	4.5	200	OH	#6-350	5	Installed	RX Opening	2	①	203.42
SUAT317-0GF	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	③ ⑧	161.88
SUAT317-0G	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2		146.97
SUAT317-DGZ	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	EC38599 Inst.	2		131.00
SUAT417-XGDU	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	3A		204.48
SUAT417-XGF	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	3A	③ ⑧	138.45
SUAT417-XG	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	3A		192.77
SUAT417-PG	14.8	11.0	4.5	200	UG	#6-350	4	EC659-0121	None	3B		103.31
SUAT517-PDG	19.0	13.5	5.1	200	UG	#6-350	4	EC659-0121	None	4	①	166.14
SUAT618-XGNM	22.0	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	5	⑤	320.57
SUAS877-PG	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0121	None	6	⑨	264.12
SUAS818-PGNM	14.0	13.0	5.1	200	UG-SW	#6-350	4	EC659-0120	None	8	⑤ ⑫	280.10
SUAS917-XJCA	17.0	13.0	5.1	200	OH/UG-SW	#6-350	4	EC659-0121	RX CL. Plate	7	⑫	285.42

### 200 Amp Continuous/250 Amp Max Meter Mounting Equipment, Ring Type, 1-Phase, 3-Wire 600V 1 Position

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs	No. of Jaws	5th Jaw	Hub	KO Fig.	Notes	List Price \$
	H	W	D									
<b>NO BYPASS</b>												
SUAT327-0MCO	14.8	8.0	4.5	200	OH	#6-350	5	Installed	RX Opening	2	⑥ ⑦	140.58
SUAT327-0GWR	14.8	8.0	4.5	200	OH	#6-350	4	EC659-0121	RX Opening	2	⑥	123.00
SUAT427-PMCO	14.8	11.0	4.5	200	UG	#6-350	5	Installed	None	3B	⑥ ⑦	174.66
SUAT427-XMWR	14.8	11.0	4.5	200	OH/UG	#6-350	4	EC659-0121	RX CL. Plate	3A	⑥ ⑩	161.88

Contact utility or sales office for approval by your local utility prior to installation.

- ④ Includes 7/16" Barrel lock KO for utility security lock.
- ⑤ Includes 7/8" Barrel lock KO for utility security lock.
- ⑥ Stainless steel latch and hasp.
- ⑦ A quad neutral is standard on all SUAT1, SUAT3, & SUAT4 devices.
- ⑧ Device has line side studs. For use in the Niagara-Mohawk territory.

- ⑨ Sealing ring included.
- ⑩ For use in the Consolidated Edison territory.
- ⑪ For use in the Florida Meter Group territory.
- ⑫ "-SW" indicates an offset or side wire design. Meter is on right.

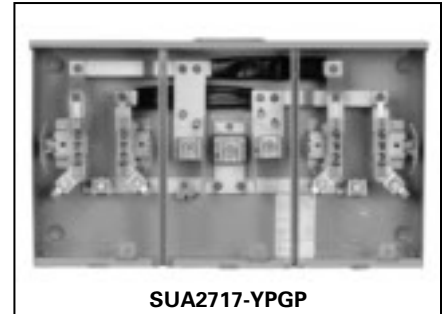
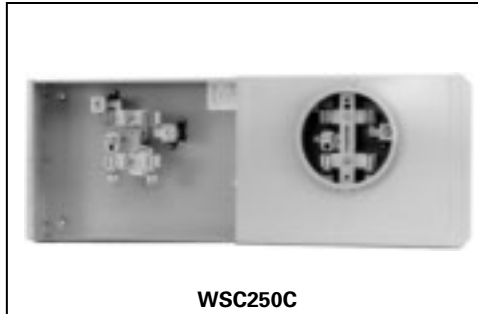
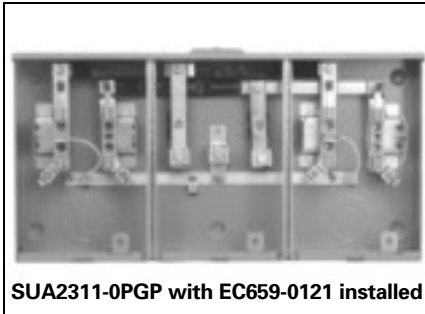
- ⑬ May be used for overhead services in the EUSERC territories.
- ⑭ For Duquense Light & Power.
- ⑮ "-SW" indicates an offset or side wire design. Meter is on left.
- ⑯ For use on the Atlantic Electric & Delmarva Service areas only.

# Meter Centers

## Single & Multiple Position Meter Sockets—Residential Types

Selection

METER CENTERS 2



### 100 Amp/Position Meter Mounting Equipment, Ringless Type, 1-Phase, 3-Wire 300V Multi-Position®

Catalog Number	Dimensions (inches)			Bus Amps	Cont. Amps	Service	No. of Pos.	No. of Jaws	5th Jaw	Hub	Notes	KO Fig.	Line Lugs	Load Lugs	List Price \$
	H	W	D												
<b>HORN BYPASS</b>															
SUA2311-0PGP	12.0	24.0	4.5	100	100	OH/UG	2	4	EC659-0121	RX Opening	② ④	16	#6-350	#14-2/0	324.83
SUA2311-0PQG	12.0	24.0	4.5	100	100	OH/UG	2	4	EC659-0121	RX Opening	⑤	16	#6-350	#14-2/0	347.19
SUA3311-0PGP	12.0	32.0	4.5	135	100	OH/UG	3	4	EC659-0121	RX Opening	② ④	17	#6-350	#14-2/0	455.82
SUA3311-0PQG	12.0	32.0	4.5	135	100	OH/UG	3	4	EC659-0121	RX Opening	⑤	17	#6-350	#14-2/0	477.12
SUA4311-0PGP	12.0	40.0	4.5	180	100	OH/UG	4	4	EC659-0121	RX Opening	② ④	18	#6-350	#14-2/0	590.01
SUA4311-0PQG	12.0	40.0	4.5	180	100	OH/UG	4	4	EC659-0121	RX Opening	⑤	18	#6-350	#14-2/0	610.25

### 200 Amp/Position Meter Mounting Equipment, Ringless Type, 1-Phase, 3-Wire 300V Multi-Position®

Catalog Number	Dimensions (inches)			Bus Amps	Cont. Amps	Service	No. of Pos.	No. of Jaws	5th Jaw	Hub	Notes	KO Fig.	Line Lugs (kcmil)	Load Lugs (kcmil)	List Price \$
	H	W	D												
<b>HORN BYPASS</b>															
SUA2717-YPDN	14.5	24.0	5.1	200	200	OH/UG	2	4	EC659-0121	HD Opening	① ③ ④	19	#1/0-600	#6-350	337.61
SUA2717-YPGP	14.5	24.5	5.1	200	200	OH/UG	2	5	Installed	HD CL. Plate	② ④	19	#1/0-600	#6-350	337.61
SUA2717-YPQG	14.5	24.0	5.1	200	200	OH/UG	2	4	EC659-0121	HD Opening	① ⑤	19	#1/0-600	#6-350	358.91
SUA2717-YPZA	14.5	24.0	5.1	200	200	OH/UG	2	4	EC659-0121	HD Opening	① ④	19	#1/0-600	#6-350	337.61
SUA3717-YPDN	14.5	32.0	5.1	270	200	OH/UG	3	4	EC659-0121	HD Opening	① ③ ④	20	#1/0-600	#6-350	498.42
SUA3717-YPGP	14.5	33.3	5.1	270	200	OH/UG	3	5	Installed	HD CL. Plate	② ④	20	#1/0-600	#6-350	498.42
SUA3717-YPZA	14.5	32.0	5.1	270	200	OH/UG	3	4	EC659-0121	HD Opening	① ④	20	#1/0-600	#6-350	498.42
SUA4719-YPDN	14.5	43.0	5.1	360	200	OH/UG	4	4	EC659-0121	HD Opening	① ③ ④	21	(2)#1/0-600	#6-350	597.47
SUA4719-YPGP	14.5	43.0	5.1	360	200	OH/UG	4	5	Installed	HD CL. Plate	② ④	21	(2)#1/0-600	#6-350	597.47
SUA4719-YPQG	14.5	43.0	5.1	360	200	OH/UG	4	4	EC659-0121	HD Opening	① ⑤	21	(2)#1/0-600	#6-350	617.70
SUA4719-YPZA	14.5	43.0	5.1	360	200	OH/UG	4	4	EC659-0121	HD Opening	① ④	21	(2)#1/0-600	#6-350	597.47
SUA5719-KPGP	14.5	51.0	5.1	450	200	OH/UG	5	4	EC659-0121	2-HD Opening	② ④	22	(2)#1/0-600	#6-350	687.99
SUA5719-KPDN	14.5	51.0	5.1	450	200	OH/UG	5	4	EC659-0121	2-HD Opening	① ③ ④	22	(2)#1/0-600	#6-350	772.13
SUA6719-KPOG	14.5	59.0	5.1	528	200	OH/UG	6	4	EC659-0121	2-HD Opening	① ⑤	23	(2)#1/0-600	#6-350	1082.04
SUA6719-KPZA	14.5	59.0	5.1	528	200	OH/UG	6	4	EC659-0121	2-HD Opening	① ④	23	(2)#1/0-600	#6-350	1082.04

### 100/80 Amp/Position Meter Mounting Equipment, Ring Type, 1-Phase, 3-Wire 300V Multi-Position

Catalog Number	Dimensions (inches)			Bus Amps	Cont. Amps	Service	No. of Pos.	No. of Jaws	5th Jaw	Hub	Notes	KO Fig.	Line Lugs (kcmil)	Load Lugs (kcmil)	List Price \$
	H	W	D												
<b>NO BYPASS</b>															
WSC150C	11.3	15.3	3.8	-	80	OH/UG	1	5	WSX019	1.25" KO	⑦ ⑩	24	#6-4/0	#8-2/0	165.00
WSC250C	11.3	30.5	3.8	-	80	OH/UG	2	5	WSX019	1.25" KO	⑦ ⑩	25	#6-4/0	#8-2/0	330.00
WSC350C	11.3	45.5	3.8	-	80	OH/UG	3	5	WSX019	1.25" KO	⑦ ⑩	26	#6-4/0	#8-2/0	497.00
WSN251CR	13.5	16.8	4.1	200	100	OH/UG	2	5	Installed	RX CL. Plate	⑨ ⑥	30	#6-250	#8-2/0	404.70
WSN351CR	13.5	25.5	4.1	200	100	OH/UG	3	5	Installed	RX CL. Plate	⑨ ⑥	31	#6-250	#8-2/0	588.95
WSN451CR	13.5	34.1	4.1	200	100	OH/UG	4	5	Installed	RX CL. Plate	⑨ ⑥	32	#6-250	#8-2/0	773.19

Contact utility or sales office for approval by your local utility prior to installation.

- ① Includes 7/16" Barrel lock KO for utility security lock.
- ② Includes 7/8" Barrel lock KO for utility security lock.
- ③ For Duquense Light & Power.
- ④ Ground lug included.
- ⑤ (2) Ground lugs included.

- ⑥ Sealing ring included.
- ⑦ Unit is unbusse and indoor.
- ⑧ Center feed.
- ⑨ End feed.

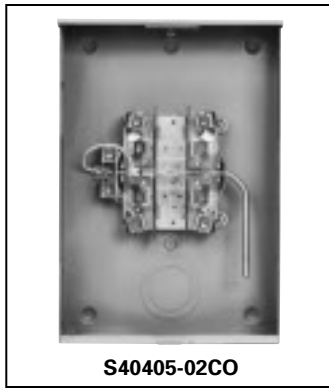
- ⑩ Devices are gangable. Use strap #WSX008M to gang devices together. For use in New York City only (Con Ed).



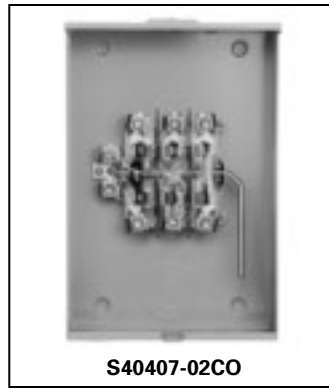
# Meter Centers

## Single Position Meter Sockets—Commercial/Industrial Types

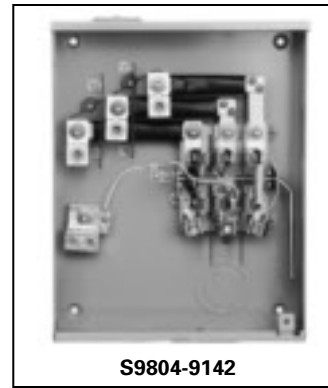
Selection



S40405-02CO



S40407-02CO



S9804-9142

2  
METER  
CENTERS

### 200 Amp Continuous Meter Mounting Equipment, Ringless Type, Lever Bypass, 1-Phase, 3-Wire<sup>⑦</sup>

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs	No. of Jaws	Hub Opening	KO Fig.	Notes	List Price \$
	H	W	D								
<b>4 OR 5 TERMINAL</b>											
S40404-02QG	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	4	RX CL. Plate	9	⑤	431.00
S40405-02QG	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	RX CL. Plate	9	⑤	478.19
S40405-015F	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	RX CL. Plate	9	② ③ ④ ⑧	473.93
S42505-02RG	19.0	13.0	5.0	200	OH/UG	3/8-24 Stud	5	RX CL. Plate	9	④ ⑥	463.28
S40405-025	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	RX CL. Plate	9		459.02
S40405-02CO	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	RX CL. Plate	9	② ④ ⑨	459.02
S40405-0BNU	28.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	RX Opening	9	①	448.37
S48805-0BNU	22.0	16.0	5.0	200	OH/UG	#6-350 kcmil	5	RX CL. Plate	10	① ④ ⑩	548.48
S44305-02CV	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	5	HD CL. Plate	9	⑪	578.00

### 200 Amp Continuous Meter Mounting Equipment, Ringless Type, Lever Bypass, 3-Phase, 4-Wire 600V

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs	No. of Jaws	Hub Opening	KO Fig.	Notes	List Price \$
	H	W	D								
<b>7 TERMINAL</b>											
S40007-01GP	17.0	10.0	5.0	200	OH	#6-350 kcmil	7	RX Opening	10	② ④	594.27
S40407-02QG	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	RX CL. Plate	9	⑤	594.27
S40407-025	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	RX CL. Plate	9	—	604.92
S40407-015F	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	RX CL. Plate	9	② ③ ④ ⑧	604.92
S40407-02CO	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	RX CL. Plate	9	② ④ ⑨	581.49
S40407-01NU	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	RX Opening	9	① ④	532.50
S9804-9142	20.0	16.0	5.0	200	UG-SW	#6-350 kcmil	7	RX CL. Plate	33	② ④	717.81
S48807-02NU	22.0	16.0	5.0	200	OH/UG	#6-350 kcmil	7	RX CL. Plate	10	① ④ ⑩	630.48
S44307-02CV	19.0	13.0	5.0	200	OH/UG	#6-350 kcmil	7	HD CL. Plate	9	⑪	630.00

Contact utility or sales office for approval by your local utility prior to installation.

① Includes 7/16" Barrel lock KO for utility security lock.  
 ② Includes 7/8" Barrel lock KO for utility security lock.  
 ③ Stainless steel latch and hasp  
 ④ Ground lug included  
 ⑤ (2) Ground lugs included

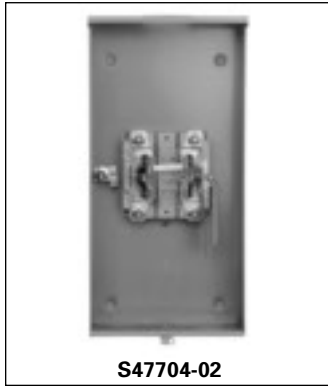
⑥ Lugs not included, order separately  
 ⑦ 5-jaw devices can be used for 3-phase 3-wire service if an isolated neutral kit is used.  
 ⑧ For use in the Florida Meter Group territory.  
 ⑨ For use in the Consolidated Edison territory.

⑩ For use in the Northeast Utilities service area.  
 ⑪ For use in the Atlantic Electric & Delmarva Service areas.

# Meter Centers

## Single Position Meter Sockets—Commercial/Industrial Types

Selection



### 320 Amp Continuous/400 Amp Max Meter Mounting Equipment, Ringless Type, Lever Bypass, 1-Phase, 3-Wire

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs®	No. of Jaws	Hub Opening	KO Fig.	Notes	List Price \$
	H	W	D								
<b>4 OR 5 TERMINAL</b>											
S48704-82GP	34.0	20.0	6.0	320	OH/UG-SW	#4-600	4	HD CL. Plate	11	② ④ ⑥ ⑩	719.94
S48104-02	31.0	16.0	5.0	320	OH/UG-SW	3/8-24 Stud	4	HD CL. Plate	14	② ④ ⑦ ⑩	1016.01
S48504-92	28.0	13.0	5.0	320	UG	3/8-24 Stud	4	None	35	④ ⑦	759.35
S47604-81GP	28.0	13.0	5.0	320	OH/UG	#4-600	4	HD Opening	12	② ④ ⑥	743.37
S47704-02	28.0	14.0	6.0	320	OH/UG	1/2-20 Stud	4	HD CL. Plate	13	⑦	787.04
S47704-01NU	28.0	14.0	6.0	320	OH/UG	1/2-20 Stud	4	HD Opening	13	② ④ ⑦	647.52
S9804-9144	25.0	16.0	6.0	320	OH/UG	3/8-24 Stud	4	HD Opening	13	① ④ ⑦	498.42
S9804-9146	34.0	20.0	6.0	320	OH/UG	3/8-24 Stud	4	HD CL. Opening	11	① ④ ⑦	749.76
S47605-02SP	28.0	13.0	5.0	320	OH/UG	3/8-24 Stud	5	HD CL. Plate	12	② ④ ⑦	460.08
S47705-01NU	28.0	14.0	6.0	320	OH/UG	1/2-20 Stud	5	HD Opening	13	② ④ ⑦	773.19
S48105-83BU	31.0	16.0	5.0	320	OH/UG-SW	#4-600	5	HD CL. Plate	14	② ④ ⑩	717.81
S44704-8265	20.0	34.0	6.0	320	OH/UG-SW	#4-600	4	HD CL. Plate	11	④ ⑥ ⑩	1135.29

### 320 Amp Continuous/400 Amp Max Meter Mounting Equipment, Ringless Type, Lever Bypass, 3-Phase, 4-Wire 600V

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs®	No. of Jaws	Hub Opening	KO Fig.	Notes	List Price \$
	H	W	D								
<b>7 TERMINAL</b>											
S47707-01NU	28.0	14.0	6.0	320	OH/UG	1/2-20 Stud	7	HD Opening	13	① ④ ⑦	773.19
S47707-02	28.0	14.0	6.0	320	OH/UG	3/8-24 Stud	7	HD CL. Plate	14	⑦	773.19
S48707-82GP	34.0	20.0	6.0	320	OH/UG-SW	#4-600	7	HD CL. Plate	11	② ④ ⑥ ⑩	870.11
S9804-9145	25.0	16.0	6.0	320	OH/UG	3/8-24 Stud	7	HD Opening	34	① ④ ⑦	634.74
S9804-9147	34.0	20.0	6.0	320	OH/UG	3/8-24 Stud	7	HD Opening	11	① ④ ⑦	890.34

### 400 Amp Continuous/400 Amp Max Meter Mounting Equipment, Ringless Type, No Bypass, 3-Phase, 4-Wire 600V

Catalog Number	Dimensions (inches)			Cont. Amps	Service	Lugs®	No. of Jaws	Hub Opening	KO Fig.	Notes	List Price \$
	H	W	D								
<b>7 TERMINAL - Landis &amp; Gyr Type K7 Bolt-in Socket</b>											
S9817-8061	34.0	20.0	6.0	400	UG	1/2-20 Stud	7	HD CL Plate	15	③ ④ ⑦ ⑧ ⑨	1917.00

Contact utility or sales office for approval by your local utility prior to installation.

- ① Includes 7/16" Barrel lock KO for utility security lock.
- ② Includes 7/8" Barrel lock KO for utility security lock.
- ③ Stainless steel latch and hasp.
- ④ Ground lug included.
- ⑤ (2) Ground lugs included.

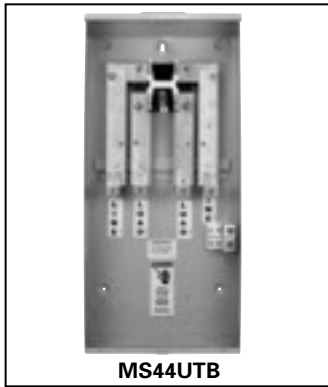
- ⑥ Anti-inversion clip included.
- ⑦ Lugs not included, order separately.
- ⑧ Bolt-in meter socket.
- ⑨ No bypass installed.

- ⑩ Lugs should be chosen based on # of cables, size of wire, and size of stud. See accessories section for more information.
- ⑪ "-SW" indicates offset or side wire design. Meter is on right.

# Meter Centers

## EUSERC Meter Sockets—Test Block Bypass & Transformer Rated Metering

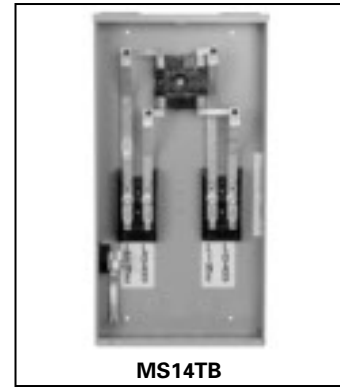
Selection



MS44UTB



MS24TB



MS14TB

2  
METER  
CENTERS

### Ring Type EUSERC-Approved Safety Sockets<sup>①</sup> (Test Block Bypass)

Catalog Number	Dimensions (inches) <sup>②</sup>			Amps Cont. Duty	Service	Hub	No. of Jaws	5th Jaw	Wire Range Cu/Al	KO Fig.	List Price \$
	L	W	D								
MS14TB	24%	12%	4%	100	1 $\phi$ -3W	RX	4	UX005B	#6-2/0 Box Lug	39	545.00
MS15TB	24%	12%	4%		3 $\phi$ -3W	RX	5	INSTALLED		39	720.00
MS17TB	24%	12%	4%		3 $\phi$ -4W	RX	7	—		39	781.00
MS24TB	30%	14%	6%	200	1 $\phi$ -3W	RX	4	UX001WL	#1/0-250 kcmil Lay-in Lug	40	1017.00
MS25TB	30%	14%	6%		3 $\phi$ -3W	HC	5	INSTALLED		41	1194.00
MS27TB	30%	14%	6%		3 $\phi$ -4W	RX	7	—		40	1343.00
MS44UTB	34%	15%	6%	320	1 $\phi$ -3W	HD	4	—	(2)1/0-250 kcmil or (1)#4-600 kcmil	44	2500.00

### 400 Ampere Transformer Rated CT-Meter Cabinet, (No Disconnect) 600V AC Max.<sup>②③</sup>

Catalog Number	Dimensions (inches)			No. of Jaws	Hub	KO Fig.	List Price \$
	Height	Width	Depth				

#### 1 Phase-3 Wire

RTU121814	52.00	24.00	11.00	4	—	42	1317.00
RTU121815	52.00	24.00	11.00	5	—	42	1329.00

#### 3 Phase-3 Wire

RTU121818	52.00	24.00	11.00	8	—	42	1419.00
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#### 3 Phase-3 Wire or 3 Phase-4 Wire

RT121413	20.00	12.00	4.63	13	RX	43	749.76
RTU122015	52.00	36.00	11.00	15	—	42	2192.00

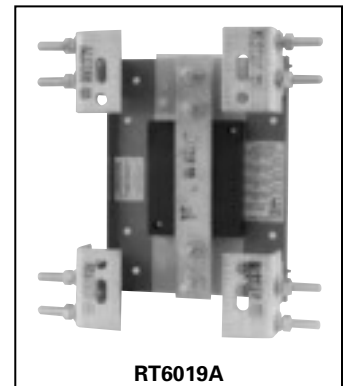
### CT Mounting Bases-400 Amp Max.

Catalog Number	Service	Max. AIC	Wire Range	List Price \$
RT6019A	1 Phase/3 Phase-3 Wire	10,000	(2) NEMA Studs	356.00
RT6019HA	1 Phase- 3 Wire	50,000	(2) NEMA Studs	447.00
RT6067A	3 Phase- 4 Wire	10,000	(2) NEMA Studs	665.00
RT6067HA	3 Phase- 4 Wire	50,000	(2) NEMA Studs	779.00

Contact utility or sales office for approval by your local utility prior to installation.



RTU121815



RT6019A

① Ground lug included.

② CT mounting base not included, order from chart below.

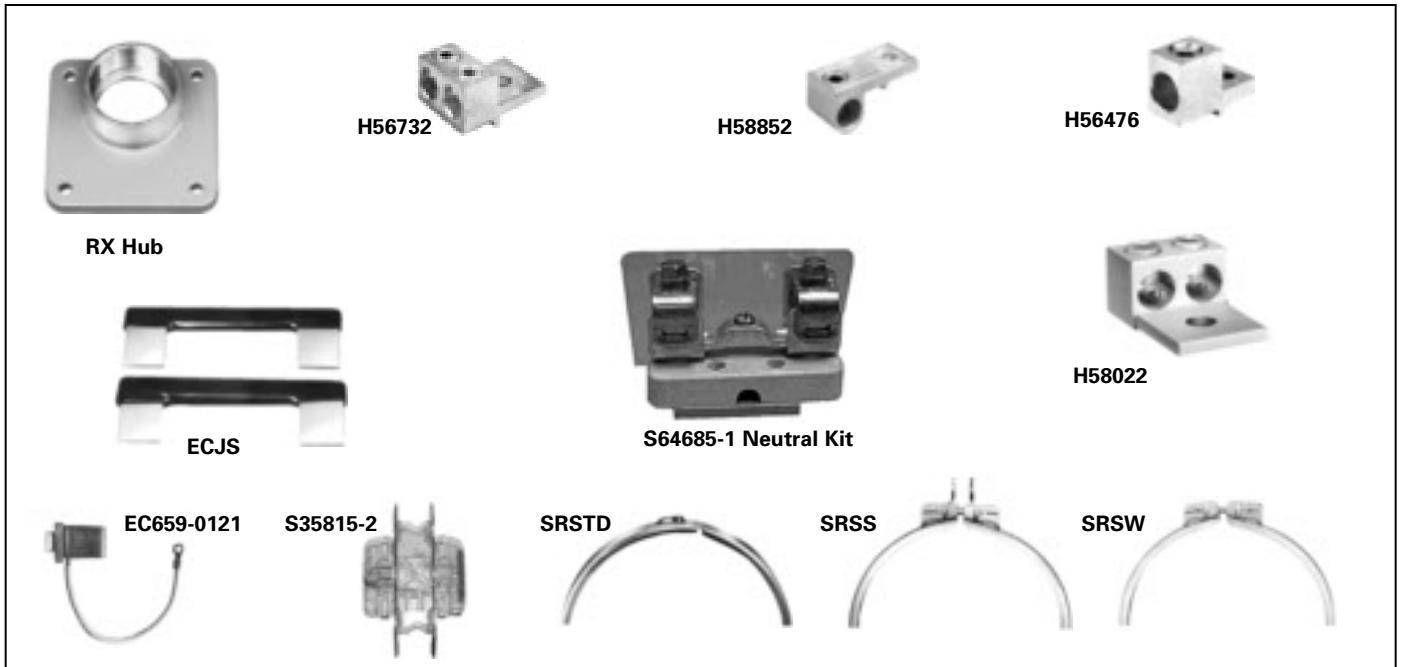
③ Includes Test Switch mounting provision, and hub opening for overhead feed.

# Meter Centers

## Accessories

Selection

METER CENTERS 2



### 5TH & 6TH Jaw Assemblies

For Use With	Catalog Number	List Price \$
All SUAXxxx single and multiple position sockets	<b>EC659-0121-grounded</b>	18.00
All SUAXxxx single and multiple position sockets	<b>EC659-0120-insulated</b>	18.53
All Lever Bypass single position sockets	<b>S35815-2</b>	123.54
SC and SD Unbussed Multiple-5th Jaw	<b>WSX019</b>	11.40
Anti-Inversion clip for use with 320amp sockets when required	<b>H59676</b>	24.50

### Sealing Rings

Description	Catalog Number	List Price \$
Snap-On Type, aluminum	<b>SRSTD</b>	17.47
Snap-On Type, steel	<b>SRSS</b>	19.38
Screw Type, aluminum	<b>SRSW</b>	25.03

### Miscellaneous Accessories

Description	Catalog Number	List Price \$
Insulated Neutral Kit for "S404xx" sockets	<b>EC64685</b>	64.00
Isolated Neutral Kit for S9817-8061	<b>S69685-1</b>	218.00
Bypass Kit for S9817-8061	<b>S69623</b>	132.06
Jumper-200 Amp Rated-use on SUAXxxx sockets only	<b>ECJS</b>	36.74
Plastic Meter Cover- Ring	<b>ECPP</b>	19.00
Plastic Meter Cover- Ringless	<b>ECCP3</b>	21.00
Neutral Isolation kit for 200amp lever bypass sockets	<b>64690-1</b>	34.08

### Lugs for Sockets with Stud Terminals<sup>①</sup>

Catalog Number	For Use With	Wire Range	List Price \$
<b>H58852</b>	Line side of S9817 Socket on UG Applications	(1) 3/0-800 kcmil	47.50
<b>H56732</b>	Line & Load of S477 & Load/Neutral of S9817 Sockets	(2) #4-350 kcmil	35.00
<b>H56476</b>	Line & Load of S477 & Load/Neutral of S9817 Sockets	(1) 3/0-800 kcmil	44.00
<b>H58022</b>	Any socket with 3/8" Stud Terminals	(2) #6-250 kcmil	33.00
<b>H55890</b>	Any socket with 3/8" Stud Terminals	(1) #6-350 kcmil	22.00

① Each lug catalog number contains one lug unless otherwise noted. Order enough lugs to cover all terminations.

### Interchangeable Hubs

Description	Catalog Number	Hub Size (Inches)	List Price \$
-------------	----------------	-------------------	---------------

#### RX CONDUIT HUBS

	<b>EC38594</b>	¾	22.90
	<b>EC38596</b>	1	37.81
	<b>EC38597</b>	1¼	37.81
	<b>EC38598</b>	1½	23.96
	<b>EC38599</b>	2	23.96
	<b>EC38600</b>	2½	107.57
Closure Plate	<b>EC38595</b>	—	38.34

#### HC CONDUIT HUBS

	<b>EHC200</b>	2	72.00
	<b>EHC250</b>	2½	108.00
	<b>EHC300</b>	3	175.00
Closure Plate	<b>EHC000</b>	—	24.00

#### HD CONDUIT HUBS

	<b>EC56856</b>	3	178.92
	<b>EC56857</b>	3½	263.06
	<b>EC56858</b>	4	119.28
Adapter Plate convert HD to RX	<b>EC9747-1113</b>	—	28.76
Closure Plate	<b>EC56933S</b>	—	76.68

# Meter Centers

## Knockout Diagrams

Selection

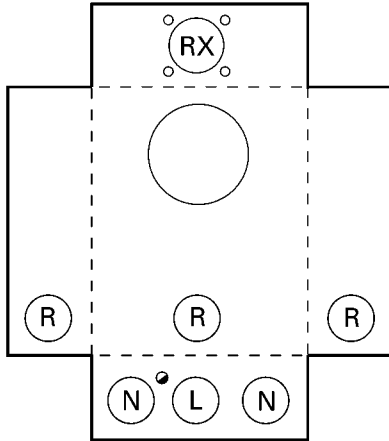


Figure 1

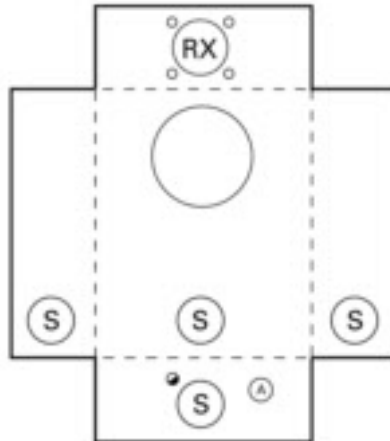


Figure 2

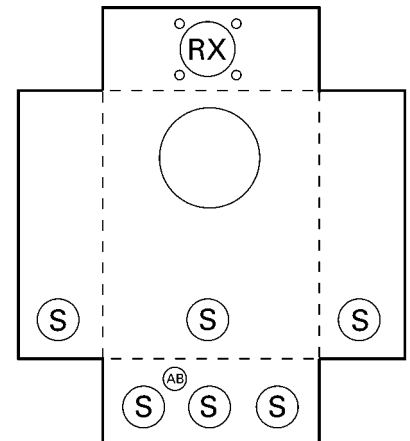


Figure 3

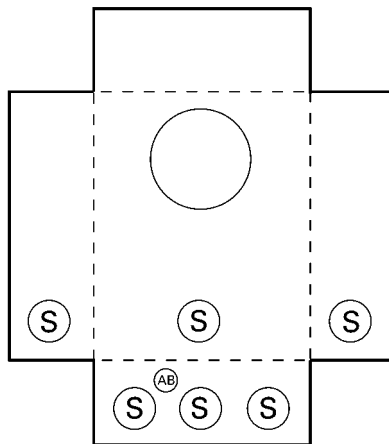


Figure 3B

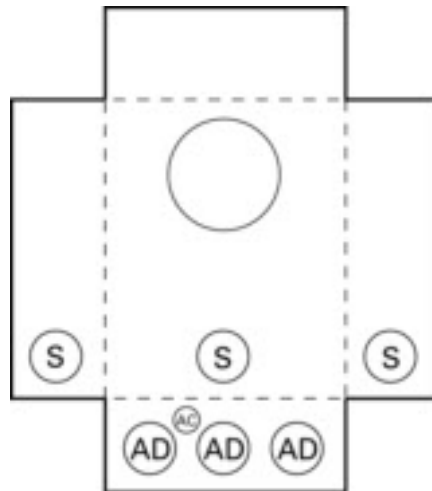


Figure 4

### KNOCKOUTS (inches):

Ø:	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB 0P
RX:	Ø2.750 HUB 0P

# Meter Centers

## Knockout Diagrams

Selection

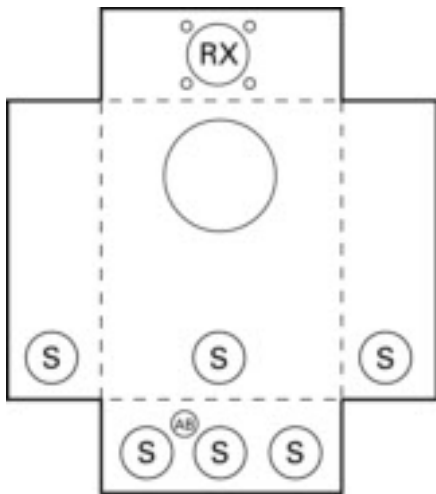


Figure 5

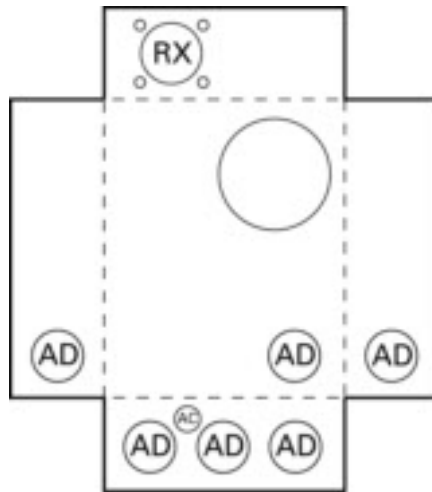


Figure 6

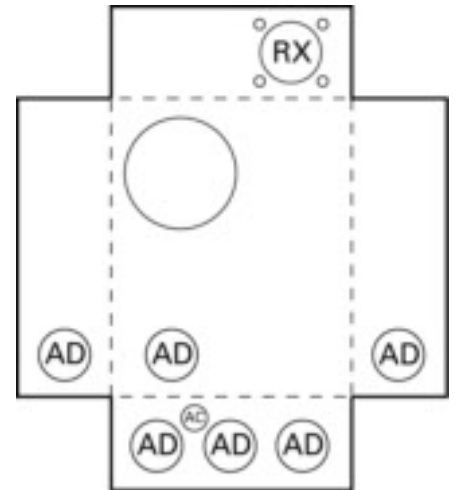


Figure 7

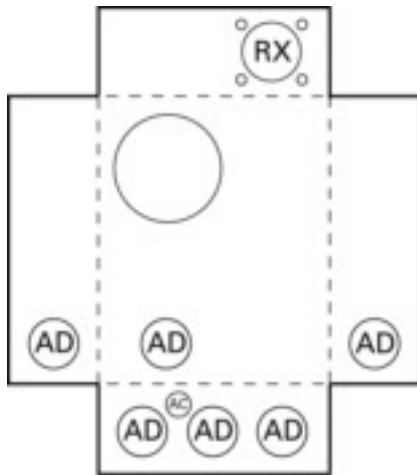


Figure 8

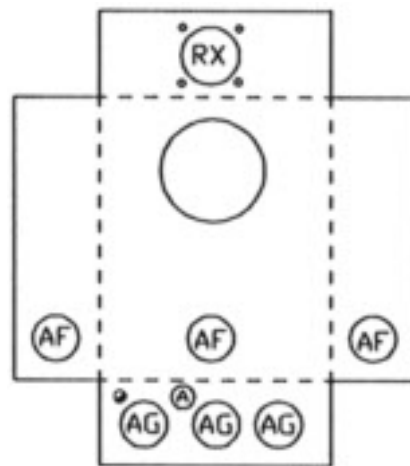


Figure 9

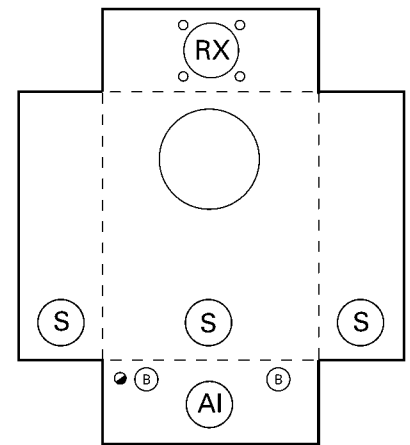


Figure 10

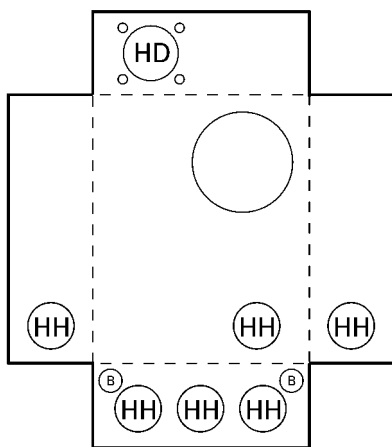


Figure 11

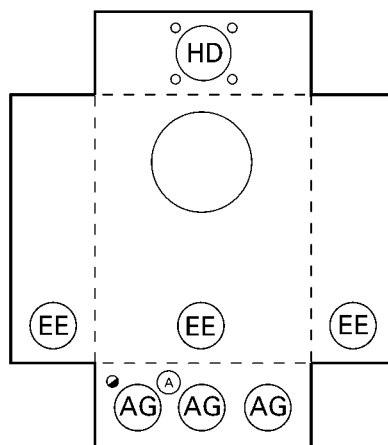


Figure 12

### KNOCKOUTS (inches):

●	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB 0P
RX:	Ø2.750 HUB 0P

# Meter Centers

## Knockout Diagrams

Selection

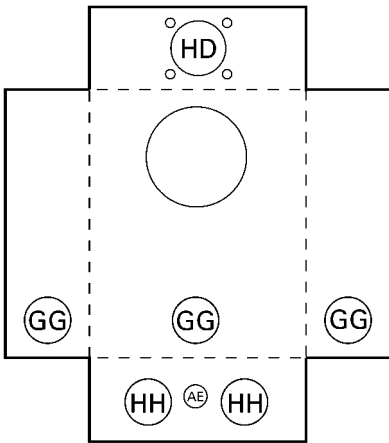


Figure 13

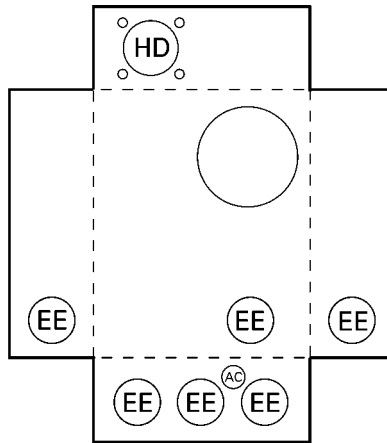


Figure 14

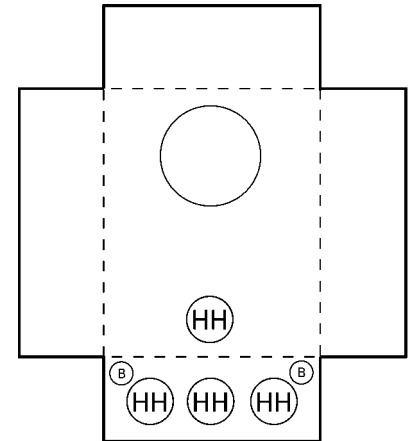


Figure 15

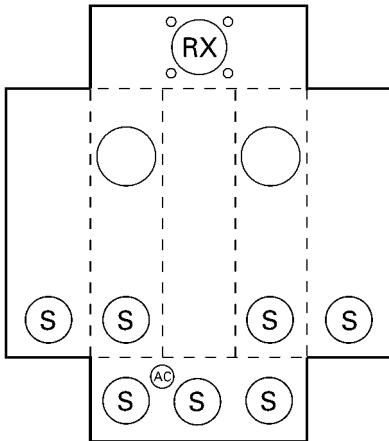


Figure 16

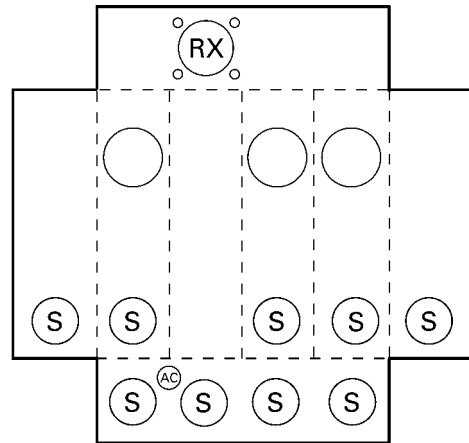


Figure 17

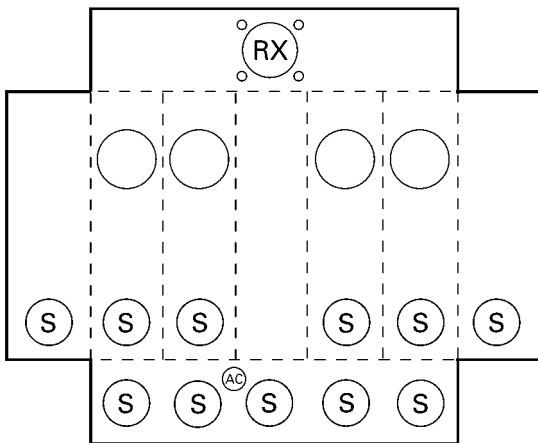


Figure 18

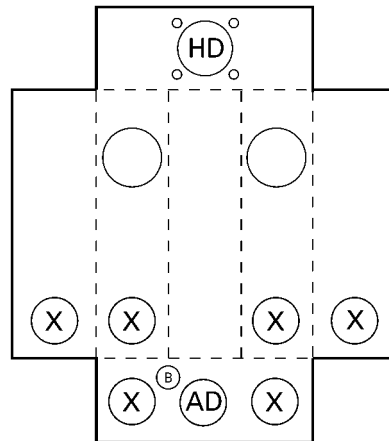


Figure 19

### KNOCKOUTS (inches):

●	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB OP
RX:	Ø2.750 HUB OP

# Meter Centers

## Knockout Diagrams

Selection

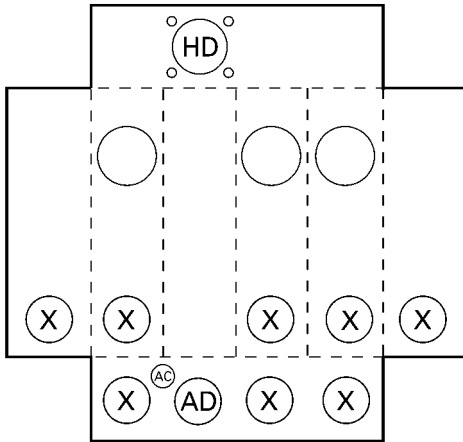


Figure 20

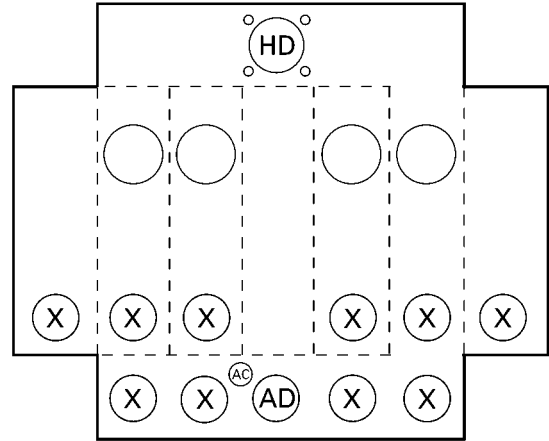


Figure 21

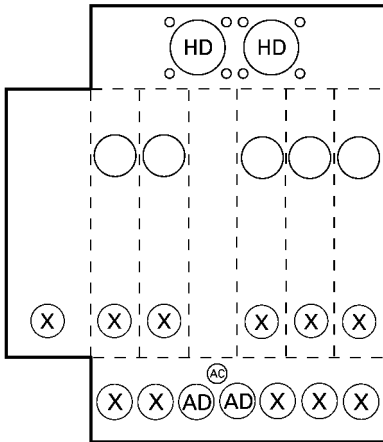


Figure 22

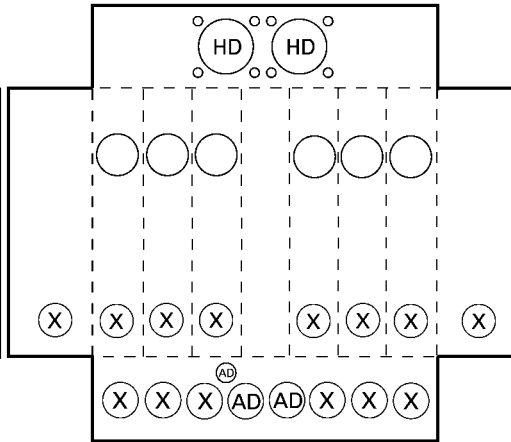


Figure 23

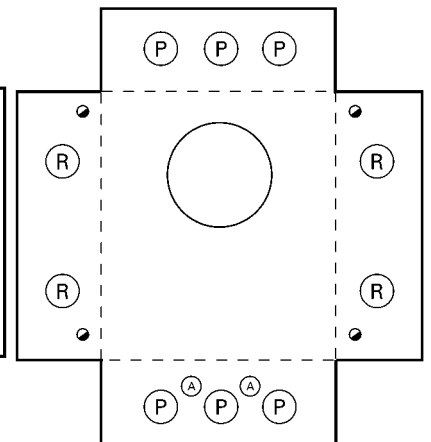


Figure 24

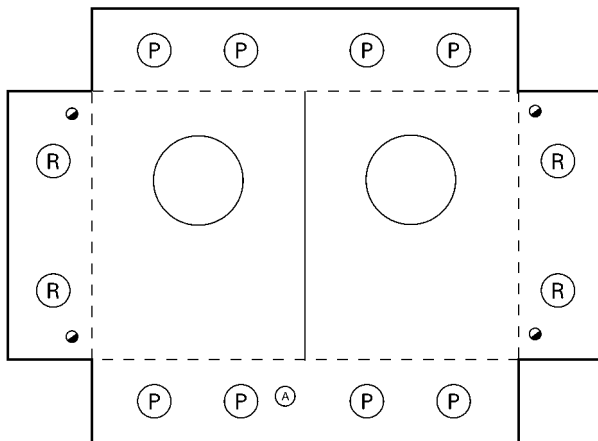


Figure 25

### KNOCKOUTS (inches):

●:	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB OP
RX:	Ø2.750 HUB OP



# Meter Centers

## Knockout Diagrams

Selection

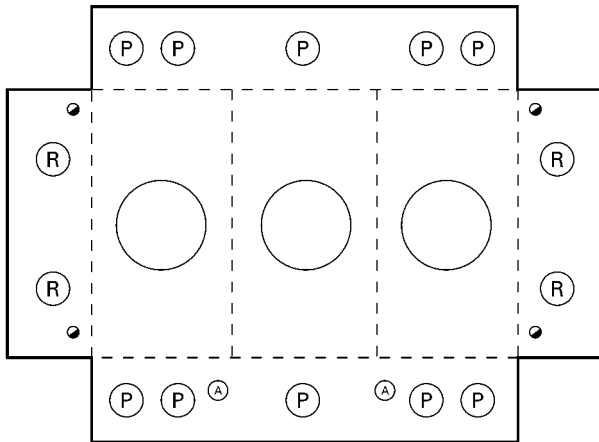


Figure 26

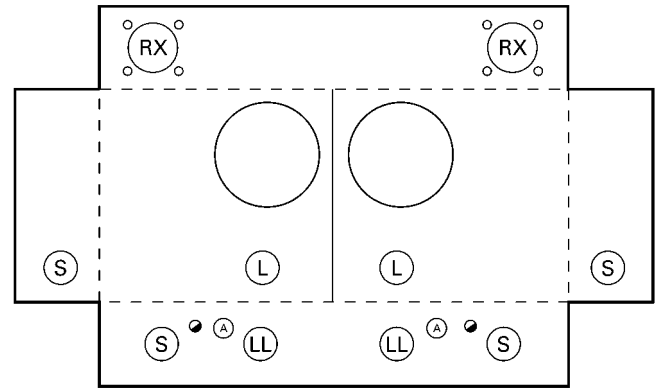


Figure 27

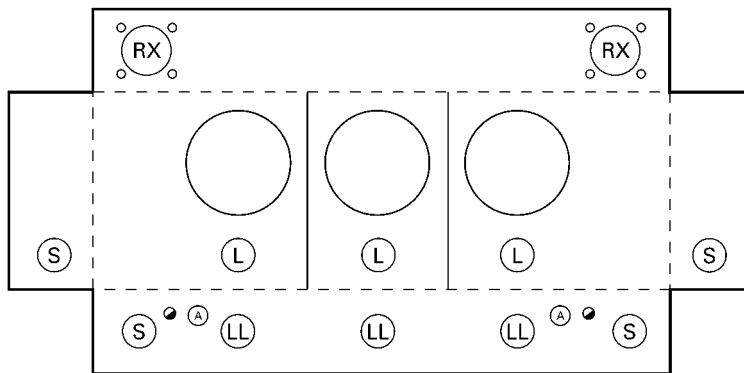


Figure 28

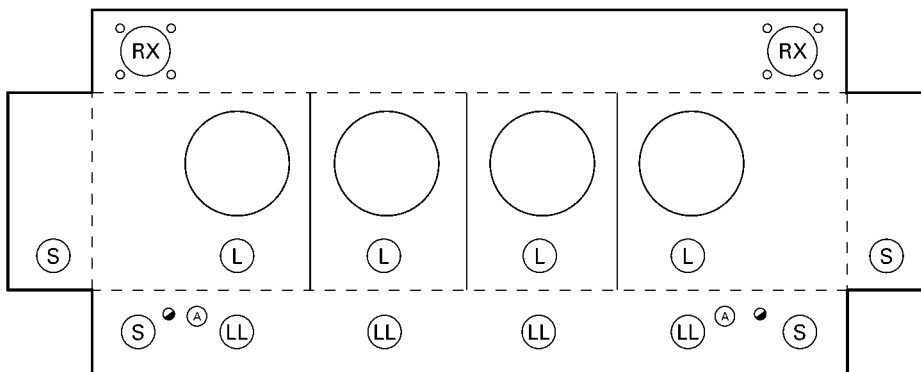


Figure 29

### KNOCKOUTS (inches):

●	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB 0P
RX:	Ø2.750 HUB 0P

# Meter Centers

## Knockout Diagrams

Selection

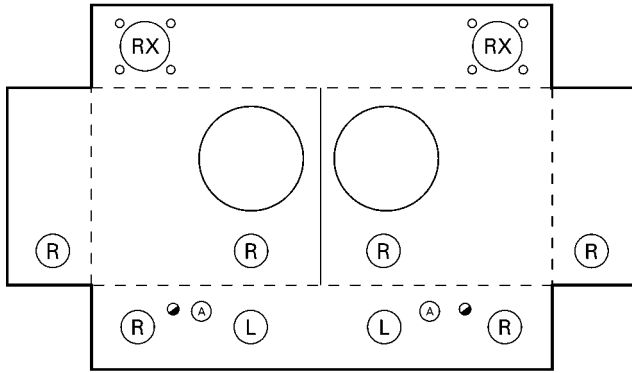


Figure 30

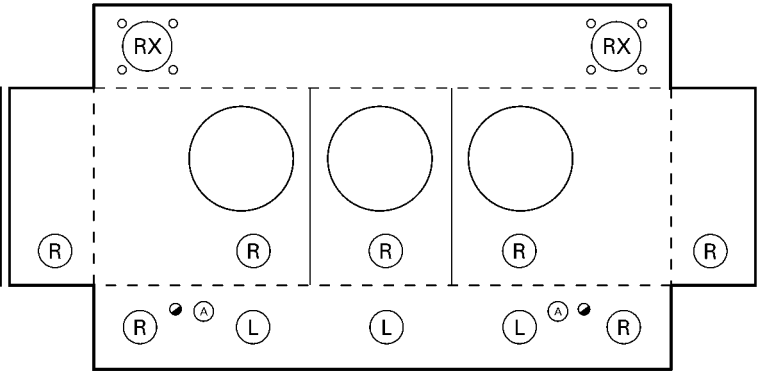


Figure 31

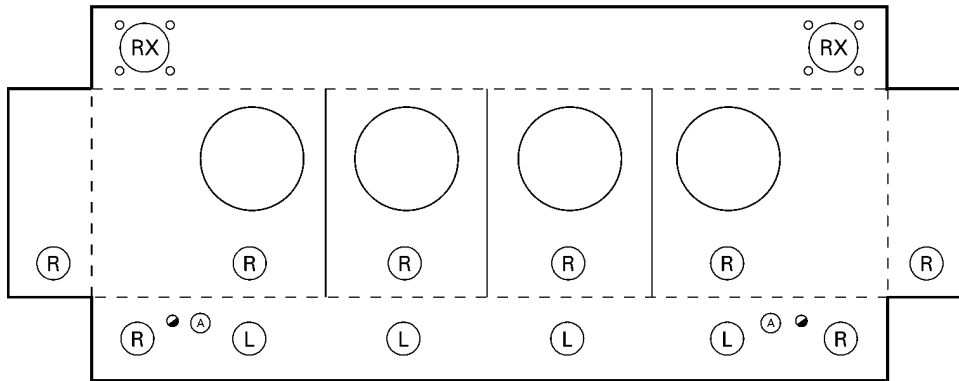


Figure 32

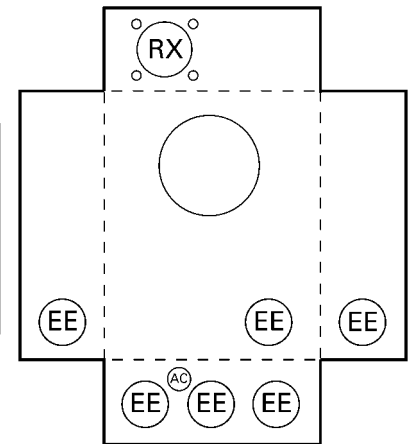


Figure 33

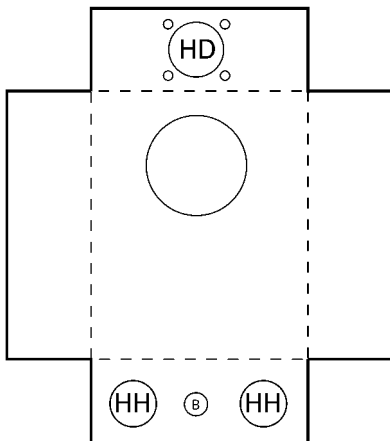


Figure 34

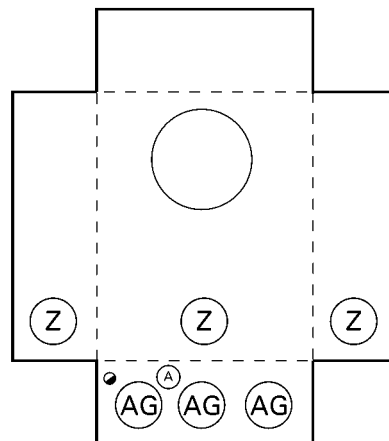


Figure 35

### KNOCKOUTS (inches):.

●	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB 0P
RX:	Ø2.750 HUB 0P

# Meter Centers

## Knockout Diagrams

Selection

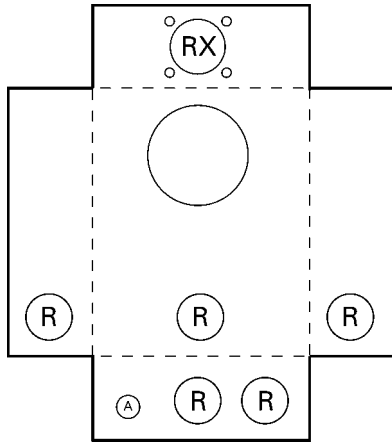


Figure 36

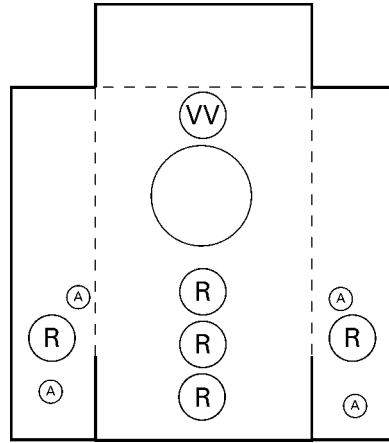


Figure 37

KNOCKOUTS (inches):	
●	1/4
A:	1/2
B:	1/2, 3/4
L:	1/2, 3/4, 1, 1-1/4, 1-1/2
N:	3/4, 1, 1-1/4, 1-1/2, 2
P:	1, 1-1/4
R:	1, 1-1/4, 1-1/2, 2
S:	1, 1-1/4, 1-1/2, 2, 2-1/2
X:	1-1/4, 1-1/2, 2, 2-1/2
Z:	1-1/2, 2, 2-1/2
EE:	2, 2-1/2, 3
GG:	2-1/2, 3, 3-1/2
HH:	2-1/2, 3, 3-1/2, 4
AB:	1/4, 1/2, 7/8
AC:	1/4, 1/2
AD:	1-1/4, 1-1/2, 2, 2-1/2, 3
AE:	1/4, 1/2, 3/4, 1, 1-1/4
AF:	1, 1-1/2, 2, 2-1/2, 3
AG:	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3
AH:	1/4, 1/2, 3/4
AI:	1, 1-1/4, 1-1/2, 2, 2-1/2, 3
HD:	Ø4.281 HUB 0P
RX:	Ø2.750 HUB 0P

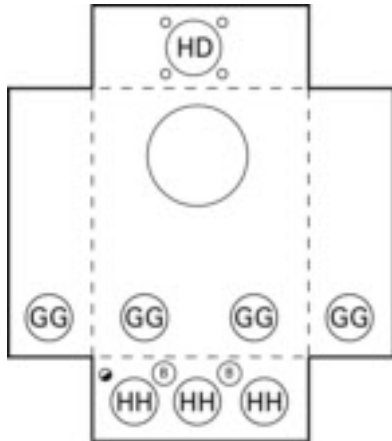


Figure 38

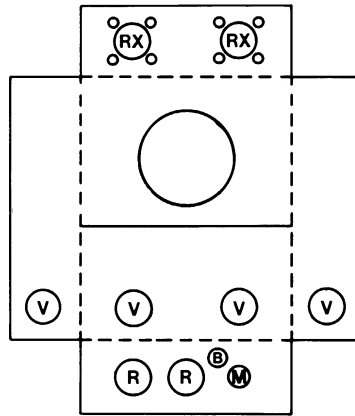


Figure 39

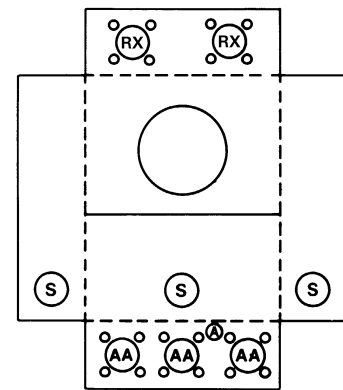


Figure 40

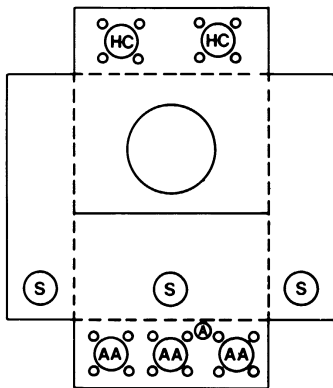


Figure 41

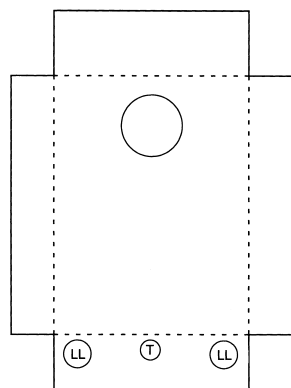


Figure 42

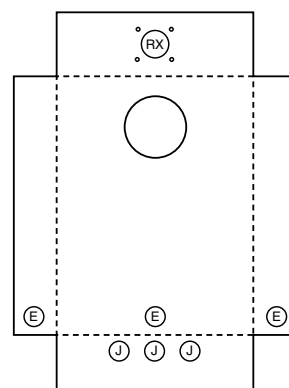


Figure 43

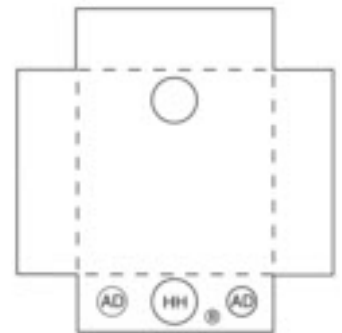


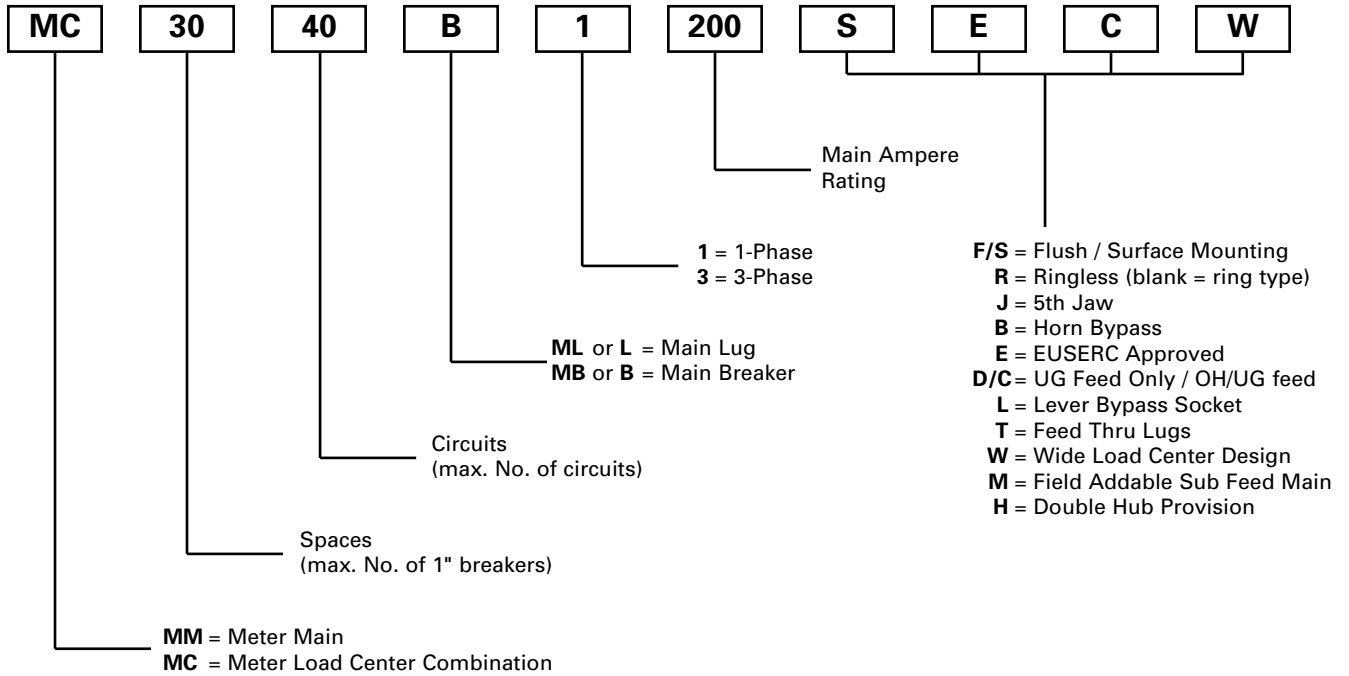
Figure 44

2  
METER  
CENTERS

# Meter Centers

## Catalog Number Logic

### Combination Meter Sockets



# Meter Centers

## Surface Mount Meter Mains, 1-Phase, 3-Wire 120/240V AC

Selection

- UL listed
- Pad locking provisions on all devices
- Horn bypass and 5th jaw available as noted
- Side hinged door with one screw removal where shown
- Suitable for use only as service entrance equipment
- Contact local utility to confirm meter socket placement prior to installation
- See end of section for dimensions and wiring diagrams

MM0202ML1100S



100A meter main (field added), OH feed only

MM0202ML1125H



125A meter main (field added)

MM0202B1XXXRJBX



125, 150, and 200A meter main (factory installed), side hinge door.

MM0406L1200X



200A meter main (field added), side hinge door

MM0202BXXX



125 and 200A meter mains, side hinge door

MM0404L1400RLM



400A meter main, side hinge door, provisions for two field installed mains

### Overhead/Underground 1-Phase, 3-Wire SN

Meter Main Combinations				UL: Overhead/ Under- ground	EUSERC: Overhead/ Under- ground	Short Circuit Rating	Catalog Number	Hub Provision	5th Jaw	Dimensions (inches)			Cover Type	List Price \$	Foot Notes
Ampere Rating	Main Breaker	No. of Spaces	No. of Circuits							Height	Width	Depth			
100	QP	2	2	OH	OH	10,000	MM0202ML1100S	RX	EC5J	18.00	7.375	4.00	Ring	366.00	1
125	QP	2	2	OH	OH	22,000	MM0202ML1125H	2-RX	EC5J	17.00	16.00	5.00	Ring	498.00	
200	1-QN/2-QP	4	6	OH/UG	OH	22,000	MM0406L1200H	2-RX	EMC5J	19.75	17.125	5.00	Ring	965.00	
200	1-QN/2-QP	4	6	OH/UG	—	22,000	MM0406L1200RH	2-RX	EMC5J	19.75	17.125	5.00	Ringless	996.00	
200	1-QN/2-QP	4	6	OH/UG	—	22,000	MM0406L1200RHJB	2-RX	Installed	19.75	17.125	5.00	Ringless	1030.00	2
400	(2) QN(R), QN(R)H, QP, QPH	2	2	OH/UG	—	22,000	MM0404L1400RLM	HD	S35815-2	29.00	27.00	6.00	Ringless	2923.00	3

### Main Breaker Field Installed

125	Q2125H	2	2	OH/UG	—	22,000	MM0202B1125RJB	RX	Installed	17.00	16.00	5.00	Ringless	1752.00	2
150	QN2150H	2	2	OH/UG	—	22,000	MM0202B1150RJB	RX	Installed	17.00	16.00	5.00	Ringless	1752.00	2
150	QN2150H	2	2	OH/UG	OH	22,000	MM0202B1150	RX	EMC5J	17.00	16.00	5.00	Ring	1736.00	
150	NEW QN2150H	2	2	OH/UG	—	22,000	MM0202B1150R	RX	EMC5J	17.00	16.00	5.00	Ringless	1736.00	
200	QN2200H	2	2	OH/UG	OH	22,000	MM0202B1200	RX	EMC5J	17.00	16.00	5.00	Ring	1752.00	
200	QN2200H	2	2	OH/UG	—	22,000	MM0202B1200R	RX	EMC5J	17.00	16.00	5.00	Ringless	1736.00	
200	QN2200H	2	2	OH/UG	—	22,000	MM0202B1200RJB	RX	Installed	17.00	16.00	5.00	Ringless	1752.00	2
125	Q2125H	2	2	OH/UG	OH/UG	22,000	MM0202B1125RJBX	RX	Installed	17.00	18.42	5.14	Ringless	1752.00	2, 3
150	QN2150H	2	2	OH/UG	OH/UG	22,000	MM0202B1150RJBX	RX	Installed	17.00	18.42	5.14	Ringless	1752.00	2, 3
200	QN2200H	2	2	OH/UG	OH/UG	22,000	MM0202B1200RJBX	RX	Installed	17.00	18.42	5.14	Ringless	1752.00	2, 3

For inches / millimeters conversion, see Application Data section.

Listed by Underwriters' Laboratories, Inc., under file #E10703 vol. 1.

① Shipped standard with two units per carton. Each unit supplied with 1.25" hub.

② Device has horn bypass.

③ Devices with "X" suffix include an extra wide utility section.

# Meter Centers NEW

## Surface Mount Meter Load Centers, 1-Phase, 3-Wire 120/240V AC 150-200A

*Selection*

METER CENTERS 2

- UL listed
- Overhead and underground feed applications
- Underground feed accomplished by use of removable gutter trough
- Load wires bottom or back exit only
- 22,000 AIC rated
- Pad locking provisions on all devices
- Side hinge doors removable by backing out only one screw
- Suitable for use only as service entrance equipment
- RX type hub provision on top end wall
- HC type hub provision on bottom end wall
- Field addable 5th Jaw (EC5J2)
- Contact local utility to confirm meter socket placement prior to installation
- See end of section for dimensions and wiring diagrams



**MC0606L1200R (Shown)**  
**MC0606L1200RJB**  
**MC0606L1200RA**



200A, main lug, 6 circuit  
 (Twelve 1" spaces), for use  
 with up to six 2-pole breakers

**MC0408B1150T (Shown)**  
**MC0408B1200T**  
**MC0408B1150RT**  
**MC0408B1200RT**



150 or 200A, main breaker,  
 four 1" spaces, feed thru  
 lugs provided

**MC0816B1150CT (Shown)**  
**MC0816B1200CT**  
**MC0816B1150RCT**  
**MC0816B1200RCT**



150 or 200A, main breaker,  
 eight 1" spaces, feed thru  
 lugs provided

**MC2040B1150RC (Shown)**  
**MC2040B1200RC**  
**MC2040B1150RJC**  
**MC2040B1200RJC**



150 or 200A, main breaker,  
 twenty 1" spaces provided

Ampere Rating	Main Breaker	No. of Spaces	No. of Circuits	Catalog Number	Replaced Catalog Number	Dimensions			Cover Type	List Price \$	Notes
						Height	Width	Depth			
150	MBK150	4	8	MC0408B1150T	MC0408MB1150T	30.0	14.0	5.0	Ring	1318.00	3
150	MBK150	4	8	MC0408B1150RT	MC0408MB1150RT	30.0	14.0	5.0	Ringless	1318.00	3
150	MBK150	8	16	MC0816B1150CT	—	32.0	14.0	5.0	Ring	1387.00	3
150	MBK150	8	16	MC0816B1150RCT	—	32.0	14.0	5.0	Ringless	1387.00	3
150	MBK150	20	40	MC2040B1150RC	MC2040MB1150R	36.0	14.0	5.0	Ringless	2540.00	3
150	MBK150	20	40	MC2040B1150RJC	—	36.0	14.0	5.0	Ringless	2522.00	3, 5
200	—	12	6	MC0606L1200R	MC0606ML1200R	27.0	14.0	5.0	Ringless	1188.00	1, 2, 3
200	—	12	6	MC0606L1200RJB	MC0606ML12RB	27.0	14.0	5.0	Ringless	1216.00	1, 2, 3, 5
200	—	12	6	MC0606L1200RA	—	27.0	14.0	5.0	Ringless	1250.00	1, 2, 3, 4
200	MBK200	4	8	MC0408B1200T	MC0408MB1200T	30.0	14.0	5.0	Ring	1318.00	3
200	MBK200	4	8	MC0408B1200RT	MC0408MB1200RT	30.0	14.0	5.0	Ringless	1318.00	3
200	MBK200	8	16	MC0816B1200CT	—	32.0	14.0	5.0	Ring	1387.00	3
200	MBK200	8	16	MC0816B1200RCT	—	32.0	14.0	5.0	Ringless	1387.00	3
200	MBK200	20	40	MC2040B1200RC	MC2040MB1200R	36.0	14.0	5.0	Ringless	2540.00	3
200	MBK200	20	40	MC2040B1200RJC	—	36.0	14.0	5.0	Ringless	2522.00	3

**Notes:**

1. No main breaker provided. Accept QN or QP type 2 or 4-pole breakers.
2. Suitable for use as service entrance equipment when not more than six disconnecting means are provided and when not used as a lighting an appliance panel board.
3. Due to wire space restrictions on the trough side, the left side of the interior is limited to a 60A max branch.
4. Aluminum enclosure.
5. Horn bypass and 5th jaw included.

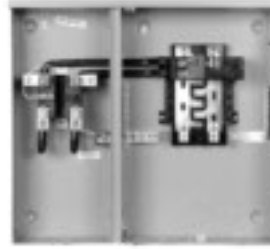
# Meter Centers

## Surface Mount Meter Load Centers, 1-Phase, 3-Wire 120/240V AC 100-200A

Selection

- UL listed
- 22,000 AIC Rated
- Pad locking provisions on all devices
- Side hinge doors removable by backing out only one screw
- Suitable for use only as service entrance equipment
- Contact local utility to confirm meter socket approval prior to installation
- See end of section for dimensions and wiring diagrams

MC0816B1XXXH



200A OH/UG feed, 8 circuit, with feed thru lugs.

MC0816B1XXXT



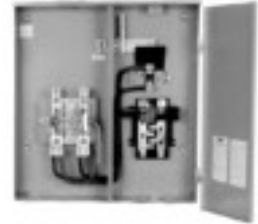
200A Trailer Panel, OH feed only, 8 circuits with feed thru lugs.

MC2040B1150(R)/  
MC2040B1200(R)/  
MC1224B1125



200A, 20 Circuit, Side by Side Meter Combo

MC0816B1400RLTM/  
MC0816B1350RLTM



One factory installed main, provisions for up to 200A field installed main, 8 circuits.

### Overhead / Underground: 1-Phase, 3-Wire SN (22,000A IR)

Meter Load Center Combinations				UL: Overhead/ Underground	EUSERC: Overhead/ Underground	Catalog Number	Hub Provision	5th Jaw	Dimensions (inches)			Cover Type	List Price \$	Foot Notes
Ampere Rating	Main Breaker	No. of Spaces	No. of Circuits						Height	Width	Depth			
125	Q2125H	12	24	OH/UG	—	MC1224B1125	RX	EMC5J	16.00	22.89	5.00	Ring	1620.00	2
125	EQ9675R	12	24	OH/UG	—	MC1224MB1125R	HS	EC5J	34.00	14.12	5.00	Ringless	1620.00	2
150	QN2150RH	8	16	OH	—	MC0816B1150T	RX	—	29.00	12.00	5.12	Ring	1387.00	1, 3
150	QN2150RH	8	16	OH/UG	—	MC0816B1150TH	2-RX	EMC5J	21.00	22.89	5.00	Ring	1360.00	1, 3
150	QN2150RH	8	16	OH/UG	—	MC0816B1150RTH	2-RX	EMC5J	21.00	22.89	5.00	Ringless	1360.00	1, 3
150	QN2150RH	20	40	OH/UG	—	MC2040B1150	RX	EMC5J	18.00	22.89	5.00	Ring	2585.00	2
150	QN2150RH	20	40	OH/UG	—	MC2040B1150R	RX	EMC5J	18.00	22.89	5.00	Ringless	2522.00	2
200	QN2200RH	8	16	OH	—	MC0816B1200T	RX	—	29.00	12.00	5.12	Ring	1387.00	1, 3
200	QN2200RH	8	16	OH	—	MC0816B1200RT	RX	—	29.00	12.00	5.12	Ringless	1387.00	1, 3
200	QN2200RH	8	16	OH/UG	—	MC0816B1200TH	2-RX	EMC5J	21.00	22.89	5.00	Ring	1360.00	1, 2
200	QN2200RH	8	16	OH/UG	—	MC0816B1200RTH	2-RX	EMC5J	21.00	22.89	5.00	Ringless	1360.00	1, 2
200	QN2200RH	20	40	OH/UG	—	MC2040B1200	RX	EMC5J	18.00	22.89	5.00	Ring	2585.00	2
200	QN2200RH	20	40	OH/UG	—	MC2040B1200R	RX	EMC5J	18.00	22.89	5.00	Ringless	2522.00	2
350	QN2150H	8	16	OH/UG	—	MC0816B1350RLTM	HD	—	29.00	27.00	6.00	Ringless	3940.00	1
400 <small>NEW</small>	QN2200H	4	8	OH/UG	—	MC0408B1400RLTM	HD	—	29.00	27.00	6.00	Ringless	3591.00	1
400	QN2200H	8	16	OH/UG	—	MC0816B1400RLTM	HD	—	29.00	27.00	6.00	Ringless	3940.00	1

① Feed thru lugs included.  
② Side by side design for OH/UG applications.

③ Over/under design for OH applications.

# Meter Centers

## EUSERC Meter Main & Meter Load Centers (100-200A) Single Phase, 3-Wire 240V AC

Selection

METER CENTERS 2

- UL listed
- For overhead and underground feed applications
- Designed to meet EUSERC standards
- 22,000 AIC Rated
- Pad locking provisions on all devices
- Surface and semi-flush units available - semi flush rails are depth adjustable for 2x6 studs
- Side hinge door removable by backing out only one screw
- Load wiring may exit top or bottom
- Suitable for use only as service entrance equipment
- RX type hub provision on top endwall, HC type hub provision on bottom endwall
- 5th jaw accessory available (ECMC5J)
- Ring type meter covers
- Contact local utility to confirm meter socket approval prior to installation
- See end of section for dimensions and wiring diagrams

MM0406L1125SEC (shown)  
MM0406L1125FEC



125A Max, main lug meter main, between the studs construction

MM0406L1200SEC (shown)  
MM0406L1200FEC



200A Max, main lug meter main, between the studs construction

MC0816B1200SCTM (shown)  
MC0816B1200FCTM



200A Pump Panel, OH/UG Feed, 8 circuits with feed thru lugs, and provisions for up to 50A second main breaker

MC1224B1100SEC (shown)  
MC1224B1100FEC  
MC1224B1125SEC  
MC1224B1125FEC



100 and 125 Amp, 12 circuit, between the studs construction

MC2442B1XXXSEC (shown)  
MC2442B1XXXFEC



200 and 225 Amp, 24 circuit, between the studs construction

MC4040B1200SECW (shown)  
MC3040B1200SECW



200A, Wide Load Center Design, Meter Combo

Amps Max.	Main Breaker	Mounting	No. of Spaces	Max. Circuits	Service	Catalog Number	Dimensions <sup>①</sup>			List Price \$
							Height	Width	Depth	
100	Q2100H	Flush	12	24	OH/UG	MC1224B1100FEC	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	976.00
100	Q2100H	Surface	12	24	OH/UG	MC1224B1100SEC	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	976.00
100	Q2100H	Flush	16	32	OH/UG	MC1632B1100FEC	30 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	818.00
100	Q2100H	Surface	16	32	OH/UG	MC1632B1100SEC	30 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	818.00
125	Q2125H	Flush	12	24	OH/UG	MC1224B1125FEC	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1668.00
125	Q2125H	Surface	12	24	OH/UG	MC1224B1125SEC	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1667.00
125	Q2125H	Flush	16	32	OH/UG	MC1632B1125FEC	30 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1743.00
125	QP, QPH	Flush	4	6	OH/UG	MM0406L1125FEC <sup>②</sup>	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	515.00
125	QP, QPH	Surface	4	6	OH/UG	MM0406L1125SEC <sup>②</sup>	26 <sup>7</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	515.00
200	EQ9985	Surface	8	16	OH/UG	MC0816B1200SCTM	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1711.00
200	EQ9985	Flush	8	16	OH/UG	MC0816B1200FCTM	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1711.00
200	EQ9985	Flush	24	48	OH/UG	MC2442B1200FEC	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	2600.00
200	EQ9985	Surface	24	48	OH/UG	MC2442B1200SEC	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	2600.00
200	QN, QNH, QP, QPH	Flush	4	6	OH/UG	MM0406L1200FEC <sup>②</sup>	30 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1756.00
200	QN, QNH, QP, QPH	Surface	4	6	OH/UG	MM0406L1200SEC <sup>②</sup>	30 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1804.00
200	QN2200RH	Surface	30	40	OH/UG	MC3040B1200SECW <sup>③</sup>	32 <sup>1</sup> / <sub>4</sub>	21	5 <sup>1</sup> / <sub>2</sub>	2614.00
200	QN2200RH	Surface	40	40	OH/UG	MC4040B1200SECW <sup>③</sup>	32 <sup>1</sup> / <sub>4</sub>	21	5 <sup>1</sup> / <sub>2</sub>	2923.00
225	EQ9986	Flush	24	42	OH/UG	MC2442B1225FEC	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	2856.00
225	EQ9986	Surface	24	42	OH/UG	MC2442B1225SEC	40 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	2856.00

① Dimensions shown are representative of outside box length, width, and depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions. Dimensions are subject to change.

② Main breaker not included.  
③ FRK1 - Flush rail kit.



# Meter Centers NEW

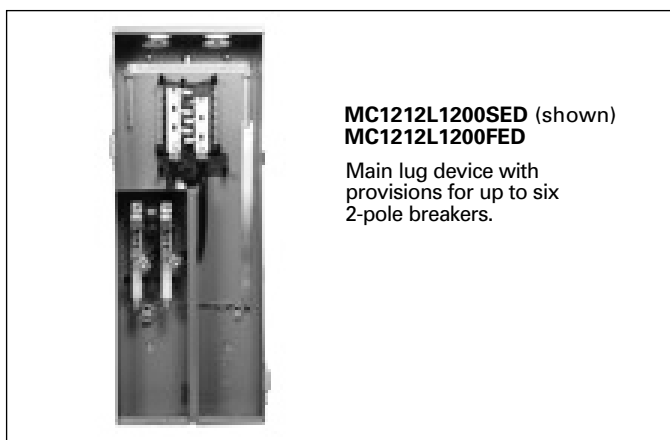
## EUSERC Meter Load Center Combinations (200-225A) Single Phase, 3-Wire 240V AC

*Selection*

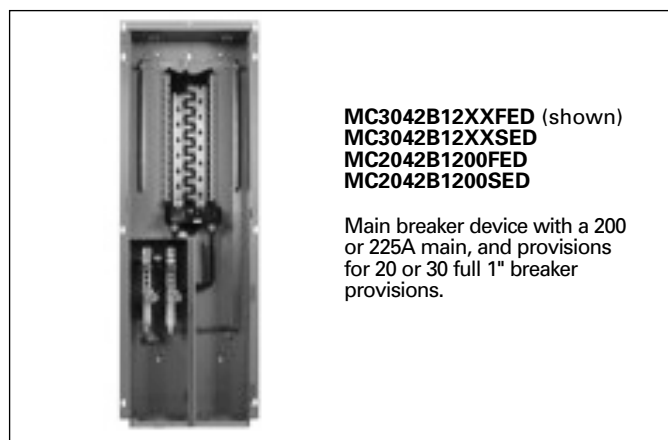
- UL listed
- Designed to meet EUSERC standards
- Underground Feed Applications Only
- Load wiring may exit top or bottom
- 22,000 AIC Rated
- Pad locking provisions on all devices
- Surface and semi-flush units available - semi flush units are depth adjustable for 2x6 stud applications
- Side hinge door removable by backing out only one screw
- Suitable for use only as service entrance equipment
- HC type hub provision on bottom endwall
- 5th jaw accessory available
- Contact local utility to confirm meter socket approval prior to installation
- See end of section for dimensions and wiring diagrams



**2**  
METER  
CENTERS



**MC1212L1200SED** (shown)  
**MC1212L1200FED**  
Main lug device with provisions for up to six 2-pole breakers.




**MC3042B12XXFED** (shown)  
**MC3042B12XXSED**  
**MC2042B1200FED**  
**MC2042B1200SED**  
Main breaker device with a 200 or 225A main, and provisions for 20 or 30 full 1" breaker provisions.

Amps Max.	Main Breaker	Mounting	No. of Spaces	Max. Circuits	Max. 2-Pole	Catalog Number	Dimensions <sup>①</sup>			List Price \$
							Height	Width	Depth	
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	NA	Flush	12	12	6	<b>MC1212L1200FED</b> <sup>①</sup>	38 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>1376.00</b>
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	NA	Surface	24	12	6	<b>MC1212L1200FED</b> <sup>①</sup>	38 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>1376.00</b>
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK200A	Flush	20	40	10	<b>MC2040B1200FED</b>	41 <sup>13</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>2600.00</b>
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK200A	Surface	20	40	10	<b>MC2040B1200SED</b>	41 <sup>13</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>2600.00</b>
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK200A	Flush	30	42	14	<b>MC3042B1200FED</b>	48 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>3140.00</b>
200 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK200A	Surface	30	42	14	<b>MC3042B1200SED</b>	48 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>3140.00</b>
225 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK225A	Flush	30	42	14	<b>MC3042B1225FED</b>	48 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>3366.00</b>
225 <span style="background-color: black; color: white; border-radius: 50%; padding: 1px 3px;">NEW</span>	MBK225A	Surface	30	42	14	<b>MC3042B1225SED</b>	48 <sup>5</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	<b>3366.00</b>

NEW

The new ECTPD1 can be installed on meter combo's listed on this page. It is a replacement door for the lower pull section that has a weatherproof GFCI receptacle cover<sup>®</sup>. Use the receptacle for temporary power then carry it to the next job site, or leave it for customer use.



**ECTPD1**

<sup>①</sup> Suitable for use as service entrance equipment when not more than six main disconnecting means are provided and when not used as a lighting and appliance panel board.

<sup>®</sup> Consists of a door, hinges, and weatherproof cover. GFCI receptacle not included.

# Meter Combinations NEW

## EUSERC Meter Load Center Combinations (250A) Single Phase, 3-Wire 240V AC

*Selection*

METER CENTERS 2

### General

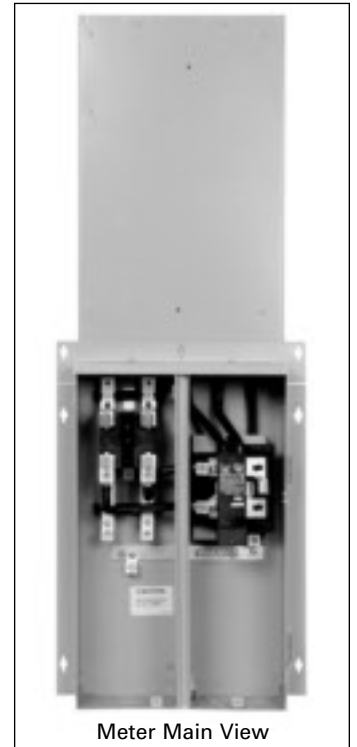
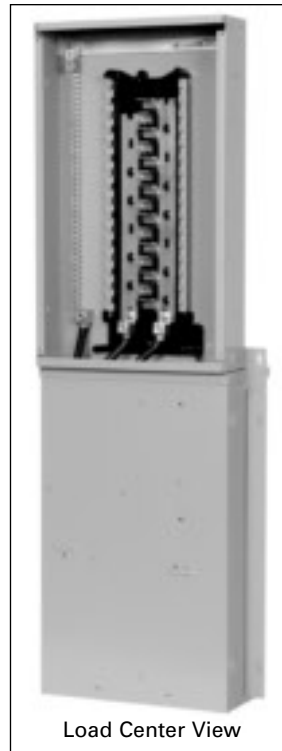
- UL Listed
- Back to Back design – Meter section faces outdoor, load center faces indoor
- 250A max, 200A continuous rating
- Copper bussing and wiring forms
- 22,000 AIC rated
- Suitable for use only as service entrance equipment
- See end of section for dimensions and wiring diagrams

### Meter Section

- Designed to meet EUSERC standards
- Flush mounting enclosure, adjustable for 2x4 or 2x6 stud applications
- Underground feed applications only
- Factory installed 200A main breaker, provisions for up to 50A max. secondary main breaker
- Pad locking provisions on all devices
- Side hinge doors removable by backing out only one screw
- HC type hub provision on bottom endwall
- Contact local utility to confirm meter socket approval prior to installation

### Load Center Section

- Load wires top exit only
- Trim mounting tabs free up both hands for trim screw installation
- INSTA-WIRE™ neutrals
- Visible neutrals



Main Ampere Rating <sup>①</sup>	Main Breaker Type <sup>①</sup>	Aux Breaker Max Ampere Rating	Auxiliary Breaker Type <sup>②</sup>	No. of Spaces	No. of Circuits	Catalog Number	Dimensions			List Price \$
							Height	Width	Depth	
200	QNH	50	QP, QPH	24	42	MC2442B1250FE2	47 <sup>3</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>4</sub>	2800.00
200	QNH	50	QP, QPH	30	42	MC3042B1250FE2	47 <sup>3</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>4</sub>	3360.00

① Factory installed main breaker.

② Field installed main breaker, 2-pole only, 50A max rating.

# Meter Centers NEW

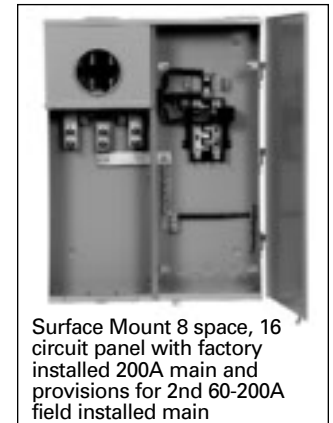
## Meter Load Centers Single Phase, 3-Wire 240V AC

*Selection*

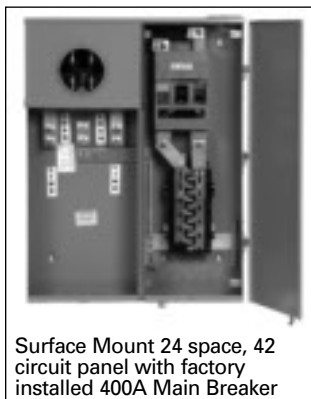
- UL Listed
- 400A Max, 320A Continuous
- Meter socket options include 320A (400A max) lever bypass, non-bypass, test block bypass, and bolt on
- Load center options include a meter main, 8 space panel with feed through lugs, 24 space
- 22,000 AIC Rated
- Accepts HD Type Hubs
- Factory installed flush mount option
- Surface mount devices accept field added flush rails
- Suitable for use only as service entrance equipment
- Contact local utility to confirm meter socket acceptance prior to installation
- See end of section for knock out diagrams and wiring schematics



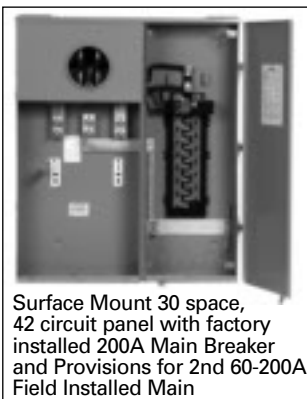
Surface Mount Meter Main  
With Provisions for Two  
60-200A Main Breakers



Surface Mount 8 space, 16  
circuit panel with factory  
installed 200A main and  
provisions for 2nd 60-200A  
field installed main



Surface Mount 24 space, 42  
circuit panel with factory  
installed 400A Main Breaker



Surface Mount 30 space,  
42 circuit panel with factory  
installed 200A Main Breaker  
and Provisions for 2nd 60-200A  
Field Installed Main



Flush Mount Front View

### Accessories

Description	Catalog Number
Flush Rail Kit for UG only devices	ECFRK1
Flush Rail Kit for OH/UG feed devices	ECFRK2
2" HD Type Hub	EC56854
2 1/2" HD Type Hub	EC56855
3" HD Type Hub	EC56856
3 1/2" HD Type Hub	EC56857
4" HD Type Hub	EC56858
HD Closure Plate	EC56933S
Snap on Sealing Ring	SRSS
Stainless Steel Screw Type Sealing Ring	SRSW
(2) #6-350 kcmil	UK350TA
(1) #2-600 kcmil	UK600TA
(2) 500-1000 kcmil	UK1000TA

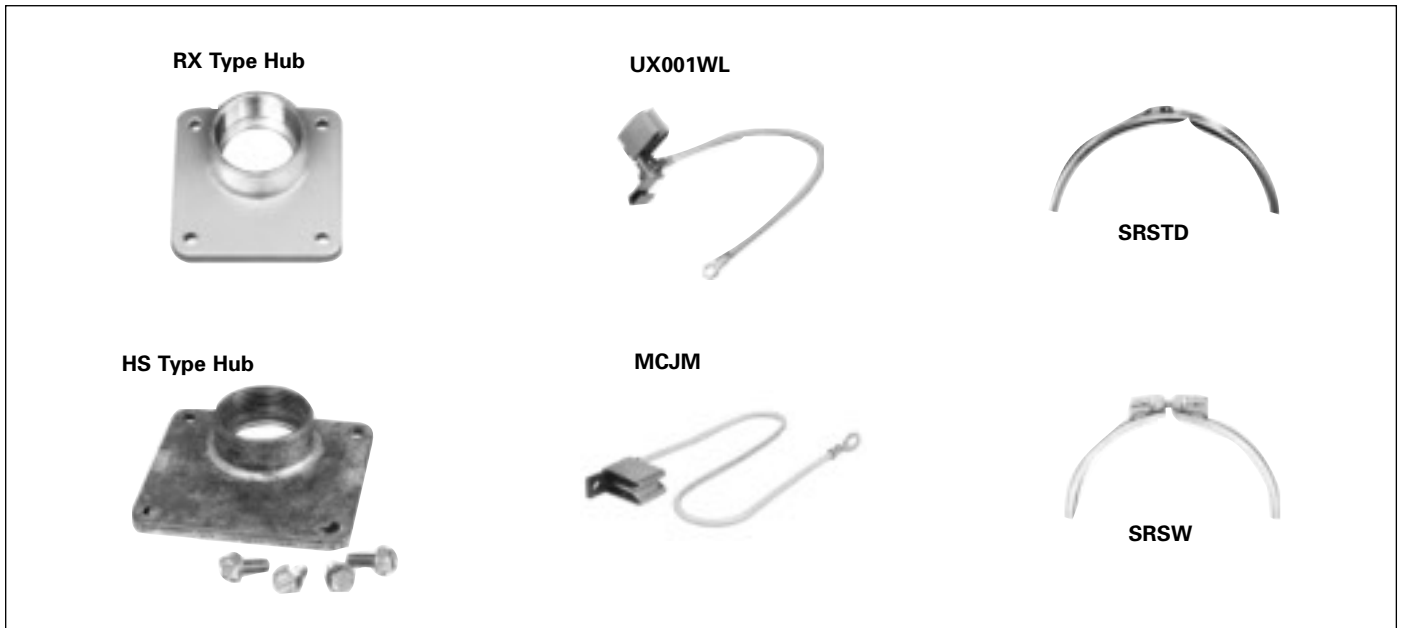
Catalog Number	Replaces	Main Breaker	Spaces	Circuits	Mounting	Meter Socket	Feed	Dimensions		
								Height	Width	Depth
MM0404L1400SC	New	(2) Field QP(H), QNR(H)	4	2	Surface	Plug In	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MM0404L1400FD	New	(2) Field QP(H), QNR(H)	4	2	Flush	Plug In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MM0404L1400SCS	New	(2) Field QP(H), QNR(H)	4	2	Surface	Test Block	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MM0404L1400FDS	New	(2) Field QP(H), QNR(H)	4	2	Flush	Test Block	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MC0816B1400SC	New	Factory QN2200RH Field QP(H), QNR(H)	8	16	Surface	Plug In	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC0816B1400FD	New	Factory QN2200RH Field QP(H), QNR(H)	8	16	Flush	Plug In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MC0816B1400SCS	New	Factory QN2200RH Field QP(H), QNR(H)	8	16	Surface	Test Block	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC0816B1400FDS	New	Factory QN2200RH Field QP(H), QNR(H)	8	16	Flush	Test Block	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MC2442B1400SDB	MC2442MB14B	Factory JXD	24	42	Surface	Bolt In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC2442B1400SD	New	Factory JXD	24	42	Surface	Plug In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400SD	MC3040MB21 MC3040MB22	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Plug In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400SDS	MC3040MB21SS MC3040MB22SS	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Test Block	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400SDB	MC3040MB22B	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Bolt In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400SDL	MC3040MB22L	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Lever Bypass	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400FD	New	Factory QN2200RH Field QP(H), QNR(H)	30	42	Flush	Plug In	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MC3042B1400SC	New	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Plug In	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>
MC3042B1400FDS	New	Factory QN2200RH Field QP(H), QNR(H)	30	42	Flush	Test Block	UG	39 <sup>1</sup> / <sub>16</sub>	30 <sup>3</sup> / <sub>8</sub>	7 <sup>3</sup> / <sub>8</sub>
MC3042B1400SCS	New	Factory QN2200RH Field QP(H), QNR(H)	30	42	Surface	Test Block	OH/UG	39 <sup>1</sup> / <sub>16</sub>	33 <sup>3</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>

# Meter Centers

## Electriccenter Accessories

Selection

2  
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CENTERS



### Interchangeable Hubs

Conduit Size (Inches) Lbs.	Catalog Number	List Price \$
<b>HS Type Hubs</b>		
3/4	ECHS075	39.50
1	ECHS100	39.50
1 1/4	ECHS125	39.50
1 1/2	ECHS150	39.50
2	ECHS200	69.00
2 1/2	ECHS250	109.00
<b>RX Type Hubs</b>		
3/4	EC38594	22.90
1	EC38596	37.81
1 1/4	EC38597	37.81
1 1/2	EC38598	23.96
2	EC38599	23.96
2 1/2	EC38600	107.57
<b>HV Type Hubs</b>		
2	ECHV200	91.00
2 1/2	ECHV250	125.00
3	ECHV300	182.00
3 1/2	ECHV350	274.00
4	ECHV400	362.00
<b>HC Type Hubs</b>		
2	ECHC200	72.00
2 1/2	ECHC250	108.00
3	ECHC300	175.00
<b>Accessories and Closure Plates</b>		
Adapter Plate	ECHCRXA	22.50
	EC9747-1113 (HD to RX)	28.76
Closure Plates	ECHC000	24.00
	ECHS000	38.00
	ECHV000	23.50
	EC38595 (RX Type)	38.34
	EC56933S (HD Type)	76.68
<b>HD Type Hubs</b>		
3	EC56856	178.92
3 1/2	EC56857	263.06
4	EC56858	119.28

### Grounding Bars (Al/Cu — except where noted)

Grounding bars are for use where grounding of electrical outlets and devices is by means of conductors. Each bar is equipped with large connectors rated for one #14-1/0 or, two or three #14-10 Cu/Al and small connectors rated for one #14-6 or, two #14-12 Cu/Al. (May be restricted by wire bending space.)

Length	Number of Connectors			Catalog Number	List Price \$
	Total	Large	Small		
1 1/8	4	0	4	ECLX068M	11.80
2 9/16	7	2	5	ECLX069M	15.60
3 1/2	11	3	8	ECLX071M	15.60
4 7/8	15	4	11	ECLX072M	17.70
5 7/8	19	5	14	ECLX073M	18.60
7	23	6	17	ECLX074M	25.50
8 1/2	27	7	20	ECLX075M	28.50

### Sealing Rings

Description	Catalog Number	List Price \$
Snap-on type, aluminum	SRSTD	17.47
Screw type, aluminum	SRSW	25.03

### Miscellaneous Accessories

Description	Catalog Number	List Price \$
Plastic Meter Opening Cover	ECPP	19.00
Plastic Meter Cover Ringless	ECCP3	21.00
NEMA Stud Mechanical Lugs <sup>①</sup>		
(2) #6-350 kcmil	UK350TA	55.00
(1) #2-600 kcmil Al/Cu	UK600TA	49.50
(2) #500-1000 kcmil Al/Cu	UK1000TA	64.00
5th jaw	EMC5J	72.00
Neutral Feeder Lugs		
#2-1/0	ECLK1-2	13.90
#4-2/0	ECLK2	18.40
#1-350 kcmil	ECLK3	24.00

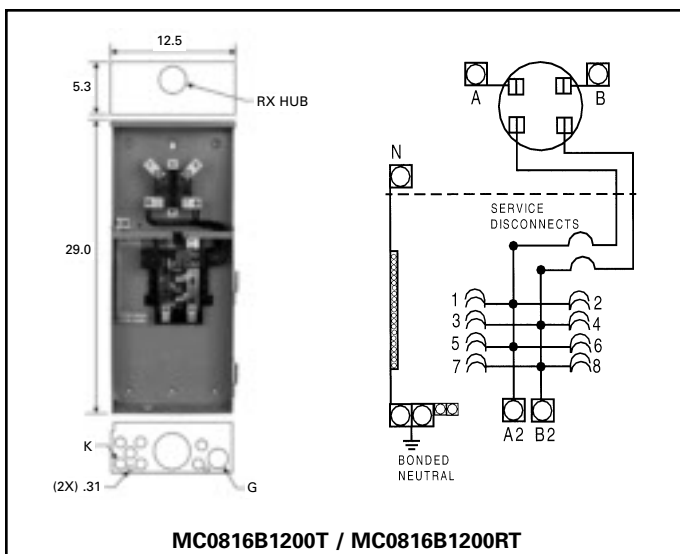
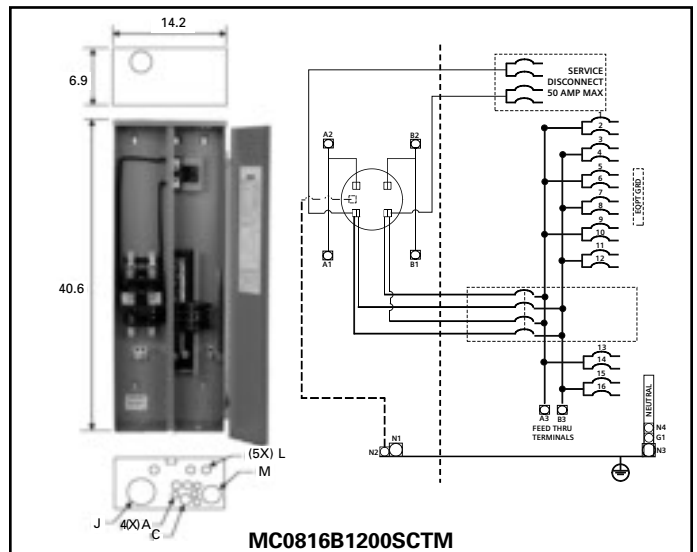
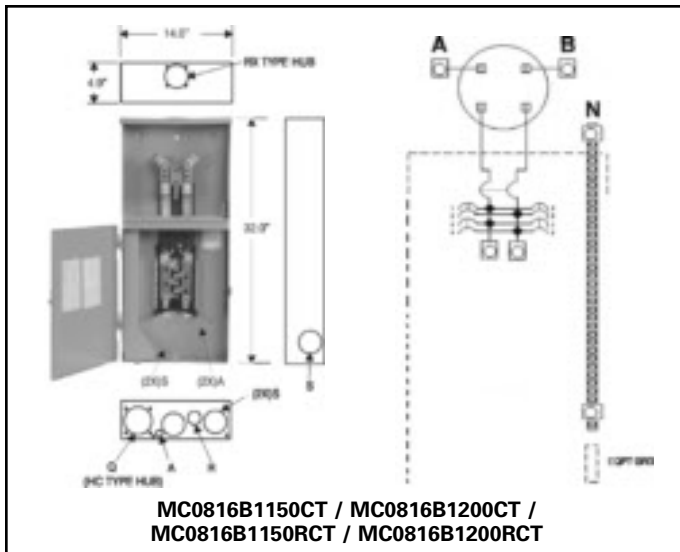
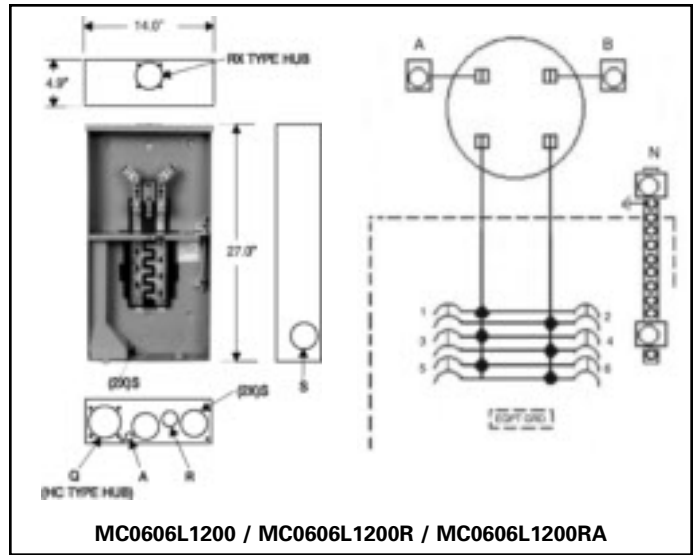
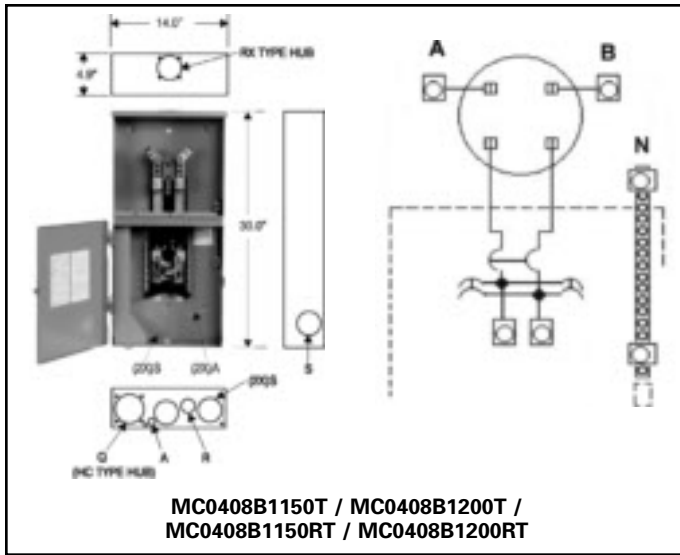
<sup>①</sup> Order one for each phase and neutral.

<sup>②</sup> See catalog number tables for replacement main information for each meter combination.

# Meter Centers

## Dimensions and Wiring Schematics

## Selection



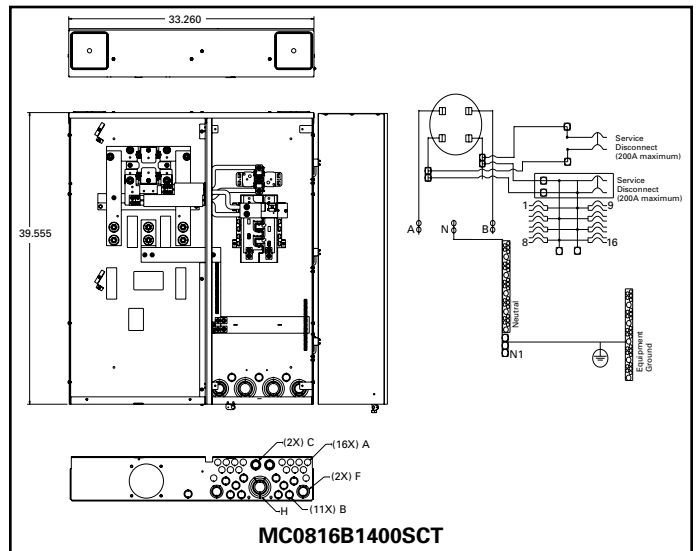
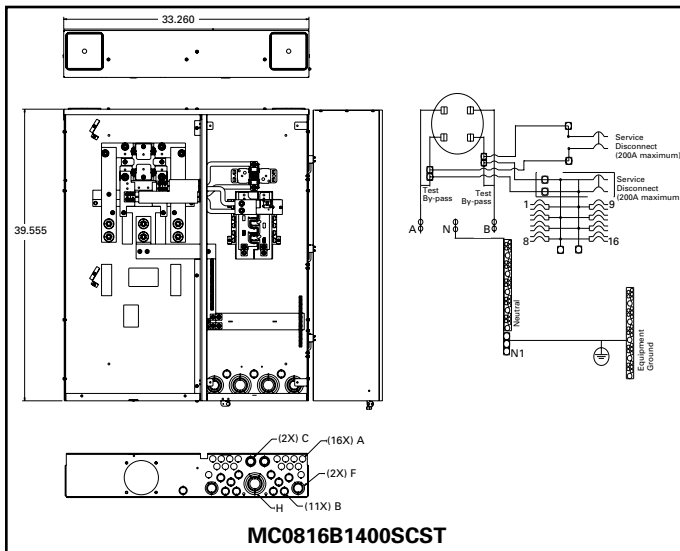
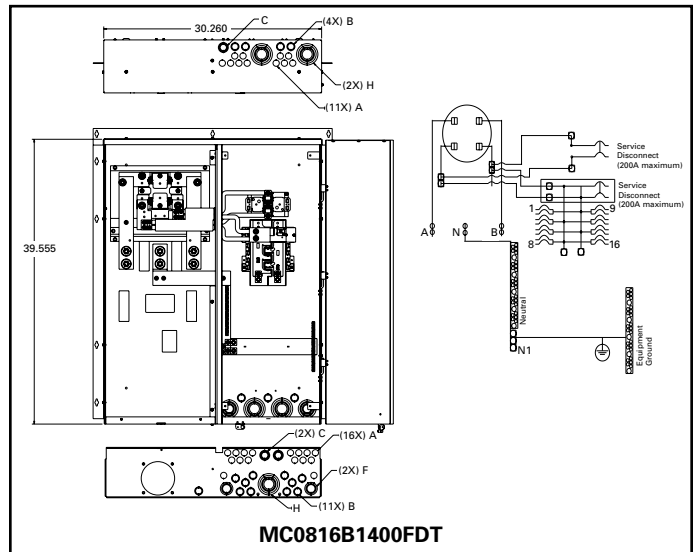
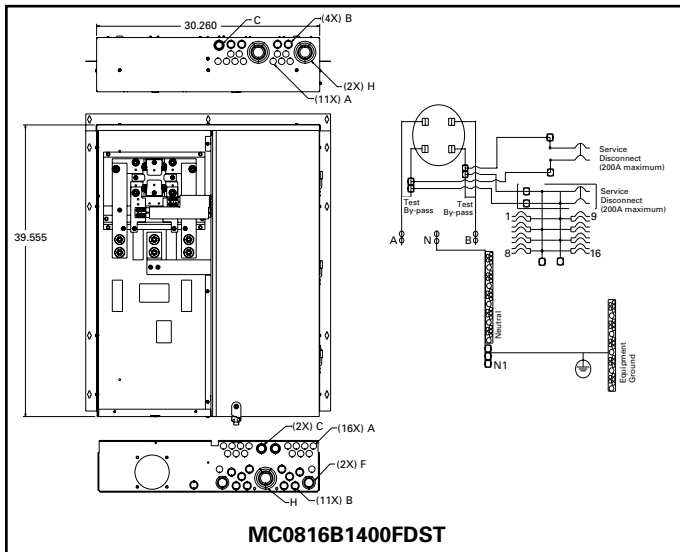
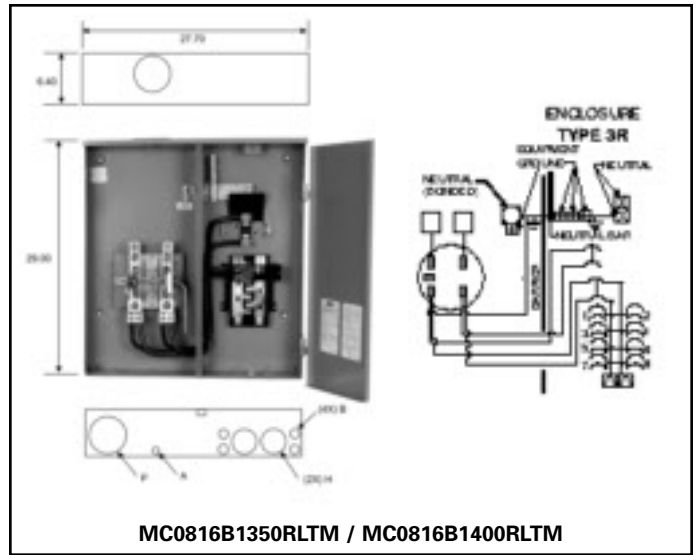
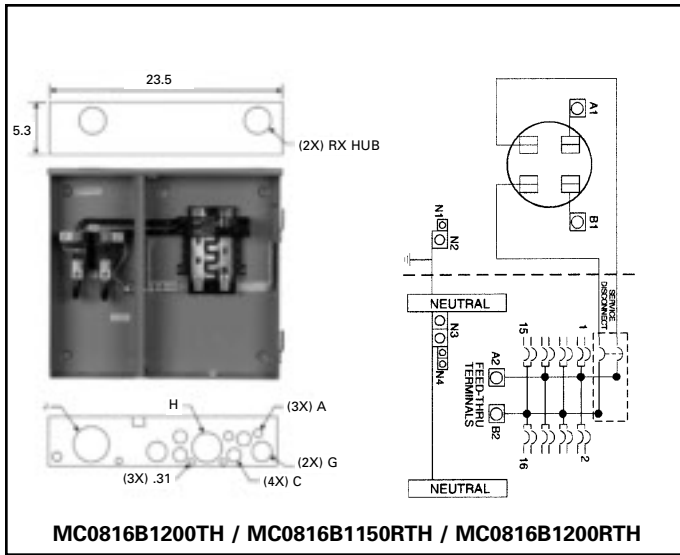
## Knockout Code — Conduit Sizes

- A = 1/2
- B = 1/2, 3/4
- C = 1/2, 3/4, 1
- D = 3/4, 1 1/4, 1 1/2
- E = 1, 1 1/4, 1 1/2, 2
- F = 3/4, 1, 1 1/4
- G = 1, 1 1/4, 1 1/2
- H = 1, 1 1/4, 1 1/2, 2, 2 1/2
- J = 1 1/4, 1 1/2, 2, 2 1/2, 3
- K = 1, 1 1/4, 2, 2 1/2, 3
- L = 3/8, 1/2, 3/4
- M = 3/4, 1, 1 1/4, 1 1/2, 2
- N = 1/4
- P = 2, 2 1/2, 3, 3 1/2, 4

# Meter Centers

## Dimensions and Wiring Schematics

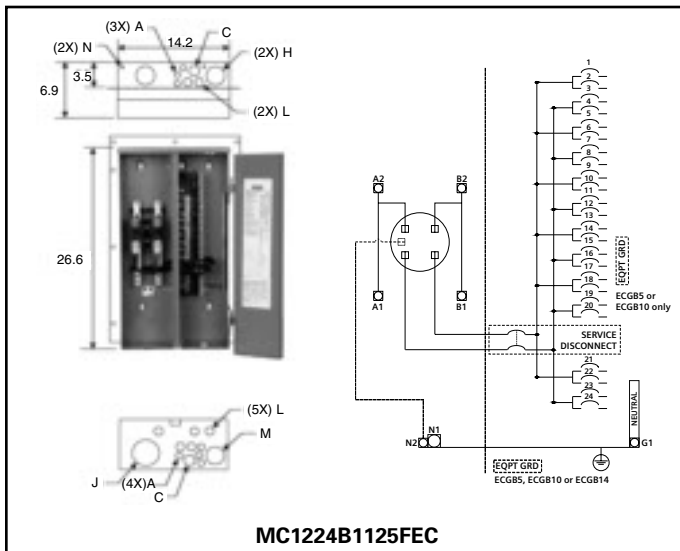
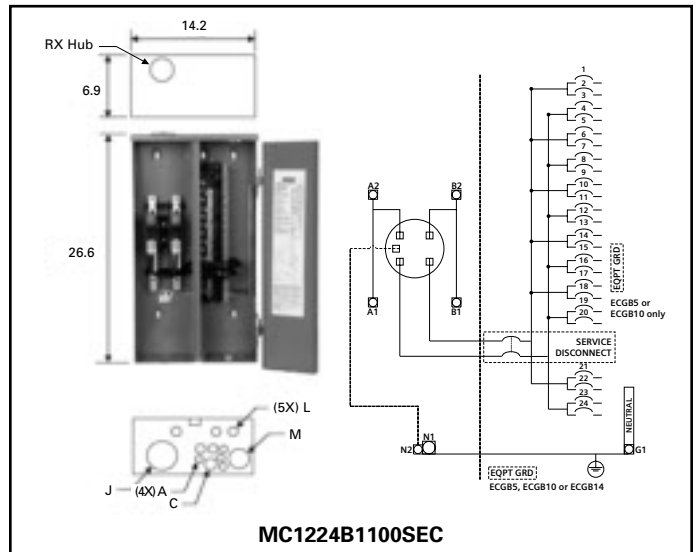
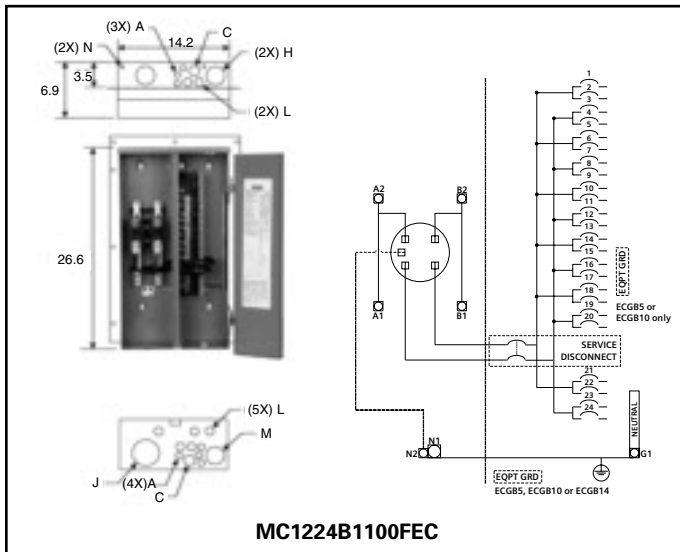
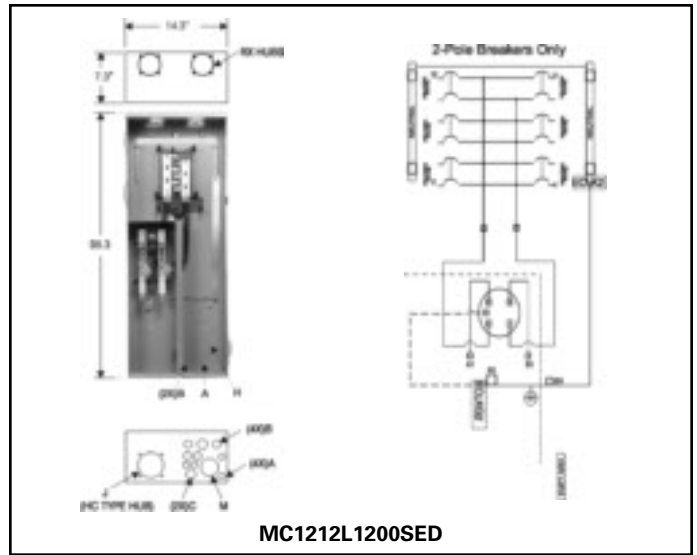
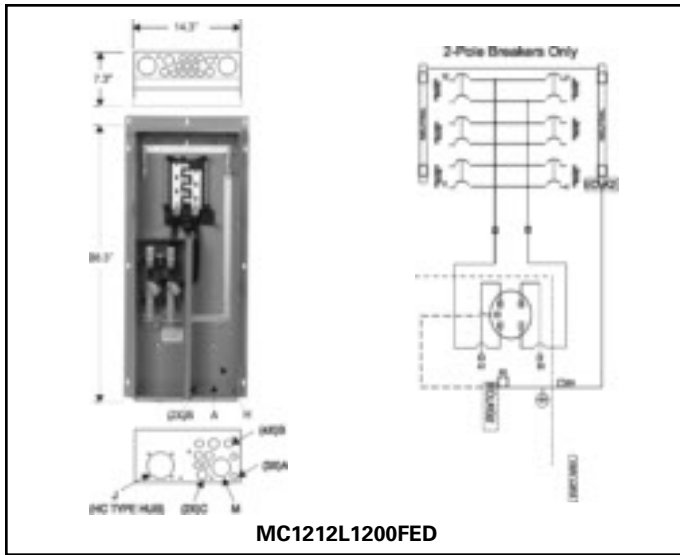
## Selection



# Meter Centers

## Dimensions and Wiring Schematics

## Selection



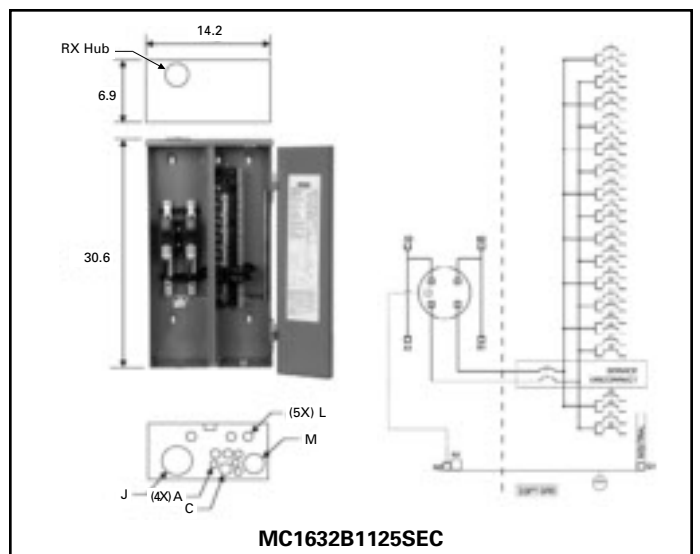
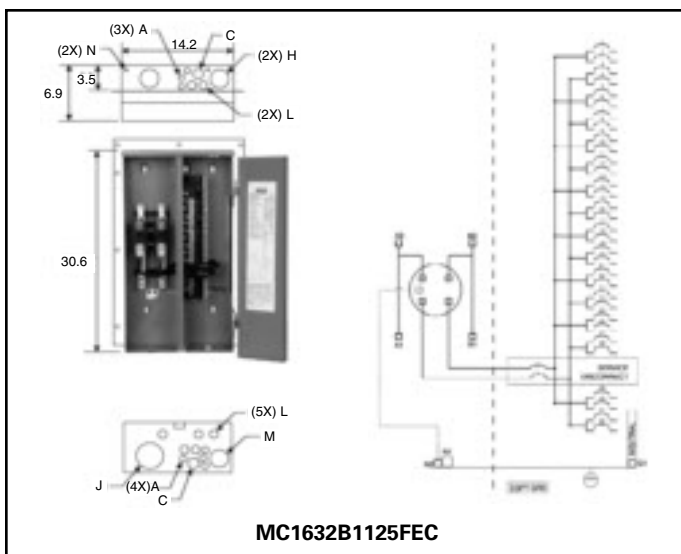
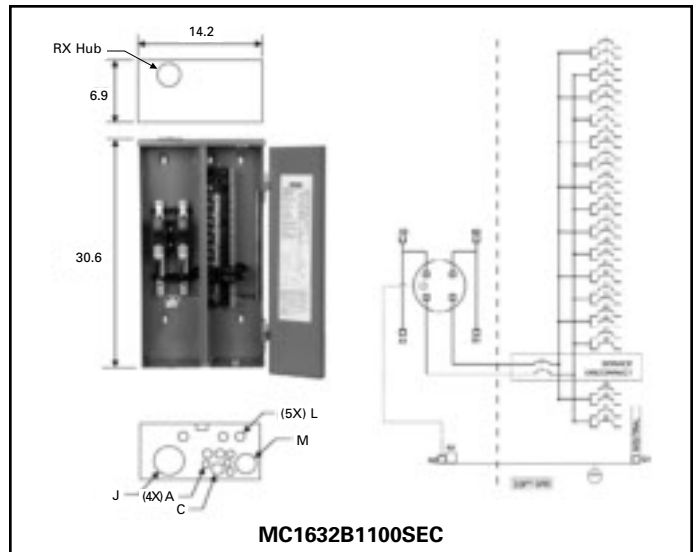
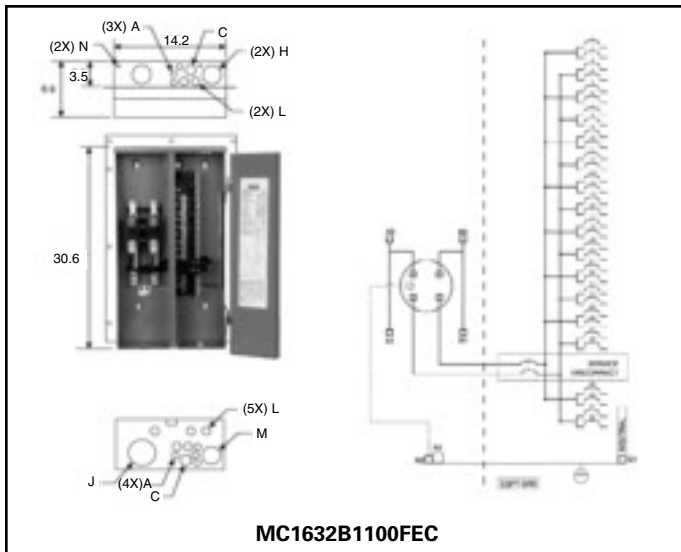
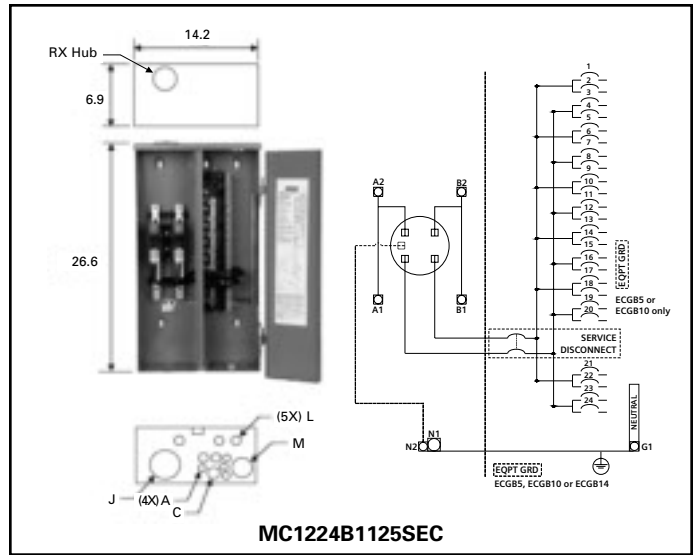
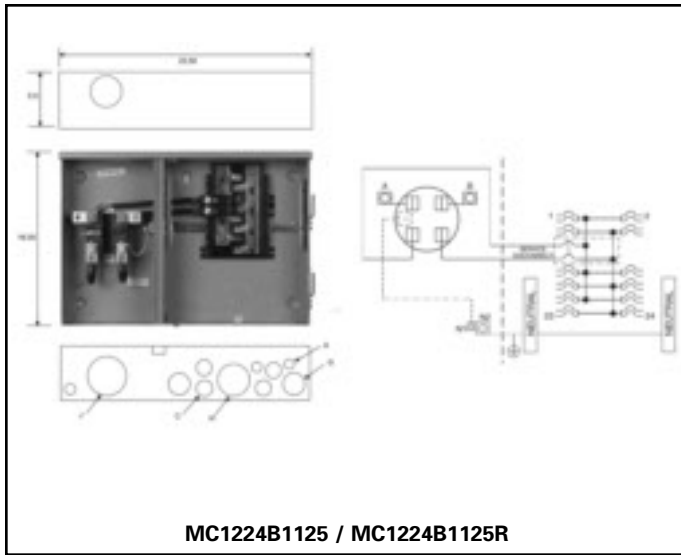
### Knockout Code — Conduit Sizes

- A = 1/2
- B = 1/2, 3/4
- C = 1/2, 3/4, 1
- D = 3/4, 1 1/4, 1 1/2
- E = 1, 1 1/4, 1 1/2, 2
- F = 3/4, 1, 1 1/4
- G = 1, 1 1/4, 1 1/2
- H = 1, 1 1/4, 1 1/2, 2, 2 1/2
- J = 1 1/4, 1 1/2, 2, 2 1/2, 3
- K = 1, 1 1/4, 2, 2 1/2, 3
- L = 3/8, 1/2, 3/4
- M = 3/4, 1, 1 1/4, 1 1/2, 2
- N = 1/4
- P = 2, 2 1/2, 3, 3 1/2, 4

# Meter Centers

## Dimensions and Wiring Schematics

## Selection

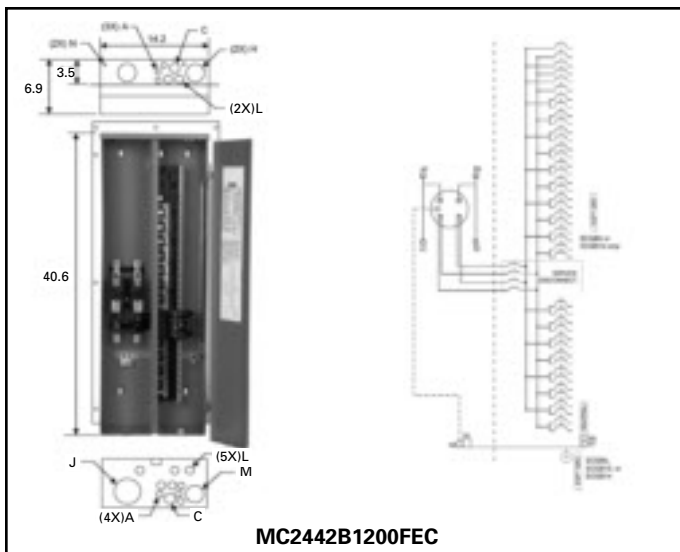
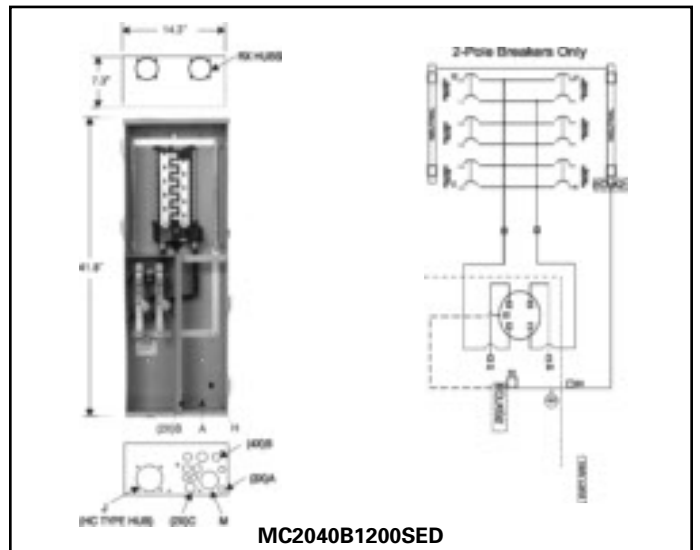
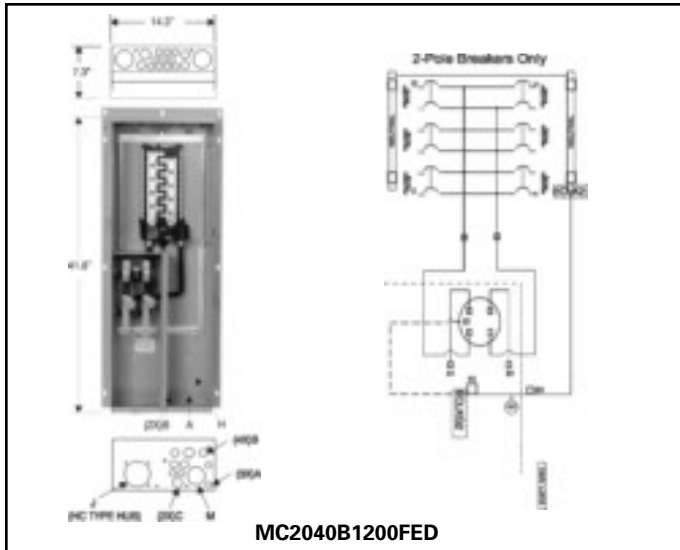
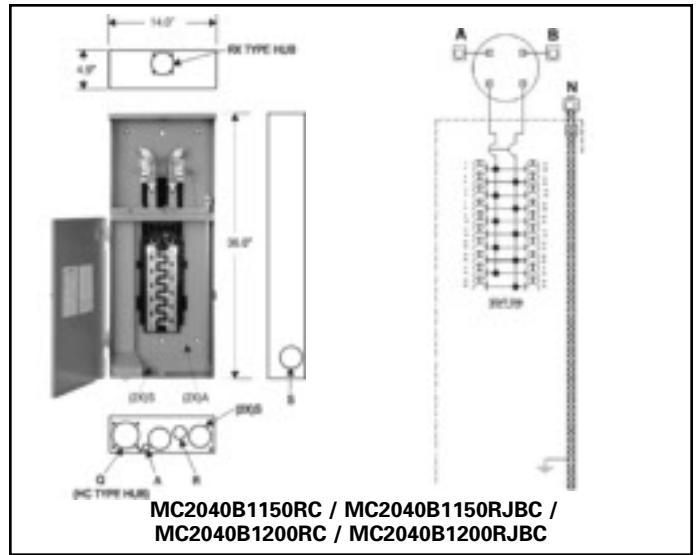
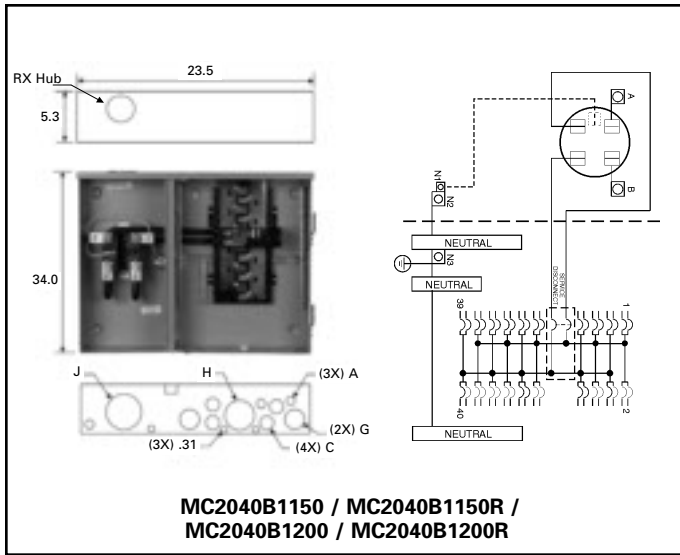




# Meter Centers

## Dimensions and Wiring Schematics

## Selection



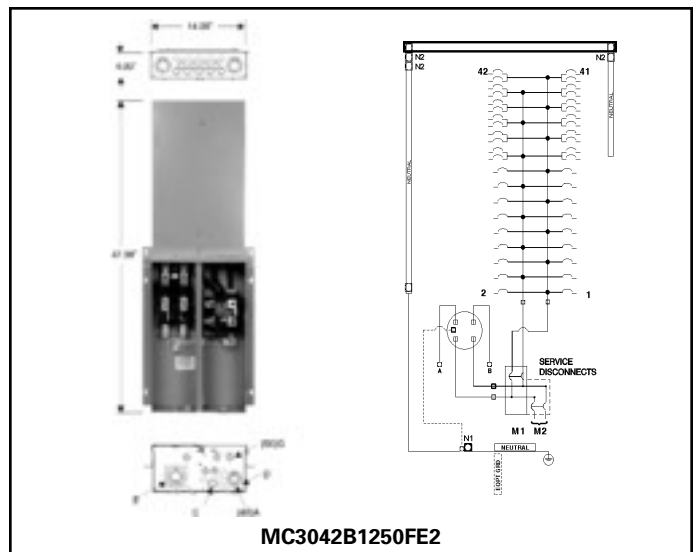
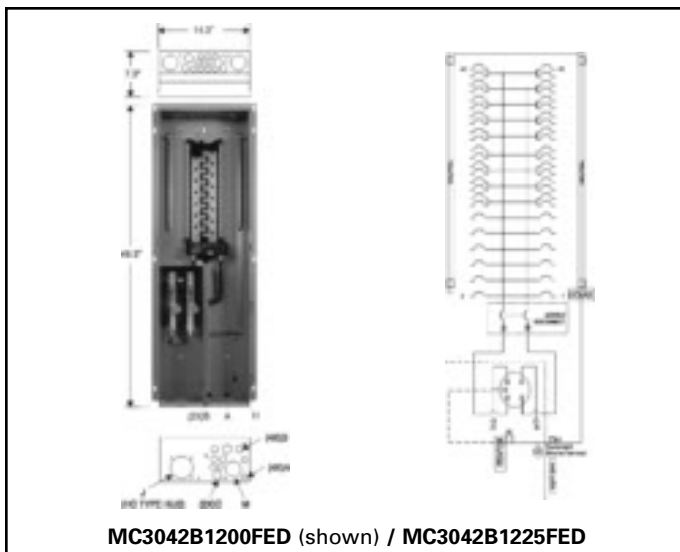
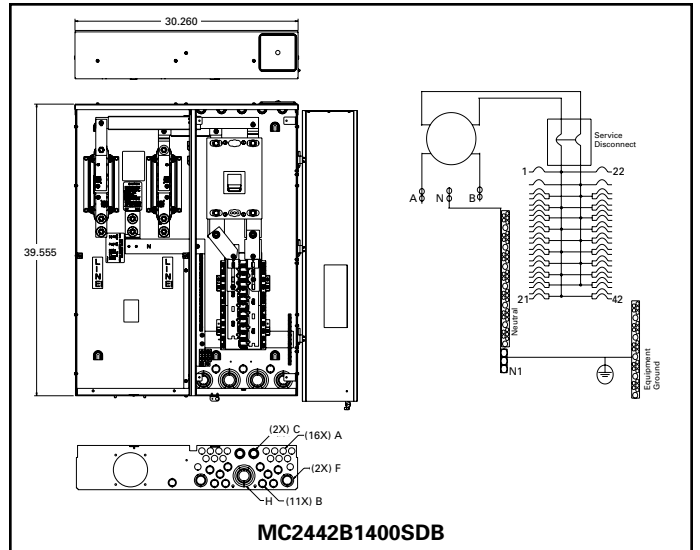
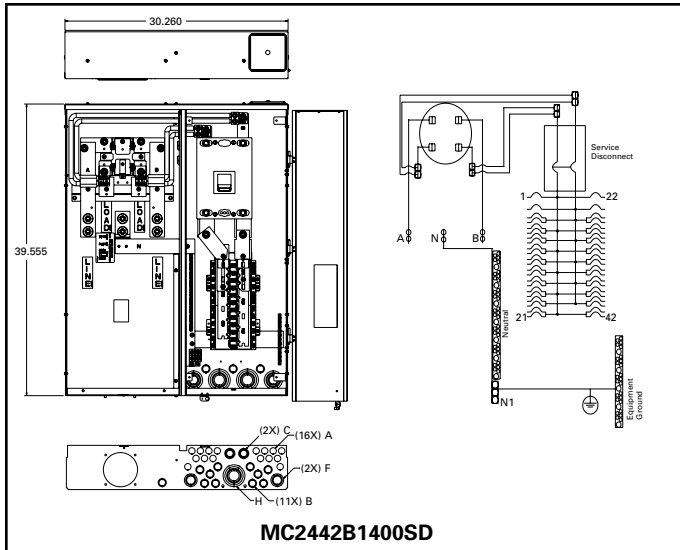
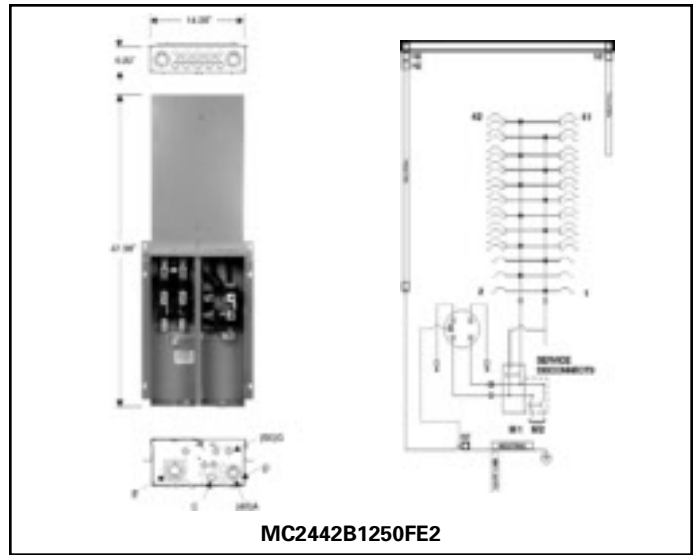
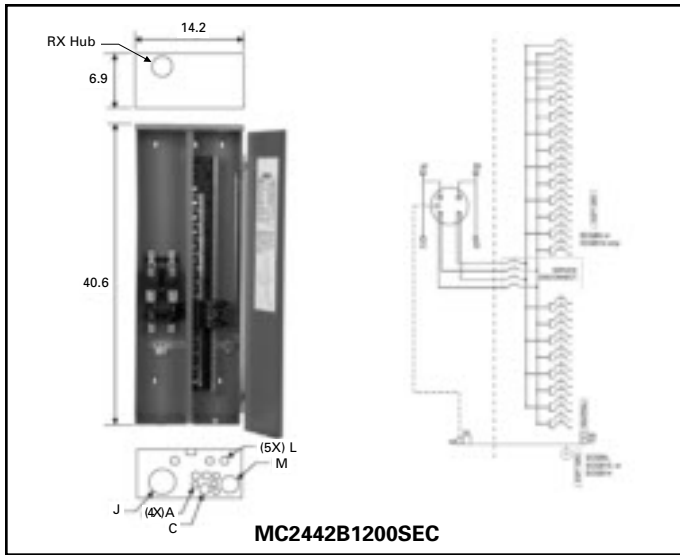
## Knockout Code — Conduit Sizes

- A = ½
- B = ½, ¾
- C = ½, ¾, 1
- D = ¾, 1¼, 1½
- E = 1, 1¼, 1½, 2
- F = ¾, 1, 1¼
- G = 1, 1¼, 1½
- H = 1, 1¼, 1½, 2, 2½
- J = 1¼, 1½, 2, 2½, 3
- K = 1, 1¼, 2, 2½, 3
- L = ¾, 1, 1¼
- M = ¾, 1, 1¼, 1½, 2
- N = ¼
- P = 2, 2½, 3, 3½, 4

# Meter Centers

## Dimensions and Wiring Schematics

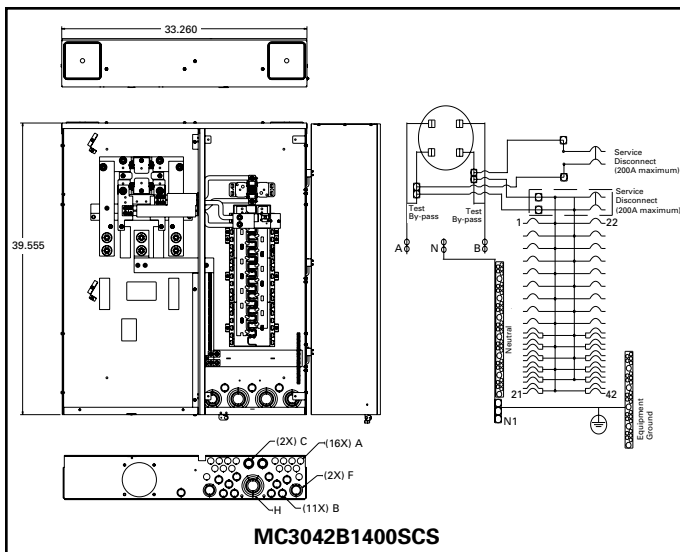
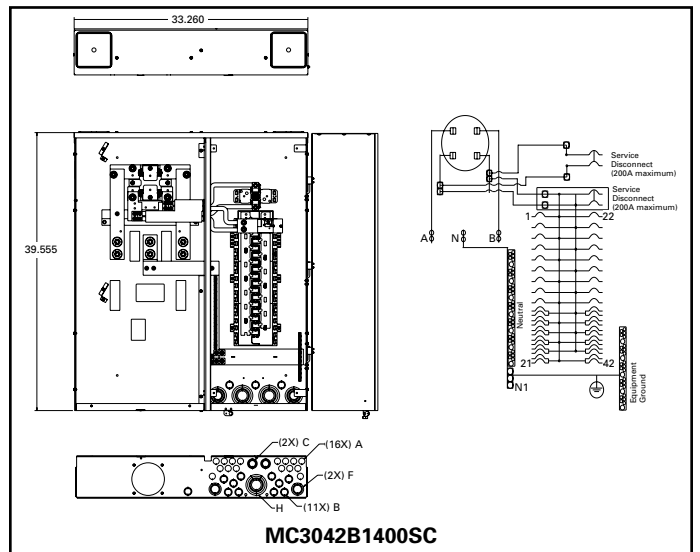
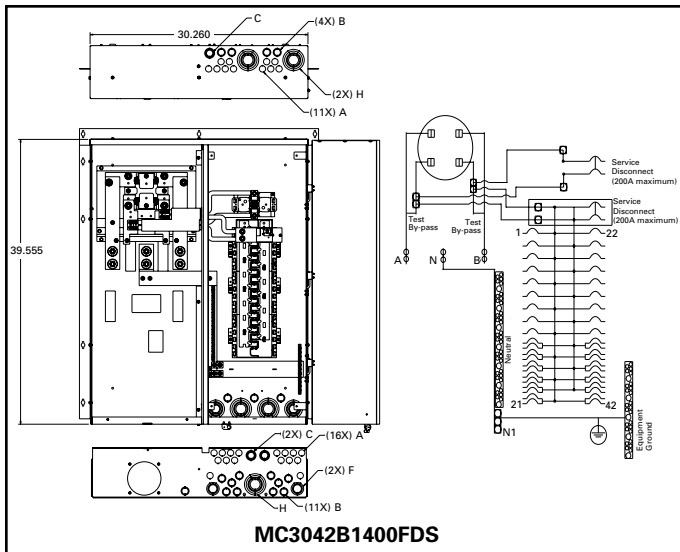
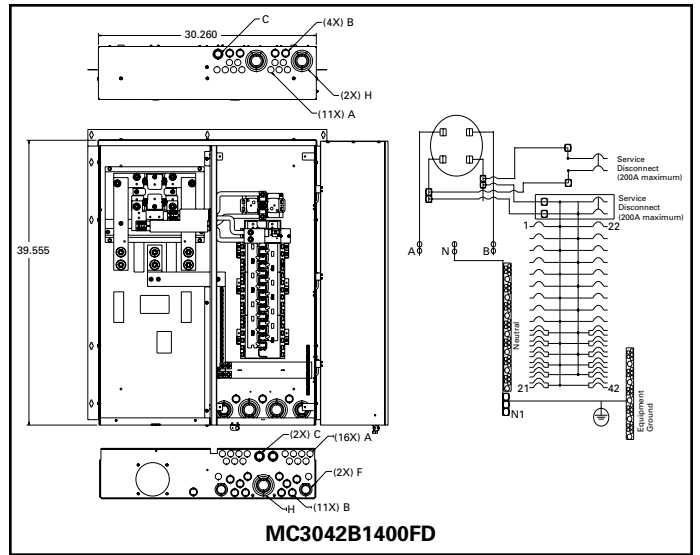
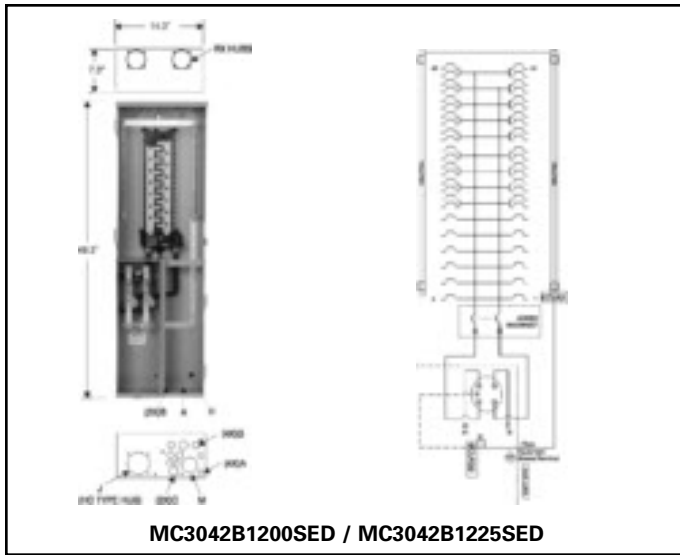
## Selection



# Meter Centers

## Dimensions and Wiring Schematics

## Selection



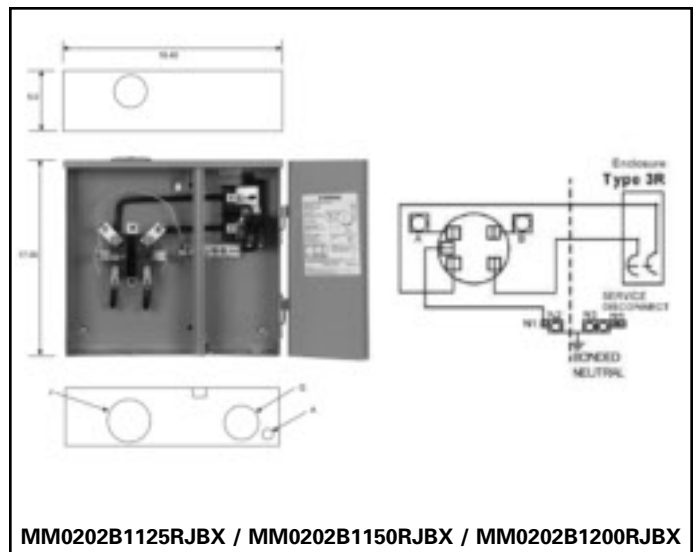
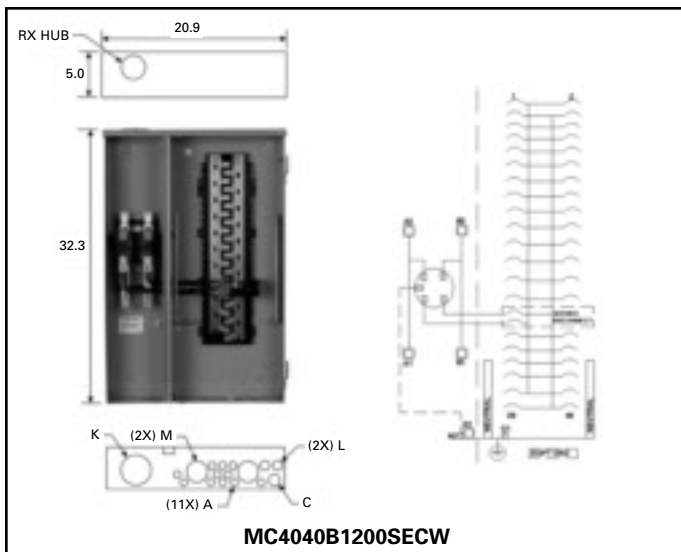
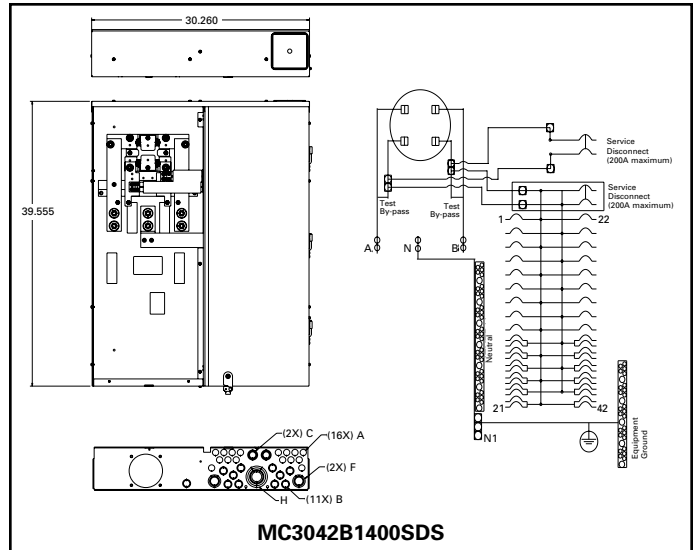
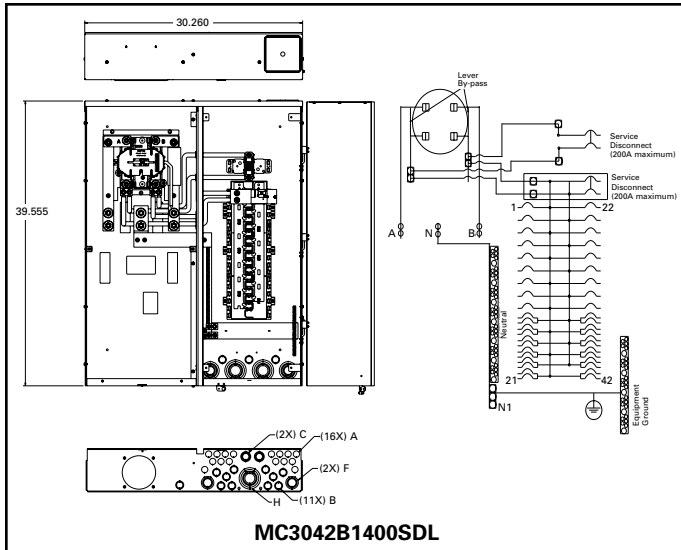
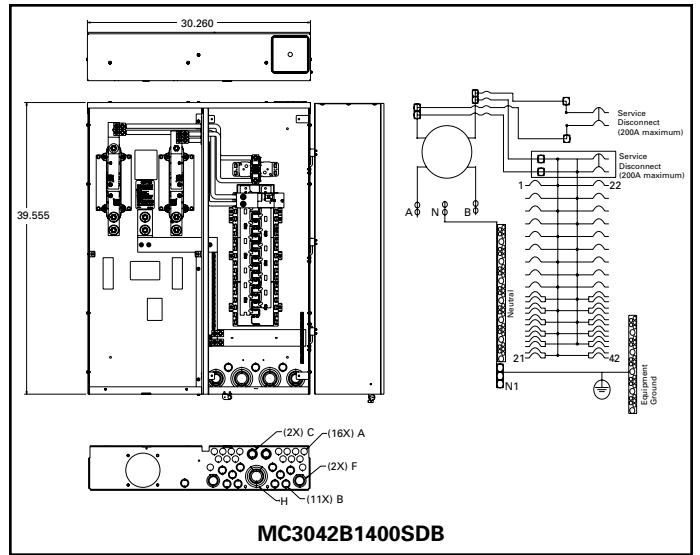
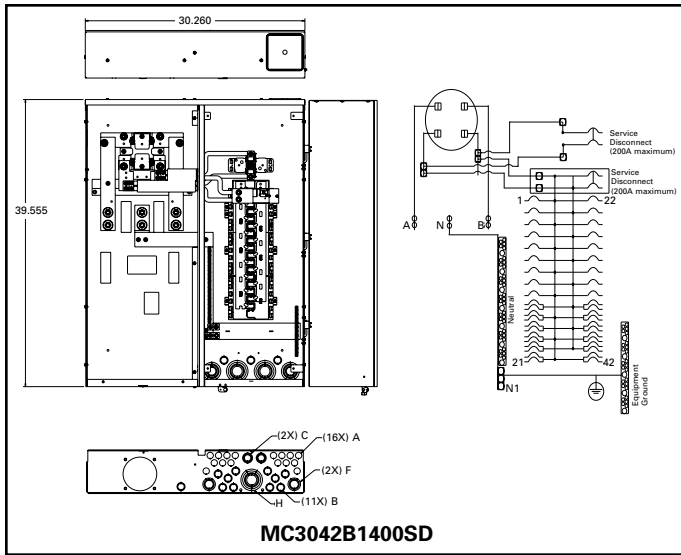
## Knockout Code — Conduit Sizes

- A = 1/2
- B = 1/2, 3/4
- C = 1/2, 3/4, 1
- D = 3/4, 1 1/4, 1 1/2
- E = 1, 1 1/4, 1 1/2, 2
- F = 3/4, 1, 1 1/4
- G = 1, 1 1/4, 1 1/2
- H = 1, 1 1/4, 1 1/2, 2, 2 1/2
- J = 1 1/4, 1 1/2, 2, 2 1/2, 3
- K = 1, 1 1/4, 2, 2 1/2, 3
- L = 3/8, 1/2, 3/4
- M = 3/4, 1, 1 1/4, 1 1/2, 2
- N = 1/4
- P = 2, 2 1/2, 3, 3 1/2, 4

# Meter Centers

## Dimensions and Wiring Schematics

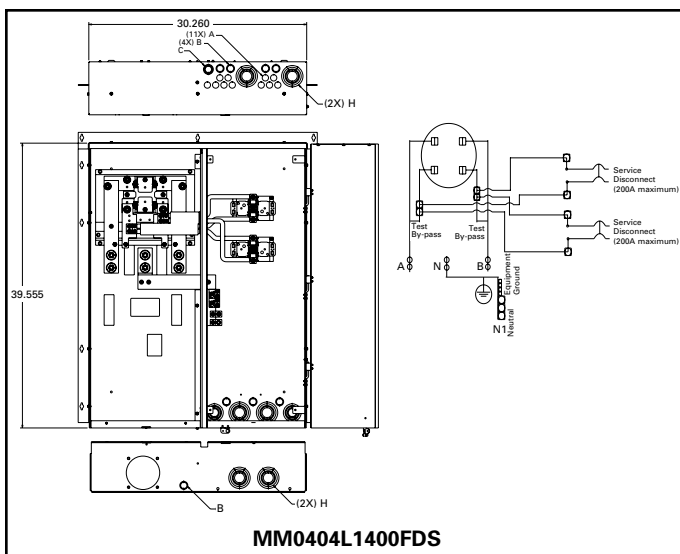
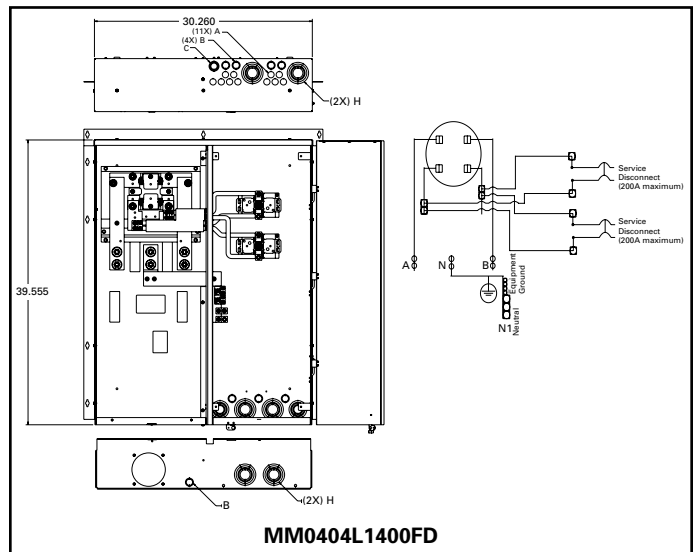
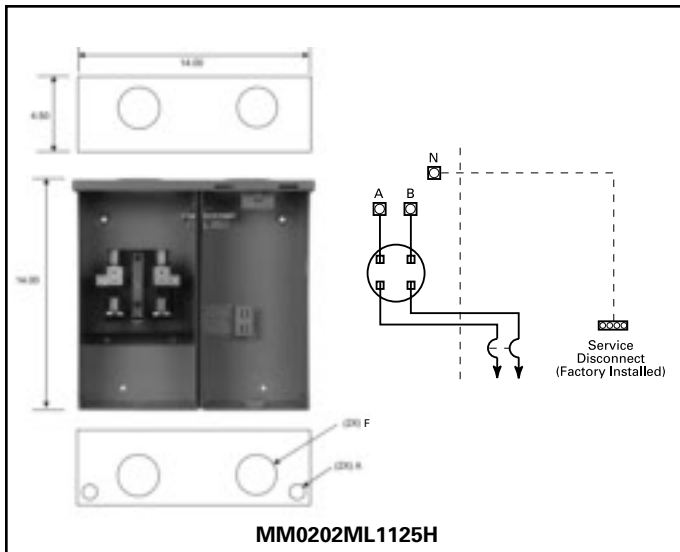
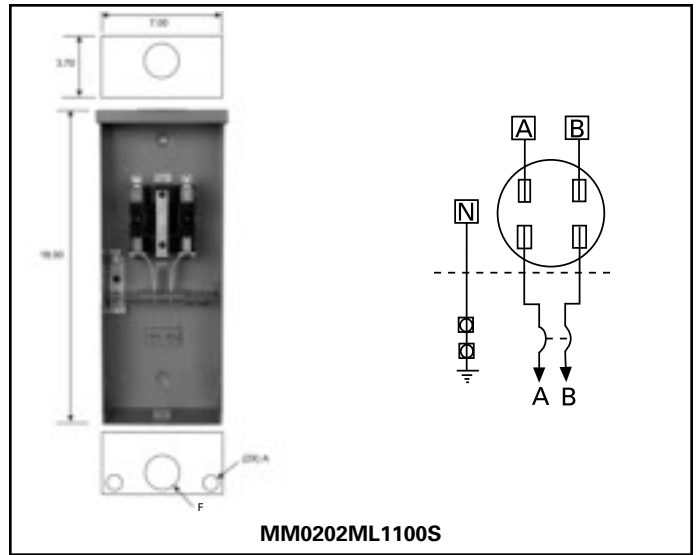
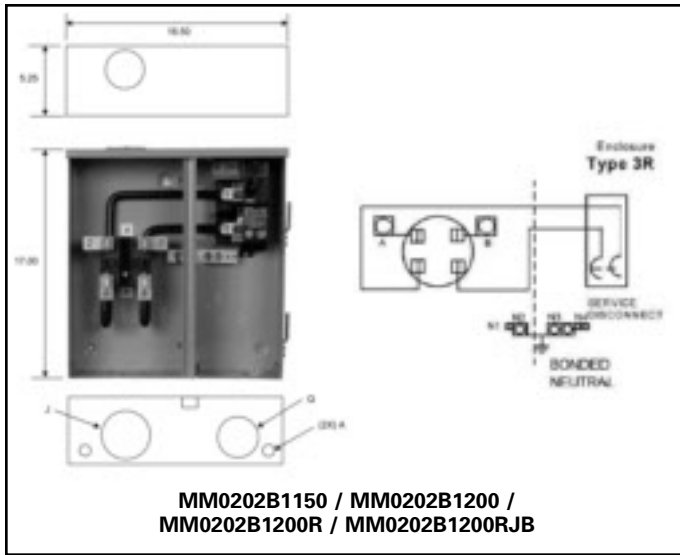
## Selection



# Meter Centers

## Dimensions and Wiring Schematics

## Selection



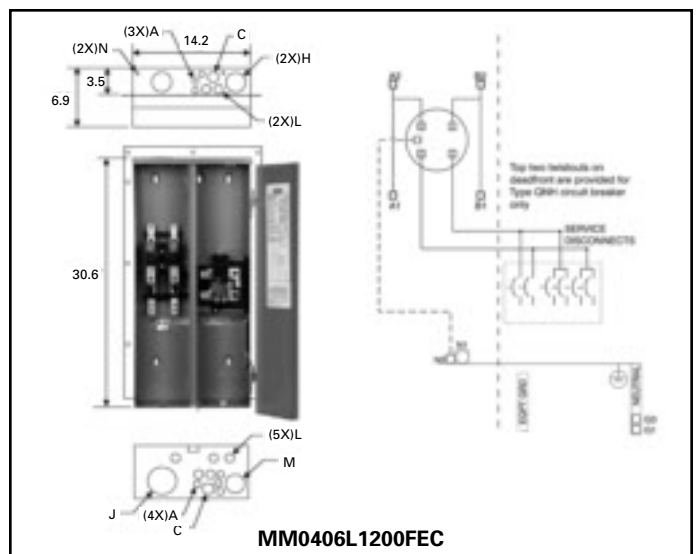
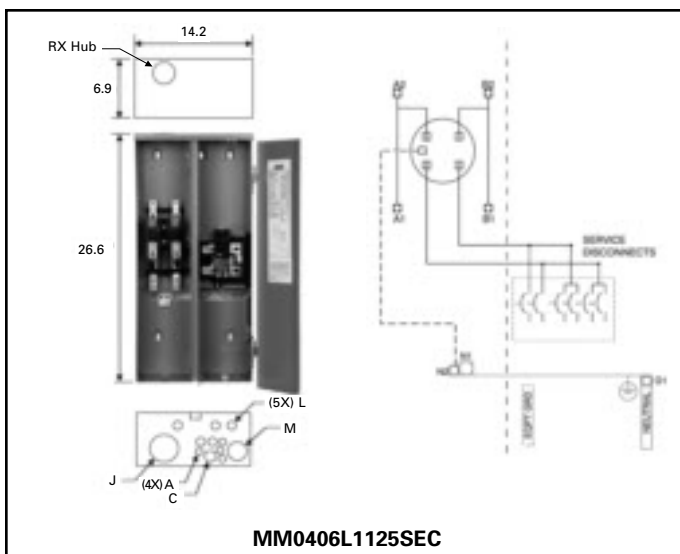
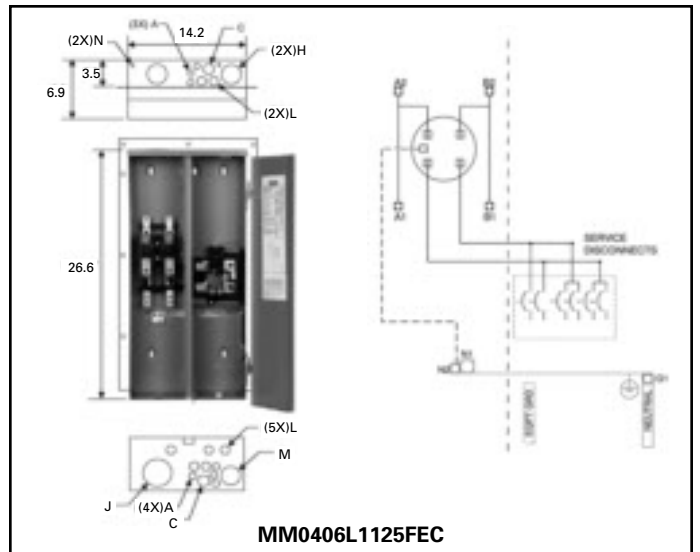
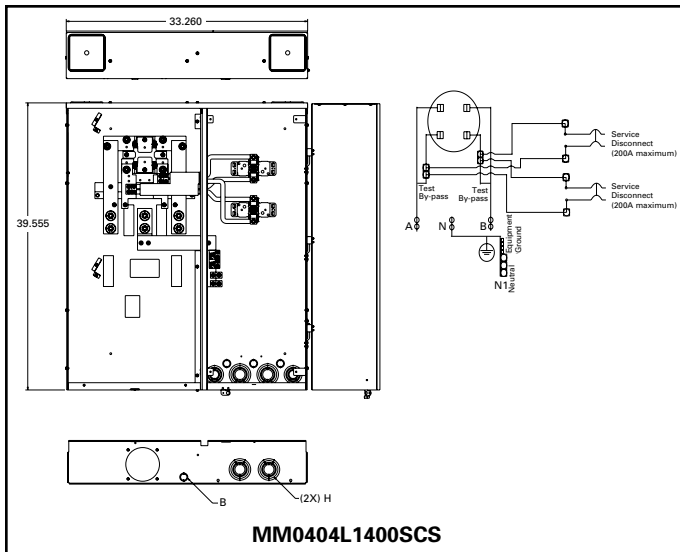
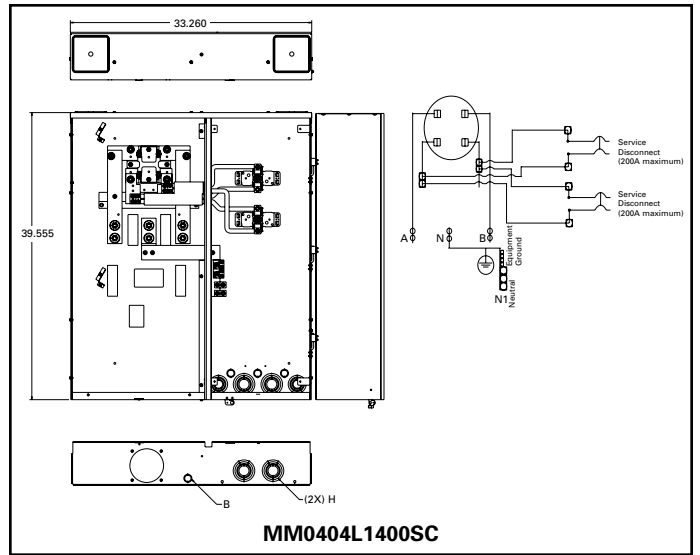
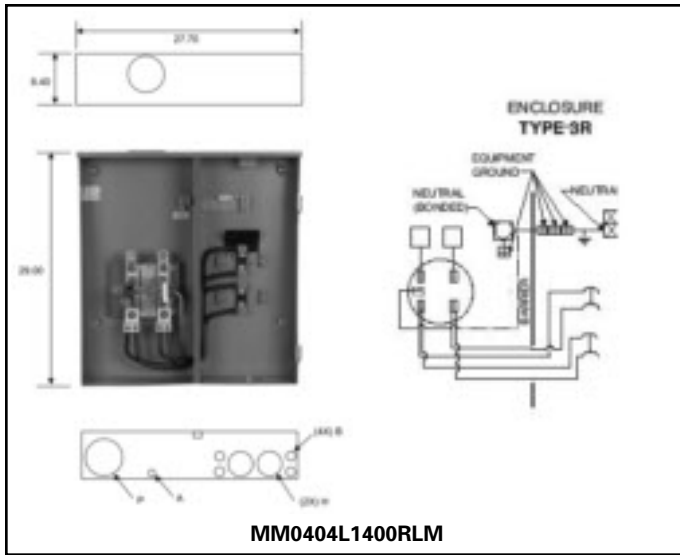
## Knockout Code — Conduit Sizes

- A = 1/2
- B = 1/2, 3/4
- C = 1/2, 3/4, 1
- D = 3/4, 1 1/4, 1 1/2
- E = 1, 1 1/4, 1 1/2, 2
- F = 3/4, 1, 1 1/4
- G = 1, 1 1/4, 1 1/2
- H = 1, 1 1/4, 1 1/2, 2, 2 1/2
- J = 1 1/4, 1 1/2, 2, 2 1/2, 3
- K = 1, 1 1/4, 2, 2 1/2, 3
- L = 3/8, 1/2, 3/4
- M = 3/4, 1, 1 1/4, 1 1/2, 2
- N = 1/4
- P = 2, 2 1/2, 3, 3 1/2, 4

# Meter Centers

## Dimensions and Wiring Schematics

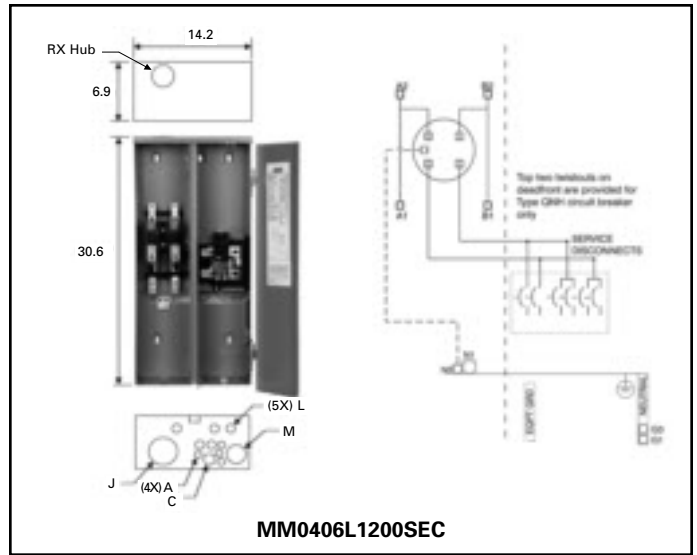
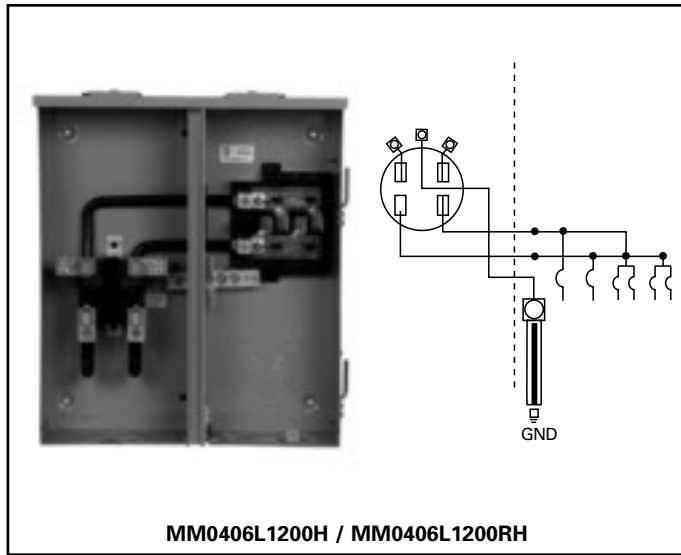
## Selection



# Meter Centers

## Dimensions and Wiring Schematics

## Selection



### Knockout Code — Conduit Sizes

- A = ½
- B = ½, ¾
- C = ½, ¾, 1
- D = ¾, 1¼, 1½
- E = 1, 1¼, 1½, 2
- F = ¾, 1, 1¼
- G = 1, 1¼, 1½
- H = 1, 1¼, 1½, 2, 2½
- J = 1¼, 1½, 2, 2½, 3
- K = 1, 1¼, 2, 2½, 3
- L = ¾, ½, ¾
- M = ¾, 1, 1¼, 1½, 2
- N = ¼
- P = 2, 2½, 3, 3½, 4

# Meter Centers

## Modular Metering: Introduction

Siemens Modular Metering can be adapted to almost every requirement in residential and commercial group metering applications. The design of each module was completed with easy handling, fast installation, and simplified layout in mind.

The complete line can be furnished for single phase three wire 120/240V AC and three phase, four wire 120/Y208V AC. Meter modules containing three phase thru bussing and three phase tenant mains are also rated for 240V AC Delta Systems. All service entrance devices are rated for 240V AC Max.

The incoming utility service can be terminated in breaker, switch, or tap box "service entrance modules". Tap boxes may be used when the total number of meters is 6 or less. For those areas that need to meet EUSERC requirements for underground feed a separate pullbox is available to attach to breaker devices up to 1200amps. Switch devices with an integral pullbox are available up to 800amps.

All 200amp meter modules offer short circuit ratings up to 100,000A IR. Modules are available to meet the wide variety of bypass requirements from utilities nationwide including horn

bypass, lever bypass, and test block bypass. Residential modules (those with no bypass or horn bypass) are available in 2-6 positions. Commercial modules with a lever bypass are available in 1-4 positions. Commercial modules with a test block bypass are available in 1-3 positions.

All 320amp meter modules offer short circuit ratings up to 42,000A IR if fully rated. Higher ratings may be achieved thru series ratings and are dependent upon the breaker used as the service disconnect.

### General



Breaker Module



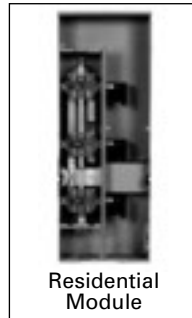
Switch Module



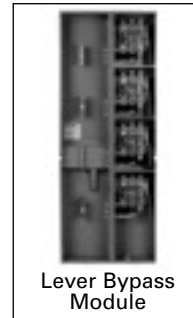
Pull Box Module



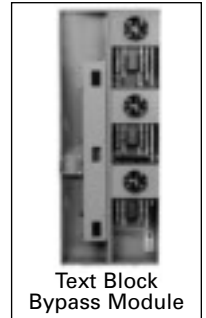
Tap Box Module



Residential Module



Lever Bypass Module

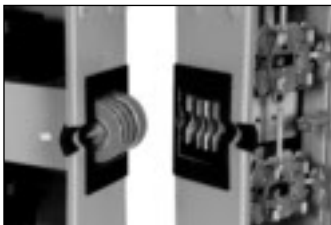


Text Block Bypass Module

## Features

### Single Bolt Joint

The time-saving single bolt joint (SBJ) provides for a single electrical connection between meter modules- a Siemens exclusive feature. The SBJ slips into one module with the adjacent unit being drawn towards it. The SBJ locks into place via a bracket on the back of each module- this keeps the SBJ stationary and is the primary means of grounding between modules.



Beveled edges on the SBJ allow for easy positioning of the joint. Field installed studs are located just above and below the SBJ opening to compress the surrounding gaskets together to form a water-tight seal. For extra stability additional nuts and bolts are included as

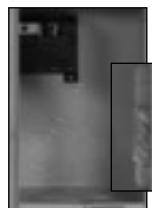
a means of physically joining the meter stacks together both above and below the SBJ opening.

### Bus Construction



Un-metered bus is surrounded by a barrier and all in-accessible bus connections are welded for maximum strength. All other connections- single bolt joint and meter socket connections, are bolted and accessible.

### Neutral & Ground Provisions



Grounds and Neutrals are located on the bottom end of the meter modules. All grounds and neutrals may be re-located to the top of the enclosure if a top-exit is needed (A siemens exclusive feature). Each meter module has small indents to help locate a field-cut knockout if a top exit is preferred.

### Tenant Breaker Provisions



Each single phase 200amp meter socket has a provision for a 4-pole plug-in type QPP circuit breaker. A 2-pole plug-in 125amp max may be used in these positions with the use of a filler plate. No other conversion kits are necessary for this transition. Each single phase 125amp meter socket has a provision for a 2-pole plug-in type QP circuit breaker. Each breaker is adjacent to each meter position. Generous gutter space allows for wiring from top, bottom, or back of the meter module. Each meter cover is embossed to provide a location for the unit (apartment) number.



# Meter Centers

## Modular Metering: Selection Information

General

**1 Pullbox w/ Landing Lugs**

**2 Main Device**

**3 Spacer<sup>ⓐ</sup>**

**4 Meter Stack**

**5 Meter Stack**

**6 Tap Box**

A single bolt joint is required to connect all thru bussing. The application above requires (4) SBJ's, one between each bussed module. Two SBJ's would be included (one with each meter stack) and two would have to be purchased for the load side tap box and one for the spacer module to main breaker connection.

### Selection Information

① Pullboxes have provisions to field install lugs to accept incoming and outgoing conductors. The modules should be used for underground service feeds when inspecting authorities require the service to be split or used in conjunction with a circuit breaker module when a EUSERC specification for underground feed is needed. Pullboxes are not meant for stand-alone use- they must be used with a service entrance breaker module.



② Most breaker and switch devices accept incoming feeds from the top or bottom. 400-800amp switches are invertible for top or bottom feed. 1200amp switches utilize a molded case switch (looks like a breaker) and are bottom feed only. Breaker modules are available in separate top and bottom feed versions. A "BF" suffix on a breaker module catalog number designates bottom feed. Tap boxes may be used as a main when 6 or less meter positions are present. Tap boxes offer a direct connection to the thru bus with no overcurrent protection. Tap boxes are not

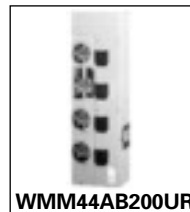


intended to feed breaker or switch modules via the thru bus. Breaker, switch, and tap box modules do not come with a single bolt joint.

③ A spacer is required between meter stack and main disconnect or tap box when installation is in EUSERC metering jurisdictions. The spacer can also be used to extend the length of the lineup when needed.



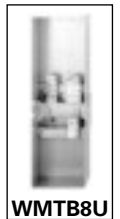
④ Meter stacks should be selected to coincide with the number of meter positions required. All thru bussing must be the same as the service entrance device (all single phase or all three phase). Each stack comes with a single bolt joint coupler and mounting rail. A single bolt joint coupler is needed for each thru bus connection. Utilities have varying requirements on height restrictions, cover types, and bypass types for each application therefore utility acceptance should be obtained prior to installation of any modules.



⑤ Order a circuit breaker tenant main for each meter position. Circuit breakers must match phase of meter socket. Determine proper breakers from series rating chart.



⑥ Tapboxes allow for a direct connection to the thru bussing. This is typically used to feed meter modules when 6 or less meters are present, but it can also be used to feed remote equipment from a modular meter installation such as a current transformer cabinet. As this is un-metered power it is the installer's responsibility to ensure utility approval prior to installation.



Various accessories are available to help customize the products to fit your application. All breaker, switch, and tapbox modules include (2) thru bus cover plates (cat # WMEP) meant to cover the ends of the installation. Additional cover plates are available for order if needed. For applications using a load-side tap box or breaker module an additional single bolt joint coupler will be needed (cat #'s SBJ1 for single phase, SBJ4 for three phase). Other accessories can be found on page 2-81.

ⓐ Spacers are required between meter stack and main disconnect or tap box when installation is in EUSERC metering jurisdictions. Check with other utilities prior to installation.

# Meter Centers

## Modular Metering: Common Series Rating Charts

**Selection**

Use the tables below to determine the correct combination of equipment and circuit breakers for the available fault current. This chart provides series rating information for the most common applications. For a complete series rating chart please contact your local sales office.

### Residential / Commercial<sup>①</sup>

Available Fault Current RMS Symmetrical Amps at 120/240 Volts Maximum	Service Entrance <sup>②</sup> Modules	Metering Branch Circuit Breakers	Load Center Branch Circuit Breakers
to 10,000	Series MPOU, WMPOU MSU, WMSU MC, WMC	QP (15—125A) QPP (125—200A)	QP, QPJ, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	QP (15—125A) QPP (125—200A)	QP, QPJ, QT, QPF, QE
to 22,000	Series MSU, WMSU MC, WMC	QPH (15—125A) QPPH (125—200A)	QP, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	QPH (15—125A) QPPH (125—200A)	QP, QT, QPF, QE
to 42,000	Series MSU, WMSU <sup>①</sup> MC, WMC	QPH (15—125A) HQPP (125—200A)	QP, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	HQP (15—125A) HQPP (125—200A)	QP, QT, QPF, QE
to 65,000	Series MSU, WMSU MC, WMC	QPH (15—125A) HQPP (125—200A)	QP, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	HQP (15—125A) HQPP (125—200A)	QP, QT, QPF, QE
to 100,000	Series MSU, WMSU	HQPPH (100—200A) 2-pole	QP, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	HQPPH (100—200A) 2-pole	QP, QT, QPF, QE

### Commercial

Available Fault Current RMS Symmetrical Amps at 120/240 Volts Maximum 1-phase, 240 Volts Maximum 3-phase	Service Entrance <sup>②</sup> Modules	Metering Branch Circuit Breakers	Load Center Branch Circuit Breakers
to 10,000	Series MPOU, WMPOU MSU, WMSU MC, WMC	QP (15—125A) 2-pole (15—100A) 3-pole QPP (125—200A) 2-pole	QP, QPJ, QT, QPF, QE
		QJ2 (60—200A) 3-pole	QP, QPJ, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	QP (15—125A) 2-pole (15—100A) 3-pole QPP (125—200A) 2-pole	QP, QPJ, QT, QPF, QE
		QJ2 (60—200A) 3-pole	QP, QPJ, QT, QPF, QE
to 22,000	Series MSU, WMSU MC, WMC	QPH (15—125A) 2-pole (15—100A) 3-pole QPPH (125—200A) 2-pole	QP, QT, QPF, QE
		QJH2 (60—200A) 3-pole	QP, QPF, QE
	MTBU, WMTBU <sup>④</sup>	QPH (15—125A) 2-pole (15—100A) 3-pole QPPH (125—200A) 2-pole	QP, QT, QPF, QE
		QJH2 (60—200A) 3-pole	QP, QPF, QE
to 42,000	Series MSU, WMSU MC, WMC	QPH (15—125A) 2-pole (15—100A) 3-pole HQPP (125—200A) 2-pole	QP, QT, QPF, QE
		QJ2-H (60—200A) 3-pole	QP
	MTBU, WMTBU <sup>④</sup>	HQP (15—125A) 2-pole (15—100A) 3-pole HQPP (125—200A) 2-pole	QP, QT, QPF, QE
		QJ2-H (60—200A) 3-pole	QP
to 65,000	Series MSU, WMSU MC, WMC	QPH (15—125A) 2-pole (15—100A) 3-pole HQPP (125—200A) 2-pole	QP, QT, QPF, QE
		HQJ2H	QP, QT, QPF, QE
	MTBU, WMTBU <sup>④</sup>	HQP (15—125A) 2-pole (15—100A) 3-pole HQPP (125—200A) 2-pole	QP, QT, QPF, QE
		HQJ2H	QP, QT, QPF, QE
to 100,000	Series MSU, WMSU MTBU, WMTBU <sup>④</sup>	HQPPH (100—200A) 2-pole	QP, QT, QPF, QE
		HQJ2H	QP, QT, QPF, QE
		HQPPH (100—200A) 2-pole	QP, QT, QPF, QE
		HQJ2H	QP, QT, QPF, QE

① This chart is applicable only with residential unified meter modules. (Siemens sockets, 1-phase outgoing) on pages 2-44 thru 2-45.

② MSU and WMSU fusible switch modules use Class T fuses only. MPOU and WMPOU pullouts also use Class T fuses.

③ Service entrance modules may not have suffix U in number.

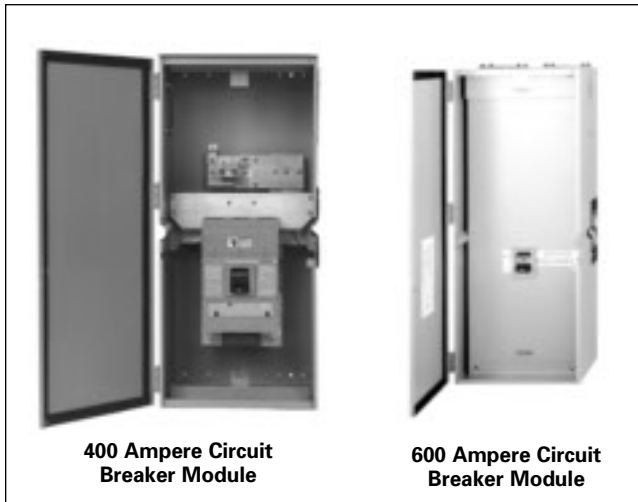
④ No overcurrent protection.

Listed by Underwriters' Laboratories, Inc., under file #E10848(N).

# Meter Centers

## Modular Metering: Circuit Breaker Service Entrance Modules

Selection



### Features

- 65,000 AIC Rated, 100,000 AIC Available<sup>Ⓞ</sup>
- Devices available in top feed or bottom feed construction<sup>Ⓞ</sup>
- Alternate amperage units available<sup>Ⓞ</sup>
- All standard enclosures are Nema 3R rated<sup>Ⓞ</sup>
- Devices equipped for bus duct entry are available<sup>Ⓞ</sup>, see page 2-82
- Breaker modules include hanging bracket and end plates. Order extra single bolt joint coupler if used as a load side disconnect, see page 2-83 for accessories

Check local utility requirements prior to installation.

### Circuit Breaker Modules

Ampere Rating	Maximum Interrupt Rating	Outdoor Enclosure						Breaker Type <sup>Ⓞ</sup>	Line Terminal Lugs No. & Size Per Line & Neutral <sup>Ⓞ</sup>	Dimensions (inches) <sup>Ⓞ</sup>		
		Top Feed	List Price \$	KO Fig.	Bottom Feed	List Price \$	KO Fig.			Height	Width	Depth

#### 1-Phase, 3-Wire SN, Incoming, 120/240V AC Max.

400	65,000	WMC4	7015.00	A4A	WMC4BF	7015.00	A4B	JXD6	(2) #1-500 kcmil	33.00	15.09	15.00
600	65,000	WMC6	10640.00	A4C	WMC6BF	10640.00	A4D	LXD6	(2) #1-500 kcmil	37.00	15.09	15.00
700	65,000	WMC7	13395.00	A5A	WMC7BF	13395.00	A5B	MD6	(3) #1/0-500 kcmil	43.00	20.09	15.00
800	65,000	WMC8	13395.00	A5A	WMC8BF	13395.00	A5B	MD6	(3) #1/0-500 kcmil	43.00	20.09	15.00
1000	65,000	WMC10	18281.00	A6A	WMC10BF	18281.00	A6B	ND6	(4) #2-500 kcmil	50.00	20.09	15.00
1200	65,000	WMC12	26001.00	A6A	WMC12BF	26001.00	A6B	ND6	(4) #2-500 kcmil	50.00	20.09	15.00
1400	65,000	WMC14	35163.00	A7A	WMC14BF	35163.00	A7B	PD6	(5) 300-600 kcmil	62.00	24.88	16.48
1600	65,000	WMC16	35163.00	A7A	WMC16BF	35163.00	A7B	PD6	(5) 300-600 kcmil	62.00	24.88	16.48

#### 3-Phase, 4-Wire SN, Incoming, 240V AC Max.

400	65,000	WMC44	8030.00	A4A	WMC44BF	8030.00	A4B	JXD6	(2) #1-500 kcmil	33.00	15.09	15.00
600	65,000	WMC64	12646.00	A4C	WMC64BF	12646.00	A4D	LXD6	(2) #1-500 kcmil	37.00	15.09	15.00
700	65,000	WMC74	16495.00	A5A	WMC74BF	16495.00	A5B	MD6	(3) #1/0-500 kcmil	43.00	20.09	15.00
800	65,000	WMC84	16495.00	A5A	WMC84BF	16495.00	A5B	MD6	(3) #1/0-500 kcmil	43.00	20.09	15.00
1000	65,000	WMC104	20725.00	A6A	WMC104BF	20725.00	A6B	ND6	(4) #2-500 kcmil	50.00	20.09	15.00
1200	65,000	WMC124	29119.00	A6A	WMC124BF	29119.00	A6B	ND6	(4) #2-500 kcmil	50.00	20.09	15.00
1400	65,000	WMC144 <sup>Ⓞ</sup>	43048.00	A7A	WMC144BF <sup>Ⓞ</sup>	43048.00	A7B	PD6	(5) 300-600 kcmil	62.00	24.88	16.48
1600	65,000	WMC164 <sup>Ⓞ</sup>	43048.00	A7A	WMC164BF <sup>Ⓞ</sup>	43048.00	A7B	PD6	(5) 300-600 kcmil	62.00	24.88	16.48

Ampere Rating	Maximum Interrupt Rating	Indoor Enclosure						Breaker Type <sup>Ⓞ</sup>	Line Terminal Lugs No. & Size Per Line & Neutral <sup>Ⓞ</sup>	Dimensions (inches) <sup>Ⓞ</sup>		
		Top Feed	List Price \$	KO Fig.	Bottom Feed	List Price \$	KO Fig.			Height	Width	Depth
2000	65,000	MC20 <sup>Ⓞ</sup>	40631.00	A30A	MC20BF <sup>Ⓞ</sup>	40631.00	A30B	RD6	(5) 300-600 kcmil	62.00	24.88	16.48

<sup>Ⓞ</sup> Dimensions shown are representative of outside box dimensions and do not include allowances for mounting bumps, covers, hubs, or hardware protrusions.

<sup>Ⓞ</sup> Wire range is the maximum allowable.

<sup>Ⓞ</sup> 1200amp maximum feed per side.

<sup>Ⓞ</sup> Contact sales office for ordering information on 100K rated units. 10% adder applies.

<sup>Ⓞ</sup> Devices are top or bottom, not combination. Both constructions use the same enclosure size and knockout patterns.

<sup>Ⓞ</sup> Contact sales office for ordering information. Lead time may apply.

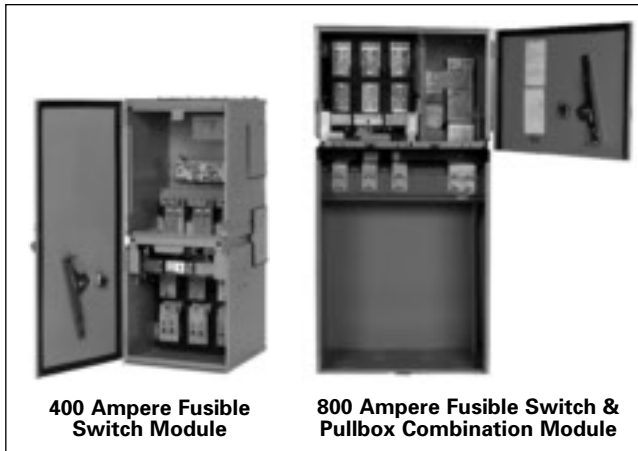
<sup>Ⓞ</sup> Bus Duct devices and 2000amp device are indoor, type N1, only.

<sup>Ⓞ</sup> Breaker types listed are for top feed units. All bottom feed units use non-interchangeable trip breakers.

# Meter Centers

## Modular Metering: Main Switch Service Entrance Modules

**Selection**



### Features

- 400-800Amp Standard Switches (Non-EUSERC) are invertible for top or bottom feed
- 1200Amp device uses a molded case switch (looks like a breaker)
- All switches are setup for class T fuses
- 100,000 AIC Rating
- Small Compact Size
- Bus Duct entry available for 400-800Amp standard switches, see page 2-83

Check local utility requirements prior to installation.

### Fusible Switch Modules

Ampere Rating	Maximum Interrupt Rating	Outdoor Enclosure		Fuse Type <sup>ⓐ</sup>	Service Feed	Line Terminal Lugs No. & Size Per Line & Neutral <sup>ⓑ</sup>	Dimensions (inches) <sup>Ⓒ</sup>			KO Fig.
		Catalog Number	List Price \$				Height	Width	Depth	

#### 1-Phase, 3-Wire SN, Incoming, 120/240V AC Max.

200	100,000	WMP02U <sup>Ⓓ</sup>	1343.00	T	OH	(1) #6-250 kcmil	33.00	12.00	13.00	A3
400	100,000	WMS4U	4086.00	T	OH/UG	(2) #4-500 kcmil	35.50	15.00	16.00	A1A
600	100,000	WMS6U	7762.00	T	OH/UG	(2) #4-500 kcmil	41.50	15.00	16.00	A1B
800	100,000	WMS8U	11895.00	T	OH/UG	(3) #4-500 kcmil	41.50	15.00	16.00	A1C
1200	100,000	WMS12U <sup>Ⓔ</sup>	25514.00	T	UG	(4) #250-500 kcmil	50.00	20.00	15.00	A1D

#### 3-Phase, 4-Wire SN, Incoming, 240V AC Max.

200	100,000	WMP024U <sup>Ⓓ</sup>	2043.00	T	OH/UG	(1) #6-250 kcmil	33.00	12.00	13.00	A3
400	100,000	WMS44U	4643.00	T	OH/UG	(2) #4-500 kcmil	35.50	15.00	16.00	A1A
600	100,000	WMS64U	9480.00	T	OH/UG	(2) #4-500 kcmil	41.50	15.00	16.00	A1B
800	100,000	WMS84U	17269.00	T	OH/UG	(3) #4-500 kcmil	41.50	15.00	16.00	A1C
1200	100,000	WMS124U <sup>Ⓔ</sup>	28611.00	T	UG	(4) #250-500 kcmil	50.00	20.00	15.00	A1D

### Combination Fusible Switch & Pull Box Modules (Meets EUSERC Requirements)

Ampere Rating	Maximum Interrupt Rating	Outdoor Enclosure		Fuse Type	Service Feed	Line Terminal Lugs No. & Size Per Line & Neutral	Dimensions (inches) <sup>Ⓒ</sup>			KO Fig.
		Catalog Number	List Price \$				Height	Width	Depth	

#### 1-Phase, 3-Wire SN, Incoming, 120/240V AC Max.

400	100,000	WMS4UPBU	5005.00	T	UG	1 Set of 2 Studs	50.06	25.50	15.00	A2A
600	100,000	WMS6UPBU	9260.00	T	UG	2 Set of 2 Studs	50.06	25.50	15.00	A2A
800	100,000	WMS8UPBU	13374.00	T	UG	3 Set of 2 Studs	50.06	25.50	15.00	A2A

#### 3-Phase, 4-Wire SN, Incoming, 240V AC Max.

400	100,000	WMS44UPBU	6842.00	T	UG	1 Set of 2 Studs	50.06	25.50	15.00	A2A
600	100,000	WMS64UPBU	12161.00	T	UG	2 Set of 2 Studs	50.06	25.50	15.00	A2A
800	100,000	WMS84UPBU	20000.00	T	UG	3 Set of 2 Studs	50.06	25.50	15.00	A2A

Ⓒ Dimensions shown are representative of outside box dimensions and do not include allowances for mounting bumps, covers, hubs, or hardware protrusions.  
 Ⓓ Wire range listed is the maximum allowable.

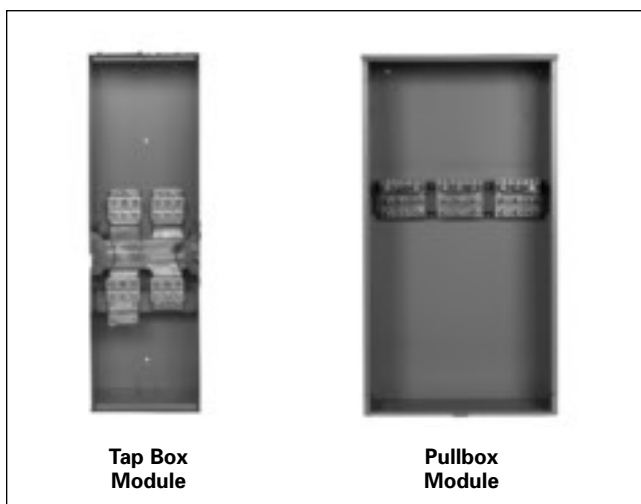
ⓐ Fuses not included.  
 ⓑ Fusible pull-out switch.  
 Ⓒ Lugs not included. NEMA II Stud Pattern lugs must be installed by user or utility.

Ⓓ Device uses a molded case switch (looks like a breaker). Class T fuses must be installed in conjunction with the molded case switch for proper operation.

# Meter Centers

## Modular Metering: Tap Box and Pullbox Modules

Selection



### Features

#### Tap Boxes

- 1200Amp thru bussing included for line side feed or load side tap and are invertible for top or bottom feed
- 100,000 AIC Rating
- Compact Construction

#### Pullboxes

- EUSERC-compliant construction for cable entry and exit (no thru bus connection)
- Can be used with breaker modules (up to 1200amps) for EUSERC compliance for underground feed or when extra conductor length needed (aligns with 6" KO on both modules)
- 65,000 AIC Rating

Check local utility requirements prior to installation.

### Tap Box Modules<sup>③</sup>

Ampere Rating	Maximum Interrupt Rating	Outdoor Enclosure		Service Feed	Line Terminal Lugs No. & Size Per Line & Neutral <sup>②</sup>	Dimensions (inches) <sup>①</sup>			KO Fig.
		Catalog Number	List Price \$			Height	Width	Depth	

#### 1-Phase, 3-Wire SN, Incoming, 120/240V AC Max.

800	100,000	WMTB8U	1507.00	OH/UG	(3) 1/0-400 kcmil	39.00	12.00	12.00	A2
1200	100,000	WMTB12U	2274.00	OH/UG	(4) 250-600 kcmil	41.00	15.00	13.00	A8
1600	100,000	WMTB16U	4877.00	OH/UG	(5) 300-600 kcmil	41.75	25.00	14.00	A9

#### 3-Phase, 4-Wire SN, Incoming, 240V AC Max.

800	100,000	WMTB84U	1632.00	OH/UG	(3) 1/0-400 kcmil	39.00	12.00	12.00	A2
1200	100,000	WMTB124U	2538.00	OH/UG	(4) 250-600 kcmil	41.00	15.00	13.00	A8
1600	100,000	WMTB164U	5277.00	OH/UG	(5) 300-600 kcmil	41.75	25.00	14.00	A9

### Pullbox Modules (no thru-bus, includes lug landings)

Ampere Rating	Maximum Interrupt Rating <sup>④</sup>	Outdoor Enclosure		Service Feed	Line Terminal Lugs No. & Size Per Line & Neutral	Dimensions (inches) <sup>①</sup>			KO Fig.
		Catalog Number	List Price \$			Height	Width	Depth	

#### 1-Phase, 3-Wire SN, Incoming, 120/240V AC Max.

400	65,000	WMMB1400	1382.00	UG	1 Set of 2 Studs	37.50	16.69	9.34	A10A
800	65,000	WMMB1800	1534.00	UG	2 Sets of 2 Studs	45.50	19.44	12.72	A10B
1200	65,000	WMMB11200	3186.00	UG	3 Sets of 2 Studs	47.50	25.94	12.72	A10C

#### 3-Phase, 4-Wire SN, Incoming, 240V AC Max.

400	65,000	WMMB3400	2191.00	UG	1 Set of 2 Studs	37.50	16.69	9.34	A10A
800	65,000	WMMB3800	2763.00	UG	2 Sets of 2 Studs	45.50	25.94	12.72	A10B
1200	65,000	WMMB31200	5749.00	UG	3 Sets of 2 Studs	47.50	33.83	12.72	A10C

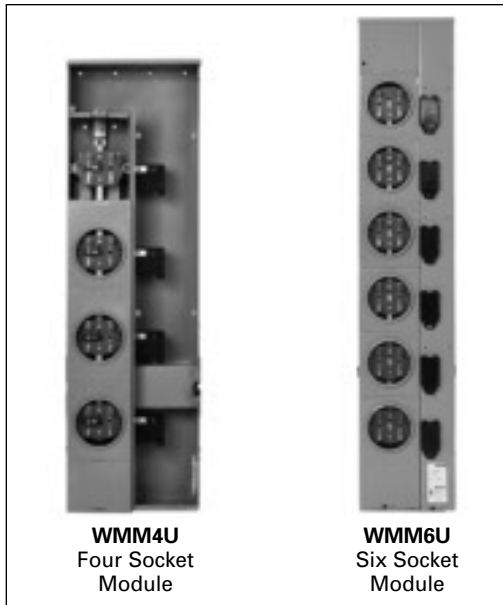
① Dimensions shown are representative of outside box dimensions and do not include allowances for mounting bumps, hubs, or hardware protrusions.  
② Wire range listed is the maximum allowable.

③ Single bolt joint coupler not included. If used for load side application an additional coupler must be ordered.  
④ Devices rated for 22,000, 65,000 rating requires cables to be tied together. Please see instructions with pullbox for details.

# Meter Centers

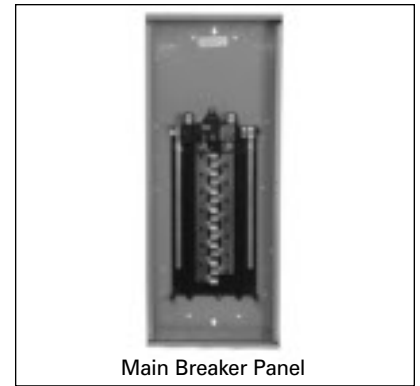
## Modular Metering: Residential Modules—Ring Style

Selection



### Features

- UL Listed for 60/75° C conductors. See equipment markings for applications
- 1200 Amp thru bus
- Interconnectable with discontinued "MM" modular metering
- Factory phased 3ø units saves on installation time
- 200A units UL Listed for use on systems capable of delivering up to 100,000 RMS symmetrical amperes maximum short circuit current
- Single bolt joint coupler included. Order additional couplers as needed. Use closure plates from main device to seal openings on side for thru bus.



Main Breaker Panel

**Series Tested Systems**—Specify Siemens Modular Metering equipment in conjunction with Ultimate Load Centers.

Check local utility requirements prior to installation.

### 1-Phase, 3-Wire SN, Incoming & Outgoing, Ring Type Gangable Meter Stack

Continuous Duty Amps Per Position	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			Field Installed 5th Jaw Assembly <sup>②</sup>	KO Fig.
						Height	Width	Depth		

#### 1-Phase 4-Jaw Sockets, 1 Phase-3 Wire Thru-Bus 120/240V AC Max.

125	2	WMM2U	1417.00	QP, QPH, HQP	65,000	32.41	13.44	7.84	ECMM5J	A12
	3	WMM3U	1587.00		65,000	41.41	13.44	7.84	ECMM5J	A12
	4	WMM4U	2083.00		65,000	50.41	13.44	7.84	ECMM5J	A13
	5	WMM5U	2684.00		65,000	59.41	13.44	7.84	ECMM5J	A14
	6	WMM6U	3301.00		65,000	68.41	13.44	7.84	ECMM5J	A15
200	2	WMM2200U	3157.00	QPP, QPPH, HOPP, HOPPH,	100,000	36.41	17.44	7.84	ECMM5J	A16
	3	WMM3200U	3379.00	QP, QPH, HQP <sup>②</sup>	100,000	47.41	17.44	7.84	ECMM5J	A17
	4	WMM4200U	4657.00		100,000	58.41	17.44	7.84	ECMM5J	A18

### 3-Phase, 4-Wire SN, Incoming and 1-Phase, 3-Wire SN Outgoing, Ring Type Gangable Meter Stacks

Continuous Duty Amps Per Position	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			5th Jaw Assembly	Stack Phasing: Phases/Socket	KO Fig.
						Height	Width	Depth			

#### 1-Phase 5-Jaw Sockets, 3 Phase-4 Wire Thru-Bus 208Y/120V AC<sup>③</sup>

125	3	WMM34U	1688.00	QP, QPH, HQP	65,000	41.41	13.44	7.84	Installed	1-AB, 1-BC, 1-CA	A12
	4	WMM44ABU	2254.00		65,000	50.41	13.44	7.84	Installed	2-AB, 1-BC, 1-CA	A13
	4	WMM44BCU	2254.00		65,000	50.41	13.44	7.84	Installed	2-BC, 1-AC, 1-AB	A13
	4	WMM44CAU	2254.00		65,000	50.41	13.44	7.84	Installed	2-AB, 1-BC, 1-CA	A13
	5	WMM54ABU	2908.00		65,000	59.41	13.44	7.84	Installed	1-AB, 2-BC, 2-CA	A14
	6	WMM64U	3574.00		65,000	68.41	13.44	7.84	Installed	2-AB, 2-BC, 2-CA	A15
200	2	WMM24AB200U	3208.00	QPP, QPPH, HOPP, HOPPH, QP, QPH, HQP <sup>②</sup>	100,000	36.41	17.44	7.84	Installed	1-BC, 1-CA	A16
	3	WMM34200U	3574.00		100,000	47.41	17.44	7.84	Installed	1-AB, 1-BC, 1-CA	A17
	4	WMM44AB200U	4556.00		100,000	58.41	17.44	7.84	Installed	2-AB, 1-BC, 1-CA	A18
	4	WMM44BC200U	4556.00		100,000	58.41	17.44	7.84	Installed	2-BC, 1-AC, 1-AB	A18
	4	WMM44CA200U	4556.00		100,000	58.41	17.44	7.84	Installed	2-AB, 1-BC, 1-CA	A18
	5	WMM54AB200U	5315.00		100,000	69.41	17.44	7.84	Installed	2-AC, 2-BC, 1-AB	A19
	5	WMM54BC200U	5315.00		100,000	69.41	17.44	7.84	Installed	2-AC, 2-AB, 1-BC	A19
	5	WMM54CA200U	5315.00		100,000	69.41	17.44	7.84	Installed	2-AB, 2-BC, 1-AC	A19

① Dimensions shown are representative of outside box length, width, & depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions.

② Order filler plate ECCP3U if using standard 2" wide circuit breaker (QP).

③ NOT for use on 3 phase-4 wire delta systems.

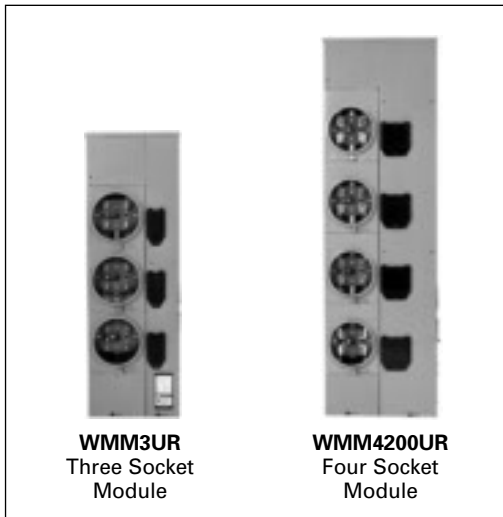
④ Order ECMM5J for insulated 5th jaw.

⑤ Max. AIC determined by maximum AIC of tenant breakers. Higher ratings may be achieved thru approved series rating combinations.

# Meter Centers

## Modular Metering: Residential Modules—Ringless Style

Selection



### Features

- UL Listed for 60/75°C conductors. See equipment markings for applications
- Individual split covers with barrel lock compatibility
- Available with and without factory installed horn bypass - field install horn bypass kit available (#ECHBK)
- Interconnectable with discontinued "MM" modular metering
- Factory phased 3 $\phi$  units saves on installation time
- Single bolt joint coupler included. Order additional couplers as needed. Use closure plates from main device to seal openings for thru bus on side.
- 200A units UL Listed for use on systems capable of delivering up to 100,000 RMS symmetrical amperes maximum short circuit current

**Series Tested Systems**—Specify Siemens Modular Metering equipment in conjunction with EQ® III or Ultimate Load Centers.

Check local utility requirements prior to installation.

2  
METER  
CENTERS

### 1-Phase, 3-Wire SN, Incoming & Outgoing, Ringless Type Gangable Meter Stacks<sup>⑥</sup>

Thru-Bus Rating (amps)	Cont. Amps/Pos	Meter Positions Per Stack	Catalog Number			Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			Field Installed 5th Jaw Assembly <sup>②</sup>	KO Fig.	
			Horn Bypass	List Price \$	No Bypass			List Price \$	Height	Width			Depth
1200	125	2	WMM2UR	1492.00	WMM2URNJ	1540.00	QP, QPH, HQP	65,000	32.41	13.44	7.84	ECMM5J	A11
		3	WMM3UR	1677.00	WMM3URNJ	1739.00		65,000	41.41	13.44	7.84	ECMM5J	A12
		4	WMM4UR	2195.00	WMM4URNJ	2330.00		65,000	50.41	13.44	7.84	ECMM5J	A13
		5	WMM5UR	2806.00	WMM5URNJ	2935.00		65,000	59.41	13.44	7.84	ECMM5J	A14
		6	WMM6UR	3427.00	WMM6URNJ	3744.00		65,000	68.41	13.44	7.84	ECMM5J	A15
	200	2	WMM2200UR	3208.00	WMM22URNJ	1610.00	QPP, QPH, HOPP,	100,000	36.41	17.44	7.84	ECMM5J	A16
		3	WMM3200UR	3451.00	WMM32URNJ	3574.00	HOPPH, QP,	100,000	47.41	17.44	7.84	ECMM5J	A17
		4	WMM4200UR	4782.00	WMM42URNJ	4878.00	QPH, HQP <sup>②</sup>	100,000	58.41	17.44	7.84	ECMM5J	A18

### 3-Phase, 4-Wire<sup>③</sup> SN, Incoming and 1-Phase, 3-Wire SN Outgoing, 5-Jaw<sup>④</sup> Ringless Type Gangable Meter Stacks<sup>⑥</sup>

Thru-Bus Rating (amps)	Cont. Amps/Pos	Meter Positions Per Stack	Catalog Number			Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			Stack Phasing Phases/Socket	KO Fig.			
			Horn Bypass	List Price \$	No Bypass			List Price \$	Height	Width			Depth		
1200	125	3	WMM34UR	1761.00	WMM34URNJ	1840.00	QP, QPH, HQP	65,000	41.41	13.44	7.84	1-AB, 1-BC, 1-AC	A12		
		4	WMM44ABUR	2378.00	WMM44ABURNJ	2485.00		65,000	50.41	13.44	7.84	2-AB, 1-BC, 1-AC	A13		
			WMM44BCUR	2378.00	WMM44BCURNJ	2485.00		65,000	50.41	13.44	7.84	1-AB, 2-BC, 1-AC	A14		
			WMM44CAUR	2378.00	WMM44CAURNJ	2485.00		65,000	50.41	13.44	7.84	1-AB, 1-BC, 2-AC	A14		
			WMM54ABUR	3029.00	WMM54ABUR3NJ	3208.00		65,000	59.41	13.44	7.84	1-AB, 2-BC, 2-AC	A14		
		5	WMM54BCUR	3029.00	WMM54BCURNJ	3208.00		65,000	59.41	13.44	7.84	2-AB, 1-BC, 2-AC	A15		
			WMM54CAUR	3029.00	WMM54CAURNJ	3208.00		65,000	59.41	13.44	7.84	2-AB, 2-BC, 1-AC	A15		
			WMM64UR	3744.00	WMM64URNJ	3774.00		65,000	68.41	13.44	7.84	2-AB, 2-BC, 2-AC	A15		
		200	2	—	—	WMM24AB2URNJ		3363.00	QP, QPH, HOP, QPP, HOPP, HOPPH <sup>②</sup>	100,000	36.41	17.44	7.84	1-BC, 1-AC	A16
			3	WMM34200UR	3649.00	WMM342URNJ		3720.00		100,000	47.41	17.44	7.84	1-AB, 1-BC, 1-AC	A17
	4		WMM44AB200UR	4657.00	WMM44AB2URNJ	4782.00	100,000	58.41		17.44	7.84	2-AB, 1-BC, 1-AC	A18		
			WMM44BC200UR	4657.00	WMM44BC2URNJ	4782.00	100,000	58.41		17.44	7.84	1-AB, 2-BC, 1-AC	A18		
			WMM44CA200UR	4657.00	WMM44CA2URNJ	4782.00	100,000	58.41		17.44	7.84	1-AB, 1-BC, 2-AC	A18		
			—	—	WMM54AB2URNJ	5399.00	100,000	69.41		17.44	7.84	1-AB, 2-BC, 2-AC	A19		
	5		—	—	WMM54BC2URNJ	5399.00	100,000	69.41		17.44	7.84	2-AB, 1-BC, 2-AC	A19		
			—	—	WMM54CA2URNJ	5399.00	100,000	69.41		17.44	7.84	2-AB, 2-BC, 1-AC	A19		

① Dimensions shown are representative of outside box length, width, & depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions.

② Order filler plate ECCP3U if using standard 2" wide circuit breaker (QP).

③ NOT for use on 3 phase-4 wire delta systems.

④ Order ECMM5J for insulated 5th jaw.

⑤ Max. AIC determined by maximum AIC of tenant

breakers. Higher ratings may be achieved thru approved series rating combinations.

⑥ Only "NJ" suffix should be used within the Florida Meter Group territory.

# Meter Centers

## Modular Metering: Commercial Modules—Introduction

General

Commercial metering applications using 240volts, such as shopping centers, office buildings, and small commercial buildings frequently require different meter sockets from those used in residential applications. In many instances a 3-phase meter socket and tenant circuit breaker must be used. Siemens is proud to offer a complete line of commercial metering to meet the majority of the vast array of utility specifications for commercial meter services.

For those utilities requiring a lever bypass Siemens has a complete line of 100-320amp/position lever bypass meter modules using the high-quality Landis & Gyr HQ lever bypass block. These modules offer several Siemens exclusive features to help installation.

If a EUSERC-approved commercial service is needed Siemens is now proud to offer our line of test-block bypass (TBB) commercial meter modules. These devices eliminate the labor intensive bussed gutter solution that was used in the past.

Some utilities require a bolt-in meter for 400amp applications. The bolt-in meter socket (also called K base) was designed and still originates with Landis & Gyr. Siemens offers the widest array of K base meter modules in the industry. The socket used in these modules is utility specific so please check for approval prior to installation.

The versatility and capability of the Siemens line of commercial meter modules has been designed to fit the majority of application and utility requirements and can be inter-connected with residential meter modules for maximum versatility.

### Lever Bypass

Siemens lever bypass meter modules are designed to stand up to the heavy demands of commercial services. Siemens features the Landis & Gyr HQ meter block at each position. Modules are available with 3-phase or single phase thru bus coupled with 3-phase or single phase tenant circuit breakers. Applications requiring 240/120V AC 3-phase 4-wire Delta should only use those modules with a 3-phase tenant main provision.

Features include:

- 1-4 positions on 100 and 200amp devices
- 1-2 positions on 320amp(400amp max) devices
- 100,000 AIC on 200amp devices
- Factory installed tenant breakers on 320amp devices
- 3-Phase 100amp devices- saves on cost of 3-phase tenant mains
- 5th jaw included, standard, on all single phase meter modules
- 1200amp thru-bus, NEMA 3R outdoor construction
- Siemens exclusive floating deadfront on 200amp devices- eliminates the need for filler plates when using a 100amp breaker in a 200amp provision
- Centrally located neutrals and ground lugs by each breaker provision
- Factory phased sockets reduces installation time
- Horizontal 3-phase breaker mounting- reduces install time and effort

### Test Block Bypass

Siemens line of test-block-bypass (TBB) meter modules are designed to provide a solution for commercial group metering applications in utility service areas that follow the EUSERC specification. Each position features the same meter block used on Siemens' commercial switchboards to maintain high quality standards. Modules are available with 3-phase or single phase thru bus coupled with 3-phase or single phase tenant circuit breakers. Applications requiring 240/120V AC 3-phase 4-wire Delta should only use those modules with a 3-phase tenant main provision.

Features include:

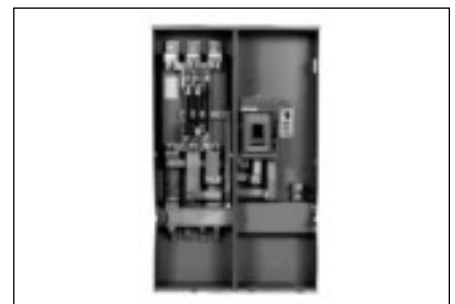
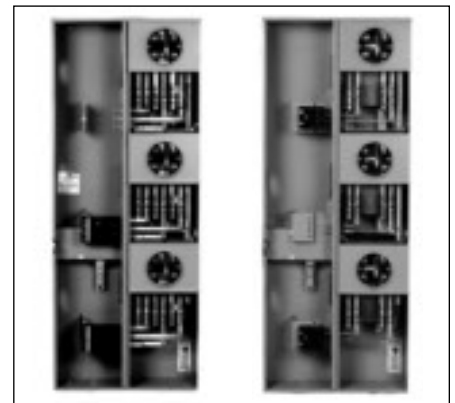
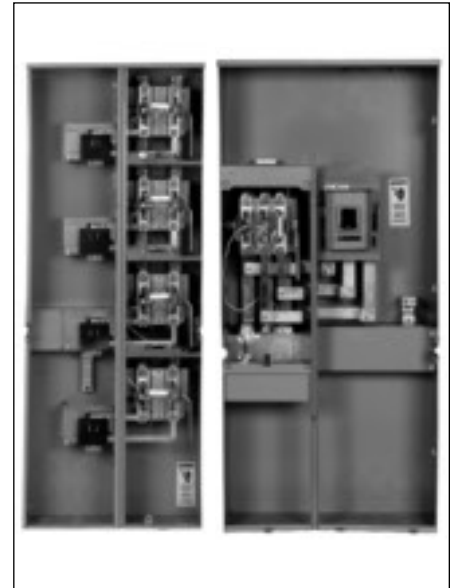
- 1-3 positions on 200amp devices
- Field conversion from 200amp to 100amp breakers with no additional kits
- 225 max tenant breaker capability
- Horizontal breaker mounting reduces install time and effort
- Centrally located neutral lugs

### K Base

Siemens line of modules featuring the Landis & Gyr bolt-in meter socket (K base) is the most extensive in the industry. These modules are available in 1 position only and are available with 3-phase or single phase thru bus coupled with 3-phase or single phase tenant circuit breakers. Applications requiring 240/120V AC 3-phase 4-wire Delta should only use those modules with a 3-phase tenant main provision. These modules should not be installed until the local utility has given approval.

Features include:

- factory installed 400amp Siemens circuit breaker
- 400amp continuous/400amp max Landis & Gyr K base meter socket (K7 for three phase, type K5 for single phase)





# Meter Centers

## Commercial Meter Modules: Single Phase Lever Bypass

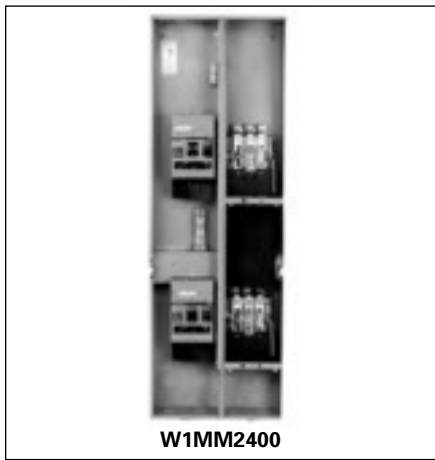
**Selection**



**W1MM4225U**

### Features

- High-quality Landis & Gyr HQ lever bypass block
- Ground lugs mounted by each position
- 225amp tenant main provisions
- Floating deadfront eliminates need for 100amp conversion kits or filler plates
- Centrally located neutral lugs
- Compact size
- 100,000 AIC Rating



**W1MM2400**

### Features

- High-quality Landis & Gyr HQ lever bypass block
- Factory installed 400amp tenant main breaker
- 225amp tenant main provisions
- One & Two position units now available
- 42,000 AIC Rating

## 1-Phase, 3-Wire SN<sup>2</sup>, Incoming and Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>3</sup>	Dimensions <sup>1</sup>			Bypass Type	KO Fig.
							Height	Width	Depth		
1200	<b>1-Phase 4-Jaw Sockets, 1 Phase-3 Wire Thru-Bus 120/240V AC Max. -Lever Bypass</b>										
	225	1	W1MM1225U	2982.00	QP, QPH HQP, QPP, QPPH, HQPP, HQPPH	100,000	23.75	23.50	9.13	Lever	A20
		2	W1MM2225U	6136.00		100,000	36.75	23.50	9.13	Lever	A21
		3	W1MM3225U	9194.00		100,000	49.75	23.50	9.13	Lever	A22
		4	W1MM4225U	12370.00		100,000	62.75	23.50	9.13	Lever	A23
	400	1	W1MM1400 <sup>4</sup>	8358.00	JXD22B400 Factory inst.	42,000	57.00	26.00	8.66	Lever	A24
400	2	W1MM2400	12720.00	JXD22B400 Factory inst.	42,000	70.38	23.00	9.69	Lever	A26	

<sup>1</sup> Dimensions shown are representative of box dimensions and do not include allowances for mounting bumps, hubs or hardware protrusions.  
<sup>2</sup> Not for use on 3 phase-4 wire delta systems.

<sup>3</sup> Max. AIC determined by maximum AIC of tenant breakers when used in conjunction with a meter socket. Higher overall ratings may be achieved thru approved series rating combinations.

<sup>4</sup> Alternate trip amperages available. To order, add -amperage after catalog number (350amp becomes W1MM1400-350). List price remains the same. Contact sales office for lead time.

# Meter Centers

## Commercial Meter Modules: 3-Phase Input with 1-Phase Output Lever Bypass

Selection



W2MM4AB225U

### Features

- High-quality Landis & Gyr HQ lever bypass block
- Ground lugs mounted by each position
- 225amp tenant main provisions
- Floating deadfront eliminates need for 100amp conversion kits or filler plates
- Centrally located neutral lugs
- Compact size
- 100,000 AIC Rating



W2MM2400AB

### Features

- High-quality Landis & Gyr HQ lever bypass block
- Factory installed 400amp tenant main breaker
- One & Two position units now available
- 42,000 AIC Rating

3-Phase, 4-Wire SN, Incoming and 1-Phase, 3-Wire SN<sup>②</sup> Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			Bypass Type	Stack Phasing: Phases/Socket <sup>④</sup>	KO Fig.
							Height	Width	Depth			
1200	225	<b>1-Phase 5-Jaw Sockets, 3 Phase-4 Wire Thru-Bus 208Y/120V AC-Lever Bypass</b>										
		1	W2MM1225U	3056.00	QP, QPH HQP, QPP, QPPH, HQPP, HQPPH	65,000	23.75	23.50	9.13	Lever	1-AB	A20
		2	W2MM2AB225U	6090.00		65,000	36.75	23.50	9.13	Lever	1-AC, 1-BC	A21
		2	W2MM2BC225U	6090.00		65,000	36.75	23.50	9.13	Lever	1-AC, 1-AB	A22
		2	W2MM2CA225U	6090.00		65,000	36.75	23.50	9.13	Lever	1-AB, 1-BC	A23
		3	W2MM3225U	9022.00		100,000	49.75	23.50	9.13	Lever	1-AB, 1-BC, 1-CA	A20
		4	W2MM4AB225U	12001.00		100,000	62.75	23.50	9.13	Lever	2-AB, 1-BC, 1-CA	A21
		4	W2MM4BC225U	12001.00		100,000	62.75	23.50	9.13	Lever	1-AB, 2-BC, 1-CA	A22
	4	W2MM4CA225U	12001.00	100,000		62.75	23.50	9.13	Lever	1-AB, 1-BC, 2-CA	A23	
	400	1	W2MM1400AB <sup>⑤</sup>	8358.00	JXD22B400 Factory inst.	42,000	57.00	26.00	8.66	Lever	1-AB	A24
	400	2	W2MM2400AB	13992.00	JXD22B400 Factory inst.	42,000	70.38	23.00	9.69	Lever	1-AB, 1-BC	A26

① Dimensions shown are representative of box dimensions and do not include allowances for mounting bumps, hubs, or hardware protrusions.

② Not for use on 3 phase-4 wire delta systems.

③ Max. AIC determined by maximum AIC of tenant breakers when used in conjunction with a meter socket. Higher overall ratings may be achieved thru approved series rating combinations.

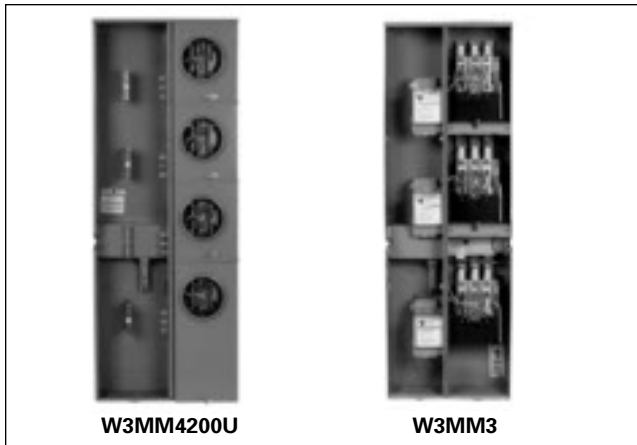
④ Alternate trip amperages available. To order, add -amperage after catalog number (350amp becomes W1MM1400-350). List price remains the same. Contact sales office for lead time.

⑤ Modules are factory phased. End user is responsible for balancing each phase by selecting the correct model number.

# Meter Centers

## Commercial Meter Modules: Three Phase with Lever Bypass

**Selection**



### Features

- High-quality Landis & Gyr HQ lever bypass block
- Ground lugs mounted by each position
- Centrally located neutral lugs
- Horizontal breaker mounting reduces install time and effort
- 100amp modules save on tenant main cost



### Features

- High-quality Landis & Gyr HQ lever bypass block
- 400amp tenant main breaker factory installed
- One & Two position units now available
- 42,000 AIC Rating

## 3-Phase, 4-Wire SN, Incoming and Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>③</sup>	Dimensions <sup>①</sup>			Bypass Type	KO Fig.	
							Height	Width	Depth			
1200	<b>3-Phase 7-Jaw Sockets, 3 Phase-4 Wire Thru-Bus 208Y/120V AC Max. -Lever Bypass<sup>②</sup></b>											
	100	1	W3MM1	3352.00	QP, QPH HQP	65,000	29.11	20.21	8.93	Lever		
		2	W3MM2	6555.00		65,000	44.70	20.21	8.93	Lever		
		3	W3MM3	9681.00		65,000	61.20	20.21	8.93	Lever		
		4	W3MM4	12942.00		65,000	77.70	20.21	8.93	Lever		
	<b>3-Phase 7-Jaw Sockets, 3 Phase-4 Wire Thru-Bus 240V AC Max. -Lever Bypass</b>											
	200	1	W3MM1200U	3352.00	QJ, QH2, QJ2-H, HQJ2-H	100,000	23.75	23.50	9.13	Lever	A20	
			W3MM2200U	6555.00		100,000	36.75	23.50	9.13	Lever	A21	
			W3MM3200U	9681.00		100,000	49.75	23.50	9.13	Lever	A22	
			W3MM4200U	12942.00		100,000	62.75	23.50	9.13	Lever	A23	
		400	1	W3MM1400 <sup>④</sup>	8358.00	JXD22B400 Factory inst.	42,000	57.00	26.00	8.56	Lever	A24
		400	2	W3MM2400	15370.00	JXD22B400 Factory inst.	42,000	70.38	23.00	9.69	Lever	A26

① Dimensions shown are representative of outside box dimensions and do not include allowances for mounting bumps, hubs, or hardware protrusions.  
 ② Accepts 3-pole 100amp maximum circuit breaker.

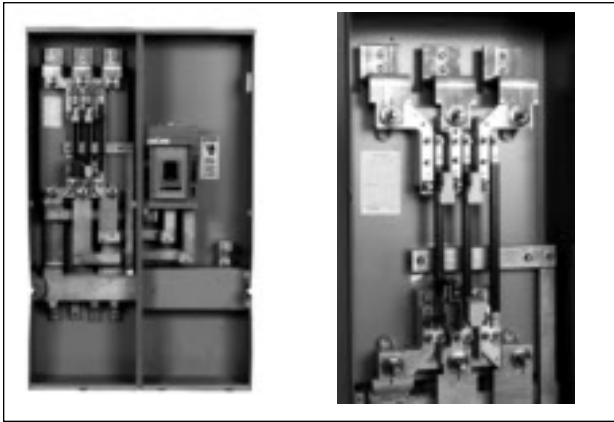
③ Max. AIC determined by maximum AIC of tenant breakers used in conjunction with meter socket. Higher ratings may be achieved overall thru approved series rating combinations.

④ Alternate trip amperages available. To order, add -amperage after catalog number (350amp becomes W3MM1400-350). List price remains the same. 1 high units only.

# Meter Centers

## Commercial Meter Modules: K Base Bolt-In<sup>®</sup> Meter Modules

Selection



### Features

- All modules feature the Landis & Gyr K5 (single phase) or K7 (three phase) Bolt-on Meter Base
- 22,000 AIC Rating

**Note:** Users are advised to contact utility PRIOR to installation to verify approval. User assumes all responsibility for ensuring utility acceptance prior to installation.

### 1-Phase, 3-Wire SN, Incoming and Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>®</sup>	Dimensions <sup>①</sup>			Stack Phasing: Phases/Socket	KO Fig.
							Height	Width	Depth		
<i>1-Phase 5 Terminal Landis &amp; Gyr K5 Bolt-In Socket, 1 Phase-3 Wire Thru-Bus 120/240V AC Max.-No Bypass</i>											
1200	400	1	W1MM1400B	10029.00	JXD22B400 Factory inst.	22,000	47.94	29.83	8.66	—	A25

### 3-Phase, 4-Wire SN, Incoming and 1-Phase, 3-Wire SN Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>®</sup>	Dimensions <sup>①</sup>			Stack Phasing: Phases/Socket	KO Fig.
							Height	Width	Depth		
<i>1-Phase 5 Terminal Landis &amp; Gyr K5 Bolt-In Socket, 1 Phase-3 Wire Thru-Bus 120/240V AC Max.-No Bypass<sup>②</sup></i>											
1200	400	1	W2MM1400BAB	10029.00	JXD22B400 Factory inst.	22,000	47.94	29.83	8.66	1-AB	A25

### 3-Phase, 4-Wire SN, Incoming and Outgoing, Ringless Type Lever Bypass Gangable Meter Stacks

Thru-Bus Rating (amps)	Max Tenant Breaker (amps)	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provision	Maximum AIC <sup>®</sup>	Dimensions <sup>①</sup>			Stack Phasing: Phases/Socket	KO Fig.
							Height	Width	Depth		
<i>3-Phase 7 Terminal Landis &amp; Gyr K7 Bolt-In Socket, 3 Phase-4 Wire Thru-Bus 240V AC Max.-No Bypass</i>											
1200	400	1	W3MM1400B <sup>④</sup>	10029.00	JXD22B400 Factory inst.	22,000	47.94	29.83	8.66	—	A25

① Dimensions shown are representative of outside box dimensions and do not include allowances for mounting bumps, hubs, or hardware protrusions.

② Not for use on 3 phase-4 wire delta systems.

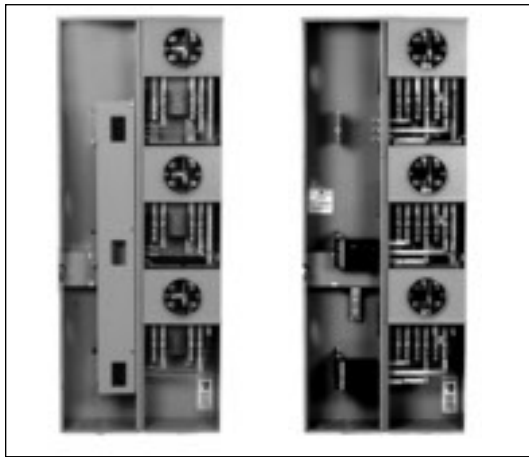
③ Maximum AIC determined by maximum AIC of tenant breakers when used in conjunction with a meter socket. Higher ratings may be achieved thru approved series rating combinations.

④ Alternate trip amperages available. To order, add -amperage after catalog number (350amp becomes W3MM1400-350). List price remains the same. Lead time applies.

# Meter Centers

## Modular Metering: Commercial Modules—Test Block Bypass

**Selection**



### Features

- EUSERC Compliant Test Block Bypass
- Ground lugs mounted by each position
- 225amp tenant breaker provisions (breakers not included)
- Single phase modules available with three phase thru bussing
- Horizontal breaker mounting reduces install time and effort
- Floating deadfront eliminates need for 100amp conversion kits or filler plates

Thru-Bus Rating (Amps)	Maximum Tenant Breaker	Socket Continuous Duty Amps	Meter Positions Per Stack	Catalog Number	List Price \$	Breaker Provisions <sup>③</sup>	Max. AIC	Dimensions (inches)			Stack Phasing Phases/Socket	KO Fig.
								H	W	D		
<b>1-Phase, 3-Wire Feed &amp; Tenant Mains 120/240V AC Max.<sup>①</sup></b>												
1200	225	200	1	W1MM1225USS	1468.00	QP, QPH, HQP,	100,000	26.5	25.5	9.0	—	A27
1200	225	200	2	W1MM2225USS	2823.00	QPP, QPPH,	100,000	46.0	25.5	9.0	—	A28
1200	225	200	3	W1MM3225USS	4215.00	HQPP, HQPPH	100,000	65.5	25.5	9.0	—	A29
<b>3-Phase, 4-Wire Feed &amp; 1-Phase, 3-Wire Tenant Mains 120Y/208V AC Max.<sup>①</sup></b>												
1200	225	200	1	W2MM1225USS	1609.00	QP, QPH, HQP,	100,000	26.5	25.5	9.0	1-AB	A27
1200	225	200	2	W2MM2AB225USS	2964.00	QPP, QPPH,	100,000	46.0	25.5	9.0	1-AC, 1-BC	A28
1200	225	200	2	W2MM2BC225USS	2964.00	HQPP, HQPPH	100,000	46.0	25.5	9.0	1-AC, 1-AB	A28
1200	225	200	2	W2MM2CA225USS	2964.00		100,000	46.0	25.5	9.0	1-AB, 1-BC	A28
1200	225	200	3	W2MM3225USS	4356.00		100,000	65.5	25.5	9.0	1-AB, 1-BC, 1-AC	A29
<b>3-Phase, 4-Wire Feed &amp; Tenant Mains 240V Max.<sup>②</sup></b>												
1200	225	200	1	W3MM1225USS	1779.00	QJ, QJH2,	100,000	26.5	25.5	9.0	—	A27
1200	225	200	2	W3MM2225USS	3344.00	QJ2H, HQJ2H	100,000	46.0	25.5	9.0	—	A28
1200	225	200	3	W3MM3225USS	4949.00		100,000	65.5	25.5	9.0	—	A29

① Not rated for use with 240/120V Delta systems.

② Rated for use with 240/120V Delta systems.

③ Stacks will accept equivalent Murray circuit breakers.

# Meter Centers

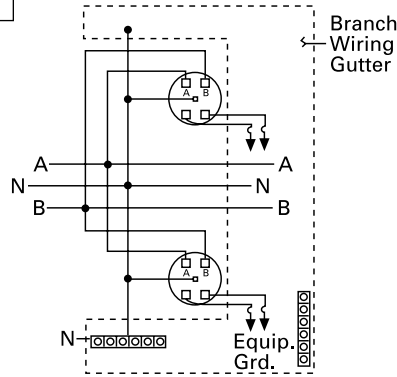
## Modular Metering: Residential Modules<sup>①</sup>

## Knockout Diagrams

Residential Meter Modules — 125A, 200A - 2 Gang

### Wiring Diagrams

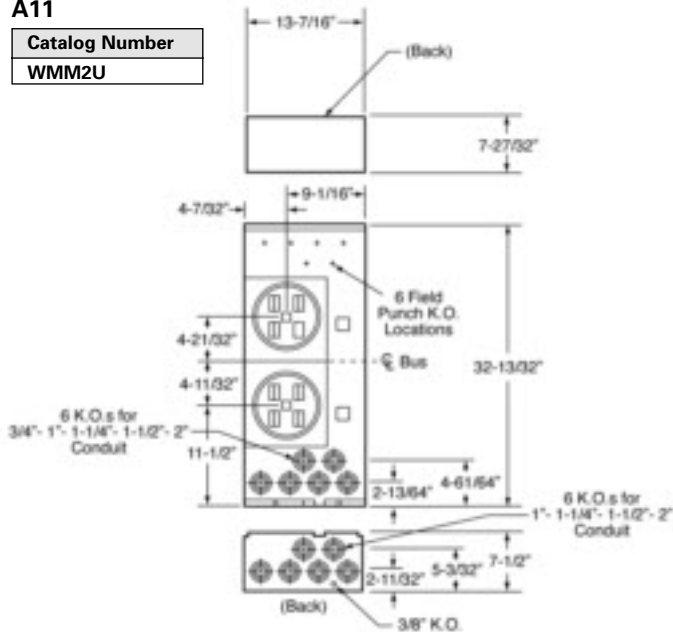
Catalog Number <sup>®</sup>
WMM2U
WMM2200U



### Knockout Diagrams

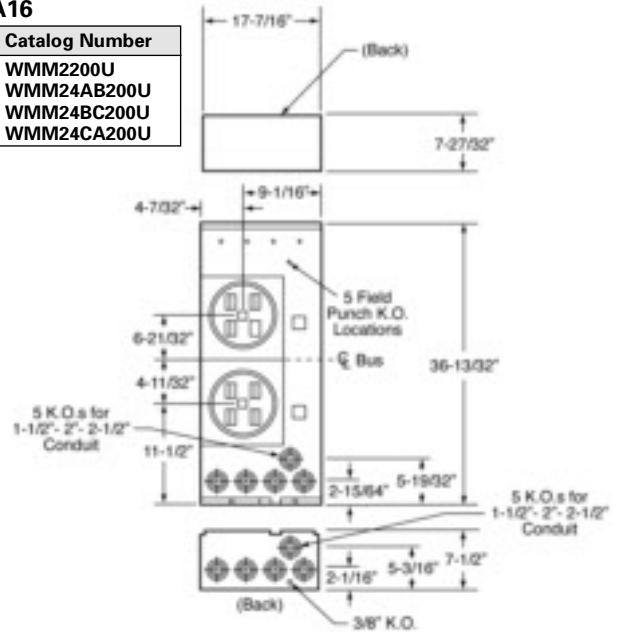
#### A11

Catalog Number
WMM2U



#### A16

Catalog Number
WMM2200U
WMM24AB200U
WMM24BC200U
WMM24CA200U



<sup>①</sup> Diagrams also applicable for suffix R, RC and RNJ products.

<sup>②</sup> Diagrams also applicable for 200A product.

# Meter Centers

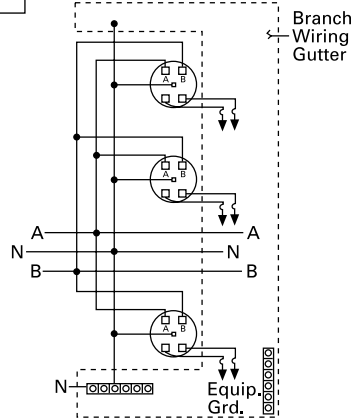
## Modular Metering: Residential Modules<sup>①</sup>

## Wiring Diagrams / Knockout Diagrams

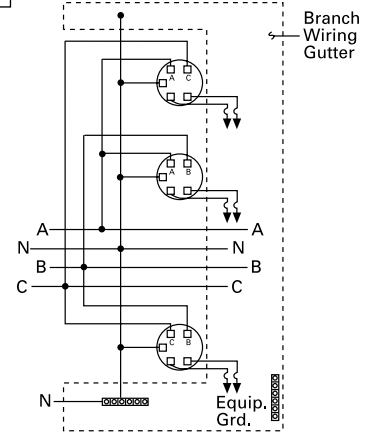
- 2-high modules — suffix indicates phases not used
- 4-high modules — suffix indicates phase with two sockets
- 5-high modules — suffix indicates phase with one socket in the module

### Wiring Diagrams

Catalog Number
WMM3U
WMM3200U



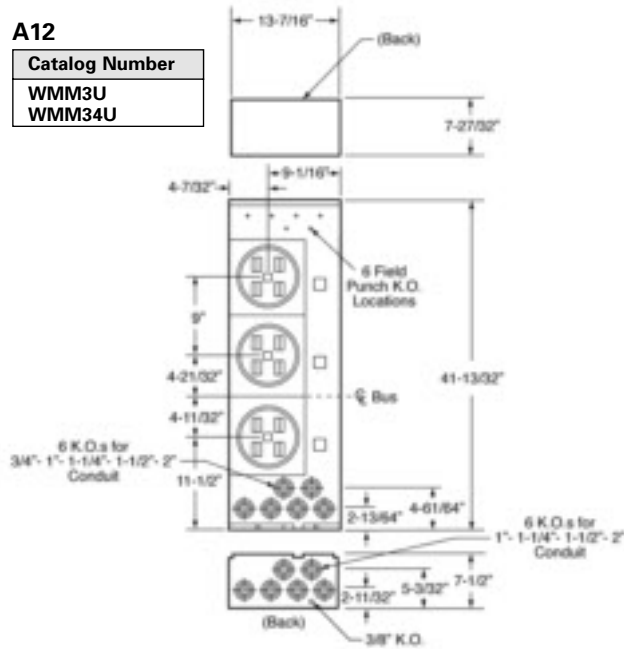
Catalog Number
WMM34U



### Knockout Diagrams

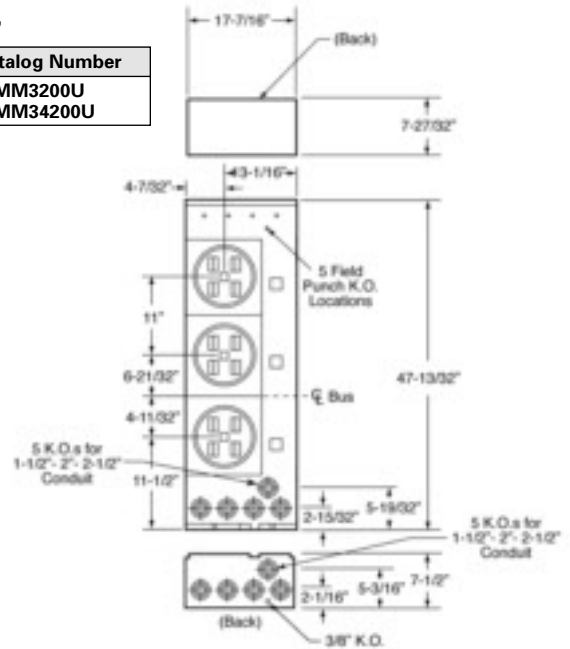
#### A12

Catalog Number
WMM3U
WMM34U



#### A17

Catalog Number
WMM3200U
WMM34200U



<sup>①</sup> Diagrams also applicable for suffix R, RC and RNJ products.

# Meter Centers

## Modular Metering: Residential Modules<sup>①</sup>

## Wiring Diagrams / Knockout Diagrams

■ 2-high modules — suffix indicates phases not used

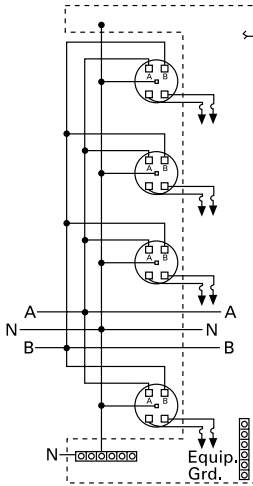
■ 4-high modules — suffix indicates phase with two sockets

■ 5-high modules — suffix indicates phase with one socket in the module

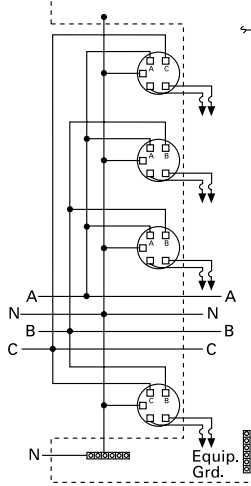
2  
METER  
CENTERS

### Wiring Diagrams

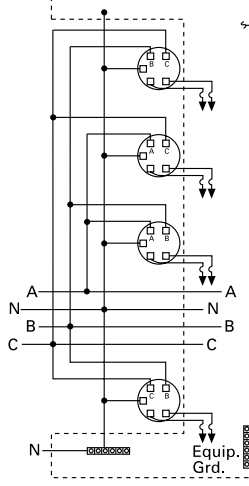
Catalog Number
WMM4U
WMM4200U



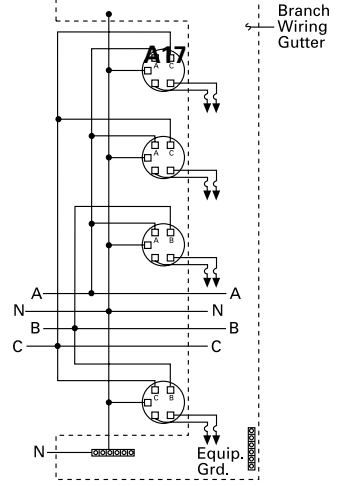
Catalog Number
WMM44ABU



Catalog Number
WMM44BCU



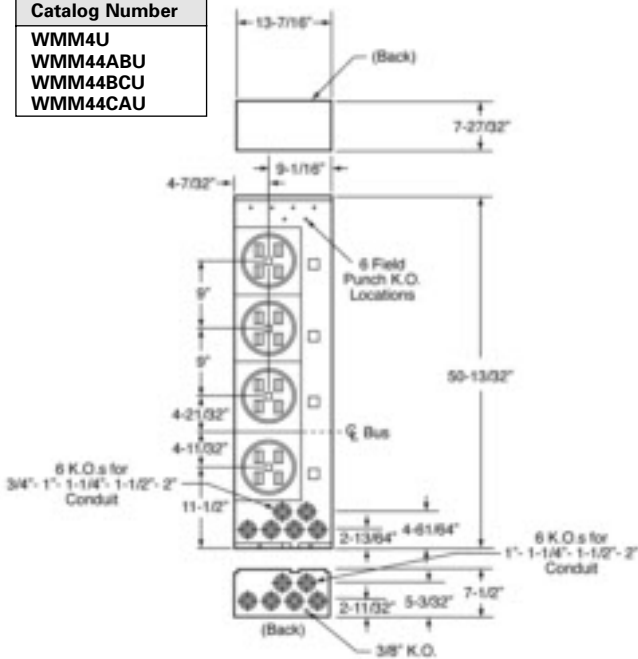
Catalog Number
WMM44CAU



### Knockout Diagrams

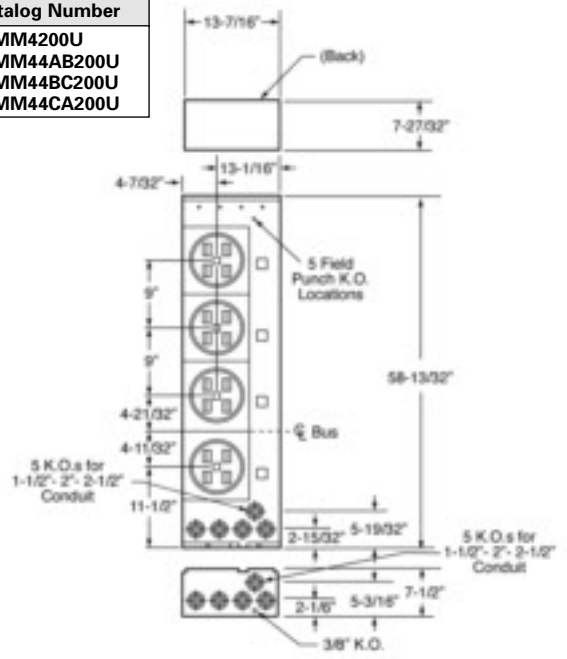
#### A13

Catalog Number
WMM4U
WMM44ABU
WMM44BCU
WMM44CAU



#### A18

Catalog Number
WMM4200U
WMM44AB200U
WMM44BC200U
WMM44CA200U



<sup>①</sup> Diagrams also applicable for suffix R, RC and RNJ products.



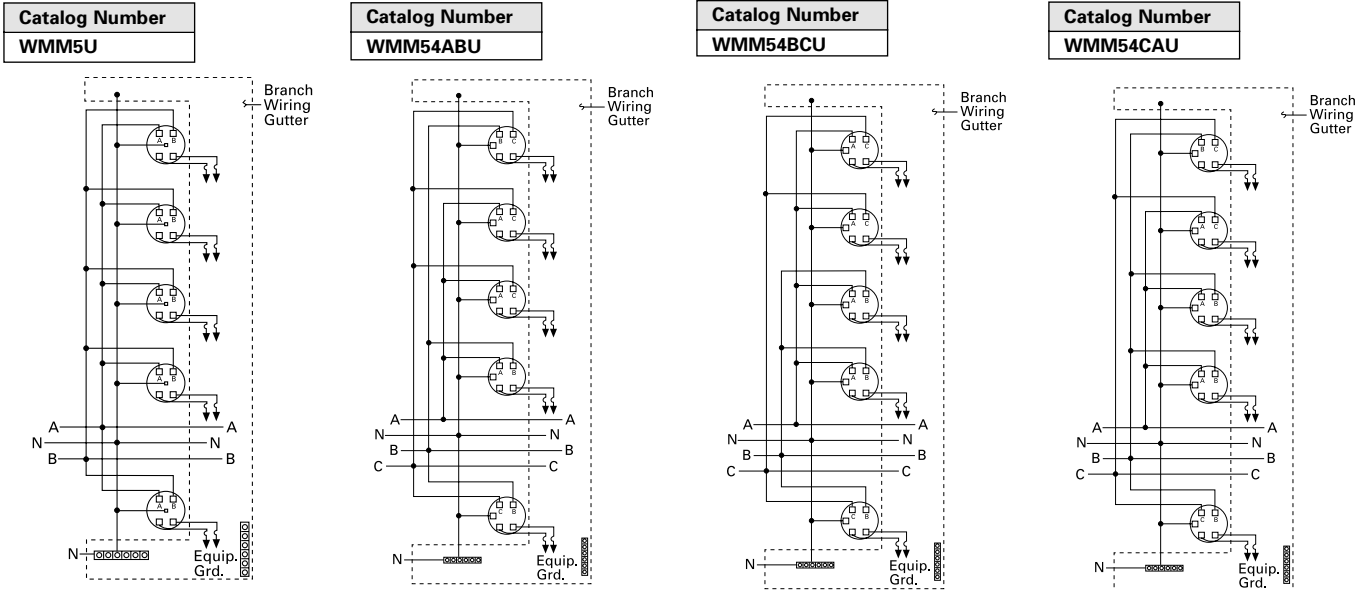
# Meter Centers

## Modular Metering: Residential Modules<sup>①</sup>

## Wiring Diagrams / Knockout Diagrams

- 2-high modules — suffix indicates phases not used
- 4-high modules — suffix indicates phase with two sockets
- 5-high modules — suffix indicates phase with one socket in the module

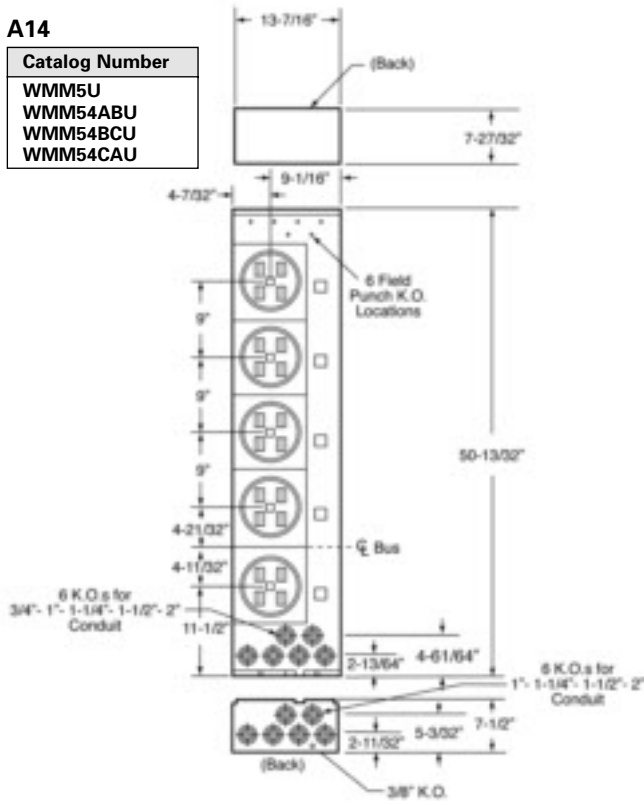
### Wiring Diagrams



### Knockout Diagrams

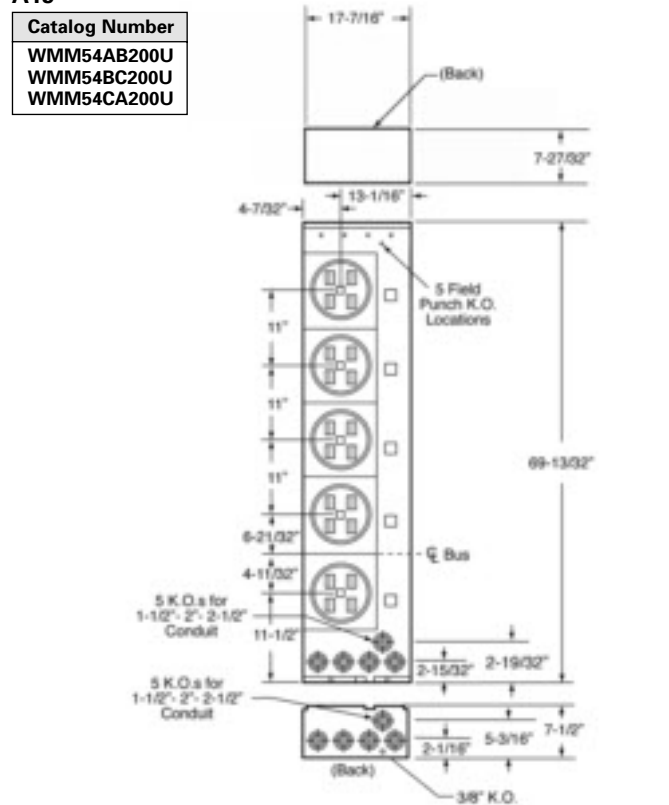
#### A14

Catalog Number
WMM5U
WMM54ABU
WMM54BCU
WMM54CAU



#### A19

Catalog Number
WMM54AB200U
WMM54BC200U
WMM54CA200U



For inches / millimeters conversion, see Application Data section.

<sup>①</sup> Diagrams also applicable for suffix R, RC and RNJ products.

# Meter Centers

## Modular Metering: Residential Modules

Outdoor

**3-Phase, 4-Wire, Incoming / 1-Phase, 3-Wire, Outgoing**

All 3-phase 4-wire meter modules have the maximum possible degree of phase balancing.

Single phase sockets are factory-connected to different phases for automatic load balancing.

Do not use single stator network meters.

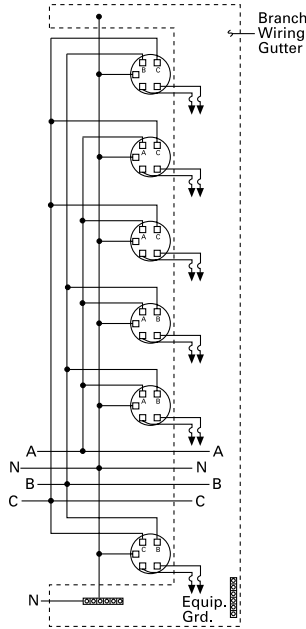
## Wiring Diagrams / Knockout Diagrams

- 2-high modules — suffix indicates phases not used
- 4-high modules — suffix indicates phase with two sockets
- 5-high modules — suffix indicates phase with one socket in the module

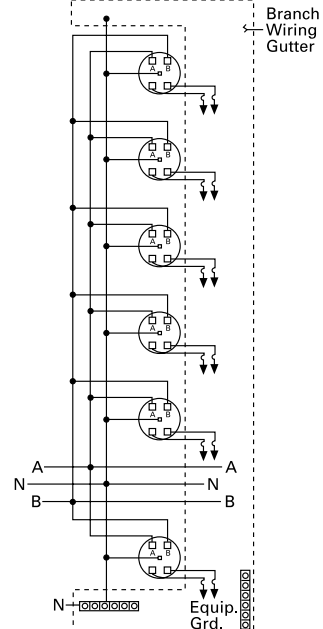
2  
METER  
CENTERS

### Wiring Diagrams

Catalog Number  
**WMM64U**



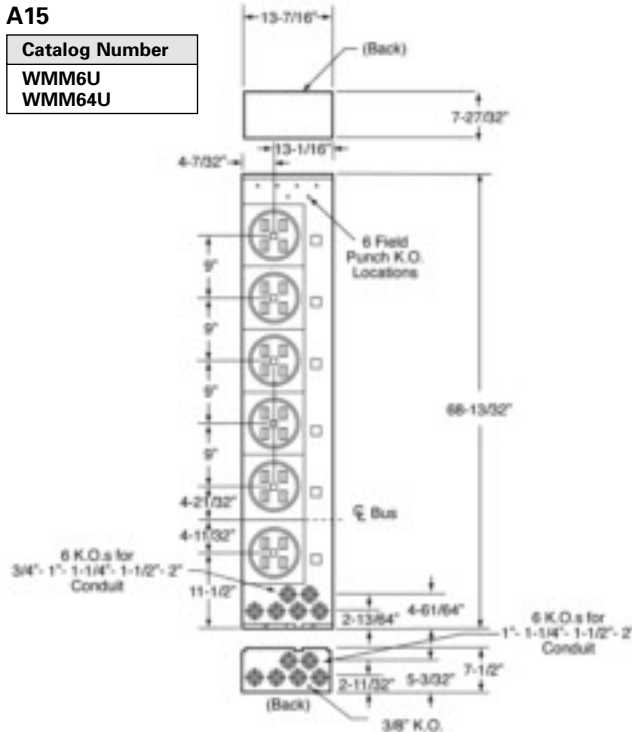
Catalog Number  
**WMM6U**



### Knockout Diagrams

**A15**

Catalog Number  
**WMM6U**  
**WMM64U**



For inches / millimeters conversion, see Application Data section.

Note: Diagrams also applicable for suffix R, RC and RNJ product.

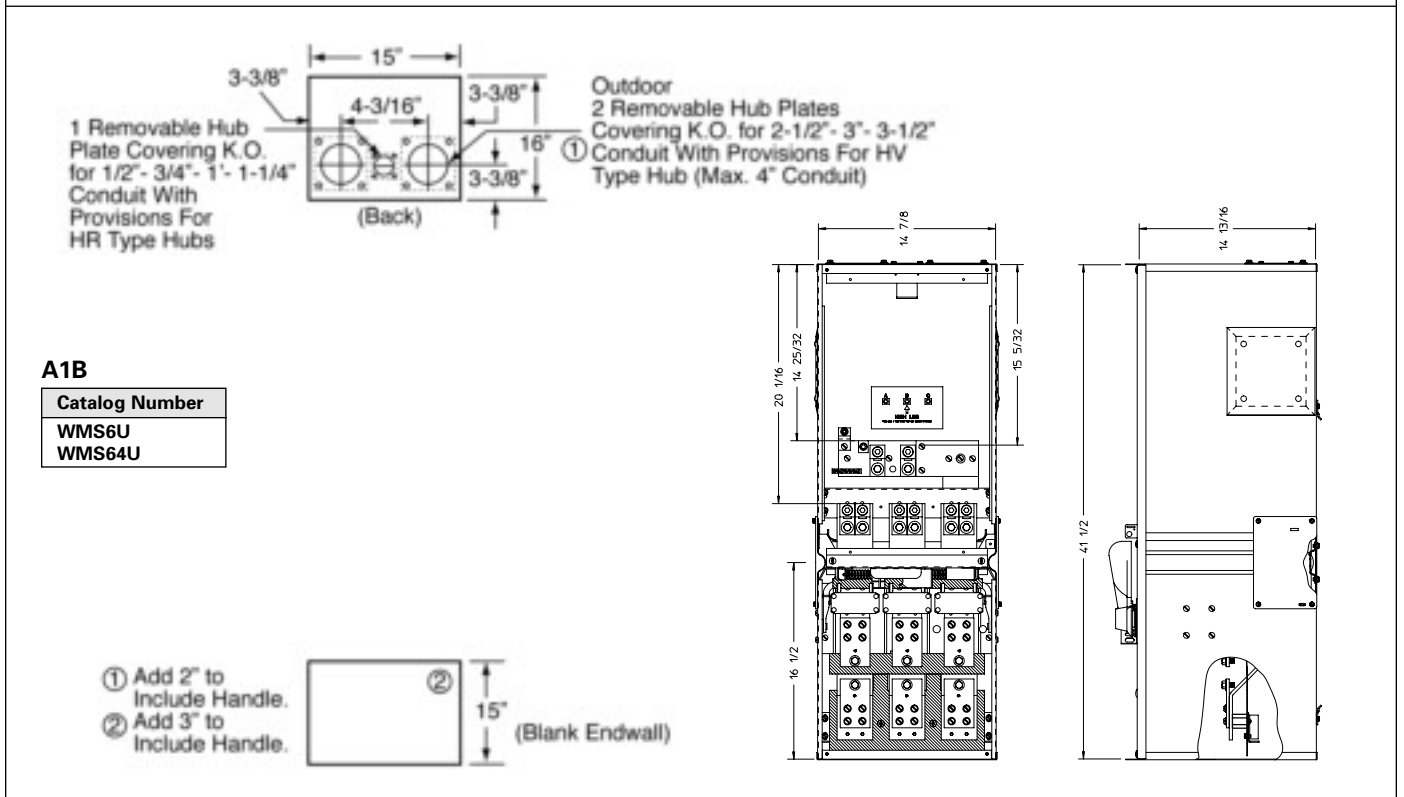
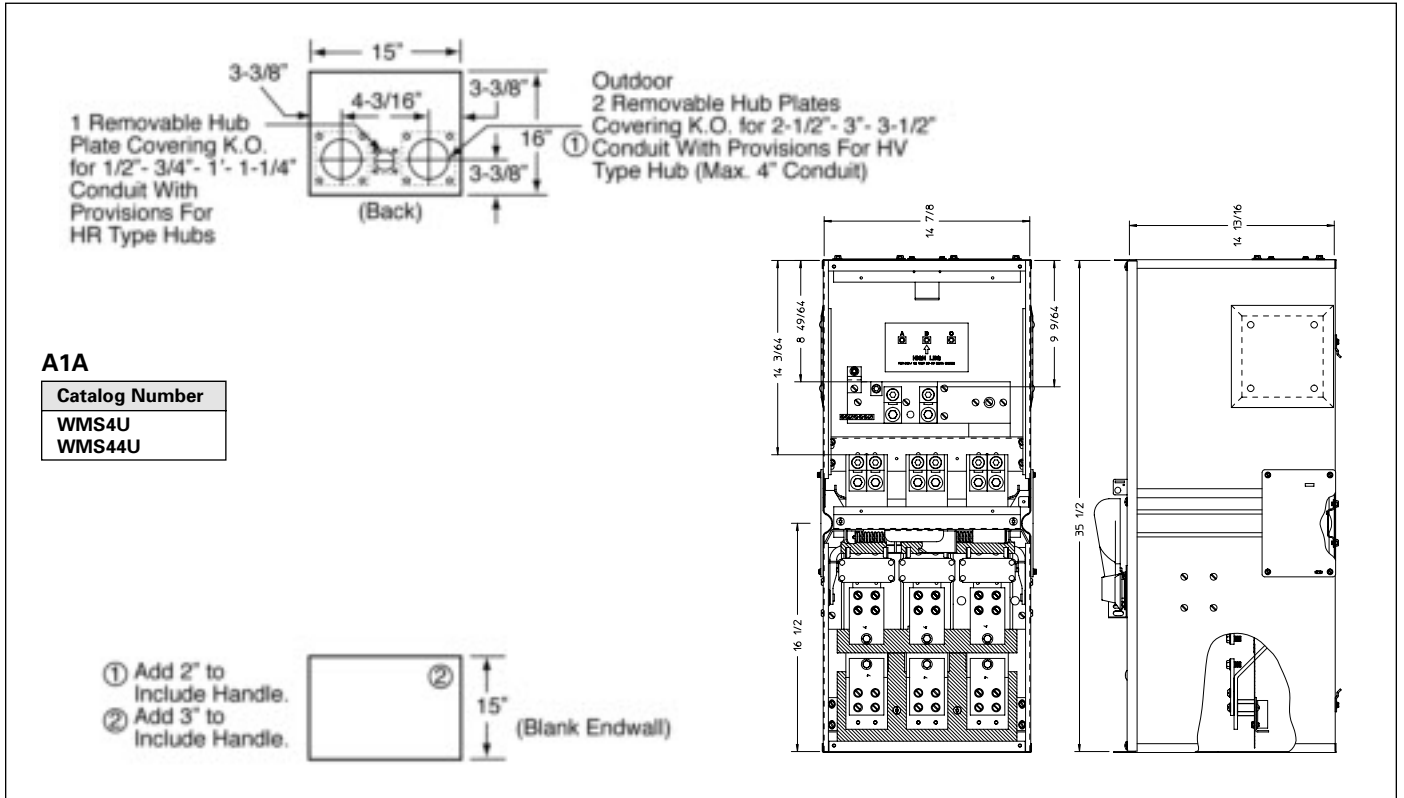
# Meter Centers

## Modular Metering: Main Switch Service Entrance Modules

## Knockout Diagrams

Installation Dimensions

No knockouts on sides of any modules.

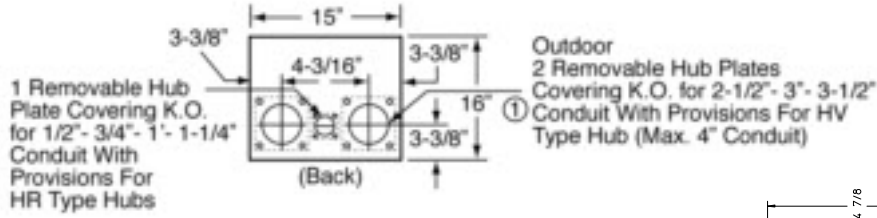


For inches / millimeters conversion, see Application Data section.

# Meter Centers

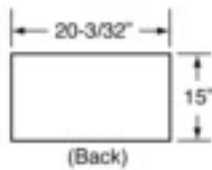
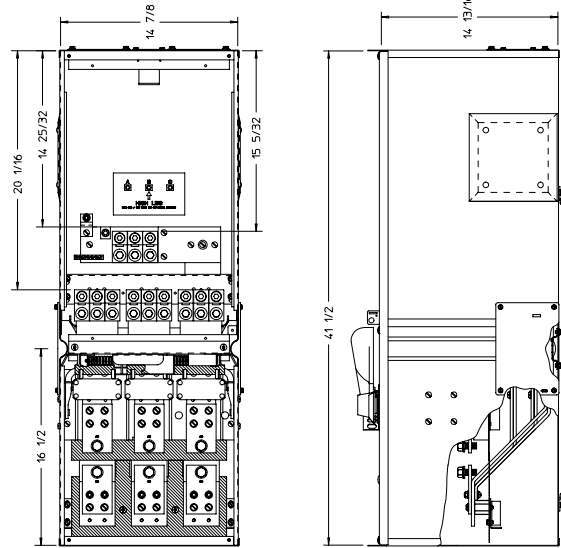
## Service Entrance Modules - Main Switch

### Knockout Diagrams



#### A1C

Catalog Number
WMS8U
WMS84U

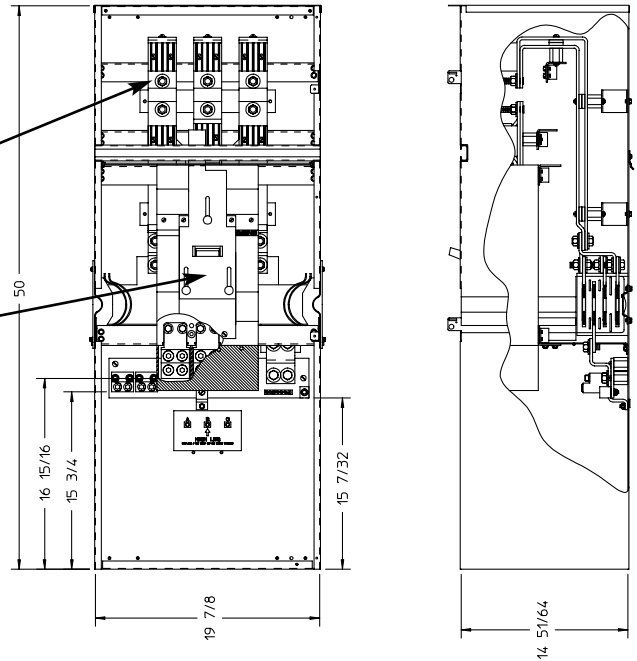
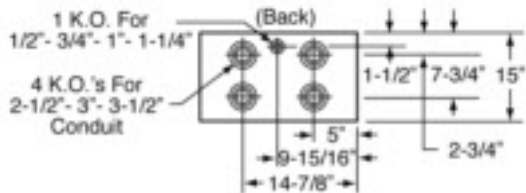


#### A1D

Catalog Number
WMS12U
WMS124U

T Fuse Provision

Molded Case Switch, ND63S120A



For inches / millimeters conversion, see Application Data section.

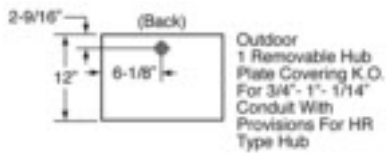
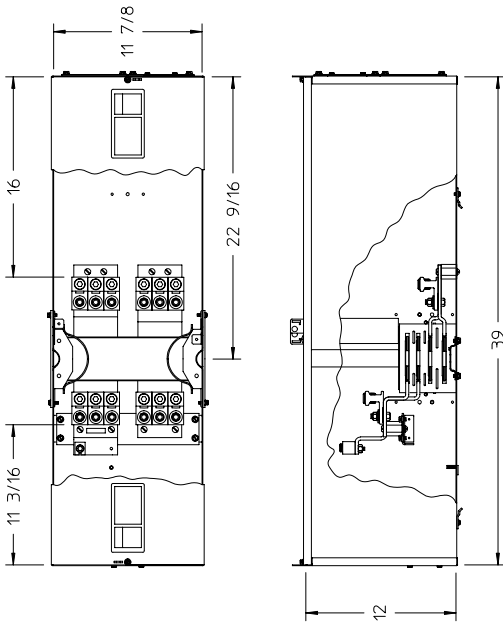
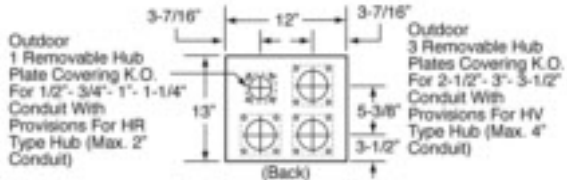
# Meter Centers

## Modular Metering: Tap Box & Main Switch Modules

## Knockout Diagrams

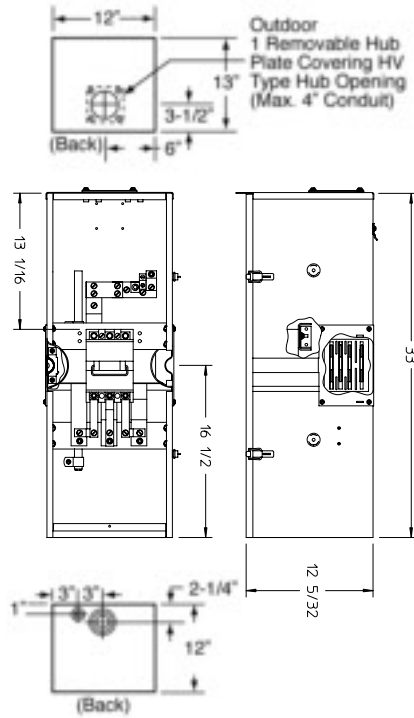
### A2

Catalog Number
WMTB8U
WMTB84U



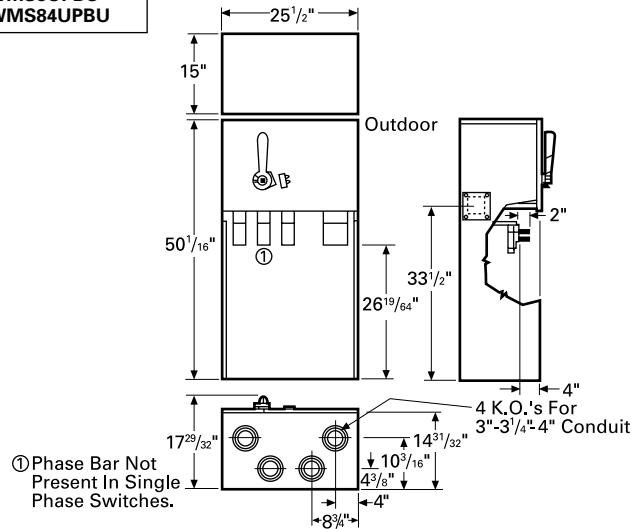
### A3

Catalog Number
WMP02U
WMP024U



### A2A

Catalog Number
WMS4UPBU
WMS44UPBU
WMS6UPBU
WMS64UPBU
WMS8UPBU
WMS84UPBU

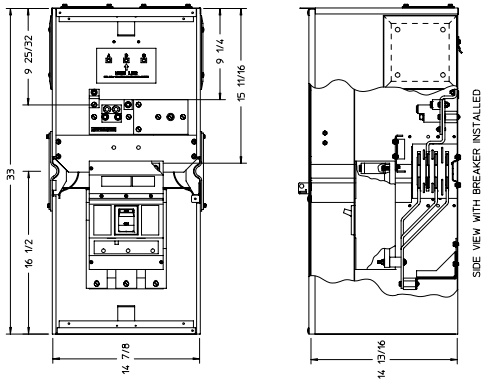
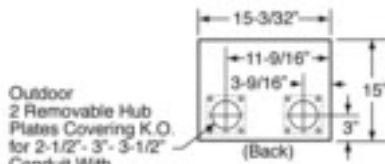


For inches / millimeters conversion, see Application Data section.

# Meter Centers

## Service Entrance Modules - Main Circuit Breaker

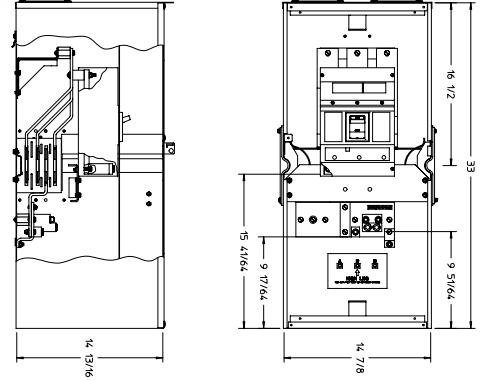
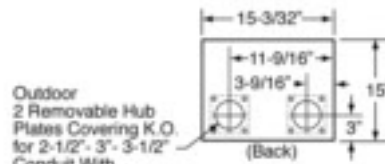
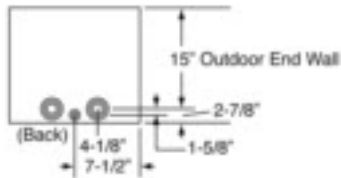
## Knockout Diagrams



**A4A**

Catalog Number

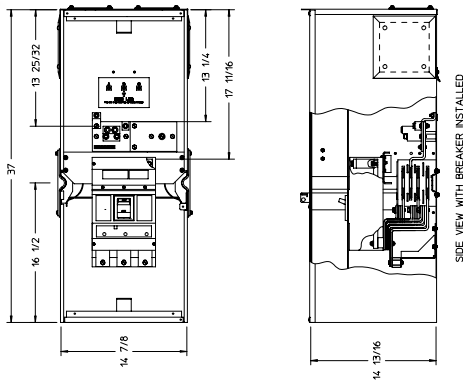
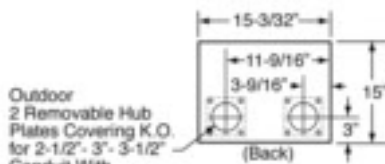
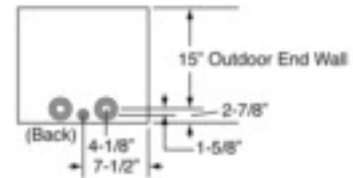
WMC4  
WMC44



**A4B**

Catalog Number

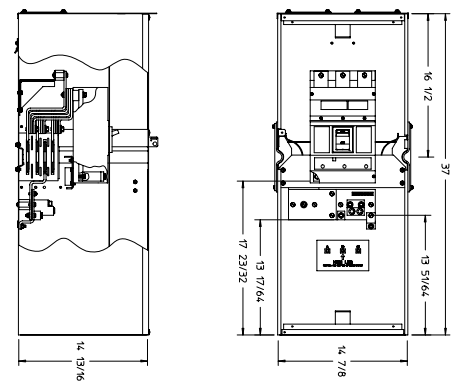
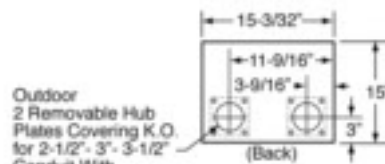
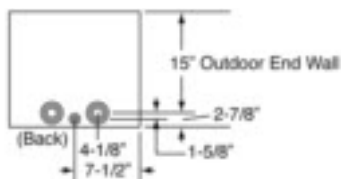
WMC4BF  
WMC44BF



**A4C**

Catalog Number

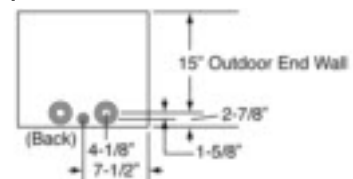
WMC6  
WMC64



**A4D**

Catalog Number

WMC6BF  
WMC64BF



For inches / millimeters conversion, see Application Data section.

# Meter Centers

## Modular Metering: Main Breaker Modules

## Knockout Diagrams

Outdoor  
4 Removable Hub  
Plates Covering K.O.  
for 2-1/2" - 3" - 3-1/2"  
Conduit With  
Provisions For HV  
Type Hub (Max. 4"  
Conduit)

20-3/32" →  
14-1/16" → 6-1/16" →  
15"  
9-1/16" →  
3-9/16" →

21 1/2" → 13 29/32" → 12 1/4" → 14 13/16" →

43" → 19 7/8" → 14 13/16" →

SIDE VIEW WITH BREAKER INSTALLED

**A5A**

Catalog Number

- WMC7
- WMC74
- WMC8
- WMC84

10" → 5-1/16" → 4 K.O.'s For 2-1/2" - 3" - 3-1/2" Conduit  
Outdoor Bottom Endwall  
7-3/4" → 2-3/4" → 1-9/16" →

Outdoor  
4 Removable Hub  
Plates Covering K.O.  
for 2-1/2" - 3" - 3-1/2"  
Conduit With  
Provisions For HV  
Type Hub (Max. 4"  
Conduit)

20-3/32" →  
14-1/16" → 6-1/16" →  
15"  
9-1/16" →  
3-9/16" →

5 1/2" → 16 1/32" → 18 29/64" →

50" → 23 1/2" → 19 7/8" → 14 13/16" →

SIDE VIEW WITH BREAKER INSTALLED

**A6A**

Catalog Number

- WMC10
- WMC12
- WMC104
- WMC124

5-1/16" → 10" → 4 K.O.'s For 2-1/2" - 3" - 3-1/2" Conduit  
Outdoor Bottom End Wall  
7-3/4" → 2-3/4" → 1-9/16" →

Outdoor  
4 Removable Hub  
Plates Covering K.O.  
for 2-1/2" - 3" - 3-1/2"  
Conduit With  
Provisions For HV  
Type Hub (Max. 4"  
Conduit)

20-3/32" →  
14-1/16" → 6-1/16" →  
15"  
9-1/16" →  
3-9/16" →

21 1/2" → 13 29/32" → 12 1/4" → 14 13/16" →

43" → 19 7/8" → 14 13/16" →

SIDE VIEW WITH BREAKER INSTALLED

**A5B**

Catalog Number

- WMC7BF
- WMC74BF
- WMC8BF
- WMC84BF

10" → 5-1/16" → 4 K.O.'s For 2-1/2" - 3" - 3-1/2" Conduit  
Outdoor Bottom Endwall  
7-3/4" → 2-3/4" → 1-9/16" →

Outdoor  
4 Removable Hub  
Plates Covering K.O.  
for 2-1/2" - 3" - 3-1/2"  
Conduit With  
Provisions For HV  
Type Hub (Max. 4"  
Conduit)

20-3/32" →  
14-1/16" → 6-1/16" →  
15"  
9-1/16" →  
3-9/16" →

23 1/2" → 16 1/32" → 18 29/64" →

50" → 55 1/2" → 19 7/8" → 14 13/16" →

SIDE VIEW WITH BREAKER INSTALLED

**A6B**

Catalog Number

- WMC10BF
- WMC12BF
- WMC104BF
- WMC124BF

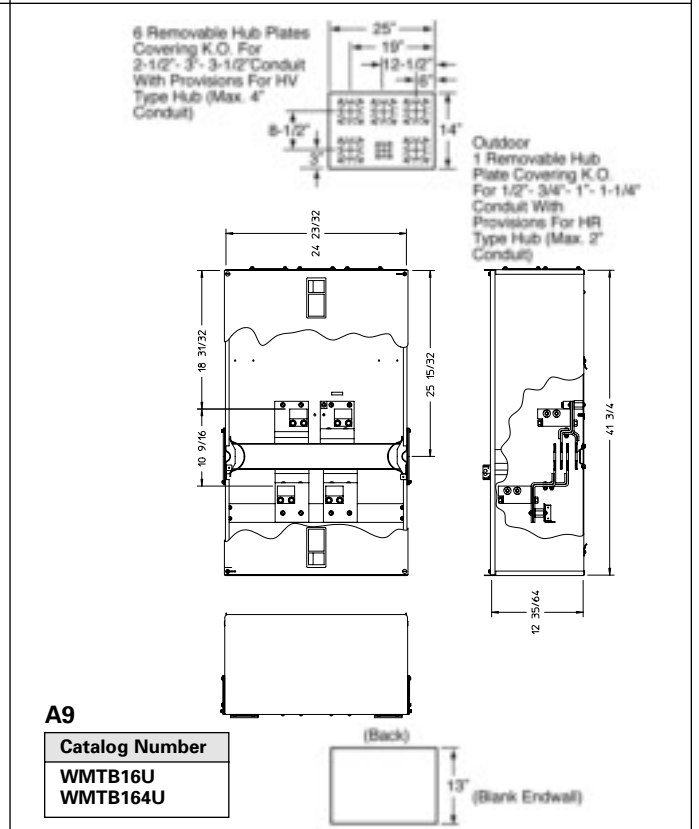
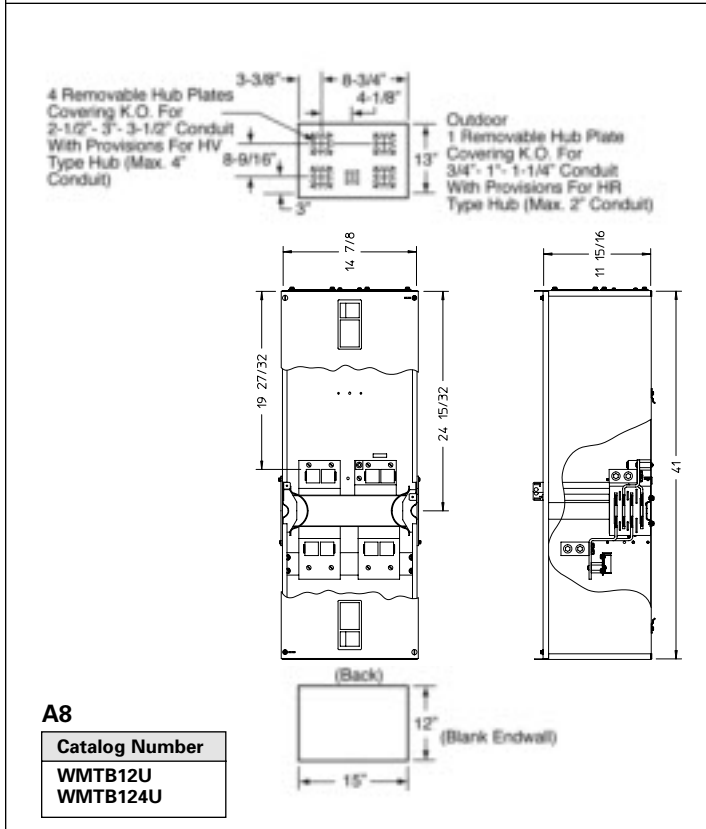
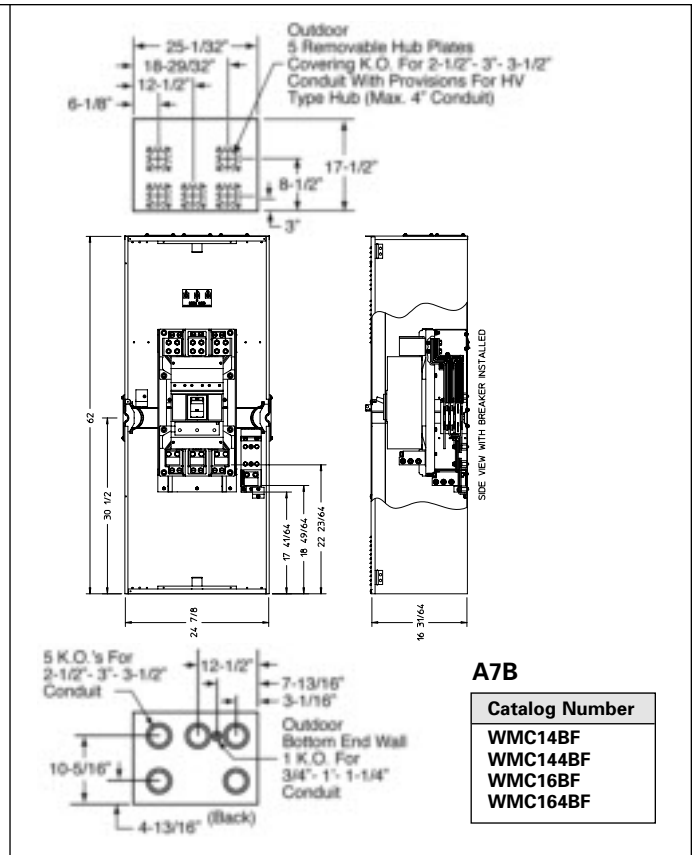
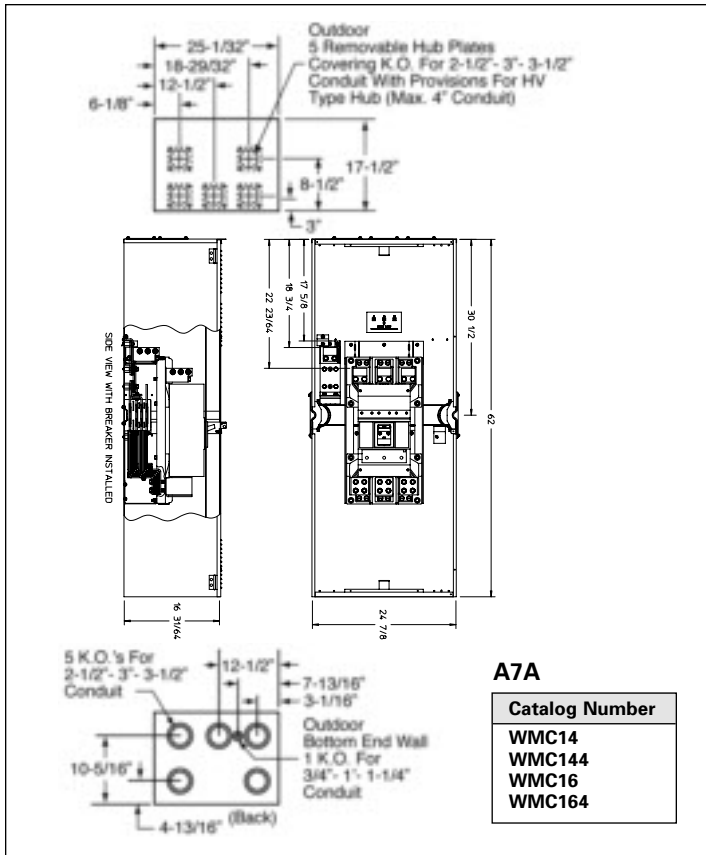
5-1/16" → 10" → 4 K.O.'s For 2-1/2" - 3" - 3-1/2" Conduit  
Outdoor Bottom End Wall  
7-3/4" → 2-3/4" → 1-9/16" →

For inches / millimeters conversion, see Application Data section.

# Meter Centers

## Modular Metering: Main Breaker & Tap Box Modules

## Knockout Diagrams



For inches / millimeters conversion, see Application Data section.



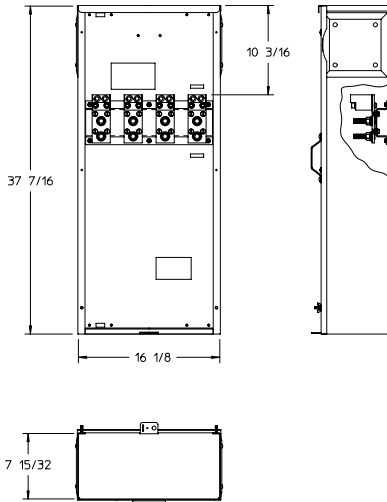
# Meter Centers

## Modular Metering: Pullbox & Lever Bypass Modules

## Knockout Diagrams

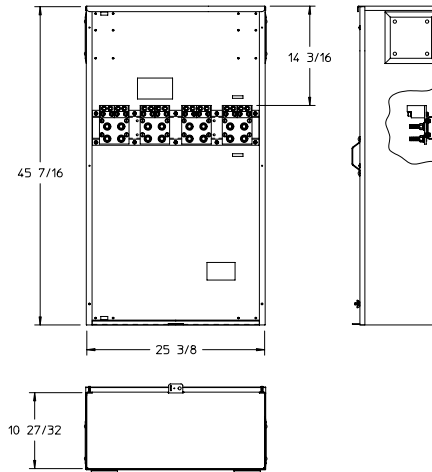
### A10A

Catalog Number
WMMB1400
WMMB3400



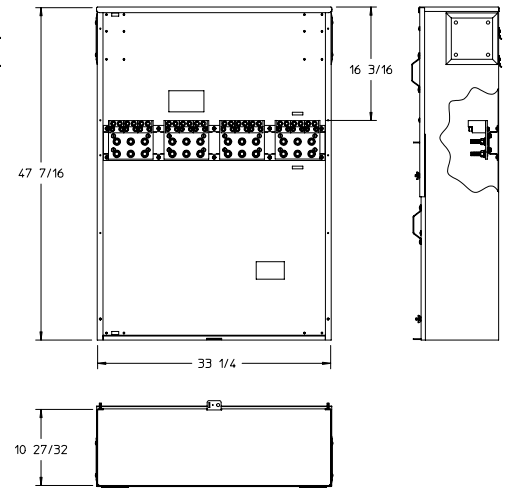
### A10B

Catalog Number
WMMB1800
WMMB3800



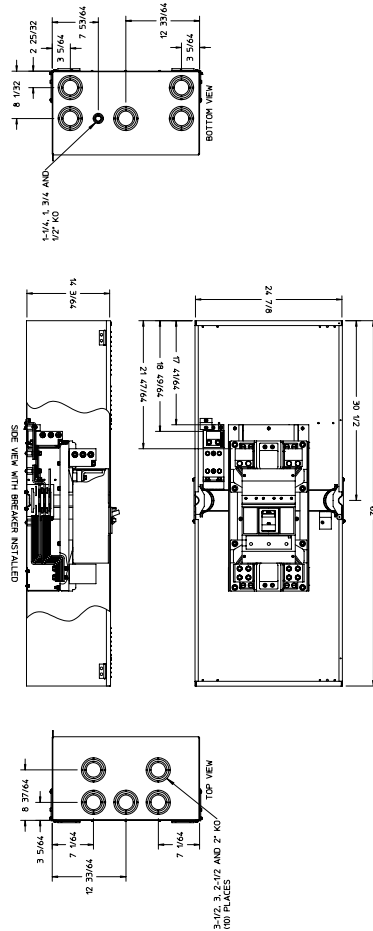
### A10C

Catalog Number
WMMB11200
WMMB31200



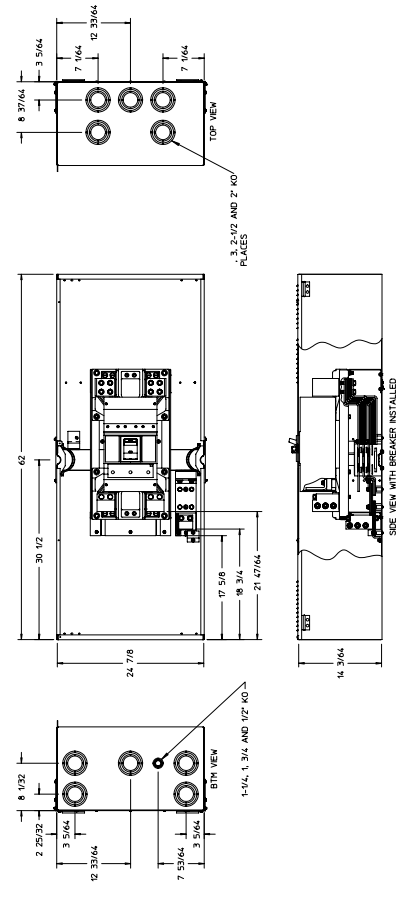
### A30A

Catalog Number
MC20



### A30B

Catalog Number
MC20BF



For inches / millimeters conversion, see Application Data section.

# Meter Centers

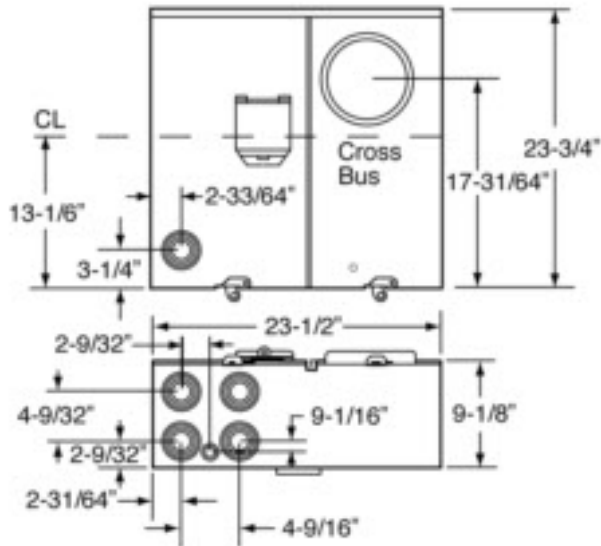
## Modular Metering: Lever Bypass Modules

## Knockout Diagrams

For Lever Bypass Modules Only

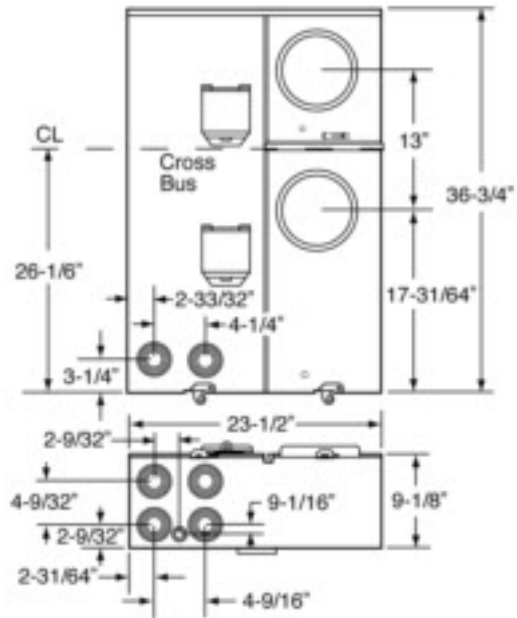
**A20**

Catalog Number
WXMM1XXXX



**A21**

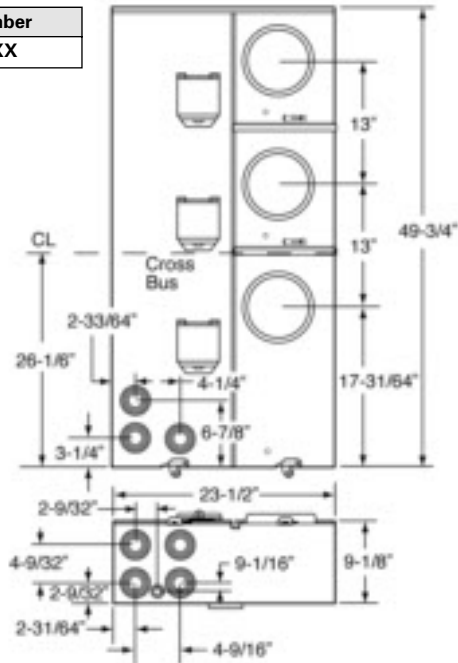
Catalog Number
WXMM2XXXX



For Lever Bypass Modules Only

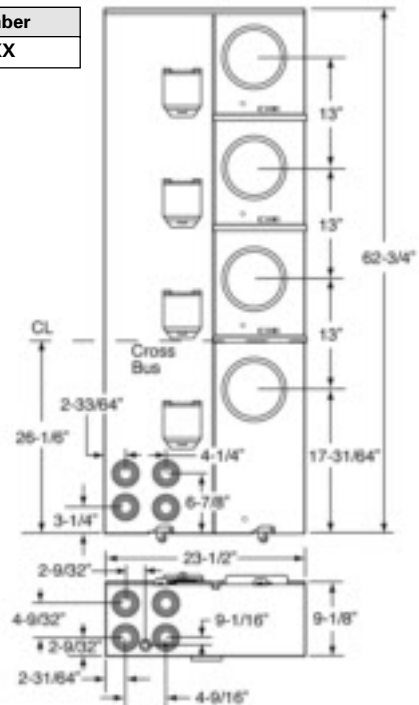
**A22**

Catalog Number
WXMM3XXXX



**A23**

Catalog Number
WXMM4XXXX



For inches / millimeters conversion, see Application Data section.

See table on page 2-49 for 3-Phase 100A stack dimensions.

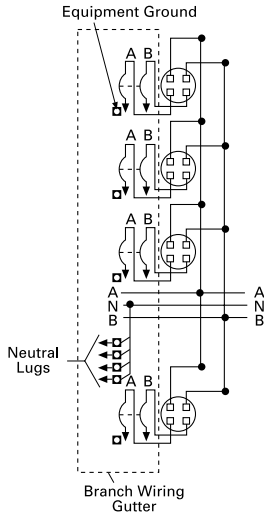
# Meter Centers

## Modular Metering: Lever Bypass Modules

## Wiring Diagrams

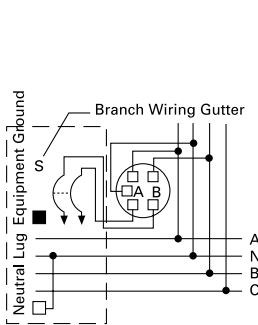
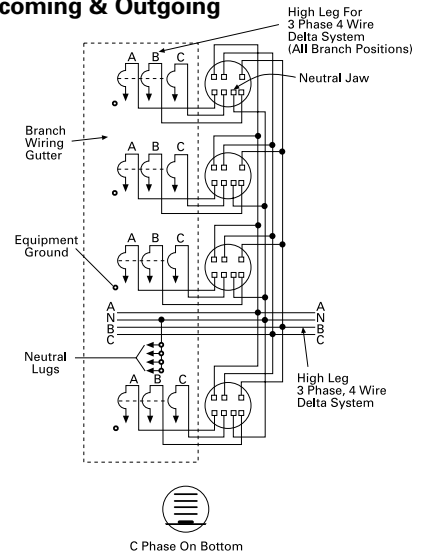
Commercial Meter Modules, Specifications  
With 5-Jaw, 1-Phase, 3-Wire Outgoing Landis & Gyr Meter Sockets

### 1-Phase Incoming & Outgoing

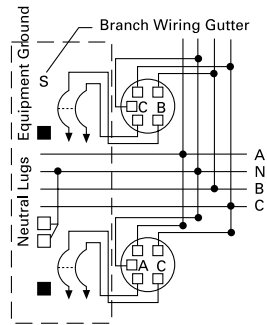


Meter Module Configuration	Wiring Diagram References
All 4 High	As Shown
All 3 High	Omit Top Meter
All 2 High	Omit Top Two Meters
All 1 High	Omit Top Two and Bottom Meters

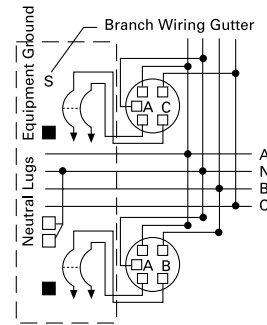
### 3-Phase Incoming & Outgoing



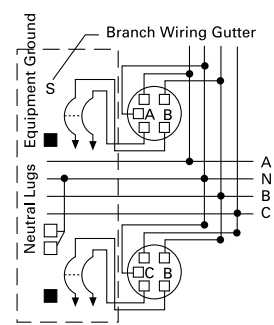
**Catalog Number**  
W2MM1225U



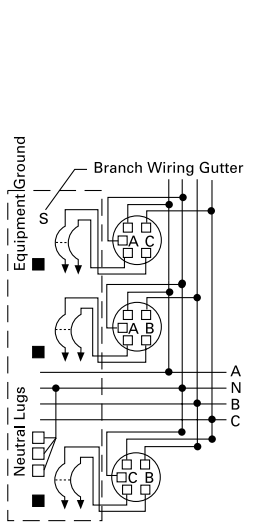
**Catalog Number**  
W2MM2AB225U



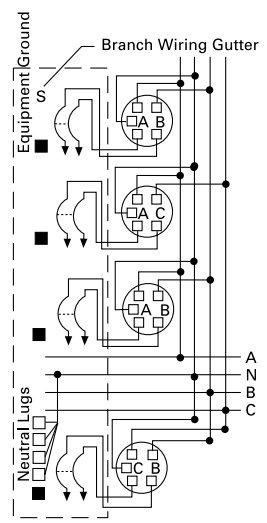
**Catalog Number**  
W2MM2BC225U



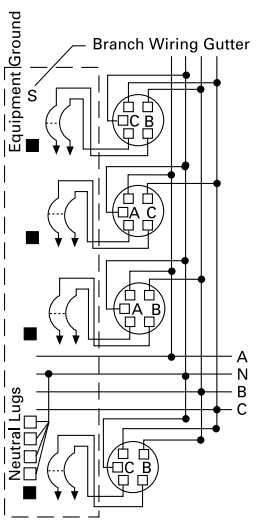
**Catalog Number**  
W2MM2CA225U



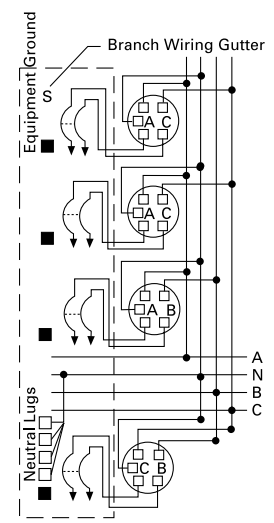
**Catalog Number**  
W2MM3225U



**Catalog Number**  
W2MM4AB225U



**Catalog Number**  
W2MM4BC225U



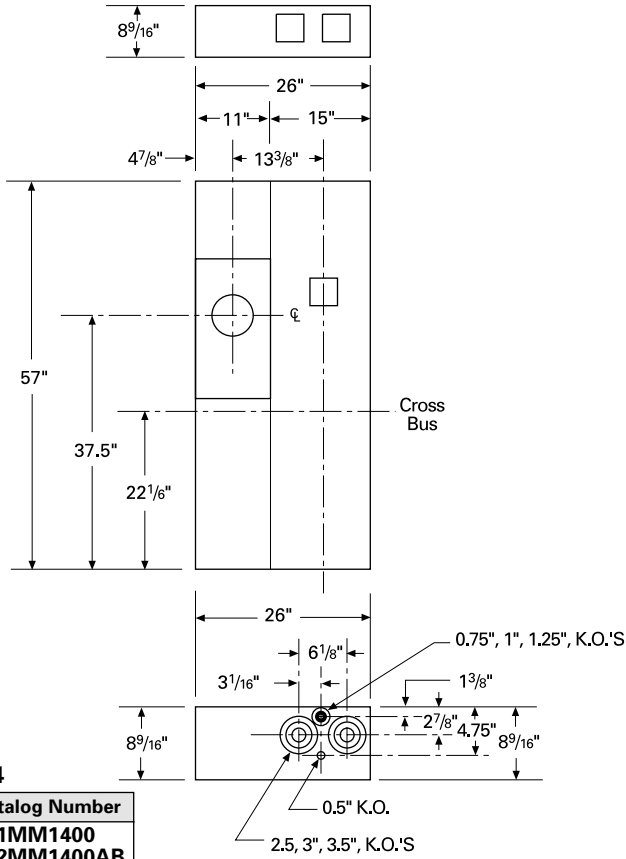
**Catalog Number**  
W2MM4CA225U

# Meter Centers

## Modular Metering: Lever Bypass Modules

## Wiring and Knockout Diagrams

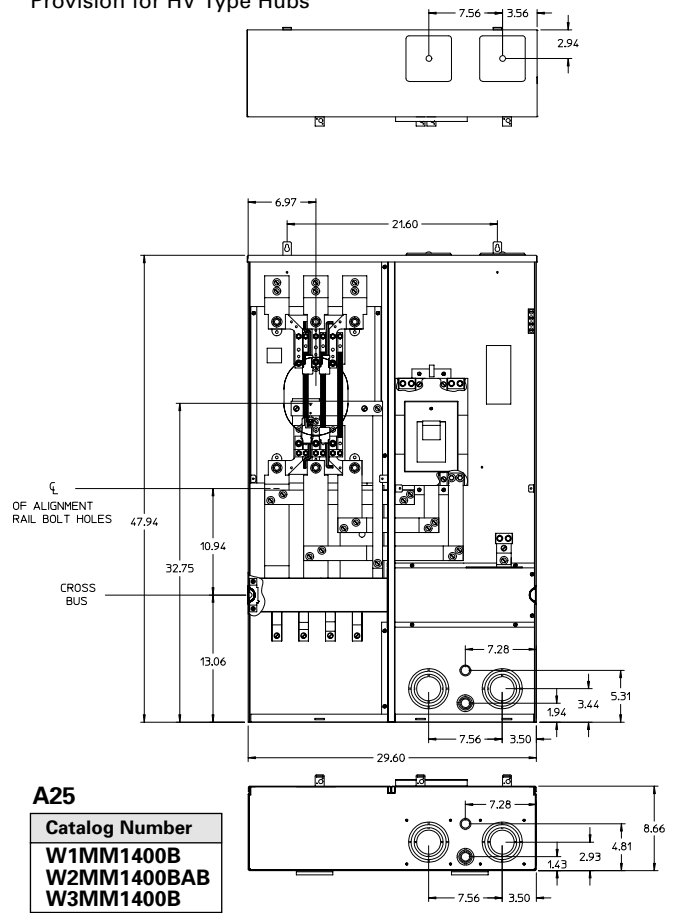
Provision for Type HD Hubs



**A24**

Catalog Number
W1MM1400
W2MM1400AB
W3MM1400

Provision for HV Type Hubs

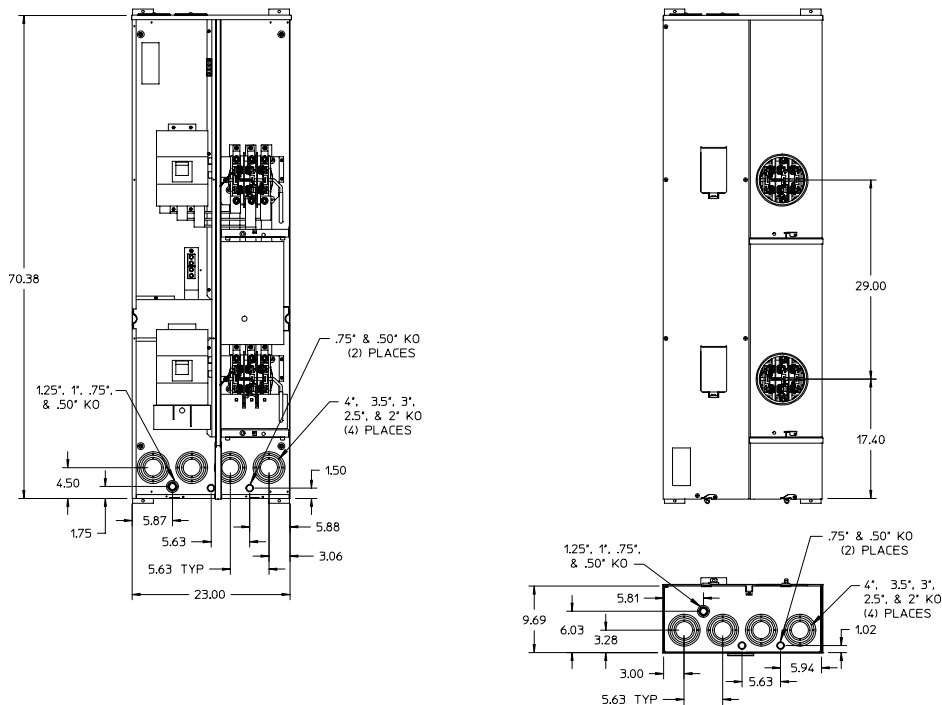


**A25**

Catalog Number
W1MM1400B
W2MM1400BAB
W3MM1400B

**A26**

Catalog Number
WXMM2400



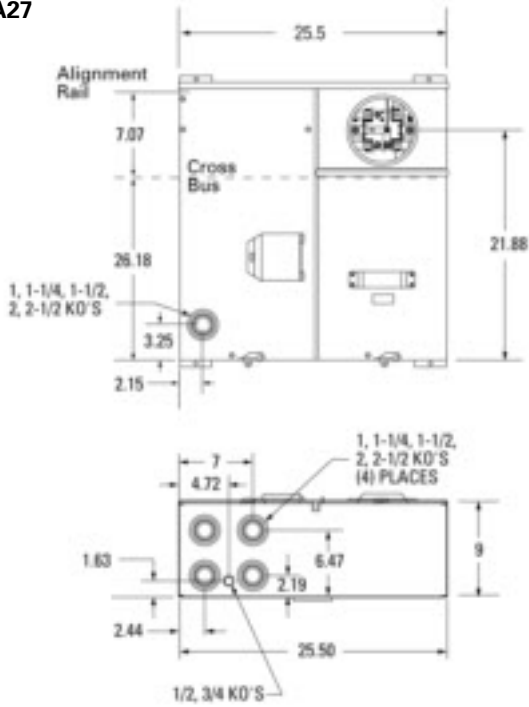
For inches / millimeters conversion, see Application Data section.

# Meter Centers

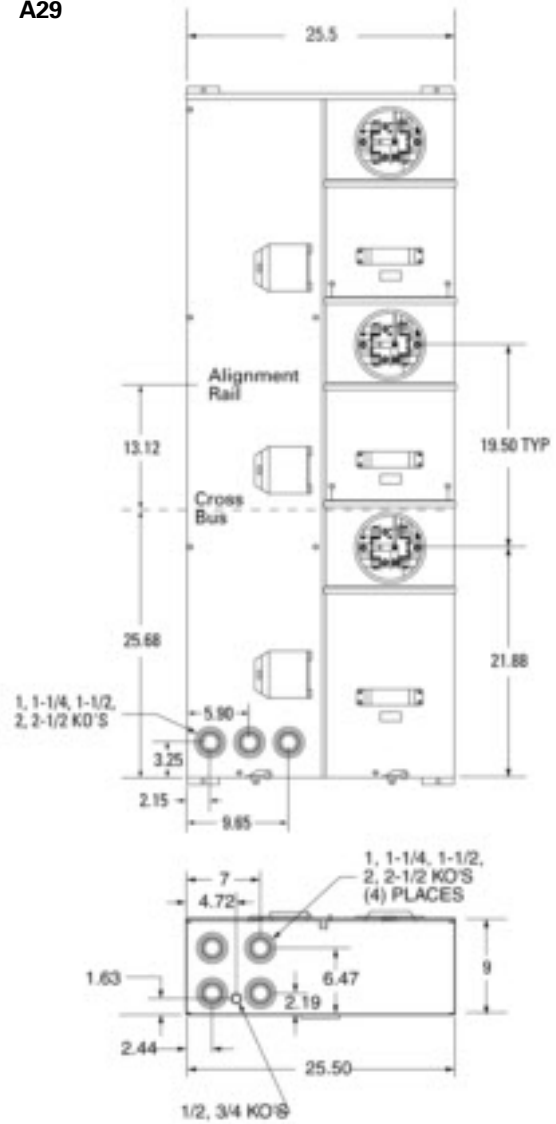
## Modular Metering: Test Block Bypass Modules

## Wiring and Knockout Diagrams

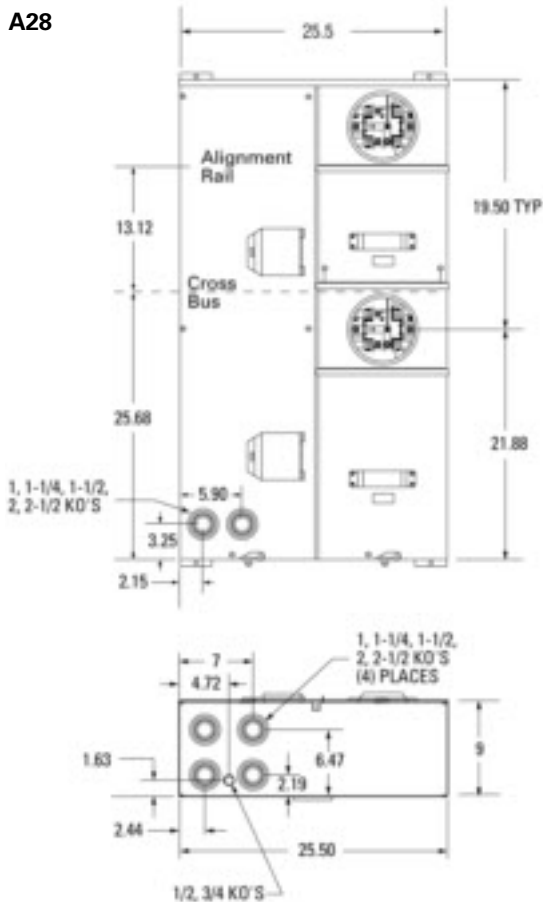
A27



A29



A28



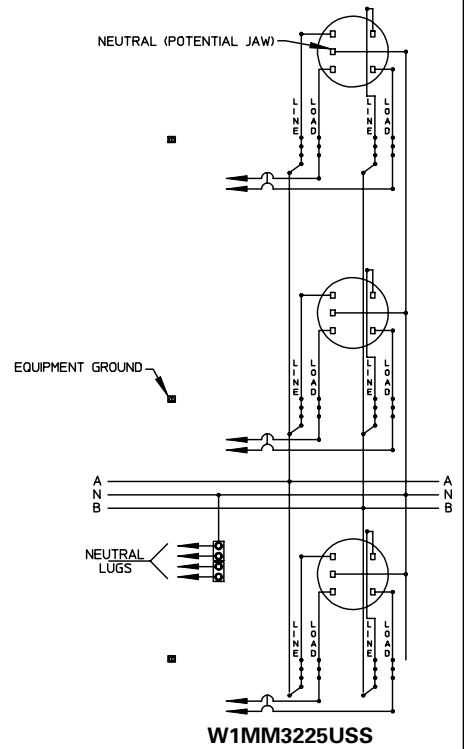
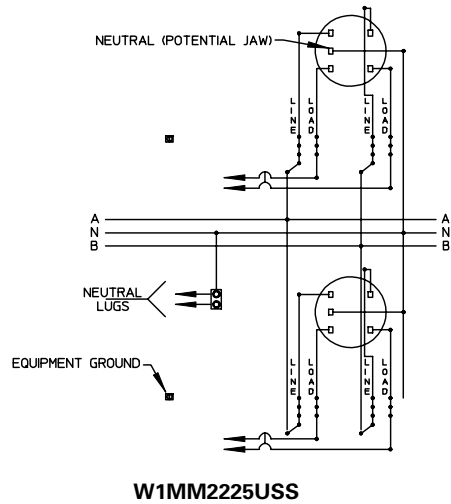
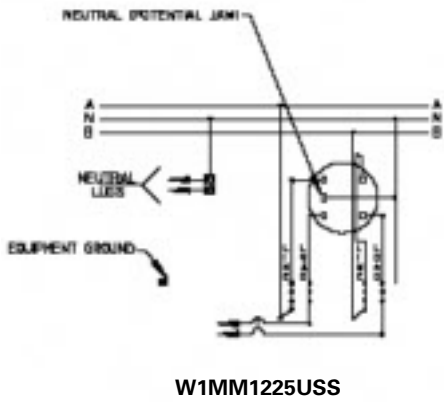
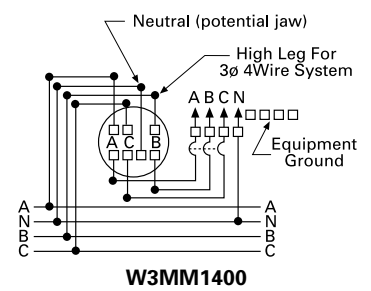
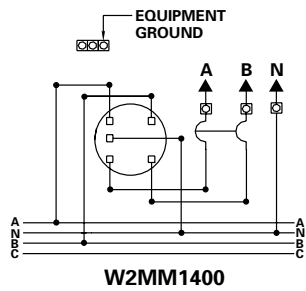
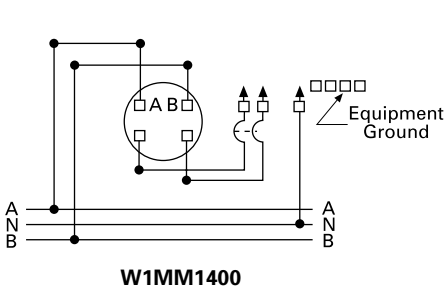
Note: KO diagrams apply to test block bypass modules only.

# Meter Centers

## Commercial Meter Modules

## Wiring and Knockout Diagrams

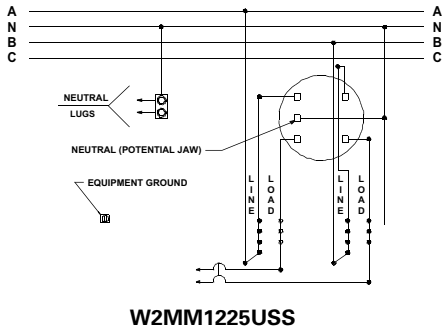
### Wiring Diagrams for 400A Plug-in and Bolt-in Socket



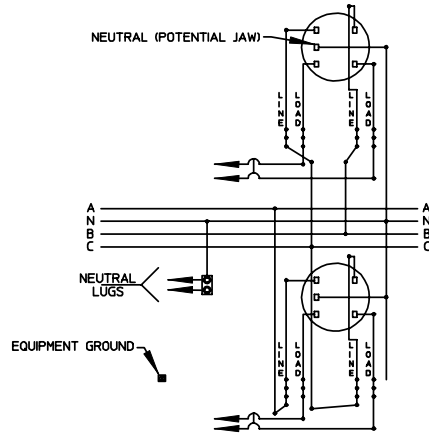
# Meter Centers

## Modular Metering: Test Block Bypass Modules

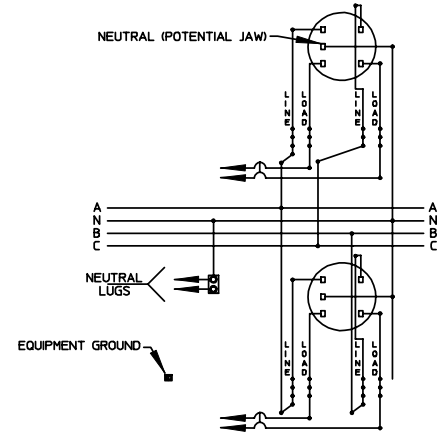
## Wiring and Knockout Diagrams



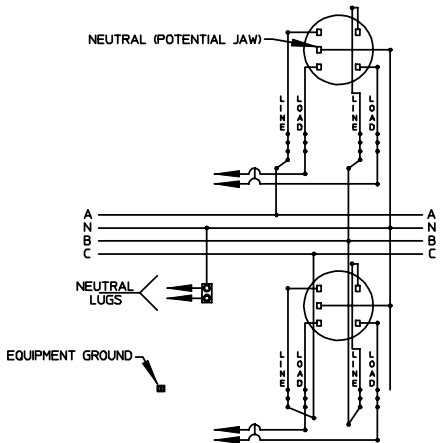
W2MM1225USS



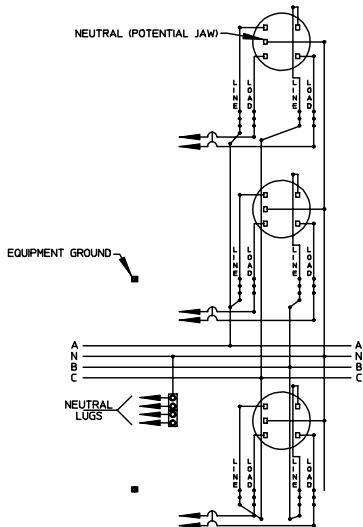
W2MM2AB225USS



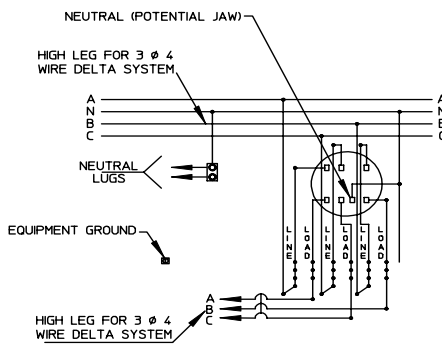
W2MM2BC225USS



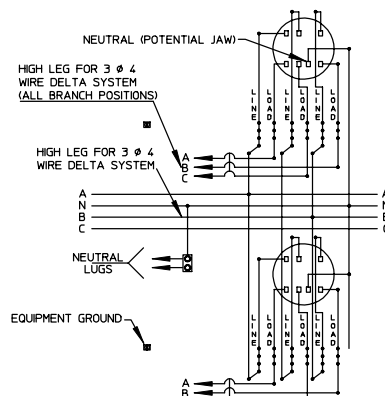
W2MM2CA225USS



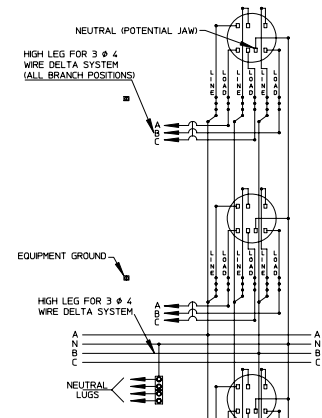
W2MM3225USS



W3MM1225USS



W3MM2225USS



W3MM3225USS

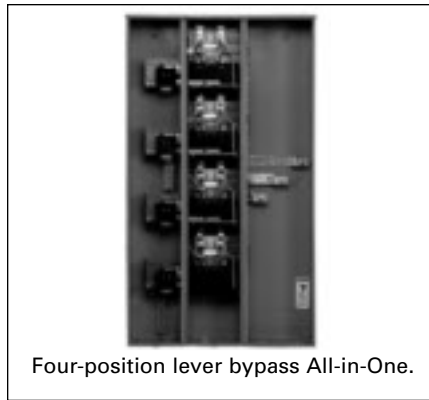
# Meter Centers

## Uni-Pak Metering: Technical Information

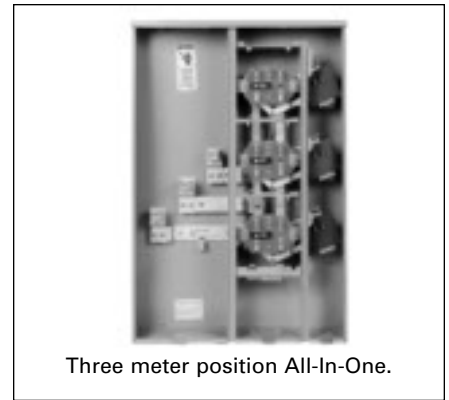
## Selection



Four-position All-in-One featuring angled breaker design.



Four-position lever bypass All-in-One.



Three meter position All-In-One.

### General Information

Siemens' all new Uni-Pak Metering offers maximum flexibility and ease of installation to meet the service requirements of multiple position metering projects. The outdoor/indoor devices are available in two through six gang set-ups which consist of a pull section with main lugs or stud terminations, and 4/5 jaw meter sockets with tenant circuit breaker provisions.

The units operate on 120/240V AC 1Ø-3W systems and are available with either 125 or 200 ampere meter sockets to meet a wide variety of small apartment and commercial building applications. A fifth jaw accessory kit is available for use on 120/208YV AC 1Ø-3W network systems.

The attractive Uni-Pak devices accept overhead or underground service terminations and are designed for wall-hung surface or semi-flush mounting.

The devices are factory pre-bussed in a compact enclosure to ensure ease of handling and installation and to maximize wall-space efficiency.

**In addition to local code and National Electrical Code requirements, the serving utility may have special requirements for metering devices. Confirm utility acceptance prior to order placement.**

### Design/Performance Features

- Siemens' exclusive 200 ampere/position non-lever bypass units feature angled breaker for faster & easier installations
- New Siemens' exclusive floating deadfront on 200 ampere devices eliminates need to line up breakers & covers
- UL Listed for Service Equipment
- UL Listed for use with 60/75°C wire
- UL Listed for short circuit ratings up to 100,000 RMS symmetrical amps at 240V AC
- Outdoor/indoor construction
- Overhead or underground service; load top, bottom or back
- Front accessible 4 or 5-jaw sockets with individual ring or ringless type meter covers
- 125 amp sockets feed plug-in tenant breakers through 125 amperes
- 200 amp sockets feed plug-in tenant breakers through 200 amps
- All unmetered bus is barriered and sealable to prevent unauthorized access
- Compact wall-hung design for ease of handling and installation
- Fifth jaw field installable at 3 or 9 o'clock
- NEW** Lever Bypass now available

- Electrodeposited paint provides uniform coverage for long-lasting protection and sharp appearance
- Meets EUSERC specifications when NEMA stud kit and flange kit (if required) are field-added (not available for lever bypass versions)

### Technical Information

Uni-Pak devices are UL listed under file #E27100 as service entrance equipment.

### Complete Selection

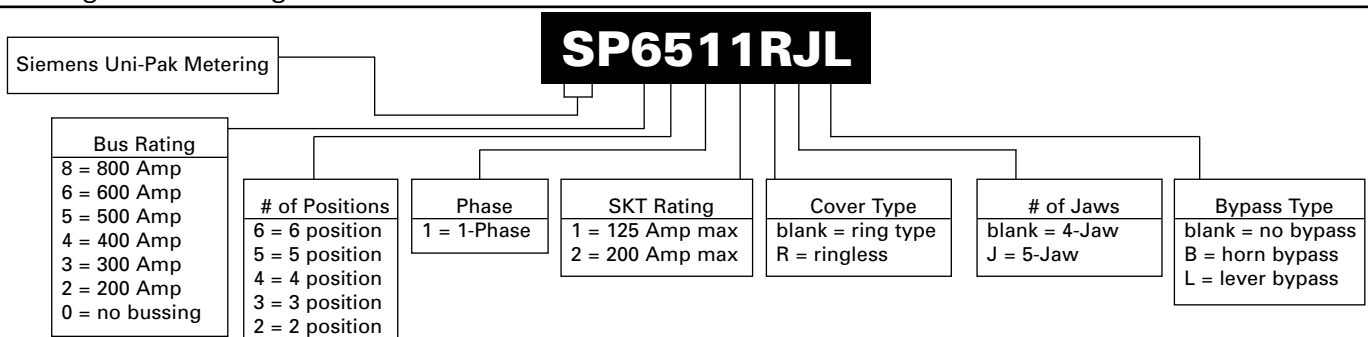
Number of Meter Jaws	4 or 5
Voltage	240V AC Maximum
Amperes (per Meter position)	125 amp or 200 amp Maximum
Amperes (Bus)	800 amps Maximum
Tenant Main Breakers	Provisions for plug-in tenant circuit breakers through 200A
Number of Meter Positions	2, 3, 4, 5 or 6
Service	Overhead or underground with load top, bottom or back

### Industry Specifications

All-In-One residential group metering units comply with the following industry standards.

- ANSI — Standard #C 12.7-1987
- NEMA — Standard #250-1985
- UL — File #E27100
- UL — Standard #50, 67, 414

### Catalog Number Logic

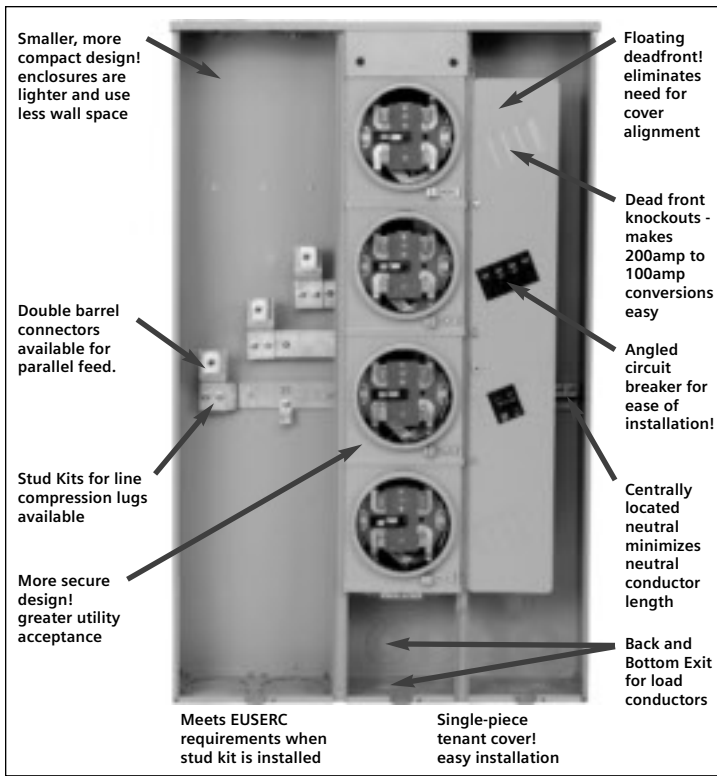




# Meter Centers

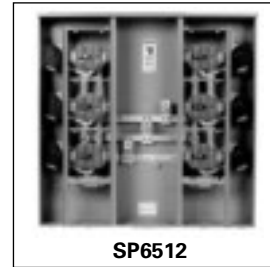
## Uni-Pak Metering: Selection-Ring Style

## Selection



### Features

- Individual split covers
- UL Listed for 60 / 75°C conductors. See equipment markings for applications
- For small apartment buildings, small professional and commercial buildings
- Completely self-contained meter centers
- Two to six 125A and 200A sockets breaker positions
- Outdoor surface mounted enclosures
- Compact, pre-bussed, easy to handle, hang and wire
- Barriered, sealable compartment for un-metered current-carrying parts
- Al/Cu lay-in lugs, except two socket units
- Top or bottom feed
- Bottom and rear branch wiring exits (Neutral and ground at bottom only)
- ANSI #61 light gray electrodeposited paint on zinc-coated G90 steel
- Meets EUSERC specifications when NEMA stud kit and flushing ring (if required) is field added



### 1-Phase, 3-Wire SN, Ring Type, Uni-Pak Meter Center

Continuous Duty Amps Per Position	Bus Amperage	Meter Positions Per Pak	Catalog Number	Breaker Provision	Maximum AIC	Dimensions <sup>①</sup>			5th Jaw Assembly	Line Lugs Wire Range	List Price \$
						Height	Width	Depth			

### 1-Phase, 4-Jaw Sockets, 120/240V AC Max.

125	200	2	SP2211	QP QPH HQP	65,000	37.63	13.67	6.00	ECMM5J	#6-300 kcmil	1242.00
	300	3	SP3311		65,000	38.40	25.50	7.50	ECMM5J	#6-300 kcmil	1494.00
	400	4	SP4411		65,000	47.40	25.50	7.50	ECMM5J	1/0-750 MCM CU-AL	2122.00
	400	5	SP4511		65,000	38.40	39.20	7.50	ECMM5J	or (2) 1/0-250 AL	2686.00
	400	6	SP4611		65,000	38.40	39.20	7.50	ECMM5J	or (2) 1/0-3/0 CU	3113.00
	500	4	SP5411		65,000	47.40	31.50	7.50	ECMM5J	(2) #2-600 kcmil	2636.00
	600	5	SP6511		65,000	38.40	45.20	7.50	ECMM5J		3038.00
	600	6	SP6611		65,000	38.40	45.20	7.50	ECMM5J		3640.00
200	400	2	SP4212	QP QPH HQP QPP QPPH HQP HQP	100,000	31.50	29.50	7.50	ECMM5J	1/0-750 MCM CU-AL	1749.00
	400	3	SP4312		100,000	38.44	29.50	7.50	ECMM5J	or (2) 1/0-250 AL	2587.00
	400	4	SP4412		100,000	47.44	29.50	7.50	ECMM5J	or (2) 1/0-3/0 CU	3392.00
	600	4	SP6412		100,000	47.44	35.50	7.50	ECMM5J	(2) #2-600 kcmil	3740.00
	600	5	SP6512		100,000	38.44	53.10	7.50	ECMM5J		4371.00
	600	6	SP6612		100,000	38.44	53.10	7.50	ECMM5J		5127.00
	800	6	SP8612 <sup>②</sup>		100,000	38.44	53.10	7.50	ECMM5J		5625.00

Flushing Rail Kits:	Description	List Price \$
---------------------	-------------	---------------

### 125 Amps per position

SP221FK	2 Gang 200 amp bus	124.00
SP331FK	3 Gang 300 amp bus	145.00
SP441FK	4 Gang 400 amp bus	145.00
SP4561FK	5&6 Gang 400 amp bus	145.00
SP6561FK	5&6 Gang 600 amp bus	145.00

### 200 Amps per position

SP422FK	2 Gang 400 amp bus	145.00
SP432FK	3 Gang 400 amp bus	145.00
SP442FK	4 Gang 400 amp bus	145.00
SP642FK	4 Gang 600 amp bus	145.00
SP6562FK	5&6 Gang 600 amp bus	145.00

<sup>①</sup> Dimensions shown are representative of outside box length, width, & depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions.

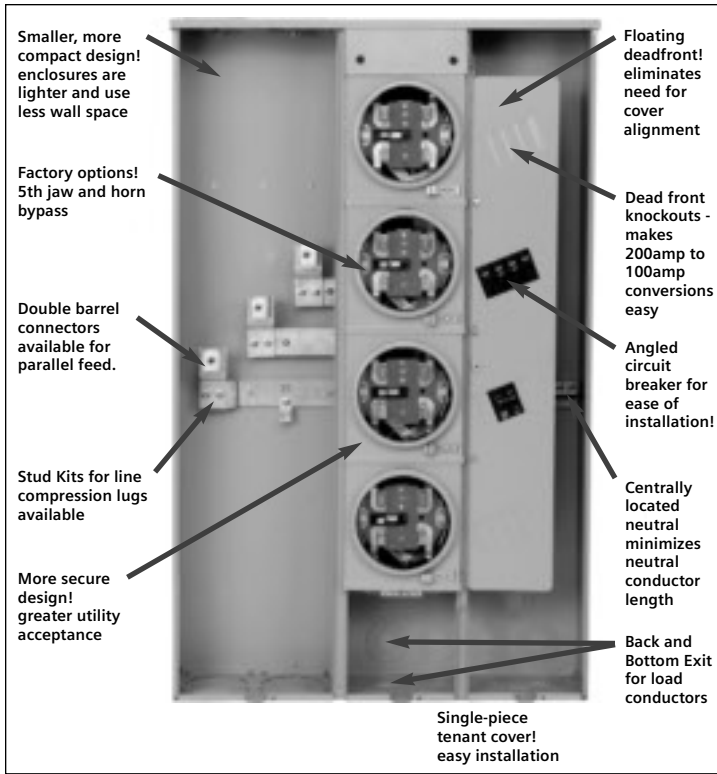
<sup>②</sup> Order NSK600 and PLK600 kits for use with SP8612. CU Cable only approved with 800A device.

# Meter Centers

## Uni-Pak Metering: Selection-Ringless Style<sup>③</sup>

## Selection

2  
METER  
CENTERS



### Features

- Ringless meter construction
- Individual split covers with barrel lock compatibility
- Available with horn bypass factory installed
- UL Listed for 60/75°C conductors See equipment markings for applications
- For small apartment buildings, small professional and commercial buildings
- Completely self-contained meter centers
- Two to six 125A and 200A sockets breaker positions

- Compact, pre-bussed, easy to handle, hang and wire
- Barriered, sealable compartment for unmetered current-carrying parts
- Al/Cu lay-in lugs, except two socket units
- Top or bottom feed
- Bottom and rear branch wiring exits (Neutral and ground at bottom only)
- ANSI #61 light grey electrodeposited paint on zinc-coated steel
- 5th jaw kit included with each unit



### 1-Phase, 3-Wire SN, Ringless Type, Uni-Pak Meter Center - No Bypass & Horn Bypass

Continuous Duty Amps Per Position	Bus Amperage	Meter Positions Per Pak	Catalog Number	Breaker Provision	Maximum AIC	Dimensions <sup>①</sup>			5th Jaw Assembly <sup>②</sup>	Horn Bypass Kit	Line Lugs Wire Range	List Price \$
						Height	Width	Depth				

#### 1-Phase, 5-Jaw Sockets, 120/240V AC Max.

125	200	2	SP2211RJ	QP QPH HQP	65,000	37.50	13.50	6.00	Included	ECHBK	#6-300 kcmil	1342.00
	200	2	SP2211RJB		65,000	37.50	13.50	6.00	Included	Installed	#6-300 kcmil	1341.00
	300	3	SP3311RJ		65,000	37.50	25.50	7.50	Included	ECHBK	#2-600 kcmil	1673.00
	300	3	SP3311RJB		65,000	37.50	25.50	7.50	Included	Installed	#2-600 kcmil	1597.00
	400	4	SP4411RJ		65,000	37.50	25.50	7.50	Included	ECHBK	1/0-750 MCM CU-AL or (2) 1/0-250 AL or (2) 1/0-3/0 CU	2348.00
	400	4	SP4411RJB		65,000	37.50	25.50	7.50	Included	Installed		2348.00
	400	5	SP4511RJ		65,000	37.50	39.20	7.50	Included	ECHBK		2938.00
	400	5	SP4511RJB		65,000	37.50	39.20	7.50	Included	Installed		2938.00
	400	6	SP4611RJ		65,000	37.50	39.20	7.50	Included	ECHBK		3442.00
	400	6	SP4611RJB		65,000	37.50	39.20	7.50	Included	Installed		3292.00
	600	5	SP6511RJ		65,000	37.50	45.20	7.50	Included	ECHBK	(2) #2-600 kcmil	3340.00
	600	5	SP6511RJB		65,000	37.50	45.20	7.50	Included	Installed		3340.00
	600	6	SP6611RJ		65,000	37.50	45.20	7.50	Included	ECHBK		3947.00
	600	6	SP6611RJB		65,000	37.50	45.20	7.50	Included	Installed		3793.00
200	400	2	SP4212RJ	QP QPH HQP QPP QPPH HQPPH	100,000	31.50	29.50	7.50	Included	ECHBK	1/0-750 MCM CU-AL or (2) 1/0-250 AL or (2) 1/0-3/0 CU	1875.00
	400	2	SP4212RJB		100,000	31.50	29.50	7.50	Included	Installed		1822.00
	400	3	SP4312RJ		100,000	38.44	29.50	7.50	Included	ECHBK		2763.00
	400	3	SP4312RJB		100,000	38.44	29.50	7.50	Included	Installed		2686.00
	400	4	SP4412RJ		100,000	47.44	29.50	7.50	Included	ECHBK		3589.00
	400	4	SP4412RJB		100,000	47.44	29.50	7.50	Included	Installed		3467.00
	600	5	SP6512RJ		100,000	38.44	53.10	7.50	Included	ECHBK	4497.00	
	600	5	SP6512RJB		100,000	38.44	53.10	7.50	Included	Installed	4371.00	
	600	6	SP6612RJ		100,000	38.44	53.10	7.50	Included	ECHBK	5300.00	
	600	6	SP6612RJB		100,000	38.44	53.10	7.50	Included	Installed	5125.00	
	800	6	SP8612RJ <sup>③</sup>		100,000	38.44	53.10	7.50	Included	ECHBK	5625.00	

① Dimensions shown are representative of outside box length, width, & depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions.

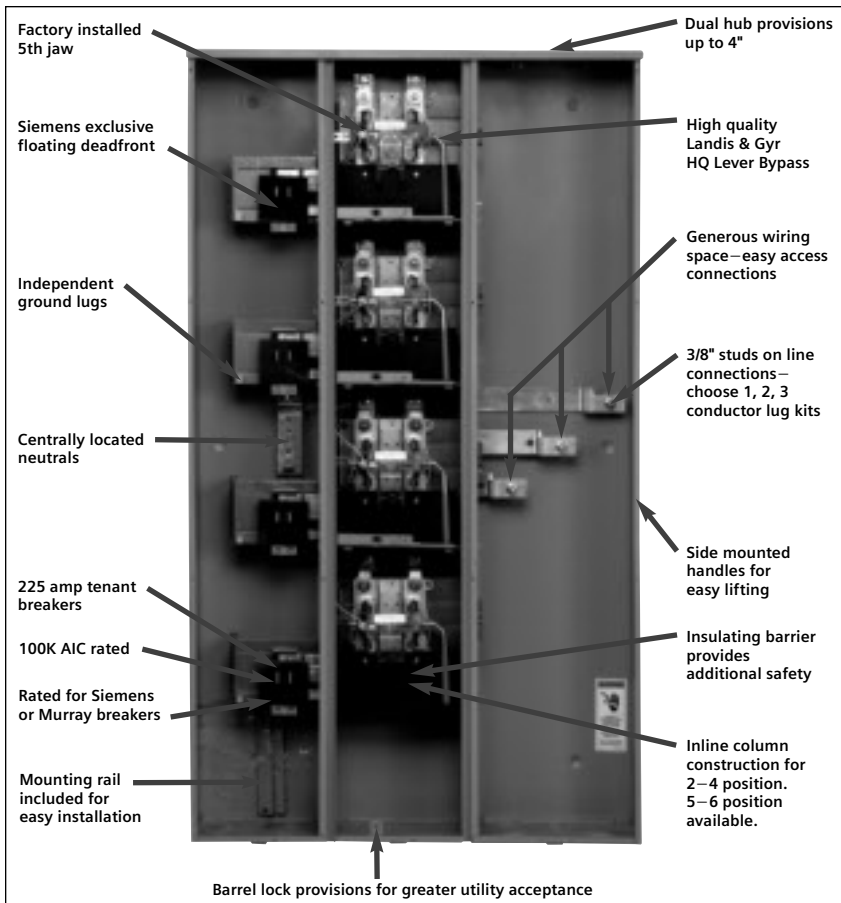
② Order ECMI5J for insulated 5th jaw. Fifth terminal for RJ devices is included, but not installed.

③ Order NSK600 and PLK600 kits for use with SP8612RJ. CU Cable only approved with 800A device.

# Meter Centers

## Uni-Pak Metering: Ringless Style with Lever Bypass

## Selection



The newly designed line of PAK metering from Siemens is now available for those utilities that require a lever bypass for residential & commercial applications. PAK Metering provides an all-in-one solution for applications needing from 2–6 meter positions. The products are designed for easy installation and include features not found on competitors, including:

- Side mounted handles to help in lifting
- “Floating” deadfront to help breaker alignment
- Provisions for one, two, or three incoming conductors per phase and neutral
- Hanging bracket to suspend the unit during installation
- 225 amp branch tenant provisions @ 100,000 AIC
- Full line of 2–6 position devices
- “In-line” (column) construction for 2–4 position devices

Siemens PAK metering has passed rigorous testing and has been accepted by many of those utilities that require a lever bypass.

**Note:** KO diagrams located on page 2-80.

Continuous Duty Amps Per Position	Maximum Tenant Breaker	Bus Amperage	Meter Positions Per Pak	Catalog <sup>®</sup> Number	List Price \$	Breaker Provision	Maximum AIC	Dimensions (inches) <sup>①</sup>			5th Jaw @ 9:00	Line Lugs <sup>②</sup>
								Height	Width	Depth		
<b>1-Phase 5-Jaw sockets, 120/240V AC Max.</b>												
200	225	400	2	SP4212RJL	3074.00	QP, QPH, HQP,	100,000	36.75	35.90	9.00	Installed	3/8"
			3	SP4312RJL	4611.00	QPP, QPPH,	100,000	49.75	35.90	9.00	Installed	Stud
			4	SP4412RJL	6148.00	HQPP, HQPPH	100,000	62.75	35.90	9.00	Installed	Field
		600	5	SP6512RJL	7685.00		100,000	49.75	57.68	9.00	Installed	Installed
			6	SP6612RJL	9063.00		100,000	49.75	57.68	9.00	Installed	Lugs

① Dimensions shown are representative of outside box length, width, and depth and do not include allowances for mounting bumps, endwalls, covers, hubs, or hardware protrusions.

② Line lugs are not included. Please order lugs from chart below.

③ A barrel lock provision is included with each metered position.

### Lug Kits

Lug Catalog Number	Wire Range	List Price \$
H56476	3/0-800/94 kcmil	44.00
H60162	(2) 1/0-250 kcmil OR (1) #4-600 kcmil	44.00
H68752-1	(3) #6-250 kcmil	74.00
H56732-2	(2) #4-350 kcmil	35.00
H56732-M	(2) #4-500 kcmil	56.00

**Note:** Lug kits should be chosen based on the wire size being run to the unit. Wire should be sized according to the National Electrical Code. A total of 3 lugs are required to wire the line side of the device.

### Hub Kits

Size (inches)	Catalog Number	List Price \$
2	EC56854	178.92
2.5	EC56855	178.92
3	EC56856	178.92
3.5	EC56857	263.06
4	EC56858	119.28
Closure Plate	EC56933S	76.68

# Meter Centers

## Uni-Pak Metering: Accessories

Selection

2  
METER  
CENTERS



ECHS125



NSK400



SUK350TA

### Accessories for All-In-One Units

Description	Catalog Number	List Price \$
-------------	----------------	---------------

#### 5th Jaw Kit<sup>①</sup>

All Types	Grounded	ECMM5J	23.50
	Insulated	ECMMI5J	20.50

#### Bypass Kits<sup>①</sup>

Horn Bypass Kit	ECHBK	149.00
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#### Cover Plate

Ring Style <sup>②</sup>	ECPP	19.00
Ringless Style	ECP3	19.00

#### Sealing Rings

Snap-On Type Aluminum	SRSS	19.38
Screw Type Stainless Steel <sup>③</sup>	SRSW	25.03

#### Filler Plates

1" Filler Plate	ECQF3	14.20
4" to 2" Filler Plate	ECCP3U <sup>④</sup>	14.20

#### NEMA Stud Kits (Meets EUSERC Requirements)<sup>①</sup>

400 Amp Bus NEMA Stud Kit	NSK400	157.00
600 Amp Bus NEMA Stud Kit <sup>②</sup>	NSK600	207.00

Description	Catalog Number	List Price \$
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#### Lugs for NEMA Stud Kits<sup>①</sup>

(2) #6-350 kcmil	SUK350TA	54.00
(1) #2-600 kcmil	SUK600TA	49.00
(2) #500-1000 kcmil	SUK1000TA	64.00

#### Alternate Lug Kits<sup>①</sup>

400 Amp Bus Lug Kit (2) #4-250	PLK400	183.00
600 Amp Bus Lug Kit (3) #6-250	PLK600	183.00

#### Type "HD" Conduit Hubs

2" Conduit Hub <sup>②</sup>	EC56854	178.92
2½" Conduit Hub <sup>②</sup>	EC56855	178.92
3" Conduit Hub	EC56856	178.92
3½" Conduit Hub	EC56857	263.06
4" Conduit Hub	EC56858	119.28
Closure Plate	EC56933S	76.68

#### Type "RX" Conduit Hubs

¾" Conduit Hub	EC38594	22.90
1" Conduit Hub	EC38596	37.81
1½" Conduit Hub	EC38597	37.81
1¾" Conduit Hub	EC38598	23.96
2" Conduit Hub	EC38599	23.96
2½" Conduit Hub	EC38600	107.57
Closure Plate	EC38595	38.34
Adapter plate for HD/RX <sup>③</sup>	EC9747-1113	27.00

① Not for use on lever bypass units.

② Order NSK600 and PLK600 kits for use with 800 Amp PAK. CU Cable only approved with 800A device.

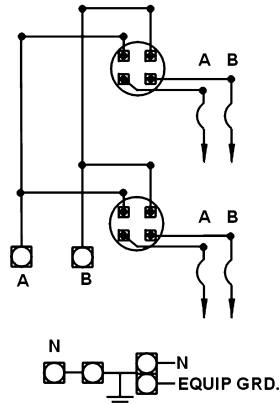
③ Use Adapter plate with RX hubs for PAK units.

④ These items made of Adapter plate and equivalent RX hub.

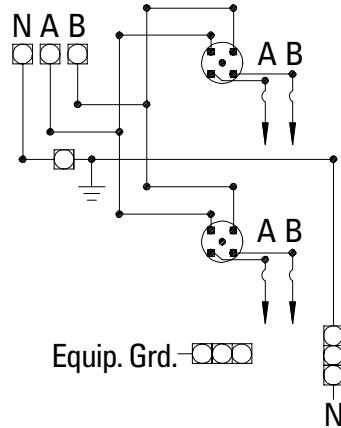
# Meter Centers

## Uni-Pak Metering

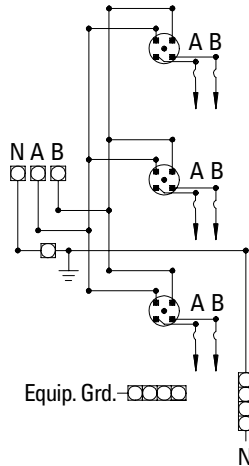
## Wiring Diagrams



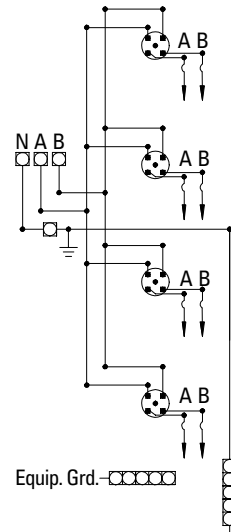
Neutral is permanently bonded to enclosure  
**2 position 125 Amp**



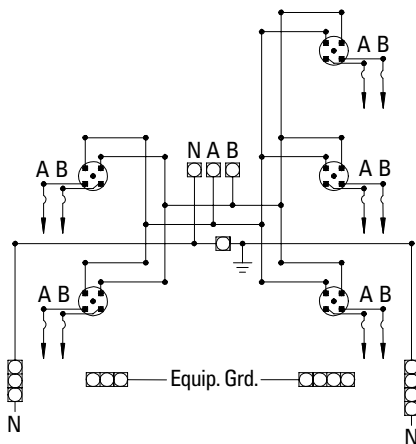
**2 position 200 Amp**



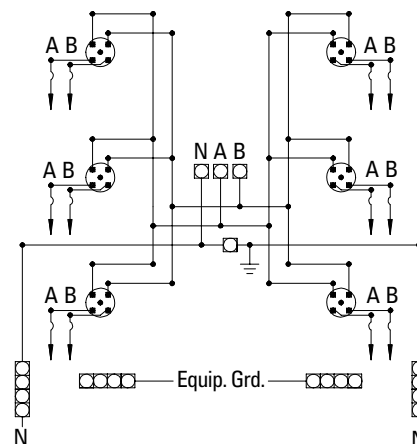
**3 position 125 & 200 Amp**



**4 position 125 & 200 Amp**



**5 position 125 & 200 Amp**

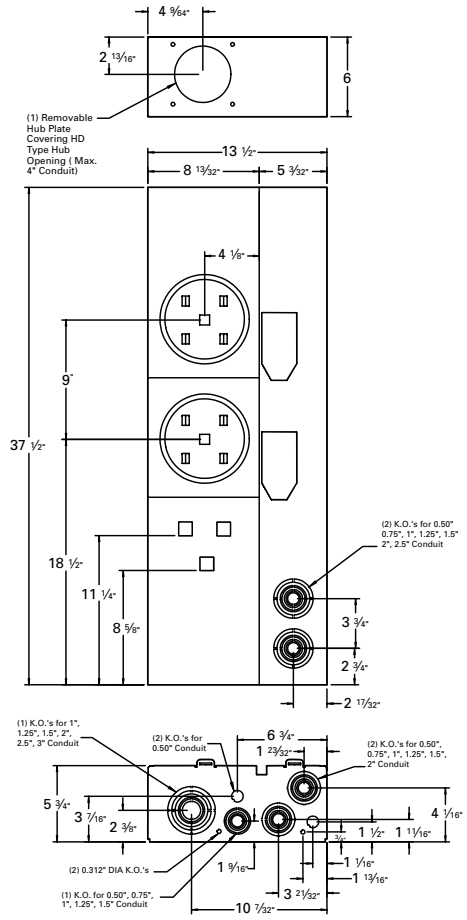


**6 position 125 & 200 Amp**

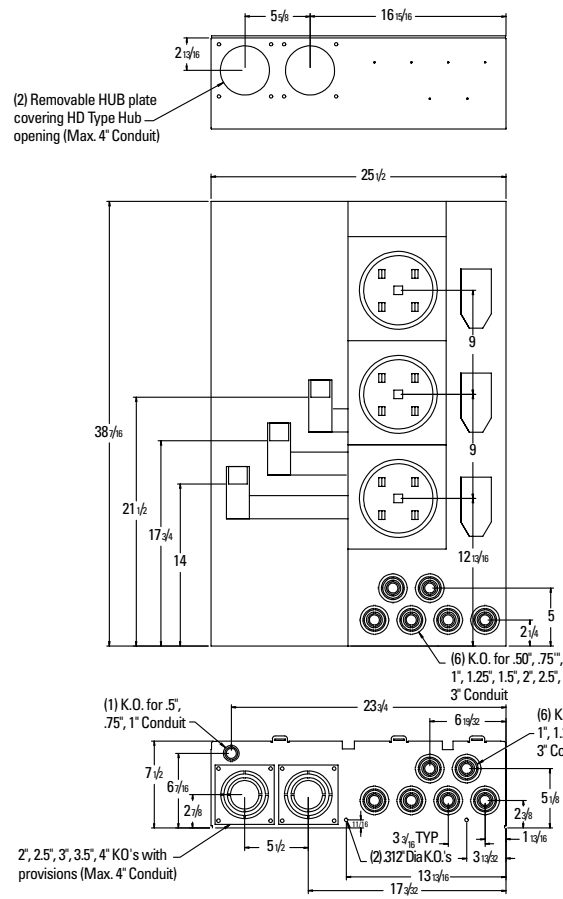
# Meter Centers

## Uni-Pak Metering

## Wiring, Dimensional & Knockout Diagrams



**SP2211X**

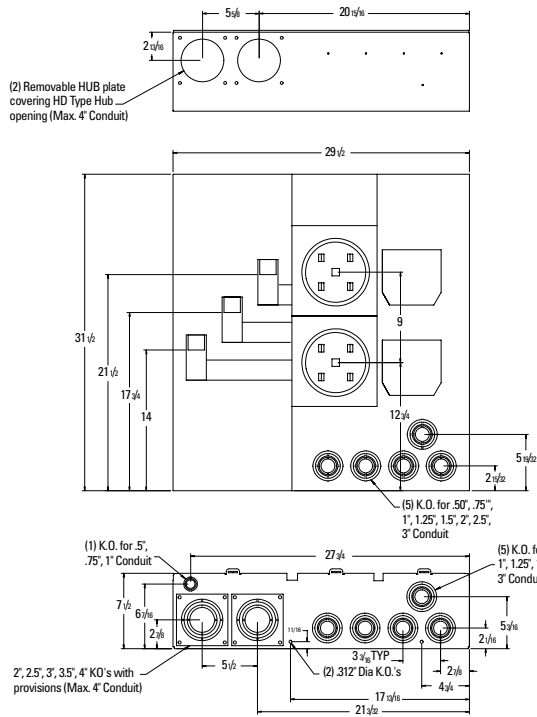


**SP3311X**

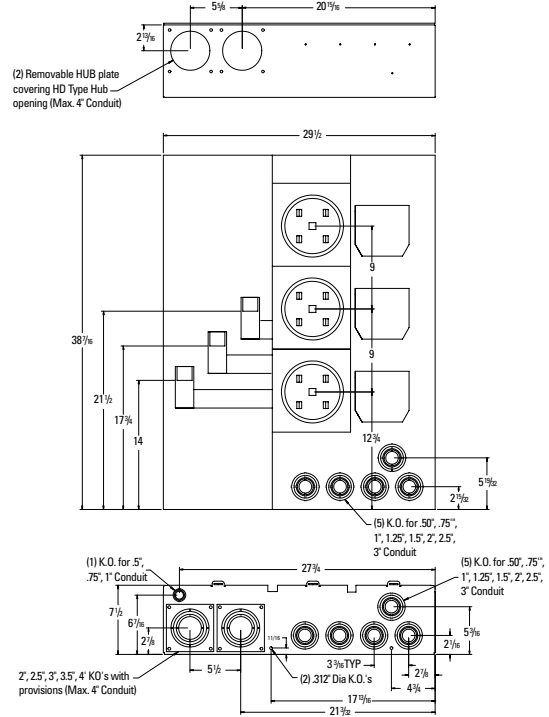
# Meter Centers

## Uni-Pak Metering

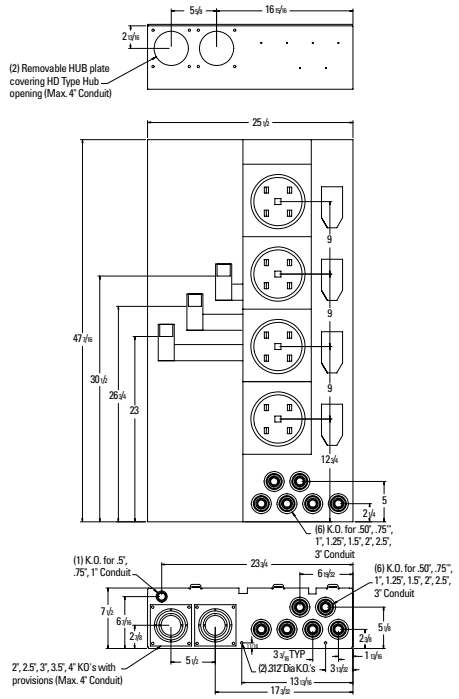
## Wiring, Dimensional & Knockout Diagrams



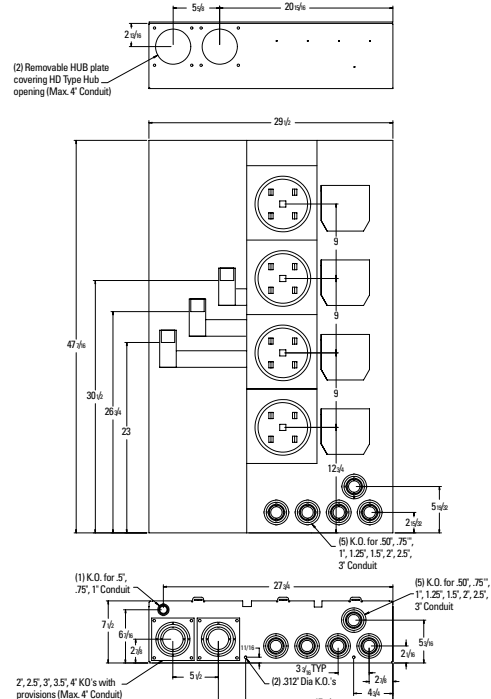
**SP4212R/RJ/RJB**



**SP4312R/RJ/RJB**



**SP4411X**

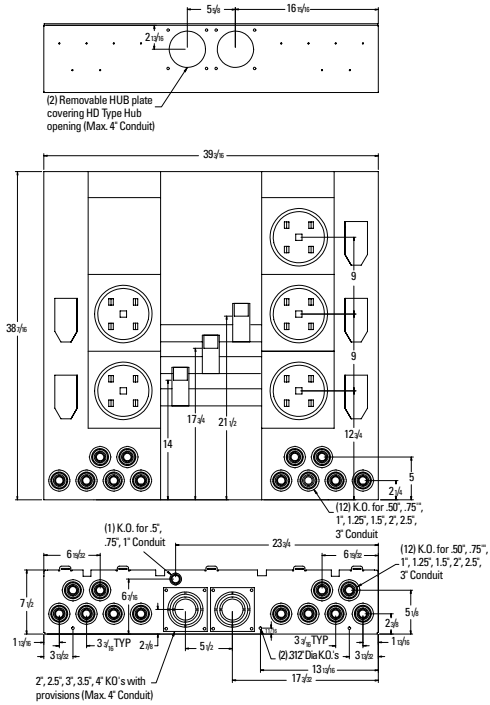


**SP4412R/RJ/RJB**

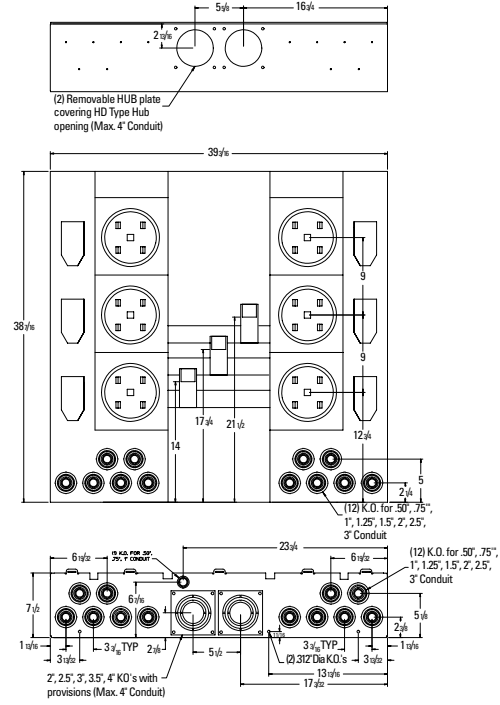
# Meter Centers

## Uni-Pak Metering

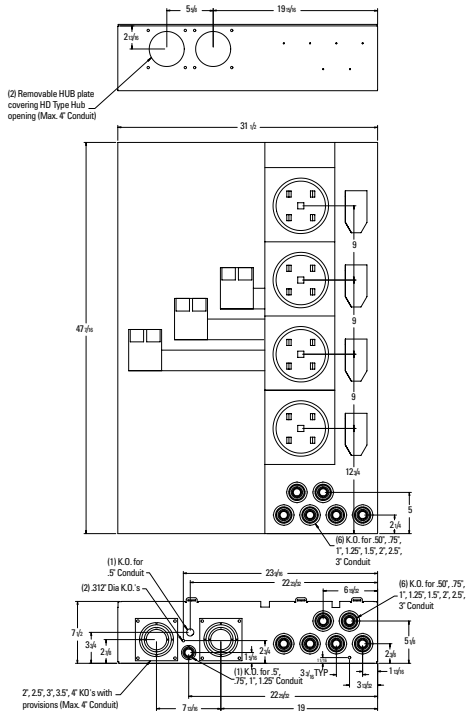
## Wiring, Dimensional & Knockout Diagrams



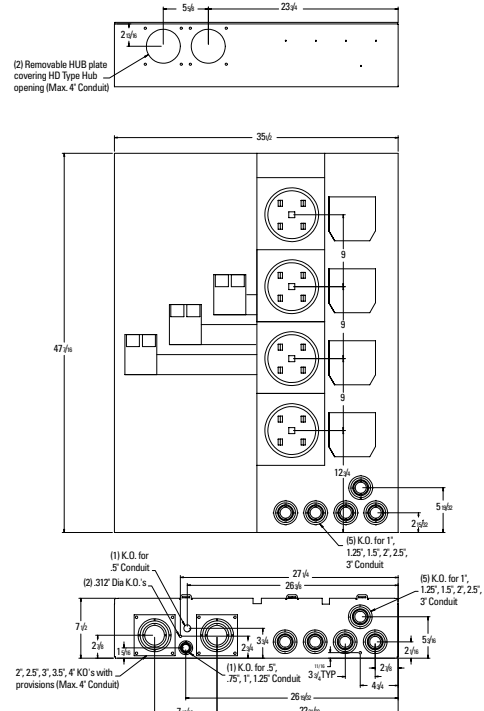
**SP4511X**



**SP4611X**



**SP5411X**



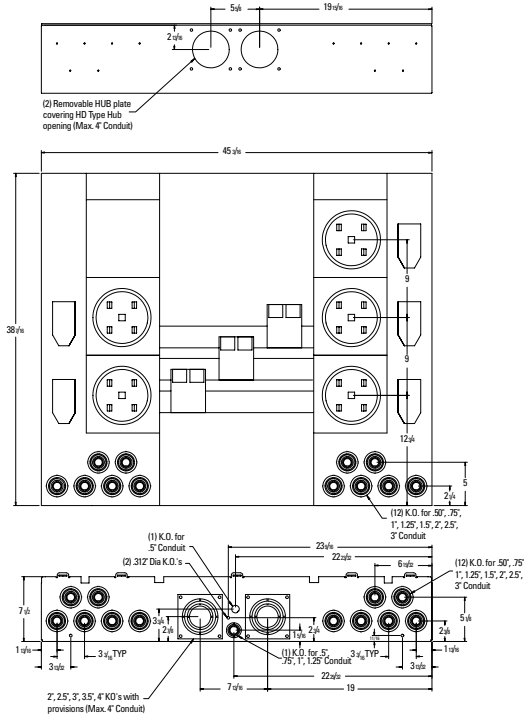
**SP6412R/RJ/RJB**



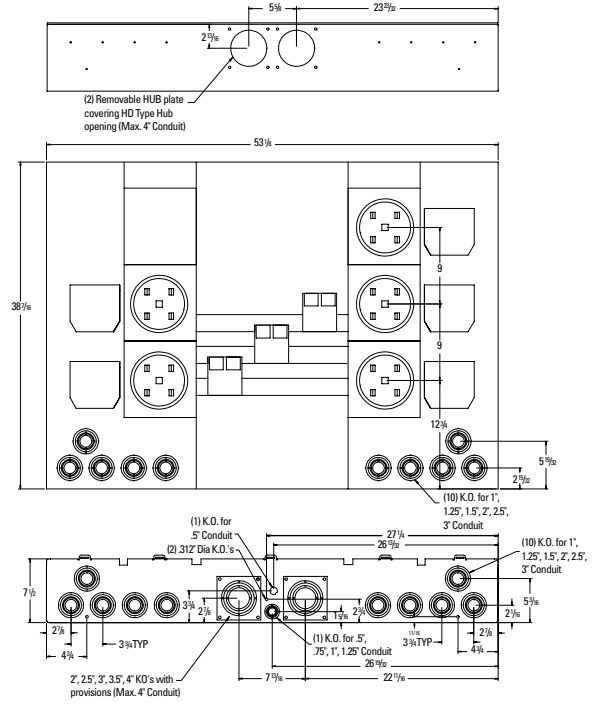
# Meter Centers

## Uni-Pak Metering

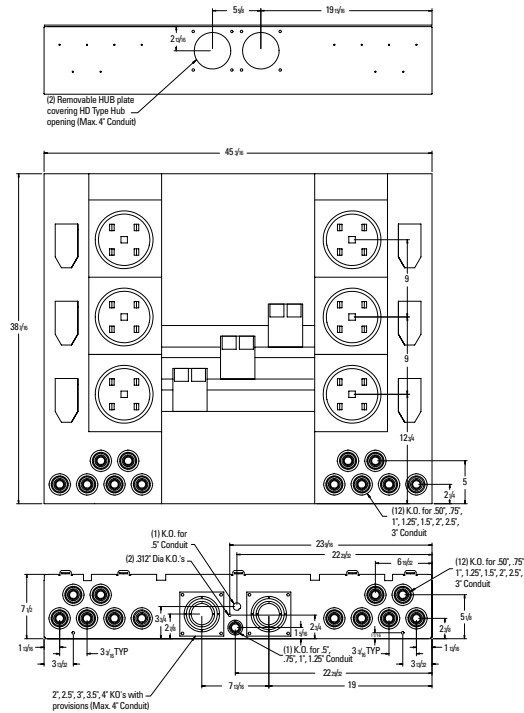
## Wiring, Dimensional & Knockout Diagrams



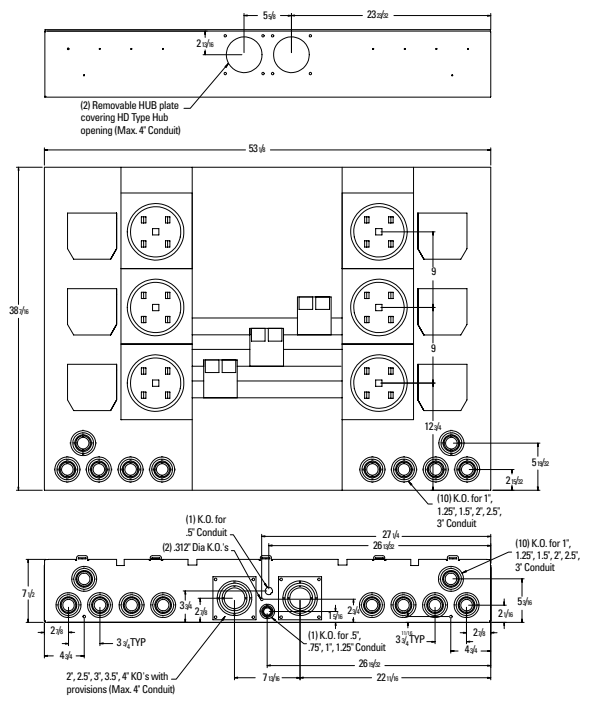
**SP6511X**



**SP6512R/RJ/RJB**



**SP6611X**

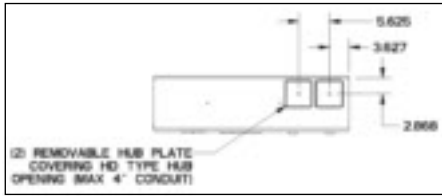


**SP6612R/RJ/RJB  
SP8612R/RJ/RJB**

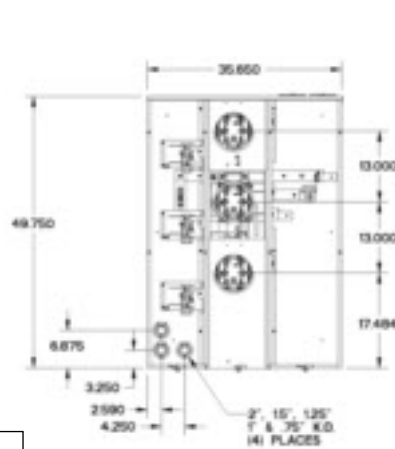
# Meter Centers

## Uni-Pak Metering: Lever Bypass

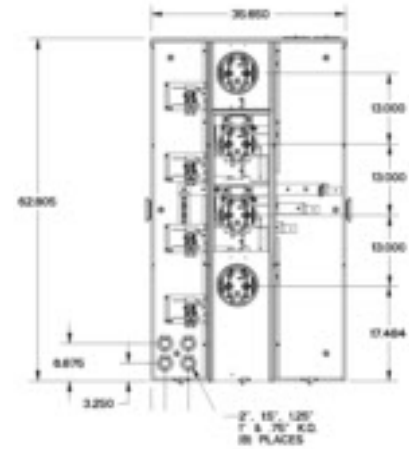
## Wiring, Dimensional & Knockout Diagrams



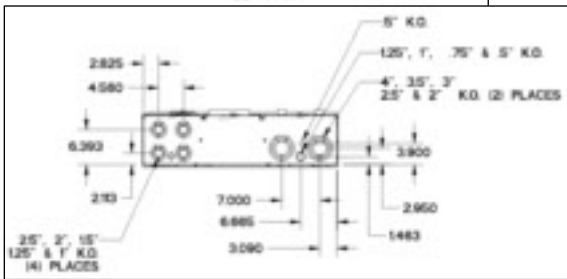
Note:  
2, 3, 4 gang models are the same dimensions on the top and bottom.



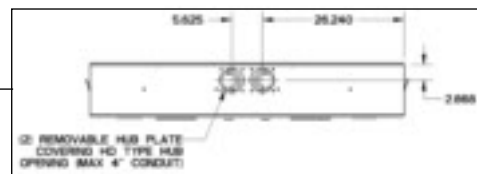
SP4312RJL



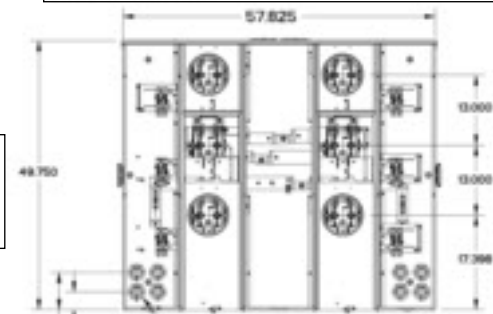
SP4412RJL



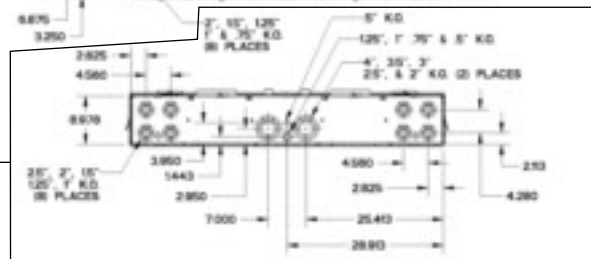
SP4212RJL



Note:  
5 & 6 gang models use the same dimensions.



SP6512RJL



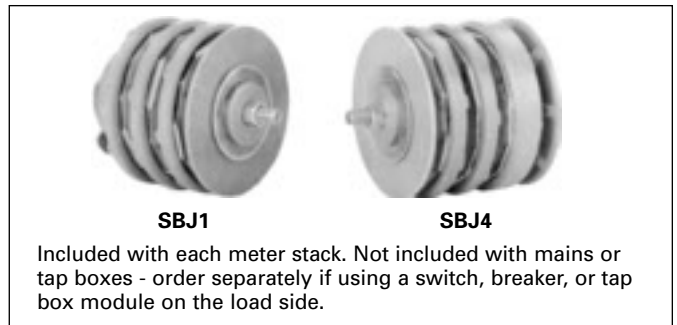
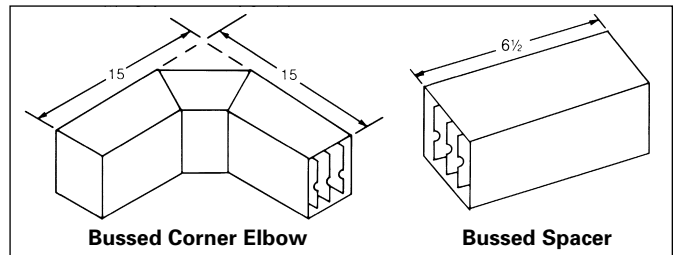
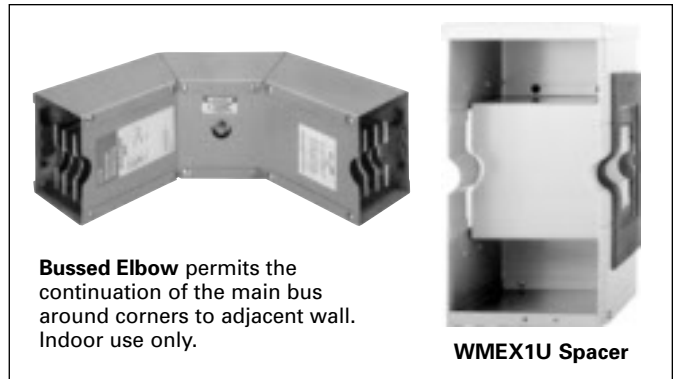
SP6612RJL

# Meter Centers

## Accessories: Modular & PAK Metering

## Selection

Description	Catalog Number	List Price \$
<b>Modular Metering Accessories</b>		
Single Bolt Joint, 1-Phase, 3-Wire, 1200A maximum	<b>SBJ1</b>	<b>364.00</b>
Single Bolt Joint, 3-Phase, 4-Wire, 1200A maximum	<b>SBJ4</b>	<b>401.00</b>
Indoor Bussed Elbow, 1-Phase, 3-Wire, 1200A maximum	<b>BE1<sup>Ⓢ</sup></b>	<b>1470.00</b>
Indoor Bussed Elbow, 3-Phase, 4-Wire, 1200A maximum	<b>BE4</b>	<b>1586.00</b>
Outdoor Bussed Extension, 1-Phase, 3-Wire, 1200A maximum	<b>WMEX1U</b>	<b>873.00</b>
Outdoor Bussed Extension, 3-Phase, 4-Wire, 1200A maximum	<b>WMEX4U</b>	<b>1088.00</b>
Pass-Thru Bushing for use with Underground Pull Box	<b>WMMBK<sup>Ⓢ</sup></b>	<b>216.00</b>
End Closure Plate	<b>WMEP<sup>Ⓢ</sup></b>	<b>42.50</b>
3/4" HR Type Hub for Service Entrance Module	<b>ECHR075</b>	<b>40.00</b>
1" HR Type Hub for Service Entrance Module	<b>ECHR100</b>	<b>39.50</b>
1-1/4" HR Type Hub for Service Entrance Module	<b>ECHR125</b>	<b>39.50</b>
1-1/2" HR Type Hub for Service Entrance Module	<b>ECHR150</b>	<b>40.00</b>
2" HR Type Hub for Service Entrance Module	<b>ECHR200</b>	<b>70.00</b>
2" HV Type Hub for Service Entrance Module	<b>ECHV200</b>	<b>91.00</b>
2-1/2" HV Type Hub for Service Entrance Module	<b>ECHV250</b>	<b>125.00</b>
3" HV Type Hub for Service Entrance Module	<b>ECHV300</b>	<b>182.00</b>
3-1/2" HV Type Hub for Service Entrance Module	<b>ECHV350</b>	<b>274.00</b>
4" HV Type Hub for Service Entrance Module	<b>ECHV400</b>	<b>362.00</b>
<b>PAK Metering Accessories</b>		
2" HD Type Hub for New Uni-PAK	<b>EC56854<sup>Ⓢ</sup></b>	<b>178.92</b>
2-1/2" HD Type Hub for New Uni-PAK	<b>EC56855<sup>Ⓢ</sup></b>	<b>178.92</b>
3" HD Type Hub for New Uni-PAK	<b>EC56856</b>	<b>178.92</b>
3-1/2" HD Type Hub for New Uni-PAK	<b>EC56857</b>	<b>263.06</b>
4" HD Type Hub for New Uni-PAK	<b>EC56858</b>	<b>119.28</b>
Closure Plate for HD Hub Opening	<b>EC56933S</b>	<b>76.68</b>
Nema Stud Kit for New 400A Uni-PAK	<b>NSK400</b>	<b>157.00</b>
Nema Stud Kit for New 600A Uni-PAK	<b>NSK600</b>	<b>207.00</b>
Parallel Lug Kit for New 400A Uni-PAK (2) 250 kcmil	<b>PLK400</b>	<b>183.00</b>
Parallel Lug Kit for New 600A Uni-PAK (3) 250 kcmil	<b>PLK600</b>	<b>183.00</b>



Description	Catalog Number	List Price \$
<b>Universal PAK &amp; MOD Access.</b>		
Sealing Ring- Snap-on, Stainless Steel	<b>SRSS</b>	<b>19.38</b>
Sealing Ring- Screw-type, Stainless Steel	<b>SRSW</b>	<b>25.03</b>
Sealing Ring- Snap-on, Aluminum	<b>SRSTD</b>	<b>17.47</b>
2-pole Bank Filler Plate <sup>Ⓢ</sup>	<b>ECCP1U</b>	<b>14.20</b>
QP 125A Max Breaker <sup>Ⓢ</sup>		
4-pole Blank Filler Plate <sup>Ⓢ</sup>	<b>ECCP2U</b>	<b>14.20</b>
QPP 225A Max Breaker <sup>Ⓢ</sup>		
4-pole Blank Filler Plate <sup>Ⓢ</sup>	<b>ECCP3U<sup>Ⓢ</sup></b>	<b>14.20</b>
With QP (2" wide) 125A breaker installed		
Plastic Cover Plate- for ring style socket	<b>ECPP</b>	<b>19.00</b>
Plastic Cover Plate- for ringless style socket	<b>ECCP3U</b>	<b>14.20</b>
Meter By-pass Jumper 4&5 Jaw	<b>ECJS<sup>Ⓢ</sup></b>	<b>36.74</b>
5th Jaw Kit for Modular Metering - 3, 6, 9 O'clock Positions	<b>ECMM5J<sup>Ⓢ</sup></b>	<b>23.50</b>
Ins. 5th Jaw Kit for Modular Metering - 3, 6, 9 O'clock Positions	<b>ECMM5J<sup>Ⓢ</sup></b>	<b>20.50</b>

Ⓢ For use on 125 & 200Amp sockets only.  
 Ⓢ One pass thru bushing supplied with each WMMB device  
 Ⓢ When adding modular metering modules to old installation, replace metal end closure plate with plastic end closure plate.  
 Ⓢ Item is a kit consisting of adapter plate & RX type hub.

Ⓢ For use on old and new style pak units.  
 Ⓢ Filler plate is not needed for NEW PAK.  
 Ⓢ (2) Required per 1-Phase meter socket. Residential type ring and ringless- 200amp max. Meter cannot be installed while in use. For use with ECPP cover plate.

Ⓢ Modular units only.  
 Ⓢ Add "12" suffix for 12" elbow: BE112 and BE412.

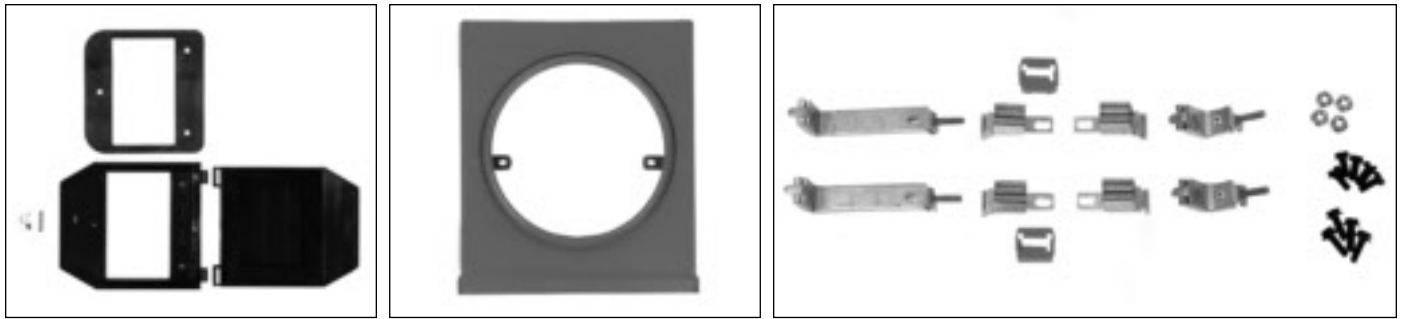
For inches / millimeters conversion, see Application Data section.

### Discount Schedule RESI

# Meter Centers

## Modular Metering Replacement Parts Kits

Selection



- Eliminate the need for Special orders
- Stocked and ready for shipment
- All kits come with appropriate hardware and instruction sheet for safe installation
- Packages are stocked in specified Quantities and cannot be substituted or changed

Part Number	Description	Contents	List Price \$
<b>Breaker Covers</b>			
GMBC1	Group Metering Breaker Cover - 125Amp Positions	One Top and bottom black plastic breaker cover piece, 1 gasket, and a locking clip	10.00
GMBC2	Group Metering Breaker Cover - 200Amp Positions	Top and bottom black plastic breaker cover pieces, gasket, and locking clip	10.00
<b>Meter Covers<sup>①</sup></b>			
MMCVR1	Modular Metering Tenant Covers 125A Ring Style	1 Ringstyle meter cover welded with support brackets and painted	10.00
MMCVR1R	Modular Metering Tenant Covers 125A Ringless	1 Ringless style meter cover welded with support brackets and painted	10.00
MMCVR2	Modular Metering Tenant Covers 200A Ring Style	1 Ringstyle meter cover welded with support brackets and painted	10.00
MMCVR2R	Modular Metering Tenant Covers 200A Ringless	1 Ringless style meter cover welded with support brackets and painted	10.00
PAKMCVRR	Tenant cover for Ring Style Uni-Pak Meter Center	1 Ringstyle meter cover welded with support brackets and painted	10.00
PAKMCVRL	Tenant cover for RingLess Uni-Pak Meter Center	1 Ringless style meter cover welded with support brackets and painted	10.00
<b>Meter Socket/Breaker Mounting</b>			
MMBMT1	Modular Metering Breaker Mounting S/A 125A	Breaker Mounting assembly includes provision for 125 or 200A breaker Meter Socket assembly includes jaws, straps, and hardware - see picture 3 above	14.00
MMSCK1	Modular Metering Meter Socket Assembly 125A		22.00
MMBMT2	Modular Metering Breaker Mounting S/A 200A		24.00
MMSCK2	Modular Metering Meter Socket Assembly 200A		22.00
<b>Loose Parts Kits</b>			
MMPK11	Modular Metering Loose Parts Kit 125A 1 PHASE	All loose screw bags, labels, instruction sheet and aluminum sealing ring (No SBJ)	16.00
MMPK13	Modular Metering Loose Parts Kit 125A 3 PHASE	All loose screw bags, labels, instruction sheet and aluminum sealing ring (No SBJ)	16.00
MMPK21	Modular Metering Loose Parts Kit 200A 1 PHASE	All loose screw bags, labels, instruction sheet and aluminum sealing ring (No SBJ)	16.00
MMPK23	Modular Metering Loose Parts Kit 200A 3 PHASE	All loose screw bags, labels, instruction sheet and aluminum sealing ring (No SBJ)	16.00

① Order CCK or CCK1 for Ring to Ringless Cover Conversion Kit.

# Meter Centers

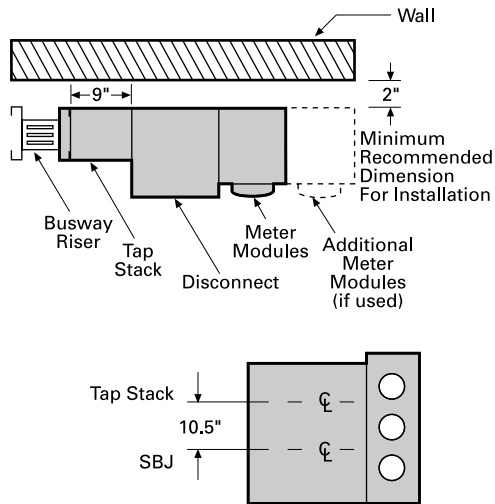
## Modular Metering - Bus Duct Modules

Selection

### Busway Application

Siemens offers a direct busway to modular metering connection. When six or less disconnects are present a connection can be made directly to the meter module. If a main is needed Siemens offers breaker options up to 1200amps and switch options up to 800amps.

All breaker and switch modules are available with up to 100,000 AIC ratings, are UL listed, and carry a Nema 1 (indoor) rating. Common service entrance modules are listed to the right. Lead time may apply. See below for spacing considerations.



Common Bus Duct Units (1)					
Amperes (3)	Phase	Mechanism Type	Catalog Number	AIC Rating (2)	List Price \$
400	1	JXD2 Breaker	MC4BD	65,000	4777.00
	3		MC44BD		7528.00
	1	Class T Fuse	MS4UBD	100,000	2679.00
	3		MS44UBD		4716.00
600	1	LXD6 Breaker	MC6BD	65,000	7250.00
	3		MC64BD		11326.00
	1	Class T Fuse	MS6UBD	100,000	5231.00
	3		MS64UBD		8766.00
800	1	JXD6 Breaker	MC8BD	65,000	11515.00
	3		MC84BD		14810.00
	1	Class T Fuse	MS8UBD	100,000	8630.00
	3		MS84UBD		15262.00
1000	1	NXD6 Breaker	MC10BD	65,000	13348.00
	3		MC104BD		18484.00
1200	1	NXD6 Breaker	MC12BD	65,000	19445.00
	3		MC124BD		27373.00

- 1 - All devices are build to order. Tap stack & SBJ sold separately.
- 2 - 100K AIC Breaker Units available - contact sales office for more information.
- 3 - Alternate amperages for breaker modules available. Contact sales office for more info.

### Tap Stacks<sup>Ⓞ</sup>

Tap stacks save space by connection Siemens' Sentron Busway directly to specially-designed Siemens circuit breaker, switch, or tap box modules. Common modules are listed above. Tap stacks require end-user to purchase an additional single bolt joint coupler and are for indoor use on end-feed applications only.



For inches / millimeters conversion, see Application Data section.

Ⓞ Tap stacks are produced with the busway. Contact sales office for more information.

# EUSERC Commercial Metering

## Commercial Type BY Meter-Main Combinations

**Selection**



### Design/Performance Features

- Outdoor/Indoor—one design for either installation.
- Ring Type—meets requirements for various ring type locking provisions.
- Test Block Bypass Installed—easy servicing without interruption.
- Main Breaker Field Installed—adaptable to the job.
- Main T-Fuse puller factory installed (less fuses)—adaptable to the job.

### Industry Specifications

- ANSI – Standard #C 12.7
- NEMA – Standard #250 Standard #PB1
- UL – Standard #414 Standard #67
- EUSERC – SEC #300

### Systems

- 100/200 amperes maximum meter
- 120/240V AC, 1ø3W, 4 jaw
- 208Y/120V AC, 3W network, 5 jaw or 3ø4W, 7 jaw
- 240V AC, 1ø3W, 3ø3W, or 3ø4W, 4, 5 or 7 jaw
- 10,000 to 100,000 AIC

**In addition to local code and National Electrical Code requirements, the serving utility may have special requirements for metering devices. Confirm meter socket acceptance prior to order placement.**

## Ring-type Meter-Main Combinations 100-200Amp Max.

240V AC Max	Amps Cont. Duty	Max AIC	Tenant Main®	CB Provision	Service	Jaws	Catalog Number	Service Feed	Dimensions (inches)®			KO Fig.	Wire Range AL/CU	Hub Provision	List Price \$
									Height	Width	Depth				
100	65,000	Circuit Breaker Provision	QP/QPH/HQP		1Phase-3 Wire	4	MM0202L1100EY	OH	36.00	12.50	4.88	1	#6-2/0 Box Lug	RX	854.00
					3 Phase-4 Wire	7	MM0303L3100EY	OH	36.00	12.50	4.88	1	#6-2/0 Box Lug		1263.00
	100,000	T-Fuse Puller®	None	1 Phase-3 Wire	4	MM0202F1100EY	OH	36.00	12.50	4.88	1	#6-2/0 Box Lug	RX	1734.00	
					4	MM0202F1100CEY	OH/UG	24.00	20.13	4.88	3	#6-2/0 Box Lug		1586.00	
				3Phase-4 Wire	7	MM0303F3100EY	OH	36.00	12.50	4.88	1	#6-2/0 Box Lug		2322.00	
					7	MM0303F3100CEY	OH/UG	24.00	20.13	4.88	3	#6-2/0 Box Lug		2121.00	
200	35,000	Circuit Breaker Provision	QJ2/QJH2/QJ2H/HQJ2H	1 Phase-3 Wire	4	MM0202L1200EY	OH	45.00	14.25	6.38	2	#1/0-250 kcmil	HC	1661.00	
					4	MM0202L1200CEY	OH/UG	30.00	24.25	6.38	4	#1/0-250 kcmil		1776.00	
				3 Phase-4 Wire	7	MM0303L3200EY	OH	45.00	14.25	6.38	2	#1/0-250 kcmil		2207.00	
					7	MM0303L3200CEY	OH/UG	30.00	24.25	6.38	4	#1/0-250 kcmil		2356.00	
	100,000	T-Fuse Puller®	None	1 Phase-3 Wire	4	MM0202F1200EY	OH	45.00	14.25	6.38	2	#1/0-250 kcmil	HC	2322.00	
					4	MM0202F1200CEY	OH/UG	30.00	24.25	6.38	4	#1/0-250 kcmil		2471.00	
				3 Phase-4 Wire	7	MM0303F3200EY	OH	45.00	14.25	6.38	2	#1/0-250 kcmil		3004.00	
					7	MM0303F3200CEY	OH/UG	30.00	24.25	6.38	4	#1/0-250 kcmil		3250.00	

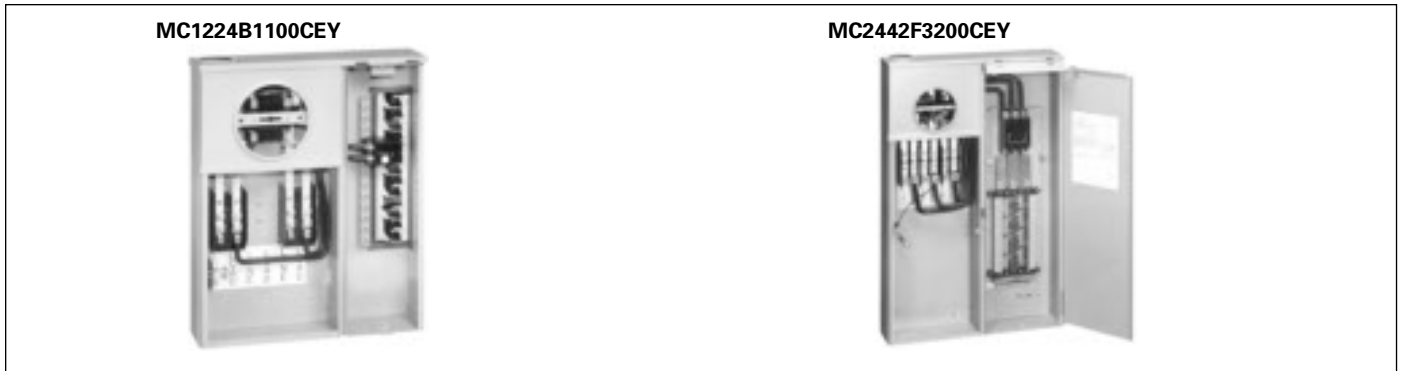
® Dimensions shown are representative of outside box length, width & depth (± 1/8") and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions. Consult factory for specific details if required.

® Price does not include breaker or fuses.  
 ® Price does not include fuses.

# EUSERC Commercial Metering

## Commercial Type BY Meter-Load Center Combinations

Selection



### Design/Performance Features

- Outdoor/Indoor—one design for either installation.
- Ring Type—meets requirements for various ring type locking provisions.
- Test Block Bypass Installed—easy servicing without interruption.
- Main Breakers Factory Installed.
- Main T-Fuse Pullers Factory Installed (less fuses).
- Compact wall-hung design reduces material and labor costs.

### Systems

- 100A, 200A maximum meter
- 120/240V AC, 1 $\phi$ 3W, 4 jaws
- 240V AC, 3 $\phi$ 4W, 7 jaws
- 10,000 thru 100,000 AIC

Accessories — See below.

**In addition to local code and National Electrical Code requirements, the serving utility may have special requirements for metering devices. Confirm meter socket acceptance prior to order placement.**

## Ring Type Commercial Meter-Load Center Combinations with Test Block Bypass

240 V AC Max.		No. of Spaces	Max. Circuits	Service	Catalog Number	AIC Rating		Dimensions (inches) <sup>⓪</sup>			Hub Prov.	Wire Wire Range AL/CU	KO Fig.	List Price	Notes
Amps Cont. Duty	Main Breaker Factory Inst.					STD. AIC	MAX AIC	Height	Width	Depth					

### 1 Phase—3 Wire, 4 Jaws, Factory Installed Main Breaker

100	Q2100	10	20	OH	MC1020B1100EY	10,000	65,000	36.00	12.50	4.88	RX	#6-2/0 Box Lug	7	1663.00	2
		12	24	OH/UG	MC1224B1100CEY	10,000	42,000	24.00	20.13	4.88	RX	#6-2/0 Box Lug	8	1727.00	2
200	QN2200RH	24	40	OH/UG	MC2440B1200CEY	10,000	22,000	30.00	25.75	6.38	HC	#1/0-250 kcmil	9	3116.00	2

### 3 Phase—4 Wire, 7 Jaws, Factory Installed T-Fuse Puller<sup>Ⓢ</sup>

100	T-Fuse Prov.	18	30	OH/UG	MC1830F3100CEY	100,000	100,000	26.00	24.25	4.88	RX	#6-2/0 Box Lug	10	3135.00	4
200	T-Fuse Prov.	24	42	OHUG	MC2442F3200CEY	100,000	100,000	42.00	27.25	6.38	HC	#1/0-250 kcmil	11	3924.00	4

## Safety Socket Accessories

Description	Catalog Number	List Price \$
Hubs		
Conduit Size		
1"	EC38596	37.81
1½"	EC38597	37.81
1½"	EC38598	23.96
2"	EC38599	23.96
2"	ECHC200	72.00
2½"	EC38600	107.57
2½"	ECHC250	108.00
3"	ECHC300	175.00
Closure Plates	EC38595	38.34
	ECHC000	24.00
Adapter Plates Bottom Only	ECHCRXA	22.50

Description	Catalog Number	List Price \$
Fifth Jaw		
100A	UX001WL	23.50
200A	UX005B	103.00

<sup>⓪</sup> Dimensions shown are representative of outside box length, width & depth and do not include allowances for mounting bumps, endwalls, covers, hubs or hardware protrusions.

<sup>Ⓢ</sup> UL Listed to field change main breaker to higher AIC.  
<sup>Ⓢ</sup> Price does not include fuses.

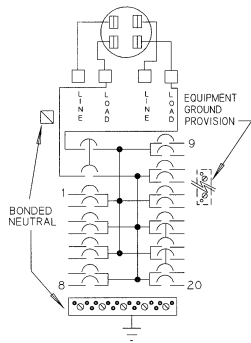
# EUSERC Commercial Metering

## Type BY Wiring Diagrams

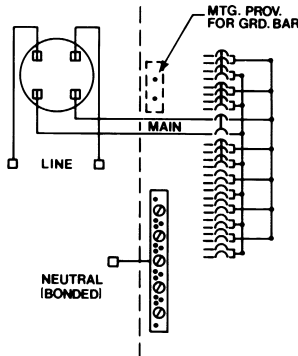
Selection

### Commercial All-In-Ones

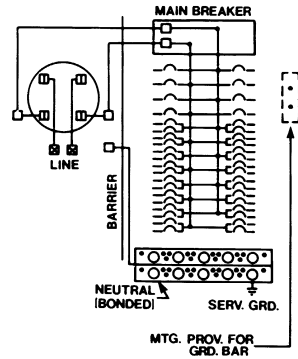
MC1020B1100EY



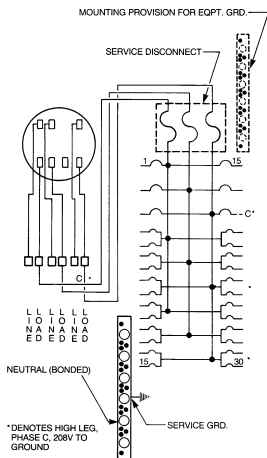
MC1224B1100CEY



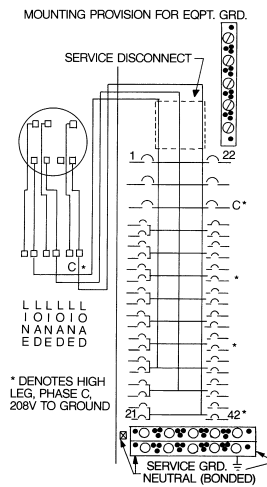
MC2440B1200CEY



MC1830F3100CEY



MC2442F3200CEY





# EUSERC Commercial Metering

## Type BY Dimensions & Knockout Data

Selection

2  
METER  
CENTERS

Figure 1

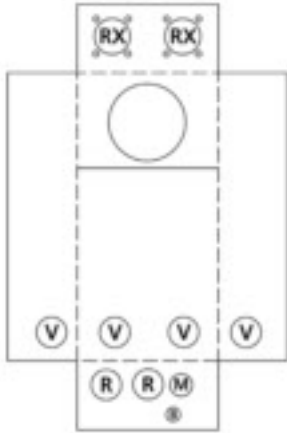


Figure 2

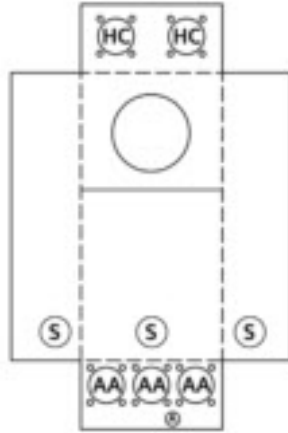


Figure 3

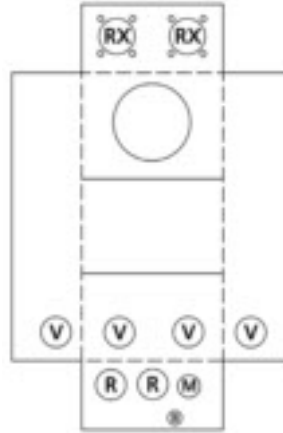


Figure 4

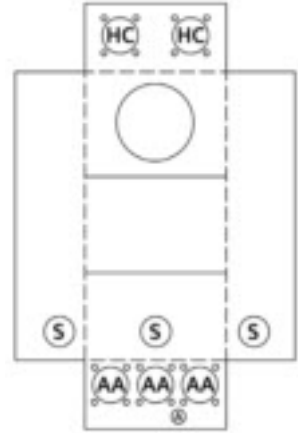


Figure 5

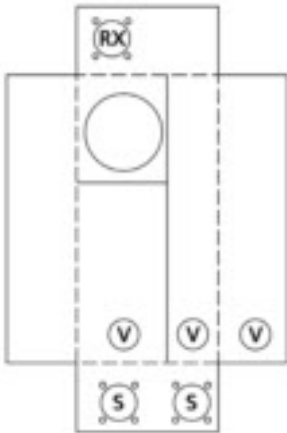


Figure 6

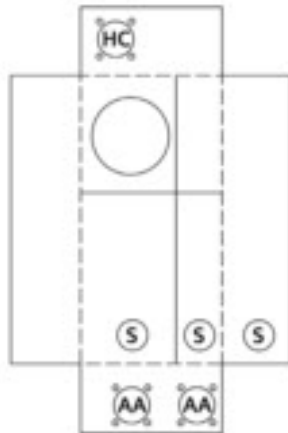


Figure 7

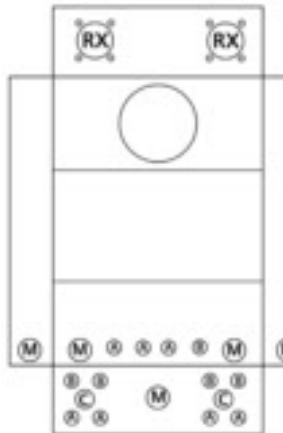
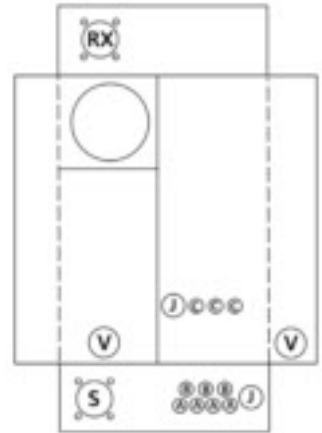


Figure 8



### Knockout Code—Conduit Sizes

● = 1/4	S = 1, 1 1/4, 1 1/2, 2, 2 1/2
A = 1/2	T = 1 1/4
B = 3/8, 3/4	U = 1 1/4, 1 1/2
C = 1/2, 3/4, 1	V = 1 1/4, 1 1/2, 2
D = 1/2, 1	W = 1 1/4, 2
E = 1/2, 3/4, 1, 1 1/4	X = 1 1/4, 1 1/2, 2, 2 1/2
F = 1/2, 1 1/4, 1 1/2	Y = 1 1/2, 2
G = 3/4	Z = 1 1/2, 2, 2 1/2
H = 3/4, 1	AA = 1 1/2, 2, 2 1/2, 3
J = 3/4, 1, 1 1/4	BB = 1 1/2, 2, 2 1/2, 3, 3 1/2
K = 3/4, 1 1/4	CC = 2, 2 1/2, 3, 3 1/2
M = 3/4, 1, 1 1/4, 1 1/2	EE = 2, 2 1/2, 3
N = 3/4, 1, 1 1/4, 1 1/2, 2	FF = 2 1/2, 3
P = 1, 1 1/4	GG = 2 1/2, 3, 3 1/2
Q = 1, 1 1/4, 1 1/2	HH = 2 1/2, 3, 3 1/2, 4
R = 1, 1 1/4, 1 1/2, 2	JJ = 3 1/2, 4
	LL = 3
	VV = 2

# Notes

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# Type VBI Safety Switches

## Guide Form Specifications

## Product Overview

	General Duty	Heavy Duty	Double Throw																																							
<b>Application</b>	General Duty Switches are intended for applications where reliable performance and continuity of service are needed, but where duty requirements are not severe and usual service conditions prevail. (These switches are intended for use primarily with supply circuits rated 240V AC or less where the available fault current is less than 100,000A when used with Class R or T fuses or 10,000A max. when used with Class H fuses.)	Heavy Duty Switches are intended for use in applications where: <ol style="list-style-type: none"> <li>1. Rugged construction, reliable performance, continuity of service and ease of maintenance are emphasized, or</li> <li>2. Available fault currents higher than 10,000A are likely to be encountered, such as in manufacturing plants, mass production industries, and commercial, institutional and other large buildings served by network systems or transformers of higher capacities.</li> <li>3. System voltage is 600V AC or DC Max.</li> <li>4. A Type 12 or 4 / 4X enclosure is required.</li> </ol>	Double throw switches are intended to transfer loads from one power source to another. All 2 & 3 pole double throw switches are suitable for use as service equipment. All are UL Listed. Switches are rated for use on systems with an available fault current of up to 10,000 AIC when protected with Class H fuses or either 100,000 or 200,000 AIC when protected with Class R, J or Class T fuses. They can also be used to connect a single source of power to either of two loads. In this application it is necessary to field modify fusible switches so that the fuses are on the load side of the switching mechanism.																																							
<b>Short Circuit Withstand Ratings</b>	Suitable for use on systems capable of delivering not more than 100,000 RMS symmetrical amperes of fault current as follows: <table border="1"> <thead> <tr> <th>Sw. Rating</th> <th>AIC Rating</th> <th>Protective Device<sup>ⓐ</sup></th> </tr> </thead> <tbody> <tr> <td>30-600A</td> <td>10,000</td> <td>Circuit Breaker</td> </tr> <tr> <td>30-600A</td> <td>10,000</td> <td>Class H Fuse</td> </tr> <tr> <td>30-600A</td> <td>100,000</td> <td>Class R Fuse</td> </tr> <tr> <td>100-600A</td> <td>100,000</td> <td>Class J or T Fuse</td> </tr> </tbody> </table>	Sw. Rating	AIC Rating	Protective Device <sup>ⓐ</sup>	30-600A	10,000	Circuit Breaker	30-600A	10,000	Class H Fuse	30-600A	100,000	Class R Fuse	100-600A	100,000	Class J or T Fuse	Suitable for use on systems capable of delivering not more than 200,000 RMS symmetrical amperes of fault current as follows: <table border="1"> <thead> <tr> <th>Sw. Rating &amp; Type</th> <th>AIC Rating</th> <th>Protective Device<sup>ⓐ</sup></th> </tr> </thead> <tbody> <tr> <td>All Heavy Duty &amp; DT</td> <td>10,000</td> <td>Circuit Breaker</td> </tr> <tr> <td>30-600A HD &amp; DT</td> <td>10,000</td> <td>Class H Fuse</td> </tr> <tr> <td>60A Compact HD</td> <td>100,000</td> <td>Class R, J or T Fuse</td> </tr> <tr> <td>GD &amp; 4P DT</td> <td>100,000</td> <td>Class R, J or T Fuse</td> </tr> <tr> <td>30-600A HD</td> <td>200,000</td> <td>Class R, J or T Fuse</td> </tr> <tr> <td>30-600A DTF &amp; DTNF DT<sup>ⓑ</sup></td> <td>200,000</td> <td>Class R, J or T Fuse</td> </tr> <tr> <td>800 &amp; 1200A HD &amp; DT<sup>ⓑ</sup></td> <td>200,000</td> <td>Class L or T Fuse</td> </tr> </tbody> </table>	Sw. Rating & Type	AIC Rating	Protective Device <sup>ⓐ</sup>	All Heavy Duty & DT	10,000	Circuit Breaker	30-600A HD & DT	10,000	Class H Fuse	60A Compact HD	100,000	Class R, J or T Fuse	GD & 4P DT	100,000	Class R, J or T Fuse	30-600A HD	200,000	Class R, J or T Fuse	30-600A DTF & DTNF DT <sup>ⓑ</sup>	200,000	Class R, J or T Fuse	800 & 1200A HD & DT <sup>ⓑ</sup>	200,000	Class L or T Fuse	
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GD & 4P DT	100,000	Class R, J or T Fuse																																								
30-600A HD	200,000	Class R, J or T Fuse																																								
30-600A DTF & DTNF DT <sup>ⓑ</sup>	200,000	Class R, J or T Fuse																																								
800 & 1200A HD & DT <sup>ⓑ</sup>	200,000	Class L or T Fuse																																								
<b>Fuses</b>	Fusible switches will accept the following UL class fuses: <ul style="list-style-type: none"> <li>30 "LF" - 30A max plug Fuses</li> <li>30-600A "GF" Class H &amp; K, Class R with kit</li> <li>100-600A "GF" Class J-move base</li> <li>100-200 "GF" Class T with kit</li> <li>400-600A "GF" Class T-move bases</li> </ul>	Fusible switches will accept the following UL class fuses: <ul style="list-style-type: none"> <li>30-600A "HF" Class H &amp; K, Class R with kit</li> <li>30-600A, 600V "HF" Class J-move base</li> <li>100-600A, 240V "HF" Class J-move base</li> <li>100-200A "HF" Class T with kit</li> <li>400-600A "HF" Class T-move bases</li> <li>800-1200A "HF" Class L, Class T with kit<sup>ⓑ</sup></li> </ul>	Fusible switches will accept the following UL class fuses: <ul style="list-style-type: none"> <li>30-200A "DT" &amp; "F" Class H &amp; K, Class R with kit</li> <li>30 &amp; 60A 600V "DT" Class J-move base</li> <li>100-200A "DT" Class J-move base, Class T with kit</li> <li>400-600A "DT" Class J-standard, Class T-move bases</li> <li>400A "F" Class T-standard</li> </ul>																																							
<b>Cover Interlocks</b>	Voidable – cover interlocks on switches prevent the switch door from being opened when in the "ON" position. No cover interlock on 30A Type 3R or on plug fuse type switches.	Voidable dual cover interlocks standard on all heavy duty switches. Prevents cover from being opened when switch is in the "ON" position and prevents switch from being turned "ON" when door is opened.	Dual cover interlocks standard on all double throw switches. Prevents cover from being opened when switch is in the "ON" position and prevents switch from being turned "ON" when door is opened.																																							
<b>Underwriters' Laboratories, Inc.</b>	Listed by UL under file #E4776 as enclosed switches and also suitable for use as service equipment (where applicable). UL98 Enclosed and Deadfront Switches.																																									
<b>NEMA Specifications</b>	Meet NEMA standard KS-1-1990 for type GD switches.	Meet NEMA standard KS-1-1990 for type HD switches.	Meet NEMA standard KS-1-1990 type GD for "DTG" & type HD for "DT", "F" & "NF" switches.																																							
<b>Groundable Neutral</b>	Fusible switches have groundable neutral blocks factory installed. Non-fusible switches accept field addable neutrals. All neutrals are bondable for service entrance use.	All switches (both Fusible and Non-Fusible) are either supplied with factory installed neutrals or accept field addable neutrals. All neutrals are bondable for service entrance use.	All except 4 pole switches will accept field addable neutrals except that "DTG" 100 & 200A switches are also available with factory installed neutrals. All neutrals are bondable for service entrance use.																																							
<b>Padlocks</b>	Padlockable cover latch. OFF padlock provisions on handle.	Padlockable cover latch and multiple OFF padlock provisions on handle.	Padlockable cover latch and multiple OFF padlock provisions on handle.																																							
<b>HP &amp; Load Break Ratings</b>	All General Duty, Heavy Duty and Double Throw Switches are both load break and horsepower rated.																																									

<sup>ⓐ</sup>The protective device can either be a fuse installed in a fusible switch or an upstream fuse or circuit breaker protecting a non-fusible switch. The ampere rating of the upstream protective device must not exceed the switch ampere rating.

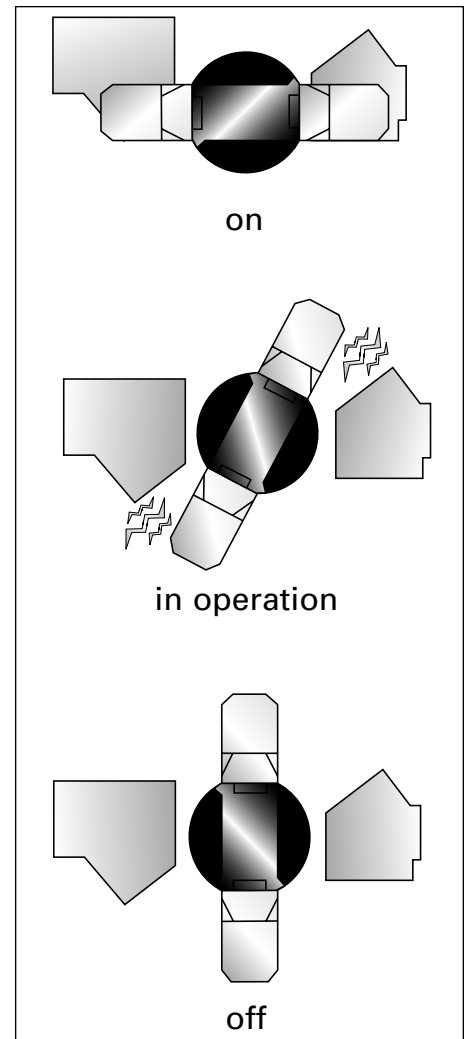
<sup>ⓑ</sup>All 4 pole and fusible double switches with catalog numbers starting with "F" are rated 100,000 AIC max.

<sup>ⓒ</sup>Class T kit available for 240V max. applications on 1200A switches.

# Feature Comparison

## Product Overview

General Duty	Heavy Duty	Double Throw	Features / Ratings
▪	▪	▪	30 thru 600 Amps
	▪	▪	800 and 1200 Amps
▪	▪	▪	240 Volt AC
	▪	▪	600 Volt AC
▪	▪	▪	250 Volt DC
	▪		600 Volt DC
▪	▪	▪	Double-break visible blade design (30-200A)
▪	▪	▪	Quick-make, quick-break switching action
▪	▪	▪	Highly visible ON/OFF handle indication
	▪		Handle design for hook stick operation
▪	▪	▪	Padlockable cover latch
▪	▪	▪	Padlockable handle
▪ <sup>③</sup>		▪	Single voidable cover interlock
	▪	▪	Dual voidable cover interlock
▪	▪	▪	Type 1 enclosure
▪	▪	▪	Type 3R enclosure
	▪	▪	Type 12 enclosure
	▪	▪	Type 4 / 4X enclosures
▪	▪	▪	Generous wiring gutters that meet UL and NEC wire-bending space requirements
▪	▪	▪	Lugs suitable for copper or aluminum at 60° or 75°C
▪	▪	▪	CU/AL wire lugs that meet UL 486B requirements
	▪	▪	Suitable for field-convertible compression connectors
▪ <sup>④</sup>	▪	▪	All plated copper current carrying parts (except lugs)
▪	▪	▪	Spring reinforced Fuse Clips (except 30A general duty) <sup>②</sup>
	▪	▪	Clear pivoting line terminal shield
▪	▪	▪	Replacement parts
	▪		Field addable 200% neutral
▪ <sup>⑦</sup>	▪ <sup>⑦</sup>	▪ <sup>①</sup>	Provisions for UL Class T, R and H Fuses
	▪	▪ <sup>①</sup>	Provisions for UL Class J and L Fuses
	▪	▪	Metal nameplate
	▪	▪	Aux. switch kits
	▪ <sup>④</sup>		Type 4X with stainless steel interior parts
▪ <sup>⑤</sup>	▪		Rolled flange enclosure design (30-200A)
	▪		UL approved HP ratings for high efficiency motors
	▪	▪	Isolated ground kits



### Double Break Switching Action

Like the time-proven Vacu-Break Design, the Siemens VBI double break switching action breaks the arc in two places in 30-200A ratings. This reduces heat generation and increases switching speed by doubling the breaking distance. The result is enhanced performance and increased longevity. We also provide the most visible blade design available today. Unlike conventional knife blade switches, the blades are self-aligning to ensure positive contact. In addition, they have no wear and friction point since the "electrical hinge" has been eliminated. The result is a very fast, positive and reliable switching action for even the most severe applications.

① 400 & 600A fusible, double-throw switches accept only Class J or T fuses.

② 30A general duty switches have fuse clips constructed of spring type copper.

③ Not supplied on 30A outdoor & plug fuse switches.

④ 30-200A Type VBI in stainless steel enclosures.

⑤ 60-200A.

⑥ 200A general duty switches have aluminum neutral assemblies.

⑦ 100-600A GD & DT and 100-1200A HD switches will accept Class T fuses.

# Safety Switches

## General Duty and Heavy Duty

## Product Overview

### Enclosure Types

- A Type 1** enclosures are intended for indoor use primarily to provide protection against contact with the enclosed equipment in locations where unusual service conditions do not exist.
- B Type 3R** enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain and sleet and must remain undamaged by the formation of ice on the enclosure. They are not intended to provide protection against conditions such as dust, internal condensation, or internal icing.
- C Type 4, 4X** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust, rain, splashing water and hose-directed water. They are not intended to provide protection against conditions such as internal condensation or internal icing. Also meets 4X definition by providing a high degree of protection against corrosion. Siemens 30-200A stainless steel 4X switches are supplied stainless interior parts and hardware as standard.
- D Type 4** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust, rain, splashing water and hose-directed water. They are not intended to provide protection against conditions such as internal condensation or internal icing.
- E Type 12<sup>®</sup>** enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt and dripping water. They are not intended to provide protection against conditions such as internal condensation.

**Type 7/9** enclosures for use in hazardous locations. Use with molded case switches listed on page 6-62. For enclosure catalog numbers and dimensions see page 5-2 & 5-12.

**Note:** Type 1 60A General Duty and Type 1 30 & 60A Heavy Duty Switches have tangential knockouts which are UL approved for bonding conduits for non-service entrance conductors.



A



B



C D



E

### Load Break Ratings

All Siemens safety switches are load break rated. The load break rating is assigned by UL after the switching unit has successfully performed the following tests for general use enclosed switches:

### Load Break Ratings

Switch Ampere Rating	Number of ON/OFF Operations per Minute	Number of Operations		
		With Current	Without Current	Total
30-100	6	6000	4000	10000
200	5	6000	2000	8000
400	4	1000	5000	6000
600	3	1000	4000	5000
800	2	500	3000	3500
1200	1	500	2000	2500

### Horsepower Ratings

All Siemens safety switches, where appropriate, are horsepower rated. The assignment of such ratings is made by UL only after the switching unit has undergone tests to determine its acceptability. In addition, the unit must successfully perform on an overload test series which includes repeated interruption of the locked rotor current of the motor for which it is to be rated as follows:

### Horsepower Ratings

Max HP Rating	Number of ON/OFF Operations per minute	Number of Cycles of Operation
100	6	50
500	1	10

©VBII Type 12 switches are also rated 3R & 3S for outdoor use. Type 3R is defined in B above. 3S rated enclosures provide a degree of protection against windblown dust and allow operation when the enclosure is ice laden.

# Catalog Numbering System

## Type VBII Safety Switch Catalog Numbering System

Product Overview

**H F 3 6 4 N R CU**

### Switch Type

**L** = General Duty  
10k AIC Max.  
(Plug Fused &  
60A Max  
Non-Fused)  
**G** = Gen. Duty  
**H** = Heavy Duty  
**DT** = Double Throw  
**DTG** = General Duty DT

### Fused or Non-Fused

**F** = Fused  
**NF** = Non-Fused

### Number of Poles

**1** = 1  
**2** = 2  
**3** = 3  
**4** = 4  
**6** = 6

### Voltage

**1** = 120V or 120/240V  
**2** = 240V  
**6** = 600V

### Special Applications With:

**CH** = Crouse-Hinds Receptacle  
**CJ** = Factory J Fuse Spacings  
**CR** = Class R Clips Installed  
**CU** = Factory-Installed Copper Lugs  
**G** = Factory-Installed Ground Bar  
**H** = Height or Size Reduced  
**L** = Oversized Enclosure  
**PN** = Pyle-National Receptacle  
**W** = Viewing Window

### Enclosure Type

**Omit** = Type 1, Indoor  
**R** = Type 3R, Outdoor  
**S** = Type 4 / 4X, Stainless Steel  
**X** = Type 4 / 4X, Non-Metallic  
**J** = Type 12, Industrial  
**XL** = Type 4/4X Non-Metallic  
Less Line & Load Lugs

### With or Without Neutral

**Omit** = Less Neutral  
**N** = With Neutral

### Amperes

<b>1</b> = 30A	<b>5</b> = 400A
<b>2</b> = 60A	<b>6</b> = 600A
<b>3</b> = 100A	<b>7</b> = 800A
<b>4</b> = 200A	<b>8</b> = 1200A

**3**  
SAFETY  
SWITCHES

## Type VBII Accessories Catalog Numbering System

**H R 6 4**

### Switch Type

**H** = Heavy Duty  
**G** = General Duty

### Accessory Type

**A1** = Auxiliary Switch 1/NO and 1/NC  
**A2** = Auxiliary Switch 2/NO and 2/NC  
**A3** = Auxiliary Switch Low Current  
**CL** = Compression Lug Barrier /  
Mounting Kit  
**G** = Ground Lug Kit  
**G2** = Insulated Ground Lug Kit  
**LC** = Copper Lug Kit  
**N** = Neutral  
**N2** = 200% Neutral  
**P** = Fuse Puller Kit  
**R** = Class R - Fuse Clip Kit  
**T** = Class T - Fuse Kit

### Amperes

<b>1</b> = 30A
<b>2</b> = 60A
<b>12</b> = 30/60A
<b>3</b> = 100A
<b>23</b> = 60/100A
<b>123</b> = 30/60/100A
<b>1234</b> = 30/60/100/200A
<b>4</b> = 200A
<b>56</b> = 400/600A
<b>5678</b> = 400/600/800/1200A
<b>78</b> = 800/1200A

### Maximum Voltage

**2** = 240V Max  
**6** = 600V Max

**Note:** Catalog numbering systems above do not apply to 4-pole double throw switches & accessories.

# General Duty Enclosed Switches

## Plug Fuse and 60A Special Application Type

Selection

### Features<sup>®</sup>

- Compact size
- Horsepower rated
- Indoor and outdoor enclosures
- Quick make-quick break mechanism
- Visible "ON"-"OFF" indications
- Padlock-off handle feature
- Door padlock provision
- Bondable neutral (where indicated)
- Lugs suitable for copper or aluminum wire
- UL Listed
- Fuses — not included
- Switches accept Edison base plug fuses
- Hubs — see page 3-20
- Lugs — see page 3-20

### Dimensions (inches)

Type	Height	Width	Depth
1	8¼	5½	3
3R	8¼	5½	3½

### Wire Range Table

Switch Type	Wire Range
120/240 Volt Fusible 30 Amp	Cu/Al #14 to #8 AWG <sup>®</sup>
120/240 Volt Non-Fusible 60 Amp	Cu/Al #14 to #3 AWG



Ampere Rating	Indoor — Type 1			Outdoor — Type 3R			Horsepower Ratings <sup>①</sup>	
	Catalog Number	List Price \$	Ship. Wt. Pkg. of 10	Catalog Number	List Price \$	Ship Wt. Pkg. of 10	1-Phase, 2-Wire	
							Standard	Maximum

### 120/240 Volt Fusible

#### 1-Pole and Solid Neutral<sup>②</sup>

120 Volt — 1-Phase, 2-Wire

30	LF111N	80.00	35	LF111NR	166.00	35	½	2
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#### 2-Pole and No Neutral

120/240 Volt — 1-Phase, 2-Wire

30	Use 2-Pole and Solid Neutral						
----	------------------------------	--	--	--	--	--	--

#### 2-Pole and Solid Neutral<sup>②</sup>

120/240 Volt — 1-Phase, 3-Wire

30	LF211N	98.00	35	LF211NR	203.00	35	1½	3
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### 240 Volt Non-Fusible

#### 2-Pole Special Application Switch

1 or 2-Pole — No Fuse

240 Volt — 1-Phase, 2-Wire

60	—	—	—	LNF222R <sup>③</sup>	176.00	35	—	10
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For inches / millimeters conversion, multiply inches by 25.4.

<sup>①</sup>Dual horsepower ratings:

Std. — applies when non-time delay plug fuses are installed.

Max — applies when time-delay plug fuses are installed.

<sup>③</sup>Has service entrance label.

UL Listed as "Enclosed Switches" (suitable for use as service equipment where indicated) under File #E4776. (NEMA) — Type G.D.

Federal Spec. — W-S-865C — type LD or type NDS

<sup>②</sup>Bottom cable entry and exit only. No hub provision supplied. GSGK60 is included and factory installed.

<sup>④</sup>Line lugs will accept and are UL approved for #14 to #6 Cu/Al cable.

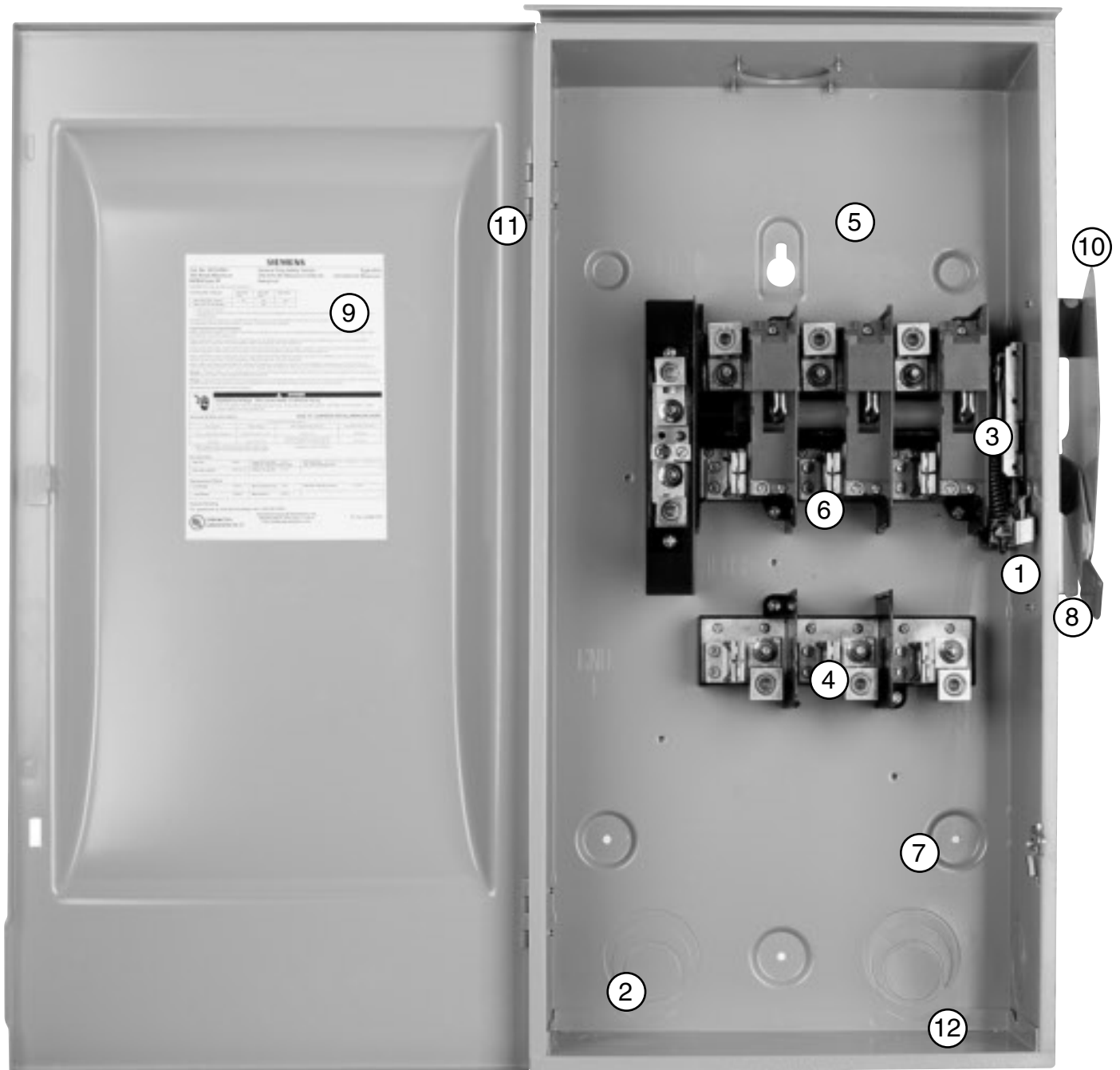
<sup>⑤</sup>Features also apply to 2- and 3-pole, 30A general duty switches on page 3-8.



# General Duty Safety Switches

## Features (60-600A)

## Product Overview



### 3 SAFETY SWITCHES

1. Cover interlock
2. Tangential knockouts through 600A for easy conduit lineup
3. Quick-make, quick-break operating mechanism that ensures positive operation
4. Provisions for T, R, J, H, and K class fuses (T & J 100-600A)
5. Generous wiring gutters that meet or exceed NEC wire-bending space requirements
6. Visible blade, double-break switch action
7. Positive 2 or 3 point mounting
8. Highly visible red handle grip
9. Informative door labeling which includes replacement parts list
10. Handle and cover padlocking provisions
11. Side-hinged door that opens 180 degrees for easier wiring
12. A unique enclosure design that adds rigidity and strength. Its rolled edge prevents cuts and scrapes to conductors and to installer's hands

# General Duty Safety Switches

Selection



3 SAFETY SWITCHES

System	Ampere Rating	Indoor — Type 1			Outdoor — Type 3R			Horsepower Ratings <sup>①</sup>					
		Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	240V AC				250 Volt DC Std.	
								1-Phase, 2-Wire		2-Phase, 4-Wire			3-Phase, 3-Wire
Std.	Max.	Std.	Max.	Std.	Max.	Std.	Max.	Std.	Max.	Std.			

## 240 Volt Fusible

### 2-Pole, 2-Fuse, and Solid Neutral<sup>②③④</sup>

### 240 Volt AC/250 Volt DC

	30	GF221N	127.00	35 <sup>⑤</sup>	GF221NR <sup>⑥</sup>	203.00	35 <sup>⑤</sup>	1½	3	—	—	3	7½	5
	60	GF222N	217.00	14	GF222NR	334.00	14	3	10	—	—	7½	15	10
	100	GF223N	437.00	23	GF223NR	492.00	24	7½	15	—	—	15	30	20
	200	GF224N	907.00	47	GF224NR	1287.00	48	15	—	—	—	25	60	40
	400	GF225NH <sup>⑦</sup>	2753.00	128	GF225NRH <sup>⑧</sup>	3730.00	130	15	—	—	—	50	125	50
	400	GF225N	2774.00	153	GF225NR	3752.00	157	15	—	—	—	50	125	50
	600	GF226NH <sup>⑦</sup>	5438.00	133	GF226NRH <sup>⑧</sup>	6897.00	135	15	—	—	—	75	200	—
	600	GF226N	5467.00	159	GF226NR	6929.00	159	15	—	—	—	75	200	—

### 3-Pole, 3-Fuse, and Solid Neutral<sup>④</sup>

### 240 Volt AC/250 Volt DC

	30	GF321N	203.00	24 <sup>④</sup>	GF321NR <sup>⑥</sup>	302.00	24 <sup>④</sup>	1½	3	—	—	3	7½	5
	60	GF322N	334.00	15	GF322NR	454.00	15	3	10	—	—	7½	15	10
	100	GF323N	581.00	25	GF323NR	840.00	25	7½	15	—	—	15	30	20
	200	GF324N	1287.00	49	GF324NR	1524.00	50	15	—	—	—	25	60	40
	400	GF325NH <sup>⑦</sup>	3262.00	136	GF325NRH <sup>⑧</sup>	3934.00	138	15	—	—	—	50	125	50
	400	GF325N	3287.00	158	GF325NR	3955.00	162	15	—	—	—	50	125	50
	600	GF326NH <sup>⑦</sup>	6091.00	138	GF326NRH <sup>⑧</sup>	8171.00	141	15	—	—	—	75	200	—
	600	GF326N	6124.00	161	GF326NR	8205.00	165	15	—	—	—	75	200	—

## 240 Volt Non-Fusible<sup>③④</sup>

### 2-Pole or 3-Pole

### 240 Volt AC/250 Volt DC

	30	GNF321	166.00	24 <sup>④</sup>	GNF321R <sup>⑥</sup>	302.00	24 <sup>④</sup>	—	3	—	—	7½	—	5
	60	GNF322	209.00	12	GNF322R	466.00	13	—	10	—	—	15	—	10
	100	GNF323	492.00	23	GNF323R	840.00	24	—	15	—	—	30	—	20
	200	GNF324	887.00	46	GNF324R	1505.00	47	—	15	—	—	60	—	40
	400	GNF325	2275.00	114	Use 600V Switch — HNF365R			—	15	—	—	125	—	50
	600	GNF326	4350.00	116	Use 600V Switch — HNF366R			—	15	—	—	200	—	—

\* In pounds (lbs).

① Dual horsepower ratings: Std.- applies when non-time delay fuses are installed. Max.- applies when time-delay fuses are installed.

② These switches are UL-listed for application on grounded B-phase systems.

③ Suitable for use on 3-phase motor loads.

④ Service entrance labeled.

⑤ Has provision for ECHA type hub.

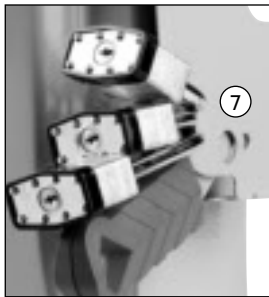
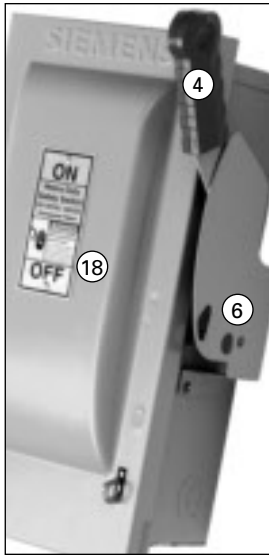
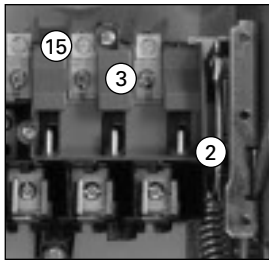
⑥ 5 switches per standard package.

⑦ 10 switches per standard package.

⑧ Height reduced switch (45.25 rather than 56 inches in height) for use with 500MCM or smaller conductors.

# Heavy Duty Safety Switches

Features



1. Quick-make, quick-break operating mechanism that ensures positive operation.
2. Visible blade, double-break switching action.
3. Arc chutes dissipate heat and prolong switch life.
4. Highly visible red handle grip. Designed for hook stick operation.
5. Defeatable dual cover interlock.
6. Center punch provided for field drilling to allow ON padlocking.
7. Handle can be padlocked in the OFF position with up to (3) padlocks with 5/16" hasps.
8. Generous top, bottom and side gutters that meet or exceed NEC wire-bending space requirements.
9. Informative door labeling which includes replacement parts list.
10. Tangential knockouts through 600A for easy conduit lineup.
11. Side-hinged door that opens past 180 degrees for easier wiring.
12. Unique enclosure design increases rigidity and prevents cuts and scrapes to conductors and installer's hands.
13. Spring reinforced fuse clips that assure reliable contact for cool operation.
14. Door latch securely holds door closed and allows cover padlocking.
15. Front removable mechanical lugs that are suitable for CU/Al 60 or 75° C conductors.
16. Lugs are field convertible to copper body and to a wide variety of compression connectors.
17. Hinged clear line terminal shield with probe holes for inspecting or testing line side terminals.
18. Embossed aluminum nameplate on Heavy Duty Switches provides highly visible ON/OFF indication.
19. Drawn cover for increased rigidity and resistance to abuse.
20. Top key hole and bottom mounting holes provide easy 2 or 3 point mounting.

# Heavy Duty Safety Switches

Selection

3  
SAFETY  
SWITCHES



System	Ampere Rating	Indoor — Type 1		Outdoor — Type 3R			Horsepower Ratings <sup>ⓐ</sup>						250 Volt DC	
		Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	240V AC		2-Phase, 4-Wire		3-Phase, 3-Wire		
								1-Phase, 2-Wire	Std.	Max.	Std.	Max.		Std.

## 240 Volt Fusible<sup>ⓑ</sup>

### 2-Pole, 2-Fuse, and Solid Neutral<sup>ⓐ</sup> (Also used for 2-Pole, 2-Wire Applications) 240 Volt AC/250 Volt DC

	30	HF221N	257.00	12	HF221NR	487.00	13	1½	3	—	—	3	7½	5
	60	HF222N	512.00	18	HF222NR	914.00	19	3	10	—	—	7½	15	10
	100	HF223N	781.00	23	HF223NR	1174.00	24	7½	15	—	—	15	30	20
	200	HF224N	1391.00	47	HF224NR	1700.00	48	15	—	—	—	25	60	40
	400	HF225NH <sup>ⓑ</sup>	3390.00	129	HF225NRH <sup>ⓑ</sup>	4536.00	131	15	—	—	—	50	125	50
	400	HF225N	3416.00	153	HF225NR	4559.00	157	15	—	—	—	50	125	50
	600	HF226NH <sup>ⓑ</sup>	6237.00	133	HF226NRH <sup>ⓑ</sup>	8317.00	135	15	—	—	—	75	200	50
	600	HF226N	6266.00	155	HF226NR	8351.00	159	15	—	—	—	75	200	50
	800	HF227N	11116.00	365	HF227NR	13270.00	365	—	—	—	—	100	250	50
	1200	HF228N■	13688.00	385	HF228NR■	18454.00	385	—	—	—	—	100	250	50

### 3-Pole, 3-Fuse, and Solid Neutral (Also used for 3-Pole, 3-Wire Applications) 240 Volt AC/250 Volt DC

	30	HF321N	323.00	14	HF321NR	620.00	15	1½	3	—	—	3	7½	5
	60	HF322N	547.00	19	HF322NR	979.00	20	3	10	—	—	7½	15	10
	100	HF323N	906.00	25	HF323NR	1400.00	26	7½	15	—	—	15	30	20
	200	HF324N	1570.00	49	HF324NR	1906.00	50	15	—	—	—	25	60	40
	400	HF325NH <sup>ⓑ</sup>	4161.00	137	HF325NRH <sup>ⓑ</sup>	4643.00	138	15	—	—	—	50	125	50
	400	HF325N	4183.00	158	HF325NR	4183.00	162	15	—	—	—	50	125	50
	600	HF326NH <sup>ⓑ</sup>	7073.00	139	HF326NRH <sup>ⓑ</sup>	9354.00	142	15	—	—	—	75	200	50
	600	HF326N	7104.00	161	HF326NR	9389.00	165	15	—	—	—	75	200	50
	800	HF327N	13591.00	375	HF327NR	17377.00	375	—	—	—	—	100	250	50
	1200	HF328N	16946.00	395	HF328NR	21095.00	388	—	—	—	—	100	250	50

## 240 Volt Fusible<sup>ⓑ</sup>

### 2-Pole, 2-Fuse<sup>ⓐ</sup> Type 4/4X Stainless Type 12 Industrial<sup>ⓐ</sup> 240 Volt AC/250 Volt DC

	30	HF221S	2216.00	13	HF221J	729.00	13	1½	3	—	—	3	7½	5
	60	HF222S	2507.00	19	HF222J	881.00	19	3	10	—	—	7½	15	10
	100	HF223S	4952.00	24	HF223J	1274.00	24	7½	15	—	—	15	30	20
	200	HF224S	7519.00	48	HF224J	2017.00	48	15	—	—	—	25	60	40

### 3-Pole, 3-Fuse<sup>ⓐ</sup> (Also used for 2-Pole, 2-Wire Applications in 400–800A Ratings) 240 Volt AC/250 Volt DC

	30	HF321S	2307.00	14	HF321J	767.00	14	1½	3	—	—	3	7½	—
	60	HF322S	2707.00	20	HF322J	939.00	20	3	10	—	—	7½	15	10
	100	HF323S	5759.00	25	HF323J	1414.00	25	7½	15	—	—	15	30	20
	200	HF324S	7965.00	49	HF324J	2185.00	49	15	—	—	—	25	60	40
	400	HF325S	16315.00	154	HF325J■	4741.00	110	15	—	—	—	50	125	50
	600	HF326S	23672.00	157	HF326J■	8957.00	161	15	—	—	—	75	200	50
	800	HF327S■	31830.00	370	HF327J■	16792.00	365	—	—	—	—	100	250	50

■ Built to order. Allow 2–3 weeks for delivery.

\* In pounds (lbs).

ⓐ Height reduced switch (45.25 rather than 56 inches in height) for use with 500MCM or smaller conductors.

ⓐ Dual horsepower ratings: Std.- applies when non-time delay fuses are installed. Max.- applies when time-delay fuses are installed.

ⓐ These switches are UL-listed for application on grounded B-phase systems and are suitable for 3-phase motor applications.

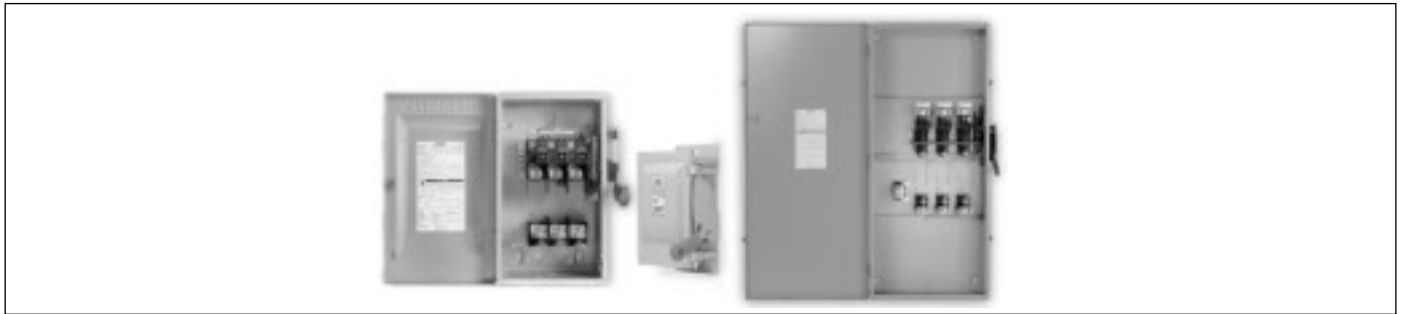
ⓐ When a neutral is required use a field installed neutral kit.

ⓐ Suitable for use as service entrance equipment.

ⓐ Also rated Type 3S/3R.

# Heavy Duty Safety Switches

Selection



3 SAFETY SWITCHES

System	Ampere Rating	Indoor — Type 1		Outdoor — Type 3R			Horsepower Ratings <sup>④</sup>								250 Volt DC	600 Volt DC
		Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	Catalog Number	List Price \$	Ship Wt.* Std. Pkg.	480V AC		600V AC		250 Volt DC	600 Volt DC			
								1-Phase, 2-Wire	3-Phase, 3-Wire	1-Phase, 2-Wire	3-Phase, 3-Wire					

600 Volt Fusible<sup>②</sup>

2-Pole, 2-Fuse <sup>③</sup>		480 Volt AC/600 Volt AC/600 Volt DC															
	30	HF261	553.00	15	HF261R	984.00	15	3	7½	—	—	3	10	—	—	5	15
	60	HF262	656.00	20	HF262R	1154.00	20	5	20	—	—	10	25	—	—	10	30
	100	HF263	1227.00	26	HF263R	1788.00	27	10	30	—	—	15	40	—	—	20	50
	400	HF265■	4663.00	149	HF265R■	5702.00	152	—	50	—	—	50	—	—	—	40	50
	600	HF266■	7813.00	150	HF266R■	11241.00	155	—	50	—	—	50	—	—	—	50	50

3-Pole, 3-Fuse		480 Volt AC/600 Volt AC/250 Volt DC <sup>①</sup>															
	30	HF361	568.00	14	HF361R	984.00	15	3	7½	5	15	3	10	7½	20	5	—
	30	HF361L <sup>②</sup>	654.00	19	HF361RL <sup>②</sup>	1128.00	20	3	7½	5	15	3	10	7½	20	5	—
	60	HF362	676.00	19	HF362R	1154.00	20	5	20	15	30	10	25	15	50	10	30 <sup>⑤</sup>
	60	—	—	—	HF362RL <sup>②</sup>	1755.00	25	5	20	15	30	10	25	15	50	10	30 <sup>⑤</sup>
	100	HF363	1301.00	24	HF363R	1788.00	25	5	20	25	60	15	40	30	75	20	50 <sup>⑤</sup>
	200	HF364	1830.00	48	HF364R	2444.00	49	25	50	50	125	30	50	60	150	40	50
	400	HF365H <sup>②</sup>	4875.00	136	HF365RH <sup>②</sup>	5877.00	137	—	—	100	250	—	—	125	350	50	—
	400	HF365	4898.00	154	HF365R	5903.00	157	—	—	100	250	—	—	125	350	50	—
	600	HF366H <sup>②</sup>	8475.00	138	HF366RH <sup>②</sup>	11676.00	141	—	—	150	400	—	—	200	500	50	—
	600	HF366	8503.00	157	HF366R	11702.00	161	—	—	150	400	—	—	200	500	50	—
800	HF367	14825.00	365	HF367R	17975.00	365	—	—	200	500	—	—	250	500	50	—	
1200	HF368	18724.00	383	HF368R	22116.00	385	—	—	200	500	—	—	250	500	50	—	

3-Pole, 3-Fuse and Solid Neutral		480 Volt AC/600 Volt AC/250 Volt DC <sup>①</sup>															
	30	HF361N	666.00	14	HF361NR	1062.00	15	3	7½	5	15	3	10	7½	20	5	—
	60	HF362N	777.00	19	HF362NR	1231.00	20	5	20	15	30	10	25	15	50	10	30 <sup>⑤</sup>
	100	HF363N	1426.00	25	HF363NR	1940.00	26	10	30	25	60	15	40	30	75	20	50 <sup>⑤</sup>
	200	HF364N	2022.00	49	HF364NR	2586.00	50	25	50	50	125	30	50	60	150	40	50
	400	HF365N	5300.00	158	HF365NR	6368.00	162	—	—	100	250	—	—	125	350	50	—
	600	HF366N	8955.00	161	HF366NR	12111.00	165	—	—	150	400	—	—	200	500	50	—
	800	HF367N	15665.00	375	HF367NR	18815.00	375	—	—	250	500	—	—	250	500	50	—
1200	HF368N	19563.00	395	HF368NR	22955.00	388	—	—	250	500	—	—	250	500	50	—	

600 Volt Fusible<sup>②</sup> (For 2-Pole Applications use outside poles of 3-Pole Switches)

2-Pole, 2-Fuse <sup>③</sup>		480 Volt AC/600 Volt AC/600 Volt DC															
	Type 4/4X Stainless		Type 12 Industrial <sup>⑥</sup>				3	7½	—	—	3	10	—	—	5	15	
	30	HF261S	2638.00	15	HF261J■	984.00											15
	60	HF262S	2792.00	20	HF262J■	991.00											20
	100	HF263S■	5613.00	27	HF263J■	1547.00											27
	400	HF265S■	15870.00	153	HF265J■	5357.00											155
600	HF266S■	22680.00	156	HF266J■	8768.00	156											

3-Pole, 3-Fuse		480 Volt AC/600 Volt AC/250 Volt DC <sup>①</sup>															
	30	HF361S	2681.00	13	HF361J	1001.00	14	—	—	5	15	—	—	7½	20	5	—
	60	HF362S	2875.00	20	HF362J	1104.00	20	—	—	15	30	—	—	15	50	10	30 <sup>⑤</sup>
	100	HF363S	5627.00	25	HF363J	1791.00	25	—	—	25	60	—	—	30	75	20	50 <sup>⑤</sup>
	200	HF364S	7997.00	49	HF364J	2507.00	49	—	—	50	125	—	—	60	150	40	50
	400	HF365S	16468.00	158	HF365J	5631.00	160	—	—	100	250	—	—	125	350	50	—
	600	HF366S	24310.00	161	HF366J	10233.00	161	—	—	150	400	—	—	200	500	50	—
	800	HF367S	31062.00	370	HF367J■	17430.00	365	—	—	200	500	—	—	250	500	50	—
1200	HF368S■	36846.00	388	HF368J■	22352.00	388	—	—	250	500	—	—	250	500	50	—	

■ Built to order. Allow 2-3 weeks for delivery.  
 \* In pounds (lbs).  
 ① 60-200A 3-Pole switches are also rated 600V DC.  
 ② Height reduced switch (45.25 rather than 56 inches in height) for use with 500MCM or smaller conductors.  
 ③ Use 3-Pole switch for 200A applications.  
 ④ Dual horsepower ratings: Std.- applies when non-time delay fuses are installed. Max.- applies when time-delay fuses are installed.  
 ⑤ Suitable for use as service entrance equipment except for 1200 when used on 480 or 600V grounded wye system.  
 ⑥ Also rated Type 3S/3R.  
 ⑦ Indicates oversized enclosure (30A switch with 60A lugs in a 60A enclosure or 60A switch with 100A lugs in a 100A enclosure).  
 ⑧ 600V DC & 600V DC horsepower rating shown requires (2) poles to be connected in series.

Discount Schedule HDSS

# Heavy Duty Safety Switches

Selection

3  
SAFETY  
SWITCHES



System	Ampere Rating	Indoor - Type 1			Outdoor - Type 3R			Horsepower Ratings							
		Catalog Number	Ship. Wgt.	List Price \$	Catalog Number	Ship. Wgt.	List Price \$	240 Volt		480 Volt		600 Volt		250V DC	600V DC
								1-Phase	3-Phase	1-Phase	3-Phase	1-Phase	3-Phase		

## 600 Volt Non-Fusible<sup>④</sup>

### 2-Pole<sup>③</sup>

### 480 Volt AC / 600 Volt AC / 600 Volt DC

	30	HNF261	12	299.00	HNF261R	13	532.00	—	—	7 1/2	—	10	—	5	15
	60	HNF262	19	532.00	HNF262R	20	930.00	—	—	20	—	25	—	10	30
	100	HNF263	24	823.00	HNF263R	25	1323.00	—	—	30	—	40	—	20	50
	400	HNF265■	109	2893.00	HNF265R	113	4075.00	15	—	50	—	50	—	40	50
	600	HNF266■	111	5102.00	HNF266R■	115	8134.00	15	—	50	—	50	—	50	50

### 3-Pole

### 480 Volt AC / 600 Volt AC / 250 Volt DC

	30	HNF361	12	299.00	HNF361R	13	532.00	5	10	7 1/2	20	10	30	5	—
	30	—	—	—	HNF361RL <sup>⑤</sup>	19	900.00	5	10	7 1/2	20	10	30	5	—
	60	HNF362H <sup>②</sup>	11	523.00	HNF362RH <sup>②</sup>	11	923.00	10	20	20	50	20	40	10	—
	60	HNF362 <sup>②⑦</sup>	18	532.00	HNF362R <sup>①</sup>	19	936.00	10	20	20	50	25	60	10	30 <sup>②</sup>
	60	—	—	—	HNF362RL <sup>⑤</sup>	24	1301.00	10	20	20	50	25	60	10	30 <sup>②</sup>
	100	HNF363 <sup>②⑦</sup>	23	864.00	HNF363R <sup>①</sup>	24	1338.00	15	40	30	75	40	100	20	50 <sup>②</sup>
	200	HNF364 <sup>①</sup>	46	1314.00	HNF364R <sup>①</sup>	47	1616.00	15	60	50	125	50	150	40	50
	400	HNF365	114	3068.00	HNF365R	118	4107.00	15	125	50	250	50	350	50	—
	600	HNF366	116	5467.00	HNF366R	120	8147.00	15	200	50	400	50	500	50	—
	800	HNF367	295	10779.00	HNF367R	295	14209.00	15	250	50	500	50	500	50	—
	1200	HNF368	305	14642.00	HNF368R	307	18567.00	15	250	50	500	50	500	50	—

## 600 Volt Non-Fusible<sup>④</sup>

### 2-Pole<sup>③</sup>

### 480 Volt AC / 600 Volt AC / 600 Volt DC

	Ampere Rating	Type 4 / 4X Stainless		Type 12 Industrial <sup>⑤</sup>		Horsepower	1-Phase	3-Phase	240 Volt	480 Volt	600 Volt	250V DC	600V DC		
		Catalog Number	Ship. Wgt.	List Price \$	Catalog Number									Ship. Wgt.	List Price \$
	30	HNF261S	13	2153.00	HNF261J	13	641.00	—	—	7 1/2	—	10	—	5	15
	60	HNF262S	20	2521.00	HNF262J	20	806.00	—	—	20	—	25	—	10	30
	100	HNF263S■	25	5137.00	HNF263J■	25	1153.00	—	—	30	—	40	—	20	50
	400	HNF265S■	113	13612.00	HNF265J■	114	3902.00	15	—	50	—	—	—	40	50
	600	HNF266S■	115	19606.00	HNF266J■	120	6557.00	15	—	50	—	—	—	50	50

### 3-Pole

### 480 Volt AC / 600 Volt AC / 250 Volt DC

	30	HNF361S	13	2186.00	HNF361J	13	670.00	5	10	7 1/2	20	10	30	5	—
	60	HNF362SH <sup>②</sup>	15	2537.00	HNF362JH <sup>②</sup>	14	930.00	10	20	20	50	20	40	10	—
	60	HNF362S <sup>②⑦</sup>	19	2563.00	HNF362J <sup>①</sup>	19	946.00	10	20	20	50	25	60	10	30 <sup>②</sup>
	100	HNF363S <sup>②⑦</sup>	24	5198.00	HNF363J <sup>①</sup>	24	1338.00	15	40	30	75	40	100	20	50 <sup>②</sup>
	200	HNF364S <sup>①</sup>	47	7078.00	HNF364J <sup>①</sup>	47	1692.00	15	60	50	125	50	150	40	50
	400	HNF365S	118	14729.00	HNF365J	119	4152.00	15	125	50	250	50	350	50	50
	600	HNF366S	120	21589.00	HNF366J	120	8150.00	15	200	50	400	50	500	50	50
	800	HNF367S	295	30951.00	HNF367J■	295	14224.00	15	250	50	500	50	500	50	50
	1200	HNF368S■	310	34305.00	HNF368J■	310	18684.00	15	250	50	500	50	500	50	50

■ Built to order. Allow 2-3 weeks for delivery.

④ Also rated 600V DC.

③ Compact switch (11.1"H, 6.6"W box less cover and handle).

⑦ Short circuit withstand rating—100,000 RMS sym. amps.

⑤ Use 3-Pole switch for 200A application.

⑥ Suitable for use as service entrance equipment except for

1200 when used on a 480 or 600V grounded wye system.

⑧ Also rated type 3S / 3R.

② Indicates oversized enclosure (30A switch in a 60A enclosure or a 60A switch in a 100A enclosure).

⑦ 600V DC and 600V DC horsepower rating shown requires (2) poles to be connected in series.

# Heavy Duty Safety Switches

## Type 4/4X & 12 with Viewing Window

**Selection**

### Description

30–600A, 3-pole 600V max. in fusible and non-fusible versions in Type 4/4X stainless steel and Type 12 enclosures.

All allow viewing of visible blade position. 30–200A also allow viewing of indicating type fuses.

### Features

- Rugged installer-friendly enclosure design features a gasket flange with continuously welded seams
- Tool-free cover latches
- Two, three and four point mounting
- Metal handle with large insulating grip features a positive stop in both ON and OFF position
- Ground lugs provided as standard
- Type 12 enclosures are fabricated from galvanized steel and are also rated for 3R/3S outdoor applications
- Type 4X stainless steel switches (30–200A) are provided with stainless steel interior parts
- The widest range of accessories available including 200% neutrals, gold plated PLC auxiliary contacts and isolated ground kits



System	Ampere Rating	Catalog Number	List Price \$	Ship. Weight <sup>①</sup>	Maximum Horsepower Ratings <sup>③</sup>					
					240V AC		480V AC	600V AC	250V DC	600V DC
					1-Phase, 2-Wire	3-Phase, 3-Wire	3-Phase, 3-Wire	3-Phase, 3-Wire	DC	DC
<b>3-Pole, 3-Wire Fusible, Type 12<sup>④⑤</sup></b>					<b>600 Volt AC / 250 Volt DC<sup>②</sup></b>					
	30	HF361JW	1146.00	17	3	7 1/2	15	20	5	—
	60	HF362JW	1169.00	22	10	15	30	50	10	30 <sup>⑥</sup>
	100	HF363JW	1945.00	26	15	30	60	75	20	50 <sup>⑥</sup>
	200	HF364JW	2661.00	53	—	60	125	150	40	50
	400	HF365JW	5867.00	166	—	125	250	350	50	—
	600	HF366JW	13063.00	168	—	200	400	500	50	—
<b>3-Pole, 3-Wire Non-Fusible, Type 12<sup>④⑤</sup></b>					<b>600 Volt AC / 250 Volt DC<sup>②</sup></b>					
	30	HNF361JW	816.00	14	3	10	20	30	5	—
	60	HNF362JW	1093.00	21	10	20	50	60	10	30 <sup>⑥</sup>
	100	HNF363JW	1489.00	25	15	40	75	100	20	50 <sup>⑥</sup>
	200	HNF364JW	1842.00	51	15	60	125	150	40	50
	400	HNF365JW	4299.00	133	15	125	250	350	50	—
<b>3-Pole, 3-Wire Fusible, Type 4X Stainless Steel<sup>⑤</sup></b>					<b>600 Volt AC / 250 Volt DC<sup>②</sup></b>					
	30	HF361SW	2828.00	17	3	7 1/2	15	20	5	—
	60	HF362SW	3030.00	23	10	15	30	50	10	30 <sup>⑥</sup>
	100	HF363SW	5782.00	28	15	30	60	75	20	50 <sup>⑥</sup>
	200	HF364SW	8171.00	55	—	60	125	150	40	50
	400	HF365SW	20138.00	168	15	125	250	350	50	—
<b>3-Pole, 3-Wire Non-Fusible, Type 4X Stainless Steel<sup>⑤</sup></b>					<b>600 Volt AC / 250 Volt DC<sup>②</sup></b>					
	30	HNF361SW	2333.00	15	3	10	20	30	5	—
	60	HNF362SW	2720.00	23	10	20	50	60	10	30 <sup>⑥</sup>
	100	HNF363SW	5349.00	27	15	40	75	100	20	50 <sup>⑥</sup>
	200	HNF364SW	7228.00	54	15	60	125	150	40	50
	400	HNF365SW	15917.00	134	15	125	250	350	50	—

① In pounds (lbs).

② 200A switches are also rated 600V DC.

③ Maximum HP ratings listed apply only when time delay fuses are used.

④ Also rated 3S/3R for outdoor use.

⑤ All switches are suitable for use as service entrance equipment. Use outside poles of 3-pole switch for 2-pole application.

⑥ 600V DC and 600V DC horsepower rating shown requires (2) poles to be connected in series.

# Heavy Duty Safety Switches

## Type VBII 4 & 6-Pole Heavy Duty Safety Switches

Selection

### Application

4 & 6-pole Switches are commonly used as a disconnecting means for two-speed, two-winding motors. Fused switches provide both over current and short circuit protection. Non-fusible switches normally provide a local disconnection means for two-speed motors which are remote from their motor controller. 4-pole switches are also used in 3-phase, 4-wire circuits when a switching neutral is required. All 4 & 6-pole switches are service entrance rated.

### Description

4 & 6-pole switches are available in 30-200A ratings and in both fusible and non-fusible versions. 4-pole switches are supplied with either Type 1 or Type 12/3R enclosures. 6-pole switches are available with either Type 12/3R or Type 4X stainless steel enclosures.

### Standards

- UL & CUL listed under file #E4776
- Meets UL98 for enclosed switches
- 4 & 6-Pole switches are suitable for use as service entrance
- Meets NEMA Standard KS-1 for enclosed switches
- Meets NEC wire bending space requirements

### Features

- Visible blade, double break switching action
- Highly visible ON/OFF indication
- Defeatable dual cover interlock
- Padlock option in OFF position
- All copper current carrying parts<sup>①</sup>
- Tangenital knockouts (Type 1, 4-pole switches)



HNF663S

### 4-Pole Type VBII Switches<sup>①②③</sup>

System	Amp Rating	Indoor Type 1			Type 12/3R Industrial			Horsepower Ratings <sup>③</sup>								
		Catalog Number	List Price \$	Ship Wt. (lbs.)	Catalog Number	List Price \$	Ship Wt. (lbs.)	240V, 2Ø, 4W		240V 3Ø		480V, 3Ø		600V, 3Ø		250V DC
								Std.	Max.	Std.	Max.	Std.	Max.	Std.	Max.	

#### Fusible 600 Volt AC, 250 Volt DC — 4-Pole, 4 Fuse<sup>④</sup>

	30	HF461	926.00	36	HF461J	1198.00	36	3	10	3	7½	5	15	7½	20	5
	60	HF462	1082.00	40	HF462J	1321.00	40	7½	20	7½	15	15	30	15	50	10
	100	HF463	1786.00	43	HF463J	2045.00	43	15	30	15	30	25	60	30	75	20
	200	HF464	2939.00	88	HF464J	3419.00	88	25	50	25	60	50	125	60	150	40

#### Non-fusible 600 Volt AC, 250 Volt DC — 4-Pole

	30	HNF461	881.00	32	HNF461J	964.00	32	—	10	—	10	—	20	—	30	5
	60	HNF462	926.00	34	HNF462J	1128.00	34	—	20	—	20	—	50	—	60	10
	100	HNF463	1716.00	36	HNF463J	1962.00	36	—	30	—	40	—	75	—	100	20
	200	HNF464	2492.00	78	HNF464J	2964.00	78	—	50	—	60	—	125	—	150	40

### 6-Pole Type VBII Switches<sup>①②③</sup>

System	Amp Rating	Type 12/3R Industrial			Type 4X Stainless Steel			Horsepower Ratings <sup>③</sup>							
		Catalog Number	List Price \$	Ship Wt. (lbs.)	Catalog Number	List Price \$	Ship Wt. (lbs.)	240V 3Ø		480V, 3Ø		600V, 3Ø		250V DC	
								Std.	Max.	Std.	Max.	Std.	Max.		

#### Fusible 600 Volt AC, 250 Volt DC — 6-Pole, 6 Fuse<sup>④</sup>

	30	HF661J	3594.00	37	HF661S	12437.00	37	3	7½	5	15	7½	20	5
	60	HF662J	4324.00	41	HF662S	13063.00	41	7½	15	15	30	15	50	10
	100	HF663J	5194.00	44	HF663S	22191.00	44	15	30	25	60	30	75	20
	200	HF664J	9599.00	90	HF664S	30293.00	90	25	60	50	125	60	150	40

#### Non-fusible 600 Volt AC, 250 Volt DC — 6-Pole

	30	HNF661J	3156.00	33	HNF661S	7422.00	33	—	10	—	20	—	30	5
	60	HNF662J	3723.00	35	HNF662S	8264.00	35	—	20	—	50	—	60	10
	100	HNF663J	4479.00	37	HNF663S	10120.00	37	—	40	—	75	—	100	20
	200	HNF664J	8155.00	80	HNF664S	18770.00	80	—	60	—	125	—	150	40

■ Built to order. Allow 2-3 weeks for delivery.

① Lugs are aluminum alloy as standard. Optional copper body lugs are available.

② All 4 & 6-pole VBII switches are suitable for use as service equipment when a neutral is installed or equipment ground kit is properly connected.

③ Dual horsepower ratings: Std. – applies when non-time-delay fuses are installed. Max. – applies when time delay fuses are installed.

④ Fusible switches accept Class H Fuses as the standard. Class R & J fuses can also be installed and increase the rating from 10,000 to 200,000 AIC. For

Class J, the load base is moved upward. For Class R fuses, rejection kits are required.

⑤ Supplied with factory installed ground lugs.



# Heavy Duty Safety Switches

## Special Application Switches / Interlocked Receptacle Switches

Selection

### Application

Receptacle Safety Switches provide cord connection protection of heavy-duty portable equipment (welders, infrared ovens, batch feeders, portable conveyors, assembly line fixtures and tools, refrigerator trucks, etc.) under load or fault conditions.

### Description<sup>①②</sup>

Type 12 and 4/4X Receptacle Safety Switches are available with 3-phase, 4-wire grounded type Crouse-Hinds Arkтите™ 2 receptacle, or Pyle-National pre-wired and mounted with interlock linkage to the switch mechanism. Insertion or removal of the plug is prevented by the interlock linkage while the switch is in the "ON" position. Receptacle prevents operation of switch if incorrect plug is inserted. Type 4/4X Switches are provided with stainless steel interior parts. All receptacle switches are 3-pole, 3-wire plus ground.



3  
SAFETY  
SWITCHES

### Crouse-Hinds Interlocked Receptacle Switches

Ampere Rating <sup>⑤</sup>	Type 12 <sup>⑥</sup>		Type 4/4X <sup>⑦</sup>		Shipping Weight Std. Pkg. <sup>④</sup>	Accepts Crouse-Hinds Arkтите <sup>®</sup> Plug Catalog Number
	Catalog Number	List Price \$	Catalog Number	List Price \$		

#### 240V Fusible, 3-Pole, 3-Wire

30	HF321JCH	2365.00	HF321SCH▲	7116.00	23	APJ3485 & NPJ3485
60	HF322JCH	2440.00	HF322SCH▲	7437.00	30	APJ6485 & NPJ6485
100	HF323JCH	3161.00	HF323SCH▲	12067.00	36	APJ10487 & NPJ10487

#### 600V Fusible, 3-Pole, 3-Wire

30	HF361JCH	2449.00	HF361SCH	7437.00	24	APJ3485 & NPJ3485
60	HF362JCH	2588.00	HF362SCH	7655.00	30	APJ6485 & NPJ6485
100	HF363JCH	3392.00	HF363SCH▲	12803.00	36	APJ10487 & NPJ10487

#### 600V Non-Fusible, 3-Pole, 3-Wire

30	HNF361JCH▲	2153.00	HNF361SCH▲	6857.00	22	APJ3485 & NPJ3485
60	HNF362JCH	2440.00	HNF362SCH	6922.00	29	APJ6485 & NPJ6485
100	HNF363JCH▲	2997.00	HNF363SCH▲	11787.00	35	APJ10487 & NPJ10487

#### 600V Fusible, 3-Pole, 3-Wire with Viewing Window

30	HF361JCHW▲	2597.00	HF361SCHW▲	7593.00	24	APJ3485 & NPJ3485
60	HF362JCHW	2743.00	HF362SCHW	7810.00	30	APJ6485 & NPJ6485
100	HF363JCHW▲	3547.00	HF363SCHW▲	12959.00	36	APJ10487 & NPJ10487

#### 600V Non-Fusible, 3-Pole, 3-Wire with Viewing Window

30	HNF361JCHW▲	2301.00	HNF361SCHW▲	7005.00	22	APJ3485 & NPJ3485
60	HNF362JCHW	2592.00	HNF362SCHW▲	7074.00	29	APJ6485 & NPJ6485
100	HNF363JCHW▲	3151.00	HNF363SCHW▲	11944.00	35	APJ10487 & NPJ10487

### Pyle-National Interlocked Receptacle Switches 3-Pole, 3-Wire Plus Ground Fusible and Non-Fusible

Ampere Rating	Voltage Rating	Type 12 Catalog Number <sup>⑥</sup>	List Price \$	Type 12 Stainless Steel Catalog Number <sup>⑦</sup>	List Price \$	Shipping Weight Std. Pkg. <sup>④</sup>	Accepts Pyle-National QuelArc™ <sup>⑧⑨</sup> Plugs Plug Catalog Number
30	600 (F) 600 (N-F)	HF361JPN▲	2449.00	HF361SPN▲	7437.00	23	JPD-83046
		HNF361JPN	2153.00	HNF361SPN	6857.00	21	
60	240 (F) 600 (F) 600 (N-F)	HF322JPN▲	2440.00	—	—	28	JPD-116046
		HF362JPN▲	2588.00	HF362SPN▲	7655.00	28	
		HNF362JPN	2440.00	HNF362SPN	6922.00	27	

▲ Built to order. Allow 6-8 weeks for delivery.

① Arkтите™ is a registered trademark of the Crouse-Hinds Company. Plugs are not sold or supplied by Siemens.

② Indicates plug with maximum diameter cable bushing.

③ QuelArc™ is a registered trademark of the Pyle-National Company.

④ In pounds (lbs.).

⑤ Ampere rating of both switch and receptacle.

⑥ Also rated Type 3R/3S.

⑦ Enclosure is constructed of Type 304 stainless steel.

# Heavy Duty

## Special Application Safety Switches / Type VBII Non-Metallic

Selection

### Application

Siemens Non-Metallic Safety Switches have fiberglass reinforced polyester enclosures which are extremely resistant to a wide range of corrosive atmospheres which can be encountered in waste water treatment plants and certain industrial applications.

reinforced enclosure allows a wide range of operating temperatures and is supplied with a continuous memory retaining gasket for a superior seal against entry of water, dust and other contaminants. The excellent insulating properties of fiberglass virtually eliminate problems caused by internal condensation.

### Description

30-200A, 600V Max, fusible and non-fusible switches are available in Type 4X enclosures. The fiberglass

All switches are load break rated and are provided with an equipment ground kit as standard. Class R fuse clip kits and auxiliary switch kits are also available.



3 SAFETY SWITCHES

System	Ampere Rating	Catalog Number	Ship Weight Std. pkg. (lbs.)	List Price \$	Horsepower Rating—3-Phase						250 Volts DC	600 Volts DC
					240 Volt AC		480 Volt AC		600 Volt AC			
					Std.	Max.	Std.	Max.	Std.	Max.		

### 3-Pole, 4-Wire, 240 Volt Fusible, Type 4X

	30	HF321NX	21	3320.00	3	7½	—	—	—	—	5	—
	60	HF322NX▲	22	3595.00	7½	15	—	—	—	—	10	—

### 3-Pole, 4-Wire, 600 Volt AC Fusible, Type 4X<sup>②③</sup>

	30	HF361NX	21	3693.00	3	7½	5	15	7½	20	5	15 <sup>④</sup>
	60	HF362NX	22	4046.00	7½	15	15	30	15	50	10	30 <sup>④</sup>
	100	HF363NX▲ <sup>①</sup>	39	7795.00	15	30	25	60	30	75	20	50 <sup>④</sup>
	200	HF364NX▲ <sup>①</sup>	83	9917.00	25	60	50	125	60	150	40	50

### 3-Pole, 3-Wire, 600 AC Volt Non-Fusible,<sup>①</sup> Type 4X<sup>②③</sup>

	30	HNF361X	20	3127.00	—	7½	—	20	—	30	5	15 <sup>④</sup>
	60	HNF362X	20	3509.00	—	15	—	50	—	60	10	30 <sup>④</sup>
	100	HNF363X▲	38	6734.00	—	30	—	75	—	100	20	50 <sup>④</sup>
	200	HNF364X▲	81	9509.00	—	60	—	125	—	150	40	50

### Non-Metallic Features

- 30, 60, 100 and 200 Ampere Switches
- 600 Volts Fusible
- 600 Volts Non-Fusible
- Rated 10,000 AIC with Class H Fuses
- Rated 200,000 AIC with Class J or R Fuses
- UL-Listed under File E4776
- Horsepower Rated
- Suitable for use as Service Equipment
- Quick-make, quick-break mechanism
- Visible Blade Construction
- Padlock-off handle feature
- Field Installable Auxiliary Contacts
- Field Replaceable Line and Load Bases
- Factory Installed Ground Lug Supplied as Standard
- Line Terminal Shields
- Neutrals Installed as Standard on Fusible Switches

▲ Built to order. Allow 6-8 weeks for delivery.

① Also used for 240 volt applications.

② Add "L" to end of catalog number for switches less line & load lugs with mounting hardware for crimp type or copper body lugs.

③ 200A switches are also rated 600V DC max.

④ 600V DC and 600V DC horsepower rating shown requires (2) poles to be connected in series.

# General and Heavy Duty Safety Switches

## Accessories

## Selection



HR612

### Class R Fuse Clip Kits

All General Duty and Heavy Duty Switches are field convertible to accept Class R Fuse Clip Kits. The kits prevent the installation of Class H and K fuses (one kit required per 3-pole switch).

### Class R Fuse Clip Kits

Catalog Number	List Price \$	Description
GSRK321	25.50	30A, 240V Kit (GD only)
HR21	83.00	30A, 240V Kit (HD only)
HR612	83.00	30A, 600V Kit/60A, 240V Kit
HR62	83.00	60A, 600V Kit
HR63	54.00	100A Kit
HR64	54.00	200A Kit
HR656	137.00	400A/600A Kit

### Class J Fusing

All 30-600A, 600V and 100-600A, 240V fusible Heavy Duty Switches are field convertible to accept Class J fuses by moving the load base to a pre-drilled J fuse position. All 100-600A, 240V fusible General Duty switches can also be field converted to accept Class J fuses.



HT63

### Class T Fuse Adapter Kits

All 100-600A, General Duty and 100-1200A Heavy Duty Switches are field convertible to accept Class T fuses. 400-600A switches are field convertible to accept Class T fuses by moving the load base to a pre-drilled T fuse position.

### Class T Fuse Adapter Kits<sup>①</sup>

Catalog Number	List Price \$	Description
HT23	76.00	100A, 240V Kit
HT63	120.00	100A, 600V Kit
HT24	102.00	200A, 240V Kit
HT64▲	143.00	200A, 600V Kit
TFAK72	214.00	800A, 240V Kit
TFAK75	238.00	800A, 600V Kit
TFAK82	543.00	1200A, 240V Kit

### Neutral Kits

Standard Neutral Kits can be field installed in General and Heavy Duty Switches.

### Neutral Kits

Switch Ampere Rating	Kit Catalog Number	List Price \$
30 GD	W410190	71.00
30 HD, 60 GD	HN612	97.00
60, 100 HD, 100 GD	HN623	186.00
200	HN64	186.00
400 & 600	HN656	436.00
800 & 1200	HN678	838.00



HN612

HN264

### 200% Neutral Kits

UL listed 200% Neutrals are available on 100-600A Heavy Duty Switches. They are typically used with non-linear transformers or where increased neutral ampacity/lug capacity is required.

### 200% Neutral Kits

Switch Ampere Rating	Kit Catalog Number	List Price \$	Wire Range Line & Load Lugs (Cu/Al)
100	HN263	225.00	(2) #14-1/0 AWG
200	HN264	352.00	(2) #6 AWG-300 Kcmil
400	HN656	436.00	(2) 1/0 AWG-750 Kcmil or (4) 1/0 AWG-250 Kcmil
600	HN678	838.00	(4) 1/0 AWG-750 Kcmil

▲ Built to order. Allow 6-8 weeks for delivery.

① One kit per pole required.

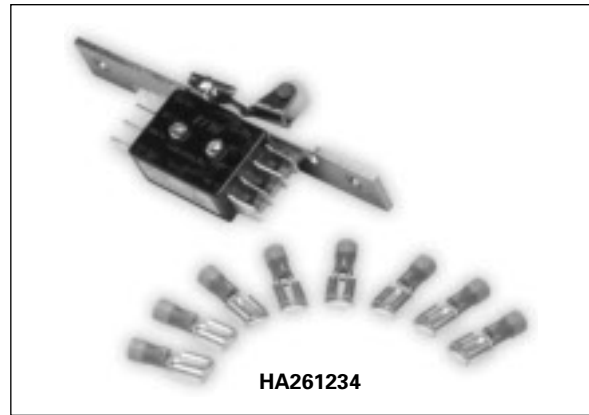
# General and Heavy Duty Safety Switches

## Accessories

## Selection



HA161234



HA261234

### Auxiliary Contacts

Auxiliary Contacts are available only for Heavy Duty Switches. The auxiliary contacts are available in 1 normally open and 1 normally closed or 2 normally open and 2 normally closed configurations. Siemens offers a PLC Auxiliary Switch (30-200A) that has very low resistance for low voltage and current typical in PLC circuits. All auxiliary contacts make after and break before main switch contacts.

### Auxiliary Contacts

Switch Ampere Rating	Aux. Switch Catalog Number	List Price \$	Kit Ampere Rating			Kit Horsepower Rating		
			125V AC Max.	250V AC Max.	28V DC Max.	125V AC Max.	250V AC Max.	28V DC Max.

#### With 1 NO & 1 NC Isolated Contacts

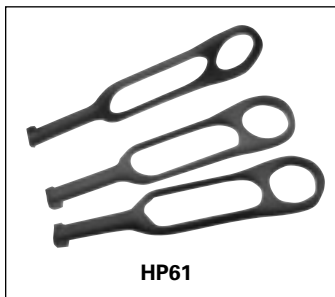
30-200	HA161234	239.00	10	10	—	1/2	3/4	—
400-1200	HA165678	587.00	10	10	—	1/2	3/4	—

#### With 2 NO & 2 NC Isolated Contacts

30-200	HA261234	266.00	10	10	7	1/2	3/4	—
400-1200	HA265678	614.00	10	10	7	1/2	3/4	—

#### Low Current PLC Type with 1 NO & 1 NC Gold Plated Contacts

30-200	HA361234	302.00	10	10	—	1/2	3/4	—
400-1200	HA365678	643.00	10	10	—	1/2	3/4	—



HP61

### Fuse Puller Kits

Fuse Puller Kits are field installable in 30-100A Type VBII Heavy Duty Switches (one kit required per 3-pole switch).

### Fuse Puller Kits

Switch Ampere Rating	Fuse Puller Kit Catalog Number	List Price \$
30	HP61	21.00
60	HP62▲	21.00
100	HP63▲	21.00

▲ Built to order. Allow 6-8 weeks for delivery.

# General and Heavy Duty Safety Switches

## Accessories

Selection

### Copper Lug Kits

Heavy duty switches are UL approved to accept field installed copper lug kits.

### Copper Lug Kits

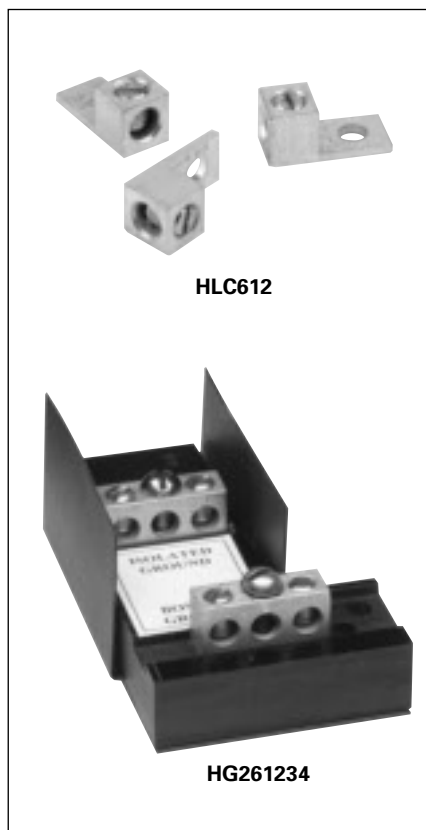
Switch Ampere Rating	Copper Lug Catalog Number	List Price \$	Description
30-60	HLC612	138.00	(9) Lugs/Kit #14-4 AWG Cu
100	HLC63▲	172.00	(9) Lugs/Kit #14-1/0 AWG Cu
200	HLC64▲	212.00	(9) Lugs/Kit #6 AWG-300 Kcmil Cu
400-1200	HLC65678	37.50	(1) Lugs/Kit #1/0 AWG-600 Kcmil Cu

### Equipment Ground Kits

Equipment Ground Lug Kits are available for all General and Heavy Duty Switches. They are field installable in Type 1 and Type 3R Switches and are factory installed as standard in Type 4 / 4X and Type 12 and also in all VBII 4&6-pole Switches.

### Equipment Ground Kits

Switch Ampere Rating	Catalog Number	List Price \$	Number of Terminals	Wire Range Per Terminal (Cu/Al)
30A GD	GSGK60	24.00	2	#14-8 AWG
60-200 GD	HG61234	24.00	2	#14-4 AWG
30-200 HD	HG61234	24.00	2	#14-4 AWG
400 & 600	HG656	123.00	4	#14-2/0 AWG
800-1200	HG678	239.00	8	#6 AWG-250 Kcmil



### Isolated Ground Kits

Isolated Ground Kits are available on 30-600A Heavy Duty Switches. They are normally used on circuits with a high content of computer or other electronic loading which require a ground which is isolated from the building ground and neutral circuits. The kit includes both isolated and grounded terminals as listed below.

### Isolated Ground Kits

Switch Ampere Rating	Catalog Number	List Price \$	Number of Terminals		Wire Range Per Terminal (Cu/Al)
			Isolated	Grounded	
30-200	HG261234	51.00	2	2	#14-4 AWG
400-600	HG2656	156.00	4	4	#14-2/0 AWG

▲ Built to order. Allow 6-8 weeks for delivery.

# General and Heavy Duty

## Hub and Lug Data

Selection



SSH150



ECHV300



ECHS200



SL0420

### Interchangeable Hubs

Conduit hubs are available for Type 3R, 12 and 4 / 4X applications. 30-200A Type 3R Switches are provided with a conduit hub provision and a removable hub plate on their top rainshed.

### Hubs

Conduit Size (inches)	Catalog Number	List Price \$	Used On
-----------------------	----------------	---------------	---------

#### Type 3R<sup>①</sup>

3/4	ECHA075	36.50	30A GD Only
1	ECHA100	36.50	
1 1/4	ECHA125	36.50	
Cover	ECHS000	38.00	60-200A GD 30-200A HD
3/4	ECHS075	39.50	
1	ECHS100	39.50	
1 1/4	ECHS125	39.50	
1 1/2	ECHS150	39.50	
2	ECHS200	69.00	
2 1/2	ECHS250	109.00	
2 1/2	ECHV250	125.00	400-1200A
3	ECHV300	182.00	
3 1/2	ECHV350	274.00	
4	ECHV400	362.00	

#### Type 4 / 4X<sup>②</sup>

3/4	SSH075	46.00	30-200A
1	SSH100	70.00	
1 1/4	SSH125	74.00	
1 1/2	SSH150	102.00	
2	SSH200	139.00	

**Note:** 30 thru 200A. Type 3R Switches have removable hub plates on rainshed. 400A and larger Type 3R Switches have no provisions for mounting hubs. Drill or punch hole in the field to accommodate hub size desired.

■ Built to order. Allow 2-3 weeks for delivery.

① Hubs suitable for 3R Switches.

② Also suitable for Type 12 applications.

③ Neutral Barrier kits are required on 30-100A switch only and only with 1-Phase / 3W or 3-Phase / 4W loads. Compression Lugs mounting kits are required on 400-1200A switches only.

④ Provides mounting for a single line or load lug.

⑤ Provides mounting for (2) compression lugs per phase on line or load.

### Compression Lug Mounting & Neutral Barrier Kit

All Heavy Duty Switches are field convertible for (Crimp) type lugs. When compression lugs are required for 30-100A switches, a neutral barrier kit is required for 1-Phase, 3W or 3-Phase, 4W applications. When compression lugs are required on 400-1200A switches, lug mounting kits are required.

### Compression Lug Mounting<sup>③</sup> and Neutral Barrier Kits

Switch Ampere Rating	Catalog Number	List Price \$	Kit Description
30	HCL612	6.40	Neutral Barrier Kit
60 & 100	HCL623	9.70	Neutral Barrier Kit
400 <sup>④</sup>	HCL65	19.00	1-Pole, Compression Lug Mounting Kit
400 & 600 <sup>⑤</sup>	HCL65678■	22.50	1-Pole, Compression Lug Mounting Kit
800 & 1200 <sup>⑥</sup>	HCL65678■	22.50	1-Pole, Compression Lug Mounting Kit

### Lugs

30 & 60A Switches are suitable for use with 60° or 75°C wire. 100-1200A are suitable for use with 75°C rated wire.

### Wire Ranges (Line, Load and Standard Neutral)

Switch Ampere Rating	Wire Range with Wire Bending Space Per NEC Requirements	Lug Wire Range
30GD	#14-8 AWG (Cu/Al) <sup>⑦</sup>	#14-8 AWG (Cu/Al)
30HD	#14-6 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
60 <sup>⑧</sup>	#14-3 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
100 <sup>⑧</sup>	#14-1/0 AWG (Cu/Al)	#14-1/0 AWG (Cu/Al)
200 <sup>⑧</sup>	#6 AWG-250 Kcmil (Cu/Al)	#6 AWG-300 Kcmil (Cu/Al)
400 <sup>⑨</sup>	1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)	(1) 1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)
600 <sup>⑨</sup>	(2) 1/0 AWG-750 Kcmil (Cu/Al) or (4) 1/0 -250 Kcmil (Cu/Al)	(2) 1/0 AWG-750 Kcmil (Cu/Al) or (4) 1/0 AWG-250 Kcmil (Cu/Al)
800	(3) 1/0 AWG-750 Kcmil (Cu/Al) Line Load or (6) 1/0 AWG-250 Kcmil (Cu/Al) (4) 1/0 AWG-750 Kcmil (Cu/Al) neutral	(3) 1/0 AWG-750 Kcmil (Cu/Al) Line Load or (6) 1/0 AWG-250 Kcmil (Cu/Al) (4) 1/0 AWG-750 Kcmil (Cu/Al) neutral
1200	(4) 3/0 AWG-750 Kcmil (Cu/Al) Line Load (4) 1/0 AWG-750 Kcmil (Cu/Al) neutral	(4) 1/0 AWG-750 Kcmil (Cu/Al) Line Load (4) 1/0 AWG-750 Kcmil (Cu/Al) neutral

⑦ Line lugs are UL approved to accept #14-6 CU/Al cable.

⑧ Max. wire size for height reduced switches is 500 kcmil (Cu/Al).

⑨ All but 60A GD & Compact HD NF switches are also UL approved for #2 Cu/Al conductors.

### Multiple Padlock Accessory

A tamper-proof device to provide for multiple padlocking to meet OSHA or plant requirements. Accepts up to 6 padlocks. Catalog number **SL0420**. Standard Carton-12. List Price **\$74.00**.

### Kirk-Key Interlocks

Kirk-Key Interlocks can be factory-installed only on Type VBII Heavy Duty and Double Throw Safety Switches.

Interlocks are used to prevent the operator from making an unauthorized operation. The interlock system is a simple method of applying key interlocks to safety switches so as to require operation in a predetermined sequence. List Price **\$1675.00**.

Before consulting the factory, the following information is required:

- User name and address
- Key number from lock assemblies on any existing locks to be interlocked with
- Complete locking scheme

Consult factory for delivery.

# General and Heavy Duty Safety Switches

*Dimensions*

Safety Switch Dimensions (Inches)\* & Shipping Weights

Catalog Number	Height			Width		Depth		Knockout Diagram Ⓢ	Shipping Weight (lbs.)
	Box A	With Door B	With Rain Shed C	Box D	With Handle E	Box F	With Handle G		
GF221N	7.97	8.13	—	5.50	5.94	3.00	5.88	S1	35 (10)
GF221NR	8.07	—	8.16	5.16	5.94	3.13	5.88	S3	35 (10)
GF222N	14.26	15.45	—	6.64	8.70	5.05	8.63	S6	14
GF222NR	14.39	—	15.76	6.64	8.70	5.05	8.63	S8	14
GF223N	21.95	23.15	—	9.64	11.70	5.05	8.63	S10	23
GF223NR	21.95	—	23.46	9.64	11.67	5.05	8.70	S11	24
GF224N	29.90	31.07	—	14.62	16.68	6.36	10.92	S12	47
GF224NR	29.90	—	31.42	14.61	16.68	6.36	10.92	S13	48
GF225N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	153
GF225NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	128
GF225NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	157
GF225NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	130
GF226N	56.00	56.57	—	24.64	26.21	9.23	14.68	S14	155
GF226NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	133
GF226NR	56.07	—	57.19	24.64	26.70	9.23	14.68	S15	159
GF226NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	135
GF321N	7.97	8.19	—	7.19	7.69	3.00	5.88	S2	24 (5)
GF321NR	8.07	—	8.16	7.19	8.16	3.13	5.88	S4	24 (5)
GF322N	14.26	15.45	—	6.64	8.70	5.05	8.63	S6	15
GF322NR	14.39	—	15.76	6.64	8.70	5.05	8.63	S8	15
GF323N	21.95	23.15	—	9.64	11.70	5.05	8.63	S10	25
GF323NR	21.95	—	23.46	9.64	11.67	5.05	8.70	S11	25
GF324N	29.90	31.07	—	14.62	16.68	6.36	10.92	S12	49
GF324NR	29.90	—	31.42	14.61	16.68	6.36	10.92	S13	50
GF325N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	158
GF325NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	136
GF325NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	162
GF325NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	138
GF326N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	161
GF326NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	138
GF326NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	165
GF326NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	141
GNF321	7.97	8.19	—	7.19	7.69	3.00	5.88	S2	24 (5)
GNF321R	8.07	—	8.16	7.19	7.69	3.13	5.88	S4	24 (5)
GNF322	11.11	12.31	—	6.64	8.71	5.05	8.61	S7	12
GNF322R	11.11	—	12.62	6.64	8.71	5.05	8.61	S9	13
GNF323	21.95	23.15	—	9.64	11.70	5.05	8.63	S10	23
GNF323R	21.95	—	23.46	9.64	11.67	5.05	8.70	S11	24
GNF324	29.90	31.07	—	14.62	16.68	6.36	10.92	S12	46
GNF324R	29.90	—	31.42	14.61	16.68	6.36	10.92	S13	47
GNF325	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	114
GNF326	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	116
HF221J	14.27	17.33	—	6.65	9.02	5.32	10.46	—	13
HF221N	14.26	15.45	—	6.64	9.01	5.05	10.17	S6	12
HF221NR	14.39	—	15.77	6.64	9.01	5.05	10.17	S8	13
HF221S	14.27	17.33	—	6.65	9.02	5.32	10.46	—	13
HF222J	16.22	19.31	—	9.17	11.47	5.33	10.46	—	19
HF222N	16.26	17.46	—	9.15	11.53	5.05	10.17	S16	18
HF222NR	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	19
HF222S	16.22	19.31	—	9.17	11.47	5.33	10.46	—	19
HF223J	21.96	23.16	—	9.65	12.02	5.34	10.46	—	24
HF223N	21.95	23.15	—	9.64	12.01	5.05	10.17	S10	23
HF223NR	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	24

**3**  
SAFETY SWITCHES

\*For inches / millimeters conversion, multiply inches by 25.4.

Ⓢ Knocks not provided on Type 4 / 4X and 12 or in 800 & 1200A switches.

# General and Heavy Duty Safety Switches

*Dimensions*

Safety Switch Dimensions (Inches)\* & Shipping Weights

Catalog Number	Height			Width		Depth		Knockout Diagram <sup>Ⓞ</sup>	Shipping Weight (lbs.)
	Box A	With Door B	With Rain Shed C	Box D	With Handle E	Box F	With Handle G		
HF223S	21.96	23.16	—	9.65	12.02	5.34	10.46	—	24
HF224J	29.96	31.07	—	14.62	16.95	6.63	12.58	—	48
HF224N	29.90	31.07	—	14.62	16.98	6.36	12.33	S12	47
HF224NR	29.90	—	31.42	14.61	16.99	6.36	12.33	S13	48
HF224S	29.96	31.07	—	14.62	16.95	6.63	12.58	—	48
HF225N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	153
HF225NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	129
HF225NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	162
HF225NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	131
HF226N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	155
HF226NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	133
HF226NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	159
HF226NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	135
HF227N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	360
HF227NR	66.25	—	67.36	38.40	39.96	9.24	14.68	—	362
HF228N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	362
HF228NR	66.25	—	67.36	38.40	39.96	9.24	14.68	—	364
HF265	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	149
HF265J	56.14	56.57	—	24.82	26.44	9.19	14.64	—	155
HF265R	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	152
HF265S	56.14	56.57	—	24.82	26.44	9.19	14.64	—	153
HF266	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	155
HF266J	56.14	56.57	—	24.82	26.44	9.19	14.68	—	156
HF266R	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	155
HF266S	56.14	56.57	—	24.82	26.44	9.19	14.68	—	161
HF321J	14.27	17.33	—	6.65	9.02	5.32	10.46	—	14
HF321N	14.26	15.45	—	6.64	9.01	5.05	10.17	S6	14
HF321NR	14.39	—	15.77	6.64	9.01	5.05	10.17	S8	15
HF321S	14.27	17.33	—	6.65	9.02	5.32	10.46	—	14
HF322J	16.27	19.31	—	9.17	11.47	5.33	10.46	—	20
HF322N	16.26	17.46	—	9.15	11.53	5.05	10.17	S16	19
HF322NR	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	20
HF322S	16.27	19.31	—	9.17	11.47	5.33	10.46	—	20
HF323J	21.96	23.16	—	9.65	12.02	5.34	10.46	—	25
HF323N	21.95	23.15	—	9.64	12.01	5.05	10.17	S10	25
HF323NR	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	26
HF323S	21.96	23.16	—	9.65	12.02	5.34	10.46	—	25
HF324J	29.96	31.07	—	14.62	16.95	6.63	12.58	—	49
HF324N	29.90	31.07	—	14.62	16.98	6.36	12.33	S12	49
HF324NR	29.90	—	31.42	14.61	16.99	6.36	12.33	S13	50
HF324S	21.96	31.07	—	14.62	16.95	6.63	12.58	—	49
HF325J	56.14	56.57	—	24.82	26.44	9.19	14.64	—	160
HF325N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	158
HF325NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	137
HF325NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	162
HF325NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	138
HF325S	56.14	56.57	—	24.82	26.44	9.19	14.64	—	158
HF326J	56.14	56.57	—	24.82	26.44	9.19	14.64	—	161
HF326N	56.00	56.57	—	24.64	26.21	9.23	14.68	S14	161
HF326NH	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	139
HF326NR	56.07	—	57.19	24.64	26.70	9.23	14.68	S15	165
HF326NRH	45.31	—	46.44	24.65	26.70	9.23	14.68	S15	142
HF326S	56.14	56.57	—	24.82	26.44	9.19	14.64	—	161
HF327J	66.25	66.82	—	38.40	39.96	9.24	14.68	—	367
HF327N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	380
HF327NR	66.25	—	67.36	38.40	40.25	9.24	14.68	—	383
HF327S	66.25	66.82	—	38.40	39.96	9.24	14.68	—	367
HF328N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	382
HF328NR	66.25	—	67.36	38.40	40.25	9.24	14.68	—	385
HF361	14.26	15.45	—	6.64	9.01	5.05	10.17	S6	14
HF361J, JW	14.27	17.33	—	6.65	9.02	5.32	10.46	—	14
HF361L	16.26	17.46	—	9.15	11.53	5.05	10.17	S16	19
HF361N	14.26	15.45	—	6.64	9.01	5.05	10.17	S6	14
HF361NR	14.39	—	15.77	6.64	9.01	5.05	10.17	S8	15
HF361R	14.39	—	15.77	6.64	9.01	5.05	10.17	S8	15
HF361RL	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	20
HF361S, SW	14.27	17.33	—	6.65	9.02	5.32	10.46	—	15
HF362	16.26	17.46	—	9.15	11.53	5.05	10.17	S16	19

\*For inches / millimeters conversion, multiply inches by 25.4.

Ⓞ Knocks not provided on Type 4 / 4X and 12 or in 800 & 1200A switches.



# General and Heavy Duty Safety Switches

## Dimensions

### Safety Switch Dimensions (Inches)\* & Shipping Weights

Catalog Number	Height			Width		Depth		Knockout Diagram Ⓢ	Shipping Weight (lbs.)
	Box A	With Door B	With Rain Shed C	Box D	With Handle E	Box F	With Handle G		
HF362J, JW	16.27	19.31	—	9.17	11.47	5.33	10.46	—	20
HF362N	16.26	17.46	—	9.15	11.53	5.05	10.17	S16	19
HF362NR	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	20
HF362R	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	20
HF362RL	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	25
HF362S, SW	16.27	19.31	—	9.17	11.47	5.33	10.46	—	20
HF363	21.95	23.15	—	9.64	12.01	5.05	10.17	S10	24
HF363J, JW	21.96	23.16	—	9.65	12.02	5.34	10.46	—	25
HF363N	21.95	23.15	—	9.64	12.01	5.05	10.17	S10	25
HF363NR	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	26
HF363R	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	25
HF363S	21.96	23.16	—	9.65	12.02	5.34	10.46	—	25
HF364	29.90	31.07	—	14.62	16.98	6.36	12.33	S12	48
HF364J, JW	29.96	31.07	—	14.62	16.95	6.63	12.58	—	49
HF364N	29.90	31.07	—	14.62	16.98	6.36	12.33	S12	49
HF364NR	29.90	—	31.42	14.61	16.99	6.36	12.33	S13	48
HF364R	29.90	—	31.42	14.61	16.99	6.36	12.33	S13	49
HF364S, SW	29.96	31.07	—	14.62	16.95	6.63	12.58	—	49
HF365	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	154
HF365H	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	136
HF365J, JW	56.14	56.57	—	24.82	26.44	9.19	14.64	—	160
HF365N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	158
HF365NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	162
HF365R	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	157
HF365RH	45.25	45.82	—	24.65	26.70	9.23	14.68	S15	137
HF365S, SW	56.14	56.57	—	24.82	26.44	9.19	14.64	—	158
HF366	56.00	56.57	—	24.64	26.21	9.23	14.68	S14	157
HF366H	45.25	45.82	—	24.65	26.21	9.23	14.68	S14	138
HF366J, JW	56.14	56.57	—	24.82	26.44	9.19	14.64	—	161
HF366N	56.00	56.57	—	24.65	26.21	9.23	14.68	S14	161
HF366NR	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	165
HF366R	56.07	—	57.19	24.65	26.70	9.23	14.68	S15	161
HF366RH	45.25	45.82	—	24.65	26.70	9.23	14.68	S15	141
HF366S	56.14	56.57	—	24.82	26.44	9.19	14.64	—	161
HF367	66.25	66.82	—	38.40	39.96	9.24	14.68	—	380
HF367J	66.25	66.82	—	38.40	39.96	9.24	14.68	—	380
HF367N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	382
HF367NR	66.25	—	67.36	38.40	40.25	9.24	14.68	—	386
HF367R	66.25	—	67.36	38.40	40.25	9.24	14.68	—	382
HF367S	66.25	66.82	—	38.40	39.96	9.24	14.68	—	380
HF368, J, S	66.25	66.82	—	38.40	39.96	9.24	14.68	—	383
HF368N	66.25	66.82	—	38.40	39.96	9.24	14.68	—	385
HF368NR	66.25	—	67.36	38.40	40.25	9.24	14.68	—	388
HF368R	66.25	—	67.36	38.40	40.25	9.24	14.68	—	385
HN265	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	109
HN265J	44.14	44.57	—	24.82	26.44	9.19	14.64	—	119
HN265R	44.07	—	45.19	24.65	26.70	9.23	14.68	S15	118
HN265S	44.14	44.57	—	24.82	26.44	9.19	14.64	—	118
HN266	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	111
HN266J	44.14	44.57	—	24.82	26.44	9.19	14.64	—	115
HN266R	44.07	—	45.19	24.64	26.70	9.23	14.68	S15	120
HN266S	44.14	44.57	—	24.82	26.44	9.19	14.64	—	115
HN361	11.11	12.31	—	6.64	9.01	5.05	10.17	S7	12
HN361J, JW	11.12	14.14	—	6.65	9.02	5.56	10.46	—	13
HN361R	11.11	—	12.63	6.64	9.01	5.05	10.17	S9	13
HN361RL	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	20
HN361S, SW	11.12	14.14	—	6.65	9.02	5.56	10.46	—	13
HN362	16.26	—	—	9.15	11.53	5.05	10.17	S16	18
HN362J, JW	16.27	17.46	—	9.17	11.47	5.33	10.46	—	19
HN362R	16.26	—	17.77	9.16	11.53	5.05	10.17	S17	19
HN362RL	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	24
HN362S, SW	16.27	17.46	—	9.17	11.47	5.33	10.46	—	19
HN363	21.95	23.15	—	9.64	12.01	5.05	10.17	S10	23
HN363J, JW	21.96	23.16	—	9.65	12.02	5.34	10.46	—	24
HN363R	21.95	—	23.46	9.64	11.97	5.05	10.17	S11	24
HN363S, SW	21.96	23.16	—	9.65	12.02	5.34	10.46	—	24
HN364	29.90	31.07	—	14.62	16.98	6.36	12.33	S12	46
HN364J, JW	29.96	31.07	—	14.62	16.95	6.63	12.58	—	47
HN364R	29.90	—	31.42	14.61	16.99	6.36	12.33	S13	47
HN364S, SW	29.96	31.07	—	14.62	16.95	6.63	12.58	—	47

\*For inches / millimeters conversion, multiply inches by 25.4.

Ⓢ Knocks not provided on Type 4 / 4X and 12 or in 800 & 1200A switches.

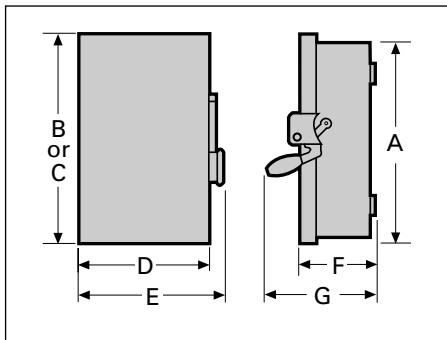
# General and Heavy Duty Safety Switches

## Dimensions

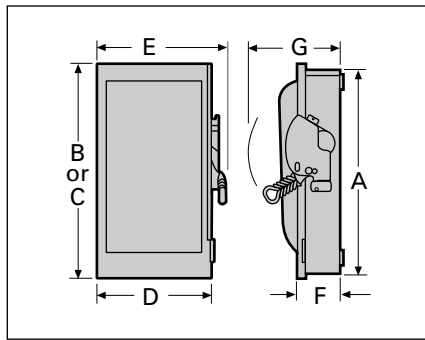
Safety Switch Dimensions (Inches)\* & Shipping Weights

Catalog Number	Height			Width		Depth		Knockout Diagram <sup>Ⓞ</sup>	Shipping Weight (lbs.)
	Box A	With Door B	With Rain Shed C	Box D	With Handle E	Box F	With Handle G		
HNF365	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	114
HNF365J, JW	44.14	44.57	—	24.82	26.44	9.19	14.64	—	114
HNF365R	44.07	—	45.19	24.65	26.95	9.23	14.68	S15	118
HNF365S, SW	44.14	44.57	—	24.82	26.44	9.19	14.64	—	118
HNF366	44.00	44.57	—	24.65	26.21	9.23	14.68	S14	116
HNF366J, S	44.14	44.57	—	24.82	26.44	9.19	14.64	—	115
HNF366R	44.07	—	45.19	24.65	26.95	9.23	14.68	S15	120
HNF367, J	54.25	54.82	—	38.40	39.96	9.24	14.68	—	302
HNF367R	54.25	—	55.36	38.40	40.25	9.24	14.68	—	304
HNF367S	54.25	54.82	—	38.40	39.96	9.24	14.68	—	302
HNF368, J, S	54.25	54.82	—	38.40	39.96	9.24	14.68	—	305
HNF368R	54.25	54.82	—	38.40	40.25	9.24	14.68	—	307
LF111N	7.97	8.13	—	5.50	5.94	3.00	5.38	S2	35 (10)
LF111NR	8.07	—	8.16	5.16	5.94	3.13	5.38	S3	35 (10)
LF211N	7.97	8.13	—	5.50	5.94	3.00	5.38	S1	35 (10)
LF211NR	8.07	—	8.16	5.16	5.94	3.13	5.38	S3	35 (10)
LNF222R	8.07	—	8.16	5.16	5.94	3.13	5.38	S5	35 (10)

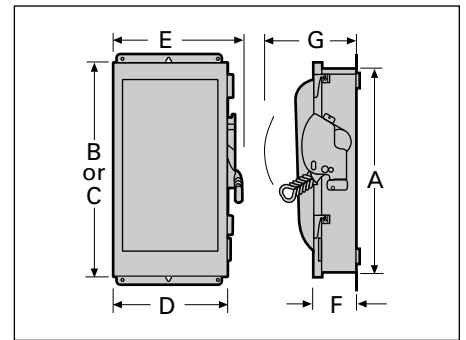
**Type 1 or 3R  
30A GD**



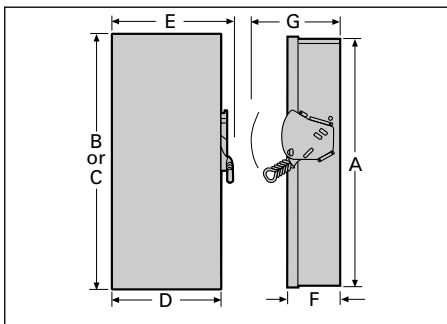
**Type 1 or 3R  
60-200A GD, 30-200A HD Type VBII**



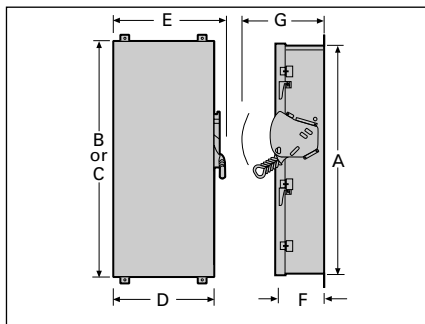
**Type 4/4X or 12  
30-200A HD Type VBII**



**Type 1 or 3R  
400-1200A Type VBII (GD & HD)**



**Type 4/4X or 12  
400-1200A HD Type VBII**



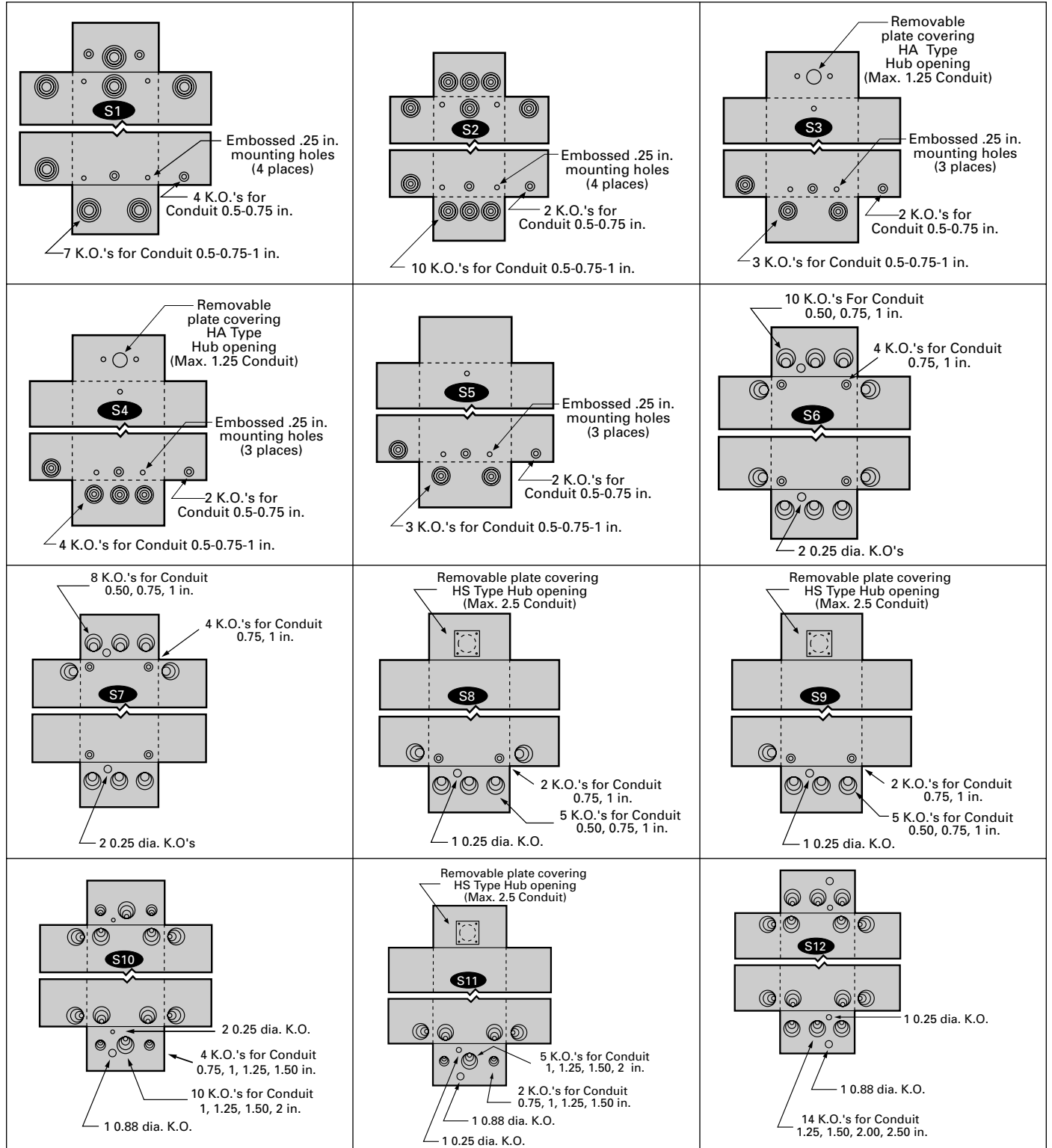
\*For inches / millimeters conversion, multiply inches by 25.4.

Ⓞ Knocks not provided on Type 4 / 4X and 12 or in 800 & 1200A switches.

# General and Heavy Duty Safety Switches

## Knockout Diagrams

### Type 1 & 3R Enclosures

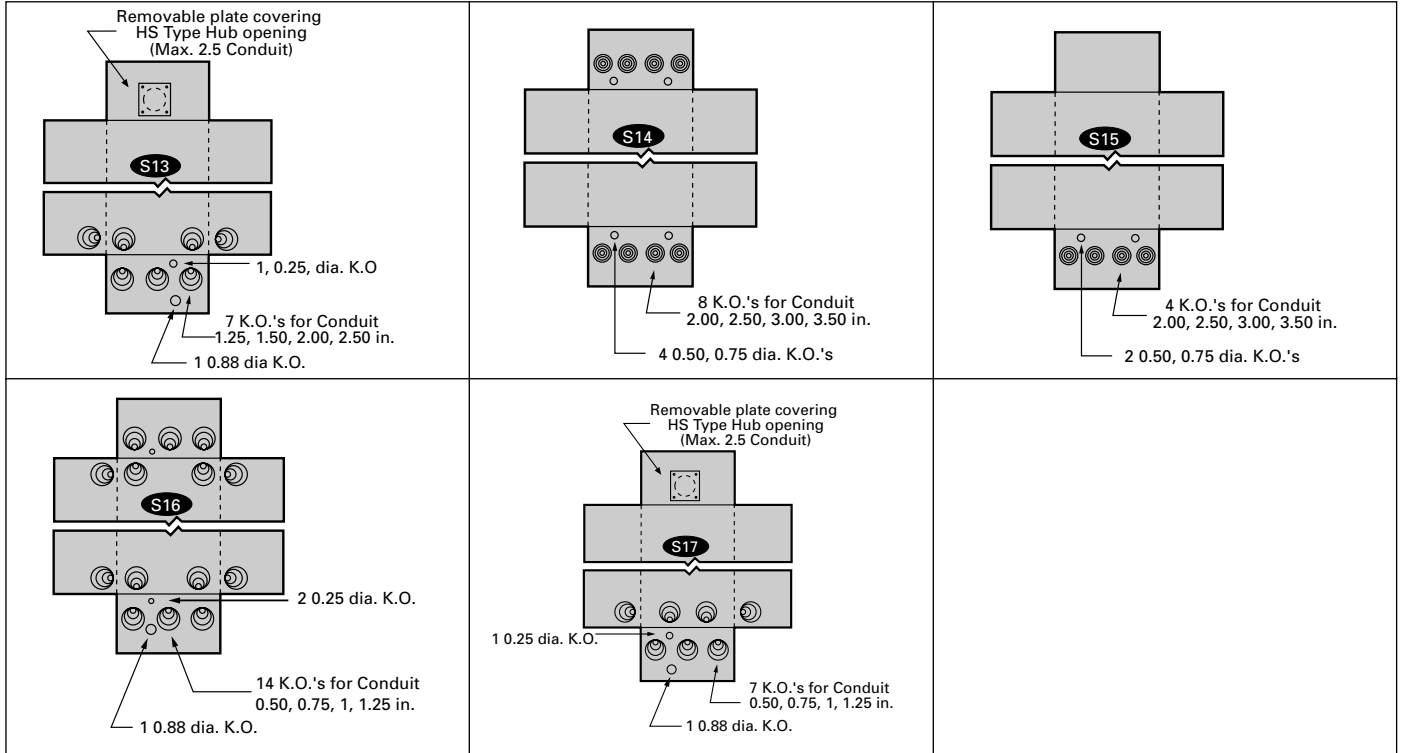


\*For inches / millimeters conversion, multiply inches by 25.4.

# General and Heavy Duty Safety Switches

## Knockout Diagrams

### Type 1 & 3R Enclosures

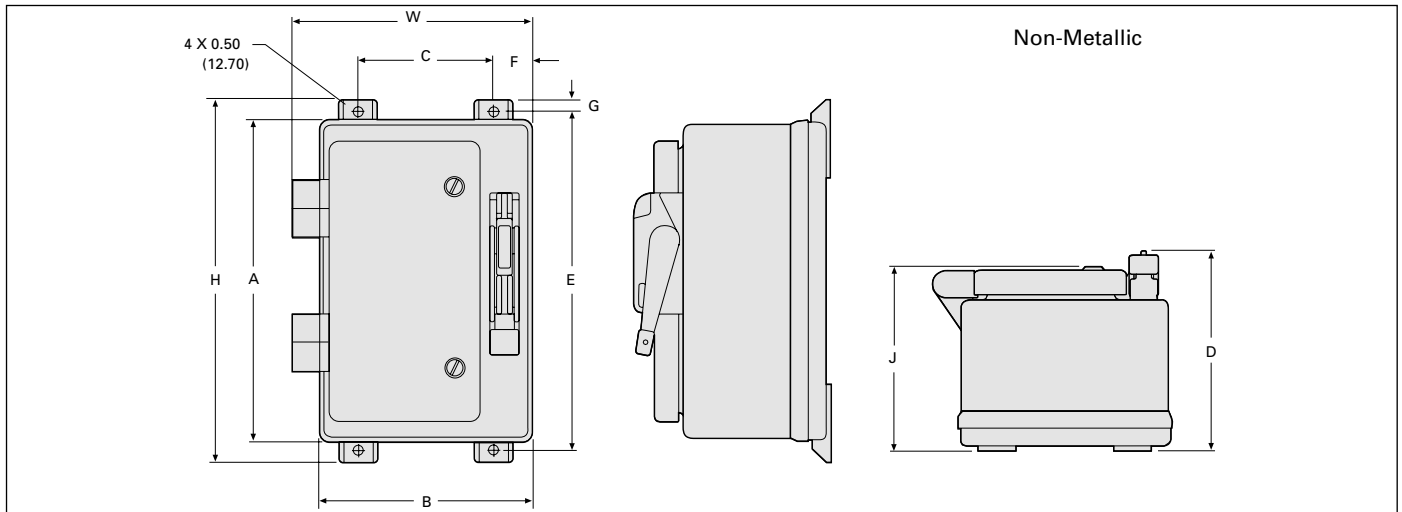


\*For inches / millimeters conversion, multiply inches by 25.4.

# Special Application Safety Switches Dimension Drawings

## Non-Metallic

## Dimensions



Catalog Number	Dimensions (Inches) Non-Metallic									
	H	W	D	A	B	C	E	F	G	J
HF321NX	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HF322NX	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HF361NX <sup>Ⓞ</sup>	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HF362NX <sup>Ⓞ</sup>	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HF363NX <sup>Ⓞ</sup>	26.95	14.87	13.25	24.84	13.72	6.25	25.75	3.75	.46	12.15
HF364NX <sup>Ⓞ</sup>	33.41	27.47	13.19	31.31	26.31	18.50	32.25	3.91	.47	12.10
HNF361X <sup>Ⓞ</sup>	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HNF362X <sup>Ⓞ</sup>	18.75	12.11	10.25	16.59	10.97	7.00	17.50	1.98	.46	9.20
HNF363X <sup>Ⓞ</sup>	26.95	14.87	13.25	24.84	13.72	6.25	25.75	3.75	.46	12.15
HNF364X <sup>Ⓞ</sup>	33.41	27.47	13.19	31.31	26.31	18.50	32.25	3.91	.47	12.10

## VBI Interlocked Receptacle Switches

Ampere Rating	Dimensions (Inches)						
	A	B	C	D	E	F	G

### Cr-H Type Fusible (240 & 600V)

30	14.27	7.42	9.02	6.22	1.52	6.1	6.0
60	16.27	9.17	11.47	6.34	1.52	6.4	7.4
100	21.96	9.65	12.02	6.80	1.52	6.5	7.6

### Cr-H Type Non-Fusible (600V max.)

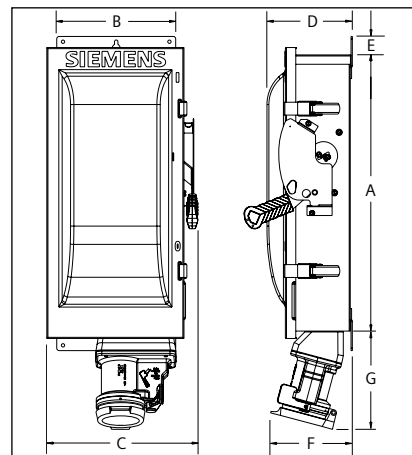
30	14.27	7.42	9.02	6.22	1.52	6.1	6.0
60	16.27	9.17	11.47	6.34	1.52	6.4	7.4
100	21.96	9.65	12.02	6.80	1.52	6.5	7.6

### Pyle-National Type Fusible (240 & 600V)

30	14.27	7.42	9.02	6.22	1.52	3.5	3.0
60	16.27	9.17	11.47	6.34	1.52	5.0	4.5

### Pyle-National Type Non-Fusible (600V max.)

30	14.27	7.42	9.02 <sup>Ⓞ</sup>	6.22	1.52	3.5	3.0
60	16.27	9.17	11.47 <sup>Ⓞ</sup>	6.34	1.52	5.0	4.5



\*For inches / millimeters conversion, multiply inches by 25.4.

<sup>Ⓞ</sup> Dimensions also apply to "L" suffix switches (less lugs).

# Special Application Safety Switches Dimension Drawings

## 4-Pole & 6-Pole

*Dimensions*

4 & 6-Pole Safety Switch Dimensions – Inches (mm)

Catalog Number	Enclosure			Mounting		
	A	B	C	D	E	F

**Figure 1, 4-Pole Fusible and Non-fusible, Type 1**

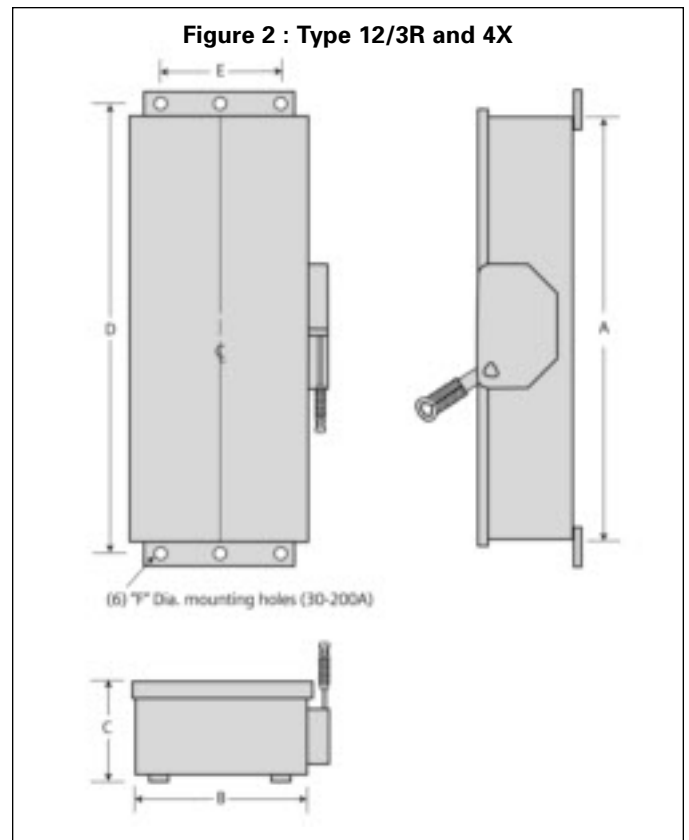
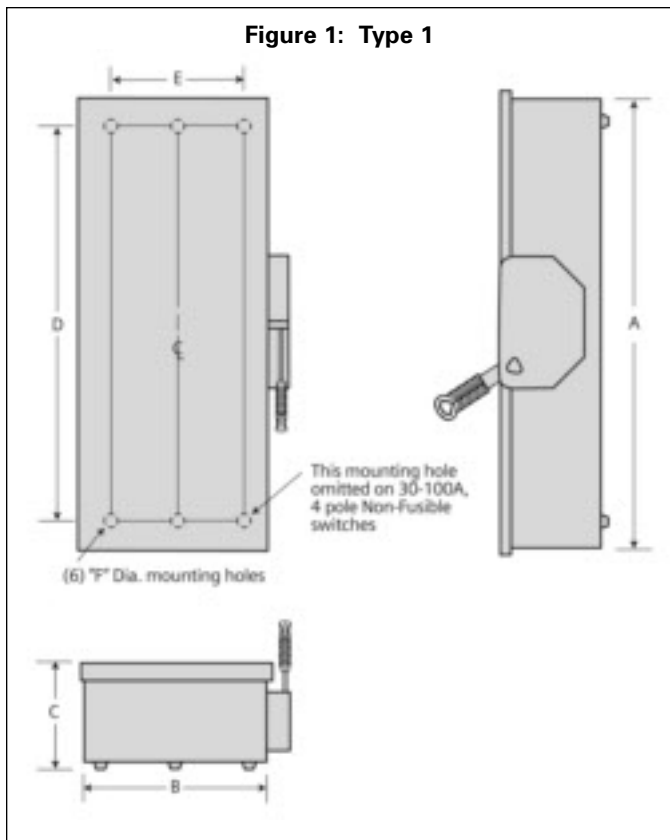
HNF461	24.50 (622)	9.53 (242)	6.09 (155)	19.00 (483)	6.75 (171)	0.268 (7)
HF461	29.12 (740)	9.53 (242)	6.09 (155)	23.50 (597)	6.75 (171)	0.268 (7)
HNF462	24.88 (632)	11.50 (292)	6.09 (155)	19.00 (483)	9.38 (238)	0.268 (7)
HF462	33.53 (852)	11.50 (292)	6.09 (155)	27.50 (699)	9.38 (238)	0.268 (7)
HNF463	27.62 (702)	12.18 (309)	6.09 (155)	19.36 (492)	8.00 (203)	0.268 (7)
HF463	36.44 (926)	12.18 (309)	6.09 (155)	28.11 (714)	8.00 (203)	0.268 (7)
HNF464	36.00 (914)	19.12 (486)	6.42 (163)	30.88 (784)	15.00 (381)	0.44 (11)
HF464	49.48 (1257)	19.12 (486)	6.42 (163)	45.50 (1130)	15.00 (381)	0.44 (11)

**Figure 2, 4 & 6-Pole Fusible Type 12/3R and 4X**

HF461J, HF661J, HF661S	29.50 (622)	9.53 (242)	6.48 (165)	31.65 (804)	5.47 (139)	0.27 (7)
HF462J, HF662J, HF662S	33.53 (852)	11.50 (292)	6.48 (165)	35.69 (907)	8.00 (203)	0.27 (7)
HF463J, HF663J, HF663S	36.44 (926)	12.18 (309)	6.48 (165)	38.67 (982)	8.47 (215)	0.27 (7)
HF464J, HF664J, HF664S	49.48 (1257)	19.12 (486)	6.78 (172)	51.64 (1312)	13.44 (341)	0.33 (8)

**Figure 2, 4 & 6-Pole Non-fusible Type 12/3R and 4X**

HNF461J, HNF661J, HNF661S	24.50 (622)	9.53 (242)	6.48 (165)	26.65 (667)	5.47 (139)	0.27 (7)
HNF462J, HNF662J, HNF662S	24.88 (632)	11.50 (292)	6.48 (165)	27.03 (687)	8.00 (203)	0.27 (7)
HNF463J, HNF663J, HNF663S	27.54 (700)	12.18 (309)	6.48 (165)	29.77 (756)	8.47 (215)	0.27 (7)
HNF464J, HNF664J, HNF664S	36.00 (914)	19.12 (486)	6.78 (172)	38.16 (969)	13.44 (341)	0.33 (8)



# Special Application Safety Switches Dimension Drawings

## Double Throw

Selection

### Description

Double throw switches are intended to transfer loads from one power source to another. All 2 & 3-pole double throw switches are suitable for use as service equipment. All are UL Listed and both horsepower and load break rated.

Switches are rated for use on systems up to 10,000A when protected with Class H fuses or 100,000A when protected with Class R or Class T fuses<sup>2</sup>. They can also be used to connect a single source of power to either of two loads. In this application it is necessary to field modify

fusible switches so that the fuses are on the load side of the switching mechanism.

A cover interlock is provided on all ampere ratings. The operating handle may be padlocked in the off position.

### Fuse Capabilities of Fusible DTF Switches

Amp Rating	Fuse Type			
	H	R	T	J
30 & 60A, 240V	Std	Yes (kit)	No	No
30 & 60A, 600V	Std	Yes (kit)	No	Yes <sup>3</sup>
100 & 200A	Std	Yes (kit)	Yes (kit)	Yes <sup>3</sup>
400 & 600A (DTF)	No	No	Yes <sup>3</sup>	Std



### Double Throw Switches

System	Voltage	Number of Poles	Amps	Type 1 — Indoor		Type 3R — Outdoor <sup>1</sup>		Type 12/3R — Industrial		Type 4X — Stainless Steel		
				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	
<b>Heavy Duty Fusible (30-200A) with Class H fuse spacings<sup>2</sup></b>												
	240 Volt AC or 250 Volt DC	2	200	DTF224▲	4043.00	DTF224R	5633.00	—	—	—	—	
			3	30	DTF321	1180.00	DTF321R▲	1733.00	—	—	—	—
		60		DTF322	2119.00	DTF322R▲	2844.00	—	—	—	—	
		100		DTF323▲	3551.00	DTF323R	4020.00	—	—	—	—	
		200		DTF324	5233.00	DTF324R	6866.00	—	—	—	—	
		3	400	DTF325	12487.00	FR325DTK <sup>4</sup> ▲	14403.00	—	—	—	—	—
	600		DTF326▲	13503.00	FR326DTK <sup>4</sup> ▲	15944.00	—	—	—	—	—	
	600 Volt AC, 250 Volt DC	3	30	DTF361	2265.00	—	—	—	—	—	—	—
			60	DTF362▲	2376.00	—	—	—	—	—	—	—
		3	100	DTF363	4177.00	DTF363R	5408.00	—	—	F353SSDTK▲	14502.00	
			200	DTF364	6143.00	DTF364R	7991.00	—	—	F354SSDTK▲	17873.00	
			400	DTF365	12778.00	FR355DTK <sup>4</sup> ▲	14650.00	—	—	F355SSDTK <sup>4</sup> ▲	29061.00	
—			—	—	—	—	—	—	—	—		
<b>Heavy Duty Non-Fusible<sup>2</sup></b>												
	240 Volt AC or 250 Volt DC	2	30	DTNF221	672.00	—	—	—	—	—	—	
			60	DTNF222	1062.00	—	—	—	—	—	—	
			100	DTNF223	1485.00	—	—	—	—	—	—	
			200	DTNF224	1953.00	DTNF224R	2557.00	—	—	—	—	
		3	400	DTNF225	5599.00	DTNF225R	8618.00	—	—	—	—	
			30	DTNF321	795.00	—	—	—	—	—	—	
			60	DTNF322	1271.00	—	—	—	—	—	—	
			100	DTNF323	1924.00	DTNF323R	2210.00	—	—	—	—	
	600 Volt AC, or 250 Volt DC	3	200	DTNF324	2804.00	DTNF324R	3556.00	—	—	—	—	
			400	DTNF325	7859.00	—	—	—	—	—	—	
			600	DTNF326	10523.00	—	—	—	—	—	—	
			800	DTNF327▲	16275.00	—	—	—	—	—	—	
		3	30	DTNF361	893.00	DTNF361R	1538.00	DTNF361J	1850.00	DTNF361S	4624.00	
			60	DTNF362	1236.00	DTNF362R	2041.00	DTNF362J	2517.00	DTNF362S	6196.00	
			100	DTNF363	2053.00	DTNF363R	3567.00	DTNF363J	3297.00	DTNF363S	9254.00	
			200	DTNF364	3003.00	DTNF364R	5040.00	DTNF364J▲	7125.00	DTNF364S	11220.00	
	4 <sup>5</sup>	400	DTNF365	8033.00	DTNF365R	13137.00	NF355HDTK	13283.00	NF355SSDTK	23311.00		
		600	DTNF366	11760.00	DTNF366R	16589.00	—	—	—	—		
		800	DTNF367	18092.00	DTNF367R	19178.00	—	—	—	—		
		1200	DTNF368▲	24760.00	DTNF368R	26601.00	—	—	—	—		
	<b>General Duty Non-Fusible</b>				<b>Type 3R — Outdoor<sup>1</sup> Less Neutral</b>		<b>Type 3R — Outdoor<sup>1</sup> With Neutral</b>					
		240 Volt AC	2	100	DTGNF223R	1150.00	DTGNF223NR	1349.00	—	—	—	—
				200	DTGNF224R	1850.00	DTGNF224NR	2202.00	—	—	—	—
		3	100	DTGNF323R	1678.00	DTGNF323NR	1890.00	—	—	—	—	
200			DTGNF324R	2097.00	DTGNF324NR	2432.00	—	—	—	—		

▲ Built to order. Allow 3-4 weeks for delivery.

<sup>1</sup> Use HS Type hubs for 30-200A switches. 400A and larger switches do not have hub provisions.  
<sup>2</sup> All Heavy Duty double throw switches with a catalog

number starting with "DT" are rated 200,000 AIC max. when protected by Class R, J or T fuses. Fuse ampere rating must not exceed switch ampere rating.  
<sup>3</sup> Move load base.

<sup>4</sup> Will accept class T Fuses only.  
<sup>5</sup> 4-pole switches are not approved for service entrance.

# Safety Switches

## Double Throw

Accessories, Lug Data and Horsepower Ratings

**Selection**

### Accessories – 2 and 3-Pole Switches Type “DT” Only<sup>®</sup>

Description	Catalog Number	List Price \$	
<b>Neutral Kits</b>	30A 60 & 100A 200A 400 & 600A 800 & 1200A	HNC612 97.00 HN263 225.00 HNC264 352.00 HN678 838.00 HND678 919.00	
	<b>Equipment Ground Kit</b>	30-200A (2) #14-4 AWG 400 & 600A (4) #14-2/0 800-1200A (8) #6-350 Kcmil	HG61234 24.00 HG656 123.00 HG678 239.00
	<b>Auxiliary Contacts (HD only) (two required per switch)<sup>®</sup></b>	30-200A with (1) NO & (1) NC contact 30-200A with (2) NO & (2) NC contacts 400-1200A with (1) NO & (1) NC contact 400-1200A with (2) NO & (2) NC contacts	HA161234 239.00 HA261234 266.00 HA165678 587.00 HA265678 614.00
	<b>Class R Fuse Clip Kits (two required per switch)</b>	30A, 240V Kit 30A, 600V Kit/60A, 240V Kit 60A, 600V Kit 100A Kit 200A Kit	HR21 83.00 HR612 83.00 HR62 83.00 HR63 54.00 HR64 54.00
	<b>Class T Fuse Adapter Kits (two required per pole)</b>	100A, 240V Kit 100A, 600V Kit 200A, 240V Kit 200A, 600V Kit	HT23 76.00 HT63 120.00 HT24 102.00 HT64 143.00
<b>Type 3R Hubs (30-200A)</b>	For 3/8" Conduit For 1" Conduit For 1 1/2" Conduit For 1 1/2" Conduit For 2" Conduit For 2 1/2" Conduit	ECHS075 39.50 ECHS100 39.50 ECHS125 39.50 ECHS150 39.50 ECHS200 69.00 ECHS250 109.00	

### Accessories – 4-Pole and Type “F” & “NF” 3-Pole Switches Only<sup>®</sup>

Description	Catalog Number	List Price \$
<b>Auxiliary Switch (two required per switch)</b>	30-800A (1) NO, (1) NC <sup>®</sup> (2) NO, (2) NC <sup>®</sup>	DS200EK1 373.00 DS200EK2 743.00
<b>Ground Lug Kit<sup>®</sup></b>	30-60-100A 200A 400-600-800A	DS100GK 12.00 DS200GK 203.00 DS468GK 292.00
<b>Hubs</b>	30-60-100A Use Type HR Hubs 200-400A Use Type SSH 4, 4X Hubs 600-800A Use Type SSH 4, 4X Hubs	
<b>Neutrals (3-pole only)</b>	30-60-100A 200A 400 & 600A Fusible 400A 3P Non-Fusible	DT100NK 195.00 DT200NK 391.00 DS800NK 488.00 DT600NK 432.00

### Maximum Horsepower Ratings Fused

Ampere Rating	1-Phase AC		3-Phase AC			250V DC
	240V	240V	480V	600V	600V	
30	3	7 1/2	15	20	5	
60	10	15	30	50	10	
100	15	30	60	75	20	
200	15	60	125	150	40	
400	—	125	125	125	50	
600	—	125	—	—	50	

### Non-Fused

30	5	10	20	30	5
60	10	20	50	60	10
100	15	40	75	100	20
200	15	60	125	150	40
400-800	—	125	250	350	50

▲ Built to order. Allow 6-8 weeks for delivery.

® For “DT” VBII Type switches only.

® Also for fusible stainless & 400A Type 12 & 4x switches.

® The following ground lugs are provided as standard in 200A and larger switches 200-(1) #14-4 Cu/Al 400-800A-(3) #6-250MCM Cu/Al.

### Wire Ranges (Line, Load and Neutral) per NEC Requirements

#### 30-200A – 2, 3 & 4-Pole Switches

Switch Ampere Rating	Wire Range (Cu/Al) New VBII Design Line, Load and Neutral
30	(1) #14-6
60	(1) #14-2
100	(1) #14-1/0 AWG
100	(1) #14-1/0 AWG
200	(1) #6-250 kcmil

#### 400-1200A – 2 & 3-Pole Switches

Switch Ampere Rating	Wire Range (Cu/Al) New VBII Design Line, Load and Neutral
400	(1) 1/0 AWG-750 kcmil or (2) 1/0 AWG-250 kcmil
600	(2) 1/0 AWG-500 kcmil
800	(2) 1/0 AWG-750 kcmil or (3) 1/0 AWG-500 kcmil
1200	(3) 1/0 AWG-600 kcmil or (4) 1/0 AWG-500 kcmil

#### 400-800A – 4-Pole switches

Switch Ampere Rating	Wire Range (Cu/Al) New VBII Design Line, Load and Neutral
400	(1) 1/0 AWG-300 kcmil or (2) 1/0 AWG-750 kcmil
600	(2) 250-500 Kcmil
800	(3) 250-500 Kcmil

### Replacement Parts – 2 and 3-Pole Switches Only<sup>®</sup>

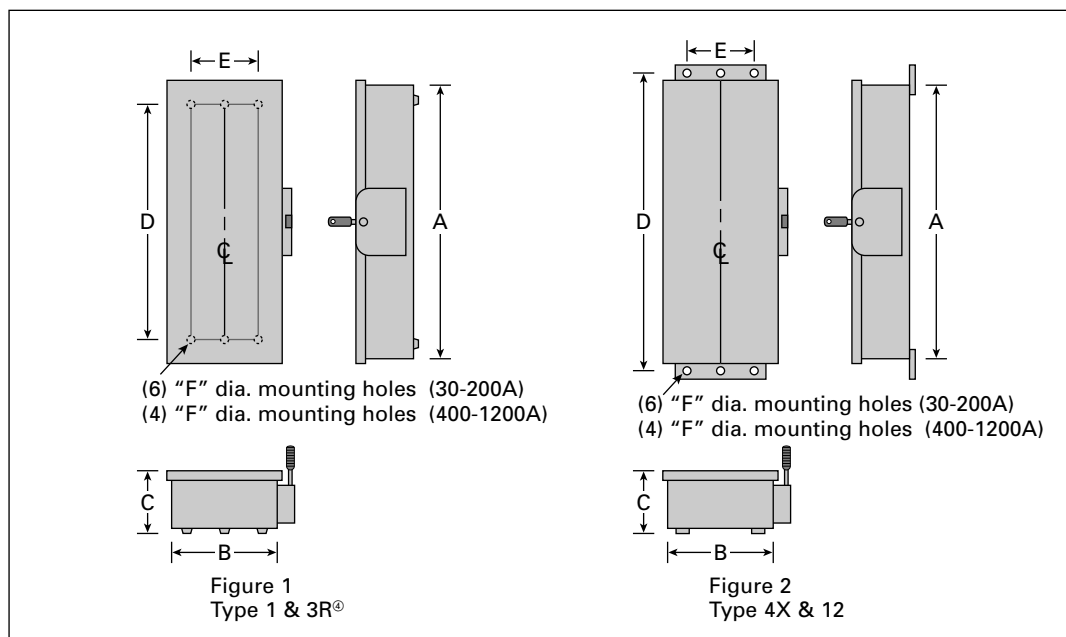
Description	Catalog Number	List Price \$
Type 1, 3R & 12 Replacement Handle	30-200A	HHD61234 98.00
Type 4X Replacement Handle	30-200A	HHD61234S 174.00
Replacement Handle	400-1200A	HHD65678 143.00

® One aux. required for normal and one required for emergency switch line base.



### VBII Design Double Throw Dimensions (Inches)

Catalog Number	Enclosure			Mounting		
	A	B	C	D	E	F
<b>Figure 1 (30-1200A Type 1 &amp; 3R)</b>						
DTNF221, DTNF321, DTNF361, DTNF361R	24.50	9.53	6.09	19.00	6.75	0.268
DTF321, DTF321R, DTF361	29.12	9.53	6.09	23.50	6.75	0.268
DTNF222, DTNF322, DTNF362, DTNF362R	24.88	11.50	6.09	19.00	9.38	0.268
DTF322, DTF322R, DTF362	33.45	11.50	6.09	27.50	9.38	0.268
DTNF223, DTNF323, DTNF323R, DTNF363, DTNF363R, DTGNF223R, DTGNF223NR, DTGNF323R, DTGNF323NR	27.62	12.18	6.09	19.36	8.00	0.268
DTF323, DTF323R, DTF363, DTF363R	36.44	12.18	6.09	28.11	8.00	0.268
DTNF224, DTNF224R, DTNF324, DTNF324R, DTNF364, DTNF364R, DTGNF224R, DTGNF224NR, DTGNF324R, DTGNF324NR	36.00	19.12	6.42	31.00	15.00	0.44
DTF224, DTF224R, DTF324, DTF324R, DTF364, DTF364R	49.44	19.12	6.42	44.50	15.00	0.44
DTF325, DTF326, DTF365	73.54	28.22	9.44	65.50	16.00	0.56
DTNF225, DTNF225R, DTNF325, DTNF365, DTNF365R	57.71	28.22	9.44	49.75	16.00	0.56
DTNF326, DTNF366, DTNF366R	57.71	28.22	9.44	49.75	16.00	0.56
DTNF327, DTNF367, DTNF367R	71.65	41.60	9.44	63.70	32.00	0.56
DTNF368, DTNF368R	71.65	41.60	9.44	63.70	32.00	0.56
NFR451DTK <sup>Ⓢ</sup> , NFR452DTK <sup>Ⓢ</sup> , NFR453DTK <sup>Ⓢ</sup>	24.63	11.63	4.78	21.50	9.25 <sup>①</sup>	0.25 <sup>①</sup>
NF454DTK <sup>Ⓢ②</sup> , NFR454DTK <sup>Ⓢ②</sup>	37.25	19.19	6.32	33.50	16.00 <sup>②</sup>	0.56 <sup>②</sup>
NF455DTK <sup>Ⓢ</sup> , NF456DTK <sup>Ⓢ</sup> , NF457DTK <sup>Ⓢ</sup> , NFR455DTK <sup>Ⓢ</sup> , NFR456DTK <sup>Ⓢ</sup> , NFR457DTK <sup>Ⓢ</sup>	63.31	27.00	8.88	58.50	22.25 <sup>②</sup>	0.56 <sup>②</sup>
<b>Figure 2 (30-200A Type 12 &amp; 4X)</b>						
DTNF361J, DTNF361S	24.42	9.65	6.48	26.65	5.47	0.27
DTNF362J, DTNF362S	24.80	11.61	6.48	27.03	8.00	0.27
DTNF363J, DTNF363S	27.54	12.29	6.48	29.77	8.47	0.27
DTNF364J, DTNF364S	35.93	19.24	6.78	38.16	13.44	0.33
NF355HDTK <sup>①</sup> , NF355SSDTK <sup>①</sup>	53.82	22.66	7.25	56.20	18.00	0.56
F353SSDTK <sup>Ⓢ②</sup>	37.00	11.62	5.50	38.50	9.00	0.26
F354SSDTK <sup>Ⓢ②</sup>	50.90	19.16	6.46	53.27	16.12	0.50
F355SSDTK <sup>Ⓢ②</sup>	74.50	25.00	8.92	76.69	20.25	0.56



\*For inches / millimeters conversion, multiply inches by 25.4.

Ⓢ (3) Mounting holes supplied (1 at top).  
 ② (4) Mounting holes provided.

Ⓢ These switches are not Type VBII design.  
 ④ Drip hood not shown but provided on Type 3R enclosures.

# Enclosed Switches

## Rotary Disconnect Switches in Non-Metallic Enclosures<sup>⑤</sup>

Selection

### Application

Siemens Rotary Disconnect switches are ideally suited for use as "in sight" disconnects for motor loads and other electrical equipment which is remotely located from its branch circuit protective device. All are supplied in non-metallic enclosures which are UL & CUL or CSA approved for a wide range of both indoor and outdoor environments. All meet UL508 requirements.

### Description

16–125A non-fusible switches are available in non-metallic enclosures which are UL approved as Type 12 & 4X and for either indoor or outdoor use. All are horsepower and load break rated. All are panel mounted and are either supplied with factory installed aux. contacts or will accept contact kits. All are compact in size while providing ample wiring space for copper line & load conductors.

### Siemens Enclosed Rotary Disconnect Switches

- 16–125A, Non-Fusible
- 600VAC max. rated (except catalog no. HNF3100CX is rated 480VAC max.)
- Available in both Type 12 and 4X non-metallic enclosures
- Both screw and hinged cover designs available
- Listed and marked "suitable for use as motor disconnect" per NEC Section 430-109
- Screw cover switches are UL listed under File No. E47705 and are CSA certified under File No. 203576
- IEC 60947-3 rated and CE marked (enclosures are IP65 rated)
- Hinged door switches are UL listed for multiple line and load conductors per phase in 30–100A ratings. They are UL & CUL listed under File No. E191706



- HP rated
- Rotary handles are available in black, red, and yellow and in pistol grip designs
- 16–63A screw cover switches have factory installed ground bars. All hinge cover switches accept ground lug kits
- Screw cover switches are provided with knockouts
- Padlockable in OFF position with up to (3) padlocks

Ampere Rating	Catalog Number				Shipping Weight <sup>①</sup>	Horsepower Ratings			
	3-Pole, 3-Wire	List Price \$	3-Pole, 3-Wire with (1) NO & (1) NC Aux. Contact <sup>⑥⑦</sup>	List Price \$		240V AC		480V AC	600V AC
						1-Phase	3-Phase	3-Phase	3-Phase

### Non-Fusible, Type 1, 4X & 12K<sup>②</sup> with Screw Cover and Black Rotary Handle 600V AC Max.<sup>⑤</sup>

16	3LD2064-0TB51-0US1	313.00	3LD2064-1GP51-0US1	355.00	1	1½	3	7½	10
25	3LD2164-0TB51-0US1	336.00	3LD2164-1GP51-0US1	378.00	1	3	7½	10	15
30	3LD2264-0TB51-0US1	395.00	3LD2264-1GP51-0US1	437.00	1	3	7½	15	20
30	—	—	3LD2264-1TS51-0US1 <sup>⑧</sup> ▲	453.00	1	3	7½	15	20
30	—	—	3LD2264-2TW51-0US1 <sup>⑦</sup> ▲	483.00	1	3	7½	15	20
63	3LD2565-0TB51-0US1	579.00	3LD2565-1GP51-0US1▲	621.00	3	10	15	40	50
100	3LD2766-0TB51-0US1	929.00	3LD2766-1GP51-0US1▲	1000.00	6	—	30	60	75
125	3LD2866-0TB51-0US1	1555.00	3LD2866-1GP51-0US1▲	1613.00	6	—	40	75	100

### Non-Fusible, Type 1, 4X & 12K<sup>②</sup> with Screw Cover and Red and Yellow Rotary Handle 600V AC Max.<sup>⑤</sup>

16	3LD2064-0TB53-0US1	313.00	3LD2064-1GP53-0US1	355.00	1	1½	3	7½	10
25	3LD2164-0TB53-0US1	336.00	3LD2164-1GP53-0US1	378.00	1	3	7½	10	15
30	3LD2264-0TB53-0US1	395.00	3LD2264-1GP53-0US1	437.00	1	3	7½	15	20
30	—	—	3LD2264-1TS53-0US1 <sup>⑧</sup> ▲	453.00	1	3	7½	15	20
30	—	—	3LD2264-2TW53-0US1 <sup>⑦</sup> ▲	483.00	1	3	7½	15	20
63	3LD2565-0TB53-0US1	579.00	3LD2565-1GP53-0US1▲	621.00	3	10	15	40	50
100	3LD2766-0TB53-0US1▲	929.00	3LD2766-1GP53-0US1▲	1000.00	6	—	30	60	75
125	3LD2866-0TB53-0US1▲	1555.00	3LD2866-1GP53-0US1▲	1613.00	6	—	40	75	100

### Non-Fusible, Type 4X<sup>④</sup> with Hinged Door and Black Pistol Grip Rotary Handle 480V AC Max.<sup>③⑤</sup>

30	HNF3030CX	870.00	—	—	4	3	7½	15	20
60	HNF3060CX	1189.00	—	—	4	10	15	40	50
100	HNF3100CX	1494.00	—	—	5	15	25	50	—

▲ Built to order. Allow 6–8 weeks for delivery.

① Carton quantity of (1). Shipping weight in pounds (lbs.).

② Approved for both indoor and outdoor use. No cover interlock provided.

③ 30 and 60A switches are also rated 600V AC.

④ Also rated as Type 12 and UL approved for both indoor and outdoor use. Defeatable cover interlock provided.

⑤ Screw cover enclosures are constructed from Makrolon 9425. Hinged cover enclosures are constructed from fiberglass reinforced polycarbonate.

⑥ Switch is supplied with (2) NO and no NC aux. contacts.

⑦ Switch is supplied with (4) NO and no NC aux. contacts. Ground bar is not provided or available.

⑧ Aux. contacts break about 3 Ms before and make about 3 Ms after main switch contacts.

⑨ 6P, 25A, switch with 1 NO & 1 NC aux. contacts and a black operating handle is also available. Order catalog number 3LD2165-4VD51 (Discount Code: Pilot Devices).

# Enclosed Switches

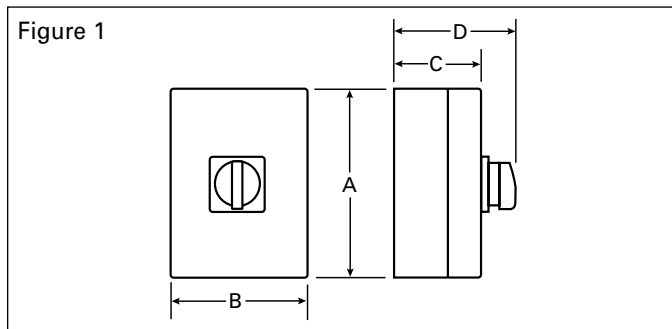
## Rotary Disconnect Switches

Selection

### Enclosed Disconnect Switch Dimensions (Inches)\*

Catalog Number	Ampere Rating	Fig. No.	Dimensions			
			A	B	C	D
3LD2064-	16	1	5.52 <sup>④</sup>	3.94	3.19	4.57
3LD2164-	25		5.52 <sup>④</sup>	3.94	3.19	4.57
3LD2264-	30		5.52 <sup>④</sup>	3.94	3.19	4.57
3LD2565-	63		6.93 <sup>⑤</sup>	5.75	4.10	5.87
3LD2766-	100		11.90	8.35	5.36	7.13
3LD2866-	125	11.90	8.35	5.36	7.13	
HNF3030CX	30	2	7.87	7.87	5.20	7.29
HNF3060CX	60		11.77	7.87	5.20	7.29
HNF3100CX	100		11.77	7.87	5.20	7.29

Note: 3LD2 Type switches only have top and bottom end KO's as follows:  
16-30A - 1/2" & 3/4", 63A - 3/4" & 1", 100 & 25A - 1" & 1 1/4"



### UL and CUL Short Circuit Withstand Ratings

Ampere Rating	Short Circuit Withstand Rating and Fuse Class				
	With Line Side Fusing			With Load Side Fusing <sup>①</sup>	
	5 kA at 600V Max	10 kA at 600V Max	18 kA at 480V Max	5 kA at 480V Max	18 kA at 480V Max
16	—	—	—	—	—
25 & 30	—	—	—	—	—
63	—	—	—	—	—
100 & 125	—	—	—	—	—

### 3LD2 Type Switches<sup>②</sup>

16	RK5 (50A Max)	—	—	—	—
25 & 30	RK5 (80A Max)	—	—	—	—
63	RK5 (175A Max)	—	—	—	—
100 & 125	—	RK5 (200A Max)	—	—	—

### HNF Type Switches

30	—	H, K & RK5 (100A Max)	J, T & CC (100A Max)	H, K & RK5 (30A Max)	Ferraz Shawmut A50P or lower let-through semiconductor fuses (60A Max)
60	⑥	H, K & RK5 (150A Max)		H, K & RK5 (60A Max)	Ferraz Shawmut A50P or lower let-through semiconductor fuses (100A Max)
100		⑥			

- ① For use as supplemental protection on the load side of the branch circuit over current protective device.
- ② Ground lug kit has two lugs for #14-4 Cu/Al wire.
- ③ Factory installed ground lugs supplied as follows: 16-30A #14-10 Cu, 63A #14-8 Cu. Ground lug not provided and is not available on catalog numbers 3LD2264-2TW51-0US1 and 3LD2264-2TW53-0US1.
- ④ 6.38 inches high including mounting feet.
- ⑤ 7.85 inches high including mounting feet.
- ⑥ 60 & 100A HNF switches are rated 10kA at 480V max. with line side Class H, K & RK5 150A max. fuses.
- ⑦ Wire range (1) #14-2 AWG 60/75 °C Cu only.
- ⑧ 16-63A 3LD switches are also rated 5kA at 600VAC max when protected by a 3RV type MSP of the same or lesser ampere rating.

\*For inches / millimeters conversion, multiply inches by 25.4.

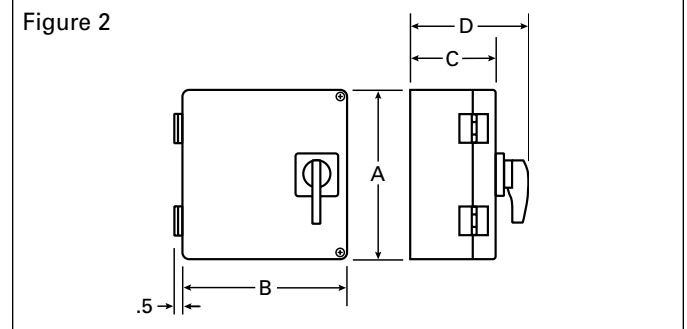
Wire ranges 60/75°C Cu Only

### 3LD2 Type Switches<sup>③</sup>

16 Amps	(1) #18-10 AWG
25-30 Amps	(1) #14-10 AWG
63 Amps	(1) #14-6 AWG
100-125 Amps	(1) #12-1 AWG

### HNF Type Switches

30 Amps	(1) #14-#10 AWG Solid (1) #14-#4 AWG Stranded Up to (4) #12 AWG Solid Up to (3) #12 AWG Stranded Up to (6) #14 AWG Stranded Up to (4) #14 AWG Stranded with (1) #10 AWG Stranded
60 & 100 Amps	(1) #14-#10 AWG Solid (1) #14-#1 AWG Stranded (2) #6 AWG Stranded Up to (3) #8 AWG Stranded Up to (6) #10 AWG Stranded Up to (6) #12 AWG Solid



### IEC Fuse and Withstand Ratings

Ampere Rating	gG Fuse Size	Short Circuit Rating
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### 3LD2 Screw Cover Switches

16	20A	5k Arms
25	25A	10k Arms
32	50A	10k Arms
63	63A	15k Arms
100	100A	20k Arms
125	125A	20k Arms

### HNF Hinged Cover Switches

30	63A	10k Arms
60	100A	10k Arms
100	100A	10k Arms

### Accessories

Switch Ampere Rating	Catalog Number	List Price \$	Description
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### 3LD2 Type Switches<sup>③</sup> (Discount Schedule PILO)

16-30A	3LD9220-2C	23.00	Neutral Kit
63A	3LD9250-2CA	32.00	Neutral Kit
100-125A	3LD9280-2C	39.50	Neutral Kit

### HNF Type Switches (Discount Schedule HDSS)

30-100A	GSGK60	24.00	Ground Lug Kit <sup>②</sup>
30A	LBRA1	59.00	Auxiliary Contact Kit (1 NO-1 NC)
60-100A	LBRA2	65.00	Auxiliary Contact Kit (1 NO-1 NC)
30-100A	HF63CX <sup>②</sup>	76.00	Neutral Kit

# Enclosed Switches

## Enclosed Bolted Pressure Switches & Safety Switch Replacement Parts

Selection

For enclosed bolted pressure contact switches order as lug-in/lug-out single section BPS main switchboards using the SPACE 2000 Switchboard EPM.

### VBI Safety Switch Replacement Parts

Ampere Rating	Line Base		Load Base		Handle / Handle Guard			
	Catalog Number	List Price \$	Catalog Number	List Price \$	General Duty		Heavy Duty	
					Catalog Number	List Price \$	Catalog Number	List Price \$

#### Fusible 2- and 3-Pole 60-600A General Duty & 30-1200A Heavy Duty<sup>⑧</sup>

30 HD 240V	HFB21 <sup>②</sup>	84.00	HBB21 <sup>②</sup>	56.00	—	—	HH6123 <sup>⑦</sup>	62.00
60 GD	HFB612 <sup>②</sup>	137.00	HBB612 <sup>②</sup>	81.00	GH223	51.00	—	—
60 HD 240V	HFB22 <sup>②</sup>	141.00	HBB22 <sup>②</sup>	83.00	—	—	HH6123 <sup>⑦</sup>	62.00
30 600V	HFB612 <sup>②</sup>	137.00	HBB612 <sup>②</sup>	81.00	—	—	HH6123 <sup>⑦</sup>	62.00
60 600V	HFB62 <sup>②</sup>	169.00	HBB62 <sup>②</sup>	97.00	—	—	HH6123 <sup>⑦</sup>	62.00
100	HFB63 <sup>②</sup>	208.00	HBB63 <sup>②</sup>	176.00	—	—	HH6123 <sup>⑦</sup>	62.00
200	HFB64 <sup>②</sup>	447.00	HBB64 <sup>②</sup>	256.00	—	—	HH64 <sup>⑦</sup>	87.00
400	HFB65 <sup>③⑥</sup>	393.00	HBB656 <sup>③</sup>	225.00	—	—	HH65678 <sup>⑦</sup>	137.00
600	HFB66 <sup>③⑥</sup>	393.00	HBB656 <sup>③⑥</sup>	225.00	HH65678	137.00	HH65678 <sup>⑦</sup>	137.00
800	HFB67A <sup>②④</sup>	863.00	HBB67A <sup>②④</sup>	473.00	—	—	HH65678 <sup>⑦</sup>	137.00
1200	HFB68 <sup>②⑥</sup>	1063.00	HBB68 <sup>②⑥</sup>	691.00	—	—	HH68 <sup>⑦</sup>	131.00

#### Non-Fusible 3-Pole 60-600A General Duty & 30-1200A Heavy Duty<sup>⑧</sup>

30 HD	HNB612 <sup>②</sup>	77.00	—	—	—	—	HH6123 <sup>⑦</sup>	62.00
60 GD	HNB612 <sup>②</sup>	77.00	—	—	GH223	51.00	—	—
60 HD	HNB623 <sup>②</sup>	313.00	—	—	—	—	HH6123 <sup>⑦</sup>	62.00
100	HNB623 <sup>②</sup>	313.00	—	—	GH223	51.00	HH6123 <sup>⑦</sup>	62.00
200	HNB64 <sup>②</sup>	327.00	—	—	GH24	61.00	HH64 <sup>⑦</sup>	87.00
400	HNB65 <sup>③⑥</sup>	313.00	—	—	HH65678	137.00	HH65678 <sup>⑦</sup>	137.00
600	HNB66 <sup>③⑥</sup>	313.00	—	—	HH65678	137.00	HH65678 <sup>⑦</sup>	137.00
800	HNB67A <sup>②④</sup>	866.00	—	—	—	—	HH65678 <sup>⑦</sup>	137.00
1200	HNB678 <sup>②</sup>	1056.00	—	—	—	—	HH68 <sup>⑦</sup>	131.00

Ampere Rating	Mechanism Assembly		Line & Load Lugs	
	Catalog Number	List Price \$	Catalog Number	List Price \$

#### Fusible 2- and 3-Pole 60-600A General Duty & 30-1200A Heavy Duty<sup>⑧</sup>

30 HD 240V	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
60 GD	HM6123	72.00	HL612 <sup>①</sup>	38.50
60 HD 240V	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
30 600V	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
60 600V	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
100	HM6123 <sup>⑦</sup>	72.00	HL63 <sup>①</sup>	97.00
200	HM64 <sup>⑦</sup>	190.00	HL64 <sup>①</sup>	165.00
400	HM65	327.00	HL65678 <sup>④</sup>	37.50
600	HM66	471.00	HL65678 <sup>④</sup>	37.50
800	HM67A	761.00	HL67A <sup>③⑦</sup>	109.00
1200	HM678	1314.00	⑨	—

#### Non-Fusible 3-Pole 60-600A General Duty & 30-1200A Heavy Duty<sup>⑧</sup>

30 HD	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
60 GD	HM6123	72.00	HL612 <sup>①</sup>	38.50
60 HD	HM6123 <sup>⑦</sup>	72.00	HL612 <sup>①</sup>	38.50
100	HM6123 <sup>⑦</sup>	72.00	HL63 <sup>①</sup>	97.00
200	HM64 <sup>⑦</sup>	190.00	HL64 <sup>①</sup>	165.00
400	HM65	327.00	HL65678 <sup>④</sup>	37.50
600	HM66	471.00	HL65678 <sup>④</sup>	37.50
800	HM67A	761.00	HL67A <sup>③⑦</sup>	109.00
1200	HM678	1314.00	⑨	—

① Three lugs included in kit.

② Includes lugs.

③ Lugs not included.

④ One lug per kit.

⑤ One per switch required unless otherwise noted.

⑥ One required per pole.

⑦ For type 4/4X stainless steel switches add "S" to end of catalog number.

⑧ For replacement door for heavy duty switches add

"DOOR" to end of switch catalog number.

⑨ Lugs included with line and load bases.

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# Disconnect Switches

## Compact Non-Fusible — Rotary and Toggle

## Selection

### Features

- 25-100 Ampere, to 50 hp 480V and 600V
- Rotary and Toggle actuation models
- LBR Type switches are UL & CUL listed under File No. E191706 as manual motor controllers per UL Standard UL508
- 3LD2 Type switches are UL listed under File No. E47705 per UL508 and are CSA certified under File No. 203576
- Base, 35mm DIN-rail and door mounting
- Multiple conductor, distribution terminal type rating LBR & LBT Type (40A-100A only)
- IEC 947-1 rated, CE marked
- Listed and marked "suitable as motor disconnect" per NEC Section 430-109

### Application

Siemens Load Break Switches are listed as manual motor controllers and are suitable as motor disconnects. They are load break rated and act as enclosure disconnects when short circuit protection is provided upstream of the switch. If upstream over current protection is not provided, use a Siemens fusible Type VBII, CFS or MCS Disconnect Switch.

### Ordering Information

**Door Mounted Switches (Rotary Type Only)** — Order either complete "3LD2" assemblies or individual "LBR" components as follows:

**Complete Assemblies** include switch, handle, and shaft. Certain 25 and 32A assemblies are also available with factory installed neutral blocks and/or aux. contacts. These accessories can also be ordered as field installed kits.

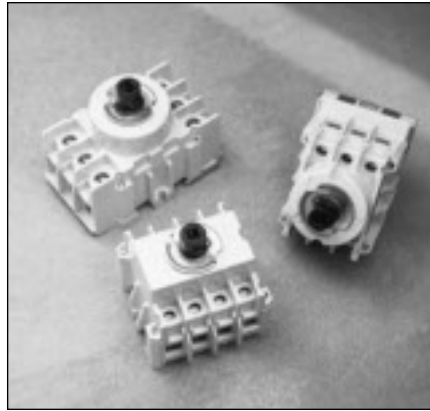
**Individual Components** are ordered as follows:

**25A** — LBR3025D switch + LBRH3 or 4 handle.

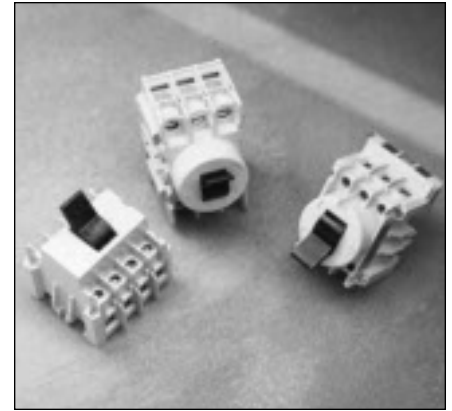
**40-100A** — LBR switch + LBRH3 or 4 handle + LBRD1.

Notes: (LBR Type switches only)

- Aux contacts are available as field installed kits on 25A units only.
- Lugs on 25A units face to the rear and lugs on 40-100A units face toward the front.



Type LBR Rotary Switches



Type LBT Toggle Switches



3LD2254-0TK51

### Base/DIN Rail Mounted Switches (Rotary or Toggle Type)

— Order either complete assemblies or individual components as follows:

**Complete Assemblies** include switch, handle, and shaft.

**Individual Components** are ordered as follows:

**Toggle** — Order the LBT switch required and a toggle switch cover plate if needed.

**Rotary, Base Mounted with Door Mounted Handle** — Order "LBR" switch + door mounted handle + shaft + any accessories.

**Rotary, Base Mounted with Direct Mounted Handle** — Order "LBR" switch + direct mounted handle.

### 3LD Type Door Mounted Complete Assemblies

(Operator, Shaft, & Switch) 600V AC Max.②

Shaft Mounted		4 Hole Mounted		Number of Poles	Ampere Rating	AC Horsepower Ratings				
Catalog Number <sup>③</sup>	List Price \$	Catalog Number <sup>③</sup>	List Price \$			120V 1Ø	240V 1Ø 3Ø	480V 3Ø	600V 3Ø	
3LD2154-0TK	81.00	3LD2103-0TK	81.00	3	25	2	3	7½	10	15
3LD2154-1TP	106.00	3LD2103-1TP	106.00	3 <sup>①</sup>						
3LD2154-1TL	101.00	3LD2103-1TL	101.00	3 + N						
3LD2154-2EP	123.00	3LD2103-2EP	123.00	3 + N <sup>①</sup>						
3LD2254-0TK	96.00	3LD2203-0TK	90.00	3	32	2	3	10	20	20
3LD2254-1TL	118.00	3LD2203-1TL	122.00	3 + N						
3LD2555-0TK	155.00	3LD2504-0TK	155.00	3						
—	—	3LD2504-3VK53	224.00	6						
—	—	3LD2704-0TK	235.00	3	100	—	—	30	60	75
—	—	3LD2804-0TK	300.00	3						

■ Built to order. Allow 6-8 weeks for delivery.  
 ① Includes auxiliary contacts (1 NO and 1 NC).

② Handles are IP65 rated and are also UL listed for Type 1, 4X and 12 applications.

③ Add 51 for a black handle or 53 for a red & yellow handle to the end of the catalog number.

# Disconnect Switches

## Compact Non-Fusible — Rotary and Toggle

Selection

### 3LD Type Base Mounted Complete Assemblies (Operator, Shaft, & Switch) 600V AC Max.②

Handle Mounting <sup>①</sup>				Number of Poles	Ampere Rating	AC Horsepower Ratings				
Shaft (center hole)		4 Hole				120V	240V		480V	600V
Catalog Number <sup>③</sup>	List Price \$	Catalog Number <sup>③</sup>	List Price \$			1Ø	1Ø 3Ø	3Ø	3Ø	3Ø
3LD2144-0TK	138.00	3LD2113-0TK	132.00	3	25	2	3	7½	10	15
3LD2144-1TL	154.00	3LD2113-1TL	149.00	3 + N		2	3	10	20	20
3LD2244-0TK	154.00	3LD2213-0TK	144.00	3	32	2	3	10	20	20
3LD2244-1TL53	138.00	3LD2213-1TL53	165.00	3 + N		—	—	—	—	—
3LD2545-0TK	207.00	3LD2514-0TK	171.00	3	63	—	10	15	40	50
—	—	3LD2714-0TK	282.00	3	100	—	—	30	60	75
—	—	3LD2814-0TK	352.00	3	125	—	—	40	75	100

Note: Shaft length allows a maximum depth from switch mounting surface to the outside of the cover of 15.25" on 25 & 32A switches and of 15.75" on 63-125A switches.



3LD2213-0TK53

### Accessories for Front Mounted 3LD2 Switches

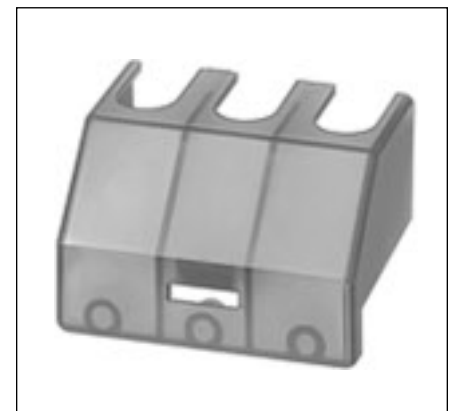
Catalog Number	Description	Switches Used With	List Price \$
3LD9200-5B <sup>②</sup>	1 NO, 1 NC Aux. Contact	25-125A	33.00
3LD9200-5BF <sup>②</sup>	1 NO, 1 NC Aux. with Gold Plated Contacts	25-125A	57.00
3LD9220-2B	Neutral/Ground Terminal	25 & 32A	23.00
3LD9250-2BA	Neutral/Ground Terminal	63A	32.00
3LD9280-2B	Neutral/Ground Terminal	100 & 125A	39.50
3LD9220-0B	4th Pole (leading ON, lagging OFF)	25 & 32A	28.50
3LD9250-0BA	4th Pole (leading ON, lagging OFF)	63A	46.50
3LD9280-0B	4th Pole (leading ON, lagging OFF)	100 & 125A	57.00
3LD9224-1B <sup>①</sup>	Black Handle (4 hole mtg.)	25 & 32A	15.00
3LD9284-1B <sup>①</sup>	Black Handle (4 hole mtg.)	63-125A	39.50
3LD9224-3B <sup>①</sup>	Red/Yellow Handle (4 hole mtg.)	25 & 32A	15.00
3LD9284-3B <sup>①</sup>	Red/Yellow Handle (4 hole mtg.)	63-125A	39.50
3LD9224-1D <sup>①</sup>	Black Handle (shaft mtg.)	25 & 32A	15.00
3LD9284-1D <sup>①</sup>	Black Handle (shaft mtg.)	63-125A	39.50
3LD9224-3D <sup>①</sup>	Red/Yellow Handle (shaft mtg.)	25 & 32A	15.00
3LD9284-3D <sup>①</sup>	Red/Yellow Handle (shaft mtg.)	63-125A	39.50
3LD9221-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	25 & 32A	3.00
3LD9251-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	63A	3.00
3LD9281-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	100-125A	4.60
3LD9221-0A <sup>①</sup>	Terminal Cover 3P (Pack of 4)	25 & 32A	9.00
3LD9251-0A <sup>①</sup>	Terminal Cover 3P (Pack of 4)	63A	10.60



3LD9220-2C

### Accessories for Base Mounted 3LD2 Switches

Catalog Number	Description	Switches Used With	List Price \$
3LD9200-5C <sup>②</sup>	1 NO, 1 NC Aux. Contact	25-125A	33.00
3LD9200-5CF <sup>②</sup>	1 NO, 1 NC Aux. with Gold Plated Contacts	25-125A	57.00
3LD9220-2C	Neutral/Ground Terminal	25 & 32A	23.00
3LD9250-2CA	Neutral/Ground Terminal	63A	32.00
3LD9280-2C	Neutral/Ground Terminal	100 & 125A	39.50
3LD9220-0C	4th Pole (leading ON, lagging OFF)	25 & 32A	28.50
3LD9250-0CA	4th Pole (leading ON, lagging OFF)	63A	46.50
3LD9280-0C	4th Pole (leading ON, lagging OFF)	100 & 125A	57.00
3LD9224-1B <sup>①</sup>	Black Handle (4 hole mtg.)	25 & 32A	15.00
3LD9284-1B <sup>①</sup>	Black Handle (4 hole mtg.)	63-125A	39.50
3LD9224-3B <sup>①</sup>	Red/Yellow Handle (4 hole mtg.)	25 & 32A	15.00
3LD9284-3B <sup>①</sup>	Red/Yellow Handle (4 hole mtg.)	63-125A	39.50
3LD9224-1D <sup>①</sup>	Black Handle (shaft mtg.)	25 & 32A	15.00
3LD9284-1D <sup>①</sup>	Black Handle (shaft mtg.)	63-125A	39.50
3LD9224-3D <sup>①</sup>	Red/Yellow Handle (shaft mtg.)	25 & 32A	15.00
3LD9284-3D <sup>①</sup>	Red/Yellow Handle (shaft mtg.)	63-125A	39.50
3LD9221-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	25 & 32A	3.00
3LD9251-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	63A	3.00
3LD9281-2A <sup>①</sup>	Terminal Cover 1P (Pack of 4)	100-125A	4.60
3LD9221-0A <sup>①</sup>	Terminal Cover 3P (Pack of 4)	25 & 32A	9.00
3LD9251-0A <sup>①</sup>	Terminal Cover 3P (Pack of 4)	63A	10.60



3LD9251-0A

① Handles and line side terminal covers are supplied as standard with 3LD2 switches.

② Add suffix 51 for a black handle or 53 for a red & yellow handle to the catalog number. Handles are 1P65 rated and are also UL listed for Type 1, 4X & 12 applications.

③ Add 51 for a black handle or 53 for a red & yellow handle to the end of the catalog number.

④ Aux. contacts break about 30 Ms before and make about 3 Ms after main switch contacts.

Ratings	10A	at 120V AC
	6A	at 240V AC
	1.4A	at 480V AC

# Disconnect Switches

## Compact Non-Fusible — Rotary and Toggle

Selection

Individual Components

### Rotary and Toggle Switches

Catalog Number	Switch Type	No. of Poles	Ampere Rating	Max AC Volt	AC Horsepower Ratings					List Price \$
					115V		480V	600V	List	
					1Ø	2Ø				
LBR3025	Rotary	3	25	480	¾	2	5	10	—	99.00
LBR3025D <sup>②</sup>	Rotary	3	25	480	¾	2	5	10	—	108.00
LBR3040 <sup>②</sup>	Rotary	3	40	600	2	3	7½	20	25	118.00
LBR3060 <sup>②</sup>	Rotary	3	60	480	2	5	10	25	—	141.00
LBR3080 <sup>②</sup>	Rotary	3	80	600	3	10	20	40	50	169.00
LBR3100 <sup>②</sup>	Rotary	3	100	480	5	15	25	50	—	208.00
LBR4040	Rotary	4	40	480	2	3	7½	20	—	184.00
LBT3040	Toggle	3	40	600	2	3	7½	20	25	118.00
LBT3060	Toggle	3	60	480	2	5	10	25	—	141.00
LBT3080	Toggle	3	80	600	3	10	20	40	50	169.00
LBT3100	Toggle	3	100	480	5	15	25	50	—	208.00
LBT4040	Toggle	4	40	480	2	3	7½	20	—	184.00



Standard Duty Rotary Switch Door Handles



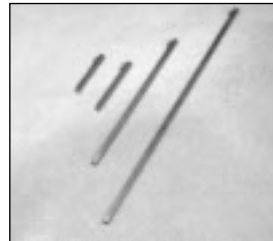
Heavy Duty Rotary Switch Door Handle

### LBR Type Handles

Catalog Number	Used on Rotary Switches	NEMA Type	Mounting	Marking	Color	Cover Interlock Supplied	Padlockable	List Price \$
<b>Standard Duty</b>								
LBRH2 <sup>②</sup>	All	1	Door	ON/OFF	Black	No	No	34.50
LBRH3 <sup>②</sup>	All	1, 3R, 12, 4X	Door	O/I, ON/OFF	Black	Yes <sup>①</sup>	Yes	51.00
LBRH4 <sup>②</sup>	All	1, 3R, 12, 4X	Door	O/I, ON/OFF	Red/Yel	Yes <sup>①</sup>	Yes	51.00
LBRH9 <sup>②</sup>	All (Pistol Grip Type)	1, 3R, 12, 4X	Door	O/I, ON/OFF	Black	Yes	Yes	130.00
LBRH10 <sup>②</sup>	All (Pistol Grip Type)	1, 3R, 12, 4X	Door	O/I, ON/OFF	Red/Yel	Yes	Yes	130.00
LBRH5	25 Amps	1	Direct Mount	O/I	Black	—	Yes	16.10
LBRH6	3-Pole, 40-60 Amps	1	Direct Mount	O/I	Black	—	Yes	21.00
LBRH7	3-Pole, 80-100 Amps	1	Direct Mount	O/I	Black	—	Yes	21.00
LBRH8	4-Pole, 40-60 Amps	1	Direct Mount	O/I	Black	—	Yes	21.00
<b>Heavy Duty</b>								
CFSH10B12	All	1, 3R, 12	Door	O/I, ON/OFF	Black	Yes	Yes	137.00
CFSH10R12	All	1, 3R, 12	Door	O/I, ON/OFF	Red/Yel	Yes	Yes	137.00

### LBR Type Rotary Shafts

Catalog No	Length In. (mm)	List Price \$
<b>For Standard Duty Handles</b>		
LBR5040	1.57 (40)	16.10
LBR5050	1.97 (50)	21.00
LBR5055	2.17 (55)	21.00
LBR5080	3.15 (80)	24.00
LBR5120	4.72 (120)	27.00
LBR5180	7.09 (180)	31.50
LBR5305	12.00 (305)	34.50
<b>For Heavy Duty Handles</b>		
CFSS5200H	7.9 (200)	34.00
CFSS5400H	15.7 (400)	36.00



Rotary Shafts



Rotary Switch Direct Mount Handles



Toggle Switch Cover Plates

### LBR 25 Amp, 4th Pole

Used on Catalog No	Catalog No	List Price \$
LBR3025	LBRP25	68.00
LBR3025D	LBRP25D	76.00

### LBR Auxiliary Switch Kits

Used on Rotary Switch	Catalog Number	Contact Arrangement	List Price \$
LBR3025	LBRA25 <sup>③④</sup>	1 NO/1 NC	51.00
LBR3025D	LBRA25D <sup>③④</sup>	1 NO/1 NC	51.00
LBR3040, LBR3060	LBRA1 <sup>③④</sup>	1 NO/1 NC with common point	59.00
LBR3080, LBR3100	LBRA2 <sup>③④</sup>	1 NO/1 NC with common point	65.00

### LBT Type Toggle Switch Cover Plate

Used on Toggle Switches	Catalog Number	List Price \$
LBT3040, LBT3060	LBTCP1	25.50
LBT3080, LBT3100	LBTCP2	27.00
LBT4040	LBTCP3	30.50

### LBR Type Rotary Switch Door Mounting Kit (For use with LBRH3 & LBRH4 only)

Used on Rotary Switch	Catalog Number	List Price \$
40-100 Amps	LBRD1	59.00

### LBR/LBT Neutral Kit<sup>⑤</sup>

Used with Catalog Number	Catalog Number	List Price \$
All	HF63CX	76.00

① No cover interlock defeat mechanism provided. To eliminate cover interlock, order additional catalog number LBRDC1.

② LBRH2 is IP54 rated. All others are IP65.

③ Ratings

15.1A resistive at 250V AC max.

.5A at 125V DC

.25A at 250V DC

.5 HP at 250V AC max.

④ Auxiliary switch contacts break about 30 Ms before and make about 3 Ms after main switch contacts. Cannot be used with LBRD1 door mounting kit.

⑤ Lug wire ranges:

HF63CX—(1) #14-2 AWG 60/75°C Cu only

⑥ Only door mountable and for use with LBRH3 & 4 handles only.

⑦ For door mounting of 40–100A LBR switches use door mounting kit LBRD1 & LBRH3 or 4 handle.

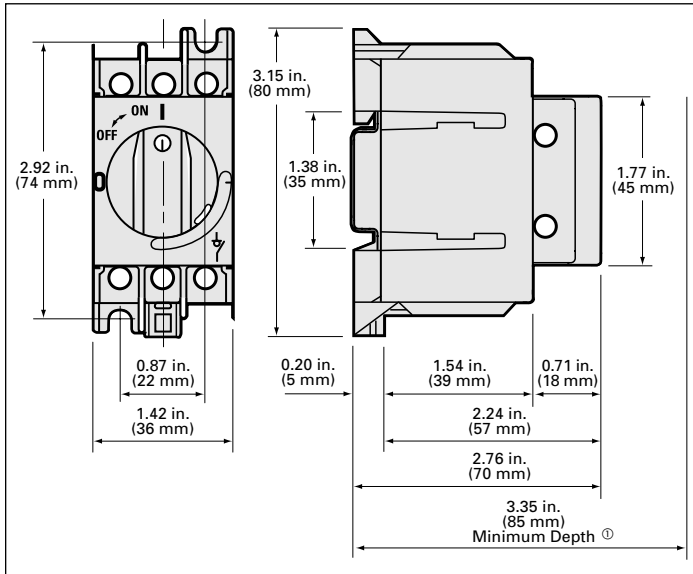


# Disconnect Switches

## Compact Non-Fusible — Rotary and Toggle

## Dimensions

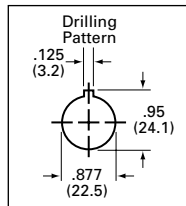
### Dimension Drawings and Wire Ranges



LBR 3025

### Wire Ranges 60/75°C Cu only

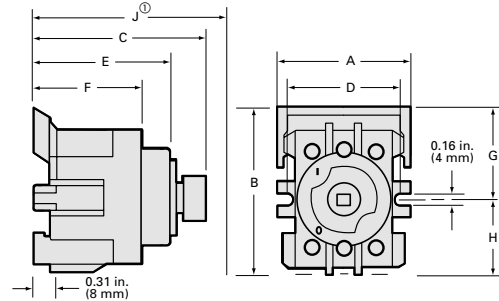
25 Amps LBR	(1) #14 - #10 AWG Solid (1) #14 - #8 AWG Stranded
40 & 60 Amps LBR & LBT	(1) #14 - #10 AWG Solid (1) #14 - #4 AWG Stranded UP to (4) #12 AWG Solid Up to (3) #12 AWG Stranded Up to (6) #14 AWG Stranded Up to (4) #14 AWG Stranded with (1) #10 AWG Stranded
80 & 100 Amps LBR & LBT	(1) #14 - #10 AWG Solid (1) #14 - #1 AWG Stranded (2) #6 AWG Stranded Up to (3) #8 AWG Stranded Up to (6) #10 AWG Stranded Up to (6) #12 AWG Solid
25A, 3LD21 32A, 3LD22 63A, 3LD25 100, 125A, 3LD2	(1) #14-8 AWG (1) #14-8 AWG (1) #14-6 AWG (1) #12-1 AWG



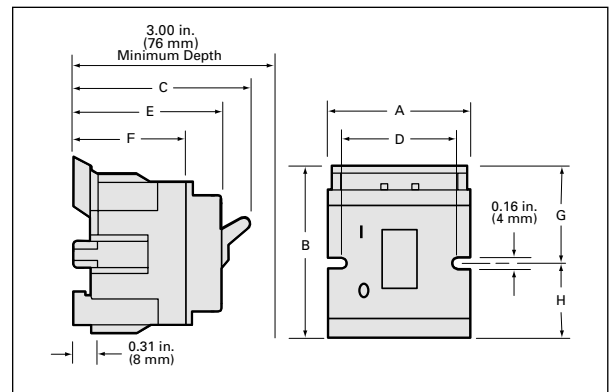
Shaft Mounted 3LD2 Handle Cutout

### Dimension J Minimum Depth<sup>①</sup>

Switch	Dimension J
LBR 40-100A	3.35 (85)
3LD2 25 & 32A Front Shaft Mounted	3.07 (78)
3LD2 63 Front Shaft Mounted	3.35 (85)
3LD2 25 & 32A Front 4-hole Mounted	2.13 (54)
3LD2 63A Front 4-hole Mounted	2.48 (63)
3LD2 100 & 125A Front 4-hole Mounted	2.56 (65)
3LD2 25 & 32A Base w/shaft Mtg. Handle	6.46 (164)
3LD2 63A Base w/shaft Mtg. Handle	6.77 (172)
3LD2 25 & 32A Base w/4-hole Mtg. Handle	5.59 (142)
3LD2 63A Base w/4-hole Mtg. Handle	5.99 (152)
3LD2 100 & 125A Base w/hole Mtg. Handle	6.07 (154)



LBR 40-100 Amps & 3LD2 25-125A



LBT Toggle — 40-100 Amps

Switch Type	Switch Catalog Number	Dimensions Inches (mm)							
		A	B	C	D	E	F	G	H
Rotary	LBR3040	2.00 (51)	2.72 (69)	2.72 (69)	1.78 (45)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)
Rotary	LBR3060	2.00 (51)	2.72 (69)	2.72 (69)	1.78 (45)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)
Rotary	LBR3080	2.09 (53)	3.32 (84)	2.92 (74)	1.97 (50)	2.29 (58)	1.69 (42)	1.66 (42)	1.66 (42)
Rotary	LBR3100	2.09 (53)	3.32 (84)	2.92 (74)	1.97 (50)	2.29 (58)	1.69 (42)	1.66 (42)	1.66 (42)
Rotary	LBR4040	2.42 (61)	2.72 (69)	2.72 (69)	2.28 (58)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)
Rotary Front Mtg.	3LD21 & 2 <sup>②</sup>	1.81 (46)	2.17 (55)	1.97 (50)	—	—	—	—	—
Rotary Front Mtg.	3LD25 <sup>②</sup>	2.36 (60)	2.52 (64)	2.32 (59)	—	—	—	—	—
Rotary Front Mtg.	3LD27 & 8	2.40 (61)	3.27 (83)	2.40 (61)	—	—	—	—	—
Rotary Base Mtg.	3LD21 & 2	1.81 (46)	2.17 (55)	2.29 (58)	—	—	—	—	—
Rotary Base Mtg.	3LD25	2.36 (60)	2.52 (64)	2.68 (68)	—	—	—	—	—
Rotary Base Mtg.	3LD27 & 8	2.80 (71)	3.27 (83)	2.76 (70)	—	—	—	—	—
Toggle	LBT3040	2.00 (51)	2.72 (69)	2.75 (70)	1.78 (45)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)
Toggle	LBT3060	2.00 (51)	2.72 (69)	2.75 (70)	1.78 (45)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)
Toggle	LBT3080	2.09 (53)	3.32 (84)	2.90 (74)	1.97 (50)	2.29 (58)	1.69 (42)	1.66 (42)	1.66 (42)
Toggle	LBT3100	2.09 (53)	3.32 (84)	2.90 (74)	1.97 (50)	2.29 (58)	1.69 (42)	1.66 (42)	1.66 (42)
Toggle	LBT4040	2.42 (61)	2.72 (69)	2.75 (70)	2.28 (58)	2.16 (55)	1.67 (42)	1.50 (38)	1.22 (31)

① Depth from outside of cover to back of switch.

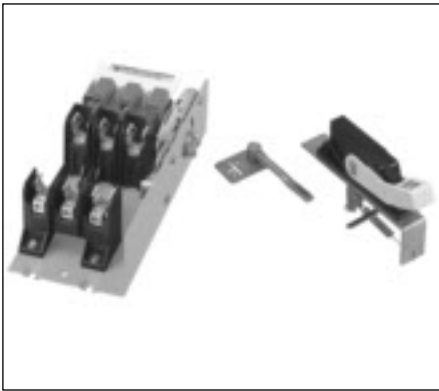
② Handle front plate dimensions:  
3LD21 & 2—2.64 inches square  
3LD25, 7 & 8—3.55 inches square

# Disconnect Switches

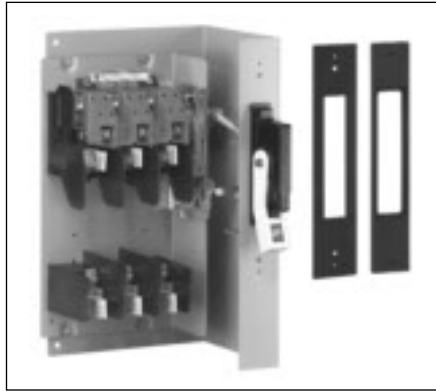
## Type VBII (30-600A) with Flange Mounted Operating Handle *Features and Ordering Information*

### Features

- 30-600A, 600VAC and DC ratings
- UL Recognized (file # E121152 vol. 3) and CSA Certified under file number 154852
- Visible blade quick make and break switching action
- Panel and Flange mounted assemblies facilitate installation
- Panel mounted switches are variable depth
- Short circuit rating of 10,000 AIC with class H fuse, and of 200,000 AIC with class R or J fuses
- Flange mounted handles are Type 1 and 12 rated and padlockable in the off position with up to (3) padlocks with 5/16 hasps ①
- Meets UL98 requirements and suitable for both main and branch circuit applications
- A complete line of aux contacts are available
- Load break and horsepower rated
- Defeatable cover interlock standard with all handles
- Meets NFPA79 requirements



**VBFS361, VBLK1 & VBH1**



**VBFS363F**



**VBNFS365, VBLK4 & VBH2**

### Ordering Information

1. Determine the ratings required (amps, volts, HP, Fusible, NF), the mounting needed (Panel or Flange), and select the appropriate switch.
2. For panel mounted switches with a rigid operating shaft (30-600A), order panel mounted switch flange mounted operating handle & rigid linkage kit based on depth required.
3. For panel mounted switches with a Max-Flex operator, order panel mounted switch, Max-Flex Handle & Adapter Kit and drive cable.
4. Select accessories if required.

① 30-200A handles are also rated Type 3R & 4X.

# Disconnect Switches

## Type VBII (30-600A) with Flange Mounted Operating Handle

Selection

### Switches

Switch Ampere Rating	Max. AC Voltage Rating	Catalog Number	Horsepower Rating, Switches and 3-Phase <sup>④</sup>						600 Volts DC (max) <sup>④</sup>	List Price \$
			240 Volts AC		480 Volts AC		600 Volts AC			
			Standard	Max.	Standard	Max.	Standard	Max.		
<b>Fusible Panel Mounted Variable Depth Switches - 3-Pole<sup>⑤⑦</sup></b>										
30	240	VBFS321	3	7 1/2	—	—	—	—	— <sup>①</sup>	582.00
60	240	VBFS322	7 1/2	15	—	—	—	—	— <sup>②</sup>	670.00
30	600	VBFS361	—	—	5	15	7 1/2	20	15 <sup>③</sup>	605.00
60	600	VBFS362	—	—	15	30	15	50	30 <sup>③</sup>	710.00
100	600	VBFS363	—	—	25	60	30	75	50 <sup>③</sup>	1327.00
200	600	VBFS364	—	—	50	125	60	150	50	2446.00
400	600	VBFS365	—	—	100	250	125	350	50 <sup>③</sup>	4649.00
600	600	VBFS366	—	—	150	400	200	500	50 <sup>③</sup>	7098.00
<b>Non-fusible Panel Mounted Variable Depth Switches - 3-Pole<sup>⑤</sup></b>										
30	600	VBNS361	—	10	—	20	—	30	15 <sup>③</sup>	529.00
60	600	VBNS362	—	20	—	50	—	60	30 <sup>③</sup>	605.00
100	600	VBNS363	—	40	—	75	—	100	50 <sup>③</sup>	1074.00
200	600	VBNS364	—	60	—	125	—	150	50	1813.00
400	600	VBNS365	—	125	—	250	—	300	50 <sup>③</sup>	3446.00
600	600	VBNS366	—	200	—	400	—	500	50 <sup>③</sup>	5261.00
<b>Fusible Flange Mounted Switches - 3-Pole<sup>⑤</sup></b>										
30	240	VBFS321F	3	7 1/2	—	—	—	—	— <sup>①</sup>	851.00
60	240	VBFS322F	7 1/2	15	—	—	—	—	— <sup>②</sup>	940.00
30	600	VBFS361F	—	—	5	15	7 1/2	20	15 <sup>③</sup>	875.00
60	600	VBFS362F	—	—	15	30	15	50	30 <sup>③</sup>	981.00
100	600	VBFS363F	—	—	50	60	30	75	50 <sup>③</sup>	1597.00
200	600	VBFS364F	—	—	100	125	60	150	50	2718.00
<b>Non-fusible Flange Mounted Switches - 3-Pole<sup>⑤</sup></b>										
30	600	VBNS361F	—	10	—	20	—	30	15 <sup>③</sup>	798.00
60	600	VBNS362F	—	20	—	50	—	60	30 <sup>③</sup>	875.00
100	600	VBNS363F	—	40	—	75	—	100	50 <sup>③</sup>	1344.00
200	600	VBNS364F	—	60	—	125	—	150	50	2084.00

Note: Fusible switches include fuse provisions for Class H Fuses. The load base can be moved to pre-drilled holes for Class J Fuses. If Class R Fuses are required add a Class R Fuse Clip Kit.

4  
DISCONNECT  
SWITCHES

### Flange Mounted Operating Handles

For use with Panel Mounted Switches. Included with Flange Mounted Switches as standard.

Catalog Number	Handle Assembly Description	List Price \$
VBH1	30-200A Type 1, 3R & 12	240.00
VBH14X	30-200A Type 4X	399.00
VBH2	400 Type 1 & 12	476.00
VBH2R	400 & 600A Type 1, 3R & 12	560.00
VBH24X	400 & 600A Type 4X	760.00

### Rigid Linkage Kits

For use with Panel Mounted Switches. Not required for Flange Mounted Switches.

Catalog Number	Switch Ampere Rating	Enclosure Depth <sup>⑦</sup>		List Price \$
		Min	Max.	
VBLK1	30-200	6.94 <sup>⑧</sup>	6.94 <sup>⑧</sup>	29.50
VBLK2	30-200	6.94 <sup>⑧</sup>	19.0	35.00
VBLK3	400 & 600	9.00	8.75	46.50
VBLK4	400 & 600	9.00	19.0	54.00

### Max-Flex™ Handle and Adapter Kit

(Type 1, 12, 3R & 4X)

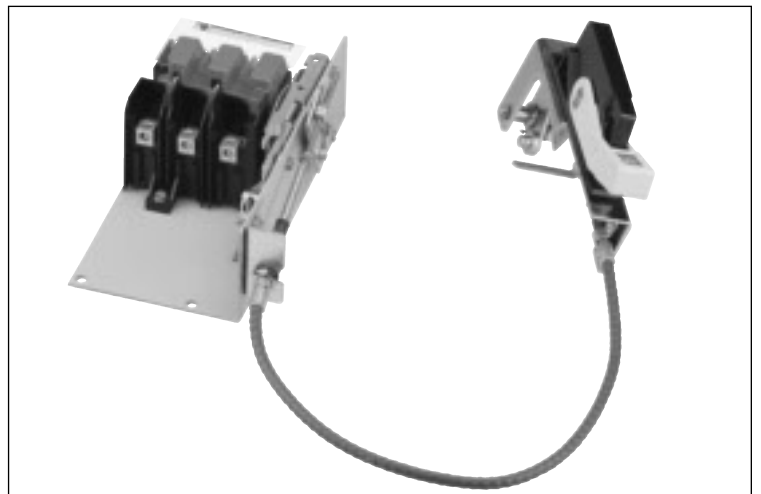
Use with 30-200A panel mounted switches and cable kit.

Catalog Number	Description	List Price \$
VBHM1	30-200A Max-Flex Adapter Kit	424.00

### Cable Kit

For use with 30-200A panel mounted switches and Max-Flex handle and adapter kit.

Catalog Number	Description	List Price \$
FHOEC036	36" long drive cable	153.00
FHOEC048	48" long drive cable	182.00



VBNS361, VBHM1 & FHOEC036

- ① Rated 5 HP at 250V DC.
- ② Rated 10 HP at 250V DC.
- ③ 600V DC & 600V DC horsepower rating shown requires (2) poles to be connected in series.
- ④ Std. - applies when non-time delay fuses are used. Max. - applies when time delay fuses are used.

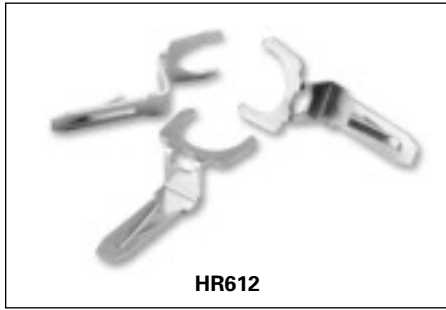
- ⑤ Includes line base, load base, operating mechanism and line and load lugs. Order operating handle and linkage kits from tables on this page.
- ⑥ Includes line base, load base, operating mechanism line and load lugs operating handle and required linkage.

- ⑦ Dimensions (min. & max.) from enclosure mounting pan to outside surface of enclosure handle mounting flange.
- ⑧ 7.12 for 200A switches.

# Disconnect Switches

## Type VBII (30-600A) with Flange Mounted Operating Handle

## Accessories



HR612

### Class R Fuse Clip Kits

These kits prevent the installation of Class H and K fuses (one kit required per switch).

### Class R Fuse Clip Kits

Catalog Number	List Price \$	Description
HR21	83.00	30A, 240V Kit (HD only)
HR612	83.00	30A, 600V Kit/60A, 240V Kit
HR62	83.00	60A, 600V Kit
HR63	54.00	100A Kit
HR64	54.00	200A Kit
HR656	137.00	400A/600A Kit

### Class J Fuse Provisions

All 30-600A, 600V fusible switches are field convertible to accept Class J fuses by moving the load base to a pre-drilled J fuse position.

### Internal Door Latch Kits

For use with enclosures with door mounted latching bar. Required when a flange mounted switch is mounted in a Hoffmann or Rittal enclosure provided with an AB cutout.

Catalog Number	Description	List Price \$
DKR2	2 point (for use with enclosures less than 40" high)	338.00
DKR3	3 point (for use with enclosures 40" or larger in height)	377.00



HT63

### Class T Fuse Adapter Kits

100-600A fusible switches are field convertible to accept Class T fuses. 400-600A switches are field convertible to accept Class T fuses by moving the load base to a pre-drilled T fuse position.

### Class T Fuse Adapter Kits<sup>Ⓞ</sup>

Catalog Number	List Price \$	Description
HT23	76.00	100A, 240V Kit
HT63	120.00	100A, 600V Kit
HT24	102.00	200A, 240V Kit
HT64▲	143.00	200A, 600V Kit

### Neutral Kits

Standard Neutral Kits can be field installed in 30-100A switches.

### Neutral Kits

Switch Ampere Rating	Kit Catalog Number	List Price \$
30A 600V, 60A 240V	HN612	97.00
60A, 600V & 100A	HN623	186.00

### Window Kits (Type 1, 12, 3R and 4x)

Allows viewing of visible blades and of indicating fuses through 200A.

Catalog Number	Description	List Price \$
VBWK1	30A Window Kit	109.00
VBWK2	60 & 100A Window Kit	118.00
VBWK3	200-600A Window Kit	123.00



HN612

### 200% Neutral Kits

UL listed 200% Neutrals are available on 60 & 100A switches. They are typically used with non-linear transformers or where increased neutral ampacity/lug capacity is required.

### 200% Neutral Kits

Switch Ampere Rating	Kit Catalog Number	List Price \$	Wire Range Line & Load Lugs (Cu/Al)
100	HN263	225.00	(2) #14-1/0 AWG

▲ Built to order. Allow 6-8 weeks for delivery.  
Ⓞ One kit per pole required.

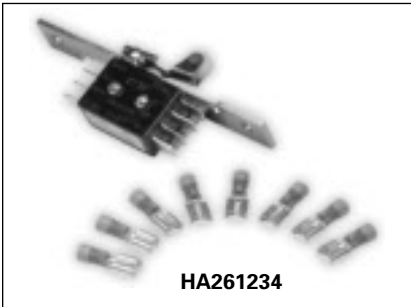
# Disconnect Switches

## Type VBII (30-600A) with Flange Mounted Operating Handle

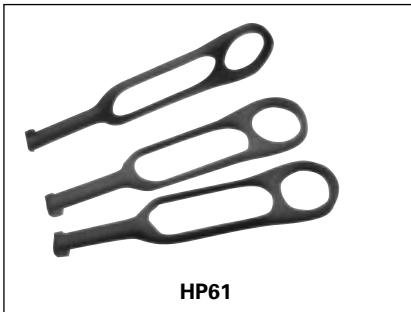
Accessories



HA161234



HA261234



HP61



HLC612

### Auxiliary Contacts

The auxiliary contacts are available in 1 normally open and 1 normally closed or 2 normally open and 2 normally closed configurations. Siemens offers a PLC Auxiliary Switch (30-200A) that has very low resistance for low voltage and current typical in PLC circuits. All auxiliary contacts make after and break before main switch contacts.

Switch Ampere Rating	Aux. Switch Catalog Number	List Price \$	Kit Ampere Rating			Kit Horsepower Rating		
			125V AC Max.	250V AC Max.	28V DC Max.	125V AC Max.	250V AC Max.	28V DC Max.

#### With 1 NO & 1 NC Isolated Contacts

30-200	HA161234	239.00	10	10	—	1/2	3/4	—
400-600	HA165678	587.00	10	10	—	1/2	3/4	—

#### With 2 NO & 2 NC Isolated Contacts

30-200	HA261234	266.00	10	10	7	1/2	3/4	—
400-600	HA265678	614.00	10	10	7	1/2	3/4	—

#### Low Current PLC Type with 1 NO & 1 NC Gold Plated Contacts

30-200	HA361234	302.00	10	10	—	1/2	3/4	—
400-600	HA365678	643.00	10	10	—	1/2	3/4	—

### Fuse Puller Kits

Fuse Puller Kits are field installable in 30-100A Type VBII Heavy Duty Switches (one kit required per 3-pole switch).

Switch Ampere Rating	Fuse Puller Kit Catalog Number	List Price \$
30	HP61	21.00
60	HP62▲	21.00
100	HP63▲	21.00

### Copper Lug Kits

All switches are UL approved to accept field installed copper lug kits.

Switch Ampere Rating	Copper Lug Catalog Number	List Price \$	Description
30-60	HLC612	138.00	(9) Lugs/Kit #14-4 AWG Cu
100	HLC63▲	172.00	(9) Lugs/Kit #14-1/0 AWG Cu
200	HLC64▲	212.00	(9) Lugs/Kit #6 AWG-300 Kcmil Cu
400-600A	HLC65678	37.50	(1) Lugs/Kit #1/0 AWG-600 Kcmil Cu

### Equipment Ground Kits

Equipment Ground Lug Kits are available for all switches.

Switch Ampere Rating	Catalog Number	List Price \$	Number of Terminals	Wire Range Per Terminal (Cu/Al)
30-200	HG61234	24.00	2	#14-4 AWG
400 & 600	HG656	123.00	4	#6 AWG-250 Kcmil

▲ Built to order. Allow 6-8 weeks for delivery.

Discount Schedule HDSS

Siemens Power Distribution & Control, SPEEDFAX™ 2007-2008 Product Catalog

4-9

# Disconnect Switches

## Type VBII (30-600A) with Flange Mounted Operating Handle

## Lug Wire Ranges & Dimensions

### Lugs

30 & 60A switches are suitable for use with 60° or 75°C wire. 100–600A switches are suitable for use with 75°C rated wire. All switches are supplied with factory installed line and load lugs.

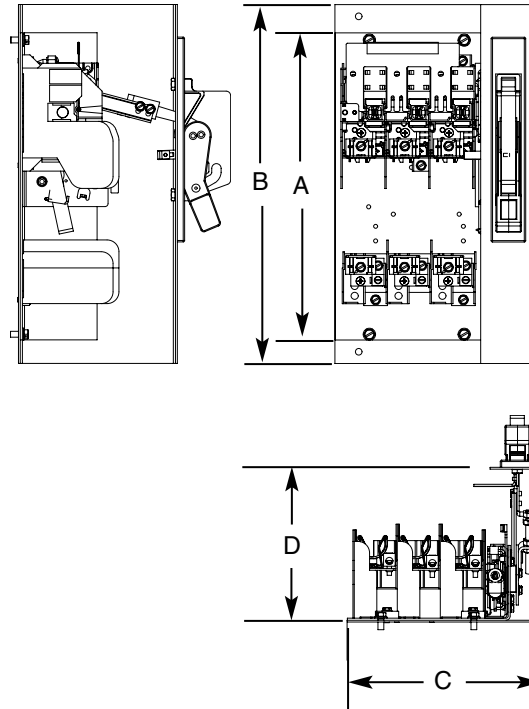
### Wire Ranges (Line, Load and Standard Neutral)

Switch Ampere Rating	UL Approved Wire Range	Lug Wire Range
30	#14-6 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
60	#14-2 AWG (Cu/Al)	#14-2 AWG (Cu/Al)
100	#14-1/0 AWG (Cu/Al)	#14-1/0 AWG (Cu/Al)
200	#6 AWG-300 Kcmil (Cu/Al)	#6 AWG-300 Kcmil (Cu/Al)
400	1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)	(1) 1/0 AWG-750 Kcmil (Cu/Al) or (2) 1/0 AWG-250 Kcmil (Cu/Al)
600	(2) 1/0 AWG-750 Kcmil (Cu/Al) or (4) 1/0 -250 Kcmil (Cu/Al)	(2) 1/0 AWG-750 Kcmil (Cu/Al) or (4) 1/0 AWG-250 Kcmil (Cu/Al)

### Approximate Dimensions

Mounting bracket shown with handle installed is supplied with Flange Mounted Switches only. All Panel Mounted Switches have a "L" shaped mounting pan with a line base, load base (if fusible) and mechanism installed.

Catalog Number	Dimensions				
	A	B	C <sup>ⓐ</sup>	D (min)	D (max)
<b>Fusible, Panel Mounted</b>					
VBFS321	11.88	N/A	6.62	6.81	19
VBFS322	13.12	N/A	8.50	6.81	19
VBFS361	11.88	N/A	6.62	6.81	19
VBFS362	13.12	N/A	8.50	6.81	19
VBFS363	13.12	N/A	8.50	6.81	19
VBFS364	17	N/A	12.33	7.05	19
VBFS365	26.25	N/A	16.50	8.63	19
VBFS366	26.25	N/A	16.50	8.63	19
<b>Non-fusible, Panel Mounted</b>					
VBNFS361	9.79	N/A	6.62	6.81	19
VBNFS362	9.79	N/A	8.50	6.81	19
VBNFS363	9.79	N/A	8.50	6.81	19
VBNFS364	10.77	N/A	12.33	7.05	19
VBNFS365	13	N/A	16.50	8.63	19
VBNFS366	13	N/A	16.50	8.63	19
<b>Fusible, Flange Mounted</b>					
VBFS321F	11.88	14.06	7.00	7.27	N/A
VBFS322F	13.12	15.83	8.85	7.27	N/A
VBFS361F	11.88	14.06	7.00	7.27	N/A
VBFS362F	13.12	15.83	8.85	7.27	N/A
VBFS363F	13.12	15.83	8.85	7.27	N/A
VBFS364F	17	18.20	12.68	7.57	N/A
<b>Non-fusible, Flange Mounted</b>					
VBNFS361F	9.79	11.78	7.00	7.27	N/A
VBNFS362F	9.79	11.78	8.85	7.27	N/A
VBNFS363F	9.79	11.78	8.85	7.27	N/A
VBNFS364F	10.77	12.00	12.68	7.57	N/A



<sup>ⓐ</sup> Dimension C for panel mounted switches indicates the minimum width from the left hand edge of the switch mounting pan to the right hand inside surface of the enclosure.

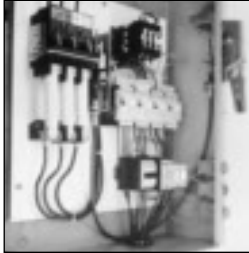
# Disconnect Switches

## Type MCS (30-200A) — Switches, Fuse and No Fuse Kits

Selection

### Features

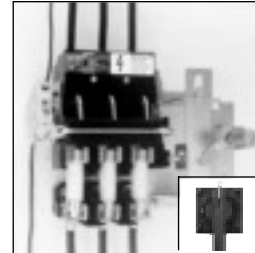
- 30, 60, 100 and 200 Ampere Switches
- UL Recognized (file # E121152 vol. 1 & 2) and CSA Certified
- Simple Mounting — with an integral switch and over center mechanism
- Horsepower & load break rated
- Compact Size
- Visible Blade Contacts
- Rugged Construction — with a short circuit current rating of 10,000 amps with Class H or 200,000 amps at 600V maximum AC, when fused with Class R or Class J fuses
- Available with three operator handle options, allowing flexible placement of switch
- Field Installable Auxiliary Contacts
- Flexible Fuse Class Configurations
- Flange mounted handles meet NFPA79 requirements



Type MCS Disconnect Switch with Max-Flex™ handle operator



Type MCS Disconnect Switch with fixed-depth, flange-mounted handle



Type MCS Disconnect Switch with rotary handle

### Ordering Information

- Select the basic switch size you need (30, 60, 100 or 200 ampere).
- Check the switch selected against the maximum horsepower rating required for your application. "L" or "R" suffix on switch catalog numbers denotes left or right-handed mechanism drive.
- Choose either fuse or no fuse kit from chart below.
- Check "Minimum Dimensions" on page 4-12 for installation space requirements.
- Select from the list of handle operators, the type which best suits your application. Handle operators can be selected from the next page.

### Basic Switches

Switch Ampere Rating	Maximum Voltage Rating	Catalog Number Right Hand	Catalog Number Left Hand	Maximum Horsepower Rating, 3 Phase <sup>①</sup>						250 Volts DC (max) <sup>④</sup>	List Price \$
				240 Volts AC		480 Volts AC		600 Volts AC			
				Standard Fuse	Time Delay Fuse	Standard Fuse	Time Delay Fuse	Standard Fuse	Time Delay Fuse		
30	600	MCS603R	MCS603L	3	7½	5	15	7½	20	5	464.00
60	600	MCS606R	MCS606L	7½	15	15	30	15	50	10	534.00
100	600	MCS610R	MCS610L▲	15	30	25	60	30	75	20	996.00
200	600	MCS620R	MCS620L▲	25	60	50	125	60	150	40	1607.00

### Fuse And No Fuse Kits (Includes load base plus line and load fuse clips)<sup>①</sup>

Basic Switch Ampere Rating	Switch Catalog Number	Kit Description	No Fuse Kits				For Class H		For Class J		For Class R		Lug Wire Size
			Standard		Cu Only <sup>②</sup>		Catalog Number ①	Std List Price \$	Catalog Number ①	Std List Price \$	Catalog Number ①	Std List Price \$	
			Catalog Number	List Price \$	Catalog Number	List Price \$							
30	MCS603R or MCS603L	No Fuse	TMK606	15.10	—	—	—	—	—	—	—	#14 to #4 AWG Cu/Al	
		30A, 250V	—	—	—	FCK203▲	67.00	—	—	FCRK203	98.00		
		30A, 600V	—	—	—	FCK206	87.00	FCJK603	98.00	FCRK206	119.00		
		60A, 250V	—	—	—	FCK206	87.00	—	—	FCRK206	119.00		
60A, 600V	—	—	—	FCK606	127.00	FCJK606	127.00	FCRK606	154.00				
60	MCS606R or MCS606L	No Fuse	TMK606	15.10	—	—	—	—	—	—	—	#14 to #4 AWG Cu/Al	
		60A, 250V	—	—	—	FCK206	87.00	—	—	FCRK206	119.00		
		60A, 600V	—	—	—	FCK606	127.00	FCJK606	127.00	FCRK606	154.00		
		100A, 250V	—	—	—	OFCK661▲	294.00	OFCK661▲	294.00	OFCK661▲	294.00		
100A, 600V	—	—	—	OFCK661▲	294.00	OFCK661▲	294.00	OFCK661▲	294.00				
100	MCS610R or MCS610L	No Fuse	TMK610	37.50	TMK610C	74.00	—	—	—	—	—	#14 to #2/0 AWG Cu/Al	
		100A, 250V	—	—	—	FCK610	296.00	FCJK610	296.00	FCRK610	362.00		
		100A, 600V	—	—	—	FCK610	296.00	FCJK610	296.00	FCRK610	362.00		
		200A, 250V	—	—	—	OFCK620	562.00	OFCK620	562.00	OFCK620	562.00		
200A, 600V	—	—	—	OFCK620	562.00	OFCK620	562.00	OFCK620	562.00				
200	MCS620R or MCS620L	No Fuse	TMK620	77.00	TMK620C▲	156.00	—	—	—	—	—	#6 to 300 kcmil Cu/Al	
		200A, 250V	—	—	—	FCK620	730.00	FCJK620	730.00	FCRK620	910.00		
		200A, 600V	—	—	—	FCK620	730.00	FCJK620	730.00	FCRK620	910.00		
		—	—	—	—	—	—	—	—	—	—		

▲ Built to order. Allow 6-8 weeks for delivery.

① For "copper only" connectors, order as follows:

**Fusible**—order standard switch, standard fuse kit and copper only no fuse kit.

**Non-Fusible**—order standard switch and copper only no fuse kit.

② Includes both line and load lugs.

③ For Class R fuses order Class H kit from this table and the Class R conversion kit from the next page.

④ HP ratings for time delay fuses and for 250V DC also apply to Non-fusible switches.

# Disconnect Switches

## Type MCS (30-200A)

## Accessories

### Auxiliary Switch Kits

Switch Catalog Number	Contact Arrangement			
	1 NO/1 NC		2 NO/2 NC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
MCS603R	MCSAKR136	347.00	MCSAKR236	602.00
MCS603L	MCSAKL136	347.00	MCSAKL236▲	602.00
MCS606R	MCSAKR136	347.00	MCSAKR236	602.00
MCS606L	MCSAKL136	347.00	MCSAKL236▲	602.00
MCS610R	MCSAK116	348.00	MCSAK216	603.00
MCS610L	MCSAK116	348.00	MCSAK216	603.00
MCS620R	MCSAK126	398.00	MCSAK226	802.00
MCS620L	MCSAK126	398.00	MCSAK226	802.00

### Class R Fuse Conversion Kits

Fuse Clip Rating	Catalog Number	List Price \$
100A, 600V	SSRK33	54.00
200A, 600V	SSRK34	54.00

### Fuse Ejector Kits

Switch Catalog Number	Fuse Ejector Kit Catalog Number	List Price \$
MCS610	FE100▲	23.00
MCS620	FE200▲	35.50

### Handle Operators

#### Fixed Depth, Flange Mounted, Types 1, 3, 3R, 12<sup>①⑥</sup>

Switch Catalog Number	Complete Handle Mechanism		Handle Only		Switch Operator Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
MCS603R	FDFS06R	317.00	FDH10	252.00	FDS06R	65.00
MCS603L	FDFS06L	317.00	FDH10	252.00	FDS06L	65.00
MCS606R	FDFS06R	317.00	FDH10	252.00	FDS06R	65.00
MCS606L	FDFS06L	317.00	FDH10	252.00	FDS06L	65.00
MCS610R	FDFS06R	317.00	FDH10	252.00	FDS06R	65.00
MCS610L	FDFS06L	317.00	FDH10	252.00	FDS06L	65.00
MCS620R	FDFS20R	415.00	FDH20	247.00	FDS20R	168.00
MCS620L	FDFS20L	415.00	FDH20	247.00	FDS20L	168.00

#### Variable Depth, Flange Mounted Max-Flex™, Types 1, 3, 3R, 12<sup>②</sup>

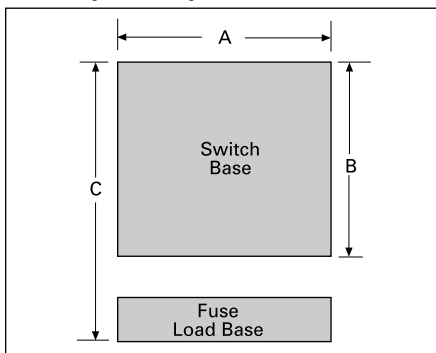
Switch Catalog Number	Complete Handle Mechanism		Handle Only		Switch Operator Only		Cable Only <sup>③</sup>	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
MCS603R	FHOS06036R	625.00	FHOHS	311.00	FHOS06R	161.00	FHOEC036	153.00
MCS603L	FHOS06036L	625.00	FHOHS	311.00	FHOS06L	161.00	FHOEC036	153.00
MCS606R	FHOS06036R	625.00	FHOHS	311.00	FHOS06R	161.00	FHOEC036	153.00
MCS606L	FHOS06036L	625.00	FHOHS	311.00	FHOS06L	161.00	FHOEC036	153.00
MCS610R	FHOS06036R	625.00	FHOHS	311.00	FHOS06R	161.00	FHOEC036	153.00
MCS610L	FHOS06036L	625.00	FHOHS	311.00	FHOS06L	161.00	FHOEC036	153.00
MCS620R	FHOS20036R	710.00	FHOHS	311.00	FHOS20R	222.00	FHOJC036	177.00
MCS620L	FHOS20036L	710.00	FHOHS	311.00	FHOS20L	222.00	FHOJC036	177.00

#### Variable Depth Rotary, Through-The-Door-Mounted, Types 1, 12<sup>④⑤</sup>

Variable Depth						Shaft Only Variable Depth		
MCS603R	CRHOS06VD	158.50	CRHOH	51.00	RHOS06	76.00	RHOSVD	31.50
MCS606R	CRHOS06VD	158.50	CRHOH	51.00	RHOS06	76.00	RHOSVD	31.50
MCS610R	CRHOS06VD	158.50	CRHOH	51.00	RHOS06	76.00	RHOSVD	31.50
MCS620R	CRHOS20VD	207.50	CRHOH	51.00	RHOS20	125.00	RHOSVD	31.50

### MCS Disconnect Switch Panel Space Requirements

#### Panel Space Requirements



#### Minimum Dimensions (inches\*)

Switch Catalog Number	Size	"A"	"B"	"C"	Fuse Class
MCS603	30A/240V	6.13	5.52	8.11	H, K, R
	30A/600V	6.13	5.52	10.11	H, K, R
	30A/600V	6.13	5.52	8.48	J
MCS606	60A/240V	6.13	5.52	7.86	H, K, R
	60A/600V	6.13	5.52	10.38	H, K, R
	60A/600V	6.13	5.52	8.35	J
MCS610	100A/240V	7.38	7.59	11.85	H, K, R
	100A/600V	7.38	7.59	13.85	H, K, R
	100A/600V	7.38	7.59	10.6	J
MCS620	200A/240V	9.17	9.00	14.7	H, K, R
	200A/600V	9.17	9.00	17.2	H, K, R
	200A/600V	9.17	9.00	13.32	J

"A" – Dimension is measured from each cross bail pin.

"B" – Dimension is measured from line side barrier to load side barrier.

"C" – Dimension is measured from line side terminal of switch to load side terminal of fuse load base.

▲ Built to order. Allow 6-8 weeks for delivery.

① For Type 4 and 4X applications, order handle only Catalog Number

100A - FDH104 (list price \$354.00)

200A - FDH204 (list price \$349.00)

② For Type 4 and 4X applications, order handle only Catalog Number FHOHS4, List Price \$432.00

③ Standard cable length is 36 inches. Alternate lengths are available as follows:

Length	Amps	Cat. No.	List Price \$
48"	30-100	FHOEC048	182.00
60"	30-100	FHOEC060	203.00
48"	200	FHOJC048	209.00
60"	200	FHOJC060	239.00

④ For Type 4 and 4X applications, order handle only Catalog Number RHOH4, List Price \$150.00

⑤ For Type 3 and 3R applications, order handle only Catalog Number RHOH, List Price \$116.00

⑥ Min. enclosure depth from mounting pan to handle mounting surfaces: 30-100A 6.44 inches  
200A 10.93 inches

\*For millimeters multiply inches by 25.4.



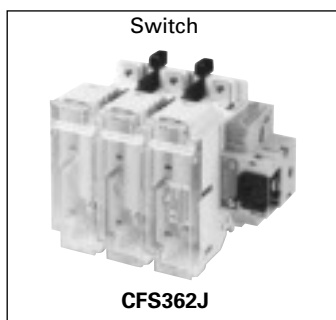
# Disconnect Switches

## Type CFS Compact Fusible Switches

## Features and Ordering Information

### Features

- 30–400A ratings
- UL Listed & CSA Certified
- IEC 60 947-3 Certified & CE marked
- Door mounted rotary handles with defeatable cover interlock
- Meets UL requirements for both main and branch circuit applications
- Compact size
- 50 or 100KA with Class CC fuses or up to 200KA with Class J fuses
- Load break and horsepower rated
- Quick make and break operation
- All handles are padlockable with up to (3) padlocks with 5/16" hasps in the OFF position
- Catalog number **CFS361C5**, **CFS361J5** & **CNFS361** can be DIN-rail mounted and can be either front or side operated with standard rotary handles
- Handles are available in Type 1, 3R, 4/4X & 12 ratings
- NFPA 79 field installed kits are available



### Ordering Information

1. Select the panel mounted switch required based on Ampere, HP and AIC requirements. Switches with a right hand mechanism are standard. 30-100A switches with a left hand mechanism are available.
  2. Select handle based on environmental rating required.
  3. Select operating shaft (200 or 400mm in length). For enclosure depths of 9.0" or less from panel mounting surface to inside of door use 200mm long shafts. For deeper enclosures use 400mm long shafts. 30A 50kA switches can be used in 10" deep enclosures (panel to inside of door) with 200mm shaft and CFSH5 handles.
  4. Line & load lugs are provided as standard on 30 & 60A switches. Terminal kits are available for 100–400A switches if needed.
  5. Auxiliary contacts are available if needed as follows:
    - A. 30A, 50kA switch CFS361C5 and non-fusible 30A switch CNFS361 will accept up to (4) aux contacts without an aux contact holder.
    - B. 30A, 50kA switch CFS361J5 will accept up to (2) aux contacts without an aux contact holder. If more than (2) aux contacts are required order aux contacts PLUS aux contact holder kit CFS AUXH1.
    - C. For all 100 or 200kA 30–400A switches order the aux contacts required PLUS aux contact holder kit CFS AUXH2.
  6. If non-fusible switch is required order a shorting bar for 60-600A switches or catalog number **CNFS361** for 30A.
  7. All switches are supplied with line shields as standard. 30, 60 & 400A switches are also supplied with load shields. Load side terminal shroud kits are available for 100 & 200A switches.
- Note: Be sure to check shaft and handle compatibility with the switch selected by using the information provided in the selection tables.

# Disconnect Switches

## Type CFS Compact Fusible Switches

Fusible Switches, 3-Pole 600V AC Max, 250V DC Max<sup>5</sup>

## Switch and Handle Selection

Switch Ampere Rating	Catalog Number	List Price \$	Fuse Provisions Provided	Max Horsepower Ratings				AC Short Circuit Rating
				240V 3Ø AC	480V 3Ø AC	600V 3Ø AC	250V DC	

### Standard - with Right Hand Mounted Mechanism

30 <sup>①</sup>	CFS361C5	361.00	Class CC	7.5	15	20	5 <sup>③</sup>	50kA
30 <sup>①</sup>	CFS361J5	376.00	Class J	7.5	15	20	5 <sup>③</sup>	50kA
30 <sup>①</sup>	CFS361C	382.00	Class CC	7.5	15	20	5 <sup>③</sup>	100kA
30 <sup>①</sup>	CFS361J	424.00	Class J	7.5	15	20	5 <sup>③</sup>	200kA
30 <sup>①</sup>	CNFS361 <sup>⑥</sup>	336.00	None	7.5	15	20	5 <sup>③</sup>	50kA
60 <sup>①</sup>	CFS362J	488.00	Class J	15	30	50	10 <sup>③</sup>	200kA
100 <sup>②</sup>	CFS363J	678.00		30	60	75	20 <sup>③</sup>	
200 <sup>②</sup>	CFS364J	1710.00		60	125	150	40 <sup>④</sup>	
400 <sup>②</sup>	CFS365J	2462.00		125	250	350	50 <sup>④</sup>	

### Optional - with Left Hand Mounted Mechanism

30 <sup>①</sup>	CFS361JL	452.00	Class J	7.5	15	20	5 <sup>③</sup>	200kA
60 <sup>①</sup>	CFS362JL	511.00		15	30	50	10 <sup>③</sup>	
100 <sup>②</sup>	CFS363JL	710.00		30	60	75	20 <sup>③</sup>	

### Operating Shafts<sup>⑤</sup>

Catalog Number	List Price \$	Shaft Length In. (mm)	Switch & Handle Compatibility
CFSS5200	34.00	7.9 (200)	5mm x 5mm for use with CFS361C5, CFS361J5 & CNFS361 switches & with "CFSH5" handles only
CFSS5400	36.00	15.7 (400)	
CFSS5200H	34.00	7.9 (200)	5mm x 5mm for use with all "CFSH10" handles & with CFS361C5, CFS361J5 & CNFS361 switches only
CFSS5400H	36.00	15.7 (400)	
CFSS10200H	36.00	7.9 (200)	10mm x 10mm for use with all "CFSH10" handles & with all switches except CFS361C5, CFS361J5 & CNFS361
CFSS10400H	38.50	15.7 (400)	

Rotary Operating Handles—Door Mounted  
(for use with 50kA CFS361C5 & CFS361J5 switches only)

### Type 1, 3R & 12<sup>⑥</sup>

Catalog Number	List Price \$	Color	Operating Shaft Compatibility
CFSH5B12	114.00	Black	CFSS5200 OR CFSS5400 (5mm x 5mm)
CFSH5R12	114.00	Yellow & Red	

Rotary Operating Handles—Door Mounted  
(for use with all operating shafts except CFSS5200 & CFSS5400 and with all CFS switches)

Catalog Number	List Price \$	Color	Description
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### Type 1, 3R & 12<sup>⑦</sup>

CFSH10B12	137.00	Black	Heavy duty pistol grip (3.78" long)
CFSH10R12	137.00	Yellow & Red	
CFSH10BL12	143.00	Black	Heavy duty pistol grip (6.00" long)
CFSH10RL12	143.00	Yellow & Red	

### Type 1, 3R, 4/4X & 12<sup>⑦</sup>

CFSH10B4	149.00	Black	Heavy duty pistol grip (3.78" long)
CFSH10R4	149.00	Yellow & Red	
CFSH10BL4	162.00	Black	Heavy duty pistol grip (6.00" long)
CFSH10RL4	162.00	Yellow & Red	

<sup>①</sup>Line and load lugs included.

<sup>②</sup>Line and load lugs are not included.

Order from table on next page if required.

<sup>③</sup>DC HP rating shown requires (2) poles to be connected in series.

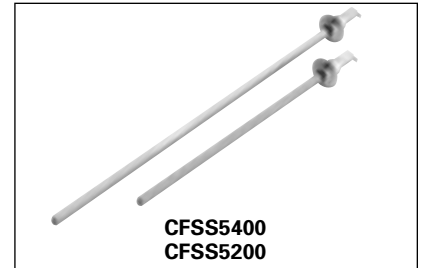
<sup>④</sup>DC HP rating shown requires (3) poles to be connected in series.

<sup>⑤</sup>Catalog numbers CFS361C5 & CFS361J5 accept 5mm x 5mm operating shafts. All others accept 10mm x 10mm operating shafts.

<sup>⑥</sup>Compact pistol grip design (3.25" long) with defeatable cover interlock. Cover can be opened when handle is padlocked in the OFF position.

<sup>⑦</sup>Defeatable cover interlock provided. Cover cannot be opened when handle is padlocked in the OFF position.

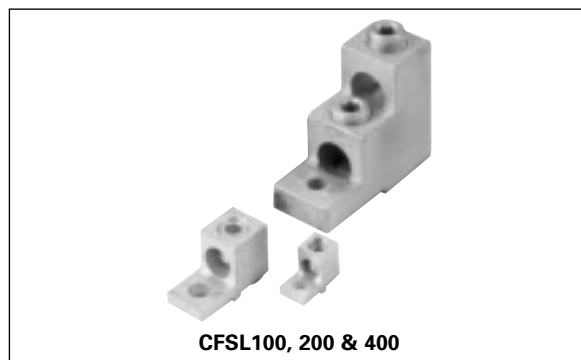
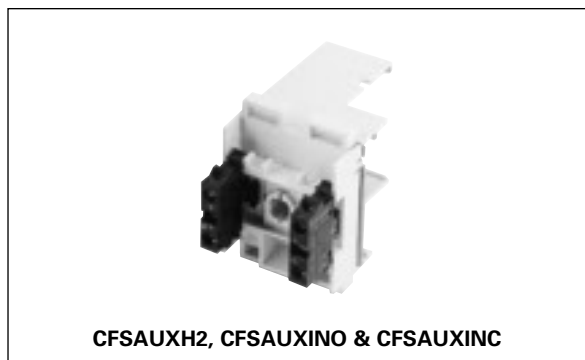
<sup>⑧</sup>Catalog number CNFS361 is a non-fusible switch.



# Disconnect Switches

## Type CFS Compact Fusible Switches

## Accessories



### Type CFS Fusible Switch Accessories

Catalog Number	List Price \$	Description
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#### Terminals<sup>①</sup>

CFSL100	71.00	100A Lug Kit (6 lugs per kit)
CFSL200	100.00	200A Lug Kit (6 lugs per kit)
CFSL400	276.00	400A Lug Kit (6 lugs per kit)

#### Shorting Bars (no fuse kits)

CFSSB60	35.50	60A Shorting Bar Kit (3 links per kit)
CFSSB100	50.00	100A Shorting Bar Kit (3 links per kit)
CFSSB200	71.00	200A Shorting Bar Kit (3 links per kit)
CFSSB400	103.00	400A Shorting Bar Kit (3 links per kit)

#### Auxiliary Contacts<sup>②</sup>

CFSAUXH1 <sup>②</sup>	52.00	Aux Contact Holder (30A 50kA Sws)
CFSAUXH2 <sup>②</sup>	52.00	Aux Contact Holder (30-400 100 & 200kA SW)
CFSAUX1NO <sup>②</sup>	28.00	Aux Contact 1 NO (30-400A Sws)
CFSAUX1NC <sup>②</sup>	28.00	Aux Contact 1 NC (30-400A Sws)

#### Terminal Shrouds

CFSTS100 <sup>③</sup>	84.00	100A Shroud Kit
CFSTS200 <sup>③</sup>	134.00	200A Shroud Kit
CFSTS400 <sup>⑦</sup>	155.00	400A Shroud Kit

#### Padlock Kit (when door is open)<sup>③</sup>

CFSPLK	100.00	Shaft Padlocking Kit for 30A Compact Switch
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#### NFPA 79 Kits

Kits provide an operating shaft suitable for use with all heavy duty handles (not for use with CFSH5B12 or CFSH5R12). Kits also provide an internal operating handle & an internal OFF padlocking provision.

CFSNFPA1 <sup>④</sup>	207.00	For use with CFS361C5, CFS361J5 & CNFS361
CFSNFPA2 <sup>⑤</sup>	343.00	For use with CFS361J - CFS365J & CFS361C

**Note:** CFSNFPA2 cannot be used in combination with CFSAUX1NO or CFSAUX1NC auxiliary contacts.

① Supplied as standard on 30 & 60A switches.

② CFS361C5 and CNFS361 will accept (4) aux contacts without an aux contact holder. CFS361J5 will accept (2) aux contacts without an aux contact holder. ON ALL OTHER SWITCHES CFS AUX H2 IS REQUIRED TO MOUNT AUX CONTACTS.

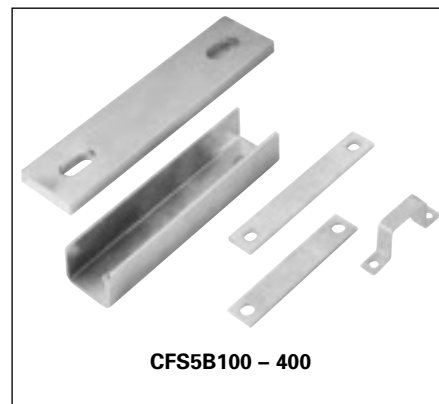
③ Supplied as standard on all but 30A compact switches.

④ 12.6 inch (320 mm) long operating shaft included.

⑤ 11.3 inch (288 mm) long operating shaft included.

⑥ Line side terminal shrouds supplied with switch.

⑦ Supplied on both line and load side with CFS365J switch.



# Disconnect Switches

## Type CFS Compact Fusible Switches

## Dimensions and Technical Characteristics

### UL & CSA Technical Characteristics

Catalog Number	CFS361C5 <sup>①</sup>	CFS361J5	CFS361C	CFS361J & CFS361JL	CFS362J & CFS362JL	CFS363J & CFS363JL	CFS364J	CFS3615J
Amp Rating	30	30	30	30	60	100	200	400
Max AC Volts	600	600	600	600	600	600	600	600
Electrical Endurance	6000	6000	6000	6000	6000	6000	6000	1000
Max Horsepower Ratings								
240V 3Ø AC	7.5	7.5	7.5	7.5	15	30	60	125
480V 3Ø AC	15	15	15	15	30	60	125	250
600V 3Ø AC	20	20	20	20	50	75	150	350
250V DC	5 <sup>②</sup>	5 <sup>②</sup>	5 <sup>②</sup>	5 <sup>②</sup>	10 <sup>②</sup>	20 <sup>②</sup>	40 <sup>③</sup>	50 <sup>③</sup>
AC Short Circuit Rating	50kA	50kA	100kA	200kA	200kA	200kA	200kA	200kA
Fuse Type (Class)	CC	J	CC	J	J	J	J	J
Electrical Endurance	6000	6000	6000	6000	6000	6000	6000	1000
Mechanical Endurance	10000	10000	10000	10000	10000	10000	8000	6000
Shaft Cross Section	5mm	5mm	10mm	10mm	10mm	10mm	10mm	10mm
Operating Torque (lb. In.)	21	21	53	88	88	88	106	132
Aux Contacts								
Nema Rating AC	A600	A600	A600	A600	A600	A600	A600	A600
Nema Rating DC	N600	N600	N600	N600	N600	N600	N600	N600

4  
DISCONNECT SWITCHES

### IEC Technical Characteristics

Catalog Number	CFS361C5 <sup>①</sup>	CFS361J5	CFS361C	CFS361J & CFS361JL	CFS362J & CFS362JL	CFS363J & CFS363JL	CFS364J	CFS3615J
Rating Insulation Voltage Ui	800	800	750	750	750	750	750	800
Rated Impulse Voltage (Uimp)	8kV	8kV	8kV	8kV	8kV	8kV	8kV	8kV
Operational Current I <sub>e</sub>								
400V AC (AC22A & AC23A)	32	32	32	32	63	100	200	400
690V AC (AC22A & AC23A)	32	32	32	32	63	100	200	400
Motor Power (kW)								
400V AC	15	15	15	15	30	51	100	220
500V AC	18.5	18.5	18.5	18.5	40	63	140	220
690V AC	25	25	25	25	55	90	185	220
Max Peak (kA peak) let through current	5.5	5.5	7.6	17.6	17.6	22	32	36
Cu cable sie (mm <sup>2</sup> )	6	6	6	6	10	25	50	185

### Wire Ranges Line & Load Lugs

Switch Ampere Rating	UL Approved Wire Size (75°C)	Mechanical Wire Range of Lug (75°C)
30	#10 Cu	#14-10 Cu
60	#6 Cu	#10-3 Cu
100	#3 Cu	#14-2/0 Cu/Al
200	#3/0 Cu	#6-3/0 Cu/Al
400	(2) 300 kcmil Al or (2) 4/0 Cu	(2)#2-600 kcmil Cu/Al

### Panel Space Requirements

Catalog Number	Ampere Rating	Dimensions Inches (mm)		
		Height	Width	Depth <sup>⑤</sup>
CFS361C5	30	4.56 (116)	3.78 (96)	6.00 (152)
CFS361J5	30	4.56 (116)	4.15 (105)	6.00 (152)
CFS361C	30	5.88 (149)	5.62 (143)	7.00 (178)
CFS361J & CFS361JL	30	5.88 (149)	6.75 (171)	7.00 (178)
CFS362J & CFS362JL	60	5.88 (149)	6.75 (171)	7.00 (178)
CFS363J & CFS363JL	100	7.19 (183)	8.25 (210)	7.00 (178)
CFS364J	200	8.13 (206)	9.44 (240)	8.00 (203)
CFS365J	400	14.94 (363)	11.94 (303)	8.00 (203)

① Ratings also apply to catalog number **CNFS361** except the 50kA AIC rating applies when switch is protected by Class J or CC 30A max. fuses.

② DC HP rating requires (2) poles to be connected in series.

③ DC HP rating requires (3) poles to be connected in series.

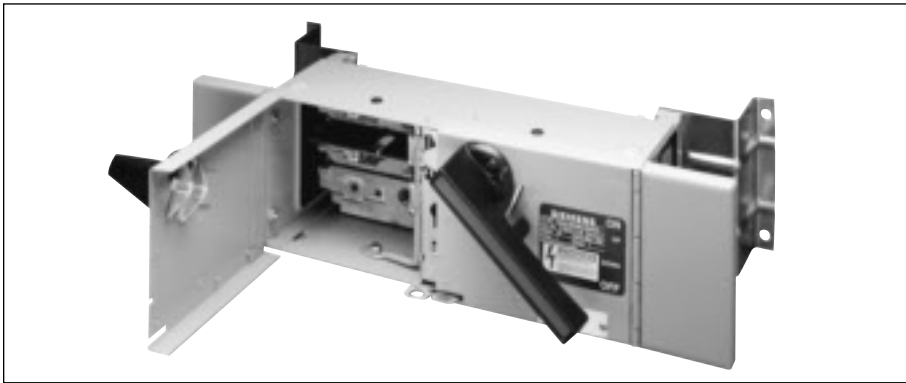
④ Ratings also apply to catalog number **CNFS361**.

⑤ Minimum dimension from mounting surface to inside of cover. Dimensions shown can be decreased if aux contacts are not required.

# Disconnect Switches

## Type VB Panelboard Units

General



### Features

**Exclusive Vacu-Break® Clampmatic Arc Control** — Hazardous switching arcs are safely confined and controlled in the Vacu-Break chamber.

**NEMA Phasing** — All line connections are phased as per NEMA Standards, i.e., left to right and top to bottom as you face the unit.

**Pressure Terminal Connectors** — Suitable for aluminum or copper (100 Amps or larger). All Terminal Connectors 200 Amps and larger are removable.

**Connection Screws** — Bullet nosed for positive location and seating of screw.

**Quick-Make Quick-Break** — Assured by design of cam mechanism and powerful springs. Positive operation in "ON" or "OFF" position results from design of the cross arm and Vacu-Break head linkage.

**Easy Mounting** — Mounting feet have captive bullet nosed screws added, which seat quickly and positively, reducing installation time.

**Padlocking Member** — Provides locking of handle in the "ON" or "OFF" position.

**Fibre End Barriers** — Insulated End Barriers prevent damage to wire during

installation and are designed with openings large enough to accommodate removable lugs (200 Amps and larger units).

**High Pressure Spring Reinforced Copper Fuse Clips** — Provided extra pressure at the contact points. Fuse clips are removable from the front in 7½" and 10" units and from the rear of 5" units.

**Voidable Cover Interlock** — Permits only authorized personnel to void the door interlock and open door with switch "on." "Fool proof" mechanism will not permit door to be closed unless handle is in the correct position.

### Specifications

#### Application

VB Panelboard Switches are intended for use in applications where:

1. Rugged constructions, reliable performance, continuity of service and ease of maintenance are emphasized, or
2. Available fault currents higher than 10,000A are likely to be encountered, in manufacturing plants, mass production industries and commercial, institutional and other large buildings served by network systems or transformers of high capacities.

### Short Circuit Withstand Ratings

Suitable for use on systems capable of delivering not more than 200,000 RMS symmetrical amperes of fault current when Class J or R fuses are installed. 1200A switches are the exception, which are suitable for use on circuits capable of delivering not more than 100,000 RMS symmetrical amperes of fault current when Class L fuses are installed. Also, 100–800A switches with Class T fuses and field adapter kit, which are 200,000 RMS symmetrical rated.

### Fuses

Fusible switches will accept the following UL Class fuses:

Class H

Class K

Class R or J with proper adapter kit

Class L — 800 and 1200A switches

Class T — 100–800 switches with proper adapter kit

### Cover Interlocks

Voidable cover interlocks standard on all switches. Prevents cover from being opened when switch is in the "ON" position.

### UL Listing

Listed by UL under file #E6849 as miscellaneous switches and also suitable for use as service equipment (where applicable). Meets UL98 standard for enclosed and deadfront switches.

### NEMA Specifications

Meets NEMA standard KS-1-1990 for type HD switches.

### Federal Specifications

Meets previous federal specifications W-S-865C for heavy duty switches (Type HD) Type 1 switches — general purpose enclosed (Type 1).

Switch Rating	Maximum Withstand Ratings — 240V AC					Maximum Withstand Ratings — 600V AC				
	H, K Fuses	R Fuses	J Fuses	L Fuses	T Fuses	H, K Fuses	R Fuses	J Fuses	L Fuses	T Fuses
30–30	10,000	200,000 <sup>Ⓢ</sup>	—	—	—	10,000	200,000	200,000	—	—
30–60	10,000	200,000	200,000	—	—	10,000	200,000	200,000	—	—
60–60	10,000	200,000	200,000	—	—	10,000	200,000	200,000	—	—
60–100	10,000	200,000	200,000	—	—	10,000	200,000	200,000	—	200,000
100	10,000	200,000	200,000	—	200,000	10,000	200,000	200,000	—	200,000
100–100	10,000	200,000	200,000	—	200,000	10,000	200,000	200,000	—	200,000
200	10,000	200,000	200,000	—	200,000	10,000	200,000	200,000	—	200,000
200–200	10,000	200,000	200,000	—	200,000	10,000	—	200,000	—	—
400	10,000	200,000	200,000	—	200,000	10,000	200,000	200,000	—	200,000
600	10,000	200,000	200,000	—	200,000	10,000	200,000	200,000	—	200,000
800	—	—	—	200,000 <sup>Ⓢ</sup>	200,000 <sup>Ⓢ</sup>	—	—	—	200,000	200,000
1200	—	—	—	100,000 <sup>Ⓢ</sup>	—	—	—	—	100,000	—

Ⓢ 2½" units will not accept Class R or J fuse clip kits and are rated 10,000 AIC max.

Ⓢ Ratings are for 600V switches and fuses when used on a 240V max. AC system.

# Disconnect Switches

## Type VB Panelboard Units

Selection

Fusible Units For SB1, SB2 Switchboards and F1, F2 Panelboards

**Catalog Numbering System**

V 7 E 3 2 3 3

**Vacu-Break** \_\_\_\_\_ ↑

Unit

**Width** \_\_\_\_\_ ↑

2 = 12"    7 = 17"    M = 17" (Main)

**Height** \_\_\_\_\_ ↑

A = 2½"    B = 5"    E = 7½"    F = 10"    H = 15"    S = 18.75"

**Number of Poles** \_\_\_\_\_ ↑

2            3

**Voltage Rating** \_\_\_\_\_ ↑

2 = 240V    6 = 600V

**Amperes** \_\_\_\_\_ ↑

0 = Single Unit

Double    1 = 30A    2 = 60A    3 = 100A    4 = 200A

**Ampere Rating** \_\_\_\_\_ ↑

1 = 30A    2 = 60A    3 = 100A    4 = 200A    5 = 400A    6 = 600A

Example: V7E3233 = **Vacu-Break Unit, 17" Wide, 7½" High, 3-Pole, 240 Volts, Double Branch Unit with 100 Amp Rating each side. Suffix letters MS indicate Main Switch.**

### Vacu-Break® Fusible Units

#### 2-Pole<sup>①</sup>, 12" Wide

240V AC, 250V DC

Ampere Rating	Unit Height (inches)	Unit Depth (inches)	Horsepower Rating			Lug Wire Range (Cu/Al) and Cables Per Pole	Unit Weight (pounds)	Catalog Number	List Price \$
			240 Volt AC		250 Volt DC				
			Standard	Maximum					
30-30	2½ <sup>②</sup>	4½	1½	3	5	(1)-#14 to #8 (Cu Only)	5	V2A2211LR■	588.00
30-30	5	4½	1½	3	5	(1)-#14 to #8	9	V2B2211LR■	758.00
30-60	5	4½	1½-3	3-10	5-10	(1)-#14 to #4	9	V2B2212LR■	837.00
60-60	5	4½	3	10	10	(1)-#14 to #4	9	V2B2222LR■	837.00
100	7½	6¾	7½	15	20	(1)-#10 to #1/0	14	V2E2203LR■	671.00
200	7½	6¾	15	—	40	(1)-#6 to 250 kcmil	19	V2E2204LR■	1175.00

#### 3-Pole

240V AC, 250V DC

Ampere Rating	Unit Height (inches)	Unit Depth (inches)	Horsepower Rating		Lug Wire Range (Cu/Al) and Cables Per Pole	Unit Weight (pounds)	Catalog Number	List Price \$
			240 Volt AC					
			Standard	Maximum				

#### Branch Circuits, 12" Wide Units

30-30	2½ <sup>②</sup>	4½	3	7½	(1)-#14 to #8 (Cu Only)	5	V2A3211■	652.00
30-30	5	4½	3	7½	(1)-#14 to #8	9	V2B3211■	943.00
30-30	5	4½	3	7½	(1)-#14 to #8	9	V2B3211R <sup>③</sup> ■	1007.00
30-60	5	4½	3-7½	7½-15	(1)-#14 to #4	9	V2B3212■	943.00
30-60	5	4½	3-7½	7½-15	(1)-#14 to #4	9	V2B3212R <sup>③</sup> ■	1007.00
60-60	5	4½	7½	15	(1)-#14 to #4	9	V2B3222	943.00
60-60	5	4½	7½	15	(1)-#14 to #4	9	V2B3222R <sup>③</sup> ■	1007.00
100	7½	6¾	15	30	(1)-#10 to #1/0	14	V2E3203	758.00
200	10	6¾	25	60	(1)-#6 to 250 kcmil	21	V2F3204	1473.00

#### Main Switch<sup>④</sup>, 12" Wide Units, Back Connected

200	10	6¾	25	50	⑤	21	V2F3204MS■	1473.00
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For inches / millimeters conversion, multiply inches by 25.4.

■ Built to order. Allow 2-3 weeks for delivery.

① These units are available in LR (left, right) connection configurations only.

② This unit is not a Vacu-Break unit, but rather operates on a sliding contact, double break principle. Rated 10,000 AIC max. with either Class H or K fuses. Will not accept Class R fuse clip kits.

③ Units set up for R-fuse application only.

④ For 2-pole main switch (200A), use 3-pole main switch Vacu-Break unit.

⑤ Load-side furnished with spade type bolted terminal pads.

# Disconnect Switches

## Type VB Panel Units

Selection

Vacu-Break® Fusible Units for SB1, SB2 Switchboards and F1, F2 Panelboards

Ampere Rating	Unit Height (inches)	Unit Depth (inches)	Horsepower Rating			Lug Wire Range (Cu/Al) and Cables Per Pole	Unit Weight (pounds)	Catalog Number	List Price \$
			240 Volt AC		250 Volt DC				
			Standard	Maximum					
<b>2-Pole<sup>①</sup>, Branch Circuits, 17" Wide Units</b>						<b>240V AC, 250V DC</b>			
30-30	2½ <sup>②</sup>	6¾	1½	3	5	(1)-#14 to #8 (Cu Only)	5	V7A2211__ <sup>①③</sup> ■	652.00
30-30	5	6¾	1½	3	5	(1)-#14 to #8	9	V7B2211__ <sup>①</sup> ○	837.00
30-30	5	6¾	1½	3	5	(1)-#14 to #8	9	V7B2211__ <sup>①</sup> ○ <sup>⑤</sup>	933.00
30-60 <sup>③</sup>	5	6¾	1½-3	3-10	5-10	(1)-#14 to #4	9	V7B2212LR <sup>④</sup> ■	931.00
30-60 <sup>③</sup>	5	6¾	1½-3	3-10	5-10	(1)-#14 to #4	9	V7B2212LRR <sup>⑤</sup> ■	994.00
60-60	5	6¾	3	10	10	(1)-#14 to #4	9	V7B2222__ <sup>①③</sup>	931.00
60-60	5	6¾	3	10	10	(1)-#14 to #4	9	V7B2222__ <sup>①</sup> ○ <sup>⑤</sup>	994.00
60-100 <sup>③</sup>	7½	6¾	3-7½	10-15	10-20	(1)-#10 to #1/0	18	V7E2223LR <sup>④</sup> ■	1090.00
100-100	7½	6¾	7½	15	20	(1)-#10 to #1/0	20	V7E2233__ <sup>①</sup> ○	1090.00
100	7½	6¾	7½	15	20	(1)-#10 to #1/0	14	V7E2203LR <sup>④</sup>	863.00
200	7½	6¾	15	—	40	(1)-#6 to 250 kcmil	21	V7E2204__ <sup>①</sup> □	1241.00
400 <sup>③</sup>	15	10½	—	—	50	(1)-#1/0 to 500 kcmil or (2)-#1/0 to 300 kcmil	63	V7H2205LR <sup>④</sup>	2947.00
600 <sup>③</sup>	15	10½	—	—	—	(2)-#4/0 to 500 kcmil	63	V7H2206LR <sup>④</sup> ■	3410.00
<b>2-Pole, Main Switch, 17" Wide Units, Back Connected</b>						<b>240V AC, 250V DC</b>			
200 <sup>③</sup>	7½	6¾	15	—	40	⑦	21	V7E2204MS <sup>④</sup> ■	1241.00
400 <sup>③</sup>	15	10½	—	—	50	⑦	63	V7H2205MS <sup>④</sup>	2947.00
600 <sup>③</sup>	15	10½	—	—	—	⑦	63	V7H2206MS <sup>④</sup>	3410.00
<b>3-Pole, Branch Circuits, 17" Wide Units</b>						<b>240V AC</b>			
30-30	2½ <sup>②</sup>	6¾	3	7½	—	(1)-#14 to #8 (Cu Only)	5	V7A3211	721.00
30-30	5	6¾	3	7½	—	(1)-#14 to #8	9	V7B3211	991.00
30-30	5	6¾	3	7½	—	(1)-#14 to #8	9	V7B3211R <sup>⑤</sup>	1052.00
30-60	5	6¾	3-7½	7½-15	—	(1)-#14 to #4	9	V7B3212	991.00
30-60	5	6¾	3-7½	7½-15	—	(1)-#14 to #4	9	V7B3212R <sup>⑤</sup>	1052.00
60-60	5	6¾	7½	15	—	(1)-#14 to #4	9	V7B3222	991.00
60-60	5	6¾	7½	15	—	(1)-#14 to #4	9	V7B3222R <sup>⑤</sup>	1052.00
60	7½	6¾	7½	15	—	(1)-#14 to #4	13	V7E3202	834.00
60-100	7½	6¾	7½-15	15-30	—	(1)-#10 to #1/0	18	V7E3223	1296.00
100-100	7½	6¾	15	30	—	(1)-#10 to #1/0	20	V7E3233	1296.00
100-100	7½	6¾	15	30	—	(1)-#10 to #1/0	20	V7E3233R <sup>⑤</sup>	1509.00
100	7½	6¾	15	30	—	(1)-#10 to #1/0	14	V7E3203	834.00
200-200	10	6¾	25	60	—	(1)-#6 to 250 kcmil	40	V7F3644 <sup>⑥</sup>	3192.00
200-200	10	6¾	25	60	—	(1)-#6 to 250 kcmil	40	V7F3244R <sup>⑤</sup>	3334.00
200	10	6¾	25	60	—	(1)-#6 to 250 kcmil	21	V7F3204	1519.00
400	15	10½	50	125	—	(1)-#1/0 to 500 kcmil or (2)-#1/0 to 300 kcmil	63	V7H3205	3410.00
400	15	10½	50	125	—	(1) 250 to 750 kcmil or (2) 1/0 to 300 kcmil	63	V7H3205750	3410.00
600	15	10½	75	200	—	(2)-#4/0 to 500 kcmil	63	V7H3206	3835.00
<b>3-Pole, Main Switch, 17" Wide Units (Vertical Mount, Top Feed, Front Connected)</b>						<b>240V AC</b>			
400	18.75	10¾	50	125	—	—	—	VMS325T	3410.00
600	18.75	10¾	75	200	—	—	—	VMS326T	3835.00
<b>3-Pole, Main Switch, 17" Wide Units (Vertical Mount, Bottom Feed, Front Connected)</b>						<b>240V AC</b>			
400	18.75	10¾	50	125	—	—	—	VMS325B	3410.00
600	18.75	10¾	75	200	—	—	—	VMS326B	3835.00
<b>3-Pole, Main Switch, 17" Wide Units, Back Connected</b>						<b>240V AC</b>			
100	7½	6¾	15	30	—	⑦	14	V7E3203MS	959.00
200	10	6¾	25	60	—	⑦	21	V7F3204MS	1519.00
400	15	10½	50	125	—	⑦	63	V7H3205MS	3410.00
600	15	10½	75	200	—	⑦	63	V7H3206MS	3835.00

For inches / millimeters conversion, multiply inches by 25.4.

- Built to order. Allow 2-3 weeks for delivery.
- MR suffix. Built to order. Allow 2-3 weeks for delivery.
- MR, LM suffix. Built to order. Allow 2-3 weeks for delivery.

- ① Order 2-pole branch circuit units by adding appropriate connection designation LM, LR or MR (indicating Left, Middle and Right, facing the panel).
- ② This unit is not a Vacu-Break unit, but rather operates on a sliding contact, double break principle. Rated 10,000 AIC max. with either Class H or K fuses. Will not accept Class R fuse clip kits.
- ③ MR not available.

- ④ Available as Type LR connection designation only.
- ⑤ Switches set up for R-fuse applications only.
- ⑥ Rated 600 Volts but factory configured to accept 250V Class H, K or R fuses. Field convertible for Class J fuses for 600V applications. Field convertible for 300V Class T fuse with TFAK42 kit.
- ⑦ Load-side furnished with spade type bolted terminal pads.

# Disconnect Switches

## Type VB Panel Units

Selection

Vacu-Break® Fusible Units For SB1, SB2 Switchboards and F1, F2 Panelboards

Ampere Rating	Unit Height (inches)	Unit Depth (inches)	Horsepower Rating				Lug Wire Range (Cu/Al) and Cables Per Pole	Unit Weight (pounds)	Catalog Number	List Price \$
			480 Volt AC		600 Volt AC					
			Standard	Maximum	Standard	Maximum				

### 2-Pole, Branch Circuits, 17" Wide Units<sup>①</sup>

600V AC, 250V DC

30-30	7½	6¾	3	7½	3	10	(1)-#14 to #8	14	V7E2611LR <sup>■</sup>	1063.00
30-60	7½	6¾	3-5	7½-20	3-5	20-25	(1)-#14 to #4	14	V7E2612LR <sup>■</sup>	1063.00
60-60	7½	6¾	5	20	10	25	(1)-#14 to #4	14	V7E2622LR <sup>■</sup>	1063.00
100	7½	6¾	10	20	15	40	(1)-#10 to #1/0	14	V7E2603LR <sup>■</sup>	753.00
200	10	6¾	25	50	30	50	(1)-#6 to 250 kcmil	21	V7F2604LR <sup>■</sup>	1657.00
400	15	10½	—	—	—	—	(1)-#1/0 to 500 kcmil	63	V7H2605MR <sup>◆</sup>	3410.00

### 3-Pole, Branch Circuits, 17" Wide Units

600V AC, 250V DC

30-30	7½	6¾	5	15	7½	20	(1)-#14 to #8	14	V7E3611	1364.00
30-30	7½	6¾	5	15	7½	20	(1)-#14 to #8	14	V7E3611R <sup>②</sup>	1568.00
30	7½	6¾	5	15	7½	20	(1)-#14 to #8	14	V7E3601	931.00
30-60	7½	6¾	5-15	15-30	7½-15	20-50	(1)-#14 to #4	14	V7E3612	1364.00
60-60	7½	6¾	15	30	15	50	(1)-#14 to #4	14	V7E3622	1364.00
60-60	7½	6¾	15	30	15	50	(1)-#14 to #4	14	V7E3622R <sup>②</sup>	1568.00
60	7½	6¾	15	30	15	30	(1)-#14 to #4	14	V7E3602	931.00
60-100	7½	6¾	15-25	30-60	15-30	50-75	(1)-#10 to #1/0	18	V7E3623	1915.00
100-100	7½	6¾	25	60	30	75	(1)-#10 to #1/0	20	V7E3633	1915.00
100-100	7½	6¾	25	60	30	75	(1)-#10 to #1/0	20	V7E3633R <sup>②</sup>	2057.00
100	7½	6¾	25	60	30	75	(1)-#10 to #1/0	14	V7E3603	931.00
200-200	10	6¾	50	125	60	150	(1)-#6 to 250 kcmil	40	V7F3644J <sup>②</sup>	3192.00
200	10	6¾	50	125	60	150	(1)-#6 to 250 kcmil	21	V7F3604	1736.00
200	10	6¾	50	125	60	150	(1)-#6 to 250 kcmil	21	V7F3604R <sup>②</sup>	1808.00
400	15	10½	100	250	125	350	(1)-#1/0 to 500 kcmil or (2)-#1/0 to 300 kcmil	63	V7H3605	4033.00
400	15	10½	100	250	125	350	(1)-250 to 750 kcmil or (2)-#1/0 to 300 kcmil	63	V7H3605750	4033.00
600	15	10½	150	400	200	500	(2)-#4/0 to 500 kcmil	63	V7H3606	4164.00

### 3-Pole, Main Switch, 17" Wide Units (Vertical Mount, Top Feed, Front Connected)

600V AC, 250V DC

400	18.75	10¾	100	250	125	350	③	—	VMS365T	4033.00
600	18.75	10¾	150	400	200	500	③	—	VMS366T	4164.00

### 3-Pole, Main Switch, 17" Wide Units (Vertical Mount, Bottom Feed, Front Connected)

600V AC, 250V DC

400	18.75	17 <sup>11</sup> / <sub>16</sub>	100	250	125	350	③	—	VMS365B	4033.00
600	18.75	17 <sup>11</sup> / <sub>16</sub>	150	400	200	500	③	—	VMS366B	4164.00

### 3-Pole, Main Switch, 17" Wide Units, Back Connected

600V AC, 250V DC

100	7½	6¾	25	50	30	50	③	14	V7E3603MS <sup>■</sup>	931.00
200	10	6¾	50	125	60	150	③	21	V7F3604MS <sup>■</sup>	1736.00
400	15	10½	100	250	125	350	③	63	V7H3605MS	4033.00
600	15	10½	150	400	200	500	③	63	V7H3606MS	4164.00

### 3-Pole, Switchboard Units, 21" Wide Units, Front Connected<sup>⑤</sup>

600V AC, 250V DC

800	25	12¾	200	500	250	500	—	160	VF357TL or BL <sup>Ⓞ</sup>	9327.00
1200	25	12¾	—	—	—	—	—	160	VF358TL or BL <sup>Ⓞ</sup>	9568.00

### 3-Pole, Switchboard Units, 21" Wide, Back Connected

600V AC, 250V DC

800	25	12¾	200	500	250	500	—	160	VB357TL or BL <sup>■</sup>	8573.00
1200	25	12¾	—	—	—	—	—	160	VB358TL or BL <sup>■</sup>	8993.00

- Built to order. Allow 2-3 weeks for delivery.
- ◆ MR suffix only is available and built to order. Allow 2-3 weeks for delivery.
- BL suffix. Built to order. Allow 2-3 weeks for delivery.
- Ⓞ Catalog number for 2-pole branch circuit units indicate connection designation LM, LR or MR (indicating Left, Middle and Right, facing the panel).

- Ⓞ Unit configured to accept class J fuses only. Also accepts 300V Class T fuses when used with TFAK42 adapter kit.
- ③ Load-side furnished with spade type bolted terminal pads.
- ④ Suffix "T" or "TL" indicates Top Feed. Suffix "B" or "BL" indicates Bottom Feed.
- ⑤ Back connected units are also available. Substitute the letter "B" (back connected) for the letter "F" (front connected) in the prefix of the catalog number. All other features are identical.

- Ⓞ Available as Type MR designation only.
- ② Switches set up for R-fuse applications only.
- Ⓞ Available as Type LR designation only.



# Disconnect Switches

## Type VB Panelboard Units, Accessories

Selection

### Extension Kits

To extend Vacu-Break unit's depth, order the extension kit which meets the specifications of the unit to be extended. Specify by catalog number from the table below.

Unit Type	Unit Height (inches)	Normal Unit Depth (inches)	Extended Unit Depth (inches)	Catalog Number	List Price \$
V2A	2½	4 <sup>9</sup> / <sub>16</sub>	6¾	W43000■	41.50
V2B	5	4 <sup>9</sup> / <sub>16</sub>	6¾	W43002	41.50
V7A	2½	6¾	10½	W48762	114.00
V7B	5	6¾	10½	W48763	121.00
V7E	7½	6¾	10½	W48764	154.00
V7F	10	6¾	10½	W48765	181.00

### Fuse Adapter Kits

Class R and Class J Fuse Kits are single unit part numbers. Order (2) kits for dual units. Class T Fuse Kits are single pole part numbers. Order (3) kits for a 3-pole unit. To order the kit which meets the specifications of the unit to be changed, specify by catalog number from the tables below.

#### 240 Volt Fuse Adapter Kits

Switch Amperage	Class R Kits		Class J Kits		Class T Kits	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
30 <sup>ⓐ</sup>	Factory Inst.	—	—	—	—	—
60	W56628	91.00	W49829	163.00	—	—
100	W55365	61.00	W49827	131.00	TFAK32	76.00
200	W55366	61.00	W49819	131.00	TFAK42	102.00
400	W55367	91.00	W49814	330.00	TFAK52	102.00
600	W55368	91.00	W49813	459.00	TFAK62	120.00

#### 600 Volt Fuse Adapter Kits

Switch Amperage	Class R Kits		Class J Kits		Class T Kits	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
30	W56623	85.00	W49832	163.00	—	—
60	W56629	85.00	W49830	163.00	—	—
100	W55365	61.00	W49828	131.00	TFAK35	120.00
200	W55366 <sup>ⓑ</sup>	61.00	W49818 <sup>ⓑ</sup>	163.00	TFAK45	143.00
400	W55367	91.00	W49816	395.00	TFAK55	151.00
600	W55368	91.00	W49815	330.00	TFAK65	174.00
800	—	—	—	—	TFAK75	238.00

### Vacu-Break Connecting Strap Kits For Panelboards and Switchboards

Ampere Rating	240V Unit Height (inches)	600V Unit Height (inches)	S4/F1, FPP (10" Deep) Strap Kit	List Price \$	S5/F2 (12.75" Deep) Strap Kit	List Price \$	SB1, SB2, SB3, FC-20, FC-1 VB-5, VB-6, Strap Kit	List Price \$
30-30	2.5	—	F602	46.00	F602D	210.00	—	—
30-30	5	7.5	F657	46.00	F657D	254.00	VB657	302.00
30-60	5	7.5	F657	46.00	F657D	254.00	VB657	302.00
60-60	5	7.5	F657	46.00	F657D	254.00	VB657	302.00
60-100	7.5	7.5	F657	46.00	F657D	254.00	VB657	302.00
100-100	7.5	7.5	F657	46.00	F657D	254.00	VB657	302.00
100	7.5	7.5	F657	46.00	F657D	254.00	VB657	302.00
200	7.5, 10	7.5, 10	F671	70.00	F671D	393.00	VB671	471.00
200-200	10	10	F672	430.00	F672D	430.00	—	—
400	15	15	—	—	—	—	VB6150	211.00
600	15	15	—	—	F6150D	186.00	VB6150	211.00

For inches / millimeters conversion, multiply inches by 25.4.

■ Built to order. Allow 2-3 weeks for delivery.

ⓑ For 200 A single units only. Dual units are suitable for Class J only, when used above 240V.

ⓐ 5" unit height switches only.

ⓑ For single units only.

# Disconnect Switches

## Type HCP Switchboard Units, Accessories

Selection

### Features

- UL Listed under file number E6849 Vol 1, Sect. 8
- 400-1200A ratings
- Visible contacts
- Field installable shunt trip and auxiliary switch accessory kits
- Installs in existing Siemens switchboards and power panelboards
- Suitable for use on systems with up to 200,000A available fault current, RMS symmetrical when equipped with Class J or Class L fuses
- Group mounts with other 30A through 600A switches, and 100 through 1200 amp frame breakers
- Allows 800A and 1200A switches in standard 38" wide distribution sections in either main or branch configurations
- 16 1/4" mounting height is the smallest 1200A design in the industry, allowing up to 4 units in one vertical section
- Field reversible horizontal mounting design for left or right hand cabling
- Handle can be padlocked in the OFF position with up to three padlocks with 5/16" hasps. A cover padlocking provision is also supplied



### 3-Pole, Horizontal Mount<sup>①</sup>

Catalog Number	Maximum Ampere Rating	Maximum AC Voltage Rating <sup>②</sup>	Fuse Class	Dimensions (inches*)			Horsepower Rating								List Price \$
							240V		480V		600V		250V DC		
				H	W	D	Std	Max	Std	Max	Std	Max			
HCP367HJ400	400	600	J	16.25	17.22	7.38	50	125	100	250	125	350	40	5117.00	
HCP367HJ600	600	600	J	16.25	17.22	7.38	75	200	150	400	200	400	40	5751.00	
HCP327HT	800	240	T	16.25	17.22	7.38	100	250	—	—	—	—	50	11366.00	
HCP367H	800	600	L	16.25	17.22	7.38	100	250	200	500	250	500	50	10724.00	
HCP328HT	1200	240	T	16.25	17.22	7.38	100	250	—	—	—	—	50	12626.00	
HCP368H	1200	600	L	16.25	17.22	7.38	100	250	200	500	250	500	50	10998.00	

### 3-Pole, Vertical Mount

HCP367VJ400	400	600	J	17.00	16.25	7.38	50	125	100	250	125	350	40	5117.00
HCP367VJ600▲	600	600	J	17.00	16.25	7.38	75	200	150	400	200	400	40	5751.00
HCP327VT	800	240	T	17.00	16.25	7.38	100	250	—	—	—	—	50	11366.00
HCP367V	800	600	L	17.00	16.25	7.38	100	250	200	500	250	500	50	10724.00
HCP328VT	1200	240	T	17.00	16.25	7.38	100	250	—	—	—	—	50	12626.00
HCP368V	1200	600	L	17.00	16.25	7.38	100	250	200	500	250	500	50	10998.00

### Accessories

#### Terminal Connectors (one lug per kit)

Ampere Rating	Catalog Number	Connector Wire Range	List Price \$
400-600A	TA2K500	(2) #1 AWG-500 kcmil (Cu or Al)	71.00
400-600A	TC2K500	(2) #1 AWG-500 kcmil (Cu only)	120.00
400-800A	TA3K500	(3) #1 AWG-500 kcmil (Cu or Al)	98.00
400-800A	TC3K350	(3) #1 AWG-350 kcmil (Cu only)	151.00
800-1200A	TA4H500	(4) #2 AWG-500 kcmil (Cu or Al)	182.00
800-1200A	TA3H750	(3) 250-750 kcmil (Cu or Al)	278.00

#### T Fuse Adapter Kits (one per pole)

Catalog Number	Description	List Price \$
TFAK72	800A, 300V AC	214.00
TFAK75	800A, 600V AC	238.00
TFAK82	1200A, 300V AC	543.00

#### Auxiliary Switch Kits

Contact Ampere Rating	Maximum Voltage		Switch Mounting	Contacts	Catalog Number	List Price \$
	AC	DC				
15A	480	125	Left Pole	1NO/1NC	A01HCPL4▲	361.00
15A	480	125	Right Pole	1NO/1NC	A01HCPR4	361.00

#### Compression Lug Adapter Kit

The use of this kit provides for the mounting of up to four lugs per phase. Each kit accepts lugs with (2) 3/8" diameter mounting holes on 1" centers. One kit per pole line or load is required. Lugs are not provided.

Ampere Rating	Catalog Number	List Price \$
400-1200A	HCPCLP	274.00

#### Shunt Trip Kit

Control Voltage		Catalog Number	List Price \$
AC	DC		
120	—	HCPST120	798.00
240	—	HCPST240▲	798.00
277	—	HCPST277	798.00
480	—	HCPST480▲	798.00
—	48	HCPST48▲	798.00
—	125	HCPST125▲	798.00

#### Switchboard Connection Strap Kit<sup>①</sup>

Switch Ampere Rating	Catalog Number	List Price \$
400-1200A	F6162D	1366.00

\*For inches / millimeters conversion, multiply inches by 25.4.

▲ Built to order. Allow 6-8 weeks for delivery.

① For horizontal mounting only in either 38" wide min switchboards or S5/F2 power panelboards.

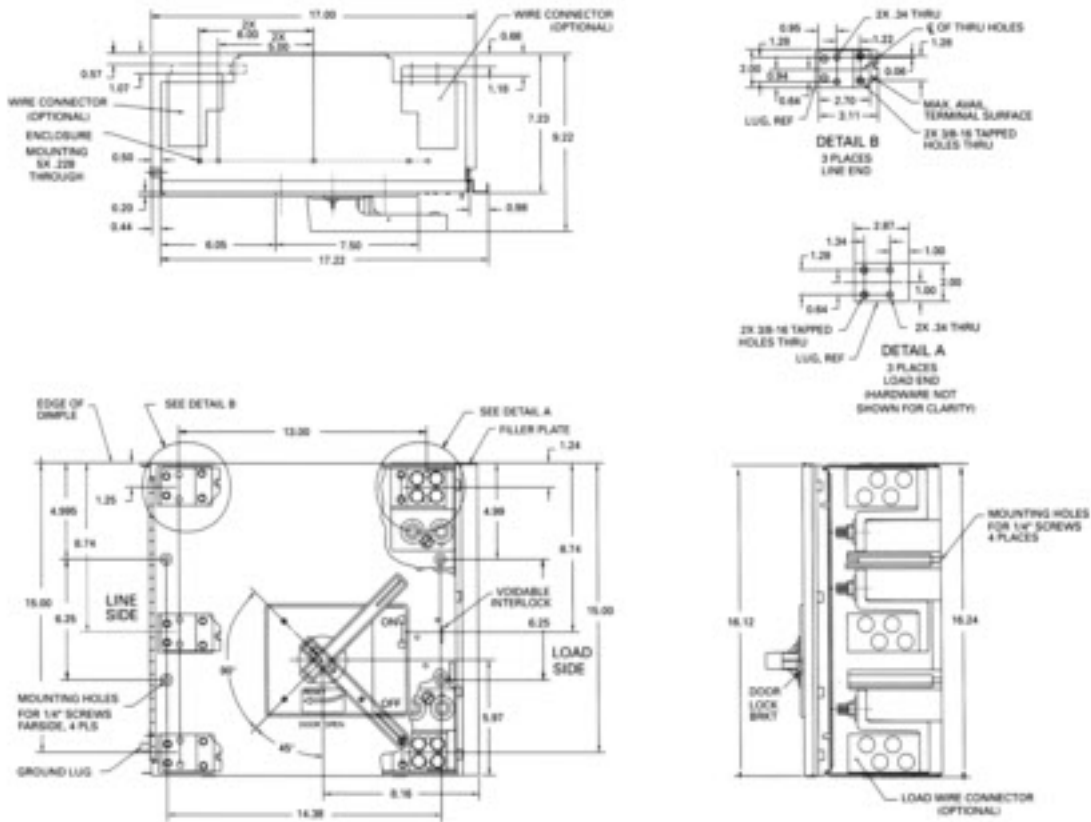
© Both 240 and 600V AC switches are also rated 250V DC max.

# Disconnect Switches

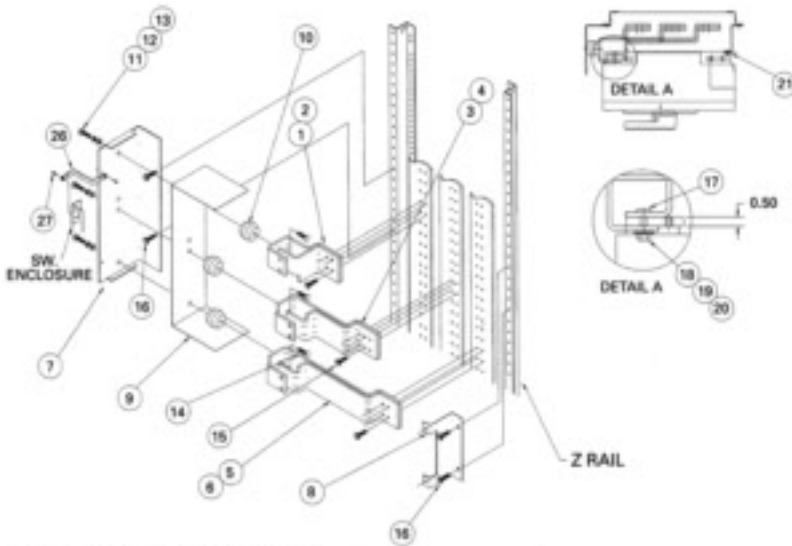
## Type HCP Switchboard Units

Dimensions

### Horizontal Mount Drawing



### Group Mounting Assembly (Horizontal Mount Only)



Note: Right exit shown, rotate 180° for left exit  
 Note: Items 26 & 27 are used to ground the switch enclosure (Route bonding wire along flange)

Item	Parts Supplied in Connection Strap Kit Cat. No. F6162D	Qty.
1-2	A/C Ø Strap (Short)	1ea.
3-4	B Ø Strap	1ea.
5-6	A/C Ø Strap (Long)	1ea.
7-8	Switch Mounting Bracket	1ea.
9	Insulation	1
10	1-3/8" Insulator	3
11	3/8-16 X 3/4" HHMS	3
12	3/8" Lock Washer	3
13	3/8" Flat Washer	3
14	3/8-16 X 3/4" RHNSB	3
15	Strap Bus Hardware Kit	2
16	1/4-28 X 3/8" SHWHSW	4
17	5/16-18 Insert	6
18	5/16-18 X 1" SRHMS	6
19	5/16 Flat Washer	6
20	5/16 Lock Washer	6
21	1/4-20 X 1" SRHMS	2
26	Ground Bracket	1
27	10-32 X 1/4" SHWHSW	2

# Disconnect Switches

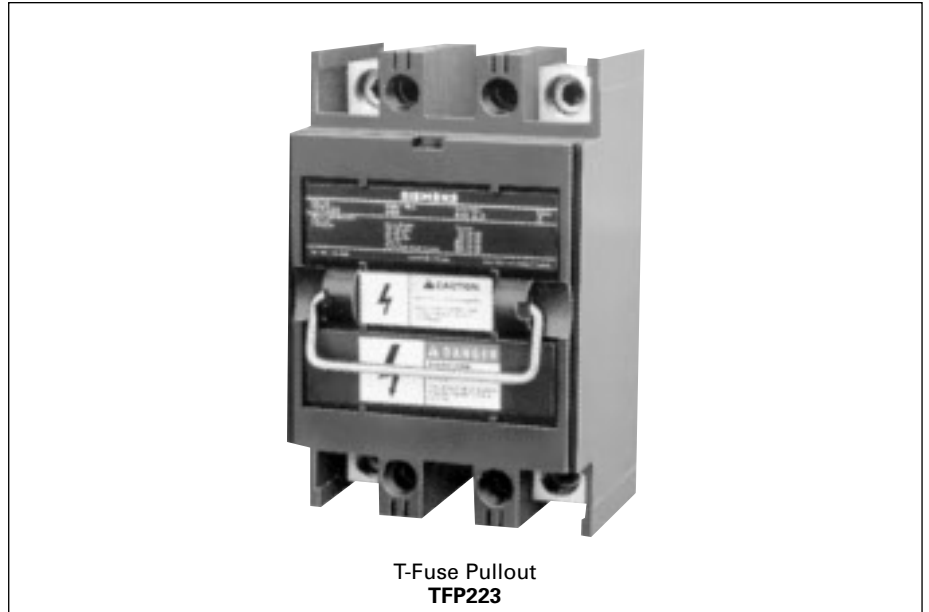
## Type TFP Fusible Pullouts

## Selection/Dimensions

### Features

#### Type TFP Fusible Pullouts

- 100 and 200 Ampere Disconnects
- 240 Volt and 600 Volt Designs
- Class T Fuses
- Factory Installed Wire Connectors
- U.L. Listed for applications up to 200,000 Amps symmetrical at 600 Volts
- Physically interchangeable with Siemens Type QJ2, QJH2 and QJ2-H
- UL 1429, File No. E118778



T-Fuse Pullout  
TFP223

### T-Fuse Pullouts

#### 2-Pole, 2-Fuse

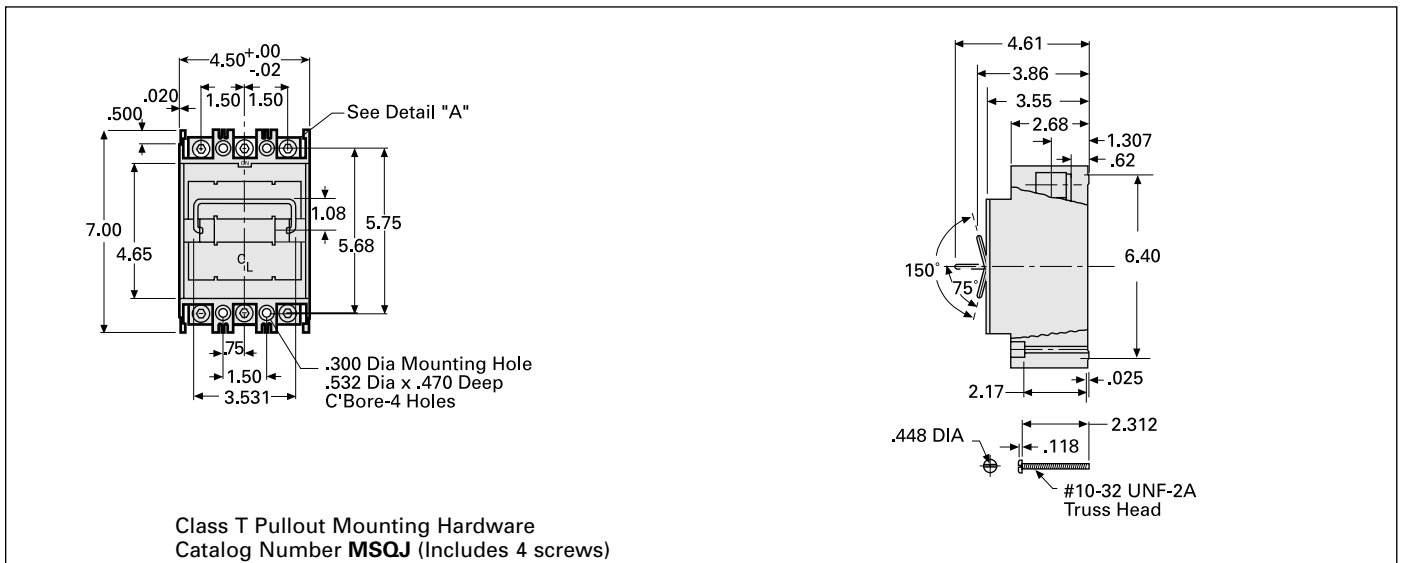
Maximum Voltage	Ampere Rating	Catalog Number	Connector Wire Range <sup>①</sup>	List Price \$
240 <sup>②</sup>	100	TFP223	(1 pc.) #6-300 kcmil Cu	540.00
	200	TFP224	(1 pc.) #4-300 kcmil Al	726.00

#### 3-Pole, 3-Fuse

240 <sup>②</sup>	100	TFP323	(1 pc.) #6-300 kcmil Cu (1 pc.) #4-300 kcmil Al	652.00
	200	TFP324		873.00
600	100	TFP363	(1 pc.) #4-300 kcmil Al	807.00
	200	TFP364		1103.00

**Fuses** — Not included. Consult local sales office for replacement parts.

### Fusible Pullouts Dimensions (inches\*)



\*For inches / millimeters conversion, multiply inches by 25.4.

<sup>①</sup> Replacement terminal lug Catalog Number **TA1Q300**.

<sup>②</sup> 240 bolt pullouts require 300 volt Class T fuses.

## Contents

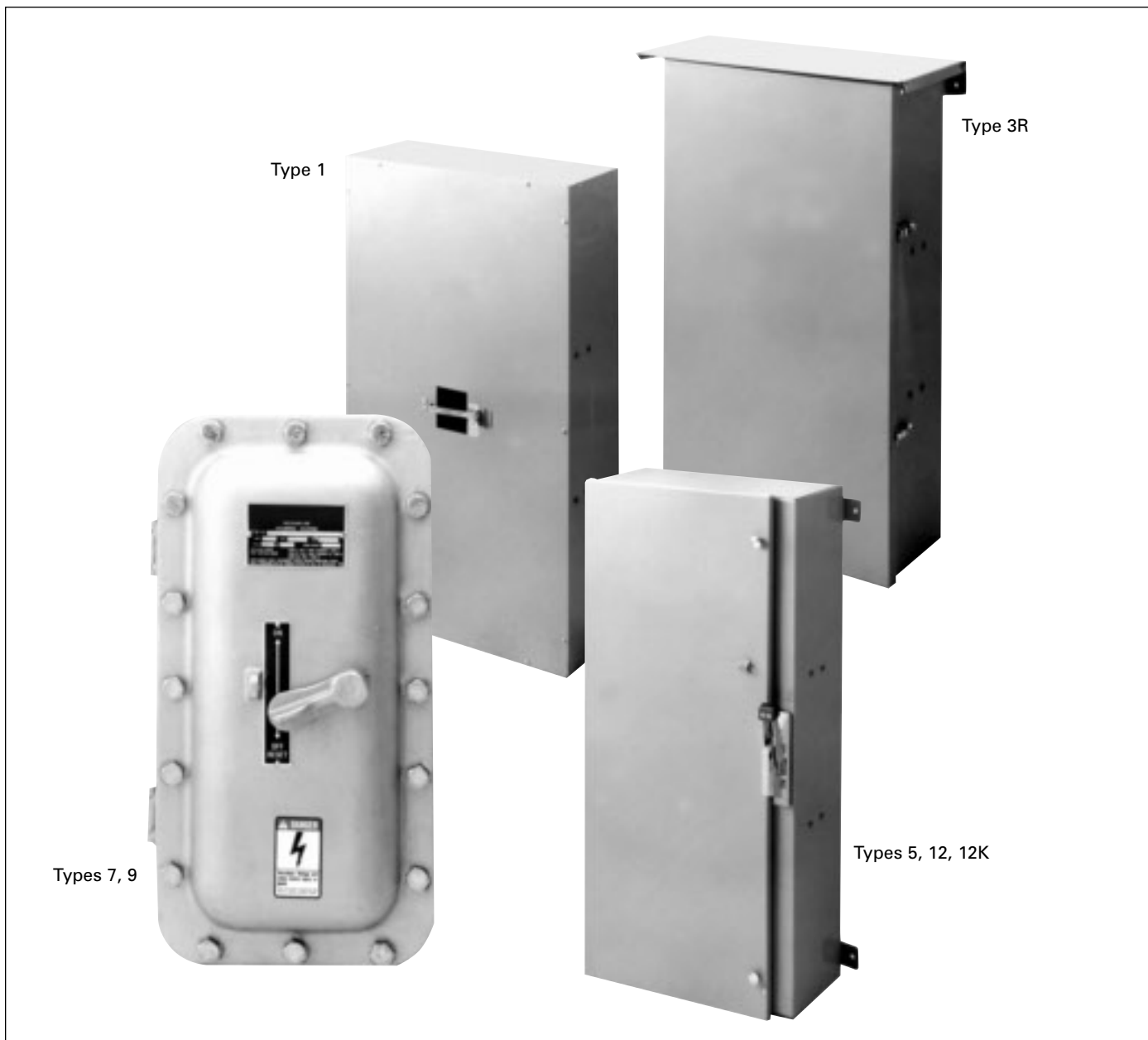
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# Enclosed Circuit Breakers

## Enclosure Types

General



Type 1

Type 3R

Types 7, 9

Types 5, 12, 12K

**Type 1** — A general indoor, sheet-steel enclosure for use in normal atmospheres. Listed as service entrance equipment.

**Type 3R** — An outdoor, sheet-steel enclosure providing protection against driving rain, sleet or snow. Listed as service entrance equipment.

**Types 7, 9** — Cast aluminum enclosure classified for explosion and fire hazard.

Only enclosure for use in hazardous location. Class I; Group D–Class II; Groups E, F, and G–Class III.

**Types 4, 4X (not shown)** — Stainless steel indoor or outdoor enclosure designed for use in areas where serious corrosion problems exist. They provide a degree of protection against windblown dust, rain, splashing water and hose-directed water. Meets NEMA Type 3, 4,

4X, 12 and 13 requirements and UL 508 Type 4 and 4X requirements.

**Types 5, 12** — A special-industry, sheet-steel enclosure for use in atmospheres containing particles of lint, dust, dirt, sawdust and other foreign matter.

**Type 12K** — A semi-dusttight sheet-steel enclosure. Listed as service entrance equipment.

# Enclosed Circuit Breakers

## Complete Assemblies—Molded Case Circuit Breakers

## Selection

Siemens Enclosed Circuit Breaker Complete Assemblies consist of a thermal magnetic molded case circuit breaker frame, trip unit, enclosure and standard line and load pressure wire connectors — assembled and shipped as one unit from the Siemens modification center. For service equipment or applications

requiring a solid neutral, neutrals must be priced and ordered separately except as noted.

To order, select the appropriate prefix from the table below and place it in front of the desired non-interchangeable trip or interchangeable trip circuit breaker catalog

number. For circuit breaker selection, refer to pages 6-20 thru 6-124.

**Note: Lead times are determined based on availability of components. Items marked with ■ or ▲ in this section may contain components that are not normally stocked.**

### Catalog Numbering

Prefix	Enclosure Type	Example:	Catalog number E1SJD63B400 consists of:
E1S	Type 1 Surface		(1) JD63F400 frame
E1F	Type 1 Flush		(1) JD63T400 trip unit
E3R	Type 3R		(1) J6N1 enclosure
E12	Type 12		(6) TA2J6500 wire connectors
E4X	Type 4X Stainless Steel		

### Selection And Pricing By Enclosure Type

Circuit Breaker			List Price \$ — Complete Assembly				Lug Catalog Number (included)	Neutrals	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface or Flush	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$
QJ2	2	60-225	648.00	840.00	NA	NA	TA1Q300	Included with enclosure	
	3	60-225	1332.00	1565.00	NA	NA			
QJH2	2	60-225	1236.00	1428.00	NA	NA	TA1Q300		
	3	60-225	1774.00	2007.00	NA	NA			
QJ2-H	2	60-225	1481.00	1673.00	NA	NA	TA1Q300		
	3	60-225	2190.00	2423.00	NA	NA			
ED2	2	15-60	437.00	698.00	542.00	3129.00	15-25A SA1E025 30-60A Line LN1E100 Load LD1E060 70-100 LN1E100 110-125A TA1E6125	Catalog Number <b>W53045</b> included with enclosure	
	2	70-100	619.00	880.00	724.00	3311.00			
	3	15-60	577.00	838.00	682.00	3269.00			
	3	70-100	762.00	1023.00	867.00	3454.00			
ED4	2	15-60	670.00	931.00	775.00	3362.00			
	2	70-100	835.00	1096.00	940.00	3527.00			
	2	110-125	1657.00	2111.00	1835.00	4227.00			
	3	15-60	833.00	1094.00	938.00	3525.00			
	3	70-100	953.00	1214.00	1058.00	3645.00			
ED6	3	110-125	1865.00	2319.00	2043.00	4435.00			
	2	15-60	762.00	1023.00	867.00	3454.00			
	2	70-100	922.00	1183.00	1027.00	3614.00			
	3	15-60	927.00	1188.00	1032.00	3619.00			
	3	70-100	1122.00	1383.00	1227.00	3814.00			
	3	110-125	2143.00	2597.00	2321.00	4713.00			

# Enclosed Circuit Breakers

## Complete Assemblies—Molded Case Circuit Breakers

**Selection**

Selection And Pricing By Enclosure Type

Circuit Breaker			List Price \$ — Complete Assembly				Lug Catalog Number (included)	Neutrals	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface or Flush	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$
HED4	2	15-60	1078.00	1339.00	1183.00	3770.00	Refer to page 6-81	Catalog Number W53045 included with enclosure	
	2	70-100	1219.00	1480.00	1324.00	3911.00			
	2■	110-125	2447.00	2901.00	2625.00	5017.00			
	3	15-60	1289.00	1550.00	1394.00	3981.00			
	3	70-100	1376.00	1637.00	1481.00	4068.00			
	3	110-125	2781.00	3235.00	2959.00	5351.00			
CED6	2■	15-100	3027.00	3481.00	3205.00	NA	Refer to page 6-81		
	2■	110-125	4406.00	4860.00	4584.00	NA			
	3	15-100	3471.00	3925.00	3649.00	NA			
	3■	110-125	5156.00	5610.00	5334.00	NA			

**5**  
ENCLOSED  
CIRCUIT BREAKERS

Circuit Breaker			List Price \$ — Complete Assembly				Number (included)	Neutrals (not included)	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface or Flush	Type 3R	Type 12	Type 4, 4X		Lug Catalog Number	List Price \$
FXD6, FD6	2■	70-225 250	2081.00 3343.00	2503.00 3765.00	2307.00 3569.00	6617.00 7879.00	TA1FD350A	N250 <sup>②</sup>	143.00
	3	70-225 250	2599.00 3898.00	3021.00 4320.00	2825.00 4124.00	7135.00 8434.00			
HFD6	2■	70-225 250	4341.00 5603.00	4763.00 6025.00	4567.00 5829.00	8877.00 10139.00			
	3■	70-225 250	5242.00 6537.00	5660.00 6959.00	5464.00 6763.00	9774.00 11073.00			
CFD6	3■	70-225 250	6663.00 7369.00	7085.00 7791.00	6889.00 7595.00	NA NA			
JXD2	2■	200-400	2930.00	4065.00	3397.00	9618.00			
	3	200-400	3541.00	4676.00	4008.00	10229.00			
JXD6, JD6	2■	200-400	3568.00	4703.00	4035.00	10256.00			
	3	200-400	4211.00	5346.00	4678.00	10899.00			
HJD6	2■	200-400	5684.00	6819.00	6151.00	12372.00			
	3	200-400	6796.00	7931.00	7263.00	13484.00			
HHJD6	2■	200-400	6781.00	7916.00	7248.00	13469.00			
	3■	200-400	8099.00	9234.00	8566.00	14787.00			
CJD6	3■	200-400	8805.00	9974.00	9335.00	NA			

■ Built to order. Allow 2-3 weeks for delivery.  
CSO - Consult Sales Office for pricing

① Order catalog number W60993 neutral for type 4, 4X enclosure or when a 200% neutral is required.

② For 200% neutral order catalog number N2250 (List price \$258.00)



# Enclosed Circuit Breakers

## Complete Assemblies—Molded Case Circuit Breakers

**Selection**

Selection And Pricing By Enclosure Type

Circuit Breaker			List Price \$ — Complete Assembly				Lug Catalog Number (included)	Neutrals				
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$			
LXD6, LD6	2■	450-600	5469.00	6638.00	5999.00	11966.00	TA2J6500	W60993 <sup>①</sup>	436.00			
	3	450-600	6740.00	7909.00	7270.00	13237.00						
HLD6, HLXD6	2■	250-600	7012.00	8181.00	7542.00	13509.00						
	3	250-600	8798.00	9967.00	9328.00	15295.00						
HHLXD6 <sup>③</sup> , HHL6	2■	450-600	8863.00	9802.00	9163.00	15130.00						
	3■	450-600	10363.00	11532.00	10893.00	16860.00						
CLD6	3■	450-600	13683.00	14852.00	14213.00	NA						
LMXD6, LMD6	2■	500-800	CSO	CSO	CSO	NA				TA3K500	W63623 <sup>②</sup>	606.00
	3■	500-800	CSO	CSO	CSO	NA						
HLMXD6 <sup>③</sup> , HLMD6	2■	500-800	CSO	CSO	CSO	NA						
	3■	500-800	CSO	CSO	CSO	NA						
MXD6, MD6	2■	500-800	7436.00	8741.00	9422.00	NA						
	3■	500-800	9245.00	10550.00	11231.00	NA						
HMXD6 <sup>③</sup> , HMD6	2■	500-800	8707.00	10012.00	10693.00	NA						
	3■	500-800	10909.00	12214.00	12895.00	NA						
CMD6	3■	500-800	15431.00	16736.00	17417.00	NA						

■ Built to order. Allow 2-3 weeks for delivery.

CSO – Consult Sales Office for pricing

① For 200% neutral in Type 1, 3R & 12 enclosures use neutral catalog number **W63623**.

② For applications requiring 600MCM neutral conductors (max. 3 in & 3 out) use neutral catalog number **W411239** (List price **\$667.00**).

③ HHLXD6, HLMXD6 and HMXD6 are only available with 3-pole breakers.

# Enclosed Circuit Breakers

## Complete Assemblies—Molded Case Circuit Breakers

Selection

Selection And Pricing By Enclosure Type

Circuit Breaker			List Price \$ — Complete Assembly				Lug Catalog Number (included)	Neutrals	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$
NXD6	2■	900-1200	CSO	CSO	CSO	NA	TA3K500 for 800A 2TA4N8500 for 900-1200A 2-Pole 3TA4N8500 for 900-1200A 3-Pole	W63623 <sup>®</sup>	606.00
	3	900-1200	CSO	CSO	CSO	NA			
ND6	2■	800	CSO	CSO	CSO	NA			
	2■	900-1200	CSO	CSO	CSO	NA			
	3	800	CSO	CSO	CSO	NA			
	3	900-1200	CSO	CSO	CSO	NA			
HNXD6	3	900-1200	CSO	CSO	CSO	NA			
	2■	800	CSO	CSO	CSO	NA			
HND6	2■	900-1200	CSO	CSO	CSO	NA			
	3	800	CSO	CSO	CSO	NA			
	3	900-1200	CSO	CSO	CSO	NA			
CND6	3■	900-1200	CSO	CSO	CSO	NA			
PXD6 <sup>①</sup>	3■	1200-1600	CSO	CSO	NA	NA	TA5P600	N2000	1056.00
PD6 <sup>①</sup>	3■	1200-1600	CSO	CSO	NA	NA	TA5P600		
HPXD6 <sup>①</sup>	3■	1200-1600	CSO	CSO	NA	NA	TA5P600		
HPD6 <sup>①</sup>	3■	1200-1600	CSO	CSO	NA	NA	TA5P600		
CPD6 <sup>①</sup>	3■	1200-1600	CSO	CSO	NA	NA	TA5P600		
RXD6 <sup>①</sup>	3	1600-2000	CSO	CSO	NA	NA	TC5R600		
RD6 <sup>①</sup>	3■	1600-2000	CSO	CSO	NA	NA	TC5R600		
HRXD6 <sup>①</sup>	3■	1600-2000	CSO	CSO	NA	NA	TC5R600		
HRD6 <sup>①</sup>	3■	1600-2000	CSO	CSO	NA	NA	TC5R600		

### Special Application Complete Enclosures with Ground Fault Protection

The following assemblies are suitable for use as service entrance devices on services which require ground fault protection.

Selection And Pricing By Enclosure Type

Breaker Type	Ampere Rating	Catalog Number	List Price \$	Catalog Number	List Price \$	Circuit Breaker Installed	Terminal Connector Installed	Neutral Installed	Neutral Sensor Installed
SND6 w/ground fault■	1000A	E1SSND69100GN	18904.00	E3RSND69100GN	20209.00	SND69100AG	3TA4N8500	W63623	N10SNDA
	1200A	E1SSND69120GN	18904.00	E3RSND69120GN	20209.00	SND69120AG	3TA4N8500	W63623	N12SNDA
SHND6 w/ground fault■	1000A	E1SSHND69100GN	20365.00	E3RSHND69100GN	21670.00	SHND69100AG	3TA4N8500	W63623	N10SNDA
	1200A	E1SSHND69120GN	20365.00	E3RSHND69120GN	21670.00	SHND69120AG	3TA4N8500	W63623	N12SNDA

■ Built to order. Allow 2-3 weeks for delivery.  
CSO – Consult Sales Office for pricing

① Not assembled — components shipped separately.  
Includes connect-all mounting assembly  
Catalog Number MB9301.

② For applications requiring 600MCM neutral conductors (max. 3 in & 3 out) use neutral catalog number W411239 (List price \$667.00).

# Enclosed Circuit Breakers

## Complete Assemblies—Molded Case Circuit Switches

**Selection**

Selection And Pricing By Enclosure Type

Molded Case Switch			Enclosure Type — List Price \$				Lug Catalog Number (included)	Neutrals	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface or Flush	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$
QJ2	2■	225	648.00	840.00	NA	NA	TA1Q300	Included with enclosure	
	3	225	1332.00	1565.00	NA	NA			
ED2	2■	100	619.00	880.00	724.00	3311.00	Refer to page 6-81	Catalog Number W53045 included with enclosure	
	3	100	762.00	1023.00	867.00	3454.00			
ED4	2■	100 125	835.00 1657.00	1096.00 2111.00	940.00 1835.00	3527.00 4227.00	Refer to page 6-81		
	3	100 125	953.00 1865.00	1214.00 2319.00	1058.00 2073.00	3645.00 4435.00			
ED6	2■	100 125	847.00 NA	1183.00 NA	1027.00 NA	3614.00 NA	Refer to page 6-81		
	3	100 125	1122.00 2143.00	1383.00 2597.00	1227.00 2321.00	3814.00 4713.00			
CED6	2■	100 125	3027.00 4406.00	3481.00 4860.00	3205.00 4584.00	NA NA	Refer to page 6-81		
	3■	100 125	3471.00 5156.00	3925.00 5610.00	3649.00 5334.00	NA NA			

Molded Case Switch			Enclosure Type — List Price \$					Lug Catalog Number (included)	Neutrals (not included)	
Breaker Frame	Number of Poles	Ampere Rating	Type 1 Surface	Type 1 Flush	Type 3R	Type 12	Type 4, 4X		Catalog Number	List Price \$
FXD6	2	250	3343.00	3343.00	3765.00	3569.00	7879.00	TA1FD350A	N250 <sup>®</sup>	143.00
	3	250	3898.00	3898.00	4320.00	4124.00	8434.00			
CFD6	3■	250	7369.00	7369.00	7791.00	7595.00	NA			
JXD2	2■	400	2930.00	NA	4065.00	3397.00	9618.00	TA2J6500	W60992 <sup>®</sup>	492.00
	3	400	3541.00	NA	4676.00	4008.00	10229.00			
JXD6	3	400	4211.00	NA	5346.00	4678.00	10899.00	TA2J6500	W60992 <sup>®</sup>	492.00
CJD6	3■	400	8805.00	NA	9974.00	9335.00	NA	TA2J6500	W60992 <sup>®</sup>	492.00
LXD6	3	600	6740.00	NA	7909.00	7270.00	13237.00	TA2J6500	W60993 <sup>®</sup>	436.00
CLD6	3■	600	13683.00	NA	14852.00	14213.00	NA	TA2J6500	W60993 <sup>®</sup>	436.00
MXD6	3	800	9245.00	NA	10550.00	11231.00	NA	TA3K500	W63623 <sup>®</sup>	606.00
CMD6	3■	800	CSO	NA	NA	CSO	NA			
NXD6	3	1200	CSO	NA	NA	CSO	NA	3TA4N8500	W63623 <sup>®</sup>	606.00
CND6	3■	1200	CSO	NA	NA	CSO	NA			
PXD6 <sup>①</sup>	3■	1600	CSO	NA	NA	NA	NA	TA5P500	N2000	1056.00
RXD6 <sup>①</sup>	3■	2000	CSO	NA	NA	NA	NA	TC5R600	N2000	1056.00

■ Built to order. Allow 2–3 weeks for delivery.  
CSO – Consult Sales Office for pricing  
① Not assembled — components shipped separately.  
Includes connect-all mounting assembly Catalog Number MB9301.

② Order Catalog Number W60993 neutral for Type 4, 4X enclosure or when a 200% neutral is required.  
③ For 200% neutral order catalog number N2250 (List price \$258.00)  
④ For 200% neutral in Type 1, 3R & 12 enclosures use neutral catalog number W63623.

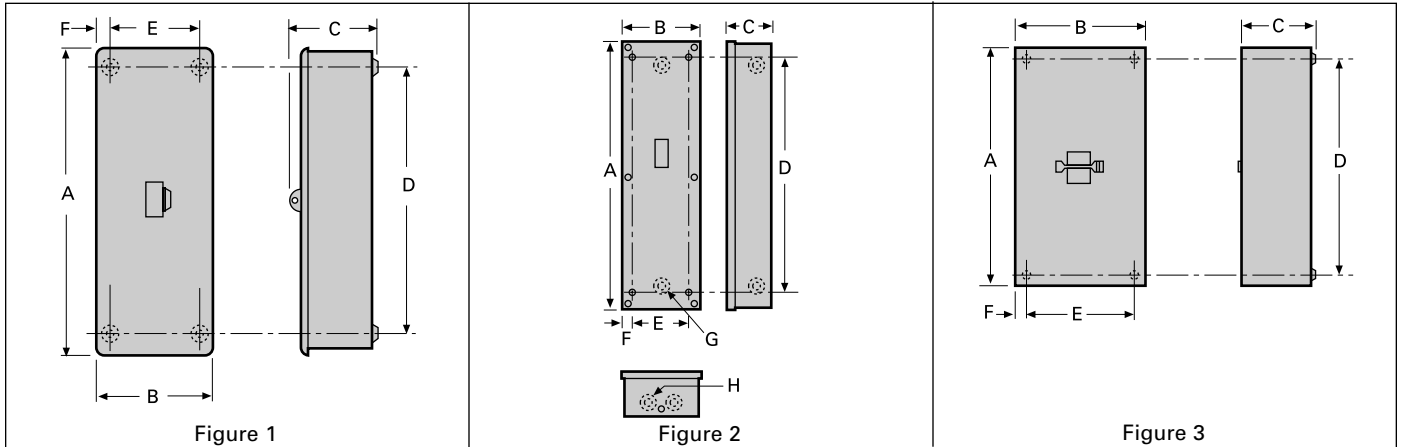
⑤ For applications requiring 600 MCM neutral conductors (Max. 3 in and 3 out) use neutral catalog number W41239 (List price \$667.00).

# Enclosed Circuit Breakers

## Enclosures — Type 1

Selection

### Dimensions



### Type 1

Fig. No.	Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>③</sup>	Weight Lb./Ship. Package	Dimensions (inches)						K.O. Dimensions	
							A	B	C	D	E	F	G	H
1	QP, QPH, HQP	1-2	60	E0204ML1060S <sup>①⑤⑥</sup>	76.00 <sup>②</sup>	16	7 <sup>7</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>16</sub>	—	—
1	QP, QPH, HQP	3	100	E0303ML3100S <sup>①⑤⑥</sup>	189.00	8	17 <sup>17</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	4 <sup>4</sup> / <sub>8</sub>	14 <sup>14</sup> / <sub>8</sub>	4 <sup>4</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>	—	—
1	BQ, BQH, HBQ	3	100	EB3100S <sup>⑤⑥</sup>	189.00 <sup>②</sup>	32	17 <sup>17</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	4 <sup>4</sup> / <sub>8</sub>	14 <sup>14</sup> / <sub>8</sub>	4 <sup>4</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>	—	—
	NGG	2-3	125	GG0121FN/SN	139.00									
2	ED2, ED4, ED6, HED4	2-3	100	E2N1S <sup>⑤⑥</sup> E2N1F <sup>⑤⑥</sup>	149.00 149.00	8 8	16 <sup>23</sup> / <sub>32</sub> 17 <sup>17</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>2</sub> 8 <sup>8</sup> / <sub>2</sub>	5 <sup>5</sup> / <sub>16</sub> 5 <sup>5</sup> / <sub>16</sub>	13 <sup>45</sup> / <sub>64</sub> 13 <sup>45</sup> / <sub>64</sub>	5 <sup>5</sup> / <sub>2</sub> 5 <sup>5</sup> / <sub>2</sub>	1 1	7 <sup>7</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub> , 1 <sup>1</sup> / <sub>8</sub>
2	ED4, ED6, HED4, CED6	2-3	125	CED6N1S <sup>⑤⑥⑦⑧</sup> CED6N1F <sup>⑤⑥⑦⑧</sup>	271.00 271.00	14 14	21 <sup>15</sup> / <sub>32</sub> 22 <sup>22</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>32</sub> 8 <sup>8</sup> / <sub>2</sub>	5 <sup>5</sup> / <sub>64</sub> 5 <sup>5</sup> / <sub>64</sub>	18 <sup>18</sup> / <sub>8</sub> 18 <sup>18</sup> / <sub>8</sub>	5 <sup>5</sup> / <sub>2</sub> 5 <sup>5</sup> / <sub>2</sub>	1 1	1 <sup>1</sup> / <sub>2</sub> , 2 1 <sup>1</sup> / <sub>2</sub> , 2	1 <sup>1</sup> / <sub>2</sub> , 2
2	FXD6, FD6, FXD6, FD6, HFD6, HFXD6, HHFD6, CFD6	2-3	250	F6N1S <sup>④</sup> F6N1F <sup>④</sup>	184.00 184.00	33	38 <sup>13</sup> / <sub>32</sub>	11 <sup>15</sup> / <sub>32</sub>	5 <sup>5</sup> / <sub>16</sub>	33	8	1 <sup>33</sup> / <sub>64</sub>	1 <sup>1</sup> / <sub>2</sub> , 1 <sup>1</sup> / <sub>2</sub> , 1 <sup>1</sup> / <sub>2</sub> , 2, 2 <sup>1</sup> / <sub>2</sub> , 3	1 <sup>1</sup> / <sub>2</sub> , 1 <sup>1</sup> / <sub>2</sub> , 1 <sup>1</sup> / <sub>2</sub> , 20, 2 <sup>1</sup> / <sub>2</sub> , 3
3	JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6	2-3	400	J6N1 <sup>④</sup>	258.00	120	41 <sup>41</sup> / <sub>16</sub>	22 <sup>27</sup> / <sub>64</sub>	10 <sup>45</sup> / <sub>64</sub>	37	18 <sup>18</sup> / <sub>4</sub>	2 <sup>2</sup> / <sub>64</sub>	—	—
3	LD6, LXD6, HLD6, HLXD6, HHL6, HHLXD6, SLD6, SHLD6, SCJD6, SCLD6, CJD6, CLD6	2-3	600	LD6N1 <sup>④</sup>	449.00	101	46	22 <sup>27</sup> / <sub>64</sub>	10 <sup>45</sup> / <sub>64</sub>	42	18 <sup>18</sup> / <sub>4</sub>	2 <sup>2</sup> / <sub>64</sub>	—	—
3	LMXD6, LMD6, HLMXD6, HLMD6	2-3	800	LMD1 <sup>④</sup>	897.00	202	60	22 <sup>27</sup> / <sub>64</sub>	10	55 <sup>55</sup> / <sub>8</sub>	18 <sup>18</sup> / <sub>4</sub>	2 <sup>2</sup> / <sub>64</sub>	—	—
3	MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, ND6, NXD6, SND6, HND6, HNXD6, SHND6, CMD6, SCMD6, CND6, SCND6	2-3	1200	MND61 <sup>④</sup>	897.00	202	60	22 <sup>27</sup> / <sub>64</sub>	10	55 <sup>55</sup> / <sub>8</sub>	18 <sup>18</sup> / <sub>4</sub>	2 <sup>2</sup> / <sub>64</sub>	—	—
—	PD6, PXD6, HPD6, HPXD6, CPD6, RD6, SPD6, SHPD6, RXD6, HRD6, HRXD6	3	2000	PRD6N1 <sup>■</sup>	6324.00	350	90	32	28	—	—	—	—	—

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.  
CSO - Consult Sales Office for pricing

① Surface mounted, indoor. If flush mounting is required, replace suffix "S" in catalog number with suffix "F". Also, if outdoor model required, use prefix "W" instead of "E".

② Discount Schedule B.

③ Does not include circuit breaker. Order circuit breaker separately.

④ Neutral not included. Order as separate item from table on next page.

⑤ Neutral included in enclosure.

⑥ Surface mounted, indoor. If outdoor model is required, use prefix "W" instead of "E". Not available in flush ("F") model.

⑦ Use for 110-125 ampere ED4, ED6, or HED4 circuit breakers.

⑧ Will not accept breaker with shunt trip.

⑨ Will not accept 2-pole GFP or breaker with shunt trip.

⑩ Includes 100% rated breakers.

⑪ Enclosure will accept shunt trip and other internal accessories except GFP.

# Enclosed Circuit Breakers

## Enclosures — Type 1

Selection

### Dimensions

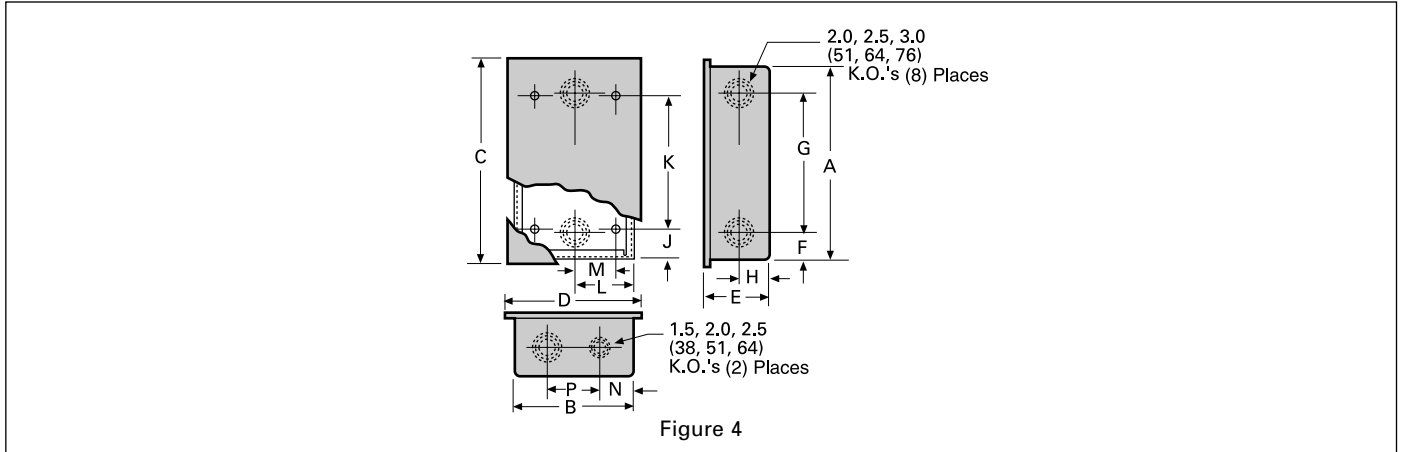


Figure 4

Figure Number	Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>Ⓢ</sup>	Weight Lb./Ship. Package	Dimensions (inches)													
							A	B	C	D	E	F	G	H	J	K	L	M	N	P
4	QJ2, QJH2, QH2-H	2-3	225	EB3225S EB3225F	226.00 <sup>Ⓢ</sup> 226.00 <sup>Ⓢ</sup>	15	27	10 $\frac{1}{8}$	27	10 $\frac{1}{8}$	5 $\frac{1}{4}$	2 $\frac{13}{16}$	21 $\frac{1}{8}$	2 $\frac{3}{8}$	3	20	5 $\frac{1}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	4 $\frac{1}{2}$
							27	10 $\frac{1}{8}$	28 $\frac{1}{8}$	11 $\frac{1}{8}$	5 $\frac{1}{4}$	2 $\frac{13}{16}$	21 $\frac{1}{8}$	2 $\frac{3}{8}$	3	20	5 $\frac{1}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	4 $\frac{1}{2}$

### Neutrals

Neutral Catalog Number	Enclosure Catalog Number	Neutral Cable Capacity and Wire Range	List Price \$
W53045 <sup>Ⓢ</sup>	E2N1(S)(F)	(1 pc.) #14-2 Cu/Al Grd. Lug (1 pc.) #14-8 Cu/Al	186.00
	CED6N1(S)(F) <sup>Ⓢ</sup>		
N250	F6N1(S)(F)	(1 pc.) #6-350 kcmil Cu/Al Grd. Lug (1 pc.) #14-2/0 Cu/Al	143.00
W60992	J6N1	(1 pc.) #1/0-750 kcmil Cu/Al or (2 pcs.) #1/0-300 kcmil Cu/Al Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	492.00
W60993	LD6N1	(2 pcs.) #1/0-600 kcmil Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	436.00
W63623	LMD1	(4 pcs.) 250 kcmil-500 kcmil Cu/Al <sup>Ⓢ</sup> Grd. Lug (1 pc.) #6-300 kcmil Cu/Al	606.00
	MND61		
N2000	PRD6N1	(6 pcs.) #3/0-750 kcmil Cu/Al Grd. Lug (2 pcs.) #3/0-750 Cu/Al	1056.00

### 200% Neutrals (For Type 1, 3R, 4/4X and 12 Enclosures)

Neutral Catalog Number	Enclosure Catalog Number	Neutral Cable Capacity and Wire Range	List Price \$
N2250	F6N1(S)(F) <sup>Ⓢ</sup>	(2 pcs.) #4-350 kcmil Cu/Al Grd. Lug (1 pc.) #14-2/0 Cu/Al	258.00
W60993	J6N1 <sup>Ⓢ</sup>	(2 pcs.) #1/0-600 kcmil Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	436.00
W63623	LD6N1 <sup>Ⓢ</sup>	(4 pcs.) 250 kcmil-500 kcmil Cu/Al Grd. Lug (1 pc.) #6-300 kcmil Cu/Al	606.00

For inches / millimeters conversion, see Application Data section.

CSO - Consult Sales Office for pricing

Ⓢ Surface mounted, indoor. If flush mounting is required, replace suffix "S" in catalog number with suffix "F".

Also, if outdoor model required, use prefix "W" instead of "E".

Ⓢ Discount Schedule B.

Ⓢ Does not include circuit breaker. Order circuit breaker separately.

Ⓢ Neutral not included. Order as separate item from table on next page.

Ⓢ Neutral included in enclosure.

Ⓢ Surface mounted, indoor. If outdoor model is required, use prefix "W" instead of "E". Not available in flush ("F") model.

Ⓢ Use for 110-125 ampere ED4, ED6, or HED4 circuit breakers.

Ⓢ Will not accept breaker with shunt trip.

Ⓢ Also for use with Type 3R, 12, 12K & 4X enclosures (Catalog numbers F6N3R, F6N12, F6N12K & FD6SS4).

Ⓢ Also for use with Type 3R, 12 & 4X enclosures (Catalog numbers J6N3R, J6N12, & LD6SS4).

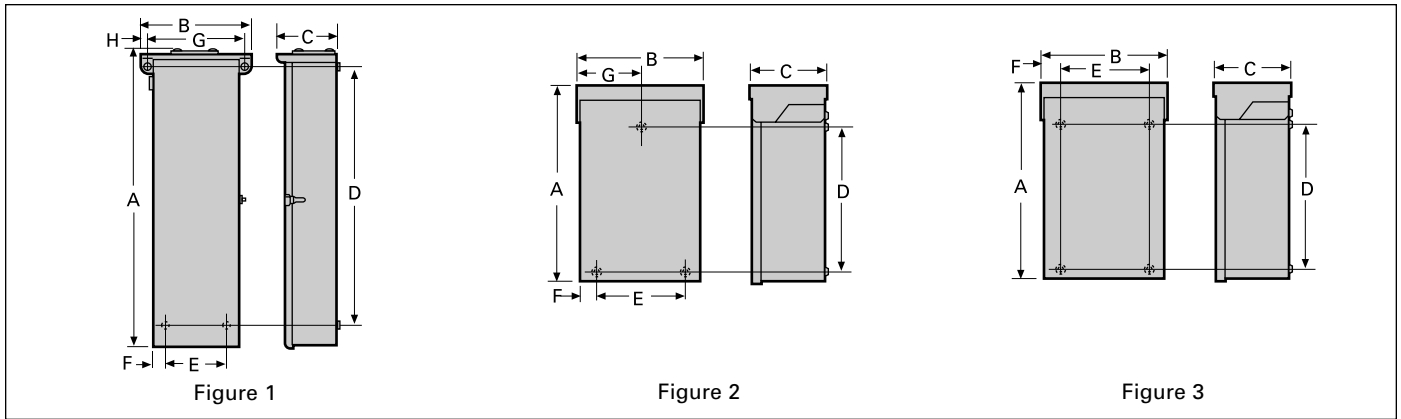
Ⓢ Also for use with Types 3R and 12 enclosures (Catalog numbers LD6N3R & LD6N12).

Ⓢ For 600 MCM neutral cable (3) in, (3) out (#4-600 kcmil Cu/Al) use catalog number W411239 (List price \$667.00)

# Enclosed Circuit Breakers

## Enclosures — Type 3R

Selection



### Type 3R

Figure Number	Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>①</sup>	Weight Lb./Ship. Package	Dimensions (inches)							
							A	B	C	D	E	F	G	H
2	QP, QPH	1-2	60	W0204ML1060 <sup>②</sup>	141.00 <sup>①</sup>	28	8 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	—	—	—	—	—
2	QPP, QPPH, HQPP	1-4	225	W0406ML1225CU <sup>②</sup>	396.00 <sup>①</sup>	24	23 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>8</sub>	20	7 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	—
2	QP, QPH, HQP	3	100	W0303ML3100 <sup>②</sup>	249.00 <sup>①</sup>	9	17 <sup>1</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>8</sub>	—
2	BQ, BQH, HBQ	3 3	50 100	WB3100 <sup>②</sup>	249.00 <sup>①</sup>	9	17 <sup>1</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>8</sub>	—
	NGG	2-3	125	GG0123RN	377.00									
5	ED2, ED4, ED6, HED4, HED6	2-3	100	E2N3R <sup>②</sup>	410.00	12	17 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	12 <sup>39</sup> / <sub>64</sub>	5 <sup>1</sup> / <sub>2</sub>	1	3	—
5	CED6	2-3	125	CE6N3R <sup>②</sup>	725.00	16	22 <sup>1</sup> / <sub>64</sub>	7 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	17 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	1	3	—
1	FXD6, FD6, FXD6, FD6, HFD6, HFXD6, HFD6, CFD6	2-3	250	F6N3R <sup>②</sup>	606.00	45	38 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	33 <sup>1</sup> / <sub>32</sub>	8	1 <sup>9</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>
1	JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6	2-3	400	J6N3R <sup>②</sup>	1393.00	126	40 <sup>63</sup> / <sub>64</sub>	26 <sup>3</sup> / <sub>8</sub>	11 <sup>23</sup> / <sub>32</sub>	35 <sup>1</sup> / <sub>4</sub>	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	24 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>
1	LD6, LXD6, LXD6H, HLD6, HLXD6, HHLXD6, CJD6, CLD6, SCJD6, SLD6, SHLD6	2-3	600	LD6N3R <sup>②</sup>	1618.00	137	45 <sup>63</sup> / <sub>64</sub>	26 <sup>3</sup> / <sub>8</sub>	11 <sup>23</sup> / <sub>32</sub>	40 <sup>1</sup> / <sub>4</sub>	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	24 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>
4	LMXD6, LMD6, HLMXD6, HLM6	2-3	800	LMD3R <sup>②</sup>	2202.00	210	61 <sup>1</sup> / <sub>64</sub>	26 <sup>3</sup> / <sub>8</sub>	11 <sup>23</sup> / <sub>32</sub>	57 <sup>1</sup> / <sub>32</sub>	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	24 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>
1	MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, ND6, NXD6, SND6, HND6, HNXD6, SHND6, CMD6, SCMD6, CND6, SCND6	2-3	1200	MND63 <sup>②</sup>	2202.00	210	61 <sup>1</sup> / <sub>64</sub>	26 <sup>3</sup> / <sub>8</sub>	11 <sup>23</sup> / <sub>32</sub>	57 <sup>1</sup> / <sub>32</sub>	18 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	24 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>

For inches / millimeters conversion, see Application Data section.

① Discount Schedule B.

② Does not include circuit breaker.

Order circuit breaker separately.

③ Neutral not included. Order as separate item from table on next page.

④ Neutral included in enclosure.

⑤ Will not accept breaker with shunt trip.

⑥ Will not accept 2 pole GFP or breaker with shunt trip.

⑦ Includes 100% rated breakers.

# Enclosed Circuit Breakers

## Enclosures — Type 3R

## Selection / Dimension

### Dimensions

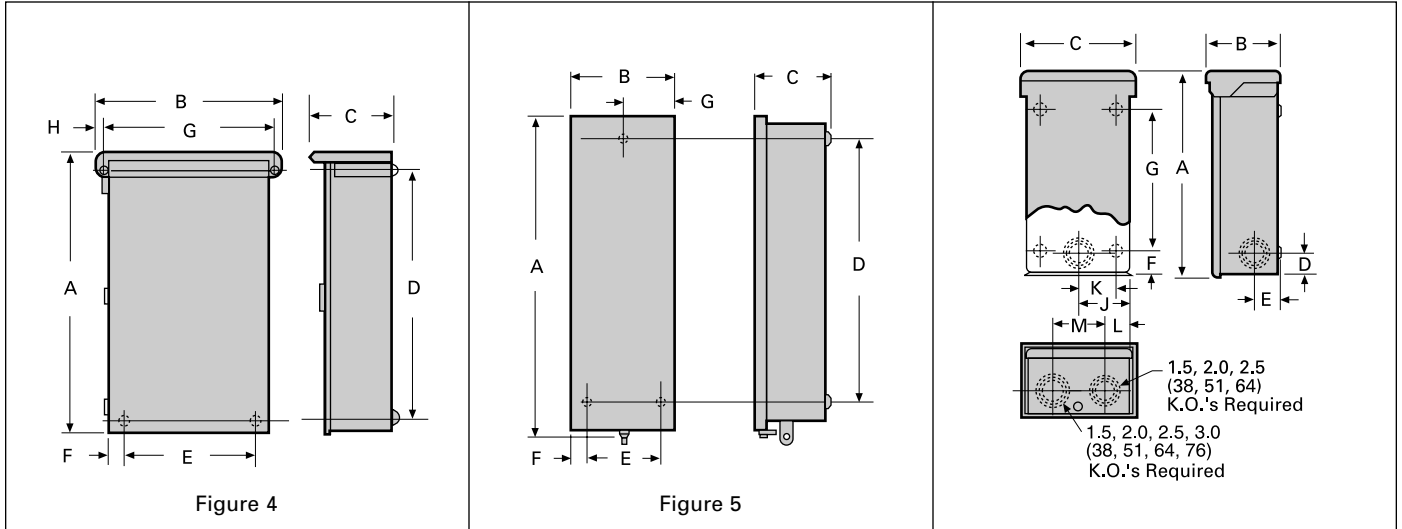


Figure Number	Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>①</sup>	Weight Lb./Ship. Package	Dimensions (inches)											
							A	B	C	D	E	F	G	H	J	K	L	M
6	QJ2, QJH2, QJ2-H	2	225	WB2225	418.00 <sup>①</sup>	17	27	5	7 <sup>11</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>4</sub>	2	2 <sup>1</sup> / <sub>2</sub>	20	4 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	—
				WB3225	459.00 <sup>①</sup>	17	27	5 <sup>5</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>4</sub>	2	2 <sup>1</sup> / <sub>2</sub>	20	4 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>

### Neutrals<sup>②</sup>

Neutral Catalog Number	Enclosure Catalog Number	Neutral Cable Capacity and Wire Range	List Price \$
W53045 <sup>④</sup>	E2N3R	(1 pc.) #14–2 Cu/Al Grd. Lug (1 pc.) #14–8 Cu/Al	186.00
	CED6N3R <sup>⑤</sup>		
N250 <sup>⑥</sup>	F6N3R	(1 pc.) #6–350 kcmil Grd. Lug (1 pc.) #14–2/0 Cu/Al	143.00
W60992 <sup>⑥</sup>	J6N3R	(1 pc.) #1/0–750 kcmil Cu/Al or (2 pcs.) #1/0–300 kcmil Cu/Al Grd. Lug (1 pc.) #6–250 kcmil Cu/Al	492.00
W60993 <sup>⑥</sup>	LD6N3R	(2 pcs.) #1/0–600 kcmil Grd. Lug (1 pc.) #6–250 kcmil Cu/Al	436.00
W63623	LMD3R	(4 pcs.) 250 kcmil–500 kcmil Cu/Al <sup>⑦</sup> Grd. Lug (1 pc.) #6–300 kcmil Cu/Al	606.00
	MND63		

Hubs — see page 5-14.

For inches / millimeters conversion, see Application Data section.

<sup>①</sup> Discount Schedule B.

<sup>②</sup> Does not include circuit breaker. Order circuit breaker separately.

<sup>③</sup> Neutral not included. Order as separate item from table on next page.

<sup>④</sup> Neutral included in enclosure.

<sup>⑤</sup> Use CED enclosure for all ED-frame 110-125 ampere units.

<sup>⑥</sup> 200% neutrals are also available. See listing on page 5-9.

<sup>⑦</sup> For applications requiring 600MCM neutral conductors (3) in, (3) out (#4-600 kcmil Cu/Al) use neutral catalog number **W411239** (List price **\$667.00**).

# Enclosed Circuit Breakers

## Enclosures — Types 4, 4X, 7, and 9

## Selection / Dimensions

### Dimensions

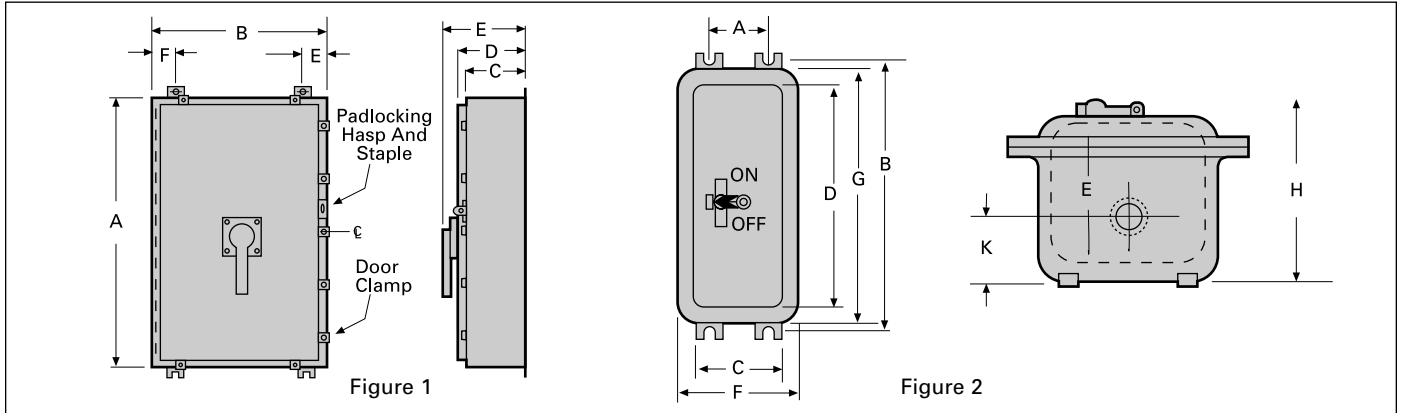


Figure 1

### Types 4 and 4X

Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>①</sup>	Weight Lb./Ship. Package	Dimensions (inches)					
						A	B	C	D	E	F
ED2, ED4, ED6, HED4	3	125	ED6SS4 <sup>②</sup>	2841.00	44	20	16	6	7½	9¾	3
FXD6, FD6, HFD6, FXD6, FD6	2-3	250	FD6SS4 <sup>②</sup>	4720.00	106	36	24	8	9½	11¾	3
JXD2, JXD6, JD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6, LXD6, LD6, HLD6, HLXD6, HHL6, HHLXD6, SLD6, SHLD6	2-3	600	LD6SS4 <sup>②</sup>	6946.00	145	42	30	10	11½	13¾	3

### Neutrals

Neutral Catalog Number	Enclosure Catalog Number <sup>②</sup>	Neutral Cable Capacity and Wire Range	List Price \$
W53045 <sup>③</sup>	ED6SS4	(1 pc.) #14-2 Cu/Al Grd. Lug (1 pc.) #14-8 Cu/Al	186.00
N250 <sup>④⑤</sup>	FD6SS4	(1 pc.) #6-350 kcmil Grd. Lug (1 pc.) #14-2/0 Cu/Al	143.00
W60993 <sup>④⑤</sup>	LD6SS4	(2 pcs.) #1/0-600 kcmil Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	436.00

Figure 2

### Types 7 and 9<sup>⑥</sup>

Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number <sup>④⑤</sup>	List Price \$ <sup>①</sup>	Weight Lb./Ship. Package	Dimensions (inches)										Knockouts	
						Mounting		Inside			Outside					Conduit Size	
						A	B	C	D	E	F	G	H	K	Std.	Max	
ED2, ED4, ED6, HED4	2-3	15-60 70-100	EA■ EB■	1750.00 2176.00	27 32	5½ 6	13½ 18	5⅞ 6½	10¾ 16	5⅞ 5⅞	9⅞ 9⅞	14¼ 19%	6⅞ 6⅞	1⅞ 2	1¼ 2	1¼ 2	
CED6	2-3	100	N/A														
FXD6, FD6, HFD6, HFXD6, CFD6	2-3	250	EC2■	4815.00	85	10%	22%	11%	20	6%	15%	23%	8%	2%	2½	2	
JXD2, JXD6, JD6, SJD6, HJD6, HJXD6, HHJD6, HHJXD6, SHJD6	2-3	200-350 300-400	EC4■ EE■	4815.00 6662.00	85 93	10% 8%	22% 27%	11% 10%	20 24%	6% 7%	15% 13%	23% 27%	8% 9⅞	2% 4	2½ 3	3 4	
LXD6, LD6, SLD6, HLD6, HLXD6, HHL6, HHLXD6, SHLD6	2-3	600	ED6■	11330.00	190	11%	40%	13%	37%	7%	18%	42%	9%	3%	4	4	

For inches / millimeters conversion, see Application Data selection.

■ Built to order. Allow 2-3 weeks for delivery.

① Does not include circuit breaker.

Order circuit breaker separately.

② Enclosures shipped with handle and breaker hardware packaged within enclosure.

③ Neutral included.

④ Neutral not included. Order as separate item.

⑤ Breather and drain option is by SPECIAL ORDER only — add \$70.00 to list price.

⑥ For 400A max. 4/4x applications which require a 200% Neutral. See listing on page 5-9.

⑦ Suitable for use as Service Entrance device.

⑧ Includes 100% rated breakers.



# Enclosed Circuit Breakers

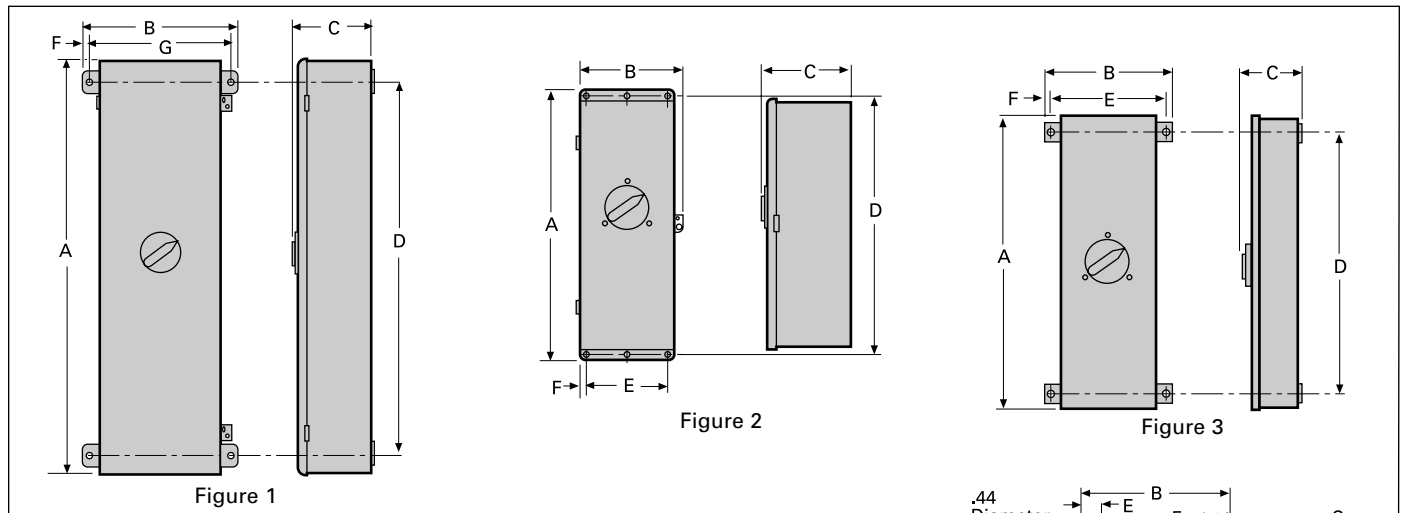
## Enclosures — Types 5, 12 and 12K

## Selection / Dimensions

### Types 5, 12 and 12K

Figure Number	Breaker Frame	Number of Poles	Maximum Current Rating	Catalog Number	List Price \$ <sup>2</sup>	Weight Lb./Ship. Package	Dimensions (inches)					
							A	B	C	D	E	F
	NGG	2-3	125	GG01212N	233.00							
2	ED2, ED4, ED6, HED4	2-3	100	E2N12 <sup>④</sup>	254.00	12	18 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>16</sub>	18	6 <sup>1</sup> / <sub>16</sub>	1/2
1	CED6	2-3	125	CED6N12 <sup>④</sup> ■	449.00	16	22 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>16</sub>	22	6 <sup>1</sup> / <sub>16</sub>	5/8
2	FXD6, FD6, FXD6, FD6, HFD6, CFD6	2-3	250	F6N12 <sup>④</sup>	410.00	40	38 <sup>19</sup> / <sub>32</sub>	14 <sup>29</sup> / <sub>64</sub>	8 <sup>1</sup> / <sub>8</sub>	34	13	23 <sup>3</sup> / <sub>32</sub>
3	JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6	2-3	400	J6N12	725.00	104	41 <sup>1</sup> / <sub>2</sub>	21 <sup>5</sup> / <sub>8</sub>	11 <sup>7</sup> / <sub>16</sub>	37 <sup>5</sup> / <sub>32</sub>	20 <sup>3</sup> / <sub>16</sub>	5/8
3	LD6, LXD6, HLD6, HLXD6, HHL6, HHLXD6, SLD6, SHLD6, CJD6, CLD6, SCJD6, SCLD6	2-3	600	LD6N12■	979.00	104	46 <sup>1</sup> / <sub>2</sub>	21 <sup>5</sup> / <sub>8</sub>	11 <sup>7</sup> / <sub>16</sub>	42 <sup>5</sup> / <sub>32</sub>	20 <sup>3</sup> / <sub>16</sub>	5/8
4	LMXD6, LMD6, HLMXD6, HLMD6	2-3	800	LMD12■	2883.00	220	—	—	—	—	—	—
4	MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, ND6, NXD6, SND6, HND6, HNXD6, SHND6, CMD6, SCMD6, CND6, SCND6	2-3	1200	MND612 <sup>④</sup> ■	2883.00	220	60	37 <sup>3</sup> / <sub>8</sub>	10	5/8	3	2

### Dimensions



### Neutrals

Neutral Catalog Number	Enclosure Catalog Number	Neutral Cable Capacity and Wire Range	List Price \$
W53045 <sup>④</sup>	E2N12	(1 pc.) #14-2 Cu/Al	186.00
	CED6N12 <sup>④</sup>	(1 pc.) #14-2 Cu/Al	
N250 <sup>④</sup>	F6N12	(1 pc.) #6-350 kcmil Grd. Lug (1 pc.) #14-2/0 Cu/Al	143.00
W60992 <sup>④</sup>	J6N12	(1 pc.) #1/0-750 kcmil Cu/Al or (2 pc.) #1/0-300 kcmil Cu/Al Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	492.00
W60993 <sup>④</sup>	L6N12	(2 pcs.) #1/0-600 kcmil Grd. Lug (1 pc.) #6-250 kcmil Cu/Al	436.00
W63623 <sup>④</sup>	LMD612	(4 pcs.) 250 kcmil-500 kcmil Cu/Al Grd. Lug (1 pc.) #6-300 kcmil Cu/Al	606.00
	MND612		

For inches/millimeters conversion, see Application Data section.  
 ■ Built to order. Allow 2-3 weeks for delivery.  
 CSO - Consult Sales Office for pricing.  
 ④ Catalog Number is for Type 12. If Type 12K with knockouts is required, add suffix "K" to catalog number.

② Does not include circuit breaker. Order circuit breaker separately.  
 ③ Neutral not included. Order as separate item.  
 ④ Neutral included in enclosure.  
 ⑤ Use CED enclosure for all ED-frame 110-125 ampere units.

⑥ 200% neutrals are also available. See listing on page 5-9.  
 ⑦ For 600 MCM neutral cable (3) in, (3) out (#4-600 kcmil Cu/Al) use catalog number W411239 (List price \$667.00)  
 ⑧ Includes 100% rated breakers.

# Enclosed Circuit Breakers

## Enclosures — Knockout and Hub Data

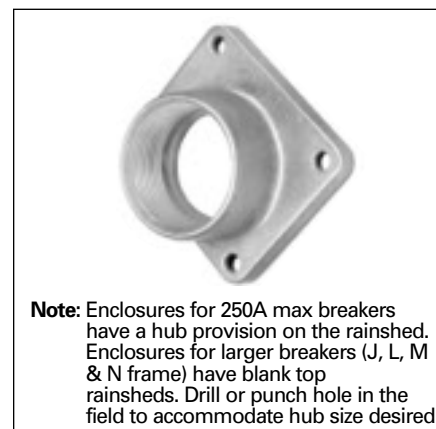
## Dimensions

### Knockouts & Wire Bending Space

Breaker Frame	Conduit Range Per Knockout Outside Dimensions (inches)	Types 1, 12 and 12K				Type 3R				Maximum Cable Sizes Recommended (Cu/Al) for Type 1, 3R, 4, 4X, 12 & 12K Enclosures <sup>④</sup>
		Number of Knockouts Per Panel (Type 4, 4X, 12 have no KO's)								
		Top	Bottom	Side	Back	Bottom	Side	Back	Maximum Hub Size (inches) Type 3R	
QP, QPH, HQP 15-125	½, ¾, 1, 1¼, 1½	4	4	4	4	3	1	1	2	7½" high encl. #6 <sup>④</sup>
BQ, BQH, HBP 70-100	¾, 1, 1¼	1	1	2	2	8	1	3	2	④
QPP, QPPH, HQPP 125-225	½, ¾, 1, 1¼, 1½, 2, 2½	—	—	—	—	4	1	1	2½	250 kcmil
QJ	1½, 2, 2½, 3	2	2	2	2	3	1	1	2½	④
NGG	¾, 1, 1¼, 1½, 2, 2½	—	—	—	—	—	—	—	—	
ED2, ED4, ED6, HED4	¾, 1, 1¼, 1½, 2	2	2	2	2	2	1	1	2	④
CED6	¾, 1, 1¼, 1½, 2	2 <sup>①</sup>	2 <sup>①</sup>	—	—	2	—	—	2	④ (CFD6 only 300 kcmil)
	¾, 1, 1¼, 1½, 2, 2½	2	2	2 <sup>②</sup>	2 <sup>②</sup>	—	1	1	2	
FXD6, FD6, FXD6, FD6 HFD6, CFD6	1½, 1¾, 1¾, 2, 2½, 3	1	1	2 <sup>②</sup>	2 <sup>②</sup>	1	1	—	4	④
		1	1	—	—	1	—	—	4	
JXD2, JXD6, JD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6	1½, 2, 2½, 3, 3½, 4	1	1	2	4	—	—	—	4	(2) 600 kcmil
LXD6, LD6, HLXD6, HLD6, HHLXD6, HHLXD6, SLD6, SHLD6	1½, 2, 2½, 3, 3½, 4	1	1	2	4	—	—	—	4	(2) 600 kcmil
LMXD6, LMD6 HLMXD6, HMLD6	—	—	—	—	—	—	—	—	4	(3) 600 kcmil
MD6, SMD6, HMD6 ND6, SND6, HND6	—	—	—	—	—	—	—	—	4	(3) 600 kcmil or (4) 500 kcmil

### Hubs (Type 3R)

Breaker Frame	Conduit Size (inches)	Catalog Number	List Price \$
QP, QPH, HQP, BQ, BQH, HBQ, NGG	¾	ECHS075	39.50
	1	ECHS100	39.50
	1¼	ECHS125	39.50
	1½	ECHS150	39.50
	2	ECHS200	69.00
QPP, QPPH, HQPP, QJ2, QJH2, QJ2-H	1¼	ECHS125	39.50
	1½	ECHS150	39.50
	2	ECHS200	69.00
	2½	ECHS250	109.00
ED2, ED4, ED6, HED4, HED6, HHED6, CED6	¾	ECHR075	40.00
	1	ECHR100	39.50
	1¼	ECHR125	39.50
	1½	ECHR150	40.00
FXD6, FD6, HFD6, HFXD6, CFD6, JXD2, JD6, JXD6, HJD6, HJXD6, LD6, LXD6, HLD6, HLXD6(A)	2½	ECHV250	125.00
	3	ECHV300	182.00
	3½	ECHV350	274.00
	4	ECHV400	362.00



**Note:** Enclosures for 250A max breakers have a hub provision on the rainshed. Enclosures for larger breakers (J, L, M & N frame) have blank top rainsheds. Drill or punch hole in the field to accommodate hub size desired.

For inches / millimeters conversion, see Application Data section.

① Type 12K only.

② Type 12K enclosure has no knockouts this location.

③ 17½" high enclosure provides sufficient wire bending space for all available CB lugs.

④ Sufficient wire bending space is provided for all available mechanical type CB lugs.

⑤ The use of cables larger than those listed below may violate NEC & UL wire bending space requirements.

⑥ The use of compression type connectors will violate NEC and UL wire bending space requirements.

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# Molded Case Circuit Breakers

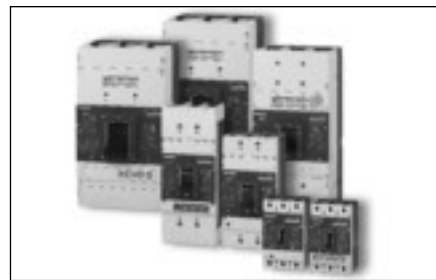
## Introduction

### Molded Case Circuit Breakers

#### OEM Circuit Breakers

In this issue of the Speedfax, Siemens introduces the modular and flexible design of Siemens VL molded case circuit breakers (MCCB) for OEM applications.

This family of MCCB's allow the OEM customer the flexibility of last minute changes, with a minimum level of stock due to product modularity. The VL family of MCCB's also offer the widest range of field installable accessories in the industry.

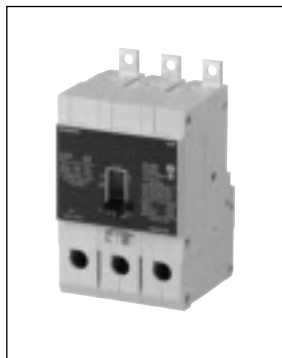


<b>Ratings</b>	30-1600A
<b>Voltage</b>	600Vac 690Vac (IEC)
<b>Standards</b>	UL, CSA, NOM, IEC, CE Marked

<b>Interruption Ratings (UL/CSA)</b>	N	35kA @ 480Vac
	H	65kA @ 480Vac
	L	100kA @ 480Vac

### Panelboard Application Circuit Breakers

Two new MCCB offerings for Panelboard applications are introduced in this issue.



**NGB**—The new NGB is a quick bolt-in panelboard molded case circuit breaker based on the compact design of the highly successful Siemens NGG (cable-in / cable-out) MCCB.

<b>Ratings</b>	15-125A
<b>Poles</b>	1, 2, 3
<b>Voltage</b>	480Y/277
<b>AIC</b>	25kA @ 480Vac
<b>Standards</b>	UL, CSA, NOM



**EB**—The new EB circuit breaker is also a compact quick bolt-in design for panelboard application only.

<b>Ratings</b>	15-125A
<b>Poles</b>	1, 2, 3
<b>Voltage</b>	600Y/347
<b>AIC</b>	35-65kA @ 480Vac
<b>Standards</b>	UL, CSA, NOM, CE Marked

### Sentron Molded Case Circuit Breakers

**Note:** The SENTRON family continues to be the standard offering of MCCB's for all applications, with the exception of 800A-1600A for Siemens panelboard and switchboards. These products will incorporate the new VL series of circuit breakers.

### Ordering

In the FD through RD frames, you may order molded case circuit breakers three basic ways:

- As separately ordered frames, trip units and lugs
- As frame, trip unit and lugs ordered as one catalog number and shipped unassembled or assembled
- As Frame and Trip Unit shipped assembled and with the trip unit made non-removable, in compliance with UL 489 requirements that to be reverse fed the circuit breaker must not have an interchangeable trip unit.

These two options are described in the following:

#### Components Ordered Separately

To get the components for a 3-pole, 400 Amp standard interrupting circuit breaker, you would order the frame (JD63F400), the trip unit (JD63T400) and six lugs (TA2J6500). This option is normally useful only if you stock and use large volumes of product and wish to reduce your inventory cost. You may stock, for example, a smaller number of frames (JD63F400) and a variety of trip units (JD63T300, JD63T350, etc.) and assemble breakers as you need them.

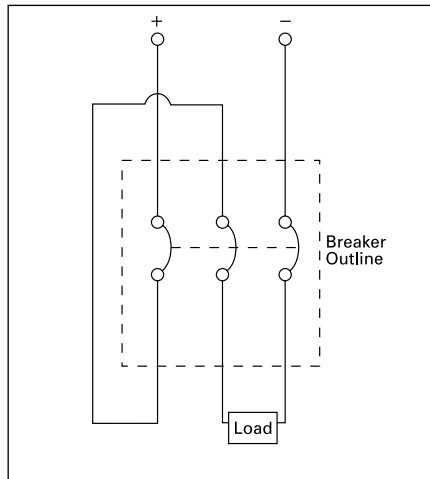
#### Frame, Trip Unit and Lugs Ordered Together

If you order the catalog number JD63B400, you will receive a frame, a trip unit and 6 lugs in separate packages. By suffixing this number with "L" (e.g. JD63B400L), you will receive frame, trip unit and lugs assembled in one container. Pursuant to UL 489, a product ordered thus will have the markings "LINE" and "LOAD", and may not be "reverse fed" (with power flowing from the "OFF" end of the breaker toward the "ON" end).

#### Non-Interchangeable Trip Breakers

If you place an "X" after the frame size designator (e.g. JXD63B400), you will receive a frame and trip unit assembled, with the trip unit made non-removable. If you suffix an "L" to this catalog number (e.g. JXD63B400L), you will receive the breaker, non-removable trip unit and lugs assembled. Unless you anticipate a specific need to change the breaker's ampere rating in the future, this is the preferred ordering method, as the products are assembled to Siemens' specifications in our factories. These breakers are suitable for use reverse fed according to UL 489, since the trip unit is not removable.

The smaller frames (QJ, ED and below) do not have removable trip units, and consequently are shipped only as assembled products. To add lugs, see the ordering instructions on each product's catalog page.



500V DC Wiring Configuration

### Connecting Breakers for DC Application

Most Siemens thermal magnetic trip MCCBs are applicable on direct current (dc) systems. Generally, for 250 V dc systems a two pole breaker is used, with one pole on each leg of the supply circuit. For three pole breakers applied on 500 V undergrounded DC systems, it is important to connect the power supply "zig-zag" through the breaker as shown in the figure below. This assures that the Voltage between phases on the breaker terminals is uniformly distributed.

# Molded Case Circuit Breakers

## Federal Specification Classification

Reference

W-C-375C/GEN

Class	Interrupting Rating		Poles	Range of Current Trip <sup>®</sup>	Breaker Type (All Circuit Breakers Meet or Exceed the Indicated Class Level)
	Symmetrical Amperes <sup>①</sup>	Volts AC 60HZ			
10a <sup>②</sup>	5,000	120/240	1 or 2	15–100	QP, BQ, QT, BL
10b	5,000	240	2 or 3	15–100	QP, BQ, BQD, CQD, BL
11a	7,500	120	1	15–100	QP, BQ, BQD, CQD, BL
11b	7,500	240	2 or 3	15–100	QP, BQ, BQD, CQD, BL
12a <sup>②</sup>	10,000	120/240	1 or 2	15–100	QP, BQ, QT, ED2, BL
12b	10,000	240	2 or 3	15–225	QP, BQ, QJ2, ED2, BQD, CQD, BL
12c	10,000	277	1	15–100	BQD, CQD, NGG, NGB, NEG, NEB
13a	14,000	277	1	15–100	ED4, BQD, CQD, NGG, NGB, NEG, NEB
13b	14,000	277/480	1, 2, or 3	15–100	ED4, BQD, CQD
14a	22,000	120/240	1 or 2	15–100	QPH, BQH, BLH
14b	22,000	240	2 or 3	70–400	QJH2, QJ2-H, BQH, BQD, CQD, BLH
15a	65,000	120/240	1 or 2	15–100	HQP, HBQ, ED4, HED4, NGG, NGB, NEG, NEB
15b	65,000	240	2 or 3	15–225	ED6, ED4, FXD6, FD6, HED4, BQD, CQD, HOJ2H, NGG, NGB, NEG, NEB
16a	100,000	480	2 or 3	15–225	CFD6, CED6
16b	100,000	600	2 or 3	15–600	CED6, CFD6, CJD6, SCJD6, CLD6, SCLD6
17a	200,000	600	2 or 3	70–2000	—
18a	18,000 14,000 14,000	240 480 600	2 or 3	15–125	ED6, HED6, HHED6
19a	22,000 18,000 14,000	240 480 600	2 or 3	70–225	FXD6, FD6, CFD6, HFD6
20a	25,000 22,000 22,000	240 480 600	2 or 3	70–225	FXD6-A, FD6-A, CFD6, HFD6
21a	42,000 30,000 22,000	240 480 600	2 or 3	70–800	HFD6, CFD6, JXD6(A), JD6(A), SJD6(A), HJD(A), HJXD6(A), HHJD6, SHJD6(A), CJD6, SCJD6, LXD6(A), LD6(A), SLD6(A), HLD6(A), HLXD6(A), HHL6, SHLD6(A), SHLD6(A), CLD6, SCLD6, LMD6, LMXD6, HLMD6, HLMXD6, MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, CMD6, SCMD6
22a	65,000 25,000 18,000	240 480 600	2 or 3	15–125	CED6, ED6, HED6, HHED6, FXD6-A, FD6-A
23a	65,000 35,000 25,000	240 480 600	2 or 3	70–1200	HHED6, FXD6-A, FD6-A, HFD6, HHFD6, CFD6, JD6(A), JXD6(A), SJD6(A), HJD6(A), HJXD6(A), SHJD6(A), HHJD6, HHJXD6, CJD6, SCJD6, LXD6(A), LD6(A), SLD6(A), HLD6(A), HLXD6(A), SHLD6(A), HHL6, HHL6, HHLXD6, CLD6, SCLD6, LMD6, LMXD6, HLMD6, HLMXD6, MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, CMD6, SCMD6, ND6, NXD6, SND6, HND6, HNXD6, SHND6, CND6, SCND6
24a	65,000 50,000 42,000	240 480 600	2 or 3	1200–2000	PD6, PXD6, HPD6, HPXD6, CPD6, RD6, RXD6, HRD6, HRXD6, SPD6, SHPD6
25a	125,000 80,000 60,000	240 480 600	2 or 3	600–4000	HHL6, CLD6, CMD6, CND6, SCLD6, SCMD6, SCND6, CPD6

### Applicable Standards

UL489 — Molded Case Circuit Breakers and Circuit Breaker Enclosures.

UL486A — Wire Connectors and Solderless Lugs for use with copper wire

UL486B — Wire Connectors and Solderless Lugs for use with aluminum wire

UL943 — Ground Fault Interrupters (for personnel protectors)

UL1087 — Molded Case Switches

UL50 — Cabinets and Boxes

UL869 — Service Equipment

NEMA AB-1 — Molded Case Circuit Breakers and Molded Case Switches

CSA—C22.2 No. 5, C22.2 No. 14

#### Note:

(A) Molded case circuit breakers are designed and tested in accordance to applicable portions of UL489 and meet application requirements of the National Electric Code. Unless marked otherwise, circuit breakers are 80% duty rated.  
(B) Molded case circuit breakers are to be connected with 60 or

75° C wire for circuit breakers having a rated ampacity of 100 amperes or less. Circuit breakers having a rated ampacity greater than 100 amperes shall only be cabled with 75° C cable unless otherwise indicated on the circuit breaker label. Exceptions to this rule are outlined in the article 110-14 C(1)(2) of the 2005 National Electric Code.

① Interrupting ratings are not limited to the values or groups of values listed. However, the values listed are minimum values for the class specified.

② Single-unit or duplex construction must be specified.

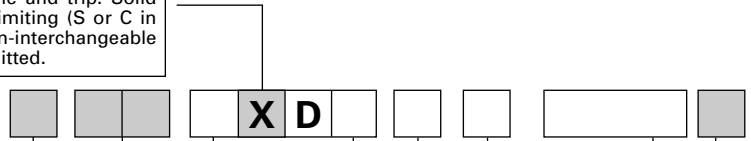
③ Use minimum frame size for ampere rating.

# Molded Case Circuit Breakers

## Catalog Numbering System

## Selection/Application

If used on 250A frame and above means non-interchangeable trip breaker with factory assembled frame and trip. Solid state trip and current limiting (S or C in first character) are non-interchangeable only, and the "X" is omitted.



### Trip Unit Type

- Omitted – Thermal-Magnetic
- S — Sensitrip® Electronic Trip

### Sentron Series Type/Interrupting Range

- Omitted – Standard Rating
- H — High IC Rating
- HH — Extra High IC Rating
- C — Highest IC Rating and Current Limiting

### Frame Identifier

- |               |             |
|---------------|-------------|
| E — Type ED   | M — Type MD |
| F — Type FD   | N — Type ND |
| J — Type JD   | P — Type PD |
| L — Type LD   | R — Type RD |
| LM — Type LMD | T — Type TD |

### Maximum Voltage

- 2 — 240 Vac
- 4 — 480 Vac
- 6 — 600 Vac

### Number of Poles

- 1
- 2
- 3
- 9 used to indicate the max. functions for an electronic trip circuit breaker (always 3 poles)

### (Specific Application Type)

- B — Standard 40°C Breaker
- M — Calibrated for 50°C Application
- F — Frame Only
- T — 40°C Trip Unit Only
- W — 50°C Trip Unit Only
- S — Molded Case Switch
- L — Low Instantaneous Range ETI Breaker
- A — Standard Range ETI Breaker
- H — High Instantaneous Range ETI Breaker

### Maximum Continuous Current Rating

- ED Frame — 015, 020, 025, 030, 035, 040, 045, 050, 060, 070, 080, 090, 100, 110, 125
- FD Frame — 070, 080, 090, 100, 110, 125, 150, 175, 200, 225, 250
- JD Frame — 200, 225, 250, 300, 350, 400
- LD Frame — 250, 300, 350, 400, 450, 500, 600
- LMD Frame — 500, 600, 700, 800
- MD Frame — 500, 600, 700, 800
- ND Frame — 900, 100 (1000A), 120 (1200A)
- PD Frame — 120 (1200A), 140 (1400A), 160 (1600A)
- RD Frame — 160 (1600A), 180 (1800A), 200 (2000A)
- TD Frame — 2000, 2500, 3200

### Suffix

- L — where applicable indicates a breaker shipped with line/loads lugs installed
- A — used with a switch to show automatic self protection
- Y — 400 Hertz
- H — 100% rated
- P — Load side lugs only

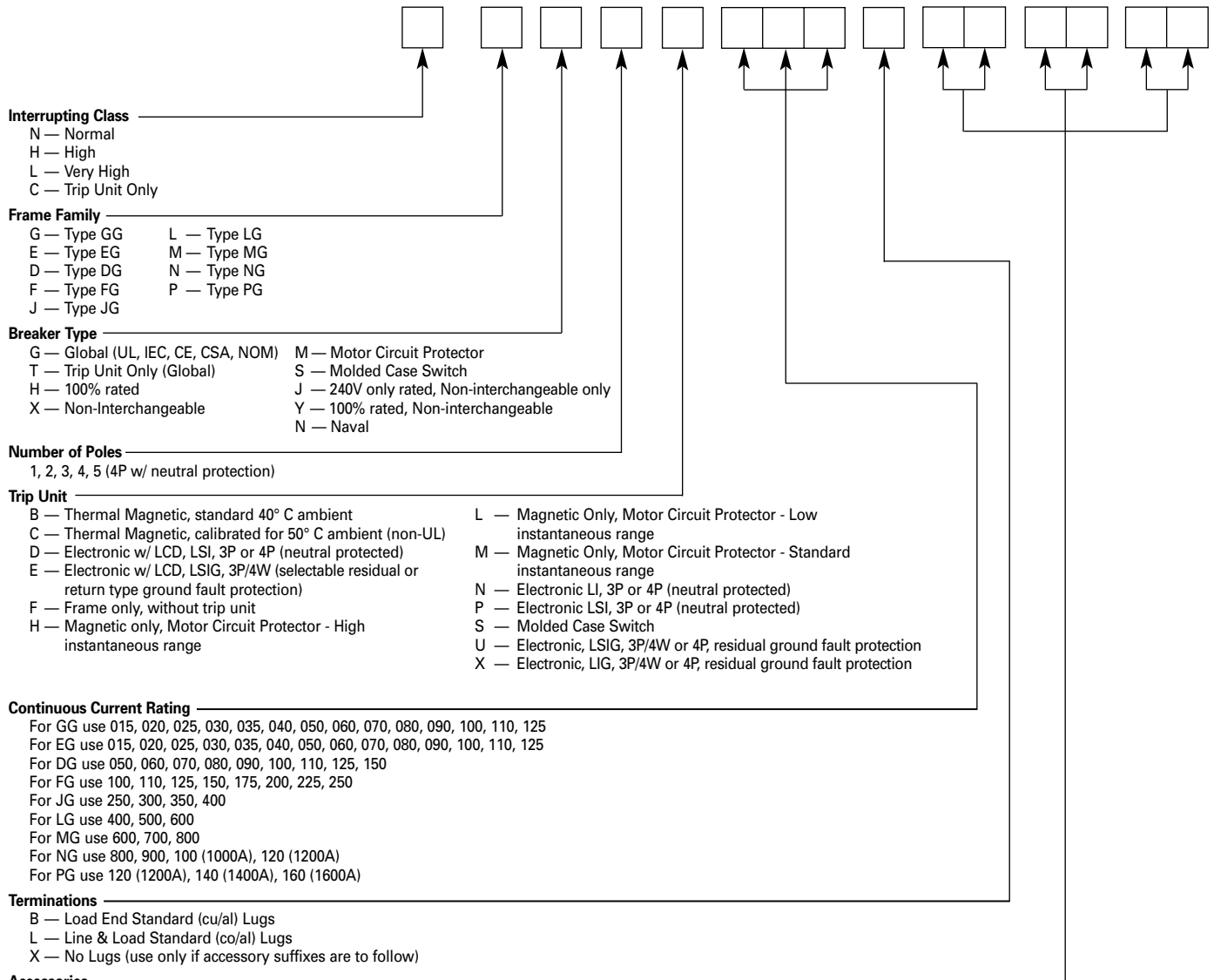
### NOTE:

- Position omitted if not used.

# VL Molded Case Circuit Breakers

## Catalog Numbering System

## Selection/Application



LCD = Liquid Crystal Display  
 LS = Long Delay & Short Delay trip functions  
 LSI = Long Delay, Short Delay, & Instantaneous trip functions  
 LSIG = Long Delay, Short Delay, Instantaneous, & Ground Fault trip functions  
 GF = Ground Fault  
 3P = 3-pole  
 4W = 4-wire



# VL Circuit Breakers

## Catalog Numbering System

**Selection**

If ordering factory-installed accessories or special modifications, you must order a 15-digit catalog number. See the examples below for a detailed explanation. The 15 digit number is achieved by placing X's in positions not being occupied by an accessory/modification.

### Auxiliary Switch Example:

**HFG3B200L A2 XXXX**

Standard 9-digit      Aux. Switch      Completes Cat #

### Shunt Trip / UVR Example:

**HFG3B200L XX UN XX**

Standard 9-digit      UVR      Completes Cat #

### Shunt Trip / Auxiliary Switch Example:

**HFG3B200L A2 RN XX**

Standard 9-digit      Aux. Switch      Shunt Trip      Completes Cat #

### Factory Modification Example:

**HFG3B200L XXXX Z1**

Standard 9-digit      Completes Cat #      Custom Mod.

These places could designate an enclosure or special modification. Siemens will define the factory modification suffixes.

### Non-Interchangeable Trip Breakers Example:

**HFX3B200L**

Standard 9-digit

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

Page		Plug-In Breakers						Panelboard Breakers						
		QT	QP, QPP <sup>②</sup>	QPH, QPPH <sup>②</sup>	HQP, HQPP <sup>②</sup>	HQPPH <sup>②</sup>	QPJ <sup>②</sup>	BL	BLH	HBL	BOD, BOD6 <sup>①</sup>	NGB		
Ratings		Poles	1, 2	1, 2, 3	1, 2, 3	1, 2, 3 <sup>②</sup>	2	2,3	1, 2, 3	1, 2, 3	1, 2, 3 <sup>②</sup>	1, 2, 3	1, 2, 3	
		Amperes, Continuous	15-50	10-125 <sup>③④</sup>	10-125 <sup>③④</sup>	10-125 <sup>③⑤</sup>	100-225	150-200	10-125 <sup>③</sup>	10-125 <sup>③</sup>	10-100 <sup>②</sup>	15-100	15-125	
		Volts (50/60 Hertz)	1-Pole	120/240	120/240	120/240	120/240	120/240	120/240	120/240	120/240	277	347	
			2-Pole	—	240	240	240	240	240	240	240	480/277	600/347	
			3-Pole	—	240	240	240	240	240	240	240	480/277	600/347	
		UL Interrupting Rating — Symmetrical RMS Amperes	120V	10,000	10,000	22,000	65,000	—	—	10,000	22,000	65,000	65,000	
			240V	10,000	10,000	22,000	65,000	100,000	10,000	10,000	22,000	65,000	65,000	
			277V	—	—	—	—	—	—	—	—	—	14,000	
			347V	—	—	—	—	—	—	—	—	—	10,000 <sup>①</sup>	
			480/277V	—	—	—	—	—	—	—	—	—	14,000	
			600/347V	—	—	—	—	—	—	—	—	—	10,000 <sup>①</sup>	
		DC	Volts — 2-Pole	—	—	—	—	—	—	—	—	250	250	
			Interrupting Rating — DC Amperes	—	—	—	—	—	—	—	—	—	14,000	
Dimensions in inches		Height	15-50A	—	2.87	2.87	—	—	7.00	3.56	3.56	—	4.50	
			15-30A	—	—	—	—	—	—	—	3.75	—	—	
			15-60A	3.12	—	—	—	—	—	—	—	—	—	—
			55-125A	—	3.12	3.12	3.12	3.12	3.00 <sup>⑥</sup>	3.75	—	3.75	4.50	—
		Width	1-Pole	1.00	1.00	1.00	1.00	—	—	1.00	1.00	1.00	1.00	—
			2-Pole	2.00 <sup>⑦</sup>	2.00 <sup>⑦</sup>	2.00 <sup>⑦</sup>	2.00	4.00 <sup>⑦</sup>	⑧	2.00	2.00	2.00	2.00	—
3-Pole	2.00 <sup>⑦</sup>		3.00	3.00	3.00	—	3.00 <sup>⑥</sup>	3.00	3.00	3.00	3.00	—		
		Depth	2.06	2.37	2.37	2.37	2.37	2.34	2.37	2.37	2.69	2.23		
Overcurrent Devices		Thermal and Fixed Magnetic Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Molded Case Switch	—	✓ <sup>⑨</sup>	—	—	—	—	—	—	—	—	—	
Accessories & Modifications		Undervoltage Trip	—	—	—	—	—	—	—	—	—	—	—	
		Shunt Trip	—	✓ <sup>⑩</sup>	✓ <sup>⑩</sup>	✓ <sup>⑩</sup>	✓ <sup>⑩</sup>	—	✓	✓	✓	✓	✓	
		Auxiliary Switch	—	—	—	—	✓ <sup>⑩</sup>	—	✓	✓	✓	✓	✓	
		Alarm Switch	—	—	—	—	—	—	—	—	—	—	✓	
Individual Enclosures		Type 1 — Indoor Surface	✓	✓	✓	✓	✓	—	—	—	—	—		
		Type 1 — Indoor, Flush	—	✓	✓	✓	✓	—	—	—	—	—		
		Type 3R — Outdoor-Rainproof	—	✓	✓	✓	✓	—	—	—	—	—		



For inches / millimeters conversion, see Application Data section.

① BOD6 CSA certified 10,000A @ 600V/347V 15-70A only.  
 ② Types QPP, QPPH, HQPP and HQPPH are special 2-pole configurations for load center mains. Amperage range = 125-225A, width = 4 in.

③ Single pole breakers available in ratings 10-70A only.  
 ④ 125A, 2-pole 120/240V AC only.  
 ⑤ Not applicable to types QPP and QPPH.  
 ⑥ Single pole circuit breakers available in ratings 15-70A only.

125A available as a 2-pole only.  
 ⑧ Not applicable to type HQPP and HQPPH.  
 ⑨ Fits only Siemens EQIII load centers. Breaker is 2 or 3 poles wide.

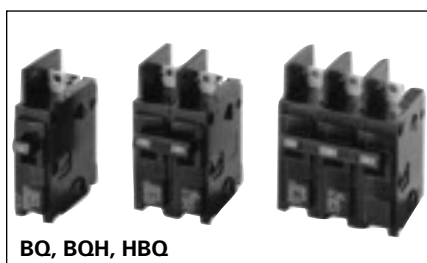
# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

Page			General Purpose Breakers									
			BQ	BQH	HBQ	QJ2	QJH2	QJ2-H	HQJ2-H	CQD	NGG	
6-26			6-26	6-26	6-26	6-28	6-28	6-28	6-28	6-29	6-30	
Ratings	AC	Poles	1, 2, 3	1, 2, 3	1, 2, 3	2, 3	2, 3	2, 3	3	1, 2, 3	1, 2, 3	
		Amperes, Continuous	1-Pole	15-70	15-70	15-50	—	—	—	—	15-100	15-125
			2-Pole	15-125	15-100	15-70	60-225	60-225	60-225	100-225	15-100	15-125
			3-Pole	15-100	15-100	15-100					15-100	15-125
		Volts (50/60 Hertz)	1-Pole	120/240	120/240	120/240	—	—	—	—	277	347
			2-Pole				240	240	240	—		
			3-Pole	240	240	240	240	240	240	480/277	600/347	
		UL Interrupting Rating — Symmetrical RMS Amperes	120V	10,000	22,000	65,000	—	—	—	—	65,000	65,000
			240V	10,000	22,000	65,000	10,000	22,000	42,000	100,000	65,000	65,000
	480V		—	—	—	—	—	—	—	14,000 <sup>③</sup>	25,000	
	600/347V		—	—	—	—	—	—	—	10,000 <sup>②</sup>	14,000	
	DC	Volts — 2-Pole	—	—	—	—	—	—	—	125/250	125/250	
Interrupting Rating — DC Amperes		—	—	—	—	—	—	—	14,000	14,000		
Dimensions in inches	Height	15-50A	3.75	3.75	4.00	—	—	—	—	4.50	—	
		55-125A	4.00	4.00	4.00	—	—	—	—	4.50	—	
		60-225A	—	—	—	7.00	7.00	7.00	7.00	—	—	
	Width	1-Pole	1.00	1.00	1.00	—	—	—	—	1.00	1.00	
		2-Pole	2.00	2.00	2.00	3.00	3.00	3.00	—	2.00	2.00	
3-Pole		3.00	3.00	3.00	4.50	4.50	4.50	4.50	3.00	3.00		
Depth		2.37	2.37	2.37	2.34	2.34	2.53	2.53	2.87	2.90		
Overcurrent Devices	Thermal and Fixed Magnetic Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Molded Case Switch	✓	—	—	✓	—	—	—	—	—		
Accessories & Modifications	Undervoltage Trip	—	—	—	—	—	—	—	✓	—		
	Shunt Trip	✓	✓	✓	✓ <sup>①</sup>	✓ <sup>①</sup>	✓ <sup>①</sup>	✓ <sup>①</sup>	✓	✓		
	Auxiliary Switch	✓	✓	✓	✓ <sup>①</sup>	✓ <sup>①</sup>	✓ <sup>①</sup>	✓ <sup>①</sup>	✓	✓		
	Alarm Switch	—	—	—	✓	✓	—	—	✓	✓		
	Mechanical Interlock	—	—	—	✓	✓	✓	✓	—	—		
	Fungus Proofing (ref. page 6-84)	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Individual Enclosures	Type 1 — Indoor Surface	✓	✓	✓	✓	✓	✓	✓	—	✓		
	Type 1 — Indoor, Flush	✓	✓	✓	✓	✓	✓	✓	—	✓		
	Type 3R — Outdoor-Rainproof	✓	✓	✓	✓	✓	✓	✓	—	✓		



For inches / millimeters conversion, see Application Data section.

① 3-pole breakers only (factory installed only).

② Type CQD6—CSA only.

③ CQD breakers are rated 14,000 KAIC at 480/277V.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

Page		General Purpose Breakers											
		NEB, NEG		HEB, HEG		ED2	ED4	ED6	HED4	HHED6	CED6		
6-24, 6-32		6-24, 6-32		6-34	6-34	6-34	6-35	6-35	6-35				
Ratings	AC	Poles		1, 2, 3, 4	1, 2, 3, 4	1, 2, 3	1, 2, 3	1 <sup>ⓐ</sup> , 2, 3	1, 2, 3	2, 3	2, 3		
		Amperes, Continuous		15-125	15-125	15-100	15-125	15-125	15-125	15-125	15-125		
		Volts 50/60HZ		1-Pole	347 <sup>ⓑ</sup>	347 <sup>ⓑ</sup>	120	277	347	277	—	—	
				2-Pole	600/347	600/347	240	480	600	480	600	600	
				3-Pole			240	480	600	480	600	600	
		Interrupt Rating Symmetrical RMS Amperes		UL	120V	—	—	10,000	—	—	100,000	—	—
					240V	85,000	100,000	10,000	65,000	65,000	100,000 <sup>ⓐ</sup>	100,000	200,000
					277V	—	—	—	22,000 <sup>ⓑ</sup>	—	65,000 <sup>ⓑ</sup>	—	—
					347V	—	—	—	—	30,000	—	—	—
					480V	35,000	65,000	—	18,000	25,000	42,000	65,000	200,000
	600V				22,000 <sup>ⓐ</sup>	25,000 <sup>ⓐ</sup>	—	—	18,000	—	18,000	100,000	
	IEC 947-2 50/60HZ		220/240V	lcu	85,000	100,000	—	—	65,000	—	—	200,000 <sup>ⓑ</sup>	
				lcs	42,000	50,000	—	—	17,000	—	—	—	
			380/415V	lcu	40,000	70,000	—	—	35,000	—	—	200,000 <sup>ⓑ</sup>	
				lcs	20,000	35,000	—	—	9,000	—	—	—	
500V			lcu	—	—	—	—	18,000	—	—	—		
lcs	—	—	—	—	—	5,000	—	—	—				
DC	2-Pole, 250V DC Interrupting Ratings		35,000	42,000	5,000	30,000	30,000	30,000	—	30,000			
	3-Pole, 500V DC Interrupting Ratings <sup>ⓐ</sup>		—	—	—	—	18,000	—	—	50,000			
Dimensions in inches	Height		5.5	5.5	6.34	6.34	6.34	6.34	6.58	9.26			
	Width		1-Pole	1.00	1.00	1.00	1.00	1.00	1.00	—	—		
			2-Pole	2.00	2.00	2.00	2.00	2.00	2.00	2.00			
			3-Pole	3.00	3.00	3.00	3.00	3.00	3.00	3.00			
			4-Pole	4.00	4.00	—	—	—	—	—			
Depth		3.00	3.00	4.00	4.00	4.00	4.00	4.00	4.00				
Overcurrent Devices	Thermal and Fixed Magnetic Trip		✓	✓	✓	✓	✓	✓	✓	✓			
	Thermal and Adjustable Magnetic Trip		—	—	—	—	—	—	—	—			
	Adjustable Magnetic Trip only		—	—	—	—	✓	—	—	✓			
	Motor Circuit Protector		—	—	—	—	—	—	—	—			
Accessories & Modifications	Molded Case Switch		✓	✓	✓	✓	✓	—	—	✓			
	Undervoltage Trip		✓	✓	✓	✓	✓	✓	✓	✓			
	Shunt Trip		✓	✓	✓	✓	✓	✓	✓	✓			
	Auxiliary Switch		✓	✓	✓	✓	✓	✓	✓	✓			
	Alarm Switch		✓	✓	✓	✓	✓	✓	✓	✓			
	Mechanical Interlock		—	—	—	—	—	—	—	—			
	Rear Connection Studs		✓	✓	✓	✓	✓	✓	✓	✓			
	Electric Motor Operator		✓	✓	✓	✓	✓	✓	✓	✓			
	Plug-In Mounting Assembly (3-4 Pole Only)		✓	✓	✓	✓	✓	✓	✓	✓			
	Fungus Proofing (ref. page 6-84)		✓	✓	✓	✓	✓	✓	✓	✓			
Individual Enclosures	Type 1 — Indoor Surface		✓	✓	✓	✓	✓	✓	✓	✓			
	Type 1 — Indoor, Flush		✓	—	✓	—	✓	✓	✓	✓			
	Type 3R — Outdoor-Rainproof		✓	—	✓	—	✓	✓	✓	✓			
	Type 7 — Flammable Gas Atmosphere		—	—	—	—	✓	✓	✓	✓			
	Type 9 — Combustion Dusttight		—	—	—	—	✓	✓	✓	✓			
	Type 5, 12 — Lint, Fine Dust, Oils, Coolants		✓	—	✓	—	✓	✓	✓	✓			
	Type 12K — Semi-Dusttight		✓	—	✓	—	✓	✓	✓	✓			

For inches / millimeters conversion, see Application Data section.

ⓐ 1-pole only.

ⓑ 35-100A: 25,000 AIR at 277V AC/15-30A: 65,000 AIR at 277V AC.

ⓐ For DC UPS system application.

ⓐ Single pole ED6 (15-30A) 30kA, (35-100A) 18 kA. CSA Only.

ⓑ Single pole HED4, 15-30A: 65,000 AIR at 240V AC; single pole HED4, 35-100A: 25,000 AIR at 240V AC.

ⓐ NEG and HEG breakers are rated at 600/347V.

ⓐ 1-pole NEG breaker is rated 85K @ 240V, 35K @ 277V and 22K @ 347V. 1-pole HEG breaker is rated 100K @ 240V, 65K @ 277V and 25K @ 347V.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

Page			General Purpose Breakers												
			FD6A, FXD6A	HFD6, HFXD6	HHFD6, HHFXD6	CFD6	JXD2-A	JD6-A, JXD6-A	HJD6-A, HJXD6-A	HHJD6-A, HHJXD6-A	CJD6				
<b>Ratings</b>			Poles	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3
			Amperes, Continuous	70-250	70-250	70-250	70-250	200-400	200-400	200-400	200-400	200-400	200-400	200-400	
			Volts 50/60HZ	2-Pole 3-Pole	600	600	600	600	240	600	600	600	600	600	
<b>AC</b>			Interrupt Rating Symmetrical RMS Amperes	UL	240V	65,000	100,000	200,000	200,000	65,000	65,000	100,000	200,000	200,000	
					480V	35,000	65,000	100,000	200,000	—	35,000	65,000	100,000	150,000	
					600V	22,000	25,000	25,000	100,000	—	25,000	35,000	50,000	100,000	
				IEC60947-2 50/60HZ	220/240V	lcu	65,000	100,000	200,000	—	—	65,000	100,000	200,000	—
						lcs	33,000	50,000	100,000	—	—	33,000	50,000	100,000	—
					380/415V	lcu	35,000	65,000	100,000	—	—	40,000	65,000	100,000	—
						lcs	18,000	33,000	50,000	—	—	20,000	33,000	50,000	—
					500V	lcu	20,000	42,000	65,000	—	—	20,000	42,000	65,000	—
						lcs	10,000	21,000	33,000	—	—	15,000	21,000	33,000	—
				<b>DC</b>			2-Pole 250V DC Interrupting Ratings	30,000	30,000	—	50,000	30,000	30,000	30,000	—
3-Pole, 500V DC Interrupting Ratings <sup>Ⓢ</sup>	18,000	25,000	—				50,000	—	25,000	35,000	—	—	50,000		
<b>Dimensions in inches</b>			Height	9.50	9.50	14.12	14.12	11.00	11.00	11.00	11.00	11.00	17.86		
			Width	2-Pole 3-Pole	4.50	4.50	4.50	4.50	7.50	7.50	7.50	7.50	7.50		
			Depth	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00			
<b>Overcurrent Devices</b>			Thermal and Fixed Magnetic Trip	—	—	—	—	—	—	—	—	—	—		
			Thermal and Adjustable Magnetic Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
			Adjustable Magnetic Trip Only	✓	—	—	✓	—	—	✓	✓	—			
			Motor Circuit Protector	✓	—	—	✓	—	—	✓	✓	—			
			Molded Case Switch	✓	—	—	✓	✓	✓	—	—	✓			
			Undervoltage Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Shunt Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Auxiliary Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Alarm Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Mechanical Interlock	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Rear Connection Studs	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Electric Motor Operator	✓	✓	✓	✓	✓	✓	✓	✓	✓			
			Plug-In Mounting Assembly	✓	✓	✓	✓	✓	✓	✓	✓	✓			
<b>Accessories &amp; Modifications</b>			Fungus Proofing (ref. page 6-84)	✓	✓	✓	✓	—	✓	✓	✓	✓			
			<b>Individual Enclosures</b>			Type 1 — Indoor Surface	✓	✓	✓	✓	✓	✓	✓	✓	
						Type 1 — Indoor, Flush	—	✓	—	✓	—	—	—	—	
						Type 3R — Outdoor-Rainproof	✓	✓	✓	✓	✓	✓	✓	✓	
						Type 7 — Flammable Gas Atmosphere	✓	✓	✓	—	✓	✓	✓	✓	
						Type 9 — Combustion Dusttight	✓	✓	✓	—	✓	✓	✓	✓	
						Type 5, 12 — Lint, Fine Dust, Oils, Coolants	✓	✓	✓	✓	✓	✓	✓	✓	
Type 12K — Semi-Dusttight	✓	✓				✓	✓	—	✓	✓	✓				

For inches / millimeters conversion, see Application Data section.

Ⓢ For DC UPS application.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

Page		General Purpose Breakers												
		LD6, LXD6	HLD6, HLXD6	HHL6, HHLXD6	CLD6	LMD6, LMXD6	HLMD6, HLMXD6	MD6, MXD6	HMD6, HMXD6	CMD6				
Page		6-44	6-45	6-45	6-45	6-48	6-49	6-51	6-52	6-52				
Ratings	AC	Poles	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	2, 3	3			
		Amperes, Continuous	250-600	250-600	250-600	450-600	500-800	500-800	500-800	500-800	400-800			
		Volts 50/60 HZ	2-Pole	600	600	600	600	600	600	600	600	600		
			3-Pole	600	600	600	600	600	600	600	600	600		
		Interrupt Rating Symmetrical RMS Amperes	UL	240V	65,000	100,000	200,000	200,000	65,000	100,000	65,000	100,000	200,000	
				480V	35,000	65,000	100,000	150,000	50,000	65,000	50,000	65,000	100,000	
				600V	25,000	35,000	50,000	100,000	25,000	50,000	25,000	50,000	65,000	
			IEC 947-2 50/60HZ	220/240V	lcu	65,000	100,000	200,000	—	65,000	100,000	65,000	00,000	200,000
					lcs	33,000	50,000	100,000	—	33,000	50,000	33,000	50,000	100,000
				380/415V	lcu	40,000	65,000	100,000	—	40,000	65,000	40,000	65,000	100,000
					lcs	20,000	33,000	50,000	—	20,000	33,000	20,000	33,000	50,000
				500V	lcu	30,000	42,000	65,000	—	30,000	42,000	30,000	42,000	65,000
					lcs	15,000	21,000	33,000	—	15,000	21,000	15,000	21,000	33,000
					DC	2-Pole 250V DC Interrupting Ratings	30,000	30,000	—	50,000	30,000	30,000	30,000	30,000
		3-Pole, 500V DC Interrupting Ratings <sup>Ⓢ</sup>	35,000	—	—	50,000	25,000	50,000	25,000	50,000	50,000			
Height	Height	11.00	11.00	11.00	17.86	16.00	16.00	16.00	16.00	16.00				
	Width	7.50	7.50	7.50	7.50	7.50	7.50	9.00	9.00	9.00				
	Depth	4.00	4.00	4.00	4.00	4.59	4.59	6.19	6.19	6.19				
Overcurrent Devices	Thermal and Adjustable Magnetic Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Adjustable Magnetic Trip Only Motor Circuit Protector	✓	—	—	✓	✓	✓	—	—	✓				
	Molded Case Switch	✓	—	—	✓	✓	—	✓	—	✓				
Accessories & Modifications	Undervoltage Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Shunt Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Auxiliary Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Alarm Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Mechanical Interlock	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Rear Connection Studs	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Electric Motor Operator	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Plug-In Mounting Assembly	✓	✓	✓	✓	—	—	✓	✓	✓				
	Fungus Proofing (ref. page 6-84)	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Individual Enclosures	Type 1 — Indoor Surface	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Type 1 — Indoor, Flush	✓	—	—	—	—	—	—	—	—				
	Type 3R — Outdoor-Rainproof	✓	✓	✓	—	✓	✓	✓	✓	✓				
	Type 5, 12 — Lint, Fine Dust, Oils, Coolants	✓	✓	✓	—	✓	✓	✓	✓	✓				
	Type 7 — Flammable Gas Atmosphere	✓	✓	✓	—	—	—	—	—	—				
	Type 9 — Combustion Dusttight	✓	✓	✓	✓	—	—	—	—	—				
Type 12K — Semi-Dusttight	✓	✓	✓	—	✓	✓	✓	✓	✓					

For inches / millimeters conversion, see Application Data section.

Ⓢ For DC UPS application.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

### Thermal-Magnetic Trip Breakers

				General Purpose Breakers							
				ND6, NXD6	HND6, HNXD6	CND6	PD6 <sup>②</sup> , PXD6 <sup>②</sup>	HPD6 <sup>②</sup> , HPXD6 <sup>②</sup>	CPD6 <sup>②</sup>		
<b>Page</b>				<b>6-55</b>	<b>6-56</b>	<b>6-56</b>	<b>6-59</b>	<b>6-59</b>	<b>6-59</b>		
<b>Ratings</b>	<b>AC</b>	Poles		2, 3	2, 3	3	3	3	3		
		Amperes, Continuous		800-1200	800-1200	800-1200	1200-1600	1200-1600	1200-1600		
		Volts 50/60 HZ		3-Pole	600	600	600	600	600	600	
		Interrupt Rating Symmetrical RMS Amperes	UL	240V	65,000	100,000	200,000	65,000	100,000	200,000	
				480V	50,000	65,000	100,000	50,000	65,000	100,000	
				600V	25,000	50,000	65,000	25,000	50,000	65,000	
			IEC 947-2 50/60HZ	220/240V	lcu	65,000	100,000	200,000	65,000	100,000	200,000
					lcs	33,000	50,000	100,000	33,000	50,000	100,000
				380/415V	lcu	40,000	65,000	100,000	40,000	65,000	100,000
					lcs	20,000	33,000	50,000	10,000	17,000	25,000
				500V	lcu	30,000	42,000	65,000	30,000	42,000	65,000
					lcs	15,000	21,000	33,000	8,000	21,000	17,000
		<b>DC</b>	2-Pole 250V DC Interrupting Ratings		30,000	30,000	30,000	30,000	30,000	30,000	
	3-Pole, 500V DC Interrupting Ratings <sup>①</sup>		25,000	50,000	50,000	25,000	50,000	50,000			
<b>Dimensions in inches</b>	Circuit breakers require Connect-all mounting block. Dimensions shown are for circuit breaker only.		Height	16.00	16.00	16.00	16.0	16.00	16.00		
			Width	9.00	9.00	9.00	9.00	9.00	9.00		
			Depth	6.19	6.19	6.19	6.19	6.19	6.19		
<b>Overcurrent Devices</b>	Thermal and Adjustable Magnetic Trip		✓	✓	✓	✓	✓	✓			
	Adjustable Magnetic Trip Only		—	—	—	—	—	—			
	Motor Circuit Protector		—	—	—	—	—	—			
<b>Accessories &amp; Modifications</b>	Molded Case Switch		✓	—	✓	✓	—	—			
	Undervoltage Trip		✓	✓	✓	✓	✓	✓			
	Shunt Trip		✓	✓	✓	✓	✓	✓			
	Auxiliary Switch		✓	✓	✓	✓	✓	✓			
	Alarm Switch		✓	✓	✓	✓	✓	✓			
	Mechanical Interlock		✓	✓	✓	✓	✓	✓			
	Rear Connections Studs		✓	✓	✓	—	—	—			
	Electric Motor Operator		✓	✓	✓	✓	✓	✓			
	Plug-in Mounting Assembly		✓	✓	✓	—	—	—			
	Fungus Proofing (ref. page 6-84)		✓	✓	✓	✓	✓	✓			
<b>Individual Enclosures</b>	Mounting Block (required)		—	—	—	✓	✓	✓			
	Type 1 — Indoor Surface		✓	✓	✓	✓	✓	✓			
	Type 1 — Indoor, Flush		—	—	—	—	—	—			
	Type 3R — Outdoor-Rainproof		✓	✓	✓	—	—	—			
	Type 7 — Flammable Gas Atmosphere		✓	✓	✓	—	—	—			
	Type 9 — Combustion Dusttight		—	—	—	—	—	—			
	Type 5, 12 — Lint, Fine Dust, Oils, Coolants		—	—	—	—	—	—			
Type 12K — Semi-Dusttight		✓	✓	✓	—	—	—				

For inches / millimeters conversion, see Application Data section.

① For DC UPS application.

② 2-pole design.

③ 3-pole design.

④ Requires Connect-all mounting assembly. Dimensions shown are for circuit breaker only.

# Molded Case Circuit Breakers

## Reference Guide

## Selection

Thermal-Magnetic Trip Breakers  
& Electronic Trip Breakers

Page			General Purpose Breakers		Solid State Trip Circuit Breakers							
			RD6 <sup>Ⓞ</sup> RXD6 <sup>Ⓞ</sup>	HRD6 <sup>Ⓞ</sup> HRXD6 <sup>Ⓞ</sup>	SJD6	SHJD6	SCJD6	SLD6	SHLD6	SCLD6		
6-62			6-62	6-62	6-42	6-42	6-42	6-46	6-46	6-46		
Ratings	AC	Poles	3	3	3	3	3	3	3	3		
		Amperes, Continuous	1600-2000	1600-2000	200-400	200-400	200-400	300-600	300-600	300-600		
		Volts 50/60 HZ	3-Pole	600	600	600	600	600	600	600		
		Interrupt Rating Symmetrical RMS Amperes	UL	240V	65,000	100,000	65,000	100,000	200,000	65,000	100,000	200,000
				480V	50,000	65,000	35,000	65,000	150,000	35,000	65,000	150,000
				600V	25,000	50,000	25,000	35,000	100,000	25,000	35,000	100,000
			IEC60947-2 50/60HZ	220/240V	lcu	65,000	100,000					
				380/415V	lcs	33,000	50,000					
					lcu	40,000	65,000					
		500V	lcs	10,000	17,000							
	lcu		30,000	42,000								
	DC	2-Pole 250V DC Interrupting Ratings		30,000	30,000							
3-Pole, 500V DC Interrupting Ratings <sup>Ⓞ</sup>		25,000	50,000									
Dimensions in inches	Height		16.00	16.00	11.00	11.00	17.86	11.0	11.00	17.86		
	Width	3-Pole	9.00	9.00	7.50	7.50	7.50	7.50	7.50	7.50		
	Depth		6.19	6.19	4.00	4.00	4.00	4.00	4.00	4.00		
Overcurrent Devices	Solid State Trip		—	—	✓	✓	✓	✓	✓	✓		
	Thermal and Adjustable Magnetic Trip		✓	✓	—	—	—	—	—	—		
	Adjustable Magnetic Trip Only Motor Circuit Protector		—	—	—	—	—	—	—	—		
	Molded Case Switch		✓	—	—	—	—	—	—	—		
Accessories & Modifications	Undervoltage Trip		✓	✓	✓	✓	✓	✓	✓	✓		
	Shunt Trip		✓	✓	✓	✓	✓	✓	✓	✓		
	Auxiliary Switch		✓	✓	✓	✓	✓	✓	✓	✓		
	Alarm Switch		✓	✓	✓	✓	✓	✓	✓	✓		
	Mechanical Interlock		✓	✓	✓	✓	✓	✓	✓	✓		
	Rear Connections Studs		—	—	✓	✓	✓	✓	✓	✓		
	Electric Motor Operator		✓	✓	✓	✓	✓	✓	✓	✓		
	Plug-In Mounting Assembly		—	—	✓	✓	✓	✓	✓	✓		
	Fungus Proofing (ref. page 6-84)		✓	✓	✓	✓	✓	✓	✓	✓		
Mounting Block (required)		✓	✓	—	—	—	—	—	—			
Individual Enclosures	Type 1 — Indoor Surface		✓	✓	✓	✓	✓	✓	✓	✓		
	Type 1 — Indoor, Flush		—	—	—	—	—	—	—	—		
	Type 3R — Outdoor-Rainproof		—	—	✓	✓	—	✓	✓	—		
	Type 7 — Flammable Gas Atmosphere		—	—	✓	✓	—	✓	✓	—		
	Type 9 — Combustion Dusttight		—	—	✓	✓	—	✓	✓	—		
	Type 5, 12 — Lint, Fine Dust, Oils, Coolants		—	—	✓	✓	✓	✓	✓	✓		
Type 12K — Semi-Dusttight		—	—	✓	✓	✓	✓	✓	✓			

For inches / millimeters conversion, see Application Data section.

<sup>Ⓞ</sup> Requires Connect-all mounting assembly. Dimensions shown are for circuit breaker only.



# Molded Case Circuit Breakers

## Reference Guide

## Selection

### Electronic Trip Breakers

Page		Solid State Trip Circuit Breakers														
		SMD6	SHMD6	SCMD6	SND6	SHND6	SCND6	SPD6 <sup>①</sup>	SHPD6 <sup>①</sup>	STD6 <sup>②</sup>	SHTD6 <sup>②</sup>	SHHTD6 <sup>②</sup>				
Ratings	AC	Poles	3	3	3	3	3	3	3	3	3	3	3			
		Amperes, Continuous	600-800	600-800	600-800	800-1200	800-1200	800-1200	1200-1600	1200-1600	2000-3200	2000-3200	2000-3200			
		Volts 50/60HZ	3-Pole	600	600	600	600	600	600	600	600	600	600			
		Interrupt Rating Symmetrical RMS Amperes	UL	240V	65,000	100,000	200,000	65,000	100,000	200,000	65,000	100,000	85,000	150,000	200,000	
				480V	50,000	65,000	100,000	50,000	65,000	100,000	50,000	65,000	65,000	100,000	150,000	
		Interrupt Rating Symmetrical RMS Amperes	IEC60947-2 50/60HZ	380/415V	Icu	—	—	—	—	—	—	—	—	—	—	
					Ics	—	—	—	—	—	—	—	—	—	—	
				690V	Icu	—	—	—	—	—	—	—	—	—	—	—
					Ics	—	—	—	—	—	—	—	—	—	—	—
		Dimensions in inches	Height	10.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	27.5	27.5	27.5		
Width	9.00		9.00	9.00	9.00	9.00	9.00	9.00	9.00	14.12	14.12	14.12				
Depth	6.19		6.19	6.19	6.19	6.19	6.19	6.19	6.19	11.38	11.38	11.38				
Overcurrent Devices	Solid State Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Accessories & Modifications	Undervoltage Trip		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Shunt Trip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Auxiliary Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Alarm Switch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Mechanical Interlock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
	Rear Connection Studs	✓	✓	✓	✓	✓	✓	—	—	✓	✓	✓				
	Electric Motor Operator	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—				
	Plug-In Mounting Assembly	✓	✓	✓	✓	✓	✓	—	—	—	—	—				
Fungus Proofing (ref. page 6-84)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Individual Enclosures	Type 1 — Indoor Surface	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—				
	Type 1 — Indoor, Flush	—	—	—	—	—	—	—	—	—	—	—				
	Type 3R — Outdoor-Rainproof	✓	✓	✓	✓	✓	✓	—	—	—	—	—				
	Type 7 — Flammable Gas Atmosphere	—	—	—	—	—	—	—	—	—	—	—				
	Type 9 — Combustion Dusttight	—	—	—	—	—	—	—	—	—	—	—				
	Type 5, 12 — Lint, Fine Dust, Oils, Coolants	✓	✓	✓	✓	✓	✓	—	—	—	—	—				
	Type 12K — Semi-Dusttight	✓	✓	✓	✓	✓	✓	—	—	—	—	—				

For inches / millimeters conversion, see Application Data section.

① Requires connect-all mounting block assembly. Dimensions shown are for circuit breaker.

② Breaker has rating plugs which can be changed within each frame rating.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

Page			6-30	6-32		6-96			6-100			6-104			
Breaker Frame Family			GG	EG		DG			FG			JG			
	Continuous Amps		15-125A	15-125A		30-150A			40-250A			70-400A			
	Poles		1, 2, 3	1, 2, 3, 4		2, 3, 4			2, 3, 4			2, 3, 4			
	Max. Volts AC		600Y/347V	600Y/347V		600V			600V			600V			
Breaker Type			NGG	NEG	HEG	NDG	HDG	LDG	NFG	HFG	LFG	NJG	HJG	LJG	
Ratings	Interrupting Class		N	N	H	N	H	L	N	H	L	N	H	L	
	Interrupting Rating RMS Symmetrical Amperes AC 50/60Hz	UL	240Vac	65	85	100	65	100	200	65	100	200	65	100	200
			480Vac	25	35	65	35	65	100	35	65	100	35	65	100
			600Vac	14 (600Y/347)	22	25	18	20	25	18	20	25	25	25	25
	DC Interrupting Ratings (UL)②	I <sub>CS</sub> /I <sub>CU</sub>	220/240Vac	65/33	85/43	100/50	65/65	100/75	200/150	65/65	100/75	200/150	65/65	100/75	200/150
			380/415Vac	25/12.5	40/30	70/35	40/40	70/70	100/75	40/40	70/70	100/75	45/45	70/70	100/75
			690Vac	—	—	—	12/6	12/6	12/6	12/6	12/6	12/6	12/6	15/8	15/8
	DC Interrupting Ratings (UL)②		250Vdc (2-Pole)	14	35	42	30	30	30	30	30	30	30	30	30
			500Vdc (3-Pole)	—	—	—	18	18	18	18	18	18	25	35	35
			600Vdc (3-Pole)	—	—	—	#	#	#	#	#	#	#	#	#
750Vdc (4-Pole)			—	—	—	#	#	#	#	#	#	#	#	#	
Dimensions in Inches	1-Pole		5.1H x 1W x 2.8D	5.5H x 1W x 3D		—			—			—			
	2-Pole		5.1H x 2W x 2.8D	5.5H x 2W x 3D		6.9H x 4.1W x 3.4D			6.9H x 4.1W x 3.4D			11H x 5.5W x 4.2D			
	3-Pole		5.1H x 3W x 2.8D	5.5H x 3W x 3D		6.9H x 4.1W x 3.4D			6.9H x 4.1W x 3.4D			11H x 5.5W x 4.2D			
	4-Pole		—	5.5H x 4W x 3D		6.9H x 5.5W x 3.4D			6.9H x 5.5W x 3.4D			11H x 7.2W x 4.2D			
Trip Unit Information	Thermal-Magnetic		◆	◆		◆			◆			◆			
	Electronic					◆			◆			◆			
	Electronic with LCD					◆			◆			◆			
	Interchangeable Trip Unit					◆			◆			◆			
	Reverse Feed (w/Non-Interchangeable Trip)		◆	◆		◆			◆			◆			
	Communications Capability*					◆			◆			◆			
Specific Application Breakers	Molded Case Switch			◆		◆			◆			◆			
	Motor Circuit Protector			◆		◆			◆			◆			
	100% Rated			◆		◆			◆			◆			
	50°C Calibrated <sup>A</sup>			◆		◆			◆			◆			
Accessories & Modifications	Auxiliary Switch		◆	◆		◆			◆			◆			
	Alarm Switch		◆	◆		◆			◆			◆			
	Shunt Trip		◆	◆		◆			◆			◆			
	Undervoltage Release			◆		◆			◆			◆			
	Mechanical Interlocks			◆		◆			◆			◆			
	Electric Motor or Stored Energy Operator			◆		◆			◆			◆			
	Rear Connecting Studs			◆		◆			◆			◆			
	Plug-In Mounting Assy. w/Trip Interlock			◆		◆			◆			◆			
	Draw-Out Assembly			◆		◆			◆			◆			
	Handle Mechanism Options		◆	◆		◆			◆			◆			
Fungus Proofing			◆		◆			◆			◆				
Enclosures <sup>A</sup>	NEMA 1 – Indoor, Surface Mount		◆	◆		◆			◆			◆			
	NEMA 1 – Indoor, Flush Mount		◆	◆		◆			◆			◆			
	NEMA 3R – Outdoor, Rain Proof		◆	◆		◆			◆			◆			
	NEMA 4, 4X – Stainless Steel			◆		◆			◆			◆			
	NEMA 7, 9 – Hazardous Locations			◆		◆			◆			◆			
	NEMA 12 – Dust		◆	◆		◆			◆			◆			
	Terminal Shields		◆	◆		◆			◆			◆			
	Distribution Lugs		◆	◆		◆			◆			◆			
	Ground Sensor (Neutral Transformer)			◆		◆			◆			◆			

① 500Vdc nominal, 600Vdc max. for ungrounded DC UPS systems.  
 ② DC Interrupting Ratings are not applicable to electronic circuit breakers.  
 \* - Communications available via a COM 10 module using Profibus protocol.  
 # - Consult Siemens for these applications.  
 GG and EG are not VL family breakers and do not share common VL accessories.  
 A - Consult Siemens for availability.

# Molded Case Circuit Breakers

## Reference Guide

## Selection/Application

Page			6-108			6-112			6-116			6-120			
Breaker Frame Family			LG			MG			NG			PG			
Continuous Amps			150-600A			200-800A			300-1200A			400-1600A			
Poles			2, 3			2, 3, 4			2, 3, 4			3, 4			
Max. Volts AC			600V			600V			600V			600V			
Breaker Type			NLG	HLG	LLG	NMG	HMG	LMG	NNG	HNG	LNG	NPG	HPG	LPG	
Ratings	Interrupting Class		N	H	L	N	H	L	N	H	L	N	H	L	
	Interrupting Rating RMS Symmetrical Amperes AC 50/60Hz	UL	240Vac	65	100	200	65	100	200	65	100	200	65	100	200
			480Vac	35	65	100	35	65	100	35	65	100	35	65	100
			600Vac	25	25	25	25	35	50	25	35	65	25	35	65
	DC Interrupting Ratings (UL) <sup>③</sup>	I <sub>CS</sub> /I <sub>CU</sub>	220/240Vac	65/65	100/75	200/150	65/65	100/75	200/150	65/65	100/75	200/150	65/65	100/75	200/150
			380/415Vac	45/45	70/70	100/75	50/50	70/70	100/75	50/25	70/35	100/50	50/25	70/35	100/50
			690Vac	12/6	15/8	15/8	20/10	30/15	35/17	20/10	30/15	35/15	20/10	30/15	35/15
	DC Interrupting Ratings (UL) <sup>③</sup>	I <sub>CS</sub> /I <sub>CU</sub>	250Vdc (2-Pole)	30	30	30	22	25	42	22	25	42	22	25	42
			500Vdc (3-Pole)	25	35	35	35	50	65	35	50	65	35	50	65
			600Vdc (3-Pole)	#	#	#	#	#	#	#	#	#	#	#	#
750Vdc (4-Pole)	#	#	#	#	#	#	#	#	#	#	#	#	#		
Dimensions in Inches	1-Pole		—			—			—			—			
	2-Pole		11H x 5.5W x 4.2D			16H x 7.5W x 4.7D			16H x 9W x 6.2D			—			
	3-Pole		11H x 5.5W x 4.2D			16H x 7.5W x 4.7D			16H x 9W x 6.2D			—			
	4-Pole		—			16H x 10W x 4.7D			16H x 12W x 6.2D			—			
Trip Unit Information	Thermal-Magnetic		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Electronic		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Electronic with LCD		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Interchangeable Trip Unit		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Reverse Feed (w/Non-Interchangeable Trip)		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Communications Capability <sup>①</sup>		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Specific Application Breakers	Molded Case Switch		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Motor Circuit Protector		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	100% Rated		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	50°C Calibrated <sup>A</sup>		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Accessories & Modifications	Auxiliary Switch		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Alarm Switch		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Shunt Trip		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Undervoltage Release		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Mechanical Interlocks		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Electric Motor or Stored Energy Operator		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Rear Connecting Studs		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Plug-In Mounting Assy. w/Trip Interlock		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Draw-Out Assembly		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Handle Mechanism Options		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Fungus Proofing		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
Enclosures <sup>A</sup>	NEMA 1 – Indoor, Surface Mount		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	NEMA 1 – Indoor, Flush Mount		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	NEMA 3R – Outdoor, Rain Proof		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	NEMA 4, 4X – Stainless Steel		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	NEMA 7, 9 – Hazardous Locations		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	NEMA 12 – Lint, Fine Dust, Oils, Coolant		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Terminal Shields	Terminal Shields		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Distribution Lugs		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	Ground Sensor (Neutral Transformer)		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	

① Communications available via COMPRO or COMMOD modules using Profibus or Modbus protocol.

② 500Vdc nominal, 600Vdc max. for ungrounded DC UPS systems.

③ DC Interrupting Ratings are not applicable to electronic circuit breakers.

# - Consult Siemens for these applications.

A - Consult Siemens for availability.

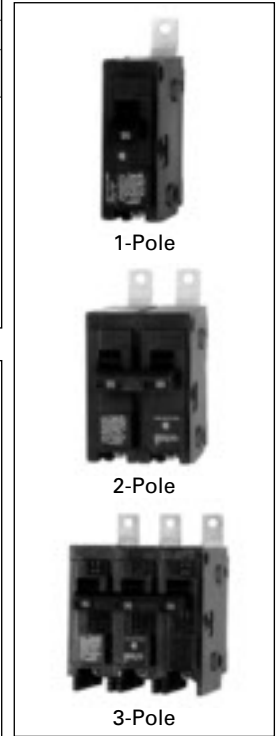
# Molded Case Circuit Breakers

## Panelboard Mounting with INSTA-WIRE

Selection

### 1-Pole Bolt-On (120V AC)<sup>①⑤</sup>

Continuous Current Rating @ 40° C	Type BL		Type BLH		Type HBL	
	10,000A IR		22,000A IR		65,000A IR	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
10	B110	35.00	—	—	—	—
15	B115 <sup>②</sup>	35.00	B115H <sup>②</sup>	69.00	B115HH <sup>②</sup>	119.00
20	B120 <sup>②</sup>	35.00	B120H <sup>②</sup>	69.00	B120HH <sup>②</sup>	119.00
25	B125	35.00	B125H	77.00	B125HH■	119.00
30	B130	35.00	B130H	77.00	B130HH	119.00
35	B135	35.00	B135H■	77.00	B135HH■	119.00
40	B140	35.00	B140H	77.00	B140HH	139.00
45	B145■	35.00	B145H■	77.00	B145HH■	139.00
50	B150	35.00	B150H	77.00	B150HH■	139.00
60	B160	35.00	B160H■	77.00	B160HH■	162.00
70	B170	76.00	B170H■	98.00	B170HH■	162.00

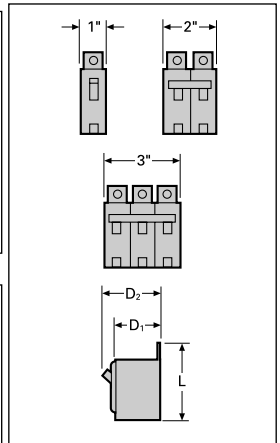


### 2-Pole Bolt-On (Common-Trip 120/240V AC)<sup>①⑥</sup>

10	B210	80.00	—	—	—	—
15	B215	80.00	B215H	156.00	B215HH	290.00
20	B220	80.00	B220H	156.00	B220HH	290.00
25	B225	80.00	B225H■	156.00	B225HH■	290.00
30	B230	80.00	B230H	156.00	B230HH	290.00
35	B235	80.00	B235H■	156.00	B235HH■	355.00
40	B240	80.00	B240H	156.00	B240HH	355.00
45	B245	80.00	B245H■	156.00	B245HH■	355.00
50	B250	80.00	B250H	156.00	B250HH	355.00
60	B260	80.00	B260H	156.00	B260HH	355.00
70	B270	156.00	B270H■	240.00	B270HH■	581.00
80	B280	212.00	B280H■	342.00	B280HH■	655.00
90	B290	212.00	B290H■	342.00	B290HH■	655.00
100	B2100	212.00	B2100H	342.00	B2100HH	655.00
110	B2110■	427.00	B2110H■	861.00	B2110HH■	655.00
125	B2125	452.00	B2125H	905.00	B2125HH■	2167.00

### 2-Pole Bolt-On (Common-Trip 240V AC)<sup>①③④</sup>

15	B215R	212.00	—	—	—	—
20	B220R	212.00	—	—	—	—
30	B230R	212.00	—	—	—	—
40	B240R■	212.00	—	—	—	—
50	B250R	212.00	—	—	—	—
60	B260R	212.00	—	—	—	—
70	B270R■	281.00	—	—	—	—
80	B280R■	321.00	—	—	—	—
90	B290R■	321.00	—	—	—	—
100	B2100R■	321.00	—	—	—	—



### 3-Pole Bolt-On (Common-Trip 240V AC)<sup>①⑦</sup>

10	B310	266.00	—	—	—	—
15	B315	266.00	B315H	400.00	B315HH	503.00
20	B320	266.00	B320H	400.00	B320HH	503.00
25	B325	266.00	B325H	400.00	B325HH■	503.00
30	B330	266.00	B330H	400.00	B330HH	503.00
35	B335	266.00	B335H■	400.00	B335HH■	503.00
40	P340	266.00	B340H	400.00	B340HH	613.00
45	B345	266.00	B345H■	400.00	B345HH■	613.00
50	B350	266.00	B350H	400.00	B350HH	613.00
60	B360	266.00	B360H	400.00	B360HH	613.00
70	B370	327.00	B370H	486.00	B370HH	655.00
80	B380	369.00	B380H■	570.00	B380HH	771.00
90	B390	369.00	B390H■	570.00	B390HH	771.00
100	B3100	369.00	B3100H	570.00	B3100HH	771.00

Breaker Type	Amperes	Dimensions		
		L	D1	D2
BL, BLH	15-50	3 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	3
BL, BLH	55-125	3 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	3
HBL	15-125	3 <sup>3</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	3

### MP-T / MP-HT / MP-MT Accessories

Description	Catalog Number	Field/Factory Installed	List Price \$
120V Shunt Trip	add suffix...00S01■	Factory	141.00(adder)
24V Shunt Trip	add suffix...00S07■	Factory	141.00(adder)
120V Auxiliary Switch	add suffix...01■ <sup>②</sup>	Factory	83.00(adder)
1-Pole Padlocking Device	ECPLD1	Field	10.10
2-Pole Padlocking Device	ECPLD2	Field	10.20
3-Pole Padlocking Device	ECQLD3 (bag of 10 pcs.)	Field	98.00
Handle Block	ECHBD1	Field	9.10

### Modifications

Description	Catalog Number	List Price \$
400Hz Calibration	add suffix...Y <sup>⑥</sup>	8.00 (adder)
415V 50Hz Calibration	add suffix...E <sup>⑥⑦</sup>	No adder
Marine 50°C Ambient Calibration	add suffix...M	No adder
Fungus Proofing	add suffix...F	10.50 (adder per pole)

■ Built to order. Allow 2-3 weeks for delivery  
 ① UL Listed for use with 60/75° wire through 125 amps, HACR rated. 120V AC Fluorescent Lighting.  
 ② 1A and 1B contacts.

③ UL Listed for use on 3-phase grounded "B" systems — 10,000 for this application.  
 ④ UL Listed for frequent switching applications (SWD).  
 ⑤ Shipped 12 per sleeve.  
 ⑥ Shipped 6 per sleeve.

⑦ Shipped 4 per sleeve.  
 ⑧ UL Listed 5KA IR.  
 ⑨ Not UL Listed.  
 ⑩ 1 & 2 Poles only.  
 ⑪ Contact factory for availability

# Molded Case Circuit Breakers

## Panelboard Mounting Circuit Breakers

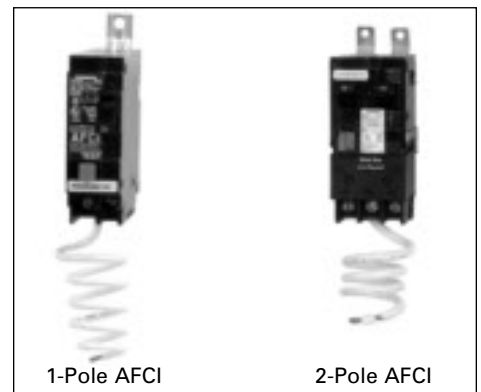
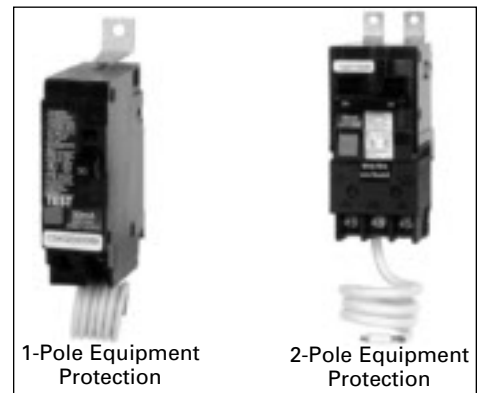
## Selection

- UL Listed and CSA Certified
- HACR Rated
- Standard 1 inch per pole format with bolt-on design

### Ground-Fault Circuit Interrupters (Class A - 5mA)<sup>Ⓜ</sup>

Ground-fault circuit interrupters (GFCI) provide Class A ground fault protection. A GFCI is a device intended for personnel protection and will de-energize the circuit when a fault current to ground is 6 milliamperes or more.

Breaker Type	Ampere Rating	10,000 A IR		22,000 A IR	
		Catalog Number	List Price \$	Catalog Number	List Price \$
<b>BLF/BLHF</b> 1-Pole 120V AC Bolt-On	15	BF115 <sup>Ⓜ</sup>	344.00	BF115H <sup>Ⓜ</sup>	683.00
	20	BF120 <sup>Ⓜ</sup>	344.00	BF120H <sup>Ⓜ</sup>	683.00
	25	BF125■	344.00	BF125H■	683.00
	30	BF130	344.00	BF130H	683.00
<b>BLF/BLHF</b> 2-Pole 120/240V AC Bolt-On	15	BF215	410.00	BF215H	743.00
	20	BF220	410.00	BF220H	743.00
	30	BF230	410.00	BF230H	743.00
	40	BF240	410.00	BF240H	743.00
	50	BF250	410.00	BF250H	743.00
	60	BF260	410.00	BF260H	743.00



### Ground Fault Equipment Protection (30mA)<sup>Ⓜ</sup>

Ground fault circuit breakers provide protection of equipment from damaging line-to-ground fault currents by de-energizing the circuit for all ungrounded conductors of the faulted circuit.

<b>BLE/BLEH</b> 1-Pole 120V AC Bolt-On	15	BE115 <sup>Ⓜ</sup>	418.00	BE115H <sup>Ⓜ</sup>	683.00
	20	BE120 <sup>Ⓜ</sup>	418.00	BE120H <sup>Ⓜ</sup>	683.00
	30	BE130	418.00	BE130H	683.00
<b>BLE/BLEH</b> 2-Pole 120/240V AC Bolt-On	15	BE215	549.00	BE215H	995.00
	20	BE220	549.00	BE220H	995.00
	30	BE230	549.00	BE230H	995.00
	40	BE240	549.00	BE240H	995.00
	50	BE250	549.00	BE250H	995.00
	60	BE260■	549.00	BE260H■	995.00

### Arc-Fault Circuit Interrupters (AFCI)<sup>Ⓜ</sup>

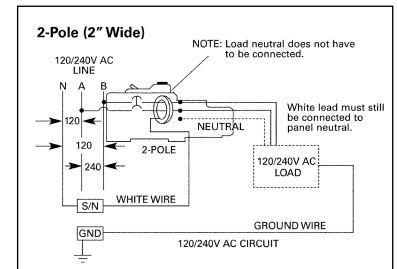
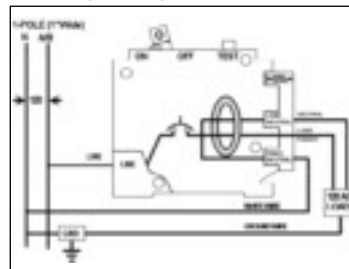
Arc-fault circuit interrupters (AFCI) detect arcing faults (an unintentional arcing condition in a circuit) that standard circuit breakers are unable to detect. An AFCI is a branch feeder device intended to mitigate the effects of arc-faults by de-energizing the circuit when an arc-fault is detected.

<b>BAF/BAFH</b> 1-Pole 120V AC	15	B115AF <sup>Ⓜ</sup>	361.00	B115AFH <sup>Ⓜ</sup>	717.00
	20	B120AF <sup>Ⓜ</sup>	361.00	B120AFH <sup>Ⓜ</sup>	717.00
<b>BAF/BAFH</b> 2-Pole 120/240V AC	15	B215AF	454.00	B215AFH■	820.00
	20	B220AF	454.00	B220AFH■	820.00

### QAF/QPF/QE Accessories

Description	Catalog Number	List Price \$
1-Pole Padlock (on/off)	ECPLD1	10.10
2-Pole Padlock (on/off)	ECPLD2	10.20
Handle Block	ECBX231M	9.70

### Wiring Diagrams



■ Built to order. Allow 2-3 weeks for delivery.

Ⓜ UL Listed as SWD (Switching Duty) Rated, suitable for 120V AC Fluorescent Lighting.

Ⓜ White line neutral (pigtail) must be connected to the panel neutral for the device to function.

# Molded Case Circuit Breakers

## Special Application Panelboard Mounting Breakers

*Selection*

### Switching Neutrals<sup>①</sup>

<b>BG</b> 2-Wire Common Trip	15	<b>BG215</b> ■	123.00	10	—	—
	20	<b>BG220</b> ■	123.00	10	—	—
	30	<b>BG230</b> ■	123.00	10	—	—
<b>BG</b> 3-Wire Common Trip	15	<b>BG315</b> ■	186.00	—	10	—
	20	<b>BG320</b> ■	186.00	—	10	—
	30	<b>BG330</b> ■	186.00	—	10	—

### HID Lighting<sup>①</sup>

For high-intensity discharge lamp loads having in-rush currents above the instantaneous trip setting of a standard breaker.

<b>BL</b> 1-Pole	15	<b>B115HID</b> ② ■	45.00	10	—	—
	20	<b>B120HID</b> ② ■	45.00	10	—	—
	30	<b>B130HID</b> ■	45.00	10	—	—
<b>BL</b> 2-Pole	15	<b>B215HID</b> ② ■	96.00	—	10	—
	20	<b>B220HID</b> ② ■	96.00	—	10	—
	30	<b>B230HID</b> ■	96.00	—	10	—

### Tungsten Lighting

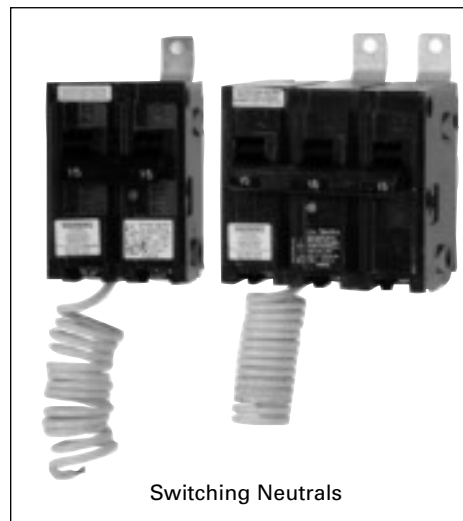
For high wattage, tungsten-lamp loads in-rush currents above the instantaneous trip setting of a standard breaker.

<b>BL</b> 1-Pole	15	<b>B115T</b> ③	62.00	10	—	—
	20	<b>B120T</b> ③	62.00	10	—	—

### Molded Case Switch

For applications that do not require overcurrent protection.

<b>BL</b> 2-Pole	30	<b>B230S</b>	68.00	—	—	—
	60	<b>B260S</b>	80.00	—	—	—



■ Built to order. Allow 2–3 weeks for delivery.

① HACR rated.

③ UL Listed for frequent switching applications (SWD). 120V AC fluorescent lighting.

# Molded Case Circuit Breakers

## BQD 100A Frame Panelboard Mounting Circuit Breakers

BQD<sup>④</sup>

Continuous Current Rating @ 40°C	1-Pole		2-Pole <sup>⑤</sup>		3-Pole <sup>⑥</sup>	
	277V AC–125V DC		480Y/277V AC–125/250V DC		480Y/277V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	BQD115 <sup>①②</sup>	128.00	BQD215 <sup>⑤</sup>	289.00	BQD315 <sup>⑥</sup>	513.00
20	BQD120 <sup>①②</sup>	128.00	BQD220 <sup>⑤</sup>	289.00	BQD320 <sup>⑥</sup>	513.00
25	BQD125 <sup>②</sup>	128.00	BQD225 <sup>⑤</sup>	289.00	BQD325 <sup>⑥</sup>	513.00
30	BQD130 <sup>②</sup>	128.00	BQD230 <sup>⑤</sup>	289.00	BQD330 <sup>⑥</sup>	513.00
35	BQD135 <sup>②</sup>	128.00	BQD235 <sup>⑤</sup>	289.00	BQD335 <sup>⑥</sup>	513.00
40	BQD140 <sup>②</sup>	128.00	BQD240 <sup>⑤</sup>	289.00	BQD340 <sup>⑥</sup>	513.00
45	BQD145 <sup>②■</sup>	128.00	BQD245 <sup>⑤</sup>	289.00	BQD345 <sup>⑥</sup>	513.00
50	BQD150 <sup>②</sup>	128.00	BQD250 <sup>⑤</sup>	289.00	BQD350 <sup>⑥</sup>	513.00
60	BQD160	128.00	BQD260	289.00	BQD360	513.00
70	BQD170■	247.00	BQD270	588.00	BQD370	699.00
80	BQD180■	247.00	BQD280	588.00	BQD380	699.00
90	BQD190■	247.00	BQD290	588.00	BQD390	699.00
100	BQD1100■	247.00	BQD2100	588.00	BQD3100	699.00

BQD6 CSA Certified

Continuous Current Rating @ 40°C	1-Pole		2-Pole <sup>③</sup>		3-Pole <sup>④</sup>	
	347V AC		600/347V AC		600/347V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	BQD6115 <sup>①</sup>	128.00	BQD6215	289.00	BQD6315	513.00
20	BQD6120 <sup>①</sup>	128.00	BQD6220	289.00	BQD6320	513.00
25	BQD6125■	128.00	BQD6225■	289.00	BQD6325■	513.00
30	BQD6130	128.00	BQD6230	289.00	BQD6330	513.00
35	BQD6135■	128.00	BQD6235■	289.00	BQD6335■	513.00
40	BQD6140■	128.00	BQD6240■	289.00	BQD6340■	513.00
45	BQD6145■	128.00	BQD6245■	289.00	BQD6345■	513.00
50	BQD6150■	128.00	BQD6250■	289.00	BQD6350■	513.00
60	BQD6160■	128.00	BQD6260■	289.00	BQD6360■	513.00
70	BQD6170■	247.00	BQD6270■	588.00	BQD6370■	699.00

Interrupting Ratings

Breaker Type	Number of Poles	RMS Symmetrical Amperes (KA)							
		Volts AC					Volts DC		
		120	240	277	480/277	347	600/347	125	125/250
BQD (UL)	1	65	—	14	—	—	—	14	—
	2	—	65	—	14	—	—	—	14
	3	—	65	—	14	—	—	—	—
BQD6 (CSA)	1	65	—	—	—	10	—	14	—
	2	—	65	—	—	—	10	—	14
	3	—	65	—	—	—	10	—	—

BQD Internal Accessories<sup>⑦</sup>

Control Voltage		Shunt Trip		Shunt Trip and Auxiliary Switch Combinations	
V AC	V DC	Catalog Number	List Price \$	Catalog Number	List Price \$
24	—	BQDST24▲	636.00	BQDST24AAS▲	897.00
120	—	BQDST120	636.00	BQDST120AAS▲	897.00
240	—	BQDST240▲	636.00	BQDST240AAS▲	897.00
277	—	BQDST277▲	636.00	BQDST277AAS▲	897.00
480	—	BQDST480▲	636.00	BQDST480AAS▲	897.00
600	—	BQDST600▲	636.00	BQDST600AAS▲	897.00
—	12	BQDST12▲	636.00	BQDST12DAS▲	897.00
—	24	BQDST24▲	636.00	BQDST24DAS▲	897.00
—	48	BQDST48▲	636.00	BQDST48DAS▲	897.00
—	125	BQDST125▲	636.00	BQDST125DAS▲	897.00

Maximum Voltage		Auxiliary Switch		Alarm Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
240	125	BQDA1▲	271.00	BQDBA▲	271.00
240	125	BQDA2▲	540.00	—	—

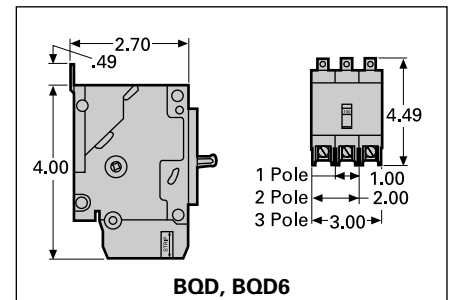
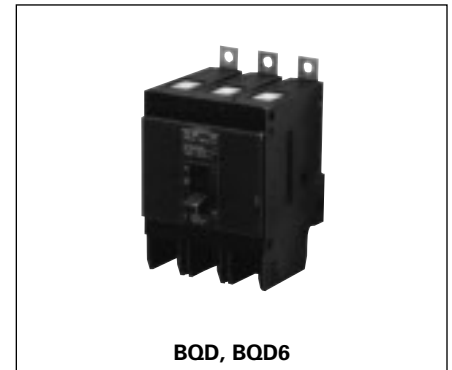
For inches / millimeters conversion, see Application Data section.  
 ■ Built to order. Allow 2–3 weeks for delivery.  
 ▲ Built to order. Allow 6–8 weeks for delivery.

① SWD rated for switching fluorescent lighting.  
 ② HID rated at 277V AC.  
 ③ Not suitable for 3-phase delta 480V applications.  
 ④ HACR rated.

⑤ HID rated at 480Y/277V AC.  
 ⑥ Accessory adds one pole space.

Accessories pages 6-86 to 6-91

## Selection/Dimensions



## Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.) (ea.)
1	1/12/48	.6
2	1/6/24	1.2
3	1/4/16	2.0

## Lugs For 60/70°C Wire

BQD – Load End Only	
15–40	#14–#6 AWG Cu #12–#6 AWG Al
45–100	#8–#1 AWG Cu #6–#1/0 AWG Al

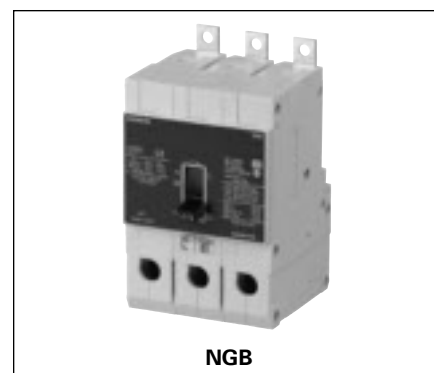
Alarm and Auxiliary Switch Combination	
Catalog Number	List Price \$
BQDA1BA	540.00

# Molded Case Circuit Breakers

## NGB Frame

Selection

Type NGB (Panelboard Mount)



Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	NGB1B015B <sup>①②</sup>	153.00	NGB2B015B <sup>②</sup>	479.00	NGB3B015B <sup>②</sup>	627.00
20	NGB1B020B <sup>①②</sup>	153.00	NGB2B020B <sup>②</sup>	479.00	NGB3B020B <sup>②</sup>	627.00
25	NGB1B025B <sup>②</sup>	153.00	NGB2B025B <sup>②</sup>	479.00	NGB3B025B <sup>②</sup>	627.00
30	NGB1B030B <sup>②</sup>	153.00	NGB2B030B <sup>②</sup>	479.00	NGB3B030B <sup>②</sup>	627.00
35	NGB1B035B <sup>②</sup>	153.00	NGB2B035B <sup>②</sup>	479.00	NGB3B035B <sup>②</sup>	627.00
40	NGB1B040B <sup>②</sup>	153.00	NGB2B040B <sup>②</sup>	479.00	NGB3B040B <sup>②</sup>	627.00
45	NGB1B045B <sup>②</sup>	153.00	NGB2B045B <sup>②</sup>	479.00	NGB3B045B <sup>②</sup>	627.00
50	NGB1B050B <sup>②</sup>	153.00	NGB2B050B <sup>②</sup>	479.00	NGB3B050B <sup>②</sup>	627.00
60	NGB1B060B	153.00	NGB2B060B	479.00	NGB3B060B	627.00
70	NGB1B070B	257.00	NGB2B070B	635.00	NGB3B070B	738.00
80	NGB1B080B	257.00	NGB2B080B	635.00	NGB3B080B	738.00
90	NGB1B090B	257.00	NGB2B090B	635.00	NGB3B090B	738.00
100	NGB1B100B	257.00	NGB2B100B	635.00	NGB3B100B	738.00
110	NGB1B110B	520.00	NGB2B110B	1272.00	NGB3B110B	1613.00
125	NGB1B125B	520.00	NGB2B125B	1272.00	NGB3B125B	1613.00

Load lugs are included as standard.  
HACR rated.

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight lbs. (kg)
1	1	0.9 (0.4)
2	1	1.9 (0.9)
3	1	2.9 (1.2)

### Lugs For 60/75°C Wire

NGB			
Ampere Rating	Wire Size	Catalog Number	List Price \$
15-30A	#14-#6 AWG Cu #12-#6 AWG Al	Integral with breaker	
35-125A	#8-#1/0 AWG Cu #8-#2/0 AWG Al	Integral with breaker	

### Interrupting Ratings (max. RMS symmetrical amperes kA)

Breaker Type	Number of Poles	UL489						IEC 60947-2 (Ics = 50% Icu)				
		Volts AC						Volts DC		Volts AC		Volts DC
		120	240	277	347	480Y/277	600Y/347	125	125/250	240	415	125/250
NGB	1	100	—	25	14	—	—	14	—	25	—	—
	2, 3	—	100	—	—	25	14	—	14 <sup>③</sup>	65	25	14

40°C, 50/60Hz.

① SWD rated.  
② HID rated.  
③ 2-pole only.



# Molded Case Circuit Breakers

## Accessories for CQD 100A Frame, NGG and NGB 125A Frame<sup>①</sup>

*Selection*

### Shunt Trip

Control Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
V AC	V DC		
120	—	CQDST120	636.00
240	—	CQDST240▲	636.00
277	—	CQDST277▲	636.00
480	—	CQDST480▲	636.00
600	—	CQDST600	636.00
—	12	CQDST12	636.00
—	24	CQDST24	636.00
—	48	CQDST48	636.00
—	125	CQDST125	636.00

### Auxiliary Switch

Maximum Voltage		Number of Contacts	CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	CQDA1	271.00
240	125	2A-2B	CQDA2	540.00

### Alarm Switch

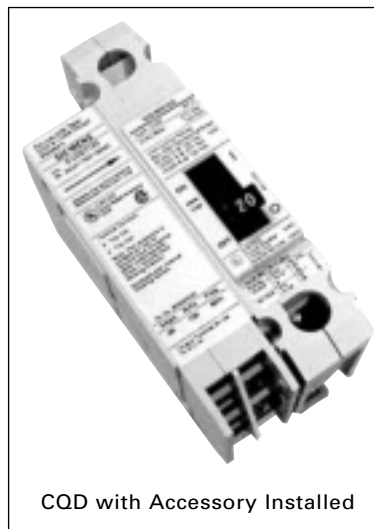
Maximum Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC		
240	125	CQDBA	271.00

### Shunt Trip and Auxiliary Switch Combinations

Shunt Trip Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC		
24		CQDST24AAS▲	897.00
120		CQDST120AAS▲	897.00
240		CQDST240AAS▲	897.00
277		CQDST277AAS▲	897.00
480		CQDST480AAS▲	897.00
600		CQDST600AAS▲	897.00
	12	CQDST12DAS▲	897.00
	24	CQDST24DAS▲	897.00
	48	CQDST48DAS▲	897.00
	125	CQDST125DAS▲	897.00

### Alarm and Auxiliary Switch Combinations

For Breaker	Catalog Number	List Price
CQD, CQD6, NGG, NGB	CQDA1BA▲	540.00



CQD with Accessory Installed

▲ Built to order. Allow 6-8 weeks for delivery.

① Adds 1-pole space for accessory.

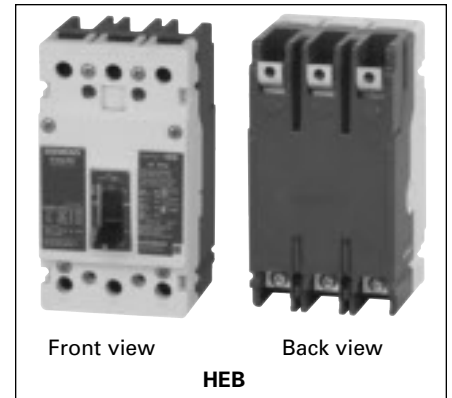
# Molded Case Circuit Breakers

## NEB & HEB Frame

### Selection

### Type NEB (Panelboard Mount)

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	NEB1B015B <sup>①②</sup>	282.00	NEB2B015B <sup>②</sup>	707.00	NEB3B015B <sup>②</sup>	883.00
20	NEB1B020B <sup>①②</sup>	282.00	NEB2B020B <sup>②</sup>	707.00	NEB3B020B <sup>②</sup>	883.00
25	NEB1B025B <sup>②</sup>	282.00	NEB2B025B <sup>②</sup>	707.00	NEB3B025B <sup>②</sup>	883.00
30	NEB1B030B <sup>②</sup>	282.00	NEB2B030B <sup>②</sup>	707.00	NEB3B030B <sup>②</sup>	883.00
35	NEB1B035B <sup>②</sup>	282.00	NEB2B035B <sup>②</sup>	707.00	NEB3B035B <sup>②</sup>	883.00
40	NEB1B040B <sup>②</sup>	282.00	NEB2B040B <sup>②</sup>	707.00	NEB3B040B <sup>②</sup>	883.00
45	NEB1B045B <sup>②</sup>	282.00	NEB2B045B <sup>②</sup>	707.00	NEB3B045B <sup>②</sup>	883.00
50	NEB1B050B <sup>②</sup>	282.00	NEB2B050B <sup>②</sup>	707.00	NEB3B050B <sup>②</sup>	883.00
60	NEB1B060B	282.00	NEB2B060B	707.00	NEB3B060B	883.00
70	NEB1B070B	321.00	NEB2B070B	803.00	NEB3B070B	1004.00
80	NEB1B080B	321.00	NEB2B080B	803.00	NEB3B080B	1004.00
90	NEB1B090B	321.00	NEB2B090B	803.00	NEB3B090B	1004.00
100	NEB1B100B	321.00	NEB2B100B	803.00	NEB3B100B	1004.00
110	NEB1B110B	710.00	NEB2B110B	1771.00	NEB3B110B	2214.00
125	NEB1B125B	710.00	NEB2B125B	1771.00	NEB3B125B	2214.00



### Type HEB (Panelboard Mount)

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	HEB1B015B <sup>①②</sup>	394.00	HEB2B015B <sup>②</sup>	918.00	HEB3B015B <sup>②</sup>	1076.00
20	HEB1B020B <sup>①②</sup>	394.00	HEB2B020B <sup>②</sup>	918.00	HEB3B020B <sup>②</sup>	1076.00
25	HEB1B025B <sup>②</sup>	394.00	HEB2B025B <sup>②</sup>	918.00	HEB3B025B <sup>②</sup>	1076.00
30	HEB1B030B <sup>②</sup>	394.00	HEB2B030B <sup>②</sup>	918.00	HEB3B030B <sup>②</sup>	1076.00
35	HEB1B035B <sup>②</sup>	394.00	HEB2B035B <sup>②</sup>	918.00	HEB3B035B <sup>②</sup>	1076.00
40	HEB1B040B <sup>②</sup>	394.00	HEB2B040B <sup>②</sup>	918.00	HEB3B040B <sup>②</sup>	1076.00
45	HEB1B045B <sup>②</sup>	394.00	HEB2B045B <sup>②</sup>	918.00	HEB3B045B <sup>②</sup>	1076.00
50	HEB1B050B <sup>②</sup>	394.00	HEB2B050B <sup>②</sup>	918.00	HEB3B050B <sup>②</sup>	1076.00
60	HEB1B060B	394.00	HEB2B060B	918.00	HEB3B060B	1076.00
70	HEB1B070B	467.00	HEB2B070B	1044.00	HEB3B070B	1198.00
80	HEB1B080B	467.00	HEB2B080B	1044.00	HEB3B080B	1198.00
90	HEB1B090B	467.00	HEB2B090B	1044.00	HEB3B090B	1198.00
100	HEB1B100B	467.00	HEB2B100B	1044.00	HEB3B100B	1198.00
110	HEB1B110B	980.00	HEB2B110B	2030.00	HEB3B110B	2433.00
125	HEB1B125B	980.00	HEB2B125B	2030.00	HEB3B125B	2433.00

Load lugs are included as standard.  
HACR rated.

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight lbs. (kg)
1	1	1.4 (0.5)
2	1	2.4 (0.9)
3	1	3.7 (1.4)

### Lugs For 60/75°C Wire

NEB/HEB			
Ampere Rating	Wire Size	Catalog Number	List Price \$
15-100A	#14-1/0	3TA1EG10	12.80
60-125A	#6-2/0	3TA1EG30	12.80

### Interrupting Ratings (max. RMS symmetrical amperes kA)

Breaker Type	Number of Poles	UL489/CSA					IEC 60947-2 (Ics = 50% Icu)				
		Volts AC					Volts DC				
		240	277	347	480	600Y/347	125/250	Volts AC		Volts DC	
NEB	1	85	35	22	—	—	35	85	—	35	—
	2, 3	85	—	—	35	22	35	85	40	—	35
HEB	1	100	65	25	—	—	42	100	—	42	—
	2, 3	100	—	—	65	25	42	100	70	—	42

40°C, 50/60Hz.

① SWD rated.  
② HID rated.

# Molded Case Circuit Breakers

## Internal Accessories for NEG & HEG 125A Frame, NEB & HEB 125A Frame

*Selection*

### Shunt Trip

Control Voltage		NEG, HEG, NEB, HEB Catalog Number	List Price \$
V AC	V DC		
110-240	125	STREER240	636.00
380-600	—	STREV600	636.00
24-60	24-60	STREM60D	636.00

### Auxiliary Switch

Maximum Voltage		Number of Contacts	NEG, HEG, NEB, HEB Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	ASKE2	271.00
240	125	2A-2B	ASKE3	540.00

### Alarm Switch

Maximum Voltage		Number of Contacts	NEG, HEG, NEB, HEB Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	ASKE1	271.00
240	125	2A-2B	ASKE5	540.00

### Undervoltage Trip

Control Voltage		NEG, HEG, NEB, HEB Catalog Number	List Price \$
AC	DC		
60		UVREM60▲	636.00
120		UVREN120	636.00
240		UVRER240	636.00
480		UVREU480▲	636.00
600		UVREV600▲	636.00
12	12	UVREA12AD▲	636.00
24	24	UVREB24AD	636.00
	48	UVREC48D▲	636.00
	125	UVRED125D▲	636.00
	250	UVREE250D▲	636.00

### Alarm and Auxiliary Switch Combinations

For Breaker	Catalog Number	List Price \$
NEG, HEG	ASKE6	540.00

▲ Built to order. Allow 6-8 weeks for delivery.

# Circuit Breakers

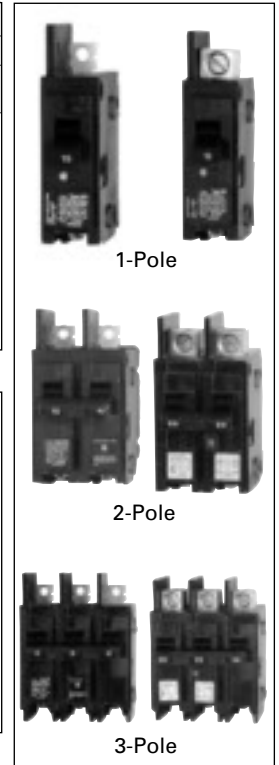
## Lug-In/Lug-Out with INSTA-WIRE

## Selection

All BQ/BQH/HBQ circuit breakers are supplied with load side lugs. If line side lugs are required, add suffix "L" to catalog number. Consult Siemens for any additional charge. All standard circuit breakers are calibrated for 40(insert degree symbol)C maximum ambient application.

### 1-Pole Plug-In (120V AC) ①⑤

Continuous Current Rating @ 40° C	Type BQ		Type BQH		Type HBQ	
	10,000A IR		22,000A IR		65,000A IR	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
10	BQ1B010	33.50	BQ1B010H	—	HB1B010	—
15	BQ1B015 <sup>②</sup>	33.50	BQ1B015H <sup>②</sup>	66.00	HB1B015 <sup>②</sup>	113.00
20	BQ1B020 <sup>②</sup>	33.50	BQ1B020H <sup>②</sup>	66.00	HB1B020 <sup>②</sup>	113.00
25	BQ1B025	33.50	BQ1B025H■	66.00	HB1B025■	113.00
30	BQ1B030	33.50	BQ1B030H	74.00	HB1B030■	113.00
35	BQ1B035■	33.50	BQ1B035H■	74.00	HB1B035■	113.00
40	BQ1B040	33.50	BQ1B040H	74.00	HB1B040■	132.00
45	BQ1B045■	33.50	BQ1B045H■	74.00	HB1B045■	132.00
50	BQ1B050	33.50	BQ1B050H	74.00	HB1B050■	132.00
60	BQ1B060■	33.50	BQ1B060H■	74.00	HB1B060■	132.00
70	BQ1B070■	33.50	BQ1B070H■	92.00	HB1B070■	142.00



### 2-Pole Plug-In (Common-Trip 120/240V AC) ①⑥

10	BQ2B010	76.00	—	—	HB2B010■	276.00
15	BQ2B015	76.00	BQ2B015H	149.00	HB2B015■	276.00
20	BQ2B020	76.00	BQ2B020H	149.00	HB2B020■	276.00
25	BQ2B025	76.00	BQ2B025H■	149.00	HB2B025■	276.00
30	BQ2B030	76.00	BQ2B030H	149.00	HB2B030■	276.00
35	BQ2B035	76.00	BQ2B035H■	149.00	HB2B035■	276.00
40	BQ2B040	76.00	BQ2B040H	149.00	HB2B040■	276.00
45	BQ2B045	76.00	BQ2B045H■	149.00	HB2B045■	276.00
50	BQ2B050	76.00	BQ2B050H	149.00	HB2B050■	338.00
60	BQ2B060	76.00	BQ2B060H	149.00	HB2B060■	338.00
70	BQ2B070	149.00	BQ2B070H■	224.00	HB2B070■	552.00
80	BQ2B080	203.00	BQ2B080H■	326.00	HB2B080■	624.00
90	BQ2B090	203.00	BQ2B090H■	326.00	HB2B090■	624.00
100	BQ2B100	203.00	BQ2B100H	326.00	HB2B100■	624.00
110	BQ2B110	407.00	BQ2B110H	864.00	HB2B110■	1794.00
125	BQ2B125	431.00	BQ2B125H	1112.00	HB2B125■	1794.00

### 2-Pole Plug-In (Common-Trip 240V AC) ①③⑥

15	BQ2H015	203.00	—	—	—	—
20	BQ2H020	203.00	—	—	—	—
30	BQ2H030	203.00	—	—	—	—
40	BQ2H040■	203.00	—	—	—	—
50	BQ2H050	203.00	—	—	—	—
60	BQ2H060	203.00	—	—	—	—
70	BQ2H070■	269.00	—	—	—	—
80	BQ2H080■	306.00	—	—	—	—
90	BQ2H090■	306.00	—	—	—	—
100	BQ2H100■	306.00	—	—	—	—

### 3-Pole Plug-In (Common-Trip 240V AC) ①⑦

10	BQ3B010	254.00	—	—	HB3B010	480.00
15	BQ3B015	254.00	BQ3B015H	381.00	HB3B015■	480.00
20	BQ3B020	254.00	BQ3B020H	381.00	HB3B020■	480.00
25	BQ3B025■	254.00	BQ3B025H■	381.00	HB3B025■	480.00
30	BQ3B030	254.00	BQ3B030H	381.00	HB3B030■	480.00
35	BQ3B035■	254.00	BQ3B035H	381.00	HB3B035■	480.00
40	BQ3B040	254.00	BQ3B040H	381.00	HB3B040■	584.00
45	BQ3B045■	254.00	BQ3B045H	381.00	HB3B045■	584.00
50	BQ3B050	254.00	BQ3B050H	381.00	HB3B050■	584.00
60	BQ3B060	254.00	BQ3B060H	381.00	HB3B060■	584.00
70	BQ3B070	311.00	BQ3B070H	463.00	HB3B070■	624.00
80	BQ3B080	351.00	BQ3B080H■	543.00	HB3B080■	734.00
90	BQ3B090	351.00	BQ3B090H■	543.00	HB3B090■	734.00
100	BQ3B100	351.00	BQ3B100H	543.00	HB3B100■	734.00

### MP-T / MP-HT / MP-MT Accessories

Description	Catalog Number	Field/Factory Installed	List Price \$
120V Shunt Trip	add suffix...00S01■	Factory	141.00(adder)
24V Shunt Trip	add suffix...00S07■	Factory	141.00(adder)
120V Auxiliary Switch	add suffix...01■ <sup>③</sup>	Factory	83.00(adder)
1-Pole Padlocking Device	ECPLD1	Field	10.10
2-Pole Padlocking Device	ECPLD2	Field	10.20
3-Pole Padlocking Device	ECQLD3 (Pkg of 10)	Field	98.00
Handle Block	ECHBD1	Field	9.10

### Factory Modifications

Description	Catalog Number	List Price \$
Line Side Lugs	add suffix...L <sup>②⑧</sup>	Consult Siemens
Quick Connect Lug	add suffix...QX	7.50 (adder per pole)
400Hz Calibration	add suffix...Y <sup>⑨</sup>	8.00 (adder)
415V 50Hz Calibration	add suffix...E <sup>②⑧</sup>	No adder
Marine 50° C Ambient Calibration	add suffix...M	No adder
Fungus Proofing	add suffix...F	10.50 (adder per pole)

① UL Listed for use with 60/75° wire through 125 amps, HACR rated.  
 ② 1A and 1B contacts.  
 ③ UL Listed for use on 3-phase grounded "B" systems — 10,000 for this application.

④ UL Listed for frequent switching applications (SWD). 120V AC Fluorescent Lighting.  
 ⑤ Shipped 12 per sleeve.  
 ⑥ Shipped 6 per sleeve.  
 ⑦ Shipped 4 per sleeve.

⑧ UL Listed 5KA IR.  
 ⑨ Not UL Listed.  
 ⑩ 1 & 2 Poles only.

■ Built to order. Allow 2-3 weeks for delivery

# Molded Case Circuit Breakers

## DIN Rail Mounted Circuit Breakers

## Selection/Dimensions

### 1-Pole DIN Rail (120V AC)

Breaker Type	Ampere Rating	Catalog Number	Load Side Connector	List Price \$	"Interrupting Ratings (KA) (RMS Symmetrical Amperes)" Volts AC	
					120	120/240
"BQXD 1-Pole 120V DIN Rail"	10	BQ1B010QLD	TC1Q1	33.50	10	
	15	BQ1B015QLD	TC1Q1	33.50	10	
	20	BQ1B020QLD	TC1Q1	33.50	10	
	25	BQ1B025QLD	TC1Q1	33.50	10	
	30	BQ1B030QLD	TC1Q1	33.50	10	
	35	BQ1B035QLD	TC1Q1	33.50	10	
	40	BQ1B040QLD	TC1Q1	33.50	10	
	45	BQ1B045QLD	TA1Q1	33.50	10	
	50	BQ1B050QLD	TA1Q1	33.50	10	
	60	BQ1B060QLD	TA1Q1	33.50	10	
	10	BQ1B010QXD	Quick-Connect	39.50	10	
	15	BQ1B015QXD	Quick-Connect	39.50	10	
	20	BQ1B020QXD	Quick-Connect	39.50	10	
	25	BQ1B025QXD	Quick-Connect	39.50	10	
	30	BQ1B030QXD	Quick-Connect	39.50	10	
	35	BQ1B035QXD	Quick-Connect	39.50	10	
	40	BQ1B040QXD	Quick-Connect	39.50	10	
	45	BQ1B045QXD	Quick-Connect	39.50	10	
	50	BQ1B050QXD	Quick-Connect	39.50	10	
	60	BQ1B060QXD	Quick-Connect	39.50	10	

### 2-Pole DIN Rail (120/240V AC)

"BQXD 2-Pole 120/240V DIN Rail"	10	BQ2B010QLD	TC1Q1	76.00		10
	15	BQ2B015QLD	TC1Q1	76.00		10
	20	BQ2B020QLD	TC1Q1	76.00		10
	25	BQ2B025QLD	TC1Q1	76.00		10
	30	BQ2B030QLD	TC1Q1	76.00		10
	35	BQ2B035QLD	TC1Q1	76.00		10
	40	BQ2B040QLD	TC1Q1	76.00		10
	45	BQ2B045QLD	TA1Q1	76.00		10
	50	BQ2B050QLD	TA1Q1	76.00		10
	60	BQ2B060QLD	TA1Q1	76.00		10
	10	BQ2B010QXD	Quick-Connect	91.00		10
	15	BQ2B015QXD	Quick-Connect	91.00		10
	20	BQ2B020QXD	Quick-Connect	91.00		10
	25	BQ2B025QXD	Quick-Connect	91.00		10
	30	BQ2B030QXD	Quick-Connect	91.00		10
	35	BQ2B035QXD	Quick-Connect	91.00		10
	40	BQ2B040QXD	Quick-Connect	91.00		10
	45	BQ2B045QXD	Quick-Connect	91.00		10
	50	BQ2B050QXD	Quick-Connect	91.00		10
	60	BQ2B060QXD	Quick-Connect	91.00		10

### Lugs-For Use with BQ, BQH, HBQ®

Circuit Breaker Amp. Rtg.	Cab. Per Lug	Lug Wire Range AWG	Catalog Number	List Price \$ (Qty. 6)
<b>Line Side</b>				
10-40	1	#16-#6 Cu #12-#6 Al	TC1Q1 <sup>①②</sup>	2.60
45-100	1	#8-#1 Cu #6-#1/0 Al	TA1Q1	2.60
<b>Load Side</b>				
10	2	#16 Cu	Connectors are Supplied with Circuit Breaker	
15-20	1	#14-#10 Cu #12-#10 Al		
25-35	1	#14-#6 Cu #12-#10 Al		
40-50	1	#8-#6 Cu #8-#4 Al		
55-70	1	#8-#4 Cu #8-#2 Al		
80-100	1	#4-#1/0 Cu #2-#1/0 Al		
110-125	1	#2-#1/0 Cu #1/0-#2/0 Al		

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① Terminals are UL Listed for 60°/75°C conductors. Also CSA Listed.

② Connector has steel construction.

③ Surface mounted indoor. If flush mounting is required, replace suffix "S" in catalog number with suffix "F".

④ Discount Schedule B.

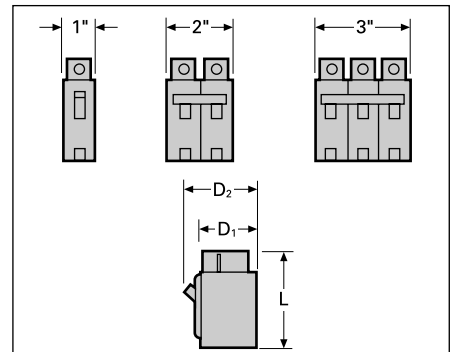
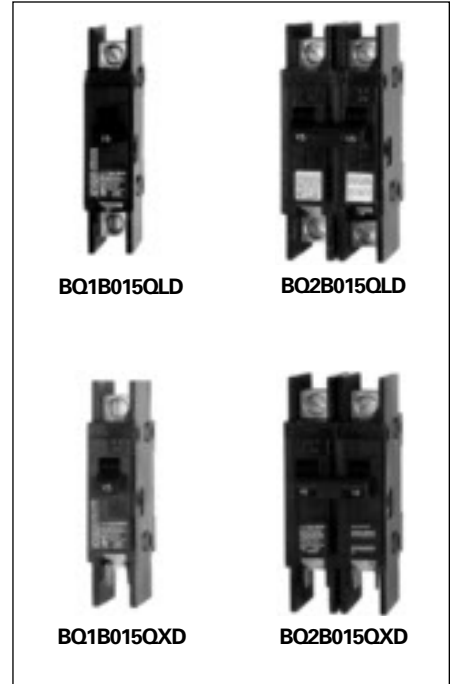
⑤ Does not include circuit breaker. Order circuit breaker separately.

⑥ Neutral included in enclosure.

⑦ Enclosure will not accept circuit breakers with shunt trips or auxiliary switches installed.

⑧ Type BQXD uses TA1Q1 or TC1Q1 lugs on line side of circuit breaker.

Enclosures Section 5  
Accessories pages 6-86 to 6-91



Breaker Type	Amperes	Dimensions (inches)		
		L	D1	D2
BQ, BQH	15-50	3 3/4	2 3/4	3
BQ, BQH	55-125	4	2 3/4	3
HBQ	15-125	4	2 3/4	3
BQXD	15-60	4 1/2	2 3/4	3

### Finger Safe Terminal Shield

Protects against accidental contact with lugs-1 per lug. Fits line and load end.

Catalog Number	Qty	List Price \$ each
BQFS2	2	2.10
BQFS1K	1000	1.40

Enclosures		
Type	Catalog Number <sup>⑧</sup>	List Price \$ <sup>⑧⑨</sup>
1	EB3100S <sup>⑩⑪</sup>	189.00
3R	WB3100	249.00

# Molded Case Circuit Breakers

## QJ 225A Frame

### Type QJ2<sup>②</sup>

Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	240V AC		240V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
60	QJ22B060■	422.00	QJ23B060	1106.00
70	QJ22B070■	422.00	QJ23B070	1106.00
80	QJ22B080■	422.00	QJ23B080■	1106.00
90	QJ22B090■	422.00	QJ23B090■	1106.00
100	QJ22B100	422.00	QJ23B100	1106.00
110	QJ22B110■	422.00	QJ23B110	1106.00
125	QJ22B125	422.00	QJ23B125	1106.00
150	QJ22B150	422.00	QJ23B150	1106.00
175	QJ22B175	422.00	QJ23B175	1106.00
200	QJ22B200	422.00	QJ23B200	1106.00
225	QJ22B225	422.00	QJ23B225	1106.00

### Type QJH2<sup>②</sup>

60	QJH22B060■	1010.00	QJH23B060■	1548.00
70	QJH22B070■	1010.00	QJH23B070■	1548.00
80	QJH22B080■	1010.00	QJH23B080■	1548.00
90	QJH22B090■	1010.00	QJH23B090■	1548.00
100	QJH22B100■	1010.00	QJH23B100	1548.00
110	QJH22B110■	1010.00	QJH23B110	1548.00
125	QJH22B125	1010.00	QJH23B125	1548.00
150	QJH22B150	1010.00	QJH23B150	1548.00
175	QJH22B175■	1010.00	QJH23B175	1548.00
200	QJH22B200	1010.00	QJH23B200	1548.00
225	QJH22B225	1010.00	QJH23B225	1548.00

### Type QJ2H<sup>②</sup>

60	QJ22B060H■	1255.00	QJ23B060H■	1964.00
70	QJ22B070H■	1255.00	QJ23B070H■	1964.00
80	QJ22B080H■	1255.00	QJ23B080H■	1964.00
90	QJ22B090H■	1255.00	QJ23B090H■	1964.00
100	QJ22B100H■	1255.00	QJ23B100H	1964.00
110	QJ22B110H■	1255.00	QJ23B110H■	1964.00
125	QJ22B125H	1255.00	QJ23B125H	1964.00
150	QJ22B150H	1255.00	QJ23B150H	1964.00
175	QJ22B175H■	1255.00	QJ23B175H	1964.00
200	QJ22B200H	1255.00	QJ23B200H	1964.00
225	QJ22B225H	1255.00	QJ23B225H	1964.00

### Type HQJ2H<sup>②</sup>

100	—	—	HQJ23B100H	▲2234.00
110	—	—	HQJ23B110H	▲2234.00
125	—	—	HQJ23B125H	▲2234.00
150	—	—	HQJ23B150H	2234.00
175	—	—	HQJ23B175H	▲2234.00
200	—	—	HQJ23B200H	2234.00
225	—	—	HQJ23B225H	▲2234.00

## QJ2

Internal Accessories (Factory installed only) (3-pole only)<sup>③</sup>  
Add suffix to catalog number and adder to list price.

Control Voltage		Shunt Trip		Auxiliary Switches				Shunt Trip and 1A and 1B Auxiliary Switch	
AC	DC	Suffix	List Adder \$	1A and 1B		2A and 2B		Suffix	List Adder \$
				Suffix	List Adder \$	Suffix	List Adder \$		
120/240		00S01■	325.	A01■	265.	A02■	532.	01S01■	590.
	24	00S07■	325.	A01■	265.	A02■	532.	01S07■	590.
	125	00S11■	325.	A01■	265.	A02■	532.	01S11■	590.

■ Built to order. Allow 2-3 weeks for delivery.

▲ Built to order. Allow 6-8 weeks for delivery.

② See Note: A page 6-73.

Note: QJ breakers are UL Listed for reverse feed applications.

③ HACR rated.

③ Internal accessories are not available on 2-pole QJ breakers.

## Selection/Dimensions

### Ordering Information

Load side TA1Q300 lugs are mounted and included when circuit breaker is ordered. For line and load lugs (TA1Q300) installed at no additional charge, add suffix "L" to catalog number.

50°C Calibration - See page 6-84.  
400HZ. - See page 6-84.

### Shipping Weights

QJ2, QJH2, QJ2H, HQJ2H		
Number of Poles	Number per Carton	Shipping Weight (lbs.)
2	10	30
3	10	41

### Lugs For 75°C Wire<sup>①</sup>

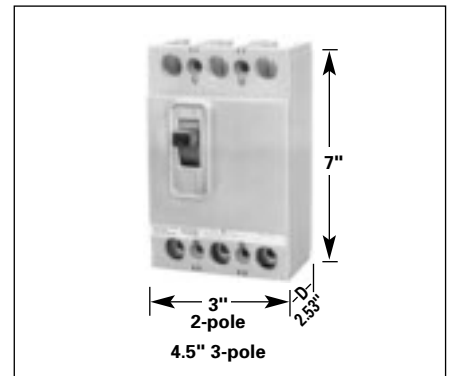
Catalog Number	Lug Body	Lug Wire Range
TA1Q300	Al	(1) #6-300 kcmil Cu (1) #4-300 kcmil Al
TC1Q250	Cu	(1) #6-250 kcmil Cu

### Enclosures (Neutral Included)

Type	Catalog Number	List Price \$
1	EB3225(S)(F)	226.00
3R (2-pole)	WB2225	418.00
3R (3-pole)	WB3225	459.00

### UL 489 Interrupting Ratings

Breaker Type	AIR @ 240V AC
QJ2	10,000
QJH2	22,000
QJ2H	42,000
HQJ2H	100,000



# Molded Case Circuit Breakers

## CQD 100A Frame

Type CQD (Cable In - Cable Out) DIN Rail Mount<sup>③</sup>

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	277V AC		480Y/277V AC 125/250V DC		480Y/277V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	CQD115 <sup>②③</sup>	140.00	CQD215 <sup>②</sup>	305.00	CQD315 <sup>②</sup>	543.00
20	CQD120 <sup>②③</sup>	140.00	CQD220 <sup>②</sup>	305.00	CQD320 <sup>②</sup>	543.00
25	CQD125 <sup>②</sup>	140.00	CQD225 <sup>②</sup>	305.00	CQD325 <sup>②</sup>	543.00
30	CQD130 <sup>②</sup>	140.00	CQD230 <sup>②</sup>	305.00	CQD330 <sup>②</sup>	543.00
35	CQD135 <sup>②</sup>	140.00	CQD235 <sup>②</sup>	305.00	CQD335 <sup>②</sup>	543.00
40	CQD140 <sup>②</sup>	140.00	CQD240 <sup>②</sup>	305.00	CQD340 <sup>②</sup>	543.00
45	CQD145 <sup>②</sup>	140.00	CQD245 <sup>②</sup>	305.00	CQD345 <sup>②</sup>	543.00
50	CQD150 <sup>②</sup>	140.00	CQD250 <sup>②</sup>	305.00	CQD350 <sup>②</sup>	543.00
60	CQD160 <sup>②</sup>	140.00	CQD260	305.00	CQD360	543.00
70	CQD170	256.00	CQD270	606.00	CQD370	735.00
80	CQD180	256.00	CQD280	606.00	CQD380	735.00
90	CQD190	256.00	CQD290	606.00	CQD390	735.00
100	CQD1100	256.00	CQD2100	606.00	CQD3100	735.00

Type CQD6 (Cable In - Cable Out) CSA Certified, not UL

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	347V AC 125V DC		600Y/347V AC 125/250V DC		600Y/347V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	—	—	CQD6215	305.00	CQD6315	543.00
20	CQD6120 <sup>②</sup>	140.00	CQD6220	305.00	CQD6320	543.00
25	CQD6125 <sup>②</sup>	140.00	CQD6225	305.00	CQD6325	543.00
30	CQD6130 <sup>②</sup>	140.00	CQD6230	305.00	CQD6330	543.00
35	CQD6135	140.00	CQD6235	305.00	CQD6335	543.00
40	CQD6140	140.00	CQD6240	305.00	CQD6340	543.00
45	CQD6145	140.00	CQD6245	305.00	CQD6345	543.00
50	CQD6150	140.00	CQD6250	305.00	CQD6350	543.00
60	CQD6160	140.00	CQD6260	305.00	CQD6360	543.00
70	CQD6170	256.00	CQD6270	606.00	—	—

Interrupting Ratings

Breaker Type	Number of Poles	RMS Symmetrical Amperes (KA)						
		Volts AC (50/60 Hz)					Volts DC	
		120	240	277	480/277	600/347	125	125/250
CQD (UL)	1	65	—	14	—	—	14	—
	2	—	65	—	14	—	—	14
	3	—	65	—	14	—	—	—
CQD6 (CSA)	1	65	—	14	—	10	14	—
	2	—	65	—	—	10	—	14
	3	—	65	—	—	10	—	—

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

② HID rated.

③ SWD rated.

③ HACR rated.

Note: CQD breakers are UL Listed for reverse feed applications.

Discount Schedule MCCB

Siemens Power Distribution & Control, SPEEDFAX™ 2007-2008 Product Catalog

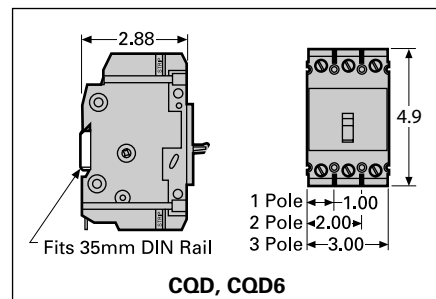
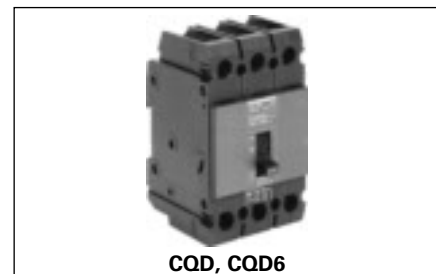
## Selection/Dimensions

Shipping Weights

Number of Poles	Number per Carton	Shipping Weight lbs. (kg)
1	1	0.5 (0)
2	1	1.0 (0)
3	1	1.5 (1)

Lugs For 60/75°C Wire

Amps	Wire Size
15-40	#14-#6 AWG Cu #12-#6 AWG Al
45-100	#8-#1 AWG Cu #6-#1/0 AWG Al



6  
MOLDED CASE  
CIRCUIT BREAKERS

Enclosures Section 5  
Accessories pages 6-31 and 6-86 to 6-91

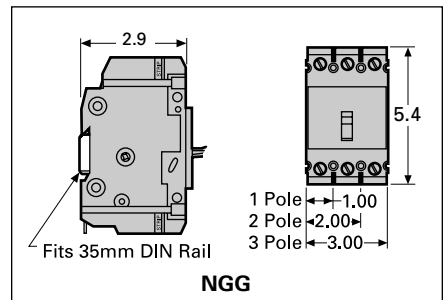
# Molded Case Circuit Breakers

## NGG 125A Frame

## Selection/Dimensions

Type NGG (Cable In - Cable Out)

Continuous Ampere Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	NGG1B015L <sup>①②</sup>	161.00	NGG2B015L <sup>③</sup>	504.00	NGG3B015L <sup>④</sup>	660.00
20	NGG1B020L <sup>①②</sup>	161.00	NGG2B020L <sup>③</sup>	504.00	NGG3B020L <sup>④</sup>	660.00
25	NGG1B025L <sup>①②</sup>	161.00	NGG2B025L <sup>③</sup>	504.00	NGG3B025L <sup>④</sup>	660.00
30	NGG1B030L <sup>②</sup>	161.00	NGG2B030L <sup>③</sup>	504.00	NGG3B030L <sup>④</sup>	660.00
35	NGG1B035L <sup>②</sup>	161.00	NGG2B035L <sup>③</sup>	504.00	NGG3B035L <sup>④</sup>	660.00
40	NGG1B040L <sup>②</sup>	161.00	NGG2B040L <sup>③</sup>	504.00	NGG3B040L <sup>④</sup>	660.00
45	NGG1B045L <sup>②</sup>	161.00	NGG2B045L <sup>③</sup>	504.00	NGG3B045L <sup>④</sup>	660.00
50	NGG1B050L <sup>②</sup>	161.00	NGG2B050L <sup>③</sup>	504.00	NGG3B050L <sup>④</sup>	660.00
60	NGG1B060L	161.00	NGG2B060L	504.00	NGG3B060L	660.00
70	NGG1B070L	271.00	NGG2B070L	669.00	NGG3B070L	777.00
80	NGG1B080L	271.00	NGG2B080L	669.00	NGG3B080L	777.00
90	NGG1B090L	271.00	NGG2B090L	669.00	NGG3B090L	777.00
100	NGG1B100L	271.00	NGG2B100L	669.00	NGG3B100L	777.00
110	NGG1B110L	547.00	NGG2B110L	1339.00	NGG3B110L	1544.00
125	NGG1B125L	547.00	NGG2B125L	1339.00	NGG3B125L	1544.00



Line and load lugs are included as standard. If no lugs are required, remove the "L" suffix. HACR rated. Suitable for screws or DIN rail mounting.

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight lbs. (kg)
1	1	.75 (0.34)
2	1	1.3 (0.59)
3	1	2.0 (0.98)

### Lugs For 60/75°C Wire

NGG			
Ampere Rating	Wire Size	Catalog Number	List Price \$
15-30A	#14-#6 AWG Cu	TC1Q1 (qty. 1)	2.60
	#12-#6 AWG Al	3TC1Q1 (qty. 3)	7.20
35-125A	#8-#1/0 AWG Cu #4-#2/0 AWG Al	3TC1GG20 (qty. 3)	13.40
15-125A	Nut Keeper plate w/ screw (for crimp terminals)	TNKG3 (qty. 3)	17.90

### Interrupting Ratings

Breaker Type	Number of Poles	UL 489 AIR								IEC 947-2				
		RMS Symmetrical Amperes (KA)								Volts AC (50/60Hz)				
		Volts AC(50/60Hz)								220/240		380/415		Volts DC
		120	240	277	347	480	600/347	125	125/250	Icu	Ics	Icu	Ics	125/250
NGG	1	65	—	25	14	—	—	14	—	25	12.5	—	—	—
	2, 3	—	65	—	—	25	14	—	14 <sup>③</sup>	65	33	25	12.5	14

For inches / millimeters conversion, see Application Data section.

① SWD rated.

② HID rated at 15-50A 1-pole @ 277 VAC; 2 & 3-pole @ 480 VAC

③ 125/250V DC rating applies to 2-pole NGG only.

Enclosures Section 5  
Accessories pages 6-31 and 6-86 to 6-91



# Molded Case Circuit Breakers

## Accessories for CQD 100A Frame, NGG and NGB 125A Frame<sup>①</sup>

*Selection*

### Shunt Trip

Control Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
V AC	V DC		
120	—	CQDST120	636.00
240	—	CQDST240▲	636.00
277	—	CQDST277▲	636.00
480	—	CQDST480▲	636.00
600	—	CQDST600	636.00
—	12	CQDST12	636.00
—	24	CQDST24	636.00
—	48	CQDST48	636.00
—	125	CQDST125	636.00

### Auxiliary Switch

Maximum Voltage		Number of Contacts	CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	CQDA1	271.00
240	125	2A-2B	CQDA2	540.00

### Alarm Switch

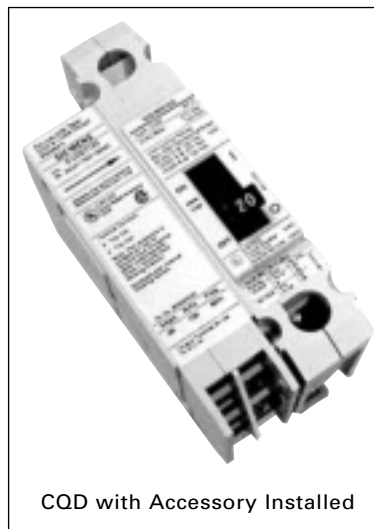
Maximum Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC		
240	125	CQDBA	271.00

### Shunt Trip and Auxiliary Switch Combinations

Shunt Trip Voltage		CQD, CQD6, NGG, NGB Catalog Number	List Price \$
AC	DC		
24		CQDST24AAS▲	897.00
120		CQDST120AAS▲	897.00
240		CQDST240AAS▲	897.00
277		CQDST277AAS▲	897.00
480		CQDST480AAS▲	897.00
600		CQDST600AAS▲	897.00
	12	CQDST12DAS▲	897.00
	24	CQDST24DAS▲	897.00
	48	CQDST48DAS▲	897.00
	125	CQDST125DAS▲	897.00

### Alarm and Auxiliary Switch Combinations

For Breaker	Catalog Number	List Price
CQD, CQD6, NGG, NGB	CQDA1BA▲	540.00



CQD with Accessory Installed

▲ Built to order. Allow 6-8 weeks for delivery.

① Adds 1-pole space for accessory.

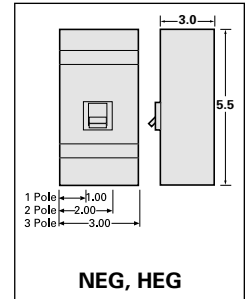
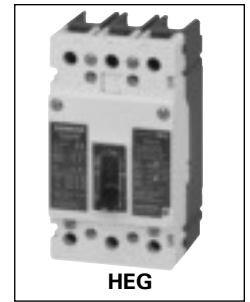
# Molded Case Circuit Breakers

## EG 125A Frame

## Selection/Dimensions

Type NEG (Cable In - Cable Out)

Continuous Ampere Rating @ 40°C	1-Pole		2-Pole		3-Pole		4-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	NEG1B015L <sup>①②</sup>	297.00	NEG2B015L <sup>③</sup>	743.00	NEG3B015L <sup>④</sup>	930.00	NEG4B015L	1210.00
20	NEG1B020L <sup>①②</sup>	297.00	NEG2B020L <sup>③</sup>	743.00	NEG3B020L <sup>④</sup>	930.00	NEG4B020L	1210.00
25	NEG1B025L <sup>②</sup>	297.00	NEG2B025L <sup>③</sup>	743.00	NEG3B025L <sup>④</sup>	930.00	NEG4B025L	1210.00
30	NEG1B030L <sup>②</sup>	297.00	NEG2B030L <sup>③</sup>	743.00	NEG3B030L <sup>④</sup>	930.00	NEG4B030L	1210.00
35	NEG1B035L <sup>②</sup>	297.00	NEG2B035L <sup>③</sup>	743.00	NEG3B035L <sup>④</sup>	930.00	NEG4B035L	1210.00
40	NEG1B040L <sup>②</sup>	297.00	NEG2B040L <sup>③</sup>	743.00	NEG3B040L <sup>④</sup>	930.00	NEG4B040L	1210.00
45	NEG1B045L <sup>②</sup>	297.00	NEG2B045L	743.00	NEG3B045L	930.00	NEG4B045L	1210.00
50	NEG1B050L <sup>②</sup>	297.00	NEG2B050L <sup>③</sup>	743.00	NEG3B050L <sup>④</sup>	930.00	NEG4B050L	1210.00
60	NEG1B060L	297.00	NEG2B060L	743.00	NEG3B060L	930.00	NEG4B060L	1210.00
70	NEG1B070L	338.00	NEG2B070L	845.00	NEG3B070L	1056.00	NEG4B070L	1376.00
80	NEG1B080L	338.00	NEG2B080L	845.00	NEG3B080L	1056.00	NEG4B080L	1376.00
90	NEG1B090L	338.00	NEG2B090L	845.00	NEG3B090L	1056.00	NEG4B090L	1376.00
100	NEG1B100L	338.00	NEG2B100L	845.00	NEG3B100L	1056.00	NEG4B100L	1376.00
110	NEG1B110L	747.00	NEG2B110L	1864.00	NEG3B110L	2330.00	NEG4B110L	3029.00
125	NEG1B125L	747.00	NEG2B125L	1864.00	NEG3B125L	2330.00	NEG4B125L	3029.00



Type HEG (Cable In - Cable Out)

Continuous Ampere Rating @ 40°C	1-Pole		2-Pole		3-Pole		4-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	HEG1B015L <sup>①②</sup>	414.00	HEG2B015L <sup>③</sup>	966.00	HEG3B015L <sup>④</sup>	1133.00	HEG4B015L	1474.00
20	HEG1B020L <sup>①②</sup>	414.00	HEG2B020L <sup>③</sup>	966.00	HEG3B020L <sup>④</sup>	1133.00	HEG4B020L	1474.00
25	HEG1B025L <sup>②</sup>	414.00	HEG2B025L <sup>③</sup>	966.00	HEG3B025L <sup>④</sup>	1133.00	HEG4B025L	1474.00
30	HEG1B030L <sup>②</sup>	414.00	HEG2B030L <sup>③</sup>	966.00	HEG3B030L <sup>④</sup>	1133.00	HEG4B030L	1474.00
35	HEG1B035L <sup>②</sup>	414.00	HEG2B035L <sup>③</sup>	966.00	HEG3B035L <sup>④</sup>	1133.00	HEG4B035L	1474.00
40	HEG1B040L <sup>②</sup>	414.00	HEG2B040L <sup>③</sup>	966.00	HEG3B040L <sup>④</sup>	1133.00	HEG4B040L	1474.00
45	HEG1B045L <sup>②</sup>	414.00	HEG2B045L	966.00	HEG3B045L	1133.00	HEG4B045L	1474.00
50	HEG1B050L <sup>②</sup>	414.00	HEG2B050L <sup>③</sup>	966.00	HEG3B050L <sup>④</sup>	1133.00	HEG4B050L	1474.00
60	HEG1B060L	414.00	HEG2B060L	966.00	HEG3B060L	1133.00	HEG4B060L	1474.00
70	HEG1B070L	492.00	HEG2B070L	1098.00	HEG3B070L	1260.00	HEG4B070L	1638.00
80	HEG1B080L	492.00	HEG2B080L	1098.00	HEG3B080L	1260.00	HEG4B080L	1638.00
90	HEG1B090L	492.00	HEG2B090L	1098.00	HEG3B090L	1260.00	HEG4B090L	1638.00
100	HEG1B100L	492.00	HEG2B100L	1098.00	HEG3B100L	1260.00	HEG4B100L	1638.00
110	HEG1B110L	1031.00	HEG2B110L	2136.00	HEG3B110L	2561.00	HEG4B110L	3330.00
125	HEG1B125L	1031.00	HEG2B125L	2136.00	HEG3B125L	2561.00	HEG4B125L	3330.00

Line and load lugs are included as standard.  
HACR rated.  
Suitable for screw mounting.

### Lugs For 60/75°C Wire

NEG/HEG			
Ampere Rating	Wire Size	Catalog Number	List Price \$
15-125A	#14 - 3/0 AWG Cu (steel lugs)	3TW1EG30 (qty. 3)	12.80
15-125A <sup>①</sup>	#14 - 1/0 AWG Cu #14 - 1/0 AWG Al	3TA1EG10 (qty. 3)	12.80
15-125A <sup>②</sup>	#6 - 3/0 AWG Cu #6 - 3/0 AWG Al	3TA1EG30 (qty. 3)	12.80
15-125A	Nut Keeper plate w/ screw (for crimp terminals)	TNKE3 (qty. 3)	12.30

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight lbs. (kg)
1	1	1.1 (0.5)
2	1	2.0 (0.9)
3	1	3.1 (1.4)
4	1	3.9 (1.8)

### Interrupting Ratings

Breaker Type	Number of Poles	UL 489 AIR					IEC 60947-2							
		RMS Symmetrical Amperes (KA)					Volts AC (50/60Hz)							
		Volts AC(50/60Hz)					Volts DC		220/240		380/415		Volts DC	
NEG	1	85	35	22	—	—	35	—	85	43	—	—	35	—
	2, 3, 4	85	—	—	35	22 <sup>③</sup>	—	35	85	43	40	20	—	35
HEG	1	100	65	25	—	—	42	—	100	50	—	—	42	—
	2, 3, 4	100	—	—	65	25 <sup>③</sup>	—	42	100	50	70	35	—	42

For inches / millimeters conversion, see Application Data section.

① SWD rated.  
② HID rated 277 VAC.

③ Applies to 3 & 4-pole breakers only.  
④ Optional lugs for NEG and HEG breakers.

Accessories pages 6-33 and 6-86 to 6-91

# Molded Case Circuit Breakers

## Internal Accessories for NEG and HEG 125A Frame

*Selection*

### Shunt Trip

Control Voltage		NEG, HEG Catalog Number	List Price \$
V AC	V DC		
110-240	125	STRER240	636.00
380-600	—	STREV600	636.00
24-60	24-60	STREM60D	636.00

### Auxiliary Switch

Maximum Voltage		Number of Contacts	NEG, HEG Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	ASKE2	271.00
240	125	2A-2B	ASKE3	540.00

### Alarm Switch

Maximum Voltage		Number of Contacts	NEG, HEG Catalog Number	List Price \$
AC	DC			
240	125	1A-1B	ASKE1	271.00
240	125	2A-2B	ASKE5	540.00

### Undervoltage Trip

Control Voltage		NEG, HEG Catalog Number	List Price \$
AC	DC		
60		UVREM60▲	636.00
120		UVREN120	636.00
240		UVRER240	636.00
480		UVREU480▲	636.00
600		UVREV600▲	636.00
24	24	UVREB24AD	636.00
	48	UVREC48D▲	636.00
	125	UVRED125D▲	636.00
	250	UVREE250D▲	636.00

### Alarm and Auxiliary Switch Combinations

For Breaker	Catalog Number	List Price \$
NEG, HEG	ASKE6	540.00

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## ED 125A Frame Sentron Series

Selection

### Ordering Instructions

- All ED Frame Sentron circuit breakers are supplied with load side lugs. If line side lugs are required, add "L" suffix to catalog number. Consult Siemens sales office for any additional charge
- 50°C Calibration, 400HZ - see page 6-84. All ED frame circuit breakers may be reverse connected

### Type ED2<sup>Ⓢ</sup>

Blue Label

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	120V AC	125V DC	240V AC	125V DC 250V DC	240V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED21B015 <sup>Ⓢ</sup>	125.00	ED22B015	288.00	ED23B015	428.00
20	ED21B020 <sup>Ⓢ</sup>	125.00	ED22B020	288.00	ED23B020	428.00
25	ED21B025	125.00	ED22B025	288.00	ED23B025	428.00
30	ED21B030	125.00	ED22B030	288.00	ED23B030	428.00
35	ED21B035	125.00	ED22B035	288.00	ED23B035	428.00
40	ED21B040	125.00	ED22B040	288.00	ED23B040	428.00
45	ED21B045	125.00	ED22B045	288.00	ED23B045	428.00
50	ED21B050	125.00	ED22B050	288.00	ED23B050	428.00
60	ED21B060	125.00	ED22B060	288.00	ED23B060	428.00
70	ED21B070	230.00	ED22B070	470.00	ED23B070	613.00
80	ED21B080	230.00	ED22B070	470.00	ED23B080	613.00
90	ED21B090	230.00	ED22B090	470.00	ED23B090	613.00
100	ED21B100	230.00	ED22B100	470.00	ED23B100	613.00

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>ED2, ED4, ED6, HED4, HHED6</b>		
1	30	38
2	10	25
3	10	38
<b>CED6</b>		
2	5	20
3	5	30

### Lugs

Ampere Rating	No. of Poles	Catalog Number	Wire Range
<b>Aluminum Body Lugs</b>			
All 15-25A	1, 2, 3	Line/Load SA1E025	#14-#10 Cu #12-#10 Al
All 30-100A	1, 2, 3	Line Side LN1E100	#10-1/0 Cu/Al
ED2, 4, CED6 30-60A	1	Load Side LD1E060	#10-#4 Cu/Al
ED2, 4, CED6 70-100A	1	Load Side LD1E100	#6-#1/0 Cu/Al
ED2, 4, 6, HED4, HHED6 30-100A	2, 3	Load Side LN1E100	#10-1/0 Cu/Al
All 110, 125A	2, 3	Line/Load TA1E6125	#3-3/0 Cu #1-2/0 Al
<b>Copper Body Lugs</b>			
All 30-125A	1, 2, 3	Line/Load TC1ED6150 <sup>Ⓢ</sup>	#10-1/0 Cu only
<b>Compression Lugs</b>			
All ED, HHED, CED		CCE125	2/0

### Type ED4<sup>Ⓢ</sup>

Blue Label

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	120V AC 277V AC	125V DC	480V AC	250V DC	480V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED41B015 <sup>Ⓢ</sup>	170.00	ED42B015	521.00	ED43B015	684.00
20	ED41B020 <sup>Ⓢ</sup>	170.00	ED42B020	521.00	ED43B020	684.00
25	ED41B025	170.00	ED42B025	521.00	ED43B025	684.00
30	ED41B030	170.00	ED42B030	521.00	ED43B030	684.00
35	ED41B035	170.00	ED42B035	521.00	ED43B035	684.00
40	ED41B040	170.00	ED42B040	521.00	ED43B040	684.00
45	ED41B045	170.00	ED42B045	521.00	ED43B045	684.00
50	ED41B050	170.00	ED42B050	521.00	ED43B050	684.00
60	ED41B060	170.00	ED42B060	521.00	ED43B060	684.00
70	ED41B070	289.00	ED42B070	686.00	ED43B070	804.00
80	ED41B080	289.00	ED42B080	686.00	ED43B080	804.00
90	ED41B090	289.00	ED42B090	686.00	ED43B090	804.00
100	ED41B100	289.00	ED42B100	686.00	ED43B100	804.00
110	—	—	ED42B110	1386.00	ED43B110	1594.00
125	—	—	ED42B125	1386.00	ED43B125	1594.00

### Enclosures (Neutral Included)

Type	Catalog Number	List Price \$
1 (Surface)	E2N1S (15-100A)	149.00
1 (Flush)	E2N1F (15-100A)	149.00
3R	E2N3R (15-100A)	410.00
4-4X	ED6SS4 (15-100A)	2841.00
7-9	EA (15-60A)	1750.00
7-9	EB (70-100A)	2176.00
12	E2N12 (15-100A)	254.00
1 (Surface)	CED6N1S <sup>Ⓢ</sup>	271.00
1 (Flush)	CED6N1F <sup>Ⓢ</sup>	271.00
3R	CED6N3R <sup>Ⓢ</sup>	725.00
12	CED6N12 <sup>Ⓢ</sup>	449.00

### Type ED6<sup>Ⓢ</sup>

Blue Label

Continuous Current Rating @ 40°C	1-Pole <sup>Ⓢ</sup>		2-Pole		3-Pole	
	347V AC		600V AC	250V DC	600V AC	500V DC
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED61B015	349.00	ED62B015	613.00	ED63B015	778.00
20	ED61B020	349.00	ED62B020	613.00	ED63B020	778.00
25	ED61B025	349.00	ED62B025	613.00	ED63B025	778.00
30	ED61B030	349.00	ED62B030	613.00	ED63B030	778.00
35	ED61B035	349.00	ED62B035	613.00	ED63B035	778.00
40	ED61B040	349.00	ED62B040	613.00	ED63B040	778.00
45	ED61B040	349.00	ED62B045	613.00	ED63B045	778.00
50	ED61B050	349.00	ED62B050	613.00	ED63B050	778.00
60	ED61B060	349.00	ED62B060	613.00	ED63B060	778.00
70	ED61B070	480.00	ED62B070	773.00	ED63B070	973.00
80	ED61B080	480.00	ED62B080	773.00	ED63B080	973.00
90	ED61B090	480.00	ED62B090	773.00	ED63B090	973.00
100	ED61B100	480.00	ED62B100	773.00	ED63B100	973.00
110	—	—	—	—	ED63B110	1872.00
125	—	—	—	—	ED63B125	1872.00

Note: ED frame circuit breakers qualified to UL 489 Supplement SB "Naval" — See page 6-84 for additional information

■ Built to order. Allow 2-3 weeks for delivery.

- Ⓢ CSA Certified only (Not UL)
- Ⓢ For CED types and all 110-125 ampere ED frames.
- Ⓢ See Note: A, page 6-81.
- Ⓢ SWD rated.
- Ⓢ HACR rated.

Modifications page 6-84  
Enclosures Section 5  
Accessories pages 6-36 and 6-86 to 6-91

# Molded Case Circuit Breakers

## ED 125A Frame Sentron Series

## Selection/Dimensions

### Type HED4<sup>®</sup>

**Black Label**

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	277V AC		125V DC		480V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	HED41B015 <sup>Ⓢ</sup>	397.00	HED42B015	929.00	HED43B015	1140.00
20	HED41B020 <sup>Ⓢ</sup>	397.00	HED42B020	929.00	HED43B020	1140.00
25	HED41B025	397.00	HED42B025■	929.00	HED43B025	1140.00
30	HED41B030	397.00	HED42B030	929.00	HED43B030	1140.00
35	HED41B035■	397.00	HED42B035■	929.00	HED43B035	1140.00
40	HED41B040	397.00	HED42B040	929.00	HED43B040	1140.00
45	HED41B045■	397.00	HED42B045■	929.00	HED43B045	1140.00
50	HED41B050■	397.00	HED42B050	929.00	HED43B050	1140.00
60	HED41B060■	397.00	HED42B060■	929.00	HED43B060	1140.00
70	HED41B070■	449.00	HED42B070■	1070.00	HED43B070	1227.00
80	HED41B080■	449.00	HED42B080■	1070.00	HED43B080	1227.00
90	HED41B090■	449.00	HED42B090■	1070.00	HED43B090	1227.00
100	HED41B100■	449.00	HED42B100■	1070.00	HED43B100	1227.00
110	—	—	HED42B110■	2176.00	HED43B110	2510.00
125	—	—	HED42B125■	2176.00	HED43B125	2510.00

### Type HHED6<sup>®</sup>

**Black Label**

### Fuseless Current Limiting

### Type CED6<sup>®</sup>

**Red Label**

Continuous Current Rating @ 40°C	2-Pole		3-Pole		2-Pole		3-Pole	
	600V AC		600V AC		600V AC, 250V DC		600V AC, 500V DC <sup>Ⓢ</sup>	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	HHED62B015■	1010.00	HHED63B015	1183.00	CED62B015	2756.00	CED63B015	3200.00
20	HHED62B020■	1010.00	HHED63B020	1183.00	CED62B020■	2756.00	CED63B020	3200.00
25	HHED62B025■	1010.00	HHED63B025	1183.00	—	—	—	—
30	HHED62B030■	1010.00	HHED63B030	1183.00	CED62B030■	2756.00	CED63B030	3200.00
35	HHED62B035■	1010.00	HHED63B035	1183.00	—	—	—	—
40	HHED62B040■	1010.00	HHED63B040	1183.00	CED62B040■	2756.00	CED63B040	3200.00
45	HHED62B045■	1010.00	HHED63B045	1183.00	—	—	—	—
50	HHED62B050■	1010.00	HHED63B050	1183.00	CED62B050■	2756.00	CED63B050	3200.00
60	HHED62B060■	1010.00	HHED63B060	1183.00	CED62B060■	2756.00	CED63B060	3200.00
70	HHED62B070■	1174.00	HHED63B070	1344.00	CED62B070■	2756.00	CED63B070	3200.00
80	HHED62B080■	1174.00	HHED63B080	1344.00	CED62B080■	2756.00	CED63B080	3200.00
90	HHED62B090■	1174.00	HHED63B090	1344.00	CED62B090■	2756.00	CED63B090	3200.00
100	HHED62B100■	1174.00	HHED63B100	1344.00	CED62B100■	2756.00	CED63B100	3200.00
110	HHED62B110■	2262.00	HHED63B110	2633.00	—	—	CED63B110■	4885.00
125	HHED62B125■	2262.00	HHED63B125	2633.00	CED62B125■	4135.00	CED63B125	4885.00

FIGURE 1 - ED, HED, HHED

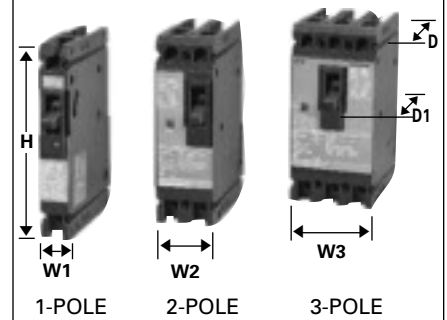
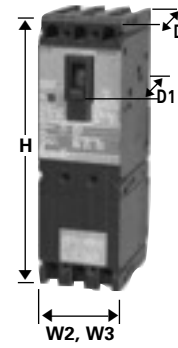


FIGURE 2 - CED (3-Pole shown)



Dimensions (in inches)

Breaker Type	W1	W2	W3	H	D	D1
Figure 1 ED2, ED4, ED6, HED4, ED6 ETI <sup>Ⓢ</sup>	1	2	3	6.35	3.92	4.56
Figure 1 HHED6	—	2	3	6.53	3.92	4.56
Figure 2 CED6, CED6 ETI <sup>Ⓢ</sup>	—	2	3	9.58	3.92	4.56

## Interrupting Ratings

Breaker Type	UL 489 AIR (File #E10848)									IEC 947-2						
	RMS Symmetrical Amperes (KA)									Volts AC (50/60Hz)						
	Volts AC									220/240			380/415		500	
	120	240	277	347	480	600	125	250	500 <sup>Ⓢ</sup>	Icu	Ics	Icu	Ics	Icu	Ics	
ED2 (1-P)	10	—	—	—	—	—	5	—	—	—	—	—	—	—	—	
ED2 (2, 3-P)	—	10	—	—	—	—	—	5 (2-P)	—	—	—	—	—	—	—	
ED4 (1-P)	65	—	22	—	—	—	30	—	—	—	—	—	—	—	—	
ED4 (2, 3-P)	—	65	—	—	18	—	—	30 (2-P)	—	—	—	—	—	—	—	
ED6 (1P)	—	—	—	30 <sup>Ⓢ</sup>	—	—	—	—	—	—	—	—	—	—	—	
ED6 (2, 3-P)	—	65	—	—	25	18	—	—	18 (3-P)	65	17	35	9	18	5	
HED4 (1-P)	100	—	65	—	—	—	30	—	—	—	—	—	—	—	—	
HED4 (1-P)	100	—	25	—	—	—	30	—	—	—	—	—	—	—	—	
HED4 (35-100A)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
HED4 (2, 3-P) <sup>Ⓢ</sup>	—	100	—	—	42	—	—	30 (2-P)	—	—	—	—	—	—	—	
HHED6 (2, 3-P) <sup>Ⓢ</sup>	—	100	—	—	65	18	—	—	—	—	—	—	—	—	—	
CED6 (2, 3-P)	—	200	—	—	200	100	—	50 (2-P)	50 (3-P)	—	—	—	—	—	—	

■ Built to order. Allow 2-3 weeks for delivery.

Ⓢ SWD rated.

Ⓢ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems.

Ⓢ HED4 and HHED6 type circuit breakers meet the UL criteria for "current limiting" at 240V AC.

Ⓢ ED6-ETI, CED6-ETI, see page 6-66 for ordering information.

Ⓢ Single Pole 15-30A 30KA @ 347V non-UL. 35-100A 18KA @ 347V non-UL.

Ⓢ HACR rated.

# Molded Case Circuit Breakers

## Accessories

## Selection

Accessories for:

### ED 125A Frame



### Combinations

Available only when ordered together. Only one module can be added to a breaker. Additional accessories, which always attach to the left pole, cannot be added to the combination later. Adds 1 inch pole space.

### Equipment Ground Sensing

A field addable kit containing 30mA or 5 mA ground fault accessory module, current transformer with 24 inch leads, and current transformer mounting equipment. Current transformer to mount in gutter of lighting panel or any control panel. Accessory module operates from separate 120V control power source.

Both 30MA and 5MA devices are equipment protection devices only. Do not use for personnel protection.



### Shunt Trip Combinations

Control Voltage		1 Shunt Trip	1 Shunt Trip and 1 Auxiliary Switch	1 Shunt Trip and 1 Auxiliary Switch and 1 Alarm Switch	1 Shunt Trip and 1 Alarm Switch	1 Shunt Trip and 2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
24		S17ED60	—	—	—	—
48		S18ED60	—	—	—	—
120		S01ED60	S01ED62A	S01ED62AB	S01ED62B	S01ED62AA
208		—	S02ED62A▲	S02ED62AB▲	S02ED62B▲	S02ED62AA▲
240		S03ED60	S03ED62A	S03ED62AB	S03ED62B▲	S03ED62AA▲
277		S15ED60▲	S15ED64A▲	S15ED64AB▲	S15ED64B▲	—
480		S04ED60	S04ED64A▲	S04ED64AB▲	S04ED64B▲	—
	12	S16ED60▲	S16ED62A▲	—	—	—
	24	S07ED60	S07ED62A	S07ED62AB▲	S07ED62B▲	S07ED62AA▲
	48	S09ED60	S09ED62A▲	S09ED62AB▲	S09ED62B▲	S09ED62AA▲
	125	S11ED60▲	S11ED62A▲	S11ED62AB▲	S11ED62B▲	S11ED62AA▲
	250	S13ED60▲	S13ED62A▲	S13ED62AB▲	S13ED62B▲	S13ED62AA▲
List Price \$:		636.00	897.00	1157.00	897.00	1157.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip	1 Undervoltage Trip and 1 Auxiliary Switch	1 Undervoltage Trip and 1 Auxiliary Switch and 1 Alarm Switch	1 Undervoltage Trip and 1 Alarm Switch	1 Undervoltage Trip and 2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
120		U01ED60	U01ED62A	U01ED62AB▲	U01ED62B▲	U01ED62AA▲
208		U02ED60▲	U02ED62A▲	U02ED62AB▲	U02ED62B▲	U02ED62AA▲
240		U03ED60	U03ED62A▲	U03ED62AB▲	U03ED62B▲	U03ED62AA▲
277		U16ED60▲	U16ED64A▲	U16ED64AB▲	U16ED64B▲	—
480		U06ED60	U06ED64A▲	U06ED64AB▲	U06ED64B▲	—
600		U08ED60▲	—	—	—	—
	24	U13ED60	U13ED62A▲	U13ED62AB▲	U13ED62B▲	U13ED62AA▲
	48	U14ED60▲	U14ED62A▲	U14ED62AB▲	U14ED62B▲	U14ED62AA▲
	125	U10ED60▲	U10ED62A▲	U10ED62AB▲	U10ED62B▲	U10ED62AA▲
	250	U12ED60▲	U12ED62A▲	—	—	U12ED62AA▲
List Price \$:		636.00	897.00	1157.00	897.00	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Auxiliary Switch	1 Alarm Switch and 1 Auxiliary Switch	2 Auxiliary Switches	1 Alarm Switch and 2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number
240	250	A01ED62	A01ED62B	A02ED62	A02ED62B
480		A01ED64	A01ED64B	—	—
List Price \$:		271.00	540.00	540.00	802.00

Maximum Voltage		1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$
	12	A01EDLV	342.00
Gold Plated Contacts—for PLC use			

### Alarm Switch Only

Maximum Voltage		1 Alarm Switch	
AC	DC	Catalog Number	List Price \$
240	250	B00ED62	271.00
480		B00ED64	271.00

### Ground Fault Sensing Relay Kit — Equipment Protection Only

For Use With Breaker Frame	Number of Poles	Description	Catalog Number		List Price \$
			30mA	5mA	
CED6, ED2, ED4 ED6, EFC, EFF, HED4, HHED6	1, 2, 3	Basic Kit	GF01ED60	GF01ED65	1483.00
		Basic Kit with Normally Open Bell Alarm	GF01ED60B0	GF01ED65B0▲	1734.00
		Basic Kit with Normally Closed Bell Alarm	GF01ED60BC	GF01ED65BC▲	1734.00

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## Accessories

## Selection

Type FXD6-A<sup>①②</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker – Without Lugs)					
Continuous Current Rating @ 40°C	2-Pole <sup>②</sup>		3-Pole		
	Catalog Number	List Price \$	Catalog Number	List Price \$	
70	FXD62B070	1801.00	FXD63B070	2276.00	
80	FXD62B080	1801.00	FXD63B080	2276.00	
90	FXD62B090	1801.00	FXD63B090	2276.00	
100	FXD62B100	1801.00	FXD63B100	2276.00	
110	FXD62B110	1801.00	FXD63B110	2276.00	
125	FXD62B125	1801.00	FXD63B125	2276.00	
150	FXD62B150	1801.00	FXD63B150	2276.00	
175	FXD62B175	1801.00	FXD63B175	2276.00	
200	FXD62B200	1801.00	FXD63B200	2276.00	
225	FXD62B225	1801.00	FXD63B225	2276.00	
250	FXD62B250	3062.00	FXD63B250	3572.00	

Type FD6-A<sup>⑦</sup>

Blue Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC<sup>②</sup>

70	FD62B070	1896.00	FD62F250	869.00	FD62T070	939.00
80	FD62B080	1896.00			FD62T080	939.00
90	FD62B090	1896.00			FD62T090	939.00
100	FD62B100	1896.00			FD62T100	939.00
110	FD62B110	1896.00			FD62T110	939.00
125	FD62B125	1896.00			FD62T125	939.00
150	FD62B150	1896.00			FD62T150	939.00
175	FD62B175	1896.00			FD62T175	939.00
200	FD62B200	1896.00			FD62T200	939.00
225	FD62B225	1896.00			FD62T225	939.00
250	FD62B250	3158.00			FD62T250	2201.00

### 3-Pole 600V AC, 500V DC<sup>③</sup>

70	FD63B070	2414.00	FD63F250	1125.00	FD63T070	1157.00
80	FD63B080	2414.00			FD63T080	1157.00
90	FD63B090	2414.00			FD63T090	1157.00
100	FD63B100	2414.00			FD63T100	1157.00
110	FD63B110	2414.00			FD63T110	1157.00
125	FD63B125	2414.00			FD63T125	1157.00
150	FD63B150	2414.00			FD63T150	1157.00
175	FD63B175	2414.00			FD63T175	1157.00
200	FD63B200	2414.00			FD63T200	1157.00
225	FD63B225	2414.00			FD63T225	1157.00
250	FD63B250	3713.00			FD63T250	2456.00

## Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489 AIR (File E10848)					IEC 947-2					
	Volts AC (50/60Hz)					Volts AC (50/60Hz)					
	240	480	600	250	500 <sup>⑤</sup>	220/240	380/415	500			
					lcu	lcs	lcu	lcs	lcu	lcs	
FXD6-A, FD6-A	65	35	22	30 (2-P)	18 (3-P)	65	33	35	9	20	10
HFXD6 <sup>⑥</sup> , HFD6 <sup>⑥</sup>	100	65	25	30 (2-P)	25 (3-P)	100	50	65	33	42	21
HHFD6 <sup>⑥</sup> , HHFXD6 <sup>⑥</sup>	200	100	25	—	—	200	100	100	50	65	33
CFD6	200	200	100	50 (2-P)	50 (3-P)	—	—	—	—	—	—

## Instantaneous Adjustment Trip Range

Breaker Ampere Rating	Nominal Instantaneous Values							±20% Tolerance High
	±20% Tolerance Low	2	3	4	5	6	7	
70-90	600	640	690	730	770	810	850	900
100-110	700	770	840	920	990	1060	1140	1200
125-150	800	900	1000	1100	1200	1300	1400	1500
175-200	900	1060	1210	1370	1520	1780	1930	2000
225-250	1100	1300	1500	1700	1900	2100	2300	2500

Note: FD frame qualified to UL489 supplement SB "NAVAL". See page 6-84 for additional information.

## Ordering Information

### Complete Breaker Unassembled with Lugs

Prices of FD6, HFD6, and HHFD6 breakers includes frame, trip and both line and load lugs (TA1FD350A). When ordered by these catalog numbers, the customer will receive the frame, trip, and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

### Complete Breaker Assembled with-out Lugs

Prices of FXD6, HFXD6, HHFXD6, and CFD6 includes frame with non-interchangeable trip unit installed only. Order required lugs separately. For line and load lugs (TA1FD350A) installed, add suffix "L" to catalog number (add 2 times list price of lugs for each pole).

50°C Applications see page 6-84.

400 Hz Applications see page 6-84.

## Lugs For 75°C Wire<sup>⑤</sup>

Catalog Number	Wire Range	List Price \$
TA1FD350A	#6–350 kcmil Cu #4–350 kcmil Al	22.00
TC1FD350	#6–350 kcmil Cu	34.50
Compression Lug		
CCF250	350 kcmil Cu/Al	51.00

## Enclosures

Type	Catalog Number	List Price \$
1	F6N1S(F)	184.00
3R	F6N3R	606.00
4-4X	FD6SS4	4720.00
7-9	EC2	4815.00
12	F6N12	410.00
Neutral <sup>④</sup>	N250	143.00

Modifications page 6-84  
Enclosures Section 5  
Accessories pages 6-39 and 6-86 to 6-91

■ Built to order. Allow 2–3 weeks for delivery.

- ① Type FXD6-A circuit breakers are UL Listed for reverse fed applications.
- ② 2-pole units are 3-pole width.
- ③ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.
- ④ Order neutral as separate item.
- ⑤ See Note: A, page 6-81.
- ⑥ HFD6 and HHFD6 type circuit breakers meet the UL criteria for "current limiting" at 240 and 480V AC.
- ⑦ HACR rated.

# Molded Case Circuit Breakers

## FD 250A Frame Sentron Series

## Selection/Dimensions

Type HFD6, Type HFXD6<sup>②③④⑤⑥</sup>

Black Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>2-Pole 600V AC, 250V DC (3-Pole Width)</b>						
70	HFD62B070	4156.00	HFD62F250	3129.00	FD62T070	939.00
80	HFD62B080	4156.00			FD62T080	939.00
90	HFD62B090	4156.00			FD62T090	939.00
100	HFD62B100	4156.00			FD62T100	939.00
110	HFD62B110	4156.00			FD62T110	939.00
125	HFD62B125	4156.00			FD62T125	939.00
150	HFD62B150	4156.00			FD62T150	939.00
175	HFD62B175	4156.00			FD62T175	939.00
200	HFD62B200	4156.00			FD62T200	939.00
225	HFD62B225	4156.00			FD62T225	939.00
250	HFD62B250	5418.00			FD62T250	2201.00

**3-Pole 600V AC, 500V DC<sup>①</sup>**

70	HFD63B070	5053.00	HFD63F250	3764.00	FD63T070	1157.00
80	HFD63B080	5053.00			FD63T080	1157.00
90	HFD63B090	5053.00			FD63T090	1157.00
100	HFD63B100	5053.00			FD63T100	1157.00
110	HFD63B110	5053.00			FD63T110	1157.00
125	HFD63B125	5053.00			FD63T125	1157.00
150	HFD63B150	5053.00			FD63T150	1157.00
175	HFD63B175	5053.00			FD63T175	1157.00
200	HFD63B200	5053.00			FD63T200	1157.00
225	HFD63B225	5053.00			FD63T225	1157.00
250	HFD63B250	6352.00			FD63T250	2456.00

Type HHFD, HHFXD6<sup>②③④⑥</sup>

**3-Pole 600V AC, Extra High Interrupting**

70	HHFD63B070	5866.00	HHFD63F250	4577.00	FD63T070	1157.00
80	HHFD63B080	5866.00			FD63T080	1157.00
90	HHFD63B090	5866.00			FD63T090	1157.00
100	HHFD63B100	5866.00			FD63T100	1157.00
110	HHFD63B110	5866.00			FD63T110	1157.00
125	HHFD63B125	5866.00			FD63T125	1157.00
150	HHFD63B150	5866.00			FD63T150	1157.00
175	HHFD63B175	5866.00			FD63T175	1157.00
200	HHFD63B200	5866.00			FD63T200	1157.00
225	HHFD63B225	5866.00			FD63T225	1157.00
250	HHFD63B250	7165.00			FD63T250	2456.00

Type CFD6<sup>③⑥</sup>

**Fuseless Current Limiting**

Red Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)		
Continuous Current Rating @ 40°C	3-Pole	
	600V AC/500V DC	
	Catalog Number	List Price \$
70	CFD63B070	6346.00
80	CFD63B080	6346.00
90	CFD63B090	6346.00
100	CFD63B100	6346.00
110	CFD63B110	6346.00
125	CFD63B125	6346.00
150	CFD63B150	6346.00
175	CFD63B175	6346.00
200	CFD63B200	6346.00
225	CFD63B225	6346.00
250	CFD63B250	7052.00

■ Built to order. Allow 2-3 weeks for delivery.

① When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems.

② For non-interchangeable trip 3-pole HFD6 type circuit

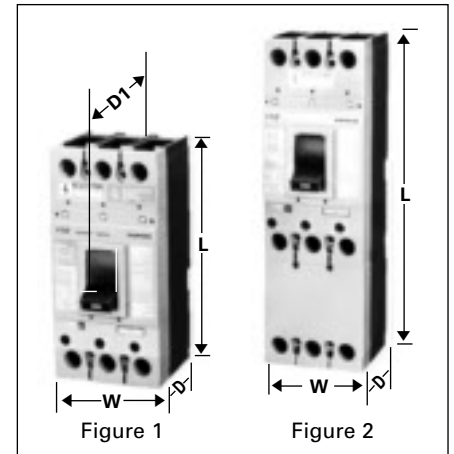
breaker, change prefix identifier from HFD6 to HFXD6. Price equals frame and trip prices combined, e.g. price of HFXD63B250 equals price of HFD63F250 plus price of FD63T250. Order lugs separately.

③ Type HFXD6, HHFXD6, CFD6 are UL Listed for reverse feed applications.

④ Type HFXD6, HFD6, HHFD6, HHFXD6 meet the UL criteria for "Current Limiting" at 240 VAC and 480V AC.

⑤ FXD6, ETI, CFD6, ETI — See page 6-66 for ordering information.

⑥ HACR rated.



Dimensions (in inches)

Breaker Type	W	L	D	D1 (to handle)
Figure 1 FXD6-A, FD6-A, HFD6, HFXD6, HHFD6, FD6-ETI <sup>⑤</sup>	4.50	9.50	4	5.25
Figure 2 CFD6, CFD6-ETI <sup>⑤</sup>	4.50	14.25	4	5.25

Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>FD6-A, HFD6, HHFD6, FXD6-A Assembled Circuit Breaker (less connectors)</b>		
2	1	8.6
3	1	10
<b>FD6-A, HFD6, HHFD6 Frame Only</b>		
2	1	7.5
3	1	8.7
<b>FD6 Trip Unit Only</b>		
2	1	1.1
3	1	1.3
<b>CFD6 Assembled Circuit Breaker (less terminals)</b>		
2	1	31
3	1	34



# Molded Case Circuit Breakers

## Internal Accessories

*Selection*

Accessories:  
for FD, FFC & FFF 250A Frames



### Shunt Trip Combinations

Control Voltage		1 Shunt Trip	
AC	DC	Catalog Number	List Price \$
24		S17FD60	636.00
120		S01FD60	636.00
240		S03FD60	636.00
277		S15FD60▲	636.00
480		S04FD60	636.00
600		S06FD60▲	636.00
	12	S16FD60▲	636.00
	24	S07FD60	636.00
	48	S09FD60▲	636.00
	125	S11FD60	636.00
	250	S13FD60▲	636.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch <sup>Ⓞ</sup>	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01FD60	636.00	W01FD64	897.00
208		U02FD60▲	636.00	W02FD64▲	897.00
240		U03FD60	636.00	W03FD64▲	897.00
277		U16FD60▲	636.00	W16FD64▲	897.00
480		U06FD60▲	636.00	W06FD64▲	897.00
600		U08FD60▲	636.00	—	—
	24	U13FD60	636.00	W13FD64	897.00
	48	U14FD60▲	636.00	W14FD64▲	897.00
	125	U10FD60▲	636.00	W10FD64▲	897.00
	250	U12FD60▲	636.00	W12FD64▲	897.00

### Auxiliary Switch Combinations

Voltage		1 Auxiliary Switch		2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
240		A01FD62	271.00	A02FD62	540.00
480		A01FD64	271.00	A02FD64	540.00
	12	A01FDLV	342.00	Gold Plated Contacts - for PLC use	

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B00FD64	271.00	C01FD64	540.00

▲ Built to order. Allow 6-8 weeks for delivery.

Ⓞ Auxiliary switch application is for 480V AC maximum.

Note: Old F-frame accessories cannot be used in new Sentron line. Likewise, new FD-frame accessories cannot be used on old F-frame circuit breakers.

# Molded Case Circuit Breakers

## JD 400A Frame Sentron Series

Selection

Type JXD2-A<sup>⑤</sup>

240V AC, 2-Pole 250V DC Only

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker without Lugs)				
Continuous Current Rating @ 40°C	2-Pole (3-Pole Width)		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$
200	JXD22B200■	2546.00	JXD23B200	3094.00
225	JXD22B225■	2546.00	JXD23B225	3094.00
250	JXD22B250■	2546.00	JXD23B250	3094.00
300	JXD22B300■	2546.00	JXD23B300	3094.00
350	JXD22B350■	2546.00	JXD23B350	3094.00
400	JXD22B400■	2546.00	JXD23B400	3094.00

Type JXD6-A<sup>①⑤</sup>

600V AC, 2-Pole 250V DC, 3-Pole 500V DC<sup>②</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker without Lugs)				
Continuous Current Rating @ 40°C	2-Pole (3-Pole Width)		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$
200	JXD62B200■	3184.00	JXD63B200	3764.00
225	JXD62B225■	3184.00	JXD63B225	3764.00
250	JXD62B250■	3184.00	JXD63B250	3764.00
300	JXD62B300■	3184.00	JXD63B300	3764.00
350	JXD62B350■	3184.00	JXD63B350	3764.00
400	JXD62B400■	3184.00	JXD63B400	3764.00

Type JD6-A<sup>⑤</sup>

Blue Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
200	JD62B200■	3309.00	JD62F400	1324.00	JD62T200■	1859.00
225	JD62B225■	3309.00			JD62T225■	1859.00
250	JD62B250■	3309.00			JD62T250■	1859.00
300	JD62B300■	3309.00			JD62T300■	1859.00
350	JD62B350■	3309.00			JD62T350■	1859.00
400	JD62B400■	3309.00			JD62T400■	1859.00

2-Pole 600V AC, 250V DC (3-Pole Width)

200	JD62B200■	3309.00	JD62F400	1324.00	JD62T200■	1859.00
225	JD62B225■	3309.00			JD62T225■	1859.00
250	JD62B250■	3309.00			JD62T250■	1859.00
300	JD62B300■	3309.00			JD62T300■	1859.00
350	JD62B350■	3309.00			JD62T350■	1859.00
400	JD62B400■	3309.00			JD62T400■	1859.00

3-Pole 600V AC, 500V DC<sup>②</sup>

200	JD63B200	3953.00	JD63F400	1694.00	JD63T200	2070.00
225	JD63B225	3953.00			JD63T225	2070.00
250	JD63B250	3953.00			JD63T250	2070.00
300	JD63B300	3953.00			JD63T300	2070.00
350	JD63B350	3953.00			JD63T350	2070.00
400	JD63B400	3953.00			JD63T400	2070.00

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)									
	UL 489 AIR (File E10848)					IEC 947-2				
	Volts AC (50/60Hz)			Volts DC		Volts AC (50/60Hz)				
	240	480	600	250	500 <sup>②</sup>	220/240		380/415		500
	lcs	lcs	lcs	lcs	lcs	lcs	lcs	lcs	lcs	lcs
JXD2-A	65	—	—	30 (2-P)	—	—	—	—	—	—
JXD6-A, JD6-A	65	35	25	30 (2-P)	25 (3-P)	65	33	40	20	30 15
HJD6-A, HJXD6-A	100	65	35	30 (2-P)	35 (3-P)	100	50	65	33	42 21
HHJD6, HHJXD6 <sup>②</sup>	200	100	50	—	—	200	100	100	50	65 33
CJD6-A	200	150	100	50 (2-P)	50 (3-P)	—	—	—	—	—

### Instantaneous Adjustment Trip Range

Breaker Ampere Rating	Nominal Instantaneous Values							
	±20% Tolerance Low	2	3	4	5	6	7	±20% Tolerance High
200-300	1250	1430	1610	1790	1960	2140	2320	2500
350-400	2000	2290	2570	2860	3140	3430	3710	4000

■ Built to order. Allow 2-3 weeks for delivery.

① Type JXD2 and JXD6 circuit breakers are UL Listed for reverse feed applications.

② When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

③ See Note: A, page 6-81.

④ HHJD6 type circuit breakers meet the UL criteria for "current limiting" at 240 and 480V AC.

⑤ HACR rated.

Note: JD frame qualified to UL489 supplement B "NAVAL." See page 6-84 for additional information.

### Ordering Information

#### Complete Breaker Unassembled with Lugs

Prices of JD6, HJD6, and HHJD6 breakers include frame, trip and both line and load lugs (TA2J6500). When ordered by these catalog numbers, the customer will receive the frame, trip, and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

#### Complete Breaker Assembled without Lugs

Prices of JXD6, HJXD6, HHJXD6, and CJD6 include frame with non-interchangeable trip unit installed only. Order required lugs separately. For line and load lugs (TA2J6500) installed, add suffix "L" to catalog number (add 2 times list price of lugs for each pole).

#### 100% Rated

Types JXD6 and HJXD6 breakers are available with 100% ratings. To order add suffix "H" to catalog number, and 10% to list price.■

100% rated JD breakers require the use of 90°C Cu cable sized at 75°C ampacity and lugs TC1J6600 or TC2J6500.

50°C Applications see page 6-84.

400Hz Applications see page 6-84.

### Lugs For 75°C Wire<sup>③</sup>

Catalog Number	Cables per Lug	Wire Range	List Price \$
TA2J6500	1, 2	#3/0-500 kcmil Cu #4/0-500 kcmil Al	31.50
TA1L6750	1	500-750 kcmil Al 500-600 kcmil Cu	76.00
TC1J6600	1	#3/0-600 kcmil Cu	77.00
TC2J6500	1, 2	#3/0-500 kcmil Cu	76.00
Compression Lug			
CCL600	1	500 kcmil Cu/Al	150.00

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Accessories pages 6-43 and 6-86 to 6-91

# Molded Case Circuit Breakers

## JD 400A Frame Sentron Series

## Selection/Dimensions

Type HJD6-A, HJXD6-A<sup>②④⑥</sup>

Black Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC (3-Pole Width)

200	HJD62B200■	5426.00	HJD62F400■	3441.00	JD62T200■	1859.00
225	HJD62B225■	5426.00			JD62T225■	1859.00
250	HJD62B250■	5426.00			JD62T250■	1859.00
300	HJD62B300■	5426.00			JD62T300■	1859.00
350	HJD62B350■	5426.00			JD62T350■	1859.00
400	HJD62B400■	5426.00			JD62T400■	1859.00

### 3-Pole 600V AC, 500V DC<sup>①②⑤</sup>

200	HJD63B200■	6538.00	HJD63F400■	4279.00	JD63T200■	2070.00
225	HJD63B225■	6538.00			JD63T225■	2070.00
250	HJD63B250■	6538.00			JD63T250■	2070.00
300	HJD63B300■	6538.00			JD63T300■	2070.00
350	HJD63B350■	6538.00			JD63T350■	2070.00
400	HJD63B400■	6538.00			JD63T400■	2070.00

Type HHJD6, HHJXD6<sup>②④⑥</sup>

### 2-Pole 600V AC (3-Pole Width)

Black Label

200	HHJD62B200■	6523.00	HHJD62F400■	4538.00	JD62T200■	1859.00
225	HHJD62B225■	6523.00			JD62T225■	1859.00
250	HHJD62B250■	6523.00			JD62T250■	1859.00
300	HHJD62B300■	6523.00			JD62T300■	1859.00
350	HHJD62B350■	6523.00			JD62T350■	1859.00
400	HHJD62B400■	6523.00			JD62T400■	1859.00

### 3-Pole 600VAC

200	HHJD63B200■	7841.00	HHJD63F400■	5582.00	JD63T200■	2070.00
225	HHJD63B225■	7841.00			JD63T225■	2070.00
250	HHJD63B250■	7841.00			JD63T250■	2070.00
300	HHJD63B300■	7841.00			JD63T300■	2070.00
350	HHJD63B350■	7841.00			JD63T350■	2070.00
400	HHJD63B400■	7841.00			JD63T400■	2070.00

Type CJD6-A<sup>⑤⑥</sup>

### Fuseless Current Limiting

Red Label

Non-Interchangeable Trip (Assembled Circuit Breakers Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
200	For 2-pole application use outside poles of 3-pole circuit breaker		CJD63B200■	8167.00
225			CJD63B225■	8167.00
250			CJD63B250■	8167.00
300			CJD63B300■	8167.00
350			CJD63B350■	8167.00
400			CJD63B400■	8167.00

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

2-pole units available in 3-pole construction.

⑤ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

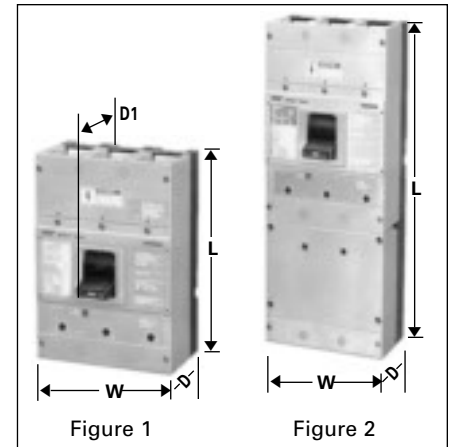
⑥ For non-interchangeable 3-pole HJD6 or HHJD6 type circuit breaker change the prefix identifier to HJXD6 or HHJXD6. Price equals price of frame plus price of trip, e.g. price of HJXD63B400 equals price of HJD63F400 plus price of JD63T400. Order lugs separately.

⑦ JXD6-ETI, CJD6-ETI see page 6-66 for ordering information.

⑧ Type HJXD6, HHJXD6 Circuit Breakers are UL listed for reverse fed applications.

⑨ CE applies to non-interchangeable type HJXD6-A only.

⑩ HACR rated.



Dimensions (in inches)

Breaker Type	W	L	D	To Handle D1
Figure 1 JXD2-A, JXD6-A, JD6-A HJD6-A, HJXD6-A, HHJD6, HJD6, HJXD6, HHJXD6, JXD6-ETI <sup>®</sup> , SJD6, SHJD6	7.5	11	4	5.44
Figure 2 CJD6, CJD6-ETI <sup>®</sup> , SCJD6	7.5	17.86	4	5.44

### Enclosures (Except SCJD6)

Type	Catalog Number	List Price \$
1	J6N1	258.00
3R	J6N3R	1393.00
12	J6N12	725.00
4X	LD6SS4	6946.00
7, 9 (200-250A)	EC4	4815.00
7, 9 (300-400A)	EE	6662.00
Neutral	W60992	492.00

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
JXD2, JXD6, JD6, HJD6, HHJD6 Assembled Breaker (less terminals)		
2	1	17.5
3	1	19.5
JD6, HJD6, HHJD6 Frame Only		
2	1	14
3	1	15.5
JD6 Trip Unit Only		
2	1	3.5
3	1	4
CJD6 Complete Assembled Breaker (less terminals)		
2	1	29.5
3	1	31.5

# Molded Case Circuit Breakers

## SJD 400A Frame Digital Solid State Sentron Sensitrip III Series

Selection

### Type SJD6-A

Blue Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SJD69200■	200	4564.00
SJD69300■	300	4564.00
SJD69400■	400	4564.00
SJD69200G■	200	7302.00
SJD69300G■	300	7302.00
SJD69400G■	400	7302.00
SJD69200NT■	200	6200.00
SJD69300NT■	300	6200.00
SJD69400NT■	400	6200.00
SJD69200NGT■	200	9164.00
SJD69300NGT■	300	9164.00
SJD69400NGT■	400	9164.00

### Type SHJD6-A

Black Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHJD69200■	200	6500.00
SHJD69300■	300	6500.00
SHJD69400■	400	6500.00
SHJD69200G■	200	9164.00
SHJD69300G■	300	9164.00
SHJD69400G■	400	9164.00
SHJD69200NT■	200	8048.00
SHJD69300NT■	300	8048.00
SHJD69400NT■	400	8048.00
SHJD69200NGT■	200	11116.00
SHJD69300NGT■	300	11116.00
SHJD69400NGT■	400	11116.00

### Current Limiting Type SCJD6-A

Red Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCJD69200■	200	8649.00
SCJD69300■	300	8649.00
SCJD69400■	400	8649.00
SCJD69200G■	200	11739.00
SCJD69300G■	300	11739.00
SCJD69400G■	400	11739.00
SCJD69200NT■	200	10389.00
SCJD69300NT■	300	10389.00
SCJD69400NT■	400	10389.00
SCJD69200NGT■	200	14334.00
SCJD69300NGT■	300	14334.00
SCJD69400NGT■	400	14334.00

### Ordering Information

Pricing information for all Digital Sentron Series SJD frames is for complete breaker only – price required lugs as separate items – lugs are suitable for 75° C wire.

**SJD6 and SCJD6 are acceptable for reverse connection application.**

**SHJD6 are not acceptable for reverse connection application.**

### Shipping Weights

Breaker Type	Number per Carton	Shipping Weight (lbs)
SJD6-A	1	20
SHJD6-A	1	20
SCJD6-A	1	33

SJD 400A Frame – 100% Rated<sup>2</sup>

### Type SJD6-A

Blue Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SJD69200H■	200	5007.00
SJD69300H■	300	5007.00
SJD69400H■	400	5007.00
SJD69200GH■	200	8048.00
SJD69300GH■	300	8048.00
SJD69400GH■	400	8048.00
SJD69200NTH■	200	6819.00
SJD69300NTH■	300	6819.00
SJD69400NTH■	400	6819.00
SJD69200NGTH■	200	10071.00
SJD69300NGTH■	300	10071.00
SJD69400NGTH■	400	10071.00

### Type SHJD6-A

Black Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHJD69200H■	200	7159.00
SHJD69300H■	300	7159.00
SHJD69400H■	400	7159.00
SHJD69200GH■	200	10088.00
SHJD69300GH■	300	10088.00
SHJD69400GH■	400	10088.00
SHJD69200NTH■	200	8827.00
SHJD69300NTH■	300	8827.00
SHJD69400NTH■	400	8827.00
SHJD69200NGTH■	200	12238.00
SHJD69300NGTH■	300	12238.00
SHJD69400NGTH■	400	12238.00

### Lugs for 75° C Wire<sup>1</sup>

Catalog Number	No of Cables per Connector	Wire Range	List Price \$
TA2J6500	2	#3/0-500 kcmil Cu	31.50
	2	#4/0-500 kcmil Cu	31.50
TA1L6750	1	500-750 kcmil Cu/Al	76.00
	1	500-600 kcmil Cu	76.00
TC1J6600	1	#3/0-600 kcmil Cu	77.00
TC2J6500	2	#3/0-500 kcmil Cu	76.00
	2	#4-#3/0-Cu/Al	32.50
<b>Compression Lug</b>			
CCL600	(1 pc.)	#1/0-500 kcmil Cu/Al	150.00

### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
200	N02SJD	396.00
300	N03SJD	396.00
400	N04SJD	396.00

### Trip Unit Adjustable Functions

Suffix Letter Code	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Short Time I <sup>2</sup> t Pick Up	Ground Fault Pick Up	Ground Fault Delay
None	LI	✓	✓	✓					
G	LIG	✓	✓	✓				✓	✓
NT	LSI	✓	✓	✓	✓	✓	✓		
NGT	LSIG	✓	✓	✓	✓	✓	✓	✓	✓

### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489 (File E10848)		
	240V AC	480V AC	600V AC
SJD6-A	65	35	25
SHJD6-A	100	65	35
SCJD6-A	200	150	100

**Note:** "G" suffix in catalog number denotes circuit breaker for 3-phase, 3-wire systems.  
For 3-phase, 4-wire, order correct 4th wire (neutral) transformer as separate and additional item.

■ Built to order. Allow 2-3 weeks for delivery.  
⊙ For additional information, see **Note: A**, page 6-81.  
⊗ Refer to the NEC for proper application of 100% rated devices.

Enclosures Section 5  
Accessories pages 6-43 and 6-86 to 6-91

# Molded Case Circuit Breakers

## Internal Accessories

Selection

Accessories for:

JD 400A Frame  
LD 600A Frame  
LMD 800A Frame  
SJD 400A Frame  
SLD 600A Frame



Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
24		S17JLD6	636.00	—	—
48		S18JLD6▲	636.00	—	—
120		S01JLD6	636.00	S01JLD62A	897.00
240		S03JLD6	636.00	S03JLD62A	897.00
277		S15JLD6▲	636.00	S15JLD64A▲	897.00
480		S04JLD6	636.00	—	—
	12	S16JLD6▲	636.00	S16JLD62A▲	897.00
	24	S07JLD6	636.00	S07JLD62A	897.00
	48	S09JLD6▲	636.00	S09JLD62A	897.00
	125	S11JLD6	636.00	S11JLD62A▲	897.00
	250	S13JLD6▲	636.00	S13JLD62A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01JLD6	636.00	U01JLD62A	897.00	U01JLD62AA	1157.00
208		U02JLD6▲	636.00	U02JLD62A▲	897.00	U02JLD62AA▲	1157.00
240		U03JLD6	636.00	U03JLD62A▲	897.00	U03JLD62AA▲	1157.00
480		U06JLD6	636.00	U06JLD64A▲	897.00	U06JLD64AA▲	1157.00
	24	U13JLD6	636.00	U13JLD62A	897.00	U13JLD62AA	1157.00
	48	U14JLD6▲	636.00	U14JLD62A▲	897.00	U14JLD62AA▲	1157.00
	125	U10JLD6▲	636.00	U10JLD62A▲	897.00	U10JLD62AA▲	1157.00
	250	U12JLD6▲	636.00	U12JLD62A▲	897.00	U12JLD62AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01JLD64	271.00	A02JLD64	540.00
—	12	A01JLDLV	342.00	A02JLDLV	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B01JLD64	271.00	A01JLD64B	540.00	A02JLD64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SJD, SLD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

**Note:** Accessory modules can only be added to right side pole of solid state SJD and SLD frame circuit breakers. No accessories can be added if mechanical interlock is used. All accessories on this page are useable on superseded JD2, JJ6, JL6, HJ6, SJL, LJ6, LL6, HL6 and SLL circuit breakers.

▲ Built to order. Allow 6–8 weeks for delivery.

# Molded Case Circuit Breakers

## LD 600A Frame Sentron Series

## Selection

Type LXD6-A<sup>①④</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker without Lugs)				
Continuous Current Rating @ 40°C	2-Pole (3-Pole Width)		3-Pole	
	600V AC	250V DC	600V AC	500V DC
	Catalog Number	List Price \$	Catalog Number	List Price \$
450	LXD62B450	4893.00	LXD63B450	6102.00
500	LXD62B500	4893.00	LXD63B500	6102.00
600	LXD62B600	4893.00	LXD63B600	6102.00

Type LD6-A<sup>④</sup>

Blue Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled w/Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC (3-Pole Width)

250	LD62B250	5020.00	LD62F600	3035.00	JD62T250	1859.00
300	LD62B300	5020.00			JD62T300	1859.00
350	LD62B350	5020.00			JD62T350	1859.00
400	LD62B400	5020.00			JD62T400	1859.00
450	LD62B450	5020.00			LD62T450	1859.00
500	LD62B500	5020.00			LD62T500	1859.00
600	LD62B600	5020.00	LD62T600	1859.00		

### 3-Pole 600V AC, 500V DC<sup>②</sup>

250	LD63B250	6290.00	LD63F600	4031.00	JD63T250	2070.00
300	LD63B300	6290.00			JD63T300	2070.00
350	LD63B350	6290.00			JD63T350	2070.00
400	LD63B400	6290.00			JD63T400	2070.00
450	LD63B450	6290.00			LD63T450	2070.00
500	LD63B500	6290.00			LD63T500	2070.00
600	LD63B600	6290.00	LD63T600	2070.00		

## Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)						IEC 947-2							
	UL 489 AIR (File E10848)						IEC 947-2							
	Volts AC (50/60Hz)			Volts DC			Volts AC (50/60Hz)							
	240	480	600	250	500 <sup>③</sup>	220/240	380/415	500	(Icu)	(Ics)	(Icu)	(Ics)	(Icu)	(Ics)
LD6-A, LXD6-A	65	35	25	30 (2-P)	25 (3-P)	65	33	40	20	30	15			
HLD6-A, HLXD6-A	100	65	35	30 (2-P)	35 (3-P)	100	50	65	33	42	21			
HHL6, HHLXD6	200	100	50	—	—	200	100	100	50	65	33			
CLD6-A	200	150	100	—	50 (3-P)	—	—	—	—	—	—			

## Instantaneous Adjustment Trip Range

Breaker Ampere Rating	Nominal Instantaneous Values							
	±20% Tolerance Low	2	3	4	5	6	7	±20% Tolerance High
	250-300	1250	1430	1610	1790	1960	2140	2320
350-450	2000	2290	2570	2860	3140	3430	3710	4000
500-600	3000	3430	3800	4290	4710	5140	5570	6000

■ Built to order. Allow 2-3 weeks for delivery.

① Type LXD6A circuit breakers are UL Listed for reverse fed applications.

② When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

③ See Note: A, page 6-81.

④ HACR rated.

Note: LD frame qualified to UL489 supplement SB "NAVAL". See page 6-84 for additional information.

Modifications page 6-84  
Enclosures Section 5  
Accessories pages 6-47 and 6-86 to 6-91

## Ordering Information

### Complete Breaker Unassembled with Lugs

Prices of LD6, HLD6, and HHL6 breakers include frame, trip, and both line and load lugs (TA2J6500). When ordered by these catalog numbers, the customer will receive the frame, trip and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

### Complete Breaker Assembled with-out Lugs

Prices of LXD6, HLXD6, HHLXD6, and CLD6 include frame with non-interchangeable trip unit installed only. Order required lugs separately. For line and load lugs (TA2J6500) installed, add suffix "L" to catalog number (add 2 times list price of lugs for each pole).

### 100% Rated

Types LXD6 and HLXD6 breakers are available with 100% ratings. To order add suffix "H" to catalog number, and 10% to list price. 100% rated LD breakers require the use of 90°C Cu cable sized at 75°C ampacity and lugs TC1J6600 or TC2J6500.

50°C Applications see page 6-84.

400Hz Applications see page 6-84.

## Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>LXD6, LD6, HLD6, HHL6 Assembled Breaker (less terminals)</b>		
2	1	17.5
3	1	19.5
<b>LD6, HLD6, HHL6 Frame Only</b>		
2	1	14
3	1	15.5
<b>LD6, HHL6 Trip Unit Only</b>		
2	1	3.5
3	1	4
<b>CLD6 Complete Assembled Breaker (less terminals)</b>		
2	1	29.5
3	1	31.5

## Lugs For 75°C Wire<sup>③</sup>

Catalog Number	Cables per Lug	Wire Range	List Price \$
TA2J6500	1, 2	#3/0 500 kcmil Cu #4/0 500 kcmil Al	31.50
TC2J6500	2	#3/0-500 kcmil Cu	76.00
TA1L6750	1	500-750 kcmil Al 500-600 kcmil Cu	76.00
TC1J6600	1	#3/0-600 kcmil Cu	77.00
<b>Compression Lug</b>			
CCL600	1	500 kcmil Cu/Al	150.00

# Molded Case Circuit Breakers

## LD 600A Frame Sentron Series

Type HLD6-A, HLXD6-A<sup>②③⑥</sup>

Black Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled w/Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC (3-Pole Width)

250	HLD62B250■	6563.00	HLD62F600■	4578.00	JD62T250■	1859.00
300	HLD62B300■	6563.00			JD62T300■	1859.00
350	HLD62B350■	6563.00			JD62T350■	1859.00
400	HLD62B400■	6563.00			JD62T400■	1859.00
450	HLD62B450■	6563.00			LD62T450■	1859.00
500	HLD62B500■	6563.00			LD62T500■	1859.00
600	HLD62B600■	6563.00			LD62T600■	1859.00

### 3-Pole 600V AC, 500V DC<sup>①⑤</sup>

250	HLD63B250■	8349.00	HLD63F600■	6090.00	JD63T250■	2070.00
300	HLD63B300■	8349.00			JD63T300■	2070.00
350	HLD63B350■	8349.00			JD63T350■	2070.00
400	HLD63B400■	8349.00			JD63T400■	2070.00
450	HLD63B450■	8349.00			LD63T450■	2070.00
500	HLD63B500■	8349.00			LD63T500■	2070.00
600	HLD63B600■	8349.00			LD63T600■	2070.00

Type HHL6, HHLXD6<sup>②③⑥</sup>

### 2-Pole 600V AC (3-Pole Width)

Black Label

250	HHL62B250■	8184.00	HHL62F600■	6199.00	JD62T250■	1859.00
300	HHL62B300■	8184.00			JD62T300■	1859.00
350	HHL62B350■	8184.00			JD62T350■	1859.00
400	HHL62B400■	8184.00			JD62T400■	1859.00
450	HHL62B450■	8184.00			HHL62T450■	1859.00
500	HHL62B500■	8184.00			HHL62T500■	1859.00
600	HHL62B600■	8184.00			HHL62T600■	1859.00

### 3-Pole 600V AC

250	HHL63B250■	9914.00	HHL63F600■	7655.00	JD63T250■	2070.00
300	HHL63B300■	9914.00			JD63T300■	2070.00
350	HHL63B350■	9914.00			JD63T350■	2070.00
400	HHL63B400■	9914.00			JD63T400■	2070.00
450	HHL63B450■	9914.00			HHL63T450■	2070.00
500	HHL63B500■	9914.00			HHL63T500■	2070.00
600	HHL63B600■	9914.00			HHL63T600■	2070.00

Type CLD6-A<sup>③⑥</sup>

### Fuseless Current Limiting

Red Label

Non-Interchangeable Trip (Assembled Circuit Breaker)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
450	For 2-pole application use outside poles of 3-pole circuit breaker		CLD63B450■	13045.00
500			CLD63B500■	13045.00
600			CLD63B600■	13045.00

## Selection/Dimensions

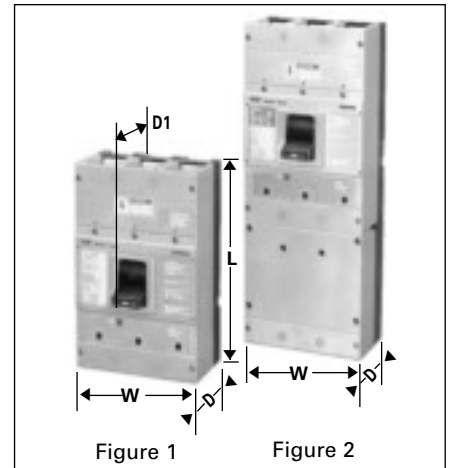


Figure 1

Figure 2

Dimensions (in inches)

Breaker Type	W	L	D	To Handle D1
Figure 1 LXD6-A, LD6-A HLD6-A HHL6, HHLXD6, LXD6-ETI <sup>®</sup> , SLD6, SHLD6	7.5	11	4	5.44
Figure 2 CLD6, CLD6-ETI <sup>®</sup> , SCLD6	7.5	17.86	4	5.44

Enclosures: (except SCLD6)

Type	Catalog Number	List Price \$
1	LD6N1	449.00
3R	LD6N3R	1618.00
12	LD6N12	979.00
4X	LD6SS4	6946.00
7,9	ED6	11330.00
Neutral	W60993	436.00

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

② For complete assembled 3-pole HLD6 or HHL6 type circuit breaker change the prefix identifier HLD6 or

HHL6 to HLXD6 or HHLXD6. Price is sum of frame and trip units prices, e.g. price of HLXD63B400 is the price of HLD63F600 plus the price of LD63T600. Order the terminal connectors separately.■

③ Type HLXD6, HHLXD6, & CLD6 Circuit Breakers are UL Listed for reverse feed applications.  
④ LXD6-ETI, CLD6-ETI see page 6-66 for ordering information.  
⑤ CE Applies to non-interchangeable type HLXD only.  
⑥ HACR rated.

# Molded Case Circuit Breakers

## SLD 600A Frame Digital Solid State Sentron Sensitrip III Series

Selection

### Type SLD6-A

Blue Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SLD69300	300	6235.00
SLD69400	400	6235.00
SLD69500	500	6235.00
SLD69600	600	6235.00
SLD69300G	300	8847.00
SLD69400G	400	8847.00
SLD69500G	500	8847.00
SLD69600G	600	8847.00
SLD69300NT	300	7834.00
SLD69400NT	400	7834.00
SLD69500NT	500	7834.00
SLD69600NT	600	7834.00
SLD69300NGT	300	10890.00
SLD69400NGT	400	10890.00
SLD69500NGT	500	10890.00
SLD69600NGT	600	10890.00

### Type SHLD6-A

Black Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHLD69300	300	7593.00
SHLD69400	400	7593.00
SHLD69500	500	7593.00
SHLD69600	600	7593.00
SHLD69300G	300	10706.00
SHLD69400G	400	10706.00
SHLD69500G	500	10706.00
SHLD69600G	600	10706.00
SHLD69300NT	300	9401.00
SHLD69400NT	400	9401.00
SHLD69500NT	500	9401.00
SHLD69600NT	600	9401.00
SHLD69300NGT	300	12989.00
SHLD69400NGT	400	12989.00
SHLD69500NGT	500	12989.00
SHLD69600NGT	600	12989.00

### Current Limiting Type SCLD6-A

Red Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCLD69300	300	13446.00
SCLD69400	400	13446.00
SCLD69500	500	13446.00
SCLD69600	600	13446.00
SCLD69300G	300	17758.00
SCLD69400G	400	17758.00
SCLD69500G	500	17758.00
SCLD69600G	600	17758.00
SCLD69300NT	300	15914.00
SCLD69400NT	400	15914.00
SCLD69500NT	500	15914.00
SCLD69600NT	600	15914.00
SCLD69300NGT	300	20940.00
SCLD69400NGT	400	20940.00
SCLD69500NGT	500	20940.00
SCLD69600NGT	600	20940.00

### Ordering Information

Pricing information for all Digital Sentron Series SLD frames is for complete breaker only – price required lugs as separate items – lugs are suitable for 75° C wire.

**SLD6 and SCLD6 are suitable for reverse connection application.**

**SHLD6 are not suitable for reverse connection application.**

### Shipping Weights

Breaker Type	Number per Carton	Shipping Weight (lbs)
SLD6-A	1	20
SHLD6-A	1	20
SCLD6-A	1	33

### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
300	N03SJD	396.00
400	N04SJD	396.00
500	N05SLD	396.00
600	N06SLD	396.00

### Trip Unit Adjustable Functions

Suffix Letter Code	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Short Time I <sup>2</sup> t Pick Up	Ground Fault Pick Up	Ground Fault Delay
None	LI	✓	✓	✓					
G	LIG	✓	✓	✓				✓	✓
NT	LSI	✓	✓	✓	✓	✓	✓		
NGT	LSIG	✓	✓	✓	✓	✓	✓	✓	✓

### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489 (File E10848)		
	240V AC	480V AC	600V AC
SLD6-A	65	35	25
SHLD6-A	100	65	35
SCLD6-A	200	150	100

Note: "G" suffix in catalog number denotes circuit breaker for 3-phase, 3-wire circuits.  
For 3-phase, 4-wire, order correct 4th wire (neutral) transformer as separate and additional item.

For ordering information and terminal connectors see page 6-44; for enclosures, see page 6-45.

**100% Rated** – Not available in SLD6 Frame.

■ Built to order. Allow 2-3 weeks for delivery.



# Molded Case Circuit Breakers

## Internal Accessories

Selection

Accessories for:

JD 400A Frame  
LD 600A Frame  
LMD 800A Frame  
SJD 400A Frame  
SLD 600A Frame



Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
24		S17JLD6	636.00	—	—
48		S18JLD6▲	636.00	—	—
120		S01JLD6	636.00	S01JLD62A	897.00
240		S03JLD6	636.00	S03JLD62A	897.00
277		S15JLD6▲	636.00	S15JLD64A▲	897.00
480		S04JLD6	636.00	—	—
	12	S16JLD6▲	636.00	S16JLD62A▲	897.00
	24	S07JLD6	636.00	S07JLD62A	897.00
	48	S09JLD6▲	636.00	S09JLD62A	897.00
	125	S11JLD6	636.00	S11JLD62A▲	897.00
	250	S13JLD6▲	636.00	S13JLD62A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01JLD6	636.00	U01JLD62A	897.00	U01JLD62AA	1157.00
208		U02JLD6▲	636.00	U02JLD62A▲	897.00	U02JLD62AA▲	1157.00
240		U03JLD6	636.00	U03JLD62A▲	897.00	U03JLD62AA▲	1157.00
480		U06JLD6	636.00	U06JLD64A▲	897.00	U06JLD64AA▲	1157.00
	24	U13JLD6	636.00	U13JLD62A	897.00	U13JLD62AA	1157.00
	48	U14JLD6▲	636.00	U14JLD62A▲	897.00	U14JLD62AA▲	1157.00
	125	U10JLD6▲	636.00	U10JLD62A▲	897.00	U10JLD62AA▲	1157.00
	250	U12JLD6▲	636.00	U12JLD62A▲	897.00	U12JLD62AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01JLD64	271.00	A02JLD64	540.00
—	12	A01JLDLV	342.00	A02JLDLV	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B01JLD64	271.00	A01JLD64B	540.00	A02JLD64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SJD, SLD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

**Note:** Accessory modules can only be added to right side pole of solid state SJD and SLD frame circuit breakers. No accessories can be added if mechanical interlock is used. All accessories on this page are useable on superseded JD2, JJ6, JL6, HJ6, SJL, LJ6, LL6, HL6 and SLL circuit breakers.

▲ Built to order. Allow 6–8 weeks for delivery.

# Molded Case Circuit Breakers

## LMD 800A Frame Sentron Series

**Selection**

Type LMXD6<sup>①④</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker without Lugs)				
Continuous Current Rating @ 40°C	2-Pole (3-Pole Width)		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$
500	—	—	LMXD63B500■	7902.00
600	LMXD62B600■	6242.00	LMXD63B600	7902.00
700	LMXD62B700■	6242.00	LMXD63B700	7902.00
800	LMXD62B800	6242.00	LMXD63B800	7902.00

Type LMD6<sup>④</sup>

Blue Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled w/Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC (3-Pole Width)

500	LMD62B500■	6632.00	LMD62F800■	3253.00	LMD62T500■	2987.00
600	LMD62B600■	6632.00			LMD62T600■	2987.00
700	LMD62B700■	6632.00			LMD62T700■	2987.00
800	LMD62B800■	6632.00			LMD62T800■	2987.00

### 3-Pole 600V AC, 500V DC<sup>②</sup>

500	LMD63B500■	8491.00	LMD63F800	4156.00	LMD63T500■	3747.00
600	LMD63B600■	8491.00			LMD63T600■	3747.00
700	LMD63B700■	8491.00			LMD63T700■	3747.00
800	LMD63B800	8491.00			LMD63T800	3747.00

### Instantaneous Adjustment Trip Range

Ampere Rating	Nominal Instantaneous Values							
	Low +/- 20% Tolerance	2	3	4	5	6	7	High +/- 20% Tolerance
500-600	3000	3430	3860	4290	4710	5140	5570	6000
700-800	3200	3500	3700	4200	4700	6400	7300	8000

### Ordering Information

#### Complete Breaker Unassembled with Lugs

Prices of LMD6 and HLMD6 breakers include frame, trip, and both line and load lugs (TA3K500). These catalog numbers include the frame, trip and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

#### Complete Breaker Assembled without Lugs

Prices of LMXD6 and HLMXD6 include frame with non-interchangeable trip unit installed only. Order required lugs separately. For line and load lugs (TA3K500) installed, add suffix "L" to catalog number (add 2 times list price of lugs for each pole).

**50°C Applications** see page 6-84.

**400Hz Applications** see page 6-84.

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>LMD6, HLMD6, LMXD6, HLMXD6 Complete Breaker (less terminals)</b>		
2	1	53
3	1	61.5
<b>LMD6, HLMD6 Frame Only</b>		
2	1	42.25
3	1	46
<b>LMD6, HLMD6 Trip Unit Only</b>		
2	1	4.5
3	1	6.5

### Lugs<sup>③</sup> for 75°C Wire

Catalog Number	Cables per Lug	Wire Range	List Price \$
TA2K500	1, 2	#1-500 kcmil Cu/Al	71.00
TA3K500	1-3	#1/0-500 kcmil Cu/Al	98.00
TA2N750	1, 2	500-750 kcmil Cu/Al	101.00

Modifications page 6-84  
Enclosures Section 5  
Accessories pages 6-50 and 6-81 to 6-91

■ Built to order. Allow 2-3 weeks for delivery.

① LMXD6 circuit breakers are UL Listed for reverse connected applications.

② When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500VDC ungrounded UPS systems only.

③ See **Note: A**, page 6-81.

④ HACR rated.

# Molded Case Circuit Breakers

## LMD 800A Frame Sentron Series

### Selection/Dimensions

Type HLMXD6<sup>①④</sup>

Black Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
500			HLMXD63B500■	9564.00
600			HLMXD63B600■	9564.00
700			HLMXD63B700■	9564.00
800			HLMXD63B800■	9564.00

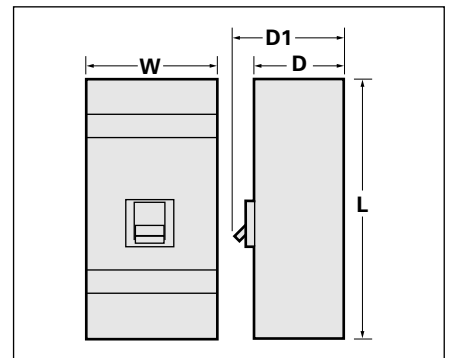
For 2-pole application use outside poles of 3-pole circuit breaker



Type HLMD6<sup>④</sup>

Black Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>2-Pole 600V AC, 250V DC (3-Pole Width)</b>						
500	HLMD62B500■	7905.00	HLMD62F800■	4526.00	LMD62T500■	2987.00
600	HLMD62B600■	7905.00			LMD62T600■	2987.00
700	HLMD62B700■	7905.00			LMD62T700■	2987.00
800	HLMD62B800■	7905.00			LMD62T800■	2987.00



**3-Pole 600V AC, 500V DC<sup>③</sup>**

500	HLMD63B500	10154.00	HLMD63F800	5819.00	LMD63T500■	3747.00
600	HLMD63B600	10154.00			LMD63T600■	3747.00
700	HLMD63B700	10154.00			LMD63T700■	3747.00
800	HLMD63B800	10154.00			LMD63T800■	3747.00

Dimensions (in inches)

Breaker Type	W	L	D	D1
LMD6, LMXD6, HLMD6, HLMXD6, LMXD6-ETI <sup>②</sup>	7.5	16	4.5	5.93

Interrupting Ratings

Breaker Type	UL 489A IR					IEC 947-2					
	RMS Symmetrical Amperes (KA)					Volts AC (50/60HZ)					
	Volts AC			Volts DC		220/240		380/415		500	
	240	480	600	250	500 <sup>⑤</sup>	(lcu)	(lcs)	(lcu)	(lcs)	(lcu)	(lcs)
LMD6, LMXD6	65	50	25	30 (2-P)	25 (3-P)	65	33	40	20	30	15
HLMD6, HLMXD6	100	65	50	30 (2-P)	50 (3-P)	100	50	65	33	42	21

Enclosures

Type	Catalog Number	List Price \$
1	LMD1	897.00
3R	LMD3R	2202.00
12	LMD12■	2883.00
Neutral	W63623	606.00

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① HLMXD6 circuit breakers are UL Listed for reverse connection applications.

② LMXD6-ETI, see page 6-66 for catalog information.

③ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500VDC ungrounded UPS systems only.

④ HACR rated.

# Molded Case Circuit Breakers

## Internal Accessories

Selection

Accessories for:

JD 400A Frame  
LD 600A Frame  
LMD 800A Frame  
SJD 400A Frame  
SLD 600A Frame



Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the SADU breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
24		S17JLD6	636.00	—	—
48		S18JLD6▲	636.00	—	—
120		S01JLD6	636.00	S01JLD62A	897.00
240		S03JLD6	636.00	S03JLD62A	897.00
277		S15JLD6▲	636.00	S15JLD64A▲	897.00
480		S04JLD6	636.00	—	—
	12	S16JLD6▲	636.00	S16JLD62A▲	897.00
	24	S07JLD6	636.00	S07JLD62A	897.00
	48	S09JLD6▲	636.00	S09JLD62A	897.00
	125	S11JLD6	636.00	S11JLD62A▲	897.00
	250	S13JLD6▲	636.00	S13JLD62A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01JLD6	636.00	U01JLD62A	897.00	U01JLD62AA	1157.00
208		U02JLD6▲	636.00	U02JLD62A▲	897.00	U02JLD62AA▲	1157.00
240		U03JLD6	636.00	U03JLD62A▲	897.00	U03JLD62AA▲	1157.00
480		U06JLD6	636.00	U06JLD64A▲	897.00	U06JLD64AA▲	1157.00
	24	U13JLD6	636.00	U13JLD62A	897.00	U13JLD62AA	1157.00
	48	U14JLD6▲	636.00	U14JLD62A▲	897.00	U14JLD62AA▲	1157.00
	125	U10JLD6▲	636.00	U10JLD62A▲	897.00	U10JLD62AA▲	1157.00
	250	U12JLD6▲	636.00	U12JLD62A▲	897.00	U12JLD62AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01JLD64	271.00	A02JLD64	540.00
—	12	A01JLDLV	342.00	A02JLDLV	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B01JLD64	271.00	A01JLD64B	540.00	A02JLD64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SJD, SLD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

**Note:** Accessory modules can only be added to right side pole of solid state SJD and SLD frame circuit breakers. No accessories can be added if mechanical interlock is used. All accessories on this page are useable on superseded JD2, JJ6, JL6, HJ6, SJD, LJ6, LL6, HL6 and SLL circuit breakers.

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## MD 800A Frame Sentron Series

Selection

Type MXD6<sup>①④</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole <sup>②</sup>		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$
500	MXD62B500■	6242.00	MXD63B500■	7902.00
600	MXD62B600■	6242.00	MXD63B600■	7902.00
700	MXD62B700■	6242.00	MXD63B700■	7902.00
800	MXD62B800■	6242.00	MXD63B800■	7902.00

Type MD6<sup>⑥</sup>

Blue Label

Interchangeable Trip						
Continuous Current Setting @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC<sup>②</sup>

500	MD62B500■	6632.00	MD62F800■	3253.00	MD62T500■	2987.00
600	MD62B600■	6632.00			MD62T600■	2987.00
700	MD62B700■	6632.00			MD62T700■	2987.00
800	MD62B800■	6632.00			MD62T800■	2987.00

### 3-Pole 600V AC, 500V DC<sup>③</sup>

500	MD63B500	8491.00	MD63F800	4156.00	MD63T500	3747.00
600	MD63B600	8491.00			MD63T600	3747.00
700	MD63B700	8491.00			MD63T700	3747.00
800	MD63B800	8491.00			MD63T800	3747.00

Lugs<sup>④</sup>

Catalog Number	Cables Per Lug	Lugs Per Kit	Wire Range	List Price \$
TA2K500	1-2	1	#1-500 kcmil Cu/Al	71.00
TA3K500	1-3	1	1/0-500 kcmil Cu/Al	98.00
TC2K500	1-2	1	#1-500 kcmil Cu	120.00
TC3K350	1-3	1	#1-350 kcmil Cu	151.00
Kits				
2TA2N8750	1-2	2	500-750 kcmil Cu/Al	365.00
3TA2N8750		3		513.00
2TA3N8750	1-3	2	500-750 kcmil Cu/Al	579.00
3TA3N8750		3		832.00
2TA4N8500	1-4	2	250-500 kcmil Cu/Al	588.00
3TA4N8500		3		853.00
2TA4P8500	1-4	2	250-500 kcmil Cu/Al	584.00
3TA4P8500		3		843.00

### Instantaneous Adjustment Trip Range

Ampere Rating	Nominal Instantaneous Values							High +/- 20% Tolerance
	Low +/- 20% Tolerance	2	3	4	5	6	7	
500-600	3000	3430	3860	4280	4710	5140	5570	6000
700-800	4000	4570	5140	5710	6280	6850	7420	8000

■ Built to order. Allow 2-3 weeks for delivery.

① MXD6 circuit breakers are UL Listed for reverse connection applications.

② 2-pole units available in 3-pole width only.

③ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems.

④ See Note: A, page 6-81.

⑤ 80% rated breakers with the CE mark will also be marked in the 100% rated version.

⑥ HACR rated.

Note: MD frame qualified to UL489 supplement B "NAVAL". See page 6-84 for additional information.

### Ordering Information

#### Complete Breaker Unassembled with Lugs

Pricing information for MD6 and HMD6 breakers includes frame, trip, and both line and load lugs (TA3K500). When ordered by these catalog numbers, the customer will receive the frame, trip and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

#### Complete Breaker Assembled without Lugs

Prices of MXD6, HMXD6 and CMD6 include frame with non-interchangeable trip units installed only. Order required lugs separately. For line and load lugs (TA3K500) installed, add suffix "L" to catalog number (add 2 times list price of lugs for each pole).

#### 100% Rated<sup>⑤</sup>

Types MXD6, HMXD6 and CMD6 breakers are available with 100% ratings. To order add suffix "H" to catalog number, and 10% to list price. 100% rated MD breakers require the use of 90°C Cu cable sized at 75°C ampacity and lugs 2TA4P8500 or 2TA2N8750 for 2-pole; 3TA4P8500 or 3TA2N8750 for 3-pole.

50°C Applications see page 6-84.

400Hz Applications see page 6-84.

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>MD6, HMD6, HMXD6, CMD6 Complete Breaker Assembled (less lugs)</b>		
2	1	53
3	1	61.5
<b>MD6, HMD6 Frame Only</b>		
2	1	42.25
3	1	46
<b>MD6, HMD6 Trip Unit Only</b>		
2	1	4.5
3	1	6.5

### Enclosures

Type	Catalog Number	List Price \$
1	MND61	897.00
3R	MND63	2202.00
12	MND612■	2883.00
Neutral	W63623	606.00

Modifications page 6-84  
Enclosures Section 5  
Accessories pages 6-54 and 6-86 to 6-91

# Molded Case Circuit Breakers

## MD 800A Frame Sentron Series

Type HMXD6<sup>①⑤</sup>

Black Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
500	For 2-pole application use outside poles of 3-pole circuit breaker		HMXD63B500■	9567.00
600			HMXD63B600■	9567.00
700			HMXD63B700■	9567.00
800			HMXD63B800■	9567.00

Type HMD6<sup>⑥</sup>

Black Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>2-Pole 600V AC, 250V DC<sup>②</sup></b>						
500	HMD62B500■	7905.00	HMD62F800■	4526.00	MD62T500■	2987.00
600	HMD62B600■	7905.00			MD62T600■	2987.00
700	HMD62B700■	7905.00			MD62T700■	2987.00
800	HMD62B800■	7905.00			MD62T800■	2987.00

**3-Pole 600V AC, 500V DC<sup>④</sup>**

500	HMD63B500	10154.00	HMD63F800	5819.00	MD63T500	3747.00
600	HMD63B600	10154.00			MD63T600	3747.00
700	HMD63B700	10154.00			MD63T700	3747.00
800	HMD63B800	10154.00			MD63T800	3747.00

Type CMD6<sup>①⑤</sup>

Red Label

Fuseless Current Limiting

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
500	For 2-pole application use outside poles of 3-pole circuit breaker		CMD63B500■	14089.00
600			CMD63B600■	14089.00
700			CMD63B700■	14089.00
800			CMD63B800■	14089.00

Interrupting Ratings

Breaker Type	UL 489 AIR—File E10848					IEC 947-2 AIR					
	RMS Symmetrical Amperes (KA)					Volts AC (50/60HZ)					
	Volts AC		Volts DC			220/240		380/415		500	
	240	480	600	250	500 <sup>⑥</sup>	(lcu)	(lcs)	(lcs)	(lcs)	(lcs)	
MD6, MXD6	65	50	25	30 (2-P)	25 (3-P)	65	33	40	20	30	15
HMD6, HMXD6	100	65	50	30 (2-P)	50 (3-P)	100	50	65	33	42	21
CMD6	200	100	65	—	50 (3-P)	200	100	100	50	65	33

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① HMXD6 and CMD circuit breakers are UL listed for reverse connection applications.

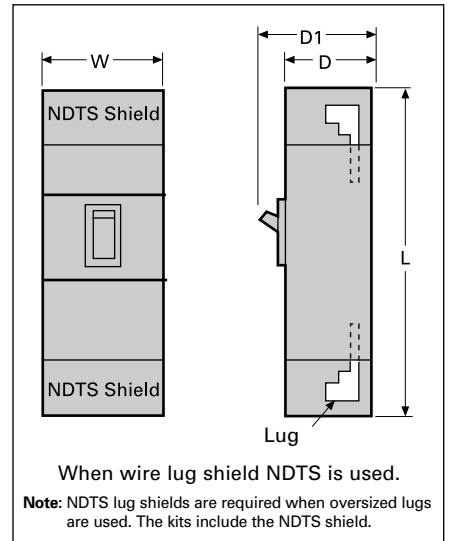
② 2-pole units available in 3-pole width only.

③ MXD6-ETI, CMD6-ETI see page 6-66 for catalog information.

④ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

⑤ HACR rated.

## Selection/Dimensions



Dimensions (in inches)

Breaker Type	W	L	D	(To Handle) D1
MD6, MXD6, HMD6, HMXD6, CMD6, MXD6-ETI, CMD6-ETI, SMD6, SHMD6, and SCMD6	9	16	6	8.25
with lug shields	9	24	6	8.25

# Molded Case Circuit Breakers

## SMD 800A Frame Digital Solid State Sentron Sensitrip III Series<sup>®3</sup>

Selection

### Type SMD6

Blue Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SMD69600A■	600	8595.00
SMD69700A■	700	8595.00
SMD69800A■	800	8595.00
SMD69600AG■	600	10214.00
SMD69700AG■	700	10214.00
SMD69800AG■	800	10214.00
SMD69600ANT■	600	8896.00
SMD69700ANT■	700	8896.00
SMD69800ANT■	800	8896.00
SMD69600ANGT■	600	11825.00
SMD69700ANGT■	700	11825.00
SMD69800ANGT■	800	11825.00

### Type SHMD6

Black Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHMD69600A■	600	10478.00
SHMD69700A■	700	10478.00
SHMD69800A■	800	10478.00
SHMD69600AG■	600	12060.00
SHMD69700AG■	700	12060.00
SHMD69800AG■	800	12060.00
SHMD69600ANT■	600	10800.00
SHMD69700ANT■	700	10800.00
SHMD69800ANT■	800	10800.00
SHMD69600ANGT■	600	13886.00
SHMD69700ANGT■	700	13886.00
SHMD69800ANGT■	800	13886.00

### Current Limiting Type SCMD6

Red Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCMD69600A■	600	15559.00
SCMD69700A■	700	15559.00
SCMD69800A■	800	15559.00
SCMD69600AG■	600	18543.00
SCMD69700AG■	700	18543.00
SCMD69800AG■	800	18543.00
SCMD69600ANT■	600	16837.00
SCMD69700ANT■	700	16837.00
SCMD69800ANT■	800	16837.00
SCMD69600ANGT■	600	21472.00
SCMD69700ANGT■	700	21472.00
SCMD69800ANGT■	800	21472.00

### Ordering Information

Pricing information for all Digital Sentron Series MD frames is for complete breaker only. Price requires lugs or lug kits as separate items. Lugs are suitable for 75°C wire or as noted. Connector wire ranges and cavities are established in conjunction with Table 8.1 of UL 489 standards. Choose actual connector for circuit breakers based on customer requirements.

### Recommended Terminal Connectors

Breaker Frame	Ampere Rating	Connector or Connector Kit
MD	500-600	TA2K500
MD	700-800	TA3K500

Types SMD6 and SHMD6 are acceptable for reverse connection applications.

### SMD 800A Frame – 100% Rated<sup>①</sup>

#### Type SMD6-H

Blue Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SMD69600AH■	600	9451.00
SMD69700AH■	700	9451.00
SMD69800AH■	800	9451.00
SMD69600AGH■	600	11249.00
SMD69700AGH■	700	11249.00
SMD69800AGH■	800	11249.00
SMD69600ANTH■	600	9861.00
SMD69700ANTH■	700	9861.00
SMD69800ANTH■	800	9861.00
SMD69600ANGTH■	600	13024.00
SMD69700ANGTH■	700	13024.00
SMD69800ANGTH■	800	13024.00

#### Type SHMD6-H

Black Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHMD69600AH■	600	11529.00
SHMD69700AH■	700	11529.00
SHMD69800AH■	800	11529.00
SHMD69600AGH■	600	13269.00
SHMD69700AGH■	700	13269.00
SHMD69800AGH■	800	13269.00
SHMD69600ANTH■	600	11900.00
SHMD69700ANTH■	700	11900.00
SHMD69800ANTH■	800	11900.00
SHMD69600ANGTH■	600	15291.00
SHMD69700ANGTH■	700	15291.00
SHMD69800ANGTH■	800	15291.00

### Current Limiting Type SCMD6-H

Red Label		
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCMD69600AH■	600	17114.00
SCMD69700AH■	700	17114.00
SCMD69800AH■	800	17114.00
SCMD69600AGH■	600	20408.00
SCMD69700AGH■	700	20408.00
SCMD69800AGH■	800	20408.00
SCMD69600ANTH■	600	18506.00
SCMD69700ANTH■	700	18506.00
SCMD69800ANTH■	800	18506.00
SCMD69600ANGTH■	600	23639.00
SCMD69700ANGTH■	700	23639.00
SCMD69800ANGTH■	800	23639.00

### Shipping Weights

Breaker Type	Number per Carton	Shipping Weight (lbs)
All types	1	61.5

### Lugs for 75°C Wire<sup>②</sup>

Catalog Number	Cables per Lug	Wire Range	List Price \$
TA2K500	2	#1-500 kcmil Cu/Al	71.00
TA3K500	3	#1-500 kcmil Cu/Al	98.00
TC2K500	2	#1-500 kcmil Cu	120.00
TC3K350	3	#1-350 kcmil Cu	151.00
<b>Kits (3 lugs/kit)</b>			
3TA4N8500	4	250-500 kcmil Cu/Al	853.00
3TA4P8500	4	250-500 kcmil Cu/Al	843.00
3TA2N8750	2	500-750 kcmil Cu/Al	513.00
3TA3N8750	3	500-750 kcmil Cu/Al	832.00

Each kit contains the following:  
 3TA4P8500—3 connectors plus 1 NDTs end barrier  
 3TA3N8750—3 connectors plus 1 NDTs end barrier  
 3TA2N8750—3 connectors plus 1 NDTs end barrier

### Trip Unit Adjustable Functions

Suffix Letter Code	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Ground Fault Pick Up	Ground Fault Delay
A	LI	✓	✓	✓				
AG	LIG	✓	✓	✓			✓	✓
ANT	LSI	✓	✓	✓	✓	✓		
ANGT	LSIG	✓	✓	✓	✓	✓	✓	✓

### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489 (File E10848)		
	240V AC	480V AC	600V AC
SMD6	65	50	25
SHMD6	100	65	50
SCMD6	200	100	65

Note: "G" suffix in catalog number denotes circuit breaker for 3-phase, 3-wire circuits.  
 For 3-phase, 4-wire, order correct 4th wire (neutral) transformer as separate and additional item.  
 ■ Built to order. Allow 2-3 weeks for delivery.

① Use 2-3TA4P8500 for 3-pole. These kits are rated for 90°C wire. 90°C Cu only cable must be used, and sized per 75°C ampacity.  
 ② For additional information, see Note: A, page 6-81.  
 ③ SMD6, SHMD6 and SCMD6 circuit breakers are UL Listed for reverse connection applications.

### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
600	N06SMDA	423.00
700	N07SMDA	423.00
800	N08SMDA	423.00

### Enclosures

Type	Catalog Number	List Price \$
1	MND61	897.00
3R	MND63	2202.00
12	MND612	2883.00
Neutral	W63623	606.00

Enclosures Section 5  
 Accessories pages 6-54 and 6-86 to 6-91

# Molded Case Circuit Breakers

## Internal Accessories

*Selection*

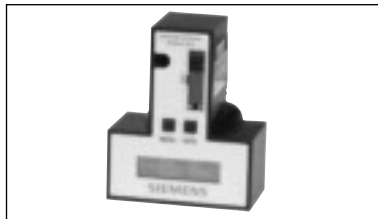
Accessories for:

MD/SMD 800A Frame  
ND/SND 1200A Frame  
PD/SPD 1600A Frame  
RD 2000A Frame



Accessory modules can mount in either left hand or right hand poles of all circuit breakers, including solid state. Exception: when mechanical interlock is used. Accessories cannot be mounted in left pole.

### Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		S01MN6	636.00	S01MN64A	897.00
208		S02MN6▲	636.00	—	—
240		S03MN6	636.00	S03MN64A▲	897.00
277		S15MN6▲	636.00	S15MN64A▲	897.00
480		S04MN6▲	636.00	S04MN64A▲	897.00
600		S06MN6▲	636.00	—	—
	12	S16MN6▲	636.00	S16MN64A▲	897.00
	24	S07MN6	636.00	S07MN64A	897.00
	48	S09MN6▲	636.00	—	—
	125	S11MN6	636.00	S11MN64A▲	897.00
	250	S13MN6▲	636.00	S13MN64A▲	636.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01MN6	636.00	U01MN64A	897.00	U01MN64AA	1157.00
208		U02MN6▲	636.00	U02MN64A▲	897.00	U02MN64AA▲	1157.00
240		U03MN6▲	636.00	U03MN64A▲	897.00	U03MN64AA▲	1157.00
277		U15MN6▲	636.00	U15MN64A▲	897.00	U15MN64AA▲	1157.00
480		U04MN6▲	636.00	U04MN64A▲	897.00	U04MN64AA▲	1157.00
600		U06MN6▲	636.00	—	—	—	—
	24	U07MN6	636.00	U07MN64A	897.00	U07MN64AA	1157.00
	48	U09MN6▲	636.00	U09MN64A▲	897.00	U09MN64AA▲	1157.00
	125	U11MN6▲	636.00	U11MN64A▲	897.00	U11MN64AA▲	1157.00
	250	U13MN6▲	636.00	U13MN64A▲	897.00	U13MN64AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01MN64	271.00	A02MN64	540.00
—	12	A01MNDLV▲	342.00	A02MNDLV▲	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B00MN64	271.00	A01MN64B	540.00	A02MN64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SMD, SND, SPD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

▲ Built to order. Allow 6-8 weeks for delivery.



# Molded Case Circuit Breakers

## ND 1200A Frame Sentron Series

## Selection

Type NXD6<sup>①③</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole 600V AC 250V DC		3-Pole 600V AC 500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
900	NXD62B900■	10498.00	NXD63B900	13167.00
1000	NXD62B100■	10498.00	NXD63B100	13167.00
1200	NXD62B120■	10498.00	NXD63B120	13167.00

Type ND6<sup>④</sup>

Blue Label

Interchangeable Trip						
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 2-Pole 600V AC, 250V DC<sup>②</sup>

Continuous Current Rating @ 40°C	Catalog Number	List Price \$	Frame Only Catalog Number	Frame Only List Price \$	Trip Unit Only Catalog Number	Trip Unit Only List Price \$
800	ND62B800■	9587.00	ND62F120	5424.00	MD62T800■	2987.00
900	ND62B900■	11675.00			ND62T900■	5075.00
1000	ND62B100■	11675.00			ND62T100■	5075.00
1200	ND62B120	11675.00			ND62T120	5075.00

### 3-Pole 600V AC, 500V DC<sup>③</sup>

Continuous Current Rating @ 40°C	Catalog Number	List Price \$	Frame Only Catalog Number	Frame Only List Price \$	Trip Unit Only Catalog Number	Trip Unit Only List Price \$
800	ND63B800	12259.00	ND63F120	6806.00	MD63T800	3747.00
900	ND63B900	14874.00			ND63T900	6362.00
1000	ND63B100	14874.00			ND63T100	6362.00
1200	ND63B120	14874.00			ND63T120	6362.00

## Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489 A IR					IEC 947-2					
	Volts AC			Volts DC		Volts AC (50/60HZ)					
	240	480	600	250	500 <sup>③</sup>	220/240		380/415		500	
					(lcu)	(lcs)	(lcu)	(lcs)	(lcu)	(lcs)	
ND6, NXD6	65	50	25	30 (2-P)	25 (3-P)	65	33	40	20	30	15
HND6, HNXD6	100	65	50	30 (2-P)	50 (3-P)	100	50	65	33	42	21
CND6	200	100	65	—	50 (3-P)	200	100	100	50	65	33

## Instantaneous Adjustment Trip Range

Breaker Ampere Rating	Nominal Instantaneous Values							
	±20% Tolerance Low	2	3	4	5	6	7	±20% Tolerance High
800	4000	4570	5140	5710	6280	6850	7420	8000
900-1200	5000	5715	6430	7145	7860	8575	9290	10000

■ Built to order. Allow 2-3 weeks for delivery.

① NXD6 circuit breakers are UL listed for reverse connection applications.

② 2-pole units available in 3-pole width only.

③ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500VDC ungrounded UPS systems only.

④ Use 2 - 3TA4P8500 kits for 3-pole, or 2 - 2TA4P8500 kits for 2-pole. Use for 100% rated breakers.

⑤ Use 2 - 3TA4N8500 for 3-pole or 2 - 2TA4N8500 for 2-pole. Rated for 75°C cable.

⑥ See Note: A, page 6-81.

⑦ 80% rated breakers with the CE mark will also be marked in the 100% rated version.

⑧ HACR rated.

Note: ND frame qualified to UL489 supplement B "NAVAL". See page 6-84 for additional information.

## Ordering Information

### Complete Breaker Unassembled with Lugs

Prices of ND6 and HND6 breakers include frame, trip, and both line and load lugs (3TA4N8500). These catalog numbers are the frame, trip and lugs separately packaged. For applications requiring different lugs, order individual items as needed.

### Complete Breaker Assembled without Lugs

Prices of NXD6, HNXD6, and CND6 include frame with non-interchangeable trip units installed only. Order required terminal connectors separately. For line and load lugs (3TA4N8500) installed, add suffix "L" to catalog number (add 2 times list price of lug kit).

### 100% Rated<sup>⑦</sup>

Types NXD6, HNXD6 and CND6 breakers are available with 100% ratings. To order, add suffix "H" to catalog number, and add 10% to list price. 100% rated ND breakers require 90°C Cu cable sized at 75°C ampacity and lug kit 3TA4P8500 or 3TA3N8750.

50°C Applications see page 6-84.

400Hz Applications see page 6-84.

## Lugs<sup>⑥</sup>

Catalog Number	Cables per Lug	Wire Range	List Price \$
TA2K500	2	#1-500 kcmil Cu/Al	71.00
TA3K500	3	#1-500 kcmil Cu/Al	98.00
TC2K500	2	#1-500 kcmil Cu	120.00
TC3K350	3	#1-350 kcmil Cu	151.00

### Kits (2 Kits required per breaker)

Catalog Number	Cables per Lug	Wire Range	List Price \$
2TA4P8500 <sup>④</sup>	4	250-500 kcmil Cu/Al	584.00
3TA4P8500 <sup>④</sup>			843.00
2TA4N8500 <sup>⑤</sup>	4	250-500 kcmil Cu/Al	588.00
3TA4N8500 <sup>⑤</sup>			853.00
2TA2N8750	2	500-750 kcmil Cu/Al	365.00
3TA2N8750			513.00
2TA3N8750	3	500-750 kcmil Cu/Al	579.00
3TA3N8750			832.00

## Enclosures

Type	Catalog Number	List Price \$
1	MND61	897.00
3R	MND63	2202.00
12	MND612■	2883.00
Neutral	W63623	606.00

Modifications page 6-84

Enclosures Section 5

Accessories pages 6-58 and 6-86 to 6-91

# Molded Case Circuit Breakers

## ND 1200A Frame Sentron Series

### Selection/Dimensions

Type HNXD6<sup>①④</sup>

Black Label

Non-Interchangeable Trip (Assembled Circuit Breaker Without Lugs)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
	600V AC/250V DC		600V AC/500V DC	
	Catalog Number	List Price \$	Catalog Number	List Price \$
900	For 2-pole application use outside poles of 3-pole circuit breaker		HNXD63B900	14794.00
1000			HNXD63B100	14794.00
1200			HNXD63B120	14794.00

Type HND6<sup>④</sup>

Black Label

Interchangeable Trip								
Continuous Current Rating @ 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only			
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
800	For 2-pole application use outside poles of 3-pole circuit breaker		HND63F120	8430.00	MD63T800	3747.00		
900					HND63B800	13883.00	ND63T900	6362.00
1000					HND63B900	16498.00	ND63T100	6362.00
1200					HND63B100	16498.00	ND63T120	6362.00

2-Pole 600V AC, 250V DC<sup>②</sup>

800	For 2-pole application use outside poles of 3-pole circuit breaker
900	
1000	
1200	

3-Pole 600V AC, 500V DC<sup>③</sup>

800	HND63B800	13883.00	HND63F120	8430.00	MD63T800	3747.00
900	HND63B900	16498.00			ND63T900	6362.00
1000	HND63B100	16498.00			ND63T100	6362.00
1200	HND63B120	16498.00			ND63T120	6362.00

Type CND6<sup>①④</sup>

Fuseless Current Limiting

Red Label

Non-Interchangeable Trip (Assembled Circuit Breaker)				
Continuous Current Rating @ 40°C	2-Pole		3-Pole	
			Catalog Number	List Price \$
900	For 2-pole application, use outside poles of 3-pole circuit breaker		CND63B900	20489.00
1000			CND63B100	20489.00
1200			CND63B120	20489.00

Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>ND6, HND6, NXD6, HNXD6, CND6 Assembled Breaker (less terminals)</b>		
2	1	53
3	1	61.5
<b>ND6, HND6 Frame Only</b>		
2	1	42.25
3	1	46
<b>ND6, HND6 Trip Unit Only</b>		
2	1	4.5
3	1	6.5

For inches / millimeters conversion, see Application Data section.

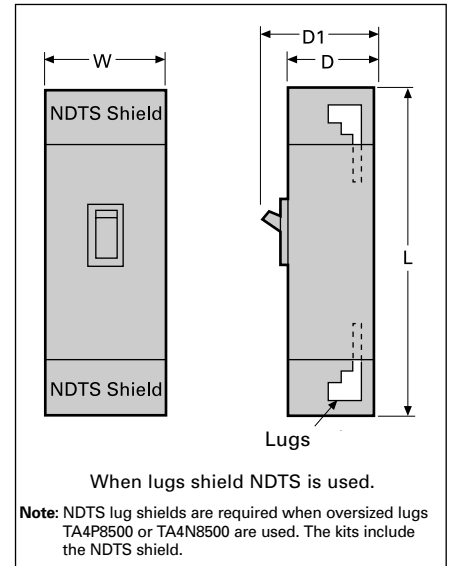
■ Built to order. Allow 2-3 weeks for delivery.

① HNXD6 and CND6 circuit breakers are UL Listed for reverse connection applications.

② 2-pole units available in 3-pole width only.

③ When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

④ HACR rated.



Dimensions (in inches)

Breaker Type	W	L	D	D1
ND6, NXD6, HND6, HNXD6, CND6, SND6, SHND6, and SCND6	9	16	6	8.25
with NDTS lug shield	9	24	6	8.25

# Molded Case Circuit Breakers

## SND 1200A Frame Digital Solid State Sentron Sensitrip III Series<sup>②</sup>

Selection

### Type SND6

#### Blue Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SND69800A■	800	13569.00
SND69100A■	1000	13569.00
SND69120A■	1200	13569.00
SND69800AG■	800	15272.00
SND69100AG■	1000	15272.00
SND69120AG■	1200	15272.00
SND69800ANT■	800	14192.00
SND69100ANT■	1000	14192.00
SND69120ANT■	1200	14192.00
SND69800ANGT■	800	17120.00
SND69100ANGT■	1000	17120.00
SND69120ANGT■	1200	17120.00

### Type SHND6

#### Black Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHND69800A■	800	15151.00
SHND69100A■	1000	15151.00
SHND69120A■	1200	15151.00
SHND69800AG■	800	16733.00
SHND69100AG■	1000	16733.00
SHND69120AG■	1200	16733.00
SHND69800ANT■	800	15772.00
SHND69100ANT■	1000	15772.00
SHND69120ANT■	1200	15772.00
SHND69800ANGT■	800	18738.00
SHND69100ANGT■	1000	18738.00
SHND69120ANGT■	1200	18738.00

### Current Limiting

### Type SCND6

#### Red Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCND69800A■	800	20855.00
SCND69100A■	1000	20855.00
SCND69120A■	1200	20855.00
SCND69800AG■	800	22969.00
SCND69100AG■	1000	22969.00
SCND69120AG■	1200	22969.00
SCND69800ANT■	800	21700.00
SCND69100ANT■	1000	21700.00
SCND69120ANT■	1200	21700.00
SCND69800ANGT■	800	25762.00
SCND69100ANGT■	1000	25762.00
SCND69120ANGT■	1200	25762.00



### SND 1200A Frame – 100% Rated<sup>①</sup>

### Type SND6-H

#### Blue Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SND69800AH■	800	14955.00
SND69100AH■	1000	14955.00
SND69120AH■	1200	14955.00
SND69800AGH■	800	16766.00
SND69100AGH■	1000	16766.00
SND69120AGH■	1200	16766.00
SND69800ANTH■	800	15628.00
SND69100ANTH■	1000	15628.00
SND69120ANTH■	1200	15628.00
SND69800ANGTH■	800	18826.00
SND69100ANGTH■	1000	18826.00
SND69120ANGTH■	1200	18826.00

### Type SHND6H

#### Black Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHND69800AH■	800	16657.00
SHND69100AH■	1000	16657.00
SHND69120AH■	1200	16657.00
SHND69800AGH■	800	18418.00
SHND69100AGH■	1000	18418.00
SHND69120AGH■	1200	18418.00
SHND69800ANTH■	800	17335.00
SHND69100ANTH■	1000	17335.00
SHND69120ANTH■	1200	17335.00
SHND69800ANGTH■	800	20620.00
SHND69100ANGTH■	1000	20620.00
SHND69120ANGTH■	1200	20620.00

### Current Limiting

### Type SCND6-H

#### Red Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SCND69800AH■	800	24085.00
SCND69100AH■	1000	24085.00
SCND69120AH■	1200	24085.00
SCND69800AGH■	800	26551.00
SCND69100AGH■	1000	26551.00
SCND69120AGH■	1200	26551.00
SCND69800ANTH■	800	25060.00
SCND69100ANTH■	1000	25060.00
SCND69120ANTH■	1200	25060.00
SCND69800ANGTH■	800	29750.00
SCND69100ANGTH■	1000	29750.00
SCND69120ANGTH■	1200	29750.00

### Trip Unit Adjustable Functions

Suffix Letter Code	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Short Time I <sup>2</sup> t Pick Up	Ground Fault Pick Up	Ground Fault Delay
A	LI	✓	✓	✓					
AG	LIG	✓	✓	✓				✓	✓
ANT	LSI	✓	✓	✓	✓	✓	✓		
ANGT	LSIG	✓	✓	✓	✓	✓	✓	✓	✓

### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489 (File E10848)		
	240V AC	480V AC	600V AC
SND6	65	50	25
SHND6	100	65	50
SCND6	200	100	65

### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
800	N08SMDA	423.00
1000	N10SMDA	423.00
1200	N12SMDA	423.00

For inches / millimeters conversion, see Application Data section.

For ordering information and terminal connectors, and enclosures, see page 6-55.

**Note:** "G" suffix in catalog number denotes circuit breaker for 3-phase, 3-wire circuits.  
For 3-phase, 4-wire, order correct 4th wire (neutral) transformer as separate and additional item.

■ Built to order. Allow 2-3 weeks for delivery.

- ① Use 2-3TA4P8500 for 3-pole. These kits are rated for 90°C wire. 90°C Cu only cable must be used, and sized per 75°C ampacity.
- ② SND6, SHND6 and SCND6 circuit breakers are UL Listed for reverse connection applications.

# Molded Case Circuit Breakers

## Internal Accessories

Selection

Accessories for:

MD/SMD 800A Frame  
ND/SND 1200A Frame  
PD/SPD 1600A Frame  
RD 2000A Frame



Accessory modules can mount in either left hand or right hand poles of all circuit breakers, including solid state. Exception: when mechanical interlock is used. Accessories cannot be mounted in left pole.

### Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		S01MN6	636.00	S01MN64A	636.00
208		S02MN6▲	636.00	—	—
240		S03MN6	636.00	S03MN64A▲	897.00
277		S15MN6▲	636.00	S15MN64A▲	897.00
480		S04MN6▲	636.00	S04MN64A▲	897.00
600		S06MN6▲	636.00	—	—
	12	S16MN6▲	636.00	S16MN64A▲	897.00
	24	S07MN6	636.00	S07MN64A	897.00
	48	S09MN6▲	636.00	—	—
	125	S11MN6	636.00	S11MN64A▲	897.00
	250	S13MN6▲	636.00	S13MN64A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01MN6	636.00	U01MN64A	897.00	U01MN64AA	1157.00
208		U02MN6▲	636.00	U02MN64A▲	897.00	U02MN64AA▲	1157.00
240		U03MN6▲	636.00	U03MN64A▲	897.00	U03MN64AA▲	1157.00
277		U15MN6▲	636.00	U15MN64A▲	897.00	U15MN64AA▲	1157.00
480		U04MN6▲	636.00	U04MN64A▲	897.00	U04MN64AA▲	1157.00
600		U06MN6▲	636.00	—	—	—	—
	24	U07MN6	636.00	U07MN64A	897.00	U07MN64AA	1157.00
	48	U09MN6▲	636.00	U09MN64A▲	897.00	U09MN64AA▲	1157.00
	125	U11MN6▲	636.00	U11MN64A▲	897.00	U11MN64AA▲	1157.00
	250	U13MN6▲	636.00	U13MN64A▲	897.00	U13MN64AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01MN64	271.00	A02MN64	540.00
—	12	A01MNDLV▲	342.00	A02MNDLV▲	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B00MN64	271.00	A01MN64B	540.00	A02MN64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SMD, SND, SPD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

▲ Built to order. Allow 6–8 weeks for delivery.

# Molded Case Circuit Breakers

## PD 1600A Frame Sentron Series

**Selection**

Type PXD6<sup>2</sup> Non-Interchangeable Trip<sup>5</sup>

3-Pole 600V AC, 250-500V DC<sup>1</sup>

**Blue Label**

Continuous Current Rating 40°C	Complete Breaker Assembled (Frame/ Trip Unit Only)		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1200	PXD63B120■	16870.00	MB9301	1227.00	TA5P600	320.00
1400	PXD63B140■	16870.00	-or-			
1600	PXD63B160	16870.00	MBR9302			

Type PD6 Interchangeable Trip<sup>5</sup>

3-Pole 600V AC, 250-500V DC<sup>1</sup>

**Blue Label**

Continuous Current Rating 40°C	Complete Breaker Unassembled		Frame Only		Trip Unit Only		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1200	PD63B120■	20017.00	PD63F160	8671.00	PD63T120■	8199.00	MB9301	1227.00	TA5P600	320.00
1400	PD63B140	20017.00			PD63T140	8199.00				
1600	PD63B160	20017.00			PD63T160	8199.00				

Type HPXD6<sup>2</sup> Non-Interchangeable Trip<sup>5</sup>

3-Pole 600V AC, 250-500V DC<sup>1</sup>

**Blue Label**

Continuous Current Rating 40°C	Complete Breaker Assembled (Frame/ Trip Unit Only)	
	Catalog Number	List Price \$
1200	HPXD63B120■	19029.00
1400	HPXD63B140■	19029.00
1600	HPXD63B160	19029.00

Type HPD6 Interchangeable Trip<sup>5</sup>

3-Pole 600V AC, 250-500V DC<sup>1</sup>

**Black Label**

Continuous Current Rating 40°C	Complete Breaker Unassembled		Frame Only		Trip Unit Only		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1200	HPD63B120■	22174.00	HPD63F160	10828.00	PD63T120■	8199.00	MB9301	1227.00	TA5P600	320.00
1400	HPD63B140	22174.00			PD63T140	8199.00				
1600	HPD63B160	22174.00			PD63T160	8199.00				

Type CPD6 Non-Interchangeable Trip<sup>5</sup>

Fuseless Current Limiting  
3-Pole 600V AC, 250-500V DC<sup>1</sup>

**Red Label**

Continuous Current Rating 40°C	Complete Breaker Assembled (Frame/ Trip Unit Only)	
	Catalog Number	List Price \$
1200	CPD63B120■	21310.00
1400	CPD63B140■	21310.00
1600	CPD63B160■	21310.00

### Interrupting Ratings

Breaker Type	UL 489 A IR					IEC 947-2					
	RMS Symmetrical KA					Volts AC (50/60HZ)					
	Volts AC			Volts DC <sup>1</sup>		220/240		380/415		500	
	240	480	600	250	500	(lcu)	(lcs)	(lcu)	(lcs)	(lcu)	(lcs)
PD6, PXD6	65	50	25	30 (2P)	25 (3P)	65	33	40	10	30	8
HPD6, HPXD6	100	65	50	30 (2P)	50 (3P)	100	50	65	17	42	11
CPD6	200	100	65	30 (2P)	50 (3P)	200	100	100	25	65	17

■ Built to order. Allow 2-3 weeks for delivery.

▲ Built to order. Allow 6-8 weeks for delivery.

① Use two outside poles of a 3-pole circuit breaker for 250V

② When wired as shown on page 6-3, this circuit breaker is

UL listed and rated for use on 500V DC ungrounded UPS systems only.

③ PXD6, HPXD6 and CPD6 type circuit breakers are UL Listed for reverse feed applications.

④ For additional information See **Note: A**, page 6-81.

### Ordering Instructions

#### Complete Breaker Unassembled with Lugs

Prices of PD6, HPD6, RD6, and HRD6 type breakers include frame, trip, mounting base (MB9301), and both line and load lugs (PD Frame – TA5P600, RD Frame – TC5R600). When ordered by these catalog numbers, the customer will receive the frame, trip, mounting assembly and lugs separately packaged. For applications requiring different mounting base or lugs, order individual items as needed.

#### Complete Breaker Assembled without Lugs

Prices of PXD6, HPXD6, RXD6, HRXD6 and CPD6 type breakers include frame with non-interchangeable trip unit installed only. Order required mounting base and lugs separately.

#### 100% Rated

Types PXD6, HPXD6 breakers are available with 100% ratings. To order add suffix "H" to catalog number, and 10% to list price. 100% PD breakers require 90° C cable sized at 75° C ampacity and TC5R600 lugs. RD 2000A Frames not available with 100% ratings.

50°C Applications see page 6-84.

400HZ Applications see page 6-84.

### Lugs<sup>4</sup>

Catalog Number	No of Cables per Connector	Wire Range	List Price \$
TA5P600	1-5 Pcs.	300-600 kcmil Cu/Al	320.00
TC5R600	1-5 Pcs.	300-600 kcmil Cu only	426.00
TA4P750▲	1-4 Pcs.	500-750 kcmil Cu/Al	254.00
TA6R600	1-6 Pcs.	300-600 kcmil Cu/Al	338.00

④ HACR rated.

**Note:** PD frame qualified to UL489 supplement B "NAVAL". See page 6-84 for additional information.

# Molded Case Circuit Breakers

## SPD 1600A Frame Digital Solid State Sentron Sensitrip III Series

### Selection/Dimensions

#### Ordering Information

Pricing information for all Digital Sentron Series PD frame unit is for breaker only. Price required mounting block assembly and necessary terminal connectors as separate items.

SPD6 and SHPD6 are acceptable for reverse connection applications.



#### Lugs<sup>①</sup>

Catalog Number	No. of Connectors	Wire Range	List Price \$
TA5P600	1-5 pcs.	300-600 kcmil Cu/Al	320.00
TC5R600	1-5 pcs.	300-600 kcmil Cu Only	426.00
TA6R600	1-5 pcs.	300-600 kcmil Cu/Al	338.00

#### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
1400	N14SPD	423.00
1600	N16SPD	423.00

#### Enclosure

Type	Catalog Number	List Price \$
1	PRD6N1	6324.00

#### Mounting Block (Required)<sup>①</sup>

Catalog Number	List Price \$
MB9301	1227.00
MBR9302	1227.00

#### Type SPD6

##### Blue Label

3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SPD69140■	1400	20564.00
SPD69160■	1600	20564.00
SPD69140G■	1400	22340.00
SPD69160G■	1600	22340.00
SPD69140NT■	1400	20903.00
SPD69160NT■	1600	20903.00
SPD69140NGT■	1400	24776.00
SPD69160NGT■	1600	24776.00

#### Type SHPD6

##### Black Label

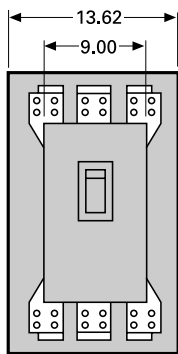
3-Pole, 600V AC		
Catalog Number	Max Current Rating	List Price \$
SHPD69140■	1400	21211.00
SHPD69160■	1600	21211.00
SHPD69140G■	1400	23206.00
SHPD69160G■	1600	23206.00
SHPD69140NT■	1400	21972.00
SHPD69160NT■	1600	21972.00
SHPD69140NGT■	1400	25709.00
SHPD69160NGT■	1600	25709.00

Suffix Letter Code	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Short Time $I^2t$ Pick Up	Ground Fault Pick Up	Ground Fault Delay
None	LI	✓	✓	✓					
G	LIG	✓	✓	✓				✓	✓
NT	LSI	✓	✓	✓	✓	✓	✓		
NGT	LSIG	✓	✓	✓	✓	✓	✓	✓	✓

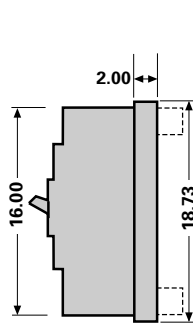
#### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489		
	240V AC	480V AC	600V AC
SPD6	65	50	25
SHPD6	100	65	50

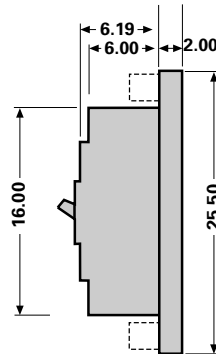
#### All PD, RD Frames:



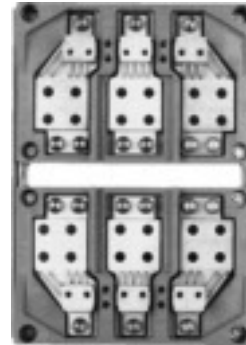
MB9301 (shown)  
MBR9302



MBR9302



MB9301



MBR9302



MB9301

For inches / millimeters conversion, see Application Data section.

■ Built to order. Allow 2-3 weeks for delivery.

① For additional information, see Note A, page 6-81.

Note: The PD frame circuit breaker requires the use of a connect-all mounting assembly to allow for placing into service.

Note: "G" suffix in catalog number denotes circuit breaker for 3-phase, 3-wire circuits.

For 3-phase, 4-wire, order correct 4th wire (neutral) transformer as separate and additional item.

# Molded Case Circuit Breakers

## Internal Accessories

## Selection

Accessories for:

**MD/SMD 800A Frame**  
**ND/SND 1200A Frame**  
**PD/SPD 1600A Frame**  
**RD 2000A Frame**



Accessory modules can mount in either left hand or right hand poles of all circuit breakers, including solid state. Exception: when mechanical interlock is used. Accessories cannot be mounted in left pole.

### Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		S01MN6	636.00	S01MN64A	897.00
208		S02MN6▲	636.00	—	—
240		S03MN6	636.00	S03MN64A▲	897.00
277		S15MN6▲	636.00	S15MN64A▲	897.00
480		S04MN6▲	636.00	S04MN64A▲	897.00
600		S06MN6▲	636.00	—	—
	12	S16MN6▲	636.00	S16MN64A▲	897.00
	24	S07MN6	636.00	S07MN64A	897.00
	48	S09MN6▲	636.00	—	—
	125	S11MN6	636.00	S11MN64A▲	897.00
	250	S13MN6▲	636.00	S13MN64A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01MN6	636.00	U01MN64A	897.00	U01MN64AA	1157.00
208		U02MN6▲	636.00	U02MN64A▲	897.00	U02MN64AA▲	1157.00
240		U03MN6▲	636.00	U03MN64A▲	897.00	U03MN64AA▲	1157.00
277		U15MN6▲	636.00	U15MN64A▲	897.00	U15MN64AA▲	1157.00
480		U04MN6▲	636.00	U04MN64A▲	897.00	U04MN64AA▲	1157.00
600		U06MN6▲	636.00	—	—	—	—
	24	U07MN6	636.00	U07MN64A	897.00	U07MN64AA	1157.00
	48	U09MN6▲	636.00	U09MN64A▲	897.00	U09MN64AA▲	1157.00
	125	U11MN6▲	636.00	U11MN64A▲	897.00	U11MN64AA▲	1157.00
	250	U13MN6▲	636.00	U13MN64A▲	897.00	U13MN64AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01MN64	271.00	A02MN64	540.00
—	12	A01MNDLV▲	342.00	A02MNDLV▲	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B00MN64	271.00	A01MN64B	540.00	A02MN64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SMD, SND, SPD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

▲ Built to order. Allow 6–8 weeks for delivery.

# Molded Case Circuit Breakers

## RD 2000A Frame Sentron Series

Selection

Type RXD6<sup>④</sup>

Blue Label

Non-Interchangeable Trip (Assembled Circuit Breaker Only Without Lugs)

3-Pole 600V AC, 250-500V DC<sup>①</sup>

Continuous Current Rating 40°C	Complete Breaker Assembled (Frame/Trip Unit Only)		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1600	RXD63B160	18701.00	MB9301	1227.00	TC5R600	426.00
1800	RXD63B180	18701.00	-or-	1227.00		
2000	RXD63B200	18701.00	MBR9302			

Type RD6<sup>④</sup>

Blue Label

Interchangeable Trip (Unassembled Circuit Breaker with Lugs)

3-Pole 600V AC, 250-500V DC<sup>①</sup>

Continuous Current Rating 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1600	RD63B160	22484.00	RD63F200	9774.00	RD63T160	8927.00	MB9301 -or- MBR9302	1227.00	TC5R600	426.00
1800	RD63B180	22484.00			RD63T180	8927.00				
2000	RD63B200	22484.00			RD63T200	8927.00				

Type HRXD6<sup>④</sup>

Black Label

Continuous Current Rating 40°C	Complete Breaker Assembled (Frame/Trip Unit Only)	
	Catalog Number	List Price \$
1600	HRXD63B160	21025.00
1800	HRXD63B180	21025.00
2000	HRXD63B200	21025.00

Type HRD6<sup>④</sup>

Black Label

Continuous Current Rating 40°C	Complete Breaker Unassembled with Lugs		Frame Only		Trip Unit Only		Mounting Assembly		Lugs (6 required)	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1600	HRD63B160	24808.00	HRD63F200	12098.00	RD63T160	8927.00	MB9301 -or- MBR9302	1227.00	TC5R600	426.00
1800	HRD63B180	24808.00			RD63T180	8927.00				
2000	HRD63B200	24808.00			RD63T200	8927.00				

### Interrupting Ratings

Breaker Type	UL 489 A IR					IEC 947-2					
	RMS Symmetrical KA					Volts AC (50/60HZ)					
	Volts AC			Volts DC <sup>①</sup>		220/240		380/415		500	
	240	480	600	250	500	(lcu)	(lcs)	(lcu)	(lcs)	(lcu)	(lcs)
RD6, RXD6	65	50	25	30 (2P)	25 (3P)	65	33	40	10	30	8
HRD6, HRXD6	100	65	50	30 (2P)	50 (3P)	100	50	65	17	42	11

### Instantaneous Adjustment Trip Range (PD / RD Frames)

Breaker Ampere Rating	Nominal Instantaneous Values							
	±20% Tolerance Low	2	3	4	5	6	7	±20% Tolerance High
1200-2000	5000	5715	6430	7145	7860	8575	9790	10,000

■ Built to order. Allow 2-3 weeks for delivery.

▲ Built to order. Allow 6-8 weeks for delivery.

① Use two outside poles of a 3-pole circuit breaker for 250V DC applications.

② When wired as shown on page 6-3, this circuit breaker is UL listed and rated for use on 500V DC ungrounded UPS systems only.

③ RXD6 and HRXD6 type circuit breakers are UL Listed for reverse feed applications.



### Mounting Block

Catalog Number	Connection Points	List Price \$
MB9301	Front	1227.00
MBR9302	Rear	1227.00

### Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
<b>PXD6, HPXD6, RXD6, HRXD6, CPD6 Assembled Breakers</b>		
3	1	61.5
<b>PD6, HPD6, RD6, HRD6 Frame Only</b>		
3	1	55.0
<b>PD6, RD6 Trip Unit Only</b>		
3	1	6.5
<b>Mounting Assembly</b>		
MB9301	1	53.0
MBR9302	1	50.9

### Lugs<sup>⑤</sup>

Catalog Number	No of Cables per Connector	Wire Range	List Price \$
TA5P600	1-5 Pcs.	300-600 kcmil Cu/Al	320.00
TC5R600	1-5 Pcs.	300-600 kcmil Cu only	426.00
TA4P750▲	1-4 Pcs.	500-750 kcmil Cu/Al	254.00
TA6R600	1-6 Pcs.	300-600 kcmil Cu/Al	338.00

④ HACR rated.

⑤ For additional information See Note: A, page 6-81.

Note: RD frame qualified to UL489 supplement B "NAVAL". See page 6-84 for additional information.

Note: For required mounting base (MB9301 or MBR9302) see page 6-60.



# Molded Case Circuit Breakers

## Internal Accessories

Selection

Accessories for:

MD/SMD 800A Frame  
ND/SND 1200A Frame  
PD/SPD 1600A Frame  
RD 2000A Frame



Accessory modules can mount in either left hand or right hand poles of all circuit breakers, including solid state. Exception: when mechanical interlock is used. Accessories cannot be mounted in left pole.

### Sensitrip Ammeter



The Ammeter Display Units plug into the Sensitrip Trip Unit and displays the phase current flowing in the breaker. They are powered by the breaker's CT's with replaceable battery back-up for maintaining trip and max logs.

The SADU reads currents, current imbalance, current demand, and trip status.

### Ammeter Mounting Kit

The Ammeter may also be panel or door mounted using the SADURMK18 remote mounting kit.

### Shunt Trip Combinations

Control Voltage		1 Shunt Trip		1 Shunt Trip and 1 Auxiliary Switch	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		S01MN6	636.00	S01MN64A	897.00
208		S02MN6▲	636.00	—	—
240		S03MN6	636.00	S03MN64A▲	897.00
277		S15MN6▲	636.00	S15MN64A▲	897.00
480		S04MN6▲	636.00	S04MN64A▲	897.00
600		S06MN6▲	636.00	—	—
	12	S16MN6▲	636.00	S16MN64A▲	897.00
	24	S07MN6	636.00	S07MN64A	897.00
	48	S09MN6▲	636.00	—	—
	125	S11MN6	636.00	S11MN64A▲	897.00
	250	S13MN6▲	636.00	S13MN64A▲	897.00

### Undervoltage Trip Combinations

Control Voltage		1 Undervoltage Trip		1 Undervoltage Trip and 1 Auxiliary Switch		1 Undervoltage Trip and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
120		U01MN6	636.00	U01MN64A	897.00	U01MN64AA	1157.00
208		U02MN6▲	636.00	U02MN64A▲	897.00	U02MN64AA▲	1157.00
240		U03MN6▲	636.00	U03MN64A▲	897.00	U03MN64AA▲	1157.00
277		U15MN6▲	636.00	U15MN64A▲	897.00	U15MN64AA▲	1157.00
480		U04MN6▲	636.00	U04MN64A▲	897.00	U04MN64AA▲	1157.00
600		U06MN6▲	636.00	—	—	—	—
	24	U07MN6	636.00	U07MN64A	897.00	U07MN64AA	1157.00
	48	U09MN6▲	636.00	U09MN64A▲	897.00	U09MN64AA▲	1157.00
	125	U11MN6▲	636.00	U11MN64A▲	897.00	U11MN64AA▲	1157.00
	250	U13MN6▲	636.00	U13MN64A▲	897.00	U13MN64AA▲	1157.00

### Auxiliary Switch Combinations

Maximum Voltage		1 Form C		2 Form C	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	A01MN64	271.00	A02MN64	540.00
—	12	A01MNDLV▲	342.00	A02MNDLV▲	684.00

### Alarm Switch Combinations

Maximum Voltage		1 Alarm Switch		1 Alarm Switch and 1 Auxiliary Switch		1 Alarm Switch and 2 Auxiliary Switches	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
480	250	B00MN64	271.00	A01MN64B	540.00	A02MN64B	802.00

### Plug-in Ammeter Display Units

Breaker Type	Description	Catalog Number	List Price \$
SMD, SND, SPD	Display Unit	SADU	1776.00
	Remote Mounting Kit	SADURMK18	342.00

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## STD 3200A Frame Digital Solid State Sentron Sensitrip III Series

### Selection/Dimensions

#### Type STD6

#### Type SHTD6

#### Type SHHTD6

##### Blue Label

##### Black Label

##### Red Label

3-Pole, 600V AC, 80% Rated		
Catalog Number	Max Current Rating	List Price \$
STD63F2000■	2000	24668.00
STD63F2500■	2500	27714.00
STD63F3200■	3200	30485.00

3-Pole, 600V AC, 80% Rated		
Catalog Number	Max Current Rating	List Price \$
SHTD63F2000■	2000	27132.00
SHTD63F2500■	2500	30485.00
SHTD63F3200■	3200	33533.00

3-Pole, 600V AC, 80% Rated		
Catalog Number	Max Current Rating	List Price \$
SHHTD63F2000■	2000	29847.00
SHHTD63F2500■	2500	33533.00
SHHTD63F3200■	3200	36884.00

3-Pole, 600V AC, 100% Rated		
Catalog Number	Max Current Rating	List Price \$
STD63F2000H■	2000	27132.00
STD63F2500H■	2500	30485.00
STD63F3200H■	3200	33533.00

3-Pole, 600V AC, 100% Rated		
Catalog Number	Max Current Rating	List Price \$
SHTD63F2000H■	2000	29847.00
SHTD63F2500H■	2500	36884.00
SHTD63F3200H■	3200	40573.00

3-Pole, 600V AC, 100% Rated		
Catalog Number	Max Current Rating	List Price \$
SHHTD63F2000H■	2000	32828.00
SHHTD63F2500H■	2500	40573.00
SHHTD63F3200H■	3200	44630.00

#### Trip Unit

Function	Fits Breaker Frame with Continuous Rating			List Price \$
	2000 Amp	2500 Amp	3200 Amp	
	Catalog Numbers			
LS	STD20TLS■	STD25TLS■	STD32TLS■	2260.00
LI	STD20TLI■	STD25TLI■	STD32TLI■	1611.00
LSI	STD20TLSI■	STD25TLSI■	STD32TLSI■	2938.00
LSG	STD20TLSG■	STD25TLSG■	STD32TLSG■	4260.00
LIG	STD20TLIG■	STD25TLIG■	STD32TLIG■	2835.00
LSIG	STD20TLSIG■	STD25TLSIG■	STD32TLSIG■	4981.00

#### Rating Plug

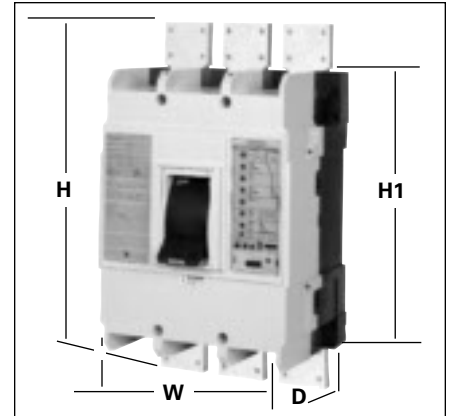
Long Time Amperes	Fits Breaker Frame with Continuous Rating			List Price \$
	2000 Amp	2500 Amp	3200 Amp	
	Catalog Numbers			
1000	20STD1000■			352.00
1200	20STD1200■			
1600	20STD1600■	25STD1600■	32STD1600■	
2000	20STD2000■	25STD2000■	32STD2000■	
2500		25STD2500■	32STD2500■	
3000			32STD3000■	
3200			32STD3200■	

#### Interrupting Ratings

Breaker Type	RMS Symmetrical kA UL 489 (File E 10848)			IEC60947-2 ( $I_{cu}=I_{cs}$ , $I_{cw}=50kA$ )	
	240V AC	480V AC	600V AC	415VAC	690VAC
STD6	85	65	50	—	—
SHTD6	150	100	85	100kA	65kA
SHHTD6	200	150	100	—	—

#### Ordering Information

STD Breakers are ordered by component - Frame, Trip Unit & Rating Plug, Accessories. Contact Sales Office for instructions.



#### Dimensions (in Inches)Ⓞ

Breaker Type	H	H1	W	D
STD SHTD SHHTD	27.5	20.5	15.5	12.5

#### Terminal Connectors

Catalog Number	List Price \$
STD32TCON	224.00

#### Cable Lugs

(2000A Only)

Catalog Number	No of Cables per Connector	Wire Range	List Price \$
TA6R600STD	(1-6 pcs.)	250-600 kcmil Cu/Al	323.00

#### Neutral Transformers

Ampere Rating	Catalog Number	List Price \$
2000	N20STD	460.00
2500	N25STD	460.00
3200	N32STD	460.00

Accessories pages 6-65 and 6-84 to 6-91

■ Built to order. Allow 2-3 weeks for delivery.

Ⓞ Dimensions for reference, not for construction.

# Molded Case Circuit Breakers

## Internal Accessories

**Selection**

Accessories for:

### STD 3200A Frame

STD Breakers are built to order. It is recommended that accessories be ordered installed in the breaker. They may also be field added.

### Ammeter Display Module

The STDDM plugs into the trip unit of the STD 3200 Amp breaker. It provides readout of currents as well as load current alarm (in conjunction with the display module relay).

### Ground Fault Monitor

The Ground Fault Monitor for the STD 3200 Amp breaker family plugs into the Trip Unit and reads the ground current. This is either the residual current calculated from the measured three phases and neutral (if present) or the directly measured ground return current in the ground lead of the supply transformer, depending on the configuration of the the trip unit. In addition to displaying the ground current, the display module provides an alarm on ground overcurrent, settable at three pickup levels with three delays (in conjunction with the display module relay).

Shunt Trip / Undervoltage Release

Control Voltage		Shunt Trip		Under Voltage Release	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120		STDST120▲	776.00	STDUV120▲	776.00
240		STDST240▲	776.00	STDUV240▲	776.00
480		STDST480▲	776.00	STDUV480▲	776.00
600		—	—	STDUV600▲	776.00
	12	STDST12▲	776.00	—	—
	24	STDST24▲	776.00	STDUV24▲	776.00
	48	STDST48▲	776.00	STDUV48▲	776.00
	125	STDST125▲	776.00	STDUV125▲	776.00

Auxiliary Switches

Control Voltage		Quantity Contacts		Catalog Number	List Price \$
AC	DC	NO	NC		
600	300	1	1	STDAS2▲	397.00
		2	2	STDAS4▲	653.00
		3	3	STDAS6▲	980.00
		4	4	STDAS8▲	1308.00
		5	5	STDAS10▲	1641.00
		6	6	STDAS12▲	1945.00

Alarm Switch

Control Voltage		Catalog Number	List Price \$
AC	DC		
600	300	STDAS▲	768.00

Auxiliary Power Module

Power Source	Catalog Number	List Price \$
120V AC	STDAPM▲	718.00

Electronic Bell Alarm / Display Relay

Control Voltage		Bell Alarm		Display Module Relay	
AC	DC	Catalog Number	List Price \$	Catalog Number	List Price \$
120	24	STDBA120▲	776.00	STDDMR120▲	776.00
	48	STDBA24▲	776.00	STDDMR24▲	776.00
	125	STDBA48▲	776.00	STDDMR48▲	776.00
		STDBA125▲	776.00	STDDMR125▲	776.00

Ammeter-Display Module

Catalog Number	List Price \$
STDDM▲	3198.00

Ground Fault Monitor

Catalog Number	List Price \$
STDGFM▲	4102.00

Mounting Bracket for Terminal Block

For mounting Control Terminal Blocks to breakers. One per each side as required.

Catalog Number	List Price \$
STDTBM▲	98.00

Secondary Terminal Blocks

The appropriate number and location of terminal blocks should be selected from the table below based on the features and accessories ordered on each circuit breaker. Control Terminal Blocks also require separate mounting brackets for the left and right sides.

Contact Block Position	Catalog Number	List Price \$	Accessory						
			Shunt Trip	Under-voltage Release	Neutral Sensor	Zone Interlock and ACCESS	Bell Alarm <sup>®</sup> or Display Module Relay	Auxiliary Switches	
								1A and 1B 2A and 2B 3A and 3B	4A and 4B 5A and 5B 6A and 6B
LEFT TOP	STDTBLT▲	162.00	X	X	X				
LEFT BOTTOM	STDTBLB▲	162.00				X			
RIGHT TOP	STDTBRT▲	162.00					X		X
RIGHT BOTTOM	STDTBRB▲	162.00						X	X

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## Magnetic Trip Only — ETI Motor Circuit Protector

Selection

Breaker Type	Ampere Rating	Instantaneous Trip Range <sup>②</sup>		Complete Circuit Breaker Without Lugs				
		Minimum <sup>③</sup>	Maximum <sup>③</sup>	Catalog Number 2-Pole	List Price \$	Catalog Number 3-Pole	List Price \$	
<b>ED6-A</b> 600V AC 250V DC	1	2.6	9	—	—	ED63A001	824.00	
	2	7	22	—	—	ED63A002	824.00	
	3	10	35	—	—	ED63A003	824.00	
	5	16	54	—	—	ED63A005	824.00	
	10	30	100	—	—	ED63A010	824.00	
	25	55	180	—	—	ED63A025	824.00	
	30	80	270	—	—	ED63A030	824.00	
	40	115	375	—	—	ED63A040	824.00	
	50	180	600	—	—	ED63A050	991.00	
	100	315	1000	—	—	ED63A100	1052.00	
	125	500	1250	—	—	ED63A125	1997.00	
	SHIPPING:		3.8 lbs. each					
	<b>CED6-A</b> 600V AC 250V DC	1	2.6	9	—	—	CED63A001■	2811.00
2		7	22	—	—	CED63A001■	2811.00	
3		10	35	—	—	CED63A003■	2811.00	
5		16	54	—	—	CED63A005■	2811.00	
10		30	100	—	—	CED63A010■	2811.00	
25		55	180	—	—	CED63A025■	2811.00	
30		80	270	—	—	CED63A030■	2811.00	
40		115	375	—	—	CED63A040■	2811.00	
50		180	600	—	—	CED63A050■	3360.00	
100		315	1000	—	—	CED63A100■	3608.00	
125		500	1250	—	—	CED63A125■	5409.00	
SHIPPING:		6 lbs. each						
<b>FXD6<sup>④</sup></b> 600V AC 250V DC		150	400	800	—	—	FXD63L150■	3448.00
	150	800	1500	—	—	FXD63A150	3448.00	
	150	1100	2500	—	—	FXD63H150	3448.00	
	250	1100	2500	—	—	FXD63A250	3448.00	
	SHIPPING:		9 lbs. each					
<b>CFD6<sup>④</sup></b> 600V AC 250V DC	150	400	800	—	—	CFD63L150■	6664.00	
	150	800	1500	—	—	CFD63A150■	6664.00	
	150	1100	2500	—	—	CFD63H150■	6664.00	
	250	1100	2500	—	—	CFD63A250■	6664.00	
	SHIPPING:		12 lbs. each					
<b>JXD6(A)<sup>①</sup></b> 600V AC 250V DC	400	1250	2500	—	—	JXD63L400	3608.00	
	400	2000	4000	JXD62H400■	3077.00	JXD63H400	3608.00	
	SHIPPING:		16 lbs. each					
<b>CJD6<sup>①</sup></b> 600V AC 250V DC	400	1250	2500	CJD62L400■	6222.00	CJD63L400■	7742.00	
	400	2000	4000	CJD62H400■	6222.00	CJD63H400■	7742.00	
	SHIPPING:		29.5 lbs. each					
<b>LXD6(A)<sup>①</sup></b> 600V AC 250V DC	600	2000	4000	LXD62L600■	4616.00	LXD63L600■	5267.00	
	600	3000	6000	—	—	LXD63H600■	5267.00	
	SHIPPING:		16 lbs. each					
<b>CLD6<sup>①</sup></b> 600V AC 250V DC	600	2000	4000	CLD62L600■	10003.00	CLD63L600■	12392.00	
	600	3000	6000	CLD62H600■	10003.00	CLD63H600■	12392.00	
	SHIPPING:		31.5 lbs. each					
<b>LMXD6<sup>④</sup></b> 600V AC 250V DC	800	2800	6000	—	—	LMXD63L800■	7460.00	
	800	3200	8000	—	—	LMXD63A800	7460.00	
	SHIPPING:		35 lbs. each					
<b>MXD6<sup>④</sup></b> 600V AC 250V DC	800	3000	6000	—	—	MXD63L800■	7460.00	
	800	4000	8000	—	—	MXD63A800■	7460.00	
	800	5000	10000	—	—	MXD63H800	7460.00	
	SHIPPING:		33 lbs. each					
<b>CMD6<sup>④</sup></b> 600V AC 250V DC	800	3000	6000	—	—	CMD63L800■	14019.00	
	800	4000	8000	—	—	CMD63A800■	14019.00	
	800	5000	10000	—	—	CMD63H800■	14019.00	
	SHIPPING:		80 lbs. each					

### Important Information

ETI interrupting ratings are determined through combination tests with properly sized overload relays and contactors.

⑤ Connectors included when ordering by circuit breaker catalog number for ED6 and CED6 ETI's. Order ETI circuit breaker and lugs (2 per pole) separately for the FXD6, CFD6, MXD6, CMD6, JXD6, CJD6, LXD6 and CLD6 ETI's.

Lug Information pages 6-81 to 6-83  
Enclosures Section 5  
Accessories pages 6-86 to 6-91  
Application data pages 6-67 to 6-68

■ Built to order. Allow 2-3 weeks for delivery.

② 2-pole available in 3-pole width only.

③ When applied on DC Circuits — Trip levels will increase approximately +15 to 20%.

③ Tolerance -20/+30%

④ For 2-pole application use outside poles of 3-pole circuit breaker.

# Molded Case Circuit Breakers

## Motor Circuits

## Application

### General

#### Protection of Motor Circuits

Molded case circuit breakers are used in motor circuits as a disconnecting means and for short-circuit protection. They should be used in conjunction with motor-running, over-current-protection devices, and should permit the motor to start without nuisance tripping from motor-inrush current. The circuit breaker should have a continuous-current rating of not less than 115% of the motor full-load current.

The recommended motor circuit protectors (Siemens ETI instantaneous only circuit breakers) listed have

continuous-current ratings of at least 115% of motor full-load currents. The trip-setting positions are approximately 11 times motor full-load currents. The suggested trip settings may have to be adjusted upward to no higher than 1300% of full-load current for non-design E type motors, and no greater than 1700% of full load current for design E motors, to allow for motor start-up due to inrush currents.

#### Breaker Mounted Immediately Ahead of Motor Starter

Siemens ETI motor circuit protectors are recommended for use in combination motor starters to provide selective short-circuit protection for the motor

branch circuit. The adjustable instantaneous-trip feature of the Siemens ETI motor circuit protector provides for a trip setting slightly above the peak motor-inrush current. With this setting, no delay is introduced in opening the circuit when a fault occurs. This circuit breaker has no time-delay trip element. Therefore it must be used in conjunction with, and immediately ahead of, the motor-running overcurrent protective device.

Important: The information below does not apply to all motor applications: it is recommended that the user refer to the National Electrical Code (NEC) for specific needs.

**Table 1 (When Breaker is Mounted Immediately Ahead of Motor Starter)**

3-Phase Induction Type Motors (Siemens ETI motor circuit protectors for branch circuit use with alternating-current combination, full voltage motor starters).

Motor Full Load Amperes	Catalog Number	ETI Trip Setting	
		Adjustment	Amperes
.20 – .33	ED63A001 CED63A001	Low	2.6
.34 – .45		2	4.5
.46 – .56		3	6
.57 – .68		4	7.5
.69 – .81		High	9
.53 – .83	ED63A002 CED63A002	Low	7
.84 – 1.14		2	11
1.15 – 1.45		3	15
1.46 – 1.68		4	19
1.69 – 2.00		High	22
.76 – 1.29	ED63A003 CED63A003	Low	10
1.30 – 1.75		2	17
1.76 – 2.29		3	23
2.30 – 2.68		4	30
2.69 – 3.18		High	35
1.23 – 1.99	ED63A005 CED63A005	Low	16
2.00 – 2.75		2	26
2.76 – 3.52		3	36
3.53 – 4.14		4	46
4.15 – 4.90		High	54
2.30 – 3.83	ED63A010 CED63A010	Low	30
3.84 – 5.37		2	50
5.38 – 6.52		3	70
6.53 – 7.68		4	85
7.69 – 9.10		High	100
4.23 – 6.91	ED63A025 CED63A025	Low	55
6.92 – 9.61		2	90
9.62 – 11.91		3	125
11.92 – 13.83		4	155
13.84 – 16.40		High	180
6.15 – 10.37	ED63A030 CED63A030	Low	80
10.38 – 14.22		2	135
14.23 – 18.06		3	185
18.07 – 20.75		4	235
20.76 – 24.50		High	270
8.84 – 14.22	ED63A040 CED63A040	Low	115
14.23 – 19.60		2	185
19.61 – 24.99		3	255
25.00 – 28.83		4	325
28.84 – 34.00		High	375
13.84 – 23.06	ED63A050 CED63A050	Low	180
23.07 – 31.52		2	300
31.53 – 39.99		3	410
40.00 – 46.14		4	520
46.15 – 54.50		High	600
24.23 – 41.52	ED63A100 CED63A100	Low	315
41.53 – 56.91		2	540
56.92 – 68.45		3	740
68.46 – 76.91		4	890
76.92 – 90.90		High	1000

Motor Full Load Amperes	Catalog Number	ETI Trip Setting	
		Adjustment	Amperes
38.46 – 55.37	ED63A125 CED63A125	Low	500
55.38 – 70.75		2	720
70.76 – 84.60		3	920
84.61 – 96.14		4	1100
96.15 – 113.60		High	1250
30.76 – 35.37	FXD63L150 CFD63L150	Low	400
35.38 – 39.99		2	460
44.51 – 49.23		4	580
53.84 – 58.45		6	700
58.46 – 63.06		7	760
63.07 – 74.50	High	820	
61.53 – 69.22	FXD63A150 CFD63A150	Low	800
69.23 – 76.91		2	900
84.61 – 92.29		4	1100
100.00 – 108.00		6	1300
108.00 – 115.00		7	1400
115.00 – 136.00	High	1500	
85.00 – 100.00	FXD63A250 CFD63A250	Low	1100
100.00 – 115.00		2	1300
131.00 – 146.00		4	1700
162.00 – 177.00		6	2100
177.00 – 192.00		7	2300
192.00 – 227.00	High	2500	
95.00 – 110.00	JXD63L400 CJD63L400	Low	1250
110.00 – 124.00		2	1430
138.00 – 151.00		4	1790
165.00 – 178.00		6	2140
178.00 – 192.00		7	2320
192.00 – 227.00	High	2500	
154.00 – 176.00	JXD63H400 CJD63H400	Low	2000
176.00 – 198.00		2	2290
220.00 – 242.00		4	2860
264.00 – 285.00		6	3430
285.00 – 308.00		7	3710
308.00 – 326.00	High	4000	
155.00 – 176.00	LXD63L600 CLD63L600	Low	2000
176.00 – 198.00		2	2290
220.00 – 242.00		4	2860
264.00 – 285.00		6	3430
285.00 – 308.00		7	3710
308.00 – 326.00	High	4000	

Motor Full Load Amperes	Catalog Number	ETI Trip Setting	
		Adjustment	Amperes
231.00 – 264.00	LXD63H600 CLD63H600	Low	3000
264.00 – 292.00		2	3430
330.00 – 362.00		4	4290
395.00 – 428.00		6	5140
428.99 – 462.00		7	5570
462.00 – 490.00		High	6000
215.00 – 238.00		LMD63L800	Low
238.00 – 261.00	2		3100
261.00 – 284.00	3		3400
308.00 – 369.00	5		4000
369.00 – 423.00	6		4800
423.00 – 462.00	7		5500
462.00 – 490.00	High		6000
246.00 – 269.00	LMD63A800	Low	3200
269.00 – 284.00		2	3500
284.00 – 323.00		3	3700
362.00 – 492.00		5	4700
492.00 – 562.00		6	6400
562.00 – 616.00		7	7300
616.00 – 660.00		High	8000
231.00 – 264.00	MXD63L800 CMD63L800	Low	3000
264.00 – 292.00		2	3430
292.00 – 330.00		3	3800
362.00 – 395.00		5	4710
428.00 – 462.00		7	5570
462.00 – 490.00		High	6000
308.00 – 352.00		MXD63A800 CMD63A800	Low
352.00 – 442.00	2		4570
442.00 – 447.00	3		5740
483.00 – 527.00	5		6280
571.00 – 616.00	7		7240
616.00 – 660.00	High		8000
385.00 – 440.00	MXD63H800 CMD63H800		Low
495.00 – 550.00		3	6430
605.00 – 660.00		5	7860
660.00 – 695.00		6	8575

Note: Low instantaneous settings have a ±20% tolerance and high settings have a ±20% tolerance

# Molded Case Circuit Breakers

## Motor Circuits

## Application

### Breaker Mounted at a Distance From Motor Starter

ET thermal-magnetic circuit breakers conform to the National Electrical Code table 430-152 requirements for motor branch and feeder circuit protection when properly applied in conjunction with motor-running overcurrent protective devices. The recommended

circuit-breaker ratings in Table 2 provide adequate time delay for starting the majority of three phase induction motors.

To determine the ampere ratings of the ET breaker to protect a motor feeder, add the rating of the ET breaker used to protect the largest motor branch circuit in the group to the full-load currents of the remaining motors in the group.

### Interrupt Ratings

For normal commercial purposes, available fault current can conveniently be obtained in the Interrupting Selector Tables.

**Table 2 (When Breaker is Mounted at a Distance From Motor Starter)**

3-Phase Induction Type Motors (EQ and ET circuit breakers (thermal-magnetic trip) for branch breaker use with alternating-current combination motor starters).

Motor Horsepower Rating	200 and 208V Motors			230V Motors			460V Motors			575V Motors		
	240V Circuit Breaker Data <sup>①</sup>			240V Circuit Breaker Data <sup>①</sup>			480V Circuit Breaker Data <sup>①</sup>			600V Circuit Breaker Data <sup>①</sup>		
	Breaker Type	Catalog Number	Ampere Rating	Breaker Type	Catalog Number	Ampere Rating	Breaker Type	Catalog Number	Ampere Rating	Breaker Type	Catalog Number	Ampere Rating
½	BQ <sup>®</sup>	BQ3B015	15	BQ <sup>®</sup>	BQ3B015	15	ED4	ED43B015	15	ED6	ED63B015	15
¾		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
1		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
1½		BQ3B015	15		BQ3B015	15		ED43B015	15		ED63B015	15
2		BQ3B020	20		BQ3B015	15		ED43B015	15		ED63B015	15
3		BQ3B030	30		BQ3B020	20		ED43B015	15		ED63B015	15
5	BQ <sup>®</sup>	BQ3B040	40	BQ <sup>®</sup>	BQ3B030	30	ED4	ED43B015	15	ED6	ED63B015	15
7½		BQ3B060	60		BQ3B050	50		ED43B030	30		ED63B020	20
10		BQ3B070	70		BQ3B070	70		ED43B030	30		ED63B030	30
15		BQ3B100	100		BQ3B090	90		ED43B040	40		ED63B035	35
20					BQ3B100	100		ED43B050	50		ED63B050	50
25	FXD6	FXD63B125	125	FXD6	FXD63B125	125	FXD6	FXD63B090	90	FXD6	FXD63B060	60
30		FXD63B150	150		FXD63B150	150		FXD63B100	100		FXD63B070	70
40		FXD63B175	175		FXD63B175	175		FXD63B125	125		FXD63B090	90
50		FXD63B200	200		FXD63B200	200		FXD63B150	150		FXD63B100	100
		FXD63B225	225									
60	JXD2	JXD23B300	300	—	—	—	FXD6, FD6	FXD63B150	150	FXD6	FXD63B100	100
75	JXD2	JXD23B400	400	JXD2	JXD23B350	350	FXD6, FD6	FXD63B200	200	FXD6, FD6	FXD63B125	125
100	JXD2	JXD23B400	400	JXD2	JXD23B400	400	FD6 <sup>®</sup> JD6 <sup>®</sup>	FD63B250 JD63B250	250 250	FXD6, FD6	FD63B175	175
125	LD6 <sup>®</sup> or LMD6	LD63B600 LMD63B600	600	LD6 <sup>®</sup> or LMD6	LD63B500 or LMD63B500	500	JD6 <sup>®</sup>	JD63B300	300	FXD6, FD6 OR JD6 <sup>®</sup>	FXD63B200 JD63B200	200 200
150	LD6 <sup>®</sup> or LMD6	LD63B600 or LMD63B600	600	LMD6	LD63B600 or LMD63B600	600	JD6 <sup>®</sup>	JD63B300	300	FXD6 or JD6 <sup>®</sup>	FXD63B225 JD63B225	225 225
200	LMD6	LMD63B800	800	LMD6	LMD63B800	800	JD6 <sup>®</sup>	JD63B350	350	JD6 <sup>®</sup>	JD63B300	300
250	—	—	—	—	—	—	JD6 <sup>®</sup>	JD63B400	400	JD6 <sup>®</sup>	JD63B400	400
300	—	—	—	—	—	—	LD6 <sup>®</sup> or LMD6	LD63B600 or LMD63B600	600	JD6 <sup>®</sup>	JD63B400	400
350	—	—	—	—	—	—	LMD6	LMD63B700	700	LD6 <sup>®</sup> or LMD6	LD63B500 or LMD63B500	500
400	—	—	—	—	—	—	LMD6	LMD63B800	800	LD6 <sup>®</sup> or LMD6	LD63B600 or LMD63B600	600
500	—	—	—	—	—	—	—	—	—	LMD6	LMD63B800	800

① The selection of breakers for this table is in accordance with Article 430, 2005 National Electric Code. Recommended circuit breakers are for full voltage starting, special consideration is necessary for reduced voltage starting.

② For panelboard applications, substitute the BL breaker for the BQ, ED2 circuit breakers may also be used.

③ For non-interchangeable trip applications, substitute the FXD6 for the FD6, the JXD6 for the JD6, or the LXD6 for the LD6.

# Molded Case Circuit Breakers

## Adjustable Installments Magnetic Trip Settings

## Application

Breaker Type	Maximum Continuous Amperes	Nominal AC Adjustable Trip Range								ETI Motor Circuit Protector Catalog Number			Thermal Magnetic Catalog Number	
		Low	2	3	4	5	6	7	High	3-Pole	2-Pole	3-Pole		
ED6	1	2.6	4.5	6	7.5	—	—	—	9	ED63A001	—	—		
	2	7	11	15	19	—	—	—	22	ED63A002	—	—		
	3	10	17	23	30	—	—	—	35	ED63A003	—	—		
	5	16	26	36	46	—	—	—	54	ED63A005	—	—		
	10	30	50	70	85	—	—	—	100	ED63A010	—	—		
	25	55	90	125	155	—	—	—	180	ED63A025	—	—		
	30	80	135	185	235	—	—	—	270	ED63A030	—	—		
	40	115	185	255	325	—	—	—	375	ED63A040	—	—		
	50	180	300	410	520	—	—	—	600	ED63A050	—	—		
	100	315	540	740	890	—	—	—	1000	ED63A100	—	—		
	125	500	720	920	1100	—	—	—	1250	ED63A125	—	—		
	CED6	1	2.6	4.5	6	7.5	—	—	—	9	CED63A001	—	—	
2		7	11	15	19	—	—	—	22	CED63A002	—	—		
3		10	17	23	30	—	—	—	35	CED63A003	—	—		
5		16	26	36	46	—	—	—	54	CED63A005	—	—		
10		30	50	70	85	—	—	—	100	CED63A010	—	—		
25		55	90	125	155	—	—	—	180	CED63A025	—	—		
30		80	135	185	235	—	—	—	270	CED63A030	—	—		
40		115	185	255	325	—	—	—	375	CED63A040	—	—		
50		180	300	410	520	—	—	—	600	CED63A050	—	—		
100		315	540	740	890	—	—	—	1000	CED63A100	—	—		
125		500	720	920	1100	—	—	—	1250	CED63A125	—	—		
FXD6-A		70	600	640	690	730	770	810	850	900	—	FXD62B070	FXD63B070	
	80	600	640	690	730	770	810	850	900	—	FXD62B080	FXD63B080		
	90	600	640	690	730	770	810	850	900	—	FXD62B090	FXD63B090		
	100	700	770	840	920	990	1060	1140	1200	—	FXD62B100	FXD63B100		
	110	700	770	840	920	990	1060	1140	1200	—	FXD62B110	FXD63B110		
	125	800	900	1000	1100	1200	1300	1400	1500	—	FXD62B125	FXD63B125		
	150	400	460	520	580	640	700	760	820	FXD63L150	—	—		
	150	800	900	1000	1100	1200	1300	1400	1500	FXD63A150	FXD62B150	FXD63B150		
	150	1100	1300	1500	1700	1900	2100	2300	2500	FXD63H150	—	—		
	175	900	1060	1210	1370	1520	1780	1930	2000	—	FXD62B175	FXD63B175		
	200	900	1060	1210	1370	1520	1780	1930	2000	—	FXD62B200	FXD63B200		
	225	1100	1300	1500	1700	1900	2100	2300	2500	—	FXD62B225	FXD63B225		
250	1100	1300	1500	1700	1900	2100	2300	2500	FXD63A250	FXD62B250	FXD63B250			
FD6-A	70	600	640	690	730	770	810	850	900	—	FD62B070	FD63B070		
	80	600	640	690	730	770	810	850	900	—	FD62B080	FD63B080		
	90	600	640	690	730	770	810	850	900	—	FD62B090	FD63B090		
	100	700	770	840	920	990	1060	1140	1200	—	FD62B100	FD63B100		
	110	700	770	840	920	990	1060	1140	1200	—	FD62B110	FD63B110		
	125	800	900	1000	1100	1200	1300	1400	1500	—	FD62B125	FD63B125		
	150	800	900	1000	1100	1200	1300	1400	1500	—	FD62B150	FD63B150		
	175	900	1060	1210	1370	1520	1780	1930	2000	—	FD62B175	FD63B175		
	200	900	1060	1210	1370	1520	1780	1930	2000	—	FD62B200	FD63B200		
	225	1100	1300	1500	1700	1900	2100	2300	2500	—	FD62B225	FD63B225		
	250	1100	1300	1500	1700	1900	2100	2300	2500	—	FD62B250	FD63B250		
	HFD6	70	600	640	690	730	770	810	850	900	—	HFD62B070	HFD63B070	
80		600	640	690	730	770	810	850	900	—	HFD62B080	HFD63B080		
90		600	640	690	730	770	810	850	900	—	HFD62B090	HFD63B090		
100		700	770	840	920	990	1060	1140	1200	—	HFD62B100	HFD63B100		
110		700	770	840	920	990	1060	1140	1200	—	HFD62B110	HFD63B110		
125		800	900	1000	1100	1200	1300	1400	1500	—	HFD62B125	HFD63B125		
150		800	900	1000	1100	1200	1300	1400	1500	—	HFD62B150	HFD63B150		
175		900	1060	1210	1370	1520	1780	1930	2000	—	HFD62B175	HFD63B175		
200		900	1060	1210	1370	1520	1780	1930	2000	—	HFD62B200	HFD63B200		
225		1100	1300	1500	1700	1900	2100	2300	2500	—	HFD62B225	HFD63B225		
250		1100	1300	1500	1700	1900	2100	2300	2500	—	HFD62B250	HFD63B250		
HHFD6		70	600	640	690	730	770	810	850	900	—	—	HHFD63B070	
	80	600	640	690	730	770	810	850	900	—	—	HHFD63B080		
	90	600	640	690	730	770	810	850	900	—	—	HHFD63B090		
	100	700	770	840	920	990	1060	1140	1200	—	—	HHFD63B100		
	110	700	770	840	920	990	1060	1140	1200	—	—	HHFD63B110		
	125	800	900	1000	1100	1200	1300	1400	1500	—	—	HHFD63B125		
	150	800	900	1000	1100	1200	1300	1400	1500	—	—	HHFD63B150		
	175	900	1060	1210	1370	1520	1780	1930	2000	—	—	HHFD63B175		
	200	900	1060	1210	1370	1520	1780	1930	2000	—	—	HHFD63B200		
	225	1100	1300	1500	1700	1900	2100	2300	2500	—	—	HHFD63B225		
	250	1100	1300	1500	1700	1900	2100	2300	2500	—	—	HHFD63B250		
	CFD6	70	600	640	690	730	770	810	850	900	—	CFD62B070	CFD63B070	
80		600	640	690	730	770	810	850	900	—	CFD62B080	CFD63B080		
90		600	640	690	730	770	810	850	900	—	CFD62B090	CFD63B090		
100		700	770	840	920	990	1060	1140	1200	—	CFD62B100	CFD63B100		
110		700	770	840	920	990	1060	1140	1200	—	CFD62B110	CFD63B110		
125		800	900	1000	1100	1200	1300	1400	1500	—	CFD62B125	CFD63B125		
150		400	460	520	580	640	700	760	820	CFD63L150	—	—		
150		800	900	1000	1100	1200	1300	1400	1500	CFD63A150	CFD62B150	CFD63B150		
150		1100	1300	1500	1700	1900	2100	2300	2500	CFD63H150	—	—		
175		900	1060	1210	1370	1520	1780	1930	2000	—	CFD62B175	CFD63B175		
200		900	1060	1210	1370	1520	1780	1930	2000	—	CFD62B200	CFD63B200		
225		1100	1300	1500	1700	1900	2100	2300	2500	—	CFD62B225	CFD63B225		
250	1100	1300	1500	1700	1900	2100	2300	2500	CFD63A250	CFD62B250	CFD63B250			

**Note:** Tolerances for instantaneous trip points meet UL 489 (7.3). Nominal AC instantaneous trip points are given in the tables. For DC instantaneous trip points, add 15% to nominal values.

Instantaneous trip adjustment is made through the breaker cover on all frame breakers. To change instantaneous trip point on circuit breaker, depress indicating knob, then rotate to desired position.

■ Built to order. Allow 2-3 weeks for delivery.

# Molded Case Circuit Breakers

## Adjustable Instantaneous Magnetic Trip Settings

## Application

Breaker Type	Maximum Continuous Amperes	Nominal AC Adjustable Trip Range								ETI Motor Circuit Protector Catalog Number			Thermal Magnetic Catalog Number		
		Low	2	3	4	5	6	7	High	3-Pole	2-Pole	3-Pole			
JXD2(A)	200	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD22B200	JXD23B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD22B225	JXD23B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD22B250	JXD23B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD22B300	JXD23B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	JXD22B350	JXD23B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	JXD22B400	JXD23B400			
JXD6(A)	200	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD62B200	JXD63B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD62B225	JXD63B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD62B250	JXD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	JXD62B300	JXD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	JXD62B350	JXD23B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	JXD62B400	JXD23B400			
JD6(A)	200	1250	1430	1610	1790	1960	2140	2320	2500	—	JD62B200	JD63B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	JD62B225	JD63B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	JD62B250	JD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	JD62B300	JD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	JD62B350	JD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	JD62B400	JD63B400			
HJD6(A)	200	1250	1430	1610	1790	1960	2140	2320	2500	—	HJD62B200	HJD63B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	HJD62B225	HJD63B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	HJD62B250	HJD63H250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	HJD62B300	HJD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	HJD62B350	HJD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	HJD62H400	HJD63B400			
HHJD6	200	1250	1430	1610	1790	1960	2140	2320	2500	—	HHJD62B200	HHJD63B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	HHJD62B225	HHJD63B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	HHJD62B250	HHJD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	HHJD62B300	HHJD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	HHJD62B350	HHJD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	HHJD62B400	HHJD63B400			
CJD6	200	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CJD63B200			
	225	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CJD63B225			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CJD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CJD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CJD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CHD63B400			
LXD6(A)	450	2000	2290	2570	2860	3140	3430	3710	4000	—	LXD62B450	LXD63B450			
	500	3000	3430	3860	4290	4710	5140	5570	6000	—	LXD62B500	LXD63B500			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	LXD62B600	LXD63B600			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	LD62B250	LD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	LD62B300	LD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	LD62B350	LD63B350			
LD6(A)	400	2000	2290	2570	2860	3140	3430	3710	4000	—	LD62B400	LD63B400			
	450	2000	2290	2570	2860	3140	3430	3710	4000	—	LD62B450	LD63B450			
	500	3000	3430	3800	4290	4710	5140	5570	6000	—	LD62B500	LD63B500			
	600	2000	2290	2570	2860	3140	3430	3710	4000	—	—	—			
	600	3000	3430	3800	4290	4710	5140	5570	6000	—	LXD63L600	—			
	600	3000	3430	3800	4290	4710	5140	5570	6000	—	LXD63H600	LD63B600			
HLD6(A)	250	1250	1430	1610	1790	1960	2140	2320	2500	—	HLD62B250	HLD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	HLD62B300	HLD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	HLD62B350	HLD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	HLD62B400	HLD63B400			
	450	2000	2290	2570	2860	3140	3430	3710	4000	—	HLD62B450	HLD63B450			
	500	3000	3430	3860	4290	4710	5140	5570	6000	—	HLD62B500	HLD63B500			
HHLD6	600	3000	3430	3860	4290	4710	5140	5570	6000	—	HLD62B600	HLD63B600			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	HHLD62B250	HHLD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	HHLD62B300	HHLD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	HHLD62B350	HHLD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	HHLD62B400	HHLD63B400			
	450	2000	2290	2570	2860	3140	3430	3710	4000	—	HHLD62B450	HHLD63B450			
CLD6	500	3000	3430	3860	4290	4710	5140	5570	6000	—	HHLD62B500	HHLD63B500			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	HHLD62B600	HHLD63B600			
	250	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CLD63B250			
	300	1250	1430	1610	1790	1960	2140	2320	2500	—	—	CLD63B300			
	350	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CLD63B350			
	400	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CLD63B400			
LMXD6	450	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CLD63B450			
	500	3000	3430	3860	4290	4710	5140	5570	6000	—	—	CLD63B500			
	600	2000	2290	2570	2860	3140	3430	3710	4000	—	—	CLD63B600			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	—			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	—			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	—			
LMD6	500	3000	3430	3860	4290	4710	5140	5570	6000	—	—	—			
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	—			
	700	3200	3500	3700	4200	4700	6400	7300	8000	—	—	—			
	800	2800	3100	3400	3700	4000	4800	5500	6000	—	—	—			
	800	3200	3500	3700	4200	4700	6400	7300	8000	—	—	—			
	800	3200	3500	3700	4200	4700	6400	7300	8000	—	—	—			



# Molded Case Circuit Breakers

## Adjustable Instantaneous Magnetic Trip Settings

## Application

Breaker Type	Maximum Continuous Amperes	Nominal AC Adjustable Trip Range								ETI Motor Circuit Protector Catalog Number	Thermal Magnetic Catalog Number		
		Low	2	3	4	5	6	7	High		3-Pole	2-Pole	3-Pole
HLMXD6	500	3000	3430	3860	4290	4710	5140	5570	6000	—	—	HLMXD63B500	
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	HLMXD63B600	
	700	3200	3500	3700	4200	4700	6400	7300	8000	—	—	HLMXD63B700	
	800	3200	3500	3700	4200	4700	6400	7300	8000	—	—	HLMXD63B800	
HLMD6	500	3000	3430	3860	4290	4710	5140	5570	6000	—	HLMD62B500	HLMD63B500	
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	HLMD62B600	HLMD63B600	
	700	3200	3500	3700	4200	4700	6400	7300	8000	—	HLMD62B700	HLMD63B700	
	800	3200	3500	3700	4200	4700	6400	7300	8000	—	HLMD62B800	HLMD63B800	
MD6	500	3000	3430	3860	4290	4710	5140	5570	6000	—	—	MD63B500	
	600	3000	3430	3860	4290	4710	5140	5570	6000	—	—	MD63B600	
	700	4000	4570	5140	5710	6280	6850	7420	8000	—	—	MD63B700	
	800	3000	3430	3860	4280	4710	5140	5570	6000	MXD63L800	—	—	
	800	4000	4570	5140	5710	6280	6850	7420	8000	MXD63A800	MD62B800	MD63B800	
	800	5000	5715	6430	7145	7860	8575	9290	10000	MXD63H800	—	—	
MXD6	500	3000	3430	3860	4280	4710	5140	5570	6000	—	MXD62B500	MXD63B500	
	600	3000	3430	3860	4280	4710	5140	5570	6000	—	MXD62B600	MXD63B600	
	700	4000	4570	5140	5710	6280	6850	7420	8000	—	MXD62B700	MXD63B700	
	800	3000	3430	3860	4280	4710	5140	5570	6000	MXD63L800	—	—	
	800	4000	4570	5140	5710	6280	6850	7420	8000	MXD63A800	MXD62B800	MXD63B800	
	800	5000	5715	6430	7145	7860	8575	9290	10000	MXD63H800	—	—	
HMD6	500	3000	3430	3860	4280	4710	5140	5570	6000	—	HMD62B500	HMD63B500	
	600	3000	3430	3860	4280	4710	5140	5570	6000	—	HMD62B600	HMD63B600	
	700	4000	4570	5140	5710	6280	6850	7420	8000	—	HMD62B700	HMD63B700	
	800	4000	4570	5140	5710	6280	6850	7420	8000	—	HMD62B800	HMD63B800	
HMXD6	500	3000	3430	3860	4280	4710	5140	5570	6000	—	—	HMXD63B500	
	600	3000	3430	3860	4280	4710	5140	5570	6000	—	—	HMXD63B600	
	700	4000	4570	5140	5710	6280	6850	7420	8000	—	—	HMXD63B700	
	800	4000	4570	5140	5710	6280	6850	7420	8000	—	—	HMXD63B800	
CMD6	400	3000	3430	3860	4280	4710	5140	5570	6000	—	—	CMD63B400	
	500	3000	3430	3860	4280	4710	5140	5570	6000	—	—	CMD63B500	
	600	3000	3430	3860	4280	4710	5140	5570	6000	—	—	CMD63B600	
	700	4000	4570	5140	5710	6280	6850	7420	8000	—	—	CMD63B700	
	800	3000	3430	3860	4280	4710	5140	5570	6000	CMD63L800	—	—	
	800	4000	4570	5140	5710	6280	6850	7420	8000	CMD63A800	—	CMD63B800	
ND6	800	4000	4570	5140	5710	6280	6850	7420	8000	—	ND62B800	ND63B800	
	900	5000	5715	6430	7145	7860	8575	9290	10000	—	ND62B900	ND63B900	
	1000	5000	5715	6430	7145	7860	8575	9290	10000	—	ND62B100	ND63B100	
	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	ND62B120	ND63B120	
	NXD6	900	5000	5715	6430	7145	7860	8575	9290	10000	—	NXD62B900	NXD63B900
		1000	5000	5715	6430	7145	7860	8575	9290	10000	—	NXD62B100	NXD63B100
1200		5000	5715	6430	7145	7860	8575	9290	10000	—	NXD62B120	NXD63B120	
HND6		800	4000	4570	5140	5710	6280	6850	7420	8000	—	HND62B800	HND63B800
		900	5000	5715	6430	7145	7860	8575	9290	10000	—	HND62B900	HND63B900
		1000	5000	5715	6430	7145	7860	8575	9290	10000	—	HND62B100	HND63B100
	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	HND62B120	HND63B120	
HNXD6	900	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HNXD63B900	
	1000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HNXD63B100	
	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HNXD63B120	
CND6	800	4000	4570	5140	5710	6280	6850	7420	8000	—	—	CND63B800	
	900	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CND63B900	
	1000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CND63B100	
	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CND63B120	
PD6	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PD63B120	
	1400	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PD63B140	
	1600	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PD63B160	
PXD6	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PXD63B120	
	1400	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PXD63B140	
	1600	5000	5715	6430	7145	7860	8575	9290	10000	—	—	PXD63B160	
HPD6	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPD63B120	
	1400	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPD63B140	
	1600	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPD63B160	
HPXD6	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPXD63B120	
	1400	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPXD63B140	
	1600	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HPXD63B160	
CPD6	1200	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CPD63B120	
	1400	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CPD63B140	
	1600	5000	5715	6430	7145	7860	8575	9290	10000	—	—	CPD63B160	
RD6	1800	5000	5715	6430	7145	7860	8575	9290	10000	—	—	RD63B180	
	2000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	RD63B200	
RXD6	1800	5000	5715	6430	7145	7860	8575	9290	10000	—	—	RXD63B180	
	2000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	RXD63B200	
HRD6	1800	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HRD63B180	
	2000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HRD63B200	
HRXD6	1800	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HRXD63B180	
	2000	5000	5715	6430	7145	7860	8575	9290	10000	—	—	HRXD63B200	

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# Molded Case Circuit Breakers

## Molded Case Switch — Circuit Disconnect

**Selection**

Maximum Frame Amp Rating	2-Pole		3-Pole		Self-Protective Instantaneous Override $\pm 20\%$ <sup>③</sup>
	Catalog Number	List Price \$	Catalog Number	List Price \$	
100	BQ2S060■ BQ2S100■	76.00 203.00	BQ3S060■ BQ3S100■	351.00 351.00	1000 1000
125	ED22S100A■ ED42S100A■ ED42S125A■ ED62S100A■ — CED62S100A■ CED62S125A■ — —	288.00 605.00 1157.00 698.00 — 2600.00 3924.00 — —	ED23S100A ED43S100A ED43S125A ED63S100A ED63S125A CED63S100A■ CED63S125A■ HES3S100L HES3S125L	488.00 742.00 1495.00 895.00 1707.00 3251.00 4665.00 900.00 1962.00	1000 1000 1000 1000 1000 1000 1000 1250 1250
225	QJ22S225A■	306.00	QJ23S225A	991.00	2000
250	FXD62S250A HFXD62S250A■ ①	1622.00 2823.00 —	FXD63S250A HFXD63S250A■ CFD63S250A■	1966.00 3422.00 6312.00	3200 3200 3200
400	JXD22S400A■ — — ①	2050.00 — — —	JXD23S400A JXD63S400A HJXD63S400A■ CJD63S400A■	2529.00 3452.00 5824.00 7195.00	6000 6000 6000 6000
600	— — ①	— — —	LXD63S600A HLXD63S600A■ CLD63S600A■	4968.00 6644.00 11686.00	8000 8000 8000
800	— — ①	— — —	LMXD63S800A■ MXD63S800A CMD63S800A	5708.00 5708.00 13259.00	10000 10000 10000
1200	— ①	— —	NXD63S120A CND63S120A■	10082.00 18932.00	10000 10000
1600	①	—	PXD63S160A <sup>②</sup>	14902.00	10000
2000	①	—	RXD63S200A■ <sup>②</sup>	16508.00	10000
<b>Non Automatic Molded Case Switch</b>					<b>Withstand<sup>④</sup></b>
2000	①	—	TD63S2000■	21709.00	50kA
2500	①	—	TD63S2500■	24441.00	50kA
3200	①	—	TD63S3200■	26897.00	50kA
4000-5000	See "SB" Type Insulated Case Breakers				

### Ordering Information

Order by catalog number. Switches include frame and self protective (except TD) trip unit only. Order lugs separately from pages 6-81 to 6-83.

■ Built to order. Allow 2-3 weeks for delivery.

① For 2-pole application use outside poles of 3-pole circuit breaker.

② For additional lugs see pages 6-81 to 6-83.

③ Molded case switches up to R frame contain a self protecting instantaneous element, which may open circuit above their override set point.

④ UL file E57556 Volume 1, section 2 and CSA LR 42022-51.

⑤ Requires mounting block MB9301 or MBR9302.

Lugs pages 6-81 to 6-83  
Enclosures Section 5  
Accessories pages 6-86 to 6-91

# Molded Case Circuit Breakers

## Digital Solid State Sentron Sensitrip III Series

Technical

The Sentron Sensitrip III circuit breaker is a true RMS current sensing device. Digital microprocessor circuitry within the electronic trip unit provides more precise control over the circuit breaker functions. This control allows circuit coordination flexibility not available with thermal magnetic circuit breakers.

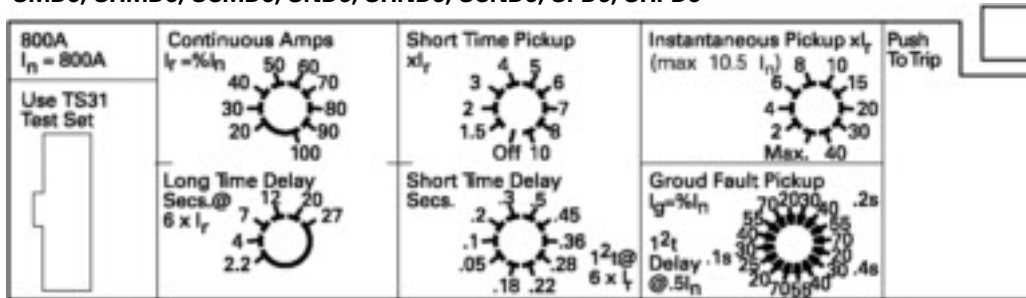
### Functions available in Sentron Sensitrip circuit breakers

Catalog Number (Description + Suffix)	Trip Type	Cont Current Setting	Long Time Delay	Instantaneous Setting	Short Time Pick Up	Short Time Delay	Short Time $I^2t$ Pick Up	Ground Fault Pick Up	Ground Fault Delay
Basic Unit + (A)	LI	✓	✓	✓					
Basic Unit + (A)G	LIG	✓	✓	✓				✓	✓
Basic Unit + (A)NT	LSI	✓	✓	✓	✓	✓	✓		
Basic Unit + (A)NGT	LSIG	✓	✓	✓	✓	✓	✓	✓	✓

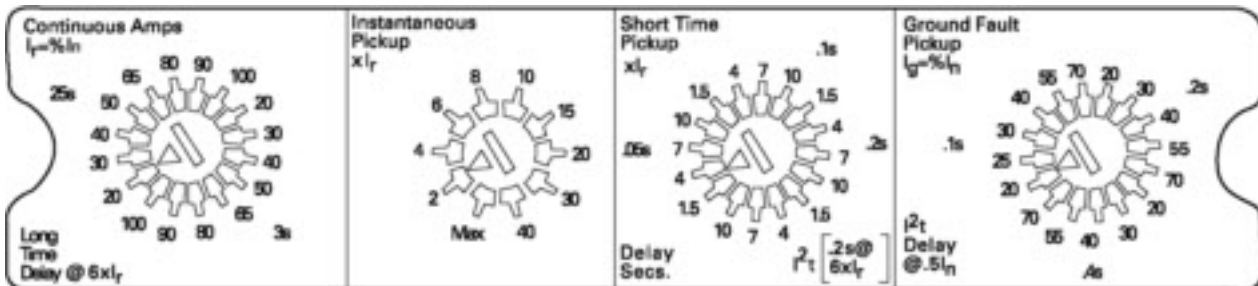
Letter "A" is used for MD and ND Solid State frame types only.

Typical Trip Unit Labeling and Adjustment Positions for the Sentron Sensitrip Circuit Breaker.

### SMD6, SHMD6, SCMD6, SND6, SHND6, SCND6, SPD6, SHPD6



### SJD6, SHJD6, SCJD6, SCD6, SHLD6, SCLD6



$I_n$  = Maximum circuit breaker ampere rating.

$I_r$  = Current Rating — a function of continuous ampere adjustment setting expressed in % of  $I_n$ .

$I_g$  = Ground Fault Pickup — a function of adjustment setting expressed in % of  $I_n$ .

# Molded Case Circuit Breakers

## Digital Solid State Sentron Sensitrip III Series

Technical

**A. Adjustable "Continuous Amps" Rating Switch**  
All Sensitrip III solid state molded case circuit breakers have an adjustable ampere rating switch. Adjustments made to this switch change the continuous current rating of the breaker from 20% to 100% of its maximum trip unit rating depending on the circuit breaker frame.

**B. Adjustable "Long Time Delay" Switch**  
All Sensitrip III circuit breakers have an adjustable long time delay switch to allow for selection of long time delays of fixed time intervals at six times the setting of the adjustable "continuous amps" rating switch.

**C. Adjustable "Instantaneous Pick-Up" Switch**  
Sensitrip III circuit breakers with an adjustable instantaneous trip switch allow selection of a tripping point from related to the adjusted circuit breaker Rating ( $I_n$ ).

**D. Adjustable "Short Time Pick-Up" Switch (Optional)**  
Sensitrip III circuit breakers with an adjustable short time pick-up switch allow for selection of short time pick-up in a range from 1.5 to 10 times the setting of the maximum current rating.

**E. Adjustable "Short Time Delay" Switch (Optional)**  
Sensitrip III circuit breakers with an adjustable short time pick-up switch also contain a switch for adjustment in time delay. The adjustable short time delay switch allows for either of two modes of short time delays. One range of settings enables the breaker to be set for fixed time delays and the other range of settings enables the breaker to be set for short time delays based on  $I^2t$  curves.

**Adjustable "Ground Fault Pick-Up" Switch**  
Sensitrip III circuit breakers containing the optional equipment ground fault protection cover the ground fault pick-up range of 20% to 70% of the circuit breaker frame rating. The ground fault pick-up settings also allow for one of three time delays based on  $I^2t$  curves.  
For 3-phase, 4-wire systems, an external neutral transformer is required with an ampere rating equal to the trip unit ampere rating.

Ground Fault Pick-up  $I_g = \% I_n$

$I^2T$  @  $.5 I_n$

Ground Fault Delay  
400 ms .4  
200 ms .2  
100 ms .1

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MOLDED CASE  
CIRCUIT BREAKERS

$I_n$  = Maximum circuit breaker ampere rating.

$I_r$  = Current Rating — a function of adjustment setting expressed in % of  $I_n$ .

$I_g$  = Ground Fault Pick-up — a function of adjustment setting expressed in % of  $I_n$ .

### Examples of Adjustment Settings

#### Catalog Number SMD69800A

$I_n = 800$	Continuous Current Setting	Long Time Delay Setting	Instantaneous Setting
$I_n = 800$ amperes Results	30 240 amperes $I_r = 30\%$ of 800	12 12 seconds trip at $6 \times 240$ amps = 1440.	8 1920 amperes $8 \times I_r = 8 \times 240$

#### Catalog Number SMD69800ANGT

$I_n$	$I_r$ Setting	Long Time Delay	Short Time Pick-Up Off	Instantaneous Setting	Short Time Pick-Up On	Short Time Delay	$I^2T$ Set	Ground Fault Pick-Up	Ground Fault Delay
800 amperes Results Ⓐ	70 560 Ⓑ	20 20 sec. Ⓒ	— — Ⓓ	$10 I_r$ 5600A Ⓔ	$8 I_r$ 4480A Ⓕ	.5 .5 secs Ⓖ	.28 .28 sec @ 4480A Ⓖ	40 320A Ⓖ	.2 .2 sec Ⓖ

Ⓐ  $I_n = 800$  amperes.

Ⓑ  $I_r = 560$  amperes (70% of 800).

Ⓒ Delay = 20 seconds at 3360 amps ( $6 \times I_r$ ).  
Breaker will trip in 20 seconds with 3360 amperes.

Ⓓ Short Time Pick-Up Off — Instantaneous can be used.

Ⓔ Instantaneous set at  $10 \times I_r = 10 \times 560 = 5600$  amperes.

Ⓕ Short Time Pick-Up On — Set at  $8 \times 8 \times 560 = 4480$  amperes.

Ⓖ Short Time Delay = .5 seconds. (Definite Time)

Note: Ⓒ & Ⓖ are mutually exclusive.

Ⓖ  $I^2t$  switch on .28 seconds @  $6 \times 560 = 3360$  amperes. (Inverse time)

Ⓖ Ground Fault Pick-Up set at 40 = 40% of  $I_n = 320$  amperes. (Definite Time)

Ⓖ Ground Fault Delay set at .2 seconds. Breaker will trip in 200 milliseconds with a 400 ampere ground fault.

# WL Power Circuit Breakers — Insulated Case

## 3-pole, up to 5000A

General

### Breaker Description

The ever-increasing use of plant and energy management systems has intensified the demand for circuit breakers supporting multiple open protocols to monitor and control the flow of energy in the power system. The extensive and modular WL family of circuit breakers and accessories provides this for applications from 200A to 5000A.

### Applications

WL breakers can be applied as main, tie, feeder or distribution breakers in low-voltage electrical power systems.

### Versions

- Frame ratings: 800A to 5000A
- 3 physical frame sizes
- Rated nominal operating voltage up to 600VAC
- Seven interrupting classes from 50kA to 200kA at 480V
- Circuit breaker or non-automatic switch
- WL Circuit Breakers are delivered as complete assembled breakers or individual frames, guide frames, and accessories

### Installation Types

Fixed-mounted or Draw-out version.

### Standards

- WL ANSI / UL 1066 Circuit Breakers will satisfy: C37.13, C37.16, C37.17, C37.50, NEMA SG3
- WL UL 489 Circuit Breakers will satisfy: UL 489
- WL Circuit Breakers are suitable for use in UL 1558 LV Switchgear and UL 891 LV Switchboards

### Conditions of Application

WL Circuit Breakers are designed to meet standard Industrial and Commercial application requirements.

### Uniform Dimensions

WL Circuit Breaker dimensions differ only in the device width, which varies by frame size. With the exception of the 200kA ANSI Frame Size II which has an additional 5" in depth to accommodate integral fuses and the UL489 Frame Size I which measures only 15" in height to allow six-high stacking in switchboards.

### Minimal Space Requirements

The WL design is extremely compact without sacrificing performance and does not use energy-wasting heat sinks.

### Trip Units

The electronic, micro processor-based trip unit is auxiliary voltage-independent for all protective functions and enables adaptation to the different protection requirements of distribution systems, motors, transformers and generators.

### Non-Automatic Switch

A special version of the circuit breaker is used as a non-automatic switch. The non-automatic switch is constructed without a trip unit and has no protective function. A possible application is for use as a tie in systems with parallel feeds.

### Main Bus Connectors

Breakers are equipped with standard vertical main bus connections. Horizontal bus connections are available as an option in Frame Size 1 and 2 up to 2000A.

### Communication Capability

MODBUS or PROFIBUS communications transmit the acquired and metered data, such as current values, breaker status, trip log, etc. to a central monitoring computer. When the optional metering function is installed, the WL acquires data useful for power management and can contribute to a significant savings in energy costs. A new, internal circuit breaker bus enables the expansion of breaker functionality through the integration of many secondary functions which were previously separate, including:

- Control of analog displays
- Options for testing the communication setup
- Display of breaker status and reason for trip
- Input modules for reading other external signals and transmitting these signals via PROFIBUS or MODBUS communication
- A selection of output modules to provide contact closures based on events or measured-value setpoints. It is not only possible to monitor the breaker remotely, it is also possible to open and close the breaker as well as setting parameters remotely

### Operating Mechanisms

Circuit breakers can be optionally delivered with different operating mechanisms, including:

- Manual operating mechanism with mechanical closing (standard)

- Manual operating mechanism with mechanical and electrically interlocked closing
- Motorized operating mechanism with mechanical and electrically interlocked closing. Operating mechanisms with electrically interlocked closing are suitable for synchronizing tasks

### Auxiliary Contacts

Auxiliary switches can be added according to the type of installation. They are easily mounted via front, top mounted terminal blocks.

### Modularity

Common guide frames for the draw-out version make them completely interchangeable between the UL 489 and ANSI / UL 1066 rated circuit breakers. Components, such as auxiliary releases, motorized operating mechanisms, trip units, current sensors, auxiliary signal switches, automatic reset devices or interlocks can be used to modify or retrofit any circuit breaker to meet changing requirements. The main contacts can be replaced to extend the life of the circuit breaker and feature integrated contact wear indicators.

### Electronic Trip Unit Modularity

Modularity is the outstanding feature of the new WL Circuit Breakers. The trip units themselves can be retrofitted with special LCDs, ground fault modules, rating plugs and communication modules. 100% Rated Circuit Breaker WL circuit breakers are designed for continuous operation at 100% of their current rating without the need for external heat sinks.

### Conditions of Application

WL Circuit Breakers are designed to meet standard Industrial and Commercial application requirements.



# WL Power Circuit Breakers — Insulated Case

## Electronic Trip Units

General

### Selection criteria for WL Circuit Breakers

The basic criteria for selecting circuit breakers is:

- Maximum Available Short Circuit at the installation point. This value determines the short circuit current interrupting rating or short circuit current withstand rating of the circuit breaker
- Rated Current In which is to flow through the respective circuit breaker continuously. This value may not be greater than the maximum rated current of the circuit breaker. The rated the rating plug, up to the maximum frame rating
- Ambient Temperature of the circuit breaker. This is usually the temperature inside the cubicle
- Design of the circuit breaker. Protective Functions of the circuit breaker. These are determined by the selection of the appropriate trip unit



### Trip Unit Functions

Basic Protective Functions		ETU725	ETU727
Long-time overcurrent protection	L	●	●
Short-time delayed overcurrent protection	S	●	●
Instantaneous overcurrent protection	I	●	●
Neutral conductor protection	N	—	●
Ground fault protection	G	—	●
<b>Additional Functions</b>			
Selectable neutral protection		—	●
Defeatable short-time protection		●	●
Defeatable instantaneous protection		—	—
Selectable thermal memory		—	—
Zone selective interlocking		—	—
Selectable I2t or fixed short-time delay		— ①	— ①
Adjustable instantaneous pick-up		—	—
Selectable I2t or I4t long-time delay		—	—
Adjustable short-time delay and pick-up		●	●
Selectable and adjustable neutral protection		—	—
Dual protective setting capability		—	—
Dynamic arc-flash sentry		—	—
Extended instantaneous protection		●	●
<b>Parameterization and Displays</b>			
Parameterization by rotary switches (10 steps)		●	●
Parameterization by communication (absolute values)		—	—
Parameterization by menu/keypad (absolute values)		—	—
Remote parameterization of the basic functions		—	—
Remote parameterization of the additional functions		—	—
Alphanumeric LCD		—	—
Graphical LCD		—	—
<b>Metering Function</b>			
Metering function		—	—
Metering function Plus		—	—
<b>Communication</b>			
CubicleBUS		—	—
Communication via PROFIBUS-DP		—	—
Communication via the MODBUS		—	—
Communication via the Ethernet (BDA)		—	—

● Standard — Not available ○ Optional

① Fixed, short-time delay only.

# WL Power Circuit Breakers — Insulated Case

## Electronic Trip Units

General



### Trip Unit Functions

Basic Protective Functions		ETU745	ETU748	ETU755	ETU776
Long-time overcurrent protection	L	●	●	●	●
Short-time delayed overcurrent protection	S	●	●	●	●
Instantaneous overcurrent protection	I	●	●	●	●
Neutral conductor protection	N	●	●	●	●
Ground fault protection	G	○	○	○	○
Additional Functions					
Selectable neutral protection		●	●	●	●
Defeatable short-time protection		●	—	●	●
Defeatable instantaneous protection		●	—	●	●
Selectable thermal memory		●	●	●	●
Zone selective interlocking		●	●	●	●
Selectable I2t or fixed short-time delay		●	●	●	●
Adjustable instantaneous pick-up		●	—	●	●
Selectable I2t or I4t long-time delay		●	●	●	●
Adjustable short-time delay and pick-up		●	●	●	●
Selectable and adjustable neutral protection		●	●	●	●
Dual protective setting capability		—	—	●	●
Dynamic arc-flash sentry		—	—	●	●
Extended instantaneous protection		●	●	●	●
Parameterization and Displays					
Parameterization by rotary switches (10 steps)		●	●	—	—
Parameterization by communication (absolute values)		—	●	●	●
Parameterization by menu/keypad (absolute values)		—	—	—	●
Remote parameterization of the basic functions		—	—	●	●
Remote parameterization of the additional functions		—	—	●	●
Alphanumeric LCD		○	○	—	—
Graphical LCD		—	—	—	●
Metering Function					
Metering function		○	○	○	○
Metering function Plus		○	○	○	○
Communication					
CubicleBUS		●	●	●	●
Communication via PROFIBUS-DP		○	○	○	○
Communication via the MODBUS		○	○	○	○
Communication via the Ethernet (BDA)		○	○	○	○

● Standard    — Not available    ○ Optional

# WL Power Circuit Breakers — Insulated Case

## 3-Pole, up to 5000A

General

### Rating Plug

It is no longer necessary to replace the current transformer to change the rated current of the breaker. Instead, you simply replace the rating plug which is easily accessible on the front of the trip unit. The circuit breaker is set to the new rated current quickly and is already correctly labeled.

### Long Time Overcurrent Protection with Switchable I2t/I4t Characteristics

The long time overcurrent protection in the ETU745, ETU755 and ETU776 trip units can be switched between an I2t and I4t characteristic to improve coordination between upstream circuit breakers and fuses.

### Front Panel

The front panel is designed so that it can be accessed through a cutout in the door, which means that all controls and displays are accessible even when the cubicle door is closed. The front panels of all Frame Size II and Frame Size III circuit breakers are identical, and allow for two different through-door access designs: Trip unit and front panel controls or front panel controls only. The degree of protection of the front panel is IP 20.

### Environmental Protection

The plastics used are halogen-free and recyclable.

### Safety and Reliability

In order to help protect the electrical distribution system and circuit breaker against unauthorized breaker operations,

## Exclusive Features

### Generator/Utility Protection Sets

24/7/365 power availability is critical for some systems. On-site generation capability is growing more and more common in many systems. All of the WL digital electronic trip units allow the system designer to precisely tailor trip settings for the most demanding requirements. However, the 755 and 776 trip units allow one set of trip settings for a fully loaded utility feed and with a simple contact closure, the trip unit toggles to a second trip set tailored to provide optimal generator protection. The wide range of settings allows the WL to provide protection for a minimal generator capacity for only essential loads, through full backup for an entire facility. This dual utility/generator protection capability in a single circuit breaker allows the system designer unparalleled, cost effective, flexibility.

### Dynamic Arc-Flash Sentry

(Patent Pending)

A unique feature of the WL trip unit allows the system designer to achieve lower levels of arc flash energy and delayed tripping for selective trip coordination purposes.

a wide range of locking devices can be installed or retrofit, including:

- Lockable drawout version to protect against unauthorized removal (standard)
- High degree of protection through Plexiglas cover
- Mechanical reclosing lockout after long-time, short-time or instantaneous trip (optional)
- Devices with trip unit ETU745 or higher are equipped with temperature sensors on the BSS and COM15/COM16 (standard)
- Lock provision for locking the breaker in the OPEN position
- Lockable covers for the CLOSE button
- Lockable racking handle prevents moving the breaker
- Lockable charging handle prevents charging the springs

### Standard Version Features

WL Circuit Breakers have the following standard equipment:

- Mechanical CLOSE and mechanical OPEN push buttons
- Manual operating mechanism with mechanical closing
- Contact position indicator
- Front panel ready-to-close indicator

Dynamic Arc-Flash Sentry (DAS) employs the unique dual protective setting capability of the 755 and 776 trip units, coupled with the ability to easily toggle to a lower arc flash parameter set. A normal operation parameter set can be optimized for selective trip coordination, while the second set is optimized for lower arc flash energy levels. The dynamic action comes from the ability to switch from the normal operation set to the arc flash limiting set based on the presence of personnel as they approach the flash protection boundary. A wide variety of switching methods may be used based on the needs of a particular facility. The capabilities range from fully automatic switching using appropriate occupancy sensors to manual switching via a key operation.

### Extended Instantaneous Protection

(Patent Pending)

Extended Instantaneous protection (EIP), another unique feature of the WL trip unit, allows the system designer to achieve full selective trip coordination up to the short-time rating of the frame while also allowing application of the breaker up to the interrupting rating of the frame. The typical power circuit

- Spring charge indicator
- Rear vertical main contacts
- Main contact replacement flag
- Auxiliary plug system with bare wire pressure screw terminals. Delivery includes all auxiliary plugs necessary for both factory installed and future field installed accessories
- Mechanical trip indicator of the overcurrent release system
- Automatic reset after trip
- The front panel cannot be removed if the circuit breaker closed
- Laminated main contact fingers as part of the breaker contact strip on the drawout circuit breaker
- Breaker position display in the operator's panel
- Captive crank handle for racking out the breaker
- Guide frame with guide rails for easy handling of draw-out version
- Breaker cannot be moved in the CLOSED state
- Rated current coding between the guide frame and the breaker
- Suitable for reverse feed applications
- The breaker is always equipped with the required number of secondary disconnect blocks

breaker with an 'LS' trip unit, or when the instantaneous function is switched off on an 'LSI' trip unit, can only be applied up to its short-time rating, commonly 85kA or less. For application on systems with levels of available fault current above the short-time rating, the typical 'LS' power circuit breaker cannot be applied or must employ an instantaneous override. This instantaneous override is set at as much as 20% below the short-time rating and can seriously compromise selective trip coordination with downstream breakers.

The WL, equipped with EIP, overcomes these limitations by providing full withstand capability, and full coordination, with a minus 0% short-time band tolerance up to 85kA on frame Size II and 100kA on Size III. Above fault currents of 20% higher than the full short-time rating, the WL breaker is self-protecting, and the EIP function will trip the breaker instantly to protect the frame and the system from these extremely high currents, as high as 150kA on frame Size III. One added benefit is that arc flash energy is greatly reduced in this high current region due to the instantaneous trip response that EIP provides.



# Molded Case Circuit Breakers

## Electronic and Communications Accessories

Selection

### Electronic & Display Devices

#### Local Display Unit

Breaker Type	Catalog Number	List Price \$
SJD, SLD, SMD, SND, SPD, SB, STD	LDU-100	1343.00

The Local Display Unit (LDU) provides a centralized read-out of all Sensitrip III and SB ICCB breakers. The device provides a panel mountable display for all trip unit data including phase currents and alarms for up to 32 breakers. Also communicates with other ACCESS™ devices.

#### Trip Unit Test Set

Type	Catalog Number	List Price \$
SJD, SLD, SMD, SND, SPD, SB, STD, Portable	TS31	13835.00
Spare TS-31 Test Set Interconnecting Cable	TS31CABLE	188.00

The TS-31 test set is used to test the operation of the fault protection functions of the circuit breaker's trip unit, including long-time, short-time, instantaneous, and ground fault by means of secondary current injections.

#### Sensitrip Ammeter Display Unit

Breaker Type	Catalog Number	List Price \$
SJD, SLD, SMD	SADU	1776.00
SND, SPD	SADURMK18	342.00

The Sensitrip Ammeter Display Unit (SADU) provides real-time metering for all Sentron-Sensitrip III Molded Case Circuit Breakers. The unit plugs directly onto the front of the trip unit and provides displays for individual phase currents flowing through the breaker. Additional features include Average, Demand, Ground and Unbalance Current displays, along with impending Trip Status. Current Metering Logs, and a unique diagnostic Trip Log that records the date, time and type of fault for the previous five breaker trips. The device is UL and CSSA certified.

The optional panel mount accessory (SADURMK18) allows easy device mounting external from the circuit breaker, in panelboard and switchboard spaces or gutters, with the flexibility of interior panel exterior panel, or wall mounting capability.

The 2 x 16 alphanumeric LCD display provides easy viewing of data, such as viewing all three phase currents simultaneously.

#### SADU Plug-in Mounting



#### SB Energy Display



#### SADU Ammeter Display Unit



- Direct plug-in or Panel Mounting\*
  - Trip Unit Powered & Battery back-up
  - 2 x 16 LCD Alphanumeric Display\*
  - Ammeter Display Functions
    - RMS Phase Currents
    - Average Current\*
    - Current Demand\*
    - Ground Current
    - Current Unbalance (%)\*
  - Breaker Status
    - Normal
    - Impending Trip\*
  - Time Stamped Trip Log (last 5)
    - Time & Date\*
    - Trip Cause: LT, ST, GF, SC
  - Max Log (with date & time)
    - Max Phase Current\*
    - Max Average Current\*
    - Max Ground Current\*
    - Max Unbalance Current\*
    - Max Current Demand\*
- \* Unique Features

# Molded Case Circuit Breakers

## Communications Accessories

## Selection



### ACCESS™ Communications<sup>①</sup>

Siemens electronic trip units feature two levels of communication: Zone Selective Interlocking and ACCESS™ System Open-protocol communications. The trip units are fully equipped for direct integration into ACCESS™ or compatible communication systems.

A multiplexor/Translator (MTA) and Expansion Plug area required for the TYPE "TL" and Sensitrip trip units when full Access™ communications is specified. The MTA also has Zone Selective Interlocking capability. Refer to Bulletin IPIM-2211A and Instruction Sheet Pc. No. 411152A00 for additional information.

Siemens WinPM.net power monitoring software delivers a powerful energy management system providing sophisticated monitoring capability to a host computer and other components in the electrical distribution system at an affordable cost. It also provides process control, including peak demand, trend analysis, waveform analysis, and harmonic calculations and displays. These functions help pinpoint energy consumption, power quality issues, and the energy cost of any process. Outages and potential outages can be quickly diagnosed and plans can be generated for expansion and preventative plant maintenance. Refer to Bulletins IPIM-2211A for additional information.

Communications is accomplished via RS-485 twisted pair wire or modem, providing communications to a remote site and allowing access to multiple plants. With integration of an Access™ Siemens Power Interface (SPI), communication with Modbus networks is enabled. This part provides the ability to communicate directly to a PC with WinPM.net or any Modbus master.

The SB-EC Trip Unit's RS-232 communications port provides additional PC communications for available trip unit data displays and trip unit configuration via Siemens SBWin™ software.

### Multiplexor Translator

Breaker Type	Features	Catalog No	List Price \$
SJD, SLD SMD, SND SPD, STD SBA, SBS, SBH	Zone Interlocking Only	MTZ	1946.00
	Full Communications with Zone Interlocking	MTA	4334.00

The Multiplexor Translator MTZ is an interface device required in zone selective interlock schemes. The MTA combines the zone selective interlocking function with interface to ACCESS® Systems.

### Cables & Connectors

#### Ribbon Cables

Breaker Type	Length	Catalog No	List Price \$
SJD, SLD SMD, SND SPD, STD SBA, SBS, SBH	6" 8" 12" 18" 24"	EPC06 EPC08 EPC12■ EPC18 EPC24■	59.00 59.00 79.00 96.00 124.00

#### Telephone Cables

Breaker Type	Length	Catalog No	List Price \$
SB STD	8'	MTC50	79.00
	15'	MTC15	118.00
	25'	MTC25	155.00
	50'	MTC50	155.00
SJD, SLD SMD, SND, SPD, SBA, SBS, SBH	8' 15' 25' 50'	MTC08 MTC15 MTC25 MTC50	79.00 118.00 155.00 155.00

The Expansion Plug EP is a required isolating device to connect the breaker with the Multiplexor Translator. It is connected to the trip unit on the breaker with a "Ribbon Cable", EPC08 e.g., and the Multiplexor Translator with the "Telephone Cable" (an RJ-11 cable) MTC50 e.g.

### Expansion Plug Selection Guide

Breaker Type	Frame Size	Mounting Type	Catalog Number	List Price \$
SB ICCB and STD	1200A, 2000A	Fixed	EPSB4FMDK <sup>①</sup> ■	219.00
		Draw out	EPSB4DMK <sup>①</sup> ■	219.00
SB ICCB and STD	3200A, 5000A	Fixed	EPSB4FMDK <sup>①</sup> ■	219.00
		Drawout	EPSB4DMK <sup>①</sup> ■	219.00
Sensitrip	ALL	ALL	EP	209.00

### Component Selection Guide<sup>②</sup>

Component Type	Trip Units and Application				
	ZSI (only) with Sensitrip MCCB'S	Access and/or ZSI with Sensitrip MCCB's	ZSI (only) with all SB-EC Trip Units ACCESS	ACCESS and/or with SB-TL Trip Units	ACCESS with SB-EC Trip Units
EP	✓	✓			
EPSB			✓	✓	
MTZ <sup>③</sup>	✓		✓	✓	
MTA <sup>③</sup>		✓		✓	
EPC Cable	✓	✓			
MTC Cable <sup>④</sup>	✓	✓			
MTC50 Cable			✓	✓	

■ Built to order. Allow 2-3 weeks for delivery.

▲ Built to order. Allow 6-8 weeks for delivery.

① Factory wired when ACCESS communications or ZSI is ordered for the SB breaker from the factory.

② When ordered with circuit breaker from the factory.

③ One MTA or MTZ per eight trip units when required.

④ Always required when multiple MT's are used. One additional cable per each additional MT.

# Lug information

## Mechanical Lug

Selection

For Use With Type(s)	Circuit Breaker Ampere Rating	Cables Per Lug	Lug Wire Range	Catalog Number	List Price \$
BQ, BOH, BQHF BOE, BQF, BL, BLH, HBL, HBQ Switching Neutrals BG, BLG	<b>Line Side</b>				
	15-40	1 1	#14-#6 AWG Cu #12-#6 AWG Al	TC1Q1 <sup>①②</sup>	2.60
	45-100	1 1	#8-#1 AWG Cu #6-#1/0 AWG Al	TA1Q1 <sup>②</sup>	2.60
	<b>Load Side</b>				
	15-20	1 1	#14-#10 AWG Cu #12-#10 AWG Al	Lugs are integral to Circuit Breaker	
	25-35	1 1	#14-#6 AWG Cu #12-#6 AWG Al		
	40-50	1 1	#8-#6 AWG Cu #8-#4 AWG Al		
	55-70	1 1	#8-#4 AWG Cu #8-#2 AWG Al		
	80-100	1 1	#4-#1/0 AWG Cu #2-#1/0 AWG Al		
	110-125	1 1	#2-#1/0 AWG Cu #1/0-#2/0 AWG Al		
BQD, CQD BQD6, CQD6	<b>Line Side (CQD, CQD6) &amp; Load Side</b>				
	15-40	1	#14-#6 AWG Cu #12-#6 AWG Al	Integral	
	45-100	1	#8-#1 AWG Cu #6-#1/0 AWG Al	Integral	
NGG	15-30	1	#14-#6 AWG Cu #12-#6 AWG Al	TC1Q1	2.60
	15-30	1	#14-#6 AWG Cu	3TC1Q1	7.20 (pkg. of 3)
	35-125	1	#8-#1/0 AWG Cu #8-#2/0 AWG Al	3TC1GG20	13.40 (pkg. of 3)
	15-125	—	NUT KEEPER PLATE	TNKG3 <sup>③</sup>	17.90 (pkg. of 3)
NEG, HEG	15-125	1	#14-3/0 AWG Cu	3TW1EG30	12.80 (pkg. of 3)
	15-125	1	#14-1/0 AWG Cu/Al	3TA1EG10	12.80 (pkg. of 3)
	15-125	1	#6-3/0 AWG Cu/Al	3TA1EG30	12.80 (pkg. of 3)
	15-125	—	Nut Keeper Kit (3-pole)	TNKE3	12.30 (pkg. of 3)
	15-125	—	Nut Keeper Kit (4-pole)	TNKE4	15.60 (pkg. of 4)

**Note:**

(A) Molded case circuit breakers having a rated ampacity of 125 amperes or less are to be connected with 60 or 75°C wire. Circuit breakers having a rated ampacity greater than 125 amperes shall only be cabled with 75°C cable unless otherwise indicated on the circuit breaker label. Exceptions to this rule are outlined in article 110-14 C(1)(2) of the 2005 National Electrical Code.

(B) Connector wire ranges and cavities are established in conjunction with Table 6.1.4.2.1 of UL 489 standards.

① Lug is steel.

② Sold in package of six.

③ One nut keeper plate is required with each lug on the NGG breaker.

# Lug Information

## Aluminum Body Lugs for Copper or Aluminum Wire

**Selection**

For Use With Type(s)	Circuit Breaker Ampere Rating	Cables Per Lug	Lug Wire Range	Catalog Number	List Price \$
QJ2, QJH2 QJ2H, HQJ2H	60–225	1	#6 AWG–300 kcmil (Cu) #4 AWG–300 kcmil (Al)	TA1Q300	13.40 (pkg. of 3)
All 2, 3-pole ED2, ED4, ED6, ED6 ETI, HED4, HHED6	15–25	1	#14–#10 AWG (Cu) #12–#10 AWG (Al)	SA1E025	3.90
	30–100	1	#10–#1/0 (Cu or Al)	LN1E100	3.90
	110–125	1	#3–3/0 (Cu) #1–2/0 (Al)	TA1E6125	12.70
CED6 All 1-pole ED, HED	30–60	1	#10–4 (Cu or Al)	LD1E060 (Load Side)	12.70
	70–100	1	#4–#1/0 (Cu or Al)	LD1E100 (Load Side)	3.90
FXD6-A, FD6-A, HFD6, CFD6 HHFD6	70–250	1	#6 AWG–350 kcmil (Cu) #4 AWG–350 kcmil (Al)	TA1FD350A	22.00
SJD6(A), SHJD6(A) SCJD6	65–200	1–2	#4 AWG–3/0 (Cu or Al)	TA2J630	32.50
JXD2(A), JXD6(A), JD6(A), SJD6(A), HJD6(A), HJXD6(A) HHJXD6, HHJD6, SHJD6(A), CJD6, SCJD6	200–400	1–2	3/0–500 kcmil (Cu) 4/0–500 kcmil (Al)	TA2J6500	31.50
LXD6(A), LD6(A), SLD6(A), HLD6(A), HLXD6(A), HHLXD6, HHL6, SHLD6(A), CLD6, SCLD6	250–600	1–2	3/0–500 kcmil (Cu) 4/0–500 kcmil (Al)	TA2J6500	31.50
LMD6 <sup>Ⓢ</sup> , LMXD6 <sup>Ⓢ</sup> , HLMD6 <sup>Ⓢ</sup> , HLMXD6 <sup>Ⓢ</sup> , MD6, MXD6, SMD6, HMD6, HMXD6, SHMD6, CMD6, SCMD6	500–600	1–2	#1–500 kcmil (Cu or Al)	TA2K500	71.00
		1–3	1/0–500 kcmil (Cu or Al)	TA3K500	98.00
	500–800	1–2	500–750 kcmil (Cu or Al)	TA2N750 <sup>Ⓢ</sup>	101.00
ND6, NXD6, SND6, HND6, HNXD6, SHND6, CND6, SCND6	800–1200	1–4	250–500 kcmil (Cu or Al)	2TA4P8500 <sup>Ⓢ</sup> 3TA4P8500 <sup>Ⓢ</sup>	584.00 843.00
			250–500 kcmil (Cu or Al)	2TA4N8500 <sup>Ⓢ</sup> 3TA4N8500 <sup>Ⓢ</sup>	588.00 853.00
PD6, HPD6, CPD6 PXD6, HPXD6, SPD6, SHPD6	1200–1600	1–5	300–600 kcmil (Cu or Al)	TA5P600	320.00
PD6, PXD6, HPD6, HPXD6, SPD6, SHPD6, RD6, RXD6, HRD6, HRXD6, STD	1200–2000	1–6	300–600 kcmil (Cu or Al)	TA6R600	338.00

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

Ⓢ Use TA2K500 or TA3K500 only.  
Ⓢ Used for 100% rated MD/ND frame breakers.

Ⓢ Contains 2 connectors plus 1 NDTS end barrier.  
Ⓢ Contains 3 connectors plus 1 NDTS end barrier.

# Lug information

## Optional Mechanical Lugs

Selection

For Use With Type	Circuit Breaker Ampere Rating	Cables Per Lug	Lug Material	Lug Wire Range	Qty Per Catalog No	Catalog Number	List Price \$
QJ2, QJH2, QJ2H, HQJ2H	60-225	1	Cu	#6 AWG-250 kcmil (Cu)	3	TC1Q250	32.00 (pkg. of 3)
ED, HED 1, 2 & 3-pole	1, 2 & 3-pole 30-125	1	Cu	#10-#1/0 (Cu)		TC1ED6150	33.50
HFD6, HHFD6, CFD6, F(X)D6-A	70-250	1	Cu	#6 AWG-350 kcmil (Cu)	1	TC1FD350	34.50
J(X)D2(A), J(X)D6(A), HJD6(A), HHJD6, SHJD6(A), L(X)D6(A), HHL6, SCD6, HLD6(A), SHLD6(A), CJD6, CLD6, SCJD6, SCLD6	200-600	1 1-2	Cu	3/0-600 kcmil (Cu) 3/0-500 kcmil (Cu)	1 1	TC1J6600 <sup>Ⓢ</sup> TC2J6500 <sup>Ⓢ</sup>	77.00 76.00
	250-600	1 1	Al	500-750 kcmil (Al) 500-600 kcmil (Cu)	1	TA1L6750	76.00
SMD6, M(X)D6, HM(X)D6, HMD6, CMD6, SCMD6, SND6, N(X)D6, HN(X)D6, SHND6, CND6, SCND6	500-600	1-2	Cu	#1 AWG-500 kcmil (Cu)	1	TC2K500	120.00
	700-800	1-3	Cu	#1 AWG-350 kcmil (Cu)	1	TC3K350	151.00
		1-2	Al	500-750 kcmil (Cu) 500-750 kcmil (Al)	2 3	2TA2N8750 3TA2N8750	365.00 513.00
	800-1200	1-3	Al	500-750 kcmil (Cu) 500-750 kcmil (Al)	2 3	2TA3N8750 3TA3N8750	579.00 832.00
R(X)D6, HR(X)D6	1600-2000	1-5	Cu	300-600 kcmil (Cu)	1	TC5R600	426.00
P(X)D6, HP(X)D6, CPD6, SPD6, SHPD6	1200-1600	1-4	Al	600-750 kcmil (Cu/Al)	1	TA4P750▲	254.00

## Compression Lugs

For Circuit Breaker Types	Ampere Rating	Poles	Lugs Per Kit	Lug Wire Size	Catalog Number	List Price \$
<b>Lugs</b> (contains indicated number of lugs and necessary hardware per kit)						
ED2, ED4, ED6, HED4, HHED6, CED6	15-125	1, 2, 3	1	#2/0 AWG Cu/Al	CCE125	27.00
QJ2, QJH2, QJ2-H	125-225	2, 3	1	350 kcmil Cu/Al	CCQ225	51.00
F(X)D6-A, HF(X)D6, HHF(X)D6, CFD6	125-250	2, 3	1	350 kcmil	CCF250	51.00
JXD2-A, J(X)D6-A, HJ(X)D6-A, HHJ(X)D6-A, CJD6, SJD6-A, SHJD6-A, SCJD6, L(X)D6-A, HL(X)D6-A, CLD6, SLD6-A, SHLD6-A, SCLD6	200-600	2, 3	1	500 kcmil	CCL600	150.00
<b>Kits</b> (contain lugs and hardware for complete line or load end of 2 or 3-pole breaker)						
M(X)D6, HM(X)D6, CMD6, SMD6, SHMD6, SCMD6	500-800	2	6	500 kcmil	CCM800K2	726.00
		3	9		CCM800K3	1056.00
N(X)D6, HN(X)D6, CND6, SND6, SHND6, SCND6	900-1200	2	8		CCN1200K2	951.00
		3	12		CCN1200K3	1393.00

6 MOLDED CASE  
CIRCUIT BREAKERS

## Distribution Lugs\*

For Circuit Breaker Types	Ampere Rating	Poles	Lugs Per kit	Wires Per Lug	Lug Wire Size	Catalog Number	List Price \$
NEG, HEG	15-125	1,2,3	3	3	#14-#2 AWG Cu	3TA3EG02	101.00 (for 3)
NEG, HEG	15-125	1,2,3	3	6	#14-#6 AWG Cu	3TA6EG06	101.00 (for 3)
ED2, ED4, ED6, HED4, HHED6, CED6	15-125	1,2,3	1	6	#14-#4 AWG Cu #6-#4 AWG Al	TA6ED06	33.50
F(X)D6-A, HF(X)D6, HHF(X)D6, CFD6	70-250	2,3	1	6	#14-#4 AWG Cu #6-#4 AWG Al	TA6FD04	41.50
JXD2-A, J(X)D6-A, HJ(X)D6-A, HHJ(X)D6-A, CJD6-A, SJD6, SHJD6-A, SCJD6, L(X)D6-A, HL(X)D6-A, CLD6-A, SLD6-A, SHLD6-A, SCLD6	200-600	2,3	1	6	#14-2/0 AWG Cu #6-2/0 AWG Al	TA6JD20	89.00

\* Special purpose wire connectors, not for general use.

Ⓢ Used for 100% rated JD/LD frame circuit breakers.

▲ Built to order. Allow 6-8 weeks for delivery.

# Molded Case Circuit Breakers

## Modifications

## General/Selection

A variety of internal and external accessories, as well as modifications, are available to adapt Siemens circuit breakers to special installation requirements. UL listed internal accessories for 100 through 2000A circuit breakers are field-addable.

Internal accessories fine tune an electrical distribution system, allowing control of the circuit breakers to meet special application requirements. For example, emergency situations may dictate tripping critically placed circuit breakers quickly. Shunt trips accomplish this conveniently and efficiently. Or, when voltage drops are a concern, undervoltage trips automatically open the circuit breaker at a predetermined voltage level.

A wide range of external operating and mounting accessories is also available. For example, face, shallow, and back mounting plates are ideal for tailoring BQ circuit breakers to OEM applications. A complete line of operating handles and handle-blocking devices meet switchboard, enclosure and safety needs. Plug-in mounting assemblies, which simplify switchboard mounting of circuit breakers and permit breaker removal without disconnecting bus or cable connections, are available.

### UL 489 Supplement SB Naval Use Breakers

Breakers tested to UL 489 Supplement SB are qualified for use on non combat and auxiliary naval vessels.

Siemens' molded case breakers from the ED frame through the 2000 Amp SB frame can be labeled "Naval" in compliance with Supplement SB.

Supplement SB testing comprises two sets of vibration tests. The first is to find mechanical resonances in the product and to subject the breaker to extreme testing at each resonant frequency. The second is a swept frequency test, in which the frequency of excitation is changed in intervals of 1Hz, and held at each frequency for five minutes. The excitation frequencies run from 4 to 33Hz, and the test is conducted in each of the three orthogonal axes of the breaker.

During these tests, the breaker must not trip from the closed position, nor may the contacts touch from the open position. Calibration and insulation resistance are also verified during the test.

For detailed information, refer to UL 489, Supplement SB.

#### 50°C Ambient Calibration — Not UL listed and not available for solid state, 100% rated breakers or 400HZ calibrated breakers.

For BL Type Circuit Breakers	
— Add suffix 'M' to catalog number (Example: B120M) .....	No Charge
For BQ, QJ2, and ED Frame Circuit Breakers	
— Replace 'B' in catalog number with 'M' .....	No Charge (Example: BQ3M060, QJ23M200, ED63M060)
For EG Frame Circuit Breakers	
— Replace 'B' in catalog number with 'C' (Example: NEG3C015) .....	Add 10% to list price
For FD, JD, LD, LMD, MD, ND, PD, and RD Frame Circuit Breakers	
Non-Interchangeable Trip (3-pole only) .....	No Charge
— Replace 'B' in catalog number with 'M' (Example: FXD63M225, JXD63M400)	
Interchangeable Trip (trip unit only, 3-pole only) .....	No Charge
— Replace 'T' in catalog number with 'W' (Example: FD63W200, JD63W400)	

#### 400 HZ Calibration

UL Listed (5KA IR)	
For BQ & BL Type Circuit Breakers (200A max.) .....	Add 25% to list price
— Add suffix 'Y' to catalog number	
Not UL Listed	
For all other Circuit Breakers, see derating tables on page 6-152 and order standard circuit breakers.	

#### Fungus Proofing — In accordance with MIL-T-152.

All BQD, CQD, NGG, ED, FD, JD, LD, LMD, MD, ND, PD, and RD, Frame Circuit Breakers are inherently fungus resistant and do not require special treatment.	
Fungus proofing in accordance with MIL-T-152	
For BL, and BQ Type Circuit Breakers	
— Order must be placed directly with the factory by the sales office ..	Add \$10.00 net per pole
For all other Circuit Breaker Types	
— Order must be placed directly with the factory by the sales office ..	Add \$160.00 net per device

**Certificate of Compliance with Test Report (catalog number CERT OF COMP.)** Add \$210.00 net  
Certificate of compliance testing must be performed on the actual device being shipped.  
The certificate cannot be provided after initial shipment. Order for devices with COC requirement must be placed directly with the factory by the sales office and shipped directly to the end user.

#### Ordering Information

For "NAVAL" label, add **\$75.** net per catalog number per order.  
Order must be placed directly with the factory by Siemens Sales Office.

Types	UL File
BQD/CQD	E10848, Vol 10, Sec 1
NGG	E10848, Vol 10, Sec 2
ED2, ED4, ED6, ILED4, HED6	E10848, Vol 4, Sec 11
CED6	E10848, Vol 4, Sec 13
FD6, FXD6, HFD6, HFXD6	E10848, Vol 4, Sec 17
CFD6	E10848, Vol 4, Sec 18
JXD2, JD6, JXD6, LXD6, LD6, HJD6, HJXD6, HLD6, HLXD6	E10848, Vol 4, Sec 8
HHJD6, HHJXD6, HHLD6, HHLXD6	E10848, Vol 4, Sec 20
CJD6, CLD6	E10848, Vol 4, Sec 14
MD6, MXD6, HMD6, HMXD6, CMD6, ND6, NXD6, HND6, HNXD6, CND6	E10848, Vol 4, Sec 15
PD6, PXD6, HPD6, HPXD6, CPD6, RD6, RXD6, HRD6, HRXD6	E10848, Vol 4, Sec 19
SBA400, SBS400, SBA800, SBS800, SBA1200, SBS1200, SBA1600, SBS1600, SBA2000, SBS2000	E9896, Vol 15, Sec 1

# Molded Case Circuit Breakers

## Internal Accessories

General

### Feature Combinations

The available feature combinations are shown in the chart below. For applications requiring combinations of features not listed in this chart, consult the sales office for availability.

Breakers	Modules Per Breaker	Avail. On Breaker Poles	ST	ST/AUX	ST/ALSW	ST/AUX/ALSW	UVT	UVT/AUX	UVT/ALSW	UVT/ST/ALSW	AUX	AUX/ALSW	ALSW	Elect. Bell Alarm	Ground fault	Grd fault w/Bell
QP, BQ, BL <sup>①</sup>	1	1, 2, 3	1	—	—	—	—	—	—	—	1, 2	—	—	—	—	—
BQD, CQD, NGG	1	2, 3	1	1/1	—	—	—	—	—	—	1, 2	1/1	1	—	—	—
QJ <sup>②</sup>	1	3	1	1/1	—	—	—	—	—	—	2	—	—	—	—	—
All ED	1	1, 2, 3	1	1/1, 1/2	1/1	1/1/1	1	1/1, 1/2	1/1	1/1/1	1, 2	1/1, 2/1	1	—	1	1
All FD	2	2, 3	1	—	—	—	1	1/1	—	—	1, 2	1/1	1	—	—	—
All JD, LD, LMD <sup>②</sup>	2	2, 3	1	1	—	—	1	1/1, 1/2	—	—	1, 2	1/1, 1/2	1, 2	—	—	—
SJD6, SHJD6, SCJD6, SLD6, SHLD6, SCLD6 <sup>③</sup>	1	3	1	1	—	—	1	1/1, 1/2	—	—	1, 2	1/1, 1/2	1, 2	—	—	—
All MD, ND, PD, RD Including Electronic trip <sup>④</sup>	2	2, 3	1	1/1	—	—	1	1/1, 1/2	—	—	1, 2	1/1, 2/1	1, 2	—	—	—
STD <sup>⑤</sup>	6	3	1	—	—	—	1	—	—	—	1 NC / 1 NO, 2 NC / 2 NO, 3 NC / 3 NO, 4 NC / 4 NO, 5 NC / 5 NO, 6 NC / 6 NO	—	1	1	—	—

### Shunt Trip (ST)

One or all critical circuit breakers may be tripped from a distant control point by use of a shunt trip device. A shunt trip operates through an auxiliary switch contact; when the breaker opens, current is not maintained on the shunt trip coil.

### Undervoltage Trip (UVT)

When voltage drops to a value below 35% of the nominal coil rating, the undervoltage trip device automatically opens the breaker. The operation is instantaneous, and the circuit breaker cannot be reclosed until the

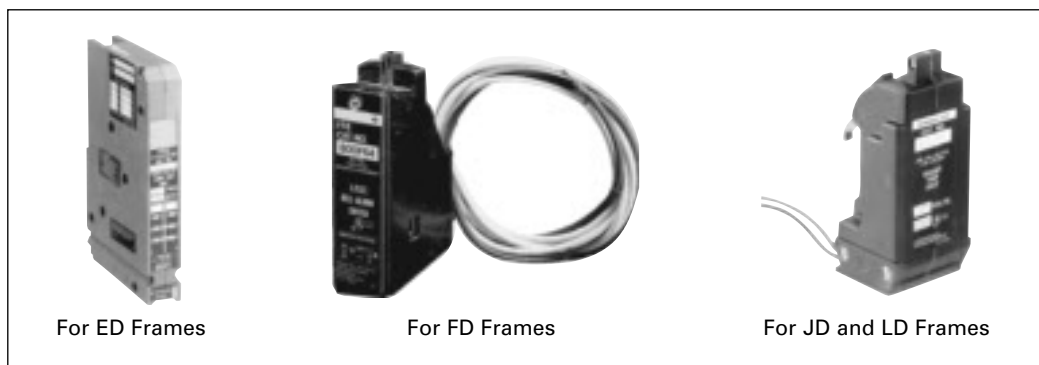
voltage returns to 85% of line voltage. The undervoltage trip, which is continuously energized, must be energized before the circuit breaker can be closed.

### Auxiliary Switch (AUX)

For applications requiring remote "on" or "off" indication (or electrical interlocking), auxiliary switches are available. Each switch comprises an "A" (open when circuit breaker is open) and a "B" (closed when circuit breaker is open) contact with a common connection. (Form C)

### Alarm Switch (ALSW)

The alarm switch contact is closed when the circuit breaker is opened automatically by an overload, short circuit, shunt trip or undervoltage trip. The alarm switch contact is open when the circuit breaker is reset.



For ED Frames

For FD Frames

For JD and LD Frames

① Factory assembled only  
② If mechanical interlock is installed, no accessory module can be installed in the right pocket.

③ If mechanical interlock is installed, no accessory module can be installed.  
④ If mechanical interlock is installed, no accessory module can be installed in the left pocket.

⑤ One module per column.

# Molded Case Circuit Breakers

## External Accessories

*Selection*

### Handle Ties

Provide simultaneous switching of 2 adjacent handles. Do not provide common trip.

For Use With Breaker Frame(s)	Catalog Number	List Price \$ each	Standard Package	Wt Lb/Std Pkg
BQ, BQH, HBQ, BLH, HBL	ECQTH3	200.00 <sup>①</sup>	50	¼

### Padlocking Devices

For locking breaker in "OFF" position.

BQXD, BL, BQ, BQH, HBQ, BLH, HBL	ECQLD3	98.00 <sup>①</sup>	10	¼
One pole BL, BLF, BE, BAF	ECPLD1	10.10	10	¼
Two pole BL, BLF and BE	ECPLD2	10.20	10	¼
All QJ	HL9419	15.10	10	¼
All BQD, CQD	BQDPLD	18.40	1	⅝
NGG	HPLG	17.90	1	¼
EB, 1- thru 3-pole	HPLEB	11.20	1	⅝
EG, 3- and 4-pole only	HPLE	15.60	1	¼
All ED	ED2HPL	16.00	1	¼
All FD	FD6PL1	15.00	1	¼
All JD, LD, LMD	JD6HPL	24.00	1	¼
All MD, ND, PD, RD	MN6PLD	62.00	1	¼
STD	STDPLD■	131.00	1	1

### Filler Plates

BQ, BQH, HBQ	QF3	2.80	1	¼
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### Handle Blocking Devices

For holding breaker in "ON" or "OFF" position. Not a lockout/tagout device.

BL, BLH, HBL, BQXD, BQ, BQH, HBQ	ECQL1	97.00 <sup>①</sup>	10	¼
QJ2, QJH2, QJ2H, HQJ2H	QJHS1	13.40 <sup>①</sup>	25	1
All BQD, CQD, NGG	BQDHBD	10.60	1	¼
EG	HBDE	15.60	1	¼
All ED	E2HBL	16.00	1	¼
All FD	FD6HB1	18.40	1	½
All JD, LD, LMD	JD6HBL	22.00	1	½
All MD, ND, PD, RD	MN6BL	62.00	1	½

### Handle Extensions

For replacement. One extension shipped with breaker.

All MD, ND, PD, RD	EX11	109.00	1	2
STD	EXSTD■	137.00		

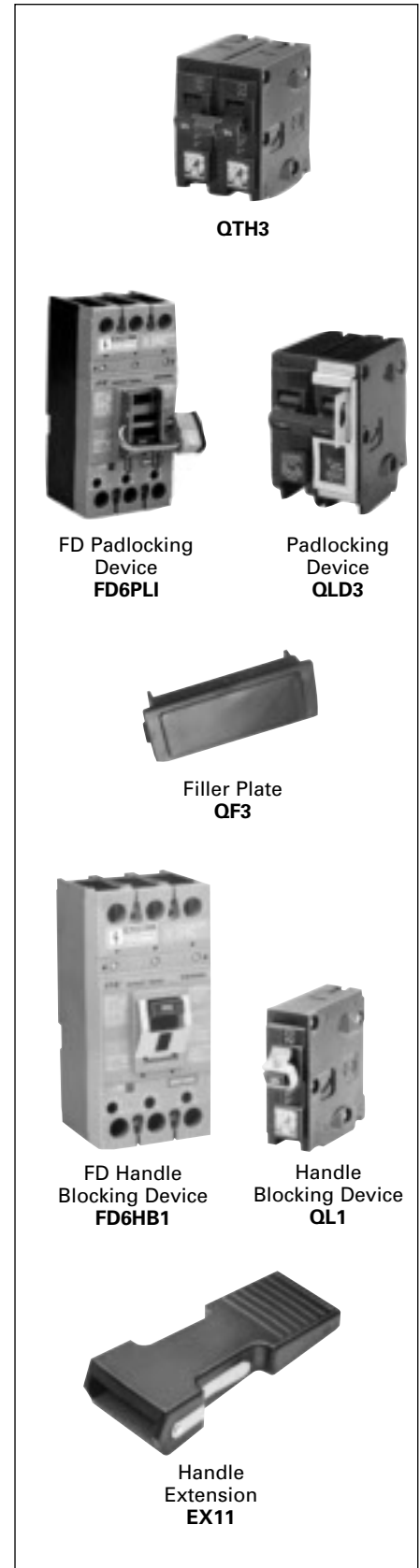
### Terminal Shields

Breaker Type	Poles	Catalog Number	List Price \$ each	Standard Package
NGG	3	TSSG3A	28.00	1

■ Built to order. Allow 2-3 weeks for delivery.

Note: CSO = Consult Sales Office

① Sold only in standard package quantities.





# Molded Case Circuit Breakers

## External Accessories

Selection

### Mounting Clips

For Use With Breaker Frame(s)	Number of Poles	Catalog Number	List Price \$ each	Standard Package	Wt Lb Std Pkg
BQ, BQH	1	MB120	8.50	20 <sup>⑥</sup>	¼

### Face Mounting Plates

GFCI	1	FP9558	14.50	10 <sup>⑥</sup>	½
BQ, BQH, BQXD	1	FP9508	13.40	10 <sup>⑥</sup>	½
	2	FP9555	17.00	10 <sup>⑥</sup>	1
	3	FP9556	18.40	10 <sup>⑥</sup>	1½
CQD, CQD6	1	CQDFMB1	28.00	1	¼
	2	CQDFMB2■	31.50	1	¼
	3	CQDFMB3■	35.00	1	¼
NGG	1	FMPG1	27.00	1	¼
	2	FMPG2	29.50	1	¼
	3	FMPG3	33.50	1	¼

### Shallow Mounting Brackets

BQ, BQH	1-6	SMB6	5.30	30 <sup>⑦</sup>	1½
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### Back Mounting Plates

All QP 1 and 2-pole	1, 2	I0204ML1125	31.50	10	¼
All QP 3-pole	3	I0303ML3100	59.00	10	¼
BQ, BQH, BQXD	2	BR2	17.00	10 <sup>⑥</sup>	¼
	3	BR3	17.00	10 <sup>⑥</sup>	¼
	4	BR4	17.00	10 <sup>⑥</sup>	¼
ED2, ED4, ED6, HED4, HED6	1	E2BMB	14.20	1	¼

### Mounting Screw Kits

CQD, CQD6		CQDSMK <sup>①</sup>	17.70	1	1¼
NGG		MSKG4 <sup>①</sup>	3.90	1	¼
All QJ		MSQJ <sup>①</sup>	4.40	1	1
All ED (CED6 requires 2 kits)		MSE6 <sup>①</sup>	4.40	1	¼
		MSE6100 <sup>②</sup>	1.10	100 <sup>③</sup>	1
All FD (CFD6 requires 2 kits)		MSF6 <sup>①</sup>	4.40	1	¼
		MSF650 <sup>③</sup>	1.10	50 <sup>③</sup>	1
All EG 1-pole		MSKE1	3.90	—	—
All EG 2-pole		MSKE2	5.00	—	—
All EG 3 or 4-pole		MSKE4	6.20	—	—
All JD, LD		MSJ6 <sup>①</sup>	14.20	1	¼
All LMD		MSLMD	24.00	1	¼
All MD, ND,		MSMN	24.00	1	¼
All PD, RD		MSPR6	57.00	1	2

### "MI" Mechanical Interlocks

For Use With Breaker Type(s)	Panel <sup>④</sup> Mounted	Plug-in Mounted	List Price \$ each	Standard Package	Wt Lb Std Pkg
BQ	—	ECQML12	299.00	10 <sup>⑥</sup>	¼
All EG (Sliding Bar)	HSBE	—	553.00	1	—
All EG (Walking Beam)	WBMEFM	—	604.00	1	—
All QJ	CSO	—	—	Complete with two breakers	1
All FD	MI5444	MI5444	604.00	1	—
All JD, LD	MI5413 <sup>⑤</sup>	—	604.00	1	1
All LMD	MI5406 <sup>⑥</sup> ■	—	604.00	1	1
All MD	MI5404 <sup>⑥</sup> ■	—	604.00	1	3
All ND	MI5404 <sup>⑥</sup> ■	—	604.00	1	3
All PD, RD	MI5405 <sup>⑥</sup> ▲	—	694.00	—	—
STD	STDMIF32▲	—	4036.00	—	—

■ Built to order. Allow 2-3 weeks for delivery.

▲ Built to order. Allow 6-8 weeks for delivery.

Note: CSO = Consult Sales Office

① Kit consists of 4 screws and washers.

② Consists of 1 screw and washers (order 100).

③ Consists of 1 screw and washers (order 50).

④ With mechanical interlock in place, no accessory can be installed into circuit breaker right pole.

⑤ Addition of the mechanical interlock will prevent accessory installation in the left pole.

⑥ Sold only in standard package quantities. Multiply List Price Each times package quantity for full price.

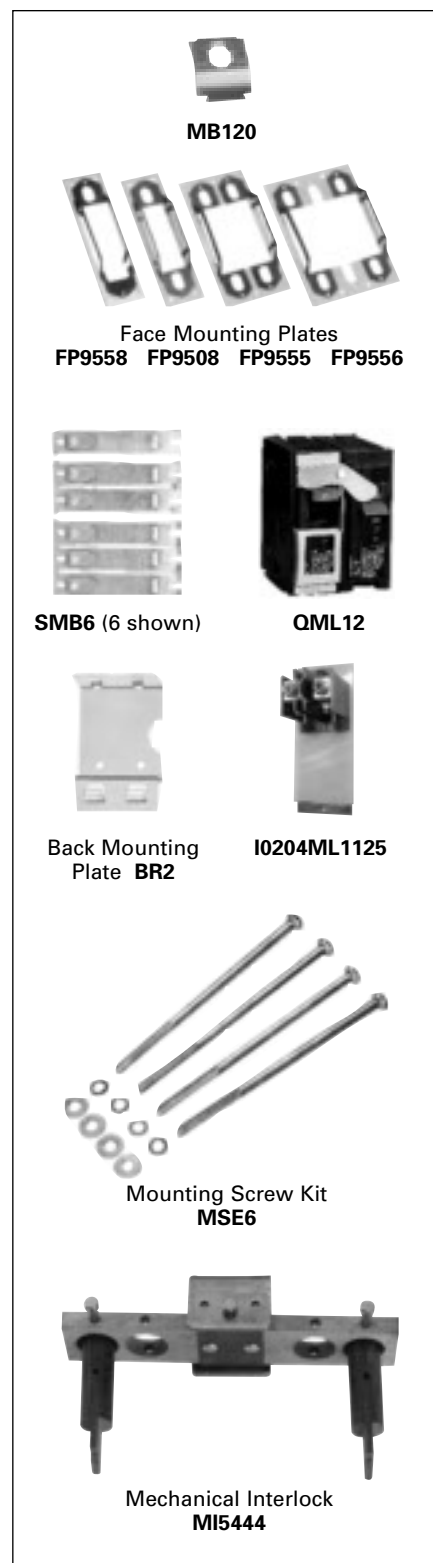
⑦ Each package contains 5 strips of 6 each. Each strip can be broken at perforations for 1, 2 or 3-pole use.

⑧ Mechanical interlock is not designed for use within Siemens panelboards.

## Discount Schedule MCCB

Siemens Power Distribution & Control, SPEEDFAX™ 2007-2008 Product Catalog

6-87



# Molded Case Circuit Breakers

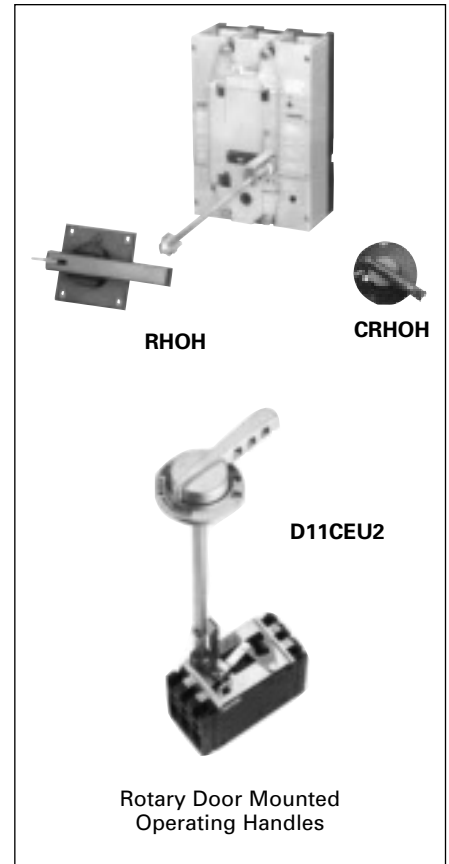
## External Accessories

### Selection

### Rotary Door Mounted Operating Handles

Types 1, 3, 3R, 12, 4 4X

For Use With Breaker Frames	Complete Mechanism			Handle Only		Breaker Operator		Shaft Only			
	Catalog Number		List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Length (inches)	Catalog Number	List Price \$	
	Standard Depth	Variable Depth									
EG	RHVE64X	RHVE124X	225.00	—	—	—	—	—	—	—	
ED <sup>①</sup>	CRHOESD	CRHOEVD	159.00	CRHOH <sup>③</sup>	51.00	RHOEBO	76.00	2	RHOSSD	31.50	
FD	CRHOFSD	CRHOFVD	213.00			RHOFBO	131.00		12	RHOSVD	31.50
JD, LD	CRHOJSD	CRHOJVD	295.00			RHOJBO	212.00			16	RHOSXD
LMD	CRHOLMSD	CRHOLMVD	295.00			RHOLMBO	212.00				
MD, ND PD, RD	RHONSD	RHONVD	452.00			RHOH	116.00	RHONBO <sup>④</sup>	239.00	3	RHONSSD <sup>▲</sup>
								12	RHONSVD	97.00	
								24	RHONSXD	127.00	



### Rotary Door Mounted Operating Handles

Types 1 & 12

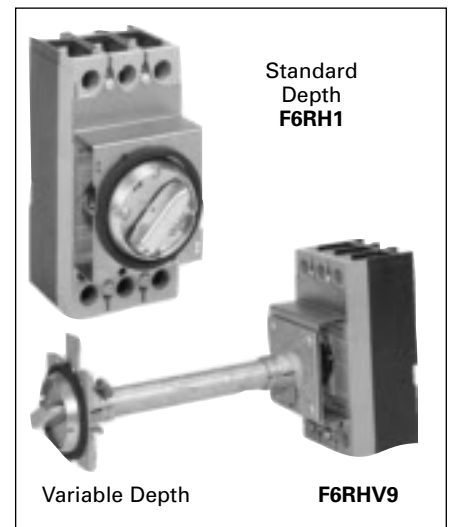
For Use With Breaker Frames	Standard Depth		Variable Depth		Handle and Shaft		Breaker Operator	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
CQD, NGG	—	—	RHOCQVD	145.00	RHOH62	55.00	CQDOP	90.00
ED	D11CEU1	160.00	D11CEU2	183.00	—	—	—	—
FD	D11CFU1 <sup>▲</sup>	198.00	D11CFU2	239.00	—	—	—	—
JD, LD	—	—	D11CJU2	339.00	—	—	—	—

For CQD and NGG red emergency handle, order assembly RHOCQVDE (includes handle and operator).  
 For CQD and NGG in a NEMA 3R enclosure, order CQDOP34 operator (\$90.00), RHOH handle and RHOSVD shaft.  
 For CQD and NGG in a NEMA 4 or 4X enclosure, order CQDOP34 operator, RHOH4 handle and RHOSVD shaft.

### Through Door Mounted Operating Handles<sup>②</sup>

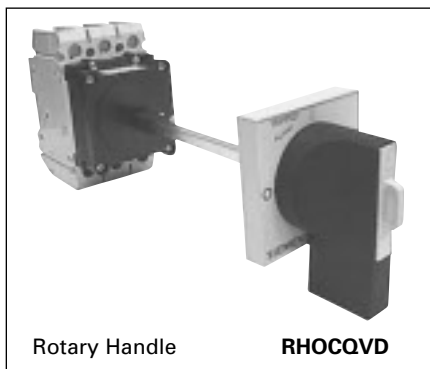
Types 1 & 12

For Use With Breaker Frames	Standard Depth		Variable Depth	
	Catalog Number	List Price \$	Catalog Number	List Price \$
CQD, NGG	FMHOS	90.00	—	—
QJ	OH9498■	139.00	VH9499	218.00
EG	RHFESD	155.00	—	—
EG (red handle)	RHFESDEM	155.00	—	—
ED	E2RH1	155.00	E2RHV9	221.00
FD	F6RH1	155.00	F6RHV9	221.00



### Door Latch Kits

Type	Catalog Number Right Hand	List Price \$	Catalog Number Left Hand	List Price \$
2 point latch	DKR2	338.00	DKL2■	338.00
3 point latch	DKR3	377.00	DKL3■	377.00



- Built to order. Allow 2-3 weeks for delivery.
- ▲ Built to order. Allow 6-8 weeks for delivery.
- ① For use on 3-pole ED frame only.

- ② Meets the requirements of NFPA 79, section 5.3.3.1 for locking external operator disconnecting devices.
- ③ For 3 or 3R, order shaft and breaker operator as shown, and handle RHOH. For 4 & 4X, order handle RHOH4. List Price \$150.00. Consult sales office for additional EG operator shaft lengths.

- ④ For extended shaft support order catalog number RHONSB2.

# Molded Case Circuit Breakers

## External Accessories

Selection

Max-Flex™, Flange Mounted Variable Depth Operators<sup>③</sup>

Frames	NEMA Type	Complete Kit		Handle Only		Breaker Operator		36" Cable	
		Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
EG	1, 3 (R), 12	MFKE3 <sup>②</sup>	528.00	—	—	—	—	—	—
	4 (x)	MFKE4X3	606.00	—	—	—	—	—	—
ED	1, 3 (R), 12	FHOE036 <sup>①</sup>	630.00	FHOH	315.00	FHOEBO <sup>①</sup>	161.00	FHOEC036	153.00
	4 (x)	—	—	FHOH4	432.00	—	—	—	—
FD	1, 3 (R), 12	FHOF036	699.00	FHOH	315.00	FHOFBO	222.00	FHOFC036	161.00
	4 (x)	—	—	FHOH4	432.00	—	—	—	—
JD, LD, SJD, SLD	1, 3 (R), 12	FHOJ036	742.00	FHOH	315.00	FHOJBO	249.00	FHOJC036	177.00
	4 (x)	—	—	FHOH4	432.00	—	—	—	—
LMD	1, 3 (R), 12	FHOLM036	741.00	FHOH	315.00	FHOLMBO	249.00	FHOJC036	177.00
	4 (x)	—	—	FHOH4	432.00	—	—	—	—
MD, ND, PD, RD, SMD, SND, SPD	1, 3 (R), 12	FHON048	958.00	FHOHN	470.00	FHONBO	251.00	FHONC048 <sup>②</sup>	237.00
	4 (x)	—	—	FHOHN4	630.00	—	—	—	—

Max-Flex™ handles are available with solid black handles instead of the customary "red for on" flange handle. These are preferred for use in IEC markets, where red handles have specific meaning. Order components separately, appending the letter "i" to the catalog number (e.g. FHOHI).

### Alternate Length Cable Only

Inches	ED		FD		JD/LD/LMD		MD/ND/PD/RD	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
48	FHOEC048	182.00	FHOFC048	192.00	FHOJC048	209.00	FHONC048	237.00
60	FHOEC060	203.00	FHOFC060	217.00	FHOJC060	239.00	FHONC060	275.00
72	FHOEC072	224.00	FHOFC072	239.00	FHOJC072	275.00	FHONC072	320.00
84	FHOEC084▲	249.00	FHOFC084▲	264.00	FHOJC084▲	277.00	FHONC084▲	337.00
96	FHOEC096	275.00	FHOFC096	287.00	FHOJC096	376.00	FHONC096	401.00
120	FHOEC120▲	376.00	FHOFC120	376.00	FHOJC120▲	408.00	FHONC120▲	437.00
144	FHOEC144▲	417.00	FHOFC144▲	417.00	FHOJC144▲	424.00	FHONC144▲	588.00

### Handle Auxiliary Switch

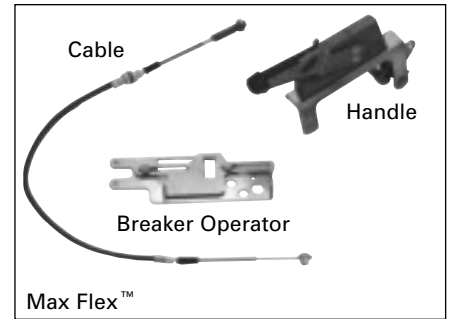
For use with Max-Flex and Rotary Door operators (FHOH and RHOH). 1 NO and 1 NC contact (Form C).

For Use With	Catalog Number	List Price \$
ED, FD, JD, LD, LMD, ND, PD, RD, SD, Max Flex	HAS1	187.00

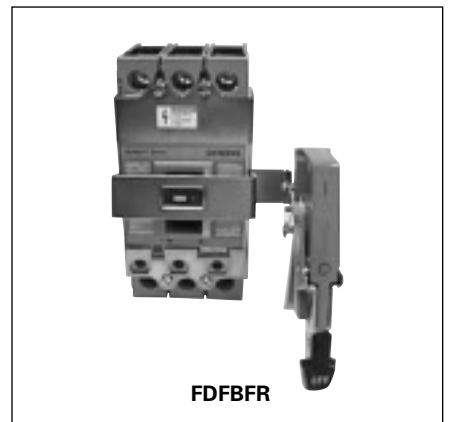
### Fixed Depth Flange Mounting

Frames	Minimum Enclosure Depth	NEMA Type	Left Hand Mount		Right Hand Mount	
			Catalog Number	List Price \$	Catalog Number	List Price \$
ED	6.44	1, 3R, 12	FDFBEL▲	275.00	FDFBER▲	275.00
			FDFBEL4▲	368.00	FDFBER4▲	368.00
FD	6.44	1, 3R, 12	FDFBFL▲	294.00	FDFBFR▲	294.00
			FDFBFL4▲	391.00	FDFBFR4▲	391.00

Max-Flex™ handles are available with solid black handles instead of the customary "Red for On" flange handle. These are preferred for use in IEC markets, where red handles have specific meaning. Order components separately, appending the letter "i" to the catalog number (e.g. FHOHI).



Max Flex™



FDFBFR

▲ Built to order. Allow 6-8 weeks for delivery.

① For 1- or 2-pole breaker order FHOE036 complete kit or FHOEBO breaker operator only. Use MFHM3R handle.

② 48 inch cable is standard length for M through R frame Max-Flex operators.

③ Meets requirements of NFPA 79, section 5.3.3.1 for locking external operator disconnecting devices

④ Consult sales office for additional cable lengths for EG Flex Shaft Operators.

# Molded Case Circuit Breakers

## External Accessories

## Selection/Dimensions

### NEG, HEG Motor Operators

Breaker Frame	Voltage	Catalog Number	List Price \$
EG	120/240AC, 125VDC	SEAER	1510.00

Consult Sales Office for availability.

### Telemand® Motor Operator

Breaker Frame	AC Voltage	Hinged to Open Down	List Price \$
ED except CED	120	MOE6120	3375.00
	240	MOE6240▲	3672.00

ED motor operator opens downward.

Breaker Frame	DC Voltage	Hinged to Open Right	List Price \$	AC Voltage	Hinged to Open Right	List Price \$
FD	24	MOF6024DC▲	3549.00	120	MOF6120	3447.00
	48	MOF6048DC▲	3549.00	240	MOF6240	3875.00
	125	MOF6125DC▲	3686.00			
JD, LD	24	MOJ6024DC▲	4507.00	120	MOJ6120	4460.00
	48	MOJ6048DC▲	4507.00	240	MOJ6240	4460.00
	125	MOJ6125DC▲	4643.00			
LMD	24	MOLMD6024DC▲	4507.00	120	MOLMD6120	4460.00
	48	MOLMD6048DC▲	4507.00	240	MOLMD6240	4460.00
	125	MOLMD6125DC▲	4643.00			
MD, ND, PD, RD	—	—	—	120	MOMN6120	5038.00
	—	—	—	240	MOMN6240	5038.00

To order FD through RD motor operators with Left side hinges, add "L" to catalog number (e.g. MOF6120L). List prices are the same.▲

### Dimensions

Frame	A	B	C	D	E	F
ED	7.04	4.31	—	4.31	13.84	8.84
FD	9.50	4.55	1.60	6.84	9.70	7.58
JD, LD, LMD	11.00	7.50	0.79	8.34	9.85	7.74
MD, ND, PD, RD	16.00	9.00	—	9.83	13.13	10.13

### Operating Currents

Catalog Number	On			Off			Reset (Amps)
	In-Rush (Amps)	Running (Amps)	Time (msec)	In-Rush (Amps)	Running (Amps)	Time (msec)	
MOE6120	10.25	2.3	550	10	2.3	400	2.3
MOE6240	5.2	1.1	500	5	1	330	1.1
MOF6120/L	13.6	5.5	200	13.6	5.5	175	5.5
MOF6240/L	7.6	3.5	200	7.6	3.5	185	3.5
MOLMD6120/L	13.6	6	210	13.6	6	185	6
MOJ6120/L	13.6	6	210	13.6	6	185	6
MOJ6240/L	7.6	3.5	217	7.6	3.5	185	3.5
MOMN6120/L	30.2	13.2	240	30.2	13.2	210	13.2
MOMN6240/L	14.7	6	260	14.7	6	230	6

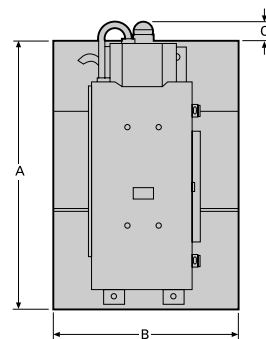
For inches / millimeters conversion, see Application Data section.

▲ Built to order. Allow 6–8 weeks for delivery.

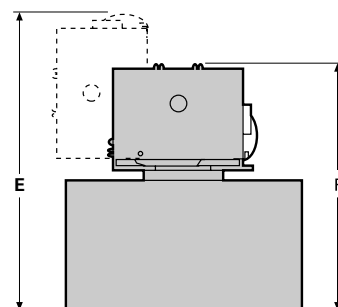


Telemand Motor Operator

### FD, JD, LD, LMD, MD, ND, PD, RD Frames



Front View



Bottom View

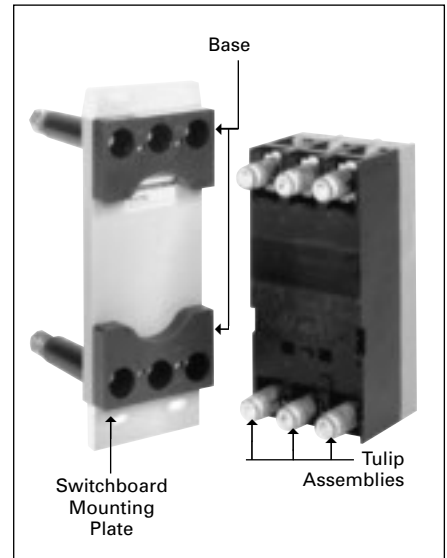
# Molded Case Circuit Breakers

## External Accessories

Selection

Plug-In Mounting Assemblies, Including Base and Tulip Assemblies

For Use With Breaker Frames	Poles	Line Side		Load Side		Steel Switchboard Mounting Plate <sup>®</sup> Catalog Number
		Catalog Number <sup>®</sup>	List Price \$	Catalog Number <sup>®</sup>	List Price \$	
EG	3	PCBERC3 <sup>®</sup>	352.00	—	—	—
	4	PCBERC4 <sup>®</sup>	402.00	—	—	
All ED except CED	2	PC2637▲	109.00	PC2638▲	109.00	PL2616
	3	PC2657	176.00	PC2658	176.00	
CED	2	PC2637▲	109.00	PC2638▲	109.00	PL2617
	3	PC2657	176.00	PC2658	176.00	
All FD except CFD	2	PC4753▲	265.00	PC4753▲	265.00	PL4762
	3	PC4754	345.00	PC4754	345.00	
CFD	2	PC4753▲	265.00	PC4753▲	265.00	PL4763
	3	PC4754	345.00	PC4754	345.00	
All JD except CJD	2	PC5777▲	356.00	PC5777▲	356.00	PL5796
	3	PC5778	589.00	PC5778	589.00	
Kit CJD, SCJD	3	PCCJD	640.00	PCCJD	640.00	PL5797
All LD except CLD	2	PC5660▲	667.00	PC5660▲	667.00	PL5680
	3	PC5661	933.00	PC5661	933.00	
Kit CLD, SCLD	3	PCCLD	984.00	PCCLD	984.00	PL5797
All MD	2	PC5662▲	1227.00	PC5662▲	1227.00	PL9698
	3	PC5663	1499.00	PC5663	1499.00	
All ND	2	PC5664 <sup>®</sup> ▲	1696.00	PC5664 <sup>®</sup> ▲	1696.00	PL9699
	3	PC5666 <sup>®</sup>	1955.00	PC5666 <sup>®</sup>	1955.00	



Tulip Assemblies Separately

For Frame	2-Pole		3-Pole	
	Catalog Number	List Price \$	Catalog Number	List Price \$
ED	TCE2▲	137.00	TCE3▲	206.00
FD	TCF2▲	206.00	TCF3▲	308.00
JD	TCJ2▲	238.00	TCJ3▲	345.00
LD	TCL2▲	274.00	TCL3▲	410.00
MD	TCM2▲	308.00	TCM3▲	457.00
ND	TCN2▲	410.00	TCN3▲	479.00

Rear-Connecting Studs

For Use With Breaker Frames	Ampere Rating	Description	Extension Behind Breaker (inches)	Line Side		Load Side	
				Catalog Number	List Price \$ <sup>®</sup>	Catalog Number	List Price \$ <sup>®</sup>
All EG	125	Short	3.60	RTLESR	43.00	RTLESR	43.00
		Long	6.00	RTLELR	51.00	RTLELR	51.00
All ED	100	Line Side (Short)	2.38	RS2643 <sup>®</sup> ▲	45.00	—	—
		Load Side (Short)	2.38	—	—	RS2644 <sup>®</sup> ▲	45.00
		Line Side (Long)	4.88	RS2641 <sup>®</sup> ▲	54.00	—	—
		Load Side (Long)	4.88	—	—	RS2642 <sup>®</sup> ▲	54.00
All FD	250	Short	3.12	RS4756 <sup>®</sup> ▲	65.00	RS4756 <sup>®</sup> ▲	65.00
		Long	7.06	RS4755 <sup>®</sup> ▲	102.00	RS4755 <sup>®</sup> ▲	102.00
All JD	400	Short	5.85	RS5774▲	180.00	RS5774▲	180.00
		Long	11.20	RS5773▲	180.00	RS5773▲	180.00
All LD	600	Short	5.85	RS5784▲	214.00	RS5784▲	214.00
		Long	11.20	RS5783▲	203.00	RS5783▲	203.00
CJD, SCJD CLD, SCLD	Add required shield kit.					CLRSJL3	51.00
LM(X)D6, HLM(X)D6	800	Short	5.85	RS5788▲	332.00	RS5788▲	332.00
		Long	11.20	RS5787▲	313.00	RS5787▲	313.00
All MD, ND	1200	Short	5.50	RS5786▲	258.00	RS5786▲	258.00
		Long	8.00	RS5785▲	326.00	RS5785▲	326.00

▲ Built to order. Allow 6-8 weeks for delivery.

®Furnished at no extra charge when ordered with plug-in mounting assembly.

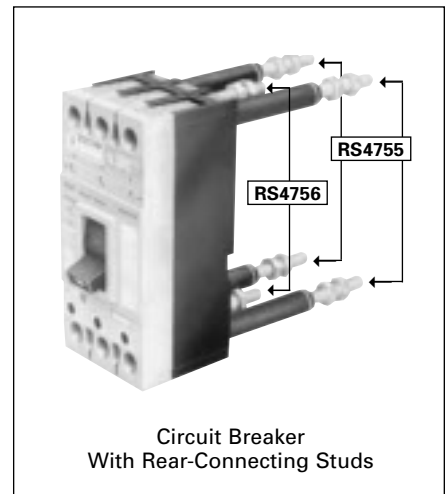
®Each piece catalog number consists of (1) mounting block assembly and required tulip assemblies (2) for 2-pole, (3) for 3-pole

®For vertical bus mounting — for horizontal, substitute PC5665 for PC5664 and PC5667 for PC5666.

®Price includes one current stud, insulating tube, stud nuts and terminal shields, when required.

®For proper electrical clearance, studs must alternate between short and long stud lengths on circuit breaker poles (e.g. SLSLSL or LSLLSL).

®Plug-in assembly for EG breakers include line and load side in one assembly.







6  
MOLDED CASE  
CIRCUIT BREAKERS

# Siemens VL Circuit Breakers

## Technical Overview

Technical

Frame Summary and Ratings Table

Frame Family	DG	FG	JG	
				
<b>Continuous Ampere Range</b>	30 to 150A	40 to 250A	70 to 400A	
<b>Number of Poles</b>	2,3   4	2,3   4	2,3   4	
<b>Maximum Voltage Rating</b>	600V	600V	600V	
<b>Type of Protection</b>				
Thermal-Magnetic	◆	◆	◆	
Electronic	◆	◆	◆	
Electronic with LCD	◆	◆	◆	
Motor Circuit Protector	◆	◆	◆	
Molded Case Switch	◆	◆	◆	
100% Rated Breaker	—	—	◆	
50°C Calibrated Breaker <sup>2</sup>	◆	◆	◆	
Interchangeable Trip Unit	◆	◆	◆	
 W In.(mm) H D D2	4.1 (105) 2, 3-pole / 5.5 (139) 4-pole 7.3 (175) 3.4 (81) 4.2 (107)		5.5 (139)   7.2 (183) 11 (279) 4.2 (102) 5.4 (138)	
<b>Type N – Normal</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	65	65	65
	480Vac	35	35	35
	600Vac	18	18	25
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	65/65	65/65	65/65
	415Vac	40/40	40/40	45/45
	690Vac	12/6	12/6	12/6
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	30	30
	500Vdc - 3p <sup>3</sup>	18	18	25
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—
<b>Type H – High</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	100	100	100
	480Vac	65	65	65
	600Vac	20	20	25
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	100/75	100/75	100/75
	415Vac	70/70	70/70	70/70
	690Vac	12/6	12/6	15/8
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	30	30
	500Vdc - 3p <sup>3</sup>	18	18	35
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—
<b>Type L – Very High</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	200	200	200
	480Vac	100	100	100
	600Vac	25	25	25
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	200/150	200/150	200/150
	415Vac	100/75	100/75	100/75
	690Vac	12/6	12/6	15/8
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	30	30
	500Vdc - 3p <sup>3</sup>	18	30	35
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—

① UL does not recognize AIC ratings for Molded Case Switches or Motor Circuit Protectors.  
② Not UL.

③ 500Vdc nominal, 600Vdc max. for ungrounded DC UPS systems.






④ DC Interruption Ratings do not apply to electronic trip circuit breakers.

# Siemens VL Circuit Breakers

## Technical Overview

Technical

### Frame Summary and Ratings Table — Continued

Frame Family	LG	MG	NG	PG
				
<b>Continuous Ampere Range</b>	150 to 600A	200 to 800A	300 to 1200A	400 to 1600A
<b>Number of Poles</b>	2, 3	2,3   4	2,3   4	3   4
<b>Maximum Voltage Rating</b>	600V	600V	600V	600V
<b>Type of Protection</b>				
Thermal-Magnetic	◆	◆	◆	◆
Electronic	◆	◆	◆	◆
Electronic with LCD	◆	◆	◆	◆
Motor Circuit Protector	◆	◆	◆	—
Molded Case Switch	◆	◆	◆	◆
100% Rated	—	◆	◆	◆
50°C Calibrated Breaker <sup>2</sup>	◆	◆	◆	◆
Interchangeable Trip Unit	◆	◆	◆	◆
 W In.(mm)	5.5 (139)	7.5 (190)   10 (253)	9 (229) 2, 3-pole / 12 (305) 4-pole	
H	11 (279)	16 (406)	16 (406)	
D	4.2 (102)	4.7 (114)	6.2 (157)	
D2	5.4 (138)	5.9 (151)	8.1 (207)	
<b>Type N – Normal</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	65	65	65
	480Vac	35	35	35
	600Vac	25	25	25
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	65/65	65/65	65/65
	415Vac	45/45	50/50	50/25
	690Vac	12/6	20/10	20/10
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	22	22
	500Vdc - 3p <sup>3</sup>	25	35	35
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—
<b>Type H – High</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	100	100	100
	480Vac	65	65	65
	600Vac	25	35	35
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	100/75	100/75	100/75
	415Vac	70/70	70/70	70/35
	690Vac	15/8	30/15	30/15
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	25	25
	500Vdc - 3p <sup>3</sup>	35	50	50
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—
<b>Type L – Very High</b> Interrupting Rating <sup>1</sup> , RMS Symmetrical Amperes (kA)				
<b>UL</b>	240Vac	200	200	200
	480Vac	100	100	100
	600Vac	25	50	65
<b>IEC</b> (I <sub>cu</sub> /I <sub>cs</sub> )	240Vac	200/150	200/150	200/150
	415Vac	100/75	100/75	100/75
	690Vac	15/8	35/17	35/17
<b>DC Voltages – Interrupting Rating (kA)<sup>4</sup></b>				
	250Vdc - 2p	30	42	42
	500Vdc - 3p <sup>3</sup>	35	65	65
	600Vdc - 3p	—	—	—
	750Vdc - 4p <sup>2</sup>	—	—	—

① UL does not recognize AIC ratings for Molded Case Switches or Motor Circuit Protectors.  
② Not UL.

③ 500Vdc nominal, 600Vdc max. for ungrounded DC UPS systems.

④ DC Interruption Ratings do not apply to electronic trip circuit breakers.

# VL Circuit Breakers

## Trip Unit Overview

## Selection

The interchangeability of the VL circuit breaker trip units allow for easy conversion from any of 3 types of protection. They are thermal-magnetic, electronic, or electronic with a built-in LCD display. The thermal-magnetic trip unit features an adjustable magnetic trip setting. The electronic trip units are microprocessor based true RMS sensing devices and are available with a variety of adjustable trip settings, configurations, and infor-

mation menus. With precise control over the circuit breaker functions and access to system status, diagnostics, and information, these trip units allow for unsurpassed flexibility in circuit coordination.

An example of coordination is the out of the box Ground Fault function on the Model 545 trip units. The pick-up and time delay settings are fixed for each

frame and do not overlap with the settings on the other frames. Therefore, when VL breakers are used together in a system the GF protection is automatically coordinated. The user also has the ability to program a custom coordination scheme with the high level of adjustability available on the Model 576 trip units.

Trip Unit Functions	VL Trip Units						
	Model 525	Model 545				Model 576	
	Thermal-Magnetic	Electronic LI	Electronic LIG	Electronic LSI	Electronic LSIg	Electronic with LCD LSI	Electronic with LCD LSIg
Continuous Current Setting ( $I_r$ )	Fixed	◆	◆	◆	◆	◆	◆
Long Time Delay ( $t_r$ )	□	◆	◆	Fixed	Fixed	◆	◆
Instantaneous Overcurrent Setting ( $I_i$ )	◆	◆	◆	Fixed	Fixed	◆	◆
Short Time Pick-up ( $I_{sd}$ )	□	□	□	◆	◆	(ON/OFF)	(ON/OFF)
Short Time Delay ( $t_{sd}$ )	□	□	□	◆	◆	◆	◆
Short Time $I^2t$ Pick-up	□	□	□	◆	◆	◆	◆
Ground Fault Pick-up ( $I_g$ )	□	□	Fixed	□	Fixed	□	◆
Ground Fault Delay ( $t_g$ )	□	□	Fixed	□	Fixed	□	◆
Alarm & Status LEDs	□	●	●	●	●	□	□
Built-in Display (LCD)	□	□	□	□	□	●	●
Pre-Trip Alarm <sup>①</sup>	□	□	□	□	□	●	●
Last trip information <sup>①</sup>	□	□	□	□	□	●	●
Zone Selective <sup>①</sup>	□	□	□	□	□	●	●
Communications <sup>①</sup>	□	□	□	□	□	●	●

◆ – Adjustable setting.

● – This feature is included.

“fixed” – Non-Adjustable setting.

□ – Feature is not included.

① – Requires the trip unit to be connected to a PC (via a COMPRO or COMMOD communications module) for access or programming.

### Continuous Amps Rating ( $I_r$ )

This setting is the continuous current that the breaker will carry without tripping. It can be set up to 100% of the trip unit's nominal rating ( $I_n$ ).

### Long Time Delay ( $t_r$ )

Sometimes referred to as the “overload” position, this function controls the breaker's “pause-in-tripping” time. It allows low level, temporary inrush currents such as those encountered when starting a motor to pass without tripping. The time delay begins when the current reaches  $6 \times I_r$ .

### Instantaneous Pick-up ( $I_i$ )

This function sets the breaker to trip instantaneously during high fault conditions. On Model 545 trip units this set-

ting is fixed on LSI and LSIg trip units and adjustable on LI and LIG trip units. These features are fully adjustable on Model 576 trip units.

### Short Time Pick-Up ( $I_{sd}$ )

This function controls the level of fault current the breaker will carry for a short time without tripping, thus allowing downstream devices to clear short circuits ahead of up-stream protection. It may be defeated (turned-off) on Model 576 trip units.

### Short Time Delay ( $t_{sd}$ )

This controls the interval of time the breaker will remain closed against a fault (at the Short Time Pick-up current level) without tripping. The time delay may be set at fixed points or at short time intervals based on  $I^2t$  curves. This function is

used with the Short Time Pick-up to achieve selectivity and better system coordination.

### Ground Fault Pick-Up ( $I_g$ )

This setting controls the level of ground fault current that will cause the breaker to trip. Model 545 Electronic Trip Units act on the residual current to sense ground current. The Model 576 Electronic Trip Unit is programmable and allows the user to select either the residual current method or direct detection (via a separate current transformer) to detect ground current.

### Ground Fault Time Delay ( $t_g$ )

This controls the interval of time the breaker will remain closed after a ground fault is detected (at the Ground Fault Pick-up current level) without tripping.





# VL Circuit Breakers

## DG 150A Frame, VL Series

Selection

### Ordering Information

#### Complete Assembled Breaker

Prices for a complete factory assembled DG breaker include the frame, trip unit, and standard line and load connectors, all factory installed and shipped as a complete breaker. Assembled breakers are only available with standard connectors.

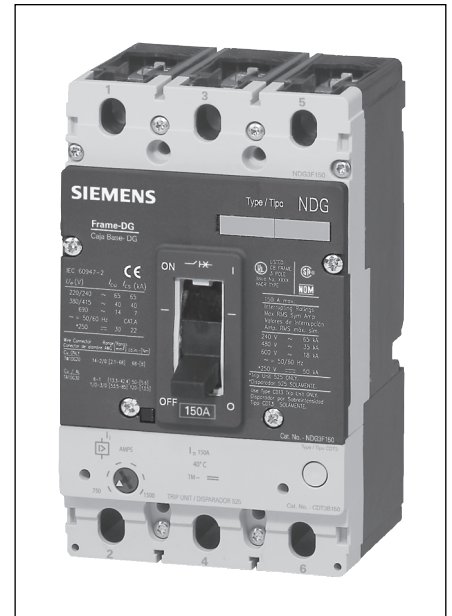
For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only. For non-interchangeable trip breakers, change the third digit of the catalog number to "X" for standard breakers.

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.



### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)		Volts DC			Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
NDG	65	35	18	30	18	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>
HDG	100	65	20	30	18	100	75	70	70	12	6
LDG	200	100	25	30	18	200	150	100	75	12	6

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number	List Price \$
Steel	30-150	#8-1/0 Cu	1	3TW1DG20 <sup>②</sup>	22.00
Aluminum <sup>①</sup>	30-150	#6-3/0 Al/Cu	1	3TA1DG30 <sup>②</sup>	22.00
Copper <sup>②</sup>	30-150	#6-3/0 Cu	1	3TC1DG30 <sup>②</sup>	101.00
<b>Distribution Lugs</b>					
	30-150	#14-#2 Cu (3pcs. Max)	3	3TA3DG02 <sup>②</sup>	110.00
	30-150	#14-#4 Cu	6	3TA6DG04 <sup>②</sup>	110.00
<b>Compression Lugs</b>					
	30-150	#14-2/0 kcmil Al/Cu	-	2CLD20 <sup>③</sup>	54.00
	30-150	#14-2/0 kcmil Al/Cu	-	3CLD20 <sup>④</sup>	81.00

- ① Standard connector supplied with complete breakers.
- ② Kit consists of 3 terminal connectors.
- ③ 2 Lugs for 2-pole breakers.
- ④ 3 Lugs for 3-pole breakers.

### DG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>t</sub> )	
	Min.	Max.
50	450	700
60	450	700
70	450	700
80	450	800
90	500	1000
100	500	1000
110	550	1100
125	625	1250
150	800	1600

Note: Each breaker has 6 trip settings in this range.

A - Consult with Siemens for availability.

### Dimensions, inches (mm)

Number of Poles	Width	Length	Depth	To Handle D1
2, 3	4.1 (105)	6.9 (175)	3.4 (81)	4.2(107)
4	5.5 (139)			

### Approx. Shipping Weight, lbs. (kg)

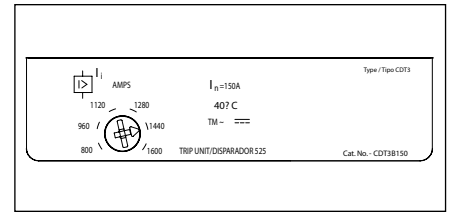
Poles	Frame	Trip Unit		Complete Breaker
		Thermal-Mag.	Electronic	
2, 3	3.7 (1.7)	2.2 (1.0)	2.6 (1.2)	5.9 (2.7)
4	4.9 (2.2)	2.6 (1.2)	3.3 (1.5)	7.5 (3.4)

External Accessories pages 6-125 through 6-139

# VL Case Circuit Breakers

## DG 150A Thermal-Magnetic Trip Unit

Selection



Model 525 Trip Unit

### DG 150A Frame 2-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY								TRIP UNIT ONLY	
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								TRIP UNIT ONLY	
	NDG2F150	618.00	HDG2F150	1533.00	LDG2F150	2664.00				
50	NDG2B050L	1002.00	HDG2B050L	1917.00	LDG2B050L	3048.00	CDT2B050	355.00		
60	NDG2B060L	1002.00	HDG2B060L	1917.00	LDG2B060L	3048.00	CDT2B060	355.00		
70	NDG2B070L	1074.00	HDG2B070L	1989.00	LDG2B070L	3120.00	CDT2B070	427.00		
80	NDG2B080L	1074.00	HDG2B080L	1989.00	LDG2B080L	3120.00	CDT2B080	427.00		
90	NDG2B090L	1074.00	HDG2B090L	1989.00	LDG2B090L	3120.00	CDT2B090	427.00		
100	NDG2B100L	1074.00	HDG2B100L	1989.00	LDG2B100L	3120.00	CDT2B100	427.00		
110	NDG2B110L	2234.00	HDG2B110L	3149.00	LDG2B110L	4280.00	CDT2B110	1587.00		
125	NDG2B125L	2234.00	HDG2B125L	3149.00	LDG2B125L	4280.00	CDT2B125	1587.00		
150	NDG2B150L	2234.00	HDG2B150L	3149.00	LDG2B150L	4280.00	CDT2B150	1587.00		

### DG 150A Frame 3-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY								TRIP UNIT ONLY	
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								TRIP UNIT ONLY	
	NDG3F150	768.00	HDG3F150	1796.00	LDG3F150	2948.00				
50	NDG3B050L	1227.00	HDG3B050L	2255.00	LDG3B050L	3407.00	CDT3B050	416.00		
60	NDG3B060L	1227.00	HDG3B060L	2255.00	LDG3B060L	3407.00	CDT3B060	416.00		
70	NDG3B070L	1344.00	HDG3B070L	2372.00	LDG3B070L	3524.00	CDT3B070	533.00		
80	NDG3B080L	1344.00	HDG3B080L	2372.00	LDG3B080L	3524.00	CDT3B080	533.00		
90	NDG3B090L	1344.00	HDG3B090L	2372.00	LDG3B090L	3524.00	CDT3B090	533.00		
100	NDG3B100L	1344.00	HDG3B100L	2372.00	LDG3B100L	3524.00	CDT3B100	533.00		
110	NDG3B110L	2793.00	HDG3B110L	3821.00	LDG3B110L	4973.00	CDT3B110	1982.00		
125	NDG3B125L	2793.00	HDG3B125L	3821.00	LDG3B125L	4973.00	CDT3B125	1982.00		
150	NDG3B150L	2793.00	HDG3B150L	3821.00	LDG3B150L	4973.00	CDT3B150	1982.00		

6 MOLDED CASE CIRCUIT BREAKERS

### DG 150A Frame 4-Pole with Thermal-Magnetic Trip Unit<sup>A</sup>

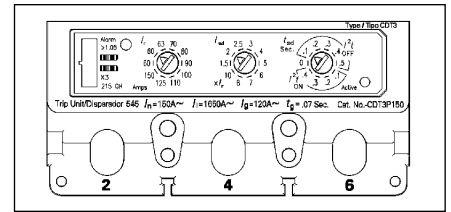
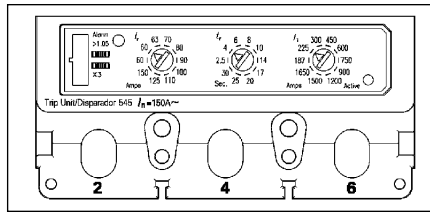
Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY								TRIP UNIT ONLY	
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								TRIP UNIT ONLY	
	NDG4F150	998.00	HDG4F150	2335.00	LDG4F150	3833.00				
50	NDG4B050L	1597.00	HDG4B050L	2934.00	LDG4B050L	4432.00	CDT4B050	541.00		
60	NDG4B060L	1597.00	HDG4B060L	2934.00	LDG4B060L	4432.00	CDT4B060	541.00		
70	NDG4B070L	1750.00	HDG4B070L	3087.00	LDG4B070L	4585.00	CDT4B070	694.00		
80	NDG4B080L	1750.00	HDG4B080L	3087.00	LDG4B080L	4585.00	CDT4B080	694.00		
90	NDG4B090L	1750.00	HDG4B090L	3087.00	LDG4B090L	4585.00	CDT4B090	694.00		
100	NDG4B100L	1750.00	HDG4B100L	3087.00	LDG4B100L	4585.00	CDT4B100	694.00		
110	NDG4B110L	3634.00	HDG4B110L	4971.00	LDG4B110L	6469.00	CDT4B110	2578.00		
125	NDG4B125L	3634.00	HDG4B125L	4971.00	LDG4B125L	6469.00	CDT4B125	2578.00		
150	NDG4B150L	3634.00	HDG4B150L	4971.00	LDG4B150L	6469.00	CDT4B150	2578.00		

A - Consult with Siemens for availability.

# VL Circuit Breakers

## DG 150A Electronic 3-Knob & LCD Trip Units

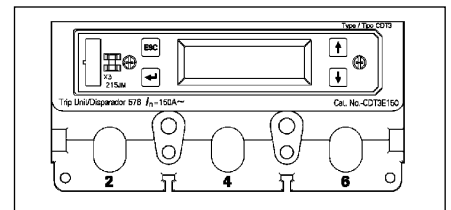
Selection



Model 545 Trip Units

### DG 150A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	<b>FRAME ONLY</b>							
<b>COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER</b>								
<b>ELECTRONIC LI TRIP</b>								
	NDG3F150	768.00	HDG3F150	1796.00	LDG3F150	2948.00		
60	NDG3N060L	1591.00	HDG3N060L	2619.00	LDG3N060L	3771.00	CDT3N060	780.00
100	NDG3N100L	1709.00	HDG3N100L	2737.00	LDG3N100L	3889.00	CDT3N100	898.00
150	NDG3N150L	3157.00	HDG3N150L	4185.00	LDG3N150L	5337.00	CDT3N150	2346.00
<b>ELECTRONIC LSI TRIP</b>								
60	NDG3P060L	1925.00	HDG3P060L	2953.00	LDG3P060L	4105.00	CDT3P060	1114.00
100	NDG3P100L	2043.00	HDG3P100L	3071.00	LDG3P100L	4223.00	CDT3P100	1232.00
150	NDG3P150L	3492.00	HDG3P150L	4520.00	LDG3P150L	5672.00	CDT3P150	2681.00
<b>ELECTRONIC LSIG TRIP</b>								
60	NDG3U060L	3806.00	HDG3U060L	4834.00	LDG3U060L	5986.00	CDT3U060	2995.00
100	NDG3U100L	3923.00	HDG3U100L	4951.00	LDG3U100L	6103.00	CDT3U100	3112.00
150	NDG3U150L	5372.00	HDG3U150L	6400.00	LDG3U150L	7552.00	CDT3U150	4561.00
<b>ELECTRONIC LIG TRIP</b>								
60	NDG3X060L	3472.00	HDG3X060L	4500.00	LDG3X060L	5652.00	CDT3X060	2661.00
100	NDG3X100L	3590.00	HDG3X100L	4618.00	LDG3X100L	5770.00	CDT3X100	2779.00
150	NDG3X150L	5038.00	HDG3X150L	6066.00	LDG3X150L	7218.00	CDT3X150	4227.00



Model 576 Trip Unit

### DG 150A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	<b>FRAME ONLY</b>							
<b>COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER</b>								
<b>LCD ELECTRONIC LSI TRIP</b>								
	NDG3F150	768.00	HDG3F150	1796.00	LDG3F150	2948.00		
60	NDG3D060L	2092.00	HDG3D060L	3120.00	LDG3D060L	4272.00	CDT3D060	1281.00
100	NDG3D100L	2226.00	HDG3D100L	3254.00	LDG3D100L	4406.00	CDT3D100	1415.00
150	NDG3D150L	3894.00	HDG3D150L	4922.00	LDG3D150L	6074.00	CDT3D150	3083.00
<b>LCD ELECTRONIC LSIG TRIP</b>								
60	NDG3E060L	3974.00	HDG3E060L	5002.00	LDG3E060L	6154.00	CDT3E060	3163.00
100	NDG3E100L	4108.00	HDG3E100L	5136.00	LDG3E100L	6288.00	CDT3E100	3297.00
150	NDG3E150L	5775.00	HDG3E150L	6803.00	LDG3E150L	7955.00	CDT3E150	4964.00

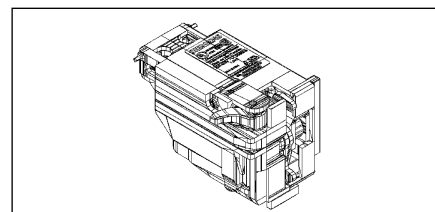
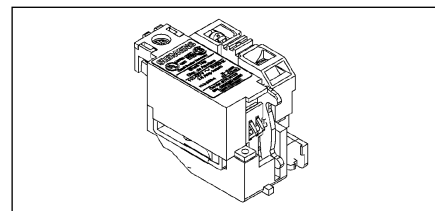
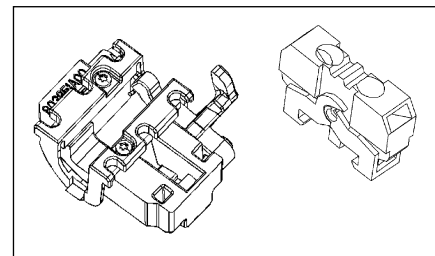
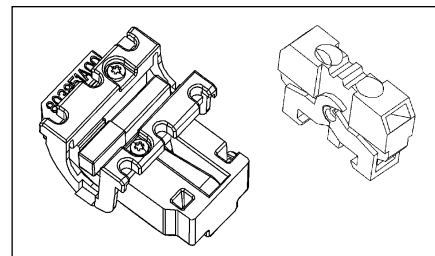
# VL Circuit Breakers

## Internal Accessories for DG 150A and FG 250A Frames

### Selection

### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
1 Alarm Switch 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL1	265.00
2 Aux. Switches 1A + 1B Bases AMBL1	Left, Right, Neutral	ASKL2	265.00
2 Aux. + 1 Alarm Switch 1A + 1B, 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL3	530.00



### Auxiliary/Alarm Switch Mounting Base Only

Description	Mounting Pocket	Catalog Number	List Price \$
Up to 3 Auxiliary Switches	Left, Right, Neutral	AMBL1	61.00
2 Aux. + 1 Alarm Switch	Left Pocket Only	AMBL2	61.00
2 Aux. + 1 Alarm Switch	Right Pocket Only	AMBL3	61.00

### Auxiliary/Alarm Switch Only

Common to DG - PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	ASWPA	108.00
1 Normally Closed Contact (1B)	ASWPB	108.00

### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	STRLB24DC	594.00
48-60 VDC		STRLC60DC	594.00
110-127 VDC		STRLD125DC	594.00
220-250 VDC		STRLE250DC	594.00
48-60 VAC		STRLM60	594.00
110-127 VAC		STRLN120	594.00
208-277 VAC		STRLS277	594.00
380-600 VAC		STRLV600	594.00

### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	UVRLA12DC	594.00
24 VDC		UVRLB24DC	594.00
48 VDC		UVRLC48DC	594.00
60 VDC		UVRLG60DC	594.00
110-127 VDC		UVRLD125DC	594.00
220-250 VDC		UVRLE250DC	594.00
110-127 VAC		UVRLN120	594.00
220-240 VAC		UVRLR240	594.00
208 VAC		UVRLP208	594.00
277 VAC		UVRLS277	594.00
380-415 VAC		UVRLT415	594.00
440-480 VAC		UVRLU480	594.00
600 VAC		UVRLV600	594.00

<sup>①</sup> 'A' refers to a normally open contact (open when the breaker contacts are open).

<sup>②</sup> 'B' refers to a normally closed contact (closed when the breaker contacts are open).

<sup>③</sup> Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

<sup>④</sup> These kits include two bases, one for mounting switches in the left pocket and another for mounting in the right.

<sup>⑤</sup> Includes 1A and 1B contact for alarm purposes, only one of which may be installed at any time.

External Accessories pages 6-125 through 6-139

6  
MOLDED CASE  
CIRCUIT BREAKERS

# VL Circuit Breakers

## FG 250A Frame, VL Series

## Selection/Dimensions

### Ordering Information

#### Complete Assembled Breaker

Prices for a complete factory assembled FG breaker include the frame, trip unit, and standard line and load connectors, all factory installed and shipped as a complete breaker. Assembled breakers are available only with standard connectors.

For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only.

For non-interchangeable trip breakers, change the third digit of the catalog number to "X" for standard breakers.

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.



Dimensions, inches (mm)

Number of Poles	Width	Length	Depth	To Handle D1
2, 3	4.1 (105)	6.9 (175)	3.4 (81)	4.2 (107)
4	5.5 (139)			

Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit		Complete Breaker
		Thermal-Mag.	Electronic	
2, 3	4.0 (1.8)	2.2 (1.0)	2.6 (1.2)	6.2 (2.8)
4	5.3 (2.4)	2.6 (1.2)	3.3 (1.5)	7.9 (3.6)

Enclosures<sup>A</sup>

NEMA Class	Catalog Number	List Price \$
1 (Flush)	FG0251F	CSO
1 (Surface)	FG0221S (225A max)	CSO
1 (Surface)	FG0251S (250A)	CSO
3R	FG0253R	CSO
4 - 4X	FG0254S	CSO
7-9	FG02579	CSO
12	FG02512	CSO
Neutral	(future)	—

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)					Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
					I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	
NFG	65	35	18	30	18	65	65	40	40	12	6
HFG	100	65	20	30	25	100	75	70	70	12	6
LFG	200	100	25	30	30	200	150	100	75	12	6

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number	List Price \$
Steel	50-250	#4-350 kcmil Cu	1	3TW1FG350 <sup>②</sup>	65.00
Aluminum <sup>①</sup>	50-250	#4-350 kcmil Al/Cu	1	3TAW1FG350 <sup>②</sup>	65.00
Copper	50-250	#4-350 kcmil Cu	1	3TCW1FG350 <sup>②</sup>	104.00
Distribution Lugs					
	50-250	#12-2/0 Cu	3	3TA3FG20 <sup>②</sup>	110.00
	50-250	#14-#4 Cu	6	3TA6FG04 <sup>②</sup>	110.00
Compression Lugs					
	50-250	#6-350 kcmil Al/Cu	—	2CLF350 <sup>③</sup>	102.00
	50-250	#6-350 kcmil Al/Cu	—	3CLF350 <sup>④</sup>	152.00

① Standard connector supplied with complete breakers.

② Kit consists of 3 terminal connectors.

③ 2 Lugs for 2-pole breakers.

④ 3 Lugs for 3-pole breakers.

### FG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>i</sub> )	
	Min.	Max.
100	625	1250
110	800	1600
125	800	1600
150	800	1600
175	1000	2000
200	1000	2000
225	1250	2500
250	1250	2500

Note: Each breaker has 6 trip settings in this range.

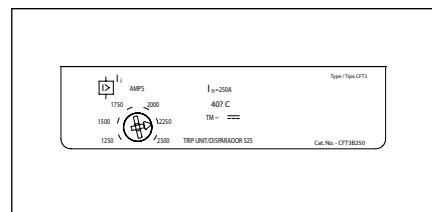
A - Consult with Siemens for availability.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## FG 250A Thermal-Magnetic Trip Unit

Selection



Model 525 Trip Unit

### FG 250A Frame 2-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY									
	NFG2F250	1128.00	HFG2F250	2994.00	LFG2F250	4505.00				
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY			
100	NFG2B100L	2374.00	HFG2B100L	4240.00	LFG2B100L	5751.00	CFT2B100	1158.00		
110	NFG2B110L	2374.00	HFG2B110L	4240.00	LFG2B110L	5751.00	CFT2B110	1158.00		
125	NFG2B125L	2374.00	HFG2B125L	4240.00	LFG2B125L	5751.00	CFT2B125	1158.00		
150	NFG2B150L	2374.00	HFG2B150L	4240.00	LFG2B150L	5751.00	CFT2B150	1158.00		
175	NFG2B175L	2374.00	HFG2B175L	4240.00	LFG2B175L	5751.00	CFT2B175	1158.00		
200	NFG2B200L	2374.00	HFG2B200L	4240.00	LFG2B200L	5751.00	CFT2B200	1158.00		
225	NFG2B225L	2374.00	HFG2B225L	4240.00	LFG2B225L	5751.00	CFT2B225	1158.00		
250	NFG2B250L	2999.00	HFG2B250L	4865.00	LFG2B250L	6376.00	CFT2B250	1783.00		

### FG 250A Frame 3-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY									
	NFG3F250	1388.00	HFG3F250	3493.00	LFG3F250	4971.00				
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY			
100	NFG3B100L	2882.00	HFG3B100L	4987.00	LFG3B100L	6465.00	CFT3B100	1362.00		
110	NFG3B110L	2882.00	HFG3B110L	4987.00	LFG3B110L	6465.00	CFT3B110	1362.00		
125	NFG3B125L	2882.00	HFG3B125L	4987.00	LFG3B125L	6465.00	CFT3B125	1362.00		
150	NFG3B150L	2882.00	HFG3B150L	4987.00	LFG3B150L	6465.00	CFT3B150	1362.00		
175	NFG3B175L	2882.00	HFG3B175L	4987.00	LFG3B175L	6465.00	CFT3B175	1362.00		
200	NFG3B200L	2882.00	HFG3B200L	4987.00	LFG3B200L	6465.00	CFT3B200	1362.00		
225	NFG3B225L	2882.00	HFG3B225L	4987.00	LFG3B225L	6465.00	CFT3B225	1362.00		
250	NFG3B250L	3617.00	HFG3B250L	5722.00	LFG3B250L	7200.00	CFT3B250	2097.00		

6  
MOLDED CASE  
CIRCUIT BREAKERS

### FG 250A Frame 4-Pole with Thermal-Magnetic Trip Unit<sup>A</sup>

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$		
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
	FRAME ONLY									
	NFG4F250	1805.00	HFG4F250	4542.00	LFG4F250	6463.00				
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY			
100	NFG4B100L	3752.00	HFG4B100L	6489.00	LFG4B100L	8410.00	CFT4B100	1771.00		
110	NFG4B110L	3752.00	HFG4B110L	6489.00	LFG4B110L	8410.00	CFT4B110	1771.00		
125	NFG4B125L	3752.00	HFG4B125L	6489.00	LFG4B125L	8410.00	CFT4B125	1771.00		
150	NFG4B150L	3752.00	HFG4B150L	6489.00	LFG4B150L	8410.00	CFT4B150	1771.00		
175	NFG4B175L	3752.00	HFG4B175L	6489.00	LFG4B175L	8410.00	CFT4B175	1771.00		
200	NFG4B200L	3752.00	HFG4B200L	6489.00	LFG4B200L	8410.00	CFT4B200	1771.00		
225	NFG4B225L	3752.00	HFG4B225L	6489.00	LFG4B225L	8410.00	CFT4B225	1771.00		
250	NFG4B250L	4707.00	HFG4B250L	7444.00	LFG4B250L	9365.00	CFT4B250	2726.00		

A - Consult with Siemens for availability.





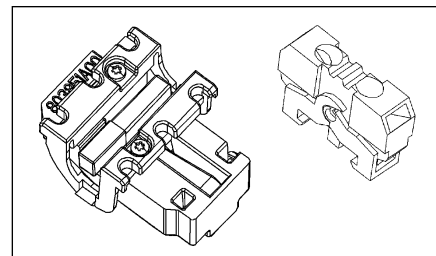
# VL Circuit Breakers

## Internal Accessories for DG 150A and FG 250A Frames

### Selection

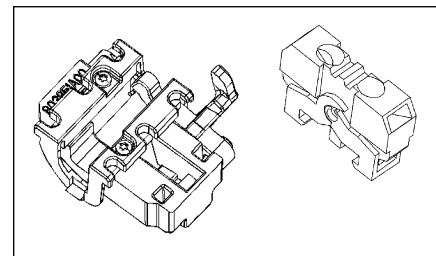
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
1 Alarm Switch 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL1	265.00
2 Aux. Switches 1A + 1B Bases AMBL1	Left, Right, Neutral	ASKL2	265.00
2 Aux. + 1 Alarm Switches 1A + 1B, 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL3	530.00



### Auxiliary/Alarm Switch Mounting Base Only

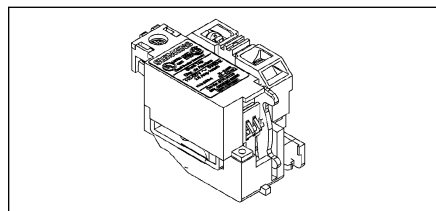
Description	Mounting Pocket	Catalog Number	List Price \$
Up to 3 Auxiliary Switches	Left, Right, Neutral	AMBL1	61.00
2 Aux. + 1 Alarm Switch	Left Pocket Only	AMBL2	61.00
2 Aux. + 1 Alarm Switch	Right Pocket Only	AMBL3	61.00



### Auxiliary/Alarm Switch Only

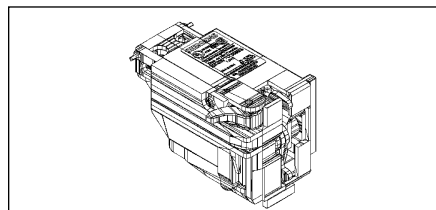
Common to DG - PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	ASWPA	108.00
1 Normally Closed Contact (1B)	ASWPB	108.00



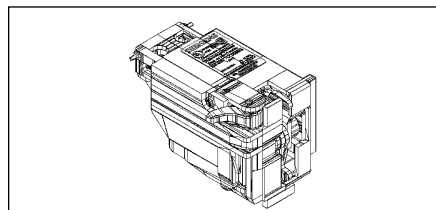
### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	STRLB24DC	594.00
48-60 VDC		STRLC60DC	594.00
110-127 VDC		STRLD125DC	594.00
220-250 VDC		STRLE250DC	594.00
48-60 VAC		STRLM60	594.00
110-127 VAC		STRLN120	594.00
208-277 VAC		STRLS277	594.00
380-600 VAC		STRLV600	594.00



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	UVRLA12DC	594.00
24 VDC		UVRLB24DC	594.00
48 VDC		UVRLC48DC	594.00
60 VDC		UVRLG60DC	594.00
110-127 VDC		UVRLD125DC	594.00
220-250 VDC		UVRLE250	594.00
110-127 VAC		UVRLN120	594.00
220-240 VAC		UVRLR240	594.00
208 VAC		UVRLP208	594.00
277 VAC		UVRLS277	594.00
380-415 VAC		UVRLT415	594.00
440-480 VAC		UVRLU480	594.00
600 VAC		UVRLV600	594.00



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

② These kits include two bases, one for mounting switches in the left pocket and another for mounting in the right.

③ Includes 1A and 1B contact for alarm purposes, only one of which may be installed at any time.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## JG 400A Frame, VL Series

## Selection/Dimensions

### Ordering Information

#### Complete Assembled Breaker

Prices for a complete factory assembled JG breaker include the frame, trip unit, and standard line and load connectors, all factory installed and shipped as a complete breaker. Assembled breakers are available only with standard connectors.

For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only. For non-interchangeable trip breakers, change the third digit of the catalog number to "X" for standard breakers.

100% Rated: For 100% rated breakers (or frames) with an interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog name to "H".

For 100% rated breakers with a non-interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog number to "Y".

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.



Dimensions, inches (mm)

Number of Poles	Width	Length	Depth	To Handle D1
2, 3	5.5 (139)	11 (279)	4.2 (102)	5.4 (138)
4	7.2 (183)			

Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit		Complete Breaker
		Thermal-Mag.	Electronic	
2, 3	9.3 (4.2)	4.0 (1.8)	4.0 (1.8)	12.6 (5.7)
4	12.1 (5.5)	5.0 (2.3)	5.0 (2.3)	16.3 (7.4)

Enclosures<sup>A</sup>

NEMA Class	Catalog Number	List Price \$
1	JG0401S	CSO
1 (Compact)	JG0401SC	CSO
3R	JG0403R	CSO
3R (Compact)	JG0403RC	CSO
7-9	JG03579 (350A max)	CSO
12	JG04012	CSO
Neutral	(future)	—

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489 AIR (File E10848)					IEC 60947-2					
	Volts AC (50/60 Hz)		Volts DC			Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
					I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	
NJG	65	35	25	30	25	65	65	45	45	12	6
HJG	100	65	25	30	35	100	75	70	70	15	8
LJG	200	100	25	30	35	200	150	100	75	15	8

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number	List Price \$
Steel	70-400	1/0-600 kcmil Cu	1	3TW1JG600 <sup>Ⓢ</sup>	87.00
Aluminum <sup>Ⓢ</sup>	70-400	3/0-250 kcmil Al/Cu	2	3TA2JG250 <sup>Ⓢ</sup>	87.00
Aluminum	70-400	250-750 kcmil Al	1	3TA1JG750 <sup>Ⓢ</sup>	109.00
Aluminum	70-400	3/0-600 kcmil Cu	1	3TA1JG750 <sup>Ⓢ</sup>	109.00
Copper	70-400	3/0-750 kcmil Cu	1	TC1JG750 <sup>Ⓢ</sup>	77.00
Copper	70-400	3/0-250 kcmil Cu	2	TC2JG250	77.00
<b>Distribution Lugs</b>					
	70-400	#14-4 Cu	12	3TA12JG04 <sup>Ⓢ</sup>	265.00
	70-400	#14-2/0 Cu	6	3TA6JG20 <sup>Ⓢ</sup>	265.00
<b>Compression Lugs</b>					
	70-400	250-600 kcmil Al/Cu	—	3CLJ600 <sup>Ⓢ</sup>	449.00
	70-400	#6-350 kcmil	—	3CLJ350	449.00
	70-400	250-750 kcmil	—	3CLJ750	449.00

<sup>Ⓢ</sup> Standard construction supplied for each breaker.

<sup>Ⓢ</sup> Kit consists of 3 terminal connectors.

<sup>Ⓢ</sup> 3 Lugs for 3-pole breakers.

<sup>Ⓢ</sup> For 100% rate applications, 90°C.

### JG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>b</sub> )	
	Min.	Max.
250	1250	2500
300	1500	3000
350	1750	3500
400	2000	4000

Note: Each breaker has 6 trip settings in this range.

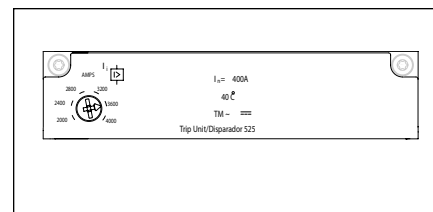
A - Consult with Siemens for availability.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## JG 400A Thermal-Magnetic Trip Unit

Selection



### JG 400A Frame 2-Pole with Thermal-Magnetic Trip Unit

Model 525 Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			
	FRAME ONLY								
	NJG2F400	1600.00	HJG2F400	3842.00	LJG2F400	5208.00	TRIP UNIT ONLY		
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER									
250	NJG2B250L	3210.00	HJG2B250L	5452.00	LJG2B250L	6818.00			CJT2B250
300	NJG2B300L	3210.00	HJG2B300L	5452.00	LJG2B300L	6818.00	CJT2B300	1494.00	
350	NJG2B350L	3210.00	HJG2B350L	5452.00	LJG2B350L	6818.00	CJT2B350	1494.00	
400	NJG2B400L	3210.00	HJG2B400L	5452.00	LJG2B400L	6818.00	CJT2B400	1494.00	

### JG 400A Frame 3-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			
	FRAME ONLY								
	NJG3F400	1972.00	HJG3F400	4484.00	LJG3F400	5740.00	TRIP UNIT ONLY		
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER									
250	NJG3B250L	3903.00	HJG3B250L	6415.00	LJG3B250L	7671.00			CJT3B250
300	NJG3B300L	3903.00	HJG3B300L	6415.00	LJG3B300L	7671.00	CJT3B300	1757.00	
350	NJG3B350L	3903.00	HJG3B350L	6415.00	LJG3B350L	7671.00	CJT3B350	1757.00	
400	NJG3B400L	3903.00	HJG3B400L	6415.00	LJG3B400L	7671.00	CJT3B400	1757.00	

### JG 400A Frame 4-Pole with Thermal-Magnetic Trip Unit<sup>A</sup>

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			
	FRAME ONLY								
	NJG4F400	2563.00	HJG4F400	5829.00	LJG4F400	7462.00	TRIP UNIT ONLY		
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER									
250	NJG4B250L	5080.00	HJG4B250L	8346.00	LJG4B250L	9979.00			CJT4B250
300	NJG4B300L	5080.00	HJG4B300L	8346.00	LJG4B300L	9979.00	CJT4B300	2285.00	
350	NJG4B350L	5080.00	HJG4B350L	8346.00	LJG4B350L	9979.00	CJT4B350	2285.00	
400	NJG4B400L	5080.00	HJG4B400L	8346.00	LJG4B400L	9979.00	CJT4B400	2285.00	

### JJ 400A Frame 240V max., 2-pole with Thermal-Magnetic Non-Interchangeable Trip Unit

Continuous Ampere Rating	N-Interrupting Class	
	Catalog Number	List Price \$
	COMPLETE BREAKER	
250	NJJ2B250L	2642.00
300	NJJ2B300L	2642.00
350	NJJ2B350L	2642.00
400	NJJ2B400L	2642.00

### JJ 400A Frame 240V max., 3-pole with Thermal-Magnetic Non-Interchangeable Trip Unit

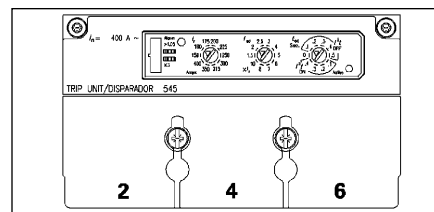
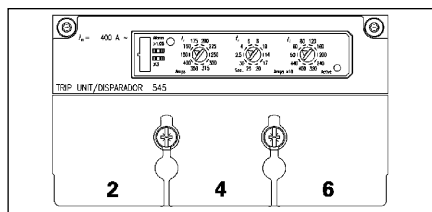
Continuous Ampere Rating	N-Interrupting Class	
	Catalog Number	List Price \$
	COMPLETE BREAKER	
250	NJJ3B250L	3192.00
300	NJJ3B300L	3192.00
350	NJJ3B350L	3192.00
400	NJJ3B400L	3192.00

A - Consult with Siemens for availability.

# VL Circuit Breakers

## JG 400A Electronic 3-Knob & LCD Trip Units

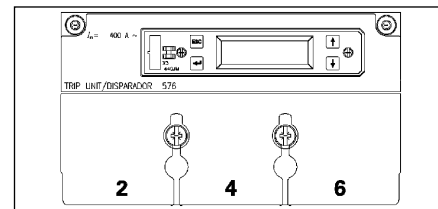
**Selection**



Model 545 Trip Units

### JG 400A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER							
<b>ELECTRONIC LI TRIP</b>								
250	NJG3N250L	4468.00	HJG3N250L	6980.00	LJG3N250L	8236.00	CJT3N250	2322.00
400	NJG3N400L	4468.00	HJG3N400L	6980.00	LJG3N400L	8236.00	CJT3N400	2322.00
<b>ELECTRONIC LSI TRIP</b>								
250	NJG3P250L	4800.00	HJG3P250L	7312.00	LJG3P250L	8568.00	CJT3P250	2654.00
400	NJG3P400L	4800.00	HJG3P400L	7312.00	LJG3P400L	8568.00	CJT3P400	2654.00
<b>ELECTRONIC LSIg TRIP</b>								
250	NJG3U250L	6682.00	HJG3U250L	9194.00	LJG3U250L	10450.00	CJT3U250	4536.00
400	NJG3U400L	6682.00	HJG3U400L	9194.00	LJG3U400L	10450.00	CJT3U400	4536.00
<b>ELECTRONIC LIG TRIP</b>								
250	NJG3X250L	6347.00	HJG3X250L	8859.00	LJG3X250L	10115.00	CJT3X250	4201.00
400	NJG3X400L	6347.00	HJG3X400L	8859.00	LJG3X400L	10115.00	CJT3X400	4201.00



Model 576 Trip Unit

### JG 400A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER							
<b>LCD ELECTRONIC LSI TRIP</b>								
250	NJG3D250L	5198.00	HJG3D250L	7710.00	LJG3D250L	8966.00	CJT3D250	3052.00
400	NJG3D400L	5198.00	HJG3D400L	7710.00	LJG3D400L	8966.00	CJT3D400	3052.00
<b>LCD ELECTRONIC LSIg TRIP</b>								
250	NJG3E250L	7080.00	HJG3E250L	9592.00	LJG3E250L	10848.00	CJT3E250	4934.00
400	NJG3E400L	7080.00	HJG3E400L	9592.00	LJG3E400L	10848.00	CJT3E400	4934.00

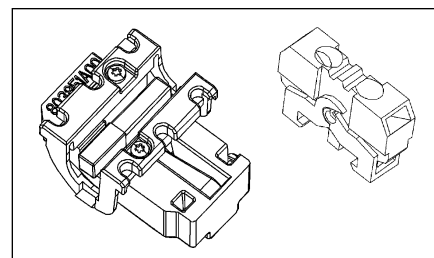
# VL Circuit Breakers

## Internal Accessories for JG 400A and LG 600A Frames

### Selection

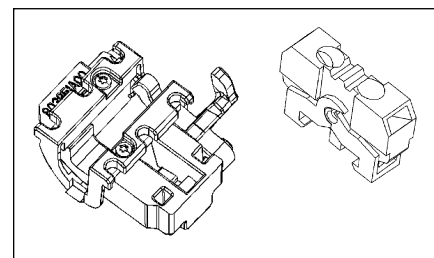
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
1 Alarm Switch 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL1	265.00
2 Aux. Switches 1A + 1B Bases AMBL1	Left, Right, Neutral	ASKL2	265.00
2 Aux. + 1 Alarm Switches 1A + 1B, 1A/B <sup>③</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL3	530.00



### Auxiliary/Alarm Switch Mounting Base Only

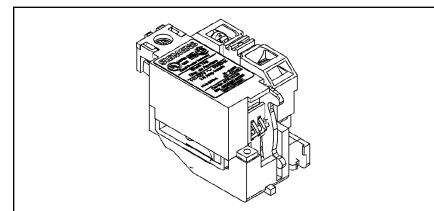
Description	Mounting Pocket	Catalog Number	List Price \$
Up to 3 Auxiliary Switches	Left, Right, Neutral	AMBL1	61.00
2 Aux. + 1 Alarm Switch	Left Pocket Only	AMBL2	61.00
2 Aux. + 1 Alarm Switch	Right Pocket Only	AMBL3	61.00



### Auxiliary/Alarm Switch Only

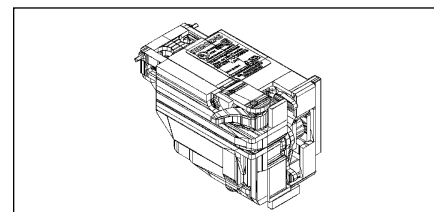
Common to DG - PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	ASWPA	108.00
1 Normally Closed Contact (1B)	ASWPB	108.00



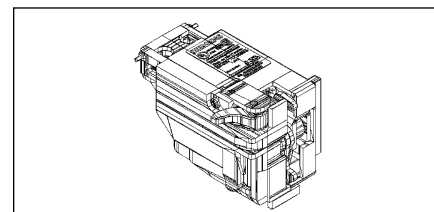
### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	STRLB24DC	594.00
48-60 VDC		STRLC60DC	594.00
110-127 VDC		STRLD125DC	594.00
220-250 VDC		STRLE250DC	594.00
48-60 VAC		STRLM60	594.00
110-127 VAC		STRLN120	594.00
208-277 VAC		STRLS277	594.00
380-600 VAC		STRLV600	594.00



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	UVRLA12DC	594.00
24 VDC		UVRLB24DC	594.00
48 VDC		UVRLC48DC	594.00
60 VDC		UVRLG60DC	594.00
110-127 VDC		UVRLD125DC	594.00
220-250 VDC		UVRLE250DC	594.00
110-127 VAC		UVRLN120	594.00
220-240 VAC		UVRLR240	594.00
208 VAC		UVRLP208	594.00
277 VAC		UVRLS277	594.00
380-415 VAC		UVRLT415	594.00
440-480 VAC		UVRLU480	594.00
600 VAC		UVRLV600	594.00



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

③ Includes 1A and 1B contact for alarm purposes, only one of which may be installed at any time.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## LG 600A Frame, VL Series

## Selection/Dimensions

### Ordering Information

#### Complete Assembled Breaker

Prices for a complete factory assembled LG breaker include the frame, trip unit, and standard line and load lugs, all factory installed and shipped as a complete breaker. Assembled breakers are available only with standard connectors.

For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only. Change the third digit of the catalog number to "X" for non-interchangeable trip unit.

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.

A Toggle Handle Extension is included with each frame or complete breaker.



### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)			Volts DC		Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
					I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	
NLG	65	35	25	30	25	65	65	45	45	12	6
HLG	100	65	25	30	35	100	75	70	70	15	8
LLG	200	100	25	30	35	200	150	100	75	15	8

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number <sup>②</sup>	List Price \$
Aluminum <sup>①</sup>	150-600	#2/0-600 kcmil Al/Cu	2 (load side)	3TA2LG600LD	109.00
Aluminum <sup>①</sup>	150-600	#2/0-600 kcmil Al/Cu	2 (line side)	3TA2LG600LN	109.00
Copper	150-600	#2/0-600 kcmil Cu	2 (load side)	3TC2LG600LD	231.00
Copper	150-600	#2/0-600 kcmil Cu	2 (line side)	3TC2LG600LN	231.00
Compression Lugs					
	150-600	#6-350 kcmil Al/Cu	-	6CLL350 <sup>③</sup>	899.00
	150-600	250-750 kcmil Al/Cu	-	3CLL750 <sup>④</sup>	494.00
	150-600	250-600 kcmil Al/Cu	-	6CLL600 <sup>③</sup>	899.00

① Standard construction supplied for each breaker.

② Kit consists of 3 terminal connectors.

③ Kit consists of 6 lugs for Line or Load end.

④ Kit consists of 3 lugs for Line or Load end.

### LG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>t</sub> )	
	Min.	Max.
400	2000	4000
500	2500	5000
600	2750	5500

Note: Each breaker has 6 trip settings.

### Dimensions, inches (mm)

Number of Poles	Width	Length	Depth	To Handle D1
2, 3	5.5 (139)	11 (279)	4.2 (102)	5.4 (138)
4	7.2 (183)			
Ext. Shield		13.6 (345.5)		

### Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit		Complete Breaker
		Thermal-Mag.	Electronic	
2, 3	17.4 (7.9)	3.5 (1.6)	4.2 (1.9)	20.9 (9.5)
4	23.2 (10.5)	4.6 (2.1)	5.5 (2.5)	27.8 (12.6)

### Enclosures<sup>A</sup>

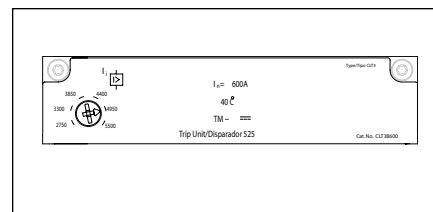
NEMA Class	Catalog Number	List Price \$
1	LG0601S	CSO
3R	LG0603R	CSO
4 - 4X	LG0604S	CSO
7-9	LG06079	CSO
12	LG06012	CSO
Neutral	(future)	-

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## LG 600A Thermal-Magnetic Trip Unit

**Selection**



Model 525 Trip Unit

### LG 600A Frame 2-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	<b>FRAME ONLY</b>							
	NLG2F600	2869.00	HLG2F600	4023.00	LLG2F600	6809.00		
	<b>COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER</b>						<b>TRIP UNIT ONLY</b>	
400	NLG2B400L	5148.00	HLG2B400L	6302.00	LLG2B400L	9088.00	CLT2B400	2135.00
500	NLG2B500L	5148.00	HLG2B500L	6302.00	LLG2B500L	9088.00	CLT2B500	2135.00
600	NLG2B600L	5148.00	HLG2B600L	6302.00	LLG2B600L	9088.00	CLT2B600	2135.00

### LG 600A Frame 3-Pole with Thermal-Magnetic Trip Unit

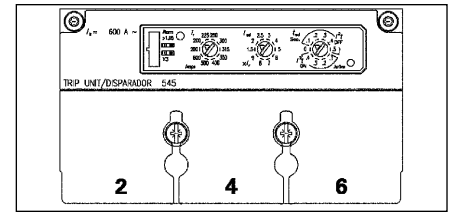
Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	<b>FRAME ONLY</b>							
	NLG3F600	3548.00	HLG3F600	4684.00	LLG3F600	7508.00		
	<b>COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER</b>						<b>TRIP UNIT ONLY</b>	
400	NLG3B400L	6276.00	HLG3B400L	7412.00	LLG3B400L	10236.00	CLT3B400	2512.00
500	NLG3B500L	6276.00	HLG3B500L	7412.00	LLG3B500L	10236.00	CLT3B500	2512.00
600	NLG3B600L	6276.00	HLG3B600L	7412.00	LLG3B600L	10236.00	CLT3B600	2512.00

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# VL Circuit Breakers

## LG 600A Electronic 3-Knob & LCD Trip Units

*Selection*

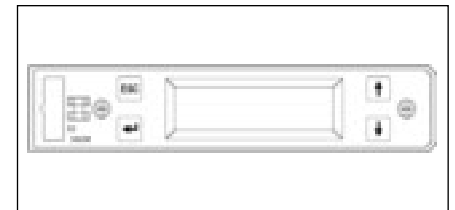


Model 545 Trip Unit

### LG 600A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			
	FRAME ONLY								TRIP UNIT ONLY
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
	NLG3F600	3548.00	HLG3F600	4684.00	LLG3F600	7508.00			
<b>ELECTRONIC LI TRIP</b>									
400	NLG3N400L	6865.00	HLG3N400L	8001.00	LLG3N400L	10825.00	CLT3N400	3101.00	
600	NLG3N600L	6865.00	HLG3N600L	8001.00	LLG3N600L	10825.00	CLT3N600	3101.00	
<b>ELECTRONIC LSI TRIP</b>									
400	NLG3P400L	7200.00	HLG3P400L	8336.00	LLG3P400L	11160.00	CLT3P400	3436.00	
600	NLG3P600L	7200.00	HLG3P600L	8336.00	LLG3P600L	11160.00	CLT3P600	3436.00	
<b>ELECTRONIC LSIG TRIP</b>									
400	NLG3U400L	9128.00	HLG3U400L	10264.00	LLG3U400L	13088.00	CLT3U400	5364.00	
600	NLG3U600L	9128.00	HLG3U600L	10264.00	LLG3U600L	13088.00	CLT3U600	5364.00	
<b>ELECTRONIC LIG TRIP</b>									
400	NLG3X400L	8794.00	HLG3X400L	9930.00	LLG3X400L	12754.00	CLT3X400	5030.00	
600	NLG3X600L	8794.00	HLG3X600L	9930.00	LLG3X600L	12754.00	CLT3X600	5030.00	

**6**  
MOLDED CASE  
CIRCUIT BREAKERS



Model 576 Trip Unit

### LG 600A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			
	FRAME ONLY								TRIP UNIT ONLY
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
	NLG3F600	3548.00	HLG3F600	4684.00	LLG3F600	7508.00			
<b>LCD ELECTRONIC LSI TRIP</b>									
400	NLG3D400L	7714.00	HLG3D400L	8850.00	LLG3D400L	11674.00	CLT3D400	3950.00	
600	NLG3D600L	7714.00	HLG3D600L	8850.00	LLG3D600L	11674.00	CLT3D600	3950.00	
<b>LCD ELECTRONIC LSIG TRIP</b>									
400	NLG3E400L	9643.00	HLG3E400L	10779.00	LLG3E400L	13603.00	CLT3E400	5879.00	
600	NLG3E600L	9643.00	HLG3E600L	10779.00	LLG3E600L	13603.00	CLT3E600	5879.00	



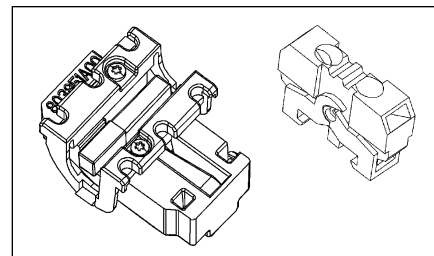
# VL Circuit Breakers

## Internal Accessories for JG 400A and LG 600A Frames

### Selection

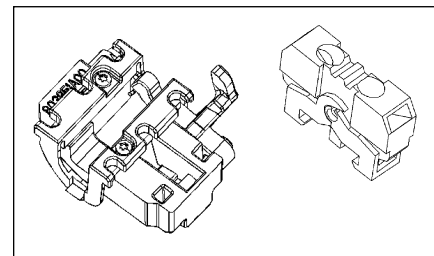
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
1 Alarm Switch 1A/B <sup>②</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL1	265.00
2 Aux. Switches 1A + 1B Bases AMBL1	Left, Right, Neutral	ASKL2	265.00
2 Aux. + 1 Alarm Switches 1A + 1B, 1A/B <sup>②</sup> Bases AMBL2 & AMBL3	Left, Right <sup>②</sup>	ASKL3	530.00



### Auxiliary/Alarm Switch Mounting Base Only

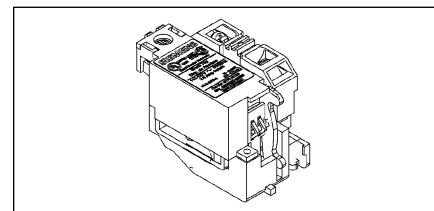
Description	Mounting Pocket	Catalog Number	List Price \$
Up to 3 Auxiliary Switches	Left, Right, Neutral	AMBL1	61.00
2 Aux. + 1 Alarm Switch	Left Pocket Only	AMBL2	61.00
2 Aux. + 1 Alarm Switch	Right Pocket Only	AMBL3	61.00



### Auxiliary/Alarm Switch Only

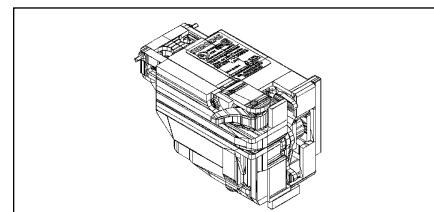
Common to DG - PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	ASWPA	108.00
1 Normally Closed Contact (1B)	ASWPB	108.00



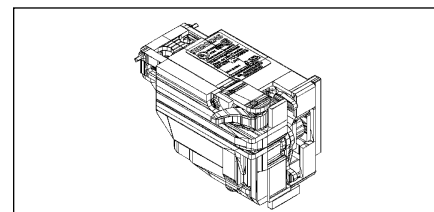
### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	STRLB24DC	594.00
48-60 VDC		STRLC60DC	594.00
110-127 VDC		STRLD125DC	594.00
220-250 VDC		STRLE250DC	594.00
48-60 VAC		STRLM60	594.00
110-127 VAC		STRLN120	594.00
208-277 VAC		STRLS277	594.00
380-600 VAC		STRLV600	594.00



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	UVRLA12DC	594.00
24 VDC		UVRLB24DC	594.00
48 VDC		UVRLC48DC	594.00
60 VDC		UVRLG60DC	594.00
110-127 VDC		UVRLD125DC	594.00
220-250 VDC		UVRLE250DC	594.00
110-127 VAC		UVRLN120	594.00
220-240 VAC		UVRLR240	594.00
208 VAC		UVRLP208	594.00
277 VAC		UVRLS277	594.00
380-415 VAC		UVRLT415	594.00
440-480 VAC		UVRLU480	594.00
600 VAC		UVRLV600	594.00



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

② Includes 1A and 1B contact for alarm purposes, only one of which may be installed at any time.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## MG 800A Frame, VL Series

## Selection/Dimensions

### Ordering Information

#### Complete Assembled Breaker

Prices for a complete factory assembled MG breaker include the frame, trip unit, and standard line and load lugs, all factory installed and shipped as a complete breaker. Assembled breakers are available only with standard connectors.

For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only. For non-interchangeable trip breakers, change the third digit of the catalog number to "X" for standard breakers.

100% Rated: For 100% rated breakers (or frames) with an interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog name to "H".

For 100% rated breakers with a non-interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog number to "Y".

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.

A Toggle Handle Extension is included with each frame or complete breaker.



### Dimensions, inches (mm)

Number of Poles	Width	Length	Depth	To Handle D1
2, 3	7.5 (190)	16 (406)	4.5 (114)	5.9 (151)
4	10 (253)			

### Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit	Complete Breaker
2, 3	31.3 (14.2)	4.0 (1.8)	35.3 (16.0)
4	40.2 (18.2)	5.0 (2.3)	45.2 (20.5)

### Enclosures<sup>A</sup>

NEMA Class	Catalog Number	List Price \$
1	MG0801S	CSO
3R	MG0803R	CSO
Neutral	(future)	—

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)			Volts DC		Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
						I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>
NMG	65	35	25	22	35	65	65	50	50	20	10
HMG	100	65	35	25	50	100	75	70	70	30	15
LMG	200	100	50	42	65	200	150	100	75	35	17

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number	List Price \$
Aluminum <sup>Ⓢ</sup>	200-800A	1/0-500 kcmil Al/Cu	3	3TA3MG500 <sup>Ⓢ</sup>	202.00
Aluminum	200-800A	500-750 kcmil Al/Cu	2	3TA2MG750 <sup>Ⓢ</sup>	364.00
Copper	200-800A	1/0-500 kcmil Cu	3	TC3MG500 <sup>ⓈⓉ</sup>	134.00
Aluminum	200-800A	#2-600 kcmil Al/Cu	3	3TA3MG600 <sup>ⓈⓉ</sup>	218.00
<b>Compression Lug Kit<sup>Ⓢ</sup></b>					
	200-800A	1/0-500 kcmil Cu	—	9CLM500 <sup>Ⓢ</sup>	1056.00

<sup>Ⓢ</sup> Total of 9 connectors (3 per phase Line or Load).

<sup>Ⓢ</sup> Kit consists of 3 terminal connectors.

<sup>Ⓢ</sup> Standard connector supplied with complete breakers.

<sup>Ⓢ</sup> Includes extended terminal cover.

<sup>Ⓢ</sup> Consists of one terminal.

<sup>Ⓢ</sup> For 100% rated applications.

### MG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>i</sub> )	
	Min.	Max.
600	3000	6000
700	3250	6500
800	3250	6500

Note: Each breaker has 6 trip settings.

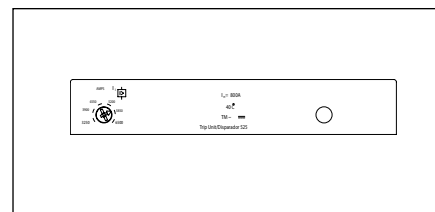
A - Consult with Siemens for availability.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## MG 800A Thermal-Magnetic Trip Unit

**Selection**



Model 525 Trip Unit

### MG 800A Frame 2-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NMG2F800	3502.00	HMG2F800	5208.00	LMG2F800	8238.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
600	NMG2B600L	6456.00	HMG2B600L	8162.00	LMG2B600L	11192.00	CMT2B600	2686.00
700	NMG2B700L	6456.00	HMG2B700L	8162.00	LMG2B700L	11192.00	CMT2B700	2686.00
800	NMG2B800L	6456.00	HMG2B800L	8162.00	LMG2B800L	11192.00	CMT2B800	2686.00

### MG 800A Frame 3-Pole with Thermal-Magnetic Trip Unit

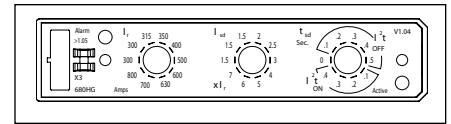
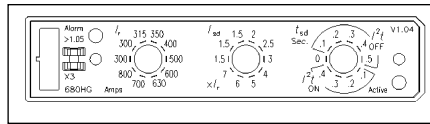
Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NMG3F800	4305.00	HMG3F800	6033.00	LMG3F800	9039.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
600	NMG3B600L	7868.00	HMG3B600L	9596.00	LMG3B600L	12602.00	CMT3B600	3161.00
700	NMG3B700L	7868.00	HMG3B700L	9596.00	LMG3B700L	12602.00	CMT3B700	3161.00
800	NMG3B800L	7868.00	HMG3B800L	9596.00	LMG3B800L	12602.00	CMT3B800	3161.00

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# VL Circuit Breakers

## MG 800A Electronic 3-Knob & LCD Trip Units

Selection



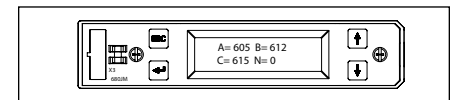
Model 545 Trip Units

### MG 800A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NMG3F800	4305.00	HMG3F800	6033.00	LMG3F800	9039.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
ELECTRONIC LI TRIP								
600	NMG3N600L	8672.00	HMG3N600L	10400.00	LMG3N600L	13406.00	CMT3N600	3965.00
800	NMG3N800L	8672.00	HMG3N800L	10400.00	LMG3N800L	13406.00	CMT3N800	3965.00
ELECTRONIC LSI TRIP								
600	NMG3P600L	9006.00	HMG3P600L	10734.00	LMG3P600L	13740.00	CMT3P600	4299.00
800	NMG3P800L	9006.00	HMG3P800L	10734.00	LMG3P800L	13740.00	CMT3P800	4299.00
ELECTRONIC LSIG TRIP								
600	NMG3U600L	10935.00	HMG3U600L	12663.00	LMG3U600L	15669.00	CMT3U600	6228.00
800	NMG3U800L	10935.00	HMG3U800L	12663.00	LMG3U800L	15669.00	CMT3U800	6228.00
ELECTRONIC LIG TRIP								
600	NMG3X600L	10602.00	HMG3X600L	12330.00	LMG3X600L	15336.00	CMT3X600	5895.00
800	NMG3X800L	10602.00	HMG3X800L	12330.00	LMG3X800L	15336.00	CMT3X800	5895.00

### MG 800A Frame 4-Pole Electronic Trip Unit<sup>A</sup>

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NMG4F800	5597.00	HMG4F800	7844.00	LMG4F800	11753.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
ELECTRONIC LI TRIP								
600	NMG4N600L	11289.00	HMG4N600L	13536.00	LMG4N600L	17445.00	CMT4N600	5156.00
800	NMG4N800L	11289.00	HMG4N800L	13536.00	LMG4N800L	17445.00	CMT4N800	5156.00
ELECTRONIC LSI TRIP								
600	NMG4P600L	11722.00	HMG4P600L	13969.00	LMG4P600L	17878.00	CMT4P600	5589.00
800	NMG4P800L	11722.00	HMG4P800L	13969.00	LMG4P800L	17878.00	CMT4P800	5589.00
ELECTRONIC LSIG TRIP								
600	NMG4U600L	14230.00	HMG4U600L	16477.00	LMG4U600L	20386.00	CMT4U600	8097.00
800	NMG4U800L	14230.00	HMG4U800L	16477.00	LMG4U800L	20386.00	CMT4U800	8097.00
ELECTRONIC LIG TRIP								
600	NMG4X600L	13796.00	HMG4X600L	16043.00	LMG4X600L	19952.00	CMT4X600	7663.00
800	NMG4X800L	13796.00	HMG4X800L	16043.00	LMG4X800L	19952.00	CMT4X800	7663.00



Model 576 Trip Unit

### MG 800A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NMG3F800	4305.00	HMG3F800	6033.00	LMG3F800	9039.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
LCD ELECTRONIC LSI TRIP								
600	NMG3D600L	9650.00	HMG3D600L	11378.00	LMG3D600L	14384.00	CMT3D600	4943.00
800	NMG3D800L	9650.00	HMG3D800L	11378.00	LMG3D800L	14384.00	CMT3D800	4943.00
LCD ELECTRONIC LSIG TRIP								
600	NMG3E600L	11581.00	HMG3E600L	13309.00	LMG3E600L	16315.00	CMT3E600	6874.00
800	NMG3E800L	11581.00	HMG3E800L	13309.00	LMG3E800L	16315.00	CMT3E800	6874.00

A - Consult with Siemens for availability.

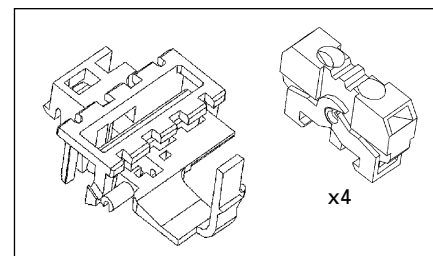
# VL Circuit Breakers

## Internal Accessories for MG 800A, NG 1200A and PG 1600A Frames

**Selection**

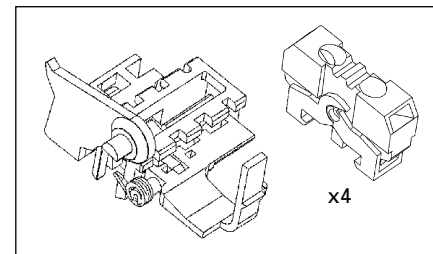
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
2 Aux. + 2 Alarm Switches 2A + 2B Bases AMBP2	Left Pocket Only	ASKP3	530.00
4 Aux. Switches 2A + 2B Bases AMBP1	Left, Right, Neutral	ASKP4	495.00



### Auxiliary/Alarm Switch Mounting Base Only

Description	Mounting Pocket	Catalog Number	List Price \$
Up to 4 Auxiliary Switches	Left, Right, Neutral	AMBP1	83.00
2 Aux. + 2 Alarm Switches	Left Pocket Only	AMBP2	83.00



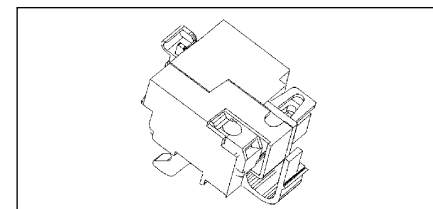
### Auxiliary/Alarm Switch Only

Common to DG - PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	ASWPA	108.00
1 Normally Closed Contact (1B)	ASWPB	108.00

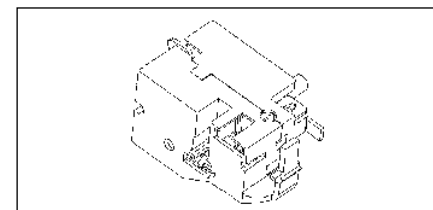
### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	STRPB24DC	654.00
48-60 VDC		STRPC60DC	654.00
110-127 VDC		STRPD125DC	654.00
220-250 VDC		STRPE250DC	654.00
48-60 VAC		STRPM60	654.00
110-127 VAC		STRPN120	654.00
208-277 VAC		STRPS277	654.00
380-600 VAC		STRPV600	654.00



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	UVRPA12DC	654.00
24 VDC		UVRPB24DC	654.00
48 VDC		UVRPC48DC	654.00
60 VDC		UVRPG60DC	654.00
110-127 VDC		UVRPD125DC	654.00
220-250 VDC		UVRPE250DC	654.00
110-127 VAC		UVRPN120	654.00
220-240 VAC		UVRPR240	654.00
208 VAC		UVRPP208	654.00
277 VAC		UVRPS277	654.00
380-415 VAC		UVRPT415	654.00
440-480 VAC		UVRPU480	654.00
600 VAC		UVRPV600	654.00



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## NG 1200A Frame, VL Series

## Selection/Dimensions

### Ordering Information

#### Complete Assembled Breaker with Lugs

Prices for a complete factory assembled NG breaker include the frame, trip unit, and standard line and load lugs, all factory installed and shipped as a complete breaker. Assembled breakers are available only with standard connectors.

For any other configuration, order the frame, trip unit, and terminals as separate items.

For DC applications, use thermal magnetic trip unit only.

For reverse feed applications, select non-interchangeable trip breakers only. For non-interchangeable trip breakers, change the third digit of the catalog number to "X" for standard breakers.

100% Rated: For 100% rated breakers (or frames) with an interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog name to "H".

For 100% rated breakers with a non-interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog number to "Y".

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.

A Toggle Handle Extension is included with each frame or complete breaker.



### Dimensions, inches (mm)

Number of Poles	W	L	D	To Handle D1
2, 3 4	9 (229) 12 (305)	16 (406)	6 (152)	8.1 (207)

### Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit	Complete Breaker
2, 3 4	46.3 (21.0) 60.6 (27.5)	8.8 (4.0) 13.2 (6.0)	55.1 (25.0) 73.8 (33.5)

### Enclosures<sup>A</sup>

Type	Catalog Number	List Price \$
1	NG1201S	CSO
3R	NG1203R	CSO
12	NG12012	CSO
Neutral	(future)	—

### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)			Volts DC		Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
					I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	I <sub>cu</sub>	I <sub>cs</sub>	
NNG	65	35	25	22	35	65	35	50	25	20	10
HNG	100	65	35	25	50	100	50	70	35	30	15
LNG	200	100	65	42	65	200	100	100	50	35	17

### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per connector	Catalog Number	List Price \$
Aluminum	300-1200A	1/0-500 kcmil Al/Cu	4	3TA4NG500 <sup>③④</sup>	291.00
Aluminum	300-1200A	500-750 kcmil Al/Cu	3	3TA3NG750 <sup>②</sup>	832.00
Copper	300-1200A	1/0-500 kcmil Cu <sup>②</sup>	4	3TC4NG500 <sup>②</sup>	832.00
Aluminum	300-1200A	1/0-500 kcmil Al/Cu	4	3TA4NG500H <sup>④</sup>	875.00
<b>Compression Lug Kit<sup>①</sup></b>					
	300-1200A	1/0-500 kcmil Al/Cu	—	12CLN500	1393.00

① Total of 12 connectors (4 per phase Line or Load).

② 90 °C for 100% rated breakers.

③ Standard connector provided with complete breakers.

④ Kit consists of 3 terminal connectors.

### NG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>b</sub> )	
	Min.	Max.
800	4000	8000
900	5000	10000
1000	5000	10000
1200	7000	12000

Note: Each breaker has 6 trip settings.

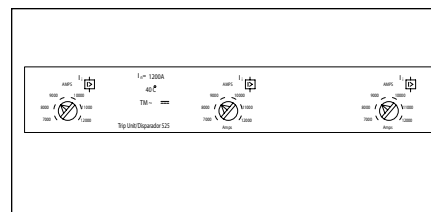
A - Consult with Siemens for availability.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## NG 1200A Thermal-Magnetic Trip Unit

**Selection**



Model 525 Trip Unit

### NG 1200A Frame 2-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NNG2F120	5135.00	HNG2F120	6853.00	LNG2F120	10000.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
800	NNG2B800L	10945.00	HNG2B800L	12663.00	LNG2B800L	15810.00	CNT2B800	5418.00
900	NNG2B900L	10945.00	HNG2B900L	12663.00	LNG2B900L	15810.00	CNT2B900	5418.00
1000	NNG2B100L	10945.00	HNG2B100L	12663.00	LNG2B100L	15810.00	CNT2B100	5418.00
1200	NNG2B120L	10945.00	HNG2B120L	12663.00	LNG2B120L	15810.00	CNT2B120	5418.00

### NG 1200A Frame 3-Pole with Thermal-Magnetic Trip Unit

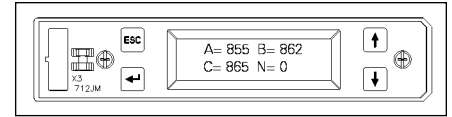
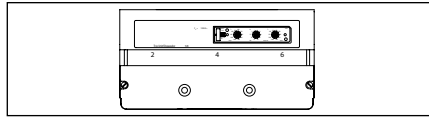
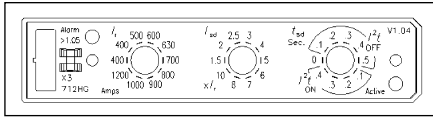
Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NNG3F120	6321.00	HNG3F120	7937.00	LNG3F120	10960.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER						TRIP UNIT ONLY	
800	NNG3B800L	13284.00	HNG3B800L	14900.00	LNG3B800L	17923.00	CNT3B800	6375.00
900	NNG3B900L	13284.00	HNG3B900L	14900.00	LNG3B900L	17923.00	CNT3B900	6375.00
1000	NNG3B100L	13284.00	HNG3B100L	14900.00	LNG3B100L	17923.00	CNT3B100	6375.00
1200	NNG3B120L	13284.00	HNG3B120L	14900.00	LNG3B120L	17923.00	CNT3B120	6375.00

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# VL Circuit Breakers

## NG 1200A Electronic 3-Knob & LCD Trip Units

**Selection**



Model 545 Trip Units

Model 576 Trip Unit

### NG 1200A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NNG3F120		6321.00	HNG3F120		7937.00	LNG3F120		10960.00
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
ELECTRONIC LI TRIP								
800	NNG3N800L	14651.00	HNG3N800L	16267.00	LNG3N800L	19290.00	CNT3N800	7742.00
1000	NNG3N100L	14651.00	HNG3N100L	16267.00	LNG3N100L	19290.00	CNT3N100	7742.00
1200	NNG3N120L	14651.00	HNG3N120L	16267.00	LNG3N120L	19290.00	CNT3N120	7742.00
ELECTRONIC LSI TRIP								
800	NNG3P800L	14985.00	HNG3P800L	16601.00	LNG3P800L	19624.00	CNT3P800	8076.00
1000	NNG3P100L	14985.00	HNG3P100L	16601.00	LNG3P100L	19624.00	CNT3P100	8076.00
1200	NNG3P120L	14985.00	HNG3P120L	16601.00	LNG3P120L	19624.00	CNT3P120	8076.00
ELECTRONIC LSIG TRIP								
800	NNG3U800L	16914.00	HNG3U800L	18530.00	LNG3U800L	21553.00	CNT3U800	10005.00
1000	NNG3U100L	16914.00	HNG3U100L	18530.00	LNG3U100L	21553.00	CNT3U100	10005.00
1200	NNG3U120L	16914.00	HNG3U120L	18530.00	LNG3U120L	21553.00	CNT3U120	10005.00
ELECTRONIC LIG TRIP								
800	NNG3X800L	16581.00	HNG3X800L	18197.00	LNG3X800L	21220.00	CNT3X800	9672.00
1000	NNG3X100L	16581.00	HNG3X100L	18197.00	LNG3X100L	21220.00	CNT3X100	9672.00
1200	NNG3X120L	16581.00	HNG3X120L	18197.00	LNG3X120L	21220.00	CNT3X120	9672.00

### NG 1200A Frame 4-Pole Electronic Trip Unit<sup>A</sup>

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NNG4F120		8218.00	HNG4F120		10319.00	LNG4F120		14249.00
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
ELECTRONIC LI TRIP								
800	NNG4N800L	19066.00	HNG4N800L	21167.00	LNG4N800L	25097.00	CNT4N800	10064.00
1000	NNG4N100L	19066.00	HNG4N100L	21167.00	LNG4N100L	25097.00	CNT4N100	10064.00
1200	NNG4N120L	19066.00	HNG4N120L	21167.00	LNG4N120L	25097.00	CNT4N120	10064.00
ELECTRONIC LSI TRIP								
800	NNG4P800L	19501.00	HNG4P800L	21602.00	LNG4P800L	25532.00	CNT4P800	10499.00
1000	NNG4P100L	19501.00	HNG4P100L	21602.00	LNG4P100L	25532.00	CNT4P100	10499.00
1200	NNG4P120L	19501.00	HNG4P120L	21602.00	LNG4P120L	25532.00	CNT4P120	10499.00
ELECTRONIC LSIG TRIP								
800	NNG4U800L	22009.00	HNG4U800L	24110.00	LNG4U800L	28040.00	CNT4U800	13007.00
1000	NNG4U100L	22009.00	HNG4U100L	24110.00	LNG4U100L	28040.00	CNT4U100	13007.00
1200	NNG4U120L	22009.00	HNG4U120L	24110.00	LNG4U120L	28040.00	CNT4U120	13007.00
ELECTRONIC LIG TRIP								
800	NNG4X800L	21576.00	HNG4X800L	23677.00	LNG4X800L	27607.00	CNT4X800	12574.00
1000	NNG4X100L	21576.00	HNG4X100L	23677.00	LNG4X100L	27607.00	CNT4X100	12574.00
1200	NNG4X120L	21576.00	HNG4X120L	23677.00	LNG4X120L	27607.00	CNT4X120	12574.00

### NG 1200A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NNG3F120		6321.00	HNG3F120		7937.00	LNG3F120		10960.00
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
LCD ELECTRONIC LSI TRIP								
800	NNG3D800L	16196.00	HNG3D800L	17812.00	LNG3D800L	20835.00	CNT3D800	9287.00
1000	NNG3D100L	16196.00	HNG3D100L	17812.00	LNG3D100L	20835.00	CNT3D100	9287.00
1200	NNG3D120L	16196.00	HNG3D120L	17812.00	LNG3D120L	20835.00	CNT3D120	9287.00
LCD ELECTRONIC LSIG 4-W TRIP								
800	NNG3E800L	18125.00	HNG3E800L	19741.00	LNG3E800L	22764.00	CNT3E800	11216.00
1000	NNG3E100L	18125.00	HNG3E100L	19741.00	LNG3E100L	22764.00	CNT3E100	11216.00
1200	NNG3E120L	18125.00	HNG3E120L	19741.00	LNG3E120L	22764.00	CNT3E120	11216.00

A - Consult with Siemens for availability.



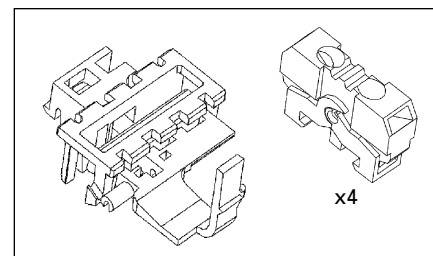
# VL Circuit Breakers

## Internal Accessories for MG 800A, NG 1200A, and PG 1600A Frames

**Selection**

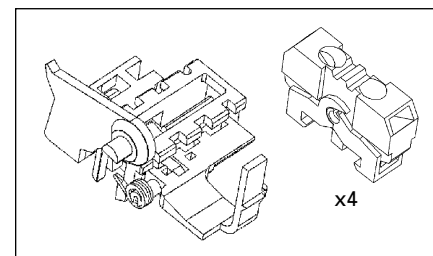
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
2 Aux. + 2 Alarm Switches 2A + 2B Base AMBP2	Left Pocket Only	<b>ASKP3</b>	<b>530.00</b>
4 Aux. Switches 2A + 2B Base AMBP1	Left, Right, Neutral	<b>ASKP4</b>	<b>495.00</b>



### Auxiliary/Alarm Switch Mounting Base Only

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
Up to 4 Auxiliary Switches	Left, Right, Neutral	<b>AMBP1</b>	<b>83.00</b>
2 Aux. + 2 Alarm Switches	Left Pocket Only	<b>AMBP2</b>	<b>83.00</b>



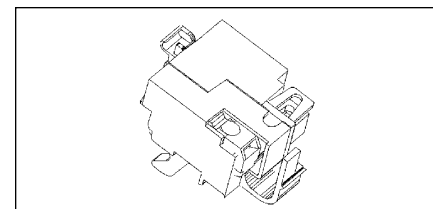
### Auxiliary/Alarm Switch Only

Common to DG-PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	<b>ASWPA</b>	<b>108.00</b>
1 Normally Closed Contact (1B)	<b>ASWPB</b>	<b>108.00</b>

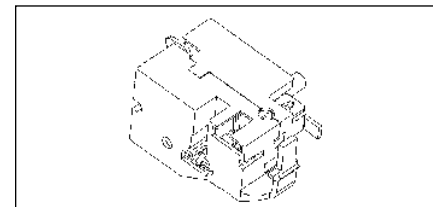
### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	<b>STRPB24DC</b>	<b>654.00</b>
48-60 VDC		<b>STRPC60DC</b>	<b>654.00</b>
110-127 VDC		<b>STRPD125DC</b>	<b>654.00</b>
220-250 VDC		<b>STRPE250DC</b>	<b>654.00</b>
48-60 VAC		<b>STRPM60</b>	<b>654.00</b>
110-127 VAC		<b>STRPN120</b>	<b>654.00</b>
208-277 VAC		<b>STRPS277</b>	<b>654.00</b>
380-600 VAC		<b>STRPV600</b>	<b>654.00</b>



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	<b>UVRPA12DC</b>	<b>654.00</b>
24 VDC		<b>UVRPB24DC</b>	<b>654.00</b>
48 VDC		<b>UVRPC48DC</b>	<b>654.00</b>
60 VDC		<b>UVRPG60DC</b>	<b>654.00</b>
110-127 VDC		<b>UVRPD125DC</b>	<b>654.00</b>
220-250 VDC		<b>UVRPE250DC</b>	<b>654.00</b>
110-127 VAC		<b>UVRPN120</b>	<b>654.00</b>
220-240 VAC		<b>UVRPR240</b>	<b>654.00</b>
208 VAC		<b>UVRPP208</b>	<b>654.00</b>
277 VAC		<b>UVRPS277</b>	<b>654.00</b>
380-415 VAC		<b>UVRPT415</b>	<b>654.00</b>
440-480 VAC		<b>UVRPU480</b>	<b>654.00</b>
600 VAC		<b>UVRPV600</b>	<b>654.00</b>



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

# VL Circuit Breakers

## PG 1600A Frame, VL Series & Thermal-Magnetic Trip Unit

### Selection/Dimensions

#### Ordering Information

Prices for a complete factory assembled PG breaker include the frame and trip unit only. The connectors must be ordered as separate items.

For any other configuration, order the frame, trip unit, and connectors as separate items.

Connectors require a Breaker Lug Mounting Assembly or Breaker Mounting Base and must be ordered as a separate item.

For DC applications, use Thermal magnetic trip unit only.

For reverse feed applications select non-interchangeable trip breakers only. Change the third digit of the catalog number to "X" for non-interchangeable trip breakers.

100% Rated: For 100% rated breakers (or frames) with an interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog name to "H".

For 100% rated breakers with a non-interchangeable trip unit, change the 3<sup>rd</sup> character of the catalog number to "Y".

For 50°C and special applications, refer to page 6-144.A

Mounting hardware is included with each frame or complete breaker.

A Toggle Handle Extension is included with each frame or complete breaker.



#### Dimensions, inches (mm)

Number of Poles	W	L	D	To Handle D1
2, 3 4	9 (229) 12 (305)	16 (406)	6 (152)	8.1 (207)

#### Shipping Weight, lbs. (kg)

Poles	Frame	Trip Unit	Complete Breaker
2, 3	60.2 (27.3)	8.8 (4.0)	69.0 (31.3)
4	76.7 (34.8)	13.2 (6.0)	89.9 (40.8)

#### PG Thermal-Magnetic, Instantaneous Trip Adjustment Range

Trip Unit Continuous Amp Rating (I <sub>n</sub> )	Instantaneous Overcurrent Setting (I <sub>t</sub> )	
	Min.	Max.
1200	7000	12000
1400	7000	12000
1600	7000	12000

Note: Each breaker has 6 trip settings in this range.



Model 525 Trip Unit

#### Interrupting Ratings

Breaker Type	RMS Symmetrical Amperes (KA)										
	UL 489					IEC 60947-2					
	Volts AC (50/60 Hz)			Volts DC		Volts AC (50/60 Hz)					
	240	480	600	250	500	220/240		380/415		690	
					I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	I <sub>CU</sub>	I <sub>CS</sub>	
NPG	65	35	25	22	35	65	35	50	25	20	10
HPG	100	65	35	25	50	100	50	70	35	30	15
LPG	200	100	65	42	65	200	100	100	50	35	17

#### Connectors for 75°C Wire

Construction	Ampere Rating	Wire Range	No. of cables per phase	Catalog Number	List Price \$
Aluminum	1200-1600A	1/0-750 kcmil Al/Cu	6	3TA6PG750 <sup>①③④</sup>	940.00
Copper	1200-1600A	1/0-750 kcmil Cu	6	3TC6PG750 (future) <sup>①③</sup>	1342.00
Aluminum	1200-1600A	300-600 kcmil	5	TA5P600 <sup>②④</sup>	320.00
Aluminum	1200-1600A	600-750 kcmil	4	TA4P750 <sup>②④</sup>	254.00
Aluminum	1200-1600A	300-600 kcmil	6	TA6R600 <sup>②④</sup>	338.00
Copper	1200-1600A	300-600 kcmil	5	TC5R600 <sup>②④⑤</sup>	426.00

① Requires Lug Mounting Assembly LMAP1600.

② Requires Breaker Mounting Base MBPG1600 Kit or MBPG1601.

③ Consists of 3 connectors.

④ Consists of 1 connector.

⑤ For 100% rated applications, 90°C.

⑥ Standard connector provided with complete breaker.

#### Mounting Arrangement

Description	Catalog Number	List Price \$
Lug Mounting Assembly	LMAP1600	968.00
Breaker Mounting Base (Front Connect)	MBPG1600	1153.00
Breaker Mounting Base (Rear Connect)	MBPG1601	1153.00

#### PG 1600A Frame 3-Pole with Thermal-Magnetic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
	NPG3F160	8983.00	HPG3F160	9944.00	LPG3F160	12158.00		
	COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER							
1200	NPG3B120	17276.00	HPG3B120	18237.00	LPG3B120	20451.00	CPT3B120	8293.00
1400	NPG3B140	17276.00	HPG3B140	18237.00	LPG3B140	20451.00	CPT3B140	8293.00
1600	NPG3B160	17276.00	HPG3B160	18237.00	LPG3B160	20451.00	CPT3B160	8293.00

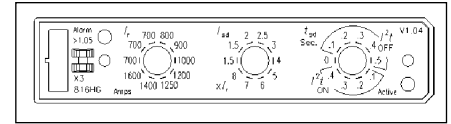
A - Consult with Siemens for availability.

External Accessories pages 6-125 through 6-139

# VL Circuit Breakers

## PG 1600A Electronic 3-Knob & LCD Trip Units

**Selection**



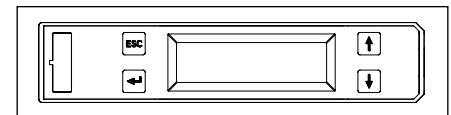
Model 545 Trip Unit

### PG 1600A Frame 3-Pole Electronic Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NPG3F160	8983.00	HPG3F160	9944.00	LPG3F160	12158.00			
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
ELECTRONIC LI TRIP								
1200	NPG3N120	18743.00	HPG3N120	19704.00	LPG3N120	21918.00	CPT3N120	9760.00
1600	NPG3N160	18743.00	HPG3N160	19704.00	LPG3N160	21918.00	CPT3N160	9760.00
ELECTRONIC LSI TRIP								
1200	NPG3P120	19077.00	HPG3P120	20038.00	LPG3P120	22252.00	CPT3P120	10094.00
1600	NPG3P160	19077.00	HPG3P160	20038.00	LPG3P160	22252.00	CPT3P160	10094.00
ELECTRONIC LSIG TRIP								
1200	NPG3U120	21006.00	HPG3U120	21967.00	LPG3U120	24181.00	CPT3U120	12023.00
1600	NPG3U160	21006.00	HPG3U160	21967.00	LPG3U160	24181.00	CPT3U160	12023.00
ELECTRONIC LIG TRIP								
1200	NPG3X120	20672.00	HPG3X120	21633.00	LPG3X120	23847.00	CPT3X120	11689.00
1600	NPG3X160	20672.00	HPG3X160	21633.00	LPG3X160	23847.00	CPT3X160	11689.00

### PG 1600A Frame 4-Pole Electronic Trip Unit<sup>A</sup>

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NPG4F160	11678.00	HPG4F160	12927.00	LPG4F160	15806.00			
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
ELECTRONIC LI TRIP								
1200	NPG4N120	24367.00	HPG4N120	25616.00	LPG4N120	28495.00	CPT4N120	12689.00
1600	NPG4N160	24367.00	HPG4N160	25616.00	LPG4N160	28495.00	CPT4N160	12689.00
ELECTRONIC LSI TRIP								
1200	NPG4P120	24800.00	HPG4P120	26049.00	LPG4P120	28928.00	CPT4P120	13122.00
1600	NPG4P160	24800.00	HPG4P160	26049.00	LPG4P160	28928.00	CPT4P160	13122.00
ELECTRONIC LSIG TRIP								
1200	NPG4U120	27308.00	HPG4U120	28557.00	LPG4U120	31436.00	CPT4U120	15630.00
1600	NPG4U160	27308.00	HPG4U160	28557.00	LPG4U160	31436.00	CPT4U160	15630.00
ELECTRONIC LIG TRIP								
1200	NPG4X120	26874.00	HPG4X120	28123.00	LPG4X120	31002.00	CPT4X120	15196.00
1600	NPG4X160	26874.00	HPG4X160	28123.00	LPG4X160	31002.00	CPT4X160	15196.00



Model 576 Trip Unit

### PG 1600A Frame 3-Pole Electronic LCD Trip Unit

Continuous Ampere Rating	N-Interrupting Class		H-Interrupting Class		L-Interrupting Class		Catalog Number	List Price \$
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
	FRAME ONLY							
NPG3F160	8983.00	HPG3F160	9944.00	LPG3F160	12158.00			
COMPLETE FACTORY ASSEMBLED CIRCUIT BREAKER								
LCD ELECTRONIC LSI TRIP								
1200	NPG3D120	20591.00	HPG3D120	21552.00	LPG3D120	23766.00	CPT3D120	11608.00
1600	NPG3D160	20591.00	HPG3D160	21552.00	LPG3D160	23766.00	CPT3D160	11608.00
LCD ELECTRONIC LSIG TRIP								
1200	NPG3E120	22520.00	HPG3E120	23481.00	LPG3E120	25695.00	CPT3E120	13537.00
1600	NPG3E160	22520.00	HPG3E160	23481.00	LPG3E160	25695.00	CPT3E160	13537.00

A - Consult with Siemens for availability.

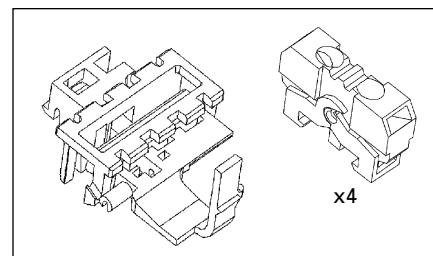
# VL Circuit Breakers

## Internal Accessories for MG 800A, NG 1200A, and PG 1600A Frames

**Selection**

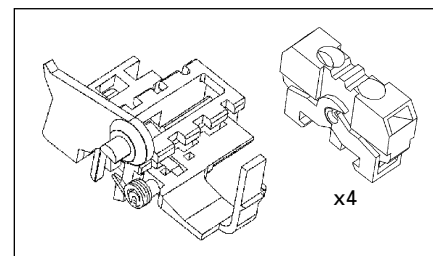
### Auxiliary Switch and Alarm Switch Combination Kits

Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
2 Aux. + 2 Alarm Switches 2A + 2B Base AMBP2	Left Pocket Only	<b>ASKP3</b>	<b>530.00</b>
4 Aux. Switches 2A + 2B Base AMBP1	Left, Right, Neutral	<b>ASKP4</b>	<b>495.00</b>



### Auxiliary/Alarm Switch Mounting Base Only

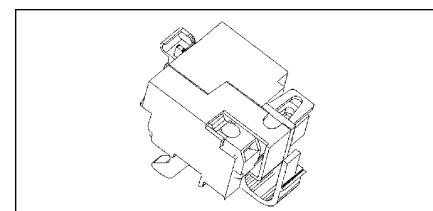
Description	Mounting Pocket <sup>①</sup>	Catalog Number	List Price \$
Up to 4 Auxiliary Switches	Left, Right, Neutral	<b>AMB1</b>	<b>83.00</b>
2 Aux. + 2 Alarm Switches	Left Pocket Only	<b>AMB2</b>	<b>83.00</b>



### Auxiliary/Alarm Switch Only

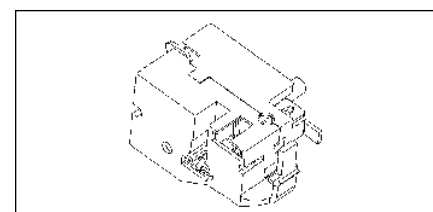
Common to DG-PG Frames

Description	Catalog Number	List Price \$
1 Normally Open Contact (1A)	<b>ASWPA</b>	<b>108.00</b>
1 Normally Closed Contact (1B)	<b>ASWPB</b>	<b>108.00</b>



### Shunt Trips

Description	Mounting Pocket	Catalog Number	List Price \$
24 VDC	Right Pocket Only	<b>STRPB24DC</b>	<b>654.00</b>
48-60 VDC		<b>STRPC60DC</b>	<b>654.00</b>
110-127 VDC		<b>STRPD125DC</b>	<b>654.00</b>
220-250 VDC		<b>STRPE250DC</b>	<b>654.00</b>
48-60 VAC		<b>STRPM60</b>	<b>654.00</b>
110-127 VAC		<b>STRPN120</b>	<b>654.00</b>
208-277 VAC		<b>STRPS277</b>	<b>654.00</b>
380-600 VAC		<b>STRPV600</b>	<b>654.00</b>



### Undervoltage Release

Description	Mounting Pocket	Catalog Number	List Price \$
12 VDC	Right Pocket Only	<b>UVRPA12DC</b>	<b>654.00</b>
24 VDC		<b>UVRPB24DC</b>	<b>654.00</b>
48 VDC		<b>UVRPC48DC</b>	<b>654.00</b>
60 VDC		<b>UVRPG60DC</b>	<b>654.00</b>
110-127 VDC		<b>UVRPD125DC</b>	<b>654.00</b>
220-250 VDC		<b>UVRPE250DC</b>	<b>654.00</b>
110-127 VAC		<b>UVRPN120</b>	<b>654.00</b>
220-240 VAC		<b>UVRPR240</b>	<b>654.00</b>
208 VAC		<b>UVRPP208</b>	<b>654.00</b>
277 VAC		<b>UVRPS277</b>	<b>654.00</b>
380-415 VAC		<b>UVRPT415</b>	<b>654.00</b>
440-480 VAC		<b>UVRPU480</b>	<b>654.00</b>
600 VAC		<b>UVRPV600</b>	<b>654.00</b>



'A' refers to a normally open contact (open when the breaker contacts are open).

'B' refers to a normally closed contact (closed when the breaker contacts are open).

① Refer to the "Accessory Locations" chart for guidelines and limitations about which pockets may be used for accessory combinations.

External Accessories pages 6-125 through 6-139

# Molded Case Circuit Breakers

## Molded Case Switch

## Selection

### General

Typically a molded case switch is used when a compact load-break switch is needed for disconnect purposes. The VL line of molded case switches from Siemens is made of the same materials and components as the VL circuit breakers but do not provide overcurrent protection. Each molded case

switch has a fixed instantaneous self-protecting trip element which may open the switch under high fault conditions.

### Application Note

Overcurrent protection must be provided by an appropriate overcurrent protective device located upstream from

the molded case switch. Also, the short-circuit current rating of the switch is limited to the interrupting rating of the upstream protective device or the ratings in the table below, **whichever is less.**

### Ordering Information

Each type VL molded case switch accepts the same terminals and accessories as the equivalent VL circuit breakers.

All type VL molded case switches are suitable for reverse feed applications.

Mounting hardware and standard line and load terminals are included on ratings through 250A. For 400 – 1600A ratings, order the lugs separately.

All ratings are UL listed and CSA certified.

## Molded Case Switch

Maximum Ampere Rating / Frame	Catalog Number	List Price \$	Catalog Number	List Price \$	Short-Circuit Current Rating*			Self Protective Instantaneous Override
					240V	480V	600V	
150A / DG 250A / FG	HDS2S150L HFS2S250L	1362.00 1618.00	HDS3S150L HFS3S250L	1447.00 1998.00	100k 100k	65k 65k	20k 35k	2,500A 3,500A
400A / JG 600A / LG	HJS2S400 HLS2S600	2840.00 3973.00	HJS3S400 HLS3S600	3357.00 4970.00	100k 100k	65k 65k	35k 35k	4,400A 5,500A
800A / MG 1200A / NG	HMS2S800 HNS2S120	4811.00 9172.00	HMS3S800 HNS3S120	5843.00 10002.00	100k 100k	65k 65k	35k 35k	6,500A 12,000A
1600A / PG	—	—	HPS3S160	18017.00	100k	65k	35k	12,000A

Maximum Ampere Rating / Frame	Catalog Number	List Price \$	Short-Circuit Current Rating*			Self Protective Instantaneous Override
			240V	480V	600V	
250A / FG	LFS3S250L	2498.00	200k	100k	25k	3,500A
400A / JG 600A / LG	LJS3S400 LLS3S600	4028.00 6863.00	200k 200k	100k 100k	42k 42k	4,400A 5,500A
800A / MG 1200A / NG	LMS3S800 LNS3S120	7597.00 12003.00	200k 200k	100k 100k	50k 65k	6,500A 12,000A
1600A / PG	LPS3S160	20179.00	200k	100k	65k	12,000A

\* The Short-Circuit Current Rating is the maximum available current of the circuit where the switch is used, when protected by an appropriate overcurrent protective device. Above 250A, terminals are not included and must be ordered separately. For terminal information and the variety of lugs available for VL breakers.

# Molded Case Circuit Breakers

## Motor Circuit Protectors

Selection

### General

#### Protection of Motor Circuits

Molded case circuit breakers are used in motor circuits as a disconnecting means and for short-circuit protection. They should be used in conjunction with motor-running, over-current protection devices, and should permit the motor to start without nuisance tripping from motor-inrush current. The circuit breaker should have a continuous current rating of not less than 115% of the motor full-load current.

The recommended motor circuit protectors listed have continuous-current ratings of at least 115% of motor full-load currents. The trip setting positions are approximately 11 times motor full-load current. The suggested trip settings may need to be adjusted upward to no higher than 1300% of full-load current for non-design E type motors, and no greater than 1700% of full-load current for design E motors, to allow for motor startup due to in-rush current.

#### Breaker Mounted Immediately Ahead of Motor Starter

Siemens motor circuit protectors are recommended for use in combination motor starters to provide selective short-circuit protection for the motor branch circuit. The adjustable instantaneous trip feature of the Siemens motor circuit protector provides for a trip setting slightly above the peak motor in-rush current. With this setting, no delay is introduced in opening the circuit when a fault occurs. This circuit breaker has no time-delay trip element. Therefore it must be used in conjunction with, and immediately ahead of, the motor-running overcurrent protection device.

Important: The information below does not apply to all motor applications: it is recommended that the user refer to the National Electrical Code (NEC) for specific needs.

**Table 1 (When Breaker is Mounted Immediately Ahead of Motor Starter)**

3-Phase Induction Type Motors (Siemens motor circuit protectors for branch circuit use with alternating-current combination, full voltage motor starters)

Motor Full Load Amperes	Trip Setting (A)	Catalog Number <sup>①</sup>	List Price \$
35-50	450	HDM3L150L	1589.00
42-60	540		
48-70	630		
55-80	720		
62-90	810		
69-100	900		
58-83	750	HDM3M150L	1589.00
69-100	900		
81-117	1050		
92-133	1200		
104-150	1350		
115-150 <sup>②</sup>	1500		
96-139	1250	HDM3H150L	1589.00
115-150 <sup>②</sup>	1500		
135-150 <sup>②</sup>	1750		
135-150 <sup>②</sup>	2000		
135-150 <sup>②</sup>	2250		
135-150 <sup>②</sup>	2500		
46-67	600	HFM3L250L	2111.00
55-80	720		
65-93	840		
74-107	960		
83-120	1080		
92-133	1200		
77-111	1000	HFM3M250L	2111.00
92-133	1200		
108-156	1400		
123-178	1600		
138-200	1800		
154-222	2000		
135-194	1750	HFM3H250L	2111.00
162-210	2100		
188-220	2450		
215-241	2800		
242-250 <sup>②</sup>	3150		
242-250 <sup>②</sup>	3500		

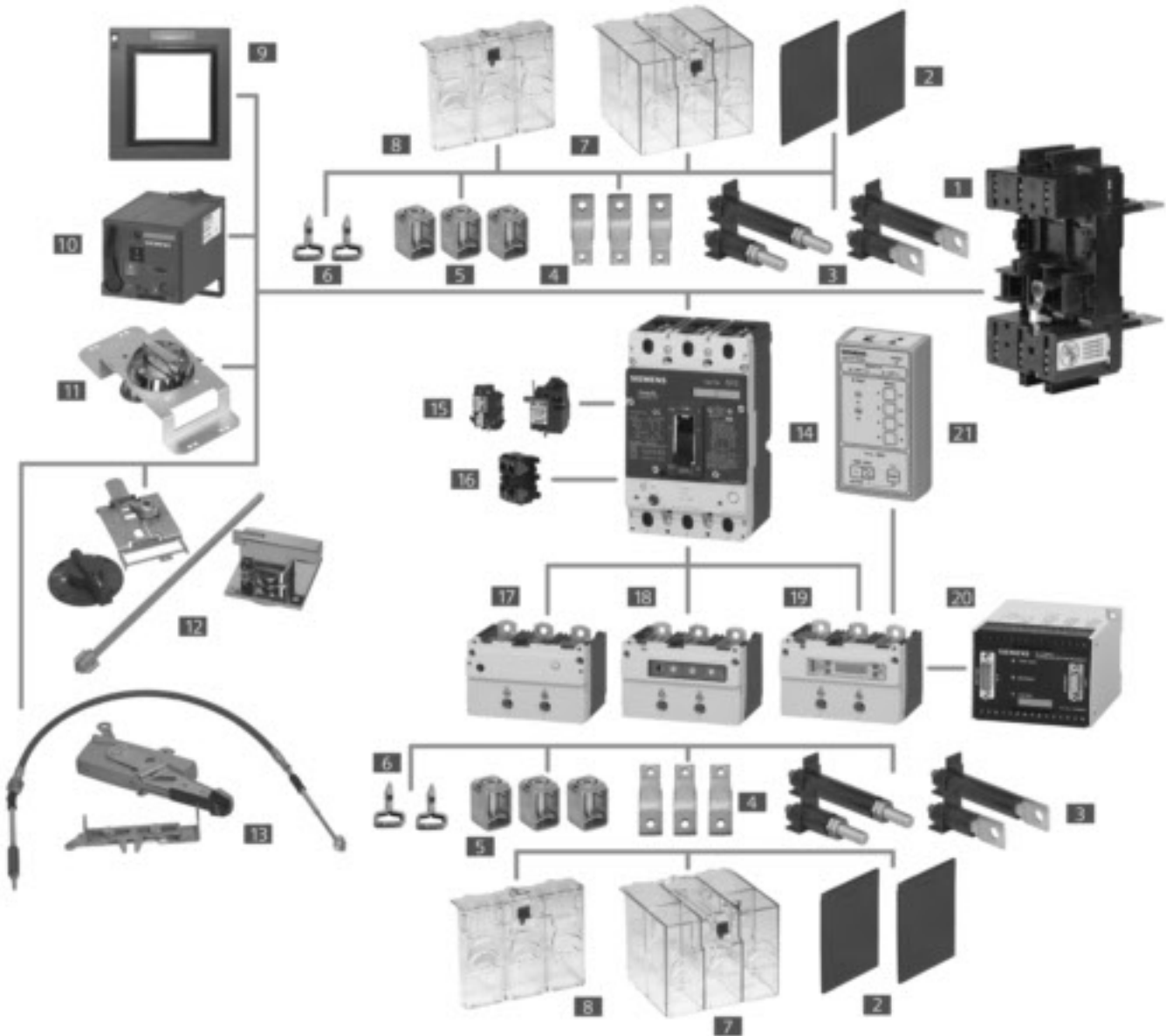
Motor Full Load Amperes	Trip Setting (A)	Catalog Number <sup>①</sup>	List Price \$
96-139	1250	HJM3L400	3881.00
115-167	1500		
135-194	1750		
154-222	2000		
173-250	2250		
192-278	2500		
154-222	2000	HJM3M400	3881.00
185-267	2400		
215-311	2800		
246-356	3200		
277-400	3600		
308-400 <sup>②</sup>	4000		
154-222	2000	HLM3L600	5771.00
185-267	2400		
215-311	2800		
246-356	3200		
277-400	3600		
308-444	4000		
212-306	2750	HLM3M600	5771.00
254-367	3300		
296-428	3850		
338-489	4400		
381-550	4950		
423-600	5500		
250-361	3250	HMM3M800	8277.00
292-422	3800		
335-483	4350		
385-556	5000		
442-638	5740		
500-722	6500		
385-556	5000	HNM3M120	13587.00
462-667	6000		
538-778	7000		
615-889	8000		
692-1000	9000		
769-1111	10,000		

① Motor circuit protectors rated 150A and 250A are supplied with line and load lugs installed. If lugs are required on 400A to 1200A motor circuit breakers, order required lugs separately.

② These settings are provided for starting currents greater than 11X but not to exceed 17X. Full Load Amps (FLA) not to exceed ampere rating of MCP.

### Modularity To Support All Your Application Needs

Modules and More: VL Circuit Breakers with Optional Accessories



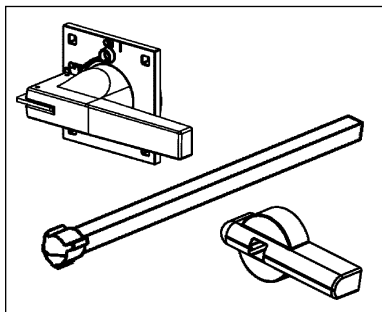
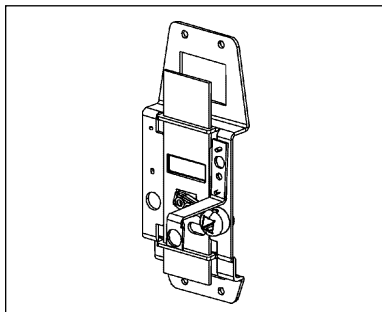
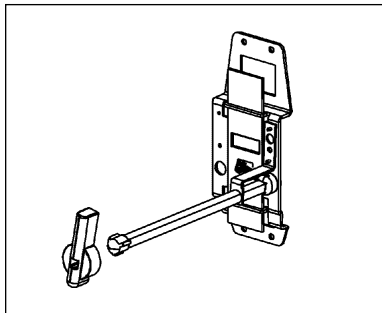
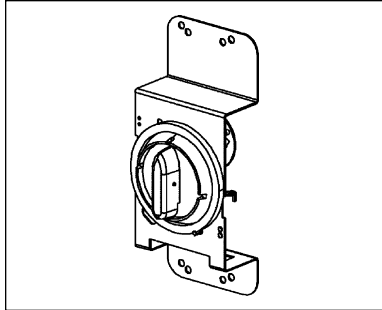
- 1 Base for Plug-In or Draw-Out
- 2 Interphase Barriers
- 3 Rear Terminals – Flat and Round
- 4 Bus Extensions
- 5 Terminal Connectors
- 6 Plug-In Terminal Blades
- 7 Extended Terminal Shield
- 8 Standard Terminal Shield

- 9 Cover Frame for Door Cutout
- 10 Stored Energy Operator
- 11 Rotary Handle Operator
- 12 Variable Depth Rotary Operator
- 13 Max Flex Operator
- 14 Circuit Breaker
- 15 Shunt Trip or Undervoltage Releases
- 16 Auxiliary/Alarm Switches

- 17 Thermal-Magnetic Trip Unit (525)
- 18 Electronic Trip Unit (545)
- 19 Elec. Trip Unit with LCD (576)
- 20 Communication Module with ZSI
- 21 Electronic Trip Unit Test Kit

# External Accessories

## Operating Mechanisms



Description	For DG to FG Frame 150 to 250 A		For JG to LG Frame 400 A to 600 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Through Door Mounted Rotary Handle Operator Kit<sup>A</sup></b> Fixed depth and the handle is mounted directly on the circuit breaker. Lockable knob (for up to 3 padlocks). NEMA 1, 12	RHFF	155.00	RHFL	193.00
Red Handle Version with red knob, yellow indicator plate NEMA 1, 12	RHFFEM	168.00	RHFLEM	205.00
<b>Door Mounted Rotary Handle Operator Kit<sup>A</sup></b> Variable depth, door mounted handle. Includes knob with masking frame, indicator plate, detachable door coupling, 12" shaft, and breaker mounted rotary operator. Lockable knob (for up to 3 padlocks). NEMA 1, 12	RHVF12	214.00	RHVL12	295.00
<b>Auxiliary Switch Kits<sup>A</sup></b> For Direct or Extended Rotary Handle Operators (RHF and RHV). Form C, Early Break type <sup>2</sup> Aux. Switch Kit <sup>Ⓞ</sup> Includes 1 switch with 5' wire For Variable Depth For Fixed Depth	RHSFA1 RHSFA1F	187.00 187.00	RHSLA1 RHSLA1F	187.00 187.00
Includes 2 switches with 5' wire For Variable Depth For Fixed Depth	RHSFA2 RHSFA2F	237.00 237.00	RHSLA2 RHSLA2F	237.00 237.00
<b>Door Mounted Rotary Operator Mechanism Only<sup>A</sup></b> Breaker mechanism only	RHVFBM	131.00	RHVLBM	212.00
<b>Door Mounted Rotary Handle Only<sup>A</sup></b> Standard version NEMA 1, 12 NEMA 3R NEMA 4X Red Handle version	RHVM12H RHVM3RH RHVM4XH RHVMEMH	51.00 116.00 150.00 61.00	RHVM12H RHVM3RH RHVM4XH RHVMEMH	51.00 116.00 150.00 61.00
<b>Extension Shaft Only, for Door Mounted Operator<sup>A</sup></b> 2 inches (50.8mm) 3 inches (76.2mm) 12 inches (304.8 mm) 16 inches (406.4 mm) 24 inches (609.6mm) w/ support bracket	RHVMS02 — RHVMS12 RHVMS16 —	31.50 — 31.50 31.50 —	RHVMS02 — RHVMS12 RHVMS16 —	31.50 — 31.50 31.50 —

Ⓞ During manual operation, Early Break auxiliary switch contacts open before the breaker opens.  
A - Consult with Siemens for availability.

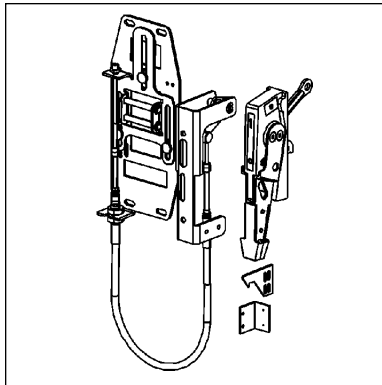
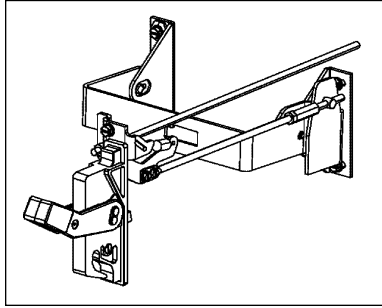


Description	For MG Frame 800 A		For NG to PG Frame 1200 to 1600 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Through Door Mounted Rotary Handle Operator Kit<sup>A</sup></b> Fixed depth, breaker mounted. For direct fitting to the circuit breaker. Lockable with up to 3 padlocks. NEMA 1, 12	RHFM	210.00	—	—
Red Handle version with red knob, yellow indicator plate NEMA 1, 12	RHFMEM	226.00	—	—
<b>Door Mounted Rotary Handle Operator Kit<sup>A</sup></b> Variable depth, door mounted handle. Includes knob with masking frame, indicator plate, detachable door coupling, 12" shaft, and breaker mounted rotary operator. Lockable knob (for up to 3 padlocks). NEMA 1, 12	RHVM12	322.00	—	—
<b>Auxiliary Switch Kits<sup>A</sup></b> For Direct or Extended Rotary Handle Operators (RHF and RHV). Early Break type2 Aux. Switch Kit Includes 1 switch with 5' wire For Variable Depth For Fixed Depth	RHSMA1 RHSMA1F	187.00 187.00	RHSPA1 RHSPA1F	187.00 187.00
Includes 2 switches with 5' wire For Variable Depth For Fixed Depth	RHSMA2 RHSMA2F	237.00 237.00	RHSPA2 RHSPA2F	237.00 237.00
<b>Door Mounted Rotary Operator Mechanism Only<sup>A</sup></b> Breaker mechanism only	RHVMBM	239.00	RHVPBM	239.00
<b>Door Mounted Rotary Handle Only<sup>A</sup></b> Standard version NEMA 1, 12 NEMA 3R NEMA 4X	RHVM12H RHVM3RH RHVM4XH	51.00 116.00 150.00	RHVP3RH RHVP3RH RHVP4XH	116.00 116.00 150.00
Red Handle version	RHVMEMH	61.00	RHVPEMH	126.00
<b>Extension Shaft Only, for Door Mounted Operator<sup>A</sup></b> 2 inches (50.8mm) 3 inches (76.2mm) 12 inches (304.8 mm) 16 inches (406.4 mm) 24 inches (609.6mm) w/ support bracket	RHVMS02 — RHVMS12 RHVMS16 —	31.50 — 31.50 31.50 —	— RHVPS03 RHVPS12 — RHVPS24	— 97.00 97.00 — 127.00

A - Consult with Siemens for availability.

# External Accessories

## Operating Mechanisms



Description	For DG and FG Frame 150 to 250 A		For JG and LG Frame 400 to 600 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Variable Depth Flange Mounted Operator Kit<sup>A</sup></b> Adjustable from 8" to 16" Complete kit, includes handle and variable depth operator. NEMA 1, 3R, 12 NEMA 4X	FHVF3R FHVF4X FHVF3RB	275.00 368.00 275.00	FHVL3R FHVL4X FHVL3RB	294.00 391.00 294.00
IEC Black Handle NEMA 1, 3R, 12				
<b>Max-Flex™, Variable Depth Flange Mounted Operator Kit<sup>A</sup></b> Complete kit, includes handle, breaker operator, and cable. NEMA 1, 3R, 12 For DG and FG operators, the cable is 36", all others are 48"	MFKF3R	588.00	MFKL3R	630.00
<b>Handle Only, for Max-Flex™ Variable Depth<sup>A</sup></b> NEMA 1, 3R, 12 Plastic NEMA 1, 3R, 12 Steel - epoxy coated NEMA 4, 4X Steel - chrome plated Solid color (all gray) Plastic <sup>①</sup> NEMA 1, 3R, 12 Solid color (black handle) Steel epoxy coated <sup>①</sup> NEMA 1, 3R, 12	MFHM3R MFHM3RS MFHM4X MFHM3RB MFHM3RSB	269.00 315.00 432.00 269.00 315.00	MFHM3R MFHM3RS MFHM4X MFHM3RB MFHM3RSB	269.00 315.00 432.00 269.00 315.00
<b>Breaker Operator Mechanism Only, for Max-Flex™<sup>A</sup></b>	MFMF	194.00	MFML	218.00
<b>Cable Only, for Max-Flex™ Variable Depth<sup>A</sup></b> 36" 48" 60" 72" 84" 96" 120" 144"	MFCF036 MFCF048 MFCF060 MFCF072 MFCF084 MFCF096 MFCF120 MFCF144	161.00 192.00 217.00 239.00 264.00 287.00 376.00 417.00	MFCM036 MFCM048 MFCM060 MFCM072 MFCM084 MFCM096 MFCM120 MFCM144	177.00 209.00 239.00 275.00 319.00 376.00 408.00 424.00
<b>Handle Auxiliary Switch<sup>A</sup></b> Form C (1NO - 1NC), early break <sup>②</sup> 1 Aux. switch 2 Aux. switch	MFSFA1 MFSFA2	165.00 330.00	MFSLA1 MFSLA2	165.00 330.00

① Max-Flex™ handles are available with solid gray or black handles instead of the customary "Red for On" flange handle.

The black handle is preferred for IEC markets, where red handles have a specific meaning.

② During manual operation, Early Break aux. contacts open before the breaker opens.

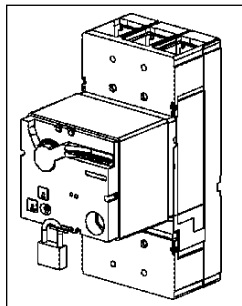
A - Consult with Siemens for availability.

Description	For MG Frame 800 A		For NG Frame 1200 A		For PG Frame 1600 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Variable Depth Flange Mounted Operator Kit<sup>A</sup></b> Adjustable from 8" to 16" Complete kit, includes handle and variable depth operator. NEMA 1, 3R, 12 NEMA 4X IEC Black Handle NEMA 1, 3R, 12	— — —	— — —	— — —	— — —	— — —	— — —
<b>Max-Flex™, Variable Depth Flange Mounted Operator Kit<sup>A</sup></b> Complete kit, includes handle, breaker operator, and cable. NEMA 1, 3R, 12 For DG and FG operators, the cable is 36", all others are 48"	<b>MFKM3R</b>	<b>736.00</b>	<b>MFKP3RS</b>	<b>839.00</b>	<b>MFKP3RS</b>	<b>839.00</b>
<b>Handle Only, for Max-Flex™ Variable Depth<sup>A</sup></b> NEMA 1, 3R, 12 Plastic NEMA 1, 3R, 12 Steel - epoxy coated NEMA 4, 4X Steel - chrome plated Solid color (all gray) Plastic <sup>①</sup> NEMA 1, 3R, 12 Solid color (black handle) Steel epoxy coated <sup>①</sup> NEMA 1, 3R, 12	<b>MFHM3R</b> <b>MFHP3RS</b> <b>MFHM4X</b>  <b>MFHM3RB</b> <b>MFHM3RSB</b>	<b>269.00</b> <b>470.00</b> <b>432.00</b>  <b>269.00</b> <b>315.00</b>	— <b>MFHP3RS</b> <b>MFHP4X</b>  — <b>MFHP3RSB</b>	— <b>470.00</b> <b>630.00</b>  — <b>470.00</b>	— <b>MFHP3RS</b> <b>MFHP4X</b>  — <b>MFHP3RSB</b>	— <b>470.00</b> <b>630.00</b>  — <b>470.00</b>
<b>Breaker Operator Mechanism Only, for Max-Flex™ A</b>	<b>MFMM</b>	<b>218.00</b>	<b>MFMP</b>	<b>218.00</b>	<b>MFMP</b>	<b>218.00</b>
<b>Cable Only, for Max-Flex™ Variable Depth<sup>A</sup></b> 36" 48" 60" 72" 84" 96" 120" 144"	<b>MFCM036</b> <b>MFCM048</b> <b>MFCM060</b> <b>MFCM072</b> <b>MFCM084</b> <b>MFCM096</b> <b>MFCM120</b> <b>MFCM144</b>	<b>177.00</b> <b>209.00</b> <b>239.00</b> <b>275.00</b> <b>319.00</b> <b>376.00</b> <b>408.00</b> <b>424.00</b>	— <b>MFCP048</b> <b>MFCP060</b> <b>MFCP072</b> <b>MFCP084</b> <b>MFCP096</b> <b>MFCP120</b> <b>MFCP144</b>	— <b>237.00</b> <b>275.00</b> <b>320.00</b> <b>337.00</b> <b>401.00</b> <b>437.00</b> <b>588.00</b>	— <b>MFCP048</b> <b>MFCP060</b> <b>MFCP072</b> <b>MFCP084</b> <b>MFCP096</b> <b>MFCP120</b> <b>MFCP144</b>	— <b>237.00</b> <b>275.00</b> <b>320.00</b> <b>337.00</b> <b>401.00</b> <b>437.00</b> <b>588.00</b>
<b>Handle Auxiliary Switch<sup>A</sup></b> Form C (1NO - 1NC), early break <sup>②</sup> 1 Aux. switch 2 Aux. switch	<b>MFSPA1</b> <b>MFSPA2</b>	<b>CSO</b> <b>CSO</b>	<b>MFSPA1</b> <b>MFSPA2</b>	<b>CSO</b> <b>CSO</b>	<b>MFSPA1</b> <b>MFSPA2</b>	<b>CSO</b> <b>CSO</b>

A - Consult with Siemens for availability.

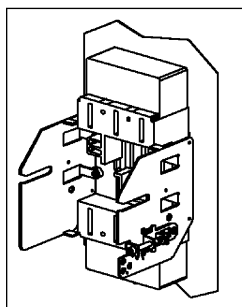
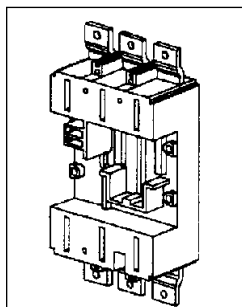
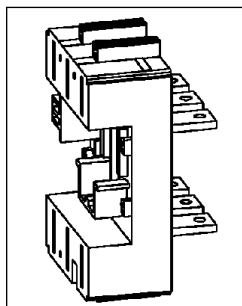
# External Accessories

## Operating Mechanisms



Description	For DG to FG Frame 150 to 250 A	
	Catalog Number	List Price \$
<b>Stored Energy and Motor Operators</b> Lockable with up to 3 padlocks.		
AC Voltage   DC Voltage	Stored Energy Type	
—   24	SEAFB	1915.00
42-48   42-48	SEAFM	1915.00
60   60	SEAFY	1915.00
110-127   110-127	SEAFN	1915.00
220-250   220-250	SEAFR	1915.00
<b>Cylinder Locks for Field Installation</b>	CLKF	120.00

## Plug-In and Draw-Out Bases



Description	For DG Frame 150 A		For FG Frame 250 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Plug-in Mounting Base Assembly</b> Includes base, terminal blade kit, sec. terminal block assembly, base trip interlock, and mounting hardware.				
<b>Rear Connected</b> 3-pole	PCBDRC3	351.00	PCBFRC3	691.00
<b>Front Connected</b> 3-pole	PCBDFC3	351.00	PCBFFC3	691.00
<b>Draw-out Assembly</b> Includes base, position indicator switch, socket, base trip interlock, crank handle, connectors, and necessary shields.				
<b>Rear Connected</b> 3-pole	DCADRC3	944.00	DCAFRC3	1194.00
<b>Front Connected</b> 3-pole (Draw-out assembly includes side plates and all hardware)	DCADFC3	944.00	DCAFFC3	1194.00
<b>Hex Wrench</b> for racking draw-out assembly and position indicator	DCHP	134.00	DCHP	134.00
<b>Position Indicator Switch</b> Form "C" switch to indicate breaker engaged/de-engaged position. <sup>①</sup>	DCIP	156.00	DCIP	156.00
<b>Secondary Terminal Block Assy.</b> Accessory connections for plug-in or draw-out breakers. Pre-wired plug and block with 8 terminal points. <sup>②</sup>	PCTF83	109.00	PCTF83	109.00
<b>90° Connection Adapter Kit</b> For rear connected 3-pole plug-in base	PCAF390	74.00	PCAF390	74.00
<b>Plug-In Spare Breaker Kit</b> Set of 6 terminal blades, 2 terminal shield, & 1 trip interlock	PCXD3	242.00	PCXF3	320.00
<b>Draw-out Spare Breaker Kit</b> Set of 6 terminal blades, & 1 trip interlock	DCXD3	210.00	DCXF3	289.00
<b>Spare Breaker Trip Interlock</b>	PCXFT	21.00	PCXFT	21.00

① Up to 2 position indicator switches may be mounted per plug-in or draw-out base.

② Up to 2 plugs per breaker (16 terminal points) may be mounted on DG, and FG breakers. Up to 3 plugs per breaker (24 terminal points) may be mounted on JG, LG, MG, NG, and PG breakers.

A - Consult Siemens for availability.

For JG to LG Frame  
400 to 600 A

For MG Frame  
800 A

For NG to PG Frame  
1200 to 1600 A

Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Stored Energy Type		Stored Energy Type		Motor Operator Type	
SEALB	3525.00	SEAMB	4173.00	MTRPB	4457.00
SEALM	3525.00	SEAMM	4173.00	MTRPM	4457.00
SEALY	3525.00	SEAMY	4173.00	MTRPY	4457.00
SEALN	3525.00	SEAMN	4173.00	MTRPN	4457.00
SEALR	3525.00	SEAMR	4173.00	MTRPR	4457.00
CLKP	120.00	CLKP	120.00	CLKP	120.00

For JG Frame  
400 A

For LG Frame  
600 A

For MG Frame  
800 A

For NG Frame  
1200 A

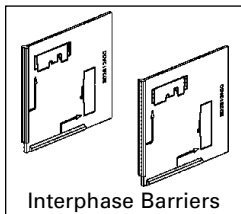
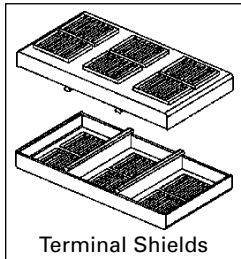
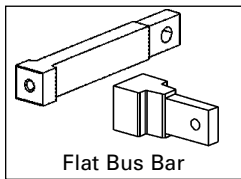
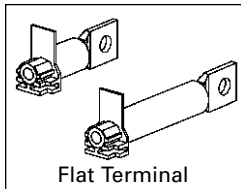
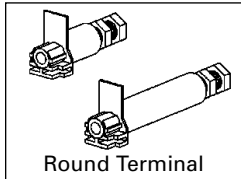
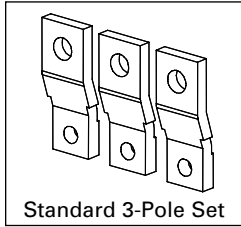
For PG Frame  
1600 A

Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
PCBJRC3	1179.00	PCBLRC3	1865.00	PCBMRC3	2891.00	PCBNRC3	3909.00	—	—
PCBJFC3	1179.00	PCBLFC3	1865.00	—	—	—	—	—	—
DCAJRC3	1881.00	DCALRC3	2886.00	DCAMRC3	4337.00	DCAPRC3	5566.00	DCAPRC3	5566.00
DCAJFC3	1881.00	DCALFC3	2886.00	DCAMFC3	4337.00	DCAPFC3 <sup>A</sup>	5566.00	DCAPFC3 <sup>A</sup>	5566.00
DCHP	134.00	DCHP	134.00	DCHP	134.00	DCHP	134.00	DCHP	134.00
DCIP	156.00	DCIP	156.00	DCIP	156.00	DCIP	156.00	DCIP	156.00
PCTL83	133.00	PCTL83	133.00	PCTM83	143.00	PCTP83	168.00	PCTP83	168.00
—	—	—	—	—	—	—	—	—	—
PCXJ3	410.00	PCXL3	483.00	PCXM3	1085.00	PCXN3	1344.00	—	—
DCXJ3	378.00	DCXL3	452.00	DCXM3	1050.00	DCXN3	1307.00	DCXP3	1307.00
PCXLT	23.00	PCXLT	23.00	PCXMT	58.00	PCXPT	77.00	PCXPT	77.00

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# External Accessories

## Connections



Description	For DG Frame 150 A		For FG Frame 250 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Front Bus Bar Connections<sup>①</sup></b> Includes nut keeper plates and shield. Standard (straight) 3-Pole Set Bus Bar Connection Strap Kit Includes 6 - Bus Bars, 6 Nut Keepers & Shields 100% rated applications	FBCD3	CSO	FBCF3	CSO
<b>Rear-Connecting Studs</b> Short length round term. (1piece) Long length round term. (1piece) 3-Pole round term. kit, 2 short + 1 long Short length flat term. (1piece) Long length flat term. (1piece) 3-Pole flat term. kit, 2 short + 1 long Flat bus bar type (1 piece) 3-Pole set of flat bus bar	RTLDSR RTLDLR SRTDR3 RTLDSF RTLDLF SRTDF3 — —	83.00 112.00 277.00 83.00 112.00 277.00 — —	RTLFSR RTLFLR SRTFR3 RTLFSF RTLFLF SRTFF3 — —	83.00 112.00 277.00 83.00 112.00 277.00 — —
<b>Terminal Shields<sup>①</sup></b> Includes 1 terminal shield, for line or load. 3-Pole Standard Shield 3-Pole Extended Shield	TSSF3 TSLF3	37.00 58.00	TSSF3 TSLF3	37.00 58.00
<b>Interphase Barriers<sup>①</sup></b> Set of 2 barriers Also fits plug-in and draw-out bases.	IPBF	29.00	IPBF	29.00
<b>Lug Mounting Assy.</b>	—	—	—	—
<b>Breaker Mounting Base</b> Front connected Rear connected	— —	— —	— —	— —

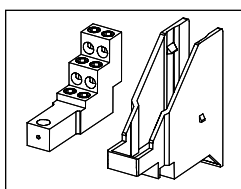
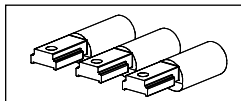
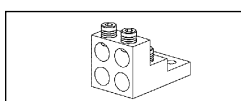
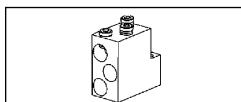
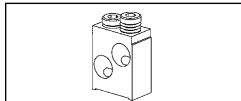
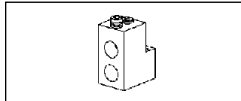
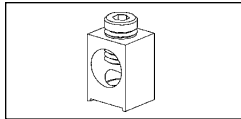
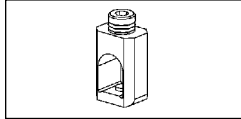
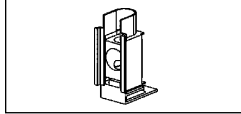
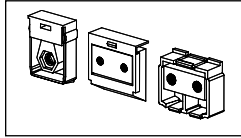
① Not UL listed.  
A - Consult Siemens for availability.

For JG Frame 400 A		For LG Frame 600 A		For MG Frame 800 A		For NG Frame 1200 A		For PG Frame 1600 A	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
FBCJ3A —	CSO —	FBCL3A —	CSO —	FBCM3A —	CSO —	FBCP3A SSBP SSBPH	CSO 1004.00 1227.00	FBCP3A SSBP SSBPH	CSO 1004.00 1227.00
RTLJSR RTLJLR SRTJR3 RTLJSF RTLJLF SRTJF3 — —	195.00 208.00 597.00 195.00 208.00 597.00 — —	— — — — — — RTLLSF SRTLF3	— — — — — — 224.00 671.00	— — — — — — RTLMSF SRTMF3	— — — — — — 323.00 967.00	— — — — — — RTLNSF SRTNF3	— — — — — — 434.00 1303.00	— — — — — — — —	— — — — — — — —
TSSL3 TSSL3	47.50 68.00	TSSL3 TSSL3	47.50 68.00	TSSM3 TSLM3	67.00 97.00	TSSP3 TSLP3	91.00 116.00	TSSP3 TSLP3	91.00 116.00
IPBM	38.50	IPBM	38.50	IPBM	38.50	IPBP	83.00	IPBP	83.00
—	—	—	—	—	—	—	—	LMAP1600	968.00
— —	— —	— —	— —	— —	— —	— —	— —	MBPG1600 MBPG1601	1211.00 1211.00

A - Consult with Siemens for availability.

# External Accessories

## Connections



Discription	For DG Frame 150 A		For FG Frame 250 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Nut Keeper Plates</b> For ring/tongue terminal or bus bar connections. (For metric threads on other than the JG or LG frame, change "TNK" to "TMK")				
1 Nut Keeper Plate	TNKD	6.10	TNKF	6.10
Kit of 3	TNKD3	19.40	TNKF3	19.40
<b>Mechanical Lugs</b> <i>Steel Wrap Around Body (Cu Wire Only)</i>				
Cable Size; (cables per phase)	#8-1/0; 1-hole		#4-350 kcmil; 1-hole	
Single Lug	TW1DG20	7.20	TW1FG350	22.00
Kit of 3	3TW1DG20	22.00	3TW1FG350	65.00
<i>Aluminum Body (Al or Cu Wire)</i>				
Cable Size; (cables per phase)	#6-3/0; 1-hole		#4-350 kcmil; 1-hole	
Single Lug	TA1DG30	7.20	TAW1FG350	22.00
Kit of 2	—	—	—	—
Kit of 3	3TA1DG30	22.00	3TAW1FG350	65.00
Cable Size; (cables per phase)	—	—	—	—
Single Lug	—	—	—	—
Kit of 2	—	—	—	—
Kit of 3	—	—	—	—
Cable Size; (cables per phase)	—	—	—	—
Single Lug	—	—	—	—
Kit of 3	—	—	—	—
<i>Copper Body (Cu Wire Only)</i>				
Cable Size; (cables per phase)	#6-3/0; 1-hole		#4-350 kcmil; 1-hole	
Single Lug	TC1DG30	33.50	TCW1FG350	34.50
Kit of 2	—	—	—	—
Kit of 3	3TC1DG30	101.00	3TCW1FG350	104.00
Cable Size; (cables per phase)	—	—	—	—
Single Lug	—	—	—	—
<b>Compression Lugs</b>				
Cable Size; (cables per phase)	#14-2/0; 1-cable		#6-350 kcmil; 1-cable	
Kit of 2	2CLD20	54.00	2CLF350	102.00
Kit of 3	3CLD20	81.00	3CLF350	152.00
Cable Size; (cables per phase)	—	—	—	—
Kit of 2	—	—	—	—
Kit of 3	—	—	—	—
Cable Size; (cables per phase)	—	—	—	—
Kit of 3	—	—	—	—
<b>Distribution Lugs</b>				
Cable Size; (cables per phase)	#14-#2; 3-hole		#14-#1; 2-hole and	
Single Lug	TA3DG02	31.50	TA3FG20	37.00
Kit of 3	3TA3DG02	110.00	3TA3FG20	110.00
Cable Size; (cables per phase)	#14-#4; 6-hole		#14-#4; 6-hole	
Single Lug	TA6DG04	33.50	TA6FG04	37.00
Kit of 3	3TA6DG04	110.00	3TA6FG04	110.00

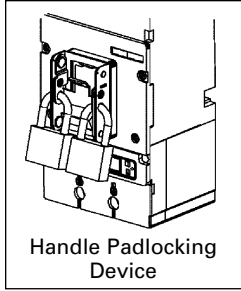


For JG Frame 400 A		For LG Frame 600 A		For MG Frame 800 A		For NG Frame 1200 A		For PG Frame 1600 A	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
TMKJ TMKJ3	6.10 19.40	TNKL TNKL3	9.80 29.00	TNKM TNKM3	9.80 29.00	TNKP TNKP3	9.80 29.00	TNKP TNKP3	9.80 29.00
1/0-500 kcmil; 1-hole TW1JG600 3TW1JG600	— 29.00 87.00	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —
3/0-250 kcmil; 2-hole TA2JG250 — 3TA2JG250	29.00 — 87.00	#2-600 kcmil; 2-hole — 2TA2LG600LD <sup>①</sup> 2TA2LG600LN <sup>②</sup> 3TA2LG600LD <sup>①</sup> 3TA2LG600LN <sup>②</sup>	— 72.00 72.00 109.00 109.00	1/0-500 kcmil, 3-hole TA3MG500 3TA3MG500	67.00 202.00	1/0-500 kcmil; 4-hole — 2TA4NG500 3TA4NG500 3TA4NG500H <sup>③</sup>	— 579.00 291.00 875.00	1/0-750 kcmil; 6-hole — — 3TA6PG750 <sup>⑤</sup>	— — 940.00
AL: 250-750 kcmil CU: 3/0-600 kcmil; 1-hole TA1JG750 — 3TA1JG750 — — —	36.00 — 109.00 — — —	AL: 250-750 kcmil CU: 3/0-600 kcmil; 1-hole TA1JG750 (400A max) — 3TA1JG750 (400A max)	36.00 — 109.00 — —	500-750 kcmil; 2-hole TA2MG750 — 3TA2MG750 — #2-600 kcmil; 3-hole — 3TA3MG600 <sup>④</sup>	122.00 — 364.00 — — 218.00	500-750 kcmil; 3-hole TA3NG750 2TA3NG750 3TA3NG750 — —	106.00 579.00 832.00 — —	600-750 kcmil; 4-hole TA4P750 <sup>⑥</sup> — — 300-600 kcmil; 5; 6-hole TA5P600 <sup>⑦</sup> TA6R600 <sup>⑧</sup> —	254.00 — — 320.00 338.00 —
3/0-250 kcmil; 2-hole TC2JG250 — —	77.00 — —	#2-600 kcmil; 2-hole — 2TC2LG600LD <sup>①</sup> 2TC2LG600LN <sup>②</sup> 3TC2LG600LD <sup>①</sup> 3TC2LG600LN <sup>②</sup>	— 154.00 154.00 231.00 231.00	1/0-500 kcmil; 3-hole TC3MG500 — —	134.00 — —	1/0-500 kcmil; 4-hole — — 3TC4NG500 — 1/0-500 kcmil; 3-hole TC3NG500 CSO	— — 832.00 — — —	1/0-750 kcmil; 6-hole — — 3TC6PG750 (future) — 300-600 kcmil; 5-hole TC5R600 <sup>⑨</sup>	— — 1342.00 — 426.00
#6-350 kcmil; 1-cable 3CLJ350 — 250-750 kcmil; 1-cable 3CLJ750 — 250-600 kcmil; 1-cable 3CLJ600	— 449.00 — 449.00 — 449.00	#6-350 kcmil; 2-cable — 6CLL350 — 250 kcmil-750 kcmil; 1-cable 3CLL750 — 250 kcmil-600 kcmil; 2-cable 6CLL600	— 899.00 — 494.00 — 899.00	1/0-500 kcmil; 3-cable — 9CLM500 (future) — —	— 1056.00 — —	1/0-500 kcmil; 4-cable — 12CLN500 — — — —	— 1393.00 — — — —	#2-600 kcmil; 8-cable — 24CLP600 (future) — — — —	— 2787.00 — — — —
#14-#4; 12-hole TA12JG04 3TA12JG04 #14-2/0; 6-hole TA6JG20 3TA6JG20	— 88.00 265.00 — 88.00 265.00	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —	— — — — —

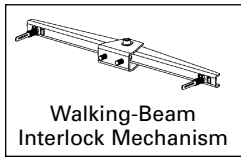
All lug kits include the nut keepers.  
<sup>①</sup> Mounted on Load Side Only.  
<sup>②</sup> Mounted on Line Side Only.  
<sup>③</sup> Rated 90° for 100% Applications.  
<sup>④</sup> Requires extended modified shield.  
<sup>⑤</sup> Used only with LMAP 1600 mounting base.  
<sup>⑥</sup> Used with MBPG 1600 or 1601 mounting base.

# External Accessories

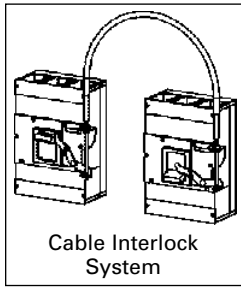
## General



Handle Padlocking Device



Walking-Beam Interlock Mechanism



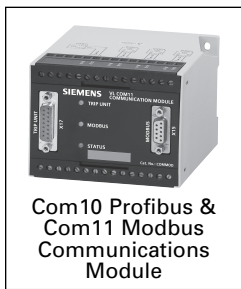
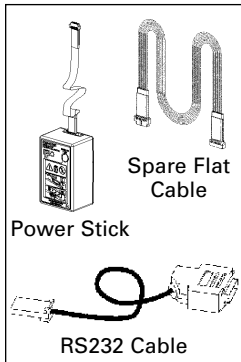
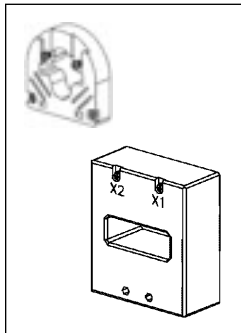
Cable Interlock System

Description	For DG Frame 150 A		For FG Frame 250 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Handle Padlocking Device</b> To padlock breaker toggle in the "OFF" position. Accepts up to 3 padlocks with 5–8 mm shackles.	HPLF	15.80	HPLF	15.80
<b>Handle Blocking Device</b> For holding the handle in the "ON" or "OFF" position. Not a lockout/tagout device.	HBDF	27.00	HBDF	27.00
<b>Walking-Beam Interlock Mechanism</b> Provides mechanical interlocking between two adjacent circuit breakers. Fixed mounted breakers Plug-in or draw-out mounted breakers (Future) Note: Both breakers must be of the same frame size.	WBMFFM WBMFDP	608.00 603.00	WBMFFM WBMFDP	608.00 603.00
<b>Cable Interlock Mechanism</b> Provides mechanical interlocking between 2 circuit-breakers - includes operator mechanism for one circuit breaker only. Combination with the next larger or smaller frame size is possible.	CBTF	481.00	CBTF	481.00
<b>Interlock Cable</b> Cable only, to connect 2 circuit breakers. Cable length 18 in. .46m (recommended up to 250A) Cable length 36 in. .91m (recommended from 600–800A) Cable length 54 in. 1.37m (recommended from 1200–1600A)	CBCF18 CBCM36 CBCP54	134.00 156.00 190.00	CBCF18 CBCM36 CBCP54	134.00 156.00 190.00
<b>Mounting Screw Kit</b> Includes the necessary hardware to mount a circuit breaker to the user's prepared surface (SAE thread) Kit with 2 screws Kit with 4 screws	MSKF2 MSKF4	3.70 3.70	MSKF2 MSKF4	3.70 3.70
<b>Trip Adjustment Sealing Cover</b> Includes a trip unit cover to prevent tampering or adjustment of trip settings. Seal not included. Electronic Trip Units Thermal-Magnetic Trip Units	TSCPET TSCFTM	15.80 38.50	TSCPET TSCFTM	15.80 38.50

For JG Frame 400 A		For LG Frame 600 A		For MG Frame 800 A		For NG Frame 1200 A		For PG Frame 1600 A	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
HPLL	22.00	HPLL	22.00	HPLM	57.00	HPLP	57.00	HPLP	57.00
HBDL	27.00	HBDL	27.00	HBDM	57.00	HBDP	57.00	HBDP	57.00
WBMLFM	608.00	WBMLFM	608.00	WBMMFM	608.00	WBMPFM	658.00	WBMPFM	658.00
WBMLDP	603.00	WBMLDP	603.00	WBMMDP	603.00	WBMPDP	658.00	WBMPDP	658.00
CBTL	515.00	CBTL	515.00	CBTM	548.00	CBTP	582.00	CBTP	582.00
—	—	—	—	—	—	—	—	—	—
CBCM36	156.00	CBCM36	156.00	CBCM36	156.00	—	—	—	—
CBCP54	190.00	CBCP54	190.00	CBCP54	190.00	CBCP54	190.00	CBCP54	190.00
—	—	—	—	—	—	—	—	—	—
MSKL4	10.90	MSKL4	10.90	MSKM4	15.80	MSKP4	29.00	MSKP4	29.00
TSCPET	15.80	TSCPET	15.80	TSCPET	15.80	TSCPET	15.80	TSCPET	15.80
TSCLTM	38.50	TSCLTM	38.50	TSCMTM	38.50	—	—	—	—

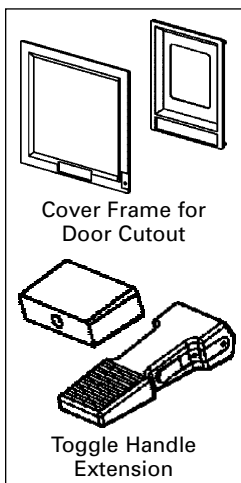
# External Accessories

## Ground Sensors & Electronic Accessories



Description	For DG Frame 150 A		For FG Frame 250 A	
	Catalog Number	List Price \$	Catalog Number	List Price \$
<b>Neutral Current Transformer (Ground Sensor, N-pole)</b>				
Neutral = 35/60A	NGSD060	402.00	—	—
Neutral = 100A	NGSF100	402.00	NGSF100	402.00
Neutral = 150A	NGSF150	402.00	NGSF150	402.00
Neutral = 250A	—	—	NGSJ250	402.00
Neutral = 400A	—	—	—	—
Neutral = 600A	—	—	—	—
Neutral = 800A	—	—	—	—
Neutral = 1000/1200A	—	—	—	—
Neutral = 1600A	—	—	—	—
<b>Communications &amp; Electronics</b>				
Power Stick - Hand held, battery operated power supply for LCD trip units. (Requires two -9V batteries) For programming and trip testing only.	EPSP18V	582.00	EPSP18V	582.00
Test Kit - Portable power supply for programming, trip test, and checking CT's plus a port for local communications of currents flow and trip settings. (Requires two 9V batteries)	ELTPHB	3428.00	ELTPHB	3428.00
Universal Power Supply - 120/240Vac adapter used in lieu of 9V batteries for Test Kit ELTPHB (includes necessary cables)	UPAPELTK	537.00	UPAPELTK	537.00
Power Supply with ZSI (for Model 576 trip units only).	COMPS	2013.00	COMPS	2013.00
Com10 Profibus Communications Module with ZSI for LCD trip Model 576 only	COMPRO	2684.00	COMPRO	2684.00
Com11 Modbus Communications Module with ZSI for LCD Trip Model 576 only	COMMOD	2684.00	COMMOD	2684.00
Communications Adapter - Interface with a laptop or PC to test or program Model 545 & 576 trip units	CSAPELTU	911.00	CSAPELTU	911.00
Cable for COM10/11 and Model 576 external power supply.....5ft. (1.5m)	COMKIT1	179.00	COMKIT1	179.00
Extension cable for COMKIT1 & COMKIT2, adds 5 ft.	COMEXT	134.00	COMEXT	134.00
Spare flat cable for Test Kits or Communications Adapters	COMPCA	358.00	COMPCA	358.00
RS232 type cable for Test Kits or Communications Adapters	COMP232	179.00	COMP232	179.00

## Door Cutouts & Extensions



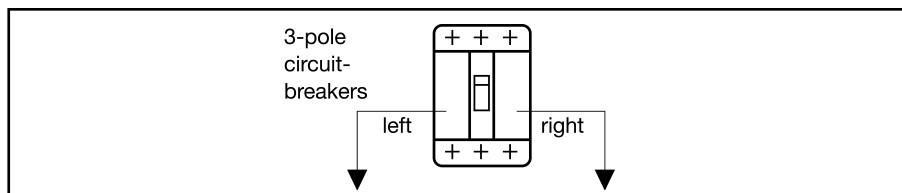
<b>Cover Frame for Door Cutout</b> For fixed or plug-in mounted circuit breakers. (IP30) 2-Pole & 3-Pole	BZLF3	224.00	BZLF3	224.00
For breakers with stored energy operator. (IP40)	BZLFRHSE	224.00	BZLFRHSE	224.00
Circuit-breaker draw-out mounted and toggle handle operated. Kit includes cover frame (bezel) and escutcheon as needed. (IP40) (not for use with rotary handle or stored energy operator)	BZLFBDC	224.00	BZLFBDC	224.00
<b>Toggle Handle Extension</b> For spare or replacement. (One is included with each LG - PG frame.)	—	—	—	—

For JG Frame 400 A		For LG Frame 600 A		For MG Frame 800 A		For NG Frame 1200 A		For PG Frame 1600 A	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—
NGSJ250	402.00	—	—	—	—	—	—	—	—
NGSL400	402.00	NGSL400	402.00	—	—	—	—	—	—
—	—	NGSM600	402.00	NGSM600	402.00	—	—	—	—
—	—	—	—	NGSN800	402.00	—	—	—	—
—	—	—	—	—	—	NGSN800	402.00	—	—
—	—	—	—	—	—	NGSP120	402.00	NGSP120	402.00
—	—	—	—	—	—	—	—	NGSP160	402.00
EPSP18V	582.00	EPSP18V	582.00	EPSP18V	582.00	EPSP18V	582.00	EPSP18V	582.00
ELTPHB	3428.00	ELTPHB	3428.00	ELTPHB	3428.00	ELTPHB	3428.00	ELTPHB	3428.00
UPAPELTK	537.00	UPAPELTK	537.00	UPAPELTK	537.00	UPAPELTK	537.00	UPAPELTK	537.00
COMPS	2013.00	COMPS	2013.00	COMPS	2013.00	COMPS	2013.00	COMPS	2013.00
COMPRO	2684.00	COMPRO	2684.00	COMPRO	2684.00	COMPRO	2684.00	COMPRO	2684.00
COMMOD	2684.00	COMMOD	2684.00	COMMOD	2684.00	COMMOD	2684.00	COMMOD	2684.00
CSAPELTU	911.00	CSAPELTU	911.00	CSAPELTU	911.00	CSAPELTU	911.00	CSAPELTU	911.00
COMKIT2	179.00	COMKIT2	179.00	COMKIT2	179.00	COMKIT1	179.00	COMKIT1	179.00
COMEXT	134.00	COMEXT	134.00	COMEXT	134.00	COMEXT	134.00	COMEXT	134.00
COMPCA	358.00	COMPCA	358.00	COMPCA	358.00	COMPCA	358.00	COMPCA	358.00
COMP232	179.00	COMP232	179.00	COMP232	179.00	COMP232	179.00	COMP232	179.00
BZLL3	224.00	BZLL3	224.00	BZLM3	279.00	BZLP3	279.00	BZLP3	279.00
BZLLRHSE	224.00	BZLLRHSE	224.00	BZLMRHSE	279.00	BZLPRHSE	279.00	BZLPRHSE	279.00
BZLLBDC	224.00	BZLLBDC	224.00	BZLMBDC	279.00	BZLPBDC	279.00	BZLPBDC	279.00
THEL	63.00	THEL	63.00	THEM	105.00	THEP	105.00	THEP	105.00

# Molded Case Circuit Breakers

## Accessory Locations

**Selection**



### Locations of Internally Mounted Accessories

Frame Family	Left Pocket	Right Pocket
<b>DG*, FG*, JG, LG</b> <b>150 to 600A</b>	Up to 3 Auxiliary Switches	Shunt Trip <b>or</b> UVR <b>or</b> up to 3 Auxiliary Switches <b>or</b> up to 2 Auxiliary Switches + 1 Alarm Switch
	Up to 2 Auxiliary Switches + 1 Alarm Switch	Shunt Trip <b>or</b> UVR <b>or</b> up to 3 Auxiliary Switches <b>or</b> up to 2 Auxiliary Switches + 1 Alarm Switch
<b>MG, NG, PG</b> <b>800 to 1600A</b>	Up to 4 Auxiliary Switches	Shunt Trip <b>or</b> UVR <b>or</b> up to 4 Auxiliary Switches
	Up to 2 Auxiliary Switches + 2 Alarm Switches	Shunt Trip <b>or</b> UVR <b>or</b> up to 4 Auxiliary Switches

\* Except DG and FG breakers with Electronic Trip Units. Due to the location of the Magnetic Latch, the Left Pocket is not available for accessories.

#### Accessory Information

- Aux. Switch is an Auxiliary Switch, 1A or 1B contact
- Alarm Switch has 1A or 1B contact
- UVR is an Undervoltage Release
- The standard location for factory mounted Auxiliary and Alarm Switches is the Left Pocket
- For 4-pole breakers, the 4th pole (located on the far left) can hold up to 3 Auxiliary Switches on DG, FG, JG, and up to 4 Auxiliary Switches on MG, NG, and PG breakers

#### Accessory Maximums

##### DG, FG, JG, LG Maximum Accessories:

- Maximum of six (6) switches total
- DG, FG Maximum of two (2) Alarm Switches, one each in the Left and Right Pockets. JG, LG Max. of 1 Alarm, Left only
- Maximum of three (3) switches combined in 4th Pole and Left Pockets

##### MG, NG, PG Maximum Accessories:

- Maximum of eight (8) switches total
- Maximum of two (2) Alarm Switches, Left Pocket only
- Maximum of four (4) switches combined in 4th Pole and Left Pockets

# Molded Case Circuit Breakers

**Selection**

## Suffix for factory mounted Switch Combinations

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	1 Alarm Switch 1 NO Alarm 1 NC Alarm	A1	ASKL1
DG, FG, JG or LG	2 Aux. Switches 1 NO + 1 NC Aux. Contacts	A2	ASKL2
DG, FG, JG or LG	2 Aux. + 1 Alarm Switches 1NO + 1NC Aux. and 1NO Alarm 1NO + 1NC Aux. and 1NC Alarm 2NO Aux. and 1NC Alarm 2NC Aux. and 1NO Alarm	A3	ASKL3
MG, NG or PG	2 Aux. + 2 Alarm Switches 1NO + 1NC Aux. and 1NO + 1NC Alarm 2NO Aux. and 2NC Alarm 2NC Aux. and 2NO Alarm	A3	ASKP3
MG, NG or PG	4 Aux. Switches 2NO + 2NC Aux.	A4	ASKP4

## Suffix for factory mounted Shunt Trips

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	24V DC 48-60V DC 110-127V DC 220-250V DC 48-60V AC 110-127V AC 208-277V AC 380-600V AC	RB RC RD RE RM RN RS RV	STRLB24DC STRLC60DC STRLD125DC STRLE250DC STRLM60 STRLN120 STRLS277 STRLV600
MG, NG or PG	24V DC 48-60V DC 110-127V DC 220-250V DC 48-60V AC 110-127V AC 208-277V AC 380-600V AC	RB RC RD RE RM RN RS RV	STRPB24DC STRPC60DC STRPD125DC STRPE250DC STRPM60 STRPN120 STRPS277 STRPV600

## Suffix for factory mounted Under Voltage Releases

If the frame is:	And you need these functions:	Then add this suffix:	Device Catalog Number
DG, FG, JG or LG	12V DC 24V DC 48V DC 60V DC 110-127V DC 220-250V DC 110-127V AC 220-240V AC 208V AC 277V AC 380-415V AC 440-480V AC 600V AC	UA UB UC UG UD UE UN UR UP US UT UU UV	UVRLA12DC UVRLB24DC UVRLC48DC UVR LG60DC UVR LD125DC UVR LE250DC UVR LN120 UVR LR240 UVR LP208 UVR LS277 UVR LT415 UVR LU480 UVR LV600
MG, NG or PG	12V DC 24V DC 48V DC 60V DC 110-127V DC 220-250V DC 110-127V AC 220-240V AC 208V AC 277V AC 380-415V AC 440-480V AC 600V AC	UA UB UC UG UD UE UN UR UP US UT UU UV	UVRPA12DC UVRPB24DC UVRPC48DC UVRPG60DC UVRPD125DC UVRPE250DC UVRPN120 UVRPR240 UVRPP208 UVRPS277 UVRPT415 UVRPU480 UVRPV600

**6**  
MOLDED CASE  
CIRCUIT BREAKERS

# Technical Data

		DG	FG	JG	LG	MG	NG	PG
<b>Max rated continuous current</b>		150	250	400	600	800	1200	1600
Rated operational voltage								
NEMA	V AC	600	600	600	600	600	600	600
IEC	V AC	690	690	690	690	690	690	690
Rated Impulse Withstand Voltage								
Main conducting paths	kV	8	8	8	8	8	8	8
Auxiliary circuits	kV	4	4	4	4	4	4	4
Ambient Temperature Range	°C	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75	-25 to +75
High Ambient Derating (thermal-mag.)	50°C	93%	93%	93%	93%	95%	95%	95%
	60°C	86%	86%	86%	86%	86%	86%	80%
	70°C	80%	80%	80%	80%	80%	80%	74%
Operating Cycles		20,000	20,000	20,000	10,000	5,000	3,000	3,000
Max switching rate (per hour)		120	120	120	60	60	30	30
Power loss (at max. rated current)								
Thermal-magnetic	W	15 – 48	32 – 80	60 – 175	85 – 230	170 – 250	150 – 220	200 – 260
Electronic trip unit	W	40	60	90	160	250	210	260
IEC <sup>①</sup>								
Time constant t = 10 ms								
1 current path								
2 current paths in series								
3 current paths in series								
Up to 250V DC		—	—	—	—	—	—	—
440V DC								
600V DC								
NEMA								
Time constant t = 8 ms								
2 poles switching								
1 current path								
250V DC Max. <sup>②</sup>		30	30	30	30	42	42	42
3 poles switching								
2 current paths in series								
500V DC Max. <sup>②</sup>		18	25	35	35	65	65	65
<b>Accessories</b>								
Auxiliary/Alarm Switch								
Current rating (1 or 2 switches)		10	10	10	10	10	10	10
Current rating (3 or 4 same switch)	A	5	5	5	5	5	5	5
Shunt Trip								
Pick-up voltage	V	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1	0.7 – 1.1
Power Consumption (short-time) at:								
48 – 60 V AC	VA	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501	401 – 501
110 – 127 V AC	VA	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489	424 – 489
208 – 277 V AC	VA	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736	533 – 736
380 – 600 V AC	VA	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645	408 – 645
24 V DC	W	594	594	594	594	594	594	594
48 – 60 V DC	W	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925	740 – 925
110 – 127 V DC	W	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648	559 – 648
220 – 250 V DC	W	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820	722 – 820
Max. Operating time	ms	50	50	50	50	50	50	50

<sup>①</sup> Consult Siemens for short circuit values.

<sup>②</sup> Review individual frame and type values.



# Technical Data

	DG	FG	JG	LG	MG	NG	PG	
<b>Undervoltage Trip</b>								
Drop voltage (percentage)	V	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%	35% – 70%
Pick-up voltage (percentage)	V	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%	70% – 85%
Power consumption (continuous) at:								
110 – 127 V AC VA	1	1	1	1	1.1	1.1	1.1	
220 – 250 V AC VA	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
208 V AC VA	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
277 V AC VA	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
380 – 415 V AC VA	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
440 – 480 V AC VA	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
500 – 525 V AC VA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
600 V AC VA	2.8	2.8	2.8	2.8	2.8	2.8	2.8	
Max. opening time	ms	50	50	50	50	50	50	50
<b>Motorized Operating Mechanism</b>								
Motor with stored energy mechanism (synchronizable)		X	X	X	X	X	X	X
Motor Operator						X	X	
Max. switching rate (per hour)		120	120	120	60	60	30	30
Command duration	ms	20 – 50	20 – 50	20 – 50	20 – 50	20 – 50	—	—
Closing time	ms	<100	<100	<100	<100	<100	<5,000	<5,000
Charging time	s	<5	<5	<5	<5	<5	<5	<5
Break time	s	<5	<5	<5	<5	<5	<5	<5
Power consumption	VA/W	<500						
Inrush (A)								
Control Voltages								
		110 – 127 V AC						
		220 – 250 V AC						
		24 V DC						
		48 V DC						
		60 V DC						
Operating Range		85 – 110% of rated control voltage						

# Molded Case Circuit Breakers

## Unusual Operating Conditions

Reference

**Note:** The information provided on this and the next page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data below is based less on controlled testing, than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.

### High Ambient Temperatures

Because thermal-magnetic trip breakers are temperature sensitive and calibrated for a specific ambient of 40° C (104° F) (average enclosure temperature), a higher ambient will cause the breaker to trip at lower current than its nameplate rating, in other words, causing the breaker to "derate" (see Table 1). Similarly, the current carrying capacity of a circuit conductor is based upon a certain ambient temperature, a higher ambient will reduce its current carrying capacity, causing it to "derate." Thus, with a fluctuating temperature, a thermal-magnetic breaker will derate nearly parallel with its connected circuit conductors and maintain close circuit protection. If the application temperature exceeds 40° C (104° F) and is known, either a breaker specially calibrated for the higher ambient or one oversized according to Table 1 may be selected. In a case such as this, the circuit conductors should be oversized as well. Siemens Electronic Trip Unit Breakers are insensitive to temperature changes. However, they do include circuitry to protect the components from abnormally high temperatures.

### Moisture — Corrosion

For atmospheres having high moisture content and / or where fungus growth is prevalent, a special preventive treatment may be required.

Where the air is heavily laden with corrosive elements, breakers made with special corrosion-resistant finishes may be required.

### Altitude

Reduced air density at altitudes greater than 6600 ft. (2000 meters) affects the ability of a molded case circuit breaker to transfer heat and interrupt faults. Therefore, circuit breakers applied at these altitudes should have interrupting, insulation and continuous currents derated as indicated in Figure 1.

**Table 1 — Temperature Derating Data for Thermal-Magnetic Breakers**

Reference Ampere Rating at 40° C (104° F)	Ampere Rating at:			
	25° C (77° F)	50° C (122° F)	60° C (140° F)	
15	17	13	11	
20	22	18	16	
25	28	23	21	
30	33	28	26	
35	39	30	25	
40	44	37	34	
50	55	46	42	
60	66	56	52	
70	77	65	60	
90	99	84	78	
100	110	94	87	
125	137	114	100	
150	165	136	120	
175	192	159	140	
200	220	182	160	
225	247	205	180	
250	275	235	220	
300	330	276	252	
350	385	325	301	
400	440	372	340	
500	550	468	435	
600	660	564	525	
700	770	658	613	
800	880	754	704	
900	990	828	749	
1000	1100	900	825	
1200	1320	1090	1000	
1400	1540	1304	1148	
1600	1760	1500	1320	
1800	1980	1690	1485	
2000	2200	1880	1650	

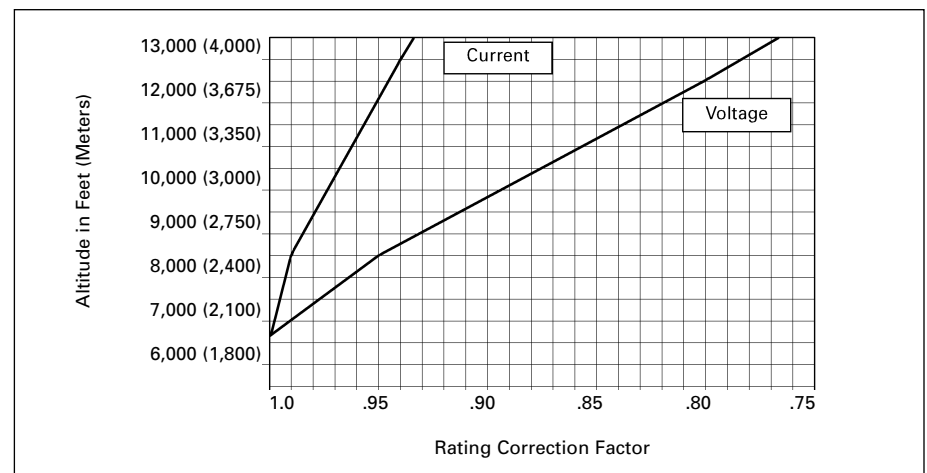
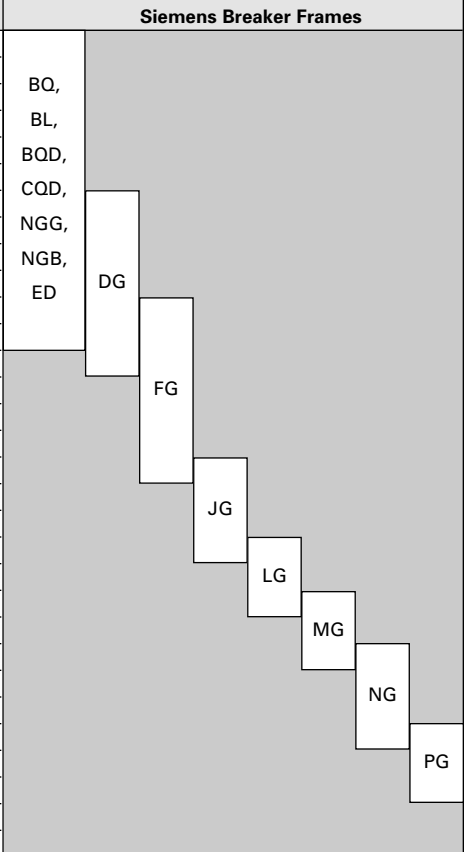


Figure 1 — Altitude Adjustment

# Molded Case Circuit Breakers

## Unusual Operating Conditions

Reference

### 400 Hz Systems<sup>①</sup>

Siemens molded case circuit breakers can be applied for overcurrent protection on 400Hz systems, commonly used to power computer installations, aircraft, military and other specialty equipment. Below are basic guidelines.

#### Circuit Breaker Derating Required

This table lists the maximum continuous current carrying capacity for Siemens breakers at 400Hz. Due to the increased resistance of the copper sections resulting from the skin effect produced by eddy currents at these frequencies, circuit breakers in many cases require derating. The thermal derating on these devices is based upon 100%, three phase application in open air in a maximum of 40° C (104° F) with 48 in. (1219 mm) of the specified cable or bus at the line and load side. Additional derating of not less than 20% will be required if the circuit breaker is to be utilized in an enclosure. Further derating may be required if the enclosure

ambient temperature exceeds 40° C (104° F).

#### Cable and Bus Sizing

The cable and bus sizes to be utilized at 400Hz are not based on standard National Electric Codes tables for 60Hz application. Larger cross sections are necessary at 400Hz. All bus bars specified are based upon mounting the bars in the vertical plane to allow maximum air flow. All bus bars are spaced at a minimum of 0.25 in. (6 mm) apart. Mounting of bus bars in the horizontal plane will necessitate additional drafting. Edgewise orientation of the bus may change the maximum ratings indicated. If additional information is required for other connections of cable or bus, contact Siemens for information.

#### Application Recommendations

It is recommended that temperatures be measured on the line and load terminals or T-connectors of the center pole. These

are usually the hottest terminals with a balanced load. A maximum temperature of 75° C (35° C over a maximum ambient of 40° C) would verify the particular application. Temperature profiles taken on these breakers can be correlated to ensure that the hottest points within the breaker are within the required temperature limits.

#### Factory Configuration

When required, molded case circuit breakers may be factory calibrated for 400Hz application. These breakers are specially labeled for 400Hz usage and their nameplate current rating will include the necessary derating factory. The highest "Maximum Continuous Amperes" rating at 400Hz, found in the table below approximates the highest specially calibrated 400Hz nameplate ampere rating available for a given frame size. Contact Siemens for ordering information on other breakers applied in 400Hz systems.

### 400Hz Breakers

Siemens Breaker Type	Maximum Continuous Ampere Rating At 40° C (104° F) <sup>②</sup>			75° C (167° F) Copper Cable per Pole	
	60HZ		400HZ	No of Pieces	Wire Size
	Open Air	Open Air <sup>③</sup>	Enclosed After Derating		
NGG, EG	15	15	12	1	#14
	20	20	16	1	#12
	15	15	12	1	#14
	20	20	16	1	#12
	25	25	20	1	#10
	30	30	24	1	#10
	35	35	28	1	#10
	40	40	32	1	#8
	45	43	34	1	#8
	50	48	38	1	#8
	60	57	46	1	#6
	70	67	54	1	#4
	80	76	61	1	#4
	90	86	69	1	#3
	100	95	76	1	#3
110	105	84	1	#2	
125	119	95	1	#1	
DG	50	48	38	1	#8
	60	57	46	1	#6
	70	63	50	1	#4
	80	72	58	1	#4
	90	80	64	1	#3
	100	90	72	1	#3
	110	95	75	1	#2
	125	105	84	1	#1
FG	100	90	72	1	#3
	110	95	75	1	#2
	125	105	84	1	#1
	150	125	100	1	#1/0
	175	140	112	1	#2/0
	200	160	128	1	#3/0
	225	180	144	1	#4/0
	250	200	160	1	250 kcmil

Siemens Breaker Type	Maximum Continuous Ampere Rating At 40° C (104° F) <sup>②</sup>			75° C (167° F) Copper Cable per Pole	
	60HZ		400HZ	No of Pieces	Wire Size
	Open Air	Open Air <sup>③</sup>	Enclosed After Derating		
JG	250	210	168	1	250 kcmil
	300	240	192	1	350 kcmil
	350	260	208	1	500 kcmil
	400	300	240	2	#2/0
JG 100% Rated	250	210	210	1	250 kcmil
	300	240	240	1	350 kcmil
	350	260	260	1	500 kcmil
	400	300	300	2	#3/0
LG	400	300	240	2	#3/0
	500	375	300	2	250 kcmil
	600	420	336	2	350 kcmil
MG	600	430	360	2	350 kcmil
	700	500	400	3	250 kcmil
	800	560	448	3	300 kcmil
MG 100% Rated	600	430	430	2	350 kcmil
	700	500	500	3	250 kcmil
	800	560	560	3	300 kcmil
NG	800	560	448	3	300 kcmil
	900	600	480	3	350 kcmil
	1000	650	520	3	400 kcmil
	1200	780	624	4	350 kcmil
NG 100% Rated	900	600	600	3	350 kcmil
	1000	650	650	3	400 kcmil
	1200	780	780	4	350 kcmil
PG	1200	780	624	4	400 kcmil
	1400	850	680	4	500 kcmil
	1600	960	768	5	500 kcmil
PG 100% Rated	1200	780	780	4	400 kcmil
	1400	850	850	4	500 kcmil
	1600	960	960	5	500 kcmil

<sup>①</sup>The information provided on this page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data above is based less on controlled testing, than on experience and engineering

judgment. Contact Siemens for further information on special conditions and treatment.

<sup>②</sup>Additional derating may be required if the ambient temperature is greater than 40° C (104° F).

<sup>③</sup>Calculated after derating to compensate for the heating of the copper conductor, caused by the skin effect generated by eddy currents produced at 400/415HZ.

# Sentron® Molded Case Circuit Breakers

## Series Connected Short Circuit Ratings

General

The term "Series Connected Short Circuit Rating" refers to the application of series circuit breakers in a combination that allows downstream breakers to have lower individual interrupting ratings than the available fault current.

This is permitted as long as the series combination has been tested and certified by UL.

The tables on these pages list specific main and branch breaker combinations that may be used for the short circuit interrupting ratings shown.

No substitutions are permitted. All combinations shown have been tested and are UL Listed. This information is provided as a reference tool only. **For verification of specific combination ratings consult the UL Recognized Components Directory.**

### 240V Series Ratings

UL Series Connected Rating	Main Breaker		Branch Breaker			
	Type	Maximum Amperes	Type	Number of Poles	Amperes	
22,000	QPH, BQH, BLH	70 (1P) 125 (2P) 100 (3P)	QP, BQ, BL	1 2 3	15-70 15-125 15-100	
			QE, BLE, QPF, BLF, QAF, BAF	2	15-60	
			QE, BLE, BE, QPF, BQF, BLF, QAF, BAF	1	15-30	
			QT	1, 2	15-40	
			QG, BG	1, 2	15-30	
			QP, BQ, BL	1 2	15-70 15-125	
	QPPH	225 (2P)	QE, BLE, BE, QPF, BQF, BLF, QAF, BAF	1	15-30	
			QE, BLE, BE, QPF, BLF, QAF, BAF	2	15-60	
			QPP	2	125-200	
			QT	1, 2	15-40	
			QP	1 2	15-25 35-70 15-25 35-125	
	QPMH	200 (2P)	QE, QPF, QAF, BAF	1 2	15-30 15-60	
			QT	2	15-30	
			QP, BQ, BL	1 2 3	15-70 15-125 60-100	
			QPF, BQF, BLF, BG, BLG, QE, BE, BLE, QAF, BAF	1	15-30	
	QJH2	225 (2 & 3P)	QPF, BLF, BG, BLG, QE, BE, BLE, QAF, BAF	2	15-60	
			QT	1, 2	15, 20, 40	
			QP, BQ, BL	1 2 3	15-70 15-125 60-100	
QPH, BQH, BLH			1 2 3	15-70 15-125 15-100		
42,000	QJ2H	QJH2	2, 3	60-225		
		65,000	70 (1P) 125 (2P) 100 (3P)	QP, BQ, BL, QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
				QPF, BQF, BLF, BE, QPHF, BQHF, BLHF, QE, BLE, QAFH, BAFH, QAF, BAF	1	15-30
QE, BLE, QE, QPHF, BLHF, BLE, QPF, BLF, QAFH, BAFH, QAF, BAF	2			15-60		
QT	1, 2			15-40		
QG, BG	1, 2			15-30		
HQP, HBQ, HBL	225 (2P)			QP, BQ, BL, QPH, BQH, BLH	1 2	15-70 15-125
		QPF, BQF, BLF, QPHF, BQHF, BLHF, QE, BLE, QAFH, BAFH, QAF, BAF	1	15-30		
HQPP	225 (2P)	QE, BLE, QE, QPHF, BLHF, BLE, QPF, BLF, QAFH, BAFH, QAF, BAF	1	15-30		

### 240V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	Number of Poles	Amperes
65,000 (Continued)	ED4, ED6	100 (1P) 125 (2 & 3P)	QEH, BLEH, QE, QPHF, BLHF, BLE, QPF, BLF, QAFH, BAFH, QAF, BAF	2	15-60
			QT	1, 2	15-40
			QPPH, QPP	2	125-200
			QP, BQ, BL, QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
			QPHF, BQHF, BLHF, QPF, BQF, BLF, QE, QEH, BLEH, BE, BLE, QAFH, BAFH, QAF, BAF	1	15-30
			QE, BLE, QE, QPHF, BLHF, BLE, QPF, BLF, QAFH, BAFH, QAF, BAF	2	15-60
	FD6-A, FXD6-A	250 (2 & 3P)	ED2	1, 2, 3	15-100
			QT	1, 2	15-40
			QP, BQ, BL, QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
			QPF, QPHF, BLF, BLHF, QAF, QAHF, BAF, BAHF	1, 2	15-60
	JXD2-A, JD6-A, JXD6-A, LD6-A, LXD6-A	600 (2 & 3P)	QJ2H, QJ2, QJH2	2, 3	60-225
			QPPH	2	125-225
			QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
	HJD6-A, HJXD6-A, HLD6-A, HLXD6-A, HMD6, HMXD6, HND6, HNXD6, HPD6, HPSD6, HRD6, HRXD6	2000 (2 & 3P)	QJ2H, QJH2	2, 3	60-225
			QPH	1 2 3	15-70 15-125 15-100
			QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
	SJD6-A, SLD6-A, SMD6, SND6, SPD6	1600 (2 & 3P)	MD6, MXD6, ND6, NXD6, PD6, PXD6, RD6, RXD6	1 2 3	15-70 15-125 15-100
			QPH, BQH, BLH	1 2 3	15-70 15-125 15-100
QPH, BQH, BLH, HQP, HBQ, HBL			1 2 3	15-70 15-125 15-100	
100,000	HED4, HED6	125 (2 & 3P)	QP, BQ, BL, QPH, BQH, BLH, HQP, HBQ, HBL	1 2 3	15-70 15-125 15-100
			QE, BLE, QE, BE, QPHF, BQHF, BLHF, QPF, BLF, BQF, BLE, QAFH, BAFH, QAF, BAF	1	15-30
			QE, BLE, QPHF, QE, BLHF, QPF, BLF, BLE, QAFH, BAFH, QAF, BAF	2	15-60
			ED2	1, 2, 3	15-100
			ED4	1	15-100
			ED4, ED6	2, 3	15-125
HED4	100 (1P)	QT	1, 2	15-40	
		ED2, ED4	1	15-100	

# Sentron® Molded Case Circuit Breakers

## Series Connected Short Circuit Ratings

General

240V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker				
	Type	Maximum Amperes	Type	Number of Poles	Amperes		
100,000 (Continued)	HQPPH	225 (2P)	QP, BQ, BL, QPH, BQH, BLH, HQP, HBQ, HBL	1 2	15-70 15-125		
			HQPP, QPPH, QPP	2	125-225		
			QEH, BLEH, QE, BE, QPHF, BQHF, BLHF, QPF, BQF, BLF, BLE, QAFH, BAFH, QAF, BAF	1	15-30		
			QE, QEH, BLEH, QPHF, BLHF, QPF, BLF, BLE, QAFH, BAFH, QAF, BAF	2	15-60		
			QT	1, 2	15-40		
			HQJ2H	225 (2 & 3P)	QP, BQ, BL	1	15-25 35-70
						2	15-25 35-125
						3	15-100
					QPH, BQH, BLH, HQP, HBQ, HBL	1 2 3	15-70 15-125 15-100
	QEH, BLEH, QE, BE, QPHF, BQHF, BLHF, QPF, BQF, BLF, BLE, QAFH, BAFH, QAF, BAF	1			15-30		
	QEH, BLEH, QPHF, BLE, BLHF, QE, QPF, BLF, QAFH, BAFH, QAF, BAF	2			15-60		
	QT	1			15-50		
	HFD6, HFXD6	250 (2 & 3P)			QP, BQ, BL, QPH, BQH, BLH, HQP, HBQ, HBL	1 2 3	15-70 15-125 15-100
						QE, BE, BLE, QPHF, BQHF, BLHF, QPF, BQF, BLF, QEH, BLEH, BAF, QAFH, BAFH, QAF	1
			QPF, BLF, BLE, BLEH, QPHF, BLHF, QEH, QE, QAFH, BAFH, QAF, BAF	2		15-60	
			ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			QJ2, QJH2, QJ2H	2, 3	60-225		
			HQPP, QPPH, QPP	2	125-225		
			QT	1, 2	15-40		
	HJD6-A, HJXD6-A, SHJD6-A	400 (2 & 3P)	ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400		
	HLD6-A	600 (2 & 3P)	ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
FD6-A, FXD6-A			2, 3	70-250			
JD6-A, JXD6-A, JXD2-A, SJD6-A			2, 3	200-400			
LD6-A			2, 3	200-600			
LXD6-A			2, 3	450-600			
SLD6-A			3	300-600			

240V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker				
	Type	Maximum Amperes	Type	Number of Poles	Amperes		
100,000 (Continued)	HLXD6-A	600 (2 & 3P)	ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400		
			LD6-A	2, 3	200-600		
			LXD6-A	2, 3	450-600		
			SLD6-A	3	300-600		
			SHLD6-A	600 (3P)	ED4	1	15-100
					ED4, ED6	2,3	15-125
	FD6-A, FXD6-A	2, 3			70-250		
	JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3			200-400		
	LD6-A	2, 3			200-600		
	LXD6-A	2, 3			450-600		
	HMD6, HMXD6	800 (2 & 3P)	ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400		
			LD6-A	2, 3	200-600		
			LXD6-A	2, 3	450-600		
	SHMD6	800 (3P)	SLD6-A	3	300-600		
			MD6, MXD6, SMD6	2,3	500-800		
			ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400		
	HND6, HNXD6, SHND6	1200 (2 & 3P)	LD6-A	2, 3	200-600		
			LXD6-A	2, 3	450-600		
			SLD6-A	3	300-600		
			MD6, MXD6, SMD6	2, 3	500-800		
			ND6, NXD6, SND6	2, 3	500-1200		
			ED4	1	15-100		
			ED4, ED6	2, 3	15-125		
			FD6-A, FXD6-A	2, 3	70-250		
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400		
			LD6-A	2, 3	200-600		
			LXD6-A	2, 3	450-600		
			HPD6, HPXD6, SHPD	1600 (3P)	SLD6-A	3	300-600
	MD6, MXD6, SMD6	2, 3			500-800		
	ND6, NXD6, SND6	2, 3			500-1200		
	PD6, PXD6, SPD6	2, 3			1200-1600		

6  
MOLDED CASE  
CIRCUIT BREAKERS

# Sentron® Molded Case Circuit Breakers

## Series Connected Short Circuit Ratings

General

### 240V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	P	Amperes
100,000 (Continued)	HRD6, HRXD6	2000 (3P)	ED4	1	15-100
			ED4, ED6	2, 3	15-125
			FD6-A, FXD6-A	2, 3	70-250
			JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
			SLD6-A	3	300-600
			MD6, MXD6, SMD6	2, 3	500-800
			ND6, NXD6, SND6	2, 3	500-1200
			PD6, PXD6, SPD6	2, 3	1200-1600
RD6, RXD6	2, 3	1600-2000			
200,000	CED6	125 (2 & 3P)	QP, BQ, BL, OPH, BOH, BLH, HQP, HBQ, HBL	1 2 3	15-70 15-125 15-100
			QPHF, BQHF, BLHF, OPF, BOF, BLF, QEH, QE, BE, BLEH, QAFH, BLE, BAFH, QAF, BAF	1	15-30
			QEH, BLEH, QAFH, QE, QPHF, BLHF, QPF, BLE, BLF, BAFH, QAF, BAF	2	15-60
			ED4, HED4	1	15-100
			ED4, ED6, HED4, HED6	2, 3	15-125
			QT	1, 2	15-40
			QP, BQ, BL, OPH, BOH, BLH, HQP, HBQ, HBL	1 2 3	15-70 15-125 15-100
			QPHF, BQHF, BLHF, QE, BE, BLE, OPF, BOF, BLF, QEH, BLEH, QAF, BAF	1	15-30
			QPHF, BLHF, QE, BLE, QPF, BLF, QEH, BLEH, QAF, BAF	2	15-60
			ED2	1, 2, 3	15-100
	HED4, ED4	1	15-100		
	ED4, ED6, HED4, HED6	2, 3	15-125		
	FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250		
	QJ2H, QJH2, QJ2	2, 3	60-225		
	QPPH, QPP	2	125-225		
	QT	1, 2	15-40		
HHJD6, HHJXD6, HHLD6, HHLXD6	600 (2 & 3P)	FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250	
		QPH, BOH, BLH, HQP, HBQ, HBL	2 3	100-125 100	
CJD6-A	400 (2 & 3P)	ED4, ED6	2, 3	15-125	
		FD6-A, FXDG-A, HFD6, HFXD6	2, 3	70-250	
		JXD2-A, JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400	
		QT	1, 2	15-30	

### 240V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker				
	Type	Maximum Amperes	Type	P	Amperes		
200,000	CLD6-A	600 (2 & 3P)	QPH, BOH, BLH, HQP, HBQ, HBL	2 3	100-125 100		
			ED4, ED6	2, 3	15-25		
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250		
			JXD2-A, JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400		
			LD6-A, HLD6-A	2, 3	200-600		
			LXD6-A, HJXD6-A	2, 3	450-600		
			QT	1, 2	15-30		
			ED4, ED6	1	15		
			ED4, ED6, HED4, HED6	2, 3	15-125		
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250		
	CMD6	800 (2 & 3P)	JXD2-A, JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400		
			LD6-A, HLD6-A	2, 3	200-600		
			LXD6-A, HLXD6-A	2, 3	450-600		
			MD6, MXD6, HMD6, HMXD6	2, 3	500-800		
			SCMD6	800 (3P)	MD6, MXD6, HMD6, HMXD6	2, 3	500-800
	CND6-A	1200 (2 & 3P)	ED4, ED6	1	15		
			ED4, ED6, HED4, HED6	2, 3	15-125		
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250		
			JXD2-A, JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400		
			LD6-A, HLD6-A	2, 3	200-600		
			LXD6-A, HLXD6-A	2, 3	450-600		
			MD6, MXD6, HMD6, HMXD6	2, 3	500-800		
			ND6, NXD6, SND6, HND6, HNXD6	2, 3	500-1200		
SCND6			1200 (3P)	MD6, HMD6, HMXD6, MXD6, SHMD6, SMD6	2, 3	500-800	
				ND6, HND6, SHND6, NXD6, HNXD6, SND6	2, 3	500-1200	
CPD6	1600 (3P)	FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250			
		JXD2-A, JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400			
		LD6-A, HLD6-A	2, 3	200-600			
		LXD6-A, HLXD6-A	2, 3	450-600			
		MD6, MXD6, HMD6, HMXD6	2, 3	500-800			
		ND6, NXD6, SND6, HND6, HNXD6	2, 3	500-1200			

# Sentron® Molded Case Circuit Breakers

## Series Connected Short Circuit Ratings

General

### 480V Series Ratings

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	Number of Poles	Amperes
18,000	ED4	125 (2 & 3P)	BQD, CQD	1, 2, 3	15-100
25,000	ED6	125 (2 & 3P)	BQD, CQD	1, 2, 3	15-100
30,000	HED6	125 (2 & 3P)	BQD, CQD	1, 2, 3	15-100
			ED4	1	15-100
			ED4, ED6	2, 3	15-125
42,000	HED4	125 (2 & 3P)	BQD, CQD	1, 2, 3	15-100
			ED4	1	15-100
			ED4, ED6	2, 3	15-125
50,000	HJD6-A, HJXD6-A, HLD6-A, HLXD6-A	600 (2 & 3P)	HED4	2, 3	15-50
	MD6, MXD6, ND6, NXD6	1200 (2 & 3P)	FD6-A, FXD6-A	2, 3	70-250
			JD6-A, JXD6-A, SJD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
			SLD6-A	3	400-600
	SMD6, SND6, SPD6	1600 (3P)	JD6-A, JXD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
	PD6, PXD6	14-1600 (3P)	FD6-A, FXD6-A	2, 3	70-250
		1600 (3P)	JD6-A, JXD6-A, SJD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
			SLD6-A	3	400-600
		RD6, RXD6	18-2000 (3P)	FD6-A, FXD6-A	2, 3
	JD6-A, JXD6-A, SJD6-A			2, 3	200-400
	LD6-A			2, 3	200-600
	LXD6-A			2, 3	450-600
65,000	HFD6, HFXD6	250 (2 & 3P)	BQD, CQD	1, 2, 3	15-100
			ED4, HED4	1	15-100
			ED4, ED6, HED4	2, 3	15-125
	HJD6-A, HJXD6-A	400 (2 & 3P)	HED4, ED4	1	15-100
			FD6-A, FXD6-A	2, 3	70-250
	HLD6-A, HLXD6-A	600 (2 & 3P)	JD6-A, JXD6-A	2, 3	200-400
			ED4, HED4	1	15-100
			FD6-A, FXD6-A	2, 3	70-250
			JD6-A, JXD6-A	2, 3	200-400
	HMD6, HMXD6	800 (2 & 3P)	LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
			FD6-A, FXD6-A	2, 3	70-250
			JD6-A, JXD6-A	2, 3	200-400
	HND6, HNXD6	1200 (2 & 3P)	LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
			MD6, MXD6, SMD6	2, 3	500-800
			FD6-A, FXD6-A	2, 3	70-250
	HPD6, HPXD6	14-1600 (3P)	FD6-A, FXD6-A	2, 3	70-250

### 480V Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	Number of Poles	Amperes
65,000 (Continued)	HRD6, HRXD6	18-2000 (3P)	FD6-A, FXD6-A	2, 3	70-250
			JD6-A, JXD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
			LXD6-A	2, 3	450-600
100,000	CFD6	250 (2 & 3P)	BQD, CQD <sup>Ⓢ</sup>	1 2, 3	15-100 15-30
			HHJXD6, HHJD6, HHL6, HHLXD6	1	15-100
	CMD6	600 (2 & 3P)	HFD6, HFXD6	2, 3	70-250
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250
			JD6-A, HJD6-A, JXD6-A, HJXD6-A	2, 3	200-400
			LD6-A, HLD6-A	2, 3	200-600
			LXD6-A, HLXD6-A	2, 3	450-600
	SCMD, SCND6	1200 (3P)	MD6, MXD6, HMD6, HMXD6	2, 3	500-800
			HFD6, HFXD6	2, 3	70-250
			CND6	1200 (3P)	FD6-A, FXD6-A, HFD6, HFXD6
150,000	CPD6	1600 (3P)	JD6-A, HJD6-A, JXD6-A, HJXD6-A	2, 3	200-400
			LD6-A, HLD6-A	2, 3	200-600
			LXD6-A, HLXD6-A	2, 3	450-600
	CJD6-A	400 (2 & 3P)	MD6, MXD6, HMD6, HMXD6	2, 3	500-800
			ND6, NXD6, HND6, HNXD6	2, 3	500-1200
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250
CLD6-A	600 (2 & 3P)	ED4	1	15-100	
		HFD6, HFXD6	2, 3	70-250	
		JD6-A, HJD6-A, JXD6-A, HJXD6-A	2, 3	200-400	
		LD6-A, HLD6-A	2, 3	200-600	
200,000	CED6	125 (2 & 3P)	LXD6-A, HLXD6-A	2, 3	450-600
			BQD, CQD <sup>Ⓢ</sup>	1 2, 3	15-100 20-30
			ED4, HED4	1	15-100
	CFD6	250 (2 & 3P)	ED4, ED6, HED4	2, 3	15-125
			BQD, CQD	1 2, 3	15-100 20-30
			ED4, ED6	2, 3	15-50
ED4, HED4			1	15-100	
200,000	CFD6	250 (2 & 3P)	HED4	2, 3	15-125
			FD6-A, FXD6-A, HFD6, HFXD6	2, 3	70-250

Ⓢ BQD & CQD breakers (2, 3P) are series rated from 15-100A for Series 7A, S2, S3, and P1 panelboard applications only.

# Sentron® Molded Case Circuit Breakers

## Series Connected Short Circuit Ratings

General

### 240 Volt Fuse Series Ratings

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	Number of Poles	Amperes
65,000	J, R	15-600 (1, 2, 3P)	QPH, BQH, BLH	1, 2, 3	15-125
	T	15-1200 (1, 2, 3P)	QPH, BQH, BLH	1, 2, 3	15-125
	L	601-6000 (1, 2, 3P)	QPH, BQH, BLH	1, 2, 3	15-125
100,000	T (300V)	15-200 (1, 2, 3P)	QP, BQ, BL	1, 2, 3	15-125
			HQP, HBQ, HBL, QPH, BQH, BLH	3	15-100
			QPF, BQF, BLF, QPHF, QE, BE, BLE, QEH, BLEH, BLHF, BOHF, QAFH, BAFH, QAF, BAF	1	15-30
			QEH, BLEH, QE, QPF, QPHF, BLHF, BLE, BLF, QAFH, BAFH, QAF, BAF	2	15-60
			QT	1, 2	15-50
		15-600 (1, 2, 3P)	QPH, BQH, BLH, HQP, HBQ, HBL	1, 2	15-125
	J, R	15-600 (2, 3P)	ED4, HED4	1	15-100
			ED4, ED6, HED4	2, 3	15-125
		70-600 (2, 3P)	FD6-A, FXD6-A	2, 3	70-250
		200-600 (2, 3P)	JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
		300-600 (3P)	SLD6-A	3	300-600
	450-600 (2, 3P)	LXD6-A	2, 3	450-600	
	T	15-1200 (2, 3P)	ED4, HED4	1	15-100
			ED4, ED6, HED4	2, 3	15-125
		70-1200 (2, 3P)	FXD6-A, FD6-A	2, 3	70-250
		450-1200 (2, 3P)	LXD6-A	2, 3	450-600
		200-1200 (2, 3P)	JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400
			LD6-A	2, 3	200-600
	300-1200 (3P)	SLD6-A	3	300-600	
L	601-6000 (2, 3P)	ED4, HED4	1	15-100	
		ED4, ED6, HED4	2, 3	15-125	
		FD6-A, FXD6-A	2, 3	70-250	
		JD6-A, JXD6-A, JXD2-A, SJD6-A	2, 3	200-400	
		LD6-A	2, 3	200-600	
		LXD6-A	2, 3	450-600	
		SLD6-A	3	300-600	
		SMD6	3	500-800	
		SND6	3	500-1200	
		PD6, PXD6, SPD6	3	1200-1600	
RD6, RXD6	3	1600-2000			
200,000	R	125-200 (2, 3P)	QJH2, QJ2H, QJ2	2, 3	125-200
	T, J	125-600 (2, 3P)	QJH2, QJ2H	2, 3	125-225
		125-400 (2, 3P)	QJ2	2, 3	125-225
	J, R	70-600 (2, 3P)	HFD6, HFXD6	2, 3	70-250

### 240 Volt Series Ratings (Continued)

UL Series Connected Rating	Main Breaker		Branch Breaker		
	Type	Maximum Amperes	Type	Number of Poles	Amperes
200,000	T	70-1200 (2, 3P)	HFD6, HFXD6	2, 3	70-250
	L	601-6000 (2, 3P)	HFD6, HFXD6	2, 3	70-250
			MD6, MXD6, HMD6, HMXD6	2, 3	500-800
			ND6, NXD6, HND6, HNXD6	2, 3	500-1200

### 480 Volt Fuse Series Ratings

UL Series Connected Rating	Main Breaker		Branch Breaker				
	Type	Maximum Amperes	Type	Number of Poles	Amperes		
50,000	J	60-400 (1, 2, 3P)	ED4	1	60-100		
		15-400 (2, 3P)	ED4	2, 3	15-100		
100,000	J	15-400 (1, 2, 3P)	ED4	1	15-50		
			T, J	70-600 (2, 3P)	FD6-A, FXD6-A	2, 3	70-250
			J, R	70-600 (2, 3P)	HFD6, HFXD6	2, 3	70-250
	T, J, R	200-600 (2, 3P)	JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400		
			LD6-A, HLD6-A	2, 3	200-600		
			450-600 (2, 3P)	LXD6-A, HLXD6-A	2, 3	450-600	
	T	70-1200 (2, 3P)	HFD6, HFXD6	2, 3	70-250		
	T, L	601-1200 (2, 3P)	JD6-A, JXD6-A, HJD6-A, HJXD6-A	2, 3	200-400		
			LD6-A, HLD6-A	2, 3	200-600		
			LXD6-A, HLXD6-A	2, 3	450-600		
L	601-6000 (2, 3P)	HFD6, HFXD6	2, 3	70-250			
		MD6, MXD6, HMD6, HMXD6	2, 3	500-800			
		ND6, NXD6, HND6, HNXD6	2, 3	500-1200			
200,000	R	15-100 (1, 2, 3P)	BQD, CQD	1	15-100		
	T, J	15-200 (1, 2, 3P)	BQD, CQD <sup>①</sup>	2, 3	20-30		

① BQD & CQD breakers are series rated from 15-100A for Series 7A, S2, S3, and P1 panelboard applications only.



# Molded Case Circuit Breakers

## Unusual Operating Conditions

Reference

**Note:** The information provided on this and the next page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data below is based less on controlled testing, than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.

### High Ambient Temperatures

Because thermal-magnetic trip breakers are temperature sensitive and calibrated for a specific ambient of 40° C (104° F) (average enclosure temperature), a higher ambient will cause the breaker to trip at lower current than its nameplate rating, in other words, causing the breaker to "derate" (see Table 1). Similarly, the current carrying capacity of a circuit conductor is based upon a certain ambient temperature, a higher ambient will reduce its current carrying capacity, causing it to "derate." Thus, with a fluctuating temperature, a thermal-magnetic breaker will derate nearly parallel with its connected circuit conductors and maintain close circuit protection. If the application temperature exceeds 40° C (104° F) and is known, either a breaker specially calibrated for the higher ambient or one oversized according to Table 1 may be selected. In a case such as this, the circuit conductors should be oversized as well. Siemens Sensitrip® III and Type SB Encased Systems Breakers are insensitive to temperature changes. However, they do include circuitry to protect the components from abnormally high temperatures.

### Moisture — Corrosion

For atmospheres having high moisture content and / or where fungus growth is prevalent, a special preventive treatment may be required.

Where the air is heavily laden with corrosive elements, breakers made with special corrosion-resistant finishes may be required.

### Altitude

Reduced air density at altitudes greater than 6600 ft. (2000 meters) affects the ability of a molded case circuit breaker to transfer heat and interrupt faults. Therefore, circuit breakers applied at these altitudes should have interrupting, insulation and continuous currents derated as indicated in Figure 1.

**Table 1 — Temperature Derating Data for Thermal-Magnetic Breakers**

Reference Ampere Rating at 40° C (104° F)	Ampere Rating at:			Siemens Breaker Frames
	25° C (77° F)	50° C (122° F)	60° C (140° F)	
15	17	13	11	BQ, BL, BQD, CQD, NGB, NGB, ED
20	22	18	16	
25	28	23	21	
30	33	28	26	
35	39	30	25	
40	44	37	34	
50	55	46	42	
60	66	56	52	
70	77	65	60	
90	99	84	78	
100	110	94	87	
125	137	114	100	
150	165	136	120	
175	192	159	140	
200	220	182	160	
225	247	205	180	
250	275	235	220	
300	330	276	252	
350	385	325	301	
400	440	372	340	
500	550	468	435	
600	660	564	525	
700	770	658	613	
800	880	754	704	
900	990	828	749	
1000	1100	900	825	
1200	1320	1090	1000	
1400	1540	1304	1148	
1600	1760	1500	1320	
1800	1980	1690	1485	
2000	2200	1880	1650	

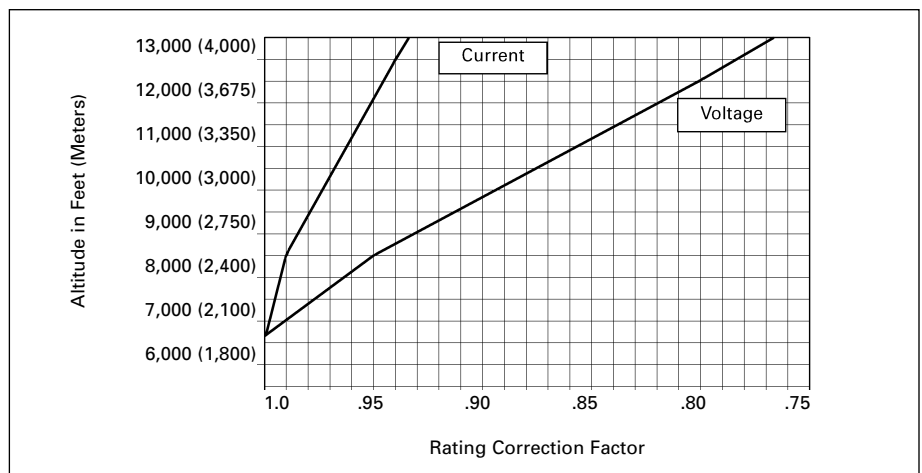


Figure 1 — Altitude Adjustment

# Molded Case Circuit Breakers

## Unusual Operating Conditions

Reference

### 400 Hz Systems<sup>①</sup>

Siemens molded case circuit breakers can be applied for overcurrent protection on 400Hz systems, commonly used to power computer installations, aircraft, military and other specialty equipment. Below are basic guidelines.

#### Circuit Breaker Derating Required

This table lists the maximum continuous current carrying capacity for Siemens breakers at 400Hz. Due to the increased resistance of the copper sections resulting from the skin effect produced by eddy currents at these frequencies, circuit breakers in many cases require derating. The thermal derating on these devices is based upon 100%, three phase application in open air in a maximum of 40°C (104°F) with 48 in. (1219 mm) of the specified cable or bus at the line and load side. Additional derating of not less than 20% will be required if the circuit breaker is to be utilized in an enclosure. Further derating may be required if the enclosure

ambient temperature exceeds 40°C (104°F).

#### Cable and Bus Sizing

The cable and bus sizes to be utilized at 400Hz are not based on standard National Electric Codes tables for 60Hz application. Larger cross sections are necessary at 400Hz. All bus bars specified are based upon mounting the bars in the vertical plane to allow maximum air flow. All bus bars are spaced at a minimum of 0.25 in. (6 mm) apart. Mounting of bus bars in the horizontal plane will necessitate additional drafting. Edgewise orientation of the bus may change the maximum ratings indicated. If additional information is required for other connections of cable or bus, contact Siemens for information.

#### Application Recommendations

It is recommended that temperatures be measured on the line and load terminals or T-connectors of the center pole. These

are usually the hottest terminals with a balanced load. A maximum temperature of 75°C (35°C over a maximum ambient of 40°C) would verify the particular application. Temperature profiles taken on these breakers can be correlated to ensure that the hottest points within the breaker are within the required temperature limits.

#### Factory Configuration

When required, molded case circuit breakers may be factory calibrated for 400Hz application. These breakers are specially labeled for 400Hz usage and their nameplate current rating will include the necessary derating factory. The highest "Maximum Continuous Amperes" rating at 400Hz, found in the table below approximates the highest specially calibrated 400Hz nameplate ampere rating available for a given frame size. Contact Siemens for ordering information on other breakers applied in 400Hz systems.

### 400Hz Breakers

Siemens Breaker Type	Maximum Continuous Ampere Rating At 40°C (104°F) <sup>②</sup>			75°C (167°F) Copper Cable per Pole	
	60HZ		Enclosed After Derating	No of Pieces	Wire Size
	Open Air	Open Air <sup>③</sup>			
ED2, ED4, ED6, BOD, HED4, HED6, CED6	15	15	12	1	#14
	20	20	16	1	#12
	25	25	20	1	#10
	30	30	24	1	#10
	35	35	28	1	#10
	40	40	32	1	#8
	45	43	34	1	#8
	50	48	38	1	#8
	60	57	46	1	#6
	70	67	54	1	#4
	80	76	61	1	#4
	90	86	69	1	#3
	100	95	76	1	#3
QJ2, QJH2, QJ2H, HQJ2H, FD6, FXD6, HFD6, HFXD6, CFD6	110	105	84	1	#2
	125	119	95	1	#1
	70	63	50	1	#4
	80	72	58	1	#4
	90	80	64	1	#3
	100	90	72	1	#3
	110	95	75	1	#2
	125	105	84	1	#1
	150	125	100	1	#1/0
	175	140	112	1	#2/0
JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6, CJD6	200	160	128	1	#3/0
	225	180	144	1	#4/0
	250	200	160	1	250 kcmil
	200	170	136	1	#3/0
	225	190	152	1	#4/0
	250	210	168	1	250 kcmil
	300	240	192	1	350 kcmil
	350	260	208	1	500 kcmil
	400	300	240	2	#3/0
	JD6, JXD6, HJD6, HJXD6 100% Rated	200	170	170	2
225		190	190	2	#4/0
250		210	210	1	250 kcmil
300		240	240	1	350 kcmil
350		260	260	1	500 kcmil
400		300	300	2	#3/0

Siemens Breaker Type	Maximum Continuous Ampere Rating At 40°C (104°F) <sup>②</sup>			75°C (167°F) Copper Cable per Pole	
	60HZ		Enclosed After Derating	No of Pieces	Wire Size
	Open Air	Open Air <sup>③</sup>			
LD6, LXD6, HLD6, HLXD6, HHL6, HHLXD6, CLD6	250	210	168	1	250 kcmil
	300	240	192	1	350 kcmil
	350	260	208	1	500 kcmil
	400	300	240	2	#3/0
	450	340	272	2	#4/0
	500	375	300	2	250 kcmil
	600	420	336	2	350 kcmil
	250	210	210	1	250 kcmil
	300	240	240	1	350 kcmil
	350	260	260	1	500 kcmil
LD6, LXD6, HLD6, HLXD6, 100% Rated	400	300	300	2	#3/0
	450	340	340	2	#4/0
	500	375	375	2	250 kcmil
	600	420	420	2	350 kcmil
	500	400	320	2	250 kcmil
	600	430	360	2	350 kcmil
MD6, MXD6, HMD6, HMXD6, CMD6	700	500	400	3	250 kcmil
	800	560	448	3	300 kcmil
	500	400	400	2	250 kcmil
	600	430	430	2	350 kcmil
MD6, MXD6, HMD6, HMXD6, CMD6 100% Rated	700	500	500	3	250 kcmil
	800	560	560	3	300 kcmil
	800	560	448	3	300 kcmil
	900	600	480	3	350 kcmil
ND6, NXD6, HND6, HNXD6, CND6	1000	650	520	3	400 kcmil
	1200	780	624	4	350 kcmil
	900	600	600	3	350 kcmil
	1000	650	650	3	400 kcmil
ND6, NXD6, HND6, HNXD6, CND6 100% Rated	1200	780	780	4	350 kcmil
	1200	780	624	4	400 kcmil
	1400	850	680	4	500 kcmil
	1600	960	768	5	500 kcmil
PD6, PXD6, HPD6, HFXD6, CPD6	1200	780	780	4	400 kcmil
	1400	850	850	4	500 kcmil
	1600	960	960	5	500 kcmil
	1600	960	768	5	500 kcmil
PD6, PXD6, HPD6, HFXD6, CPD6 100% Rated	1800	960	768	5	500 kcmil
	1800	1080	864	5	500 kcmil
	2000	1200	960	6	500 kcmil
	RD6, RDXD6, HRD6, HFXD6 80% Rated				

① The information provided on this page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data above is based less on

controlled testing, than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.

② Additional derating may be required if the ambient

temperature is greater than 40°C (104°F).

③ Calculated after derating to compensate for the heating of the copper conductor, caused by the skin effect generated by eddy currents produced at 400/415Hz.

# Molded Case Circuit Breakers

IEC 947-2® AC Interrupting Ratings, 50/60 HZ KA

Reference

Ampere Rating	Breaker Frame	Breaker Type	220/240 Volts		380/415 Volts		500 Volts	
			Icu	Ics	Icu	Ics	Icu	Ics
15-125	ED	ED6	65	17	35	9	18	5
70-250	FD	FXD6	65	33	35	18	20	10
		FD6	65	33	35	18	20	10
		HFD6	100	50	65	33	42	21
		HFXD6	100	50	65	33	42	21
		HHFD6	200	100	100	50	65	33
		HHFXD6	200	100	100	50	65	33
250-400	JD	JXD6(A)	65	33	40	20	30	15
		JD6(A)	65	33	40	20	30	15
		HJD6(A)	100	50	65	33	42	21
		HJXD6(A)	100	50	65	33	42	21
		HHJD6	200	100	100	50	65	33 <sup>b</sup>
		HHJXD6	200	100	100	50	65	33 <sup>b</sup>
		CJD6	—	—	—	—	—	—
		SJD6(A) <sup>②</sup>	65	33	40	20	30	15
		SHJD6(A) <sup>②</sup>	100	50	65	33	42	21
		SCJD6	—	—	—	—	—	—
400-600	LD	LXD6(A)	65	33	40	20	30	15
		LD6(A)	65	33	40	20	30	15
		HLD6(A)	100	50	65	33	42	21
		HLXD6(A)	100	50	65	33	42	21
		HHL6(A)	200	100	100	50	65	33 <sup>b</sup>
		HHLXD6	200	100	100	50	65	33 <sup>b</sup>
		CLD6	—	—	—	—	—	—
		SLD6(A) <sup>②</sup>	65	33	40	20	30	15
		SHLD6(A) <sup>②</sup>	100	50	65	33	42	21
600-800	LMD	SCLD6 <sup>②</sup>	—	—	—	—	—	—
		LMXD6	65	33	40	20	30	15
		LMD6	65	33	40	20	30	15
		HLMXD6	100	50	65	33	42	21
		HLMD6	100	50	65	33	42	21
600-800	MD	MXD6	65	33	40	20	30	15
		MD6	65	33	40	20	30	15
		HMXD6	100	50	65	33	42	21
		HMD6	100	50	65	33	42	21
		CMD6	200	100	100	50	65	33
		SMD6 <sup>②</sup>	65	33	40	20	30	15
		SHMD6 <sup>②</sup>	100	50	65	33	42	21
		SCMD6 <sup>②</sup>	200	100	100	50	65	33
800-1200	ND	NXD6	65	33	40	20	30	15
		ND6	65	33	40	20	30	15
		HNXD6	100	50	65	33	42	21
		HND6	100	50	65	33	42	21
		CND6	200	100	100	50	65	33
		SND6	65	33	40	20	30	15
		SHND6	100	50	65	33	42	21
		SCND6	200	100	200	50	65	33
1200-1600	PD	PXD6	65	33	40	10	30	8
		PD6	65	33	40	10	30	8
		HPXD6	100	50	65	17	42	11
		HPD6	100	50	65	17	42	11
		CPD6	200	100	100	25	65	17
		SPD6	—	—	—	—	—	—
		SHPD6	—	—	—	—	—	—
1600-2000	RD	RXD6	65	33	40	10	30	8
		RD6	65	33	40	10	30	8
		HRXD6	100	50	65	17	42	11
		HRD6	100	50	65	17	42	11

# Molded Case Circuit Breakers

## Typical Specifications

Reference

### General Specifications

Molded case circuit breakers shall provide circuit overcurrent protection with inverse time and instantaneous tripping characteristics and shall be Siemens Sentron, Sensitrip or approved equal.

All circuit breakers shall be listed by Underwriters' Laboratories, Inc., conform to applicable requirements of NEMA Standard Publication No. AB1 and meet appropriate classifications of Federal Specifications W C 375B/Gen.

All circuit breakers shall have a quick-make, quick-break over center toggle type mechanism and the handle mechanism shall be trip free to prevent holding contacts closed against a short circuit or sustained overload. All circuit breaker handles shall assume a position between "ON" and "OFF" when tripped automatically. Multi-pole circuit breakers shall be common-trip such that an overload or short circuit on any one pole will result in all poles opening simultaneously. Arc extinction is to be accomplished by magnetic arc chutes. All ratings are to be clearly visible. When reverse feed is indicated on the drawings, in accordance with UL, circuit breakers with sealed trip units shall be supplied.

### Thermal Magnetic Specifications

Unless otherwise noted on the drawings, all Circuit breakers 2000 Ampere and below shall have thermal-magnetic trip units, with inverse time-current characteristics. Automatic operation of these circuit breakers shall be obtained by means of thermal-magnetic tripping devices located in each pole providing inverse time delay and instantaneous circuit protection. Circuit breakers shall be ambient compensating in that, as the ambient temperature increases over 40°C, the circuit breaker automatically derates itself so as to better protect its associated conductor. Thermal magnetic breakers from 250 to 2000A frames shall have thermal interchangeable trip units, with instantaneous magnetic trip settings that are adjustable and accessible from the front of all circuit breakers on frame sizes 250 Amperes and above. Where indicated, provide circuit breakers UL listed for application at 100% of their continuous ampere rating in their intended enclosure.

### Motor Circuit Protectors

Where indicated on the drawings and in the combination motor starter/motor control center schedule, furnish instantaneous magnetic trip only circuit breakers for motor short circuit protection. The magnetic trips shall be adjustable and accessible from the front of all circuit breakers frames. The continuous current rating shall be between 1 and 800 Amperes as indicated on the drawing.

The interrupting rating of the circuit breakers shall be as indicated in the specifications, and shown on the drawing or single line diagram. The interrupting rating of the circuit breakers shall be at least equal to the available short circuit current at the line terminals of the circuit breaker and correspond to the UL listed integrated short circuit current rating specified.

### Internal Accessories

Provide shunt trips, bell alarms, and auxiliary switches as shown on the contract drawings. Gold plated auxiliary switches shall be supplied for PLC connection. Internal accessories for all breakers shall be UL listed for field installation and modification.

### Connection Accessories

Unless otherwise noted, Mechanical lugs shall be provided with all Molded Case Breakers. Where indicated on the drawings, compression lugs shall be provided on 1200 Ampere frame and below circuit breakers. All compression lugs shall be supplied by the Circuit Breaker Manufacturer. Where indicated on the drawings, UL listed plug-in or rear connectors shall be supplied.

### Solid State Sensing Specifications

As indicated on the drawings, circuit breaker frames 400 Ampere through 3200-Ampere shall have microprocessor-based RMS sensing trip units, with the capability to measure through to the 21st harmonic. Automatic operation of all circuit breaker frames 400A and larger shall be obtained by means of solid state tripping elements providing inverse time delay and (instantaneous) and/or (short-time delay) circuit protection. Continuous current ratings shall be adjustable from 20% to 100% of the trip unit rating, without the need for a rating plug. Long-time delay and instantaneous trip shall be adjustable. The optional short-time trip function shall have adjustable pick-up settings, three fixed times, and I<sup>2</sup>t ramp. Circuit breaker frames 400A and larger, and where indicated on the drawings, shall be 100% equipment rated.

### Integral Ground Fault Option

Main and feeder circuit breakers, as indicated on the drawings, shall be provided with integral ground fault protection. Ground fault pick-up shall be adjustable from 20% to 70% of the circuit breakers maximum continuous current rating. Ground fault time delay shall be adjustable with three I<sup>2</sup>t ramps.

### Metering Option

When indicated on the drawings, solid state trip breakers shall be furnished with a plug-in or panel mounted metering device. This device shall simultaneously display all three phase currents, as well as average current, ground current, and phase unbalance. In addition it shall display breaker status, a max log, and a trip log. The trip log will retain and display date, time and type of trip (overload, short circuit or ground fault) for the most recent 5 trip events.

### Current Limiting Specifications

Where indicated on the drawings, Siemens current limiting circuit breakers are to be furnished. Current limiting circuit breakers shall limit the let-through I<sup>2</sup>t to a value less than the I<sup>2</sup>t of one-half cycle wave of the symmetrical prospective current without any fusible elements when operating within its current range.

### Series Connected Combination Specifications

Where protective devices are applied in series combination, such that the prospective available fault current exceeds the interrupting rating (AIR) of the downstream protective devices, such combinations shall be UL recognized combinations. All electrical equipment using these UL recognized circuit breaker combinations shall be clearly marked in accordance with NEC Section 240-83(c).

# Molded Case Circuit Breakers

## Superseded Breakers

General

Sentron Series	Note	Superseded	Note	Superseded
CED62B015-CED62B125 CED62S100A CED63A001-CED63A125 CED63B015-CED63B125 CED63S100A HHED62B015-HHED62B125 HHED63B015-HHED63B125	① ① ① ① ① ① ①	CLE62B015-CLE62B100 CLE62S100 CLE63A001-CLE63A125 CLE63B015-CLE63B100 CLE63S100 HED62B015-HED62B125 HED63B015-HED63B125	③ ③ ③ ③	CE2B015-CE2B100 CE2S100 CE3B015-CEB100 CE3S100
CFD62A150, CFD62L150, CFD62A250 CFD62B070-CFD62B250 CFD62S250A CFD63A150, CFD63L150, CFD63A250 CFD63B070-CFD63B250 CFD63S250A	① ① ① ① ① ①	CLF62A150, CLF62A250 CLF62B070-CLF62B240 CLF62S250 CLF63A150, CLF63A250 CLF63B070-CLF63B250 CLF63S250	③ ③	CJ2B125-CJ2B250 CJ3B125-CJ3B250
CJD62B200-CJD62B400 CJD62H400, CJD62L400 CJD62S400A CJD63B200-CJD63B400 CJD63H400, CJD63L400 CJD63S400A	① ① ① ① ① ①	CLJ62B100-CLJ62B400 CLJ62L400, CLJ62H400 CLJ62S400 CLJ63B200-CLJ63B400 CLJ63L400, CLJ63H400 CLJ63S400	④ ④ ④ ④	CJ2B300-CJ2B400 CJ2S400 CJ3B300-CJ3B400 CJ3S400
CPD63B120-CPD63B160	②	CP3B120-CP3B160		
ED21B015-ED21B100 ED22B015-ED22B100 ED22S100A ED23B015-ED23B100 ED23S100A	① ① ① ① ①	E21B015-E21B100 E22B015-E22B100 E22S100A E23B015-E23B100 E23S100A	② ② ② ② ②	EE1B015-EE1B100 EE2B015-EE2B100 EE2S100 EE3B015-EE3B100 EE3S100
ED41B015-ED41B100 ED42B015-ED42B125 ED42S100A ED43B015-ED43B125 ED43S100A	① ① ① ① ①	E41B015-E41B100 E42B015-E42B100 E42S100 E43B015-E43B100 E43S100	② ② ② ② ②	EH1B015-EH1B100 EH2B015-ED2B125 EH2S100 EH3B015-EH3B100 EH3S100
ED61B015-ED61B100 ED62B015-ED62B125 ED62S100A ED63A001-ED63A125 ED63B015-ED63B125 ED63S100A HHED62B015-HHED62B125 HHED63B015-HHED63B125	① ① ① ① ① ① ① ①	E61B015-E61B100 E62B015-E62B100 E62S100A E63A001-E63A125 E63B015-E63B100 E63S100A HED62B015-HED62B125 HED63B015-HED63B125	② ② ② ② ② ② ②	EF1B015-EF1B020 EF2B015-EF2B100 EF2S100 EF3A003, EF3J050, EF3L050-EF3A100, EF3H1 EF3B015-EF3B100 EF3S100
FD62B070-FD62B250 <sup>⑥</sup> FD63B070-FD63B250 <sup>⑥</sup>	① ①	F62B070, F62B250 F63B070-F63B250		
FXD62A150, FXD62L150, FXD62A250 FXD62B070-FXD62B250 <sup>⑥</sup> FXD62S250A FXD63A150, FXD63L150, FXD63A250 FXD63B070-FXD63B250 <sup>⑥</sup> FXD63S250A	① ① ① ① ① ①	FJ62A150, FJ62L150-FJ62A250 FJ62B070-FJ62B250 FJ62S250 FJ63A150, FJ63L150-FJ63A250 FJ63B070-FJ63B250 FJ63S250	② ② ② ② ②	FJ2B070-FJ2B225 FJ2S225 FJ3A225 FJ3B070-FJ3B225 FJ3S225
HED41B015-HED41B100 HED42B015-HED42B125 HED43B015-HED43B125	① ① ①	HE41B015-HE41B100 HE42B015-HE42B100 HE43B015-HE43B100		
HED61B015-HED61B100 HED62B015-HED62B125 HED63B015-HED63B125	① ① ①	HE61B015-HE61B100 HE62B015-HE62B110 HE63B015-HE63B100	② ②	HE2B015-HE2B100 HE3B015-HE3B100
HFD62B070-HFD62B250 HFD63B070-HFD63B250	① ①	HF62B070-HF62B250 HF63B070-HF63B250		
HHED62B015-HHED62B125 HHED63B015-HHED63B125	① ①	HED62B015-HED62B125 HED63B015-HED63B125		
HJD63B200-HJD63B400	①	HJ63B200-HJ63B400	②	HJ3B125-HJ3B400
HLD63B250-HLD63B600	①	HL63B450-HL63B600	②	HL3B450-HL3B600
HMD63B500-HMD63B800	②	HN3B500-HN3B800		
HND63B100-HND63B120	②	HK3B100-HK3B120		
HPD63B120-HPD63B160	②	HP3B120-HP3B160		
HRD63B160-HRD63B200	②	HR3B160-HR3B200		

① Mechanically and electrically interchangeable.

② Electrically interchangeable only, refer to sales office for further details.

③ Electrically interchangeable only if the system interrupting capacity is less than or equal to:  
 200 kA at 240V AC  
 200 kA at 480V AC  
 100 kA at 600V AC

④ Electrically interchangeable only if the system interrupting capacity is less than or equal to:  
 200 kA at 240V AC  
 150 kA at 480V AC  
 100 kA at 600V AC  
 ⑤ Refer to local sales office for replacement information.

⑥ Effective 1994 — The FD6 and FXD6 types have been replaced by FD6-A and FXD6-A type thermal / magnetic circuit breakers — mechanically and electrically interchangeable with the exception that FXD6-A and FD6-A have 22kA at 600V AC ratings versus 18kA at 600V AC for types FXD6 and FD6.

6  
MOLDED CASE  
CIRCUIT BREAKERS

# Molded Case Circuit Breakers

## Superseded Breakers

General

Sentron Series	Note	Superseded	Note	Superseded
JD62B200-JD62B400 JD63B200-JD63B400	① ①	JLB200-JL62B400 JL63B200-JL63B400	② ②	JL2B070-JL2B400 JL3B0L0-JL3B400
JXD22B200-JXD22B400 JXD22S400A JXD23B200-JXD23B400 JXD23S400A	① ① ① ①	JD22B200-JD22B400 JD22S400 JD23B200-JD23B400 JD23S400	② ② ② ②	JD2B250-JD2B400 JD2S400 JD3B250-JD3B400 JD3S400
JXD62B200-JXD62B400 JXD62H400, JXD62L400 JXD62S400A JXD63B200-JXD63B400 JXD63H400, JXD63L400 JXD63S400A	① ① ① ① ① ①	JJ62B200-JJ62B400 JL62L400, JL62H400 JJ62S400A JJ63B200-JJ63B400 JL63A400, JL63H400, JL63L400 JJ63S400A	② ② ② ② ②	JJ2B250-JJ2B400 JL2L400-JL2H400  JJ3B200-JJ3B400 JL3H400, JL3L400, JL3A225
LD62B250-LD62B500 LD62B250-LD63B600	① ①	LL63B250-LL62B600 LL63B250-LL63B600	② ②	LL2B450-LL2B600 LL3B450-LL3B600
LXD62B450-LXD62B600 LXD62J600, LXD62L600 LXD62S600A LXD63B450-LXD63B600 LXD64H600, LXD63L600 LXD63S600A	① ② ① ① ① ①	LJ62B450-LJ62B600 LL2H600, LL2U600, LL2X600 LJ62S600 LJ63B450-LJ63B600 LL63H600, LL63L600 LJ63S600A	② ②	LL3A450, LL3H600 LL3S600
MD62B500-MD62B800 MD63B500-MD63B800	② ②	KM2B500-KM2B800 KM3B500-KM3B800		
MXD62A800, MXD62H800, MXD62L800 MXD62S800A MXD63A800, MXD63H800, MXD63L800 MXD63S800A	② ② ② ②	KM2A800, KM2H800, KM2L800 KM2S800 KM3A600, KM3H800, KM3L800 KM3S800		
ND63B100-ND63B900 NXD63S120A	② ②	KP3B100-KP3B900 KP3S120		
PD63B120-PD63B160 PXD63S160A	② ②	HP3B120-HP3B160 HP3S160		
RD63B160-RD63B200	②	HR3B160-HR3B200		
QJ22B060-QJ22B225 QJ22B060H-QJ22B225H QJ22S225 QJ23B060-QJ23B225 QJ23B060H-QJ23B225H	① ① ① ① ①	QJ2B125-QJ2B225  QJS225 QJ3B125-QJ3B225		
QJH22B060-QJH22B225 QJH23B060-QJH23B225 QJH23S225	① ① ①	QJ2H125-QJ2B225 QJ3H125-QJ3H225 QJ3S225		
RD63B160-RD63B200 RXD63S200A	② ②	HR3B160-HR3B200 HR3S200		
SHJD69200-SHJD69400 SHJD69200G-SHJD69400G SHJD69200NGT-SHJD69400NGT SHJD69200NT-SHJD69400NT	① ① ① ①	SHJ63B200-SHJ63B400G SHJ63B200G-SHJ63B400G SHJ63N200G-SHJ63N400G SHJ63N200-SHJ63N400		
SHLD69300-SHLD69600 SHLD69300G-SHLD69600G SHLD69300NGT-SHLD69600NG SHLD69300NT-SHLD69600NT	① ① ① ①	SHL63B300-SHL63B600 SHL63B300G-SHL63B600G SHL63N300G-SHL63N600G SHL63N300-SHL63N600		
SHND69100A-SHND69120A SHND69100AG-SHND69120AG	① ①	SHND69100-SHND69800 SHND69100G-SHND69800G	② ②	SHKF3B100-SHKF3B800 SHKF3B100G-SHKF3B800G
SHPD69120-SHPD69160 SHPD69120G-SHPD69160G	② ②	SHPF3B120-SHPF3B160 SHPF3B120G-SHPF3B160G		

① Mechanically and electrically interchangeable.

② Electrically interchangeable only, refer to sales office for further details.

③ Electrically interchangeable only if the system interrupting capacity is less than or equal to:  
200 kA at 240V AC  
200 kA at 480V AC  
100 kA at 600V AC

④ Electrically interchangeable only if the system interrupting capacity is less than or equal to:  
200 kA at 240V AC  
150 kA at 480V AC  
100 kA at 600V AC

⑤ Refer to local sales office for replacement information.

# Molded Case Circuit Breakers

## Superseded Breakers

General

Sentron Series	Note	Superseded	Note	Superseded
SHND69100NGT-SHND69800NGT SHND69100NT-SHND69800NT	① ②	SHKF3N100G-SHKF3N800G SHKF3N100-SHKF3N800	② ②	SHK3N100G-SHK3N600G SHK3N100-SHK3N600
SHPF3B120-SHPF3B160 SHPF3B120G-SHPF3B160G SHPF3N120-SHPF3N160 SHPF3N120G-SHPF3N160G	② ② ② ②	SHP3B120-SHP3B800 SHP3B120G-SHP3B800G SHP3N120-SHP3N800 SHP3N120G-SHP3N800G		
SJD69200-SJ369400 SJD69200G-SJD69400G SJD69200NGT-SJD69400NGT SJD69200NT-SJD69400NT	① ① ① ①	SJL63B200-SJL63B400 SJL63B200G-SJL63B400G SJL63N200G-SJL63N400G SJL63N200-SJL63N400		
SLD69300-SLD69600 SLD69300G-SLD69600G SLD69300NGT-SLD69600NGT SLD69300NT-SLD69600NT	① ① ① ①	SLL63B300-SLL63B600 SLL63B300G-SLL63B600G SLL63N300G-SLL63N600G SLL63N300-SLL63N600		
SMD69600A-SMD69800A SMD69600AG-SMD69800AG SMD69600ANGT-SMD69800ANGT SMD69600ANT-SMD69800ANT	① ① ① ①	SMD69600-SMD69800 SMD69600G-SMD69800G SMD69600NGT-SMD69800NGT SMD69600NT-SMD69800NT	② ② ② ②	SKMF3B600-SKMF3B800 SKMF3B600G-SKMF3B800G SKMF3N600G-SKMF3N800G SKMF3N600-SKMF3N800
SND69800A-SND69120A SND69800AG-SND69120AG SND69800ANGT-SND69120ANGT SND69800ANT-SND69120ANT	① ① ① ①	SND69100-SND69800 SND69100G-SND69800G SND69100NGT-SND69800NGT SND69100NT-SND69800NT	② ② ② ②	SKPF3B100-SKPF3B600 SKPF3B100G-SKPF3B600G SKPF3N100G-SKPF3N600G SKPF3N100-SKPF3N600
SPD69120-SPD69160 SPD69120G-SPD69160G SPD69120NGT-SPD69160NGT SPD69120NT-SPD69160NT	② ② ② ②	SHPF3B120-SHPF3B160 SHPF3B120G-SHPF3B160G SHPF3N120-SHPF3N160G SHPF3N120G-SHPF3N160G		
— —	④	BQCC1B015-BQC1B030		
— —	④	CC1B015-CC1B030		
— —	④	CC2B015-CC2B030		
— —	④	CC3B015-CC3B030		
— —	④	EF2A003, EF2H050, EF2L050, EF2A100, EF2H150, EF2L150		
— —	④	EH1B015-EH1B100		
— —	④	EH2B015-EH2B100		
— —	④	EH3B015-EH3B100		
— —	③	HE2A003, HE2H050, HE2L050-HE2A100		
— —	③	HE3A003, HE3H050, HE3L050-HE3A100		
— —	③	HE3B015-HE3B100		

① Mechanically and electrically interchangeable.  
 ② Electrically interchangeable only, refer to sales office for further details.  
 ③ These units are for replacement purposes only. Consult sales office for availability.

④ These units are no longer manufactured, and no replacement is available.

# Notes

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# Distribution Dry Type Transformers

## 600 Volts Class — Single and Three Phase

Selection

### 600 Volts Class

Single Phase 0.25–167 KVA

Three Phase 3–1000 KVA

### Features

- Standard units are UL listed and are designed in accordance with ANSI, NEMA (ST20) and IEEE standards

### Encapsulated

- UL listed designs (UL 506)
- Totally enclosed, non-ventilated, heavy gauge steel enclosure
- Core and coil completely embedded within a resin compound for quiet, low temperature operation
- Encapsulation seals out moisture and air
- UL listed indoor/outdoor enclosure features integral wall mounting brackets
- Rugged design resists weather, dust, and corrosion
- Efficient, compact, lightweight, easy to install
- Flexible wiring leads that terminate within the bottom wiring compartment
- Large wiring compartment on the bottom with convenient knockouts
- High quality non-aging electrical grade core steel
- Precision wound coils

### Ventilated

- UL listed designs (UL 1561)
- Designed for indoor NEMA 2 installations. NEMA 3R enclosures suitable for outdoor locations available as an option
- Core and coils are designed with UL listed high-temperature materials rated for 220°C; standard units feature 150°C winding temperature rise
- Optional low temperature rise of 115°C or 80°C winding temperature rise for increased efficiency and additional overload capability
- Rugged sheet steel enclosure per UL1561, UL506 standards with removable panels for access to the internal wiring area
- Neoprene noise dampening pads isolate the core and coil from the enclosure
- Optional drip shields/weathershield and wall brackets available
- High quality, non-aging electrical grade core steel
- Precision wound coils



Encapsulated Transformer



Ventilated Transformer

### Single Phase Transformer Ampere Ratings

Single Phase Full Load Amperes (FLC)						
KVA	120V	208V	240V	277V	480V	600V
.25	2.0	1.2	1.0	0.9	0.5	0.4
.50	4.2	2.4	2.1	1.8	1.0	0.8
.75	6.3	3.6	3.1	2.7	1.6	1.3
1	8.3	4.8	4.2	3.6	2.1	1.7
1.5	12.5	7.2	6.2	5.4	3.1	2.5
2	16.7	9.6	8.3	7.2	4.2	3.3
3	25	14.4	12.5	10.8	6.2	5
5	41	24	20.8	18.0	10.4	8.3
7.5	62	36	31	27	15.6	12.5
10	83	48	41	36	20.8	16.7
15	125	72	62	54	31	25
25	206	120	104	90	52	41
37.5	312	180	156	135	76	62
50	416	240	208	180	104	83
75	625	340	312	270	156	125
100	833	480	416	361	208	166
167	1391	803	695	603	347	278

### Three Phase Transformer Ampere Ratings

Three Phase Full Load Amperes (FLC)				
KVA	208V	240V	480V	600V
3	8.3	7.2	3.6	2.9
6	16.6	14.4	7.2	5.8
9	25	21.6	10.8	8.6
15	41.7	36.1	18.0	14.4
30	83.4	72.3	36.1	28.9
45	124	108	54.2	43.4
75	208	180	90	72
112.5	312	270	135	108
150	416	360	180	144
225	624	541	270	216
300	832	721	360	288
500	1387	1202	601	481
750	2084	1806	903	723
1000	2779	2408	1204	963

### Insulation Class and Temperature Rise

KVA		Insulation		
1-Phase	3-Phase	NEMA Class <sup>®</sup>	Temperature Class	Temperature Rise
0.25–25 <sup>①</sup>	3–15	F	180° C	115° C
15–167	15–1000	H	220° C	150° C

### Sound Level in Decibels<sup>®</sup> — 600V Class

KVA	NEMA Average dB	KVA	NEMA Average dB
0–9	40	301–500	60
10–50	45	501–700	62
51–150	50	701–1000	64
151–300	55		

① 25KVA 277 -120/240 is 115°C rise. 25KVA 480 x 240 -120/240 is 150°C rise.

② Average sound level applies to 150°C rise K-1 transformers. Average dB levels for low temperature and other K-Factor ratings available upon request.

③ NEMA Class for 80°C rise = B, 115°C rise = F, 150°C = H. Insulation class per UL 1446 180° = (H), 220° = (R)

# Transformers

## Dry Type Distribution 600 Volt Class

General

Siemens dry type distribution transformers are rated 600 volt class and are available in a wide variety of ratings to provide versatile electrical distribution for general purpose, lighting and power loads in commercial and industrial applications.

Ratings are available from 0.25 through 167 kVA single phase, and 3 through 1000 kVA 3-phase. A variety of primary and secondary voltage ratings are available to match the load requirements to the distribution system. All units meet applicable ANSI and NEMA standards. Standard designs are UL Listed.

Dry type transformers are air cooled by natural convection. They require no special vaults for installation, and can be installed in locations convenient to the load being served.

Encapsulated designs are provided for ratings from 0.25 kVA through 15 kVA, 1-phase, and from 3 kVA through 15 kVA 3-phase. These designs feature indoor/outdoor enclosures with integral wall mounting brackets, and 115°C rise, 180°C insulation system.



Encapsulated Transformer

Ventilated designs are provided for ratings from 25 kVA through 167 kVA 1-phase, and from 15 kVA through 1000 kVA 3-phase. These feature indoor enclosures, 150°C rise, and 220°C insulation system.



Ventilated Transformer

A wide variety of designs and optional accessories are available including weather shields for outdoor NEMA 3R protection.

### K-Factor Rated for Non-Linear Loads

Siemens offers transformer designs which meet K-Factor ratings. K-Factor is a ratio between the additional losses due to harmonics and the eddy losses at 60Hz. It is used to specify transformers for non-linear loads. Note that K-Factor transformers do not eliminate harmonic distortion; they withstand the non-linear load condition without overheating.

### K-Factor Features

- Designed to ANSI and NEMA Standards
- UL K-Factor Listed per UL 1561
- K-Factor Rating Designed to IEEE c57.110
- Aluminum Wound Coils
- Core, Conductors designed for Harmonics and Eddy Currents 150°C Rise, 220°C Insulation
- Electrostatic Shield to Attenuate Line Transients
- 200% Neutral Bar (2X Phase current)
- NEMA 1 Enclosure

### Options

- Special K-Factor ratings
- Special voltage ratings
- NEMA 3R Enclosure
- 80° or 115°C temperature rise
- Low noise designs

- Copper windings
- Drip shields
- Wall mounting brackets (15–50 kVA)

### Encapsulated Features

- UL Listed Designs
- Totally Enclosed, Non-Ventilated
- Heavy Gauge Steel Enclosure
- Core and Coil Completely Embedded Within a Resin Compound — quiet, low temperature operation
- Encapsulation — seals out moisture and air
- UL Listed Indoor/Outdoor Enclosure — features integral wall mounting brackets
- Rugged Design Resists Weather, Dust, and Corrosion
- Efficient, Compact, Lightweight — easy to install
- Flexible Wiring Leads Terminate Within Bottom Wiring Compartment
- Large Wiring Compartment on Bottom with Convenient Knockouts
- High Quality Non-Aging Electrical Grade Core Steel
- Precision Wound Coils

### Options

- Copper windings
- Electrostatic shield (3 kVA and larger)

### Ventilated Features

- UL Listed Designs
- Designed for Indoor Installation
- Core and Coils are Designed with UL Listed High-Temperature Materials — rated for 220°C; standard units feature 150°C winding temperature rise
- Rugged Sheet Steel Enclosure per ULI561, UL506 standards with Removable Panels for Access to Internal Wiring Area
- Neoprene Noise Dampening Pads Isolate the Core and Coil from the Enclosure
- High Quality, Non-Aging Electrical Grade Core Steel
- Precision Wound Coils

### Options

- Low temperature rise of 115°C or 80°C winding temperature rise for increased efficiency and additional overload capability
- Outdoor enclosures
- Totally enclosed non-ventilated designs
- Copper windings
- Electrostatic shield
- Low noise designs
- K-factor rated designs
- Drip shields and wall brackets available

# Transformers

## Dry Type Distribution 600 Volt Class

## Specifications

### K-Factor Rated For Non-Linear Loads

Furnish and install K-Factor rated dry type transformers of the two winding type, self-cooled, with 60Hz ratings as indicated on the electrical plans. Unless specified otherwise, provide standard NEMA taps, standard impedance, and standard sound levels. Transformers shall be Siemens or approved equal.

Transformers shall be designed, manufactured, and tested in accordance with ANSI, NEMA and IEEE Standards and shall be UL Listed. The self-coded kVA rating shall be suitable for 30°C average, 40°C maximum ambient temperature.

Non-Linear rated transformers shall be suitable for nonsinusoidal loads and harmonic distortion as indicated in IEEE C57.110, and shall be designed with the following K-Factor rating (choose one):

- K4 for 50% Non-Linear load
- K13 for 100% Non-Linear load
- K20 for 150% Non-Linear load
- K30 for 200% Non-Linear load

Non-Linear rated transformers shall be UL Listed and shall bear the UL marking on the nameplate along with the specified K-Factor rating. Non-Linear rated transformers shall include the following design features:

- a) Core designed to withstand voltage distortion and high frequency harmonic currents. Magnetic flux density designed to reduce eddy currents and prevent saturation or overheating of the core.
- b) Primary and secondary coils designed to minimize stray losses, skin effect losses, and excessive heating from harmonic currents. Coils shall not exceed the specified

winding temperature rise, the corresponding hot spot temperature rating, or the 220°C insulation rating while carrying the specified Non-Linear load.

- c) Neutral bus sized for 200% of rated current to withstand circulating currents and triplen harmonics.
- d) An Electrostatic Shield between the primary and secondary winding and grounded to a common point within the transformer enclosure. When properly grounded, the shield shall provide noise isolation and attenuate common mode and transverse mode noise transients under normal loading conditions.
- e) The design and materials used shall enable the transformers to comply with NEMA TP1 efficiency standards.

Transformers rated 15 kVA and larger shall be a ventilated dry type with a UL Listed 220°C insulation system. Units shall be designed to operate with a rated maximum temperature rise of 150°C (Provide optional 115°C or 80°C rise when specified).

Construction shall consist of aluminum windings and arranged to brace coil layers and provide maximum ventilation. (Provide optional copper windings when specified). Cores shall be constructed of non-aging electrical grade steel with high magnetic permeability and low loss characteristics.

Core laminations shall be tightly assembled. The complete core and coil assembly shall be impregnated with non-hydroscopic thermo-setting varnish to provide a high dielectric, moisture-resistant, and flame retardant seal.

Core and coil assemblies shall be constructed to provide short circuit withstand capability as defined by ANSI and NEMA standards. The complete assembly shall be installed on vibration dampening pads to reduce noise and securely bolted to the enclosure base. A flexible grounding conductor shall be installed between the core and coil assembly and the transformer enclosure.

Enclosures shall be ventilated, heavy gauge steel construction finished with light gray paint. Front and rear covers shall be removable to provide access to the terminal compartment. Terminals shall be fully sized to carry the transformer full load current and shall be arranged to accept required UL-Listed cable connectors. Units installed outdoors shall have a UL-Listed type 3R outdoor enclosure, or shall be UL Listed with optional weathershields installed.

Standard voltage ratings shall be supplied with NEMA standard taps for the high voltage windings.

Unless specified otherwise, average sound levels (150°C rise) shall meet the following ANSI/ NEMA standards:

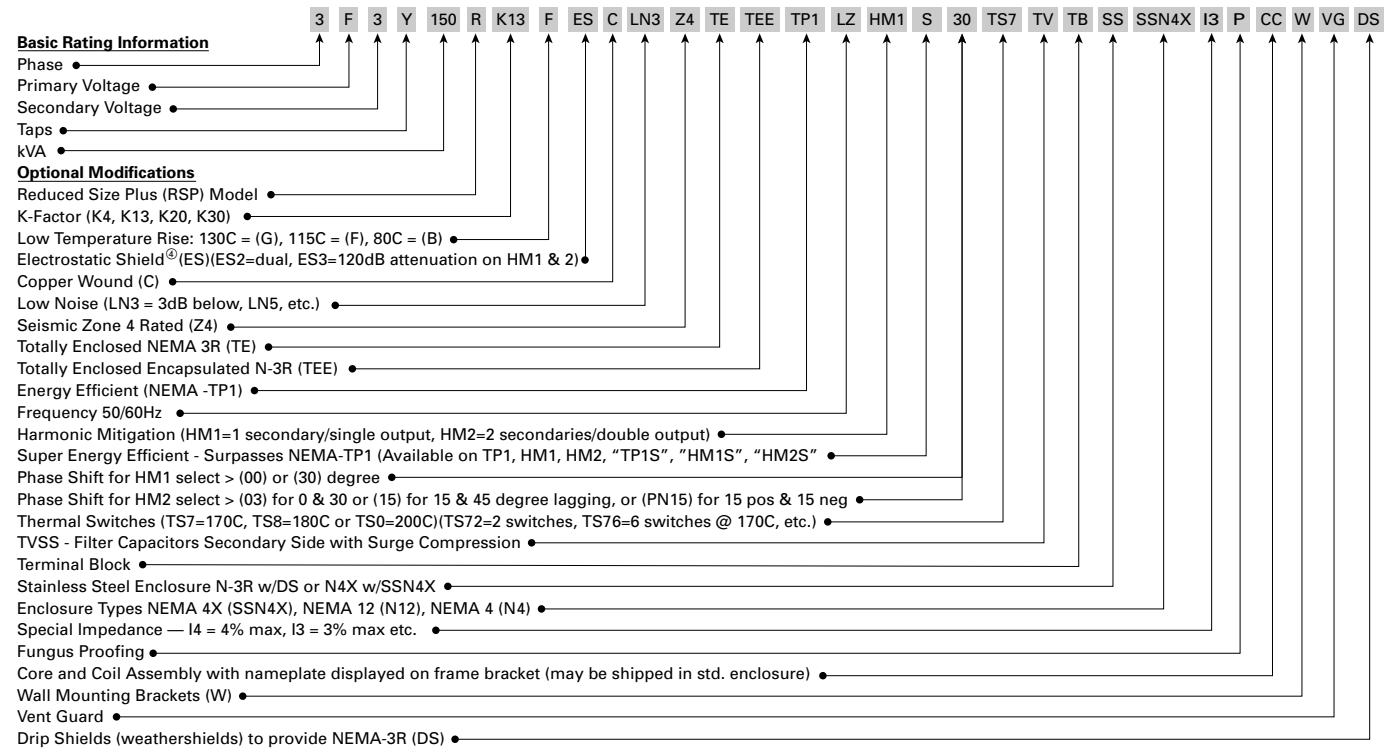
0 to 9 kVA	40 dB
10 to 50 kVA	45 dB
51 to 150 kVA	50 dB
151 to 300 kVA	55 dB
301 to 500 kVA	60 dB
501 to 700 kVA	62 dB
701 to 1000 kVA	64 dB

Each transformer shall have a securely attached nameplate providing complete electrical ratings, wiring diagram, tap connections, and catalog number, as applicable.

# Distribution Dry Type Transformers

## Catalog Number Coding System for Transformers

Selection



Note 1: If the catalog number will not completely describe the product, it will be identified as SPC-\_\_KVA-XFMR.  
 Note 2: "QST" suffix on catalog numbers defines units available in the Siemens warehouse distribution system.  
 Note 3: Suffix K4TP1 or K13TP1 will indicate K-Factor rating and TP1 rating at K1 loading.

Phase		Primary		Secondary	
1-Phase	1	240X120	A	120/240	1
3-Phase	3	208	B	240 <sup>①</sup>	2
		240	C	208Y/120	3
		480X240	D	120/208 <sup>⑤</sup>	3
		277	E	480Y/277	5
		480	F	380Y/219	6
		600	G	230Y/133	7
				110/220	8
190/200/208/220x380	Export				
400/416/440	Range				
190/208/220/240x380	Export				
416/440/480	Range				

### TAPS

Description <sup>②</sup>	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

### KVA

KVA	Catalog Code	KVA	Catalog Code	KVA	Catalog Code	KVA	Catalog Code
0.25	205	5	005	30	030	150	150
0.50	505	6	006	37.5	037	167	167
0.75	705	7.5	007	45	045	225	225
1	001	9	009	50	050	300	300
1.5	105	10	010	75	075	500	500
2	002	15	015	100	100	750	750
3	003	25	025	112.5	112	1000	000

<sup>①</sup> Available in 3-phase 3 to 15 KVA only.  
<sup>②</sup> Taps are determined by transformer design and are not selectable on standard catalog units.  
<sup>③</sup> With continuous overloads these units will be operating as 150°C rise designs.  
<sup>④</sup> "XES" Suffix coding for shielded isolation with filters & surge suppression.  
<sup>⑤</sup> Applies to HMT designs.

### OPTIONAL PRODUCT OFFERINGS

- For non-standard or non-cataloged voltages or non-cataloged primary taps refer to sales office.
- Non-standard application, 50/60 Hz, special impedance, voltage, etc. — consult sales office.
- Wall mounting brackets and weathershields — available at no charge on all indicated units when requested at time of initial project order. Contact sales office for feasibility of wall brackets on units with special temperature rise, low noise, or copper windings.
- Special temperature rise:
  - 115° C rise, can tolerate 15% continuous overload.<sup>③</sup> (Suffix Code F)
  - 80° C rise, can tolerate 30% continuous overload.<sup>③</sup> (Suffix Code B)
- Copper windings — Available on most designs. (Suffix Code C)
- Low Noise Suffix code LN3 (3dB below std.) available as indicated. For LN5, etc. contact sales office with required sound level.
- Totally Enclosed Non-Ventilated (TE) — see page 7-8.
- Auto transformers (A) — see page 7-11.
- Non-standard paint color — contact sales office.
- Electrostatic shield (full width copper foil) for added noise attenuation and reduction of high frequency disturbances. (Suffix Code ES)
- Energy Efficient (NEMA TP1), Meets TP1-1996 Efficiency.
- Harmonic mitigating transformers—see page 7-15.
- Transformer and panel combinations—see page 7-13.
- Reduced Size Plus models—see page 7-17.

7 TRANSFORMERS

# Distribution Dry Type Transformers

## Single Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
<b>208 Volts Primary, 120/240 Volts Secondary</b>									
1	1B1N001	377.00	N	115° C	180° C	Wall	No	Encapsulated	2
2	1B1N002	629.00	N	115° C	180° C	Wall	No	Encapsulated	2
3	1B1N003	770.00	N	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
5	1B1N005	967.00	N	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
7.5	1B1N007	1425.00	N	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
10	1B1N010	1614.00	N	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	1B1N015	1859.00	N	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
25	1B1Y025TP1	5509.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5
37.5	1B1Y037TP1	6502.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5
50	1B1Y050TP1	7597.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5
75	1B1Y075TP1	18495.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
100	1B1Y100TP1	20659.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
167	1B1Y167TP1	51057.00	N	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 240 × 480 Volts Primary, 120/240 Volts Secondary

.25	1D1N205	164.00	N	115° C	180° C	Wall	No	Encapsulated	None
.50	1D1N505	255.00	N	115° C	180° C	Wall	No	Encapsulated	None
.75	1D1N705	381.00	N	115° C	180° C	Wall	No	Encapsulated	None
1.0	1D1N001	380.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
1.5	1D1N105	552.00	N	115° C	180° C	Wall	No	Encapsulated	None
2.0	1D1N002	631.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
3.0	1D1N003	769.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
5.0	1D1N005	968.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
7.5	1D1N007	1405.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
10.0	1D1N010	1603.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
15	1D1N015	1868.00	N	115° C	180° C	Wall	No	Encapsulated	2, 1b
15	1D1Y015TP1	3562.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
25	1D1Y025TP1	5283.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
37.5	1D1Y037TP1	6720.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
50	1D1Y050TP1	7737.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	1D1Y075TP1	10254.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
100	1D1Y100TP1	21106.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
167	1D1Y167TP1	32804.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 277 Volts Primary, 120/240 Volts Secondary

3	1E1U003	755.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
5	1E1U005	978.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
7.5	1E1U007	1535.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
10	1E1U010	1804.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	1E1U015	5170.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
25	1E1U025	5311.00	U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3

### 480 Volts Primary, 120/240 Volts Secondary

3	1F1R003	774.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
5	1F1R005	968.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
7.5	1F1R007	1415.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
10	1F1R010	1598.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	1F1R015	1868.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
25	1F1R025	4314.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ For outdoor application. Ventilated transformers requiring drip shields/weathershields are UL listed

for outdoor use. No charge when requested at time of initial project order.  
 ④ Encapsulated transformers are UL listed for indoor/outdoor use.

⑤ No charge when requested at time of initial project order.  
 ⑥ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

# Distribution Dry Type Transformers

## Single Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
<b>600 Volts Primary, 120/240 Volts Secondary</b>									
3	1G1R003	780.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
5	1G1R005	1246.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
7.5	1G1R007	1759.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
10	1G1R010	1617.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	1G1R015	3665.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
25	1G1R025	5555.00	R, U	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
25	1G1Y025TP1	9545.00	Y, U	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
37.5	1G1Y037TP1	12171.00	Y, U	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
50	1G1Y050TP1	14122.00	Y, U	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	1G1Y075TP1	20472.00	Y	150° C	220° C	Floor	Yes	Ventilated	2, 3, 5
100	1G1Y100TP1	25821.00	Y	150° C	220° C	Floor	Yes	Ventilated	2, 3, 5
167	1G1Y167TP1	51057.00	Y	150° C	220° C	Floor	Yes	Ventilated	2, 3, 5

See page 7-6 for footnotes ①②③④ & ⑤

### Overseas Model 190/200/208/220 x 380/400/416/440 Volts Primary, 120/240 Volts Secondary—1Ø, 50/60 Hz

1	1H1N001	828.00	N	115° C	180° C	Wall	No	Encapsulated	2
2	1H1N002	1211.00	N	115° C	180° C	Wall	No	Encapsulated	2
3	1H1N003	1570.00	N	115° C	180° C	Wall	No	Encapsulated	2
5	1H1N005	1976.00	N	115° C	180° C	Wall	No	Encapsulated	2
7.5	1H1N007	2613.00	N	115° C	180° C	Wall	No	Encapsulated	2
10	1H1N010	3138.00	N	115° C	180° C	Wall	No	Encapsulated	2
15	1H1N015	4030.00	N	115° C	180° C	Wall	No	Encapsulated	2, 3
25	1H1N025	6532.00	N	115° C	180° C	Wall	No	Encapsulated	2, 3
37.5	1H1N037	7368.00	N	150° C	220° C	Floor & Wall	Yes	Ventilated	2, 3, 5
50	1H1N050	8571.00	N	150° C	220° C	Floor & Wall	Yes	Ventilated	2, 3, 5
75	1H1N075	10179.00	N	150° C	220° C	Floor	Yes	Ventilated	2, 3, 5
100	1H1N100	11550.00	N	150° C	220° C	Floor	Yes	Ventilated	2, 3, 5

### Overseas Model 190/208/220/240 x 380/416/440/480 Volts Primary, 120/240 Volts Secondary—1Ø, 50/60 Hz

1	1X1N001	828.00	N	115° C	180° C	Wall	No	Encapsulated	2
2	1X1N002	1211.00	N	115° C	180° C	Wall	No	Encapsulated	2
3	1X1N003	1570.00	N	115° C	180° C	Wall	No	Encapsulated	2
5	1X1N005	1976.00	N	115° C	180° C	Wall	No	Encapsulated	2
7.5	1X1N007	2613.00	N	115° C	180° C	Wall	No	Encapsulated	2
10	1X1N010	3138.00	N	115° C	180° C	Wall	No	Encapsulated	2
15	1X1N015	4030.00	N	115° C	180° C	Wall	No	Encapsulated	2, 3
25	1X1N025	6532.00	N	115° C	180° C	Wall	No	Encapsulated	2, 3

### Overseas Model 190/200/208/220 x 380/400/416/440 Volts Primary, 110/220 Volts Secondary—1Ø, 50/60 Hz

1	1H8N001	828.00	N	115° C	180° C	Wall	No	Encapsulated	2
2	1H8N002	1211.00	N	115° C	180° C	Wall	No	Encapsulated	2
3	1H8N003	1570.00	N	115° C	180° C	Wall	No	Encapsulated	2
5	1H8N005	1976.00	N	115° C	180° C	Wall	No	Encapsulated	2
7.5	1H8N007	2613.00	N	115° C	180° C	Wall	No	Encapsulated	2

Notice: CE mark is included on sizes 1 through 25KVA on all overseas models.

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

# Distribution Dry Type Transformers

## Three Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
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### 480 Volts Δ Primary, 240 Volts Δ Secondary With 120 Volt Tap On B Phase<sup>⑤</sup>

15	3F1Y015TP1	4204.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3F1Y030TP1	6562.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3F1Y045TP1	6648.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3F1Y075TP1	9606.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
112.5	3F1Y112TP1	13152.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
150	3F1Y150TP1	15852.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
225	3F1Y225TP1	22217.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
300	3F1Y300TP1	29647.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
500	3F1Y500TP1	59077.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
750	3F1Y750TP1	93911.00	Y	150° C	220° C	Floor	Yes	Ventilated	1a, 2, 3

### 480 Volts Δ Primary, 240 Volts Δ Secondary

3	3F2R003 <sup>⑦</sup>	2094.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
6	3F2R006 <sup>⑦</sup>	2774.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
9	3F2R009 <sup>⑦</sup>	3457.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3F2R015 <sup>⑦</sup>	5035.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3

### 480 Volts Δ Primary, 208Y/120 Volts Secondary

3	3F3R003	1807.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
6	3F3R006	1899.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
9	3F3R009	2735.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3F3R015	2943.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3F3Y015TP1	4246.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 6, 7
30	3F3Y030TP1	5467.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 6, 7
45	3F3Y045TP1	6494.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 6, 7
75	3F3Y075TP1	9244.00	Y	150° C	220° C	Floor & Wall <sup>⑧</sup>	Yes	Ventilated	1, 2, 3, 5, 6, 7
112.5	3F3Y112TP1	11607.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 6, 7
150	3F3Y150TP1	15472.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 6, 7
225	3F3Y225TP1	19634.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 6, 7
300	3F3Y300TP1	27092.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 6, 7
500	3F3Y500TP1	41465.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 6, 7
750	3F3Y750TP1	92836.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 7
1000	3F3S000TP1	91694.00	J, Y, K, S	150° C	220° C	Floor	Yes	Ventilated	None

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type	Drip Shield Required	Optional Modifications	Avg. Sound Level
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### Totally Enclosed Transformers, Indoor/Outdoor Use<sup>⑥</sup>

#### 480 Volts Δ Primary, 208Y/120 Volts Secondary

15	3F3Y015TE	7260.00	Y	150° C	220° C	Floor	No	None	45dB
30	3F3Y030TE	10382.00	Y	150° C	220° C	Floor	No	None	45dB
45	3F3Y045TE	12171.00	Y	150° C	220° C	Floor	No	None	50dB
75	3F3Y075TE	17130.00	Y	150° C	220° C	Floor	No	None	50dB
112.5	3F3Y112TE	12626.00	Y	150° C	220° C	Floor	No	None	55dB
150	3F3Y150TE	15862.00	Y	150° C	220° C	Floor	No	None	55dB

#### 480 Volts Δ Primary, 240 Volts Δ Secondary with 120V Lighting Tap on B Phase<sup>⑤</sup>

15	3F1Y015TE	7260.00	Y	150° C	220° C	Floor	No	None	45dB
30	3F1Y030TE	10382.00	Y	150° C	220° C	Floor	No	None	45dB
45	3F1Y045TE	12171.00	Y	150° C	220° C	Floor	No	None	50dB
75	3F1Y075TE	16981.00	Y	150° C	220° C	Floor	No	None	50dB
112.5	3F1Y112TE	23718.00	Y	150° C	220° C	Floor	No	None	55dB
150	3F1Y150TE	30907.00	Y	150° C	220° C	Floor	No	None	55dB

#### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115°C Rise	F
1b. 80°C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS
6. Low noise—3dB below std.	LN3
7. Super Energy Efficient	S <sup>®</sup>

#### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.

② Wall designations for units having standard features.

③ For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use.

④ Encapsulated transformers are UL listed for indoor/outdoor use (2.5% on each side of lighting tap).

⑤ Reduced capacity 1-phase tap—When utilizing 1-phase

tap at 5%, the 3-phase load is reduced to 85% max. (5% reduction on 3 coils). 10% of rated KVA absolute maximum (evenly balanced on each side of lighting tap). When utilizing 1-phase tap at 10%, the 3-phase load is reduced to 70% max. (10% reduction on 3 coils).

⑥ No charge when requested at time of initial project order.

⑦ 240 volt secondary (3F2) is available in 3-phase 3 to 15KVA only.

⑧ TE units will have inrush equal to 2 sizes larger than rated KVA.

⑨ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

⑩ Wall mounting for 150°C rise aluminum only.

⑪ TP1S "S" features are described on page 7-14.



# Distribution Dry Type Transformers

## Three Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②⑦</sup>	Drip Shield Required <sup>③</sup>	Enclosed Type <sup>④</sup>	Optional Modifications
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### 480 Volts Δ Primary, 480Y/277 Volts Secondary

15	3F5R015	4660.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3F5Y015TP1	3952.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 7
30	3F5Y030TP1	33766.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 7
45	3F5Y045TP1	8191.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5, 7
75	3F5Y075TP1	12353.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
112.5	3F5Y112TP1	17122.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
150	3F5Y150TP1	15157.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
225	3F5Y225TP1	30016.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
300	3F5Y300TP1	43146.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7
500	3F5Y500TP1	78455.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5, 7

### 3-Phase 480 Δ — 208Y/120 K-4 (50% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K4TP1	5480.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6
30	3F3Y030K4TP1	5903.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6
45	3F3Y045K4TP1	6945.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6
75	3F3Y075K4TP1	10012.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6
112.5	3F3Y112K4TP1	13214.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6
150	3F3Y150K4TP1	17173.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6
225	3F3Y225K4TP1	23977.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6
300	3F3Y300K4TP1	32603.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6
500	3F3Y500K4TP1	81244.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6

### 3-Phase 480 Δ — 208Y/120 K-13 (100% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K13TP1	6181.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6, 7
30	3F3Y030K13TP1	6659.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6, 7
45	3F3Y045K13TP1	7766.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5, 6, 7
75	3F3Y075K13TP1	11103.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7
112.5	3F3Y112K13TP1	14912.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7
150	3F3Y150K13TP1	19380.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7
225	3F3Y225K13TP1	27282.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7
300	3F3Y300K13TP1	36776.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7
500	3F3Y500K13TP1	96114.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5, 6, 7

### 3-Phase 480 Δ — 208Y/120 K-20 (125% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K20TP1	6659.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
30	3F3Y030K20TP1	9193.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
45	3F3Y045K20TP1	10870.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
75	3F3Y075K20TP1	15244.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
112.5	3F3Y112K20TP1	23304.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
150	3F3Y150K20TP1	25308.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
225	3F3Y225K20TP1	36122.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
300	3F3Y300K20TP1	53724.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
500	3F3Y500K20TP1	105122.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5

### 3-Phase 480 Δ — 208Y/120 K-30 (150% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
30	3F3Y030K30TP1	8451.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
45	3F3Y045K30TP1	11749.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 4, 5
75	3F3Y075K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
112.5	3F3Y112K30TP1	28298.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
150	3F3Y150K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
225	3F3Y225K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
300	3F3Y300K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5
500	3F3Y500K30TP1	CSO	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 5

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115°C Rise	F
1b. 80°C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS
6. Low noise — 3dB below std.	LN3
7. Super Energy Efficient	S <sup>®</sup>

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.

② Wall designations for units having standard features.

③ For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use.

④ Encapsulated transformers are UL listed for indoor/outdoor use. 9 & 15kva with R taps also available in ventilated enclosures.

⑤ K-Factor transformers equipped with electrostatic shield and 200% neutral as standard features.

⑥ No charge when requested at time of initial project order.

⑦ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

⑧ TP1S features are described on page 7-14.

# Distribution Dry Type Transformers

## Three Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
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### 208 Volts Δ Primary, 208Y/120 Volts Secondary

3	3B3R003	1923.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
6	3B3R006	3055.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
9	3B3R009	4166.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3B3R015	5140.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3B3Y015TP1	4038.00	Y, T	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3B3Y030TP1	6953.00	Y, T	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3B3Y045TP1	21463.00	Y, T	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3B3Y075TP1	26602.00	Y, T	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3B3Y112TP1	33138.00	Y, T	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3B3Y150TP1	19676.00	Y, T, M	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3B3S225TP1	32520.00	R, S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3B3S300TP1	46740.00	R, S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3B3S500TP1	84992.00	R, S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 208 Volt Δ Primary, 240 Δ Secondary with 120 Volt TAP on B Phase<sup>②</sup>

15	3B1Y015TP1	4165.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3B1Y030TP1	9585.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3B1Y045TP1	12455.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3B1Y075TP1	19323.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
112.5	3B1Y112TP1	24112.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5
150	3B1Y150TP1	28211.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5
225	3B1Y225TP1	37520.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 4, 5

### 208 Volts Δ Primary, 480Y/277 Volts Secondary

9	3B5R009	4176.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3B5R015	4934.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
30	3B5R030TP1	6983.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3B5R045TP1	8201.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3B5R075TP1	11559.00	R	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3B5R112TP1	19146.00	R	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3B5R150TP1	19088.00	R	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3B5S225TP1	26527.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3B5S300TP1	65844.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3B5S500TP1	95283.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 240 Volts Δ Primary, 208Y/120 Volts Secondary

15	3C3Y015TP1	7780.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3C3Y030TP1	13383.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3C3Y045TP1	7871.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3C3Y075TP1	11683.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3C3Y112TP1	15676.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3C3Y150TP1	17465.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3C3S225TP1	32520.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3C3S300TP1	46740.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3C3S500TP1	56332.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 240 Volts Δ Primary, 480Y/277 Volts Secondary

15	3C5Y015TP1	7780.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3C5Y030TP1	9585.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3C5Y045TP1	12455.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3C5Y075TP1	17138.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3C5Y112TP1	21398.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3C5Y150TP1	28211.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3C5S225TP1	45801.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3C5S300TP1	65844.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3C5S500TP1	84992.00	S	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS
6. Low noise—3dB below std.	LN3

- ① Actual taps may vary based on volts/turn ratio.
- ② Wall designations for units having standard features.
- ③ For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use.
- ④ Encapsulated transformers are UL listed for indoor/outdoor use. 9 & 15kva with R taps also available in ventilated enclosures.

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

- ⑤ No charge when requested at time of initial project order.
- ⑥ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

- ⑦ Reduced capacity 1-phase tap—When utilizing 1-phase tap at 5%, the 3-phase load is reduced to 85% max. (5% reduction on 3 coils). 10% of rated KVA absolute maximum (evenly balanced on each side of lighting tap). When utilizing 1-phase tap at 10%, the 3-phase load is reduced to 70% max. (10% reduction on 3 coils).

# Distribution Dry Type Transformers

## Three Phase

## Selection

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②⑦</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
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### 600 Volts Δ Primary, 208Y/120 Volts Secondary

3	3G3R003	3476.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
6	3G3R006	2541.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
9	3G3R009	3137.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3G3R015	4846.00	R	115° C	180° C	Wall	No	Encapsulated	1b, 2, 3
15	3G3Y015TP1	6740.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
30	3G3Y030TP1	8309.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
45	3G3Y045TP1	10797.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 5
75	3G3Y075TP1	14854.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3G3Y112TP1	18545.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3G3Y150TP1	24455.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3G3Y225TP1	32520.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3G3Y300TP1	46740.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3G3Y500TP1	84992.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

### 600 Volts Δ Primary, 480Y/277 Volts Secondary

3	3G5R003	1819.00	R	115° C	180° C	Wall	No	Encapsulated	2
6	3G5R006	3009.00	R	115° C	180° C	Wall	No	Encapsulated	2
9	3G5R009	4684.00	R	115° C	180° C	Wall	No	Encapsulated	2
15	3G5R015	8424.00	R	115° C	180° C	Wall	No	Encapsulated	2
15	3G5Y015TP1	7780.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	2, 4, 5
30	3G5Y030TP1	9585.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	2, 4, 5
45	3G5Y045TP1	12455.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	2, 4, 5
75	3G5Y075TP1	17138.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
112.5	3G5Y112TP1	30128.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
150	3G5Y150TP1	28211.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
225	3G5Y225TP1	37520.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
300	3G5Y300TP1	52867.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5
500	3G5Y500TP1	98065.00	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 5

## Dual Purpose Auto Transformers<sup>⑥</sup>

KVA		Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
600V Pri 480V Sec	480V Pri 380V Sec									

### 600 Volts Primary, 480 Volts Secondary 3Ø 60 Hz &— 480 Volts Primary 380 Volts Secondary 3Ø 50/60 Hz Alternate Rating

15	12	3G4R015A	2008.00	R	115° C	180° C	Wall	No	Encapsulated	—
30	24	3G4R030A	2549.00	R	115° C	180° C	Wall	No	Encapsulated	—
45	36	3G4R045A	3816.00	R	115° C	180° C	Wall	No	Encapsulated	—
75	60	3G4R075A	5552.00	R	115° C	180° C	Floor & Wall	No	Encapsulated	4
112.5	90	3G4R112A	6603.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	4, 5
150	120	3G4R150A	7655.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	4, 5
225	180	3G4R225A	9240.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	4, 5
300	240	3G4R300A	12020.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	4, 5
500	400	3G4R500A	16155.00	R	150° C	220° C	Floor & Wall	Yes	Ventilated	5

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use.

④ Encapsulated transformers are UL listed for indoor/outdoor use.  
 ⑤ No charge when requested at time of initial project order.  
 ⑥ If used on unbalanced loads, these auto transformers will need to be used on a 4-wire system with the supply neutral connected to the transformer. If used on motor

loads, then they may be used on a 3-wire system without a neutral or fourth wire. Review in NEC 450-4 and 450-5.  
 ⑦ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

# Distribution Dry Type Transformers

## Three Phase

## Selection

### Isolation & Filtering Transformers

The Siemens "XES" models are specifically designed to protect sensitive equipment from surges, spikes and line noise. These designs are available with

either 208 volt or 480 volt primary and 280Y/120 volt secondary up to 225 kVA. All units have spike/surge protection on the primary side and low pass filters on the secondary. The combination of these components and the electrostatic

shielding provide excellent transverse mode noise attenuation of 60 db. Additionally the common mode noise attenuation of 120 db will increase protection from line noise, spikes and surges.

### Shielded Isolation with Filter Capacitors and Surge Suppression ("XES" Models)

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>③</sup>	Drip Shield Required <sup>②</sup>	Enclosure Style	Optional Modifications
<b>480 Volts Δ Primary, 208Y/120 Volts Secondary</b>									
15	3F3Y015XESTP1	6504.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
30	3F3Y030XESTP1	9008.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
45	3F3Y045XESTP1	11000.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
75	3F3Y075XESTP1	16130.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 5
112.5	3F3Y112XESTP1	18000.00	Y	150° C	220° C	Floor	Yes	Ventilated	1a, 3, 5

### 208 Volts Δ Primary, 208Y/120 Volts Secondary

15	3B3Y015XESTP1	6504.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
30	3B3Y030XESTP1	9008.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
45	3B3Y045XESTP1	11000.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
75	3B3Y075XESTP1	16130.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 5
112.5	3B3Y112XESTP1	18000.00	Y	150° C	220° C	Floor	Yes	Ventilated	1a, 3, 5

### 240 Volts Δ Primary, 208Y/120 Volts Secondary

15	3C3Y015XESTP1	6504.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
30	3C3Y030XESTP1	9008.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
45	3C3Y045XESTP1	11000.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 5
75	3C3Y075XESTP1	16130.00	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 5
112.5	3C3Y112XESTP1	18000.00	Y	150° C	220° C	Floor	Yes	Ventilated	1a, 3, 5

Taps (See page 7-11)

### Motor Drive Isolation

### Three Phase 60HZ Motor Drive Isolation Transformers

KVA <sup>⑤</sup>	Motor H.P. <sup>④</sup>	Catalog Number	List Price \$	Standard Taps	Temperature Rise	Insulation	Mounting Type	Drip Shield Required <sup>②</sup>
7.5	3 & 5	DT ( ) 007	3045.00	2-5% FCAN/BN	115° C	180° C	Floor & Wall	Yes
11	7.5	DT ( ) 011	5492.00	2-5% FCAN/BN	115° C	180° C	Floor & Wall	Yes
15	10	DT ( ) 015	5008.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
20	15	DT ( ) 020	5797.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
27	20	DT ( ) 027	6902.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
34	25	DT ( ) 034	7659.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
40	30	DT ( ) 040	8073.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
51	40	DT ( ) 051	9163.00	2-5% FCAN/BN	150° C	220° C	Floor & Wall	Yes
63	50	DT ( ) 063	10650.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
75	60	DT ( ) 075	12130.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
93	75	DT ( ) 093	12366.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
118	100	DT ( ) 118	13114.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
145	125	DT ( ) 145	15537.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
175	150	DT ( ) 175	18626.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
220	200	DT ( ) 220	23366.00	2-5% FCAN/BN	150° C	220° C	Floor	Yes
275	250	DT ( ) 275	CSO	2-5% FCAN/BN	150° C	220° C	Floor	Yes
330	300	DT ( ) 330	CSO	2-5% FCAN/BN	150° C	220° C	Floor	Yes
440	400	DT ( ) 440	CSO	2-5% FCAN/BN	150° C	220° C	Floor	Yes
550	500	DT ( ) 550	CSO	2-5% FCAN/BN	150° C	220° C	Floor	Yes
660	600	DT ( ) 660	CSO	6.2% FCAN/BN	150° C	220° C	Floor	Yes

DT ( ) Code	Primary Volts	Secondary Volts
18	208 Delta	208Y/120
20	208 Delta	230Y/133
21	208 Delta	460Y/266
22	230 Delta	230Y/133
24	230 Delta	460Y/266
30	380 Delta	460Y/266
42	460 Delta	230Y/133
44	460 Delta	460Y/266
45	460 Delta	380Y/220
52	575 Delta	230Y/133
54	575 Delta	460Y/266

Motor Drive Isolation Optional Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields/Weather Shields	DS
6. Thermal Switches	TS

(Contact Sales office for List Price)

① Actual taps may vary based on volts/turn ratio.

② For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use. No charge when requested at time of initial project order.

③ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number.

④ Refer selection and application guide for additional information on horsepower, Ampere, KVA ratings and

applications. Standard taps varies with design volts/turn ratio.

⑤ KVA sizes 225 through 660 are available in "RSP" designs as described on page 7-17.

# Distribution Dry Type Transformers

## Sentron Power Centers

Selection

### Economical Space Saving Package

Siemens Sentron Power Center is a pre-wired combination of a primary breaker disconnect, dry type shielded transformer, secondary breaker disconnect and a secondary power panel all in one convenient package.

You save time, space and money by not having to individually assemble, mount and wire these components. Simply add the branch and you're ready to go.

### UL-3R Enclosures

All Sentron Power Center enclosures are UL-3R listed for indoor and outdoor use.

### Transformer Assembly

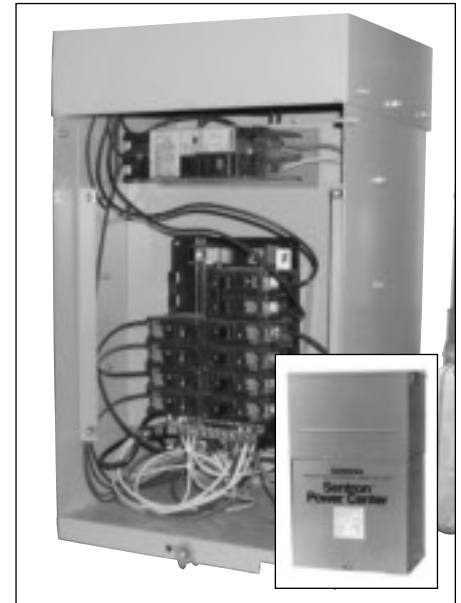
Siemens totally encapsulated distribution transformers are designed for general purpose indoor/outdoor operation.

Sentron Power Centers can be installed in a wide variety of atmospheric and environmental conditions. A 180°C, UL recognized insulation system is used.

Sentron Power Center units are electrostatically shielded to provide transient voltage protection at no extra cost. All units have 2-5% FCBN taps.

### Panel Assembly

The power panel assembly will accommodate one-inch, 1, 2 or 3-pole, common trip, duplex secondary branch circuit breakers, Type Q and QT as well as ground fault circuit breakers. Per UL and NEC requirements, the Sentron Power Center assembly comes fully equipped with primary and secondary main circuit breakers. Branch circuit breakers can be obtained from our local distributor once you have established your branch circuit requirements. All Sentron Power Centers are UL listed for service entrance.



KVA	Catalog Number <sup>④⑧⑨</sup>	List Price \$	Maximum Secondary Circuits <sup>①</sup>			Interior Number Reference	Approximate Dimensions (in inches)			Approximate Net Weight (lbs.)
			1" Wide	1/2" Wide	2" Wide		Height	Width	Depth	
			120V (1-Pole)	120V (1-Pole)	240V (2-pole)					

### 480 Volts Δ Primary, 240/120 Volts Secondary — Single Phase<sup>②</sup> — Sentron Power Centers<sup>⑤</sup>

5.0	1LPC005	4310.00	8	16	4	I1224L1100CU	32.13	13.25	7.63	120
7.5	1LPC007	5082.00	8	16	4	I1224L1100CU	32.13	15.88	11.00	160
10.0	1LPC010	5520.00	8	16	4	I1224L1100CU	34.38	15.88	11.00	185
15.0	1LPC015	6667.00	12	24	6	I1224L1125CU	34.38	17.13	12.38	240
25.0	1LPC025	8412.00	20	40	10	I2440L1200CU	41.88	17.88	13.50	330

### 480 Volts Δ Primary, 208Y/120 Volts Secondary — Three Phase<sup>③</sup> — Sentron Power Centers<sup>⑤</sup>

9.0	3LPC009	8404.00	12	24	4	I1836L3200CU	33.75	22.13	7.63	255
15.0	3LPC015	12140.00	12	24	4	I1836L3200CU	35.13	22.13	12.38	385
22.5	3LPC022	13486.00	18	36	6	I2442L3200CU	38.25	30.25	13.38	535
30.0	3LPC030	15310.00	24	42	8	I3042L3200CU	43.75	33.00	13.75	680

## Circuit Breaker Data for Sentron Power Centers

### 480 Volts to 240/120 Volts — Single Phase

KVA	480 Volts Primary Breaker <sup>①⑥⑦</sup>	240/120 Volts Secondary Main	Maximum Rating of Secondary Breakers
5.0	ED42B025L (25A)	Q225 (25A)	20 Amps
7.5	ED42B025L (25A)	Q240 (40A)	30 Amps
10.0	ED42B035L (35A)	Q250 (50A)	40 Amps
15.0	ED42B050L (50A)	Q270 (70A)	60 Amps
25.0	ED42B090L (90A)	Q2125 (125A)	100 Amps

### 480 Volts Δ to 280Y/120 Volts — Three Phase

KVA	480 Volts Primary Breaker <sup>①⑥⑦</sup>	280Y/120 Volts Secondary Main	Maximum Rating of Secondary Breakers
9.0	ED43B025L (25A)	Q330 (30A)	25 Amps
15.0	ED43B040L (40A)	Q350 (50A)	40 Amps
22.5	ED43B070L (70A)	Q370 (70A)	60 Amps
30.0	ED43B090L (90A)	Q3100 (100A)	80 Amps

① Primary breaker has lineside lug for customer connection.

② Single Phase – 18,000 Amps RMS Symmetrical Interrupting Capacity.

③ Three Phase – 18,000 Amps RMS Symmetrical Interrupting Capacity.

④ Sentron Power Centers are NEMA 3R for outdoor application and may be ordered with "SS" suffix for 304 stainless steel enclosure.

⑤ Secondary branch breakers are not included and must be ordered separately.

⑥ Primary and secondary main breakers are included and are factory installed.

⑦ ED frame breakers furnished are rated 18000 AIC and are sufficient for fault current of transformer. If higher AIC rating is required by spec, the ED can be changed in the field to HED 4 (22000 AIC) or HHED6 (65000 AIC).

⑧ 1LPC005 and 3LPC009 are copper wound.

⑨ Available with Stainless Steel NEMA 3R enclosures by adding catalog number suffix "SS".

# Transformers

## NEMA TP1 Energy Efficiency Standard

## Selection

### Single Phase and Three Phase TP1-Energy Efficient Transformers

Most commercial and industrial facilities require several low-voltage transformers to decrease the voltage received from the utility to the voltages used by various loads such as lighting, computers and other electrically operated equipment. Standard transformers convert approximately 95% of the electricity received into usable output voltage. Since these transformers are energized continually, even a small improvement in efficiency can provide significant energy savings. These energy efficient transformers are specifically designed to help save money on utility bills and reduce energy waste.

Depending on the size of the transformer, a "NEMA TP1 compliant" transformer can save \$100-300 each year at an electricity rate of \$0.075 cents per kWh. A typical large commercial facility will have 6-10 low voltage transformers, and thus can save between \$600 and \$3,000 per year.

#### Basic Design Characteristics

The TP1 designs include the use of higher grade electrical steel and other features designed to lower flux density and reduce

losses especially at average 35% loading where the TP1 measurements apply. To meet TP1 the design engineer must consider both the "I square R" losses and the core or iron losses. Simple de-rating from a higher kVA will not satisfy the TP1 standards as the efficiency level is dependent on the combination of core (no-load) losses and I<sup>2</sup>R (winding) losses.

The core construction employs the use of high quality non-aging electrical grade grain-oriented silicon steel with high permeability, low hysteresis and low eddy current losses. These characteristics are required to achieve the TP1 efficiency levels. Core laminations must be tightly assembled enabling magnetic flux densities to be kept well below the saturation point.

The core and coil designs must be low loss type with minimum efficiencies per NEMA TP1 when operated at 35% of full load capacity. Efficiency shall be tested in accordance with NEMA TP2 (Standard test method for measuring the energy consumption of distribution transformers). The efficiency levels must meet the following minimums.



#### TP1- Energy Efficient transformers:

Single Phase		Three Phase	
kVA	Efficiency	kVA	Efficiency
15	97.7%	15	97.0%
25	98.0%	30	97.5%
37.5	98.2%	45	97.7%
50	98.3%	75	98.0%
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%

### New Super Energy Efficient Transformers:

#### TP1S, HM1S & HM2S

TP1S transformer designs surpass the NEMA TP1 standards for efficiency. These units are designed not to exceed 115°C temperature rise above a 40°C ambient under full linear load and not to exceed 150°C rise under a non-linear load level of K13 (K20 for HMT units).

Standard features of the TP1S, HM1S, HM2S units include:

- Higher efficiency level with Linear Load Efficiency: 25% less loss than NEMA TP-1 from 35% to 65% load @ 75°C for sizes 15-750KVA
- TP1S units are TP1 Rated efficiency under non-linear loads with a load profile of K13 at 50% loads @ 75°C
- Noise levels are 3 dB lower than NEMA ST-20
- Standard 200% neutral
- K13 rating on nameplate (K20 for HMT units)
- Electrostatic shield
- Ten year pro-rated warranty with standard liability limitations same as Sentron Harmonic Mitigation units



# Transformers

## Sentron Harmonic Mitigating Transformers (HM1 & HM2)

## Selection

### Description

The Sentron Harmonic Mitigating Transformers (HMTs) are designed to meet the needs of modern power distribution systems that contain a large percentage of non-linear equipment that produces harmonics. Some examples of this type of equipment are computers, printers, fax machines, scanners, copiers, uninterruptible power supplies, ballast and variable frequency drives (VFD). This type of equipment generates harmonic voltages and currents because they contain AC to DC power conversion rectifiers. Harmonic voltages and currents can cause a variety of problems ranging from poor power factor, voltage distortion, capacitor resonance and motor failures to overloaded transformers and conductors.

The Sentron HMTs are specially designed to operate under high non-linear load conditions and have the additional benefit of improving the overall power system reliability.

### Application

One of the most effective ways to eliminate power system harmonics is to use a technique known as "phase shifting." In this method power system harmonics are eliminated by pairing together harmonics that have 180° relative angular displacement, which causes them to cancel one another out. This can be accomplished by a variety of means:

#### Single Output Harmonic Mitigating Transformer (0° or -30° primary-secondary angular displacement)

- The primary of this transformer has a delta connection and its secondary has a special double winding connection. Although there is only one secondary three phase output, the 3<sup>rd</sup>, 9<sup>th</sup> and 15<sup>th</sup> harmonic currents are prevented from circulating in the primary windings by canceling their magnetic fluxes at low impedance with the double winding secondary, reducing voltage distortions to the loads.
- When two transformers with this type of connection, 0° and -30° displacement, are used in parallel,

the 3<sup>rd</sup>, 9<sup>th</sup> and 15<sup>th</sup> harmonic currents are canceled as previously described, and additionally the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents are cancelled in the electrical supply common to both transformers due to their relative 30° phase shift.

- If a single harmonic mitigating transformer (0°) is used in an existing or new system utilizing standard delta-wye transformers (-30°), the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents originating from the HMT transformer (0°) will attempt to cancel the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents originating from the standard delta-wye transformer (-30°). This reduces the overall 5<sup>th</sup> and 7<sup>th</sup> harmonics present in the system, with the actual reduction dependent on the magnitudes of the secondary loads.

#### Double-Output Harmonic Mitigating Transformer (0° and -30°, -15° and -45°, or +15° and -15° primary-secondary angular displacement)

- The primary of this transformer has a delta connection and its secondary has double-output, special double winding connections with 30° phase shift between outputs. This arrangement cancels the 3<sup>rd</sup>, 5<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup>, and 15<sup>th</sup> harmonics at very low impedance on the secondary side. This greatly improves voltage distortion for the loads and the primary power factor. The advantage of this arrangement is that the reductions of harmonic currents are achieved with one transformer creating a 12 pulse load.
- If two of these transformers are used, with the primaries of each phase shifted 15° with respect to one another, then cancellation of harmonics up to the 19<sup>th</sup> are achievable creating a 24 pulse load.

### Benefits

Elimination of undesirable harmonics by using the Siemens Sentron HMTs is an effective solution to the power quality problems encountered by today's power system professionals. By treating the harmonics at their source, using advanced technology, installation problems can be avoided and overall system reliability improved. The Sentron HMT product line provides many far

reaching benefits such as lower operating cost, improved operating efficiency, reduced down-time due to outages caused by nuisance tripping, and increased equipment life due to low voltage distortions.

### Design and Construction Features

The Sentron Harmonic Mitigating Transformers comply with all applicable ANSI/IEEE standards including C57.12.91, C57.96, C57.110, CSA # C22.2 No. 47 (CUL), UL506, UL1561 as well as NEMA ST-20. The design life is 25 years at 130 degree C rise, 30 years at 115C rise and 40 years for 80C rise models. Approvals and listings include UL, CSA. with CE approval available when requested. The Sentron HMTs have capability up to the load capability up to K-20, which is achieved by harmonic cancellations in the secondary and low flux density design for protection against heat in place of design enlargement protection only. Copper coil windings with full width copper foil electrostatic shield are standard and additional shield options are available for higher noise attenuation requirements. All HMTs have 130C rise with optional 115C and 80C winding rise designs available. All designs include vacuum impregnated polyester resin encapsulation of windings and NEMA 3R enclosures. A neutral sized at 200% of the ampacity of the secondary phase conductors for extra protection against triplens and unbalanced single phase loads. The Sentron HMT designs have TP1 energy efficient rating equal to that of a non K-Factor rated transformer and have the Energy Star emblem displayed. Siemens HMT designs have TP1 efficiency levels at 35% load @ ref temp. 75 degree C and also retain TP1 efficiency levels at 65% load @ reference temperature 85C. A ten-year pro-rated warranty with standard liability limitations applies to all Sentron HMTs.



# Transformers

## Sentron Harmonic Mitigating Transformers (HM1 & HM2)

## Selection

### Catalog Number Coding:

Single output (1 secondary) = HM1,  
 Double output (2 secondaries) = HM2.  
 Phase Shift Options: HM1 followed by > (00) or (30) degree.  
 HM2 > (03) for 0 & 30 or (15) for 15 & 45 degree lagging,  
 or (PN15) = 15 pos & 15 neg.  
 HMT, 480 Volt Primary 120/208 Volt Secondary (3F3) - 130C  
 (standard), 115C and 80C Winding Rise displayed on this page.

HMTs are also available with 480 - 277/480 (3F5), 208-120/208 (3B3), 208-277/480 (3B5).

### Standard Features Include:

- K-13 Load profile rating.
- TP1 Efficiencies @ 35% and 65% load.
- (C) Copper windings.
- (ES) Electrostatic shield.
- 130 C Winding rise.

KVA	130C (std.) Rise HMT Catalog Number	List Price \$	115C Rise HMT Catalog Number	List Price \$	80C Rise HMT Catalog Number	List Price \$	Secondary Configuration		Enclosure Style	Optional HMT Modifications
							Outputs	Phase Shift		
15	3F3Y015GHM100	①	3F3Y015FHM100	①	3F3Y015BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
15	3F3Y015GHM130	①	3F3Y015FHM130	①	3F3Y015BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
15	3F3Y015GHM203	①	3F3Y015FHM203	①	3F3Y015BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
15	3F3Y015GHM215	①	3F3Y015FHM215	①	3F3Y015BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
15	3F3Y015GHM2PN15	①	3F3Y015FHM2PN15	①	3F3Y015BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
30	3F3Y030GHM100	①	3F3Y030FHM100	①	3F3Y030BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
30	3F3Y030GHM130	①	3F3Y030FHM130	①	3F3Y030BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
30	3F3Y030GHM203	①	3F3Y030FHM203	①	3F3Y030BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
30	3F3Y030GHM215	①	3F3Y030FHM215	①	3F3Y030BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
30	3F3Y030GHM2PN15	①	3F3Y030FHM2PN15	①	3F3Y030BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
45	3F3Y045GHM100	①	3F3Y045FHM100	①	3F3Y045BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
45	3F3Y045GHM130	①	3F3Y045FHM130	①	3F3Y045BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
45	3F3Y045GHM203	①	3F3Y045FHM203	①	3F3Y045BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
45	3F3Y045GHM215	①	3F3Y045FHM215	①	3F3Y045BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
45	3F3Y045GHM2PN15	①	3F3Y045FHM2PN15	①	3F3Y045BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
75	3F3Y075GHM100	①	3F3Y075FHM100	①	3F3Y075BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
75	3F3Y075GHM130	①	3F3Y075FHM130	①	3F3Y075BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
75	3F3Y075GHM203	①	3F3Y075FHM203	①	3F3Y075BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
75	3F3Y075GHM215	①	3F3Y075FHM215	①	3F3Y075BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
75	3F3Y075GHM2PN15	①	3F3Y075FHM2PN15	①	3F3Y075BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
112.5	3F3Y112GHM100	①	3F3Y112FHM100	①	3F3Y112BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
112.5	3F3Y112GHM130	①	3F3Y112FHM130	①	3F3Y112BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
112.5	3F3Y112GHM203	①	3F3Y112FHM203	①	3F3Y112BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
112.5	3F3Y112GHM215	①	3F3Y112FHM215	①	3F3Y112BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
112.5	3F3Y112GHM2PN15	①	3F3Y112FHM2PN15	①	3F3Y112BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
150	3F3Y150GHM100	①	3F3Y150FHM100	①	3F3Y150BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
150	3F3Y150GHM130	①	3F3Y150FHM130	①	3F3Y150BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
150	3F3Y150GHM203	①	3F3Y150FHM203	①	3F3Y150BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
150	3F3Y150GHM215	①	3F3Y150FHM215	①	3F3Y150BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
150	3F3Y150GHM2PN15	①	3F3Y150FHM2PN15	①	3F3Y150BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
225	3F3Y225GHM100	①	3F3Y225FHM100	①	3F3Y225BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
225	3F3Y225GHM130	①	3F3Y225FHM130	①	3F3Y225BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
225	3F3Y225GHM203	①	3F3Y225FHM203	①	3F3Y225BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
225	3F3Y225GHM215	①	3F3Y225FHM215	①	3F3Y225BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
225	3F3Y225GHM2PN15	①	3F3Y225FHM2PN15	①	3F3Y225BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
300	3F3Y300GHM100	①	3F3Y300FHM100	①	3F3Y300BHM100	①	1	Zero Degree	Vented	A,B,C,D,E,F,G,H
300	3F3Y300GHM130	①	3F3Y300FHM130	①	3F3Y300BHM130	①	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G,H
300	3F3Y300GHM203	①	3F3Y300FHM203	①	3F3Y300BHM203	①	2	0 & 30 Lagging	Vented	A,B,C,D,E,F,G,H
300	3F3Y300GHM215	①	3F3Y300FHM215	①	3F3Y300BHM215	①	2	15 & 45 Lagging	Vented	A,B,C,D,E,F,G,H
300	3F3Y300GHM2PN15	①	3F3Y300FHM2PN15	①	3F3Y300BHM2PN15	①	2	15 Pos & 15 Neg	Vented	A,B,C,D,E,F,G,H
500	3F3Y500GHM100	①	3F3Y500FHM100	①	3F3Y500BHM100	①	1	Zero Degree	Vented	C,D,E,F,G,H
500	3F3Y500GHM130	①	3F3Y500FHM130	①	3F3Y500BHM130	①	1	30 Deg Lagging	Vented	C,D,E,F,G,H
500	3F3Y500GHM203	①	3F3Y500FHM203	①	3F3Y500BHM203	①	2	0 & 30 Lagging	Vented	C,D,E,F,G,H
500	3F3Y500GHM215	①	3F3Y500FHM215	①	3F3Y500BHM215	①	2	15 & 45 Lagging	Vented	C,D,E,F,G,H
500	3F3Y500GHM2PN15	①	3F3Y500FHM2PN15	①	3F3Y500BHM2PN15	①	2	15 Pos & 15 Neg	Vented	C,D,E,F,G,H

Optional Modifications Table for HMTs		Adder to Base \$	Thermal Sensors 170° C= (TS7), 185° C= (TS8) or 200° C= (TS0)		List Price Adder \$
A	Sound Level LN3= (3dB below NEMA standard)	CSO	H	TS7 = 1 sensor center coil	CSO
B	LN5= (5dB below NEMA standard)	CSO	H	TS72 = 2 sensors center coil	CSO
C	Attenuation—Single shield—60dB Common Mode Std.	H	H	TS76 = 6 sensors, (2) on each coil	CSO
D	ES2= Double shield—80dB Common Mode > ES3= Double shield & TVSS—120dB Common >	CSO	H	TS8 = 1 sensor center coil	CSO
	Filtering & Attenuation	CSO	H	TS82 = 2 sensors center coil	CSO
E	TV= Secondary side TVSS (90kA Standard) with common mode noise attenuation	CSO	H	TS86 = 6 sensors, (2) on each coil	CSO
F	TB= Terminal Block	CSO	H	TS0 = 1 sensor center coil	CSO
G	S= Super Energy Efficient (HM1S & HM2S)	CSO	H	TS02 = 2 sensors center coil	CSO
				TS06 = 6 sensors, (2) on each coil	CSO

① Contact Sales Office for pricing.



# Reduced Size Transformers

## Three Phase

## Selection

### Sentron Reduced Size Plus (RSP)

The "Sentron Reduced Size Plus" is ideal for locations with limited equipment space. This product is specifically designed for easier installation with sufficiently sized bus and all around access for cable entry from bottom, lower back or sides. The rodent proof grillwork at the bottom slides up for insertion of forks or pallet jack for easy positioning. The RSP has 3-phase shunt-trip activated disconnect installed

on the primary side and a safety alarm feature which operates automatically if the coils overheat due to severe load or in case of failure as life expectancy is reached. The "RSP" is a dry type transformer with fan assisted cooling activated by thermal sensors only when needed for peak periods and heavy loading. The RSP system incorporates dry contacts to indicate 3 different temperature levels for customers

wishing to monitor the transformer remotely. Audible noise insulation barriers are factory installed inside of the enclosure for quieter operation for average applications. The "Sentron Reduced Size Plus" is available with copper or aluminum windings in 150C, 115C or 80C rise as well as K-Factor, electrostatic shielding and TP1 efficiency ratings.

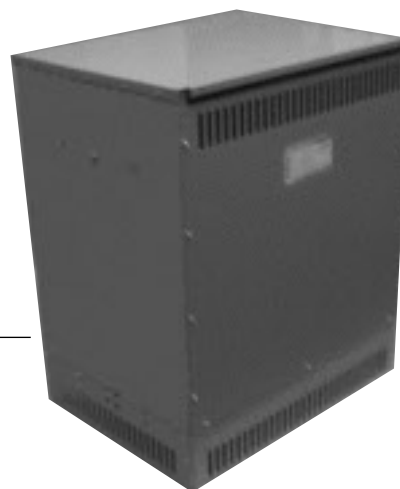
#### Features:

- Approximately 30% smaller and 40% lighter
- Built to NEMA ST-20 standards, IEEE C57 and UL Listed
- 3-phase disconnect switch factory installed on primary. Protection from overheating with shunt trip device.
- Easy connection to LV lug landing pads
- Lugs provided on disconnect for HV connections to disconnect
- Cable entrance from lower back, sides or bottom
- Quiet operation for average applications; 2 dB below NEMA std.
- Thermal switches activate (Fans) @125°C, (Alarm) @190°C and (Disconnect) @200°C.
- Greater efficiency than standard models
- Dry contacts for remote monitoring connections
- Same distance to wall as standard units
- Front access for easy maintenance
- Enclosure is rodent proof by design
- Audible safety alarm to signal overheating
- NEMA 3R with weather shields added
- Energy efficient NEMA-TP1 designs

#### Sizes Available:

150-1000 KVA.

**SMALLER**  
**LIGHTER**  
**QUIETER**  
**ENERGY EFFICIENT**



# Warehouse Stock Transformers

## Type QST (Standard Units)

**Selection**

KVA	Catalog Number	List Price \$	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>
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### Single Phase

#### 240 × 480 Volts Primary, 120/240 Volts Secondary

.05	1D1N555QST	98.00	N	115° C	180° C	Wall	None	Encapsulated
.075	1D1N775QST	114.00	N	115° C	180° C	Wall	None	Encapsulated
.10	1D1N110QST	114.00	N	115° C	180° C	Wall	None	Encapsulated
.15	1D1N115QST	163.00	N	115° C	180° C	Wall	None	Encapsulated
.25	1D1N205QST	164.00	N	115° C	180° C	Wall	None	Encapsulated
.50	1D1N505QST	255.00	N	115° C	180° C	Wall	None	Encapsulated
.75	1D1N705QST	381.00	N	115° C	180° C	Wall	None	Encapsulated
1.0	1D1N001QST	380.00	N	115° C	180° C	Wall	None	Encapsulated
1.5	1D1N105QST	552.00	N	115° C	180° C	Wall	None	Encapsulated
2.0	1D1N002QST	631.00	N	115° C	180° C	Wall	None	Encapsulated
3.0	1D1N003QST	769.00	N	115° C	180° C	Wall	None	Encapsulated
5.0	1D1N005QST	968.00	N	115° C	180° C	Wall	None	Encapsulated
7.5	1D1N007QST	1405.00	N	115° C	180° C	Wall	None	Encapsulated
10	1D1N010QST	1603.00	N	115° C	180° C	Wall	None	Encapsulated
15	1D1N015QST	1868.00	N	115° C	180° C	Wall	None	Encapsulated
25	1D1Y025TP1QST	5283.00	Y	150° C	220° C	Floor & Wall	DSK11Q	Ventilated
37.5	1D1Y037TP1QST	6720.00	Y	150° C	220° C	Floor & Wall	DSK12Q	Ventilated
50	1D1Y050TP1QST	7737.00	Y	150° C	220° C	Floor & Wall	DSK12Q	Ventilated
75	1D1Y075TP1QST	10254.00	Y	150° C	220° C	Floor & Wall	DSK12Q	Ventilated
100	1D1Y100TP1QST	21106.00	Y	150° C	220° C	Floor	DSK15Q	Ventilated
167	1D1Y167TP1QST	32804.00	Y	150° C	220° C	Floor	DSK15Q	Ventilated

### Three Phase

#### 480 Volts Δ Primary, 208Y/120 Volts Secondary

3	3F3R003QST	1807.00	R	115° C	180° C	Wall	None	Encapsulated
6	3F3R006QST	1899.00	R	115° C	180° C	Wall	None	Encapsulated
9	3F3R009QST	2735.00	R	115° C	180° C	Wall	None	Encapsulated
15	3F3Y015TP1QST	4246.00	Y	150° C	220° C	Floor & Wall	DSK31Q	Ventilated
30	3F3Y030TP1QST	6468.00	Y	150° C	220° C	Floor & Wall	DSK11Q	Ventilated
45	3F3Y045TP1QST	6494.00	Y	150° C	220° C	Floor & Wall	DSK11Q	Ventilated
75	3F3Y075TP1QST	9244.00	Y	150° C	220° C	Floor & Wall	DSK12Q	Ventilated
112.5	3F3Y112TP1QST	11607.00	Y	150° C	220° C	Floor	DSK12Q	Ventilated
150	3F3Y150TP1QST	15472.00	Y	150° C	220° C	Floor	DSK34Q	Ventilated
225	3F3Y225RTP1QST	24774.00	Y	150° C	220° C	Floor	DSK15Q	Ventilated
300	3F3Y300RTP1QST	34349.00	Y	150° C	220° C	Floor	DSK36Q	Ventilated
500	3F3Y500RTP1QST	54933.00	Y	150° C	220° C	Floor	DSK37Q	Ventilated

### Three Phase

#### 480 Volts Δ Primary, 240 Volts Δ Secondary With 120 Volt Tap On B Phase<sup>⑤</sup>

15	3F1Y015TP1QST	4204.00	Y	150° C	220° C	Floor & Wall	DSK31Q	Ventilated
30	3F1Y030TP1QST	6562.00	Y	150° C	220° C	Floor & Wall	DSK11Q	Ventilated
45	3F1Y045TP1QST	6648.00	Y	150° C	220° C	Floor & Wall	DSK11Q	Ventilated
75	3F1Y075TP1QST	9606.00	Y	150° C	220° C	Floor & Wall	DSK12Q	Ventilated
112.5	3F1Y112TP1QST	13152.00	Y	150° C	220° C	Floor	DSK12Q	Ventilated
150	3F1Y150TP1QST	15852.00	Y	150° C	220° C	Floor	DSK34Q	Ventilated

### Taps

Description	Designation
4-3% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps are shown for warehouse stock transformers.

② Wall designations for units having standard features.

③ For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use.

④ Encapsulated transformers are UL listed for indoor/outdoor use.

⑤ Reduced capacity 1-phase tap—5% of rated KVA (2.5% on each side of lighting tap).

☐ = Warehouse Stock

# Warehouse Stock Transformers

## Type QST and Buck-Boost Transformers

Selection

Encapsulated, Indoor/Outdoor Enclosure, 115° C Rise

120 × 240 Volts — 12/24 Volts,  
60 Hz, No Taps, Wall Mounted

Catalog Number	KVA	List Price \$
050BB1224Q	.050	241.00
100BB1224Q	.100	278.00
150BB1224Q	.150	334.00
205BB1224Q	.250	391.00
505BB1224Q	.500	539.00
705BB1224Q	.750	688.00
1BB1224Q	1.00	890.00
105BB1224Q	1.50	1077.00
2BB1224Q	2.00	1318.00
3BB1224Q	3.00	1763.00
5BB1224Q	5.00	2525.00

120 × 240 Volts — 16/32 Volts,  
60 Hz, No Taps, Wall Mounted

Catalog Number	KVA	List Price \$
050BB1632Q	.050	241.00
100BB1632Q	.100	278.00
150BB1632Q	.150	334.00
205BB1632Q	.250	391.00
505BB1632Q	.500	539.00
705BB1632Q	.750	688.00
1BB1632Q	1.00	890.00
105BB1632Q	1.50	1077.00
2BB1632Q	2.00	1318.00
3BB1632Q	3.00	1763.00
5BB1632Q	5.00	2525.00

240 × 480 Volts — 24/48 Volts,  
60 Hz, No Taps, Wall Mounted

Catalog Number	KVA	List Price \$
050BB2448Q	.050	278.00
100BB2448Q	.100	334.00
150BB2448Q	.150	372.00
205BB2448Q	.250	447.00
505BB2448Q	.500	613.00
705BB2448Q	.750	780.00
1BB2448Q	1.00	983.00
105BB2448Q	1.50	1188.00
2BB2448Q	2.00	1448.00
3BB2448Q	3.00	1763.00
5BB2448Q	5.00	3694.00

## Accessories

### Dripshield/Weathershield Kits for Type QST Ventilated Transformers<sup>①</sup>

Catalog Number	Single Phase 150°C Rise & TP1 KVA Sizes	Three Phase 150°C Rise & TP1 KVA Sizes	Single Phase 115°C Rise & TP1 KVA Sizes	Three Phase 115°C Rise & TP1 KVA Sizes	Single Phase 80°C Rise & TP1 KVA Sizes	Three Phase 80°C Rise & TP1 KVA Sizes	Nameplate Ref. #
DSK11Q	25	30, 45	—	30	—	15, 30	4317G05
DSK12Q	37.5, 50, 75	75, 112.5	25, 37.5, 50	45, 75	25, 37.5	45, 75	4317G06
DSK34Q	—	150	—	112.5	—	—	4317G07
DSK15Q	100, 167	225	75, 100	150	50, 75, 100	112.5, 150	4317G08
DSK36Q	—	300	—	225	—	—	4317G09
DSK37Q	—	500	—	300	—	—	4317G10
DSK31Q	—	15	—	15	—	—	4317G11
DSK38Q	—	750, 1000	—	500, 750	—	500	4317G67

### Wall Mounting Brackets for Type QST Ventilated Transformers

Catalog Number	Single Phase 150°C Rise & TP1 KVA Sizes	Three Phase 150°C Rise & TP1 KVA Sizes	Single Phase 115°C Rise & TP1 KVA Sizes	Three Phase 115°C Rise & TP1 KVA Sizes	Single Phase 80°C Rise & TP1 KVA Sizes	Three Phase 80°C Rise & TP1 KVA Sizes
WMB42Q	25	15, 30, 45	—	15, 30	—	15, 30
WMB43Q	37.5, 50	75	25, 37.5	45	25	45

### Terminal Lug Kits For Ventilated Transformers

Catalog Number	Single Phase KVA Sizes	Three Phase KVA Sizes	List Price \$	Terminal Lug <sup>③</sup>		Cable Range	Terminal Lug <sup>③</sup>		Cable Range	Hardware Included	
				Qty. <sup>④</sup>	Lug No.		Qty. <sup>④</sup>	Lug No.		Qty.	Bolt Size
TLK31Q	—	15	65.00	7	KA25U/TA0	14awg-1/0mcm	n/a			7	1/4" x 1"
TLK32Q	—	30, 45	141.00	7	KA29U/TA250	6awg-250mcm	n/a			7	5/16" x 1 1/2"
TLK11Q	25, 37.5	—	127.00	8	KA29U/TA250	6awg-250mcm	n/a			8	5/16" x 1 1/2"
TLK13Q	75	—	279.00	12	KA29U/TA250	6awg-250mcm	n/a			12	5/16" x 1 1/2"
TLK33Q	—	75	243.00	3	KA29U/TA250	6awg-250mcm	8	KA31U/TA350	6awg-350mcm	3, 8	(3) 5/16" x 1 1/2" (8) 3/8" x 1 1/2"
TLK12Q	50	—	191.00	4	KA29U/TA250	6awg-250mcm	4	KA31U/TA350	6awg-350mcm	8	3/8" x 1 1/2"
TLK34Q	—	112.5	243.00	11	KA31U/TA350	6awg-350mcm	n/a			11	3/8" x 1 1/2"
TLK36Q	—	225	459.00	22	KA31U/TA350	6awg-350mcm	n/a			22	3/8" x 1 1/2"
TLK35Q	—	150	396.00	3	KA31U/TA350	6awg-350mcm	8	KA34U/TA500	4awg-500mcm	11	3/8" x 1 1/2"
TLK37Q	—	300	638.00	6	KA31U/TA350	6awg-350mcm	16	KA34U/TA500	4awg-500mcm	22	3/8" x 1 1/2"
TLK15Q	167	—	562.00	8	KA31U/TA350	6awg-350mcm	12	KA34U/TA500	4awg-500mcm	20	3/8" x 1 1/2"
TLK38Q	—	500	1150.00	9	KA31U/TA350	6awg-350mcm	24	KA34U/TA500	4awg-500mcm	33	3/8" x 1 1/2"
TLK14Q	100	—	279.00	12	KA31U/TA350	6awg-350mcm	n/a			12	3/8" x 1 1/2"
TLK39Q	—	750	1430.00	12	KA31U/TA350	6awg-350mcm	28	KA34U/TA500	4awg-500mcm	40	3/8" x 1 1/2"

① These accessories fit only warehouse stock transformers with QST Catalog Suffix.

② UL Listed for indoor and outdoor use with dripshield installed.

③ May be used on "QST" suffix units and "non QST" suffix transformers. Terminal lugs are screw type, lug connectors suitable for both copper and aluminum cable. TA lugs are single barrel, AU lugs are double barrel. Each barrel is suitable for cable range shown. Lugs are rated 90° C

④ Lug kit contains quantity required for each transformer.

# Warehouse Stock Transformers

## Warehouse Stock

## Selection



### Application

The Buck-Boost Transformer has four separate windings, two-windings in the primary and two-windings in the secondary. The unit is designed for use as an insulating transformer or as an autotransformer. As an autotransformer the unit can be connected to Buck (decrease) or Boost (increase) a supply voltage. When connected in either the Buck or Boost mode, the unit is no longer an insulating transformer but is an autotransformer. Units are designed for 60Hz applications.

Autotransformers are more economical and physically smaller than equivalent two-winding transformers and are designed to carry the same function as two-winding transformers, with the exception of isolating two circuits. Since autotransformers may transmit line disturbances directly, they may be prohibited in some areas by local building codes. Before applying them, care should be taken to assure that they are acceptable according to local code.

**NOTE:** Autotransformers are not used in closed delta connections as they introduce into the circuit a phase shift which makes them uneconomical.

As insulating transformers these units can accommodate a high voltage of 120, 240 or 480 volts. For units with two 12 volt secondaries, two 16 volt secondaries, or two 24 volt secondaries, the output can be wired for either secondary voltage, or for 3-wire secondary. The unit is rated (KVA) as any conventional transformer.

### Operation

Electrical and electronic equipment is designed to operate on a standard supply voltage. When the supply voltage is constantly too high or too low, (usually greater than  $\pm 5\%$ ), the equipment fails to operate at maximum efficiency. A Buck-Boost transformer is a simple and economical

means of correcting this off-standard voltage up to  $\pm 20\%$ . A Buck-Boost transformer will NOT, however, stabilize a fluctuating voltage. Buck-Boost transformers are suitable for use in a three phase autotransformer bank in either direction to supply 3-wire loads. They are also suitable for use in a three phase autotransformer bank which provides a neutral return for unbalanced current. They are NOT suitable for use in a three phase autotransformer bank to supply a 4-wire unbalanced load when the source is a 3-wire circuit.

### Construction

Buck-Boost Transformers are contained within a NEMA 3R, non-ventilated weather-proof enclosure. Wiring compartments are located at the bottom. Core and coil assemblies are encapsulated. Insulation system temperature is  $180^{\circ}\text{C}$  and the winding temperature rise is  $115^{\circ}\text{C}$ . Coils are copper wound through 3 kva.

### How To Select The Proper Transformer

To select the proper Transformer for Buck-Boost applications, determine:

1. Input line voltage — The voltage that you want to buck (decrease) or boost (increase). This can be found by measuring the supply line voltage with a voltmeter.
2. Load voltage — The voltage at which your equipment is designed to operate. This is listed on the nameplate of the load equipment.
3. Load KVA or Load Amps — You do not need to know both — one or the other is sufficient for selection purposes. This information usually can be found on the nameplate of the equipment that you want to operate.

4. Number of phases — Single or three phase line and load should match because a transformer is not capable of converting single to three phase. It is however a common application to make a single phase transformer connection from a three phase supply by use of one leg of the three phase supply circuit. Care must always be taken not to overload the leg of the three phase supply. This is particularly true in a Buck-Boost application because the supply must provide for the load KVA, not just the nameplate rating of the Buck-Boost transformer.
5. Frequency — The supply line frequency must be the same as the frequency of the equipment to be operated — either 50 or 60 cycles.

### How To Use Selection Charts

1. Choose the selection table with the correct number of phases for single or three phase applications.
2. Line/Load voltage combinations are listed across the top of the selection table. Select a line/load voltage combination which comes closest to matching your applications.
3. Follow the selected column down until you find either the KVA or load amps of your application. If you do not find the exact value, go on the next highest rating.
4. Now follow across the table to the far left-hand side to find the catalog number and the KVA of the transformer you need.
5. Follow the column of your line/load voltage to the bottom to find the connection diagram for this application.  
**NOTE:** Connection diagrams show low voltage and high voltage connection terminals. Either can be input or output depending on Buck or Boost application.
6. In the case of three phase loads either two or three single phase transformers are required as indicated in the "quantity required" line at the bottom of the table. The selection is dependent on whether a Wye connected bank of three transformers with a neutral is required or whether an open Delta connected bank of two transformers for a Delta connected load will be suitable.
7. For line/load voltage not listed on the selection tables, use the pair listed on the table that is slightly above your application for reference. Then apply the first formula at the bottom of the table to determine "new" output voltage. The new KVA rating can be found using the second formula.

# Warehouse Stock Transformers

## Buck-Boost

## Selection

120 × 240 Volts Primary — 12/24 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 1			Boosting							Bucking						
Catalog Number	Line Voltage (Available)		96	100	105	109	189	208	215	220	125	132	229	245	250	252
Insulating Transformer Rating	Load Voltage (Output)		115	120	115	120	208	229	237	242	114	120	208	222	227	240
050BB1224Q .050 KVA	KVA		.24	.25	.50	.50	.43	.48	.49	.50	.52	.55	.48	.51	.52	1.05
	Load Amps		2.08	2.08	4.17	4.17	2.08	2.08	2.08	2.08	4.59	4.59	2.29	2.29	2.29	4.38
100BB1224Q .100 KVA	KVA		.48	.50	.96	1.00	.87	.95	.99	1.01	1.04	1.10	.95	1.02	1.04	2.10
	Load Amps		4.17	4.17	8.33	8.33	4.17	4.17	4.17	4.17	9.16	9.16	4.58	4.58	4.58	8.75
150BB1224Q .150 KVA	KVA		.72	.75	1.44	1.50	1.30	1.43	1.48	1.51	1.55	1.65	1.43	1.53	1.56	3.15
	Load Amps		6.25	6.25	12.50	12.50	6.25	6.25	6.25	6.25	13.75	13.75	6.88	6.88	6.88	13.13
205BB1224Q .250 KVA	KVA		1.19	1.25	2.40	2.50	2.17	2.38	2.47	2.52	2.60	2.75	2.38	2.54	2.60	5.25
	Load Amps		10.42	10.42	20.83	20.83	10.42	10.42	10.42	10.42	22.92	22.92	11.46	11.46	11.46	21.88
505BB1224Q .500 KVA	KVA		2.37	2.50	4.80	5.00	4.33	4.77	4.94	5.04	5.18	5.50	4.77	5.09	5.20	10.50
	Load Amps		20.83	20.83	41.67	41.67	20.83	20.83	20.83	20.83	45.83	45.83	22.92	22.92	22.92	43.75
705BB1224Q .750 KVA	KVA		3.56	3.75	7.19	7.50	6.50	7.15	7.41	7.56	7.77	8.25	7.15	7.63	7.80	15.75
	Load Amps		31.25	31.25	62.50	62.50	31.25	31.25	31.25	31.25	68.75	68.75	34.38	34.38	34.38	65.63
1BB1224Q 1.00 KVA	KVA		4.75	5.00	9.58	10.00	8.67	9.53	9.88	10.08	10.36	11.00	9.53	10.17	10.40	21.00
	Load Amps		41.67	41.67	83.33	83.33	41.67	41.67	41.67	41.67	91.66	91.66	45.83	45.83	45.83	87.50
105BB1224Q 1.50 KVA	KVA		7.13	7.50	14.38	15.00	13.00	14.30	14.81	15.13	15.54	16.50	14.30	15.26	15.61	31.50
	Load Amps		62.50	62.50	125.00	125.00	62.50	62.50	62.50	62.50	137.50	137.50	68.75	68.75	68.75	131.25
2BB1224Q 2.00 KVA	KVA		9.50	10.00	19.17	20.00	17.33	19.07	19.75	20.17	20.72	22.00	19.07	20.35	20.81	42.00
	Load Amps		83.33	83.33	166.66	166.66	83.33	83.33	83.33	83.33	183.33	183.33	91.66	91.66	91.66	175.00
3BB1224Q 3.00 KVA	KVA		14.25	15.00	28.75	30.00	26.00	28.60	29.63	30.25	31.08	33.00	28.60	30.53	31.21	63.00
	Load Amps		125.00	125.00	250.00	250.00	125.00	125.00	125.00	125.00	275.00	275.00	137.50	137.50	137.50	262.50
5BB1224Q 5.00 KVA	KVA		23.75	25.00	47.92	50.00	43.33	47.67	49.37	50.42	51.79	55.00	47.67	50.88	52.02	105.00
	Load Amps		208.33	208.33	416.66	416.66	208.33	208.33	208.33	208.33	458.33	458.33	229.17	229.17	229.17	437.50
Connection Diagram (pg. 7-24)			B	B	B	A	A	D	D	D	D	A	A	D	D	C

Three Phase — Table 2			Boosting							Bucking						
Catalog Number	Line Voltage (Available)		189Y/ 109	195Y/ 113	200Y/ 115	208Y/ 120	416Y/ 240	416Y/ 240	189	208	220	218	229	250	255	264
Insulating Transformer Rating	Load Voltage (Output)		208Y/ 120	234Y/ 135	240Y/ 139	229Y/ 132	458Y/ 264	437Y/ 252	208	229	242	208	208	227	232	240
050BB1224Q .050 KVA	KVA		1.50	.84	.86	1.65	1.65	3.15	.75	.83	.87	1.58	.83	.90	.92	.95
	Load Amps		4.17	2.08	2.08	4.17	2.08	4.17	2.08	2.08	2.08	4.39	2.29	2.29	2.29	2.29
100BB1224Q .100 KVA	KVA		3.00	1.69	1.73	3.30	3.30	6.29	1.50	1.65	1.75	3.15	1.65	1.80	1.84	1.90
	Load Amps		8.33	4.17	4.17	8.33	4.17	8.33	4.17	4.17	4.17	8.75	4.58	4.58	4.58	4.58
150BB1224Q .150 KVA	KVA		4.50	2.54	2.60	4.96	4.96	9.44	2.26	2.48	2.62	4.73	2.48	2.71	2.76	2.86
	Load Amps		12.50	6.25	6.25	12.50	6.25	12.50	6.25	6.25	6.25	13.13	6.88	6.88	6.88	6.88
205BB1224Q .250 KVA	KVA		7.50	4.22	4.33	8.30	8.25	15.75	3.75	4.13	4.37	7.88	4.13	4.50	4.61	4.76
	Load Amps		20.83	10.42	10.42	20.83	10.42	20.83	10.42	10.42	10.42	21.88	11.46	11.46	11.46	11.46
505BB1224Q .500 KVA	KVA		15.01	8.44	8.66	16.60	16.50	31.50	7.50	8.26	8.73	15.76	8.26	9.01	9.21	9.53
	Load Amps		41.67	20.83	20.83	41.67	20.83	41.67	20.83	20.83	20.83	43.75	22.92	22.92	22.92	22.92
705BB1224Q .750 KVA	KVA		22.52	12.67	12.99	24.90	24.75	47.25	11.26	12.39	13.10	23.64	12.39	13.52	13.82	14.29
	Load Amps		62.50	31.25	31.25	62.50	31.25	62.50	31.25	31.25	31.25	65.63	34.38	34.38	34.38	34.38
1BB1224Q 1.00 KVA	KVA		30.02	16.89	17.32	33.20	33.00	63.00	15.01	16.51	17.47	31.52	16.51	18.02	18.42	19.05
	Load Amps		83.33	41.67	41.67	83.33	41.67	83.33	41.67	41.67	41.67	87.50	45.83	45.83	45.83	45.53
105BB1224Q 1.50 KVA	KVA		45.03	25.33	25.98	49.80	49.50	94.50	22.52	24.77	26.20	47.28	24.77	27.03	27.63	28.53
	Load Amps		125.00	62.50	62.50	125.00	62.50	125.00	62.50	62.50	62.50	131.25	68.75	68.75	68.75	68.75
2BB1224Q 2.00 KVA	KVA		60.06	33.77	34.64	66.40	66.00	126.00	30.02	33.03	34.93	63.05	33.03	36.04	36.84	38.11
	Load Amps		166.67	83.33	83.33	166.67	83.33	166.66	83.33	83.33	83.33	175.00	91.67	91.67	91.67	91.67
3BB1224Q 3.00 KVA	KVA		90.07	50.66	51.96	99.59	99.00	189.00	45.03	49.54	52.39	94.57	49.54	54.06	55.25	57.16
	Load Amps		250.00	125.00	125.00	250.00	125.00	250.00	125.00	125.00	125.00	262.50	137.50	137.50	137.50	137.50
5BB1224Q 5.00 KVA	KVA		150.11	84.44	86.60	165.99	165.00	318.00	75.05	82.56	87.32	157.62	82.56	90.10	92.09	95.26
	Load Amps		416.67	208.33	208.33	416.67	208.33	416.66	208.33	208.33	208.33	437.50	229.17	229.17	229.17	229.17
Quantity Required			3	3	3	3	3	3	2	2	2	2	2	2	2	2
Connection Diagram (pg. 7-24)			F	E	E	F	J	K	G	G	G	H	G	G	G	G

☐ = Warehouse Stock

• Output voltage for lower input voltage can be found by:  
 $\frac{\text{Rated Output Voltage}}{\text{Rated Input Voltage}} \times \text{Input Actual Voltage} = \text{Output New Voltage}$

• Output KVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output KVA} = \text{New KVA Rating}$

• Inputs and outputs may be reversed without affecting KVA capacity. See note on page 7-24

# Warehouse Stock Transformers

## Buck-Boost

**Selection**

120 × 240 Volts Primary — 16/32 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 3			Boosting							Bucking						
Catalog Number	Line Voltage (Available)		95	100	105	208	215	215	220	225	135	240	240	245	250	255
Insulating Transformer Rating	Load Voltage (Output)		120	113	119	236	244	229	235	240	120	212	225	230	234	239
050BB1632Q .050 KVA	KVA		.19	.36	.37	.37	.38	.72	.73	.73	.42	.37	.75	.77	.78	.80
	Load Amps		1.56	3.12	3.12	1.56	1.56	3.12	3.12	3.12	3.54	1.77	3.33	3.33	3.33	3.33
100BB1632Q .100 KVA	KVA		.38	.72	.74	.74	.76	1.44	1.46	1.50	.84	.74	1.50	1.54	1.56	1.60
	Load Amps		3.13	6.25	6.25	3.13	3.13	6.25	6.25	6.25	7.09	3.54	6.66	6.66	6.66	6.66
150BB1632Q .150 KVA	KVA		.56	1.06	1.12	1.12	1.14	2.16	2.20	2.26	1.26	1.10	2.26	2.30	2.34	2.40
	Load Amps		4.69	9.38	9.38	4.69	4.69	9.38	9.38	9.38	10.64	5.30	10.02	10.02	10.02	10.02
205BB1632Q .250 KVA	KVA		.94	1.78	1.86	1.88	1.91	3.59	3.67	3.75	2.11	1.84	3.75	3.83	3.90	3.98
	Load Amps		7.81	15.63	15.63	7.81	7.81	15.63	15.63	15.63	17.71	8.85	16.67	16.67	16.67	16.67
505BB1632Q .500 KVA	KVA		1.88	3.56	3.72	3.75	3.81	7.19	7.34	7.50	4.21	3.68	7.50	7.67	7.80	7.97
	Load Amps		15.63	31.25	31.25	15.63	15.63	31.25	31.25	31.25	35.42	17.71	33.33	33.33	33.33	33.33
705BB1632Q .750 KVA	KVA		2.81	5.34	5.58	5.63	5.72	10.78	11.02	11.25	6.32	5.53	11.25	11.50	11.70	11.95
	Load Amps		23.44	46.88	46.88	23.44	23.44	46.88	46.88	46.88	53.13	26.56	50.00	50.00	50.00	50.00
1BB1632Q 1.00 KVA	KVA		3.75	7.13	7.44	7.50	7.63	14.38	14.69	15.00	8.43	7.37	15.00	15.33	15.60	15.93
	Load Amps		31.25	62.50	62.50	31.25	31.25	62.50	62.50	62.50	70.83	35.42	66.67	66.67	66.67	66.67
105BB1632Q 1.50 KVA	KVA		5.63	10.69	11.16	11.25	11.44	21.56	22.03	22.50	12.64	11.05	22.50	23.00	23.40	23.90
	Load Amps		43.90	93.80	93.80	46.90	46.90	93.80	93.80	93.80	106.30	53.10	100.00	100.00	100.00	100.00
2BB1632Q 2.00 KVA	KVA		7.50	14.25	14.88	15.00	15.25	28.75	29.38	30.00	16.86	14.73	30.00	30.67	31.20	31.87
	Load Amps		62.50	125.00	125.00	62.50	62.50	125.00	125.00	125.00	141.70	70.80	133.30	133.30	133.30	133.30
3BB1632Q 3.00 KVA	KVA		11.25	21.38	22.31	22.50	22.88	43.13	44.06	45.00	25.29	22.10	45.00	46.00	46.80	47.80
	Load Amps		93.80	187.50	187.50	93.80	93.80	187.50	187.50	187.50	212.50	106.30	200.00	200.00	200.00	200.00
5BB1632Q 5.00 KVA	KVA		18.75	35.63	37.19	37.50	38.13	71.88	73.44	75.00	42.15	36.83	75.00	76.67	78.00	79.67
	Load Amps		156.30	312.50	312.50	156.30	156.30	312.50	312.50	312.50	354.20	177.10	333.30	333.30	333.30	333.30
Connection Diagram (pg. 7-24)			B	A	A	D	D	C	C	C	A	D	C	C	C	C

Three Phase — Table 4			Boosting					Bucking					
Catalog Number	Line Voltage (Available)		183Y/ 106	208Y/ 120	195	208	225	240	245	250	256	265	272
Insulating Transformer Rating	Load Voltage (Output)		208Y/ 120	236Y/ 136	208	236	240	208	230	234	240	234	240
050BB1632Q .050 KVA	KVA		1.13	1.28	1.13	.62	1.30	.56	1.33	1.35	1.39	.72	.74
	Load Amps		3.13	3.13	3.13	1.56	3.13	1.56	3.34	3.34	3.34	1.77	1.77
100BB1632Q .100 KVA	KVA		2.25	2.55	2.25	1.30	2.60	1.13	2.66	2.70	2.77	1.44	1.48
	Load Amps		6.25	6.25	6.25	3.13	6.25	3.13	6.67	6.67	6.67	3.55	3.55
150BB1632Q .150 KVA	KVA		3.38	3.83	3.38	1.95	3.90	1.69	3.98	4.05	4.16	2.15	2.21
	Load Amps		9.38	9.38	9.38	4.69	9.38	4.69	10.00	10.00	10.00	5.31	5.31
205BB1632Q .250 KVA	KVA		5.63	6.39	5.63	3.17	6.50	2.81	6.64	6.76	6.93	3.59	3.68
	Load Amps		15.63	15.63	15.63	7.81	15.63	7.81	16.67	16.67	16.67	8.85	8.85
505BB1632Q .500 KVA	KVA		11.26	12.77	11.26	6.33	12.99	5.63	13.28	13.50	13.86	7.17	7.36
	Load Amps		31.25	31.26	31.25	15.63	31.25	15.63	33.33	33.33	33.33	17.69	17.71
705BB1632Q .750 KVA	KVA		16.89	19.16	16.89	9.50	19.49	8.44	19.92	20.26	20.78	10.76	11.04
	Load Amps		46.88	46.88	46.88	23.44	46.88	23.44	50.00	50.00	50.00	26.54	26.56
1BB1632Q 1.00 KVA	KVA		22.52	25.55	22.52	12.67	25.98	11.26	26.56	27.02	27.71	14.34	14.72
	Load Amps		62.50	62.50	62.50	31.25	62.50	31.25	66.67	66.67	66.67	35.39	35.42
105BB1632Q 1.50 KVA	KVA		33.77	38.32	33.77	19.00	38.97	16.89	39.84	40.53	41.57	21.52	22.08
	Load Amps		93.75	93.75	93.75	46.88	93.75	46.88	100.00	100.00	100.00	53.08	53.13
2BB1632Q 2.00 KVA	KVA		45.03	51.10	46.03	25.33	51.96	22.52	53.11	54.04	55.43	28.69	29.44
	Load Amps		125.00	125.00	125.00	62.50	125.00	62.50	133.33	133.33	133.33	70.78	70.83
3BB1632Q 3.00 KVA	KVA		67.55	76.64	67.55	38.00	77.94	33.77	79.67	81.06	83.14	43.03	44.17
	Load Amps		187.50	187.50	187.50	93.75	187.50	93.75	200.00	200.00	200.00	106.17	106.25
5BB1632Q 5.00 KVA	KVA		112.58	127.74	112.58	63.33	129.90	56.29	132.79	135.09	138.56	71.72	73.61
	Load Amps		312.50	312.50	312.50	156.25	312.50	156.25	333.33	333.33	333.33	176.95	177.08
Quantity Required			3	3	2	2	2	2	2	2	2	2	2
Connection Diagram (pg. 7-24)			F	F	H	G	H	L	H	H	H	G	G

☐ = Warehouse Stock

• Output KVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output KVA} = \text{New KVA Rating}$

• Output KVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output KVA} = \text{New KVA Rating}$

# Warehouse Stock Transformers

## Buck-Boost

## Selection

240 × 480 Volts Primary — 24/48 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 5			Boosting									Bucking				
Catalog Number	Line Voltage (Available)		230	380	416	425	430	435	440	450	450	460	277	480	480	504
Insulating Transformer Rating	Load Voltage (Output)		276	418	458	468	473	457	462	495	472	483	231	436	457	480
050BB2448Q .050 KVA	KVA		.29	.44	.48	.49	.49	.95	.96	.52	.98	1.01	.29	.50	1.00	1.05
	Load Amps		1.04	1.04	1.04	1.04	1.04	2.08	2.08	1.04	2.08	2.08	1.25	1.15	2.19	2.19
100BB2448Q .100 KVA	KVA		.58	.87	.95	.97	.99	1.90	1.93	1.03	1.97	2.01	.58	1.00	2.00	2.10
	Load Amps		2.08	2.08	2.08	2.08	2.08	4.17	4.17	2.08	4.17	4.17	2.50	2.29	4.38	4.38
150BB2448Q .150 KVA	KVA		.86	1.31	1.43	1.46	1.48	2.86	2.89	1.55	2.95	3.02	.86	1.50	3.00	3.15
	Load Amps		3.13	3.13	3.13	3.13	3.13	6.25	6.25	3.13	6.25	6.25	3.75	3.44	6.56	6.56
205BB2448Q .250 KVA	KVA		1.44	2.18	2.38	2.43	2.46	4.76	4.81	2.58	4.92	5.03	1.44	2.50	5.00	5.25
	Load Amps		5.21	5.21	5.21	5.21	5.21	10.42	10.42	5.21	10.42	10.42	6.25	5.73	10.94	10.94
505BB2448Q .500 KVA	KVA		2.88	4.35	4.77	4.87	4.93	9.52	9.62	5.16	9.83	10.06	2.88	5.00	10.00	10.50
	Load Amps		10.42	10.42	10.42	10.42	10.42	20.83	20.83	10.42	20.83	20.83	12.50	11.46	21.88	21.88
705BB2448Q .750 KVA	KVA		4.31	6.53	7.15	7.30	7.39	14.28	14.44	7.73	14.75	15.09	4.31	7.49	15.00	15.75
	Load Amps		15.63	15.63	15.62	15.63	15.63	31.25	31.25	15.63	31.25	31.25	18.75	17.19	32.81	32.81
1BB2448Q 1.00 KVA	KVA		5.75	8.71	9.53	9.74	9.85	19.04	19.25	10.31	19.67	20.13	5.75	9.99	20.00	21.00
	Load Amps		20.83	20.83	20.83	20.83	20.83	41.67	41.67	20.83	41.67	41.67	25.00	22.92	43.75	43.75
105BB2448Q 1.50 KVA	KVA		8.63	13.06	14.30	14.61	14.78	28.56	28.88	15.47	29.50	30.19	8.63	14.99	30.00	31.50
	Load Amps		31.25	31.25	31.25	31.25	31.25	62.50	62.50	31.25	62.50	62.50	37.50	34.38	65.63	65.63
2BB2448Q 2.00 KVA	KVA		11.50	17.42	19.07	19.48	19.71	38.08	38.50	20.63	39.33	40.25	11.50	19.98	40.00	42.00
	Load Amps		41.67	41.67	41.67	41.67	41.67	83.33	83.33	41.67	83.33	83.33	50.00	45.83	87.50	87.50
3BB2448Q 3.00 KVA	KVA		17.25	26.13	28.60	29.22	29.56	57.13	57.75	30.94	59.00	60.38	17.25	29.98	60.00	63.00
	Load Amps		62.50	62.50	62.50	62.50	62.50	125.00	125.00	62.50	125.00	125.00	75.00	68.80	131.25	131.25
5BB2448Q 5.00 KVA	KVA		28.75	43.54	47.67	48.70	49.30	95.20	96.20	51.56	98.30	100.60	28.80	50.00	100.00	105.00
	Load Amps		104.17	104.17	104.17	104.17	104.20	208.30	208.30	104.17	208.30	208.30	125.00	114.60	218.75	218.75
Connection Diagram (pg. 7-24)			B	D	D	D	D	C	C	D	C	C	B	D	C	C

Three Phase — Table 6			Boosting							Bucking								
Catalog Number	Line Voltage (Available)		399Y/ 230	380	430	440	460	460	480	480	440	440	460	460	480	480	500	500
Insulating Transformer Rating	Load Voltage (Output)		480Y/ 277	418	473	462	506	483	528	504	400	419	438	418	457	436	455	476
050BB2448Q .050 KVA	KVA		.86	.75	.85	1.66	.91	1.74	.95	1.82	.79	1.58	1.66	.83	1.73	.86	.90	1.80
	Load Amps		1.04	1.04	1.04	2.08	1.04	2.08	1.04	2.08	1.14	2.18	2.18	1.14	2.18	1.14	1.14	2.19
100BB2448Q .100 KVA	KVA		1.73	1.51	1.70	3.33	1.82	3.48	1.90	3.63	1.59	3.17	3.31	1.66	3.46	1.73	1.80	3.61
	Load Amps		2.08	2.08	2.08	4.16	2.08	4.16	2.08	4.16	2.29	4.37	4.37	2.29	4.37	2.29	2.29	4.38
150BB2448Q .150 KVA	KVA		2.60	2.26	2.56	4.99	2.73	5.22	2.85	5.45	2.38	4.75	4.97	2.48	5.19	2.59	2.70	5.41
	Load Amps		3.12	3.13	3.12	6.24	3.12	6.25	3.12	6.24	3.43	6.55	6.55	3.43	6.55	3.43	3.43	6.56
205BB2448Q .250 KVA	KVA		4.33	3.77	4.26	8.32	4.56	8.70	4.76	9.08	3.96	7.92	8.28	4.14	8.64	4.32	4.51	9.02
	Load Amps		5.20	5.21	5.20	10.40	5.20	10.40	5.20	10.40	5.72	10.92	10.92	5.72	10.92	5.72	5.72	10.94
505BB2448Q .500 KVA	KVA		8.60	7.54	8.52	16.64	9.11	17.40	9.51	18.16	7.93	15.85	16.57	8.28	17.29	8.64	9.02	18.04
	Load Amps		10.40	10.42	10.40	20.80	10.40	20.80	10.40	20.80	11.44	21.84	21.84	11.44	21.84	11.44	11.44	21.88
705BB2448Q .750 KVA	KVA		12.90	11.31	12.77	24.97	13.67	26.10	14.27	27.24	11.89	23.77	24.85	12.42	25.93	12.96	13.52	27.06
	Load Amps		15.60	15.63	15.60	31.20	15.60	31.20	15.60	31.20	17.16	32.76	32.76	17.16	32.76	17.16	17.16	32.81
1BB2448Q 1.00 KVA	KVA		17.30	15.08	17.03	33.29	18.23	34.80	19.02	36.31	15.85	31.70	33.14	16.57	34.57	17.28	18.03	36.08
	Load Amps		20.80	20.83	20.80	41.60	20.80	41.60	20.80	41.60	22.88	43.68	43.68	22.88	43.68	22.88	22.88	43.75
105BB2448Q 1.50 KVA	KVA		25.90	22.62	25.55	49.93	27.34	52.50	28.53	54.47	23.78	47.55	49.71	24.85	51.86	25.92	27.05	54.13
	Load Amps		31.20	31.25	31.20	62.40	31.20	62.40	31.20	62.40	34.32	65.52	65.52	34.32	65.62	34.32	34.32	65.63
2BB2448Q 2.00 KVA	KVA		34.60	30.17	34.07	66.58	36.46	69.60	38.04	72.63	31.70	63.40	66.27	33.13	69.15	34.56	36.06	72.17
	Load Amps		41.60	41.67	41.60	83.20	41.60	83.20	41.60	83.20	45.76	87.36	87.36	45.76	87.36	45.76	45.76	87.50
3BB2448Q 3.00 KVA	KVA		52.00	45.25	51.18	100.03	54.69	104.57	57.07	109.12	47.63	95.25	99.57	49.77	103.89	51.92	54.18	108.25
	Load Amps		62.50	62.50	62.50	125.00	62.50	125.00	62.50	125.00	68.75	131.25	131.25	68.75	131.25	68.75	68.75	131.25
5BB2448Q 5.00 KVA	KVA		86.10	75.42	85.17	166.44	91.15	174.01	95.11	181.57	79.26	158.50	165.69	82.83	172.87	86.39	90.16	180.42
	Load Amps		104.00	104.17	104.00	208.00	104.00	208.00	104.00	208.00	114.40	218.40	218.40	114.40	218.40	114.40	114.40	218.75
Quantity Required			3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Connection Diagram (pg. 7-24)			E	G	G	H	G	H	G	H	G	H	H	G	H	G	G	H

☐ = Warehouse Stock

• Output voltage for lower input can be found by:  
 $\frac{\text{Rated Output Voltage}}{\text{Rated Input Voltage}} \times \text{Input Actual Voltage} = \text{Output New Voltage}$

• Output KVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output KVA} = \text{New KVA Rating}$

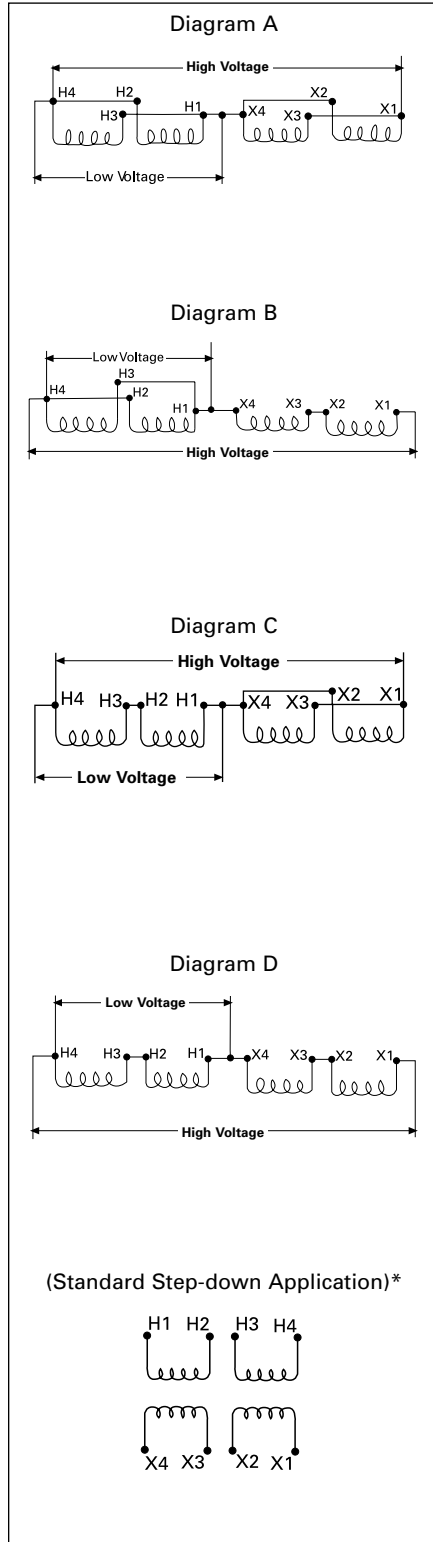
• Inputs and outputs may be reversed without affecting KVA capacity. See note on page 7-24.

# Buck-Boost Transformers

## Single Phase, Three Phase

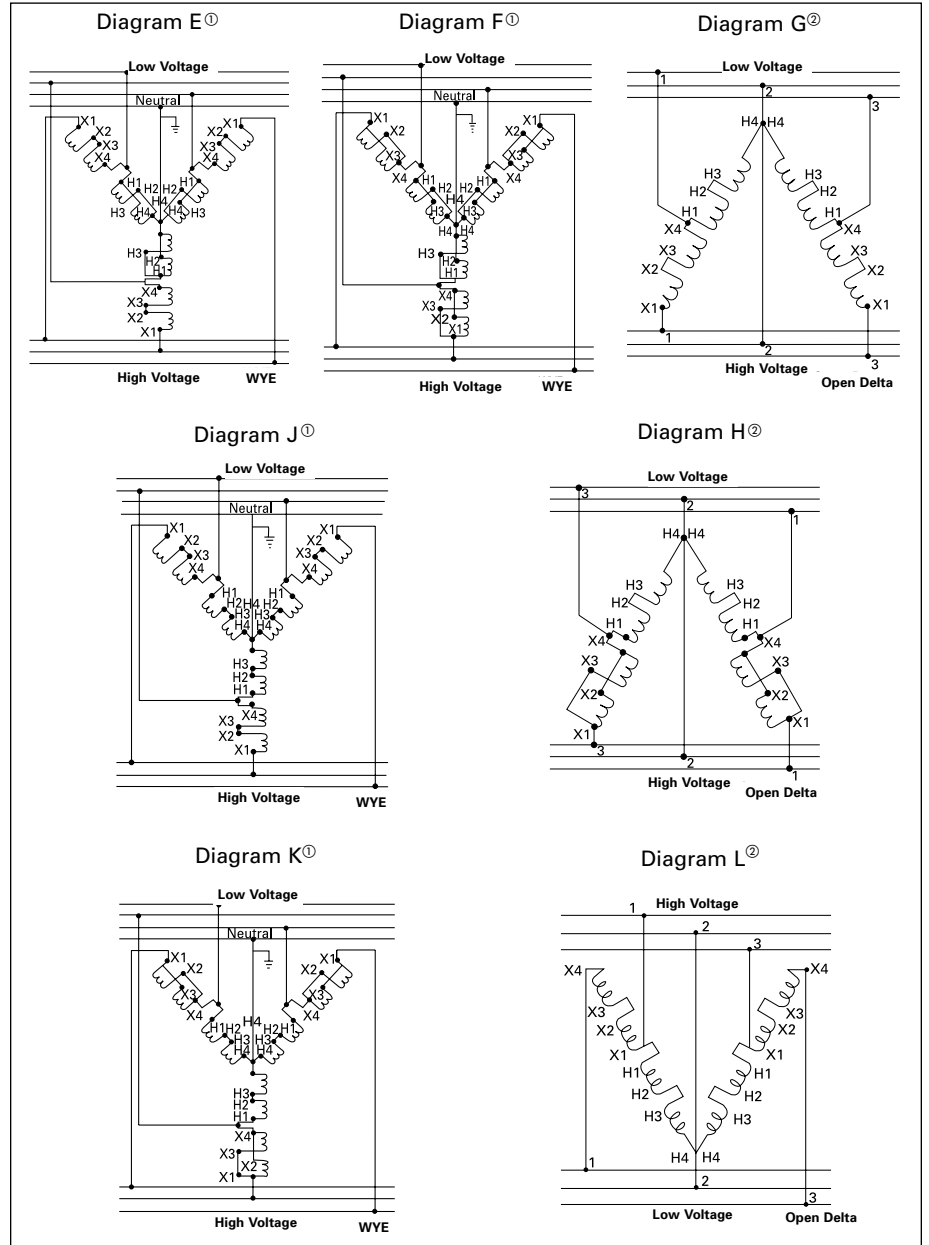
## Typical Connection Diagrams

### Single Phase



### Three Phase

Note: Contact sales office for diagrams applicable to "Q" suffix.



#### \*Low Voltage Applications:

By using the "Standard Step-down Application" diagram at left, buck boost transformers will convert 120V or 240V to 12, 24, 16 or 32 volts and 240V or 480V to 24 or 48 volts without affecting the nameplate KVA rating of the transformer. Buck boost transformers used in this type of application will become isolation or insulating type transformers.

- ① These diagrams can only be used when the source is a 4-wire supply.
- ② The neutral XO should not be used when the source is a three wire supply.

- Note:
- Inputs and Outputs may be reversed; KVA capacity remains constant. Exception: Cannot use 3-wire input with 4-wire output to form a neutral and does not apply to standard step-down applications.
  - Refer to NEC 450-4 for overcurrent protection of an autotransformer.

- All applications are suitable for 60Hz only.



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Siemens ACCESS power monitoring systems provide the hardware and software for complete power information management and control.

### Features

- Power Quality Reliability and Analysis
- Electrical Asset Management
- Utilities Cost Allocation and Billing
- Utilities Usage Aggregation
- Load Studies and Circuit Optimization
- Demand and Power Factor Control
- Load Preservation
- Equipment Monitoring and Control
- JCAHO Compliance Testing
- Facility Monitoring and Automation
- Sequence of Events Recording
- Preventative Maintenance

For technical assistance contact:

**1-800-427-2256**

Email your questions:

**Access.Support@siemens.com**

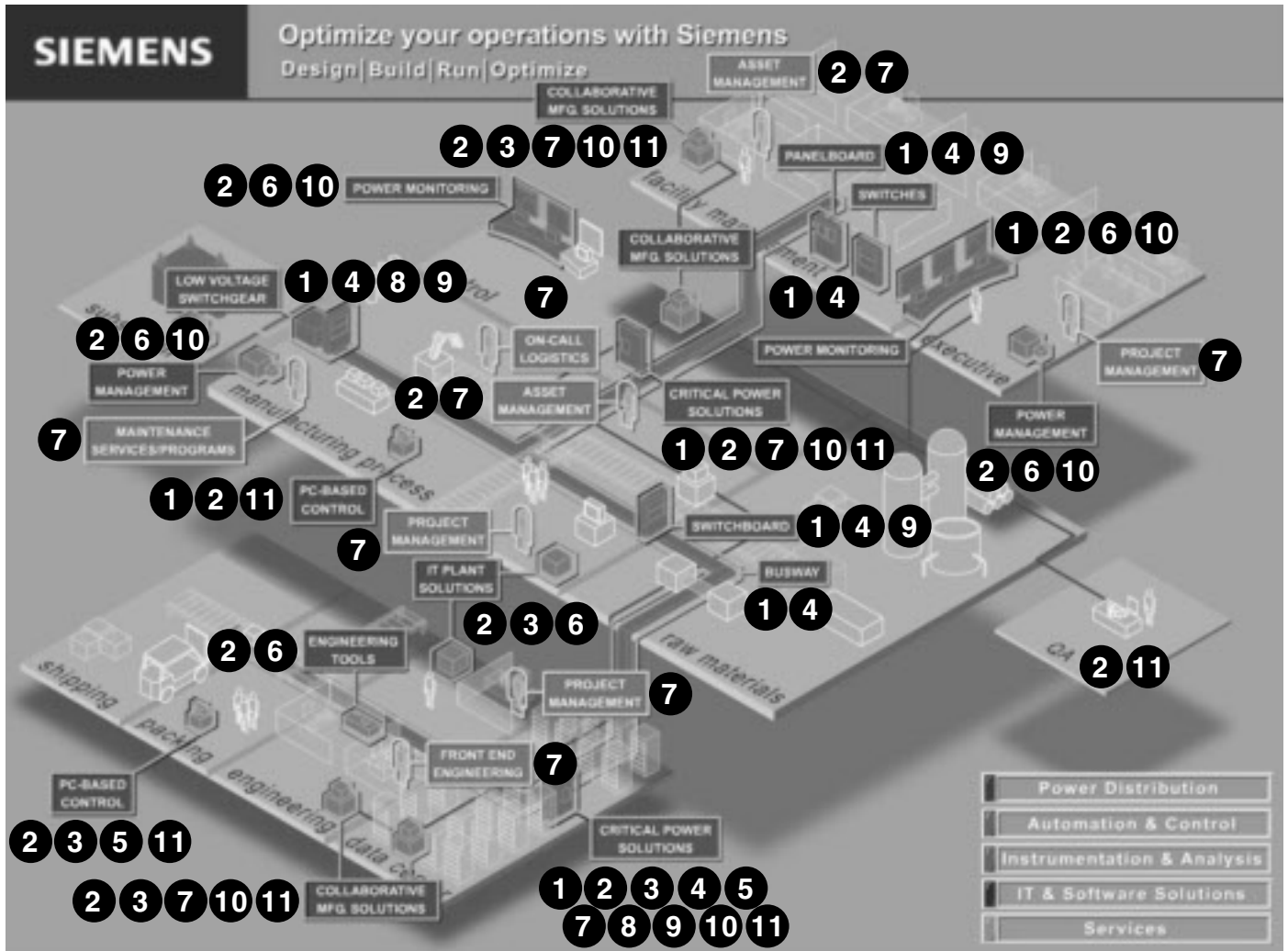
For latest information go to:

**www.sea.siemens.com/ACCESS**

# Totally Integrated Power

## System Overview

General



### 1. Power Meters

Siemens' ACCESS power monitors combine the best of new technologies and proven practices. Monitor critical loads, power quality, and demand via the web directly from the meters.

### 2. Power Monitoring Software

WinPM.Net web-enabled software facilitates easy, enterprise-wide connection to power monitoring equipment, circuit breakers, and other devices from Siemens and third parties. Access information via the web with unlimited no-cost clients using built-in WebReach™ via your web browser.

### 3. Communications Networks

Utilize existing Ethernet or RS-485 communications networks to extract the information you need and get it where it needs to go.

### 4. Components

Current Transformers (CTs), Voltage/Potential Transformers (PTs), Power Supplies, Ethernet Switches, Protocol Converters. Siemens can provide everything required for your system.

### 5. Intelligent I/O

Our S7 I/O enables plug-n-play communications with Modbus devices and expands digital and analog input and output functionality of ACCESS Systems.

### 6. Billing and Load Allocation Software

ACCESS Energy Manager is the low-cost, simplified solution for cost allocation, billing & load/demand analysis using your web browser.

### 7. Engineering Services

PDS Application Engineers can help from design through commissioning of even the most demanding power quality and monitoring systems.

### 8. Motor Control Centers

Monitor mains and feeders for critical or power-intensive loads. Communicate with breakers (Static Trip III, SBEC), SAMMS, SIMOCODE, I/O and devices from other manufacturers. Use ACCESS power meters to web-enable new as well as existing MCCs.

### 9. Low & Medium Voltage Switchgear

Web-enable switchgear by having ACCESS monitor power as well as breaker status and upload the information to a corporate Intranet or to the Internet. Use MeterMail™ directly from meters for alarm conditions or simple reporting.

### 10. Facility Management Systems

Tie into building automation systems to provide the required power and energy information. Lots of communications options are available ranging from legacy protocols to XML directly from the power monitors.

### 11. Distributed Control Systems, Automation, and SCADA/Human Machine Interface

ACCESS power monitors and/or software can talk to all major vendors' systems.

8

POWER  
MONITORING

# Totally Integrated Power

## Intelligent Metering and Control Devices

General

	9100	9200	9300	9330	9350	9510 ADR	9510	9610/9610H
<b>POWER, ENERGY and DEMAND</b>								
Voltage/current: per phase, average		•	•	•	•		•	•
Voltage/current: unbalance			•	•	•		•	•
Power: real, reactive, apparent, power factor, frequency	kW/kWh	•	•	•	•		•	•
Energy: bi-directional, import, export		•	•	•	•		•	•
Energy: total, net			•	•	•		•	•
Demand: block, sliding window		•	•	•	•		•	•
Demand: thermal predicted			•	•	•		•	•
<b>POWER QUALITY ANALYSIS</b>								
Sag/swell monitoring					•		•	•
Symmetrical components: zero, negative, positive								•
Transient detection, microseconds								65/17
Harmonics (individual, even, odd, total) up to		THD only	15th	15th	31st		63rd	127th/256th
Sampling rate, maximum samples/cycle		64	32	32	64		256	512/1024
Flicker, harmonics to EN50160, IEC 6100-4-7 / 4-15								•
Configurable for IEEE 519-1992, IEEE 1159, SEMI/ITIC								•
"Number of nines" uptime data (3 nines=99.9%)							•	•
<b>DATA and WAVEFORM LOGS</b>								
Triggered by setpoint, schedule, or external signal				•	•		•	•
Sequence-of-event logs, variable log depth				•	•		•	•
Minimum/maximum logs for any parameter				•	•		•	•
Historical logs, maximum # of channels	1			32	96	800	800	800
Waveform logs, maximum # of consecutive cycles					48		96	96
Time-stamps, resolution in seconds	•			0.001	0.001		0.001	0.001
GPS time synchronization						•	•	•
<b>COMMUNICATION PORTS and I/O ( ) = Optional</b>								
RS-232/485 ports						1	1	1
RS-485-only ports		1	1	2	2	1	1	1
Ethernet ports			(1)	(1)	(1)	(1)	(1)	(1)
Infrared optical ports			1	1	1	1	1	1
Wireless Transmission	•							
PROFIBUS ports			(1)					
Built-in modems				(1)	(1)	(1)	(1)	(1)
Modbus RTU Slave on serial, modem or infrared ports (if equipped with modem or infrared port)		•	•	•	•	•	•	•
Modbus RTU Master on serial ports						•	•	•
Modbus/TCP on Ethernet ports			•	•	•	•	•	•
DNP 3.0 on serial, modem, infrared ports				•	•	•	•	•
EtherGate™: 31 other meters accessible via RS-485				•	•	•	•	•
ModemGate: 31 other meters accessible via RS-485				•	•	•	•	•
MeterM@il®: data e-mailed from meter				•	•	•	•	•
WebMeter®: on-board web server			•	•	•	•	•	•
XML			•	•	•	•	•	•
Analog inputs			(4)	(4)	(4)	(4)	(4)	(4)
Analog outputs			(4)	(4)	(4)	(4)	(4)	(4)
Digital status/counter inputs (standard/optional add-ons)				4	4	8/8	8/8	8/8
Digital relay outputs (control/pulse)		2	4	4	4	7	7	7
<b>SETPOINTS, ALARMING and CONTROL</b>								
Setpoints, minimum response time				1 sec	1 sec	½ cycle	½ cycle	½ cycle
Math, logic, trig, log, linearization formulas				•	•	•	•	•
Single- and multi-condition alarms				•	•	•	•	•
Call-out on alarm				•	•	•	•	•
<b>REVENUE METERING</b>								
ANSI C12.16 accuracy compliant	•		•	•	•		•	•
ANSI C12.20 0.2 compliant		•					•	•
IEC 60687 0.2S compliant							•	•
IEC 60687 accuracy class 0.5S compliant		•	•	•	•		•	•
ANSI class 10 (5A nominal, 10A max)			•	•	•			
ANSI class 2, IEC 1/10 (1A nominal, 10A max)							•	•
ANSI class 20, IEC 5/20 (5A nominal, 20A max)							•	•
MV-90 on serial; Ethernet ports				•	•		•	•
Time-of-use				•	•		•	•
Transformer/line loss compensation							•	•

Some features are optional. Refer to datasheets for allowable port configurations. Products meet or exceed the accuracy requirements of the standards listed; due to form factors, not all ANSI/IEC compliance tests may apply. Some products certified by third-party laboratory.

# Totally Integrated Power

## 9200 Power Meter

## Selection



### Features

- Use the 9200 Power Meter for basic metering applications, like sub-billing, cost allocation and tenant monitoring
- For use in Switchboards to replace multiple analog meters and rotary switches, with less space and wiring
- Choose between two mounting options, and one of three measurement packages. All units come standard with Modbus/RTU RS-485 communication. The 9200 with no display is excellent for low cost sub-metering applications in switchboards

### High Accuracy

#### Measurement Method and Accuracy

- 64 samples per cycle
- IEC 60687 class 0.5 accuracy
- 4 quadrant energy and demand
- Per phase voltage, current, peak current demand, watts, VARs, kWh, and more
- Neutral current, THD, frequency, power factor and more
- Revenue Accurate

### Building Management Interface

#### Pulse Output Option

- kWh and/or kVARh and/or kVAh pulsing
- Rated 100mA, 200 VAC/DC

### System Integration

#### Communications

- Industry standard protocol, Modbus RTU, for use with WinPM.Net™ software or any Modbus compatible system

#### Power Supply

- 100-240 VAC (50-60 Hz)/110-300 VDC
- 20-60 VDC (+/-10%)
- 480 VAC

### Standard Measurements

- Voltage (I-n), per phase, avg.
- Voltage (I-I), per phase, avg.
- Current, per phase, avg.

### Meter Options

#### Enhanced Package #1

- Includes standard measurements and adds:
  - Energy,(kWh) Imported/Exported Total Power, (kW)
  - Total Peak Power Demand (kW)\*
  - Current Demand, Avg + Per Phase Peak
  - Current Demand, Avg + Per Phase Current, Neutral Frequency
  - Power Factor, Total

#### Enhanced Package #2

- Includes all the preceding parameters and adds:
  - Power, (kW) Per Phase\*
  - Power Factor, Per Phase
  - Reactive Energy (KVARh) Import/Export\*
  - Apparent Energy, (kVAh)\*
  - Reactive Power, (kVAR) Per Phase & Total\*
  - Apparent Power, (kVA) Per Phase & Total\*
  - Reactive Power, (kVAR) Peak Demand\*
  - Apparent Power, (kVA) Peak Demand\*
  - THD Voltage & Current, Per Phase
  - Energy, (kWh) Import/Export Per Phase\*

9200 Meter Catalog Number Configuration	Meter Catalog Number									
	9	2	0	D	D	-	1	Z	Z	A
<b>Description</b>										
<b>Meter base unit and display options</b>										
• Integrated display unit with RS-485 and Modbus RTU communication				D						
• Remote display unit with RS-485 and Modbus RTU communication				R						
• Non-display unit with RS-485 and Modbus RTU communication				T						
<b>Metering Options</b>										
• Configured for Volts and Amps per phase and avg.				A						
• Configured for Volts and Amps per phase and avg. with Energy/Power, Frequency, PF (package #1)				D						
• Configured for Volts and Amps per phase and avg. with Energy/Power, Frequency, PF, KVAR, kVA, and THD (package #2)				G						
<b>Power Supply</b>										
• 100-240 Vac / 110-300Vdc							1			
• 435-530Vac							2			
• 20-60 Vdc							3			
<b>Digital Output</b>										
• None								Z		
• Two optically isolated Form A outputs for kWh, kVAh or kVARh energy pulsing									A	
<b>Security Options for Revenue Metering</b>										
• Password Protected										Z
<b>Specials</b>										
• None										A

\*Meets or exceeds IEC 60687 class 0.5 accuracy.  
\*\*As represented in SPACE 2000.

# Totally Integrated Power

## 9300/9330/9350 Low Cost Web-enabled Power Meter

Selection



Use the 9300 Power Meter for basic metering applications, like sub-billing, cost allocation, tenant monitoring and for any PROFIBUS applications.

Use the 9330 Power Meter where onboard data logging and setpoint-based alarms are required. An optional, built-in modem is available, and can be used as a gateway for up to 31 additional devices.

Use the 9350 where – in addition to all of the above – waveforms are required. Also has sag/swell, enhanced harmonics, and faster sampling rates.

All meters have the option of adding a network card which provides an Ethernet port and access to onboard web pages, for easy viewing of real-time data from your desktop browser. This also enables MeterMail, a function that allows the meters to send messages to PCs, pagers, cell phones, PDAs and other mobile devices. These messages can be alarms, data, peak demand notifications, etc.

### Mounting Options:

- Integrated Display for panel mounting
- Remote Display
- No display
- In FT21 or S1 switchboard case for retrofit applications

### Measurements

- Hundreds of high accuracy power measurements
- Harmonics to the 15th for 9300 & 9330, to the 31st for the 9350
- Predicted kW demand for demand control applications

### Digital Inputs and Outputs

- 4 digital inputs for status/counter functions, log gas, water, steam and air inputs
- 4 digital outputs for control/pulse



**Draw-Out Case Option**  
Available in 9300, 9330 and 9350 meter styles

### Waveform Capture (9350 only)

- Capture from 12 to 48 cycles on all channels at 16 to 64 samples per cycle
- Sag/swell detection to trigger waveforms on out-of-tolerance conditions

### Analog Inputs and Outputs

- 4 - 4-20mA Inputs and Outputs
- 4 - 0-1mA Inputs and Outputs

### Communications

- **9300** single RS-485 port, Ethernet option
- **9330** two RS-485 ports std, Ethernet and Modem optional
- **9350** two RS-485 ports std, Ethernet and Modem optional

### Supported Protocols

- **9300** SEAbus/ION, PROFIBUS, Modbus RTU & TCP
- **9330** SEAbus/ION, Modbus RTU & TCP, DNP3.0

- **9350** SEAbus/ION, Modbus RTU & TCP, DNP3.0
- EtherGate™ allows direct Ethernet-to RS-485 data transfer to 31 other devices
- Infrared data port standard

### Onboard Data Logging

- 9330 - Log up to 32 parameters for 30 days
- 9350 - Same as 9330 plus three 6-channel waveform captures, fully configurable
- Sequence-of-events and min/max logging

### Setpoints for Control and Alarms

- Create custom set-points on any parameter or condition
- 1 second operation
- Control demand with peak shaving and advanced notification of approaching peaks

9300 Meter Catalog Number Configuration		Meter Catalog Number													
		9	3	0	D	C	-	1	0	0	-	N	Z	Z	Z
<b>Description</b>															
<b>Meter base unit and display options</b>															
• Meter with integrated display	D														
• Meter with remote display (includes 6' cable and surface mount transducer)	R														
• Meter without display (Surface mount transducer version)	T														
• Meter with integrated display installed in S1 retro-fit switchboard kit (meter in cage with cover, no casing)	S														
• Meter with integrated display installed in FT21 retro-fit switchboard kit (meter in cage with cover, no casing)	F														
<b>Communications</b>															
• RS485 with Modbus RTU (for use with integrated display only - when selecting "D","S" or "F" base unit above)	C														
• RS485 with Modbus RTU (for use with transducer version only - when selecting "T" or "R" base unit above)	M														
• Profibus (for use with integrated display model only - selection "D" above)	P														
<b>Power Supply</b>															
• 85-240 VAC/VDC							1								
• 20-60 VDC							2								
<b>Input Voltage</b>															
• 50-347 VAC								0							
<b>Input Frequency</b>															
• 50 - 60 Hz									0						
<b>Network Card or Analog I/O (Analog options not available with Profibus or Remote and Transducer base unit options)</b>															
• None												Z			
• Ethernet Communication (10BaseT) RJ-45 Port												N			
• 4 Analog Inputs 0 to 1 mA												B			
• 4 Analog Inputs 0 to 20 mA												C			
• 4 Analog Outputs 0 to 1 mA												D			
• 4 Analog Outputs 0 to 20 mA												E			
• 4 Analog Inputs 0 to 1 mA & 4 Analog Outputs 0 to 1 mA												F			
• 4 Analog Inputs 0 to 20 mA & 4 Analog Outputs 0 to 20 mA												G			
<b>Wire Terminal Type for Input Voltage &amp; Current Connections</b>															
• Ring/Split/Bare wire type													Z		
• Barrier/Captured wire type													P		
<b>Meter Mounting Options</b>															
• Standard panel mounting														Z	
• DIN Rail Kit (available for Remote "R" or Transducer "T" type base units only)														D	
<b>Tropicalization Protection</b>															
• None														Z	
• Yes														T	
<b>Specials</b>															
• None															A

8

POWER MONITORING

# Power Monitoring

## 9330/9350 Power Quality Meter with Web Server Technology

Selection

9330/9350 Meter Catalog Number Configuration		Meter Catalog Number																		
		9330	D	C	1	0	0	0	Z	Z	Z	A								
<b>Description</b>																				
<b>Meter base unit and display options</b>																				
• Meter with integrated display			D																	
• Meter with remote display (includes 6' cable and surface mount transducer)			R																	
• Meter without display (Surface mount transducer version)			T																	
• Meter with integrated display installed in S1 retro-fit switchboard kit (meter in cage with cover, no casing)			S																	
• Meter with integrated display installed in FT21 retro-fit switchboard kit (meter in cage with cover, no casing)			F																	
<b>Communications</b>																				
• RS485 with Modbus RTU (for use with integrated display only - when selecting "D," "S" or "F" base unit above)				C																
• RS485 with Modbus RTU (for use with transducer version only - when selecting "T" or "R" base unit above)				M																
<b>Power Supply</b>																				
• 85-240 VAC/VDC					1															
• 20-60 VDC					2															
<b>Input Voltage</b>																				
• 50-347 VAC						0														
<b>Input Frequency</b>																				
• 50 - 60 Hz							0													
<b>Modem</b>																				
• None																0				
• Modem w/ RJ-11 (See Note 1 below)																1				
• Modem w/ plug connector (See Note 1 below)																2				
<b>Network Card or Analog I/O</b> (Analog options not available with Remote or Transducer base unit options)																				
• None																			Z	
• Ethernet Communication (10BaseT) RJ-45 Port																			N	
• 4 Analog Inputs 0 to 1 mA																			B	
• 4 Analog Inputs 0 to 20 mA																			C	
• 4 Analog Outputs 0 to 1 mA																			D	
• 4 Analog Outputs 0 to 20 mA																			E	
• 4 Analog Inputs 0 to 1 mA & 4 Analog Outputs 0 to 1 mA																			F	
• 4 Analog Inputs 0 to 20 mA & 4 Analog Outputs 0 to 20 mA																			G	
<b>Wire Terminal Type for input voltage &amp; current connections</b>																				
• Ring/Split/Bare wire type																			Z	
• Barrier/Captured wire type																			P	
<b>Meter Mounting Options</b>																				
• Standard panel mounting																			Z	
• DIN Rail Kit (available for Remote "R" or Transducer "T" type base units only)																			D	
<b>Tropicalization Protection</b>																				
• None																			Z	
• Yes																			T	
<b>Specials</b>																				
• None																				A

Note 1 — The listed modems are suitable for USA applications. Contact Sales for special versions.

# Totally Integrated Power

## 9510/9610 Power Quality Meter with Web Server Technology

## Selection



### 9510/9610 Power Meter Power Quality Meter with Web Server Technology

- Use the 9510 Power Quality Meter at service entrance points, on critical loads, and at locations requiring power quality analysis
- Use the 9610 Power Quality Meter to meet all the requirements above and where high-speed transient capture, additional memory for data logging and/or compliance monitoring is required
- Both meters have the option of adding a network card, which provides an Ethernet port and access to onboard web pages for easy viewing of real-time data from your desktop browser. Also includes e-mail for alarms as well as for sending scheduled data such as monthly kWh

#### Mounting Options:

- Integrated Display for panel mounting
- Transducer (TRANS) with no display where local display is not required

#### Measurements

- Hundreds of high accuracy power measurements
- Harmonics to the 127th for 9510, to the 511th for the 9610
- Predicted kW demand for demand control applications

#### Standard Digital Inputs and Outputs

- 8 digital inputs for status/counter functions. Log gas, water, steam, air inputs, breaker status, etc.
- 4 digital outputs for control/pulse
- 3 relay outputs for control

#### Additional I/O

- 4 - 4-20mA Inputs and Outputs
- 4 - 0-1mA Inputs and Outputs
- 8 Digital Inputs

#### Waveform Capture

- Capture from 7 to 96 cycles on all channels at 16 to 1024 samples per channel per cycle per event. Multiple events can be linked to form a continuous waveform strip chart
- 1 cycle Sag/swell detection to trigger waveforms on out-of-tolerance conditions

#### Transient Capture

- The 9610 can detect and record sub-cycle transients as short as 17 microseconds

#### Communications

- 9510** two RS-485 ports standard, Ethernet and Modem optional
- 9610** two RS-485 ports standard, Ethernet and Modem optional
- Meter Mail allows e-mail of alarms or data logs by schedule or event driven

#### Supported Protocols

- 9510** SEABus/ION, Modbus RTU & TCP, DNP3.0, XML

- 9610** SEABus/ION, Modbus RTU & TCP, DNP3.0, XML
- EtherGate™ allows direct Ethernet-to-RS-485 data transfer to 31 other devices
- ModemGate™ allows direct modem-to-RS-485 data transfer to 31 other devices
- Infrared data port standard

#### Modbus Master

- Bring other devices' information into the meter using the Modbus Master capability. Store data onboard in the meter, display locally, create set-points for the logged values and perform logic functions. Web server posts slave device data to web pages

9510/9610 Meter Catalog Number Configuration		Meter Catalog Number															
		9	5	1	0	D	C	-	1	1	5	6	-	A	Z	Z	A
		9	6	1	0									B			D
<b>Description</b>																	
<b>Meter base unit and display options</b>																	
• Meter with integrated display, and 5 MB logging memory	D																
• Meter with integrated display, and 10 MB logging memory	E																
• Meter without display, with 5 MB logging memory (Transducer version)	T																
• Meter without display, with 10 MB logging memory (Transducer version)	U																
<b>Sampling Rate</b>																	
• 512 sampling	C																
• 1024 Sampling	H																
<b>Power Supply</b>																	
• 85-240 Vac/Vdc									1								
• 20-60 Vdc									2								
<b>Input Voltage</b>																	
• 57 to 347 L-N / 100 to 600 L-L Vac									1								
<b>Input Current</b>																	
• 1A Nominal (10 Amp full scale)										1							
• 5A Nominal (20 Amp full scale)										5							
<b>System Frequency</b>																	
• 50 Hz											5						
• 60 Hz											6						
<b>Communication Cards</b>																	
RS232/RS485 (Selectable)	RS485	Infrared (Note 1)	Modem (Notes 1 & 2)	Ethernet 10Base-T with RJ45	Ethernet 10Base-FL												
X	X	X															A
X	X	X		X													B
X	X	X	X														C
X	X	X	X	X													D
X	X	X		X	X												E
X	X	X	X	X	X												F
<b>Auxiliary I/O Cards</b>																	
• Option #1 - None (base meter includes 8 digital in & 7 digital out)																	Z
• Option #2 - 8 Binary Inputs; 4 Analog Inputs 0 to 1 mA																	B
• Option #3 - 8 Binary Inputs; 4 Analog Inputs 0 to 20 mA																	C
• Option #4 - 8 Binary Inputs; 4 Analog Outputs -1 to 1 mA																	D
• Option #5 - 8 Binary Inputs; 4 Analog Outputs 0 to 20 mA																	E
• Option #6 - 8 Binary Inputs; 4 Analog Inputs 0 to 20 mA & 4 Analog Outputs 0 to 20 mA																	F
• Option #7 - 8 Binary Inputs; 4 Analog Inputs 0 to 1 mA & 4 Analog Outputs -1 to 1 mA																	G
<b>Tropicalization Protection</b>																	
• None																	Z
• Yes																	T
<b>Specials</b>																	
• Standard (password protected, no locking or sealing)																	A
• Password protected and hardware lockable (lock enabled/disabled via jumper on comm card)																	B
• EN50160 compliance monitoring																	C
• EN50160 compliance monitoring with password protection and hardware lockable																	D

**Note 1** – The infrared and modem connections cannot be operated simultaneously. The connection type is configurable.  
**Note 2** – The listed modems are suitable for European applications. Contact Sales for special versions.

# Totally Integrated Power

## Critical Process Monitoring with the 9510/9610

Selection

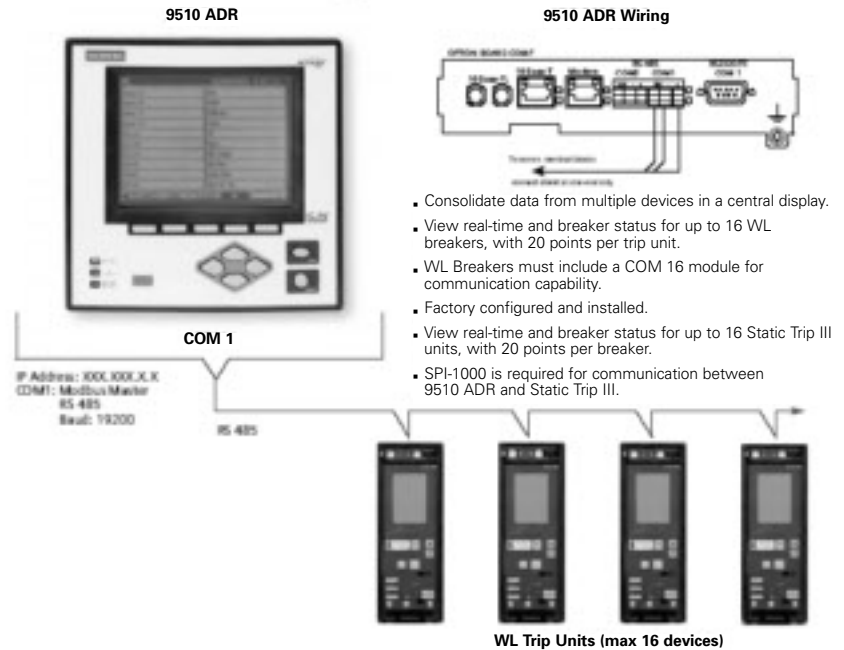
### Siemens Advanced Data Recorder (ADR)

For use as a low-cost data concentrator or local display, the 9510 ADR is a multi-function device which supports multiple protocols, digital and I/O options, and customizable displays. Each unit must be custom configured for your application. Standard units are shipped with displays only for the digital I/O status. To use the unit as a Local Display, custom programming is required.

#### Features:

- Monitor breaker status changes with 1ms resolution
- Collect, log and scale pulse inputs from water, air, gas, electricity or steam meters
- Act as an Ethernet Gateway for serial devices
- Display Modbus slave information locally and via HTML web pages
- Log data and e-mail alarms from Downstream Modbus devices
- Display trip unit data from WL, Static Trip III and SB-EC devices
- Trigger alarms based on setpoint conditions

#### Local Display for WL Power Breaker

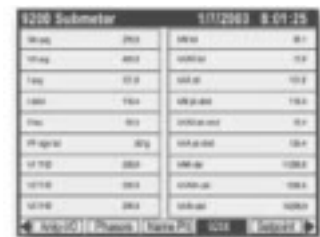


#### Water, Air, Gas and Steam Monitoring

The Advanced data recorder comes with Digital inputs which can be configured for pulse counting applications where full utility monitoring is required.

Now gas, water, air and steam pulses can be collected in one unit, logged and displayed. Up to 16 digital inputs can be added.

#### Local Display



9510 ADR Catalog Number Configuration		Meter Catalog Number															
		9	5	1	0	D	C	-	2	R	T	U	-	B	Z	Z	A
<b>Description</b>																	
<b>Monitor Base Unit Type</b>																	
• Monitor with integrated display, and 5 MB logging memory	D																
• Monitor with integrated display, and 10 MB logging memory	E																
• Monitor without display, with 5 MB logging memory (Transducer version)	T																
• Monitor without display, with 10 MB logging memory (Transducer version)	U																
<b>Communication</b>																	
• Modbus	C																
<b>Power Supply</b>																	
• 85-240 Vac/Vdc	1																
• 20-60 Vdc	2																
<b>Device</b>																	
• Remote Transducer Unit	R T U																
<b>Communication Cards</b>																	
5 (Selectable)	RS485	Infrared (Note 1)	Modem (Notes 1 & 2)	10Base-T with RJ45	10Base-FL												
X	X	X															A
X	X	X		X													B
X	X	X	X														C
X	X	X	X	X													D
X	X	X		X	X												E
X	X	X	X	X	X												F
<b>Auxiliary I/O Cards</b>																	
• None (base meter includes 8 digital in & 7 digital out)																	Z
• 8 Binary Inputs; 4 Analog Inputs 0 to 1 mA																	B
• 8 Binary Inputs; 4 Analog Inputs 0 to 20 mA																	C
• 8 Binary Inputs; 4 Analog Outputs -1 to 1 mA																	D
• 8 Binary Inputs; 4 Analog Outputs 0 to 20 mA																	E
• 8 Binary Inputs; 4 Analog Inputs 0 to 20 mA & 4 Analog Outputs 0 to 20 mA																	F
• 8 Binary Inputs; 4 Analog Inputs 0 to 1 mA & 4 Analog Outputs -1 to 1 mA																	G
<b>Tropicalization Protection</b>																	
• None																	Z
• Yes																	T
<b>Specials</b>																	
• Standard (password protected, no locking or sealing)																	A

\* Factory Programming Available (contact sales or refer to Engineering Service price list).



# Totally Integrated Power

## WinPM.Net Software

WinPM.Net™ web-enabled software is a complete energy information management solution for your business. It offers control capabilities, comprehensive power quality and reliability analysis and can help you reduce energy related costs. WinPM.Net allows you to manage our intelligent metering, monitoring and control devices, analyze data, and decide on new courses of action.

Its cutting-edge flexibility and compatibility means you can add one piece at a time, at your own pace, while still maintaining your original investments. Interface to your existing systems through industry-standard protocols and choose newer components as they become available. WinPM.Net is a powerful software suite that can process, analyze, store, and share data across your entire enterprise. You can access information from any desktop workstation, locally or around the world, in the format you need. The software collects data through serial, wireless, modem, or Ethernet links, so you can manage a single site or a global network of devices.

### Device Compatibility

**WinPM.Net supports all current ACCESS field devices, including the following:**

- 9700 Power Meter
- 9610 Power Meter
- 9510 Power Meter
- 9350 Power Meter
- 9330 Power Meter
- 9300 Power Meter
- 9200 Power Meter
- 4720 Power Meter
- 4700 Power Meter
- 4300 Power Meter
- ISGS intelligent Switchgear System
- SB Energy Communicating Breaker Unit (SBEC)
- WL/VL Low Voltage Power Circuit Breakers
- Static trip III Trip Unit
- S7 I/O
- Siemens Advanced Motor Master System (SAMMS)
- ISGS MV Relays
- Most third party Modbus Devices

### Features Summary:

- Unlimited no-cost view only clients using standard web browser
- Data Acquisition
- Monitoring

- Analysis
- Control
- Equipment Monitoring and Control
- Preventative Maintenance

### Customized System Diagrams:

- Powerful Aggregation and control Tools
- All configuration tools are included as standard; no separate development/runtime licenses

### WinPM.Net: for Analysis and Control:

- Display and Configuration
- Power Quality
- Cost Allocation
- Automated Control
- Logging Data from Devices
- Load Aggregation
- Modbus Master

### WinPM.Net Networks:

- Serial Sites
- Ethernet Sites
- Modem Sites
- Gateway Sites
- Web Deployment
- Time Synchronization
- Third Party Integration

### Custom Graphical Interface:

- Reporting & Visualization
- Device Configuration
- Firmware Upgrade Utility
- Configuration Tools

### WinPM.Net Monitoring Your Power System:

- Take Advantage of Default Views
- Power Quality Displays
- Customize Your Backgrounds
- Display Data the Way You Want
- Receive Alarms at Your Desktop or on Your Mobile Device (Pager, Cell phone, PDA, etc.)
- Access WinPM.Net Remotely from any Networked PC Using Web Browser (Internet Explorer).
- Perform Manual Control Operations
- Create Your Own Database Queries
- Check Status Indicators
- Generate Trend Graphs
- Tunnel into Details with "Hot Spots"
- Share data with other ODBC programs

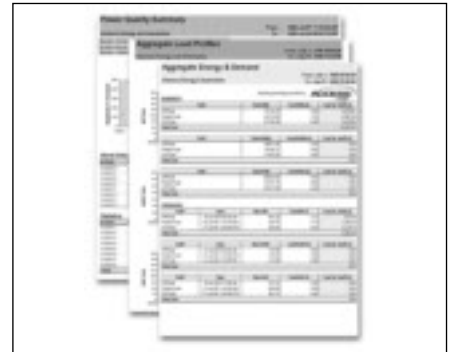
## General

### Applications:

- Power Quality and Reliability Analysis
- Cost Allocation and Billing
- Load Studies and Circuit Optimization
- Demand and Power Factor Control
- Equipment Monitoring and Control
- Preventative Maintenance

### WinPM.Net Data Analysis:

- Standard Reports
- Aggregate Energy and Demand Reports
- Aggregate Load Profile Reports
- Power Quality Reports
- EN50160 Reports
- Custom Reports



### Ordering Information:

WinPM.Net is packaged based on the number of devices (power monitors, circuit breakers, protective relays, etc.) that will be monitored.

Consult factory for pricing and configuration recommendations. Start-up services are required for all software sales.

### Email:

**Access.Support@sea.siemens.com**

**Toll-free: 1-800-427-2256**

# Totally Integrated Power

## Current & Voltage Transformers (Metering Grade)

Selection



### Low Voltage Current Transformers (Metering Grade)

Primary	Description	Secondary	Accuracy	Catalog Number
<b>Split Core - Rectangular Metering Grade, 600V, 0.5% Accuracy</b>				
100A	1.25" x 1.51" Window	5A Output		PDS-CTSC-011
200A	1.25" x 1.51" Window	5A Output		PDS-CTSC-021
300A	1.25" x 1.51" Window	5A Output		PDS-CTSC-031
400A	2.45" x 2.89" Window	5A Output		PDS-CTSC-042
600A	2.45" x 2.89" Window	5A Output		PDS-CTSC-062
800A	2.45" x 2.89" Window	5A Output		PDS-CTSC-082
1000A	2.45" x 5.50" Window	5A Output		PDS-CTSC-013
1200A	2.45" x 5.50" Window	5A Output		PDS-CTSC-123
1600A	2.45" x 5.50" Window	5A Output		PDS-CTSC-163
2000A	2.75" x 6.625" Window	5A Output		PDS-CTSC-02R
3000A	2.75" x 6.625" Window	5A Output		PDS-CTSC-03R
<b>Split Core - Round Metering Grade, 600V</b>				
200A	4.0" Window	5A Output	4% Accuracy	PDS-CTHC-024
300A	4.0" Window	5A Output	4% Accuracy	PDS-CTHC-034
400A	4.0" Window	5A Output	3% Accuracy	PDS-CTHC-044
600A	4.0" Window	5A Output	2% Accuracy	PDS-CTHC-064
800A	4.0" Window	5A Output	2% Accuracy	PDS-CTHC-084
1200A	4.0" Window	5A Output	2% Accuracy	PDS-CTHC-124
3000A	6.0" Window	5A Output	2% Accuracy	PDS-CTHC-306
2000A	6.0" Window	5A Output	2% Accuracy	PDS-CTHC-206
4000A	6.0" Window	5A Output	2% Accuracy	PDS-CTHC-406
<b>Solid Core - Round Metering Grade, 600V, 0.3 % Accuracy</b>				
200A	1.25" Window	5A Output		PDS-CTRC-021
300A	1.25" Window	5A Output		PDS-CTRC-031
400A	1.25" Window	5A Output		PDS-CTRC-041
500A	1.25" Window	5A Output		PDS-CTRC-051
600A	1.25" Window	5A Output		PDS-CTRC-061
800A	1.25" Window	5A Output		PDS-CTRC-081
1000A	1.25" Window	5A Output		PDS-CTRC-101
100A	2.25" Window	5A Output		PDS-CTRC-012
200A	2.25" Window	5A Output		PDS-CTRC-022
300A	2.25" Window	5A Output		PDS-CTRC-032
400A	2.25" Window	5A Output		PDS-CTRC-042
800A	4.0" Window	5A Output		PDS-CTRC-084
1000A	4.0" Window	5A Output		PDS-CTRC-104
1200A	4.0" Window	5A Output		PDS-CTRC-124
1600A	4.0" Window	5A Output		PDS-CTRC-164
2000A	4.0" Window	5A Output		PDS-CTRC-204
3200A	6.5" Window	5A Output		PDS-CTRC-326
4000A	6.5" Window	5A Output		PDS-CTRC-426
<b>Solid Core - Round Metering Grade, 600V, 0.3 % Accuracy</b>				
100A	1.75" x 2.47", 1" Window	5A Output		SMU-CT-011
200A	1.75" x 2.47", 1" Window	5A Output		SMU-CT-021
250A	1.75" x 2.47", 1" Window	5A Output		SMU-CT-025
300A	1.75" x 2.47", 1" Window	5A Output		SMU-CT-031
400A	1.1" x 3.56", 1.56" Window	5A Output		SMU-CT-041
600A	1.1" x 3.56", 1.56" Window	5A Output		SMU-CT-061
800A	1.1" x 3.56", 1.56" Window	5A Output		SMU-CT-081
1000A	1.1" x 3.56", 1.56" Window	5A Output		SMU-CT-123
2000A	1.15" x 5.73", 3.25" Window	5A Output		SMU-CT-02R
2500A	1.15" x 5.73", 3.25" Window	5A Output		SMU-CT-25R
3000A	1.15" x 5.73", 3.25" Window	5A Output		SMU-CT-30R
4000A	1.15" x 5.73", 3.25" Window	5A Output		SMU-CT-40R

### Voltage Transformers - Metering Grade, 600V and 5KV, +/- 1% Accuracy at all burdens up to 5VA at 1.0 and .95 pf

Catalog Number	Description	Primary	Secondary
467-480	Potential Transformer (4:1)	480 V	120 V
467-288	Potential Transformer, 277:120V L-N 2.4:1	277 V	120 V
PTW3-2-60-242	Potential Transformer, 2 BUSHINGS, NO FUSES	2400 V	120 V
PTW5-2-110-722	Potential Transformer, 2 BUSHINGS, NO FUSES	7200 V	120 V

# Totally Integrated Power

## Application Engineering Services & Training

*General*



Training Center in Norcross, Georgia

### **Siemens' Power Distribution Solutions group can provide engineered solutions, not just great products.**

Here is a brief summary of what we do:

- Power Quality & Reliability Analysis
  - Utilities Cost Allocation and Billing
  - Load Studies & Circuit Optimization
  - Demand & Power Factor Control
  - Equipment Monitoring & Control
  - Preventative Maintenance & Reporting
  - Design, Start-up & Commissioning
  - Factory certify power monitoring system operation
  - System drawings and device documentation
- Optimally configure each power monitoring device (set-up, data logging, communications, event-capture, customized web-server pages, etc.)
  - Workstation software setup and configuration
  - Other customized work per customer requirements (custom screen configuration, networks, alarming, etc.)
  - Technical support
  - Overview and thorough "hands-on" operator training on their own systems
  - Additional, higher-level training can be tailored to suit individual customer needs at Siemens' training facility in Norcross, GA or on-site

Siemens PDS Application Engineers are power monitoring experts experienced in all industrial and commercial power applications. Our engineers are the best qualified to ensure that power monitoring systems are properly installed and commissioned.

For your specific needs, please consult factory.

Additionally, integration into Eaton/Cutler-Hammer, Square D PowerLogic, General Electric, Rockwell, PML and many other systems can be accomplished in a number of ways. Please give us a call to discuss our specific requirements.

# Notes

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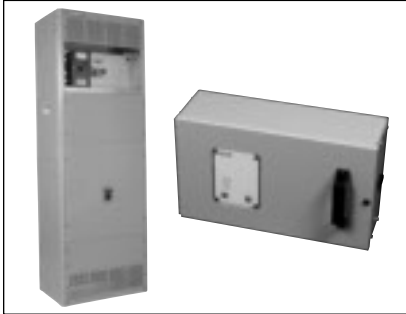
# TVSS - Transient Voltage Surge Suppressors

## TPS - Transient Protection System

*General*

Siemens offers surge suppression products to provide for multi-stage protection. Why have multi-stage protection? High voltage surges enter your systems as the result of utility switching, lightning strikes and low voltage transients caused by internal equipment such as motors and compressors. All of these surges can destroy sensitive electronic equipment.

The Siemens TPS system has products to fit at every level of the electrical distribution system.



### INTEGRAL

#### Factory Installed Option

- Pre-wired and Protection Ready
- Priced & Configured with Specified Gear
- Field Replaceable Design
- UL Listed

**Contact Factory for More Information and Current Specifications.**

#### Lighting Panel Mounted Units - P1, P2 & P3

##### TPS 1

Standard Features:

- Retrofit capabilities
  - Direct Bus Connection
  - 120kA, 160kA & 240kA
  - LED Indication, Audible Alarm & Dry Contacts
  - All Modes of Protection
- Surge Counter & Remote Monitor Options.

##### TPS 1 (SAD & SAD/MOV Hybrid)

Standard Features:

- Retrofit capabilities
  - Direct Bus Connection
  - 20kA, 90kA, 130kA & 170kA
  - LED Indication, Audible Alarm & Dry Contacts
  - All Modes of Protection
- Surge Counter & Remote Monitor Options.

##### TPS 11

Standard Features:

- Breaker Fed (30-50 amp)
- 120kA & 160kA (voltage sensitive)

- LED Indication, Audible Alarm & Dry Contacts
  - All Modes of Protection
- Surge Counter & Remote Monitor Options.

##### TPS 9

Standard Features:

- Breaker Fed (20 amp)
- 80kA & 100kA
- LED Indication

#### Distribution Panel and Distribution Section Switchboard Mounted Unites P4 and P5 and front connected distribution section switchboard applications

##### TPS 5

Standard Features:

- Close Connection to Panel Bus
  - 160kA & 240kA
  - LED Indication, Audible Alarm & Dry Contacts
  - Integral Disconnect Switch
  - All Modes of Protection
- Surge Counter & Remote Monitor Options.

#### Service Section and Switchgear Mounted Units - S1, S2, S3 or RCIII Switchboards

##### TPS 6

Standard Features:

- Mounted in Customer Instrument Compartment
  - 240kA, 320kA & 400kA
  - LED Indication, Audible Alarm & Dry Contacts
  - Integral Disconnect Switch
  - All Modes of Protection
- Surge Counter & Remote Monitor Options.

#### Motor Control Mounted Units - 6 inch and 18 inch MCC Bucket Applications

##### TPS MCC

Standard Features:

- 6" Compact Design Installed in a Section
- 160kA & 240kA
- Racking Lever Disconnect
- Audible Alarm
- Modular

### EXTERNAL

#### For Remote Wall Mounting Applications

- Factory Quick Ship
- Fully Assembled
- EMI / RFI Filtering
- UL Listed

**Contact Factory for More Information and Current Specifications.**

##### TPS 9

Close Coupling to Distribution Equipment  
Standard Features:

- Breaker Fed (20 amp)
  - 80kA, 100kA, 120kA & 150kA (voltage sensitive)
  - LED Indication
  - NEMA 4X Enclosure
- Flush Mounting Option.

##### TPS 10

Close Coupling to Distribution Equipment  
Standard Features:

- Breaker Fed (30-50 amp)
- 50kA
- LED Indication
- NEMA 4X Enclosure
- All Modes of Protection

Audible Alarm, Dry Contacts, Remote Monitor & Flush Mounting Options.

##### TPS 11

Close Coupling to Distribution Equipment  
Standard Features:

- Breaker Fed (30-50 amp)
  - 80kA, 120kA & 160kA (voltage sensitive)
  - LED Indication
  - NEMA 4X Enclosure
  - All Modes of Protection
- Audible Alarm, Dry Contacts, Remote Monitor & Flush Mounting Options.

##### TPS 12

Close Coupling to Service Entrance and Distribution Equipment  
Standard Features:

- Breaker Fed (30-50 amp)
  - 80kA, 120kA & 160kA (voltage sensitive)
  - LED Indication
  - NEMA 4X Enclosure
  - All Modes of Protection
- Internal Disconnect Switch, Surge Counter, Dual Surge Counter, Remote Monitor, 3, 4, 4X & Flush Mounting Options.

##### TPS 16

Close Coupling to Distribution Equipment  
Standard Features:

- Breaker Fed (30-50 amp)
  - 120kA, 180kA & 240kA
  - 10 - Mode Protection Design
  - NEMA 4X Enclosure
- Dry Contacts, Surge Counter, Audible Alarm, & Remote Monitor Options.

# TVSS - Transient Voltage Surge Suppressors

## TPS 9 - Transient Protection System

*Selection*

### TPS 9

Transient Protection System for Sensitive Electronic loads. Externally mounted to Electrical Distribution Equipment.

### FEATURES

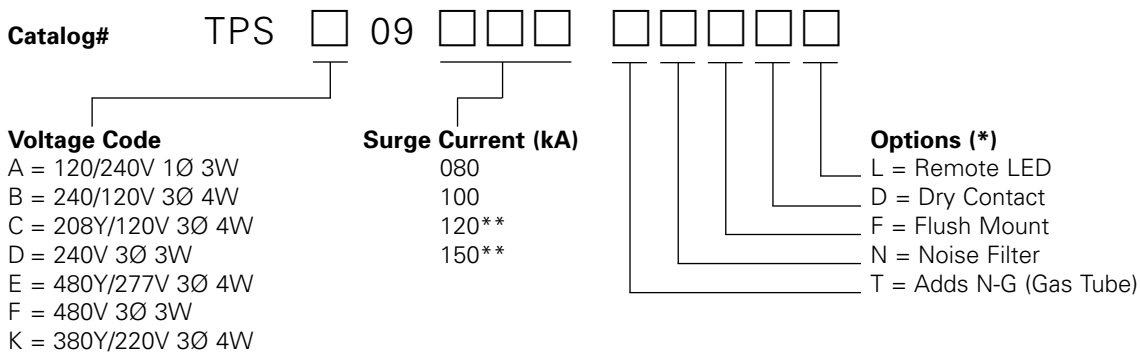
- UL 1449 Second Edition Revision effective Feb. 9, 2007 (aka UL 1449 Rev 2.5). Designed and tested in accordance with IEEE C62.41.1, C62.41.2, and C62.45
- UL 1449 Rev 2.5 listed for 200kA SCCR applications or below. In compliance with NEC Article 285.6
- Modes of protection: L-N, L-G, and L-L
- Multistage protection circuit
- Fast acting 20mm MOV's
- NEMA4X Standard Enclosure
- LED indicators for immediate status monitoring
- Dimensions: 8" x 3" x 3"
- Weight: 4 lbs.



### AVAILABLE OPTIONS

- Flush Mount

### ORDERING INFORMATION



\* When an option is not selected, include a zero (0) in the option field  
 \*\*Only for voltage codes A and C

# TVSS - Transient Voltage Surge Suppressors

## TPS - Transient Protection System

*Selection*

### TPS 10

Transient Protection System for Sensitive Electronic loads. Externally mounted to Electrical Distribution Equipment.

### FEATURES

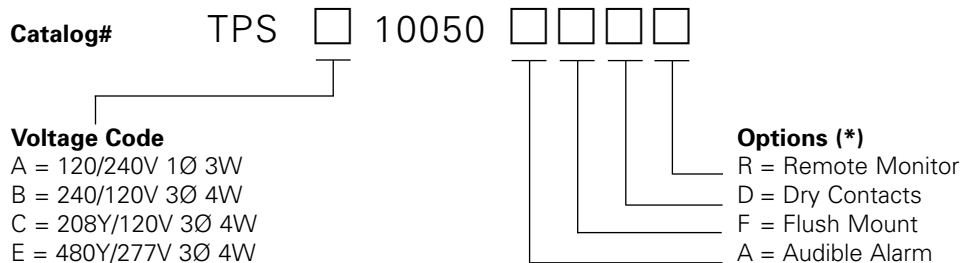
- UL 1449 Second Edition Revision effective Feb. 9, 2007 (aka UL 1449 Rev 2.5). Designed and tested in accordance with IEEE C62.41.1, C62.41.2, and C62.45
- Patented TranSafe™ Circuitry Design incorporating thermal cutouts and surge rated fuses
- UL 1449 Rev 2.5 listed for 200kA SCCR applications or below. In compliance with NEC Article 285.6
- All modes of protection: L-N, L-G, L-L, & N-G
- Multistage protection circuit
- Fast acting 20mm MOV's
- NEMA 4X Standard Enclosure
- LED indicators for immediate status monitoring
- Dimensions: 6" x 6" x 4"
- Weight: 8 lbs.



### AVAILABLE OPTIONS

- Audible Alarm
- Dry Contacts
- Flush Mount
- Remote Monitor

### ORDERING INFORMATION



\* When an option is not selected, include a zero (0) in the option field



# TVSS - Transient Voltage Surge Suppressors

## TPS - Transient Protection System

*Selection*

### TPS 11

Transient Protection System for Sensitive Electronic loads. Externally mounted to Electrical Distribution Equipment.

### FEATURES

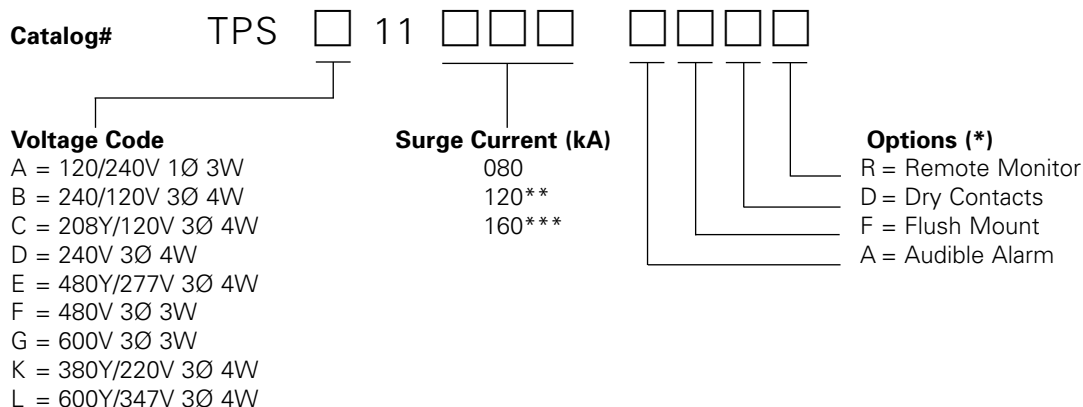
- UL 1449 Second Edition Revision effective Feb. 9, 2007 (aka UL 1449 Rev 2.5). Designed and tested in accordance with IEEE C62.41.1, C62.41.2, and C62.45
- Patented TranSafe™ Circuitry Design incorporating thermal cutouts and surge rated fuses
- UL 1449 Rev 2.5 listed for 200kA SCCR applications or below. In compliance with NEC Article 285.6
- All modes of protection: L-N, L-G, L-L, & N-G
- Multistage protection circuit
- Fast acting 20mm MOV's
- NEMA4X Standard Enclosure
- LED indicators for immediate status monitoring
- Dimensions: 6" x 6" x 4"
- Weight : 8 lbs.



### AVAILABLE OPTIONS

- Audible Alarm
- Dry Contacts
- Flush Mount
- Remote Monitor

### ORDERING INFORMATION



\*When an option is not selected, include a zero (0) in the option field  
 \*\* Only for voltage codes A, B, C, E, K and L  
 \*\*\* Only for voltage codes A, B, C, E and K

# TVSS - Transient Voltage Surge Suppressors

## TPS - Transient Protection System

*Selection*

### TPS 12

Transient Protection System for Sensitive Electronic loads. Externally mounted to Electrical Distribution Equipment.

### FEATURES

- UL 1449 Second Edition Revision effective Feb. 9, 2007 (aka UL 1449 Rev 2.5). Designed and tested in accordance with IEEE C62.41.1, C62.41.2, and C62.45
- Patented TranSafe™ Circuitry Design incorporating thermal cutouts and surge rated fuses
- UL 1449 Rev 2.5 listed for 200kA SCCR applications or below. In compliance with NEC Article 285.6
- All modes of protection: L-N, L-G, L-L, & N-G
- Multistage protection circuit
- Fast acting 40mm MOV's
- Standard monitoring: *LED Indicators, Audible Alarm, and Dry Contacts*
- NEMA 12 Standard Enclosure:
 

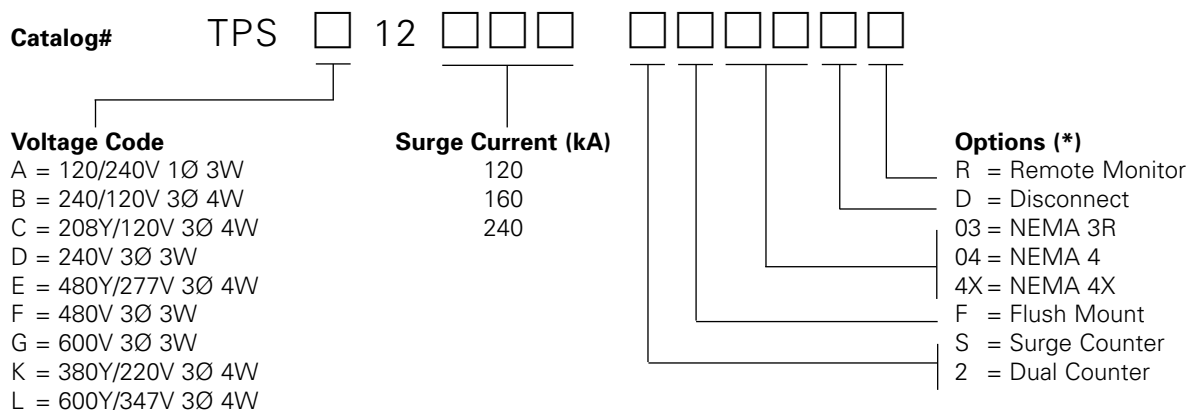
Standard	10" x 10" x 5"
W/Disconnect	12" x 12" x 5"
Flushmount	12" x 12" x 6"
Weight	21 lbs.



### AVAILABLE OPTIONS

- Surge Counter
- Remote Monitor
- Flush Mount
- Dual Surge Counter
- Internal Disconnect
- NEMA3R, 4, and 4X (may increase enclosure size)

### ORDERING INFORMATION



\*When an option is not selected, include a zero (0) in the option field

# TVSS - Transient Voltage Surge Suppressors

## TPS - Transient Protection System

**Selection**

### TPS 16

Discrete 10-Mode Transient Protection System for Sensitive Electronic loads. Externally mounted to Electrical Distribution Equipment.

### FEATURES

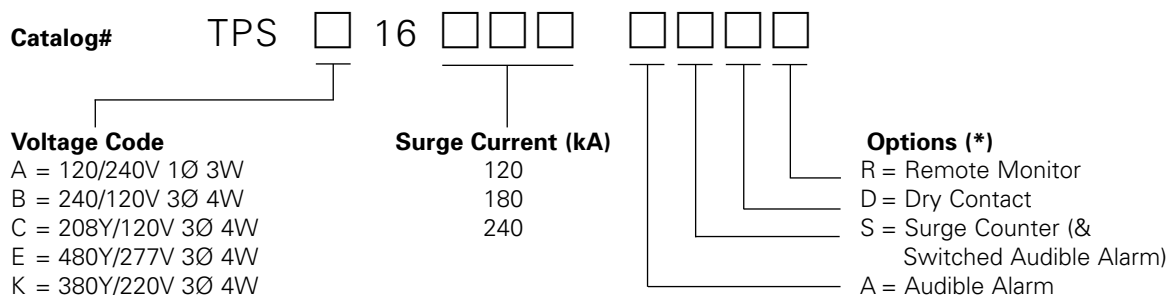
- UL 1449 Second Edition Revision effective Feb. 9, 2007 (aka UL 1449 Rev 2.5). Designed and tested in accordance with IEEE C62.41.1, C62.41.2, and C62.45
- Patented TranSafe™ Circuitry Design incorporating thermal cutouts and surge rated fuses
- UL 1449 Rev 2.5 listed for 200kA SCCR applications or below. In compliance with NEC Article 285.6
- All modes of protection: L-N, L-G, L-L, & N-G
- Multistage protection circuit
- Fast acting 20mm MOV's
- Standard monitoring: *LED Indicators for immediate status monitoring, Red Service LED*
- NEMA 4X Standard Enclosure:
 

Standard	10" x 8" x 6"
Weight	15 lbs.

### AVAILABLE OPTIONS

- Remote Monitor   ▪ Surge Counter
- Dry Contact       ▪ Audible Alarm

### ORDERING INFORMATION



\*When an option is not selected, include a zero (0) in the option field

# Notes

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# Panelboards

## Introduction

**General**

The new generation of products from an outstanding ancestry represents the high level of engineering innovation expected from Siemens. Additional strength has been added to an already rugged and durable panelboard family. This product has added flexibility and is easier to install. These newer designs also simplify wiring and reduce material requirements, saving additional installation time.

The newly defined "P Series" of panels offer a stepped approach to power distribution. Anchored at one end with the innovative P1 that offers the industries most flexible designs to virtually eliminate the impact of common mistakes like feed direction, main lug versus main breaker. Adding distribution is also easy with the ability to add feed-thru lugs. With a minimum number of enclosures (six sizes), the P1 fits the majority of the lighting panel needs in a cost-effective package.

The next step in the series and with subsequent steps, offers increased capacity and options. The P2 offers maximum flexibility and options to fit the most demanding specifications.

The P3 is another flexible and innovative panel. Sized more like a lighting panel for

those tight areas, the P3 panel packs the power of a distribution panel.

The P4 offers a mid-sized distribution panel and allows fusible as well as circuit breaker branch and main devices.

The P5 anchors the other end of the series. Larger fusible and circuit breaker branch and main devices give maximum power to the distribution system.

Siemens also offers a number of specialty panels like column panels. Don't see your requirement met? Ask a Siemens representative to tell you about our custom capabilities.

The lighting panel design still features the Fas-Latch trim that is popular with installers, the jacking screw system that permits adjustments even after wiring has been installed, and other features such as exclusive split neutral. Many panelboards have the capability of mixing and matching breakers of different sizes and ratings – or changing from main lug to main breaker, or adding subfeed breakers without changing box size. Other models accept a wide range of fuse types, including Siemens exclusive Vacu-Break® technology.

## Features Overview

Siemens offers a complete line of lighting, and power distribution panelboards. At the heart of the product line is the extensive research and technology found among Siemens circuit protection devices – both fusible switches and molded case circuit breakers.

Key Panelboard Features	P1	P2	P3	P4	P5
Lighting And Appliance Applications	•	•	•	•	•
Power Panelboard Applications	—	•	•	•	•
Convertible From Top Feed To Bottom Feed Or Vice Versa	•	—	—	—	—
Change From Main Lug To Main Breaker Or Add Subfeed Without Changing Enclosure Size	•	—	—	—	—
Space-Saving, Horizontally Mounted Main Breaker	Up To 250 Amps	Up To 250 Amps	Up To 250 Amps	•	•
Short-Circuit Rating Label Giving Performance Level	•	•	•	•	•
Standard Aluminum Ground Assembly	•	•	•	•	•
Blank End-Walls Standard ①	•	•	•	•	•
Bolted Current-Carrying Parts	•	•	•	•	•
Split Neutral	•	•	•	•	•
Connection Accessible From Front	•	•	•	•	•
Screw-Type Mechanical Lugs	•	•	•	•	•
Time-Reducing Wing Nuts To Secure Interior Without Tools	•	•	•	•	•
Main and Branch Devices Connected With Case-Hardened Hardware	•	•	•	•	•
Flush Lock, Concealed Door Hinges/Trim Screws	•	•	•	—	—
Symmetrical Interior Mounting Studs To Eliminate Upside-Down Mounting of Box	•	•	•	•	•
Interior Height Adjustment For Flush Applications	•	•	•	•	•
Mix and Match Fusible Switch Circuit Breaker Capability	—	—	—	•	•
Shallow Depth (Standard)	5.75"	5.75"	7.75"	10.00"	12.75"
Accepts A Wide Range Of Fuse Types	—	—	—	•	•
Accepts Vacu-Break Fusible Switch	—	—	—	•	•
Accepts A Wide Range Of Circuit Breakers	—	•	•	•	•
Accepts ACCESS™ Communications Tie-In ②	—	•	•	•	•
Optional Compression Lugs	•	•	•	•	•

• Standard

① KOs available on P1 and P2 — 5.75" deep X 20" wide boxes and P3 7.75" deep X 24" wide boxes.

② Panelboards equipped with Siemens Sensitrip® circuit breakers or Power Meters can be integrated into Siemens ACCESS™ electrical monitoring systems.

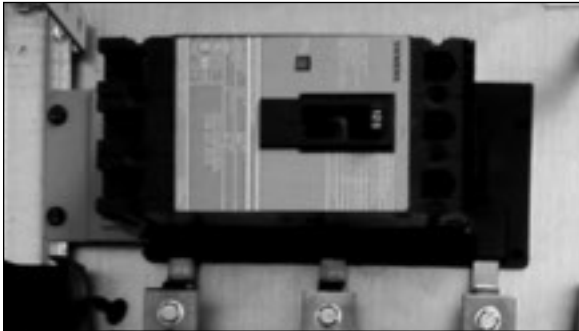
# Panelboards

## Features / Benefits

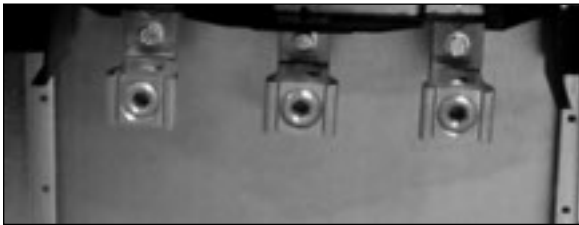
## Reference

The standard Siemens P1 panelboard has some unique features that make it easier to design for an engineer, easier to reconfigure in the field for a contractor, and easier to upgrade and maintain for the Owner. The P1 is the smallest panel in the Siemens lineup, with bus sizes up to 400A. What makes it different is its split neutral design and its open ended bus. In the Siemens panel, instead of the common single neutral bus on one end, we have a neutral bus on both sides that is cross-bussed. This makes branch wiring simpler and cleaner – the lead lengths for line and neutral can now be made the same, creating more room and a neater installation. It also allows access to both ends of the bus as a standard feature – this provides the flexibility to make changes in the field, even if it wasn't part of the original configuration.

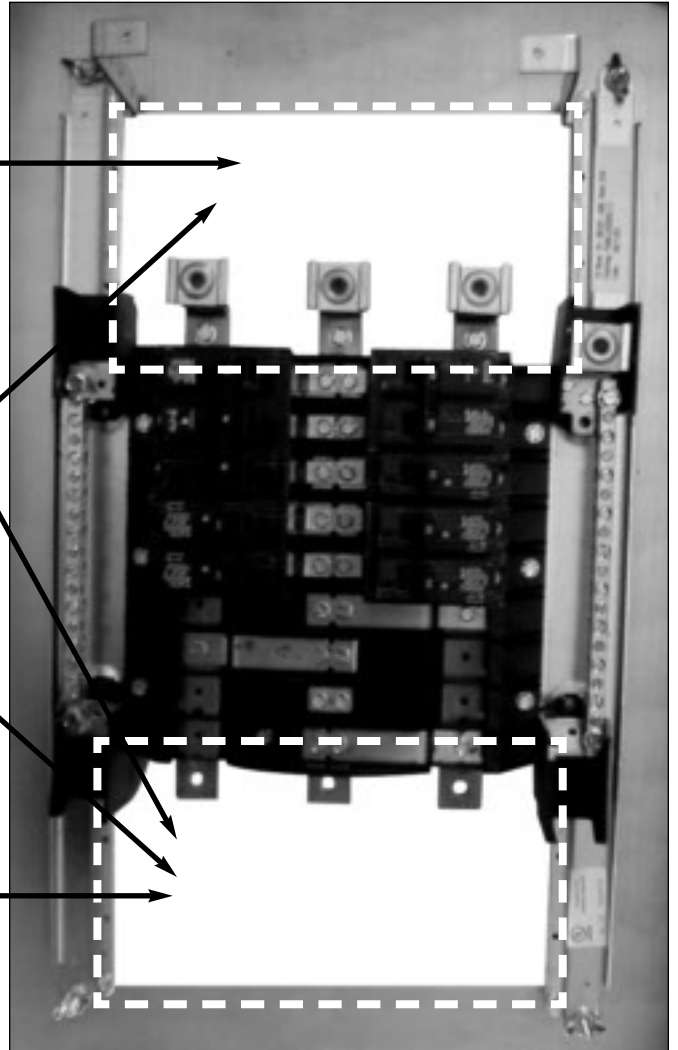
### MAIN BREAKER or SUB-FEED BREAKER



### MAIN LUGS or FEED-THROUGH LUGS



### INTEGRAL BUS MOUNTED TVSS



The following can be done to a standard P1 panelboard **in the field** with no modifications:

- Change from top fed to bottom fed
- Add feed-through lugs
- Add an Integral bus-mounted TVSS
- Add a sub feed breaker up to 250 amps
- Change from Main Lugs to Main Breaker
- Change from Main Breaker to Main Lugs
- Panel may have up to two ground assemblies. Options are standard aluminum, copper, insulated or isolated aluminum or copper. Mounting provisions in opposing corners of the box are standard. Any of these options may be added after installation.

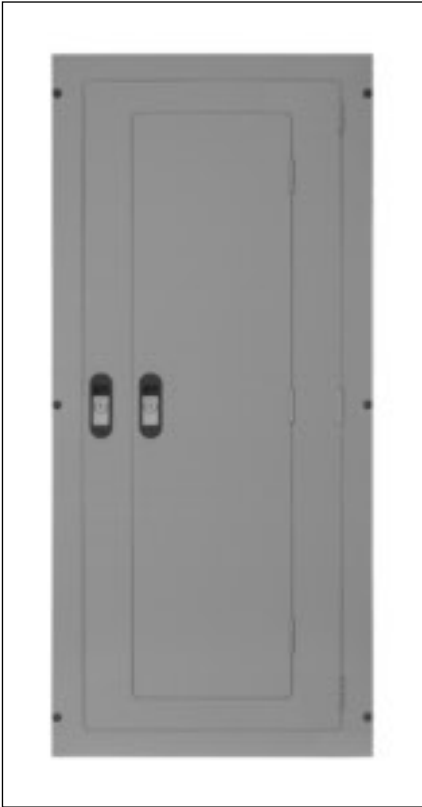
# Panelboards

## Trim

*Options*



Standard Trim (FAS-Latch)



Door in Door Front



Hinged Front



# Panelboards

## Special Enclosures

*Options*



NEMA 3R Enclosures



NEMA 4X Enclosures

## Panel Family Portrait



"P" Series Panelboard Family for Lighting and Appliance and Distribution Panel Applications

# Panelboards

## General Specifications

General

### Class CTL Panelboards

Class CTL panelboards incorporate physical features which, in conjunction with the physical size, configuration, or other means provided in Class CTL circuit breakers, are designed to prevent the installation of more over current protective poles than that number for which the device is designed and rated, per UL 67 and National Electrical Code (NEC) NFPA70.

### Service Entrance Equipment

When a panelboard is used as service entrance equipment, it must be located near the point of entrance of building supply conductors. In a main lugs only panel, the number of breakers or switches directly connected to the main bus must be limited to six. In a panel having a main breaker or main switch, the number of circuits are not limited except as may be provided under other panelboard requirements, i.e., lighting and appliance branch circuit panelboards. Also, panels must include a connector for bonding and grounding neutral conductor.

### Panelboard Code Data

42-Circuit Rule: NEC Paragraph 408.34 defines a lighting and appliance branch circuit panelboard as one having more than 10 percent of its over current devices rated 30 amperes or less, for which neutral connectors are provided. NEC paragraph 408.35 states that not more than 42 over current devices (other than those provided in the mains) of a lighting and appliance branch-circuit panelboard shall be installed in any one cabinet. For the purpose of this article, a two pole circuit breaker shall be considered two over current devices; a three pole circuit breaker shall be considered three over current devices. (NEC 408.34 and 408.35 do not apply to panelboards feeding and communication circuits. Panelboards for this application must be so marked.)

### Integrated Equipment Short Circuit Rating

The term "Integrated Equipment Short Circuit Rating" refers to the application of series connected circuit breakers in combination that allows some breakers to have lower individual interrupting ratings than the available fault current. This is permitted as long as the series combination has been tested and certified by UL.

### Standards

NEC: 2005  
NEMA: PB1  
UL: 67 and 50. Listed by Underwriter's Laboratories, Inc., under "Panelboards" File #E2269, and #E4016. Meets Federal Specification W-P-115c.

### Wire Connectors

Standard wire connectors in Siemens panels are suitable for copper or aluminum cables rated 60/75 degree. Copper main lugs are price added option for most panel types and some Circuit Breakers (check with Siemens sales for availability). It should be noted that most copper lugs will only accept copper cables. Some applications, 100% rated devices in particular, require that the cable and connectors be rated 90 degree but are sized to the 75 degree tables.

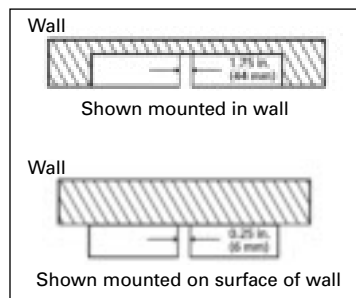
### Grounds

Standard ground connectors are also suitable for copper or aluminum wire. Ground connector assemblies (EGK, IGK) have (7) 1/0 max. and (15) #6 max. connections. The 1/0 holes are capable of connecting up (3) #10 max. wires. Copper ground assemblies (ECGK, ICGK) are rated for copper wire only and have the same wiring capacity as the Al/Cu connectors.

### Neutral Connectors

Standard neutrals, like standard main lugs, are also rated for copper or aluminum wire. The neutral cross bar material follows the selection bus. Copper neutral lugs are rated for copper cable only and available as a price added option.

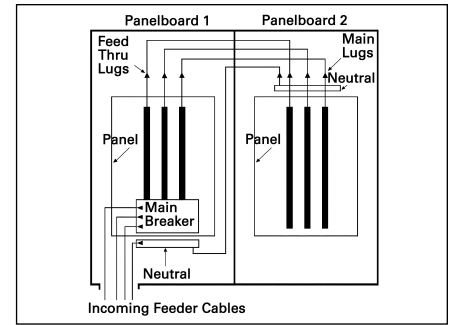
### Panel Mounting



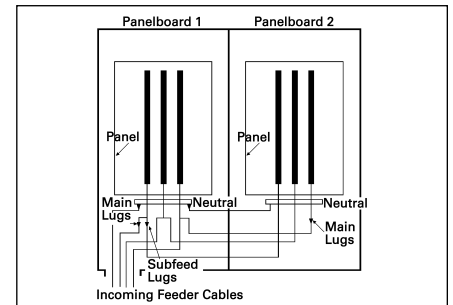
Space Required for Mounting of Double Panels

Use two or more panelboards with feed-thru or subfeed lugs when:

1. Lighting and appliance panelboards are required with more than 42 circuits.
2. More circuit mounting space is required than is provided in the largest box size.



Feed-Thru Lugs



Subfeed Lugs or Double Lugs

Feed-thru lugs are mounted at the opposite end of the main bus from the main lugs or main breaker and are used to connect two or more panelboards to the incoming feeder. The feeder cables are brought into Panelboard 1 and connected to the main lugs or main breaker. Cables interconnecting the two panelboards are connected to the feed-thru lugs in Panelboard 1 and are carried over the main lugs in Panelboard 2. This arrangement could be reversed with the main lugs located at the top and the feed-thru lugs at the bottom of the panel. Subfeed lugs are mounted directly beside the main incoming lugs and are used to connect two or more panelboards to the incoming feeder. The feeder cables are brought into Panelboard 1 and connected to the main lugs. Another set of cables that are the same size are connected to the subfeed lugs of Panelboard 1 and are carried over the main lugs of Panelboard 2.

# Panelboards

## General Specifications

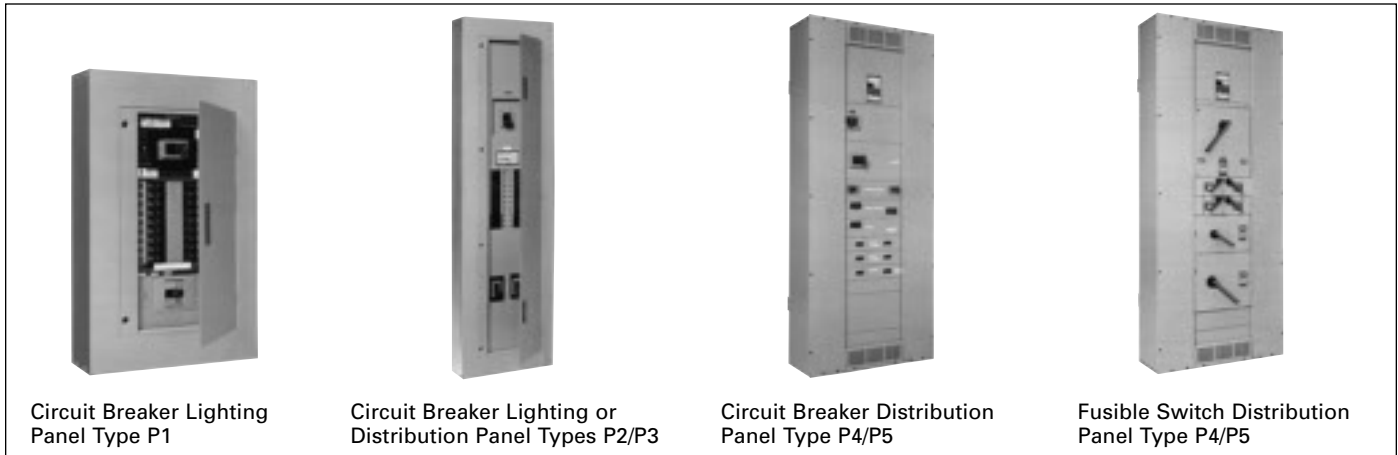
## General

### Bussing Sequence

Interiors are designed to accommodate top or bottom feed. Regardless of which is specified, the uppermost pole is always on "A" phase; the second pole down is always on "B" phase, and the third pole down is always on "C" phase (assuming 3Ø panel).

As standard, branch breakers shall be mounted at the top of the panel with "spaces" at the bottom, regardless of the direction panel is fed.

All breakers have bolted connections except plug-in type. The panel design provides bracing up to 200,000A IR UL short circuit rating. Case-hardened, high performance, thread rolling screws are used on branch bus.



### Panelboard Ratings

Description	P1	P2	P3	P4	P5
<b>Max. Voltage</b>	480Y/277V AC Max. 250V DC Max.	600V AC Max. 500V DC Max.	600V AC Max. 500V DC Max.	600V AC Max. 500V DC Max.	600V AC Max. 500V DC Max.
<b>System</b>	1-Phase, 2-Wire 1-Phase, 3-Wire 3-Phase, 3-Wire 3-Phase, 4-Wire	1-Phase, 2-Wire 1-Phase, 3-Wire 3-Phase, 3-Wire 3-Phase, 4-Wire	1-Phase, 2-Wire 1-Phase, 3-Wire 3-Phase, 4-Wire 3-Phase, 3-Wire	1-Phase, 3-Wire 3-Phase, 4-Wire 3-Phase, 3-Wire	1-Phase, 3-Wire 3-Phase, 4-Wire 3-Phase, 3-Wire
<b>Main Lugs Main Breaker Main Switch</b>	125A-400A 100A-400A —	125A-600A 100A-600A —	250A-800A 225A-600A —	400A-1200A 400A-800A 100A-200A	800A-1200A 800A-1200A 400A-1200A
<b>Circuits</b>	18, 30, 42	18, 30, 42, 54 <sup>①</sup>	—	—	—
<b>Branch Ratings</b>	15-125A <sup>②</sup>	15-225A	15-600A	15-600A C/B 30-200A Fusible	15-1200A C/B 30-1200 Fusible
<b>Branch Disconnect Devices</b>	BL, BLH, HBL, BQD, NGB <sup>③</sup> , BQD6, BLE, BLEH, BLF, BLHF, BAF, BAFH, BGL	BL, BLH, HBL, BQD, NGB, NEB, HEB, BQD6, QJ2, HQJ2, QJ2H, HQJ2H <sup>④</sup> , ED4, HED4, ED6, HHED6, BLE, BLEH, BLF, BLHF, BAF, BAFH, BGL	BL, BLH, HBL, BQD, NGB, NEB, HEB, BQD6, QJ2, HQJ2, QJ2H, HQJ2H <sup>④</sup> , ED4, HED4, ED6, HHED6, BLE, BLEH, BLF, BLHF, BAF, BAFH, BGL	All 15-600A Breakers and MG at 800 Amps, 30-200A Fusible Switches	All 15-1200A C/B 30A-200A VB Switches 400-1200A HCP Switches
<b>Subfeed Circuit Breakers</b>	NGB, ED4, ED6, HED4, HED6, QJ2, QJH2, QJ2-H, FXD6, FD6, HFD6, HFXD6 <sup>⑤</sup>	JD6, JXD6, HJD6, HJXD6, FD6, HFD6, FXD6, HFXD6 <sup>⑤⑥</sup>	JD6, JXD6, HJD6, FD6, HFD6, FXD6, HFXD6 <sup>⑤⑥</sup>	—	—
<b>Enclosure Heights Inches – (mm)</b>	32, 38, 44 @250A (813, 965, 1118) 56, 62, 68 @400A (1422, 1575, 1727)	26, 32, 38, 44, 50, 56, 62, 68, 74 (660-1880)	56, 62, 68, 74, 80 (1422-2032)	60, 75, 90 (1524, 1905, 2286)	60, 75, 90 (1524, 1905, 2286)
<b>Standard Trims</b>	Fas-Latch – 1 Piece Surface or Flush	Fas-Latch – 1 Piece Surface or Flush	Fas-Latch – 1 Piece Surface or Flush	Four Piece <sup>⑦</sup> Surface	Four Piece <sup>④</sup> Surface

① Functional pricing is based on circuits shown. However, the panel can be figured with less circuits.  
 ② P1 can have (1) subfeed breaker. P2 and P3 can have up to (2) FD subfeed breakers.  
 ③ JD and FD breakers are mounted vertical. Limitations apply.

④ Trim ring provided for flush applications.  
 ⑤ A maximum of (4) QJ breaker may be mounted in a P2 Panel and are single mounted.  
 ⑥ A maximum of (6) QJ breakers may be mounted in a P3 panel and are twin mounted.

⑦ P1 panels with NGB breakers are limited to NGB branch devices only. BL and BQD frames may not be mixed in this panel type.

# Panelboards

## General Specifications

General

### Typical Panelboard Modifications

Description	Lighting and Distribution Panelboards			Distribution Panelboards	
	P1	P2	P3	P4	P5
<b>Box</b> Type 3R/12 Type 4, 4X Drip Proof Drip Proof Hood Only Sealed Box Gasketed Trim Wider Box Deeper Box	• • • • • • • —	• • • • • • • •	• • • • • • • •	• • • • • • • •	• • • • • • • •
<b>Front</b> Hinged Front Door-in-Door Front Common Front Split Door Special Locks Nameplate	• • • • • • •	• • • • • • •	• • • • • • •	• • — — • • •	• • — — • • •
<b>Interior</b> Aluminum Equipment Ground Bar Copper Equipment Ground Bar Insulated Equipment Ground Subfeed Lugs Feed-Thru Lugs Split Bus Compression Lugs Copper Lugs 200% Neutral Temperature Rated - Aluminum <sup>①</sup> Temp. Rise Over Ambient - Copper 750 Ampere / in. - Aluminum <sup>①</sup> 1000 Ampere / in. - Copper  Copper Plating - Silver or Tin Remote Control Switches Time Clocks Circuit Breaker Shunt Trips R, J and T Fuse Clips	Standard • — • — • • • • • Standard • — — Tin External Mounted External Mounted • —	Standard • • • • • • • • • Standard • • • • Tin Std./ Silver Optional • • • —	Standard • • • • • • • • • Standard • • • • Tin Std./ Silver Optional • • • • —	Standard • • • • • • • • • Check Plant For Availability Standard • • • • Silver Std./ Tin Optional • • • • •	Standard • • • • • • • • • Check Plant For Availability Standard • • • • Silver Std./ Tin Optional • • • • •

① All aluminum bus is tin-plated. • Available as an option.

### UL Fuse Classes<sup>①</sup>

Class	Amperes	Volts	Interrupting Ratings (kA)	$I^2t, I_i$	Circuits
H	1-600	250 and 600V or less AC	10	—	Less than 10,000A Available
K5 <sup>②</sup>	1-600	250 and 600V or less AC	100	$I_t$ – RK5 up to 100A, $I_i$ – RK5 up to 100A	Feeder circuits
J	1-600	600V or less	200	$I_t$ – Low, $I_i$ – Low	Feeder circuits (motor load small %)
RK1	1/10-600	600V or less and 250V or less	200	$I_t$ – Slightly > J, $I_i$ – Slightly > J	Feeder circuits (motor load small %)
RK5	1/10-600	600V or less and 250V or less	200	$I_t$ – > RK-1, $I_i$ – > RK-1	Motor starting currents a factor
T	1-800, 1-1200	300 and 600V or less AC	To 200	$I_t$ – Low, $I_i$ – Low	Non-Motor loads
L	601-1200	600V or less	200	$I_t$ – Low, $I_i$ – Low	Mains, feeder circuits

① Per UL 67.

② Fuses do not prohibit the use of Class H type fuse in switch.

# Panelboards

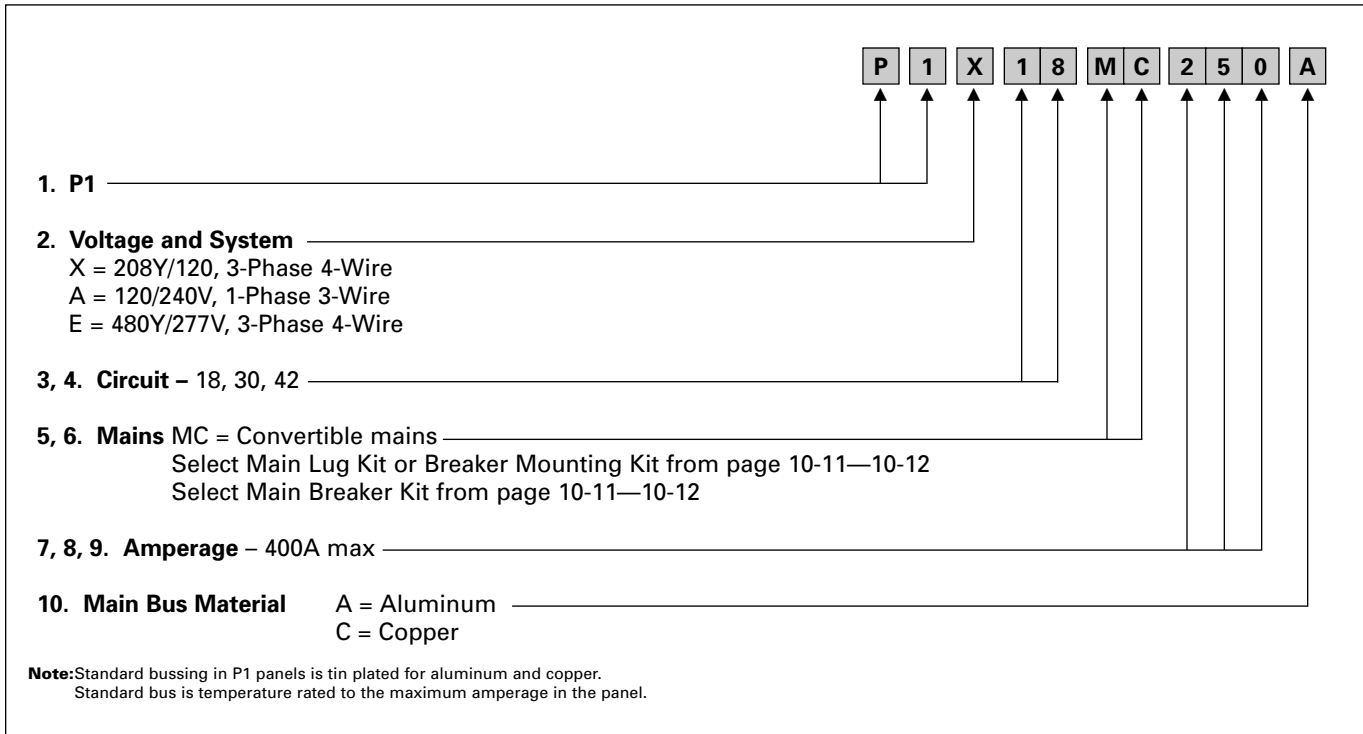
## Unassembled

Reference

### Catalog Numbering System

Type P1 unassembled panelboards are completely convertible from main lug to main breaker and vice-versa. Additionally feed-thru lugs, or a subfeed circuit breaker up to 400 amperes can be added without increasing the box height. Follow these easy steps to select and price the proper P1 panel from stock:

1. Compute total number of poles to determine interior catalog number.
2. List catalog number and price of interior, box and front.
3. Select main lug kit or main breaker kit from appropriate tables. **Note:** Main/Subfeed Breaker mounting kits may be ordered with or without breakers included, see page 10-11 and 10-12 for selection.
4. List required branch circuit breakers and filler plates to cover any unused positions.
5. Select any modifications or accessories.
6. Compute total list price.



### Branch Breakers

Panel Type	Voltage (Max.)	Breaker Type	Speedfax Page
P1	240	BI, BLH, HBL, BQD	See section 6
	480/277	BQD	
	600/347	BQD	

© Consult sales office for availability of CSA.

# Panelboards

## Distributor Stock

## Selection

### Pricing An Unassembled Panel

#### 400A Max. — 20" Wide x 5.75" Deep

1. Choose the appropriate Interior from the table below.
2. Choose and price the Main Device:  
Main Lugs from pages 10-11, Main Breaker Kit from page 10-13 and Main Breakers from Section 6.
3. Choose and price Branch Breakers.  
BL, BOD and NGB breakers from Section 6.
4. Choose and price Feed-Thru Lugs or Subfeed Breaker Feed-Thru Lugs from page 10-11, Subfeed Breaker Kit from page 10-11, and Subfeed Breaker from Section 6.



### Type P1 Unassembled Panelboards

#### Convertible Mains — 1-Phase, 3-Wire

120 / 240V

Interiors Only—Less Branch Breakers					Boxes				Fronts			
Total List Price \$	Amperes Rating Mains	Max. No of Poles	Interiors	List Price \$	Height (inches)	Type 1	List Price \$	Type 3R/12 <sup>Ⓞ</sup>	List Price \$	Surface	Flush	List Price \$
836.50	250	18	P1A18MC250A	630.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
975.50		30	P1A30MC250A	787.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1201.50		42	P1A42MC250A	1042.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1303.00	400	18	P1A18MC400A	979.00	56	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1443.00		30	P1A30MC400A	1138.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1669.00		42	P1A42MC400A	1393.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00
893.50	250	18	P1A18MC250C	694.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
1066.50		30	P1A30MC250C	889.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1310.50		42	P1A42MC250C	1165.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1389.00	400	18	P1A18MC400C	1077.00	56	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1562.00		30	P1A30MC400C	1272.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1806.00		42	P1A42MC400C	1548.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00

#### Convertible Mains — 3-Phase, 4-Wire

208Y / 120V

836.50	250	18	P1X18MC250A	630.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
1068.50		30	P1X30MC250A	891.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1301.50		42	P1X42MC250A	1154.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1373.00	400	18	P1X18MC400A	1059.00	56	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1604.00		30	P1X30MC400A	1320.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1838.00		42	P1X42MC400A	1584.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00
896.50	250	18	P1X18MC250C	697.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
1152.50		30	P1X30MC250C	987.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1402.50		42	P1X42MC250C	1269.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1489.00	400	18	P1X18MC400C	1190.00	56	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1743.00		30	P1X30MC400C	1477.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1994.00		42	P1X42MC400C	1760.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00

#### Convertible Mains — 3-Phase, 4-Wire

480Y / 277V

836.50	250	18	P1E18MC250A	630.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
1068.50		30	P1E30MC250A	891.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1301.50		42	P1E42MC250A	1154.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1373.00	400	18	P1E18MC400A	1059.00	46	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1743.00		30	P1E30MC400A	1320.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1838.00		42	P1E42MC400A	1584.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00
896.50	250	18	P1E18MC250C	697.00	32	B32	52.00	WP32	1690.00	S32B	F32B	262.00
1152.50		30	P1E30MC250C	987.00	38	B38	52.00	WP38	1690.00	S38B	F38B	262.00
1402.50		42	P1E42MC250C	1269.00	44	B44	52.00	WP44	1690.00	S44B	F44B	262.00
1489.00	400	18	P1E18MC400C	1190.00	56	B56	107.00	WP56	1841.00	S56B	F56B	384.00
1743.00		30	P1E30MC400C	1477.00	62	B62	107.00	WP62	1841.00	S62B	F62B	384.00
1994.00		42	P1E42MC400C	1760.00	68	B68	107.00	WP68	1841.00	S68B	F68B	384.00

Ⓞ Front included in NEMA 3R Box.

# Panelboards

## Distributor Stock

## Selection

### Type P1 Panelboards

#### Lug Kits — Main or Feed Thru

Ampere Rating	Material	Wire Range	Service	Catalog Number	List Price \$
250	Al	(1) #6 AWG-350 kcmil Cu or Al	1-Phase	<b>MLKA1</b>	<b>208.00</b>
		(1) #6 AWG-350 kcmil Cu or Al	3-Phase	<b>MLKA3</b>	<b>262.00</b>
	Cu	(1) #6 AWG-350 kcmil Cu or Al	1-Phase	<b>MLKC1</b>	<b>388.00</b>
		(1) #6 AWG-350 kcmil Cu or Al	3-Phase	<b>MLKC3</b>	<b>500.00</b>
400	Al	(2) 3/0 250 or (1) 600 kcmil	1-Phase 3-Phase	<b>4MLKA1</b> <b>4MLKA3</b>	<b>791.00</b> <b>879.00</b>
		(2) 3/0 250 or (1) 600 kcmil	1-Phase 3-Phase	<b>4MLKC1</b> <b>4MLKC3</b>	<b>1059.00</b> <b>1307.00</b>

#### Copper Neutral Lug Kits — 250A

Number of Circuits	Description	Catalog Number	List Price \$
18	2 Branch Neutral Strips, 1 Main Neutral Lug, Hardware	<b>CNLK18</b>	<b>208.00</b>
30	2 Branch Neutral Strips, 1 Main Neutral Lug, Hardware	<b>CNLK30</b>	<b>229.00</b>
42	2 Branch Neutral Strips, 1 Main Neutral Lug, Hardware	<b>CNLK42</b>	<b>251.00</b>

#### 200% Neutral Lug Kits/250A

18	2 Branch Neutral Strips, 2 Main Neutral Lug, Hardware	<b>2NLK18</b>	<b>310.00</b>
30	2 Branch Neutral Strips, 2 Main Neutral Lug, Hardware	<b>2NLK30</b>	<b>330.00</b>
42	2 Branch Neutral Strips, 2 Main Neutral Lug, Hardware	<b>2NLK42</b>	<b>351.00</b>

#### 200% Neutral Lug Kits/400A and 600A

18	2 Branch Neutral Strips, 4 Main Neutral Lug, Hardware	<b>42NLK18</b>	<b>487.00</b>
30		<b>42NLK30</b>	<b>487.00</b>
42		<b>42NLK42</b>	<b>487.00</b>

### Type P1, P2, and P3 Panelboards

#### Miscellaneous Parts and Accessories

Catalog Number	Description	List Price \$
<b>EGK</b>	Al Ground Bus 44 Connections	<b>18.00</b>
<b>BK1</b>	Bonding kit for 250A max. and all P1 panels	<b>20.00</b>
<b>BK2</b>	Bonding kit for S1/S2 400 & 600	<b>20.00</b>
<b>BK3</b>	Bonding kit	<b>20.00</b>
<b>IMK1</b>	Interior Adjusting Kit	<b>13.00</b>
<b>11-1824-01</b>	Directory Card Holder	<b>7.00</b>
<b>12-1110-01</b>	Directory Card	<b>3.00</b>
<b>11-1056-01</b>	NEMA Instruction Book	<b>3.00</b>
<b>NBK03</b>	Number Strips 1-42	<b>9.00</b>
<b>NBK04</b>	Number Strips 43-84	<b>9.00</b>
<b>NBK05</b>	Number Strips 85-126	<b>8.00</b>
<b>NBK06</b>	Number Strips 127-168	<b>8.00</b>
<b>ECGK</b>	Cu Ground Bus 44 Connections	<b>21.00</b>
<b>IGK</b>	Insulated Al Ground Bus	<b>57.00</b>
<b>ICGK</b>	Insulated Cu Ground Bus	<b>67.00</b>
<b>EWK1</b>	End Wall Kit with Knockouts (20" W x 5.75" DP)	<b>33.00</b>
<b>EWK2</b>	End Wall Kit with Knockouts (24" W x 7.75" DP)	<b>33.00</b>
<b>QF3</b>	Filler Plate	<b>2.80</b>
<b>EBF1</b>	NEB/HEB Filler Plate	<b>3.00</b>

### Type P1 Panelboards

#### Breaker Mounting Kits 250A Max. — Main or Subfeed w/o Breaker

Ampere Rating	Breaker Types	Service	Catalog Number	List Price \$
100A	BOD	3-Phase	<b>MBKBC3</b>	<b>586.00</b>
100A	BL, BLH, HBL	1-Phase	<b>MBKBL1</b>	<b>208.00</b>
		3-Phase	<b>MBKBL3</b>	<b>586.00</b>
125A	NGB	1-Phase	<b>MBKNB1</b>	<b>498.00</b>
		3-Phase	<b>MBKNB3</b>	<b>1063.00</b>
125A	ED4, ED6, HED4, HED6	1-Phase	<b>MBKED1</b>	<b>498.00</b>
		3-Phase	<b>MBKED3</b>	<b>1063.00</b>
225A	QJ2, QJH2, QJ2-H	1-Phase	<b>MBKQJ1</b>	<b>498.00</b>
		3-Phase	<b>MBKQJ3</b>	<b>1063.00</b>
250A	FXD6, FD6, HFD6	1-Phase	<b>MBKFD1</b>	<b>797.00</b>
		3-Phase	<b>MBKFD3</b>	<b>939.00</b>
400A <sup>Ⓢ</sup>	JXD2, JD6, JXD6, HJD6, HJXD6	1-Phase	<b>MBKJD1</b>	<b>2381.00</b>
		3-Phase	<b>MBKJD3</b>	<b>2755.00</b>

Ⓢ 400 amp kit is for main—only not allowed for subfeed breaker.



**MBKQJ3**



**MBKFD3**

# Panelboards

## Panelboard Replacement, Modification, and Additions

*Selection*

S1/S2 Panels—All the P1 panel kits for 250 amp and below panels will work for 250 amp maximum S1/S2 panels.

### 400/600 Amp S1/S2 and All SE Panels

#### Lug Kits — Main or Feed Thru

Ampere Rating	Material	Wire Range	Service	Catalog Number	List Price \$
125A/250A	Al/Cu	(2) 1/0–250 kcmil	1-Phase	<b>MLKA1</b>	<b>208.00</b>
125A/250A	Al/Cu	(2) 1/0–250 kcmil	3-Phase	<b>MLKA3</b>	<b>262.00</b>
400A/600A	Al/Cu	(2) #4–250 kcmil or (1) 3/0–500 kcmil	1-Phase	<b>SMLKA1</b>	<b>791.00</b>
400A/600A	Al/Cu	(2) #4–250 kcmil or (1) 3/0–500 kcmil	3-Phase	<b>SMLKA3</b>	<b>879.00</b>

#### Breaker Mounting Kits

Ampere Rating	Breaker Types	Service	Catalog Number	List Price \$
125A	ED2, ED4, ED6, HED4, HED6, HHED6	1-Phase	<b>SMBKED1</b>	<b>670.00</b>
225A	ED2, ED4, ED6, HED4, HED6, HHED6	3-Phase	<b>SMBKED3</b>	<b>1273.00</b>
225A	QJ2, HQJ2, HQJ2H <sup>Ⓞ</sup>	1-Phase	<b>SMBKQJ1</b>	<b>1786.00</b>
225A	QJ2, HQJ2, HQJ2H <sup>Ⓞ</sup>	3-Phase	<b>SMBKQJ3</b>	<b>2007.00</b>
250A	FXD6, FD6, HFXD6, HFD6	1-Phase	<b>SMBKFD1</b>	<b>955.00</b>
250A	FXD6, FD6, HFXD6, HFD6	3-Phase	<b>SMBKFD3</b>	<b>1128.00</b>
400A	JD6, JXD6, HJD6, HJXD6	1-Phase	<b>SMBKJD1</b>	<b>2381.00</b>
400A	JD6, JXD6, HJD6, HJXD6	3-Phase	<b>SMBKJD3</b>	<b>2755.00</b>
600A	LD6, LXD6, HLD6, HLXD6	1-Phase	<b>SMBKLD1</b>	<b>2533.00</b>
600A	LD6, LXD6, HLD6, HLXD6	3-Phase	<b>SMBKLD3</b>	<b>2854.00</b>

#### Neutral Kits

Ampere Rating	Description	Catalog Number	List Price \$
250A max.	30/42 circuit 200% neutral kit	<b>2NLK2</b>	<b>464.00</b>
400/600A max.	42 circuit 200% neutral kit	<b>2NLK1</b>	<b>487.00</b>

Other applications:

For P4/S4 and 10" deep SPP panels see page 10-50 for branch breaker mounting kits.

For P5/S5 and 12.75" deep SPP panels see page 10-61 for branch breaker mounting kits.

For P4/F1 and 10" deep FPP panels see page 10-50 for branch fusible switch mounting kits.

For P5/F2 and 12.75" deep FPP panels see page 10-61 for branch fusible switch mounting kits.

For Series 5, Series 6, CDP6 and VB 6 panels as well as FC20, FCI, FCII, SB1, SB2 and SB3

distribution switchboards, see page 12-32 for branch device mounting kits.

<sup>Ⓞ</sup> QJ mounting kit is for subfeed breakers only, not main breaker.  
The kit contains mountings for (2) breakers.



# Sentron® Panelboards

## Warehouse Stock/Unassembled

## Selection

### Main Breaker Mounting Kits w/Breakers for P1 panels

Catalog Number	Description	Ratings		List Price \$
		240V	480V	
MBKED3100	Kit w/3-pole ED4 100A breaker	65KA	18KA	1869.00
MBKED3125	Kit w/3-pole ED4 125A breaker	65KA	18KA	3197.00
MBKQJ1125	Kit w/2-pole QJ2 125A breaker	10KA	—	1929.00
MBKQJ1150	Kit w/2-pole QJ2 150A breaker	10KA	—	1929.00
MBKQJ1175	Kit w/2-pole QJ2 175A breaker	10KA	—	1929.00
MBKQJ1200	Kit w/2-pole QJ2 200A breaker	10KA	—	1929.00
MBKQJ1225	Kit w/2-pole QJ2 225A breaker	10KA	—	1929.00
MBKQJ3125	Kit w/3-pole QJ2 125A breaker	10KA	—	2757.00
MBKQJ3150	Kit w/3-pole QJ2 150A breaker	10KA	—	2757.00
MBKQJ3175	Kit w/3-pole QJ2 175A breaker	10KA	—	2757.00
MBKQJ3200	Kit w/3-pole QJ2 200A breaker	10KA	—	2757.00
MBKQJ3225	Kit w/3-pole QJ2 225A breaker	10KA	—	2757.00
MBKQJ1125H	Kit w/2-pole QJ2H 125A breaker	42KA	—	2115.00
MBKQJ1150H	Kit w/2-pole QJ2H 150A breaker	42KA	—	2115.00
MBKQJ1175H	Kit w/2-pole QJ2H 175A breaker	42KA	—	2115.00
MBKQJ1200H	Kit w/2-pole QJ2H 200A breaker	42KA	—	2115.00
MBKQJ1225H	Kit w/2-pole QJ2H 225A breaker	42KA	—	2115.00
MBKQJ3125H	Kit w/3-pole QJ2H 125A breaker	42KA	—	3144.00
MBKQJ3150H	Kit w/3-pole QJ2H 150A breaker	42KA	—	3144.00
MBKQJ3175H	Kit w/3-pole QJ2H 175A breaker	42KA	—	3144.00
MBKQJ3200H	Kit w/3-pole QJ2H 200A breaker	42KA	—	3144.00
MBKQJ3225H	Kit w/3-pole QJ2H 225A breaker	42KA	—	3144.00
MBKFD3150	Kit w/3-pole FXD6 150A breaker	65KA	35KA	3301.00
MBKFD3175	Kit w/3-pole FXD6 175A breaker	65KA	35KA	3301.00
MBKFD3200	Kit w/3-pole FXD6 200A breaker	65KA	35KA	3301.00
MBKFD3225	Kit w/3-pole FXD6 225A breaker	65KA	35KA	3301.00
MBKFD3250	Kit w/3-pole FXD6 250A breaker	65KA	35KA	4612.00
MBKJD1300	Kit w/2-pole JXD6 300A breaker	65KA	—	4534.00
MBKJD3300	Kit w/3-pole JXD6 300A breaker	65KA	35KA	5974.00
MBKJD1400 <sup>①</sup>	Kit w/2-pole JXD6 400A breaker	65KA	35KA	4534.00
MBKJD3400 <sup>①</sup>	Kit w/3-pole JXD6 400A breaker	65KA	35KA	5974.00

① 400 Amp Kit used as Main only. And for top feed applications only.

### Branch Breakers Selection for P1

#### Selection Guide

1. Select breaker type.
2. Select required amperage.
3. Select number of poles.
4. Select branch breaker catalog numbers.
5. Select ground bar and filler plates. (See replacement parts & accessories on Page 10-11.)

### AFCI Arc Fault Circuit Interrupter

Breaker Type	Ampere Rating	Catalog Number	Interrupting Ratings (kA) RMS Symmetrical Amperes		
			Volts AC		
			120	120/240	240
BAF 1-Pole	15	B115AF	10	—	—
	20	B120AF	10	—	—
BAFH 1-Pole	15	B115AFH	22	—	—
	20	B120AFH	22	—	—

### Switching Neutrals<sup>①</sup>

Breaker Type	Ampere Rating	Catalog Number	Interrupting Ratings (kA) RMS Symmetrical Amperes		
			Volts AC		
			120	120/240	240
BG 2-Wire Common Trip	15	BG215■	10	—	—
	20	BG220■	10	—	—
	30	BG230■	10	—	—
BG 3-Wire Common Trip	15	BG315■	—	10	—
	20	BG320■	—	10	—
	30	BG330■	—	10	—

# Sentron® Panelboards

## Warehouse Stock/Unassembled

Selection

### Branch Breakers Selection for P1

#### Selection Guide

1. Select breaker type.
2. Select required amperage.
3. Select number of poles.
4. Select branch breaker catalog numbers.
5. Select ground bar and filler plates. (See replacement parts & accessories on Page 10-11.)

#### BL Branch Breakers – 10,000A IR

Amp Rating	1-Pole 120/240V	2-Pole 120/240V	2-Pole 240V	3-Pole 240V
15	B115	B215	B215R	B315
20	B120	B220	B220R	B320
25	B125	B225	B225R	B325
30	B130	B230	B230R	B330
35	B135	B235	B235R	B335
40	B140	B240	B240R	B340
45	B145	B245	B245R	B345
50	B150	B250	B250R	B350
55	B155	—	—	—
60	B160	B260	B260R	B360
70	B170	B270	B270R	B370
80	—	B280	B280R	B380
90	—	B290	B290R	B390
100	—	B2100	B2100R	B3100
110	—	B2110	—	—
125	—	B2125	—	—

#### BLH Branch Breakers – 22,000A IR

Amp Rating	1-Pole 120/240V	2-Pole 120/240V	3-Pole 240V
15	B115H	B215H	B315H
20	B120H	B220H	B320H
25	B125H	B225H	B325H
30	B130H	B230H	B330H
40	B140H	B240H	B340H
50	B150H	B250H	B350H
55	B155H	—	—
60	B160H	B260H	B360H
70	B170H	B270H	B370H
80	—	B280H	B380H
90	—	B290H	B390H
100	—	B2100H	B3100H

#### HBL Branch Breakers – 65,000A IR

Amp Rating	1-Pole 120/240V	2-Pole 120/240V	3-Pole 240V
15	B115HH	B215HH	B315HH
20	B120HH	B220HH	B320HH
30	B130HH	B230HH	B330HH
40	B140HH	B240HH	B340HH
50	B150HH	B250HH	B350HH
60	—	B260HH	B360HH
70	—	B270HH	B370HH
80	—	B280HH	B380HH
90	—	B290HH	B390HH
100	—	B2100HH	B3100HH

#### BQD Branch Breakers – 14,000A IR Max. @ 480/277 Vac / 65,000A IR max. @ 240 Vac

Amp Rating	1-Pole 277V	2-Pole 480Y/277V	3-Pole 480Y/277V
15	BQD115	BQD215	BQD315
20	BQD120	BQD220	BQD320
25	BQD125	BQD225	BQD325
30	BQD130	BQD230	BQD330
35	BQD135	BQD235	BQD335
40	BQD140	BQD240	BQD340
45	BQD145	BQD245	BQD345
50	BQD150	BQD250	BQD350
60	BQD160	BQD260	BQD360
70	BQD170	BQD270	BQD370
80	BQD180	BQD280	BQD380
90	BQD190	BQD290	BQD390
100	BQD1100	BQD2100	BQD3100

#### GFCI Personnel Protection (5MA)

Breaker Type	Ampere Rating	Catalog Number	Interrupting Ratings (kA) RMS Symmetrical Amperes		
			Volts AC		
			120	120/240	240
BLF 1-Pole	15	BF115	10	—	—
	20	BF120	10	—	—
	25	BF125■	10	—	—
	30	BF130	10	—	—
BLF 2-Pole	15	BF215	—	10	—
	20	BF220	—	10	—
	30	BF230	—	10	—
	40	BF240■	—	10	—
	50	BF250■	—	10	—
	60	BF260■	—	10	—
BLHF 1-Pole	15	BF115H	22	—	—
	20	BF120H	22	—	—
	30	BF130H■	22	—	—
BLHF 2-Pole	15	BF215H■	—	22	—
	20	BF220H■	—	22	—
	30	BF230H■	—	22	—
	40	BF240H■	—	22	—
	50	BF250H■	—	22	—
	60	BF260H■	—	22	—

■ Built to order. Allow 2-3 weeks for delivery.  
 ◎ HACR rated.

# Panelboards

## Factory Assembled

## Selection

### Catalog Numbering System

P 1 C 4 2 F X 2 5 0 A T S

#### Type of Panel

P1, P2, P3, P4, P5

#### Voltage and System

C = 208Y/120 3Ø 4 W Wye AC - All	R = 415/240 3Ø 4 W Wye AC - All
E = 480Y/277 3Ø 4 W Wye AC - All	S = 440/250 3Ø 4 W Wye AC - All
D = 240 3Ø 3 W Delta AC - All	L = 600/347 3Ø 4 W Wye AC - All
F = 480 3Ø 3 W Delta AC - All	T = 230 3Ø 3 W Delta AC - All
G = 600 3Ø 3 W Delta AC - P2, P3, P4, P5	Z = 380 3Ø 3 W Delta AC - P2, P3, P4, P5
I = 347 3Ø 3 W Delta AC P2, P3, P4, P5	1 = 24V DC 1-Pole Branches Only (3) - All
B = 240/120 3Ø 4 W Delta BØ High Leg AC - All	2 = 24V DC 2-Pole Branches Only (3) - All
Q = 240/120 3Ø 4 W Delta CØ High Leg AC - All	3 = 48V DC 1-Pole Branches Only (3) - All
X = 120/240 2Ø 5 W Single Neutral AC - P2, P3, P4, P5	4 = 48V DC 2-Pole Branches Only (3) - All
A = 120/240 1Ø 3 W Grounded Neutral AC (2) - All	5 = 125V DC 1-Pole Branches Only (3) - All
H = 120 1Ø 2 W Grounded Neutral AC (2) - All	N = 125V DC 2-Pole Branches Only - All
J = 240 1Ø 2 W No Neutral AC (3) - All	O = 125/250V DC 2-Pole Branches Only - All
Y = 125 1Ø 2 W Grounded Neutral AC (2) - P2, P3, P4, P5	P = 125/250V DC 2 & 3-Pole Branches - All
Z = 500 2W DC - P2, P3, P4, P5	U = 120V AC 3Ø3W - All
K = 220/127 3Ø 4 W Wye AC - All	V = 240V 3Ø3W Grounded B Phase - All
M = 380/220 3Ø 4 W Wye AC - All	

#### Circuits

P1 – 18, 30, 42  
P2 – 18, 30, 42, 54<sup>Ⓞ</sup>

#### or Enclosure Height

P3 – 56, 62, 68, 74, 80  
P4, P5 – 60, 75, 90

#### Main Lug (ML), Main Breaker

(See Main Breaker Table coding below), Main Switch (MS)

#### Amperage

100–400A = P1      250–800A = P3  
100–600A = P2      400–1200A = P4, P5

#### Bus Material

Temp rated Al.  
750A/sq. in. Al.  
Temp rated Cu.  
Temp rated Cu.  
Temp rated Cu.  
1000A/sq. in. Cu.  
1000A/sq. in. Cu.

#### Bus Plating

Tin-Plated  
Tin-Plated  
Tin-Plated  
Silver-Plated  
Tin-Plated  
Tin-Plated  
Silver-Plated

#### Letter

A  
B  
C  
E  
F  
G  
H

Bus Code	P1 <sup>①</sup>	P2	P3	P4	P5
A	•	•	•	•	•
B	n/a	•	•	•	•
C	•	•	•	n/a	n/a
F	n/a	•	•	•	•
E	n/a	optional	optional	•	•
G	n/a	•	•	optional	optional
H	n/a	optional	optional	•	•

• Indicates default for this bus type.

#### Feed Location

T = Top  
B = Bottom

#### Mounting

S = Surface

F = Flush. Flush trims extend 1 1/2" beyond the base box dimensions on P1, P2 and P3 and 2" on P4 and P5 panels.

### Main Breaker Coding

#### (Breaker Type) Code

(BAF) BA, (BAFH) BF, (BQD) BQ, (NGB) NB, (BQD6) B6, (BL) BL, (BLEH) BE, (BLH) BH, (BLR) BR, (HBL) HB, (BGL-SWI) B1, (BLE-GFCI) BG, (BLF-GFCI) BC, (CED6) CE, (ED4) E4, (ED6) E6, (HED4) H4, (HHED6) HA, (BLHF-GFCI) B4, (BL-HID) B2, (HQP) HQ, (QP) QP, (QPH) PQ, (QJ2) QJ, (QJ2H) Q2, (QJH2) QH, (CFD6) CF, (FD6) FD, (FXD6) FX, (HFD6) HF, (HFXD6) H2, (HHFD6) H1, (HHFXD6) H3, (CJD6) CJ, (HHJD6) 6H, (HHJXD6) H9, (HJD6) H6, (HJXD6) H5, (HJXD6H) H7, (HQJ2H) Q3, (JD6) J6, (JXD2) JD, (JXD2H) J2, (JXD6) JX, (JXD6H) JH, (CLD6) CL (HHL6) HH, (HHLXD6) XH, (HLD6) HL, (HLXD6) HO, (HLXD6H) HP, (LD6) L6, (LXD6) LX, (LXD6H) HL, (HLMD6) HJ, (HLMXD6) HK, (LMD6) L1, (LMXD6) LM, (NMX) M1, (HMX) M2, (LMX) M3, (NNX) N1, (HNX) N2, (LNx) N3, (NNY) N4, (HNY) N5, (LNY) N6, (CMD6H) CH, (HMD6) HM, (HMxD6) HR, (HMxD6H) HS, (MD6) MD, (MXD6) MX, (MXD6H) MH, (CND6) CN, (CND6H) C6, (HND6) HN, (HNxD6) HT, (HNxD6H) HX, (ND6) ND, (NXD6) NX, (NXD6H) NT

Ⓞ Panel must not be a lighting and appliance panel. See NEC article 384.

Ⓞ Standard bussing in P1, P2 and P3 panels is tin-plated for aluminum and copper. Standard bus is temperature rated to the maximum amperage in the panel.

# Panelboards

## Circuit Breaker / Lighting and Distribution

Pricing

### Types P1

- To specify a particular panelboard; list panel catalog number, branches, modifications, and price on an Estimate Sheet. Price includes interior with provisions, box, ground bar, and trim. See Example No. 1.
- When more than 42 circuits are specified for P1 a two section panel will be required. Feed-thru lugs must be priced in one section from the modifications on pages 10-20.

Example No. 2 is a two section panel, each having 42 circuits. Section One will contain 1-225/3 QJ2 main breaker (top feed), 250A feed-thru lugs and 21" of unit space. Section Two will contain 250A main lugs only (bottom feed) and 21" of unit space. Sections will be 44" in height.

- Standard main breakers are indicated by the 6th and 7th positions in the catalog number. If any other main breaker type is required, replace with the appropriate code from page 10-18. See Example No. 3.
- All panel modifications must be listed and priced separately.
- If the boxes are to be sized the same then each panel must have the same amount of unit space.

Panel LPA		
1 — P1C30QJ225ATS		2540.
10-20/1	25. ea.	250.
4-30/3	140. ea.	560.
		<u>3350.</u>

Example No. 1

Panel LPB		
1 — P1C42QJ225ATS		2760.
1 — P1C42ML250ATS		1330.
1 — Feed-Thru Lugs		190.
		<u>4280.</u>

Example No. 2

Panel LPC		
1 — P1C42HF250CTS		3160.
HFD6 Main		1900.
42-20/1 BLH	35. ea.	1470.
Cu Bus		255.
Type 3R		860.
		<u>7645.</u>

Example No. 3

### Type P2

Type P2 panelboards are priced the same as Type P1 described above except for two section panels.

- When more than 42 circuits are specified for P2, a two section panel will be assumed. Main breaker codes in the 5th and 6th positions will dictate the use of feed-thru lugs. An "ML" in the fifth and sixth positions will dictate the use of subfeed lugs for 125A and 250A and feed-thru lugs for 400A and 600A.

Boxes will be sized the same for two section panels.

Base price includes all provisions. Subfeed or feed-thru lugs as required must be priced from page 10-28.

Example No. 4 is a two section panel, each having 42 circuits. Section One will contain 1-400/3 JXD6 main breaker (top feed), 225A feed-thru lugs, and 21" of unit space. Section Two will contain 400A main

lugs only (bottom feed) and 21" of unit space. Sections will be 53" in height.

### Types P3, P4 and P5

- To specify a particular panelboard, first determine voltage, system, amperage and type of main, amperage and type of branch devices, and modifications if any. (Step 1)

- List branch devices and modifications requiring space additions. List unit space requirements of each.

Note: Some units are twin mounted meaning two breakers occupy the same unit space.

Select appropriate enclosure height from selection chart on pages 10-34, 10-44, or 10-56, based on unit space requirements. (Step 2)

- Select panelboard catalog number from appropriate table based upon voltage, system, amperage and unit space requirements. (Step 3)

#### Step #1

Amperage	400
Voltage	208Y/120
System	3-phase 4-wire
Main	Main Breaker
Branches	5-125/3, 2-225/3, 1-250/3
Modification	None
Feed	Top
Mounting	Surface

#### Step #2 Unit Space Calculation

5-125/3 QJ2	5" = 15"
5-225/3 QJ2	5" = 5"
1-250/3 FXD6	5" = 5"
	25"
Enclosure is B275 from Selection Chart on page 10-41. (32" wide, 75" high, 10" deep).	

#### Step #3

1—P4C75JX400ATS		\$ 4210.
5-125/3 QJ2	940.	4700.
2-225/3 QJ2	940.	1880.
1-250/3 FXD6	2700.	2700.
		<u>13490.</u>

For inches / millimeters conversion, see Application Data section.

# Panelboards

## Circuit Breaker / Lighting and Distribution

General

### Type P1

**480Y/277 Vac Maximum  
600Y/ 347 Vac (CSA only) Maximum  
400 Ampere Mains  
400 Ampere Maximum Branch  
UL Short Circuit Rating —  
200,000 A. @ 240 Vac / 100,000 A. @  
480/277 Vac. IR Maximum**

**Branch Breaker Symmetrical  
Interrupting Capacity**

**Based on Underwriters' Test Procedure**

Feed thru and subfeed lugs may result in lower interrupting ratings if not protected by a main device. Consult sales office.

Meets 2005 NEC wire bending requirement, section 312.6.

Meet Federal Specification W-P-115C.

### Panelboards

Listed by Underwriters' Laboratories, Inc., under "Panelboards" File #E2269 for interiors and #E4016 for boxes and fronts.

### Service

1-phase 2-wire - 120 Vac, 240 Vac,  
24 Vdc, 48 Vdc, 125 Vdc

1-phase 3-wire - 120/240 Vac, 125/250  
Vdc

3-phase 3-wire - 480Y/277 (when derived  
from 3-phase 4-wire system), 240 Vac,  
120 Vac, 125/250 Vdc

3-phase 4-wire - 208Y/120 Vac,  
240/120 Vac, 480Y/277 Vac,  
600Y/347 Vac, 380/220 Vac.

### Panelboard Fronts and Doors

Standard panelboards are furnished with trim featuring concealed fasteners and hinges with a flush door lock.

All are factory-assembled for ease of installation. Fronts are fabricated from code gauge steel and finished ANSI-61. See page 10-71 for optional fronts.

### Main Breakers

BL, BLH, HBL, BQD, ED4, ED6, HED4, HHED6, QJ2, QJH2, QJ2-H, FXD6, FD6, HFD6, HFXD6, JXD6, JD6, HJXD6, HJD6. (All main breakers except 400 amp frame are mounted horizontal.)

### Main Breaker Panel Connectors

Ampere Rating	Connectors Suitable for Cu or Al
100	(1)—#14 1/0 AWG
125	(1)—#4 1/0 AWG
225	(1)—#4 AWG-300 kcmil
250	(1)—#4/0 AWG-350 kcmil Al (1)—#6/0 AWG-350 kcmil Cu
400 <sup>ⓐ</sup>	(2)—#3/0 AWG-250 kcmil Al or (1)—#3/0 AWG-500 kcmil Al

Connector ranges indicated do not apply to all main breaker types. Refer to molded case circuit breaker standard pressure wire connector chart (Section 6) for the connector range of a specific frame.

### Main Lug Connectors

125	(1)—#6 AWG-350 kcmil
250	(1)—#6 AWG-350 kcmil
400	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil

### Boxes

20" wide, 5.75" deep

- End walls are blank as standard. End walls with knockouts will be supplied at no charge on 5.75" deep panels if requested at time of order.

### Main Breaker Gutter Dimensions (inches)

Main Breaker	Side Gutter		Neutral Location
	20" w/box	24" w/box	20" w/box
BL, BLH, HBL, BQD	8.500	10.500	11.500
NGB	8.000	10.000	11.500
ED4, ED6, HED4	6.125	8.125	11.500
QJ2, QJH2, QJ2-H	6.500	8.500	11.500
FD6, FXD6, HFD6	5.250	7.250	11.500
JD6 <sup>ⓑ</sup> , JXD6 <sup>ⓑ</sup>	15.000	15.000	26.750

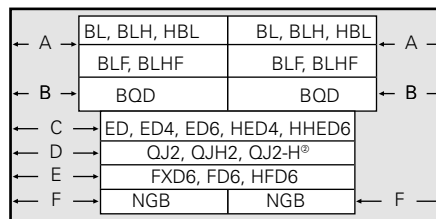
### Main Lug End Gutter Dimensions (inches)

Amp Rating	End Gutter	Neutral Location
125	10.500	11.500
250	10.500	11.500
400 <sup>ⓐ</sup>	25.500	26.750

### Side Gutter Wiring Space (inches)

Reference Letter	Panel Width 20"	Panel Width 24" (Optional)
A	6.375	7.375
B	5.500	7.500
C	6.125	8.125
D <sup>ⓐ</sup>	6.500	8.500
E	5.250	7.250
F	5.000	7.000

### Branch Breaker Side Gutters



### Weight — Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is:

- About 3 lbs. per inch of box height

### Gauge Steel Boxes

Width	Height	Gauge Steel
20"	All	#16

### Fronts — Surface, Flush

20"	All	#14
-----	-----	-----

### Series Connected Short Circuit Ratings

The term "Series Connected Short Circuit Rating" refers to the application of series connected circuit breakers in a combination that allows some breakers to have lower individual interrupting ratings than the available fault current. This is permitted as long as the series combination has been tested and certified by UL.

The table below lists specific main and branch breaker series combinations that are marked on all P1 panels.

All combinations shown have been tested for use in P1 panelboards and are UL listed. Other combinations are available. See Circuit Breaker Section, of this book.

These series ratings must be specified on order at time of entry.

<sup>ⓐ</sup> P1 400 amp main breaker panels have wire bending space available for 600 kcmil.

<sup>ⓑ</sup> 400A main breaker is vertical mounted.

For inches / millimeters conversion, see Application Data section.

<sup>ⓐ</sup> Feed-thru lug and neutral wire bending space is 15.000" and 16.250" respectively on 400A panel.

<sup>ⓑ</sup> P1 panel limited to (1) subfeed 250 amperes max.

# Panelboards

## Circuit Breaker / Lighting and Distribution

**Selection**

### Type P1

#### Shown with Standard Mains, Top Fed and Surface Trim

Catalog number is for aluminum main bus. For optional copper main bus change "A" in position 11 to "C".

See copper price adder on page 10-20.

Panels are top feed, surface mounted. For bottom feed, change "T" in position 12 to "B". For flush mounting, change "S" in position 13 to "F".

Replace fifth and sixth position in panelboard catalog number, with alternate main breaker code. Use price adders from main breaker selection table. Horizontally mounted.

#### Main Lugs Only

Maximum Panel Ampere Rating	Maximum 1-Pole Circuits	Box Height (inches)	208Y/120V		120/240V		480Y/277V	
			3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$
125	18	32	P1C18ML125ATS	840.00	P1A18ML125ATS	750.00	P1E18ML125ATS	910.00
	30	38	P1C30ML125ATS	1060.00	P1A30ML125ATS	980.00	P1E30ML125ATS	1190.00
	42	44	P1C42ML125ATS	1250.00	P1A42ML125ATS	1180.00	P1E42ML125ATS	1440.00
250	18	32	P1C18ML250ATS	910.00	P1A18ML250ATS	820.00	P1E18ML250ATS	1020.00
	30	38	P1C30ML250ATS	1100.00	P1A30ML250ATS	1010.00	P1E30ML250ATS	1270.00
	42	44	P1C42ML250ATS	1330.00	P1A42ML250ATS	1230.00	P1E42ML250ATS	1540.00
400	18	56	P1C18ML400ATS	1240.00	P1A18ML400ATS	1110.00	P1E18ML400ATS	1240.00
	30	62	P1C30ML400ATS	1440.00	P1A30ML400ATS	1340.00	P1E30ML400ATS	1440.00
	42	68	P1C42ML400ATS	1710.00	P1A42ML400ATS	1580.00	P1E42ML400ATS	1710.00

#### Main Circuit Breaker

100	18	32	P1C18BL100ATS	1170.00	P1A18BL100ATS	1060.00	P1E18BD100ATS	1520.00
	30	38	P1C30BL100ATS	1370.00	P1A30BL100ATS	1250.00	P1E30BD100ATS	1740.00
	42	44	P1C42BL100ATS	1640.00	P1A42BL100ATS	1450.00	P1E42BD100ATS	2230.00
125	18	32	P1C18NB125ATS	1710.00	P1A18NB125ATS	1600.00	P1E18NB125ATS	1710.00
	30	38	P1C30NB125ATS	1920.00	P1A30NB125ATS	1790.00	P1E30NB125ATS	1920.00
	42	44	P1C42NB125ATS	2190.00	P1A42NB125ATS	2010.00	P1E42NB125ATS	2190.00
225	18	32	P1C18QJ225ATS	2350.00	P1A18QJ225ATS	1950.00	P1E18FX225ATS	2510.00
	30	38	P1C30QJ225ATS	2540.00	P1A30QJ225ATS	2150.00	P1E30FX225ATS	2780.00
	42	44	P1C42QJ225ATS	2760.00	P1A42QJ225ATS	2360.00	P1E42FX225ATS	3030.00
250	18	32	P1C18FX250ATS	2760.00	P1A18FX250ATS	2360.00	P1E18FX250ATS	2760.00
	30	38	P1C30FX250ATS	2950.00	P1A30FX250ATS	2550.00	P1E30FX250ATS	2950.00
	42	44	P1C42FX250ATS	3160.00	P1A42FX250ATS	2770.00	P1E42FX250ATS	3160.00
400	18	56	P1C18JX400ATS	3160.00	P1A18JX400ATS	2650.00	P1E18JX400ATS	3990.00
	30	62	P1C30JX400ATS	3370.00	P1A30JX400ATS	2850.00	P1E30JX400ATS	4190.00
	42	68	P1C42JX400ATS	4540.00	P1A42JX400ATS	3160.00	P1E42JX400ATS	4540.00

#### Main Breaker Selection (Cost adder for other than std.)

Ampere Rating	Breaker Type	Maximum Interrupting Rating		Catalog Number	List Price \$	Available Trip Values	
		240 Vac	480/277 Vac				
100	BL	10	—	BL	STD @ 240 Vac	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	
	BLH	22	—	BH	65.	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	
	HBL	65	—	HB	400.	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	
	BOD	65	14	BQ	400. @ 240 Vac / STD @ 480/277 Vac	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	
125	NGB	100	25	NB	STD	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	
	ED4	65	18	E4	55.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	
	HED4	100	42	H4	540.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	
	HHED6	100	65	HA	540.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	
	QJ2	10	—	QJ	STD @ 240 Vac	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
225	QJH2	22	—	QH	75.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	QJ2-H	42	—	Q2	160.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	HQJ2H	100	—	HQ	1360.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	FD6	—	35	FD	140.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	FXD6	65	35	FX	140.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	HFD6	100	65	HF	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	HFXD6	—	65	H2	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	
	HHFD6	200	100	H1	2120.	70, 80, 90, 100, 110, 125, 150, 175, 225	
	250	FD6	—	—	FD	STD	250
		FXD6	65	35	FX	STD	250
HFD6		100	65	HF	1900.	250	
HFXD6		—	—	H2	1900.	250	
HHFD6		200	100	H1	2120.	250	
400	JD6	—	—	J6	STD	200, 225, 250, 300, 350, 400	
	JXD6	65	35	JX	STD	200, 225, 250, 300, 350, 400	
	HJD6	100	65	H6	2270.		
	HJXD6	—	—	H5	2270.		

For inches / millimeters conversion, see Application Data section.

Note: Price branch devices from page 10-19.

# Panelboards

## Circuit Breaker / Lighting and Distribution

Selection

Type P1

### Branch Breaker Selection

Breaker Type	Available Ampere Rating	List Price \$ Installed			Provisions for Future \$	Maximum Interrupting Rating (kA)				
		1-Pole	2-Pole	3-Pole		120V	120/240V	240V	277V	480/277V
BL (120V)	15, 20, 25, 30, 35, 40, 45, 50, 60 70 80, 90, 100	25.	45.	140.	—	10	10	—	—	—
		35.	85.	190.	—					
		—	140.	210.	—					
BL (HID)	15, 20, 30	40.	70.	—	—	—	—	—	—	—
BLH (120V)	15, 20, 25, 30, 35, 40, 45, 50, 55, 60 70 80, 90, 100	35.	85.	220.	—	22	22	—	—	—
		75.	130.	300.	—					
		—	200.	310.	—					
HBL	15, 20, 30, 40, 50 60, 70, 80, 90, 100	65. —	150. 400.	290. 480.	— —	65	65	65	—	—
BLF (GFCI)	15, 20, 30 40, 50, 60	140. —	240. 250.	— —	— —	10	—	—	—	—
BLE (EQGFI)	15, 20, 30	220.	330.	—	—	10	—	—	—	—
BLEH	15, 20, 30 40, 50, 60 (2-Pole Only)	420. —	530. 530.	—	—	22	22	—	—	—
BGL (SWN)	15, 20, 30 15, 20, 30	— —	100. —	— 120.	— —	10	10	—	—	—
BAF	15, 20	160.	330.	—	—	10	—	—	—	—
BAFH	15, 20	180.	340.	—	—	22	—	—	—	—
BLR (240V)	15, 20, 25, 30, 35, 40, 45, 50, 55, 60 70, 80, 90, 100	—	110.	—	—	10	10	10	—	—
		—	190.	—	—					
BLHF (GFCI)	15, 20, 30 40, 50, 60	160. —	280. 300.	— —	— —	22	22	—	—	—
BQD	15, 20, 30, 40, 50, 60 70, 80, 90, 100	85. 200.	270. 400.	380. 490.	— —	65	65	65	14	14
		—	360. 420.	480. 540.	— —					
NGB	15, 20, 30, 40, 50, 60 70, 80, 90, 100, 110, 125	130.	360.	480.	—	100	100	100	25	25
		210.	420.	540.	—					
		—	710.	910.	—					

### Subfeed Breakers — Limit One Per Panel

Breaker Type	Available Ampere Rating	List Price \$ Installed			Provisions for Future \$	Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole		120V	120/240V	240V
ED4	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 110, 125	—	520.	670.	120.	—	—	65
		—	880.	1120.	120.	—	—	65
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	690.	770.	120.	—	—	100
		—	1260.	1460.	120.	—	—	100
HHED6	15, 20, 30, 40, 50, 60, 70 80, 90, 100, 110	—	1270.	1400.	120.	—	—	100
		—	1270.	1400.	120.	—	—	100
QJ2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	420.	880.	170.	—	—	10
QJH2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	930.	1140.	170.	—	—	22
QJ2H	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	1080.	1410.	170.	—	—	42
HQJ2H	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	—	1940.	170.	—	—	100
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	1220.	1540.	220.	—	—	65
HFD6	70, 80, 90, 100, 125, 150, 175, 200, 225, 250	—	2440.	2550.	220.	—	—	100

Note: BGL Breaker — 1-pole takes 2" unit space or 2-poles  
— 2-pole takes 3" unit space or 3-poles

Note: 1-pole HBL limited to 50 amps

# Panelboards

## Type 1 P1 Panelboard Modifications and Additions

## Selection

### Enclosures

Description	List Price \$
6" end gutter	235.
2" side gutter	200.
Barrier in gutter (add to extra gutter price)	200.
24" wide	235.

Hinged trims	160.
Piano hinged trims	360.
Door-in-door trims	360.
Screw to the box trims	160.

Trim mounted devices . . . . . See page 10-72	
• Pilot lights	
• Toggle switches	
• Push buttons	
(Devices mounted to be wired to the trim should also have hinged trim specified)	

Painted boxes . . . . . See page 10-72	
Custom colors . . . . . See painted boxes	
Increase gauge trims and boxes . . . . . See page 10-72	
Stainless steel trims and boxes, Type 1 . . . . . See page 10-72	
Aluminum trims and boxes, Type 1 . . . . . See page 10-72	

### Meters

(Contact sales for pricing and application engineering for space requirements)

### Panel Skirts

See page 10-73

Special Locks	List Price \$
TEY	235.
TEU1	255.
Cat 60	235.
LL803	235.
LL806	235.
Yale 47 (NYC)	425.

### Panel Modifications

Main Bus	Catalog Number*	Amp Ratings		
		125A	250A	400A
Copper (tin pltd.)	C	255.	255.	390.

\* "C" represents "A" in the 11th digit of the catalog number.

### Branch and Main Breaker and Accessories

See breaker section for pricing on the following options

- Handle blocks
- Handle locks
- Aux. Contacts<sup>Ⓞ</sup>
- UVR<sup>Ⓞ</sup>

Bus mounted TVSS . . . . . see section 9

### Service Entrance Label

Type P1 Panelboards are factory labeled suitable for use as service entrance equipment when NEC requirements are met. A panelboard cannot have more than six main disconnects, unless it is a lighting and appliance branch panelboard. Lighting and appliance branch panelboards are limited to two main disconnects.

### Grounding of Panelboards

Ground Bars except for brazed to box are shipped with the panel interior factory mounted.

- Non-Insulated Equipment Ground Bar – STD
- Copper Non-Insulated Ground Bar . . . . . 40.
- Al Insulated Equipment Ground Bar . . . . . 40.
- Cu Insulated Equipment Ground Bar . . . . . 75.
- Ground Bar Brazed to Box . . . . . 245. (recommended for painted boxes)

### Shunt Trip on Main or Branch

BL, BLH, HBL, BQD as branch only. BL, BLH, HBL uses 1" unit space for shunt trip as a branch device. All others may be used on mains or subfeeds. See breaker section for list price adders.

QJ2, QJ2-H, QJH2, HQJ2H, ED4, ED6, HED4, HED6, HHED6, FXD6, HFD6, JXD6, JD6, HJD6, HJXD6
--

### Remote Control Switches

480V AC max. mounted in a 23" enclosure to be cable connected to the panel.

### Time Clocks

Time clocks may be mounted in a 23" enclosure to be cable connected to the panel. Sangamo, Tork or Paragon time clock can be supplied.

Description	List Price \$
Time Clock (1 or 2-pole, single or double throw contacts; 3-pole, single throw) 277V maximum with plain dial	1070.
Astronomical dial	210.
An omitting device	75.
Reserve power or carryover	2450.
Space and mounting provisions only	540.

### Remote Switches Modifications (See page 10-71)

### Application for Remote Switch

Switch Type	Modification
920	Mounts in 23" relay cabinet as a main only
911	≤ 150 AMPS mounts in 23" relay cabinet as a main only >150 AMPS not available
LEN	30A mounts in 23" relay cabinet as a main only

### Feed-Thru Lugs

Cannot be used in conduction with TVSS or subfeed breakers

Ampere Rating	List Price \$	Type	Connector Range
250	190.	Al/Cu Lay-in Mechanical	(1)—#6 AWG-350 kcmil
	370.	Cu Lay-in Mechanical	(1)—#6 AWG-350 kcmil
	285.	Al/Cu Compression	(1)—#6 AWG-350 kcmil
400	490.	Al/Cu AWG Mechanical	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil
	775.	Cu	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil
	585.	Al/Cu Compression	(1) 400—600 kcmil

Note: Specify copper or aluminum cable.

<sup>Ⓞ</sup> Accessories on 1" pole breakers (BL, BQD, ED) will take unit space.



# Panelboards

## Type P1 Panelboard Connector Modifications

Selection

### Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price Adder \$			
					3-Phase/4-Wire	3-Phase/3-Wire	1-Phase/3-Wire	1-Phase/2-Wire
MLO	125	N/A	(1) #4 AWG - 350 kcmil	None	105.	105.	105.	105.
	250							
	400	N/A	(1) 250-600 kcmil or (2) #3/0 AWG - 250 kcmil	None	150.	150.	150.	150.
Main Breaker	125	ED4, ED6, HED4 HHED6, CED6	(1) #12-1/0 AWG	Box must go to 24" wide	115.	85.	85.	85.
	225	QJ2, QJH2, QJ2H	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers	225.	180.	180.	180.
	250	FXD6, HFD6, CFD6	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers	225.	180.	180.	180.

**NOTE:** Standard compression lugs used for P1 panels are range taking lugs and may require a particular crimping tool to accommodate the range. Consult factory for information. 200% neutral not available with compression lugs.

### Enclosure Modifications

Description	List Price Adder \$	
	Panel Width 20"	Panel Width 24"
NEMA 3R enclosures	860.	1180.
NEMA 3R/12 enclosures	1175.	1180.
Gasket between trim and box (Type 1)	680.	900.

### NEMA-4—Water Tight, Dust Tight, Steel Enclosure (consult plant for actual enclosure size)

Box Height (inches)	Enclosure Size			List Price Adder \$
	H	W	D	
32	32	20	5.75	4230.
38	38	20	5.75	5330.
44	44	20	5.75	6605.
56	56	20	5.75	16260.
62	62	20	5.75	17500.
68	68	20	5.75	19025.

### Additional Enclosure Modifications

Description	List Price \$
Strip Heaters	895.
Humidstat Control	1570.
Thermostat Control	1570.

### NEMA-4X—Water Tight, Dust Tight and Corrosion Resistant (consult plant for actual enclosure size)

Box Height (inches)	Enclosure - Stainless Steel & Steel with Epoxy Coating			Enclosure - Fiberglass Size (inches)			List Price \$
	H	W	D	H	D	W	
32	32	20	5.75	36	24	8	10145.
38	38	20	5.75	48	36	12	12085.
44	44	20	5.75	48	36	12	15805.
56	56	20	5.75	60	36	12	20265.
62	62	20	5.75	66	36	12	23710.
68	68	20	5.75	72	36	12	27435.

### Remote Switches Modifications (See page 10-71)

#### Application for Remote Switch

Switch Type	Modification
920	Mounts in 23" relay cabinet as a main only
911	≤ 150 AMPS mounts in 23" relay cabinet as a main only >150 AMPS not available
LEN	30A mounts in 23" relay cabinet as a main only

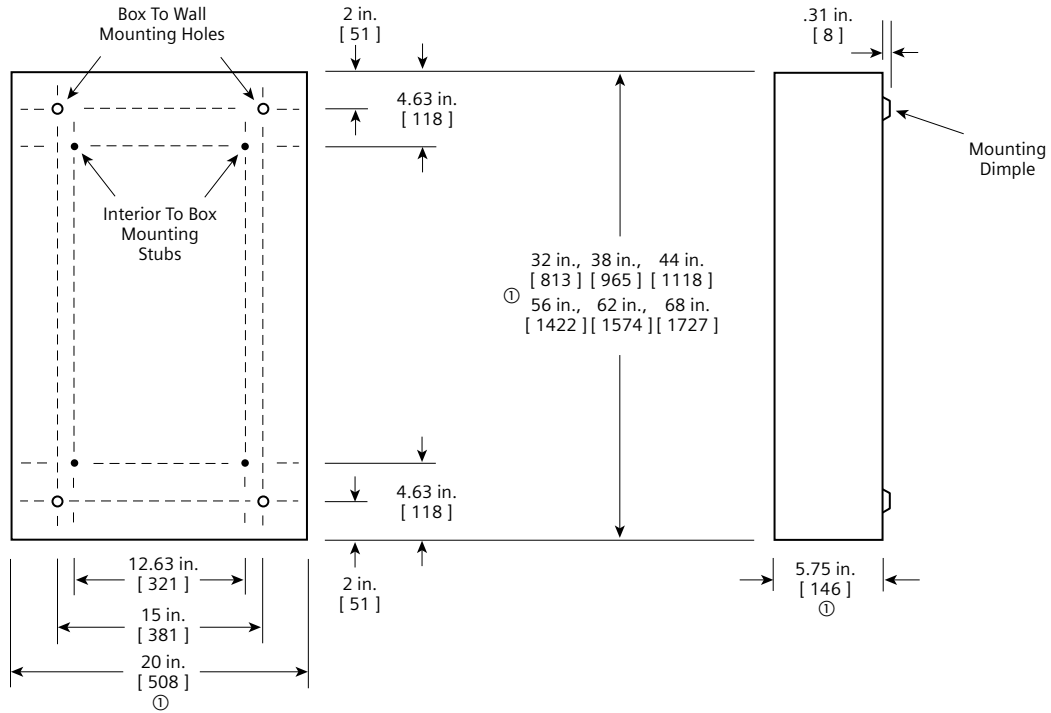
# Panelboards

## Type P1

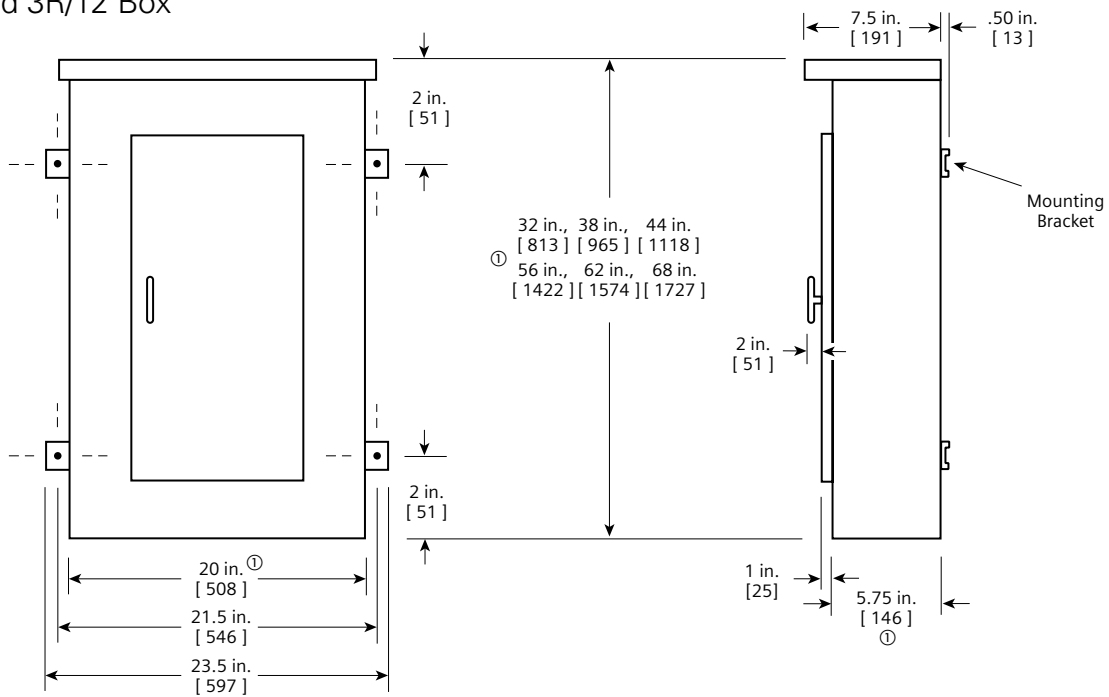
## Dimensions

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



① Dimensions are interior of the box. Add 5/8" to width for absolute dimension. Add 1/8" to height for absolute dimension.

Dimensions shown in inches and millimeters [ ].

# Panelboards

## Type P2 Panelboards

**General**

### Features

Flexibility is the hallmark of the P2 panel. This panel offers a wide array of factory-assembled options to meet almost all lighting panel applications. With this design, the ability to mix breaker frames in unit space up to 250 amps will also meet many distribution panel requirements in a much smaller package. Bussing options for the P2 vary from the typical temperature rated to 750 A/Si aluminum to 1000A/Si copper. Standard bussing in the P2 panel is tin-plated. Silver-plated copper is also offered as an option. Integrated time clocks, bus mounted contactors, as mains or sub mains, split bus, and subfeed lugs (up to 400 amp) are just a few of the options of this unique panel.

Like a lighting panel, P2 is set up around 18, 30, 42, and 54 circuit configurations. It will also allow the user to configure the panel to the smallest possible size. The P2 panel starts with 9" of unit space (18 circuits of 1" pole breakers). Breakers mounted in unit space can be mixed and matched to meet customer requirements. All 1" pole breakers (BL, BQD, ED frames) are mounted in 3" or 6" pole increments. Breaker frames, above 125 amps, are mounted in 6" single breaker mountings.

As an example of a minimum panel, (6) 20 amp 1-pole BL breakers (3" of unit space) and a 3-pole 225 amp QJ breaker (6" of unit space) equaling 9" of unit space can be configured in a P2 panel without any extra provisions or space required. FD 250 amp and JD 400 amp breakers are mounted as subfeed breakers outside of unit space.

Another unique feature of the P2 panel is that blank unit space can be added to allow for future expansions or modifications. Any expansions or modifications must be in 3" increments. BL, BQD, and ED frame breakers have 3" or 6" pole kits, and can be mixed in unit space by these increments. Breakers of the same frame can cross from one mounting to another if contiguous. QJ frame breakers are mounted in 6" increments for two- and three pole, single mounted units. Changes in the unit space length for BL, BQD, or ED frame breakers require an addition deadfront, center strip kit. Check with sales or the factory for additional unit space kits.

### Main Lug / Main Breaker

**Enclosure** – Standard Type 1 enclosure is 20" wide x 5.75" deep X. Box Height is determined by main device and unit space. See charts for box height.

**Voltage** – 600V AC max.  
250V DC max.

**Amperage** – 600 amp max.

**Short circuit rating** – 200 KAIC max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P2 panel is limited to 22 KAIC. Note that the main device may be mounted remote from the panel.

**Bussing** – The P2 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P2 panel is: 750 A/Si aluminum, temperature rated copper, and 1000 A/Si copper. The copper bus option for this panel is tin-plated.

### Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 3 lbs. (1 kg) per inch (54g per mm) of box height.

### Gauge Steel of Boxes Fronts, Surface and Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Front
20 (508)	26–74 (660–1880)	#16	#14

# Panelboards

## Type P2 Panelboards

## Selection/Dimensions

Panel Unit Space To Box Height Requirements (See wire bending space diagrams below for "A" and "B" dimension references)

"B" Dimension Box Height	P2 Panels With Standard Line Lugs. Unit Space (starting with 9" and adding 6" increments) "A" Dimension													
	Main Lugs				Main Breakers									
	125A	250A	400A	600A	125A Horiz. BL, BQD, ED	125A Horiz. CED	125A Vert. ED	225A Horiz. QJ	250A Horiz. FD	250A Vert. CFD	400A JD	400A CJD	600A LD	600A CLD
26	9	—	—	—	9	—	—	—	—	—	—	—	—	—
32	15	9	—	—	15	9	9	9	—	—	—	—	—	—
38	21	15	9	9	21	15	15	15	9	—	—	—	—	—
44	27	21	15	15	27	21	21	21	15	—	—	—	—	—
50	33	27	21	21	33	27	27	27	21	9	9	—	—	—
56	39	33	27	27	39	33	33	33	27	15	15	—	9	—
62	45	39	33	33	45	39	39	39	33	21	21	9	15	9
68	51	45	39	39	51	45	45	45	39	27	27	15	21	15
74	57	51	45	45	57	51	51	51	45	33	33	21	27	21

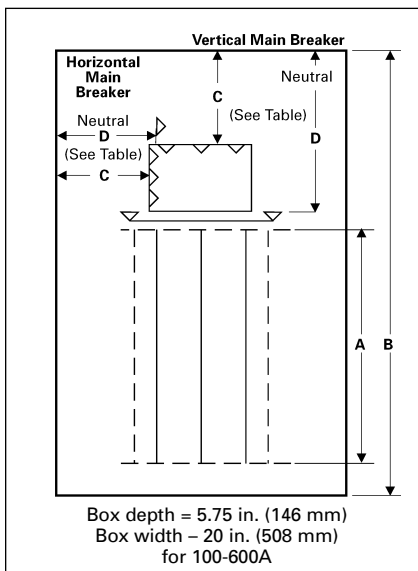
### Main Breaker

Panel Amps	Breaker Frames	C	D
100	BL	5.75	8.00
	BQD	5.125	8.00
125	NGB	4.625	8.00
	ED	4.00	8.00
225	QJ	5.00	7.00
250	FD	5.00	7.00
400	JD	14.00	25.00
600	LD	15.50	23.00

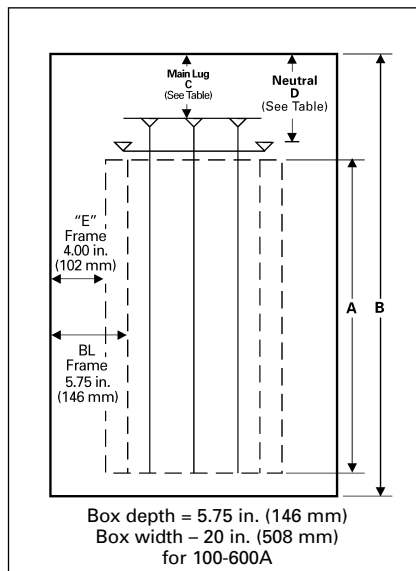
### Main Lug Connectors

Panel Amps	Standard Connectors	C	D
125	(1) #14 - 2/0	6.62	8.19
250	(1) #6 AWG - 350 kcmil	12.34	11.22
400	(1) #4 AWG - 600 kcmil	14.00	13.09
	or (2) #6 - 250 kcmil		
600	(2) #4 AWG - 500 kcmil	14.00	11.00

Main breaker wire bending space diagram



Main lug wire bending space diagram

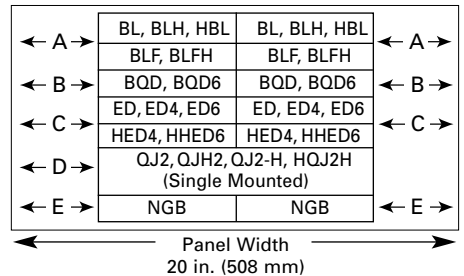


### Branch Breaker Side Gutters Inches (mm)

Reference Letter	Panel Width 20" (508)
A	5.750 (146)
B	5.125 (130)
C	4.000 (102)
D <sup>Ⓢ</sup>	5.000 (127)
E	4.625 (117)

Ⓢ Single branch mounting construction.

Branch breaker wire bending space diagram



Branch Breaker Side Gutters

# Panelboards

## Type P2 Panelboards

Selection

### Main Breaker Selection<sup>①</sup>

Ampere Rating	Breaker Type	Maximum Interrupting Rating (kA)			Ref. Catalog Number	List Price Adder \$			Available Trip Values
		240V	480V	600V		240V	480V	600V	
100	BL	10	—	—	BL	STD	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	HBL	65	—	—	HB	400.	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	BQD	65	14	—	BQ	400.	STD (480/277)	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	BLH	22	—	—	BH	65.	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	ED4	65	18	—	E4	330.	330.	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	NGB	100	25	—	NB	250.	55.	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100
	ED6	100	25	14	E6	360.	360.	STD	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	HED4	100	42	—	H4	540.	540.	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	HHED6	100	65	18	HA	540.	540.	540.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
CED6 <sup>②</sup>	200	200	100	CE	1960.	1960.	1960.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100	
125	NGB	100	25	—	NB	STD	STD	—	110, 125
	ED4	65	18	—	E4	55.	55.	—	125
	ED6	65	25	18	E6	360.	360.	STD	125
	HED4	100	42	—	H4	540.	540.	—	125
	HHED6	100	65	18	HA	540.	540.	540.	125
CED6 <sup>②</sup>	200	200	100	CE	1960.	1960.	1960.	125	
225	QJ2	10	—	—	QJ	STD	—	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJH2	22	—	—	QH	70.	—	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJ2H	42	—	—	Q2	160.	—	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HQJ2H	100	—	—	Q3	1360.	—	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FD6	65	35	18	FD	190.	STD	STD	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FXD6	65	35	18	FX	190.	STD	STD	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6	100	65	25	HF	1900.	1900.	1900.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFXD6	100	65	25	H2	1900.	1900.	1900.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	CFD6 <sup>②</sup>	200	200	100	CF	2770.	2770.	2770.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
250	FD6	65	35	18	FD	STD	STD	STD	250
	FXD6	65	35	18	FX	STD	STD	STD	250
	HFD6	100	65	35	HF	1680.	1680.	1680.	250
	HFXD6	65	35	25	H2	1680.	1680.	1680.	250
	CFD6 <sup>②</sup>	200	150	100	CF	1895.	2450.	2610.	250
400	JXD6 <sup>②</sup>	65	35	25	JX	STD	STD	STD	200, 225, 250, 300, 350, 400
	JD6 <sup>②</sup>	65	35	35	J6	STD	STD	STD	200, 225, 250, 300, 350, 400
	HJXD6 <sup>②</sup>	100	65	35	H6	1825.	1825.	1825.	200, 225, 250, 300, 350, 400
	HJD6 <sup>②</sup>	100	65	35	H5	1825.	1825.	1825.	200, 225, 250, 300, 350, 400
	SJD6 <sup>②</sup>	65	35	25	SJ	2200.	2200.	2200.	200, 300, 400
	SHJD6 <sup>②</sup>	100	65	35	S2	2500.	2500.	2500.	200, 300, 400
	CJD6 <sup>②</sup>	200	200	100	CJ	2650.	2650.	2650.	200, 300, 400
	SCJD6 <sup>②</sup>	200	200	100	SC	4385.	4385.	4385.	200, 300, 400
	600	LXD6 <sup>②</sup>	65	35	25	LX	STD	STD	STD
LD6 <sup>②</sup>		65	35	25	L6	STD	STD	STD	250, 300, 350, 400, 450, 500, 600
HLXD6 <sup>②</sup>		100	65	35	HL	1825.	1825.	1825.	250, 300, 350, 400, 450, 500, 600
HLD6 <sup>②</sup>		100	65	35	HO	1825.	1825.	1825.	250, 300, 350, 400, 450, 500, 600
SLD6 <sup>②</sup>		65	35	25	SL	2500.	2500.	2500.	300, 400, 500, 600
SHLD6 <sup>②</sup>		100	65	35	S6	4325.	4325.	4325.	300, 400, 500, 600
CLD6 <sup>②</sup>		200	150	100	CL	3830.	3830.	3830.	300, 400, 500, 600
SCLD6		200	150	100	C6	5130.	5130.	5130.	300, 400, 500, 600

When an ED4, ED6, HED4, QJ2, QJH2, QJ2H, FD6, HFD6, or FXD6 frame main breaker, vertically mounted, is required, price as a main breaker panel and add from the table for the main breaker mounting.

### Vertically Mounted Main Breaker

Ampere Rating	Breaker Type(s)	Number of Poles		Unit Space (in.)
		2-Pole	3-Pole	
100	ED4	295.	320.	6
	ED6	295.	320.	
	HED4	295.	320.	
225	QJ2, QJH2, QJ2-H	390.	415.	6
	FXD6, FD6, HFD6	625.	670.	

### Subfeed Breakers

Breaker Type	Mounting Position When Used as Subfeed Breaker	List Price \$		Provisions for Future \$	Ampere Ratings For Load	Maximum Interrupting Rating (kA) Symmetrical		
		2-Pole	3-Pole			240V AC	480V AC	600V AC
FD6 <sup>③</sup> , FXD6	Twin	1220.	1540.	220.	70–250	65	35	22
HFD6 <sup>③</sup> , HFXD6	Twin	2440.	3010.	220.	70–250	100	65	25
JD6 <sup>④</sup> , JXD6	Single	1720.	2180.	290.	200–400	65	35	25
HJD6 <sup>④</sup> , HJXD6	Single	3160.	4220.	290.	200–400	100	65	35

- ① Interchangeable trip main breakers are mounted at top of panel only.
- ② Vertically mounted.
- ③ Twin mounted subfeed breakers are mounted at the bottom of panelboard only and adds 24" to the panel height.
- ④ Subfeed breaker is mounted at bottom of panelboard only. 400 amp subfeed breaker adds 24" to the panel height. (Only for use with MLO)

# Panelboards

## Type P2 Panelboards

Selection

### Branch Circuit Breakers

Max. Amp Rating	Bolt-On Breaker Type	Amps	List Price \$			Provisions for Future \$	Maximum Interrupting Rating (kA)						
			1-Pole	2-Pole	3-Pole		120V AC	120/240V AC	240V AC	277V AC	480V AC	600V AC	250V DC
100	BL	15-60	25.	45.	140.	—	10	—	—	—	—	—	—
		70	35.	85.	190.	—	—	10	—	—	—	—	
		80-100	—	140.	210.	—	—	—	10	—	—	—	
	BLH	15-60	35.	85.	220.	—	—	22	—	—	—	—	—
		70	75.	130.	300.	—	—	22	—	—	—	—	—
		80-100	—	200.	310.	—	—	—	22	—	—	—	—
	HBL	15-55	85.	270.	380.	—	—	65	—	—	—	—	—
		60-100	—	400.	490.	—	—	65	—	—	—	—	—
	BL, HID	15-30	45.	75.	—	—	10	10	—	—	—	—	—
	BLR (240V)	15-60	—	110.	—	—	—	—	10	—	—	—	—
		70-100	—	190.	—	—	—	—	10	—	—	—	—
	BLE (GFCI)	15-30	220.	330.	—	—	10	—	—	—	—	—	—
		40-60	—	330.	—	—	—	10	—	—	—	—	—
BLEH	20-30	420.	—	—	—	22	—	—	—	—	—	—	
	15-60	—	530.	—	—	—	22	—	—	—	—	—	
BLF (GFCI)	15-30	140.	240.	—	—	10	—	—	—	—	—	—	
	40-60	140.	250.	—	—	—	10	—	—	—	—	—	
BLHF (GFCI)	15-30	160.	280.	—	—	22	—	—	—	—	—	—	
	40-60	160.	300.	—	—	—	22	—	—	—	—	—	
BGL <sup>Ⓢ</sup>	15-30	—	100.	130.	—	10	10	—	—	—	—	—	
BAF	15-20	160.	330.	—	—	10	—	—	—	—	—	—	
BAFH	15-20	180.	340.	—	—	22	—	—	—	—	—	—	
BQD	15-60	85.	270.	380.	—	—	65	—	14	—	—	14	
	70-100	200.	400.	490.	—	—	65	—	—	14	—	14	
125	NGB	15-60	130.	360.	480.	—	100	100	100	25	25	—	14
		70-100	210.	420.	540.	—	100	100	100	25	25	—	14
		110-125	—	710.	910.	—	100	100	100	25	25	—	14
	ED4	15-60	160.	440.	590.	—	65	—	—	22	—	—	—
		70-100	260.	520.	670.	—	—	—	65	—	18	—	30
		110-125	—	880.	1120.	—	—	—	65	—	18	—	—
	ED6	15-60	—	460.	700.	—	—	—	65	—	25	18	30
		70-100	—	600.	790.	—	—	—	65	—	25	18	—
		110-125	—	1100.	1350.	—	—	—	65	—	25	18	—
	HED4 <sup>Ⓢ</sup>	15-60	320.	700.	880.	—	—	—	65	—	25	18	30
		70-100	320.	860.	960.	—	—	—	65	—	25	18	—
		110-125	—	1590.	1800.	—	—	—	65	—	25	18	—
HHED6	15-60	—	700.	890.	—	—	—	100	65	—	—	—	
	70-100	—	860.	990.	—	—	—	100	42	42	—	30	
	110-125	—	1600.	1810.	—	—	—	100	—	42	—	—	
225	QJ2	60-225	—	420.	880.	170.	—	—	10	—	—	—	—
	QJH2	60-225	—	930.	1140.	170.	—	—	22	—	—	—	—
	QJ2H	60-225	—	1080.	1410.	170.	—	—	42	—	—	—	—
	HQJ2H	60-225	—	—	1940.	170.	—	—	100	—	—	—	—

### Branch Device Limitations

For panels applied on systems requiring neutral connections, some limitations apply. By application rule (NEC 408.14) lighting and appliance panels are limited to 42 circuits installed. Each overcurrent device pole counts as a circuit. Additional limitations for these panels are based on available neutral connections.

### Branch Neutral Connections

Wire Range	Max. Number of Connections	Max. Amp <sup>Ⓢ</sup>
#14-#6	26	65
#14-1/0	28	125
#6-350 kcmil	3	250
(1) #4-600 kcmil or (2) #6-250 kcmil	1	400

Ⓢ 1-Pole HED 4 15-30A Rated 65kA 35 through 100A Rated 25kA.

Ⓢ Two pole breaker is one phase and neutral.

Ⓢ Three pole is two phase and neutral.

Ⓢ Based on 75 degree copper.

**NOTE:** QJ Breakers are single mounted in unit space and take 6" of unit space. Limited to (4) per panel max. BL, HBL, BLH and BQD breakers are mounted in common mountings in 3" or (6) pole increments. ED4, ED6, HED4 and HHED6 breakers are mounted in common mountings in 3" or (6) pole increments.

# Panelboards

## Type P2 Panelboards

*Selection*

Typical Catalog Numbers

### Main Lugs Only

Maximum Panel Amp Rating	Maximum 1-Pole Circuits	Box Height inches (mm)	Catalog Number	List	Catalog Number	List	Catalog Number	List
			3Ø4W 208Y/120V	Price \$	1Ø3W 120/240V	Price \$	3Ø4W 480Y/277V	Price \$
125	18	26 (660)	P2C18ML125ATS	940.00	P2A18ML125ATS	840.00	P2E18ML125ATS	990.00
	30	32 (813)	P2C30ML125ATS	1140.00	P2A30ML125ATS	1060.00	P2E30ML125ATS	1270.00
	42	38 (965)	P2C42ML125ATS	1360.00	P2A42ML125ATS	1250.00	P2E42ML125ATS	1550.00
250	18	32 (813)	P2C18ML250ATS	990.00	P2A18ML250ATS	910.00	P2E18ML250ATS	1090.00
	30	38 (965)	P2C30ML250ATS	1200.00	P2A30ML250ATS	1100.00	P2E30ML250ATS	1380.00
	42	44 (1118)	P2C42ML250ATS	1420.00	P2A42ML250ATS	1330.00	P2E42ML250ATS	1630.00
400	18	38 (965)	P2C18ML400ATS	1350.00	P2A18ML400ATS	1240.00	P2E18ML400ATS	1350.00
	30	44 (1118)	P2C30ML400ATS	1550.00	P2A30ML400ATS	1440.00	P2E30ML400ATS	1550.00
	42	50 (1270)	P2C42ML400ATS	1780.00	P2A42ML400ATS	1710.00	P2E42ML400ATS	1780.00
	54	56 (1422)	P2C54ML400ATS	1970.00	P2A54ML400ATS	1800.00	P2E54ML400ATS	1970.00
600	18	38 (965)	P2C18ML600ATS	1630.00	P2A18ML600ATS	1580.00	P2E18ML600ATS	1630.00
	30	44 (1118)	P2C30ML600ATS	1840.00	P2A30ML600ATS	1780.00	P2E30ML600ATS	1840.00
	42	50 (1270)	P2C42ML600ATS	2070.00	P2A42ML600ATS	1950.00	P2E42ML600ATS	2070.00
	54	56 (1422)	P2C54ML600ATS	2260.00	P2A54ML600ATS	2140.00	P2E54ML600ATS	2260.00

### Main Circuit Breaker

100	18	26 (660)	P2C18BL100ATS	1270.00	P2A18BL100ATS	1170.00	P2E18BQ100ATS	1660.00
	30	32 (813)	P2C30BL100ATS	1510.00	P2A30BL100ATS	1380.00	P2E30BQ100ATS	1910.00
	42	38 (965)	P2C42BL100ATS	1810.00	P2A42BL100ATS	1600.00	P2E42BQ100ATS	2450.00
125	18	26 (660)	P2C18NB125ATS	1710.00	P2A18NB125ATS	1490.00	P2E18NB125ATS	1980.00
	30	32 (813)	P2C30NB125ATS	1920.00	P2A30NB125ATS	1710.00	P2E30NB125ATS	2240.00
	42	38 (965)	P2C42NB125ATS	2190.00	P2A42NB125ATS	1930.00	P2E42NB125ATS	2780.00
225	18	32 (813)	P2C18QJ225ATS	2590.00	P2A18QJ225ATS	2140.00	P2E18FX225ATS	2770.00
	30	38 (965)	P2C30QJ225ATS	2800.00	P2A30QJ225ATS	2370.00	P2E30FX225ATS	3060.00
	42	44 (1118)	P2C42QJ225ATS	3020.00	P2A42QJ225ATS	2600.00	P2E42FX225ATS	3030.00
250	18	38 (965)	P2C18FX250ATS	2990.00	P2A18FX250ATS	2550.00	P2E18FX250ATS	3170.00
	30	44 (1118)	P2C30FX250ATS	3200.00	P2A30FX250ATS	2780.00	P2E30FX250ATS	3470.00
	42	50 (1270)	P2C42FX250ATS	3430.00	P2A42FX250ATS	3000.00	P2E42FX250ATS	3450.00
400	18	50 (1270)	P2C18JX400ATS	3490.00	P2A18JX400ATS	2930.00	P2E18JX400ATS	4380.00
	30	56 (1422)	P2C30JX400ATS	3710.00	P2A30JX400ATS	3140.00	P2E30JX400ATS	4610.00
	42	62 (1575)	P2C42JX400ATS	4850.00	P2A42JX400ATS	3370.00	P2E42JX400ATS	4850.00
	54	68 (1727)	P2C54JX400ATS	5080.00	P2A54JX400ATS	3600.00	P2E54JX400ATS	5080.00
600	18	56 (1422)	P2C18LX600ATS	6320.00	P2A18LX600ATS	5550.00	P2E18LX600ATS	6320.00
	30	62 (1575)	P2C30LX600ATS	6550.00	P2A30LX600ATS	5790.00	P2E30LX600ATS	6550.00
	42	68 (1727)	P2C42LX600ATS	6780.00	P2A42LX600ATS	6010.00	P2E42LX600ATS	6780.00
	54	74 (1727)	P2C54LX600ATS	7000.00	P2A54LX600ATS	6240.00	P2E54LX600ATS	7000.00

# Panelboards

## Type P2 Panelboard Modifications and Additions

**Selection**

### Enclosures

#### Extra Gutter to Sides or Ends of the Can

Description	List Price \$
6" end gutter	235.
2" side gutter	200.
Barrier in gutter (add to extra gutter price)	200.
24" wide	235.

Hinged trims	160.
Piano hinged trims	360.
Door-in-door trims	360.
Screw to the box trims	160.

Trim mounted devices . . . . . See page 10-72

- Pilot lights
- Toggle switches
- Push buttons

(Devices mounted and wired to the trim should also have hinged trim specified)

Painted boxes . . . . . See page 10-72

Custom colors . . . . . See painted boxes

Increase gauge trims and boxes . . . . . See page 10-72

Stainless steel trims and boxes, Type 1 . . . . . See page 10-72

Aluminum trims and boxes, Type 1 . . . . . See page 10-72

#### Meters

(Contact sales for pricing and application engineering for space requirements)

#### Panel Skirts See page 10-73

Special Locks	List Price \$
TEY	235.
TEU1	255.
Cat 60	235.
LL803	235.
LL806	235.
Yale 47 (NYC)	425.

### Panel Bus Modifications

Main Bus	Catalog Number	Amperes Rating			
		125A	250A	400A	600A
750 A/SI AL.	B	190.	190.	340.	645.
Copper (tin pltd.)	F	340.	340.	910.	1335.
Copper (silver pltd.)	E	455.	455.	475.	1220.
1000 A/SI Copper (tin pltd.)	G	730.	730.	1020.	2110.
1000 A/SI Copper (silver pltd.)	H	1070.	1070.	1240.	2355.

### Subfeed, Feed-Thru and Split Bus

Ampere Rating	List Price \$		Connector Cu/Al Wire Range	Unit Space (inches)
	3-Pole	2-Pole		
100/125	85.	85.	(2)—#12 AWG-2/0 kcmil	3
225/250	85.	85.	(2)—#6 AWG-350 kcmil	6
400	235.	235.	(4)—250 kcmil (2)—600 kcmil	12

#### Subfeed (Double) Lugs for Main Lug Panelboards Only

100/125	85.	85.	(2)—#12 AWG-2/0 kcmil	3
225/250	85.	85.	(2)—#6 AWG-350 kcmil	6
400	235.	235.	(4)—250 kcmil (2)—600 kcmil	12

#### Feed-Thru Lugs — Cannot Be Used in Conjunction with TVSS or Subfeed Breakers

100/125	190.	160.	(1)—#12 AWG-2/0 kcmil	3
225/250	190.	160.	(1)—#6 AWG-350 kcmil	6
400	490.	445.	(2)—250 kcmil (1)—600 kcmil	9
600	720.	680.	(2)—250-500 kcmil	12

#### Split Bus

Requires feed thru lugs also to feed sub panel section and for space requirements.

100/125	245.	180.	(1)—#12 AWG-2/0 kcmil	9
225/250	245.	180.	(1)—#6 AWG-350 kcmil	9
400	490.	445.	(2)—250 kcmil (1)—600 kcmil	12
600	720.	680.	(2)—250-500 kcmil	15

#### Contactors Mains or Submain See Page 10-71

- Asco 920 through 225 amps – adds 12" unit space as main, 15" unit space as submain
- Asco 911 through 150 amps – adds 21" unit space
- Siemens LEN through 30 amps – adds 12" unit space, makes box 10" deep

#### Branch and Main Breaker Accessories

See breaker section of this catalog.

- Handle blocks
- Handle locks
- Aux. Contacts<sup>Ⓞ</sup>
- UVR<sup>Ⓞ</sup>

#### Increase Capacity Neutral up to 200%

Main Bus Amps	List Price Adder \$
125	340.
250	530.
400	560.
600	625.

See page 10-29 for unit space adders and compatibility with other options.

### Copper MLO Only

Main Bus Amps	List Price Adder \$
125	115.
250	190.
400	285.
600	285.

Bus mounted TVSS . . . . . see section 9

#### Service Entrance Label

Type P2 Panelboards are factory labeled suitable for use as service entrance equipment when NEC requirements are met. A panelboard cannot have more than six main disconnects, unless it is a lighting and appliance branch panelboard. Lighting and appliance branch panelboards are limited to two main disconnects.

#### Grounding of Panelboards

Ground Bars except for brazed to box are shipped with the panel interior factory mounted.

- Non-Insulated Equipment Ground Bar – **STD**
- Copper Non-Insulated Ground Bar . . . . . **40.**
- Al Insulated Equipment Ground Bar . . . . . **40.**
- Cu Insulated Equipment Ground Bar . . . . . **75.**
- Ground Bar Brazed to Box . . . . . **245.** (recommended for painted boxes)

#### Shunt Trip on Main or Branch

BL, BLH, HBL, ED4, HED4, HED6, HHED6 uses 1" unit space for shunt trip. All others may be used on mains or subfeeds. See breaker section for list price adders.

QJ2, QJ2-H, QJH2, HQJ2H, ED4, ED6, HED4, HED6, HHED6, FXD6, HFD6, JXD6, JD6, HJD6, HJXD6

#### Time Clocks

Time clocks may be mounted in a 23" enclosure to be cable connected to the panel. Sangamo, Tork or Paragon time clock can be supplied and mounted in panelboard cabinet. Adds 12" to panel height. Mounts in Sub-area.

Description	List Price \$
Time Clock (1 or 2-pole, single or double throw contacts; 3-pole, single throw) 277V maximum with plain dial	1070.
Options—	
Astronomical dial	210.
An omitting device	75.
Reserve power or carryover	2450.
Space and mounting provisions only	540.

#### Subfeed Main Breaker Panels Double Lugs

Ratings Amps	Poles	Mount Ht.	List Price \$
100	2 3	21"	575. 620.
225	2 3	21"	635. 670.
400	2 3	18"	760. 825.

<sup>Ⓞ</sup> Accessories on 1" pole breakers (BL, BQD, ED) will take unit space.



# Panelboards

## Type P2 Panelboard Standard Modifications and Additions

Selection

### Box Size Additions for Optional Features

Options	Main Lugs				Main Breakers											
	125A	250A	400A	600A	125A Horiz. BL, BQD, ED, NGB	125A Horiz. CED	125A Vert. ED	225A Horiz. QJ	225A Vert. QJ	225A Horiz. FD	250A Vert. FD	250A Vert. CFD	400A JD	400A CJD	600A LD	600A CLD
<b>*Min. Box Size</b>	<b>26"</b>	<b>32"</b>	<b>38"</b>	<b>38"</b>	<b>26"</b>	<b>32"</b>	<b>32"</b>	<b>32"</b>	<b>38"</b>	<b>38"</b>	<b>44"</b>	<b>50"</b>	<b>50"</b>	<b>62"</b>	<b>56"</b>	<b>62"</b>
200% Neutral (lug type)	0	0	6 (all)	6 (all)	0	0	0	N/A	0	N/A	0	0	0	0	0	0
Std. Lugs (100% Neut. PNL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CU Lugs (100% Neut. PNL)	6	6	6	0	N/A	N/A	0	N/A	0	N/A	0	0	0	0	0	0
Comp Lugs (100% Neut. PNL)	6	6	6	6	N/A	N/A	0	N/A	0	N/A	0	0	0	0	0	0
Feed-thru Standard Lugs	6	6	12	12	6	6	6	N/A	6	N/A	6	6	12	12	12	12
Feed-thru Cu Lugs	6	6	12	N/A	N/A	N/A	6	N/A	6	N/A	6	6	12	12	N/A	N/A
Feed-thru Comp Lugs	6	12	12	N/A	N/A	N/A	6	N/A	6	N/A	12	12	12	12	N/A	N/A
Subfeed Standard Lugs	0	6	6	N/A	—	—	—	—	—	—	—	—	N/A	—	—	—
Split Bus	6	6	6	6	6	6	6	N/A	6	N/A	6	6	6	6	6	6
(1) FD Subfeed (Horizontal Mtg.)	N/A	12	12	12	N/A	N/A	N/A	N/A	N/A	12	12	12	12	12	12	12
(2) FD Subfeed (Vertical Mtg.)	N/A	24	24	24	N/A	N/A	N/A	N/A	N/A	24	24	24	24	N/A	N/A	N/A
TVSS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Split bus is paired with feed-thru lugs by default. Feed-thru lugs are to feed the section after the split.

**NOTE:** N/A = OPTION NOT AVAILABLE

\*Min. Box Size, corresponding to 9" of Unit Space.

### Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price \$			
					3Ø4W	3Ø3W	1Ø3W	1Ø2W
MLO	125	N/A	(1)#6 - 350 kcmil Al/Cu	6	105.	75.	75.	65.
	250	N/A	(1)#6 - 350 kcmil Al/Cu	6	105.	75.	75.	65.
	400	N/A	(1) 400 - 600 kcmil Cu or (2)#6 - 350 kcmil Al/Cu	6	150.	115.	115.	95.
	600	N/A	(2)#6 - 350 kcmil Cu or Cu/Al or 400 - 600 kcmil Al/Cu	6	200.	150.	150.	115.
Main Breaker	100	ED4, ED6, HED4 HHED6, CED6	(1)#14-2/0 AWG Cu or Al	Box must go to 24" wide on CED6 breaker only Add 6" to box height for NØ	115.	85.	85.	85.
	225	QJ2, QJH2, QJ2H	(1)#6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide	225.	180.	180.	180.
	250	FXD6, HFD6, CFD6	(1)#6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers Requires an additional 6.0" box height	225.	180.	180.	180.
	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(2)#1/0 AWG - 500 kcmil Cu or Al	9	305.	235.	235.	235.
	600	LD6, LXD6, HLD6, CJD6, SLD6, SHLD6, SCLD6	(2)#2/0 AWG - 500 kcmil Cu or Al	6	305.	235.	235.	235.

### Alternate Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price \$
MLO	400	N/A	(1) 250 - 750 kcmil or (2)#3/0 AWG - 250 kcmil Cu or Al	6	275.
Main Breaker	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(1)#4/0 AWG - 750 kcmil Cu or Al	6	510.

# Panelboards

## Type P2 Panelboard Connector Modifications

*Selection*

### Enclosure Modifications

Description	List Price Adder \$	
	Panel Width 20"	Panel Width 24"
NEMA 3R enclosure s	860.	1180.
NEMA 3R/12 enclosure s	1175.	1180.
Gasket between trim and box (Type 1)	680.	900.

### NEMA-4 for Type P2 Water Tight, Dust Tight, Steel Enclosure (consult plant for actual enclosure size)

Box Height Inches	Enclosure Size			List Price Adder \$
	H	W	D	
26	26	20	5.75	3920.
32	32	20	5.75	4230.
38	38	20	5.75	5330.
44	44	20	5.75	6605.
50	50	20	5.75	8015.
56	56	20	5.75	16260.
62	62	20	5.75	20545.
68	68	20	5.75	24835.
74	74	20	5.75	29340.

### NEMA-4X for Type P2 Water Tight, Dust Tight and Corrosion Resistant (consult plant for actual enclosure size)

Box Height Inches	Enclosure - Stainless Steel and Steel with Epoxy Coating			Enclosure - Fiberglass Size (inches)			List Price \$
	H	W	D	H	W	D	
26	26	20	5.75	30	24	8	9000.
32	32	20	5.75	36	24	8	10145.
38	38	20	5.75	48	36	12	12085.
44	44	20	5.75	48	36	12	15805.
50	50	20	5.75	60	36	12	18710.
56	56	20	5.75	60	36	12	20265.
62	62	20	5.75	72	36	8	23710.
68	68	20	5.75	72	36	8	27435.
74	74	20	5.75	84	36	8	31155.

### Remote Switch Modifications (see page 10-71)

#### Application For Remote Switch

Switch Type	Modification
920	Adds 12" to unit space
911	≤ 225A Adds 21" unit space >225 ≤400 Amps Add 10" to width and 8" DP minimum and 24" to height
LEN	30A Adds 15" to unit space >30A 100 Adds 12" to unit space 7.7 Dp. Box min. 100 A ≤ 200 Adds 12" to unit space and 10" Dp. min.

# Panelboards

## Type P2 Panelboard Kits and Accessories

*Selection*

### Standard Enclosures

Box Height Inches	Catalog Number					
	Type 1	Standard Trim			Type 3R	Type 3R/12
	Box	Surface	Flush			
26	B26	S26B	F26B	NR26	WP26	
32	B32	S32B	F32B	NR32	WP32	
38	B38	S38B	F38B	NR38	WP38	
44	B44	S44B	F44B	NR44	WP44	
50	B50	S50B	F50B	NR50	WP50	
56	B56	S56B	F56B	NR56	WP56	
62	B62	S62B	F62B	NR62	WP62	
68	B68	S68B	F68B	NR68	WP68	
74	B74	S74B	F74B	NR74	WP74	

### Options For Type 1 Trims

Items must be ordered as manual line item on Spartanburg

Hinged trim – Replace “B” suffix with “H”

Door-in-door – Replace “B” suffix with “D”

Metal card holder – Replace “B” suffix with “M” on standard trim, add “M” suffix on optional trims

### Option For 24" Wide Enclosures with Equal Gutter on Both Sides

24" wide with equal gutter on both sides - Add “24” as prefix

### Breaker Kits and Accessories

Kit Number	Description	Contents	List Price \$
BBKB32	BL/BQD 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	85.00
BBKED32	ED 6-pole 3" branch breaker kit	Kit contains breaker support, inter-phase barriers, (3) A/C connectors, (1) B connector, hardware	90.00
BBKNB32	NGB 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	90.00
BBKQ1	QJ branch breaker kit for 2 and 3-pole single mount	Kit to contain all connectors and cover plates necessary to mount both 2 and 3-pole breakers	102.00
DFK1	BL, BQD, ED deadfront kit for 1" pole breakers	Center strips 3", 6", 9", 15", 21" plus mounting hardware	90.00
DFFP3	Deadfront filler 3"	3" empty space filler and hardware	45.00
DFFP6	Deadfront filler 6"	6" empty space filler and hardware	51.00
BNK2	Branch neutral (P2)	Three tier lug with mounting hardware to increase neutral capacity	45.00
P2BK1	P2 250A max. Bonding Kit	Bonding strap and hardware	23.00
P2BK2	P2 400A max. Bonding Kit	Bonding strap and hardware	23.00
P2BK3	P2 600A max. Bonding Kit	Bonding strap and hardware	23.00

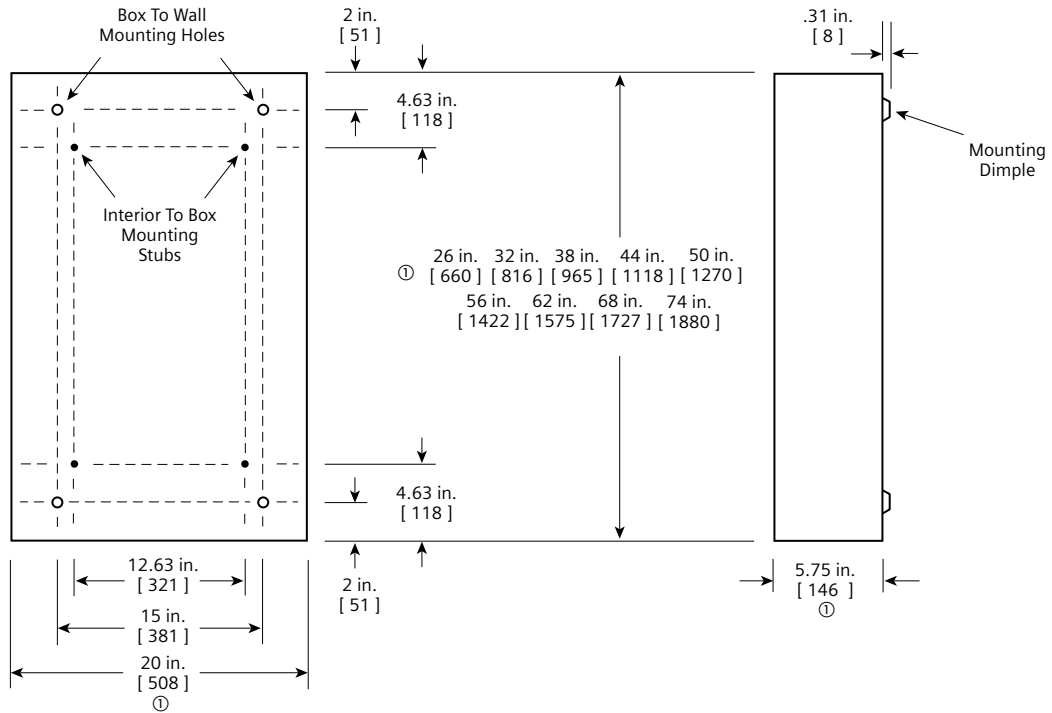
# Panelboards

## Type P2 Panelboards

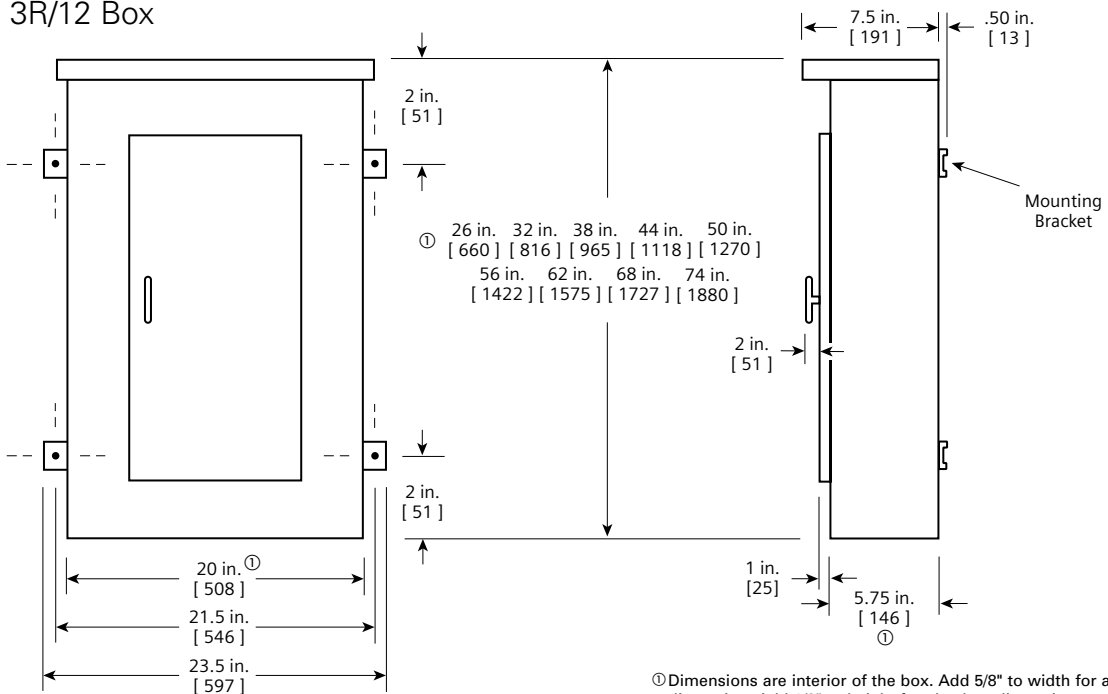
## Dimensions

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



① Dimensions are interior of the box. Add 5/8" to width for absolute dimension. Add 1/8" to height for absolute dimension.  
 Dimensions shown in inches and millimeters [ ].

# Panelboards

## Type P3 Panelboards

General

### Features

Another innovation from Siemens is the P3 panel. It is a smaller, footprint distribution panel to fit a large number of applications that require more (or larger) branch devices than the lighting panel class offer. This panel offers a wide array of factory-assembled options, and has the ability to mix breaker frames in unit space up to 250 amps. Bussing options for the P3 vary from the standard temperature aluminum to temperature rated copper, 750 A/Si aluminum, and 1000A/Si copper designs. All bussing in the P3 panel is tin-plated as a standard. Silver-plated copper is offered as an option on a copper bus. Integrated time clocks, bus mounted contactors, as mains or sub mains, split bus and subfeed lugs (up to 400 amp) are just a few of the options of this unique panel.

The P3 panel configurations, defined by the unit space, allow for a given amperage, main device, and box height. The P3 panel starts with a 56" high box. Breaker unit space can be mixed and matched to meet customer requirements. All 1" pole breakers (BL, BQD, ED frames) are mounted in 3" or 6" pole increments. Breakers frames, above 125 amps, are mounted in 6" single or twin breaker mountings. As an example panel, FD 250 amp and JD 400 amp breakers are mounted as subfeed breakers outside of unit space.

Like other distribution panels, the P3 panel can have blank space added into the panel to allow for future expansions or modifications. Any expansions or modifications must be in 3" increments. BL, BQD and ED frame breakers have 3" or 6-pole kits and can be mixed in unit space by these increments. Breakers of the same frame can cross from one mounting to another if contiguous. QJ frame breakers are mounted in 6" increments for two and three pole single and twin mounted units. Changes in the unit space length for BL, BQD, or ED frame breakers require an additional deadfront center strip kit. Check with sales or the factory for additional unit space kits.

### Main Lug/Main Breaker

**Enclosure** – Standard Type 1 enclosure is 24" wide x 7.75" deep. X Box Height is determined by main device and unit space. See charts for box height.

**Voltage** – 600V AC max.  
250V DC max.

**Amperage** – 800 amp max.

**Short Circuit Rating** – 200 Kaic max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P3 panel is limited to 22 Kaic. Note that the main device may be mounted remote from the panel.

**Bussing** – The P3 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P3 panel is: 750 A/Si aluminum, temperature rated copper, and 1000 A/Si copper. The copper bus option for this panel is tin-plated.

### Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 5 lbs. (1 kg) per inch (54g per mm) of box height.

### Gauge Steel of Boxes Fronts, Surface & Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Front
24" (610)	56 - 80" (1422, 2032)	#16	#14

# Panelboards

## Type P3 Panelboards

## Selection/Dimensions

### Panel Unit Space To Box Height Requirements

"B" Dimension Box Height	P3 Panels With Standard Line Lugs. Unit Space (starting with 9" and adding 6" increments) "A" Dimension										
	Main Lugs				Main Breakers						
	250A	400A	600A	800A	250A Horiz. FD	250A Vert. FD	250A CFD	400A JD	400A CJD	600A LD	600A CLD
56	27	21	21	21	21	15	9	9	—	9	—
62	33	27	27	27	27	21	15	15	9	15	9
68	39	33	33	33	33	27	21	21	15	21	15
74	45	39	39	39	39	33	27	27	21	27	21
80	51	45	45	45	45	39	33	33	27	33	27

### Main Breaker Wire Bending

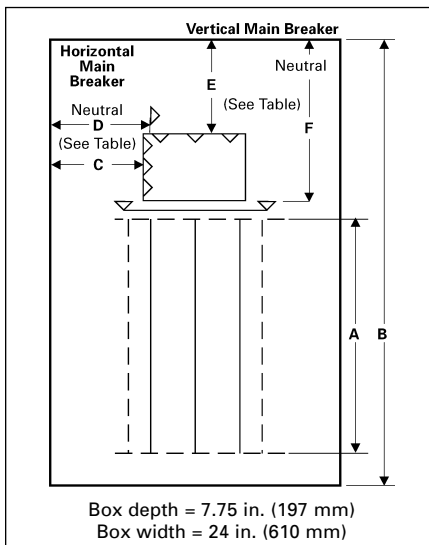
Breaker Frame	C	E	F
FD Horiz.	7.25	—	20.13
FD Vert.	—	12.25	25.38
CFD	—	13.63	31.38
JD	—	15.63	29.38
CJD	—	14.75	35.38
LD	—	14.75	29.38
CLD	—	14.00	35.38

### Main Lug Wire Bending

Panel Amps	Standard Connectors	C	D
250	(1) #6 AWG - 350 kcmil	10.75 ①	13.50
400	(2) #3/0 AWG - 250 kcmil or (1) 600 kcmil	16.00	17.88
600	(2) #3/0 AWG - 500 kcmil	16.00	17.88
800	(2) 600 kcmil	16.00	17.88

① This lug is removable.

### Main Breaker Wire Bending Diagram



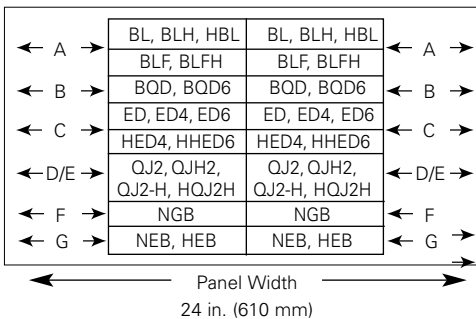
Main Breaker Wire Bending

### Branch Breaker Side Gutters Inches (mm)

Reference Letter	Panel Width 24" (609)
A	7.750 (197)
B	7.125 (181)
C	6.000 (152)
D ①	7.000 (178)
E	5.000 (127)
F	6.625 (168)
G	5.750 (144)

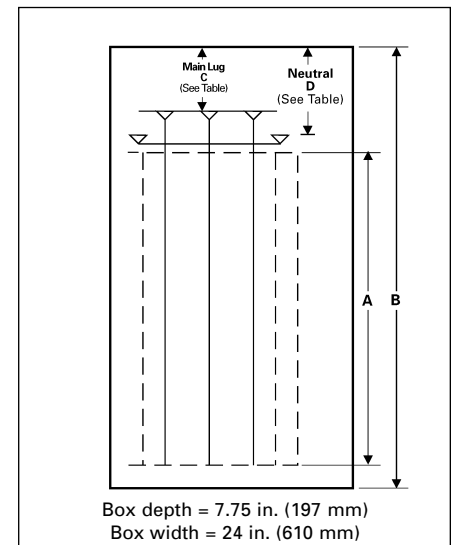
① Single branch mounting construction.

### Branch Breaker Wire Bending Diagram



Branch Breaker Side Gutters

### Main Lug Wire Bending Diagram



Main Lug Wire Bending

# Panelboards

## Type P3 Panelboards

*Selection*

### Alternate Main Breakers

Ampere Rating	Breaker Type	Maximum Interrupting Rating (kA)			Ref. Catalog Number	List Price Adder \$			Available Trip Values
		240V	480V	600V		240V AC	480V AC	600V AC	
250	FD6	65	35	18	FD	STD	STD	STD	70, 80, 90, 100, 110, 125, 150, 200, 225, 250
	FXD6	65	35	18	FX	STD	STD	STD	70, 80, 90, 100, 110, 125, 150, 200, 225, 250
	HFD6	100	65	25	HF	1900.	1900.	1900.	70, 80, 90, 100, 110, 125, 150, 200, 225, 250
	HFXD6	100	65	25	H2	1900.	1900.	1900.	70, 80, 90, 100, 110, 125, 150, 200, 225, 250
	CFD6 <sup>Ⓞ</sup>	200	150	100	CF	2770.	2770.	2770.	70, 80, 90, 100, 110, 125, 150, 200, 225, 250
400	JXD6 <sup>Ⓞ</sup>	65	35	25	JX	STD	STD	STD	200, 225, 250, 300, 350, 400
	JD6 <sup>Ⓞ</sup>	65	35	25	J6	STD	STD	STD	200, 225, 250, 300, 350, 400
	HJXD6 <sup>Ⓞ</sup>	100	65	35	H6	2060.	2060.	2060.	200, 225, 250, 300, 350, 400
	HJD6 <sup>Ⓞ</sup>	100	65	35	H5	2060.	2060.	2060.	200, 225, 250, 300, 350, 400
	SJD6 <sup>Ⓞ</sup>	65	35	25	SJ	2480.	2480.	2480.	200, 300, 400
	SHJD6 <sup>Ⓞ</sup>	100	65	35	S2	2820.	2820.	2820.	200, 300, 400
	CJD6 <sup>Ⓞ</sup>	200	200	100	CJ	3000.	3000.	3000.	200, 300, 400
	SCJD6 <sup>Ⓞ</sup>	200	200	100	SC	4950.	4950.	4950.	200, 300, 400
600	LXD6 <sup>Ⓞ</sup>	65	35	25	LX	STD	STD	STD	450, 500, 600
	LD6 <sup>Ⓞ</sup>	65	35	25	L6	STD	STD	STD	250, 300, 350, 400, 450, 500, 600
	HLXD6 <sup>Ⓞ</sup>	100	65	35	HL	2060.	2060.	2060.	250, 300, 350, 400, 450, 500, 600
	HLD6 <sup>Ⓞ</sup>	100	65	35	HO	2060.	2060.	2060.	250, 300, 350, 400, 450, 500, 600
	SLD6 <sup>Ⓞ</sup>	65	35	25	SL	2820.	2820.	2820.	300, 400, 500, 600
	SHLD6 <sup>Ⓞ</sup>	100	65	35	S6	4890.	4890.	4890.	300, 400, 500, 600
	CLD6 <sup>Ⓞ</sup>	200	150	100	CL	4320.	4320.	4320.	300, 400, 500, 600
	SCLD6	200	150	100	C6	5790.	5790.	5790.	300, 400, 500, 600

Ⓞ Vertically mounted

# Panelboards

## Type P3 Panelboards

Selection

### Branch Circuit Breakers

Max. Amp Rating	Bolt-On Breaker Type	List Price \$					Provisions for Maximum Interrupting Rating (kA)						
		Amps	1-Pole	2-Pole	3-Pole	Future \$	120V AC	120/240V AC	240V AC	277V AC	480V AC	600V AC	250V DC
100	BL	15-60	25.	45.	140.	—	10	—	—	—	—	—	—
		70	35.	85.	190.	—	—	10	—	—	—	—	—
		80-100	—	140.	210.	—	—	—	10	—	—	—	—
	BLH	15-60	35.	85.	220.	—	—	22	—	—	—	—	—
		70	75.	130.	300.	—	—	22	—	—	—	—	—
		80-100	—	200.	310.	—	—	—	22	—	—	—	—
	HBL	15-55	85.	270.	380.	—	—	65	—	—	—	—	—
		60-100	—	400.	490.	—	—	—	65	—	—	—	—
	BL, (HID)	15-30	45.	75.	—	—	10	—	—	—	—	—	—
	BLR (240V)	15-60	—	110.	—	—	—	—	10	—	—	—	—
		70-100	—	190.	—	—	—	—	10	—	—	—	—
	BLE (GFCI)	15-30	220.	330.	—	—	10	—	—	—	—	—	—
		40-60	—	330.	—	—	—	10	—	—	—	—	—
	BLEH (GFCI)	15-30	420.	—	—	—	22	—	—	—	—	—	—
15-60		—	530.	—	—	—	22	—	—	—	—	—	
BLF (GFCI)	15-30	140.	240.	—	—	10	—	—	—	—	—	—	
	40-60	—	250.	—	—	—	10	—	—	—	—	—	
BLHF (GFCI)	15-30	160.	280.	—	—	22	—	—	—	—	—	—	
	40-60	—	300.	—	—	—	22	—	—	—	—	—	
BGL <sup>①</sup>	15-30	—	100.	130.	—	10	—	—	—	—	—	—	
BAF	15-20	160.	330.	—	—	10	—	—	—	—	—	—	
BAFH	15-20	180.	340.	—	—	22	—	—	—	—	—	—	
BQD	15-60	85.	270.	380.	—	—	65	—	—	14	—	14	
	70-100	—	400.	490.	—	—	—	65	—	14	—	14	
125	NGB	15-60	130.	360.	480.	—	100	100	100	25	25	—	14
		70-100	210.	420.	540.	—	100	100	100	25	25	—	14
		110-125	—	710.	910.	—	100	100	100	25	25	—	14
	NEB	15-60	250.	370.	560.	—	85	85	85	35	35	22	35
		70-100	250.	490.	640.	—	85	85	85	35	35	22	35
		110-125	460.	890.	1090.	—	85	85	85	35	35	22	35
	HEB	15-60	380.	560.	710.	—	100	100	100	65	65	25	42
		70-100	380.	690.	780.	—	100	100	100	65	65	25	42
		110-125	1160.	1280.	1450.	—	100	100	100	65	65	25	42
	ED4	15-60	160.	440.	590.	—	65	—	—	22	—	—	—
		70-100	260.	520.	670.	—	—	—	65	—	18	—	30
		110-125	—	880.	1120.	—	—	—	65	—	18	—	—
	ED6	15-60	—	460.	700.	—	—	—	65	—	25	18	30
		70-100	—	600.	790.	—	—	—	65	—	25	18	—
110-125		—	1100.	1350.	—	100	—	—	—	—	—	—	
HED4	15-60	490.	850.	950.	—	100	—	—	—	—	—	—	
	70-100	490.	950.	1070.	—	—	—	—	65	—	—	—	
	110-125	—	1750.	1970.	—	—	—	—	65	—	—	—	
HHED6	15-60	—	860.	960.	—	—	—	100	42	42	—	30	
	70-100	—	960.	1090.	—	—	—	100	42	42	—	30	
	110-125	—	1760.	1990.	—	—	—	100	42	42	—	—	
225	QJ2	60-225	—	420.	880.	170.	—	—	10	—	—	—	—
	QJH2	60-225	—	930.	1140.	170.	—	—	22	—	—	—	—
	QJ2H	60-225	—	1080.	1410.	170.	—	—	42	—	—	—	—
	HQJ2H	60-225	—	—	1940.	170.	—	—	100	—	—	—	—

### Subfeed Breakers

Breaker Type	Mounting Position When Used as Subfeed Breaker	List Price \$		Provisions for Future \$	Ampere Ratings For Load	Maximum Interrupting Rating (kA) Symmetrical		
		2-Pole	3-Pole			240V AC	480V AC	600V AC
FD6 <sup>②</sup> , FXD6	Twin	1220.	1540.	220.	70-250	65	35	18
HFD6 <sup>②</sup> , HFXD6	Twin	2440.	3010.	220.	70-250	100	65	25
JD6 <sup>③</sup> , JXD6	Single	1720.	2180.	290.	200-400	65	35	25
HJD6 <sup>③</sup> , HJXD6	Single	3160.	4220.	290.	200-400	100	65	35

### Neutral Connectors

Wire Range	Max. Number of Connections	Max. Amps <sup>⑤</sup>
#14-#1/0	44	125
#14-3/0	12	200
#4 - 350 kcmil	6	250
(1)#4 - 600 kcmil or (2)#6 - 250 kcmil	1	400

### Branch Device Limitations

For panels applied on systems requiring neutral connections, some limitations

apply. By application rule (NEC 408.14), lighting and appliance panels are limited to 42 circuit installed. Each overcurrent

device pole counts as a circuit. Additional limitations for these panels are based on available neutral connections.

① BGL 2-pole is (1) phase and neutral 3-pole is (2) phases and neutral.

NOTE: QJ Breakers are twin mounted in unit space and take 6" of unit space. Limited to (6) per panel max. BL, HBL, BLH and BQD breakers are mounted in common mountings in 3" or (6) pole increments. ED2, ED4, ED6, HED4 and HHED6

breakers are mounted in common mountings in 3" or (6) pole increments.

② Twin mounted subfeed breakers are mounted at bottom of panelboard only and adds 24" to the panel height.

③ Subfeed breaker is mounted at bottom of panelboard only. 400 amp subfeed breaker adds 30" to the panel height.



# Panelboards

## Type P3 Panelboards

Selection

Typical Catalog Numbers

Main Lugs Only – shown with aluminum bus, top fed, and surface trims

Maximum Panel Amp Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250V DC Max.	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
250	27	P3C56ML250ATS	1760.00	P3B56ML250ATS	1760.00	P3A56ML250ATS	1660.00
	33	P3C62ML250ATS	1980.00	P3B62ML250ATS	1980.00	P3A62ML250ATS	1890.00
	39	P3C68ML250ATS	2220.00	P3B68ML250ATS	2220.00	P3A68ML250ATS	2110.00
	45	P3C74ML250ATS	2440.00	P3B74ML250ATS	2440.00	P3A74ML250ATS	2330.00
	51	P3C80ML250ATS	2660.00	P3B80ML250ATS	2660.00	P3A80ML250ATS	2570.00
400	21	P3C56ML400ATS	2120.00	P3B56ML400ATS	2120.00	P3A56ML400ATS	2050.00
	27	P3C62ML400ATS	2350.00	P3B62ML400ATS	2350.00	P3A62ML400ATS	2270.00
	33	P3C68ML400ATS	2580.00	P3B68ML400ATS	2580.00	P3A68ML400ATS	2490.00
	39	P3C74ML400ATS	2800.00	P3B74ML400ATS	2800.00	P3A74ML400ATS	2720.00
	45	P3C80ML400ATS	3020.00	P3B80ML400ATS	3020.00	P3A80ML400ATS	2950.00
600	21	P3C56ML600ATS	2410.00	P3B56ML600ATS	2410.00	P3A56ML600ATS	2290.00
	27	P3C62ML600ATS	2630.00	P3B62ML600ATS	2630.00	P3A62ML600ATS	2510.00
	33	P3C68ML600ATS	2850.00	P3B68ML600ATS	2850.00	P3A68ML600ATS	2730.00
	39	P3C74ML600ATS	3080.00	P3B74ML600ATS	3080.00	P3A74ML600ATS	2970.00
	45	P3C80ML600ATS	3310.00	P3B80ML600ATS	3310.00	P3A80ML600ATS	3190.00
800	21	P3C56ML800ATS	2850.00	P3B56ML800ATS	2850.00	P3A56ML800ATS	2730.00
	27	P3C62ML800ATS	3080.00	P3B62ML800ATS	3080.00	P3A62ML800ATS	2970.00
	33	P3C68ML800ATS	3310.00	P3B68ML800ATS	3310.00	P3A68ML800ATS	3190.00
	39	P3C74ML800ATS	3530.00	P3B74ML800ATS	3530.00	P3A74ML800ATS	3410.00
	45	P3C80ML800ATS	3760.00	P3B80ML800ATS	3760.00	P3A80ML800ATS	3640.00

Maximum Panel Amp Rating	Unit Space (inches)	240V		408Y/277V		480V <sup>①</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
250	27	P3D56ML250ATS	1660.00	P3E56ML250ATS	1970.00	P3F56ML250ATS	1660.00
	33	P3D62ML250ATS	1890.00	P3E62ML250ATS	2200.00	P3F62ML250ATS	1890.00
	39	P3D68ML250ATS	2110.00	P3E68ML250ATS	2430.00	P3F68ML250ATS	2110.00
	45	P3D74ML250ATS	2330.00	P3E74ML250ATS	2650.00	P3F74ML250ATS	2330.00
	51	P3D80ML250ATS	2570.00	P3E80ML250ATS	2880.00	P3F80ML250ATS	2570.00
400	21	P3D56ML400ATS	2050.00	P3E56ML400ATS	2120.00	P3F56ML400ATS	2050.00
	27	P3D62ML400ATS	2270.00	P3E62ML400ATS	2350.00	P3F62ML400ATS	2270.00
	33	P3D68ML400ATS	2490.00	P3E68ML400ATS	2580.00	P3F68ML400ATS	2490.00
	39	P3D74ML400ATS	2720.00	P3E74ML400ATS	2800.00	P3F74ML400ATS	2720.00
	45	P3D80ML400ATS	2950.00	P3E80ML400ATS	3020.00	P3F80ML400ATS	2950.00
600	21	P3D56ML600ATS	2290.00	P3E56ML600ATS	2410.00	P3F56ML600ATS	2290.00
	27	P3D62ML600ATS	2510.00	P3E62ML600ATS	2630.00	P3F62ML600ATS	2510.00
	33	P3D68ML600ATS	2730.00	P3E68ML600ATS	2850.00	P3F68ML600ATS	2730.00
	39	P3D74ML600ATS	2970.00	P3E74ML600ATS	3080.00	P3F74ML600ATS	2970.00
	45	P3D80ML600ATS	3190.00	P3E80ML600ATS	3310.00	P3F80ML600ATS	3190.00
800	21	P3D56ML800ATS	2730.00	P3E56ML800ATS	2850.00	P3F56ML800ATS	2730.00
	27	P3D62ML800ATS	2970.00	P3E62ML800ATS	3080.00	P3F62ML800ATS	2970.00
	33	P3D68ML800ATS	3190.00	P3E68ML800ATS	3310.00	P3F68ML800ATS	3190.00
	39	P3D74ML800ATS	3410.00	P3E74ML800ATS	3530.00	P3F74ML800ATS	3410.00
	45	P3D80ML800ATS	3640.00	P3E80ML800ATS	3760.00	P3F80ML800ATS	3640.00

① For 600V, change "F" in position 3 to "G." Price only branch breakers with 600V ratings.

# Panelboards

## Type P3 Panelboards

*Selection*

Typical Catalog Numbers

**Main Circuit Breaker – shown with aluminum bus, top fed, and surface trims**

Maximum Panel Amp Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250V DC Max	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
250	21	P3C56FD250ATS	3430.00	P3B56FD250ATS	3430.00	P3A56FD250ATS	3540.00
	27	P3C62FD250ATS	3660.00	P3B62FD250ATS	3660.00	P3A62FD250ATS	3770.00
	33	P3C68FD250ATS	3880.00	P3B68FD250ATS	3880.00	P3A68FD250ATS	4000.00
	39	P3C74FD250ATS	4110.00	P3B74FD250ATS	4110.00	P3A74FD250ATS	4220.00
	45	P3C80FD250ATS	4340.00	P3B80FD250ATS	4340.00	P3A80FD250ATS	4450.00
400	9	P3C56JD400ATS	3830.00	P3B56JD400ATS	3830.00	P3A56JD400ATS	3260.00
	15	P3C62JD400ATS	4050.00	P3B62JD400ATS	4050.00	P3A62JD400ATS	4720.00
	21	P3C68JD400ATS	5190.00	P3B68JD400ATS	5190.00	P3A68JD400ATS	4940.00
	27	P3C74JD400ATS	5420.00	P3B74JD400ATS	5420.00	P3A74JD400ATS	5180.00
	33	P3C80JD400ATS	5650.00	P3B80JD400ATS	5650.00	P3A80JD400ATS	5410.00
600	9	P3C56LD600ATS	6660.00	P3B56LD600ATS	6660.00	P3A56LD600ATS	6260.00
	15	P3C62LD600ATS	6890.00	P3B62LD600ATS	6890.00	P3A62LD600ATS	6500.00
	21	P3C68LD600ATS	7120.00	P3B68LD600ATS	7120.00	P3A68LD600ATS	6720.00
	27	P3C74LD600ATS	7340.00	P3B74LD600ATS	7340.00	P3A74LD600ATS	6950.00
	33	P3C80LD600ATS	7570.00	P3B80LD600ATS	7570.00	P3A80LD600ATS	7180.00

Maximum Panel Amp Rating	Unit Space (inches)	240V		408Y/277V		480V <sup>①</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
250	21	P3D56FD250ATS	3340.00	P3E56FD250ATS	3450.00	P3F56FD250ATS	3540.00
	27	P3D62FD250ATS	3570.00	P3E62FD250ATS	3670.00	P3F62FD250ATS	3770.00
	33	P3D68FD250ATS	3790.00	P3E68FD250ATS	3890.00	P3F68FD250ATS	4000.00
	39	P3D74FD250ATS	4020.00	P3E74FD250ATS	4120.00	P3F74FD250ATS	4220.00
	45	P3D80FD250ATS	4240.00	P3E80FD250ATS	4350.00	P3F80FD250ATS	4450.00
400	9	P3D56JD400ATS	4090.00	P3E56JD400ATS	5190.00	P3F56JD400ATS	3260.00
	15	P3D62JD400ATS	3850.00	P3E62JD400ATS	4940.00	P3F62JD400ATS	4720.00
	21	P3D68JD400ATS	4090.00	P3E68JD400ATS	5190.00	P3F68JD400ATS	4940.00
	27	P3D74JD400ATS	4310.00	P3E74JD400ATS	5420.00	P3F74JD400ATS	5180.00
	33	P3D80JD400ATS	4540.00	P3E80JD400ATS	5650.00	P3F80JD400ATS	5410.00
600	9	P3D56LD600ATS	6260.00	P3E56LD600ATS	6660.00	P3F56LD600ATS	6260.00
	15	P3D62LD600ATS	6500.00	P3E62LD600ATS	6890.00	P3F62LD600ATS	6500.00
	21	P3D68LD600ATS	6720.00	P3E68LD600ATS	7120.00	P3F68LD600ATS	6720.00
	27	P3D74LD600ATS	6950.00	P3E74LD600ATS	7340.00	P3F74LD600ATS	6950.00
	33	P3D80LD600ATS	7180.00	P3E80LD600ATS	7570.00	P3F80LD600ATS	7180.00

① For 600V, change "F" in position 3 to "G." Price only branch breakers with 600V ratings.

# Panelboards

## Type P3 Panelboard Modifications and Additions

**Selection**

### Enclosures

#### Extra Gutter to Sides or Ends of the Can

Description	List Price \$
6" end gutter .....	235.
2" side gutter .....	200.
Barrier in gutter (add to extra gutter price) .....	200.

Hinged trims .....	160.
Piano hinged trims .....	360.
Door-in-door trims .....	360.
Screw to the box trims .....	160.

Trim mounted devices .....	See page 10-72
• Pilot lights	
• Toggle switches	
• Push buttons	
(Devices mounted and wired to the trim should also have hinged trim specified)	

Painted boxes .....	See page 10-72
Custom colors .....	See painted boxes
Increase gauge trims and boxes .....	See page 10-72
Stainless steel trims and boxes, Type 1 .....	See page 10-72
Aluminum trims and boxes, Type 1 .....	See page 10-72

### Meters

(Contact sales for pricing and application engineering for space requirements)

### Panel Skirts

See page 10-73

### Special Locks

TEY .....	235.
TEU1 .....	255.
Cat 60 .....	235.
LL803 .....	235.
LL806 .....	235.
Yale 47 (NYC) .....	425.

### Panel Bus Modifications

Main Bus	Catalog Number	Amperes Rating			
		125A	250A	400A	600A
750 A/SI AL. Copper (tin pltd.)	B	190.	190.	340.	645.
Copper (silver pltd.)	F	340.	340.	910.	1335.
1000 A/SI Copper (tin pltd.)	G	730.	730.	1020.	2110.
1000 A/SI Copper (silver pltd.)	H	1070.	1070.	1240.	2355.

### Subfeed, Feed-Thru and Split Bus

Ampere Rating	List Price \$		Connector Cu/Al Wire Range
	3-Pole	2-Pole	

#### Subfeed (Double) Lugs for Main Lug Panelboards Only

225/250	85.	85.	(2)—#6 AWG-350 kcmil
400	235.	235.	(2)—250 kcmil (1)—600 kcmil

#### Feed-Thru Lugs — Cannot Be Used in Conjunction with TVSS or Subfeed Breakers

See page 10-40 for unit space adders and compatibility with other options.

225/250	190.	160.	(1)—#6 AWG-350 kcmil
400	490.	445.	(2)—250 kcmil (1)—600 kcmil
600	720.	680.	(2)—250-500 kcmil
800	770.	—	(2)—600 kcmil

#### Split Bus

225/250	245.	180.	(1)—#6 AWG-350 kcmil
400	490.	445.	(2)—250 kcmil (1)—600 kcmil
600	720.	680.	(2)—250-500 kcmil
800	1435.	1390.	(2)—600 kcmil

#### Branch and Main Breaker Accessories

See page 10-70 and Breaker Section

- Handle blocks
- Handle locks
- Aux. Contacts<sup>Ⓞ</sup>
- UVR<sup>Ⓞ</sup>

#### Increase capacity neutral up to 200%

Main Bus Amps	List Price Adder \$
125	340.
250	530.
400	560.
600	625.

See page 10-40 for unit space adders and compatibility with other options.

#### Copper MLO Only

Main Bus Amps	List Price Adder \$
125	115.
250	190.
400	285.
600	285.

### Bus mounted TVSS

..... See Section 9 for TPS1

### Service Entrance Label

Type P3 Panelboards are factory labeled suitable for use as service entrance equipment when NEC requirements are met. A panelboard cannot have more than six main disconnects, unless it is a lighting and appliance branch panelboard. Lighting and appliance branch panelboards are limited to two main disconnects.

### Grounding of Panelboards

Ground Bars except for brazed to box are shipped with the panel interior factory mounted.

- Non-Insulated Equipment Ground Bar — **STD**
- Copper Non-Insulated Ground Bar . . . . . **40.**
- Al Insulated Equipment Ground Bar . . . . . **40.**
- Cu Insulated Equipment Ground Bar . . . . . **75.**
- Ground Bar Brazed to Box . . . . . **245.** (recommended for painted boxes)

### Shunt Trip on Main or Branch

See breaker section for list price adders. BL, BLH, HBL, BQD, ED4, HED4, ED6, HED6, HHED6, QJ2, QJ2H, QJH2, HQJ2H as branch only. BL, BLH, HBL, ED2, ED4, HED4, ED6, HED6, HHED6 uses 1" unit space for shunt trip. All others may be used on mains or subfeeds.

QJ2, QJ2-H, QJH2, HQJ2H, ED4, ED6, HED4, HED6, HHED6, FXD6, HFD6, JXD6, JD6, HJD6, HJXD6

### Time Clocks

Time clocks may be mounted in a 23" enclosure to be cable connected to the panel. Sangamo, Tork or Paragon time clock can be supplied and mounted in panelboard cabinet. Adds 12" to panel height. Mounts in Sub-area.

Description	List Price \$
Time Clock (1 or 2-pole, single or double throw contacts; 3-pole, single throw) 277V maximum with plain dial Options—	<b>1070.</b>
Astronomical dial	<b>210.</b>
An omitting device	<b>75.</b>
Reserve power or carryover	<b>2450.</b>
Space and mounting provisions only	<b>540.</b>

<sup>Ⓞ</sup> Accessories on 1" pole breakers (BL, BQD, ED) will take unit space.

# Panelboards

## Type P3 Panelboard Standard Modifications

*Selection*

### Option Combinations

Amps	Incoming	Subfeed Lugs	Feed-thru Lugs	FD <sup>①</sup> Subfeed	JD <sup>①</sup> Subfeed	FD <sup>②</sup> Subfeeds	200% Neutral	Min. Box Size (in.)	Unit Space (in.)			
250	Main Lug Only	—	• — —	— • —	— — —	— — •	• • •	56 56 56	27 15 9			
		Main Lugs w/Subfeed Lugs	•	• — —	— • —	— — —	— — •	• • •	56 56 62	21 21 9		
			Main Breaker (Horiz. FD)	—	• —	— •	— —	— —	• •	56 56	21 9	
	Main Breaker (Vert. FD)	None Std.		• —	— •	— —	— —	• •	56 68	15 9		
	Main Breaker (CFD)	None Std.	• —	— •	— —	— —	• •	56 68	9 9			
400 <sup>②③</sup>	Main Lug Only	•	— • — — —	— • — — —	— — • — —	— — — — •	• • • • •	56 56 56 56 62	21 15 9 9 9			
		Main Breaker (JD)	None Std.	—	— • — — —	— — • — —	— — — • —	• • • • •	56 62 68 68 74	9 9 9 9 9		
				Main Breaker (CJD)	None Std.	—	— • — — —	— — • — —	— — — • —	• • • • •	62 74 74 74 80	9 9 9 9 9
						Main Lug Only	—	• — — — —	— — • — —	— — — • —	• • • • •	56 56 56 56 62
	Main Breaker LD						—	—	• — — — —	— — • — —	— — — • —	• • • • •
Main Breaker CLD		—	—					• — — — —	— — • — —	— — — • —	• • • • •	62 68 74 74 80
			Main Lug Only	—	• — — — —			— — • — —	— — — • —	• • • • •	56 56 56 56 62	21 9 9 9 9
				Main Breaker LD	—	—		• — — — —	— — • — —	— — — • —	• • • • •	56 56 56 56 62
	Main Breaker CLD					—	—	• — — — —	— — • — —	— — — • —	• • • • •	56 56 56 56 62

① Subfeed lugs are currently not offered as standard with main circuit breakers.

② Subfeed lugs on panels above 400A are not standard.

③ 200% neutral cannot be provided along with a 400A subfeed breaker because the breaker blocks the 4th lug site.

# Panelboards

## Type P3 Panelboard Connector Modifications

Selection

### Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price \$			
					3-Phase/4-Wire	3-Phase/3-Wire	1-Phase/3-Wire	1-Phase/2-Wire
MLO	250	N/A	(1)#6 AWG - 350 kcmil	—	105.	75.	75.	65.
	400	N/A	(1) 250 - 500 kcmil or (2)# 1/0 AWG - 250 kcmil	—	150.	115.	115.	95.
	600	N/A	(2)#3/0 AWG - 500 kcmil	—	200.	150.	150.	115.
	800	N/A	(2) 400-750 kcmil Cu only	—	265.	200.	200.	200.
Main Breaker	250	FXD6, HFD6, CFD6	(1)#6 AWG - 350 kcmil Cu or Al	CFD6 requires an additional 6.0" box height	225.	180.	180.	180.
	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(2)#1/0 AWG - 500 kcmil Cu or Al	6	305.	235.	235.	235.
	600	LD6, LXD6, HLD6, CJD6, SLD6, SHLD6, SCLD6	(2)#2/0 AWG - 500 kcmil Cu or Al	6	305.	235.	235.	235.

### Alternate Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price \$
MLO	400	N/A	(1) 250 - 750 kcmil or (2)#3/0 AWG - 250 kcmil Cu or Al	6	275.
	800	N/A	(2) 600 kcmil	6	390.
Main Breaker	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(1)#4/0 AWG - 750 kcmil Cu or Al	6	305.

### Enclosure Modifications

Description	List Price Adder \$
	Panel Width 24"
NEMA 3R enclosures	1175.
NEMA 3R/12 enclosures	1175.
Gasket between trim and box (Type 1)	890.

**NEMA-4 For Type P3**  
**Water Tight, Dust Tight, Steel Enclosure**  
 (consult plant for actual enclosure size)

Box Height Inches	Enclosure Size			List Price \$
	H	W	D	
56	56	24	7.75	16260.
62	62	24	7.75	20545.
68	68	24	7.75	24835.
74	74	24	7.75	29340.
80	80	24	7.75	29350.

**NEMA-4X For Type P3**  
**Water Tight, Dust Tight and Corrosion Resistant**  
 (consult plant for actual enclosure size)

Box Height Inches	Enclosure - Stainless Steel and Steel with Epoxy Coating			Enclosure - Fiberglass Size (inches)			List Price \$
	H	W	D	H	W	D	
56	56	24	7.75	60	36	12	20265.
62	62	24	7.75	66	36	8	23710.
68	68	24	7.75	72	36	8	27435.
74	74	24	7.75	78	36	8	31155.
80	80	24	7.75	84	36	8	31610.

Remote Switch Modifications (see page 10-71)

### Application For Remote Switch

Switch Type	Modification
920	Adds 12" to unit space
911	≤ 225A Adds 21" unit space >225 ≤400 Amps Add 10" to width and 8" DP minimum and 24" to height
LEN	30A Adds 15" to unit space >30A ≤ 100 Adds 12" to unit space 100 A ≤ 200 Adds 12" to unit space and 10" Dp. min.

# Panelboards

## Type P3 Panelboard Kits and Accessories

*Selection*

### Standard Enclosures

Box Height (in.)	Catalog Number				
	Type 1 Standard Trim			Type 3R	Type 3R/12
	Box	Surface	Flush		
56	24WD56	P3S56	P3F56	24NRD56	24WPD56
62	24WD62	P3S62	P3F62	24NRD62	24WPD62
68	24WD68	P3S68	P3F68	24NRD68	24WPD68
74	24WD74	P3S74	P3F74	24NRD74	24WPD74
80	24WD80	P3S80	P3F80	24NRD80	24WPD80

### Options For Type 1 Trims

Items must be ordered as manual line item on factory

Hinged trim – Add “H” suffix

Door-in-door – Add “D” suffix

Metal card holder – Add “M” suffix

### Breaker Kits and Accessories

Kit Number	Description	Contents	List Price \$
BBKB32	BL/BQD 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	85.00
BBKNB32	NGB 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	90.00
BBKEB32	NEB/HEB 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	113.00
BBKED32	ED 6-pole 3" branch breaker kit	Kit contains breaker support, inter-phase barriers, (3) A/C connectors, (1) B connector, hardware	90.00
BBKQ2	Branch breaker kit for 2 and 3-pole QJ twin mount	Kit contains all connectors and cover plates necessary to mount both 2 and 3-pole breakers	350.00
DFFP3	Deadfront filler 3"	3" empty space filler and hardware	45.00
DFFP6	Deadfront filler 6"	6" empty space filler and hardware	51.00
P3BK1	P3 bonding kit	Bonding strap and hardware	23.00

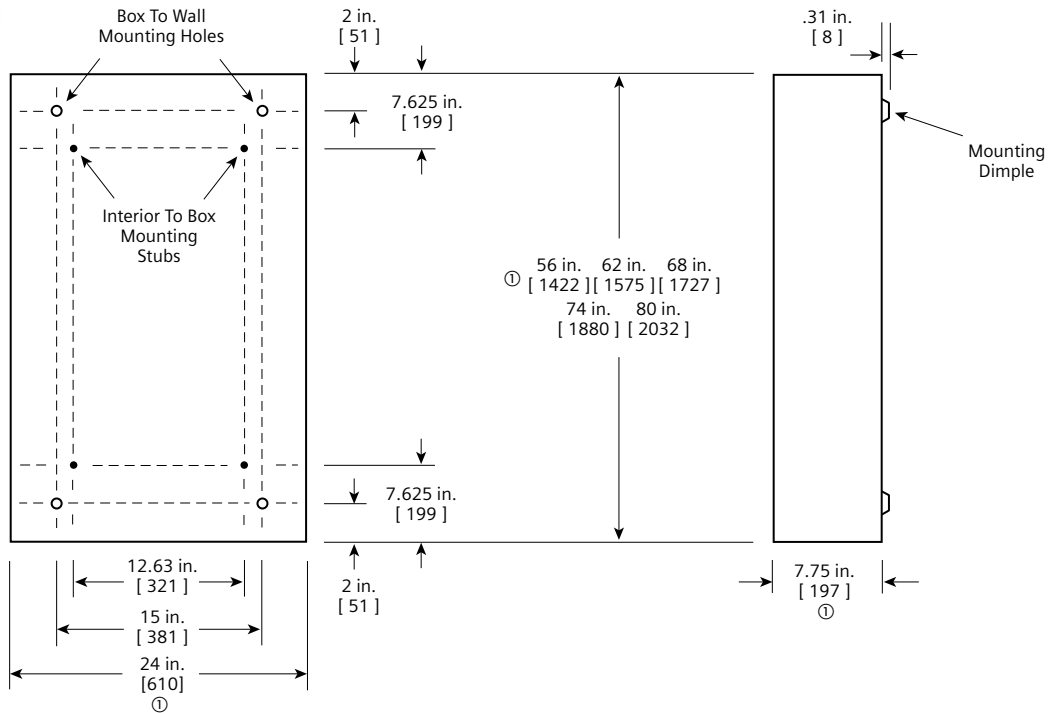
# Panelboards

## Type P3 Panelboards

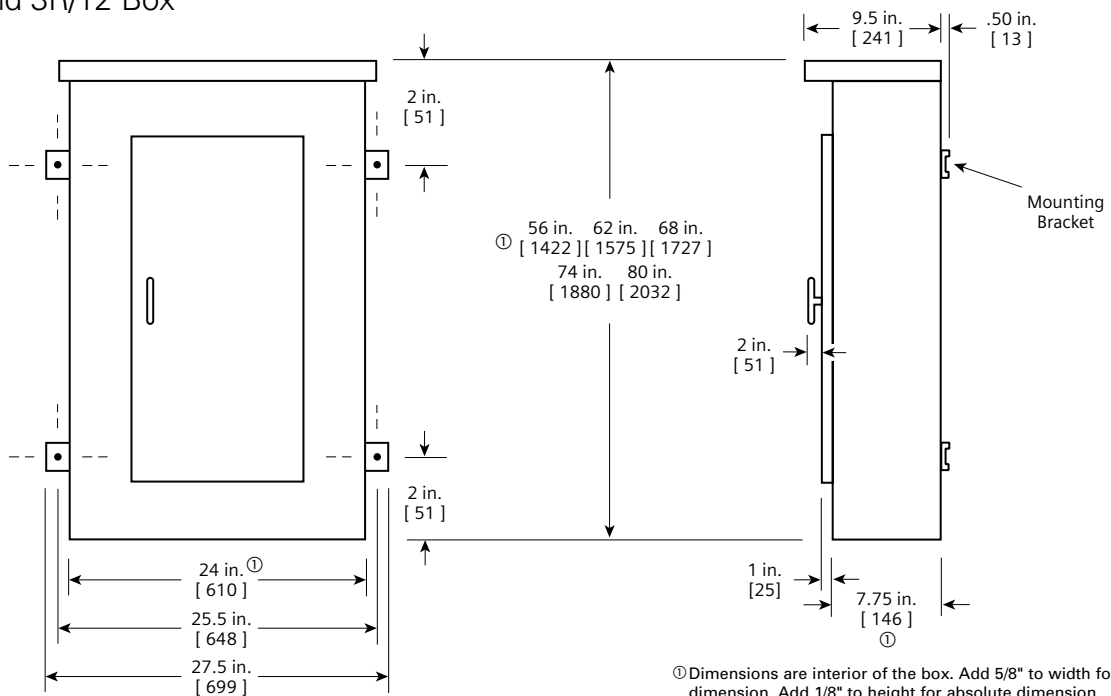
## Dimensions

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



Ⓞ Dimensions are interior of the box. Add 5/8" to width for absolute dimension. Add 1/8" to height for absolute dimension.  
 Dimensions shown in inches and millimeters [ ].

# Panelboards

## Type P4 Panelboards

General

### Features

The P4 panel is a medium sized footprint distribution panel to fit a large number of applications that require more or larger branch devices and higher amp ratings than the lighting panel class offer. Even with the increased capacity, this panel is a space saver with its 32" width and 10" depth. The P4 panel offers a wide array of factory-assembled options and has the ability to mix breaker frames in unit space up to 800 amps and fusible switches up to 200 amps. Bussing options for the P4 vary from the standard temperature rated aluminum to temperature rated copper and 750A/Si aluminum and 1000A/Si copper designs. All aluminum bussing in the P4 panel is tin-plated as a standard. Silver-plated is offered as the default for copper bus and tin as an option. Integrated time clocks, bus mounted contactors as mains or submains, split bus and subfeed lugs (up to 600 amp) are just a few of the options of this flexible panel.

The 4 panel configurations defined by the unit space allowed for a given amperage, main device and box height. The P4 panel starts with a 60" high box. All of the branch devices are unit space mounted. Breakers and switches can be mixed and matched to meet customer requirements.

### Main Lug / Main Breaker / Main Switch

**Enclosure** – Standard Type 1 enclosure is 32" wide x 10" deep. X Box Height is determined by main device and unit space. See charts for box height. Voltage – 600V AC max. 250V DC max.

**Amperage** – 400-800 amp main breaker (check with factory on availability of 800 amp), 400-1200 amp MLO, 100-200 amp main switch.

**Short Circuit Rating** – 200 KAIC max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P4 panel is limited to 42 KAIC. Note that the main device may be mounted remote from the panel.

**Bussing** – The P4 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P4 panel is: 750 A/Si aluminum, temperature rated copper, and 1000 A/Si copper. The copper bus option for this panel is silver-plated.

### Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 8 lbs. (1 kg) per inch (54g per mm) of box height.

### Main Lugs<sup>①</sup>

Ampere Rating	Connectors Suitable for Copper or Aluminum
400	(1) - #3/0 AWG-500 kcmil (2) - #3/0 AWG-250 kcmil
600	(2) - #3/0 AWG-500 kcmil
800	(3) - #3/0 AWG-500 kcmil
1000	(4) - #3/0 AWG-500 kcmil
1200	(4) - #3/0 AWG-500 kcmil

<sup>①</sup> Alternate lugs for 750 kcmil cable are available, but result in significant loss of branch unit mounting space. Consult Siemens.

### Gauge Steel of Boxes Fronts, Surface and Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Fronts
32" (813)	60 - 75 - 90 (1524, 1905, 2286)	#16 <sup>①</sup>	#14 (1 piece trim) 14 Ga (4 piece trim)

<sup>①</sup> Box has 16 gauge side panels and 12 gauge back support.

### Enclosure Selection<sup>①</sup>

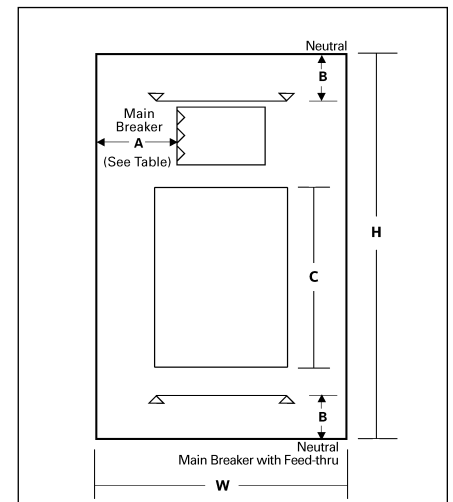
Enclosure Dimension in Inches (mm)			Available Circuit Space in Inches (mm) Dimension "C"		
H	W	D	Main Lug	Main Breaker	Main Switch
Type 1, 3R/12			400 / 800A	400 / 800A	100 / 200A
60 (1524)	32 (813)	10 (254)	30 (762)	21.25 (540)	20 (508)
75 (1905)	32 (813)	10 (254)	45 (1143)	36.25 (921)	35 (889)
90 (2286)	32 (813)	10 (254)	60 (1524)	51.25 (1302)	50 (1270)

### Main Breaker Unit Space Dimensions

Ampere Rating	Breaker Type	Dimensions in Inches (mm)	
		A	Neutral B
400	JXD6, JD6, HJD6	10.42 (265)	13.125 (333)
400-600	LXD6, LD6, HLD6, SJD6, SHJD6, SLD6, SHLD6	10.42 (265)	
800	LMD6, LMXD6	10.00 (265)	

### Main Switch Connectors

Ampere Rating	Connectors suitable for Copper or Aluminum
100	(1) #10-#1/0 AWG (Cu or Al)
200	(1) #6 AWG-300 kcmil



<sup>①</sup> Standard trim is four piece without door. Surface or flush one piece trim is available for 32 in. (813 mm) wide circuit breaker panel.



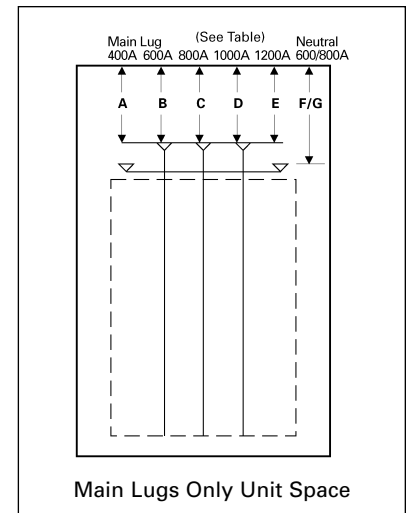
# Panelboards

## Type P4 Panelboards

## Dimensions

### Main Lugs Only Wire Bending Space

Lugs	Dimensions in inches (mm)						
	Main Lug					Neutral	
	400A A	600A B	800A C	1000A D	1200A E	400-600A F	800-1200A G
Standard	16.500 (419)	16.750 (419)	15.969 (406)	15.969 (406)	15.969 (406)	13.125 (333)	13.125 (333)
Oversize	16.500 (419)	21.750 (552)	25.969 (660)	25.969 (660)	25.969 (660)	18.125 (460)	23.125 (587)
Crimp	19.187 (487)	18.250 (464)	18.687 (475)	18.250 (464)	18.250 (464)	15.937 (405)	15.937 (405)
Standard w/Subfeed	16.750 (425)	15.969 (406)	—	—	—	13.125 (333)	13.125 (333)
Standard w/Feed-thru	16.500 (419)	16.750 (419)	—	—	—	13.125 (333)	13.125 (333)



### Branch Switch Unit Space

Ampere Rating	Number of Poles	Mounting Height in inches (mm)		AC Voltage	Cables Per Connector	Connectors Suitable for Copper or Aluminum
		Twin Mounted	Single Mounted			
30-30	2, 3	2.50 (64)	—	240	1	#14 - #8 AWG (Cu Only)
30-30	2, 3	5.00 (127)	—	240	1	#14 - #4 AWG
30-60	2, 3	5.00 (127)	—	240	1	#14 - #4 AWG
60-60	2, 3	5.00 (127)	—	240	1	#14 - #4 AWG
60-100	2, 3	7.50 (191)	—	240	1	#10 - #1/0 AWG
100-100	2, 3	7.50 (191)	—	240	1	#10 - #1/0 AWG
200-200	3	10.00 (254)	—	240	1	#6 AWG - 350 kcmil
200	2	—	7.50 (191)	240	1	#6 AWG - 350 kcmil
200	3	—	10.00 (254)	240	2	#6 AWG - 350 kcmil
30-30	2, 3	7.5 (191)	—	600	1	#14 - #8 AWG
30-60	2, 3	7.5 (191)	—	600	1	#14 - #4 AWG
60-60	2, 3	7.5 (191)	—	600	1	#14 - #4 AWG
60-100	2, 3	7.5 (191)	—	600	1	#10-#1/0 AWG
100-100	2, 3	7.5 (191)	—	600	1	#10-#1/0 AWG
200-200	3	10.00 (254)	—	600	1	#6 AWG - 250 kcmil
100	2, 3	—	7.50 (191)	600	1	#10-#1/0 AWG
200	2, 3	—	10.00 (254)	600	1	#6 AWG - 250 kcmil

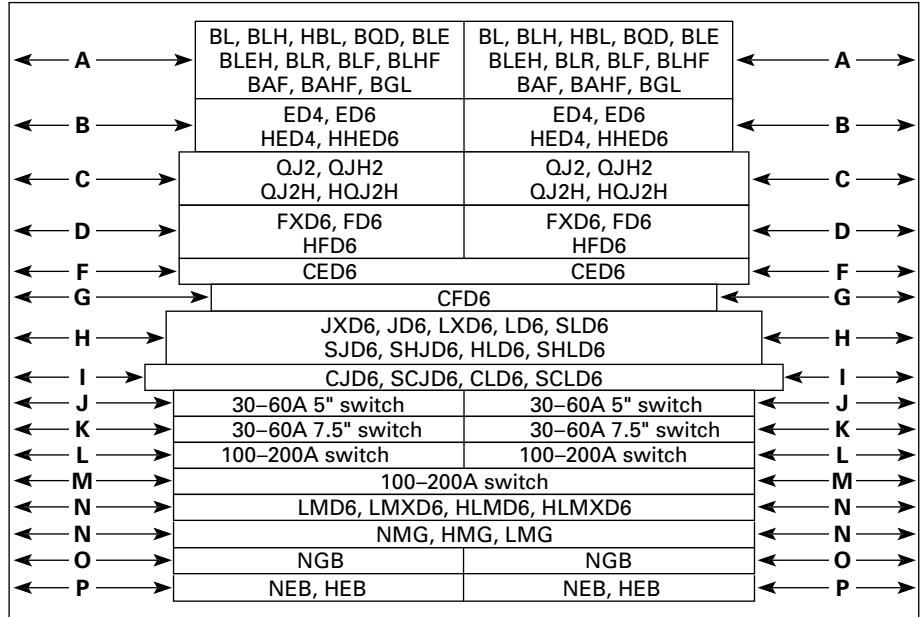
# Panelboards

## Type P4 Panelboards

## Dimensions

### Branch Breaker Side Gutter Inches (mm)

Reference Letter	Panel Width 32 in. Inches (mm)
A	11.000 (279)
B	7.000 (178)
C	6.500 (146)
D	5.250 (133)
F	4.615 (177)
G	8.769 (223)
H	12.500 (265)
I	8.250 (210)
J	10.000 (254)
K	7.000 (178)
L	5.000 (127)
M	7.500 (191)
N	10.000 (254)
O	10.500 (267)
P	7.750 (197)



# Panelboards

## Power and Distribution

**Selection**

### Type P4

#### Shown with Standard Mains, Top Fed and Surface Trim

Catalog number is for aluminum main bus. For optional copper main bus change "A" in position 11 to "C".

Panels are top feed, surface mounted. For bottom feed, change "T" in position 12 to "B". For flush mounting, change "S" in position 13 to "F".

Replace fifth and sixth position in panelboard catalog number, with alternate main breaker code. Use price adders from main breaker section table. Horizontally mounted.

#### Main Lugs Only — shown with aluminum bus, top fed, and surface trims.

Maximum Panel Amps	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250 Vdc Max	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
400	30	P4C60ML400ATS	1220.00	P4B60ML400ATS	1220.00	P4A60ML400ATS	1220.00
	45	P4C75ML400ATS	1270.00	P4B75ML400ATS	1270.00	P4A75ML400ATS	1270.00
	60	P4C90ML400ATS	1360.00	P4B90ML400ATS	1360.00	P4A90ML400ATS	1360.00
600	30	P4C60ML600ATS	1570.00	P4B60ML600ATS	1570.00	P4A60ML600ATS	1570.00
	45	P4C75ML600ATS	1660.00	P4B75ML600ATS	1660.00	P4A75ML600ATS	1660.00
	60	P4C90ML600ATS	1750.00	P4B90ML600ATS	1750.00	P4A90ML600ATS	1750.00
800	30	P4C60ML800ATS	1910.00	P4B60ML800ATS	1910.00	P4A60ML800ATS	1910.00
	45	P4C75ML800ATS	2020.00	P4B75ML800ATS	2020.00	P4A75ML800ATS	2020.00
	60	P4C90ML800ATS	2120.00	P4B90ML800ATS	2120.00	P4A90ML800ATS	2120.00
1000	30	P4C60ML101ATS	2230.00	P4B60ML101ATS	2230.00	P4A60ML101ATS	2230.00
	45	P4C75ML101ATS	2350.00	P4B75ML101ATS	2350.00	P4A75ML101ATS	2350.00
	60	P4C90ML101ATS	2460.00	P4B90ML101ATS	2460.00	P4A90ML101ATS	2460.00
1200	30	P4C60ML120ATS	2510.00	P4B60ML120ATS	2510.00	P4A60ML120ATS	2510.00
	45	P4C75ML120ATS	2650.00	P4B75ML120ATS	2650.00	P4A75ML120ATS	2650.00
	60	P4C90ML120ATS	2800.00	P4B90ML120ATS	2800.00	P4A90ML120ATS	2800.00
Maximum Panel Amps	Unit Space (inches)	240V		480Y/277V		480V <sup>Ⓞ</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
400	30	P4D60ML400ATS	1010.00	P4E60ML400ATS	1200.00	P4F60ML400ATS	1010.00
	45	P4D75ML400ATS	1060.00	P4E75ML400ATS	1270.00	P4F75ML400ATS	1060.00
	60	P4D90ML400ATS	1110.00	P4E90ML400ATS	1360.00	P4F90ML400ATS	1110.00
600	30	P4D60ML600ATS	1270.00	P4E60ML600ATS	1570.00	P4F60ML600ATS	1270.00
	45	P4D75ML600ATS	1360.00	P4E75ML600ATS	1660.00	P4F75ML600ATS	1360.00
	60	P4D90ML600ATS	1410.00	P4E90ML600ATS	1750.00	P4F90ML600ATS	1410.00
800	30	P4D60ML800ATS	1510.00	P4E60ML800ATS	1910.00	P4F60ML800ATS	1510.00
	45	P4D75ML800ATS	1590.00	P4E75ML800ATS	2020.00	P4F75ML800ATS	1590.00
	60	P4D90ML800ATS	1690.00	P4E90ML800ATS	2120.00	P4F90ML800ATS	1690.00
1000	30	P4D60ML101ATS	1760.00	P4E60ML101ATS	2230.00	P4F60ML101ATS	1760.00
	45	P4D75ML101ATS	1870.00	P4E75ML101ATS	2350.00	P4F75ML101ATS	1870.00
	60	P4D90ML101ATS	1960.00	P4E90ML101ATS	2460.00	P4F90ML101ATS	1960.00
1200	30	P4D60ML120ATS	2020.00	P4E60ML120ATS	2510.00	P4F60ML120ATS	2020.00
	45	P4D75ML120ATS	2130.00	P4E75ML120ATS	2650.00	P4F75ML120ATS	2130.00
	60	P4D90ML120ATS	2260.00	P4E90ML120ATS	2800.00	P4F90ML120ATS	2260.00

#### Main Circuit Breaker — shown with standard mains, aluminum bus, top fed, and surface trims.

Maximum Panel Amps	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250 Vdc Max	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
400	21.25	P4C60JX400ATS	4000.00	P4B60JX400ATS	4000.00	P4A60JX400ATS	3450.00
	36.25	P4C75JX400ATS	4210.00	P4B75JX400ATS	4210.00	P4A75JX400ATS	3630.00
	51.25	P4C90JX400ATS	4420.00	P4B90JX400ATS	4420.00	P4A90JX400ATS	3820.00
600	21.25	P4C60LX600ATS	6250.00	P4B60LX600ATS	6250.00	P4A60LX600ATS	5250.00
	36.25	P4C75LX600ATS	6600.00	P4B75LX600ATS	6600.00	P4A75LX600ATS	5550.00
	51.25	P4C90LX600ATS	6950.00	P4B90LX600ATS	6950.00	P4A90LX600ATS	5840.00
800	21.25	P4C60M1800ATS	8020.00	P4B60M1800ATS	8020.00	P4A60M1800ATS	6710.00
	36.25	P4C75M1800ATS	8480.00	P4B75M1800ATS	8480.00	P4A75M1800ATS	7160.00
	51.25	P4C90M1800ATS	8930.00	P4B90M1800ATS	8930.00	P4A90M1800ATS	7610.00
Maximum Panel Amps	Unit Space (inches)	240V		480Y/277V		480V <sup>Ⓞ</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
400	21.25	P4D60JX400ATS	3820.00	P4E60JX400ATS	4120.00	P4F60JX400ATS	3940.00
	36.25	P4D75JX400ATS	4010.00	P4E75JX400ATS	4340.00	P4F75JX400ATS	4140.00
	51.25	P4D90JX400ATS	4220.00	P4E90JX400ATS	4560.00	P4F90JX400ATS	4350.00
600	21.25	P4D60LX600ATS	6000.00	P4E60LX600ATS	6250.00	P4F60LX600ATS	6000.00
	36.25	P4D75LX600ATS	6310.00	P4E75LX600ATS	6600.00	P4F75LX600ATS	6310.00
	51.25	P4D90LX600ATS	6650.00	P4E90LX600ATS	6950.00	P4F90LX600ATS	6650.00
800	21.25	P4D60M1800ATS	8020.00	P4E60M1800ATS	8020.00	P4F60M1800ATS	8020.00
	36.25	P4D75M1800ATS	8480.00	P4E75M1800ATS	8480.00	P4F75M1800ATS	8480.00
	51.25	P4D90M1800ATS	8930.00	P4E90M1800ATS	8930.00	P4F90M1800ATS	8930.00

**Note:** For 600V application, change "F" in position 3 to "G". See alternate main breaker table on page 10-48 for 600V rated mains. Change position 5 and 6 and add

price from table. Price only 600V rated branch breakers.

# Panelboards

## Power and Distribution

*Selection*

### Main Fusible Switch (fuses not included)

Maximum Panel Ampere Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
200	20	P4C60MS100ATS	1670.00	P4B60MS100ATS	1670.00	P4A60MS100ATS	1400.00
	35	P4C75MS100ATS	1770.00	P4B75MS100ATS	1770.00	P4A75MS100ATS	1480.00
	20	P4C60MS200ATS	1740.00	P4B60MS200ATS	1740.00	P4A60MS200ATS	1440.00
	35	P4C75MS200ATS	1840.00	P4B75MS200ATS	1840.00	P4A75MS200ATS	1530.00
Maximum Panel Ampere Rating	Unit Space (inches)	240V		480Y/277V		480V <sup>Ⓞ</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
200	20	P4D60MS100ATS	1590.00	P4E60MS100ATS	1930.00	P4F60MS100ATS	1790.00
	35	P4D75MS100ATS	1610.00	P4E75MS100ATS	2050.00	P4F75MS100ATS	1890.00
	20	P4D60MS200ATS	1590.00	P4E60MS200ATS	2000.00	P4F60MS200ATS	1860.00
	35	P4D75MS200ATS	1690.00	P4E75MS200ATS	2110.00	P4F75MS200ATS	1950.00

### Type P4

#### Alternate Main Breaker Selection

Ampere Rating	Breaker Type	Catalog Number <sup>Ⓞ</sup>	Maximum Interrupting Rating (KA)			List Price \$	Available Trip Values
			240V	480V	600V		
400	JXD6	JX	65	35	25	STD	200, 225, 250, 300, 350, 400 200, 225, 250, 300, 350, 400 200, 225, 250, 300, 350, 400 200, 225, 250, 300, 350, 400 200, 300, 400 200, 300, 400 200, 300, 400
	JD6	J6	65	35	25	510.	
	HJD6	HJ	100	65	35	1630.	
	CJD6	CJ	200	150	150	2260.	
	SJD6	SJ	65	35	25	1130.	
	SHJD6	SH	100	65	35	2370.	
	SHJD6H	SC	200	150	100	3020.	
600	LXD6	LX	65	35	25	STD	450, 500, 600 250, 300, 350, 400, 450, 500, 600 250, 300, 350, 400, 450, 500, 600 450, 500, 600 300, 400, 500, 600 300, 400, 500, 600 300, 400, 500, 600
	LD6	L6	65	35	25	120.	
	HLD6	HL	100	65	35	880.	
	CLD6	CL	200	150	100	3390.	
	SLD6	SL	65	35	25	730.	
	SHLD6	S6	100	65	35	2430.	
	SCLD6	C6	200	150	100	4640.	
800	NMX	M1	65	35	25	STD	600, 700, 800 600, 700, 800 600, 700, 800
	HMX	M2	100	65	50	1130.	
	LMX	M3	200	100	65	3260.	
800	LMXD6	LM	65	50	25	590.	500, 600, 700, 800 500, 600, 700, 800 500, 600, 700, 800 500, 600, 700, 800
	LMD6	L1	65	50	25	590.	
	HLMXD6	HK	100	65	50	1870.	
	HLMD6	HJ	100	65	50	1870.	

For inches / millimeters conversion, see Application Data section.

Ⓞ For 600V applications, change "F" in position 3 to "G".  
Price only 600V branch device.

Ⓞ Space price covers cost of housing frame plate with blank cover plate. Provision price includes all necessary mounting hardware, less circuit breaker, and includes housing frame cover plate with breaker handle opening.

# Panelboards

## Power and Distribution

Selection

### Branch Breaker Selection

Breaker Type	Available Trip Value Ampere Ratings	List Price Installed \$			Space \$ <sup>①</sup>	Provisions for Future \$ <sup>①</sup>	Mounting Height (inches)		Maximum Interrupting Rating (KA)									
		1-Pole	2-Pole	3-Pole			Twin	Single	120V	120/240V	240V	277V	480Y/277	480V	600V	250V DC		
BL	15-60 70 80, 90, 100	100. 160. —	170. 190. 230.	250. 290. 330.	35. 35. 35.	55. 55. 55.	②	②	—	10 10 10	—	—	—	—	—	—	—	
BL (HID)	15, 20, 30	110.	190.	—	35.	55.	②	②	—	10	—	—	—	—	—	—	—	
BAF	15, 20	220.	380.	—	35.	55.	②	②	10	10	—	—	—	—	—	—	—	
BAFH	15, 20	280.	450.	—	35.	55.	②	②	22	22	—	—	—	—	—	—	—	
BLF (GFCI)	15, 20, 30 40, 50, 60	220. —	250. 290.	— —	35. 35.	55. 55.	②	②	—	10 10	—	—	—	—	—	—	—	
BLE (EQ GFI)	15, 20, 30	200.	250.	—	35.	55.	②	②	—	10	—	—	—	—	—	—	—	
BLEH	15, 20, 30, 40, 50, 60	420. —	— 530.	— —	35. 35.	55. 55.	② ②	② ②	— —	10 10	—	—	—	—	—	—	—	
BGL (SWN)	15, 20, 30	—	180.	230.	35.	55.	②	②	—	10	—	—	—	—	—	—	—	
BL (240V)R	15, 20, 30, 40, 50, 60 70, 80, 90, 100	— —	210. 310.	— —	35. 35.	55. 55.	②	②	—	—	10 10	—	—	—	—	—	—	
BLH (120V)	15, 20, 30, 40, 50, 60, 70 80, 90, 100	130. —	250. 280.	340. 480.	35. 35.	55. 55.	②	②	—	22 22	—	—	—	—	—	—	—	
HBL	15, 20, 30, 40, 50, 60 70, 80, 90, 100	130. —	320. 320.	400. 540.	35. 35.	55. 55.	②	②	—	65 65	65 65	—	—	—	—	—	—	
BLHF (GFCI)	15, 20, 30,	250.	340.	—	35.	55.	②	②	—	22	—	—	—	—	—	—	—	
BQD	15, 20, 30, 40, 50, 60 70, 80, 90, 100	130. 200.	320. 420.	400. 540.	35. 35.	55. 55.	②	②	—	—	65 65	—	14 14	—	—	—	14 14	
NGB	15-60 70-100 110-125	140. 210. —	460. 500. 820.	510. 660. 1190.	35. 35. 35.	55. 55. 55.	3.75	—	100 100 100	100 100 100	25 25 25	25 25 25	25 25 25	—	—	—	14 14 14	
NEB	15-60 70-100 110-125	270. 300. 730.	450. 510. 1290.	590. 670. 1440.	75. 75. 75.	110. 110. 110.	3.75	—	85 85 85	85 85 85	35 35 35	35 35 35	35 35 35	—	—	—	35 35 35	
HEB	15-60 70-100 110-125	390. 430. 1220.	690. 760. 2150.	910. 990. 2280.	75. 75. 75.	110. 110. 110.	3.75	—	100 100 100	100 100 100	65 65 65	65 65 65	65 65 65	—	—	—	42 42 42	
ED4 <sup>⑤</sup>	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	175. 260. —	570. 620. 1010.	630. 820. 1470.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	3.75 <sup>②③</sup>	— — —	— — —	65 65 65	—	18 18 18	18 18 18	—	—	—	30 30 30
HED4	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	490. 490. —	850. 950. 2660.	1120. 1220. 2830.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	3.75 <sup>②③</sup>	— — —	— — —	100 100 100	⑥ — —	25 <sup>⑥</sup> 25 <sup>⑥</sup> 42	25 42 42	—	—	—	30 30 30
HHED6	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	— — —	940. 1060. 2970.	1250. 1360. 3130.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	3.75 <sup>②③</sup>	— — —	— — —	100 100 100	— — —	— — —	65 65 65	25 25 25	—	—	—
CED6	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	— —	1970. 3160.	2410. 3980.	75. 75.	110. 110.	3.75 <sup>③</sup>	—	— —	— —	200 200	— —	— —	200 200	— —	—	—	30 30
QJ2	60, 70, 80, 90, 100, 125, 150, 175, 200, 225	—	720.	940.	75.	150.	5	5	—	—	10	—	—	—	—	—	—	—
QJH2	60, 70, 80, 90, 100, 125, 150, 175, 200, 225	—	740.	1250.	75.	150.	5	5	—	—	42	—	—	—	—	—	—	—
FXD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	1250.	1590.	75.	320.	5	5	—	—	65	—	—	—	35	—	—	30
HFD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	2750.	3350.	75.	320.	5	5	—	—	100	—	—	—	65	—	—	30
CFD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	3500.	4470.	75.	320.	—	5	—	—	200	—	—	—	200	—	—	30
FXD6	250	—	2190.	2700.	75.	320.	5	5	—	—	65	—	—	—	35	—	—	30
HFD6	250	—	3940.	4240.	75.	320.	5	5	—	—	100	—	—	—	65	—	—	30
CFD6	250	—	4590.	5580.	75.	320.	—	5	—	—	200	—	—	—	200	—	—	30
JXD2	200, 225, 250, 300, 350, 400	—	2150.	2350.	130.	350.	—	8.75	—	—	65	—	—	—	—	—	—	30
JXD6	200, 225, 250, 300, 350, 400	—	2230.	2750.	130.	350.	—	8.75	—	—	—	—	—	—	35	25	—	30
HJD6	200, 225, 250, 300, 350, 400	—	4380.	4610.	130.	350.	—	8.75	—	—	100	—	—	—	65	35	—	30
CJD6	200, 225, 250, 300, 350, 400	—	4910.	6310.	130.	350.	—	8.75	—	—	200	—	—	—	150	100	—	30
SJD6 <sup>④</sup>	200, 225, 250, 300, 350, 400	—	—	5960.	130.	350.	—	8.75	—	—	65	—	—	—	35	25	—	—
SHJD6 <sup>④</sup>	200, 300, 400	—	—	6610.	130.	350.	—	8.75	—	—	100	—	—	—	65	35	—	—
LXD6	450, 500, 600	—	3540.	4580.	140.	640.	—	8.75	—	—	65	—	—	—	35	25	—	30
HLD6	250, 300, 350, 400, 450, 500, 600	—	4280.	5360.	140.	640.	—	8.75	—	—	100	—	—	—	65	35	—	30
CLD6	450, 500, 600	—	7950.	9720.	140.	640.	—	8.75	—	—	200	—	—	—	150	100	—	30
SLD6 <sup>④</sup>	300, 400, 500, 600	—	—	6600.	140.	640.	—	8.75	—	—	65	—	—	—	35	25	—	—
SHLD6 <sup>④</sup>	300, 400, 500, 600	—	—	6680.	140.	640.	—	8.75	—	—	100	—	—	—	65	35	—	—
LMD6, LMXD6	500, 600, 700, 800	—	5060.	6520.	210.	1360.	—	8.75	—	—	65	—	—	—	50	25	—	30
HLMXD6, HLMXD6	500, 600, 700, 800	—	6510.	8060.	210.	1360.	—	8.75	—	—	100	—	—	—	65	50	—	30
NMX	600, 700, 800	—	4590.	5930.	210.	1720.	—	8.75	—	—	65	—	—	—	35	25	—	30
HMX	600, 700, 800	—	5910.	7320.	210.	1720.	—	8.75	—	—	100	—	—	—	65	50	—	30
LMX	600, 700, 800	—	15430.	17690.	210.	1720.	—	8.75	—	—	200	—	—	—	100	65	—	30

① Space price covers cost of housing frame plate with blank cover plate. Provision price includes all necessary mounting hardware, less circuit breaker, and includes housing frame cover plate with breaker handle opening.

② 1 to 6 poles may be mounted in 3.75" of unit space.  
③ Accessories such as shunt trips on three pole breakers require 6.25" of unit space.

④ HED4 1-pole 15-30A = 65,000 IR  
35-100A = 25,000 IR  
⑤ For 600V applications, ED6 available at same list price.  
⑥ Ground fault not available on branch Sensitrip breakers.

⑦ Integral ground fault not available for 3-phase, 4-wire systems. Only 3-phase, 3-wire from 3-phase, 4-wire systems.  
⑧ HED 4 3-Pole=42,000 IR

# Panelboards

## Power and Distribution

## Selection

### Branch Switch Selection

Ampere Rating	List Price \$ <sup>①</sup>		Space Only \$ <sup>①</sup>	Provisions for Future \$	Mounting Hgt (inches)
	3-Pole	2-Pole			
<b>240V — Twin Mounted</b>					
30-30	965.	815.	105.	140.	2½ <sup>③</sup>
30-30	1020.	870.	170.	225.	5
30-60	1020.	900.	170.	225.	5
60-60	1020.	900.	170.	225.	5
60-100	1315.	1050.	225.	255.	7½
100-100	1410.	1050.	225.	255.	7½
200-200	2510.	—	275.	435.	10

<b>240V — Single Mounted</b>					
Ampere Rating	List Price \$ <sup>①</sup>		Space Only \$ <sup>①</sup>	Provisions for Future \$	Mounting Hgt (inches)
	3-Pole	2-Pole			
30	830.	—	260.	280.	7½
60	830.	—	260.	280.	7½
100	1080.	—	225.	295.	7½
200	1355.	—	225.	295.	10
200	—	1335.	275.	435.	7½

Type S4/P4/SPP (10" deep) and F1/P4/FPP (10" deep)

### Connecting Strap Kits — w/o Circuit Breaker

For use with Sentron SPP Shallow Depth or Type S4 power panels				
Breaker Type	Mounting Type	Unit Height (inches)	Catalog Number	List Price \$
BL/BQD	Twin	3.75	SBL	902.00
NGB	Twin	3.75	SNB	902.00
NEB, HEB	Twin	3.75	SEB	902.00
ED	Twin	3.75	SE6	902.00
CED6	Single	3.75	SCE	902.00
QJ	Twin	5	SQJ	1622.00
FD6	Twin	5	SF6	1622.00
CFD6	Single	5	SCF	1622.00
JXD2,6	Single	8.75	SJ1	2254.00
SJD6	Single	8.75	SSJ1	2254.00
CJD6	Single	8.75	SCJ	2254.00
SCJD6	Single	8.75	SSCJ	2254.00
LD6	Single	8.75	SL6	2668.00
SLD6	Single	8.75	SSL6	2668.00
CLD6	Single	8.75	SCL	2668.00
SCLD6	Single	8.75	SSCL	2668.00
NM, HM, LM, SNM, SHM	Single	8.75	MG1	3317.00

### Connecting Strap Kits<sup>④</sup>

#### Fusible

For use with Sentron Shallow Depth or Type SPP/FPP/F1/P4 power panels			
Ampere Rating	Unit Height (inches)	10" Deep Box	
		Catalog Number	List Price \$
30-30	2.5	F602	46.00
30-60	5, 7.5	F657	46.00
30-60	5, 7.5	F657	46.00
60-60	5, 7.5	F657	46.00
60-100	5, 7.5	F657	46.00
100-100	5, 7.5	F657	46.00
100	7.5	F657	46.00
200	7.5	F657	46.00
200	10	F671	70.00
200-200	10	F672	430.00

For inches / millimeters conversion, see Application Data section.

① Space price covers cost of housing frame plate without breaker handle opening. Provisions include all necessary mounting hardware less breakers.

② For Class J, R or T fuse clip prices, refer to page 10-51. For Class J fuse clips price 600V, 7½" high units.

③ NEC fuse clips only. ④ Normal stock item.

Ampere Rating	List Price \$ <sup>①</sup>		Space Only \$ <sup>①</sup>	Provisions for Future \$	Mounting Hgt (inches)
	3-Pole	2-Pole			
<b>600V — Twin Mounted</b>					
30-30	1400.	—	225.	295.	7½
30-60	1400.	—	225.	295.	7½
60-60	1400.	—	225.	295.	7½
60-100	1525.	—	225.	295.	7½
100-100	1610.	—	225.	295.	7½
200-200	2895.	—	275.	435.	10

<b>600V — Single Mounted</b>					
Ampere Rating	List Price \$ <sup>①</sup>		Space Only \$ <sup>①</sup>	Provisions for Future \$	Mounting Hgt (inches)
	3-Pole	2-Pole			
100	1070.	—	225.	295.	7½
200	1465.	—	275.	445.	10

### Blank Plates — Circuit Breaker and Vacu-Break

For use with Sentron SPP and Type S4 power panels		
Height (inches)	Catalog Number	List Price \$
1.25	6FPB01	196.00
2.5	6FPB02	224.00
3.75	6FPB03	224.00
5.0	6FPB05	224.00
10.0	6FPB10	302.00

### Filler Plates

For use with Sentron SPP and S4 power panels		
Breaker Type	Filler Plate Catalog Number	List Price \$
BL, BLH, HBL ED2, ED4, ED6 HED4, HHED6	QF3	2.80 per pole

Note: When a front filler plate is not completely filled with breakers, the openings in the unused space must be closed with filler plates selected from this table.

# Sentron® Panelboards

## Modifications and Additions

Selection

### Type P4

When required, special constructions or additions to standard panelboards may be specified for all **factory-assembled** Power and Distribution Panelboards. Below and on the next page are listed many of those available for Type S4/F1/P4 panelboards. *In no case do these apply to **Narrow** (Column) Width Lighting Panelboards or **Unassembled** Panelboards.*

#### 1. Type 3R/12

Description	List Price \$ 32"
Panelboard Construction: Single Door (Complete enclosure does not require a trim)	1175.

Description	List Price \$ All Panels

#### 2. Painted Finish See page 10-71

#### 3. Miscellaneous Accessories

Nameplate — laminated, engraved	50.
Tamper-Resistant Screws — per panel	70.

#### 4. Devices Mounted on Gutter Cover — Includes Device, Mounting — Wired or Unwired See page 10-71

#### 5. Increased Capacity Neutral

Ampere Rating		List Price \$
Phase	Neutral	
400	600	540.
400	800	560.
600	1200	795.
800	1200	850.

#### 6. Subfeed or Feed-Thru Lugs (One Set Per Panel)

##### Subfeed Double Lugs (Main Lug Panels)

Ampere Rating	List Price \$		Unit Space (Additional Inches)
	3-Phase	1-Phase	MLO
400	245.	245.	—
600	455.	455.	—
800	NA	NA	NA
1200	NA	NA	NA

##### Feed-Thru Lugs

400	245.	245.	10
600	455.	455.	10
800	615.	615.	17.5
1200	765.	765.	17.5

#### 7. Split Bus (Unit Space +1.25")

Phases	List Price \$			
	400A	600A	800A	1200A
1	350.	415.	570.	700.
3	415.	455.	655.	740.

#### 8. MLO Compression Lugs — Aluminum Lugs for Use With Copper or Aluminum Cable see page 10-52.

#### 9. Compression Lugs For Circuit Breakers see page Section 6.

#### 10. Circuit Breaker Main — With Vacu-Break Branch Panelboards

Price appropriate main breaker panel, then add list prices of desired vacu-break branches and accessories.

#### 11. Vacu-Break Main — With Circuit Breaker Branch Panelboards

Price appropriate main switch panel, then add list price of desired circuit breaker branches and accessories.

#### 12. Grounding of Panelboards (No Brazed Ground Bus Offered)

Ground Bus ships with the interior as standard — **\$115.** list added for factory mounted.

Non-Insulated Equipment Ground Bar Including Ground Lug . . . . . **Standard**  
Insulated Equipment Ground Bar Including Ground Lug . . **\$395.** per panel

#### 13. Fuse Clip Provisions (Add to 250 Volts or 600 Volts Unit Prices Per Switch)

Ampere Rating	List Price \$ Class J	List Price \$ Class R	List Price \$ Class T
30	55.①	55.②	N/A
60	55.①	55.	N/A
100	85.	85.	180.
200③	85.	85.	285.

#### 14. Spanner Wrenches (for Vacu-Break Switches)

Ampere Rating	List Price \$
30-250	460.

#### 15. Remote Control Switches

Switch Type	Modification
920	TAKES 20.0 unit space
911	≤ 800A 25" to unit space ≥ 800A 30" unit space
LEN	≤ 60 AMPS 10" unit space > 60 AMPS 15" unit space

#### 16. Ground Fault on Main Breaker

Description	Ampere Rating	List Price \$
Conventional Ground Fault④ includes: Ground Fault Relay, Ground Sensor, CPT and Shunt Trip	400-600	6300.
Test and Monitor Panel⑤		1070.
Ground Fault add to Sensitrip III breaker price	400-600③	2500.

#### 17. Time Clocks⑥

Sangamo, Tork or Paragon time clock can be supplied, mounted in panelboard cabinet. For required increase in enclosure dimensions, consult local sales office. Price appropriate panelboard, then add list price below.

Description	List Price \$
Time Clock (one or two pole, single or double throw contacts; three pole, . single throw) 277V maximum with plain dial . . . . .	1070.
Add for —	
Astronomical dial . . . . .	210.
An omitting device . . . . .	75.
Reserve power or carryover . . . . .	2450.
Space and mounting provisions only	540.

For inches / millimeters conversion, see Application Data section.

① At 250 Volts — available on 5" unit only.  
② Class "J" clips not required on 600V twin 200A switch.  
Class "R" and "T" clips not available on this switch.

③ Integral ground fault not available on 600 amp 3-phase, 4-wire systems. Only 3-phase, 4-wire systems. Only 3-phase wire from 3-phase, 4-wire systems.

④ Available in 90" high enclosure only. Unit space is 42½" with Test and Monitor Panel; 45" without Test and Monitor Panel.

⑤ Not available on Sensitrip III.  
⑥ For required unit space — consult local sales office.  
Price includes increased enclosure height if required.  
⑦ No charge at time of order.

# Sentron® Panelboards

## Modifications and Additions

Selection

Type S4/F1/P4

### 18. Circuit Breaker Accessories

Breaker Type	List Price \$
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**Handle Blocking Device**  
Blocks handle in either the "ON" or "OFF" position See Page 10-73

**Padlocking Device — Padlocks in "OFF" position** See Page 10-73

### 19. Ground Fault Sensing Relay Kit Equipment Protection ED Frames (30 ma) See Section 6

### 20. Main Bus

Standard main bus and ground bus is tin plated aluminum. For copper main bus, neutral bus and ground bus add from the table for each panel. Copper Neutral Bar **\$115**. List Price.

Main Bus	Catalog Number <sup>①</sup>	List Price \$	
		400A	600-1200A
Silver Plated Cu	E	475.	1220.
1000A per sq. in Cu	D	540.	1230.
750A per sq. in Al	B	340.	645.

### 21. Copper Lugs — For Main Lug Only Panels

Standard main lugs and neutral lugs are tin plated aluminum, UL listed for use with aluminum/copper cables. Price below is for one panel and includes copper lugs for main lugs and neutral lugs, and must be used with copper cables.

Main Bus Ampere Rating	List Price \$
400	150.
600	190.
800-1200	260.

### 22. Shunt Trip on Main and Branches<sup>②</sup>

See Breaker Section for list prices on this option.

### 23. Alternate Lugs Main Lug Only

Style	Amperage Rating	Alternate Connectors	Box Height Addition	Price Addition \$
400	N/A	(1)#3/0 AWG - 750 kcmil or (2)#3/0 AWG - 250 kcmil Cu or Al unit space	Deduct 2.5" Unit Space from available unit space	125.
600	N/A	(2)#3/0 AWG - 750 kcmil or (4)#3/0 - 350 kcmil	0	255.
MLO	800	(3)#3/0 AWG - 750 kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	390.
1000	N/A	(4)#3/0 AWG - 750 kcmil Cu or Al	Deduct 7.5" Unit Space from available unit space	510.

### 24. Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	Price Addition \$
MLO	400	N/A	(1)250-500 kcmil or (2)#2/0 AWG - 250 kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = \$150 3-Phase 3-Wire = \$115 1-Phase 3-Wire = \$115 2-Wire = \$115
	600	N/A	(2)#3/0 AWG - 500 kcmil	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = \$200 3-Phase 3-Wire = \$150 1-Phase 3-Wire = \$150 2-Wire = \$150
	800	N/A	(3)#3/0 AWG - 500 kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = \$255 3-Phase 3-Wire = \$190 1-Phase 3-Wire = \$190 2-Wire = \$190
	1000	N/A	(4)#3/0 AWG - 500 kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = \$350 3-Phase 3-Wire = \$255 1-Phase 3-Wire = \$255 2-Wire = \$255
	1200	N/A	(4)#3/0 AWG - 500 kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = \$350 3-Phase 3-Wire = \$255 1-Phase 3-Wire = \$255 2-Wire = \$255
Main Breaker	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(2)#2/0 AWG - 500 kcmil Cu or Al	0	3-Phase 4-Wire = \$350 3-Phase 3-Wire = \$255 1-Phase 3-Wire = \$255 2-Wire = \$255

For inches / millimeters conversion, see Application Data section.

- ① Replace "A" in position 11 of catalog number.
- ② Shunt Trip on 100A frame breakers increases mounting height to 6.25" for twin mounting.

- ③ Must price "D" for "B" main bus from item #20 above.
- ④ See section (6) circuit breakers for 100% rated circuit breaker requirements.



# Sentron® Panelboards

## Type 1 Enclosure Modifications and Additions

*Selection*

Catalog Number	Description	Panel Adder \$	After Market Price \$
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### Boxes

PB60	P4 box 32 W X 10 Dp X 60 Ht.	Standard	595.
PB75	P4 box 32 W X 10 Dp X 75 Ht.	Standard	595.
PB90	P4 box 32 W X 10 Dp X 90 Ht.	Standard	595.
WP260	P4 Nema 3R/12 32W X 10 Dp X 60 Ht.	1175.	2255.
WP275	P4 Nema 3R/12 32W X 10 Dp X 75 Ht.	1175.	2255.
WP290	P4 Nema 3R/12 32W X 10 Dp X 90 Ht.	1175.	2255.

### Trims

P460V	P4 Std (4 piece trim) vented 60"	Standard	615.
P475V	P4 Std (4 piece trim) vented 75"	Standard	645.
P490V	P4 Std (4 piece trim) vented 90"	Standard	670.
P460NV	P4 Std (4 piece trim) unvented 60"	①	615.
P475NV	P4 Std (4 piece trim) unvented 75"	①	645.
P490NV	P4 Std (4 piece trim) unvented 90"	①	670.
P460VHG	P4 Std (4 piece trim) vented 60" w/Hinged gutter covers	290.	910.
P475VHG	P4 Std (4 piece trim) vented 75" w/Hinged gutter covers	290.	935.
P490VHG	P4 Std (4 piece trim) vented 90" w/Hinged gutter covers	290.	965.
P460NVHG	P4 Std (4 piece trim) unvented 60" w/Hinged gutter covers	290.②	910.
P475NVHG	P4 Std (4 piece trim) unvented 75" w/Hinged gutter covers	290.②	935.
P490NVHG	P4 Std (4 piece trim) unvented 90" w/Hinged gutter covers	290.②	965.
P460VD	P4 Std (1 PC. Door) vented 60"	③	730.
P475VD	P4 Std (1 PC. Door) vented 75"	③	755.
P490VD	P4 Std (1 PC. Door) vented 90"	③	785.
P460NVD	P4 Std (1 PC. Door) unvented 60"	②③	730.
P475NVD	P4 Std (1 PC. Door) unvented 75"	②③	755.
P490NVD	P4 Std (1 PC. Door) unvented 90"	②③	785.
P460VDD	P4 Std (1 PC. Door in door) vented 60"	360.	1090.
P475VDD	P4 Std (1 PC. Door in door) vented 75"	360.	1115.
P490VDD	P4 Std (1 PC. Door in door) vented 90"	360.	1140.
P460NVDD	P4 Std (1 PC. Door in door) unvented 60"	360.②	1090.
P475NVDD	P4 Std (1 PC. Door in door) unvented 75"	360.②	1115.
P490NVDD	P4 Std (1 PC. Door in door) unvented 90"	360.②	1140.

### Flush Mounting Kits

F60	Flush kit for P4 60" Ht.	③	145.
F75	Flush kit for P4 75" Ht.	③	145.
F90	Flush kit for P4 90" Ht.	③	145.

### Type 3R/12 Enclosures

WP260	P4 3R/12 Enclosures 60"	1175.	2255.
WP275	P4 3R/12 Enclosures 75"	1175.	2255.
WP290	P4 3R/12 Enclosures 90"	1175.	2255.

For inches / millimeters conversion, see Application Data section.

① No price adder. Note as Mod.

② Note as Mod.

③ No charge if noted at time of order.

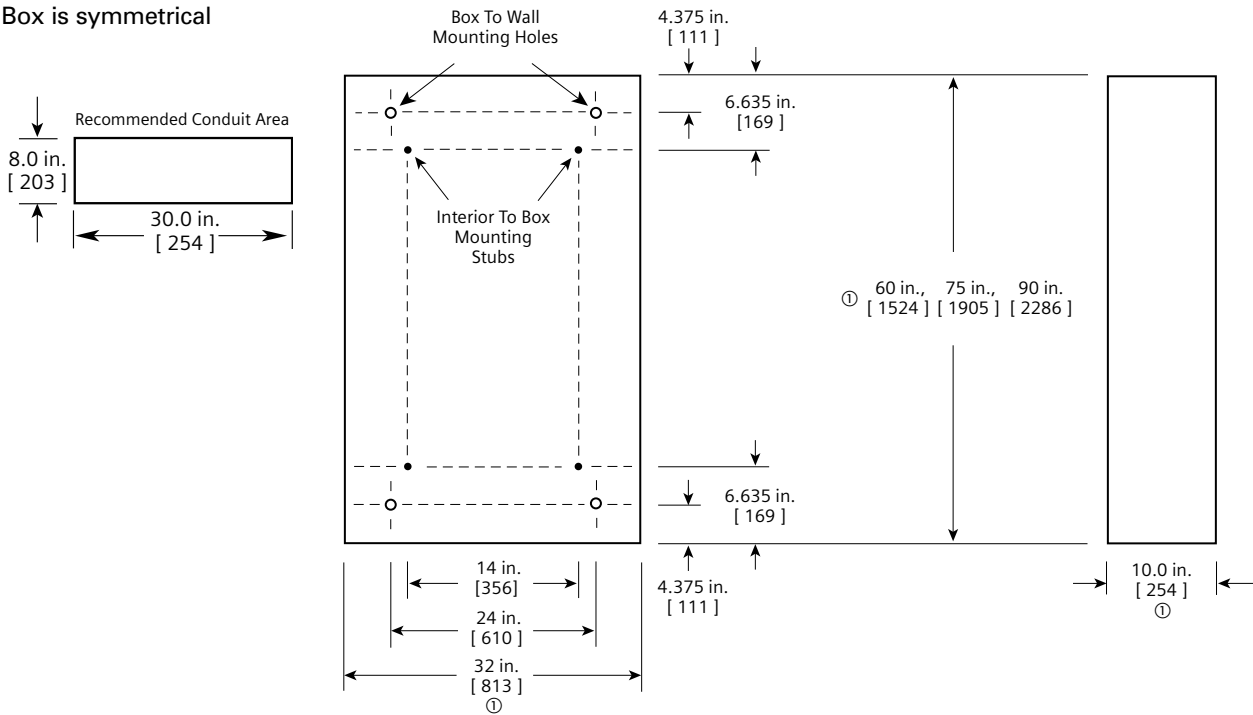
# Panelboards

## Type P4 Panelboards

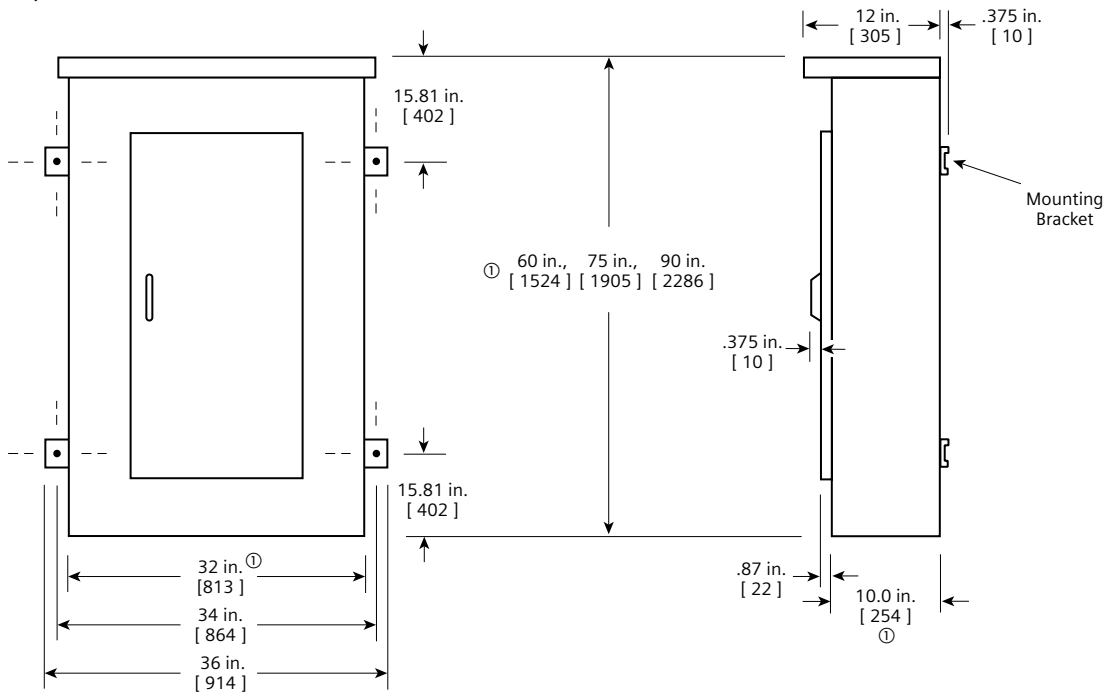
## Dimensions

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



① Dimensions are interior of the box. Add 5/8" to width for absolute dimension. Add 1/8" to height for absolute dimension.  
**Dimensions shown in inches and millimeters [ ].**

# Panelboards

## Type P5 Panelboards

General

### Features

The P5 panel is the largest footprint distribution panel in the Siemens panel family. Even though it is our largest panel type, the P5 panel is still a space saver with its 38" width and 12.75" depth. With even higher main ratings to fit the application that require more or larger branch devices. This panel offers a wide array of factory assembled options and has the ability to mix breaker frames in unit space up to 1200 amps and fusible switches up to 1200 amps. Bussing options for the P5 vary from the standard temperature rated aluminum to temperature rated copper and 750 A/SI aluminum and 1000A/Si copper designs. All aluminum bussing in the P5 panel is tin-plated as a standard. Silver-plated is offered as the default for copper bus and tin as an option. Integrated time clocks, bus mounted contactors as mains or submains, split bus and subfeed lugs (up to 600 amps) are just a few of the options of this flexible panel.

The P5 panel configurations defined by the unit space allowed for a given amperage, main device and box height. The P5 panel starts with a 60" high box. All of the branch devices are unit space mounted. Breakers and switches can be mixed and matched to meet customer requirements.

### Main Lug / Main Breaker / Main Switch

**Enclosure** – Standard Type 1 enclosure is 38" wide x 12.75" deep. X Box Height is determined by main device and unit space. See charts for box height.

**Voltage** – 600V AC max.  
250V DC max.

**Amperage** – 800-1200 amp Main breaker, 800-1200 amp MLO (check availability of 1600 amp with factory), 400-1200 amp Main switch.

**Short Circuit Rating** – 200 Kaic max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P5 panel is limited to 42 Kaic. Note that the main device may be mounted remote from the panel.

**Bussing** – The P5 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of UL 67 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P5 panel is: 750 A/si aluminum, temperature rated copper, and 1000 A/si copper. The copper bus option for this panel is tin-plated.

### Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 10 lbs. (1 kg) per inch (54g per mm) of box height.

### Main Lugs ①

Ampere Rating	Connectors Suitable for Copper or Aluminum
800	(3) - #3/0 AWG-500 Kcmil
1000	(4) - #3/0 AWG-500 Kcmil
1200	(4) - #3/0 AWB-500 Kcmil

① Alternate lugs for 750 kcmil cable are available, but result in significant loss of branch unit mounting space. Consult Siemens.

### Gauge Steel of Boxes Fronts, Surface and Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Fronts
38" (965)	60 - 75 - 90 (1524, 1905, 2286)	#16 <sup>①</sup>	#14 (1 piece trim) #14 Ga. (4 piece trim)

① 16 gauge side panels, 12 gauge back support.

# Panelboards

## Power and Distribution

## Selection/Dimensions

### Enclosure Selection <sup>①</sup>

Enclosure Dimension in Inches (mm)				Available Unit Space in Inches (mm)		
H	W	D		Main Lug	Main Breaker	Main Switch
Type 1, 3R/12	Type 1, 3R/12	Type 1	Type 3R/12	800 / 1200A	800 / 1200A	800 / 1200A
60 (1524)	38 (965)	12.75 (324)	14.25 (362)	30 (762)	20 (508)	—
75 (1905)	38 (965)	12.75 (324)	14.25 (362)	45 (1143)	35 (889)	35 (889)
90 (2286)	38 (965)	12.75 (324)	14.25 (362)	60 (1524)	50 (1270)	50 (1270)

### Main Breaker Unit Space Dimensions

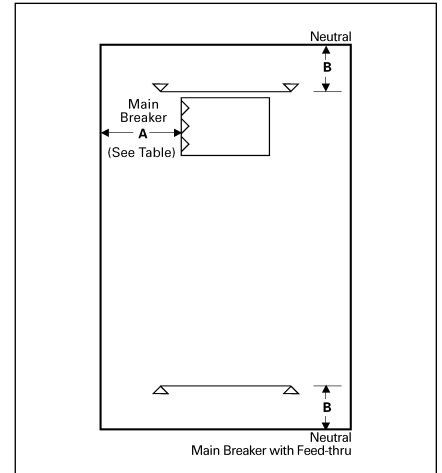
Ampere Rating	Breaker Type	Dimensions in Inches (mm)	
		A	Neutral B
800	LXD6, LMXD6, LMD6, MXD6, MD6, HMD6	13.00 (330)	13.125 (333)
	CMD6, SCMD6, SHMD6, SMD6	10.42 (265)	
1200	NXD6, ND6, HND6, CND6, SND6, SHND6	13.00 (330)	

### Main Switch

Maximum Ampere Rating	A	B
400A/600A VB	9.3	13.125
800A/1200A HCP	10.3	13.125

### Main Switch Connectors

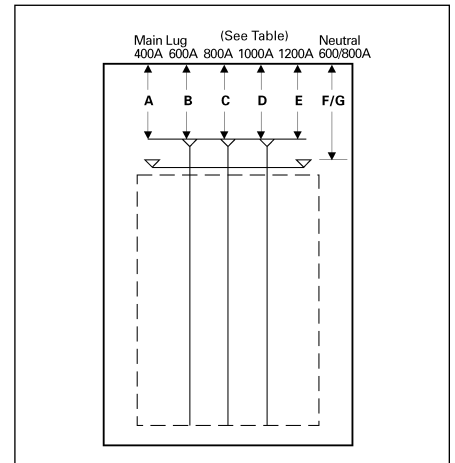
Ampere Rating	Connectors suitable for Copper or Aluminum
400	(1) #3/0 AWG-500 kcmil (2) #3/0 AWG-250 kcmil
600	(2) #3/0 AWG-500 kcmil
800	(3) #3/0 AWG-500 kcmil
1200	(4) #3/0 AWG-500 kcmil



Main Breaker Wire Bending Space Dimensions & Main Switch

### Main Lugs Only Wire Bending Space

Lugs	Dimensions in inches (mm)			
	Main Lug			Neutral
	800A C	1000A D	1200A E	800A G
Standard	15.969 (406)	15.969 (406)	15.969 (406)	13.125 (333)
Oversize	25.969 (660)	25.969 (660)	25.969 (660)	23.125 (587)
Crimp	18.687 (475)	18.250 (464)	18.250 (464)	15.937 (405)
Standard with Subfeed	—	—	—	13.125 (333)
Standard with Feed-thru	—	—	—	13.125 (333)



Main Lugs Only Wire Bending Space

<sup>①</sup> Standard trim is for space without door. Surface flush one piece trim is available for 32" (813mm) wide circuit breaker panel.

# Panelboards

## Power and Distribution

## Selection

### Type P5

#### Shown with Standard Mains, Top Fed and Surface Trim

Catalog number is for aluminum main bus. For optional copper main bus change "A" in position 11 to "C".

Panels are top feed, surface mounted. For bottom feed, change "T" in position 12 to "B". For flush mounting, change "S" in position 13 to "F".

Replace fifth and sixth position in panelboard catalog number, with alternate main breaker code. Use price adders from main breaker section table. Horizontally mounted.

#### Main Lugs Only — shown with aluminum bus, top fed, and surface trims.

Maximum Panel Ampere Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250 Vdc Max	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
800 <sup>Ⓢ</sup>	30	P5C60ML800ATS	2020.00	P5B60ML800ATS	2020.00	P5A60ML800ATS	2020.00
	45	P5C75ML800ATS	2130.00	P5B75ML800ATS	2130.00	P5A75ML800ATS	2130.00
	60	P5C90ML800ATS	2260.00	P5B90ML800ATS	2260.00	P5A90ML800ATS	2260.00
1000	30	P5C60ML101ATS	2460.00	P5B60ML101ATS	2460.00	P5A60ML101ATS	2460.00
	45	P5C75ML101ATS	2610.00	P5B75ML101ATS	2610.00	P5A75ML101ATS	2610.00
	60	P5C90ML101ATS	2750.00	P5B90ML101ATS	2750.00	P5A90ML101ATS	2750.00
1200	30	P5C60ML120ATS	2900.00	P5B60ML120ATS	2900.00	P5A60ML120ATS	2900.00
	45	P5C75ML120ATS	3070.00	P5B75ML120ATS	3070.00	P5A75ML120ATS	3070.00
	60	P5C90ML120ATS	3230.00	P5B90ML120ATS	3230.00	P5A90ML120ATS	3230.00
Maximum Panel Ampere Rating	Unit Space (inches)	240		480Y/277V		480V <sup>Ⓢ</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
800 <sup>Ⓢ</sup>	30	P5D60ML800ATS	1610.00	P5E60ML800ATS	2020.00	P5F60ML800ATS	1610.00
	45	P5D75ML800ATS	1720.00	P5E75ML800ATS	2130.00	P5F75ML800ATS	1720.00
	60	P5D90ML800ATS	1800.00	P5E90ML800ATS	2260.00	P5F90ML800ATS	1800.00
1000	30	P5D60ML101ATS	1960.00	P5E60ML101ATS	2460.00	P5F60ML101ATS	1960.00
	45	P5D75ML101ATS	2070.00	P5E75ML101ATS	2610.00	P5F75ML101ATS	2070.00
	60	P5D90ML101ATS	2150.00	P5E90ML101ATS	2750.00	P5F90ML101ATS	2150.00
1200	30	P5D60ML120ATS	2300.00	P5E60ML120ATS	2900.00	P5F60ML120ATS	2300.00
	45	P5D75ML120ATS	2430.00	P5E75ML120ATS	3070.00	P5F75ML120ATS	2430.00
	60	P5D90ML120ATS	2550.00	P5E90ML120ATS	3230.00	P5F90ML120ATS	2550.00

#### Main Circuit Breaker — shown with aluminum bus, top fed, and surface trims.

Maximum Panel Ampere Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V or 250 Vdc Max	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
800 <sup>Ⓢ</sup>	21.25	P5C60M1800ATS	8140.00	P5B60M1800ATS	8140.00	P5A60M1800ATS	6820.00
	36.25	P5C75M1800ATS	8590.00	P5B75M1800ATS	8590.00	P5A75M1800ATS	7190.00
	51.25	P5C90M1800ATS	9040.00	P5B90M1800ATS	9040.00	P5A90M1800ATS	7570.00
1200	20	P5C60N1120ATS	12900.00	P5B60N1120ATS	12900.00	P5A60N1120ATS	11590.00
	35	P5C75N1120ATS	13620.00	P5B75N1120ATS	13620.00	P5A75N1120ATS	12230.00
	50	P5C90N1120ATS	14350.00	P5B90N1120ATS	14350.00	P5A90N1120ATS	12880.00
Maximum Panel Ampere Rating	Unit Space (inches)	240		480Y/277V		480V <sup>Ⓢ</sup>	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
800 <sup>Ⓢ</sup>	21.25	P5D60M1800ATS	7720.00	P5E60M1800ATS	8140.00	P5F60M1800ATS	7720.00
	36.25	P5D75M1800ATS	8160.00	P5E75M1800ATS	8590.00	P5F75M1800ATS	8160.00
	51.25	P5D90M1800ATS	8590.00	P5E90M1800ATS	9040.00	P5F90M1800ATS	8590.00
1200	20	P5D60N1120ATS	12310.00	P5E60N1120ATS	12900.00	P5F60N1120ATS	12310.00
	35	P5D75N1120ATS	13010.00	P5E75N1120ATS	13620.00	P5F75N1120ATS	13010.00
	50	P5D90N1120ATS	13680.00	P5E90N1120ATS	14350.00	P5F90N1120ATS	13680.00

For inches / millimeters conversion, see Application Data section.

Ⓢ Alternate main breaker requires additional 1.25" unit space.

Ⓢ For 600V, change "F" in position 3 to "G". Price only branch breakers with 600V ratings.

# Panelboards

## Power and Distribution

Selection

### Main Fusible Switch (fuses not included)

Maximum Panel Ampere Rating	Unit Space (inches)	208Y/120V		240/120V		120/240V	
		3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$
400	20	P5C75MS400ATS	3480.00	P5B75MS400ATS	3480.00	P5A75MS400ATS	2790.00
	40	P5C90MS400ATS	3660.00	P5B90MS400ATS	3660.00	P5A90MS400ATS	2940.00
600	25	P5C75MS600ATS	4920.00	P5B75MS600ATS	4920.00	P5A75MS600ATS	4170.00
	40	P5C90MS600ATS	5170.00	P5B90MS600ATS	5170.00	P5A90MS600ATS	4380.00
800 <sup>④</sup>	28.75	P5C75MS800ATS	7640.00	P5B75MS800ATS	7640.00	P5A75MS800ATS	6290.00
	43.75	P5C90MS800ATS	8030.00	P5B90MS800ATS	8030.00	P5A90MS800ATS	6610.00
1200 <sup>④</sup>	28.75	P5C75MS120ATS	9770.00	P5B75MS120ATS	9770.00	P5A75MS120ATS	8070.00
	43.75	P5C90MS120ATS	10290.00	P5B90MS120ATS	10290.00	P5A90MS120ATS	8500.00
Maximum Panel Ampere Rating	Unit Space (inches)	240V		480Y/277V		480V <sup>①</sup>	
		3-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$	3-Phase, 3-Wire Catalog Number	List Price \$
400	25	P5D75MS400ATS	3480.00	P5E75MS400ATS	4650.00	P5F75MS400ATS	3890.00
	40	P5D90MS400ATS	3660.00	P5E90MS400ATS	4900.00	P5F90MS400ATS	4100.00
600	25	P5D75MS600ATS	4920.00	P5E75MS600ATS	5190.00	P5F75MS600ATS	4920.00
	40	P5D90MS600ATS	5170.00	P5E90MS600ATS	5480.00	P5F90MS600ATS	5180.00
800 <sup>④</sup>	28.75	P5D75MS800ATS	7640.00	P5E75MS800ATS	7650.00	P5F75MS800ATS	7250.00
	43.75	P5D90MS800ATS	8030.00	P5E90MS800ATS	8050.00	P5F90MS800ATS	7620.00
1200 <sup>④</sup>	28.75	P5D75MS120ATS	9770.00	P5E75MS120ATS	9770.00	P5F75MS120ATS	9240.00
	43.75	P5D90MS120ATS	10290.00	P5E90MS120ATS	10290.00	P5F90MS120ATS	9730.00

### Alternate Main Breaker Selection<sup>②</sup>

Ampere Rating	Breaker Type	Catalog Number <sup>③</sup>	Maximum IR (KA) Symmetrical Amperes			List Price \$	Available Trip Values
			240V AC	480V AC	600V AC		
800	NMX HMX LMX	M1	65	35	25	STD	600, 700, 800
		M2	100	65	50	1130.	600, 700, 800
		M3	200	100	65	3260.	600, 700, 800
800	LMD6 HLMD6 MD6 <sup>④</sup> HMD6 <sup>④</sup> CMD6 <sup>④</sup> SMD6 <sup>④</sup> SHMD6 SCMD6	LMXD6	65	50	25	590.	500, 600, 700, 800
		HD	100	65	50	1870.	500, 600, 700, 800
		M6	65	50	25	1710.	500, 600, 700, 800
		HM	100	65	50	2370.	500, 600, 700, 800
		CM	200	100	50	4370.	500, 600, 700, 800
		SM	65	50	25	5860.	600, 700, 800
		S8	100	65	50	3540.	600, 700, 800
		C8	200	100	65	5860.	500, 600, 800
1200	NNX HNX LNX	N1	65	35	25	STD	800, 900, 1000, 1200
		N2	100	65	50	1130.	800, 900, 1000, 1200
		N3	200	100	65	2500.	800, 900, 1000, 1200
1200	ND6 HND6 CND6 SND6 SHND6 SCND6	N6	65	50	25	1190.	800, 900, 1000, 1200
		HN	100	65	50	2370.	800, 900, 1000, 1200
		CN	200	100	50	2500.	900, 1000, 1200
		SN	65	50	25	2440.	900, 1000, 1200
		SI	100	65	50	4080.	800, 900, 1000, 1200
		CI	200	100	65	5080.	800, 900, 1000, 1200

For inches / millimeters conversion, see Application Data section.

① For 600V, change "F" in position 3 to "G". Price only branch breakers with 600V ratings.

② For ground fault, see page 10-62.

③ Replace "MB" in catalog number with code letter. Use adders from this table.

④ 800 and 1200 ampere switches have "L" class fuse provisions (Type HCP).

# Panelboards

## Power and Distribution

Selection

Type P5

### Branch Circuit Breakers

Breaker Type	Available Trip Value Ampere Ratings	List Price Installed \$			Space \$	Provisions for Future \$ <sup>①</sup>	Mounting Height (inches)		Maximum Interrupting Rating (KA)									
		1-Pole	2-Pole	3-Pole			Twin	Single	120V	120/240V	240V	277V	480Y/277	480V	600V	250V DC		
BL	15, 20, 30, 40, 50, 60 70 80, 90, 100	100. 160. —	170. 190. 230.	250. 290. 330.	35. 35. 35.	55. 55. 55.	3.75 <sup>③</sup>	—	—	10 10 10	—	—	—	—	—	—	—	
BL (HID)	15, 20, 30	110.	190.	—	35.	55.	3.75 <sup>②</sup>	—	—	10	—	—	—	—	—	—	—	
BAF (arc fault)	15, 20	220.	380.	—	35.	55.	3.75 <sup>②</sup>	—	10	10	—	—	—	—	—	—	—	
BAFH(arc fault)	15, 20	280.	450.	—	35.	55.	3.75 <sup>②</sup>	—	22	22	—	—	—	—	—	—	—	
BLF (GFCI)	15, 20, 30 40, 50, 60	220. —	250. 290.	— —	35. 35.	55. 55.	3.75 <sup>②</sup>	—	—	10 10	—	—	—	—	—	—	—	
BLE (EQ GFI)	15, 20, 30	200.	250.	—	35.	55.	3.75 <sup>②</sup>	—	—	10	—	—	—	—	—	—	—	
BLEH	15, 20, 30 40, 50, 60	420. —	530. 530.	— —	35. 35.	55. 55.	3.75 <sup>②</sup> 3.75 <sup>②</sup>	—	—	10 10	—	—	—	—	—	—	—	
BGL (SWN)	15, 20, 30	—	180.	230.	35.	55.	3.75 <sup>②</sup>	—	—	10	—	—	—	—	—	—	—	
BL (240V)R	15, 20, 30, 40, 50, 60, 70 70, 80, 90, 100	— —	210. 310.	— —	35. 35.	55. 55.	3.75 <sup>②</sup>	—	—	—	10 10	—	—	—	—	—	—	
BLH (120V)	15, 20, 30, 40, 50, 60 70 80, 90, 100	130. — 225.	240. 340. 280.	340. 380. 480.	35. 35. 35.	55. 55. 55.	3.75 <sup>②③</sup> 3.75 <sup>②③</sup>	—	—	22 22 22	—	—	—	—	—	—	—	
BLHF (GFCI)	15, 20, 30 40, 50, 60	250. —	340. —	— —	35. 35.	55. 55.	3.75 <sup>②</sup>	—	—	22 22	—	—	—	—	—	—	—	
HBL	15, 20, 30, 40, 50, 60 70, 80, 90, 100	130. —	320. 420.	400. 540.	35. 35.	55. 55.	3.75 <sup>②</sup>	—	—	22 22	—	—	—	—	—	—	—	
BQD	15, 20, 30, 40, 50, 60 70, 80, 90, 100	130. 200.	320. 420.	400. 540.	35. 35.	55. 55.	3.75 <sup>②③</sup>	—	—	—	65 65	—	14 14	—	—	—	14 14	
NGB	15-60 70-100 110-125	140. 210. —	460. 500. 820.	510. 660. 1190.	35. 35. 35.	50. 50. 50.	3.75	—	100 100 100	100 100 100	25 25 25	25 25 25	25 25 25	—	—	—	14 14 14	
NEB	15-60 70-100 110-125	270. 300. 730.	450. 510. 1290.	590. 670. 1440.	35. 35. 35.	50. 50. 50.	3.75	—	85 85 85	85 85 85	35 35 35	35 35 35	35 35 35	—	—	—	35 35 35	
HEB	15-60 70-100 110-125	390. 430. 1220.	690. 760. 2150.	910. 990. 2280.	35. 35. 35.	50. 50. 50.	3.75	—	100 100 100	100 100 100	65 65 65	65 65 65	65 65 65	—	—	—	42 42 42	
ED4 <sup>④</sup>	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	175. 260. —	570. 620. 1010.	630. 820. 1470.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	—	—	—	65 65 65	—	18 18 18	18 18 18	—	—	—	30 30 30
HED4 <sup>④</sup>	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	490. 490. —	850. 950. 2660.	1120. 1220. 2830.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	—	—	—	100 100 100	⑥	25 <sup>⑦</sup> 25 <sup>⑦</sup> 42	42 42 42	—	—	—	30 30 30
HHED6	15, 20, 30, 40, 50, 60 70, 80, 90, 100 110, 125	—	940. 1060. 2970.	1250. 1360. 3130.	75. 75. 75.	110. 110. 110.	3.75 <sup>②③</sup>	—	—	—	100 100 100	—	—	—	65 65 65	25 25 25	—	—
CED6	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	1970. 3160.	2410. 3980.	75. 75.	110. 110.	3.75 <sup>③</sup>	—	—	—	200 —	—	—	—	200 —	—	—	30 —
QJ2	60, 70, 80, 90, 100, 125, 150, 175, 200, 225	—	720.	940.	75.	150.	5	5	—	—	10	—	—	—	—	—	—	—
QJH2	60, 70, 80, 90, 100, 125, 150, 175, 200, 225	—	740.	1250.	75.	150.	5	5	—	—	22	—	—	—	—	—	—	—
QJ2H	60, 70, 80, 90, 100, 125, 150, 175, 200, 225	—	1030.	1540.	75.	150.	5	5	—	—	42	—	—	—	—	—	—	—
FXD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	1250.	1590.	75.	320.	5	5	—	—	65	—	—	—	35	—	—	30
HFD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	2750.	3350.	75.	320.	5	5	—	—	100	—	—	—	65	—	—	30
CFD6	70, 80, 90, 100, 125, 150, 175, 200, 225	—	3500.	4470.	75.	320.	—	5	—	—	200	—	—	—	200	—	—	30
FXD6	250	—	2190.	2700.	75.	320.	5	5	—	—	65	—	—	—	35	—	—	30
HFD6	250	—	3940.	4240.	75.	320.	5	5	—	—	100	—	—	—	65	—	—	30
CFD6	250	—	4590.	5580.	75.	320.	—	5	—	—	200	—	—	—	200	—	—	30
JXD2	200, 225, 250, 300, 350, 400	—	2150.	2350.	130.	350.	8.75	8.75	—	—	65	—	—	—	—	—	—	30
JXD6	200, 225, 250, 300, 350, 400	—	2230.	2750.	130.	350.	8.75	8.75	—	—	—	—	—	—	35	25	30	
HJD6	200, 225, 250, 300, 350, 400	—	3690.	4380.	130.	350.	8.75	8.75	—	—	100	—	—	—	65	35	30	
CJD6	200, 225, 250, 300, 350, 400	—	4910.	6310.	130.	350.	—	8.75	—	—	200	—	—	—	150	100	30	
SJD6 <sup>④</sup>	200, 225, 250, 300, 350, 400	—	—	5960.	130.	350.	—	8.75	—	—	65	—	—	—	35	25	—	
SHJD6 <sup>④</sup>	200, 300, 400	—	—	6610.	130.	350.	—	8.75	—	—	100	—	—	—	65	35	—	
LXD6	450, 500, 600	—	3540.	4580.	140.	640.	—	—	—	—	65	—	—	—	35	25	30	
HLD6	250, 300, 350, 400, 450, 500, 600	—	4280.	5360.	140.	640.	—	8.75	—	—	100	—	—	—	65	35	30	
CLD6	450, 500, 600	—	6600.	9720.	140.	640.	—	—	—	—	200	—	—	—	150	100	30	
SLD6 <sup>④</sup>	300, 400, 500, 600	—	—	6600.	140.	640.	—	—	—	—	65	—	—	—	35	25	—	
SHLD6 <sup>④</sup>	300, 400, 500, 600	—	—	6680.	140.	640.	—	8.75	—	—	100	—	—	—	65	35	—	
LMD6	500, 600, 700, 800	—	5060.	6520.	210.	1380.	—	8.75	—	—	65	—	—	—	50	25	30	
HLMD6	500, 600, 700, 800	—	6510.	8060.	210.	1380.	—	8.75	—	—	100	—	—	—	65	50	30	
MD6	500, 600, 700, 800	—	7450.	9500.	210.	1380.	—	—	—	—	65	—	—	—	35	25	30	
HMD6	500, 600, 700, 800	—	9320.	10870.	210.	1380.	—	10	—	—	100	—	—	—	65	35	30	
CMD6	500, 600, 700, 800	—	8010.	12160.	210.	1380.	—	—	—	—	200	—	—	—	150	100	30	
SMD6 <sup>④</sup>	600, 700, 800	—	—	10260.	210.	1380.	—	—	—	—	65	—	—	—	35	25	—	
SHMD6 <sup>④</sup>	600, 700, 800	—	—	11030.	210.	1380.	—	10	—	—	100	—	—	—	65	50	—	
ND6	800, 900, 1000, 1200	—	—	13040.	220.	1560.	—	—	—	—	65	—	—	—	50	25	30	
HND6	800, 900, 1000, 1200	—	—	13670.	220.	1560.	—	10	—	—	100	—	—	—	65	35	30	
CND6	800, 900, 1000, 1200	—	—	17690.	220.	1560.	—	—	—	—	200	—	—	—	150	100	30	
SND6 <sup>④</sup>	900, 1000, 1200	—	—	13030.	220.	1560.	—	—	—	—	65	—	—	—	35	25	—	
SHND6 <sup>④</sup>	800, 1000, 1200	—	—	13900.	220.	1560.	—	10	—	—	100	—	—	—	65	50	—	
NMX	600, 700, 800	—	4590.	5930.	210.	1720.	—	8.75	—	—	65	—	—	—	35	25	30	
HMX	600, 700, 800	—	5910.	7320.	210.	1720.	—	8.75	—	—	100	—	—	—	65	50	30	
LMX	600, 700, 800	—	7280.	11060.	210.	1720.	—	8.75	—	—	200	—	—	—	100	65	30	
NNX	800, 900, 1000, 1200	—	8910.	11850.	210.	1720.	—	10	—	—	65	—	—	—	35	25	30	
HNX	800, 900, 1000, 1200	—	10490.	12430.	210.	1720.	—	10	—	—	100	—	—	—	65	50	30	
LNX	800, 900, 1000, 1200	—	15430.	17690.	210.	1720.	—	10	—	—	200	—	—	—	100	65	30	

For inches / millimeters conversion, see Application Data section.

① Space price covers cost of housing frame plate with blank cover plate. Provision price includes all necessary mounting hardware, less circuit breaker, and includes housing frame cover plate with breaker handle opening.

② 1 to 6 poles may be mounted in 3.75" of unit space.

③ Accessories such as shunt trips on three pole breakers require 6.25" of unit space.

④ HED4 1-pole 15-30A = 65,000 IR  
35-100A = 25,000 IR

⑤ For 600V applications, ED6 available at same list price.

⑥ Ground fault is not available on branch Sensitrip breakers.

⑦ HED4 3-Pole = 42,000 IR

### Discount Schedule PBSB

Siemens Power Distribution & Control, SPEEDFAX™ 2007-2008 Product Catalog

# Panelboards

## Power and Distribution

## Selection/Dimensions

### Branch Switch Selection (fuses not included)

Ampere Rating	List Price \$ <sup>③</sup>		Space Only \$ <sup>①</sup>	Provisions for Future \$	Mounting Height (inches)
	3-Pole	2-Pole			

#### 240V — Twin Mounted NEC Fuse Clips<sup>②</sup>

30-30	965.	815.	105.	140.	2½ <sup>④</sup>
30-30	1020.	870.	170.	225.	5
30-60	1020.	880.	170.	225.	5
60-60	1020.	900.	170.	225.	5
60-100	1315.	1040.	225.	255.	7½
100-100	1410.	1050.	225.	255.	7½
200-200	2510.	—	275.	435.	10

#### 240V — Single Mounted NEC Fuse Clips<sup>②</sup>

30	830.	—	—	280.	7½
60	830.	—	—	280.	7½
100	1080.	—	225.	295.	7½
200	1355.	—	275.	435.	10
200	—	2015.	225.	295.	7½
400	2545.	2015.	475.	475.	15
600	3540.	4740.	475.	475.	15
800 (HCP)	9295.	4740.	680.	680.	16¼
1200 (HCP)	11100.	5110.	680.	680.	16¼

Ampere Rating	List Price \$ <sup>③</sup>		Space Only \$ <sup>④</sup>	Provisions for Future \$	Mounting Height (inches)
	3-Pole	2-Pole			

#### 600V — Twin Mounted NEC Fuse Clips<sup>②</sup>

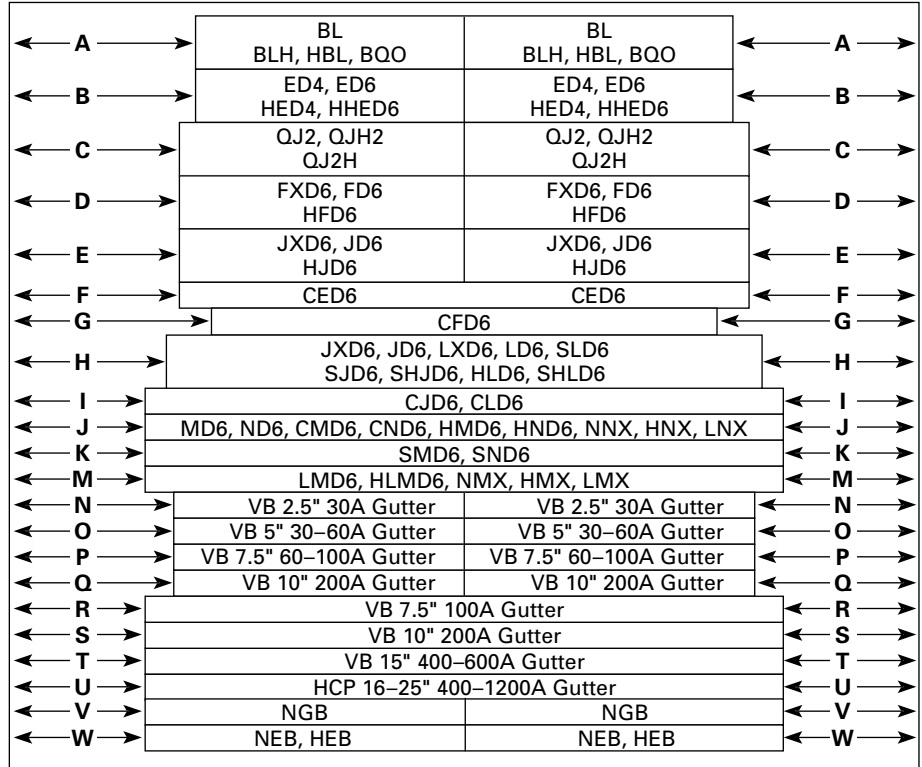
30-30	1400.	—	225.	295.	7½
30-60	1400.	—	225.	295.	7½
60-60	1400.	—	225.	295.	7½
60-100	1525.	—	225.	295.	7½
100-100	1610.	—	225.	295.	7½
200-200	2895.	—	275.	435.	10

#### 600V — Single Mounted NEC Fuse Clips<sup>②</sup>

100	1070.	—	225.	295.	7½
200	1465.	—	275.	445.	10
400	3170.	—	475.	475.	15
400 (HCP)	9295.	—	680.	680.	15
600	3860.	—	475.	475.	15
600 (HCP)	9295.	—	680.	680.	15
800 <sup>③</sup> (HCP)	9295.	—	680.	680.	16¼
1200 <sup>③</sup> (HCP)	11100.	—	680.	680.	16¼

### Branch Breaker Side Gutter Inches (mm)

Reference Letter	Panel Width 38 in. Inches (mm)
A	14.0 (356)
B	10.0 (254)
C	9.5 (242)
D	8.25 (210)
E	8.125 (207)
F	7.615 (193)
G	11.769 (299)
H	13.425 (341)
I	8.956 (227)
J, M, N, O	13.0 (330)
K	12.0 (305)
P	10.0 (254)
Q	8.0 (203)
R, S	10.5 (267)
T	9.3 (236)
U	10.3 (262)
V	13.0 (330)
W	10.75 (273)



For inches / millimeters conversion, see Application Data section.

① Space price covers cost of housing frame plate without breaker handle opening. Provisions include all necessary mounting hardware less breakers.

② For Class J, R or T fuse clip prices, refer to page 10-62.  
③ 800 and 1200 ampere switches have class "L" fuse provisions. (Type HCP).  
④ NEC fuse clips only.



# Panelboards

## Power and Distribution

## Selection/Dimensions

Types P5 and SPP/FPP, F2 (12 3/4" deep)

### Connecting Strap Kits<sup>①②③</sup> Circuit Breaker

For use with Sentron Deep or Type S5 power panels				
Breaker Type	Mounting	Unit Height (inches)	12.75" Deep Box	
			Catalog Number	List Price \$
BL/BQD	Twin	3.75	SBLBD	902.00
NGB	Twin	3.75	SNBD	902.00
NEB, HEB	Twin	3.75	SNBD	902.00
ED	Twin	3.75	SE6D	902.00
CED6	Single	3.75	SCED	882.00
QJ	Twin	5	SQJD	1622.00
FD6	Twin	5	SF6D	1622.00
CFD6	Single	5	SCFD	1622.00
JXD2, JXD6	Single	8.75	SJ1D	2254.00
JXD2, JXD6	Twin	8.75	SJ2D	2488.00
SJD6	Single	8.75	SSJ1D	2488.00
CJD6	Single	8.75	SCJD	2254.00
SCJD6	Single	8.75	SSCJD	2254.00
LD6	Single	8.75	SL6D	2668.00
SLD6	Single	8.75	SSL6D	2668.00
CLD6	Single	8.75	SCLD	2668.00
SCLD6	Single	8.75	SSCLD	2668.00
LMD6, HLMD6	Single	8.75	SLM1D	3240.00
MD6, HMD6, CMD6	Single	10	SMND	3847.00
SMD6, SHMD6	Single	10	SSMND	4097.00
ND6, HND6	Single	10	SMND	3847.00
SND6, SHND6, SCND6	Single	10	SSMND	4097.00
NM, HM, LM, SNM, SHM	Single	8.75	MG1D	3317.00
NN, HN, LN, SNN, SHN	Single	10	NG1D	3939.00

### Connecting Strap Kits<sup>③</sup> Fusible

For use with Sentron FPP Deep or Type F2/P5 power panels			
Ampere Rating	Unit Height (inches)	12.75" Deep Box	
		Catalog Number	List Price \$
30-30	2.5	F602D	210.00
30-30	5, 7.5	F657D	254.00
30-60	5, 7.5	F657D	254.00
60-60	5, 7.5	F657D	254.00
60-100	5, 7.5	F657D	254.00
100-100	5, 7.5	F657D	254.00
100	7.5	F657D	254.00
200	7.5	F657D	254.00
200	10	F671D	393.00
200-200	10	F672D	430.00
400-600	15	F6150D	186.00
800-1200 <sup>④</sup>	16.25	F6162D	1366.00

### Blank Plates Circuit Breaker and Vacu-Break<sup>①</sup>

For use with Sentron SPP and Type S5 power panels		
Height (inches)	Catalog Number	List Price \$
1.25	6FPB01	196.00
2.5	6FPB02	224.00
3.75	6FPB03	224.00
5.0	6FPB05	224.00
10.0	6FPB10	302.00

### Filler Plates

For use with Sentron SSP and Type S5 power panels		
Breaker Type	Filler Plate Catalog Number	List Price \$
BL, BLH, HBL, BQD, ED2, ED4, ED6, HED4, HED6, HHED6	QF3	2.80 per pole

For inches / millimeters conversion, see Application Data section.

① Normal stock item.

② Includes cover plate and mounting hardware, less circuit breaker.

③ Also fits Types FCI, FCII, SB1 and SB2 switchboards.

④ 800-1200 amp units are HCP switch.

Note: When a front filler plate is not completely filled with breakers, the openings in the unused space must be closed with filler plates selected from this table.

### Type P5

When required, special constructions or additions to standard panelboards may be specified for all **factory-assembled** Power and Distribution Panelboards. Below and on the next page are listed many of those available for Type S5 panelboards. *In no case do these apply to **Narrow** (Column) Width Lighting Panelboards or **Unassembled** Panelboards.*

#### 1. Type 3R/12

Description	List Price \$ 38"
Panelboard Construction: Single Door . . .	1485.

Complete enclosure does not require a trim.

#### 2. Painted Finish see page 10-72.

#### 3. Miscellaneous Accessories

Description	List Price \$ All Panels
Nameplate — laminated, engraved . . . .	50.
Tamper-Resistant Screws — per panel . .	70.

#### 4. Devices Mounted on Gutter Cover — Includes Device, Mounting — Wired or Unwired see page 10-72

#### 5. Feed-Thru Lugs<sup>①</sup> (One Set Per Panel)

Ampere Rating	List Price \$		Unit Space (Additional inches) MLO
	3-Phase	1-Phase	
400	245.	245.	10
600	455.	455.	10
800	615.	615.	17.5
1200	765.	765.	17.5

#### 6. Split Bus<sup>②</sup>

Phases	List Price \$		Unit Space (Additional inches)
	800A	1200A	
1-Phase	570.	700.	1.25
3-Phase	655.	740.	1.25

#### 7. MLO Compression Lugs — Aluminum Lugs for Use With Copper or Aluminum Cable

Available as main lugs and neutral lug. Price includes required aluminum compression lugs. See page 10-64.

#### 8. Compression Lugs For Circuit Breakers — See Section 6.

#### 9. Circuit Breaker Main — With Vacu-Break Branch Panelboards

Price appropriate main breaker panel, then add list prices of desired vacu-break branches and accessories.

#### 10. Vacu-Break Main — With Circuit Breaker Branch Panelboards

Price appropriate main switch panel, then add list price of desired circuit breaker branches and accessories.

#### 11. Grounding of Panelboards<sup>③</sup>

Non-Insulated Equipment Ground Bus Including Ground Lug . . . . . **Standard**  
Insulated Equipment Ground Bus Including Ground Lug . . . **\$15. per panel**

Description	List Price \$
ST W/CPT	2240.
BFI — Blown Fuse	1200.
BFI/BFT — Blown Fuse/Blown Fuse Trip	3180.
GF/BFT — Ground Fault & Blown Fuse Trip	10810.
BFT — Blown Fuse Trip	1985.
GF w/Test Panel	10810.

#### 13. Fuse Clip Provisions (Add to 250 Volts or 600 Volts Unit Prices Per Switch)

Ampere Rating	List Price \$ Class J	List Price \$ Class R	List Price \$ Class T
30	55. <sup>④</sup>	55. <sup>④⑤</sup>	N/A
60	55. <sup>④</sup>	55.	N/A
100	85.	85.	160.
200 <sup>⑥</sup>	85.	85.	180.
400, 600	85.	85.	285.

For inches / millimeters conversion, see Application Data section.

① For use on main lug, main breaker or main switch panels without subfeed breakers.

② For increase in panelboard height — Consult local sales office. Price includes increased enclosure height if required.

③ Ground bar not installed in box. For factory installation, add \$100. List Price per panel.

④ Price 600 Volt 7½" high units.

⑤ At 250 Volts — available on 5" unit only.

⑥ Class "J" clips not required on 600V twin 200A switch. Class "R" and "T" clips not available on this switch.

### Type P5

#### 14. Remote Control Switches

Switch Type	Modification
920	TAKES 20.0 unit space
911	≤ 800A 25" to unit space ≥ 800A 30" unit space
LEN	≤ 60 AMPS 10" unit space > 60 AMPS 15" unit space

#### 15. Ground Fault on Main Breaker

Description	Ampere Rating	List Price \$
Conventional Ground Fault <sup>①</sup> includes: Ground Fault Relay, Ground Sensor, CPT and Shunt Trip	800-1200	7330.
Test and Monitor Panel <sup>②</sup>		1070.
Ground Fault add to Sensitrip III breaker price (takes 5" of unit space)	800-1200	2500.

#### 16. Time Clocks<sup>③</sup>

Sangamo, Tork or Paragon time clock can be supplied, mounted in panelboard cabinet. For required increase in enclosure dimensions, consult local sales office. Price appropriate panelboard, then add list price below.

Description	List Price \$
Time Clock (one or two pole, single or double throw contacts; three pole, single throw) 277V maximum with plain dial	1070.
Add for —	
Astronomical dial	210.
An omitting device	75.
Reserve power or carryover	2450.
Space and mounting provisions only	540.

#### 17. Circuit Breaker Accessories

##### Handle Blocking Device

Blocks handle in either the "ON" or "OFF" position — See page 10-73

Padlocking Device — Padlocks in "OFF" position — See page 10-73

#### 18. Ground Fault Sensing Relay Kit Equipment Protection ED Frames (30 ma) — See page 10-73

#### 19. Main Bus

Standard main bus and ground bus are tin plated aluminum. For copper main bus, neutral bus and ground bus add from the table for each panel. Copper Neutral Bar **\$115**. List Price.

Main Bus	Catalog Number <sup>④</sup>	800-1200 Ampere \$
Silver Plated Copper	E	1220.
1000A per sq. in. Copper	D	1070.
750A per sq. in. Aluminum	B	645.

#### 20. Copper Lugs — For Main Lug Only Panels

Standard main lugs and neutral lugs are tin plated aluminum, UL listed for use with aluminum/copper cables. Price below is for one panel and includes copper lugs for main lugs and neutral lugs, and must be used with copper cables.

Main Bus Ampere Rating	List Price \$
800-1200	225.

#### 21. Shunt Trip on Main and Branches<sup>⑤</sup>

See Breaker Section for list price on this option.

#### 22. Spanner Wrenches (for Vacu-Break Switches)

Ampere Rating	List Price \$
30-250	460.

#### 23. Alternate Lugs

Style	Amperage Rating	Alternate Connectors	Box Height Addition	Price Addition \$
MLO	800	(3)#3/0 AWG - 750 Kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	390.
	1000	(4)#3/0 AWG - 750 Kcmil Cu or Al	Deduct 7.5" Unit Space from available unit space	510.
	1200	(4)#3/0 AWG - 750 Kcmil Cu or Al	Deduct 7.5" Unit Space from available unit space	510.
Main Switch Vacu-Break	400	(1)#3/0 AWG - 750 Kcmil Cu or Al or (2)#3/0 AWG 250 Kcmil Cu or Al	Deduct 3.75" Unit Space from available unit space	125.

① Available in 90" high enclosure only. Unit space is 42 1/2" with Test and Monitor Panel; 45" without Test and Monitor Panel.

② Not available on Sensitrip III.

③ For required unit space — consult local sales office. Price includes increased enclosure height if required.

④ Replace "A" in position 11 of catalog number.

⑤ Shunt Trip on 100A frame breakers increases mounting height to 6.25" for twin mounting.

⑥ Must price "D" or "B" from item #19 above.

⑦ See section (6) circuit breakers for 100% rated circuit breaker requirements.

# Panelboards

## Modifications and Additions

Selection

### 24. Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	Price Addition \$
MLO	800	N/A	(3)#3/0 AWG - 500 Kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = <b>\$255</b> 3-Phase 3-Wire = <b>\$190</b> 1-Phase 3-Wire = <b>\$190</b> 2-Wire = <b>\$190</b>
	1000	N/A	(4)#3/0 AWG - 500 Kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = <b>\$350</b> 3-Phase 3-Wire = <b>\$255</b> 1-Phase 3-Wire = <b>\$255</b> 2-Wire = <b>\$255</b>
	1200	N/A	(4)#3/0 AWG - 500 Kcmil Cu or Al	Deduct 5.0" Unit Space from available unit space	3-Phase 4-Wire = <b>\$350</b> 3-Phase 3-Wire = <b>\$255</b> 1-Phase 3-Wire = <b>\$255</b> 2-Wire = <b>\$255</b>
Main Breaker (S5 Only)	800	MD6, HMD6, CMD6, SMD6, SHMD6, SCMD6	(3)#2/0 AWG - 500 Kcmil Cu or Al	0	3-Phase 4-Wire = <b>\$305</b> 3-Phase 3-Wire = <b>\$235</b> 1-Phase 3-Wire = <b>\$235</b> 2-Wire = <b>\$235</b>
	1200	ND6, HND6, CND6, SND6, SHND6, SCND6	(4)#250 - 500 Kcmil Cu or Al	0	3-Phase 4-Wire = <b>\$305</b> 3-Phase 3-Wire = <b>\$235</b> 1-Phase 3-Wire = <b>\$235</b> 2-Wire = <b>\$235</b>

### Type 1 Enclosure Modifications and Additions

P5	Description	Panel Adder \$	After Market Price \$
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#### Boxes

PB860	P5 box 38 W X 12.75 Dp X 60 Ht.	Standard	595.
PB875	P5 box 38 W X 12.75 Dp X 75 Ht.	Standard	595.
PB890	P5 box 38 W X 12.75 Dp X 90 Ht.	Standard	595.
PBD860	P5 box 38 W X 14.50 Dp X 60 Ht.	①	615.
PBD875	P5 box 38 W X 14.50 Dp X 75 Ht.	①	615.
PBD890	P5 box 38 W X 14.50 Dp X 90 Ht.	①	615.

#### Trims

P560V	P5 Std (4 piece trim) vented 60"	Standard	615.
P575V	P5 Std (4 piece trim) vented 75"	Standard	645.
P590V	P5 Std (4 piece trim) vented 90"	Standard	670.
P560NV	P5 Std (4 piece trim) unvented 60"	②	615.
P575NV	P5 Std (4 piece trim) unvented 75"	②	645.
P590NV	P5 Std (4 piece trim) unvented 90"	②	670.
P560VHG	P5 Std (4 piece trim) vented 60" w/Hinged gutter covers	290.	910.
P575VHG	P5 Std (4 piece trim) vented 75" w/Hinged gutter covers	290.	935.
P590VHG	P5 Std (4 piece trim) vented 90" w/Hinged gutter covers	290.	965.
P560NVHG	P5 Std (4 piece trim) unvented 60" w/ Hinged gutter covers	290.③	910.
P575NVHG	P5 Std (4 piece trim) unvented 75" w/Hinged gutter covers	290.③	935.
P590NVHG	P5 Std (4 piece trim) unvented 90" w/Hinged gutter covers	290.③	965.
P560VD	P5 Std (1 PC. Door) vented 60" Use 14.5" deep box	170.	730.
P575VD	P5 Std (1 PC. Door) vented 75" Use 14.5" deep box	170.	760.
P590VD	P5 Std (1 PC. Door) vented 90" Use 14.5" deep box	170.	785.
P560NVD	P5 Std (1 PC. Door) unvented 60" Use 14.5" deep box	170.③	730.
P575NVD	P5 Std (1 PC. Door) unvented 75" Use 14.5" deep box	170.③	760.
P590NVD	P5 Std (1 PC. Door) unvented 90" Use 14.5" deep box	170.③	785.
P560VDD	P5 Std (1 PC. Door in door) vented 60" Use 14.5" deep box	360.	1090.
P575VDD	P5 Std (1 PC. Door in door) vented 75" Use 14.5" deep box	360.	1115.
P590VDD	P5 Std (1 PC. Door in door) vented 90" Use 14.5" deep box	360.	1140.
P560NVDD	P5 Std (1 PC. Door in door) unvented 60" Use 14.5" deep box	360.③	1090.
P575NVDD	P5 Std (1 PC. Door in door) unvented 75" Use 14.5" deep box	360.③	1115.
P590NVDD	P5 Std (1 PC. Door in door) unvented 90" Use 14.5" deep box	360.③	1140.

#### Flush Mounting Kits

F860	Flush kit for P5 60" Ht.	④	140.
F875	Flush kit for P5 75" Ht.	④	140.
F890	Flush kit for P5 90" Ht.	④	140.

#### Type 3R/12

WP860	P5 3R/12 60"	—	140.
WP875	P5 3R/12 75"	—	140.
WP890	P5 3R/12 90"	—	140.

① Required with door over breaker handles.

② Un-vented trims require amps per square inch bussing.

③ Requires 14.5 deep box.

④ No adder if ordered at time of order entry.

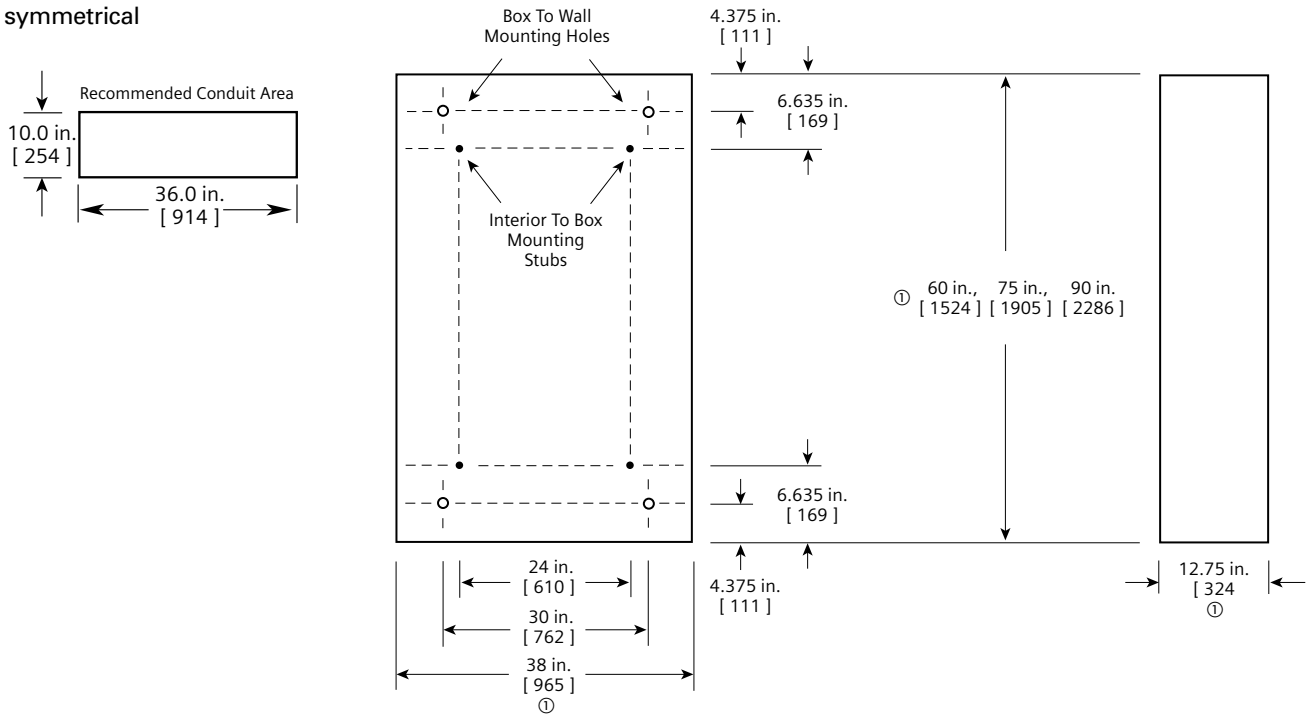
# Panelboards

## Type P5 Panelboards

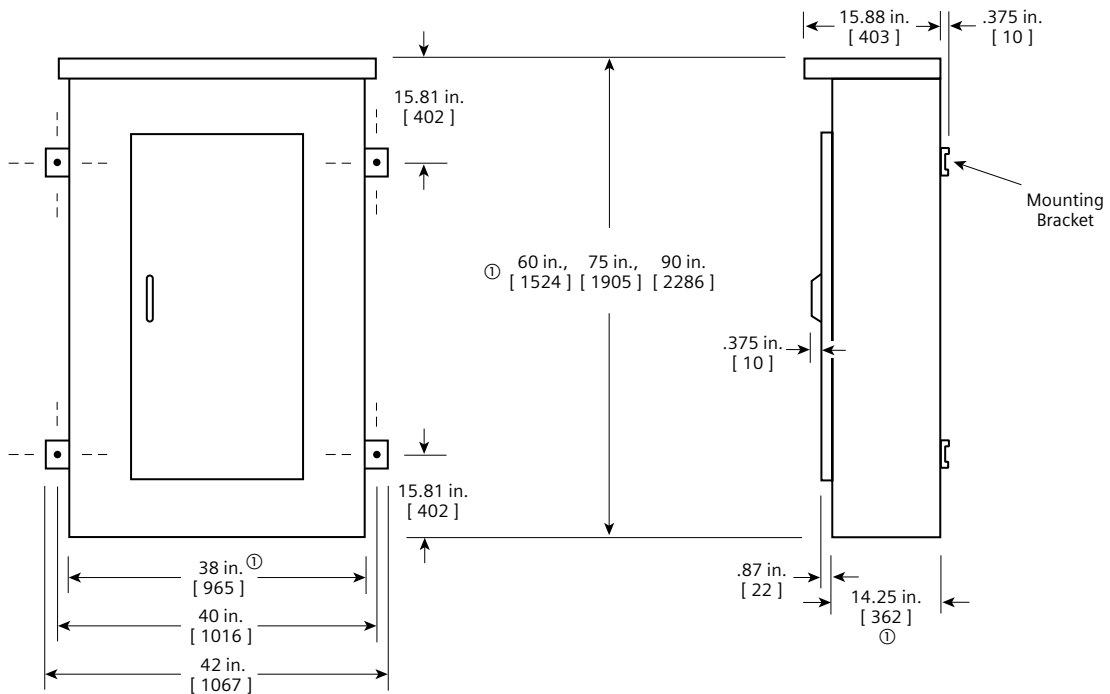
## Dimensions

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



① Dimensions are interior of the box. Add 5/8" to width for absolute dimension. Add 1/8" to height for absolute dimension.  
**Dimensions shown in inches and millimeters [ ].**

# Panelboards

## Circuit Breaker / Column Type

General

### Type C1

**240 Volts AC Maximum**  
**250 Ampere Mains**  
**250 Ampere Maximum Branch**  
**UL Short Circuit Rating —**  
**200,000 IR Maximum**

**Branch Breaker Symmetrical**  
**Interrupting Rating**

**Based on Underwriters' Test Procedure**

### Type C2

**480Y/277 Volts AC Maximum**  
**250 Ampere Mains**  
**250 Ampere Maximum Branch**  
**UL Short Circuit Rating —**  
**100,000 IR Maximum**

Meets 2002 NEC wire bending requirement, section 312-6.

### Panelboards

Listed by Underwriter's Laboratories, Inc., under "Panelboards" File #E2269.

Meets Federal Specification W-C375B/Gen.

### Service

240 Volts Maximum. 1-Phase, 3-Wire, or 3-Phase, 4-Wire.

### Panelboards Fronts and Doors

Standard panelboards are furnished with trim with a flush door lock. All are factory assembled for ease of installation. Fronts are fabricated from code gauge steel and finished ANSI-61.

### Main Breakers C1

BL, BLH and HBL frame breakers are mounted horizontally. All other frames are mounted vertically.

### Main Breakers C2

BQD frame breakers are mounted horizontally. All other frames are mounted vertically.

### Boxes

C1 — 7 $\frac{1}{8}$ " wide, 5 $\frac{1}{4}$ " deep.  
 C2 — 8 $\frac{1}{2}$ " wide, 5 $\frac{1}{4}$ " deep.

### Branch Breaker Side Gutters

Type	Circuit Breaker	Side Gutter (inches)
C1	BL, BLH, HBL, BQD	3.505
C2	BQD	3.5

### Weight—Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is:

\*About 3 lbs. per inch of box height.

### Gauge Steel Boxes

Type	Width	Height	Gauge Steel
C1	7 $\frac{1}{8}$ "	48", 73", 85"	#14
C2	8 $\frac{1}{2}$ "	48", 73", 85"	#14

### Fronts

C1	7 $\frac{1}{8}$ "	48", 73", 85"	#14
C2	8 $\frac{1}{2}$ "	48", 73", 85"	#14

### Main Breaker Connectors

Ampere Rating	Connectors suitable for Cu or Al
100	(1) #14-1/0 AWG
125	(1) #4-1/0 AWG
225	(1) #6 AWG-300 kcmil
250	(1) #4 AWG-350 kcmil Al (1) #6 AWG-350 kcmil Cu

### Main Lug Connectors

125	(1) #6 AWG-350 kcmil
250	(1) #6 AWG-350 kcmil

### Series Connected Short Circuit Ratings

The term "Series Connected Short Circuit Rating" refers to the application of series connected circuit breakers in a combination that allows some circuit breakers to have lower individual interrupting ratings than the available fault current. This is permitted as long as the series combination has been tested and certified by UL.

The table below lists specific main and branch breaker series combinations that are marked on all C1 panels. All combinations shown have been tested for use in C1 panelboards and are UL Listed. Other combinations are available. See series rating information in the Circuit Breaker Section, pages 6-146 to 6-150. Ratings other than those shown below must be specified at the time of order entry.

For inches / millimeters conversion, see Application Data section.

© Connector ranges indicated do not apply to all main breaker types. Refer to molded case circuit breaker standard pressure wire connectors in the breaker section of this catalog for the wire ranges for a specific breaker frame.

# Panelboards

## Circuit Breaker / Column Type

**Selection**

### Main Lugs Only C1

**240 Volts Maximum**

Maximum Panel Ampere Rating	Maximum 1-Pole Circuits	Box Height (inches)	208Y/120V 3-Phase, 4-Wire Catalog Number	List Price \$	120/240V 1-Phase, 3-Wire Catalog Number	List Price \$
125	18	48	C1C18ML125CTS	1030.00	C1A18ML125CTS	1190.00
	30	73	C1C30ML125CTS	1250.00	C1A30ML125CTS	1170.00
	42	85	C1C42ML125CTS	1440.00	C1A42ML125CTS	1370.00
250	18	48	C1C18ML250CTS	1100.00	C1A18ML250CTS	1010.00
	30	73	C1C30ML250CTS	1290.00	C1A30ML250CTS	1200.00
	42	85	C1C42ML250CTS	1520.00	C1A42ML250CTS	1420.00

### Main Circuit Breaker ①② C1

**240 Volts Maximum**

100	18	48	C1C18BL100CTS	1360.00	C1A18BL100CTS	1250.00
	30	73	C1C30BL100CTS	1570.00	C1A30BL100CTS	1440.00
	42	85	C1C42BL100CTS	1840.00	C1A42BL100CTS	1660.00
125	18	48	C1C18E4125CTS	1910.00	C1A18E4125CTS	1790.00
	30	73	C1C30E4125CTS	2110.00	C1A30E4125CTS	2020.00
	42	85	C1C42E4125CTS	2390.00	C1A42E4125CTS	2200.00
225	18	48	C1C18QJ225CTS	2540.00	C1A18QJ225CTS	2150.00
	30	73	C1C30QJ225CTS	2750.00	C1A30QJ225CTS	2350.00
	42	85	C1C42QJ225CTS	2950.00	C1A42QJ225CTS	2550.00
250	18	48	C1C18FX250CTS	2950.00	C1A18FX250CTS	2550.00
	30	73	C1C30FX250CTS	3140.00	C1A30FX250CTS	2760.00
	42	85	C1C42FX250CTS	3350.00	C1A42FX250CTS	2960.00

### Main Lugs Only C2

**480Y/277 Volts Maximum**

Maximum Panel Ampere Rating	Maximum 1-Pole Circuits	Box Height (inches)	480Y/277V 3-Phase, 4-Wire Catalog Number	List Price \$
125	18	48	C2E18ML125CTS	1030.00
	30	73	C2E30ML125CTS	1260.00
	42	85	C2E42ML125CTS	1440.00
250	18	48	C2E18ML250CTS	1100.00
	30	73	C2E30ML250CTS	1290.00
	42	85	C2E42ML250CTS	1520.00

### Main Circuit Breaker ①② C2

**480Y/277 Volts Maximum**

100	18	48	C2E18BD100CTS	1710.00
	30	73	C2E30BD100CTS	1930.00
	42	85	C2E42BD100CTS	2190.00
125	18	48	C2E18E4125CTS	1910.00
	30	73	C2E30E4125CTS	2110.00
	42	85	C2E42E4125CTS	2390.00
225	18	48	C2E18FX225CTS	2710.00
	30	73	C2E30FX225CTS	2980.00
	42	85	C2E42FX225CTS	3240.00
250	18	48	C2E18FX250CTS	2950.00
	30	73	C2E30FX250CTS	3140.00
	42	85	C2E42FX250CTS	3350.00

### Alternate Main Breaker Selection ①② C1

Ampere Rating	Breaker Type	Maximum Interrupting Rating (KA)	Catalog Number	List Price \$	Available Trip Values
100	BL	10	BL	STD	50, 60, 70, 80, 90, 100
	BLH	22	LH	65.	50, 60, 70, 80, 90, 100
	HBL	65	HL	405.	50, 60, 70, 80, 90, 100
125	ED4	65	E4	STD	50, 60, 70, 80, 90, 100, 110, 125
	HED4	100	H4	540.	50, 60, 70, 80, 90, 100, 110, 125
225	QJ2	10	QJ	STD	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJH2	22	QH	100.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJ2-H	42	Q2	160.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
225	FXD6	65	FX	140.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6②	100	HF	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
250	FXD6	65	FX	STD	250
	HFD6②	100	HF	1900.	250

For inches / millimeters conversion, see Application Data section.

① BL, BLH, HBL and BOD are horizontally mounted. All others vertically mounted.

② Interchangeable trip breakers such as FD6 and HFD6 cannot be back fed. Must be top feed only.

# Panelboards

## Circuit Breaker / Column Type

Selection

### Branch Breaker Selection C1

Breaker Type	Available Ampere Rating	List Price Installed \$			Provisions for Future \$	Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole		120V	120/240V	240V
BL (120V)	15, 20, 30, 40, 50, 60	25.	45.	140.	—	—	10	—
	70	35.	85.	190.	—	—	10	—
	70, 80, 90, 100	—	140.	210.	—	—	10	—
BL (HID)	15, 20, 30	55.	80.	—	—	—	—	—
BLF (GFCI)	15, 20, 30	140.	240.	—	—	10	—	—
	40, 50, 60	—	250.	—	—	10	—	—
BLE (EQGFI)	15, 20, 30	220.	330.	—	—	10	—	—
BGL (SWN)	15, 20, 30	—	100.	130.	—	10	—	—
BLR (240V)	15, 20, 30, 40, 50, 60	—	105.	—	—	—	—	10
	70, 80, 90, 100	—	185.	—	—	—	—	10
BLH (120V)	15, 20, 30, 40, 50, 60	35.	85.	220.	—	—	22	—
	70	75.	130.	300.	—	—	22	—
	70, 80, 90, 100	—	200.	310.	—	—	22	—
BLHF (GFCI)	15, 20, 30	155.	270.	—	—	—	22	—
	40, 50, 60	—	291.	—	—	—	22	—
HBL	15, 20, 30, 40, 50	65.	150.	290.	—	—	65	65
	60, 70, 80, 90, 100	—	400.	480.	—	—	65	65
BQD	15, 20, 30, 40, 50, 60	85.	270.	290.	—	—	—	65
	70, 80, 90, 100	200.	400.	480.	—	—	—	65

### Subfeed Breakers — Limit One Per Panel<sup>®</sup> C1

ED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125	—	420.	540.	100.	—	—	65
		—	750.	910.	100.	—	—	65
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125	—	690.	910.	100.	—	—	65
		—	1270.	1450.	100.	—	—	100
QJ2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	420.	880.	150.	—	—	10
QJH2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	930.	1140.	150.	—	—	22
QJ2-H	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	1080.	1410.	150.	—	—	42
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	1220.	1540.	200.	—	—	65
HFD6 <sup>®</sup>	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	2440.	3010.	200.	—	—	100

### Alternate Main Breaker Selection<sup>①②③</sup> C2

Ampere Rating	Breaker Type	IR	Catalog Number	List Price \$	Available Trip Values
100	BQD	14	BD	STD	50, 60, 70, 80, 90, 100
	ED4	18	E4	55.	50, 60, 70, 80, 90, 100
	ED6	25	E6	65.	50, 60, 70, 80, 90, 100
	HED4	42	H4	290.	50, 60, 70, 80, 90, 100
	HHED6	65	H6	390.	50, 60, 70, 80, 90, 100
	125	ED4	18	E4	STD
125	ED6	25	E6	25.	110, 125
	HED4	42	H4	290.	110, 125
	HHED6	65	H6	390.	110, 125
	225	FXD6	35	FX	STD
225	HFD6	65	HF	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	250	FXD6	35	FX	STD
250	HFD6	65	HF	1760.	250

### Branch Circuit Breakers C2

Breaker Type	Available Ampere Rating	List Price Installed \$			Provisions for Future \$	Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole		277V	480/277V	480V
BQD	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	85.	270.	290.	—	14	14	—
		200.	400.	480.	—	14	14	—

### Subfeed Breakers — Limit One Per Panel<sup>②</sup> C2

ED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125	—	420.	540.	100.	—	18	18
		—	750.	910.	100.	—	18	18
ED6	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125	—	530.	860.	100.	—	—	25
		—	1090.	1090.	100.	—	—	25
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 125	—	690.	910.	100.	—	—	42
		—	1270.	1450.	100.	—	—	42
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	1220.	1540.	200.	—	—	35
HFD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	2440.	3010.	200.	—	—	65

① No increase in box height. Space is already built into C1 panel.

② BL, BLH, HBL and BQD are horizontally mounted. All others vertically mounted.

③ Interchangeable trip breakers such as FD6 and HFD6 cannot be back fed. Must be top feed only.



# Sentron® Panelboards

## Circuit Breaker / Column Type, Modifications and Additions

**Selection**

### Type C1/C2

When required, special constructions or additions to standard panelboards may be specified for factory-assembled column panelboards.

#### Box Modifications

Description	List Price \$
Gasketed	<b>670.</b>
Metal Card Holder	<b>65.</b>
Welded Metal Card Holder	<b>125.</b>
Nameplate	<b>55.</b>
Al Ground Bar	<b>STD</b>
Cu Ground Bar	<b>40.</b>
Insulated Al Ground Bar	<b>40.</b>
Insulated Cu Ground Bar	<b>75.</b>

#### Interior Modifications

Description	List Price \$
Feed-Thru Lugs	<b>180.</b>
Cu Neutral Lugs	<b>110.</b>
Cu main Lugs 125A	<b>115.</b>
Cu main Lugs 250A	<b>190.</b>

#### Box Sizing Chart

Certain modifications such as subfeed breakers and feed-thru lugs require additional unit space. Use this chart to determine proper enclosure size.

Panel Configuration	Box Height (inches)
All MLO 18 Circuit	48
All MLO 30 Circuit	73
All MLO 42 Circuit	85
All MLO 18 Circuit with feed-thru lugs	73
All MLO 30 Circuit with feed-thru lugs	85
All MLO 42 Circuit with feed-thru lugs	85
All MLO 18 Circuit with subfeed breaker	73
All MLO 30 Circuit with subfeed breaker	85
All Main Breaker 18 Circuit	48
All Main Breaker 30 Circuit	73
All Main Breaker 42 Circuit	85
All Main Breaker 18 Circuit with feed-thru lugs	73
All Main Breaker 30 Circuit with feed-thru lugs	85
All Main Breaker 42 Circuit with feed-thru lugs	85
All Main Breaker 18 Circuit with subfeed breaker	73
All Main Breaker 30 Circuit with subfeed breaker	85

#### Column Extension

Available in various standard lengths, extensions are 5¼ inches deep and 7 inches wide.

Height (inches)	Catalog Number	List Price \$
14	<b>LXX-14</b>	<b>150.00</b>
20	<b>LXX-20</b>	<b>160.00</b>
26	<b>LXX-26</b>	<b>180.00</b>
32	<b>LXX-32</b>	<b>180.00</b>
38	<b>LXX-38</b>	<b>210.00</b>
41	<b>LXX-41</b>	<b>210.00</b>
44	<b>LXX-44</b>	<b>235.00</b>
53	<b>LXX-53</b>	<b>255.00</b>
56	<b>LXX-56</b>	<b>275.00</b>
62	<b>LXX-62</b>	<b>285.00</b>
65	<b>LXX-65</b>	<b>305.00</b>
68	<b>LXX-68</b>	<b>305.00</b>
74	<b>LXX-74</b>	<b>330.00</b>
80	<b>LXX-80</b>	<b>360.00</b>
86	<b>LXX-86</b>	<b>380.00</b>

#### Pull Boxes

Two styles of pull boxes are available, top and front mounted. When the panel and its extensions are mounted in a structural WF beam a front mounted pull box is required. When the panels are surface mounted, a top mounted pull box may be used. Provisions are made so that the neutral bar may be mounted in the pull box when required.

(Front mounted pull box dimensions are 14" H. X 20" W.)

Description	Catalog Number	List Price \$
Top Mount	<b>LXXP-T</b>	<b>180.00</b>
Front Mount <sup>Ⓞ</sup>	<b>LXX50-F</b>	<b>445.00</b>

For inches / millimeters conversion, see Application Data section.

<sup>Ⓞ</sup>Includes 50" extension. Price additional extensions from above.

# Sentron® Panelboards

## Telephone and Equipment Cabinets

**Telephone and Equipment Cabinets:** Conform to requirements of Underwriters' Laboratories, Inc., for all cabinets and boxes bearing their label. Surface and Flush enclosures: box and front constructed of code-gauge steel, box galvanized and front only finished with light gray, ANSI-61.

**Boxes:** Standard construction has blank end walls, without knockouts.

**Fronts:** Siemens Fas Latch fronts feature concealed hinges and fastening screws. Match P1 and P2 Panels in appearance. Two locks supplied on doors more than 51 inches high.

## Selection/Dimensions



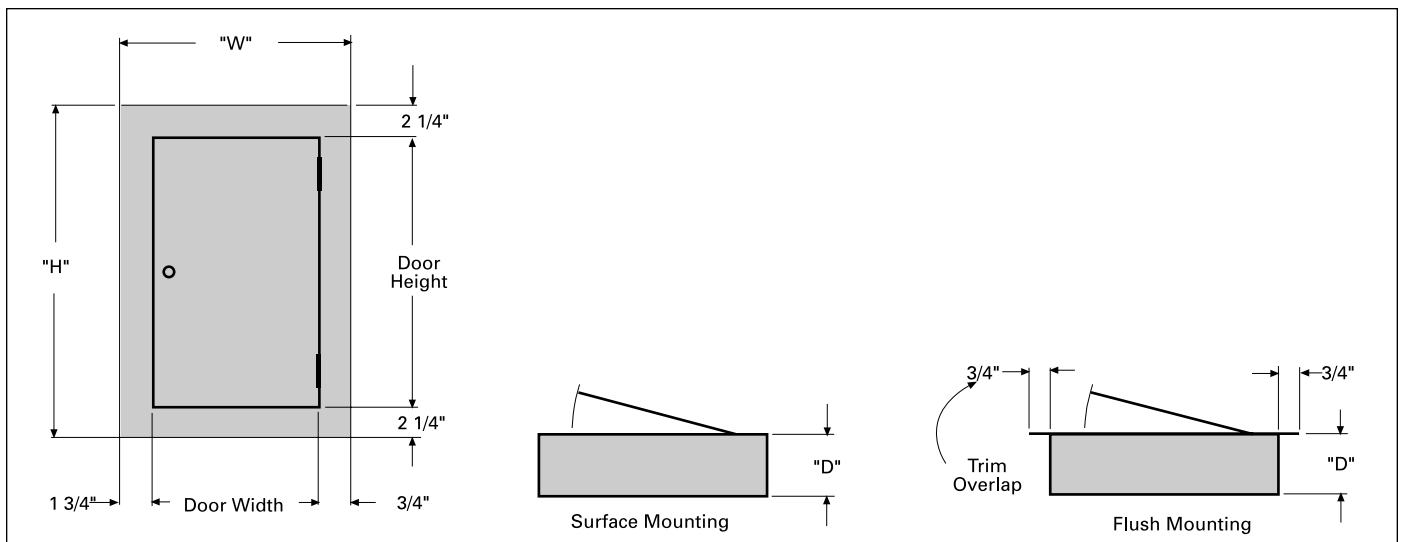
### Cabinets

Dimensions (inches)			Catalog Number	List Price \$ Without Backboard	List Price \$ With Backboard
Height	Width	Depth			

#### With FAS Latch Front

23	20	5.75	TC <sup>⓪</sup> 23B	300.	350.
26	20	5.75	TC <sup>⓪</sup> 26B	320.	370.
29	20	5.75	TC <sup>⓪</sup> 29B	340.	390.
32	20	5.75	TC <sup>⓪</sup> 32B	360.	410.
35	20	5.75	TC <sup>⓪</sup> 35B	380.	430.
38	20	5.75	TC <sup>⓪</sup> 38B	400.	450.
41	20	5.75	TC <sup>⓪</sup> 41B	420.	470.
44	20	5.75	TC <sup>⓪</sup> 44B	440.	490.
47	20	5.75	TC <sup>⓪</sup> 47B	460.	510.
50	20	5.75	TC <sup>⓪</sup> 50B	480.	530.
53	20	5.75	TC <sup>⓪</sup> 53B	500.	550.
56	20	5.75	TC <sup>⓪</sup> 56B	520.	570.
59	20	5.75	TC <sup>⓪</sup> 59B	540.	590.
62	20	5.75	TC <sup>⓪</sup> 62B	560.	610.
65	20	5.75	TC <sup>⓪</sup> 65B	580.	630.
23	24	5.75	TCW <sup>⓪</sup> 23B	420.	470.
29	24	5.75	TCW <sup>⓪</sup> 29B	460.	510.
35	24	5.75	TCW <sup>⓪</sup> 35B	500.	550.
38	24	5.75	TCW <sup>⓪</sup> 38B	520.	570.
41	24	5.75	TCW <sup>⓪</sup> 41B	540.	590.
44	24	5.75	TCW <sup>⓪</sup> 44B	560.	610.
53	24	5.75	TCW <sup>⓪</sup> 53B	620.	670.
59	24	5.75	TCW <sup>⓪</sup> 59B	640.	690.

### Dimensions



For inches / millimeters conversion, see Application Data section.

⓪ Add S for Surface, F for Flush.

# Sentron® Panelboards

## Enclosure Modifications

*Selection*

Customer Relay Cabinets				
Dimensions			Catalog Number	List Price <sup>①</sup> \$
H	W	D		
23	20	5.75	RC(1)23B	355.00
26	20	5.75	RC(1)26B	378.00
29	20	5.75	RC(1)29B	386.00
32	20	5.75	RC(1)32B	394.00
35	20	5.75	RC(1)35B	401.00
38	20	5.75	RC(1)38B	562.00
41	20	5.75	RC(1)41B	594.00
44	20	5.75	RC(1)44B	594.00
47	20	5.75	RC(1)47B	604.00
50	20	5.75	RC(1)50B	625.00
53	20	5.75	RC(1)53B	636.00
56	20	5.75	RC(1)56B	647.00
59	20	5.75	RC(1)59B	678.00
62	20	5.75	RC(1)62B	700.00
65	20	5.75	RC(1)65B	753.00
68	20	5.75	RC(1)68B	784.00
71	20	5.75	RC(1)71B	827.00
74	20	5.75	RC(1)74B	859.00
77	20	5.75	RC(1)77B	912.00

Customer Relay Cabinets				
Dimensions			Catalog Number	List Price <sup>①</sup> \$
H	W	D		
23	24	5.75	RCW(1)23B	372.00
26	24	5.75	RCW(1)26B	396.00
29	24	5.75	RCW(1)29B	402.00
32	24	5.75	RCW(1)32B	411.00
35	24	5.75	RCW(1)35B	419.00
38	24	5.75	RCW(1)38B	583.00
41	24	5.75	RCW(1)41B	615.00
44	24	5.75	RCW(1)44B	615.00
47	24	5.75	RCW(1)47B	636.00
50	24	5.75	RCW(1)50B	647.00
53	24	5.75	RCW(1)53B	657.00
56	24	5.75	RCW(1)56B	678.00
59	24	5.75	RCW(1)59B	710.00
62	24	5.75	RCW(1)62B	721.00
65	24	5.75	RCW(1)65B	795.00
68	24	5.75	RCW(1)68B	816.00
71	24	5.75	RCW(1)71B	869.00
74	24	5.75	RCW(1)74B	890.00
77	24	5.75	RCW(1)77B	943.00

Note: Replace (1) with "S" for surface applications and "F" for flush applications.

① List Price includes Fas latch trim and steel mounting pan. If 2 or more cabinets are to be stacked, specify on order (no extra charge for connecting hardware).

### Additional Enclosures Modifications

Description	List Price \$
Strip Heaters	910.
Humidstat control	1600.
Thermostat control	1600.

Ampere Rating	ASCO #920 Mechanically held		ASCO #911 — 3-poles Mechanically held remote control switch suitable for all classes of loads (Total system loads). Voltage rated to 480V AC, UL listed.	Siemens LEN Electrically Held	
	List Price \$		List Price \$	List Price \$	
	2-Pole	3-Pole		2-Pole	3-Pole
20	—	—	—	—	—
30	2680.	3075.	—	1270.	1495.
60	3360.	4315.	—	1580.	1920.
75	3360.	4315.	—	—	—
100	3795.	4940.	7015.	2055.	2415.
150	5215.	6615.	9475.	3360.	4015.
200	5970.	7430.	—	3360.	4015.
225	6455.	8090.	—	—	—
260	—	—	19400.	—	—
300	—	—	26935.	—	—
400	—	—	44520.	—	—
600	—	—	44520.	—	—
800	—	—	46270.	—	—
1000	—	—	60270.	—	—
1200	—	—	65530.	—	—

Application (See individual panel sections for application information)

### Remote Control Switch Modification

Description	List Price Adder \$
Separate Door in Dead Front Over Switch (P2 as main only)	410.
Auxiliary Contacts (Mounted Not Wired) Ea.	490.
2-Wire Control (add 6" to panel height.)	850.

### Control Power Transformer

Size	VA	List Price Adder \$
0,1	50	245.
2	75	350.
3	150	510.
4	250	625.

# Panelboards

## Modifications and Additions

End Walls Only for 5.75 in. Deep Box End Walls Only for 7.75 in. Deep Box

With knockouts Blank	<b>\$30. List Each</b> <b>20. List Each</b>	With knockouts Blank	<b>\$40. List Each</b> <b>30. List Each</b>
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Standard Enclosures Made From Special Materials - Type P1, P2, P3

**Aluminum, Stainless Steel, and Chrome Plated Enclosures. Price standard panelboard and add from the following table.**

Material	List Price \$	
	Up to 20 in. W	Over 20 in. W

### Aluminum

Alumite	Box	<b>1185.</b>	<b>1920.</b>
	Front	<b>1540.</b>	<b>3440.</b>
Mill Finish	Box	<b>1045.</b>	<b>1540.</b>
	Front	<b>1845.</b>	<b>2570.</b>

### Stainless Steel

General Purpose Grade (Brush Front)	Box	<b>1845.</b>	<b>2600.</b>
	Front	<b>3045.</b>	<b>5000.</b>

### Chrome Plate

Polished Finish	Front Only	<b>1185.</b>	<b>1450.</b>
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### Addition Width

Width	Lighting Panel	Distribution Panels
Per 2"	205	350

Consult factory for dimension limitations.

### Addition Depth

Depth	Lighting Panel	Distribution Panels
Per 2"	150	250

Consult factory for dimension limitations.

## Selection

### Miscellaneous

Description	List Price \$	
	Panel Width 20 in.	Panel Over 20 in.
Conduit Hubs — Up to		
1 1/2 in. Each	<b>60.</b>	<b>60.</b>
2 in. to		
2 1/2 in. Each	<b>90.</b>	<b>90.</b>
3 in. Each	<b>110.</b>	<b>110.</b>

### Increased Gauge Steel - 10 gauge Maximum

Box and Front	<b>265.</b>	<b>265.</b>
Box or Front Only	<b>185.</b>	<b>185.</b>

### Painted Finish

Set-up Charge Net	<b>85.</b>
Box Only	<b>30.</b>
Alternate Color Trim	<b>30.</b>

### Special Drillings

Template Must Accompany Order	<b>90.</b>
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### Front And Door Modifications

Vault Handle	<b>480.</b>
Cutout in Trim <sup>②</sup>	<b>250.</b>
Two Panels with Common Trim <sup>③</sup>	<b>340.</b>

<sup>①</sup> Panels having doors over 48 in. high, 2 locks are standard.

<sup>②</sup> Voids UL label.

<sup>③</sup> Lighting panels only. Field must supply dimensional information and panel orientation.

### Devices Mounted On Trim-Includes Device, Mounting (Wired or Unwired)

Toggle Switch-SPST or 3-way; 15A, 277 V Maximum	
First Switch	<b>350.</b>
Each Additional	<b>210.</b>
Pilot Light-General Purpose, Neon or Incandescent	
First Light	<b>350.</b>
Each Additional	<b>210.</b>
Pushbutton	
First Device	<b>350.</b>
Each Additional	<b>210.</b>

# Panelboards

## Circuit Breaker Accessories and Modifications

*Selection*

### Blank Plates—Vacu-Break

For use with VB-23, VB-30, VB-32 and Uni-Power Switchboards


Unit Height (in.)	12 in. Units—23 in. Wide Enclosures Only		17 in. Units—30 in. and 32 in. Wide Enclosures	
	Catalog Number	List Price \$	Catalog Number	List Price \$
2 1/2	VB2F025	121.00	VB7F025	163.00
5	VB2F050	139.00	VB7F050	163.00
7 1/2	VB2F075	139.00	VB7F075	181.00
10	VB2F100	163.00	VB2F100	163.00

### Conduit Enclosing Shield (Panel Skirts)

Sheet metal to cover conduits above or below a standard panelboard box.

Skirt Length	Width	List Price \$	4 Side Adder \$
8, 9, 11, 12	20.00	125.	110.
14, 17, 18, 23, 25	20.00	225.	110.
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	20.00	320.	110.
37, 38, 39, 40, 41, 42, 43, 44	20.00	405.	110.
8, 9, 11, 12	24.00	200.	145.
14, 17, 18, 23, 25	24.00	320.	145.
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	24.00	435.	145.
37, 38, 39, 40, 41, 42, 43, 44	24.00	530.	145.

### Panel Skirts Standard Length



8, 9, 10, 11, 12, 14, 17, 18, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

### Molded Case Switches

#### (Non-Automatic Circuit Interrupters)

When Molded case switches are substituted for thermal breakers deduct from the installed thermal breaker price:

Ampere Rating	Breaker Frame	Number of Poles	
		3-Pole	2-Pole
100	ED2	95.	75.
	ED4	95.	80.
	ED6	95.	85.
225	QJ2	60.	35.
250	FXD6	200.	170.
400	JXD2	405.	325.
	JXD6	455.	370.
600	LXD6	760.	590.
800	MD6	1790.	1350.
1200	ND6	3650.	NA

# Notes

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### Benefits of Lighting Control Systems

The benefits of lighting control systems include enhanced comfort, productivity, security, environmental aesthetics and of course, energy savings. In terms of energy savings, many lighting control systems can easily pay for themselves in less than two years.

Siemens has developed a new lighting control system which is simple in both design and installation. It efficiently covers a complex range of lighting schemes with a minimal investment of time and money.

The Siemens LCP3000EZ Lighting Control Systems has been designed to make lighting control genuinely accessible for any building, whether the need is a single ON-OFF panel, or a complicated fully networked system of control panels sequencing on-off schemes across a hundred floors. In short, lighting control is something you can do quickly and affordably.

For production details and pricing, please contact your nearest local Siemens sales office or contact the Siemens Call Center at 1-800-427-2256 for technical information.

### Code Requirements

ANSI/ASHRAE/IESNA require positive lighting control beyond the historical light switch and circuit breaker disconnect panel. The code states: Interior lighting in non-residential buildings larger than 5000 square feet and not in operation 24 hours a day shall be controlled with an automatic control device to shut off building lighting in all spaces. This automatic control device shall function on a scheduled basis or an occupancy sensor or a signal from an other control or alarm system.

The LCP3000EZ is California Title 24 Certified.

# Lighting Controls

## LCP3000EZ Panels

General



### System Features

The Siemens LCP3000EZ is fully assembled and delivered with all specified relays, digital inputs, power supply and RS232 interface installed in the enclosure. Wall mount the enclosure. Connect the 120V AC power supply. connect the loads to the relays. Connect the inputs. Then with a PDA with serial port support (RS232) (running Palm OS 3.5 or higher), configure which inputs control which output/s (relay/s) and the system is ready to go. The configuration program also can be run on a PC using Palm Emulator software. The configuration software and the Palm Emulator are provided with every order at no charge.

If your system has more than one panel, simply interconnect the panels with an 18 AWG solid copper twisted pair.

The Siemens LCP3000EZ lighting control system comes with an

abundance of standard operating features and the intelligence to meet virtually any lighting control application. Each panel is equipped with an RS232 interface for easy configuration of inputs and outputs. Any panel in the network can be configured from any other panel in the same network. Other options include Ethernet interface, PC software, two different time clocks (4 and 16 control points, which provide the ability to set 324 or 500 schedules respectively), motion sensors, dual sensors for light and temperature and more. These options enable you to have a lighting control system that can meet even the most demanding applications.

Each individual device holds its own operating program in non-volatile memory. There is no central or master controller. This feature prevents entire system shut down, which could happen on systems with a central logic board.

### Networking

Up to 10 panels can be networked together without the need for any additional cards or devices. With optional Web access devices and ComBridge Studio Software, the user can network up to 500 panels. The LCP3000EZ interfaces with any Building Automation System using OPC.

### Web Access Software

The optional Web access software allows the user access any device in the LCP3000EZ system. This allows control of



any relay from a PC. Password protection allows partial control to individual users. For example, the employee can turn ON or OFF the office lights from any PC.

### Enclosure

The LCP3000EZ is enclosed in a NEMA 1, UL listed enclosure with hinged door and hinged dead fronts. There are two dead fronts, one for the low voltage (24V) section and one for the line voltage load relays. There is a barrier between the two sections.

### Technical Literature

You are able to review and download a copy of the LCP3000EZ Lighting Control Selection and Application Guide at [http://www.sea.siemens.com/power/product/pdprodlc\\_3000ez.html](http://www.sea.siemens.com/power/product/pdprodlc_3000ez.html). A printed version of the Selection and Application Guide, No. LCSA-03000-0604, or the Technical Data Sheet, No. LCSS-01002-0304, can be requested through the Siemens Call Center at 1-800-427-2256.

### System Specifications

- NEMA 1, surface mount, optional key lock and flush mount kit
- Enclosures are always 20" wide and 5¾" deep; height depends on number of outputs:
  - 24" high for up to 16 outputs
  - 32" high for up to 32 outputs
  - 40" high for up to 48 output relays
- Load relays:
  - Mechanically held
  - Visual position indicator
  - Have manual override
  - Built in timer which can be set in 30 minute intervals up to 6 hours
  - Eight relays per module
  - Can be programmed as groups to control two or three pole loads
- - Are rated 20 Amp, 277 Volt (480V "Y" with ground three phase loads)
- All panel size accept a maximum of 32 digital (switch) inputs:
  - Rated 24V AC/DC
  - Can be configured to accept maintained, or momentary inputs
  - Four inputs per module
- 4 control channels time clock allows 324 schedules
- 16 control channels time clock allows 500 schedules. Four channels have astronomical clock feature
  - Both time clocks have 10 years battery back up
  - Automatic day light savings time adjustment
- - Time of day (TOD) schedules
- - Warn Off - 5 minutes
- RS-232 interface in every panel
- Network up to 10 panels twisted pair wire, without additional cards
- Network up to 500 panels with optional Web access devices and ComBridge Studio Software
- Ambient Conditions:
  - Ambient operating temperature: 23°F - 113°F (-5... +45°C)
  - Ambient temperature (non-op): -13°F - 158°F (-25... +70°C)
  - Relative Humidity (non-condensing): 5% to 93%

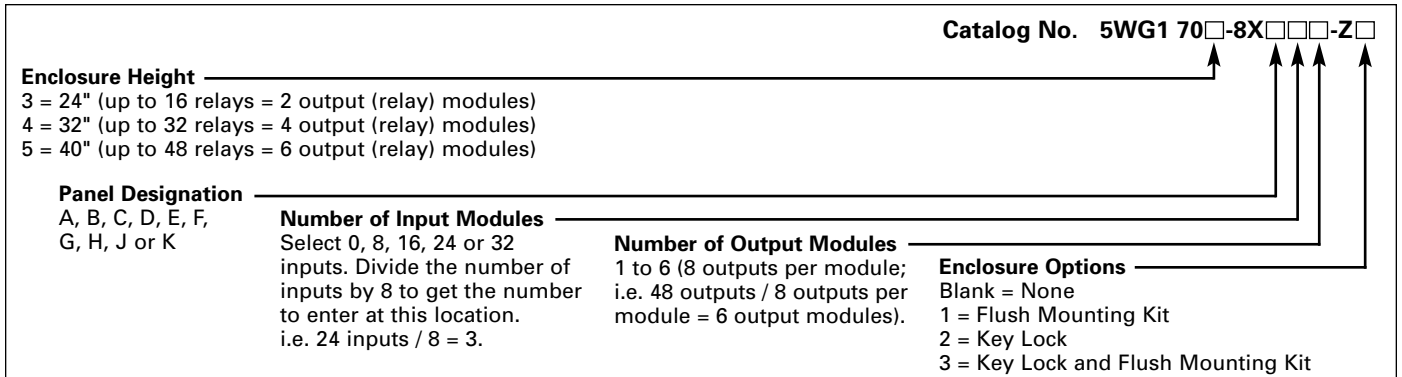


# Lighting Controls

## LCP3000EZ

## Accessories

### LCP3000EZ Catalog Numbering System



To format the LCP3000EZ catalog number proceed as follows:

1. **Enclosure Height:** Determine the number of relays and provisions for future relay additions your installation requires. Round the number up to the nearest multiple of 8 (relays come in blocks of 8 relays).

- 8 to 16 outputs (relays) enclosure height is 24". Enter 3 in the Enclosure Height field
- 24 to 32 outputs (relays) enclosure height is 32". Enter 4 in the Enclosure Height field
- 40 to 48 outputs (relays) enclosure height is 40". Enter 5 in the Enclosure Height field

2. **Panel designation:** First panel is A, second panel is B, third panel is C, etc. Last panel is K. There is no Panel I.

3. **Number of input Modules:**

Determine the number of inputs your system requires and round the number up to the nearest multiple of 8 (input modules are packaged as 2 blocks of 4; therefore, they are supplied in groups of 8). Divide the number of inputs by 8 to determine the number of input modules:

- 8 inputs: enter 1 in the Number of Input Modules field
- 16 inputs: enter 2 in the Number of Input Modules field
- 24 inputs: enter 3 in the Number of Input Modules field
- 32 inputs: enter 4 in the Number of Input Modules field

4. **Number of output (relay) modules:**

Determine the number of relays, and provisions for future relay additions your installation requires; then round the number up to the nearest 8 (relays come in blocks of 8 relays). Divide the number of relays by 8 to determine the number of output (relay) modules:

- 8 relays: enter 1 for Number of Output (relay) Modules field
- 16 relays: enter 2 in the Number of Output (relay) Modules field
- 24 relays: enter 3 in the Number of Output (relay) Modules field
- 32 relays: enter 4 in the Number of Output (relay) Modules field
- 40 relays: enter 5 in the Number of Output (relay) Modules field
- 48 relays: enter 6 in the Number of Output (relay) Modules field

5. **Enclosure options:** Determine if key lock, flush mounting kit of both are required.

- No option required: leave the Enclosure Options field blank
- Flush mount kit: enter 1 in the Enclosure Options field
- Key lock: enter 2 in the Enclosure Options field
- Key lock and flush mount kit: enter 3 in the Enclosure Options field

Example:

A system needs two panels:

The first panel requires 20 inputs and 30 outputs (relays).

The second panel requires 31 inputs and 44 outputs (relays).

Key lock is required in both panels.

First Panel:

1. Enclosure height: Number of outputs (relays) = 30, round up to the nearest multiple of 8 which is 32. 32/8 = 4. Enter **4** in the Enclosure Height field.
2. Panel designation: This is the first panel. Enter **A** in the Panel Designation field.
3. Number of input modules: Number of inputs = 20, round up to the nearest multiple of 8 which is 24. 24/8 = 3. Enter **3** in the Number of Input Modules field
4. Number of output (relay) modules: Number of relays = 30 round up to the nearest multiple of 8 which is 32.

32/8 = 4. Enter **4** in the Number of Output (relay) Modules field.

Second Panel:

5. Enclosure height: Number of outputs (relays) = 44, round up to the nearest multiple of 8 which is 48. 48/8 = 6. Enter **5** in the Enclosure Height field.
6. Panel designation: This is the second panel. Enter **B** in the Panel Designation field.
7. Number of input modules: Number of inputs = 31, round up to the nearest multiple of 8 which is 32. 32/8 = 4. Enter **4** in the Number of Input Modules field.
8. Number of output (relay) modules: Number of relays = 42 round up to the nearest multiple of 8 which is 48. 48/8 = 6. Enter **6** in the Number of Output (relay) Modules field.
- Applicable to all panels:
9. Enclosure options: Key lock required. Enter **2** in the Enclosure Options field.

Finalized catalog numbers:

First panel is: 5WG1 704-8XA34-Z2

Second panel is: 5WG1 705-8XB46-Z2

### External options

After you have finished with the LCP3000EZ catalog number, select any external options for the project. i.e.:

- Motion sensors (two SIEMENS motion sensors are supported per panel). Third party motion sensors with dry contacts can be used; This type is used in conjunction with the Input Modules
- Outdoor light sensor (one is supported by each network of 10 panels)
- Override or key switch (you may select this option, although the binary inputs can also be used for this purpose)
- Web Access software (ComBridge Studio)
- OPC interface
- E-mail services
- Data Base services

# Lighting Controls

## LCP3000EZ

## Accessories

**Options** (not included in panel catalog number)

5WG1 372-5EY01-Z-A201	4 control channels time clock
5WG1 373-5EY01-Z-A202	16 control channels time clock
5WG1 255-2AB11	Motion sensor
5WG1 114-2AB02-Z-A221	Wall mounted bus coupler for motion sensor(s). Panel A*
5WG1 114-2AB02-Z-A231	Wall mounted bus coupler for motion sensor(s). Panel A*
5WG1 114-2AB02-Z-B222	Wall mounted bus coupler for motion sensor(s). Panel B*
5WG1 114-2AB02-Z-B232	Wall mounted bus coupler for motion sensor(s). Panel B*
5WG1 114-2AB02-Z-C223	Wall mounted bus coupler for motion sensor(s). Panel C*
5WG1 114-2AB02-Z-C233	Wall mounted bus coupler for motion sensor(s). Panel C*
5WG1 114-2AB02-Z-D224	Wall mounted bus coupler for motion sensor(s). Panel D*
5WG1 114-2AB02-Z-D234	Wall mounted bus coupler for motion sensor(s). Panel D*
5WG1 114-2AB02-Z-E225	Wall mounted bus coupler for motion sensor(s). Panel E*
5WG1 114-2AB02-Z-E235	Wall mounted bus coupler for motion sensor(s). Panel E*
5WG1 114-2AB02-Z-F226	Wall mounted bus coupler for motion sensor(s). Panel F*
5WG1 114-2AB02-Z-F236	Wall mounted bus coupler for motion sensor(s). Panel F*
5WG1 114-2AB02-Z-G227	Wall mounted bus coupler for motion sensor(s). Panel G*
5WG1 114-2AB02-Z-G237	Wall mounted bus coupler for motion sensor(s). Panel G*
5WG1 114-2AB02-Z-H228	Wall mounted bus coupler for motion sensor(s). Panel H*
5WG1 114-2AB02-Z-H238	Wall mounted bus coupler for motion sensor(s). Panel H*
5WG1 114-2AB02-Z-J229	Wall mounted bus coupler for motion sensor(s). Panel J*
5WG1 114-2AB02-Z-J239	Wall mounted bus coupler for motion sensor(s). Panel J*
5WG1 114-2AB02-Z-K230	Wall mounted bus coupler for motion sensor(s). Panel K*
5WG1 114-2AB02-Z-K240	Wall mounted bus coupler for motion sensor(s). Panel K*
5WG1 588-2CB11-Z-A211	Touch Panel, Panel A
5WG1 588-2CB11-Z-B212	Touch Panel, Panel B
5WG1 588-2CB11-Z-C213	Touch Panel, Panel C
5WG1 588-2CB11-Z-D214	Touch Panel, Panel D
5WG1 588-2CB11-Z-E215	Touch Panel, Panel E
5WG1 588-2CB11-Z-F216	Touch Panel, Panel F
5WG1 588-2CB11-Z-G217	Touch Panel, Panel G
5WG1 588-2CB11-Z-H218	Touch Panel, Panel H
5WG1 588-2CB11-Z-J219	Touch Panel, Panel J
5WG1 588-2CB11-Z-K220	Touch Panel, Panel K
5WG1 254-3EY01-Z-A203	Outdoor ambient light level sensor
5WG1 220-2CB02-Z-A204	Key switch
63101-32-01	Software for LAN connection (for monitoring and control)
63101-32-10	5 license extension for LAN software
63101-32-06	OPC services for connection with BAS, LAN software required
63101-32-01	LAN software e-mail services
63101-32-04	LAN software database services
63101-32-08	LAN software Visual Editor



**5WG1 376-5EY01-Z-A201**  
4 Control channels



**5WG1 254-3EY01-Z-A203**  
Outdoor ambient light sensor



**5WG1 148-1AB21-Z-A251**  
IP Interface

\* Each panel supports 2 SIEMENS motion sensors. Catalog number corresponds to bus coupling 1 and bus coupling 2 for each panel. The actual motion sensing device plugs into the bus coupling unit.

**Notes about components catalog number:**

- First 12 characters are the "out of the box" component catalog number (i.e. 5WG1 588 2CB11).
- Z is a position holder in the catalog number sequence.
- Last four characters are for a component's specific location in the system (for example K220; where K indicates that the device belongs to panel K and 220 is the device's unique address).

# Lighting Controls

## Accessories

## Selection

### Description of devices

All devices described here are interconnected via 18 AWG solid copper twisted pair or via a communication bus on the DIN rails incorporated into the panels.



**Output (relay) Device (5WG1 512-1CB01):** Block of 8 277 V, 20 amp, relays with timers, visual indication and manual override capability.



**Sixteen Control Channels Time Clock (5WG1 373-5EY01):** It has 16 control channel. Each channel can be seen by the system as an input. This device can be programmed with up to 500 different schedules, automatic

day light saving time and 10 years battery back up. The first four control channels can be programmed as astronomical time clock. This feature allows to control the outside lights based on date and geographical location, rather than with an outdoor light level sensor.



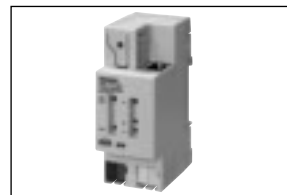
**Input Device (5WG1 261-1CB01):** Block of 4 digital inputs. It can take inputs from a set of dry contacts (maintained or momentary). Inputs requires 24 volt supplied by the power supply.



**RS232 Interface (5WG1 148-1AB04):** It allows the user to configure the panel on site via a DB9 serial cable. Configuration is done with the software supplied free of charge with every order.



**Power Supply (5WG1 123-1CB01):** Input 120 V, 50/60 HZ. One per panel. It supplies voltage for communications and for the inputs.



**IP Interface (5WG1 148-1AB21):** It allows connection to the user's LAN for control and monitoring of the system. Optional ComBridge Studio software is required for LAN connectivity. It can be configured for fixed IP address and also for DHCP.



**Choke (5WG1 120-1AB01):** It is mounted next to the power supply. The choke prevents the power-supply 5WG1 123-1CB01 from short-circuiting the data on the bus line. It picks up the power from the two outer

printed conductors and feeds it via inductors to the two inner printed conductors.



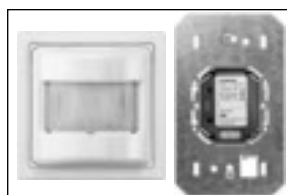
**Outdoor Ambient Light Sensor (5WG1 P254-3EY01):** Used to control outdoor lights such as parking lot, signs, drive through window. Three light level thresholds (100 Fc, 50 Fc and 20 Fc) are pre-programmed into the

device. This is also a temperature sensor. Outside temperature can be read when the optional ComBridge Studio LAN software is used.



**Four Control Channels Time Clock (5WG1 372-5EY01):** It has four control channels; each channel can be seen by the system as an input. This device can be programmed with up to 322 different schedules,

automatic day light saving time and 10 years battery back up.



**Motion Sensor (5WG1 255-2AB11):** Detects motion to command light to turn ON. Each motion sensor require bus coupling unit 5WG1 114-2CB02.

# Lighting Controls

## Accessories

## Selection



### Key Switch (5WG1 220-2CB02):

It is a block of 4 digital inputs. It can take inputs from a set of dry contacts (maintained or momentary). It requires no voltage from the power supply.

One UP220 device is supported

by each set of 10 panels. This device is intended to be used for after hours override purposes (i.e. cleaning crews).



### Touch panel (5WG1 588-2CB11):

It allows remote control of the lights. It also provides relay status, indication of outside light level and temperature. Each panel in the system can have a dedicated touch panel.

LAN software (ComBridge Studio): It allows connectivity to the user's LAN for control and monitoring of the lighting control system. It has options for the following applications:

- Additional licenses to allow more than one person to control the lights (access is password protected with levels of access authority)
- OPC interface: For communications with building automation systems (BAS)
- E-mail services: can be programmed to send e-mail when a pre-selected event occurs
- Database Services: Stores pre-selected events on a database for further viewing and analysis
- Visual editor: Allows a graphical interface with the lighting control system

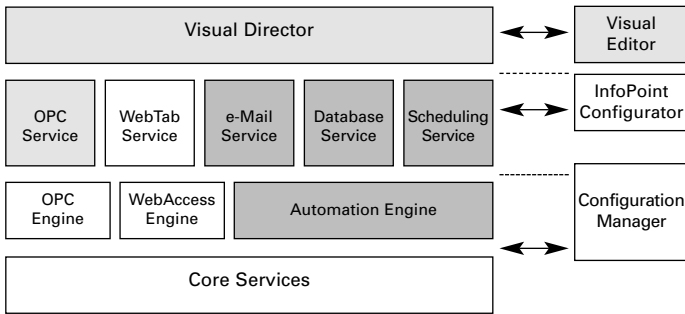
### Replacement parts

To order replacement parts simply refer to the number on a device label (for devices installed in the enclosure, this number label is also on the inner door. This number starts with the panel letter designation followed by a number (i.e. A-101). From this number, SIEMENS knows exactly what you need.

# Lighting Controls

## Web Visualization with ComBridge Studio

### Overview



Visual Director is a complete Web visualization tool with user interface, its own navigation structure with EIB display and control elements that can be freely positioned.

The OPC service links EIB elements with OPC client systems.

Automation Services execute automation functions directly from the ComBridge Studio Server PC: schedule jobs, e-mails and database entries for the purpose of data analysis and reporting.

Core and Webtab Services link the EIB system to the network and enable fast tabular visualization.

### Applications

Get and configure only the functions that you really need to establish a simple, easy to operate interface. The graphical interface is ideal for use by non-technical personnel. It is also used to create links to other building automation functions and systems.

### Tools

IP Router, users and functional expansions can be added at any time. This offers considerable cost benefits. These functions can be divided into four groups:

- Webtab Services
- Automation Services
- OPC Services
- Visualization

### Webtab Services



This package provides all the functions to control and monitor an LCP3000EZ Lighting Control System.

It contains Webtabs, which support linking to the visualization of the lighting control data points in the shortest time possible.

The following tools are part of the Core and Webtab Services:

- ComBridge Configuration Manager: User interface for management of the IP router, TCP engines and software licenses
- ComBridge InfoPoint Configurator: Easy-to-use tool for the creation of Webtabs, OPC data point lists, email services, time jobs and database entries.

### Automation Services



- Web-based user control: Control of the installation, ComBridge Studio Automation Services deliver application services at the supervisory level.

#### Schedules:

Daily programs can be stored and managed centrally using the Scheduling Service. Simply checkmark the week days on which you need to activate. Switching and control commands can be executed according to the schedule.

#### Emails:

Critical conditions or events can be monitored so that in event of their occurrence, emails are delivered. The contents of emails can be custom designed, and even sent with an attachment, e.g. with photos or circuit diagrams. This capability enables an easy to visualize system that can expedite Trouble Diagnosis & Repair.

#### Data recording:

Using the Database Services, you can write selected events to a database for daily, weekly or monthly scheduled evaluation and reporting.

# Lighting Controls

## Web Visualization with ComBridge Studio

*Overview*

### OPC Services



ComBridge Studio offers full OPC server functionality enabling SIEMENS lighting controls integration with other building automation systems (BAS).

#### Double Advantage:

ComBridge Studio OPC Services can also be used at the same time as other ComBridge Studio applications.

For example, the facility can be controlled by OPC at the same time as the workplace is controlled using Webtab or a Visual Director application. It is also possible to ensure access to the system installations for service personnel, or setup an email message services.

#### Quantity Control:

Not all data is of interest to the OPC client system. Exchanging all data with the system can lead to huge volumes of information that clogs up the system. In the InfoPoint Configurator you can restrict lists to the required information only.

### Visual Director



ComBridge Studio Visual Director is supplementary to Webtab and offers a wide range of design options such as definable navigation, layout of the graphical display and control elements.

#### Web Standards:

Visual Director is HTML-based. Web assets, such as, navigation, graphics, dynamic HTML, layouts, scripts and dynamic contents in visualization projects can be used repeatedly. Furthermore, HTML know-how is now prevalent in the market and easily available.

#### User Login:

Visual Director provides complete system definition, application and use. Each user can be assigned their own start page and navigation allowing for individual system or operational "views" depending upon operator or monitor access level, engineering, maintenance or security function. The user level lets you control the data points each user can access.

#### Visual Editor:

Visual Director contains a menu-assisted, pixel-graphics HTML editor with a multitude of functions for creating your Web user interface.

5WG1 261-1CB01 Binary Input Device

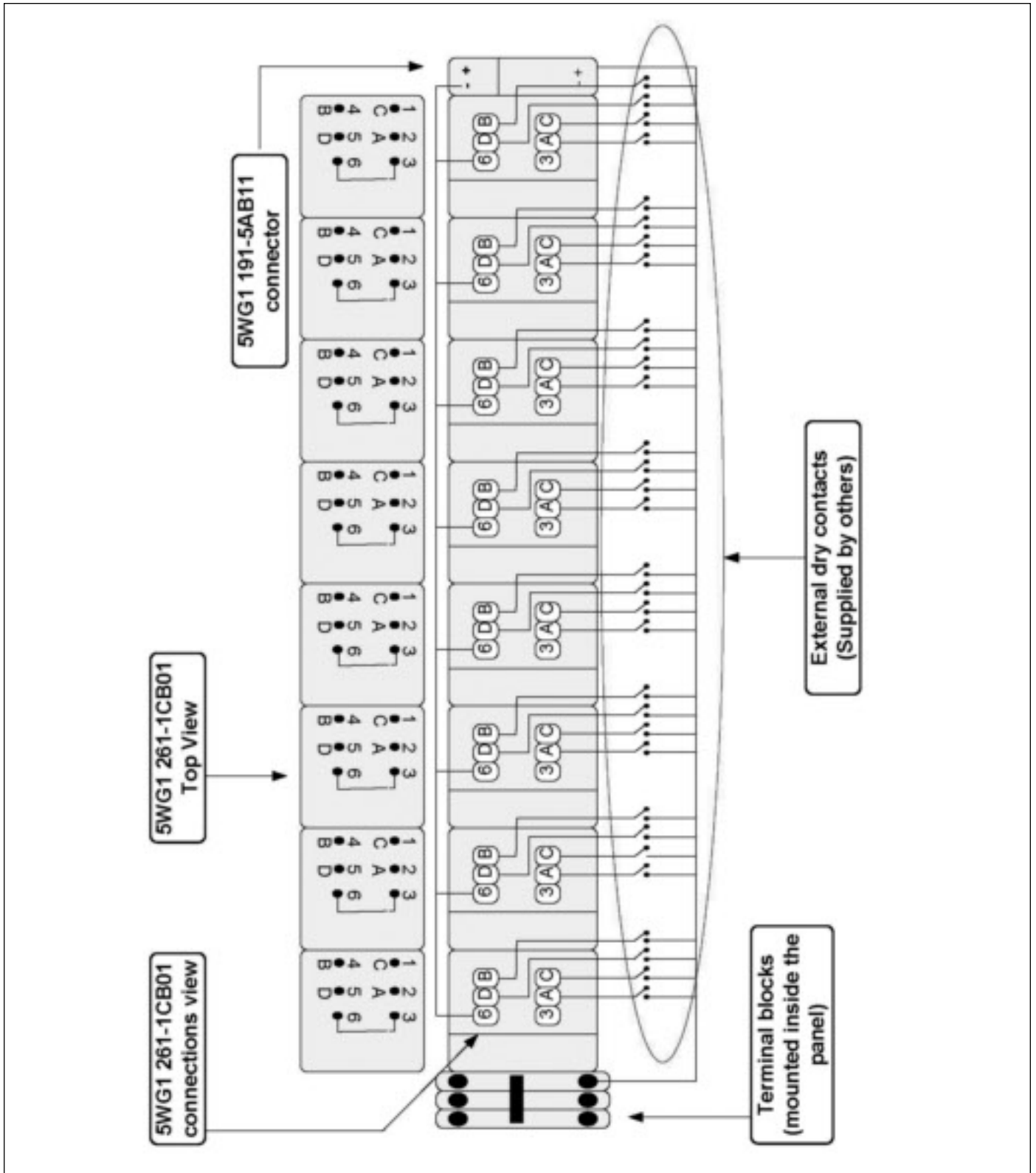


Figure 2

### 5WG1 512-1CB01 Load Relays Device

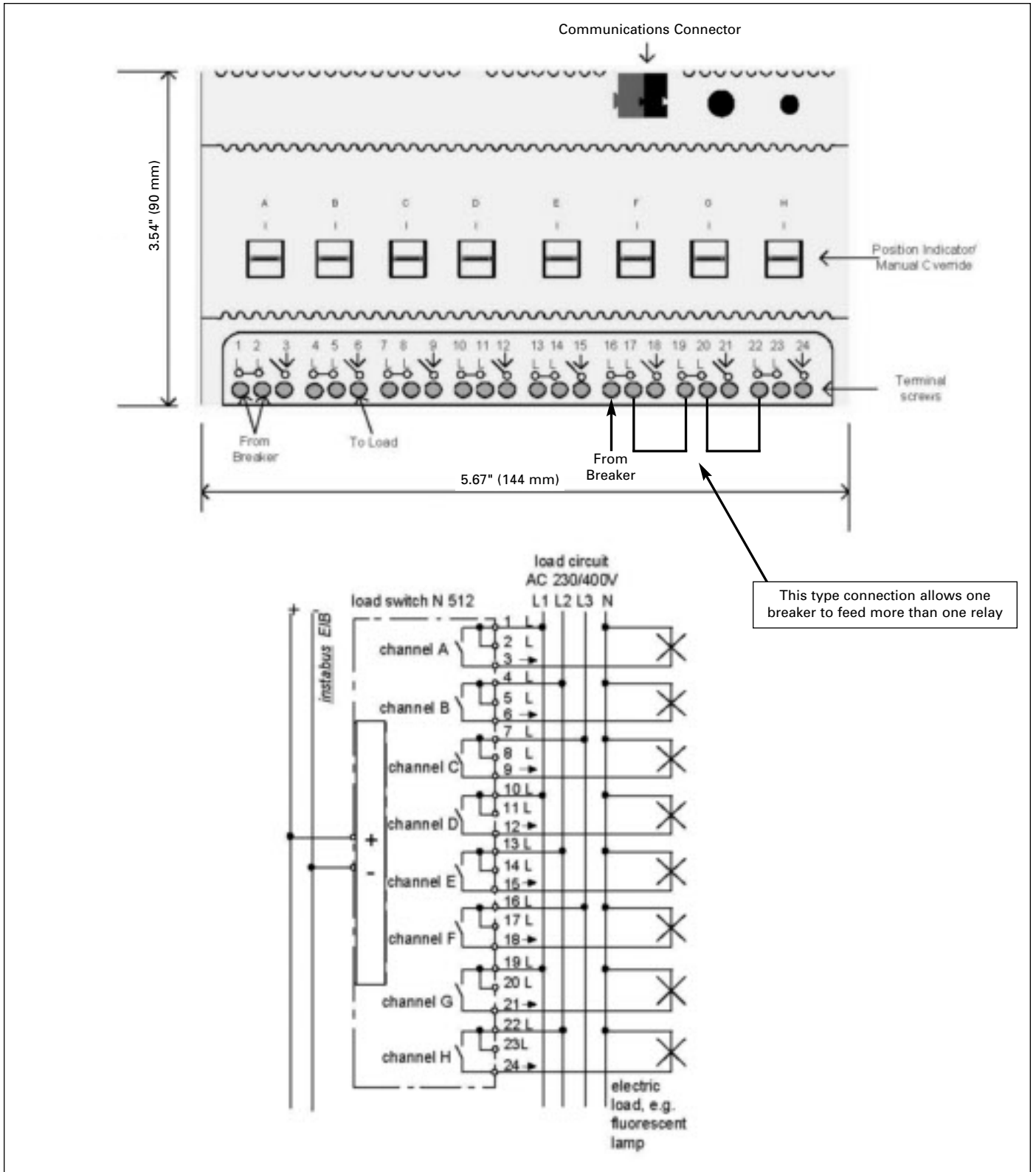


Figure 3



**Other Applications:**

If the LCP3000EZ does not meet your needs SIEMENS can help with your lighting control requirements beyond the capabilities of the LCP3000EZ.

SIEMENS has the equipment and technology to do complex installations which require dimming for energy savings. If you require day light harvesting for additional energy savings, SIEMENS is your source.

For fluorescent dimming, SIEMENS uses DALI (Digital Addressable Lighting Interface). This is state of the art technology, which uses individually addressable DALI ballasts.

This technology allows you to change lighting zones via software without the need of re-wiring the system. It also allows you to monitor ballast and lamp failure, as well as the light output (relay).

Contact your nearest SIEMENS Energy and Automation Sales Office for additional information.

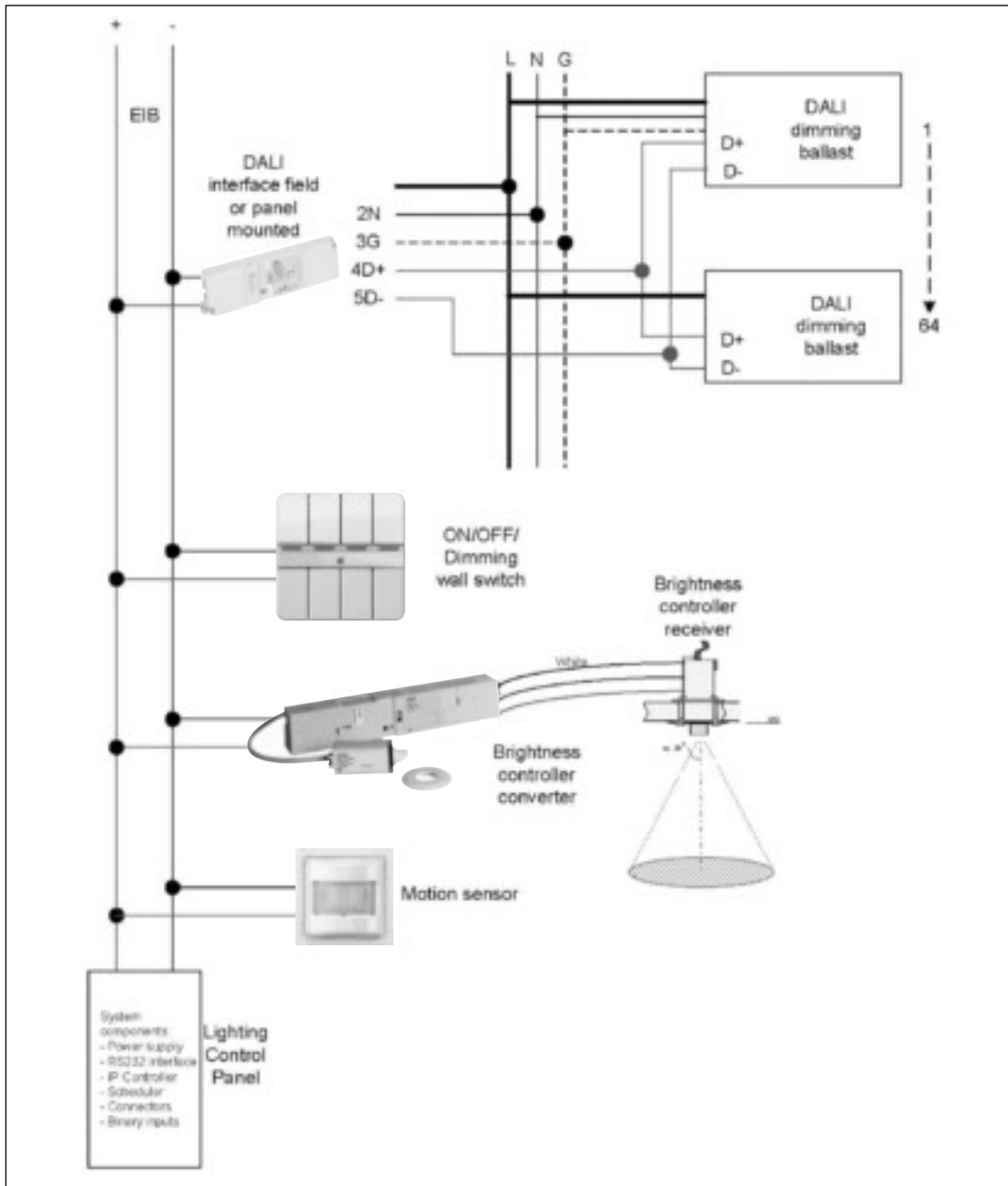


Figure 4

# Notes

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# Front Connected Switchboards

## Type SB1, SB2 and SB3

General

### Maximum Flexibility

Whether the design is for a 240V ac, 400 ampere system; a 600V ac, 6000 ampere system; or something in between, Siemens front connected switchboards should be considered. Every aspect of the equipment design has been targeted at improving layout convenience, reducing installation costs, and minimizing the impact and cost of system changes. These switchboards provide the rugged construction and service reliability required for industrial plants, hi-rise complexes, hospitals, and commercial buildings, and are built to UL 891 and NEMA PB-2 standards.

### Type SB1 For Limited Space Applications

The Siemens type SB1 switchboard has been specifically designed for those applications where floor space is at a premium. The SB1 contains front-connected protective devices and bus ratings up to 2000 amperes at 600V ac. The rear of all sections align as standard.

### Type SB2 For Increased Service And More Load Cable Room

Siemens SB2 switchboards can have extra depth behind the vertical bus in each distribution section, and contains protective devices and bus rated up to 4000 amperes at 600V ac. The rear of all sections align as a standard. Front and rear alignment is available as an option.



### Type SB3 For Custom Options

The SB3 switchboard is available with protective devices and bus up to 6000 amperes at 600V ac. Options include, but are not limited to, incoming and outgoing busway, ACCESS communication, protective relaying, autothrowover schemes and transformer connections.

Siemens SB Switchboards Available Features	SB1	SB2	SB3
Maximum Bus Rating	2000A	4000A	6000A
Main Devices	MCCB, VB, HCP, BPS	MCCB, VB, HCP, BPS, WL (Fixed)	MCCB, VB, HCP, BPS, WL
Feeder Devices	MCCB, VB, HCP, BPS	MCCB, VB, HCP, BPS, WL, (Fixed)	MCCB, VB, HCP, BPS, WL
Solid State MCCB	No	100,000 AIC	200,000 AIC
Customer Metering	Yes	Yes	Yes
Utility Metering	Yes	Yes	Yes
Density Rated Bussing	No	Yes	Yes
Accessible	Front	Front	Front (up to 38" deep) Front/Rear (Above 38" deep)
Alignment	Rear	Rear STD; Rear/Front Optional	Rear STD; Rear/Front Optional

For additional information on this product visit our website at [www.sea.siemens.com](http://www.sea.siemens.com).  
For application pricing information contact your local distributor or the closest Siemens sales office.

# Integrated Power Systems Switchboards

## Type IPS

The modular design of the Siemens IPS switchboard allows the user to integrate electrical distribution equipment, power monitoring and environmental controls that typically mount in multiple enclosures into one switchboard line-up. Users have the freedom to configure an arrangement that best fits their individual needs. Optional factory installed interconnection wiring is available to further reduce installation time.

### IPS Equipment Benefits include:

- Less product to handle and install
- Lower total installation cost
- Less time on the jobsite
- Less floor space used for electrical equipment
- Single source equipment supplier
- Simplified field setup and programming

IPS switchboards are built to UL 891 and NEMA PB-2 standards. Standard height of IPS sections is 90 inches. Optional height of 70 inches is available. Minimum depth of IPS switchboards is 13.75 inches. Optional depths of 20, 28 and 38

inches are available. Some components dictate the use of optional depths.

### Numerous components are available to fit customer's individual needs.

- Lighting Panelboards (MLO and Main Device)
- Power Monitoring
- Distribution Transformers
- ACCESS Communication
- Lighting Contactors
- Lighting Control
- HVAC Control
- Building Management
- PLC
- Automatic Transfer Switch
- Motor Starter Units
- Backup Generators

### Typical IPS switchboards consist of one service section and one or more distribution sections that are cable connected.

However, IPS switchboards are also available with through bus and pull sections. IPS switchboards will

accommodate systems up to 4000 amperes. 600V ac maximum in 1-phase 3-wire, 3-phase 3-wire, or 3-phase 4-wire configurations.

All components can be built into standard NEMA Type 1 indoor enclosures, or optional NEMA Type 3R outdoor construction.

Bus bars are available in standard tin-finished aluminum or optional silver-finished copper. Standard bus is sized on the basis of heat rise criteria, in accordance with UL 891. All bus bars are sized to limit heat rise to 65°C above a maximum ambient temperature of 40°C.

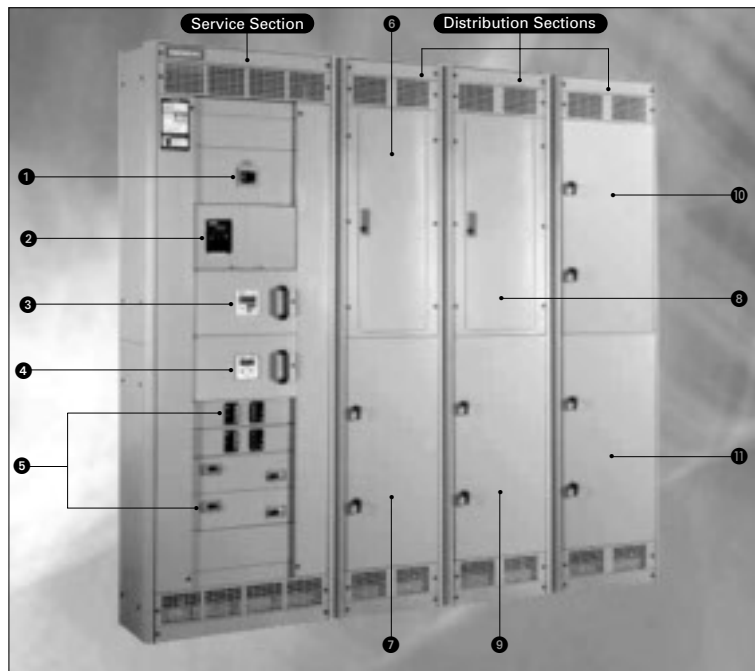
As an option, conductor material can be sized according to density limits, based on bus material. The applicable limits are:

Copper — 1000 amperes sq. in.

Aluminum — 750 amperes sq. in.

Screw type mechanical connectors (lugs) are provided as standard equipment on all devices. However, compression connectors are available as an option.

## General



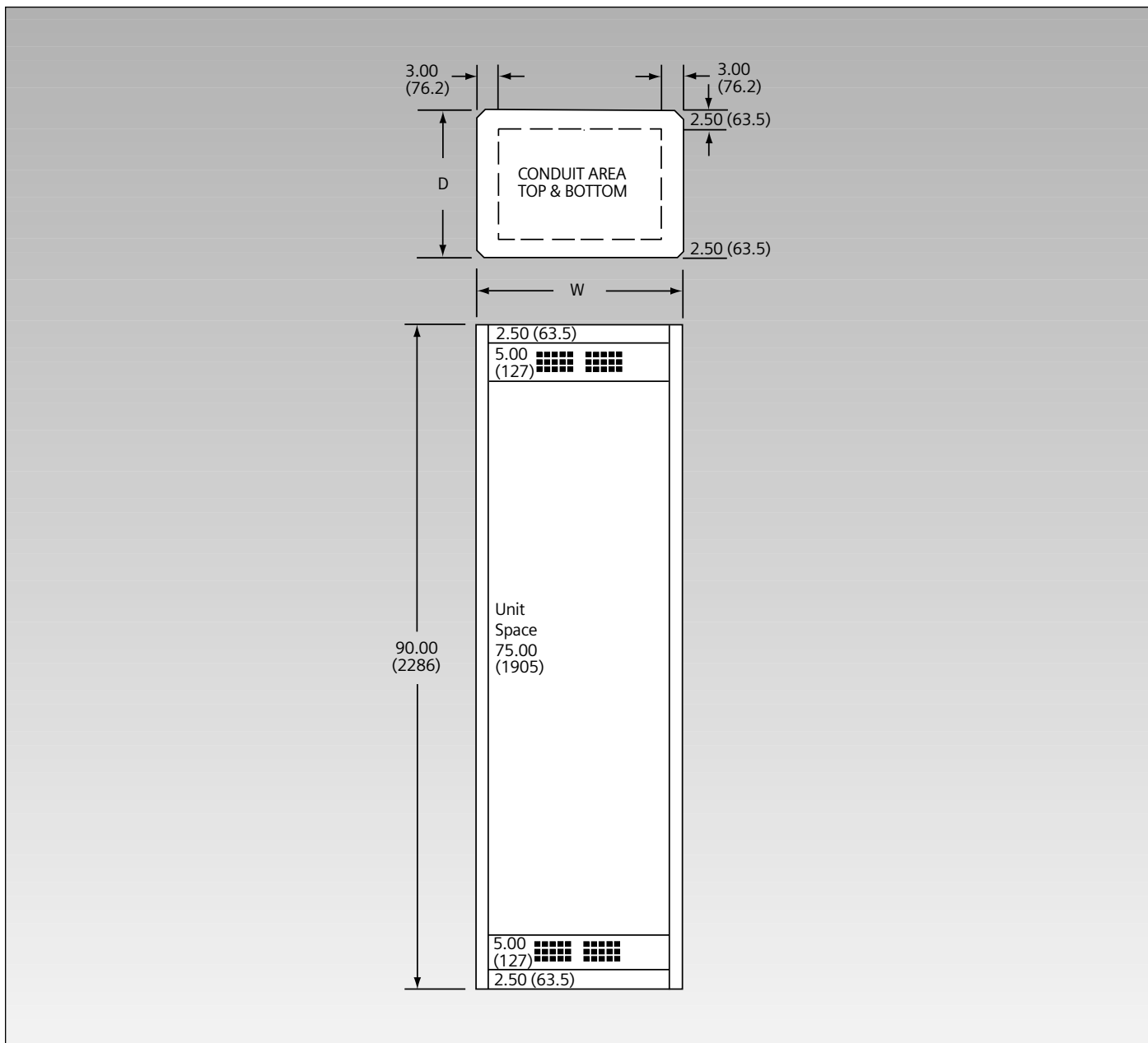
- |   |  |   |
|---|--|---|
| ① • Main Breaker or Switch<br>up to 4000 Amp<br>• MLO to 2000 Amp | ⑤ • Feeder Breakers (up up 4000 Amp)<br>• Feeder Switches (up up 4000 Amp)<br>• Motor Starter Modules<br>(up to NEMA Size 4)<br>• Lighting Contactors (30 to 225 Amp)<br>• PLC<br>• Time Clock | ⑦ Distribution Transformer  |
| ② Transient Voltage<br>Surge Suppressor                           | ⑥ Lighting Panelboards   | ⑧ Lighting Control  |
| ③ Digital Meter   |  | ⑨ Lighting Contactors, PLC, Time Clocks,<br>ATS, Telephone Cabinets |
| ④ Local Display Unit<br>(ACCESS™ Communication)                   |  | ⑩ HVAC Control  |
|   |  | ⑪ Customer Supplied Components                                      |

For additional information on this product visit our website at [www.sea.siemens.com](http://www.sea.siemens.com).

For application pricing information contact your local distributor or the closest Siemens sales office.

# Integrated Power Systems Switchboard (Type IPS)

## Individually Mounted Devices



Dimensions shown in inches and millimeters ( ).

# Integrated Power Systems Switchboard (Type IPS)

## Individually Mounted Devices

### Unit Space For Components

Component	Dimensions in inches (mm)		
	Required Unit Space	Minimum Section Width (W)	Minimum Section Depth (D)
P3 Panels	37.50 (953) <sup>②</sup>	25.00 (635)	13.75 (349)
P1, P2 Panels		20.00 (508) <sup>③</sup>	
Time Clock <sup>①</sup>	(Up to 6 in 20" and 25" wide, 9 in 32" wide)	25.00 (635)	20.00 (508)
LCP Lighting Control Panel		20.00 (508)	
Distribution Transformer <sup>④</sup>	(15 KVA)	37.50 (953) <sup>②</sup>	28.00 (711)
Distribution Transformer <sup>④</sup>	(30 - 45 KVA)	25.00 (635)	
Distribution Transformer <sup>④</sup>	(75 - 112.5 KVA)	37.50 (953)	38.00 (965)
Distribution Transformer <sup>④</sup>	(150 KVA)	32.00 (813)	
Distribution Transformer <sup>④</sup>	(225 KVA)	75.00 (1905)	38.00 (965)
Distribution Transformer <sup>④</sup>	(300 KVA)	46.00 (1168)	
Lighting Contactor 30 through 225 Amp <sup>①</sup> ASCO 920 or Siemens CLH <sup>⑤</sup>	(Up to 4 in 20" and 25" wide, 6 in 32" wide)	37.50 (953)	13.75 (349)
PLC (LOGO!) <sup>①</sup>	(Up to 6 in 20" and 25" wide, 9 in 32" wide)		
PLC (S7-200) <sup>①</sup>	(Up to 4 in 20" and 25" wide, 6 in 32" wide)	75.00 (1905)	20.00 (508)
Automatic Transfer Switch (up to 400 Amp) <sup>⑥ ⑦</sup>			
400-1200 Amp MCCB	37.50 (953)	32.00 (813)	28.00 (711)
1600-2000 Amp MCCB			
800-2000 Amp ICCB (WL Breaker)	75.00 (1905)	38.00 (965)	38.00 (965)
2500-4000 Amp ICCB (WL Breaker)			
800-1200 Amp BPS	37.50 (953)	46.00 (1168)	38.00 (965)
1600-2000 Amp BPS	75.00 (1905)		
2500-4000 Amp BPS			

NOTE: For required unit space relative to HVAC control and custom specified components, contact Siemens sales.

① These components can be mixed in a 37.5" (953mm) high compartment.

② 37.50" (half section) for panels that would fit in to panel cans <=44".

75" (full section) for panels that would fit into panel cans >44".

③ 20.00" for P1/P2 panel (note may be mounted 2 across in >=38" wide sections).

25" for P3 panels (note may be mounted 2 across in >=46" wide sections).

④ Distribution transformer minimum size requirements are based on 150 degree rise TP1 rated units - aluminum or copper bus. Consult Siemens for size requirements related to other ratings including K-Rated. Outdoor sections with transformers must also have rear door added to that section for ventilation. Stacked transformers in a section are limited to 45KVA at this time. Contact Siemens for updated information.

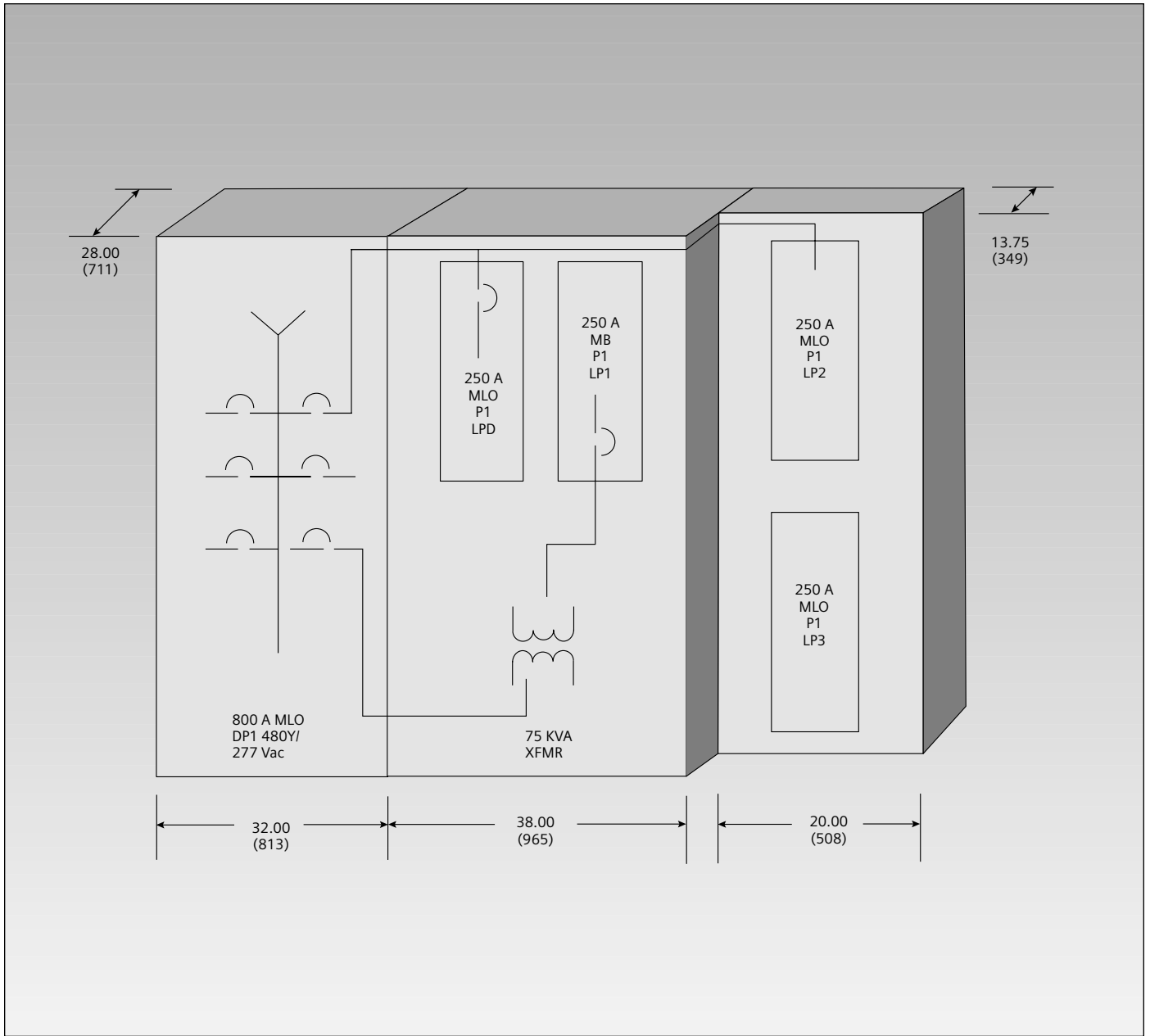
⑤ For CLH contactor only, up to 6 in 20" and 25" wide section can be mounted and 9 in a 32" wide section.

⑥ ATS includes generator controls. Contact Siemens sales for details.

⑦ Emergency power generators are available. Contact Siemens sales for details.

# Integrated Power Systems Switchboard

## Typical IPS Lineup



Dimensions shown in inches and millimeters ( ).



# General Layout Information (Type SB1, SB2, SB3, IPS)

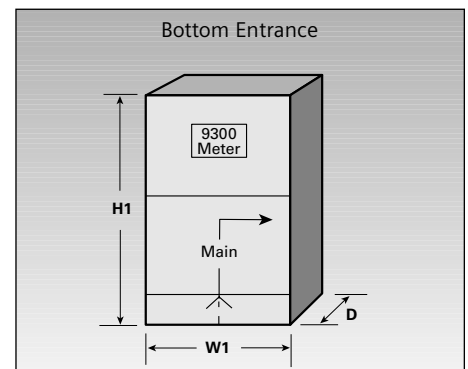
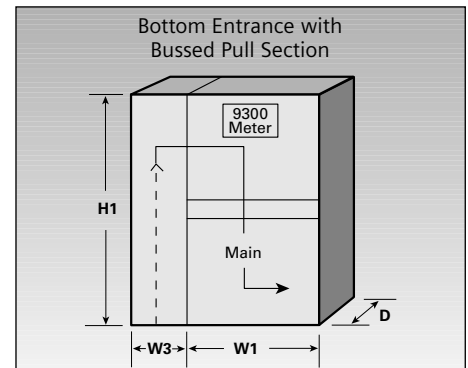
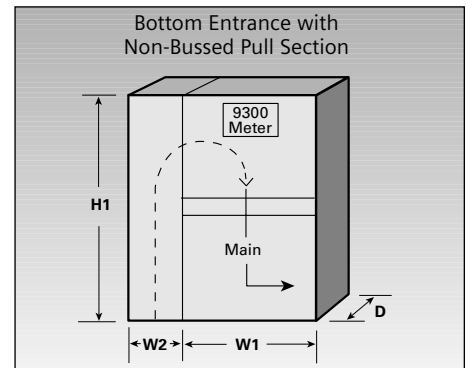
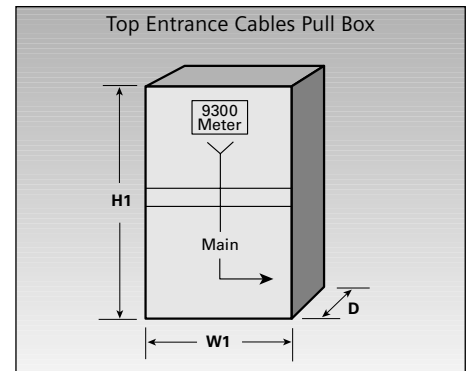
## Individually Mounted Service Mains

Max. Amp. Rating	Device Type	Dimensions in Inches (mm)				Minimum Required Depth	
		Height	Width		Pull Section		
			H1	W1			W2
<b>Molded Case Circuit Breakers</b>							
400	HJXD6, HHJD6, HHJXD6, JXD2, JXD6, JD6, HJD6, SJD6, SHJD6	90.00 (2286)	32.00 (813)	14.00 (356)		20.00 <sup>②</sup> (508)	
600	HLXD6, HHLXD6, HHLXD6, LXD6, LD6, HLD6, SLD6, SHLD6			20.00 (508)			
800	MXD6, MD6, HMD6, LMXD6, LMD6, HLMXD6, HLMXD6, SMD6, SHMD6, NM, HM, LM		32.00 (813)		20.00 (508)		
1000	NXD6, ND6, HND6, SND6, SHND6, HNXD6, NN, HN, LN		38.00 (965)		32.00 (813)		
1200	NXD6, ND6, HND6, SND6, SHND6, HNXD6, NN, HN, LN						
1600	PXD6, PD6, HPD6, SPD6, HPXD6, NP, HP, LP				32.00 (813)		28.00 <sup>③</sup> (711)
2000	RXD6, RD6, HRXD6, HRD6						
<b>Insulated Case Circuit Breakers — Stationary Mounted</b>							
800	Type WL Insulated Case Breaker	90.00 (2286)	38.00 (965)	20.00 (508)		28.00 <sup>③</sup> (711)	
1200				32.00 (813)			
1600				32.00 (813)		38.0 (965)	
2000				38.00 (965)			
3000				38.00 (965)			
4000	38.00 (965)						
<b>Switches</b>							
400	HCP	90.00 (2286)	38.00 (965)	14.00 (356)		20.00 <sup>②</sup> (508)	
600				20.00 (508)			
800							
1200							
800	Vacu-Break			38.00 (965)			20.00 (508)
1000				32.00 (813)			28.00 <sup>③</sup> (711)
1200							
800	Bolted Pressure						
1000							
1200							
1600							
2000	46.00 (1168)		38.00 (965)	32.00 (813)	38.00 (965)		
2500							
3000							
4000							

① For EUSERC UGPS dimensions, refer to Siemens Front Connected Switchboard Selection & Application Guide.

② Optional depths are 28 and 38 inches.

③ Optional depth is 38 inches.



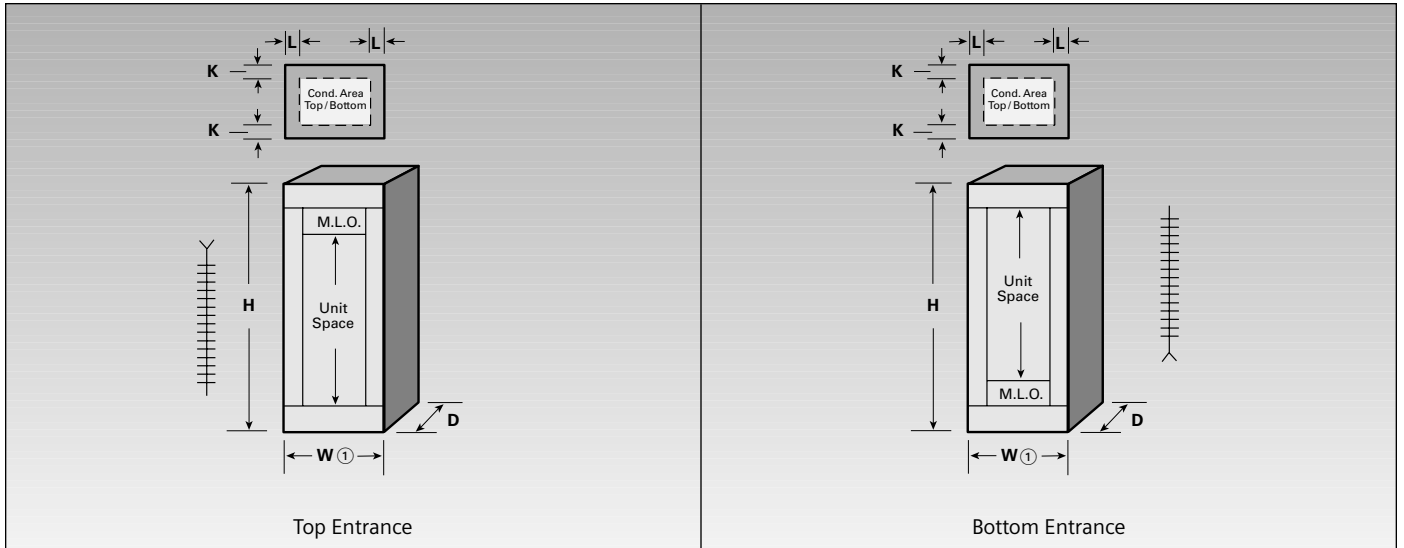
# General Layout Information (Type SB1, SB2, SB3, IPS)

## Main Lug Only — 400A through 2000A

Available branch circuit unit space varies depending on amperage of incoming service, lug type and if through bus is

required. If more unit space is required than is shown in the table below, one or more panel mount device distribution

sections must be added.



## Main Lug Only Unit Space

Dimensions in inches (mm)

Max. Ampere Rating	Suitable For Use Only As Service Av Equipment ⑤ ⑥	Max. AIC Rating	Height (H)	Unit Space ② ③ ④			Width (W) ①	Minimum Depth (D) ⑦	Conduit Area	
				Lugs					K	L
				Standard 500 kcmil	Alternate 750 kcmil	Compression 600 kcmil Max.				
400	Available as a user selectable option	200,000	90.00 (2286) ③	62.50 (1588)	60.00 (1524)	55.00 (1397)	32 or 38 (8.13 or 965)	2.50 (64)	3.00 (76)	
600				60.00 (1524)	56.25 (1429)					
800				58.75 (1492)	52.50 (1334)	53.75 (1365)				
1200				57.50 (1461)	50.00 (1270)					
1600				45.00 (1143)	38.75 (984)	45.00 (1143)				38.00 (965)
2000										

① 46 in. (1168) width available as an option.

② See page 12-12 for unit space requirements for disconnect devices.

③ Optional 70" high is also available. Unit space is reduced by 20".

④ If load through bus is required, the available unit space is reduced by 7.50 inches for 400-1200 amp MLO sections.

⑤ Maximum of 6 disconnect devices only.

⑥ SUSE service disconnects 1000A or higher on solidly grounded wye systems of more than 150V to ground require ground fault protection. Ground fault uses 10 in.

(254 mm) of unit space. See NEC 230-95 for additional details. This applies to branch devices 1000A or larger on non-service equipment unless ground fault protection is provided upstream at the service. See NEC 240-13 for further information.

⑦ Optional section depths are 20", 28" and 38."

# General Layout Information (Type SB1, SB2, SB3, IPS)

## Panel Mounted MCCB — 400A through 1200A

IPS service sections can house both a main service disconnect device and branch disconnects. Switchboards can be furnished with "Suitable for Use Only as Service Equipment"

labels, but include no provisions for utility metering.

Branch circuit device unit space varies, depending on the rating and consequent

physical size of the main disconnect device. If more unit space is required than is shown in the tables below, one or more additional panel mounted device distribution sections must be added.

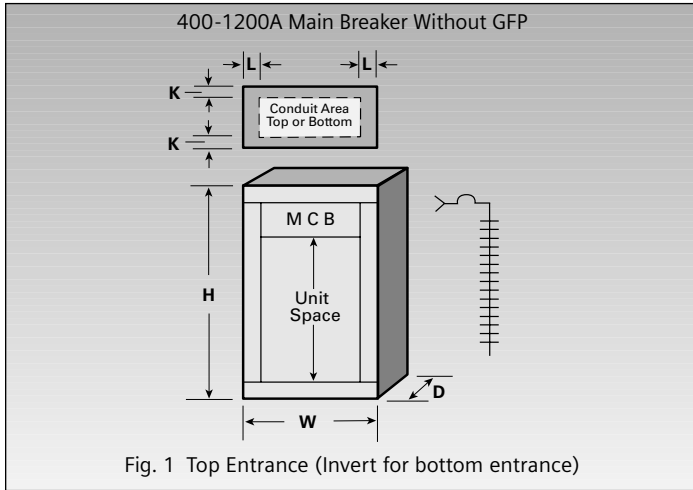


Fig. 1 Top Entrance (Invert for bottom entrance)

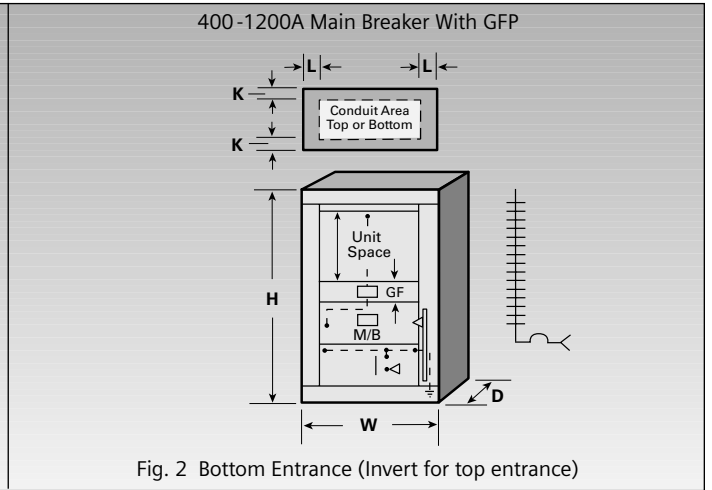


Fig. 2 Bottom Entrance (Invert for top entrance)

## Main Breaker with or without Ground Fault Protection

Dimensions in inches (mm)

Max. Ampere Rating	Breaker Type	Height (H)	Unit Space <sup>①②③</sup>	Width (W)	Minimum Depth (D) <sup>④</sup>	Conduit Area		Main Location	Service Entrance Label
						K	L		
400	JXD2, JXD6, JD6, HJD6, HJXD6, HHJD6, HHJXD6, SJD6, SHJD6	90.00 (2286) <sup>⑤</sup>	56.25 (1429)	32.00 (813)	13.75 (349)	2.50 (64)	3.00 (76)	Top or Bottom	Yes
600	LXD6, LD6, HLD6, HLXD6, HHLXD6, HHLXD6, SLD6, SHLD6		53.75 (1365)						
800	LMD6, LMXD6, HLMD6, HLMXD6, NM, HM, LM	90.00 (2286) <sup>⑤</sup>	52.50 (1334)	38.00 (965) <sup>⑥</sup>	13.75 (349)	2.50 (64)	3.00 (76)	Top or Bottom	Yes
1000	MXD6, MD6, HMD6, HMXD6		40.00 (1016)						
	NXD6, ND6, HND6, HNXD6, NN, HN, LN		52.50 (1334)						
1200	SND6, SHND6	90.00 (2286) <sup>⑤</sup>	40.00 (1016)	38.00 (965) <sup>⑥</sup>	13.75 (349)	2.50 (64)	3.00 (76)	Top or Bottom	Yes
	NXD6, ND6, HND6, HNXD6, NN, HN, LN		52.50 (1334)						
	SND6, SHND6	90.00 (2286) <sup>⑤</sup>	40.00 (1016)	38.00 (965) <sup>⑥</sup>	13.75 (349)	2.50 (64)	3.00 (76)	Top or Bottom	Yes

① Ground fault, if applied, uses 10 in. (254 mm) of unit space.

② See page 12-12 for unit space requirements for disconnect devices.

③ Available unit space for 400 and 600 amp main breaker sections is reduced to 53.75 if load side through bus is required.

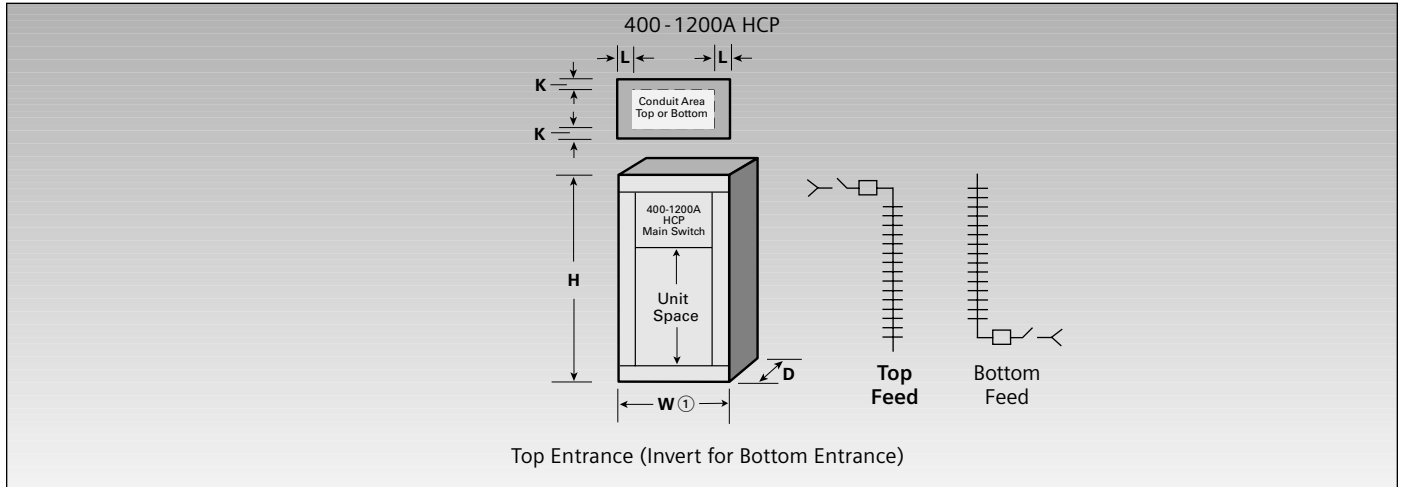
④ Optional section depths are 20", 28" and 38".

⑤ Optional 70" high is also available. Unit space is reduced by 20".

⑥ 46 in. (1168 mm) wide if 750 kcmil or compression lugs required.

# General Layout Information (Type SB1, SB2, SB3, IPS)

## Panel Mounted HCP Switch Main — 400A through 1200A



### 400 — 1200A HCP Switch Main

Dimensions in inches (mm)

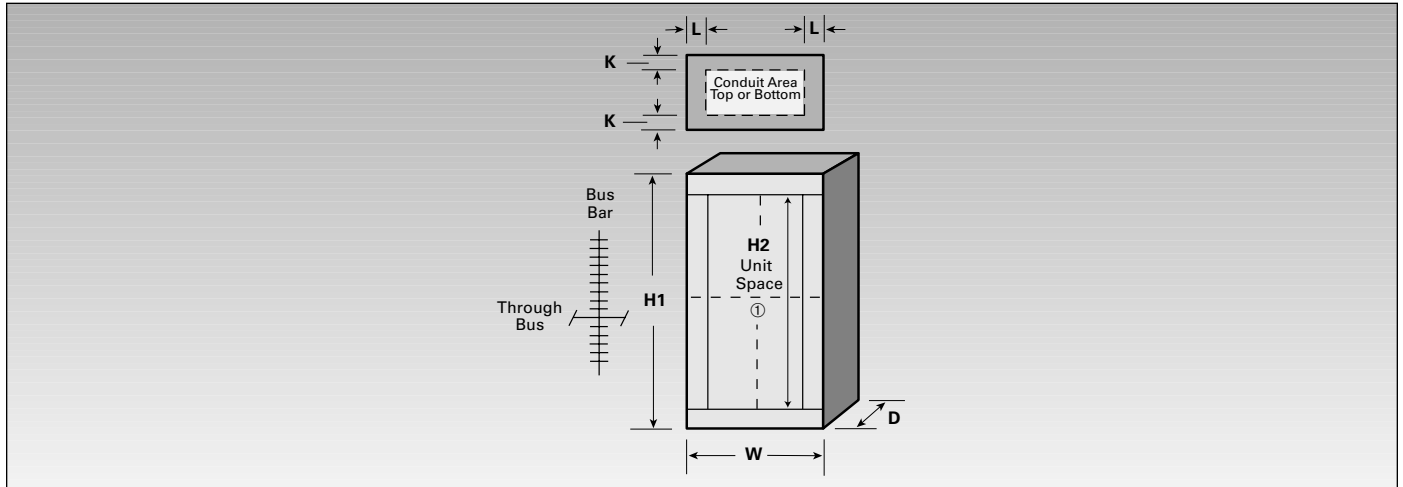
Max. Ampere Rating	Height (H)	Unit Space ②	Width (W) ①	Minimum Depth (D) ③	Conduit Area		Main Location	Service Entrance Label
					K	L		
400	90.00 ④ (2286)	46.25 (1175)	38.00 (965)	13.75 (349)	2.50 (64)	3.00 (76)	Top or Bottom	Yes
600								
800								
1200								

① 46 in. (1168 mm) width available as an option.  
 ② See page 12-12 for unit space requirements for disconnect devices.  
 ③ Optional section depths are 20", 28" and 38".  
 ④ Optional 70" high is also available. Unit space is reduced by 20".

# General Layout Information (Type SB1, SB2, SB3, IPS)

## Panel Mounted Devices Through-Bus Fed

### Through-Bus Fed Distribution Sections



### Through-Bus Fed Dimensions

Dimensions in Inches (mm)

Maximum Riser Amperage	With Maximum Through-Bus Amperage	Height		Width		Minimum Section Depth (D) <sup>③</sup>	Conduit Area	
		H1 <sup>②</sup>	Unit Space H2 <sup>① ②</sup>	W			K	L
2000	2000 2500 & 3000 4000	90.00 (2286)	65.00 (1651)	32.00 or 38.00 <sup>④</sup> (813) (965)		20.00 (508)	2.50 (64)	3.00 (76)
3000	4000		62.50 (1588)	38.00 or 46.00 (965) (1168)				

① See page 12-12 for unit space requirements for disconnect devices.

② Optional 70" high is available. Unit space is reduced by 20.

③ Optional section depths are 28" and 38".

④ 46 inches (118 mm) width optional.

# General Layout Information (Type SB1, SB2, SB3, IPS)

## Unit Space for Panel Mount Disconnect and Miscellaneous Components

### Unit Space Requirements — Molded Case Circuit Breakers (Mains and Branches)

Max. Ampere Rating	Device Type	Total Poles Available			Unit Space Required		Enclosure Minimum Width
		1P	2P	3P	Twin Mounted	Single Mounted	
					Dimensions in inches (mm)		
100	BL, BLH, HBL, BQD, NGB, NEB, HEB ED4, HHED6	6		2	3.75 (95)		
	2						
125	ED4, ED6, HED4, HHED6, NGB, NEB, HEB		2	2	6.25 (159)	—	32.00 (813)
	HED4, HHED6, ED4, NGB, ED6 with accessories				3.75 (95)		
	CED6				6.25 (159)		
	CED6 with accessories				5.00 (127)		
225	QJ2, QJH2, QJ2-H, HQJ2-H						
250	FXD6, FD6, HFD6, HFXD6, HHFD6, HHFXD6			—	—	5.00 (127)	
	CFD6			—	—	5.00 (127)	
400	JX2, JXD6, JD6, HJD6			1	1	—	8.75 (222)
	HJXD6, HHJD6, HHJXD6			2	2	8.75 (222)	—
	SJD6, SHJD6			—	—	—	—
600	LXD6, LD6, HLD6, HLXD6, HHLXD6, HHLXD6			1	—	—	8.75 (222)
	SLD6, SHLD6			—	—	—	—
	LMD6, LMXD6, HLMD6, HLMXD6			1	1	—	—
800	MXD6, MD6, HMD6, HMXD6			—	—	—	10.00 (254)
	SMD6, SHMD6			—	—	—	10.00 (254)
	NM, HM, LM			—	—	—	8.75 (222)
1200	NXD6, ND6, HND6, HNXD6			1	—	—	10.00 (254)
	SND6, SHND6, NN, HN, LN			—	—	—	10.00 (254)

### Unit Space Requirements — Fusible Switches (Mains and Branches)

Max Amp Rating	Switch Type	Unit Space Required				Enclosure Minimum Width	
		240V		600V			
		Twin	Single	Twin	Single		
30-30	Vacu-Break	2.50 (64) <sup>②</sup>	—	—	—	32.00 (813)	
30-30		5.00 (127)		7.50 (191)			
30-60							
60-60							
60-100							
100-100		7.50 (191)					
200-200		10.00 (254) <sup>③</sup>		10.00 (254) <sup>④</sup>			
100		7.50 (191)		—			7.50 (191)
200		10.00 (254)		—			10.00 (254)
400		—		15.00 (381)			—
600	—	—	—	—			
400-1200	HCP	—	16.25 (413)	—	16.25 (413)	38.00 (965)	

① 46 in. (1168mm) wide if 750 kcmil or compression lugs required.  
 ② The 2.5 in. (64) high unit is suitable for NEC Class H, K1 and K5 fuses only. Class R rejection type fuse holders are not available.  
 ③ Unit rated 600V, factory configured to accept 250V Class K or R fuses. Field convertible to accept Class J fuses.  
 ④ Factory configure to accept Class J fuses only.

### Unit Space Requirements For Miscellaneous Components

Component	Unit Space in inches (mm)
Local Display ADR 9000 (SRTU)	10.00 (254)
Transient Voltage Surge Suppressor (TPS)	10.00 (254)
9200A Digital Meter	10.00 (254)
9200B Digital Meter	10.00 (254)
9200C Digital Meter	10.00 (254)
9300 Digital Meter	10.00 (254)
9330 Digital Meter	10.00 (254)
9350 Digital Meter	10.00 (254)
Lighting Contactor 30 to 225 Amp Siemens CLH	10.00 (254)
Lighting Contactor 30 to 225 Amp ASCO 920	20.00 (508)
Time Clock Sangamo, Tork or Paragon	10.00 (254)
PLC (LOGO! <sup>™</sup> and S7)	10.00 (254)

# Rear Connected Switchboards

## Type RCS

Siemens RCS switchboards differ from the front connected (Type SB1, SB2, SB3) design primarily in the distribution sections. In the distribution section the branch feeders are individually mounted. Because of this method of mounting, access to the outgoing cable terminals must be from the rear of the unit. Bus bar extensions from the feeder devices are run to the rear of the RCS section stopping before the conduit area for easy access and cable connection. An optional cable management system

can be requested to secure the outgoing cables. The front and rear of all sections align and are designed for mounting away from the wall. RCS switchboard will accommodate requirements up to 6000 ampere and 600 volts. The main bus can be specified for 400 to 6000 ampere rating. Main, tie and branch devices are available in amperage ratings up to 6000 amps. RCS switchboards can be indoor (NEMA 1) or outdoor (NEMA 3R) construction.

## General

RCS switch boards utilize Type WL insulated case and/or low voltage power circuit breakers with drawout mountings. Features and benefits include high breaker density, 100kA standard short circuit bus bracing and three levels of horizontal bus. Options include insulated/isolated bus, Dynamic Arc Flash Sentry, ModBus Communication and intelligent power monitoring.



Switchboard Type RCS	Mounting	WL Insulated Case Circuit Breaker Drawout Mount	WL LV Power Circuit Breaker Drawout Mount
Main Devices	Individual	400-5000A	400-5000A
Branch Devices	Individual	400-5000A	400-5000A

For additional information on this product visit our website at [www.sea.siemens.com](http://www.sea.siemens.com). For application pricing information contact your local distributor or the closest Siemens sales office.

# Multi-Metering Switchboards

## Type MMS

In today's commercial and industrial environments, the electrical metering requirements vary according to the specification of the development site. Siemens offers a solution with high quality multi-metering switchboards that meet the non-EUSERC area requirements. The MMS switchboard meets the requirements of member utilities and municipalities with these dependable commercial switchboards.

### Features

- Up to 4000A main service  
208Y/120V, three phase/four wire  
480Y/277V, 3-phase 4-wire
- 100A, 200A and 320A tenant mains are available
- UL listed and labeled

### ■ NEMA "Non-EUSERC" Design

- Hot sequence metering is standard; cold sequence also available
- 50,000A symmetrical bus bracing is standard; above 50,000A available upon request.
- All meter sockets are pre-wired for 100A, 200A or 320A devices
- Copper or Aluminum bus available
- Units are front accessible.
- NEMA Type 1 and Type 3R construction available
- Available with optional cable pull sections
- Sockets include lever type manual by-pass
- Load cable exit top or bottom
- Common depth for main and metering sections upon request
- Ring-less type meter cover design

*General*



For additional information on this product visit our website at [www.sea.siemens.com](http://www.sea.siemens.com).  
For application pricing information contact your local distributor or the closest Siemens sales office.



# Multi-Metering Switchboards

## Type SMM

Completely engineered and assembled, Siemens SMM commercial metering switchboards require minimal field assembly. They are UL listed and labeled and meet all EUSERC standards. SMM switchboards are built to meet the rugged requirements of the western United States. These units can be modified to meet any additional requirements of member utilities and municipalities. For a high quality dependable commercial metering switchboard consider the West Coast SMM design.

### Features

- Up to 4000A main service  
120/240V 1-phase 3-wire  
240/120V 3-phase 4-wire  
208Y/120V 3-phase 4-wire  
480Y/277V 3-phase 4-wire
- 200 amp continuous duty meter sockets
- **Meets EUSERC requirements**
- UL listed and labeled
- Hot sequence metering standard - cold sequence metering optional
- Test blocks are standard
- Copper or Aluminum bus
- 65,000A Sym bracing standard (higher bracing rating available if required)
- Type NEMA Type 1 and Type 3R construction available
- Meets UL891 and NEMA PB2 standards
- Rear cable barriers available for top load cable exist
- Ring type meter cover design

*General*

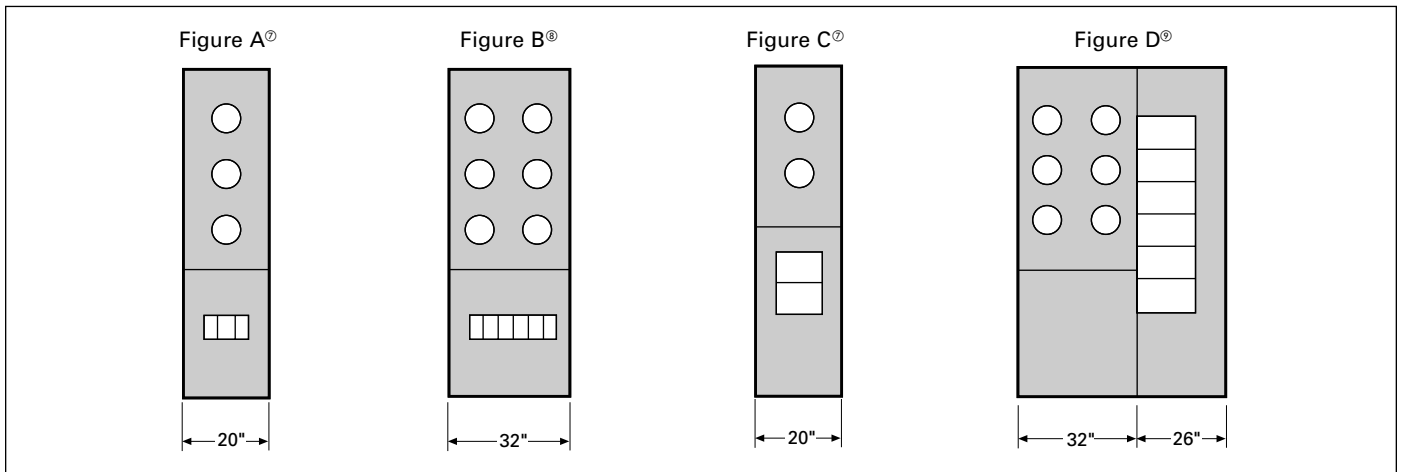


For additional information on this product visit our website at [www.sea.siemens.com](http://www.sea.siemens.com).  
For application pricing information contact your local distributor or the closest Siemens sales office.

# Multi-Metering Switchboards

## Type SMM

General



### SMM/SMD Sections with Space for Tenant Mains/Meter Sockets

**Table 7.4.6.19 SMM<sup>①</sup> Sections With Space For CB Mains And Sockets<sup>②③④</sup>**

Sockets	Figure
3	A
6	B

**Table 7.4.6.20 SMD<sup>⑤</sup> Sections With Space For CB Mains And Sockets<sup>②③④</sup>**

3	A
6	B

**Table 7.4.6.21 SMM<sup>①</sup> Sections With Space For T-Fuse Mains And Sockets<sup>②③④</sup>**

3	A
6	B

**Table 7.4.6.22 SMD<sup>⑤</sup> Sections With Space For T-Fuse Mains and Sockets<sup>②③④</sup>**

3	A
6	B

**Table 7.4.6.23 SMM<sup>①</sup> Sections With Space For VB Mains And Sockets<sup>②③④⑥</sup>**

2	C
6	D
2	C
6	D

**Table 7.4.6.24 SMD<sup>⑤</sup> Sections With Space For VB Mains And Sockets<sup>②③⑥</sup>**

2	C
6	D
2	C
6	D

**NOTE:** Component priced Meterboards allow for any combination of 100 and 200 ampere tenant mains or blank positions. Select the base structure, meter sockets and tenant mains accordingly.

① SMM sections—Cross bus from 800–2500 ampere. Sections 20" deep.

② Price sockets with tenant mains from Table 7.4.6.25, 7.4.6.26, 7.4.6.27. Price sockets only from Table 7.4.6.28.

③ Cross bus is not included. Price from Table 7.4.6.29 or 7.4.6.30.

④ When load cables exit top of section, rear load barrier (RLB) must be priced. See Table 7.4.6.31.

⑤ SMD sections required for cross bus exceeding 2500 ampere. Sections 28" deep.

⑥ Fuses not included. For Class J fuse provisions, change R to J.

⑦ 26" wide for Outdoor Type 3R.

⑧ 38" wide for Outdoor Type 3R.

⑨ 35" wide for Outdoor Type 3R.

# Multi-Metering Switchboards

## Type SMM

General

### Components

Table 7.4.6.25 — Tenant Circuit Breaker With Meter Socket<sup>②</sup>

240 Volt				
Option <sup>①</sup>	Ampere Rating	Breaker Type	No. of Poles	I.C.
01	100	BQ	2	10,000
			3	10,000
		BQH	2	22,000
	3		22,000	
	100	HBQ	2	65,000
			3	65,000
		200	QJ2	2
	3			10,000
	QJH2		2	22,000
3		22,000		
QJ2-H		2	42,000	
	3	42,000		
	02	100	ED4	2
3				65,000
NGG			2	65,000
		3	65,000	
100		HED4	2	100,000
			3	100,000
		HEG	2	100,000
3			100,000	
200			FD6	2
		3		65,000
		HFD6	2	100,000
3			100,000	
480 Volt				
03	100	ED4	2	18,000
			3	18,000
		NGG	2	25,000
	3		25,000	
	100	HED4	2	42,000
			3	42,000
		HHED6	2	65,000
	3		65,000	
	100		HEG	2
		3		65,000
		200	FD6	2
	3			35,000
	HFD6		2	65,000
			3	65,000
	200		HFD6	2
3				65,000

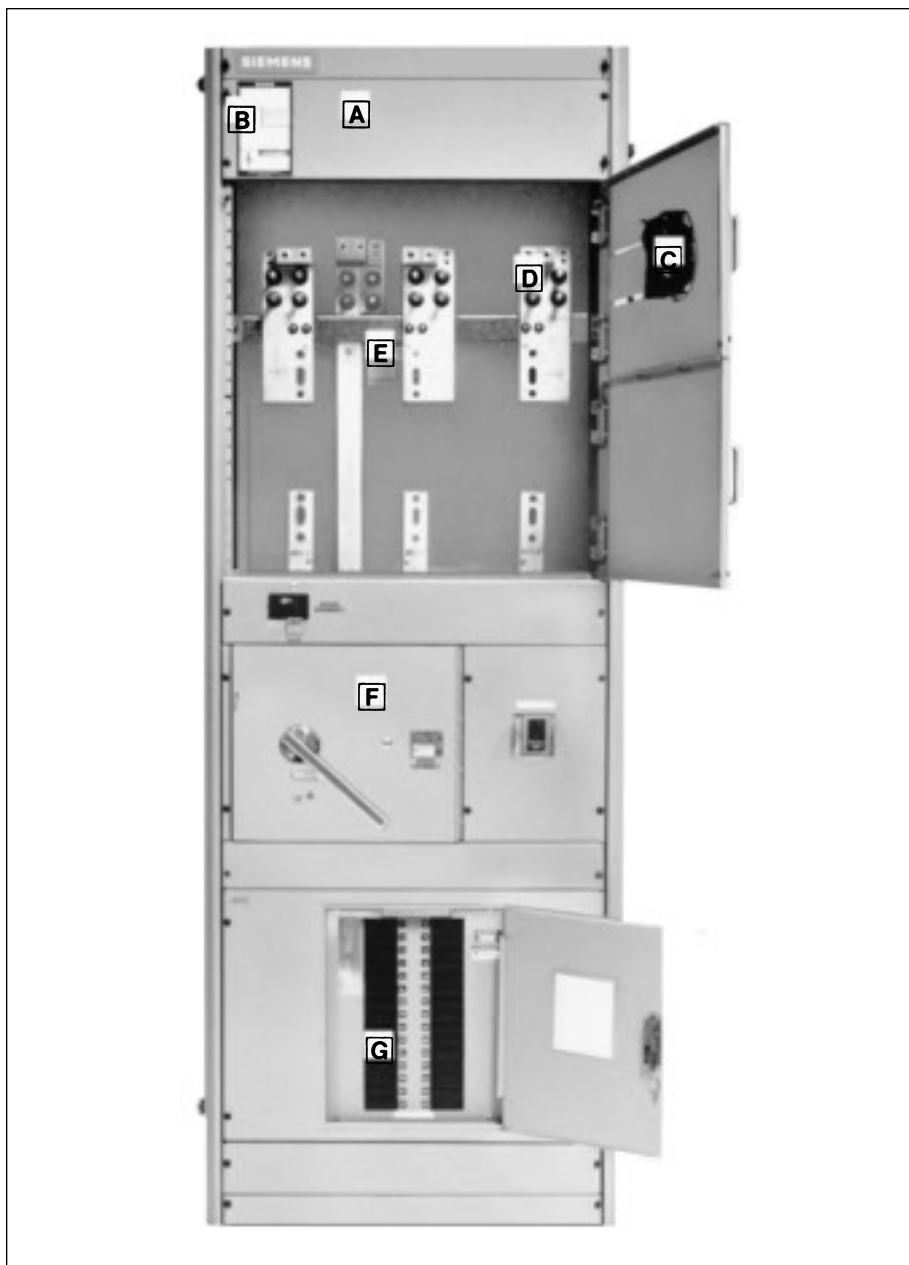
① Order 100A and 200A tenant circuit breakers from the same option only. Do not mix breakers from different options.

② Meter socket with Test Block included. For socket only, without tenant disconnect, price from Table 7.4.6.28.

# Super Blue Pennant Switchboards

Warehouse Stock

General



## Features

The Super Blue Pennant service entrance switchboard is designed to meet the needs of main over current protection with distribution devices for medium duty service applications. Main service disconnects can be either Siemens Vacu-Break fusible switch or Siemens molded case circuit breakers. Either type of device provides dependable performance with series rated combinations available. The switchboard is labeled as "suitable for use only as service equipment". Super Blue Pennant switchboards meet EUSERC utility requirements.

- Ⓐ NEMA Type 1 indoor or Type 3R outdoor self-contained enclosures are constructed of code gauge steel and painted ANSI-61 light gray.
  - Ⓑ Rating label information is clearly visible on the equipment front panel. Danger, short circuit rating labels and UL listing label present necessary information to conform with NEMA Standard PB-2.
  - Ⓒ Metering and test block provisions meet EUSERC utility specifications.
  - Ⓓ Incoming main lugs are mechanical screw-type mounted on studs accepting a wide range of cable sizes.
  - Ⓔ Barrired hot sequence utility metering and fully bussed power company current transformer compartment meet EUSERC utility standards.
  - Ⓕ Service disconnect can be fusible Vacu-Break switch through 200,000 AIC or circuit breaker with maximum rating of 65,000 AIC at 240 volts and 50,000 AIC at 480 volts.
  - Ⓖ Distribution panel kits are optional and field addable with ratings of 400–800 amperes. Up to 40 branch circuit provisions available, 18 branch circuit minimum.
- High interrupting capacity subfeed kits with molded case circuit breaker ratings of 225 or 400 amperes.
  - Series rated combinations are available. Consult sales office.
  - Contact sales office for warehouse stocking locations.

### Ampere Ratings

400–600–800 Ampere Circuit Breaker Main  
400–600 Ampere Fusible Vacu-Break Main

### Voltage Ratings

120/240 Volts	1-Phase, 3-Wire
240/120 Volts	3-Phase, 4-Wire Delta
240 Volts	3-Phase, 3-Wire Delta
208Y/120 Volts	3-Phase, 4-Wire
480Y/277 Volts	3-Phase, 4-Wire
480 Volts	3-Phase, 3-Wire Delta

### I.C. Ratings

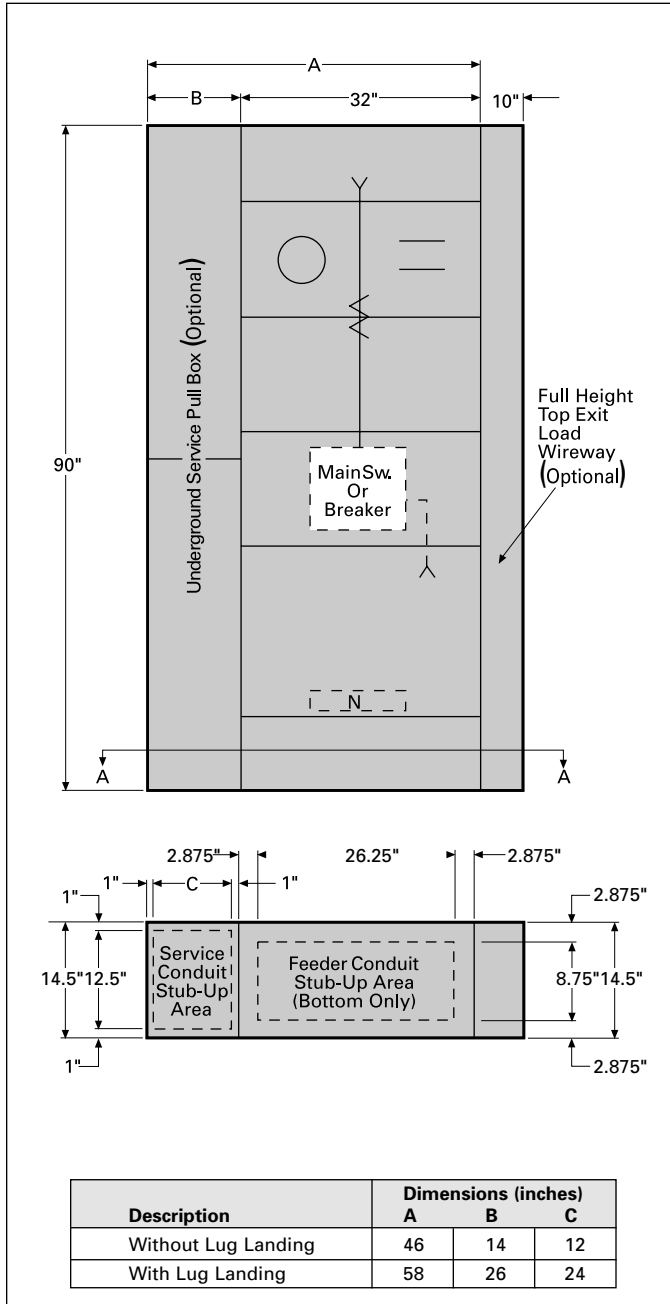
The short circuit current rating is limited to the lowest current interrupting rating, at the supply voltage, of any device installed. Only Siemens breakers with short circuit interrupting ratings equal to or greater than the marked short circuit current rating shall be used for replacement or additions.

# Super Blue Pennant Switchboards

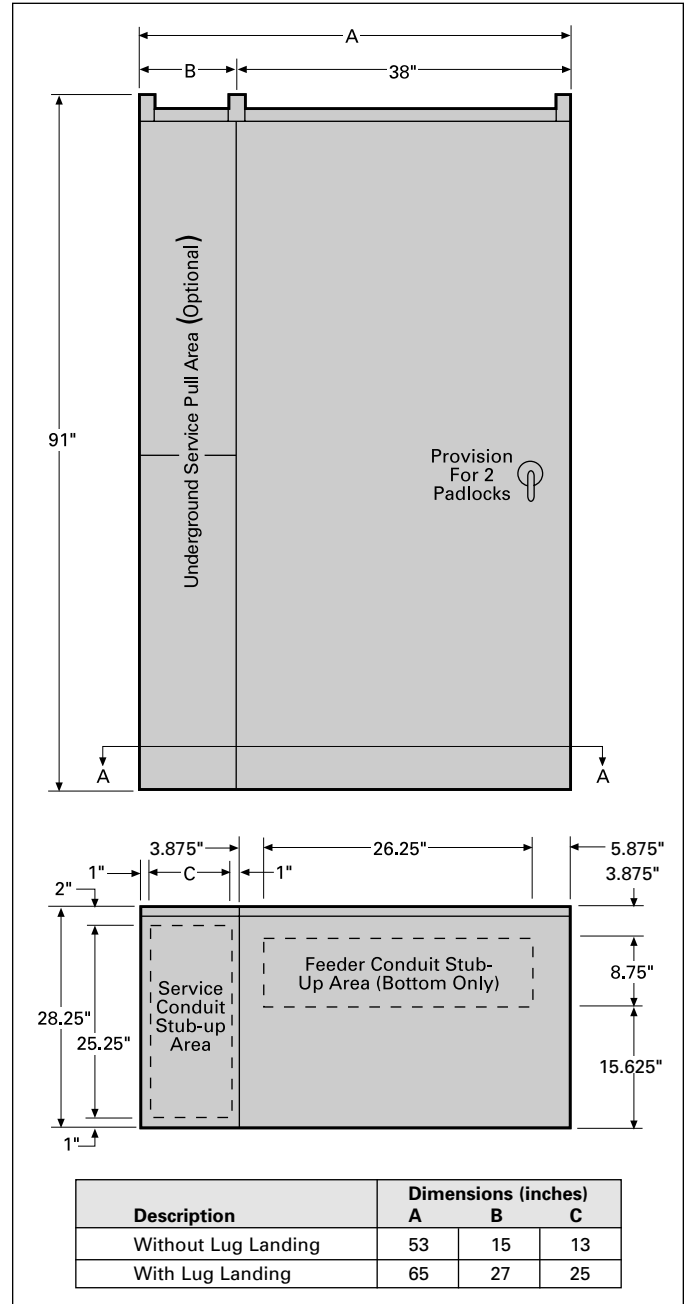
## Type 1 — Indoor, Type 3R — Outdoor

### Dimensions

#### Type 1 — Indoor



#### Type 3R — Outdoor Weatherproof



For inches / millimeters conversion, see conversion table in Application Data section.

# Super Blue Pennant Switchboards

## Main Circuit Breaker

Selection

### Main Circuit Breaker

Main Device Ampere Rating	Service Voltage	Catalog Number		List Price \$ <sup>①</sup>		Meter Socket Clips	Distribution Kits Available <sup>②</sup>	Approximate Weight (lbs.)	
		Indoor	Outdoor	Indoor	Outdoor			Indoor	Outdoor
400 Ampere Line Lugs (2)— $\frac{1}{2}$ -500 kcmil (Copper or Aluminum) Breaker Rated 65,000A IR Symmetrical at 240 Volts 35,000A IR Symmetrical at 480 Volts Type JD6	120/240; 1-Phase, 3-Wire	PB224	WPB224	4005.00	7071.00	5 <sup>③</sup>	PQ2630 PQ2612	320	1050
	240/120; 3-Phase, 4-Wire Delta 240; 3-Phase, 3-Wire 208Y/120; 3-Phase, 4-Wire	PB424	WPB424	5000.00	8008.00	15	PQ4630 PQ4612	335	1060
	480Y/277; 3-Phase, 4-Wire 480; 3-Phase, 3-Wire	PB444	WPB444	6856.00	9889.00	15	PE4630 PF4606	335	1060
600 Ampere Line Lugs (2)— $\frac{1}{2}$ -500 kcmil (Copper or Aluminum) Breaker Rated 65,000A IR Symmetrical at 240 Volts 35,000A IR Symmetrical at 480 Volts Type LD6	120/240; 1-Phase, 3-Wire	PB226	WPB226	5125.00	8151.00	5 <sup>③</sup>	PQ2630 PQ2612	320	1050
	240/120; 3-Phase, 4-Wire Delta 240; 3-Phase, 3-Wire 208Y/120; 3-Phase, 4-Wire	PB426	WPB426	6981.00	10015.00	15	PQ4630 PQ4612	335	1060
	480Y/277; 3-Phase, 4-Wire 480; 3-Phase, 3-Wire	PB446	WPB446	10476.00	13542.00	15	PE4630 PF4606	335	1060
800 Ampere Line Lugs (3)— $\frac{1}{2}$ -500 kcmil (Copper or Aluminum) Breaker Rated 65,000A IR Symmetrical at 240 Volts 50,000A IR Symmetrical at 480 Volts Type MD6	120/240; 1-Phase, 3-Wire	PB228	WPB228	6612.00	9656.00	5 <sup>③</sup>	PQ2840 PQ2816	460	1090
	240/120; 3-Phase, 4-Wire Delta 240; 3-Phase, 3-Wire 208Y/120; 3-Phase, 4-Wire	PB428	WPB428	9053.00	12104.00	15	PQ4840 PQ4818	475	1090
	480Y/277; 3-Phase, 4-Wire 480; 3-Phase, 3-Wire	PB448	WPB448	13909.00	16930.00	15	PE4840 PF4809	475	1090



For inches / millimeters conversion, see conversion table in Application Data section.

①Price does not include load side lugs, Distribution Panel or Subfeed Kits.

②For 6-jaw requirements, order 6th clip kit from accessories.

③Refer to Distribution Panel Kits for list prices.

■ = Warehouse Stock

# Super Blue Pennant Switchboards

## Main Fusible Switch

Selection

### Main Fusible Switch<sup>①</sup>

Main Device Ampere Rating	Service Voltage	Catalog Number		List Price \$ <sup>②</sup>		Meter Socket Clips	Distribution Kits Available <sup>③</sup>	Approximate Weight (Lbs)	
		Indoor	Outdoor	Indoor	Outdoor			Indoor	Outdoor
400 Ampere Line Lugs (2)— $\frac{1}{2}$ -500 kcmil (Copper or Aluminum) 200,000 AIC maximum at 600 Volts	120/240; 1-Phase, 3-Wire	PF224	WPF224	4697.00	7549.00	5 <sup>③</sup>	PQ2630 PQ2612	365	1094
	240/120; 3-Phase, 4-Wire Delta 240; 3-Phase, 3-Wire 208Y/120; 3-Phase, 4-Wire	PF424	WPF424	5726.00	8721.00	15	PQ4630 PQ4612	375	1110
	480Y/277; 3-Phase, 4-Wire 480; 3-Phase, 3-Wire	PF444	WPF444	6714.00	9498.00	15	PE4630 PF4606	375	1110
600 Ampere Line Lugs (2)— $\frac{1}{2}$ -500 kcmil (Copper or Aluminum) 200,000 AIC maximum at 600 Volts	120/240; 1-Phase, 3-Wire	PF226	WPF226	5761.00	8927.00	5 <sup>③</sup>	PQ2630 PQ2612	370	1100
	240/120; 3-Phase, 4-Wire Delta 240; 3-Phase, 3-Wire 208Y/120; 3-Phase, 4-Wire	PF426	WPF426	7942.00	10936.00	15	PQ4630 PQ4612	390	1110
	480Y/277; 3-Phase, 4-Wire 480; 3-Phase, 3-Wire	PF446	WPF446	10225.00	13024.00	15	PE4630 PF4606	390	1120



12 SWITCHBOARDS

For inches / millimeters conversion, see conversion table in Application Data section.

<sup>①</sup>Fuses not included.

<sup>②</sup>Price does not include load side lugs, Distribution Panel or Subfeed Kits.

<sup>③</sup>For 6-jaw requirements, order 6th clip kit from accessories.

<sup>④</sup>Refer to Distribution Panel Kits for list prices.

☐ = Warehouse Stock

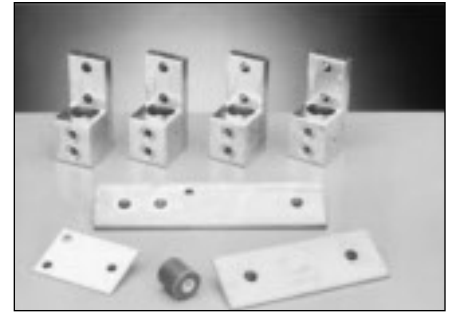
# Super Blue Pennant Switchboards

## Components

Selection

### Main Device (Circuit Breaker or Fusible Switch) Load Side Lugs<sup>①</sup> — Discount Schedule SWBD

Ampere Rating	Description	Catalog Number	Wire Range	List Price \$
400	For Fusible Switch	LKF4	(1)—3/0-750 kcmil (Cu or Al)	227.00
600		LKF6	(2)—3/0-500 kcmil (Cu or Al)	227.00
400	For Circuit Breaker	LKB4	(1)—600-750 kcmil (Cu or Al)	227.00
600		LKB6	(2)—3/0-350 kcmil (Cu or Al)	227.00
800		LKB8	(2)—600-750 kcmil (Cu or Al)	451.00



### Distribution Panel Kits — Discount Schedule SWBD

Ampere Rating	Voltage	Number and Type of Breaker Poles				Catalog Number	List Price \$ <sup>③</sup>	Weight
		QP or HQ <sup>⑦</sup>	ED4 <sup>⑦</sup>	QJ2 or QJH2 <sup>⑦</sup>	FXD6 <sup>②③⑦</sup>			
400 and 600	120/240V; 1-Phase, 3-Wire	30	—	—	—	PQ2630	1105.00	39
		12	—	12	—	PQ2612		
	240/120V; 3-Phase, 4-Wire Delta <sup>④⑤</sup> 240V; 3-Phase, 3-Wire <sup>⑤</sup> 208Y/120V; 3-Phase, 4-Wire	30	—	—	—	PQ4630	1373.00	42
		12	—	12	—	PQ4612		
	480Y/277V; 3-Phase, 4-Wire 480V; 3-Phase, 3-Wire	—	30	—	—	PE4630	1163.00	42
		—	12	—	6	PF4606	1163.00	65
800	120/240V; 1-Phase, 3-Wire	40	—	—	—	PQ2840	1806.00	65
		12	—	16	—	PQ2816		
	240/120V; 3-Phase, 4-Wire Delta <sup>④⑤</sup> 240V; 3-Phase, 3-Wire 208Y/120V; 3-Phase, 4-Wire	40	—	—	—	PQ4840	2283.00	70
		12	—	18	—	PQ4818		
	480V; 3-Phase, 3-Wire	—	40	—	—	PE4840	1806.00	65
		—	12	—	9	PF4809	2552.00	70

### Circuit Breaker Subfeed Kits: (Breakers Not Included) — Discount Schedule SWBD

Description	Catalog Number	List Price \$
For FXD6-225A 2 or 3-pole	PSFFJ6	595.00
For JXD6, JD6, HJD6 400A 2 or 3-pole	PSFJL6	913.00

For inches / millimeters conversion, see conversion table in Application Data section.

① Price includes phase and neutral load lugs and neutral link assembly.  
② 2-pole FXD6 requires 3-pole space.

③ Price includes branch neutral and disconnect link assembly. ④ 1-pole breakers must not be connected to "B" phase.  
⑤ 1-pole breakers must not be connected to "B" phase.  
⑥ 2-pole breakers must be rated 240V.  
⑦ FXD6 circuit breakers are limited to 225A maximum.  
⑧ Price from Molded Case Circuit Breaker section.

☐ = Warehouse Stock



# Super Blue Pennant Switchboards

## Accessories

Selection

Description	Catalog Number	List Price \$
-------------	----------------	---------------

### Underground Pull Section or Full Height Section For Load Wiring — Discount Schedule SWBD

14.5" Deep 90" High 14" Wide (12" opening) — indoor 15" Wide (12" opening) — outdoor	PUG14 WPUG14	1597.00 3370.00
26" Wide (24" opening) — indoor 27" Wide (24" opening) — outdoor	PUG26 WPUG26	1866.00 3879.00
10" Wide (load wiring)	PLW10	853.00

### Lug Landing Kits — Discount Schedule SWBD (Requires Catalog Number PUG26 or WPUG26)

400A 1-Phase, 3-Wire or 3-Phase, 4-Wire	PLL44 <sup>①</sup>	814.00
600A 1-Phase, 3-Wire or 3-Phase, 4-Wire	PLL46 <sup>①</sup>	1221.00
800A 1-Phase, 3-Wire or 3-Phase, 4-Wire	PLL48 <sup>①</sup>	1435.00

### "R" Fuse Clip Adapter Kit (Set of 3) — Discount Schedule VBSS

400A 250/600V	SSRK35	137.00
600A 250/600V	SSRK36	137.00

### "J" Fuse Clip Adapter Kit (Set of 3) — Discount Schedule VBSS

400A 250V	W49814	330.00
400A 600V	W49816	395.00
600A 240V	W49813	459.00
600A 600V	W49815	330.00

### "T" Fuse Clip Adapter Kit (One Pole Kit) — Discount Schedule VBSS

400A 240V	TFAK52	102.00
400A 600V	TFAK55	151.00
600A 240V	TFAK62	120.00
600A 600V	TFAK65	174.00

### Optional Meter Sockets and Doors — Discount Schedule SWBD

Meter Compartment Door (32" Wide x 15" High for "S" base socket with test block cutout (order necessary meter base from items below)	PSP32	510.00
Meter Compartment Door (32" Wide x 30" High) for 2 "S" base meters with mounting provisions for test block and printing demand meter (order meter base from table below) Left Hand Hinge or Right Hand Hinge	PSDP32	577.00
Blank Meter Compartment Door (32" Wide x 15" High)	PBP32	243.00
5 Clip Meter Socket with ring	PMS5	260.00
6 Clip Meter Socket with ring	PMS6	294.00
8 Clip Meter Socket with ring	PMS8	317.00
13 Clip Meter Socket with ring	PMS13	577.00
15 Clip Meter Socket with ring	PMS15	612.00

### Filler Plates — Discount Schedule MCCB

QP-HQP-QJ2-QJ2H-QJH2	QF3	2.80
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### Handle Blocking and Padlock Devices — Discount Schedule MCCB

Blocking (QP-HQP 1, 2 and 3-pole)	QL1	8.30
Blocking (QJ2, QJ2-H, QJH2)	QJHS1	13.40
Blocking (ED2, ED4, ED6)	E2HBL	16.00
Padlock (QP-HQP)	QLD3	8.40
Padlock (QJ2, QJ2-H, QJH2)	HL9419	15.10
Padlock (ED2, ED4, ED6)	ED2HPL	16.00

### Equipment Ground Bus — Discount Schedule SWBD

	PEGB42	101.00
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For inches / millimeters conversion, see conversion table in Application Data section.

① A PUG26 or WPUG26 Underground pull section is required when using these lug landing kits.

☐ = Warehouse Stock

# Circuit Breaker, Fusible Application Switchboards

## Circuit Breaker — BCT Service Cubicle

*Selection*

Service Entrance Equipment With Provisions For Metering Current Transformers

### Service Entrance Circuit Breaker

#### COLD SEQUENCE METERING STANDARD For Hot Sequence Metering Invert Unit and Breaker

- Available with current transformer provisions on load side and can be inverted for current transformer provision on line side.
- Tamperproof enclosure with hinged door over current transformer compartment with latch for utility company sealing.
- Current transformer provisions are adjustable for use with 12" or 14.5" primary bar type current transformer.
- Indoor construction for floor mounting only.
- All units supplied as top feed cold metering only. Units may be field modified as shown in the Available Configurations listed in the table below.
- Listed by Underwriters Laboratories' as suitable for use as service equipment only.



BCT Switchboard

### Connectors (Per phase and neutral)

Ampere Rating	Connectors Suitable for Cu or Al
400A	(1)–4/0–500 kcmil or (2)–250 kcmil
600A	(2)–4/0–500 kcmil
800A	(3)–250–500 kcmil
1000–1200A	(4)–250–500 kcmil

Catalog Number	List Price \$	Symmetrical Amps Interrupting Capacity			Ampere Rating	System Voltage		Dimensions (inches)			Available Configurations		
		240V	480V	600V				Height	Width	Depth	Top Feed Cold Seq.	Top Feed Hot Seq.	Bottom Feed Cold / Hot Seq.
BCT436JXD6	6805.00	65,000	35,000	25,000	400	120/240V	1-Phase, 3-Wire	70	32	13.75	✓	✓	✓
BCT436HJD6	10922.00	100,000	65,000	35,000		208Y/120V	3-Phase, 4-Wire				✓	✓	
BCT636LXD6	9720.00	65,000	35,000	25,000	600	240V	3-Phase, 3-Wire	70	32	13.75	✓	✓	✓
BCT636HLD6	12467.00	100,000	65,000	35,000		480Y/277V	3-Phase, 4-Wire				✓	✓	
BCT836MXD6	12752.00	65,000	50,000	25,000	800	480 or 600V	3-Phase, 3-Wire	70	32	13.75	✓	✓	✓
BCT836HMD6	17194.00	100,000	65,000	50,000							✓	✓	
BCT1036NXD6	15220.00	65,000	—	—	1000	208Y/120V	3-Phase, 4-Wire	90	32	13.75	✓	✓	✓
BCT1036HND6	20066.00	100,000	—	—							✓	✓	
BCT1236NXD6	20135.00	65,000	—	—	1200	240V	3-Phase, 3-Wire	90	32	13.75	✓	✓	✓
BCT1236HND6	25777.00	100,000	—	—							✓	✓	
PTE	1439.00	Potential Transformer Enclosure			—	—	—	20	20	10			

For inches / millimeters conversion, see conversion table in Application Data section.

☐ = Warehouse Stock

# Service Entrance Switchboards

## Fusible Switch — SCT Service Cubicle

**Selection**

### Service Entrance Fusible Switch

- Quick-Make — Quick-Break Fusible dead front switch.
- Interlocked door over fuses with provisions for padlocking switch.
- Door over current transformer section with latch arrangement for utility company seal.
- Current transformer provisions are adjustable for use with 12" or 14.5" primary bar type current transformer.
- Indoor construction for floor mounting only.
- Compact tamperproof enclosure with hinged door over current transformer compartment with latch for utility company sealing.
- Listed by Underwriters Laboratories' as suitable for use as service equipment only.



SCT Switchboard

### Connectors (Per phase and neutral)

Ampere Rating	Connectors Suitable for Cu or Al
400A	(1)–4/0–500 kcmil or (2)–250 kcmil
600A	(2)–4/0–500 kcmil
800A	(3)–250–500 kcmil
1000–1200A	(4)–250–500 kcmil

Ampere Rating	Fuse Clip	Symmetrical Amperes Interrupting Capacity
400–600	R	200,000
800–1200	L	100,000

Catalog Number		List Price \$	Ampere Rating	System Voltage		Dimensions (inches)		
Cold Sequence	Hot Sequence					Height	Width	Depth
SCT432	LSCT432	7314.00	400	120/240V	1-Phase, 3-Wire	90	32	20
SCT632	LSCT632	9161.00	600	208Y/120V 240V	3-Phase, 4-Wire 3-Phase, 3-Wire			
SCT436	LSCT436	8516.00	400	480Y/277V	3-Phase, 4-Wire			
SCT636	LSCT636	9755.00	600	480 or 600V	3-Phase, 3-Wire			
SCT836	LSCT836	14244.00	800	All	—			
SCT1236	LSCT1236	17695.00	1200	208Y/120V 240V	3-Phase, 4-Wire 3-Phase, 3-Wire			

For inches / millimeters conversion, see conversion table in Application Data section.

☐ = Warehouse Stock

# Switchboard Replacement and Modification Kits

## Replacement Data, Accessories, Modifications

Selection

### Connecting Strap Kits<sup>①</sup> — Circuit Breaker Discount Schedule SWBD

For use with Series 5 or 6 CDP Circuit Breaker Panelboards or FC20, FCI, FCII, CDP-6, VB-6, SB1, SB2, and SB3 Switchboards — includes copper straps, cover plates and necessary hardware for switchboards manufactured since 1974. Replacement strap kits for RCIII switchboards contact your local sales office.

Breaker Type	Strap Kit Catalog Number <sup>②</sup>	List Price \$	Height (inches)	Mounting
BL, BLH, HBL, BQD	SBLBD	902.00	3.75	D
NEB, HEB	SEBD	902.00	3.75	D
NGB	SNBD	902.00	3.75	D
ED2, ED4, ED6, HED4, HED6, HHED6	6E62	1074.00	3.75	D
CED6	6CLE2	1074.00	3.75	D
QJ2, QJH2, QH2-H	6QJ2	1942.00	5	D
FD6, FXD6, HFD6, HFXD6, HHFD6, HHFXD6	6F62	1942.00	5	D
CFD6	6CLF1	1973.00	5	S
JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6 Single Branch	6JJ61	2695.00	8.75	S
JXD2, JD6, JXD6, HJD6, HJXD6, HHJD6, HHJXD6 Double Branch	6JJ62	2983.00	8.75	D
CJD6	6CLJ1	2695.00	8.75	S
SJD6, SHJD6	6SJL1	2695.00	8.75	S
SCJD6	6SCJ1	2695.00	8.75	S
LD6, LXD6, HLD6, HLXD6	6LL61	3207.00	8.75	S
CLD6	6CLL1	3207.00	8.75	S
SLD6, SHLD6	6SLL1	3207.00	8.75	S
SCLD6	6SCL1	3207.00	8.75	S
LMD6, LMXD6, HLMD6, HLMXD6	6SLM1D	3240.00	8.75	S
MD6, MXD6, HMD6, HMXD6, CMD6	6SMND	3847.00	10	S
SMD6, SHMD6, SCMD6	6SSMND	4097.00	10	S
NM, HM, LM, (VL Breaker)	6MG1D	3317.00	8.75	S
ND6, NXD6, HND6, HNXD6, CND6	6SMND	3847.00	10	S
SND6, SHND6, SCND6	6SSMND	4097.00	10	S
NN, HN, LN, (VL Breaker)	6NG1D	3939.00	10	S

**Note:** D = Denotes double branch or twin mounting  
S = Denotes single mount

### Connecting Kits

For use with SMM and SMD metering switchboards.<sup>⑤⑥</sup>

Disconnect Device	Strap Kit Catalog Number	List Price \$
NGB	SMMNGMK	135.00
HEG	SMMHEMK	135.00
BQ, BQH, HBQ	SMMBQMK	135.00
QJ2, QJH2, QJ2-H	SMMQJMK	135.00
ED4, HED4	SMMEDMK	135.00
FD6, HFD6	SMMFDMK	135.00
CED6	SMMCCEMK	135.00
T-Fuse Pullout	SMMTFMK	135.00

For inches / millimeters conversion, see conversion table in Application Data section.

⑤ Consult sales office for availability.

⑥ Connecting strap kit includes front filler plate.

③ 10" plate accommodates 18 BQ or HBQ 1-pole breakers.

④ Kits consist of all necessary mounting hardware, less disconnect device and cable.

⑤ Siemens meter sockets used in SMM switchboards built after 1/91.

### Filler Plates — Discount Schedule SWBD

For use with Series 5 or 6 CDP Circuit Breaker Panelboards, FC-20, Class II, FCI, FCII, SB1, SB2, and SB3 Switchboards.

Breaker Frame	Filler Plate Catalog Number	List Price \$	Notes
BQ, BQH, HBQ, E2, E4, E6, HE4, HE6, E2-A, E4-A, E6-A, HE4-A or HE6-A and ED2, ED4, ED6, HED4, HED6	QF3	2.80	Per Pole

**Note:** When a front filler plate is not completely filled with breakers, the openings in the unused space must be closed with 1-pole filler plates from table.

### Connecting Strap Kits Vacu-Break<sup>①</sup> and HCP Discount Schedule SWBD

For use with VB-5, VB-6, FC-20, FC-I, FC-II, SB1, SB2 and SB3 Switchboards. Includes copper straps and necessary hardware for Switchboards manufactured since 1974.

Ampere Rating	Unit Height (inches)	Catalog Number	List Price \$
30-30	5, 7½	VB657	302.00
30-60	5, 7½		
60-60	5, 7½		
60-100	7½		
100-100	7½		
100	7½		
200	7½, 10	VB671	471.00
200-200	10	VB610	511.00
400-600	15	VB6150	211.00
800-1200 <sup>②</sup>	16½	F6162D	1366.00

### Blank Plates — Circuit Breaker and Vacu-Break<sup>①</sup> Discount Schedule SWBD

For use with Series 5 or 6 VB and CDP Panelboards, FC20, Class II, FCI, FCII, SB1, SB2, and SB3 Switchboards.

Height (inches)	Catalog Number	
	Series 6	List Price \$
1½	6FPB01	196.00
2½	6FPB02	224.00
3½	6FPB03	224.00
5	6FPB05	224.00
10	6FPB10	302.00

**Note:** Price breakers from circuit breaker section of this catalog.

### Replacement Meter Socket Kits<sup>⑤⑥</sup>

For use with SMM and SMD metering switchboards.

Type	Strap Kit Catalog Number	List Price \$
1-Phase	MSK2001	281.00
3-Phase	MSK2003	385.00

⑤ Siemens Type WMS263 Meter Sockets are rated 200A Continuous Duty.

⑥ Type HCP.

⑦ Special order component supplied by apparatus factory. Contact Sales for availability.

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All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness hereof is not guaranteed. Since conditions of use are outside our control, the user should determine the suitability of the product for its intended use and assumes all risk and liability whatsoever in connection herewith.

# Medium Voltage Equipment

## 5-15 kV GM-SG and 38 kV GM38 Metal-Clad Switchgear

General

### Overview

Siemens 5, 7, 15 and 38kV class medium voltage, one- or two-high vacuum circuit breaker switchgear is of the metal-clad type as covered by ANSI standard C37.20.2. All parts are completely enclosed within grounded metal barriers. Circuit breakers are the horizontal drawout type. Secondary control devices and primary circuits are isolated from each other by shutters or barriers. Primary circuits of different potential are also separated by barriers. All primary bus work and joints are completely encased with insulation material to suit the voltage class of the equipment.

Each vertical section may contain a main bus bar section and two compartments for auxiliary devices and / or circuit breakers, with primary and secondary disconnects, instrument transformers, instruments and relays, secondary wiring and other necessary components. The switchgear is designed so that additional vertical sections with circuit breakers and / or auxiliary compartments may be added in the future.

The space saving potential of the 5-15kV type GM-SG cubicle and GMSG circuit breaker designs allows up to two drawout elements to be furnished in a single vertical section. The units can be furnished with two 2000 ampere circuit breakers in one unit. For 3000 ampere self-cooled or 4000 ampere fan-cooled circuit breakers, one rollout auxiliary can be located in the lower cell, with the circuit breaker in the upper cell; or the cell can be left blank, with the circuit breaker located in the lower cell.

### Features

#### Floor Rollout

Circuit breakers in the lower cell can be rolled out directly on the floor in front of the unit, without a handling device, lift truck, or hoist for indoor and Shelter-Clad (walk-in) outdoor installations. A lift truck accessory is optionally available for handling circuit breakers in the upper cell of the 5-15kV GM-SG switchgear, or in non-walk-in outdoor enclosures, or for installations of switchgear on a raised "housekeeping" pad.

#### Closed Door Racking

The cell mounted racking mechanism may be operated with the cell door open or closed, through a small opening in the lower section of each door. For racking, a manual drive crank or an optional electric motor drive may be used.

#### Automatic Shutters

Automatically operated grounded steel shutters are included to allow or block access to the stationary primary disconnects. The shutters are designed to remain closed until they are forced open by insertion of the circuit breaker. This design maximizes protection for maintenance personnel, as compared to racking mechanism operated shutters, which could be opened with the circuit breaker out of the cell thereby exposing personnel to energized components.

#### White Interior Device Panels in Front Compartments Standard

#### 5 through 15kV Available in Two-High Design

#### 38kV Available in One-High Design Only

### Tested to ANSI Standards

Siemens switchgear is tested to meet the requirements of ANSI standards. A complete design test program including short circuit interruption, load current switching, continuous current, mechanical endurance, close and latch current, short time and momentary withstand, impulse withstand, and the other tests required by the standards has been successfully completed. Certified test data can be furnished to customers upon request. These tests encompass the complete equipment design, including both the switchgear structure and the circuit breaker removable element.

#### 4000A Rating (5-15kV)

Designs are available to 3000A self-cooled, and 4000A fan cooled.

#### 3000A Rating (38kV)

Designs are available to 2000A self-cooled and 3000A fan cooled.

#### UL listing

UL listings to ANSI C37.54/C37.55 standards is optionally available.

#### cUL Available

#### 50kA Interrupting Rating Available at up to 15kV

#### Siemens Relays, see Relaying section on page 13-25



For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Medium Voltage Equipment

## GM-SG Overview

General

Siemens GM-SG 5kV, 7.2kV and 15kV metal-clad power switchgear assemblies with horizontal drawout type GMSG vacuum circuit breakers take advantage of the latest developments in vacuum interrupter technology. Up to two circuit breakers can be stacked in a single vertical section, allowing significant space savings.

The equipment meets or exceeds the latest standards of ANSI, IEEE, and NEMA.

GM-SG switchgear is designed for use in industrial plants, commercial buildings, electric utility systems, cogeneration installations, and other electrical systems. It is commonly used for protection and switching of transformers, motors, generators, capacitors, buses, distribution feeder lines, and, in general, for protection of any medium voltage power circuit.

Siemens experience gained in over 80 years of supplying metal-clad switchgear in the U.S. has been captured in the GM-SG design. The objective has been to incorporate features designed to provide safety, while simplifying operation, maintenance, and minimizing installation cost.

The switchgear structure and the drawout vacuum circuit breaker are an integrated design, with dielectric, thermal, and interruption integrity built directly into the basic design, not added as an afterthought.

### Siemens 3AH3 Operating Mechanism

The GMSG circuit breaker uses the proven Siemens 3AH3 stored-energy operating mechanism. This operator is an evolution of the 3A family of operators first introduced in 1976. Over 60,000 3AH3 operating mechanisms have been produced since 1998.

### Faster Interruption

Standard interrupting time is 5-cycles with an option available for 3-cycle interrupting time.

### Siemens Vacuum Interrupters

The vacuum interrupters used in the GMSG circuit breaker are manufactured by Siemens and have been proven in thousands of installations since 1976. The chrome-copper contact design used in these interrupters assures low chopping levels, eliminating the need for surge protection on most circuits.

### Front Mounted Operating Mechanism

The simple GMSG operating mechanism makes maintenance and inspection easy. The mechanism is located on the front of the circuit breaker, rather than underneath.

### Maintenance Intervals

If applied under ANSI "usual service" conditions, maintenance of the circuit breaker mechanism is only needed at ten year intervals.

Maintenance of the switchgear cubicle is recommended at five year intervals, and primarily consists of cleaning insulation.

### Floor Rollout

No lift truck or dolly is needed to insert or remove circuit breakers in the lower cell of switchgear located at floor level. For indoor switchgear located on a raised "housekeeping" pad or for outdoor non-walk-in switchgear, a lift truck is required to handle circuit breakers.

### "Universal" Spare Breaker (up to 50kA)

The physical configuration and interlock logic allow the use of a single circuit breaker to serve as a "universal" spare breaker at an installation site for up to 50kA. The interlock logic checks the principal rating characteristics (continuous current, maximum voltage, and interrupting current), and allows a circuit breaker to be inserted in any circuit breaker cell, provided that the circuit breaker equals or exceeds the ratings required by the cell.

### Single Source Responsibility

Single source responsibility is assured since the complete equipment is designed by Siemens and is manufactured and tested in a single facility. The vacuum circuit breakers are checked in the switchgear cells as part of production testing, and shipped in the switchgear to assure interchangeability and reduce the possibility of damage to circuit breakers in shipment.

### Full ANSI Design Background

Full design integrity is assured. ANSI C37.09 and C37.20.2 require design tests on circuit breakers and structures together. The 3AH3 operator is produced in our global center of competence for circuit breakers in Berlin, and final assembly of both the drawout GMSG circuit breaker and the switchgear structures occurs in a single facility. Siemens controls the entire process, from design concept to production. Records are maintained to document compliance with ANSI standards.

### UL or C-UL Listing Available

Where the arrangement of components allows, UL or C-UL Listing is available.

### Quality Systems

Facilities involved with application, engineering, design and production are certified to ISO 9001 requirements.

13

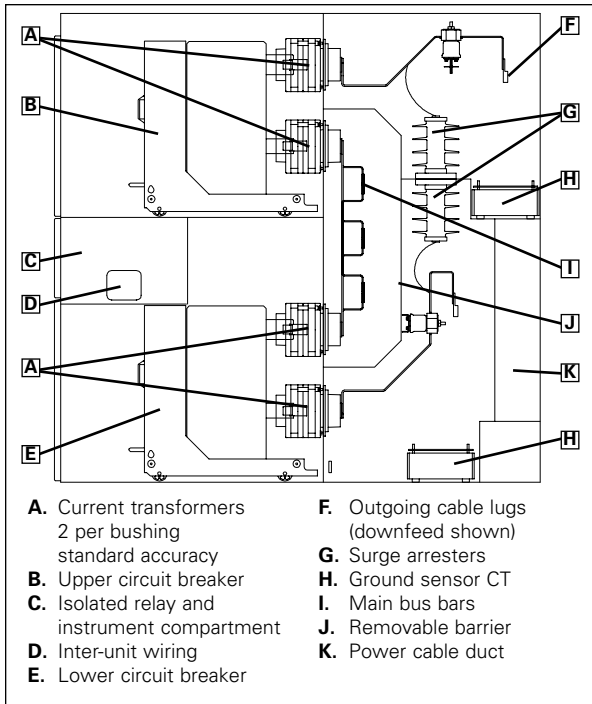
SWITCHGEAR

# Medium Voltage Equipment

## GM-SG Overview

General

Figure 1: GM-SG Switchgear 1200A or 2000A  
Circuit Breaker Section



### Structural Flexibility

Siemens GM-SG metal-clad switchgear provides enhanced flexibility in locating circuit breaker, auxiliary, and metering cells within the structure layout. Circuit breakers rated 1200A and 2000A may be located in upper or lower cell positions.

Bus sectionalizing (tie) circuit breaker cells may be located on the upper or lower levels and are ordinarily located next to an auxiliary cell on the same level to accommodate transition bus work.

3000A circuit breakers can be located either in the bottom cell or the top cell of a vertical section. If the 3000A circuit breaker is located in the lower cell, the upper cell can be used for metering devices only. If the 3000A circuit breaker is in the upper cell, the lower cell may be used to house a set of drawout voltage transformers, or a drawout control power transformer, or rollout fuses for a remote control power transformer.

The 3000A circuit breaker can be used for 4000A continuous current applications, with the addition of fan cooling equipment in the auxiliary cell above or below the circuit breaker. This application of fan cooling is well suited if loads above 3000A are infrequent, as for example, in the case of a fan-cooled rating on a power transformer.

Each vertical section contains the main bus bar compartment plus a rear compartment for incoming and outgoing connections. The front portion of the vertical section contains

a central secondary device compartment, located between two cells for auxiliary devices and / or circuit breakers, including primary and secondary disconnects, instrument transformers, instruments and relays, secondary wiring, and other components as necessary. The switchgear is normally designed so that additional vertical sections may be added in the future.

### Enclosure Design

The GM-SG design includes full ANSI/IEEE C37.20.2 Metal-Clad construction. This means complete enclosure of all live parts and separation of major portions of the circuit to retard the spread of faults to other compartments. Removable plates permit access to all compartments. The rear panels are individually removable to allow separate access either to downfeed or upfeed cable connections.

The structure is constructed of bolted steel for better dimensional control than with welded designs. Sheet steel interunit barriers extend the full height and depth of each vertical section for isolating adjacent sections. The ground bus extends the entire length of the complete switchgear lineup, and to all circuit breaker cells.

### Circuit Breaker Interchangeability

The GM-SG switchgear cubicle and the removable GMSG circuit breaker element are both built to master fixtures so circuit breakers of the same ratings are interchangeable with each other even if the circuit breaker is required for use with a cell with "provisions only" supplied years earlier. The GMSG circuit breaker is not interchangeable with the older designs.

A circuit breaker of higher rating (up to 50kA) can be used in a cell of equal or lower rating, i.e., a 3000A 50kA 15kV circuit breaker can be used in a 1200A 25kA 15kV circuit breaker cell.

### Tested to ANSI/IEEE Standards

Siemens GM-SG switchgear is tested to meet the requirements of ANSI/IEEE standards. A complete design test program, including short circuit interruption, load current switching, continuous current, mechanical endurance, close and latch current, short time and momentary withstand, impulse withstand, and the other tests required by the standards has been successfully completed. These tests encompass the complete equipment design, including both the switchgear structure and the circuit breaker removable element. Production tests in accordance with ANSI/IEEE standards are performed on every group of switchgear and on each circuit breaker. Certified copies of all test data can be furnished to customers upon request.

The switchgear is not classified as arc-resistant switchgear, and has not been tested for resistance to internal arcing per IEEE C37.20.7. Qualification to seismic requirements of various codes (e.g., IBC-2006, UBC, IEEE 693, etc.) is available. Consult Siemens with detailed requirements.

### UL or C-UL Listing Available

When specified, if the component configuration allows, the switchgear can be provided with the UL or C-UL (for use in Canada) listed label, indicating conformance to the requirements of ANSI C37.54 and ANSI C37.55.



# Medium Voltage Equipment

## GM-SG Vacuum Circuit Breakers

General

### Type GMSG Vacuum Circuit Breakers 5kV, 7.2kV and 15kV

Siemens Type GMSG circuit breakers are available in 25kA through 63kA\* interrupting classes, or 250MVA through 1000MVA on the older "constant MVA" rating basis. Continuous current ratings include 1200A, 2000A, and 3000A self-cooled. 4000A is available using a 3000A circuit breaker together with forced-air (fan) cooling in the switchgear cubicle.

\*Consult factory for availability of 63kA

#### Maintenance Features

The GMSG circuit breakers incorporate many features designed to reduce and simplify maintenance, including:

- Virtually maintenance-free vacuum interrupter
- Ten year maintenance interval
- Floor rollout
- Front mounted operator
- Common operator family
- Simple outer-phase barriers
- "Universal" spare circuit breaker concept
- Non-sliding current transfer
- Rugged secondary disconnects

#### Ten Year Maintenance Interval on GMSG Circuit Breaker

When applied under mild conditions (ANSI "usual service" conditions), maintenance is only needed at ten year intervals on the circuit breaker. The maintenance interval for the switchgear cubicles is five years.

#### Low Maintenance Requirements

The interrupter is a sealed unit, so the only maintenance necessary is to clean off any contaminants and to check the vacuum integrity. The vacuum interrupters can be disconnected from the stored energy mechanism quickly, without tools, and vacuum integrity inspected by hand; alternatively, a simple hi-pot test can be used.

#### Floor Rollout

When located in the lower cell, the circuit breakers are arranged to rollout directly on the floor in front of the switchgear if the switchgear is not located on a "housekeeping" pad. No adapter, hoist, or lift truck is necessary.

#### Mechanism Operation

The mechanism is arranged to pre-store closing energy in the closing springs. The closing springs are selected so that they provide sufficient energy not only to close the circuit breaker safely into maximum "close and latch" currents, but also to pre-store the tripping energy necessary to open the circuit breaker. The closing springs can be manually charged during maintenance or in emergency conditions, but are normally charged electrically automatically after each closing operation.

#### Interlocks

The racking system prevents racking of a closed circuit breaker, and keeps the circuit breaker trip-free during racking. The racking mechanism can be padlocked to prevent unauthorized operation. Padlocks can also be applied to the racking mechanism to maintain the circuit breaker in the trip-free condition.

#### Stored Energy Operator

The GMSG circuit breaker utilizes the Siemens 3AH3 stored energy operator for long life, high reliability, and ease of maintenance. Parts used in the manufacture of the circuit breaker are precision tooled or produced on numerically controlled equipment. The circuit breaker design includes frequent use of inherent alignment techniques.

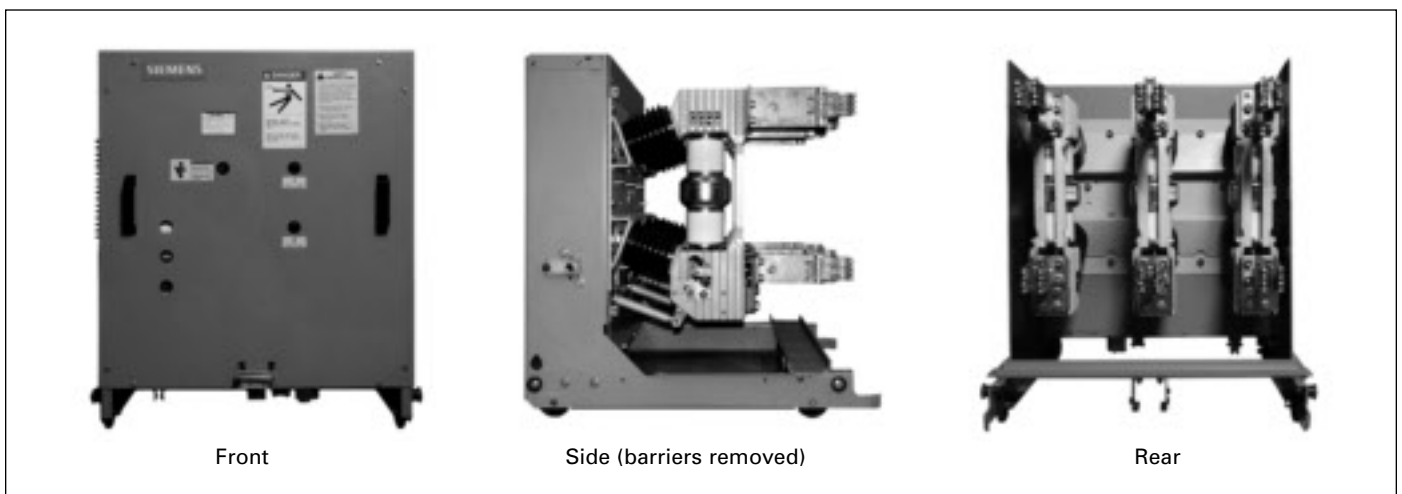


Figure 2: GMSG Circuit Breaker

# Medium Voltage Equipment

## GM-SG Ratings

Selection

**Table 1: Type GMSG Circuit Breaker Ratings (New “Constant kA” Ratings Basis)**

These ratings are in accordance with the following standards:

- ANSI/IEEE C37.04-1999 Standard Rating Structure for AC High-Voltage Circuit Breakers
- ANSI C37.06-2000 AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Preferred Ratings and Related Required Capabilities
- ANSI/IEEE C37.09-1999 Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
- ANSI/IEEE C37.010-1999 Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

Rated Values		Units	Circuit Breaker Type <sup>①</sup>							
			5-GMSG-40 xxxx-104	5-GMSG-50 xxxx-130	5-GMSG-63 <sup>②</sup> xxxx-164	7-GMSG-40 xxxx-104	15-GMSG-25 xxxx-65	15-GMSG-40 xxxx-104	15-GMSG-50 xxxx-130	15-GMSG-63 <sup>②</sup> xxxx-164
Maximum Design Voltage (V) <sup>③</sup>		kV rms	4.76	4.76	4.76	8.25	15.0	15.0	15.0	15.0
Voltage Range Factor (K) <sup>④</sup>		—	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Withstand Voltage Levels	Power Frequency	kV rms	19	19	19	36	36	36	36	36
	Lightning Impulse (BIL)	kV crest	60	60	60	95	95	95	95	95
Continuous <sup>⑤</sup>		A rms	1200 2000 3000 4000FC	1200 2000 3000 4000FC	1200 2000 3000 4000FC	1200 2000 3000 4000FC	1200 2000	1200 2000 3000 4000FC	1200 2000 3000 4000FC	1200 2000 3000 4000FC
Short-Circuit (I) <sup>⑥⑦</sup>		kA rms sym	40	50	63	40	25	40	50	63
Interrupting Time <sup>⑧</sup>		ms cycles	83 5	83 5	83 5	83 5	83 5	83 5	83 5	83 5
Permissible Tripping Delay (Y)		Sec	2	2	2	2	2	2	2	2
Max. Sym. Interrupting (I)		kA rms sym	40	50	63	40	25	40	50	63
% dc Component		%	47	47	47	47	47	47	47	47
Short-Time Current (I) (3 seconds)		kA rms	40	50	63	40	25	40	50	63
Closing & Latching (Momentary) Asymmetrical (1.55 x I)		kA rms	62	78	98	62	39	62	78	98
Closing & Latching (Momentary) Peak (2.6 x I)		kA peak	104	130	164	104	65	104	130	164

① “xxxx” in type designation refers to the continuous current rating 1200, 2000, or 3000A, as appropriate. The 4000A fan-cooled rating is achieved using a 3000A circuit breaker, in combination with fan cooling as indicated in footnote 4.

② Maximum design voltage for which the circuit breaker is designed, and the upper limit for operation.

③ K is listed for informational purposes only. For circuit breakers rated on a “constant kA basis”, the voltage range factor is 1.0.

④ 4000FC indicates that fan cooling is included in the switchgear structure for this rating. 4000A rating is not available in outdoor equipment.

⑤ All values apply to polyphase and line-to-line faults.

⑥ Standard duty cycle is 0 - 0.3s - CO - 3 min. - CO.

⑦ Standard rated interrupting time is 5 cycles (83ms). Optional rated interrupting time of 3 cycles (50ms) is available.

⑧ Consult factory for availability.

# Medium Voltage Equipment

## GM-SG Ratings

Selection

Table 2: Type GMSG Circuit Breaker Control Data<sup>④</sup>

Nominal	Control Voltages, ANSI C37.06		Close Coil	Trip Coil	Spring Charging Motor	
	Range				Amperes	Charging
	Close	Trip	Amperes <sup>①</sup>	Amperes <sup>①③</sup>	Run (Avg.) <sup>①</sup>	Seconds
24 VDC	19 - 28	14 - 28	5.8	17 / —	—	—
48 VDC	36 - 56	28 - 56	2.9	11.4 / 30	8	10
125 VDC	100 - 140	70 - 140	1.0	4.8 / 7.4	4	10
250 VDC	200 - 280	140 - 280	0.5	2.1 / 4.2	2	10
120 VAC	104 - 127	104 - 127	0.9	— <sup>②</sup>	6	10
240 VAC	208 - 254	208 - 254	0.4	— <sup>②</sup>	3	10

① Current at nominal voltage.

② Capacitor trip.

③ Value preceding slash (/) is the current for the standard trip coil with standard rating interrupting time. Value following (/) is current for optional trip coil with 3-cycle interrupting time.

④ — means this selection not available in this voltage.

Table 3: Interrupting Capacity Auxiliary Switch Contacts<sup>②</sup>

Type Switch	Continuous Current Amperes	Control Circuit Voltage				
		120 AC	240 AC	48 DC	125 DC	250 DC
Circuit Breaker	10	10	5	10 / 30 <sup>①</sup>	5	3
TOC	15	15	10	0.5	0.5	0.2
MOC	20	15	10	10	10	5

① 2 contacts in series.

② All switch contacts are non-convertible.

Table 4: Voltage Transformers

Voltage Class	Ratio	Accuracy Class at 120V Sec.			VA Thermal Rating
		X, Y, Z	Z	ZZ	
5kV	2400 / 120	0.3	1.2	—	500
5kV	4200 / 120	0.3	1.2	—	500
5kV	4800 / 120	0.3	1.2	—	500
15kV	7200 / 120	0.3	0.3	1.2	1000
15kV	8400 / 120	0.3	0.3	1.2	1000
15kV	12000 / 120	0.3	0.3	1.2	1000
15kV	14400 / 120	0.3	0.3	1.2	1000

Table 5: Current Transformers<sup>①</sup>

Ratio	60Hz Metering Accuracy at Burden				Relay Class
	B0.1	B0.5	B1.0	B2.0	
<b>Type MD Torroidal Standard Accuracy</b>					
100:5	2.4 <sup>②</sup>	—	—	—	C 15
150:5	0.6	2.4	—	—	C 20
200:5	0.6	1.2	—	—	C 25
250:5	0.6	1.2	2.4	—	C 35
300:5	0.6	0.6	1.2	2.4	C 40
400:5	0.3	0.6	1.2	2.4	C 60
500:5	0.3	0.3	0.6	1.2	C 75
600:5 <sup>③</sup>	0.3	0.3	0.6	1.2	C100
800:5	0.3	0.3	0.6	0.6	C130
1000:5	0.3	0.3	0.3	0.3	C170
1200:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C200
1500:5	0.3	0.3	0.3	0.3	C200
2000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C210
2500:5	0.3	0.3	0.3	0.3	C300
3000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C240
4000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C230
<b>Type MDD Torroidal Special Accuracy</b>					
75:5	2.4 <sup>②</sup>	4.8	—	—	C 20
100:5	1.2	2.4	—	—	C 30
150:5	0.6	1.2	2.4	4.8	C 40
200:5	0.6	1.2	1.2	2.4	C 60
250:5	0.3	0.6	1.2	2.4	C 80
300:5	0.3	0.6	0.6	1.2	C100
400:5	0.3	0.3	0.6	0.6	C130
500:5	0.3	0.3	0.3	0.6	C160
600:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C210
800:5	0.3	0.3	0.3	0.3	C270
1000:5	0.3	0.3	0.3	0.3	C340
1200:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C425
1500:5	0.3	0.3	0.3	0.3	C510
2000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C460
2500:5	0.3	0.3	0.3	0.3	C580
3000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C660
4000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C460

① 1-second through-current and momentary current are equal to the ratings of the associated circuit breakers.

② Exceeds ANSI C37.20.2 Accuracy Limit.

③ Multi-ratio current transformers available. The accuracy ratings shown apply only to the full secondary winding.

# Medium Voltage Equipment

## GM-SG

## Dimensions

**Table 6: Cubicle Dimensions Per Vertical Section**<sup>①②③</sup>

Type	Dimensions in Inches (mm)				Weight in lbs. (kg)
	Height	Width	Depth	Drawout Aisle	
Indoor GM-SG	95.25 (2419)	36.0 (914)	98.5 (2502) <sup>⑦</sup>	72.0 (1829) recommended <sup>⑤</sup>	3300 (1497)
Shelter-Clad Single-Aisle SGM-SG	114.75 (2915)	36.0 (914) <sup>④</sup>	173.5 (4407) <sup>③</sup>	72.0 (1829) included	5000 (2268)
Shelter-Clad Common Aisle SGM-SG	114.75 (2915)	36.0 (914) <sup>④</sup>	269.0 (6833) <sup>⑥</sup>	72.0 (1829) included	8900 (4037)
Aisle-Less Non-Walk-In OGM-SG	113.62 (2886)	36.0 (914) <sup>④</sup>	101.9 (2588) <sup>⑤</sup>	72.0 (1829) recommended <sup>⑤</sup>	3950 (1792)

**Table 7: GMSG Vacuum Circuit Breaker Weight in lbs. (kg)**<sup>②③</sup>

Continuous Current (A)	Circuit Breaker Type							
	5-GMSG-40 5-GMSG-250	5-GMSG-50 5-GMSG-350	5-GMSG-63	7-GMSG-40 7-GMSG-500	15-GMSG-25 15-GMSG-500	15-GMSG-40 15-GMSG-750	15-GMSG-50 15-GMSG-1000	15-GMSG-63
1200	440 (200)	455 (206)	809 (368)	455 (206)	430 (195)	445 (202)	460 (209)	819 (372)
2000	650 (295)	665 (302)	819 (372)	665 (302)	640 (290)	670 (304)	675 (306)	829 (377)
3000	665 (302)	670 (304)	824 (375)	675 (306)	—	675 (306)	680 (308)	834 (379)

① Weight does not include circuit breakers, add separately from table 7.

② Weight estimates are for circuit breaker only. Add 75 lbs (34 kg) if shipped separately packaged.

③ Weight and dimensions are approximate.

④ Add 6" (152 mm) to each end of lineup for aisle extension 12" (304 mm) total.

⑤ 72" (1829 mm) aisle space recommended allows room for interchange of circuit breakers. Minimum aisle space required for handling circuit breaker with lift truck is 65" (1651 mm). Minimum aisle space required if all circuit breakers are at floor level is 54" (1372 mm).

⑥ Add for roof overhang.

	Non-Walk-In	Shelter-Clad
Rear (cable side)	3.62" (92 mm)	3.62" (92 mm)
Front (drawout side)	5.37" (136 mm)	1.5" (38 mm)

⑦ If indoor switchgear is installed on a raised "housekeeping" pad, the pad must not extend further than 3" (75 mm) from the front of the switchgear to avoid interference with the use of the portable lift truck.

⑧ Approximate circuit breaker dimensions in inches (mm) (W X D X H):

Net	32" (813 mm) X 39" (991 mm) X 36" (914 mm)
If packed for shipment separate from switchgear:	42" (1067 mm) X 47" (1194 mm) X 43" (1092 mm)



# Medium Voltage Equipment

## GM-SG Stacking Versatility

## Dimensions

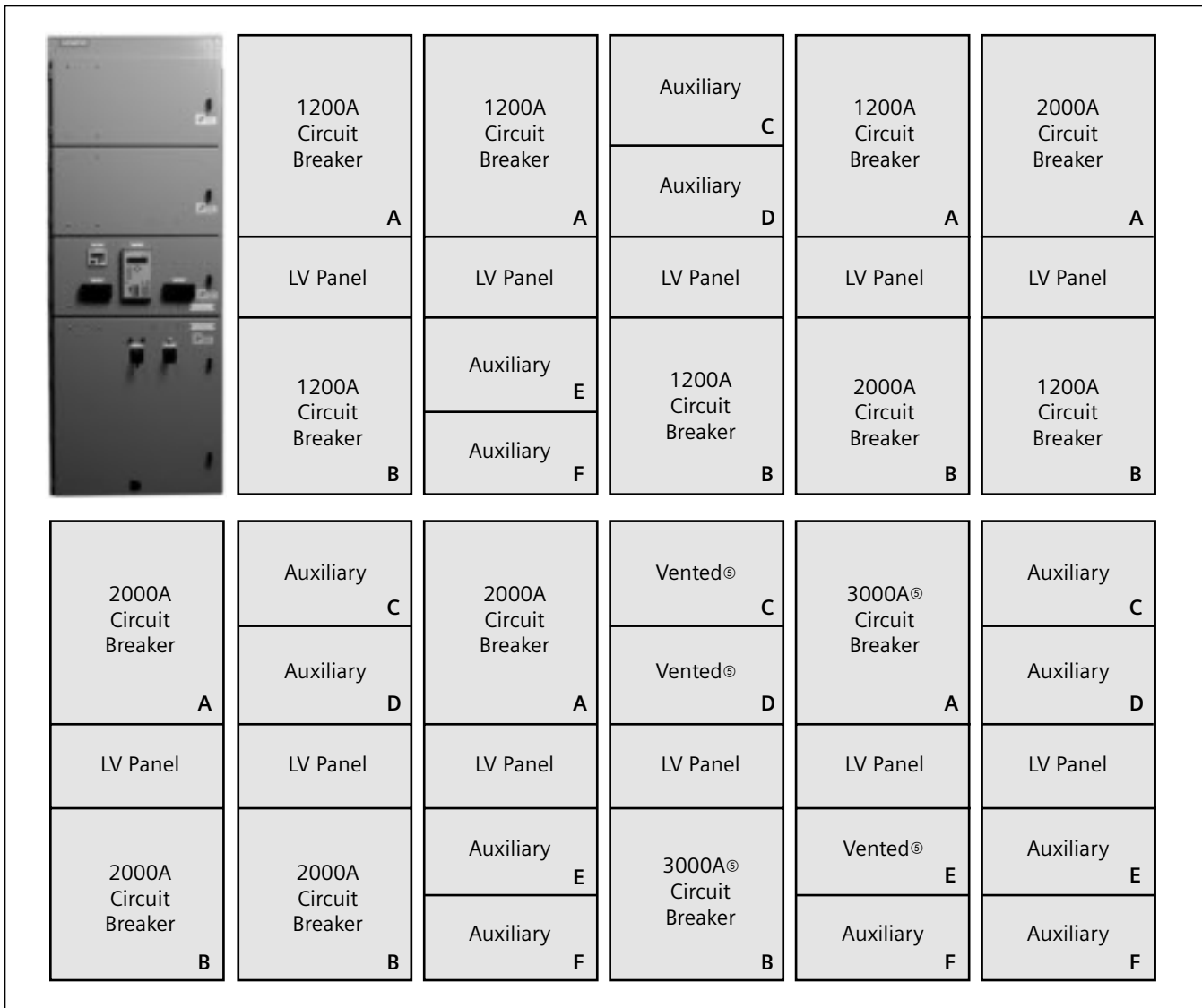


Figure 3: GM-SG Stacking Versatility

- ① Main bus sizes 1200A, 2000A, 3000A or 4000A (self-cooled).
- ② No rollout auxiliaries allowed in upper cell (C or D) if lower cell (B) has 3000A circuit breaker. If 3000A circuit breaker is located in upper cell (A), one rollout auxiliary may be located in lower cell F.
- ③ Auxiliary cells (C, D, E, or F) may each contain 1 rollout (except as indicated in notes 2 and 5).
- ④ Fuse rollout for stationary control power transformer must be located in lower rollout cell F, if CPT is located in rear or is remote. If CPT is located in lower auxiliary cell (E and F), fuse rollout is located in upper auxiliary cell.

- ⑤ For fan cooled 4000A rating, circuit breaker (3000A self-cooled, 4000A fan-cooled) may be located in upper cell (A) with fan cooling in cell E, or may be located in lower cell (B) with fan cooling in cells C and D.
- ⑥ Stacking arrangements are available as shown. Total circuit breaker loading in a vertical unit may not exceed main bus rating. Consult Siemens for specific application assistance regarding total load limits in each unit, or refer to ANSI/IEEE C37.20.2.

# Medium Voltage Equipment

## GM-SG Accessories

*General*

### Standard Accessories Include:

- Manual racking crank
- Spring charging crank
- Drawout extension rails (facilitate handling of circuit breakers in upper cell)
- Lifting sling (for circuit breakers above floor level)
- Split plug jumper (standard unless test cabinet is furnished)
- Contact lubricant
- Touch up paint

### Optional Accessories Include:

- Circuit breaker lift device
- Test cabinet (in place of split plug jumper)
- Test plugs (if required by devices)
- Electric racking motor assembly (to enable racking while operator is at a distance from the switchgear)
- Manual or electrical ground and test device

Test provisions, either a split plug jumper or a test cabinet, are available for testing the circuit breaker outside its cubicle.

The split plug jumper is used to bridge the secondary disconnects with a flexible cable, so the circuit breaker may be electrically closed and tripped with the control switch on the instrument panel while the circuit breaker is outside of its compartment. The test cabinet, including a control switch is used for closing and tripping the circuit breaker at a location remote from the switchgear.

### Manual Ground and Test Device

This is a drawout element that can be inserted into a circuit breaker cell. It opens the shutters, connects to the cell primary disconnecting contacts, and so provides a means to make the primary disconnect stabs available for testing. It is suitable for high potential testing of outgoing circuits of the switchgear main bus, or for phase sequence checking. It also provides a means to connect temporary grounds to de-energized circuits for maintenance purposes.

The manual ground and test incorporates three-position single-pole switches (upper stabs to ground, neutral, and lower stabs to ground), eliminating the need for user-furnished ground cables. The switches are hook-stick operable and are rated for the full momentary and short-time ratings of the associated switchgear. User-furnished grounding cables and commercially available ground clamps seldom have ratings equal to those of the switchgear.

### Electrical Ground and Test Device

An electrical ground and test device includes a power operated switch (derived from a GMSG circuit breaker) arranged to allow grounding one set of disconnect stabs. Two devices, one each for the upper and lower stabs, are required if grounding is desired to either side of the unit. The device also provides a means of access to the primary circuits for high potential tests or for phase sequence checking. These devices are able to close and latch against short circuit currents corresponding to the ratings of the equipment. Due to the unique requirements frequently involved in such devices, all applications of electrically operated ground and test devices should be referred to Siemens for review.

**Note:** Due to the special nature of ground and test devices, each user must develop definitive operating procedures for incorporating safe operating practices. Only qualified personnel should be allowed to use ground and test devices.



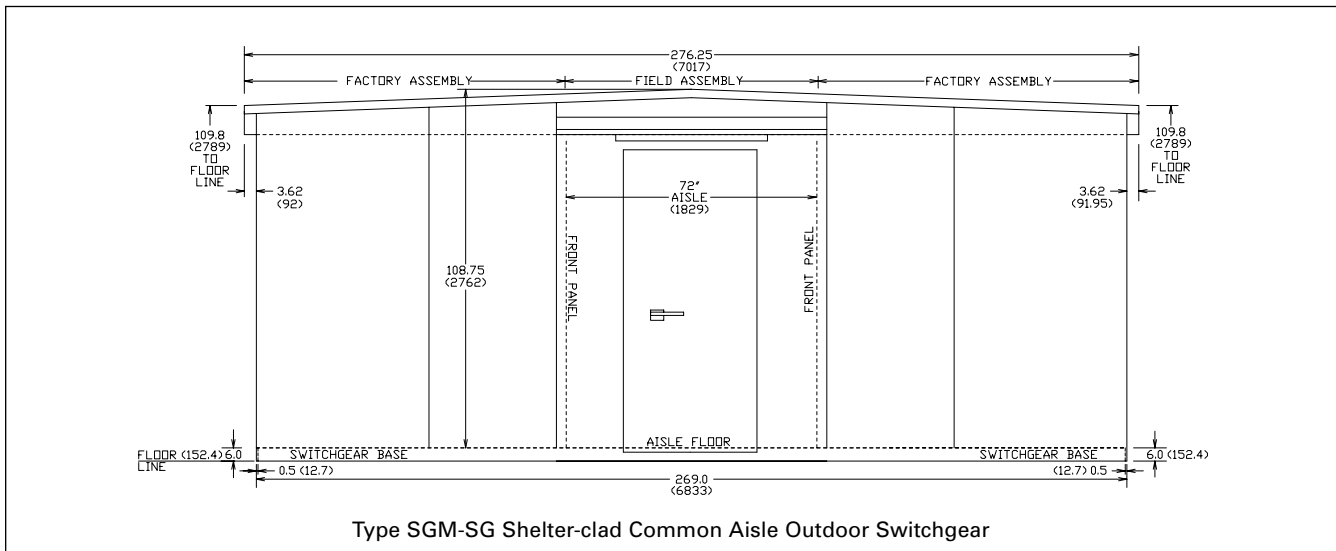
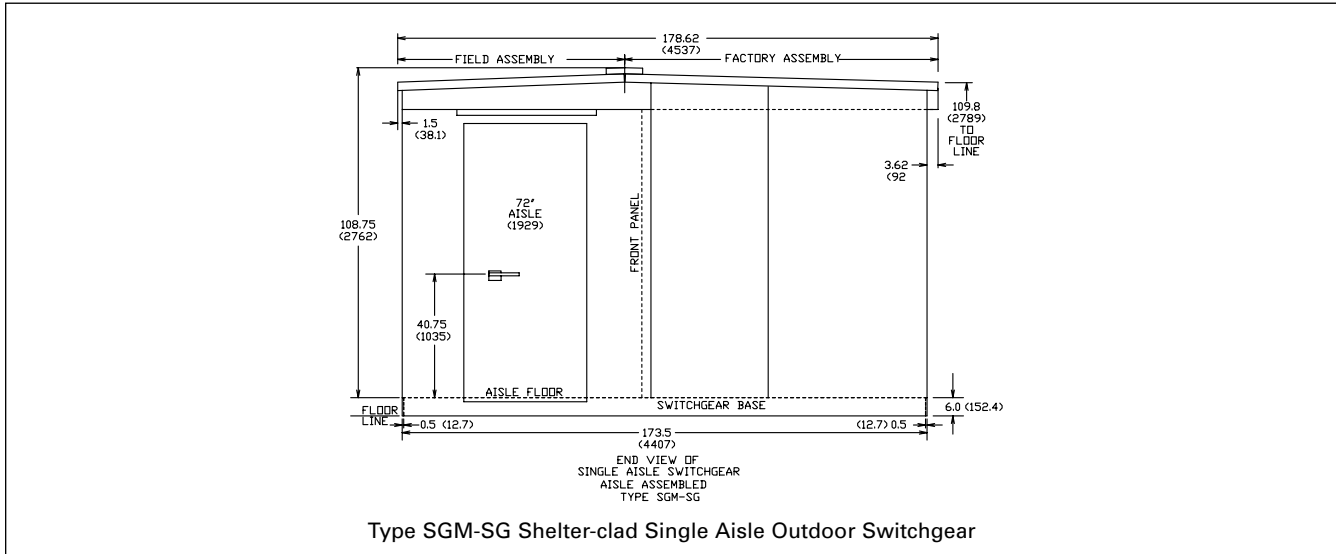
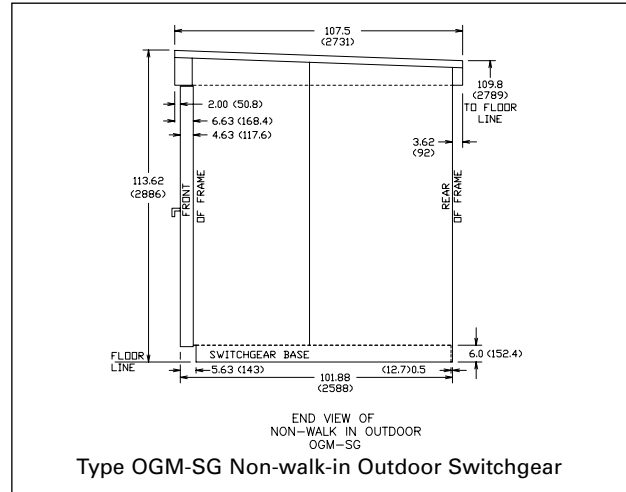
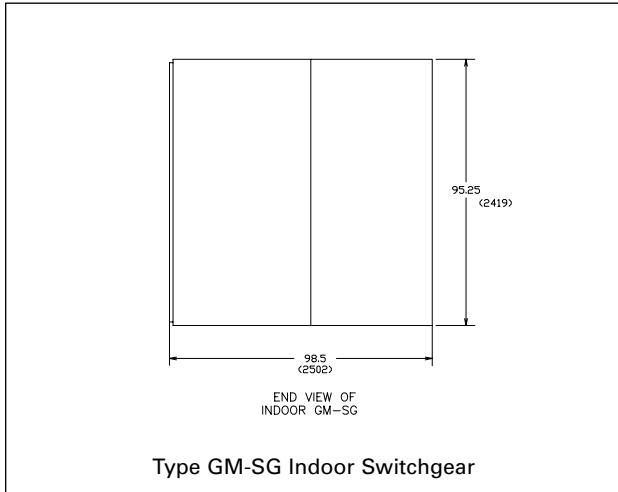
Figure 4: Accessory Cabinet

# Medium Voltage Equipment

## GM-SG

## Dimensions

Figure 5: Switchgear End Views



# Medium Voltage Equipment

## 38 kV GM38 Metal-Clad Switchgear



- Highly reliable vacuum interrupters – MTTF over 42,500 years
- Up to 50 full-fault interruptions
- Meets or exceeds the latest ANSI, IEEE and NEMA standards
- Universal spare circuit breaker
- Interlock permits insertion of higher rating vacuum circuit breaker into lower rated cell but not vice-versa
- Front accessible circuit breaker operating mechanism for ease of maintenance
- Closed door racking
- Floor rollout circuit breaker in lower cell without a dolly

### Drawout Indoor Switchgear

- Horizontal drawout type 38-3AH vacuum circuit breaker
- Uses the latest developments in vacuum interrupter technology

### Ratings

**Table 8 Type 38-3AH Circuit Breaker Ratings**

Measured Parameter				Circuit Breaker Type				
				38-3AH-1500 <sup>①</sup>	38-3AH-31 <sup>①</sup>	38-3AH-40 <sup>①</sup>		
General	Nominal Voltage Class		kV	38.0	38.0	38.0		
	Nominal 3-Phase MVA Class <sup>②</sup>		MVA	1500	—	—		
Rated Values	Rated Voltage	Max	E kV RMS	38.0	38.0	38.0		
		Voltage Range Factor	K	1.65	1.0	1.0		
Rated Levels	Insulation	Rated Withstand Test Voltage	Low Frequency	kV RMS	80	80	80	
			Impulse	kV Crest	150	150	150	
Rated Current	Rated Current	Continuous <sup>④</sup>	Amperes	1200 2000 3000FC	1200 2000 3000FC	1200 2000 3000FC		
			Short circuit (at rated max. kV) <sup>⑤⑥</sup>	I kA RMS	21	31.5	40	
			Interrupting Time	Cycles	5	5	5	
			Permissible Tripping Delay Y	Sec.	2	2	2	
Related Required Capabilities	Current	Rated Max. Voltage Divided by K	E/K kV RMS	23	38	38		
			Max. Sym. Interrupting <sup>⑦</sup>	K Times Rated Short Circuit Current KI	kA RMS	35	31.5	40
					kA RMS	35	31.5	40
			Closing and Latching (Momentary) <sup>⑧</sup>		kA RMS	56	50	62
kA Crest	95	85			104			

<sup>①</sup> Type 38-3AH-1500 ratings are in accord with ANSI C37.06-1987. Type 38-3AH-31 and 38-3AH-40 ratings conform to C37.06-2000 ratings.

<sup>②</sup> Maximum voltage for which the circuit breaker is designed and the upper limit for operation.

<sup>③</sup> K is the ratio of rated maximum voltage to the lower limit of the range of operating voltage in which the required symmetrical and asymmetrical interrupting capabilities vary in inverse proportion to the operating voltage.

<sup>④</sup> 3000 ampere ratings are achieved using forced air cooling in the switchgear cubicle.

<sup>⑤</sup> To obtain the required symmetrical interrupting capability of a circuit breaker at an operating voltage between 1/K times rated maximum voltage and rated maximum voltage, the following formula shall be used.

$$\text{Required Symmetrical Interrupting Capacity} = \text{Rated Short Circuit Current} \times \frac{\text{Rated Maximum Voltage}}{\text{Operating Voltage}}$$

For operating voltages below 1/K times rated maximum voltage, the required symmetrical interrupting capability of the circuit breaker shall be equal to K times rated short circuit current.

<sup>⑥</sup> With the limitations stated in 5.10 of ANSI Standard C37.04-1979, all values apply for polyphase and line-to-line faults.

For single phase-to-ground faults, the specific conditions stated in 5.10.2.3 of ANSI Standard C37.04-1979 apply.

<sup>⑦</sup> Current values in this row are not to be exceeded even for voltages below 1/K times rated maximum voltage.

For voltages between rated maximum voltage and 1/K times rated maximum voltage, follow 5 above.

<sup>⑧</sup> Current values in this row are independent of operating voltage up to and including rated maximum voltage.

<sup>⑨</sup> Included for reference only—not listed in ANSI C37.06.

**Table 9 Type 38-3AH Circuit Breaker Control Data**

Control Voltages, ANSI C37.06 Table 10			Coil Amperes <sup>①</sup>		Spring Charging Motor		
Nominal	Range		Close	Trip	Amperes		Charging Seconds
	Close	Trip			Run (Avg.)	Inrush (Peak)	
48 VDC	38–56	28–56	2.1	20	8	25	10
125 VDC	100–140	70–140	1.0	5.4	4	18	10
250 VDC	200–280	140–280	0.5	2.1	2	10	10
120 VAC	104–127	—	0.9	—	6	—	10
240 VAC	208–254	—	0.4	—	3	—	10

<sup>①</sup> Current at nominal voltage.

## General/Specifications

- Visible secondary disconnect
- One high construction
- Pair with Siemens relays to match any application

**Table 10 Interrupting Capacity Auxiliary Switch Contacts**

Type Switch	Cont. Current Amperes	Circuit Interrupting Capacity in Amperes				
		Control Circuit Voltage				
		120 AC	240 AC	48 DC	125 DC	250 DC
<b>Non-inductive</b>						
Breaker	10	10	5	10	9.6	4.8
TOC	15	15	10	0.5	0.5	0.2
MOC	20	15	10	10	10	5
<b>Inductive</b>						
Breaker	10	6	3	10	6	3
TOC	15	15	10	0.5	0.5	0.2
MOC	20	15	10	10	10	5

**Table 11 Current Transformers<sup>①</sup>**

Ratio	60 Hz Metering Accuracy at Burden				Relay Class
	B0.1	B0.5	B1.0	B2.0	
<b>Type MD38 Toroidal Standard Accuracy</b>					
100:5	2.4 <sup>②</sup>	—	—	—	C 10
150:5	0.6	2.4	—	—	C 20
200:5	0.6	1.2	—	—	C 25
250:5	0.6	1.2	2.4	—	C 35
300:5	0.6	1.2	1.2	2.4	C 40
400:5	0.3	0.6	1.2	1.2	C 60
500:5	0.3	0.3	0.6	1.2	C 75
600:5 <sup>③</sup>	0.3	0.3	0.6	1.2	C100
800:5	0.3	0.3	0.6	0.6	C130
1000:5	0.3	0.3	0.3	0.3	C170
1200:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C200
1500:5	0.3	0.3	0.3	0.3	C180
2000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C210
2500:5	0.3	0.3	0.3	0.3	C300
3000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C300
<b>Type MDD38 High Accuracy</b>					
75:5	2.4 <sup>②</sup>	4.8	—	—	C 15
100:5	2.4 <sup>②</sup>	4.8	—	—	C 20
150:5	1.2	2.4	4.8	4.8	C 35
200:5	0.6	1.2	2.4	4.8	C 50
250:5	0.6	1.2	1.2	2.4	C 70
300:5	0.3	0.6	1.2	2.4	C 90
400:5	0.3	0.6	0.6	1.2	C120
500:5	0.3	0.3	0.6	0.6	C150
600:5 <sup>③</sup>	0.3	0.3	0.6	0.6	C200
800:5	0.3	0.3	0.3	0.3	C250
1000:5	0.3	0.3	0.3	0.3	C300
1200:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C400
1500:5	0.3	0.3	0.3	0.3	C440
2000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C450
2500:5	0.3	0.3	0.3	0.3	C550
3000:5 <sup>③</sup>	0.3	0.3	0.3	0.3	C700

<sup>①</sup> 1-second through-current and momentary current are equal to the ratings of the associated circuit breakers.

<sup>②</sup> Exceeds ANSI C37.20.2 Accuracy Limit.

<sup>③</sup> Multi-ratio current transformers available. The accuracy ratings shown apply only to the full secondary winding.

**Table 12 Voltage Transformers**

Volt. Class	Ratio	Accuracy Class at 120V		VA Thermal Rating (55°C Amb)
		W,X,Y,Z	ZZ	
38kV 1 Bushing	20125:115	0.3	1.2	1000
38kV 2 Bushing	24000:120 27600:115 34500:115	0.3	1.2	1000



# Medium Voltage Equipment

## 38 kV GM38 Metal-Clad Switchgear

## Dimensions

### Enclosure Dimensions

**Table 13 Cubicle Dimensions-Per Vertical Section**

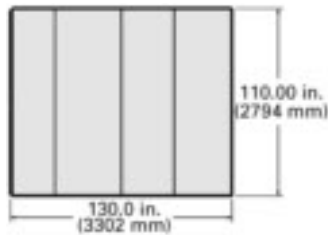
Type	Weight in lbs. (kg)	Dimensions in inches (mm)			
		Width	Depth	Drawout Aisle	
Indoor	GM38	5000 (2273)	48 (1219)	110 (2794)	96 (2438) Recommended
Shelter-Clad Single-Aisle	SGM38	6400 (2909)	48 (1219)ⓐ	132.5 (3366)	96 (2438) Included
Shelter-Clad Common-Aisle	SGM38	11700 (5318)	48 (1219)ⓐ	132.5 (3366)	96 (2438) Included
Aisle-Less Non-Walk-In	OGM38	5800 (2636)	48 (1219)	130.5 (3315)	96 (2438) Recommended

ⓐ Add 6 in. (152 mm) to each end of lineup for aisle extension, 12 in. (305 mm) total.

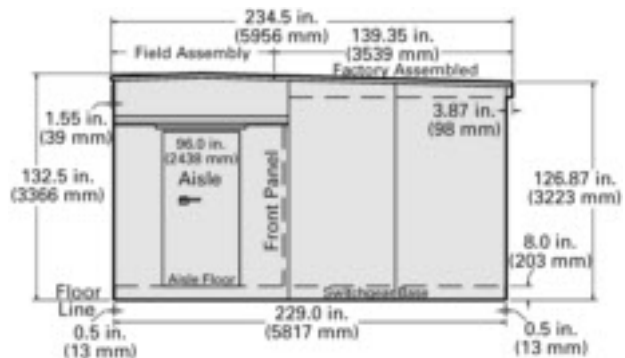
	Add for roof overhang	Non-Walk-in	Shelter-Clad
	Rear (Cable Side)	3.875 in. (98 mm)	3.875 in. (98 mm)
	Front	6.875 in. (175 mm)	1.5 in. (38 mm)

**Table 14 38-3AH Circuit Breaker Weights in lbs. (kg)**

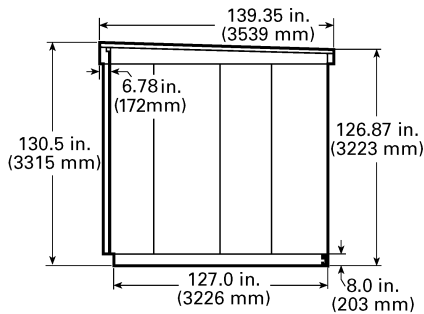
Cont. Current Amps	Circuit Breaker Type		
	38-3AH-1500	38-3AH-31	38-3AH-40
1200	800 (364)	800 (364)	850 (387)
2000	900 (409)	900 (409)	950 (432)
3000	1000 (455)	1000 (455)	1050 (478)



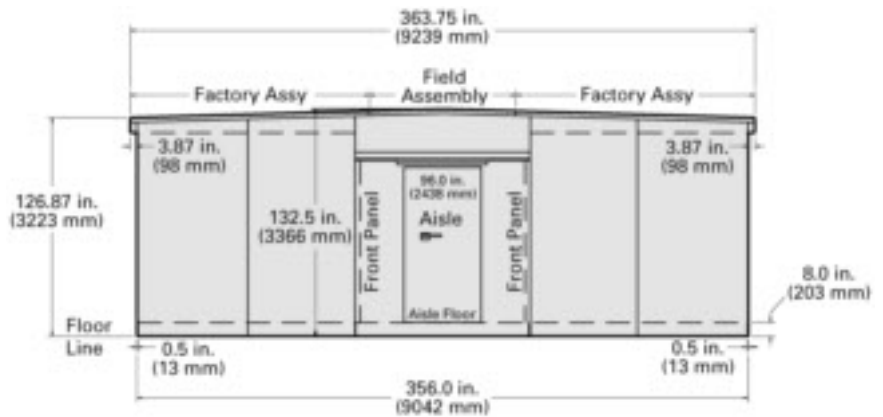
**End View of Indoor Switchgear**  
Type GM38



**End View of Single Aisle Switchgear**  
Type SGM38



**End View of Aisle-Less Outdoor Switchgear**  
(Non Walk-In) Type OGM38



**End View of Common Aisle Switchgear**  
Type SGM38

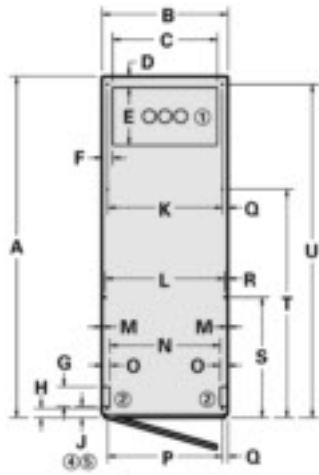
For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Medium Voltage Equipment

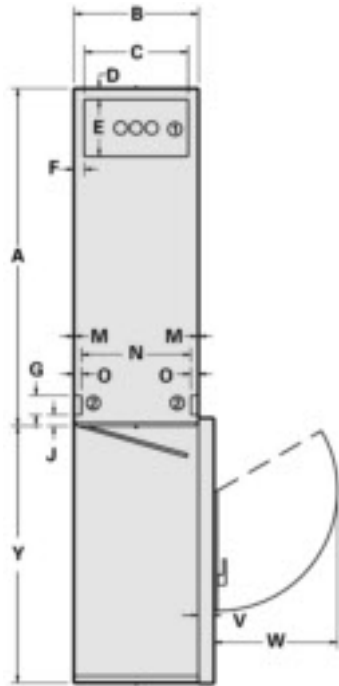
## 38 kV GM38 Metal-Clad Switchgear

Dimensions

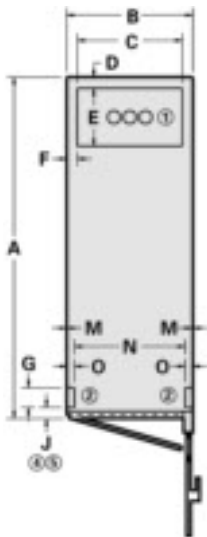
Floor Plans



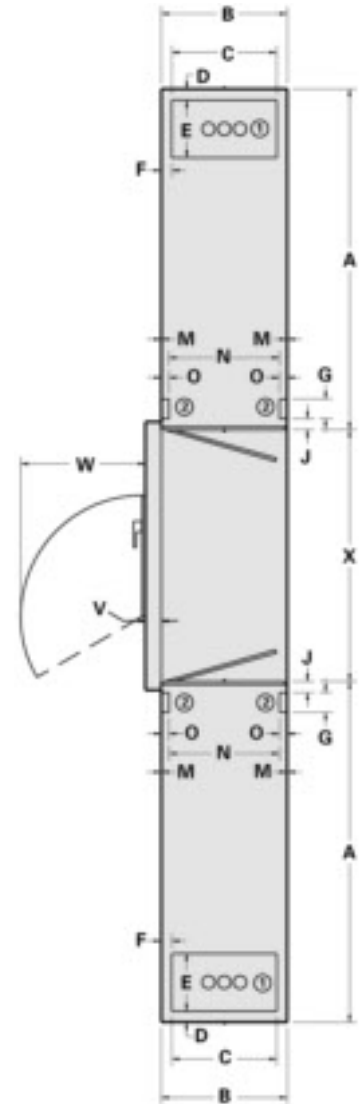
Indoor GM38 Switchgear



Outdoor SGM38 Shelter-Clad Walk-In Single Aisle Switchgear



Outdoor OGM38 Non Walk-in Switchgear



Outdoor SGM38 Shelter-Clad Walk-In Common-Aisle Switchgear

- ① Recommended location of conduits for power cables, top or bottom.
- ② Recommended location of secondary leads, top or bottom.
- ③ Customer conduit not to extend more than 1 in. (25 mm) above floor line.
- ④ Allow 6 in. (152 mm) clearance for lift truck on each end.
- ⑤ Floor must be level 80 in. (2032 mm) in front of switchgear to allow proper operation of lift truck.

Table 15 38kV Switchgear Floor Plan Detail  
Dimensions in inches (mm)

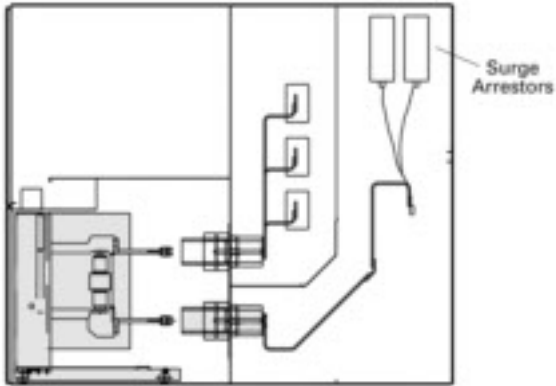
A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
130.0 (3302)	48.0 (1219)	40.0 (1016)	42.5 (1080)	22.0 (559)	4.0 (102)	7.5 (191)	3.5 (89)	4.25 (108)	43.75 (1111)	45.88 (1165)	0.12 (3)	43.12 (1095)	2.82 (72)	43.75 (1111)	2.13 (54)	1.16 (29)	45.84 (1164)	87.06 (2211)	126.91 (3224)	6.0 (152)	47.5 (1207)	96.0 (2438)

# Medium Voltage Equipment

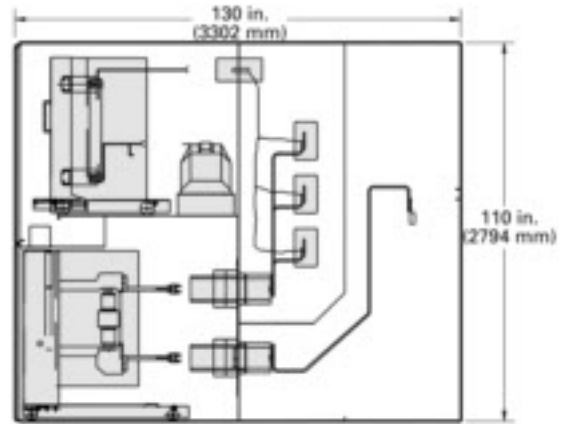
## 38 kV GM38 Metal-Clad Switchgear

### Dimensions

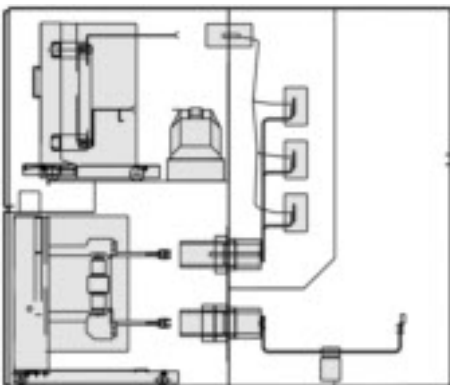
Side Views — 1200, 2000, 3000A Breakers / Auxiliary



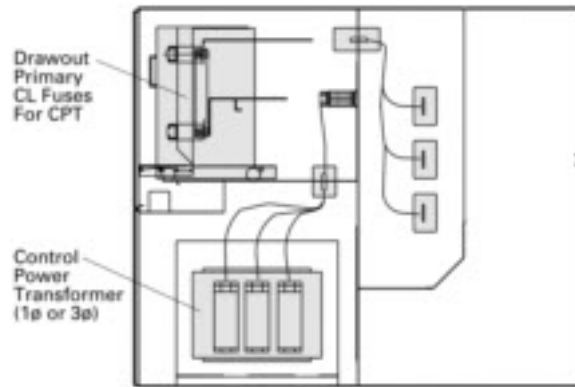
**Auxiliary / 1200A-3000A Breaker**  
(No drawout auxiliaries in upper cell for 3000A breaker)



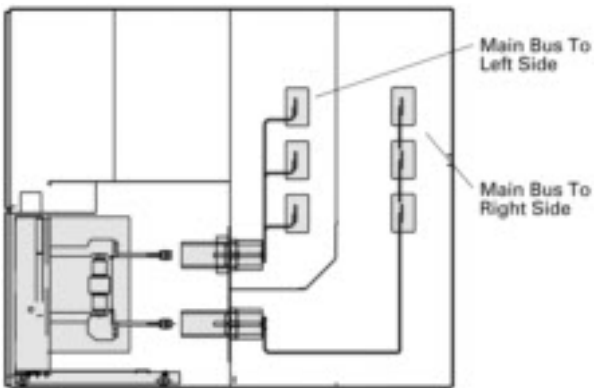
**VT Auxiliary / 1200A or 2000A Breaker**  
(Downfeed Cables)



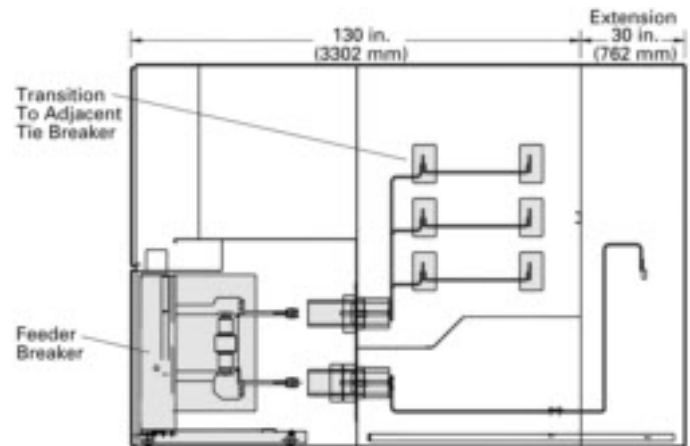
**Auxiliary / 1200A or 2000A Breaker**  
(Upfeed Cables)



**CPT Fuse Truck / Stationary 3Ø CPT**



**Auxiliary / Bus Tie Breaker**



**Auxiliary / Feeder Breaker**  
(Adjacent to right side of tie breaker section)

# Medium Voltage Equipment

## 38 kV GIS Metal-Clad Switchgear

### General/Specifications

#### GIS

Types 8DA10 and 8DB10 Medium Voltage Gas-Insulated Switchgear are gas insulated, vacuum circuit breaker designs with a voltage range of 4.16kV to 38kV. Lightning impulse withstand voltage ratings up to 200kV BIL and interrupting ratings up to 40kA are available.

The 8DA10 and 8DB10 Medium Voltage Gas-Insulated Switchgear designs feature fixed-mounted vacuum circuit breakers, connectable to the main bus through three-position (closed-open-ready to ground) switches. The position of the switches is externally observable from the front of the unit using a convenient camera system. Medium Voltage Gas-Insulated Switchgear is suitable for systems where small size, arc resistance, environmental immunity, or reduced maintenance needs are important. Depending upon the voltage rating, Medium Voltage Gas-Insulated Switchgear is approximately 1/5 the

size of conventional air insulated switchgear.

#### MV Vacuum Interrupter GIS

The 8DA and 8DB – up to 38kV, 2500A, 40kA, 200kV BIL.

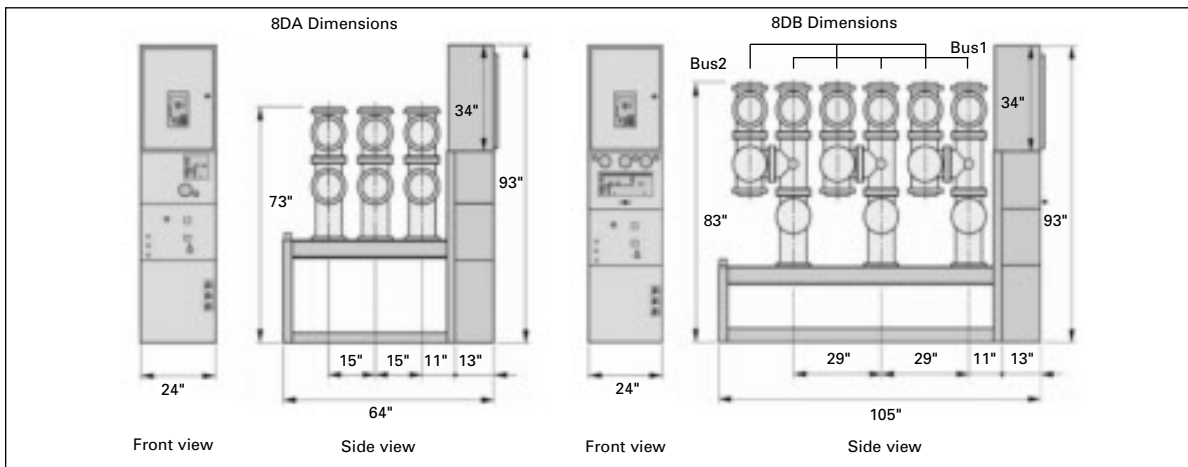
- Inherently arc-resistant
- Significantly reduced P.P.E. needs
- Compact – 80% smaller than air insulated switchgear
- 20 year internal maintenance cycle
- Meets IEEE and IEC standards
- UL or C-UL Listing available
- Single phase design eliminates phase-to-phase faults
- Meets NEC visible disconnect requirement
- Well suited for contaminated environments
- Pair with Siemens Protective Relays to match any application



#### GIS Specification Sheet

Rated Values		8DA10 3-pole / 8DB10 3-pole		
Voltage	Max. kV	15	27	38
Frequency	kV	60 Hz	60 Hz	60 Hz
Short-dur. power-frequency withstand voltage	kV	36	60	80
Lightning impulse withstand voltage	kV	95	125	170; 200*
Short-circuit breaking current		up to 40kA	up to 40kA	up to 40kA
Short-time withstand current, 3s		up to 40kA	up to 40kA	up to 40kA
Short-circuit making current (peak)		up to 104kA	up to 104kA	up to 104kA
Peak withstand current		up to 104kA	up to 104kA	up to 104kA
Normal current of busbar		up to 4000A	up to 4000A	up to 4000A
Normal current of feeders		up to 2500A	up to 2500A	up to 2500A

\* On request. Consult factory



# Medium Voltage Equipment

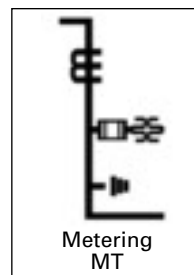
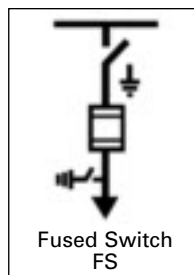
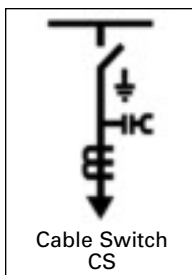
## 5–15–27 kV SIMOSEC Metal-Enclosed Load Interrupter Switchgear

### General/Specifications

#### SIMOSEC

Medium voltage metal-enclosed load interrupter indoor switchgear up to 27.6kV.

- Extremely compact footprint
- Meets ANSI / IEEE C37.20.3
- UL or C-uL listing available
- Seismic up to Zone 4 (optional)
- High switching capacity – 100 operations @ 600A
- Gas insulated three-position switch-disconnector, hermetically sealed for life inside the stainless steel vessel
- Switch-disconnector combines the function of a load interrupter switch (with CLOSED-OPEN indication) and a grounding switch (with OPEN-GROUND indication)
- HV HRC fuses and cable terminations accessible only if the feeder grounding switch is in the grounded position
- Fuses and outgoing cables front accessible
- Standard viewing window for visible verification of isolating distance
- Standard capacitive voltage presence indicator
- Integrated mechanical interlocking
- Animated mimic diagram
- Main bus at top or bottom to suit application
- Configurations: individual feeder switches, transformer primary switches & switch lineups
- Ideal for utility, construction & industrial applications
- Over 20 years field experience and more than 350,000 switch-disconnector units installed



### SIMOSEC Specification Sheet

#### Dimensions

	Cable Switch CS	Fused Switch FS	Metering MT	Cable Connection CC
Width <sup>1</sup> Single cable or fuse	14.8" <sup>1</sup> (375mm)	14.8" <sup>1</sup> (375mm)	19.7" <sup>2</sup> (500mm)	14.8" <sup>1</sup> (375mm)
Width <sup>2</sup> Two cables or double-barrel fuse	19.7" <sup>2</sup> (500mm)	19.7" <sup>2</sup> (500mm)	29.5" <sup>3</sup> (750mm)	19.7" <sup>2</sup> (500mm)
Depth	48.4" (1230mm)			
Height	88.6 - 100.4" (2250 - 2850mm) depending on arrangement			

#### Ratings

Rated voltage		Up to 5kV	8.25kV & 15kV	27.6kV
Rated frequency		50 / 60	50 / 60	50 / 60
Rated short-duration power-frequency withstand voltage		19kV	36kV	60kV
Rated lightning impulse withstand voltage (BIL)		60kV	95kV	125kV
Rated short-time withstand current $t_k$ = rated duration of short	2 Sec	Up to 25kA	Up to 25kA	Up to 20kA
Maximum fused continuous current (not fuse E rating)	Single fuse FS-1	325A	165A	65A
	Double fuse FS-2	575A	305A	117A
	Triple fuse FS-3	600A	430A	156A
Main bus continuous		600A, 1200A	600A, 1200A	600A, 1200A
Switch-disconnector	Continuous	600A	600A	600A
	Interrupting	600A	600A	600A

Capacitive voltage indicator

Cable discharge switch (1.6kA 1-sec) (optional)

# Medium Voltage Equipment

## MV Controllers (MVC) up to 7.2 kV

General

### General

The design and manufacture of the Series 81000™ medium voltage controller unit is based on our experience as a leading manufacturer of motors worldwide. The benefits of this experience result in control scheme flexibility and increased safety, while simplifying operations, maintenance, and minimizing installation costs. Typical applications include:

- Squirrel-Cage Induction Motors (non-reversing, reversing, and multi-speed)
- Reduced Voltage Starters (autotransformer reactor or solid-state type)
- Synchronous motors (brush or brushless type)
- Wound Rotor Motors — with or without secondary control
- Transformer Feeders
- Capacitor Bank Feeders
- Power Bus Feeders (Tie)

The utilization voltage range for the controllers is 2300 through 7200 volts AC.

The Siemens Series 81000 medium voltage controller allows the user to combine vacuum contactors, latched contactors and load break switches in one lineup. The user can also connect directly to Siemens GM-SG Medium Voltage switchgear without additional transition sections. This provides extreme flexibility in systems design.

### Stationary Controllers:

- Full Voltage (FVNR)
- Reduced Voltage Primary Reactor (RVPR)
- Reduced Voltage Autotransformer (RVAT)

### Load Break Switches (LBS)

#### Drawout Controllers:

- Full Voltage (FVNR)
- Reduced Voltage Primary Reactor (RVPR)
- Reduced Voltage Autotransformer (RVAT)
- Reduced Voltage Solid State (SSRV)
- Brushless Synchronous (BL-SYNCH)
- Brush-type Synchronous (BT-SYNCH)
- Two Speed Two Winding (2S2W)
- Two Speed One Winding (2S1W)
- Wound Rotor (WR)
- Reversing

E2 (Fused) Contactors — To meet interrupting capability required for NEMA Class E2 controllers, the 97H3 and 96H6 contactors are provided with primary current limiting fuses in all three phases. The resulting interrupting ratings are shown in the Table 17.

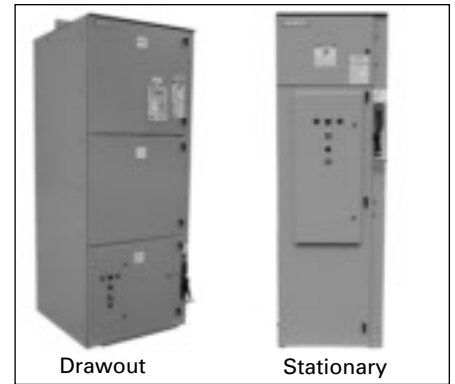


Table 16 Controllers and Load Break Switches Selection Table

	Controller Type	2.3kV	4.16kV	6.9kV	13.8kV
Maximum Motor Size	Stationary	to 1500HP	to 2500HP	to 4000HP	—
	Drawout	to 3000HP	to 5500HP	to 4000HP	—
	SSRV	to 3000HP	to 5500HP	to 4000HP	to 5500HP
Load Break Switch (LBS)	600A	Fused Unfused	Fused Unfused	— Unfused	— —
	1200A	Fused Unfused	Fused Unfused	— Unfused	— —

Table 17 Series 81000 Ratings

System Voltage	Enclosed Continuous Ampere Rating	Interrupting Capacity		Motor Horsepower Rating (3 Phase)				Transformer Loads	
		Unfused Class E1	Fused Class E2	Synchronous Motors		Induction Motors	Maximum Motor Fuse Rating	Maximum 3-Phase kVA	Maximum Fuse Rating
				0.8 PF	1.0 PF				
2300	360	5kA	200 MVA	1500	1750	1500	24R	1500	450E
2300	720	10kA	200 MVA	3000	3500	3000	57X	2000	600E
4000	360	5kA	350 MVA	2500	3000	2500	24R	2500	450E
4000	720	10kA	350 MVA	5500	6000	5500	57X	3500	600E
4600	360	5kA	400 MVA	2500	3000	2500	24R	2500	450E
4600	720	10kA	400 MVA	5500	6000	5500	57X	4000	600E
6900 <sup>Ⓢ</sup>	360	7.2kA	570 MVA	4000	5000	4000	24R	1500	200E

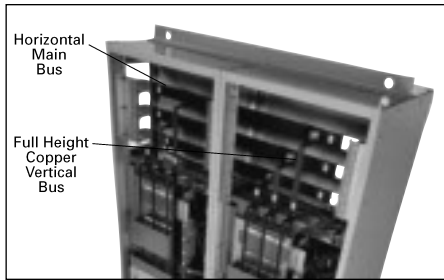
<sup>Ⓢ</sup> Nominal motor voltage 6600V.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Medium Voltage Equipment

## MV Controllers (MVC) up to 7.2 kV

General



Main and Vertical Bus Construction (shown with optional insulation)

### Power Bus

All power bus is isolated behind grounded steel barriers. Automatic shutters are provided to cover the line-side bus stabs whenever a starter door is opened. Horizontal bus ratings range from 600 through 3000 amperes and are further detailed in Table 18. Vertical tap buses in each section are rated 360, 540, or 720 amperes, depending on the application. Insulated bus with boots are available as options.

### Drawout

The Siemens Series 81000 Drawout Medium Voltage Motor Controller is a modular design consisting of up to three vacuum contactors per vertical section each with three current limiting fuses, all housed in a free-standing sheet steel enclosure.

The completely drawout contactor carriage (360A) includes all major power components (vacuum contactor, power fuses, CPT, CPT fuses) on a wheeled, drawout carriage. The drawout contactor carriage includes a quick disconnect plug for secondary connections. Drawout fuse carriages are used when loads require 720A vacuum contactors.

Contactors are available in up to three high mounting for 5kV and 360A.

The drawout controllers are available in a wide range of starter types, including Solid State Reduced Voltage.

### Stationary

The Siemens Series 81000 MVC is also offered in a stationary contactor design. The one high stationary starters can be configured in a reduced height (75") and reduced width (24") stand-alone enclosure facilitating a smaller footprint and reduced shipping cost.

### Solid State Reduced Voltage Controller (SSRVC)

#### Soft Start Advantages

- Minimize system maintenance and repair
- Reduce system downtime
- Increase productivity
- Minimize mechanical wear and tear
- Reduce inrush currents
- Reduce motor torque for prolonged motor life

#### Standard Features

- Drawout main fused contactor (360A)
- Drawout main fuses with fixed-mounted main contactor (720A)
- Bypass contactor
- Heavy duty soft start module
- 125% continuous duty rating (on soft start module only)
- Digital microprocessor control with non-volatile memory
- Fiber optic isolation
- Advanced electronic motor protection
- Metering
- Alphanumeric LCD display
- Keypad programming
- Modbus RTU communications



Solid State Reduced Voltage

#### Standard Adjustment Capabilities

- Soft start and stop
- Voltage and current ramp

#### Starting Methods (settable)

- Current limit and dual ramp
- Learned acceleration curve or user defined (custom) acceleration curve
- Kick start and jog

#### Optional Features

- Zero sequence ground fault protection
- Profibus communications

#### Flexibility

- Available in lineups with up to 3000A main bus directly connected with Metal-Clad Switchgear, Load Interrupter Switches, or other Class E2 Controllers

#### Safety

- Full drawout construction means power fuse changes are done outside of the enclosure

#### Reliability

- Made under ISO 9001 Quality System standards

#### Dependability

- Series 81000 Controllers have been in production for over 20 years

#### UL Listed

Table 18 Series 81000 Bus Ratings

Type Bus	Continuous Amperes	Conductor Size in Inches (mm)	Conductor Material	Current Density (Amps/in <sup>2</sup> )	
Main Horizontal	600	0.25 (6) x 3.0 (76)	Aluminum	800	
	1000	0.375 (10) x 3.0 (76)		889	
	1200	0.50 (13) x 3.0 (76)		800	
	Vertical	1000	0.25 (6) x 3.0 (76)	Copper	1333
		1200	0.375 (10) x 3.0 (76)		1067
		2000	2 x 0.375 (10) x 3.0 (76)		889
		3000 <sup>Ⓢ</sup>	3 x 0.50 (13) x 3.0 (76)		667
360		0.25 x (6) x 1.0 (25)	1440		
Ground	540	0.25 (6) x 1.5 (38)	1440		
	720	0.50 (13) x 2.0 (51)	720		
Ground	600	0.25 (6) x 2.0 (51)		1200	

<sup>Ⓢ</sup> 3000A bus must be located on top of unit.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Medium Voltage Equipment

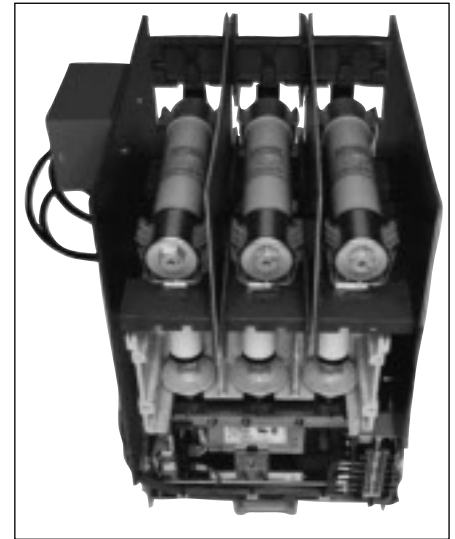
## MV Controllers (MVC) up to 7.2 kV

General

### Fuse Application

Table 19 Type FM Fuse Data

Maximum Designed Voltage	Current Designation	Continuous Current at 40°C	Minimum Interrupting Capability	Interrupting Rating 50/60 Hz
5080	2R (1 barrel)	70	190	Single Phase 80kA RMS Asymmetrical (210MVA at 2.4kV) (415MVA at 4.8kV)
	3R	100	225	
	4R	130	330	
	6R	170	500	
	9R	200	740	
	12R	230	955	
	18R (2 barrel)	390	1440	
	24R	450	1910	
	57X (3 barrel)	900	4500	
7200	2R (1 barrel)	70	190	Single Phase 80kA RMS Asymmetrical (620MVA at 7.2kV)
	3R	100	225	
	4R	130	330	
	6R	170	500	
	9R	200	740	
	12R	230	955	
	18R (2 barrel)	390	1440	
	24R	450	1910	



Type FM Fuses Installed on 97H3 Contactor

### For Non-Motor Loads

The principal application for ANSI "E" rated fuses in Series 81000 controllers is for non-rotating loads, such as transformer feeders. The following tabulation may be used for estimating which "E" rated fuse is appropriate for a particular 3-phase transformer application.

Table 20 Typical Fuse Sizes for Transformer Protection

Transformer kVA	Fuse Size at:			
	2.4kV	4.16kV	4.8kV	6.9kV
45	25E	10E	10E	—
75	30E	15E	15E	10E
112.5	40E	20E	20E	15E
150	50E	30E	25E	20E
225	80E	40E	40E	25E
300	100E	65E	50E	40E
500	200E	100E	80E	65E
750	250E	150E	125E	100E
1000	400E	200E	200E	125E
1500	450E	300E	250E	200E
2000	—	400E	350E	—
2500	—	450E	400E	—
3000	—	—	450E	—

Note: Fuse sizes are based on 133% overload capacity, except 1500kVA at 2.4kV, 2500kVA at 4.16kV, and 3000kVA at 4.8kV.

Fuse ratings higher or lower than those listed in Table 20 may be necessary if the transformer has unusual magnetizing (inrush) current characteristics, or for proper coordination with the secondary protective device (secondary fuse, low voltage circuit breaker trip device, overcurrent relay, etc.). Transformer overload capability may also have a bearing on fuse selection. However, this

table is accurate for most typical transformer feeder applications.

The "E" rated fuses have the same interrupting current ratings as the type FM or A720R "R" rated fuses. Both are rated at 50kA symmetrical and 80kA asymmetrical interrupting.

All medium voltage controllers employ current limiting fuses for short circuit protection. The term "current limiting" derives from the operating characteristics of the fuse. Figure 6 shows graphically how, for maximum fault levels, the fuse operates within the first 1/4 cycle of short circuit current. This limits the energy "let-thru" well below peak values, thus providing "current limitation."

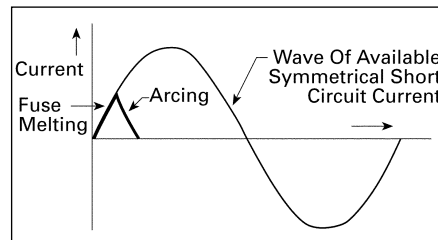


Figure 6 Current Limiting Effect

A mechanical indicator "pops-out" of the end of the fuse if the fuse has operated. This provides a visual means for checking the condition of the fuse, and also acts to engage the optional blown fuse trip bar on the 97H3 contactor.

Current designations 2R through 24R (38R and 57X ("X" rated) for fuses on 720A) are used to distinguish one fuse size from another within the same voltage rating. Ampere ratings are not

used to identify medium voltage fuses, since fuse selection involves many different variables. Among these are motor locked rotor and running current, acceleration time, and the time current characteristics of the overload relay used. The fuses are installed on the top of the 97H3 vacuum contactor or on the draw-out fuse carriage used with the 96H6 contactor. No fuse pullers or special tools are required to install or replace the fuses.



# Medium Voltage Equipment

## MV Controllers (MVC) up to 7.2 kV

## Dimensions/Specification

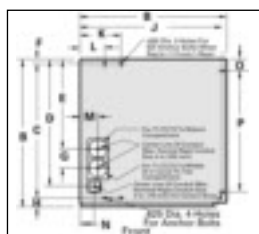
Table 21 MV Controllers Dimensions and Specification Sheet

Type	Stationary	Drawout or Rating	Number of Contactors	Enclosure Dimensions in Inches				
				NEMA 1, 1A or 12			N3R-WI 107" Width	N3RNWI 103" Width
				Height	Width	Depth		
Induction Full Voltage Non-Reversing (FVNR)	Drawout	5kV 360A 5kV 720A 7kV 360A	1	30 90 90 <sup>①</sup>	36	36	42	42
	Stationary	5kV 360A 7kV 360A	1	75/90	24	36	42	42
Reduced Voltage Primary Reactor Non-Reversing (RVPR)	Drawout	5kV 360A 5kV 720A 7kV 360A	2	90	60/72 96/108 72/96	36	78 114 78/114	78 120 120
	Stationary	5kV 360A 7kV 360A	2	75/90	60	36	78	78
Reduced Voltage-Autotransformer Non-Reversing (RVAT)	Drawout	5kV 360A 5kV 720A 7kV 360A	3	90	60/72 96/108 72/96	36	78 114 78/114	78 120 120
	Stationary	5kV 360A 7kV 360A	3	75/90	60	78	78	
Induction Full Voltage Reversing (FVR)	Drawout	5kV 360A 5kV 720A 7kV 360A	3	90	36 72 36	36	42 78 42	42 78 42
Synchronous Full Voltage Non-Reversing (FVNRS)	Drawout	5kV 360A 5kV 720A 7kV 360A	1	90	60/72 72/84 72/84	36	78 78/114 78/114	78 78/120 78/120
Synchronous Reduced Voltage-Autotransformer Non-Reversing (RVATS)	Drawout	5kV 360A 5kV 720A 7kV 360A	3	90	84/108 132/144 132	36	114 150 150	120 156 156
Induction Full Voltage 2-Speed 2-Winding (2S2W)	Drawout	5kV 360A 5kV 720A 7kV 360A	2	90	36 72 72	36	42 78 78	42 78 78
Induction Full Voltage 2-Speed 1-Winding (2S1W)	Drawout	5kV 360A 5kV 720A 7kV 360A	3	90	36 ② 72	36	42 ② 78	42 ② 78
Latched Contactor	Drawout	5kV 360A 5kV 720A 7kV 360A	1	30 90 90	36	36	42	42
Solid State Reduced Voltage Non-Reversing (SSRV)	Drawout	5kV 360A 5kV 720A 7kV 360A 15kV 300A	2	90	36 72 72 126	36 36 36 48	42 78 78 —	42 78 78 —
LBS Unfused 600A or 1200A	—	5kV / 7kV	—	90	36	36	42	42
LBS 600A Fused or 1200A/900E Fused	—	5kV	—	90	72	36	78	78
Incoming Line Main Lugs Only	—	5kV / 7kV	—	90	18 24 36	36	42	42

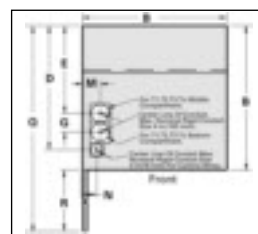
① Also available in 45" construction for 2-high arrangement, requires top mounted bus.

② Consult factory.

### Typical Floor Plan Details for Class E2 Medium Voltage Controllers



Detail A — Floor Plan View — Bottom Conduit Entry



Detail B — Floor Plan View — Conduit Entry Top

Table 22 MVC Floor Plan Dimensions in Inches (mm)

A	B	C	D	E	F	G	H	J
90.00 (2286)	36.00 (914)	32.75 (832)	31.00 (787)	21.88 (556)	1.12 (28)	4.68 (119)	2.13 (54)	34.94 (887)
K	L	M	N	O	P	Q	R	
10.06 (256)	6.06 (154)	4.42 (112)	3.50 (89)	2.87 (73)	29.50 (749)	68.50 (1740)	32.50 (826)	

# Medium Voltage Equipment

## MV Controllers (MVC) up to 7.2 kV

## Protective Relaying

### Motor Protection Options

Drive motors often play a decisive role in the functioning of a production process. Motor damage and breakdowns not infrequently lead also to consequential damage and production shutdowns, the cost of which significantly exceeds the cost of repairing the motor. Optimum design of the motor protection ensures that damage following thermal overload is prevented, meaning that there is no reduction to the normal service life. Secondary faults are minimized in the event of short circuits, ground faults and

winding faults. The spectrum extends from small low-voltage motors with an output of a few kW to high voltage motors with outputs measured in MW. Protection system design must be based on the rating of the motor, the importance of the drive for the technological process, the operating conditions and the requirements of the motor manufacturer.

Common motor protection functions and SIPROTEC motor protective relay selection tables are provided below.



### Protection functions for various types of motor faults

Fault	Protection	ANSI Number
Stator thermal overload	Stator thermal overload protection	49
Rotor thermal overload during start too long or blocked too frequent	2 Protection principles for the rotor overload protection Motor starting time supervision Restart inhibit	48 66, 49R
Ground-fault	Ground-fault protection ( $I_0 > U_0 > < (U_0, I_0)$ )	50G, 64G, 67G
Short-Circuit	Overcurrent time protection Current differential protection	50, 51 87
Loss of phase	Negative sequence protection ( $I_2/I_N$ )	46
Bearing overload	Temperature sensors (RTD's)	38
Overheating of plant on unloaded drives (pumps, compressors)	Undercurrent protection, Active power protection (P<)	37 32U
Undervoltage (starting torque not reached $M \sim U^2$ or start too long)	Undervoltage protection	27
Asynchronous operation (of a synchronous motor)	Underexcitation protection	40

### Motor Protection Selection Table

Asynchronous Motor		Synchronous Motor	
100 kW – 500 kW <b>7SJ60</b> Basic device	<b>7SJ61</b> + more I/O's + control functions + flexible serial interfaces + better local HMI (4 line display; digital keyboard)	< 2 MW <b>7UM61</b> (Option: Generator Basic)	
500 kW – 2 MW <b>7SJ62</b> Basic device + control functions	<b>7UM61</b> + more I/O's (7UM612) + control functions + high accuracy + high sensitivity + operating range in a wide frequency band (11Hz - 68Hz)	< 10 MW <b>7UM62</b> (Option: Generator Basic)	
or with control functions via bay mimic diagram in graphic display <b>7SJ63</b> Basic device	<b>7SJ64</b> + Synchro check function + high sensitivity + extensive control function + 1 serial interface more		
> 2 MW	<b>7UM62</b> + differential protection + control functions + high accuracy + high sensitivity + operating range in a wide frequency band (11Hz - 68Hz)	> 10 MW <b>7UM61</b> + (Option: Generator Basic)  <b>7UM62</b> (Option: Generator Basic) or with control functions via bay mimic diagram in graphic display <b>7SJ64</b> + (Option: Generator Basic)	

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Medium Voltage Equipment

## Arc Flash Solutions

General



### SARRACSTM Remote Breaker Racking

Protection for your most important investments: your personnel and your equipment!

Incidents of serious and sometimes fatal injury have become an all too common occurrence when faults occur while circuit breakers are being racked in or out on a live bus. NFPA 70E-2004 (referenced in OSHA 29CFR-1910-S Appendix "A") requires that personnel wear full-body flash suits during racking procedures on an energized system. However, as operators must stand within the flash

boundary, they are still at considerable risk due to intense heat, concussion forces and airborne debris should a fault explosion occur. Now, by allowing operators to remotely perform racking procedures from a distance of up to 40 feet, SARRACS safety breaker system from Siemens provides increased protection for your most important investments: your personnel and your equipment.

SARRACS (with Custom Torque) provides the following:

#### Operator Safety

- Remote operation
  - Personnel safely operate breaker racking system from a distance of up to 40 feet
- Eliminates need for special personal protective equipment (PPE) during racking
  - Since operator is outside the flash boundary, a full-body flash suit is not required
- Completely portable
  - Ball bearing wheels, casters, and transport handle for easy maneuvering

#### Breaker Safety

- Utilizes state-of-the-art SIMATIC® S7-200 PLC from Siemens
  - Digital position control for consistent and accurate breaker engagement
  - Customized position-torque control provides protection to minimize equipment damage
  - Auto reverse (optional)
  - Speed control
  - Ramp up/ramp down
  - Interface options

#### Flexibility

- Programmable to allow for varying torque profiles and mechanical requirements of individual circuit breakers in a lineup
  - Mechanically adjustable to allow for different circuit breakers in the same lineup
- Portable and self-contained
  - Easy to store and transport
  - Strong but light (approx. 200 lb.)
- Designs available for most circuit breakers

Siemens Industrial Services can provide training and on-site modifications if required.

# Medium Voltage Equipment

## Arc Flash Solutions

General

### Remote Circuit Breaker Controller System

#### Alternate to Arc-Resistant switchgear

Siemens can offer a cost effective solution that satisfies the NFPA 70E requirements which provides improved personnel safety when coupled with conventional switchgear.

With the Siemens CB Controller (C7) there is no longer a need to stand in front of the circuit breaker cell to view circuit breaker status, operate the circuit breaker or view metering information. All of this can be done from a safe distance from the switchgear.

This places the operator or maintenance personnel at a safe distance while they perform these necessary functions.

Each lineup would be supplied with its own controller as follows.

The system consists of two hardware levels. They are the Siemens SIPROTEC protective relays installed for each circuit breaker in the switchgear and the touch screen CB Controller C7 mounted remote. The two levels are connected via a

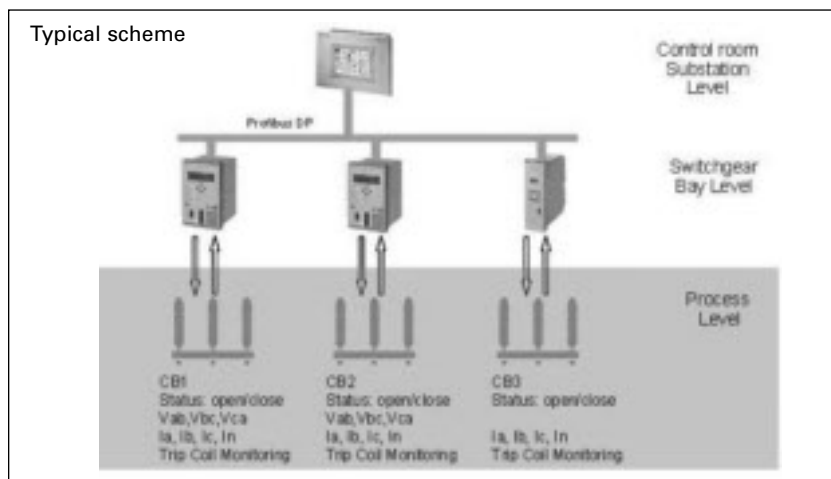
Profibus communication link. All necessary security measures are available to prevent unauthorized usage.

Siemens will configure the system completely and test all communication functionality and relay data.

The above solution in conjunction with remote circuit breaker racking (see

SARRACS above) allows for circuit breaker operation and racking without being in front of any circuit breaker during the trip/close function or the racking in/out procedure.

When operated correctly, a circuit breaker can be tripped and racked out without being in the flash hazard zone.



# Power Switching Centers

## SIMOSEC Narrow Profile Gas Insulated

*General*

### SIMOSEC

Medium voltage metal-enclosed load interrupter indoor switchgear up to 27.6kV.

- Extremely compact footprint
- Meets ANSI / IEEE C37.20.3
- UL or C-uL listing available
- Seismic up to Zone 4 (optional)
- High switching capacity – 100 operations @ 600A
- Gas insulated three-position switch-disconnector, hermetically sealed for life inside the stainless steel vessel
- Switch-disconnector combines the function of a load interrupter switch (with CLOSED-OPEN indication) and a grounding switch (with OPEN-GROUND indication)
- HV HRC fuses and cable terminations accessible only if the feeder grounding switch is in the grounded position
- Fuses and outgoing cables front accessible
- Standard viewing window for visible verification of isolating distance
- Standard capacitive voltage presence indicator
- Integrated mechanical interlocking
- Animated mimic diagram
- Main bus at top or bottom to suit application
- Configurations: individual feeder switches, transformer primary switches & switch lineups
- Ideal for utility, construction & industrial applications
- Over 20 years experience and more than 350,000 switch-disconnector units installed



SIMOSEC Information on page 13-17

# Protective Relays & SCADA Systems

## SCADA Substation Automation

General

### SICAM PAS & SICAM StationManager II

SICAM PAS (Power Automation System) can meet all the demands made of a distributed substation control system – both now and in the future, too. SICAM PAS was conceived as an open system, i.e., besides providing standardized data transfer processes, it features user interfaces for the integration of system-specific tasks. SICAM PAS can thus be integrated with ease in existing systems and can be used for system integration. With modern diagnostics, it optimally supports commissioning and maintenance. SICAM PAS is clearly structured and reliable, thanks to its open, fully documented and tested system.

SICAM StationManager II combines extensive IED integration capabilities, an IEC 1131 compliant programming interface, some of the best configuration and diagnostic tools in the industry, and various advanced features like WAN support, data encryption and HTML server capabilities, to make it a perfect Substation Data Concentrator.

Major Features and Benefits:

- Built-in power supply supporting 48 VDC, 125 VDC, and 115 VAC power inputs
- Three PC-104 card slots (instead of two); Support for new EPIC processor
- Supports two Ethernet fiber converters; Demodulated IRIG-B input

- Completely enclosed packaging; RS-485 switches mounted on outside of chassis
- StationManager II is completely software compatible with StationManager I

### ICCP Protocol Communications

- Unexpected events occur in the real world. ICCP runs in “real world” conditions
- Secure communications are required to support confidentiality, integrity and availability. ICCP/NT supports secure communication using the ICCP PKI security standard
- With critical communications, reliable products are of utmost importance

### SIPROTEC with IEC 61850 – for more efficient power automation

SIPROTEC – the standard for numerical protective relaying – has established itself right across the market. Besides the common system platform and the unique DIGSI 4 service software that may be used for all protective devices, it also supports the new IEC 61850 communication standard. A potential that offers even more efficiency easily and conveniently.

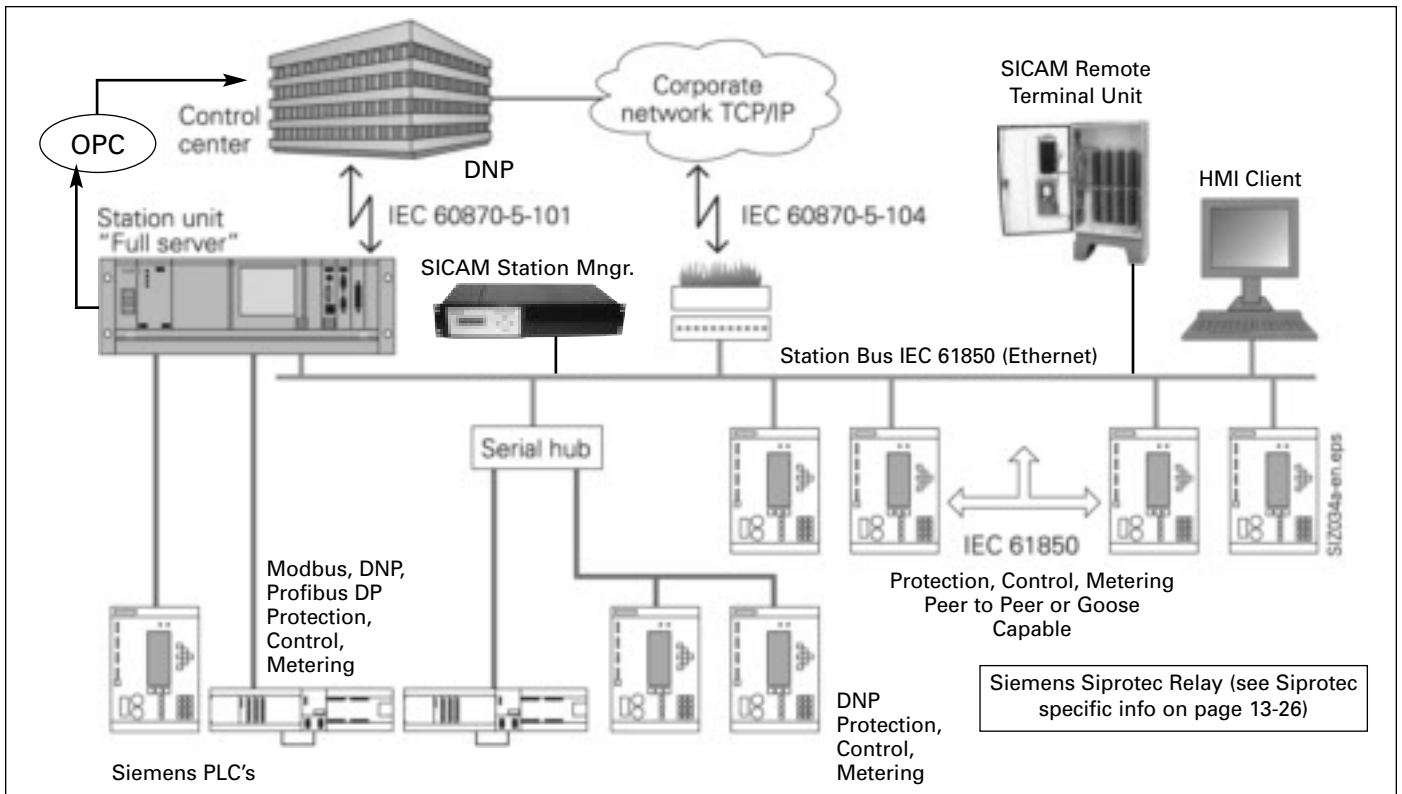
### IEC 61850 – what it is and what it can achieve

Users and manufacturers jointly developed the new international standard IEC 61850. It was approved in early 2004. The agreed aim of this standard is to arrive at a

complete communication solution for substations, thus providing users with interoperability among different makes on the basis of Ethernet technology. This opens up a whole new dimension in efficient substation management. Not only short-term savings in operation and maintenance, but also simplified engineering, less complexity, and longterm expandability can make you one of the winners in tomorrow’s power market. Progress. It’s that simple.

### HMI Client

Using a local or web-based HMI from the SICAM PAS you can monitor and control all parts of a system from a central point. The clear display of the operating situation allows you to react fast; you consequently reduce your operating costs and can quickly restore power in the event of malfunctions. As an integrated overall system, SICAM PAS supports you all the way from the bay level to the control center interface with fast data handling, with the flexibility of a programmable-logic controller and with the reliability philosophy of a classic telecontrol unit. Availability and flexibility will help you create state-of-the-art, monitoring, control and protection concepts in power automation.



# Protective Relays & SCADA Systems

## SIPROTEC Protective Relays

*General*

### Overview

High-performance protective relaying comes into its own when it's a question of minimizing power system operating costs.

Uncomplicated operation, convenient commissioning tools and flexible communication are all important elements when service and maintenance costs have to be reduced. The Siemens SIPROTEC family with its protection relays and bay control units is an integrated system for medium-voltage to extra-high-voltage applications.

Numerical protection systems are nothing new; after all, Siemens has more than 25 years experience in this field. Although system hardware is still often referred to as protection equipment or units – as was once the case with analog technology – it can now do so much more. These relays not only handle fault detection and location tasks but also control, metering and monitoring functions. And it is these additional functions – impossible before the advent of numerical technology – which offer major cost-cutting potential.

### IEC 61850

SIPROTEC — the standard for numerical protective relaying — has established itself right across the market. Besides the common system platform and the unique DIGSI 4 service interface that may be used for all protective devices, it also supports the new IEC 61850 communication standard. A potential that offers more efficiency, easily and conveniently. With SIPROTEC relays and bay control units from Siemens we offer all the advantages of an expert and innovative partner in the field of protective relaying and substation automation. We bring you attractively priced intelligent solutions by paying particular attention to lowering your life cycle and system management costs. These solutions are the first ones available on the market with the international IEC 61850 standard. To enable you to profit from these advantages as quickly as possible, Siemens collaborated in the preparation of this international standard and made every effort to ensure no time was lost in bringing it out. The result is certainly worth a look, because SIPROTEC and

other Power Automation products and Siemens systems are available on the basis of the IEC 61850 standard and can even be retrofitted in systems supplied since 1998.

### System advantages

#### • One bay, one unit

The SIPROTEC 4 relay family offers fully integrated protection, control, monitoring, and automation functions incorporated in a single device. For many applications, this product contains all the functions you need to meet all your protection and control requirements with just one unit per bay, saving on investment and installation costs and enhancing availability.

#### • DIGSI 4 – one tool for all tasks and products

DIGSI 4 is a computer program designed for all SIPROTEC relays. DIGSI 4 offers users a universal tool for all support tasks from setting and commissioning of devices to simple analysis and documentation of system faults. Our powerful analysis tool speeds up troubleshooting and supplies important service information.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Protective Relays & SCADA Systems

## SIPROTEC Protective Relays

Selection

### ANSI Selection List for Protective Relays

ANSI Number*	Protection Function	Distance		Pilot wire differential		Line differential		Overcurrent								Differential					Generator and motor protection		Breaker management	Synchronizing	Breaker failure	Voltage, frequency		
		7SA522	7SA6	7SD600	7SD5	7SD610	7SJ45	7SJ46	7SJ600	7SJ602	7SJ61	7SJ62	7SJ63	7SJ64	7VH60	7UT612	7UT613	7UT63	7SS60	7SS52	7UM61	7UM62	7VK61	7VE6	7SV600	7RW600		
14	Locked rotor protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
21	Distance protection, phase	■	■	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	■	■	—	—	—	—	—	
21N	Distance protection, earth (ground)	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	■	■	—	—	—	—	—	
21FL	Fault locator	■	■	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
24	Overfluxing (V/f protection)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
25	Synchronizing, synchronism check	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
27	Undervoltage	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
27/34	Stator earth-fault 3 <sup>rd</sup> harmonic	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
32	Directional power	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
32F	Forward power	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
32R	Reverse power	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
37	Undercurrent or underpower	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
40	Loss of field	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
46	Load unbalance, negative phase-sequence overcurrent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
47	Phase-sequence voltage	■	■	—	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
48	Incomplete sequence, locked rotor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
49	Thermal overload	—	●	—	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
49R	Rotor thermal protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
49S	Stator thermal protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
50	Instantaneous overcurrent	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
50N	Instantaneous earth-fault overcurrent	■	■	—	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
50BF	Breaker failure	●	●	—	■	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
51GN	Zero speed and underspeed device	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
51	Overcurrent-time relay, phase	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
51N	Overcurrent-time relay, earth	■	■	—	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
51V	Overcurrent-time relay, voltage controlled	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
59	Overvoltage	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
59N	Residual voltage earth-fault protection	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
59GN	Stator earth-fault protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64	100% Stator earth-fault protection (20 Hz)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
64R	Rotor earth-fault	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

■ Standard function  
 ● Optional  
 \* ANSI/IEEE C37.2: IEEE Standard Electrical Power System Device Function Numbers

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Protective Relays & SCADA Systems

## SIPROTEC Protective Relays

Selection

### ANSI Selection List for Protective Relays

ANSI Number*	Protection Function	Distance		Pilot wire differential		Line differential		Overcurrent							Differential					Generator and motor protection		Breaker management		Synchronizing		Breaker failure		Voltage, frequency											
		7SA522	7SA6	7SD600	7SD5	7SD610	7SJ45	7SJ46	7SJ600	7SJ602	7SJ61	7SJ62	7SJ63	7SJ64	7VH60	7UT612	7UT613	7UT63	7SS60	7SS52	7UM61	7UM62	7VK61	7VE6	7SV600	7RW600													
67	Directional overcurrent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
67N	Directional earth-fault overcurrent	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
67G	Stator earth-fault directional overcurrent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
68	Power swing detection	●	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
74TC	Trip circuit supervision	■	■	—	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
78	Out-of-step protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
79	Auto-reclosure	●	●	—	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
81	Frequency protection	■	■	—	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
81R	Rate-of-frequency-change protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Vector jump supervision	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
85	Carrier interface/remote trip	■	■	●	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
86	Lockout function	■	■	■	■	■	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
87G	Differential protection generator	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
87T	Differential protection transformer	—	—	—	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
87BB	Differential protection busbar	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
87M	Differential protection motor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
87L	Differential protection line	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
87N	Restricted earth-fault protection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

- Standard function
- Optional
- \* ANSI/IEEE C37.2: IEEE Standard Electrical Power System Device Function Numbers

1) Only sensitive directional earth-fault overcurrent (67Ns).

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.



# Protective Relays & SCADA Systems

## SIPROTEC Protective Relays

**Selection**

Siemens Protective Relays - Quick Competitor Comparison by Application

### Motor Protection

Model	Siemens Equivalent	Typical Catalog Number
GE 239	<b>SIMPRO</b>	<b>SIMPRO-100-R-N</b>
GE 269	<b>SIMPRO</b>	<b>SIMPRO-100-R-N</b>
GE 269+	<b>SIMPRO</b>	<b>SIMPRO-100-R-N</b>
GE 369	<b>SIMPRO</b>	<b>SIMPRO-100-R-V</b>
GE 469	<b>SIMPRO</b> and <b>7SJ601</b>	<b>SIMPRO-100-R-V/7SJ6015-4EA01-0AA0</b>

### Feeder Protection

Model	Siemens Equivalent	Typical Catalog Number
ABB CO (4 single phase)	<b>7SJ45</b> (1 three phase) 7SJ46 (1 three phase) 7SJ601 (1 three phase)	<b>7SJ4505-1EA00-1AA1</b> (1 three phase) 7SJ4605-1EA00-1AA0 (1 three phase) 7SJ6015-4EA01-0AA0 (1 three phase)
ABB Microshield	7SJ600 <b>7SJ602</b> 7SJ61 7SJ62	7SJ6005-4EA00-0DA1 <b>7SJ6025-4EB00-1FA0</b> 7SJ6115-5EC90-1FA0+L0D 7SJ6215-5EC90-1FE0+L0D
ABB DPU-1500	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
ABB DPU-2000R	7SJ62 7SJ63 <b>7SJ64</b>	7SJ6215-5EC90-1FE0+L0D 7SJ6315-5EC90-1FE0+L0D <b>7SJ6405-5EC92-1FE4+L0D</b>
Basler BE3-51 (4 single phase)	<b>7SJ45</b> (1 three phase) 7SJ46 (1 three phase)	<b>7SJ4505-1EA00-1AA1</b> (1 three phase) 7SJ4605-1EA00-1AA0 (1 three phase)
Basler BE1-51 (4 single phase)	<b>7SJ45</b> (1 three phase) 7SJ46 (1 three phase) 7SJ601 (1 three phase)	<b>7SJ4505-1EA00-1AA1</b> (1 three phase) 7SJ4605-1EA00-1AA0 (1 three phase) 7SJ6015-4EA01-0AA0 (1 three phase)
Basler BE1-851	7SJ600 <b>7SJ602</b> 7SJ61	7SJ6005-4EA00-0DA1 <b>7SJ6025-4EB00-1FA0</b> 7SJ6115-5EC90-1FA0+L0D
Basler BE1-951	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
GE MDP	7SJ45 7SJ46 <b>7SJ601</b>	7SJ4505-1EA00-1AA1 7SJ4605-1EA00-1AA0 <b>7SJ6015-4EA01-0AA0</b>
GE 735	7SJ600 <b>7SJ602</b> 7SJ61	7SJ6005-4EA00-0DA1 <b>7SJ6025-4EB00-1FA0</b> 7SJ6115-5EC90-1FA0+L0D
GE 750	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
GE F60	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
SEL 351A	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
SEL 351	<b>7SJ62</b> 7SJ63 7SJ64	<b>7SJ6215-5EC90-1FE0+L0D</b> 7SJ6315-5EC90-1FE0+L0D 7SJ6405-5EC92-1FE4+L0D
SEL 351S	7SJ62 7SJ63 <b>7SJ64</b>	7SJ6215-5EC90-1FE0+L0D 7SJ6315-5EC90-1FE0+L0D <b>7SJ6405-5EC92-1FE4+L0D</b>
SEL 501	7SJ600 <b>7SJ602</b> 7SJ61	7SJ6005-4EA00-0DA1 <b>7SJ6025-4EB00-1FA0</b> 7SJ6115-5EC90-1FA0+L0D
SEL 551	7SJ600 <b>7SJ602</b> 7SJ61	7SJ6005-4EA00-0DA1 <b>7SJ6025-4EB00-1FA0</b> 7SJ6115-5EC90-1FA0+L0D

\*Siemens catalog numbers in Bold are the preferred equivalent model.  
Siemens does not accept any liability for the information contained in this document.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Protective Relays & SCADA Systems

## SIPROTEC Protective Relays

*Selection*

### General Protection

Model	Siemens Equivalent	Typical Catalog Number
ABB GPU2000	<b>7UM62</b>	<b>7UM6215-5EC90-0BA0+L0D</b>
Basler BE1- GPS100	7UM61 <b>7UM62</b>	7UM6115-5EC90-0CA0+L0D <b>7UM6215-5EC90-0BA0+L0D</b>
Beckwith M-3420	7UM61 <b>7UM62</b>	7UM6115-5EC90-0CA0+L0D <b>7UM6215-5EC90-0BA0+L0D</b>
Beckwith M-3425	<b>7UM62</b>	<b>7UM6215-5EC90-0CA0+L0D</b>
GE 489	7UM61 <b>7UM62</b>	7UM6115-5EC90-0CA0+L0D <b>7UM6215-5EC90-0BA0+L0D</b>
SEL 300G	7UM61 <b>7UM62</b>	7UM6115-5EC90-0CA0+L0D <b>7UM6215-5EC90-0BA0+L0D</b>

### Bus Protection

Model	Siemens Equivalent	Typical Catalog Number
ABB HU	<b>7VH60</b>	<b>7VH6002-0EA20-0AA0</b>
ABB CA	<b>7VH60</b>	<b>7VH6002-0EA20-0AA0</b>
ABB TPU2000R	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
Basler BE1-87	7UT513 <b>7UT612</b> (3) 7VH60	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b> 7VH6002-0EA20-0AA0
GE PVD	<b>7VH60</b>	<b>7VH6002-0EA20-0AA0</b>
GE B30	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
SEL 387	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>

### Transformer Protection

Model	Siemens Equivalent	Typical Catalog Number
ABB HU (3)	7UT512 (1) 7UT513 (1) <b>7UT612 (1)</b>	7UT5125-4GB11-0AA0 7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
ABB CA (3)	7UT512 (1) 7UT513 (1) <b>7UT612 (1)</b>	7UT5125-4GB11-0AA0 7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
ABB TPU2000R	7UT512 7UT513 <b>7UT612</b>	7UT5125-4GB11-0AA0 7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
Basler BE1-CDS	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
GE 745	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
GE T60	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
SEL 387	7UT513 <b>7UT612</b>	7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>
SEL 587	7UT512 7UT513 <b>7UT612</b>	7UT5125-4GB11-0AA0 7UT5135-4GB11-1AA0 <b>7UT6125-5EC00-1AA0</b>

### Voltage/Frequency Protection

Model	Siemens Equivalent	Typical Catalog Number
Basler BE1-27	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
Basler BE1-59	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
Basler BE1-27/59	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
Basler BE1-810/U	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE IAV	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE IFV	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE MIV	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE NGV	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE DFF	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE MFF	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>
GE SFF	<b>7RW600</b>	<b>7RW60000-4EA00-0DA0</b>

\*Siemens catalog numbers in Bold are the preferred equivalent model.

# Replacement Breakers & Retrofit Products

## Medium Voltage Replacement Circuit Breakers

General

### Ratings from 5–38 kV, 250–1500 MVA, 1200-3000 Amperes

Replacement circuit breakers provide a cost-effective way to upgrade your system capabilities while saving you from costly maintenance and lost productivity and preserving your investment in existing cubicles and cables.

Whether your equipment was originally manufactured by Allis-Chalmers, Westinghouse, GE, Federal Pacific, ITE, or another manufacturer, we will assist you to evaluate the Siemens replacement options which best meet your needs.

#### Why Replacement Breakers?

- Increased Reliability and Performance
- Reduced Operating and Maintenance Expenditures
- Reduced Downtime, Minimal Changeover Time During Upgrade
- Preserved Investment in Existing Cubicles
- Improved Employee and Environmental Safety

#### Why Siemens?

Siemens Offers the Best Vacuum Circuit Breaker in the Industry.

- Superior Performance, Longer Service Life
  - 10,000 full load operation, 10-year maintenance cycle on replacement circuit breakers with 3AH operator
- Standard Operator on All Siemens Replacement, Medium Voltage Distribution, and Outdoor Vacuum Circuit Breakers
- Extensive Replacement Breaker Experience – 750+ projects since 1983
  - Over 400,000 3AF/H series circuit breakers in service worldwide
  - Nuclear Class 1E Rated (350+ breakers)
- Full Range of Service Capabilities by Skilled Factory-Trained Engineers and Technicians

### Siemens Medium Voltage Replacement Circuit Breakers

The following circuit breakers are available as pre-engineered designs. Other manufacturers, models, and ratings can be engineered by Siemens.

#### Transformer Protection

Manufacturer	Model	kV	Ratings MVA	AMP						
Allis-Chalmers (All Air-Magnetic)	AM	5	150	1200, 2000						
			250	1200, 2000						
	MB	7	250	1200, 2000						
			500	1200, 2000						
			150	1200						
	MC/MCV	15	250	1200, 2000						
			500	1200, 2000						
			250	1200, 2000						
	MA	5	250	1200, 2000						
			350	1200, 2000						
FA	5	350	3000							
		FB	7	500	1200, 2000, 3000					
				FC/FCV	15	500	1200, 2000			
Siemens	3AF (2-High)	5	750	1200, 2000						
			1000	1200, 2000, 3000						
			250	1200, 2000						
			350	1200, 2000, 3000						
			500	1200, 2000, 3000						
			7.5	500	1200, 2000					
			15	500	1200, 2000					
			750	1200, 2000						
			1000	1200, 2000, 3000						
			GE	Magneblast (AMH)	4.16	250	600, 1200, 2000			
100	600, 1200, 2000									
Magneblast (AM)	2.4	4.16		150	600, 1200, 2000					
				100	600, 1200, 2000					
				150	600, 1200, 2000					
				250	600, 1200, 2000					
				350	1200, 2000, 3000					
				7.2	500	1200, 2000, 3000				
				13.8	250	1200, 2000				
				500	1200, 2000					
750	1200, 2000									
Westinghouse	DH	5	150	1200, 2000						
			250	1200, 2000						
			350	3000						
			7.5	500	1200, 2000					
			15	500	1200, 2000					
			750	1200, 2000						
			1000	1200, 2000, 3000						
			DHP	5	350	1200, 2000				
					7.5	500	1200, 2000			
					15	500	1200, 2000			
750, 750C	1200, 2000									
ITE	HV	5	100	600, 1200						
			150	600, 1200						
			250	600, 1200						
			HK	7.5	500	1200, 2000				
					500	1200, 2000				
					750	1200, 2000				
						1000	1200, 2000			
						Federal Pacific	DST2	5	250	1200, 2000
									7.5	500
			15	500	1200, 2000					
			750	1200, 2000						
			1000	1200, 2000						
			MOP	27	1000	1200				
McGraw Edison	PSD	15			501	1200				
			502	2000						
			751	1200						



5-MSV (replacement for Allis-Chalmers MA)

# Replacement Breakers & Retrofit Products

## Safety Racking Solutions

General

### Siemens GM Switchgear Electric Racking Accessory

An optional electric racking accessory is available for 5-15kV GM, GM-SG, and 38kV GM38 switchgear. The switchgear requires modifications to the front panel to add mounting adapters for the motor drive mechanism. The accessory consists of a motor drive enclosure which installs on mounting brackets on the switchgear front panel of a circuit breaker compartment. The unit includes a power cord, which can be connected to a convenient power source in the vicinity of the switchgear. Instructions for mounting the racking accessory and for racking of circuit breakers are provided on a label on the racking accessory.



**Figure 7** Motor drive mounted on CB cubicle door.



**Figure 8** Power and Control switch units.

### Allis-Chalmers D and F Switchgear—Closed Door Racking Modification

In order to improve operator safety, Siemens offers a field modification to convert type D and F switchgear to a closed-door, remote rack design. This modification provides a cost effective solution to keep operators clear of the arc flash zone during breaker racking.

Allis-Chalmers and later Siemens manufactured type D and F medium-voltage switchgear from 1958 through the late 1980's. This gear utilized air-magnetic breakers that were typically manually racked via a lever while the cubicle panel door was open.

The field modification consists of a floor-mounted screw racking device and a breaker-mounted bracket to interface with the floor-mounted screw device. These additions allow end-users to either have closed-door manual racking, or closed-door remote racking.

The closed-door remote racking option requires the above mentioned cell and breaker additions, as well as a minor front panel modification to accept a torque-regulated motor. The motor can be moved from one cell position to the next, thus only one motor device is required.

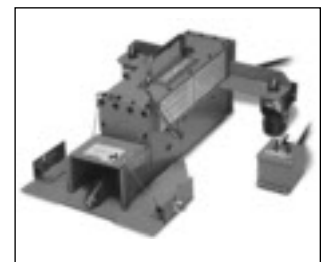


**Before:** Original floor-mounted lever racking, commonly used on type D and F switchgear, required the operator to stand in front of the breaker with the panel door open.



**After:** Following the field modification, the breaker can be racked in and out while the operator stands outside of the arc flash zone.

Manuf.	Model	kV	Ratings MVA	AMP		
Allis-Chalmers						
D Gear	MA	5	250	1200, 2000		
			350	1200, 2000		
F Gear	FA	5	350	3000		
			FC/FCV	15	500	1200, 2000, 3000
					750	1200, 2000
			1000	1200, 2000, 3000		



Easily installed on existing units and can be provided for 5kV, 7.5kV, and 15kV ratings, from 1200A through 3000A.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Field Services

## Start-up Commissioning Services

General

We realize that, even though our Totally Integrated Automation® and Totally Integrated Power® products are designed for quick and easy installation, your schedule may not allow you to allocate the resources and personnel necessary to get this equipment up and running when it is required.

In today's business environment, staff members are frequently overloaded, or they may be dedicated to other projects. Now, when you purchase new equipment from Siemens, you can add startup services at special rates. This will give you the additional help required to meet even the most pressing deadlines... at affordable rates. You can be confident that we will arrive at your door with the installation experience necessary to get your new general purpose drives, motor control center or switchgear properly started up and working when you need it.

Factory-trained engineers will:

- Startup your newly-purchased Siemens equipment
- Test for operational functionality
- Provide a written report detailing tests and services
- Advise your team on upkeep and maintenance.

In many cases, you will receive a one-year parts warranty extension on your new equipment such as:

- Motor control centers
- General purpose variable speed drives
- Low voltage switchgear.

### Bonus:

Receive an additional one-year parts warranty when you purchase Siemens startup services with your new motor control centers, general purpose variable speed drives and/or low voltage switchgear.



### Medium Voltage Switchgear Startup Service

- Inspect anchorage, alignment and grounding
- Check tightness of bolted bus joints
- Measure and record critical distances such as contact gap
- Perform mechanical operation tests on the operating mechanism
- Perform a contact resistance test on the breaker vacuum contacts
- Perform insulation resistance tests
- Perform vacuum interrupter integrity (over-potential) tests
- Perform insulation resistance test on all control wiring at 1000 volts DC
- Verify trip, close, trip-free and anti-pump functions
- More



### Low Voltage Switchgear Startup Service

- Perform mechanical operational test
- Check cell fit and element alignment

- Check tightness of connections
- Lubricate as required
- Perform a contact resistance test
- Perform an insulation resistance test at 1000 volts DC from pole-to-pole and from each pole-to-ground with breaker closed and across open contacts of each phase
- Perform secondary current injection testing
- More



### Switchboards and Power Switching Centers

- Inspect for physical damage and nameplate compliance with single line diagram
- Perform mechanical operational test. (circuit breakers, switches, etc.)
- Check cell fit and element alignment
- Check tightness of connections and lubricate
- Perform a contact resistance test on RL/WL/SB breakers and power switches
- Perform an insulation resistance test at 1000 volts DC from pole-to-pole and from each pole-to-ground with breaker or switch closed and across open contacts of each phase
- Perform Secondary Current Injection Testing (RL/WL/SB breakers)
- More

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SWITCHGEAR

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Field Services

## Start-up Commissioning Services

**General**



### Motor Control Center Startup Service

- Ensure that all protective devices have been properly set and locked
- Review power fuse selection and installation procedures
- Conduct a general physical inspection of MCC power and control connections. Check tightness of connections

- Ensure incoming line power connections comply with UL/NEC requirements where applicable
- Ensure that any special motor starting and running applications have been considered when selecting motor starter controls, and that main metering is functioning properly
- Perform startup on drives, solid state/soft-start starters and other equipment
- More

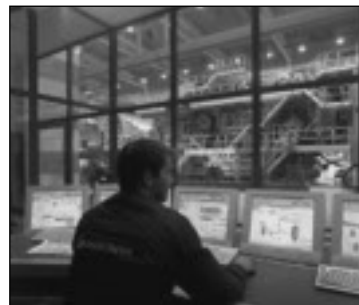


### General Purpose Variable Speed Drives Startup Service

- Inspect electrical and mechanical parts

- after installation and wiring (per drawings)
- Make final adjustments such as speed range, acceleration/deceleration and tuning to motor
- Check starting, stopping, interlocking and sequencing (per drawings)
- Check and adjust for purchased options such as bypass, braking, serial communications, encoder interface, and line filters
- Verify power quality (MM440 units only)
- More

## Engineer-by-the-Day for new equipment purchases



\*Minimum purchase required. Extended warranty not available with Engineer-by-the-Day service.



Now, you can take advantage of the expertise of a Siemens factory-trained engineer to startup your Siemens power distribution and control equipment purchases.

Engineer-by-the-Day is available in complete one-day increments for setup of the following products\*:

- ACCESS power monitoring
- Busway
- Dry type transformers
- Insulated case circuit breakers
- Molded case circuit breakers
- Panelboards
- Sensitrip circuit breakers
- Switchboards
- Switches
- More

Siemens Energy & Automation is committed to ensuring that your equipment is up and running...when you need it. Siemens Industrial Services provides expert factoryauthorized equipment startup at a special rate when you purchase the service before your product is delivered.

Get your equipment up and running on time. Contact your local distributor or Siemens Energy & Automation sales office to learn more.

# Field Services

## Power System Studies



### Short Circuit Study

Power system specialists from Siemens will determine the maximum duty that your system's protective devices, transformers, and interconnections will be subjected to in the event of three phase and/or line-to-ground fault conditions. In addition, we will provide basic information required to establish protective relay settings.

### Coordination Study

Under fault conditions, systems should isolate the faulted area to minimize disturbance to the remaining system, and simultaneously limit damage to equipment. We will review the characteristics of your protective devices, then provide the settings necessary to ensure that your system functions optimally should a fault occur.

### Harmonic Analysis

As AC drives have become increasingly prevalent in industry, we have seen the introduction of destructive harmonics to many systems. The power quality experts from Siemens will determine the extent and severity of harmonics in your system, then recommend the appropriate means of limiting potential damage.

### Transient Stability Study

This study is particularly valuable for facilities that generate their own power, and those with very large motors. Our

power system specialists will study the transient response of rotating equipment following system disturbances, and analyze system behavior in relation to the power company tie.

### Protective Device Evaluation

With the objective of achieving optimum protection, we will perform the necessary calculations required to select the interrupting rating of power fuses, circuit breakers, and other protective devices.

### Power Quality Assessment

With the proliferation of sensitive electronic equipment in recent years, power quality has become a major concern for industry. We perform structured, step-by-step studies with timely diagnosis and expert solutions to the complex challenges of utility and end-user power quality issues.

### Arc Flash Study

NFPA 70E recommends that an Arc Flash Hazard Analysis be performed prior to work on electrical equipment. Siemens will determine the incident energy levels, Arc Flash Boundary (AFB), and required level of Personal Protective Equipment (PPE).

### Load Flow Study

This steady-state analysis of your system's capability to supply the connected load will produce a listing of real and reactive power flow in each line or branch, and the bus voltages, under both normal and abnormal system conditions.

### Voltage Unbalance Study

Voltage flicker and poor voltage regulation are a common concern on systems with large arc furnaces. The experts from Siemens use this study to develop comprehensive solutions that limit the effects of voltage irregularities and protect sensitive equipment.

## General/Selection

### Grounding Study

With the goal of ensuring proper protection and reducing the possibility of excessive transient overvoltages during line-to-ground faults, our engineers will determine and recommend the most appropriate form of system grounding protection (including solidstate, low resistance, and high resistance).

With power system expertise and experience that comes from real-world successes, the specialized team of professional engineers and certified technicians from Siemens will help you:

- Minimize downtime
- Improve the safety of your operations for employees and sub-contractors
- Optimize your system's performance
- Extend your equipment's life cycle
- Reallocate your valuable internal maintenance resources to your core business
- Maximize the protection of sensitive electronics
- Ensure your facility complies with applicable safety regulations

In addition, the power system specialists from Siemens also provide the following:

### Power System Studies on "Equipment Release for Manufacture"

- To ensure adequate interrupting rating, and to ensure that coordination capabilities are recognized

### Streamlined Power System Construction Studies (PSCS)

- For devices being installed on construction projects

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.



### Arc Flash Hazards

In the fraction of a second that it takes copper to expand to vapor, an arc flash can generate skin-searing heat — four times hotter than the surface of the sun.

Recent revisions to NFPA70E require that an Arc Flash Hazard Analysis be performed prior to working on or near electrical equipment containing exposed energized conductors. The analysis determines the arc flash boundaries (AFB), incident energy levels and the required level of personal protective equipment (PPE). The recommendations in the analysis can be used to determine hazards in your workplace. Implementing the recommendations will help protect your workers and help you satisfy OSHA requirements.

### The Siemens solution to minimize risks from arc flash hazards

Working within NFPA and IEEE guidelines, our experienced power systems engineers will perform systematic and accurate Arc Flash Hazard Studies as follows:

- 1. Short Circuit Calculations**  
Siemens will either use your data, or make calculations for you, to identify bolted and arcing fault levels at key points in a power distribution system.
- 2. Protective Device Coordination**  
Using the customer's electrical systems coordination study, Siemens determines the duration of the arcing faults.
- 3. Arc Flash Hazard Calculations**  
The incident energy level, the flash hazard boundary, and the PPE required are then calculated for each location.
- 4. Documentation**  
The information above is compiled for you into a comprehensive report, which contains information necessary to comply with regulatory requirements.
- 5. Unsafe Work Locations**  
The report will identify work locations having incident energy levels in excess of available PPE ratings.
- 6. Arc Flash Hazard Mitigation**  
Recommendations will be made to minimize Arc Flash Hazards by changes in system protection or operational procedures.
- 7. Arc Flash Hazard Labels**  
In addition to the report, our customers will receive a field label containing the flash hazard boundary distance, incident energy level, PPE category and shock hazard for each location.

### Implementing recommendations from a Siemens Arc Flash Hazard Study can bring you the following benefits:

- Improve employee safety
- Improve your electrical system
- Provide safety information to subcontractors
- Assist in compliance with regulations
- Provide you with documentation that may bring about reductions in workers compensation and insurance rates

Turn to Siemens for Arc Flash Hazard Studies, comprehensive safety training and other related services that will enhance the safety of your personnel and the reliability of your operation.

### **SARRACS — Complete arc flash protection for switchgear racking.**

After completion of your Arc Flash Hazard Study and Equipment Labeling efforts, why not consider another aspect to your personnel safety initiatives? Why not consider Siemens' SARRACS remote circuit breaker racking system? Racking medium voltage circuit breakers (>1000V) into and out of a live bus is one instance where the PPE required may not be adequate to protect personnel from arc flash. Siemens SARRACS effectively removes the operator from the arc flash boundary by allowing for remote installation or removal. In addition, SARRACS provides torque monitoring to detect improper breaker connection.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.



# Secondary Unit Substations

## Overview

General

Siemens offers a wide variety of unit substation designs to meet customer requirements. A unit substation consists of one or more transformers mechanically and electrically connected to and coordinated in design with one or more switchgear or switchboard assemblies. A secondary unit substation is defined as a unit substation whose outgoing section is rated below 1000 volts.

### A typical secondary unit substation consists of three sections:

- Primary: an incoming section that accepts incoming high voltage (2400 to 13,800 volts) line
- Transformer: section that transforms incoming voltage down to utilization voltage (600 volts or less)
- Secondary: an outgoing section that distributes power to outgoing feeders and provides protection for these feeders (600 volts and less)

### Standard secondary unit substations consist of:

- Medium Voltage Primary
- Transformer
- Low Voltage Secondary

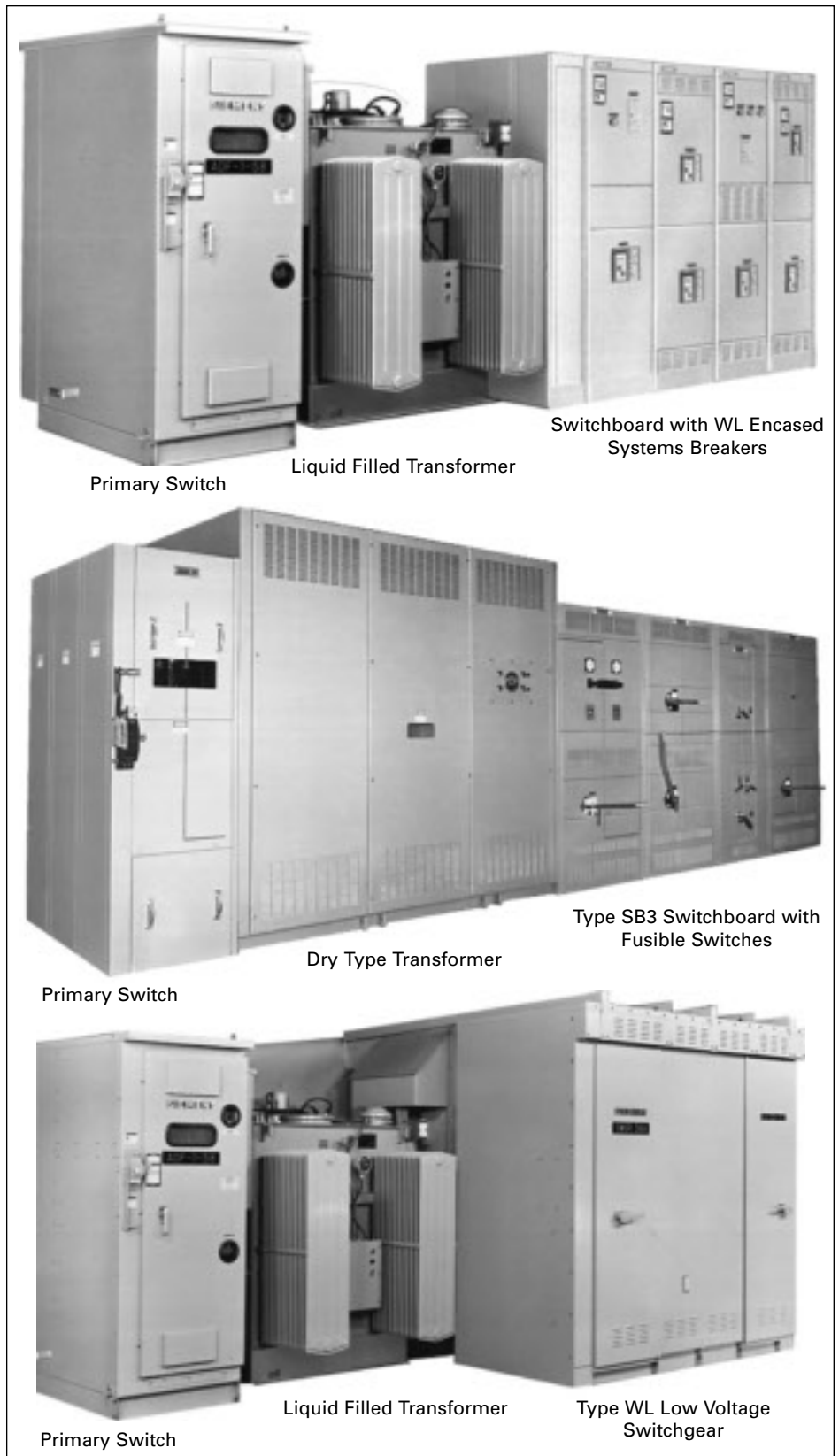
### Siemens also offers low voltage unit substations with:

- Low Voltage Primary
- Transformer
- Low Voltage Secondary

The primary reason for using a secondary unit substation is to bring power as close as possible to the center of the loads. Another reason is that it provides a system design concept incorporating a wide variety of components that permits tailoring equipment to the needs of the application. A secondary unit substation provides

- Reduced power losses
- Better voltage regulation
- Improved service continuity
- Increased functional flexibility
- Lower installation cost
- Efficient space utilization

Every component and assembly of secondary unit substations are designed and engineered as an integral part of a complete system.

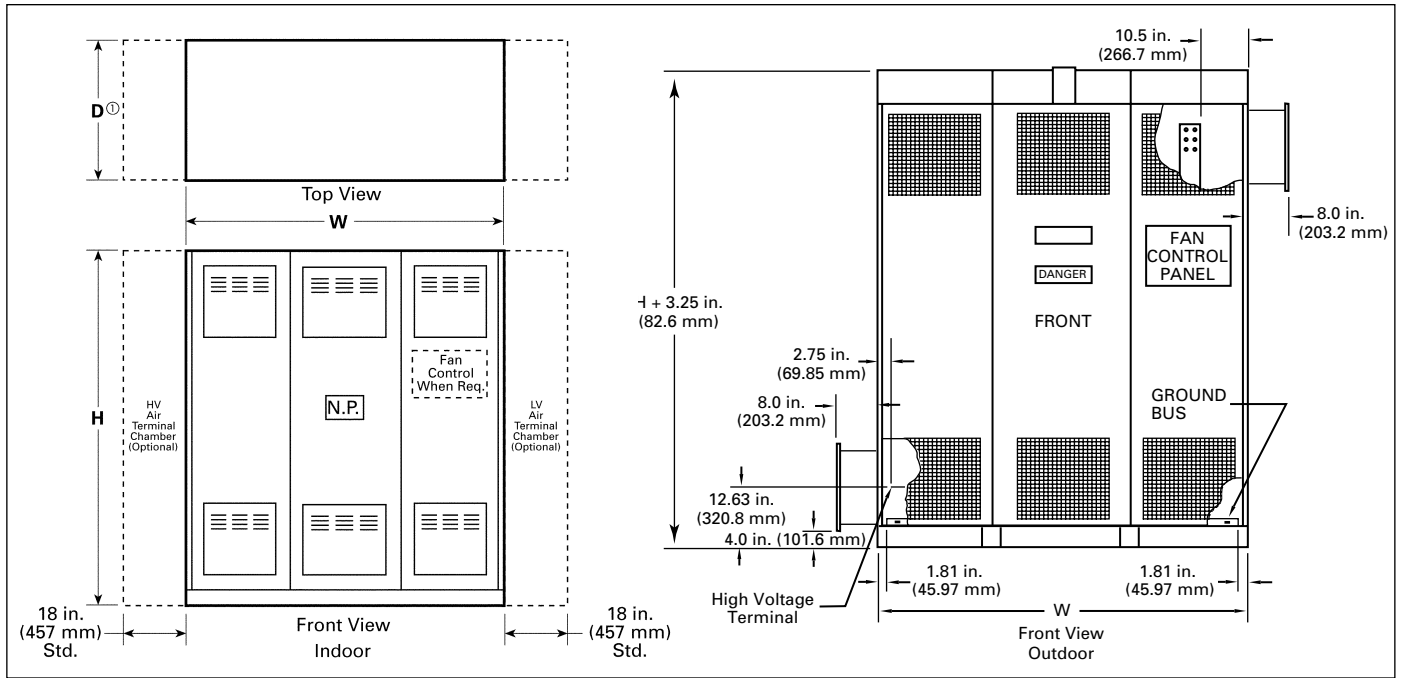


For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Secondary Unit Substations

## Transformers — Dry Type

## Dimensions



**Table 23 5kV and 15kV Ventilated Dry Type Transformers**

kVA Rating	115°C or 150°C Temp Rise 5 kV = 30 kV BIL, 15 kV = 60 kV BIL				80°C Temp Rise 5 kV = 30 kV BIL, 15 kV = 60 kV BIL				115°C or 150°C Temp Rise 5 kV = 60 kV BIL, 15 kV = 95 kV BIL				80°C Temp Rise 5 kV = 60 kV BIL, 15 kV = 95 kV BIL			
	Dim. in Inches (mm)			Approx. weight— Lbs. (kg)	Dim. in Inches (mm)			Approx. weight— Lbs. (kg)	Dim. in Inches (mm)			Approx. weight— Lbs. (kg)	Dim. in Inches (mm)			Approx. weight— Lbs. (kg)
	H	W	D		H	W	D		H	W	D		H	W	D	
225	90 (2286)	48 (1219)	48 (1219)	2,200 (998)	90 (2286)	48 (1219)	48 (1219)	2,500 (1134)	—	—	—	—	—	—	—	—
300	90 (2286)	78 (1981)	48 (1219)	2,500 (1134)	90 (2286)	78 (1981)	48 (1219)	3,150 (1429)	90 (2286)	78 (1981)	48 (1219)	3,150 (1429)	90 (2286)	78 (1981)	48 (1219)	3,300 (1499)
500	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	3,150 (1429)	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	4,150 (1882)	90 (2286)	78 (1981)	48 (1219)	4,150 (1882)	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	4,400 (1996)
750	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	4,150 (1882)	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	5,050 (2291)	90 (2286)	90 (2286)	58 (1473)	5,100 (2313)	90 (2286)	90 (2286)	58 (1473)	5,500 (2495)
1000	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	5,050 (2291)	90 (2286)	78 (1981)	48 <sup>①</sup> (1219)	6,550 (2971)	90 (2286)	90 (2286)	58 (1473)	6,600 (2994)	90 (2286)	102 (2591)	58 (1473)	7,400 (3357)
1500	90 (2286)	90 (2286)	48 <sup>①</sup> (1219)	6,700 (3039)	90 (2286)	90 (2286)	48 <sup>①</sup> (1219)	8,050 (3652)	90 (2286)	102 (2591)	58 (1473)	8,050 (3652)	90 (2286)	112 (2845)	58 (1473)	14,000 (6350)
2000	90 (2286)	90 (2286)	58 (1473)	8,050 (3652)	90 (2286)	102 (2591)	58 (1473)	13,000 (5897)	90 (2286)	112 (2845)	58 (1473)	13,000 (5897)	102 (2591)	112 (2845)	58 (1473)	14,000 (6350)
2500	102 (2591)	112 (2845)	58 (1473)	13,000 (5897)	102 (2591)	112 (2845)	58 (1473)	16,000 (7258)	102 (2591)	112 (2845)	58 (1473)	16,000 (7258)	110 (2794)	112 (2845)	58 (1473)	16,000 (7258)
3000	110 (2794)	120 (3048)	58 (1473)	14,000 (6350)	110 (2794)	120 (3048)	58 (1473)	18,000 (8165)	110 (2794)	120 (3048)	58 (1473)	18,000 (8165)	110 (2794)	120 (3048)	58 (1473)	18,000 (8165)

**Table 24 5kV and 15kV Cast Coil Type Transformers**

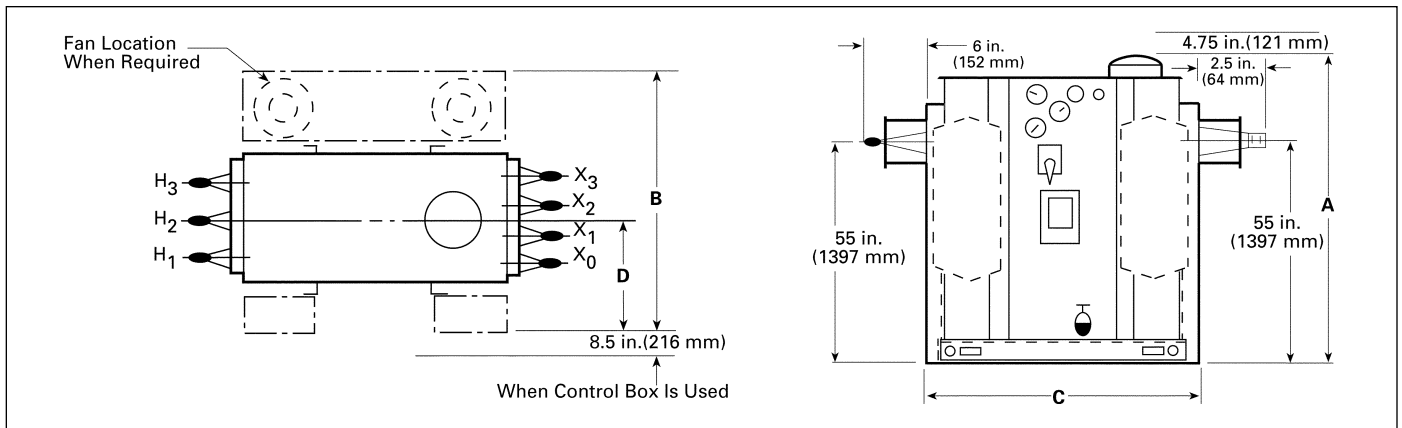
kVA Rating	115°C or 80°C 5 kV = 75 kV BIL				Weight in Lbs. (kg)	115°C or 80°C Rise 15 kV = 95 kV BIL			
	Dim. in Inches (mm)			Approx. Weight in Lbs. (kg)		Dim. in Inches (mm)			Approx. Weight in Lbs. (kg)
	H	W	D			H	W	D	
500	90 (2286)	90 (2286)	58 (1473)	5,400 (2449)	90 (2286)	90 (2286)	58 (1473)	5,400 (2449)	
750	90 (2286)	96 (2438)	58 (1473)	7,200 (3266)	90 (2286)	96 (2438)	58 (1473)	7,200 (3266)	
1000	90 (2286)	102 (2591)	58 (1473)	8,500 (3856)	90 (2286)	96 (2438)	58 (1473)	8,500 (3856)	
1500	90 (2286)	108 (2743)	58 (1473)	12,900 (5851)	96 (2438)	102 (2591)	58 (1473)	12,900 (5851)	
2000	102 (2591)	114 (2896)	58 (1473)	13,900 (6305)	102 (2591)	114 (2896)	58 (1473)	13,900 (6305)	
2500	108 (2743)	120 (3048)	58 (1473)	15,900 (7212)	108 (2743)	120 (3048)	58 (1473)	15,900 (7212)	
3000	114 (2896)	126 (3200)	58 (1473)	18,900 (8573)	114 (2896)	126 (3200)	58 (1473)	18,900 (8573)	

① 208V secondary requires 58 in. (1473 mm) deep enclosure.

# Secondary Unit Substations

## Transformers — Liquid Filled Type

## Dimensions



5kV and 15kV Liquid-Filled Transformer

**Table 25 5kV and 15kV Silicone Liquid Transformers**

kVA Rating	65°C Temp. Rise				Weight Lb. (kg)	55°C/65°C Temp. Rise				Weight Lb. (kg)
	Dimensions in Inches (mm)					Dimensions in Inches (mm)				
	A	B	C	D		A	B	C	D	
500	70.5 (1791)	59.5 (1511)	52.00 (1321)	21.50 (546)	4190 (1901)	70.5 (1791)	76.0 (1930)	52.00 (1321)	38.00 (965)	4390 (1991)
750	72.5 (1842)	81.0 (2057)	53.00 (1346)	40.50 (1029)	6450 (2926)	72.5 (1842)	81.0 (2057)	53.00 (1346)	40.50 (1029)	6890 (3125)
1000	74.5 (1892)	75.0 (1905)	56.00 (1422)	40.50 (1029)	7630 (3461)	80.5 (2045)	81.0 (2057)	56.00 (1422)	40.50 (1029)	8350 (3788)
1500	79.5 (2019)	81.0 (2057)	59.00 (1499)	40.50 (1029)	9500 (4309)	80.5 (2045)	103.5 (2629)	59.00 (1499)	51.75 (1314)	11300 (5126)
2000	79.5 (2019)	102.5 (2604)	59.00 (1499)	53.25 (1353)	12070 (5475)	89.5 (2273)	122.5 (3112)	59.00 (1499)	61.25 (1556)	13920 (6314)
2500	79.5 (2019)	110.5 (2807)	59.00 (1499)	57.25 (1454)	14190 (6437)	89.5 (2273)	130.5 (3315)	59.00 (1499)	65.25 (1657)	15230 (6908)

**Table 26 5kV and 15kV Mineral Oil Filled Transformers**

kVA Rating	65°C Temp. Rise				Weight Lb. (kg)	55°C/65°C Temp. Rise				Weight Lb. (kg)
	Dimensions in Inches (mm)					Dimensions in Inches (mm)				
	A	B	C	D		A	B	C	D	
500	70.5 (1791)	53.5 (1359)	52.00 (1321)	21.5 (546)	4100 (1860)	70.5 (1791)	53.5 (1359)	52.00 (1321)	21.50 (546)	4270 (1937)
750	70.5 (1791)	58.5 (1486)	53.00 (1346)	24.0 (610)	6200 (2812)	70.5 (1791)	75.0 (1905)	53.00 (1346)	40.50 (1029)	6420 (2912)
1000	70.5 (1791)	64.5 (1638)	56.00 (1422)	24.0 (610)	7140 (3239)	70.5 (1791)	81.0 (2057)	56.00 (1422)	40.50 (1029)	7720 (3502)
1500	72.5 (1842)	64.5 (1638)	59.00 (1499)	24.0 (610)	8800 (3992)	72.5 (1842)	81.0 (2057)	59.00 (1499)	40.50 (1029)	9550 (4332)
2000	76.5 (1943)	78.0 (1981)	59.00 (1499)	36.0 (914)	10250 (4649)	76.5 (1943)	98.5 (2502)	59.00 (1499)	49.25 (1251)	10650 (4831)
2500	76.5 (1943)	84.0 (2134)	59.00 (1499)	42.0 (1067)	13730 (6228)	76.5 (1943)	106.5 (2705)	59.00 (1499)	53.25 (1353)	14250 (6464)
3000	76.5 (1943)	98.5 (2502)	70.00 (1778)	49.25 (1251)	⓪	76.5 (1943)	106.5 (2705)	70.00 (1778)	53.25 (1353)	⓪
3750	77.5 (1969)	108.5 (2756)	72.00 (1829)	54.25 (1378)	⓪	77.5 (1969)	124.5 (3162)	72.00 (1829)	62.25 (1581)	⓪

⓪ Consult Siemens for weight.

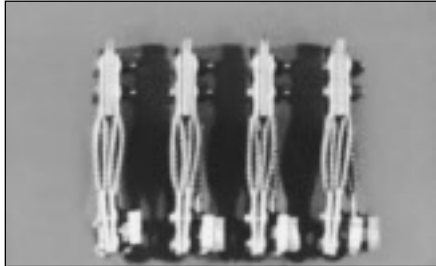
**Note:** Dimensions and weights on this page are for estimating purposes only, not for construction.

# Secondary Unit Substations

## Transition Sections

General

A transition section is required between the transformer and the primary section, and between the main device section of the switchboard for a liquid filled transformer. Connection between the transformer secondary and the main bus of the switchboard is made with flexible connectors.



Transition Section



Flexible Connectors Between Transformer Secondary and Main Bus of Switchboard

### High Voltage Transition Section Between Primary Switch and Transformer

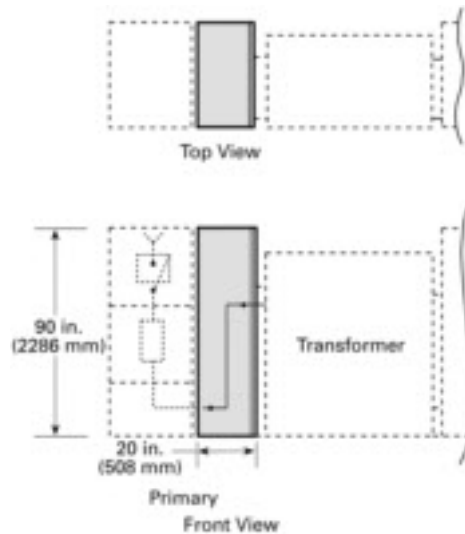


Table 27

Transformer	Width in Inches (mm)	Depth
Oil, RTEmp, Silicone	20 (508)	①
Ventilated Dry Type <sup>②</sup>	20 (508)	①
Outdoor Cast-Coil <sup>②</sup>	20 (508)	①

① Same depth as primary switch section.

② Transition section is not required (optional).

### Low Voltage Transition Section Between Transformer and Low Voltage Switchboard

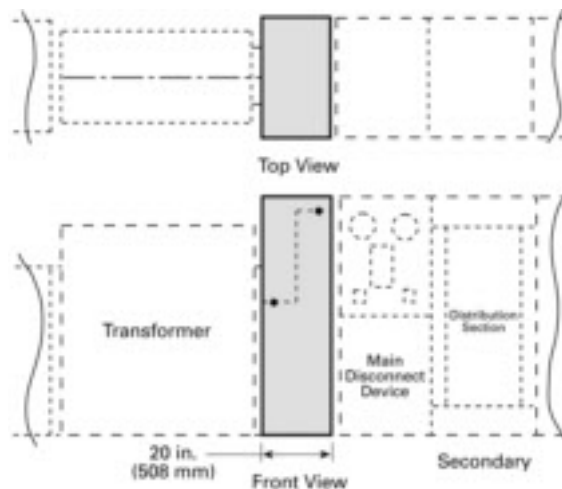


Table 28

Amp Rating	Dimensions in Inches (mm)			
	Liquid Filled Transformer		Ventilated Dry Type and Cast Coil Transformer <sup>②</sup>	
	W	D	W	D
600	20	①	20	①
800	(508)		(508)	
10000				
1200	20	①	20	①
1600	(508)		(508)	
2000				
2500	20	①	20	①
3000	(508)		(508)	
4000				

① Same depth as primary switch section.

② Transition section is not required (optional).

Switchboard secondary defines requirements. Consult Siemens for specific requirements.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Secondary Unit Substations

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- **Switchboard Secondary**

Note: See Section 12 for Switchboard Secondaries

- **Switchgear Secondary**

Note: See Pages 42-51 for WL Switchgear Secondary

# Low Voltage Switchgear

## Type WL Low Voltage Metal-Enclosed Switchgear

General

Siemens Type WL low voltage metal-enclosed switchgear is designed, constructed and tested to provide superior power distribution, power monitoring and control. At the heart of the Type WL low voltage switchgear is the World Class Siemens WL breaker.

Siemens Type WL low voltage switchgear can be utilized in the following applications:

- Industrial
- Institutional
- Critical Power
- Utility and co-generation
- Commercial

### Product Scope

- Equipment ratings  
635VAC Maximum  
3-Phase 3-Wire,  
3-Phase 4-Wire  
50/60 Hz  
6000 amp maximum horizontal bus  
5000 amp maximum vertical bus
- Enclosure options  
NEMA 1 Indoor  
NEMA 3R Outdoor Walk-in  
NEMA 3R Outdoor Non Walk-in

### Exclusive Features

#### Generator/Utility Protection Sets

24/7/365 power availability is critical for some systems. On-site generation capability is growing more and more common in many systems. All of the WL digital electronic trip units allow the system designer to precisely tailor trip settings for the most demanding requirements. However, the 755 and 776 trip units allow one set of trip settings for a fully loaded utility feed and with a simple contact closure, the trip unit toggles to a second trip set tailored to provide optimal generator protection. The wide range of settings allows the WL to provide protection for a minimal generator capacity for only essential loads, through full backup for an entire facility. This dual utility/generator protection capability in a single circuit breaker allows the system designer unparalleled, cost-effective flexibility.



Type WL Low Voltage Metal-Enclosed Switchgear

#### Extended Instantaneous Protection

(EIP – Patent Pending Feature)  
Another unique feature of the WL Trip Unit, allows the system designer to achieve full selective trip coordination up to the short-time rating of the frame, while also allowing application of the breaker up to the interrupting rating of the frame. EIP allows the WL breaker to be applied up to the full withstand rating of the breaker, for complete coordination, with a minus 0% short-time band tolerance up to 85kA on Frame Size II and 100kA on Frame Size III. Above fault currents of 20% higher than the full short-time rating, the WL breaker is self protecting, and the EIP function will trip the breaker instantly to protect the frame and the system from these extremely high currents, as high as 150 kA on Frame Size III. One added benefit is that arc flash energy is greatly reduced in this high current region due to the instantaneous trip response that EIP provides.

#### Industry Standards

Type WL switchgear with power circuit breakers are designed, tested and constructed in accordance with:

- UL 1558—Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear
- ANSI C37.20.1—Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear

WL drawout circuit breakers are designed for continuous operation at 100% of their current rating without the need for external heat sinks, and are in accordance with:

- UL 1066—Low Voltage AC and DC Power Circuit Breakers Used in Enclosures
- ANSI C37.13—Low Voltage AC Power Circuit Breakers Used in Enclosures

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Low Voltage Switchgear

## Type WL Low Voltage Metal-Enclosed Switchgear

## Specifications

### WL Low Voltage Metal-Enclosed Switchgear Features & Benefits

- Control and communication termination area located in front of equipment and segregated from power cable termination area that is located in rear of equipment
- Front accessible vertical and horizontal wiring channels
- Easy access to control and communication connections through separate front door
- No heat sinks on breaker or bus
- No front-breaker door ventilation
- 100kA bus bracing standard - 150kA and 200kA optional
- Insulated/isolated bus through 6000 amps
- Three levels of horizontal bus through 5000 amps
- Modular design for maximum configuration flexibility
- Breaker racking handle integral to the breaker
- All breaker settings and displays clearly visible with breaker door closed
- Field installable "drop in place" accessories and trip units
- Same accessories work for entire breaker line
- ModBus, ProfiBus and Ethernet communication
- Field installable ground fault protection and zone selective interlock
- Rogowski coil current sensors provide high metering accuracy and prevent saturation at high current levels
- Dynamic Arc Flash Sentry (DAS) and EIP (Extended Instantaneous Protection) are patent pending features from Siemens that greatly reduce Arc Flash Energy

### Breaker Ratings

Frame Size II																		
Frame Rating		800					1600					2000				3200		
Rating Designation		N	S	H	L	F	N	S	H	L	F	S	H	L	F	S	H	L
Interrupting Current $I_{CS}$ (kAIR RMS) 50/60 Hz	254VAC	50	65	85	100	200	50	65	85	100	200	65	85	100	200	65	85	100
	508VAC	50	65	85	100	200	50	65	85	100	200	65	85	100	200	65	85	100
	635VAC	50	65	65	85	200	50	65	65	85	200	65	65	85	200	65	65	85
Short-time Withstand Current $I_{CW}$ (kA RMS) 50/60 Hz	0.5s	50	65	65	85	20	50	65	65	85	20	65	65	85	20	65	65	85
Extended Instantaneous Protection (kA RMS - 0% to 20+%)	285-508VAC	50	65	85	100	200	50	65	85	100	200	65	85	100	200	65	85	100
	635VAC	50	65	65	85	200	50	65	65	85	200	65	65	85	200	65	65	85
Close & Latch Ratings (kA RMS) 50/60 Hz		50	65	65	85	75	50	65	65	85	75	65	65	85	75	65	65	85
Rating Plug Range		200A to 800A					200A to 1600A					200A to 2000A				200A to 3200A		
Endurance Rating (switching operations with maintenance) <sup>①</sup>	Mech.	15,000					15,000					15,000				15,000		
	Elec.	15,000					15,000					15,000				15,000		

Frame Size III												
Frame Rating		3200			4000				5000			
Rating Designation		M	F	H	L	M	F	H	L	M	F	
Interrupting Current $I_{CS}$ (kAIR RMS) 50/60 Hz	254VAC	150	200	85	100	150	200	85	100	150	200	
	508VAC	150	200	85	100	150	200	85	100	150	200	
	635VAC	85	200	85	85	85	200	85	85	85	200	
Short-time Withstand Current $I_{CW}$ (kA RMS) 50/60 Hz	0.5s	100 <sup>②</sup>	40	85	100 <sup>②</sup>	100 <sup>②</sup>	40	85	100 <sup>②</sup>	100 <sup>②</sup>	40	
Extended Instantaneous Protection (kA RMS - 0% to 20+%)	254VAC											
	508VAC	150	200	85	100	150	200	85	100	150	200	
635VAC	85	200	85	85	85	200	85	85	85	200		
Close & Latch Ratings (kA RMS) 50/60 Hz		100 <sup>②</sup>	40	85	100 <sup>②</sup>	100 <sup>②</sup>	40	85	100 <sup>②</sup>	100 <sup>②</sup>	40	
Rating Plug Range		800A to 3200A			800A to 4000A				800A to 5000A			
Endurance Rating (switching operations with maintenance) <sup>①</sup>	Mech.	10,000			10,000				10,000			
	Elec.	10,000			10,000				10,000			

① Maintenance means: Replacing main contacts and arc chutes (see operating instructions). Main contacts in breakers with Rating Designation M can only be replaced by Siemens personnel.

② Do not apply breaker at 635V AC on a system with available fault current > 85kA RMS.

# Low Voltage Switchgear

## Type WL Low Voltage Metal-Enclosed Switchgear

General

### Main and Ground Bus

The standard main bus is silver-plated copper. Tin-plated copper bus is optionally available. Vertical and horizontal bus bar utilize a channel shape design to maximize short circuit withstand capability and minimize heat rise. All bus joints include Grade 5 bolts and conical spring washers. Provisions for future extension of the main bus include plated joints and high tensile strength steel hardware.

The main three phase horizontal bus is arranged vertically one phase above the other with edge-to-edge alignment to provide high, short circuit strength. Insulated main bus with isolated vertical bus is optional.

Vertical bus ratings available are 1600, 2000, 3200, 4000 and 5000 amperes continuous current. Horizontal bus ratings available are 1600, 2000, 3200, 4000, 5000 and 6000 amperes. A neutral bus is furnished when specified, and can be rated 1600, 2000, 3200, 4000, 5000 or 6000 amperes continuous current.

A standard copper ground bus extends through all sections. Cable lugs are mounted to the ground bus in each section.

Standard short-circuit withstand (4 cycle) and short-time withstand (60 cycle) bus bracing is 100,000 amperes. Higher short-circuit withstand bus bracings (150kA and 200kA) are available.

Load side runbacks for feeder circuits are copper construction, are insulated with sleeve tubing in the main bus area, and are supported by high-strength bus bracing.

### Control and Communication Wiring

Standard control and communication wiring is #14 AWG extra-flexible, stranded copper type SIS. Terminations are made with compression-type, insulated terminals. Control and communication wiring is installed and accessed from the front of the switchgear structure. Each breaker compartment has a dedicated horizontal and vertical wireway.

For devices not having screw-type terminals, pressure terminals are used.

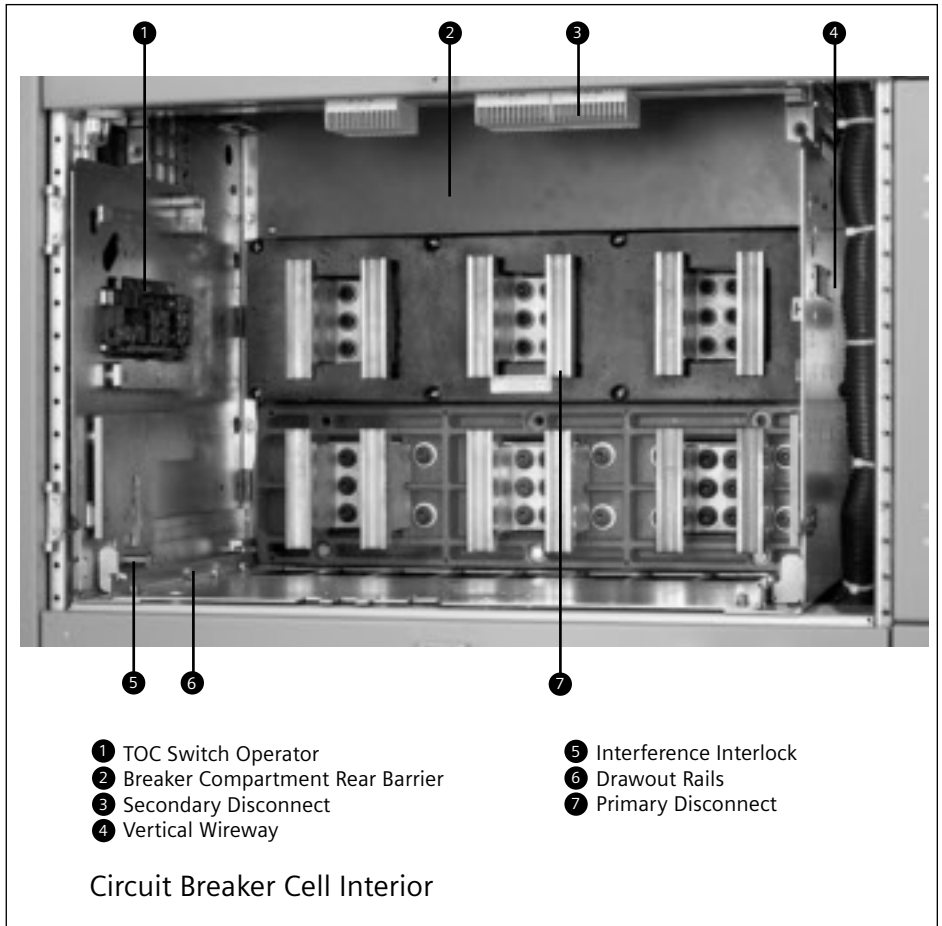
### Insulation

The insulation used is a UL recognized thermoset material that has excellent heat resistance, flame retardance, dimensional stability and low moisture absorption.

### Circuit Breaker Compartments

Typical circuit breaker compartments include primary disconnects, drawout rails, secondary disconnects, vertical wireway, horizontal wireway and, if applicable, TOC switch operator, MOC switch operator and associated interlocks. Drawout rails allow the breaker to be withdrawn from the compartment without additional extensions or adapters. Up to six (2 sets of three) current transformers for metering or relaying can be mounted in each compartment.

A separate secondary disconnect access door that is supplied with each breaker can be used to mount a variety of auxiliary devices such as breaker control switches, indicating lights and pushbuttons.



For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.



# Low Voltage Switchgear

## Type WL Low Voltage Metal-Enclosed Switchgear

General

### Options

#### Siemens High Resistance Grounding System

- (1) The HRG section can be 22" or 32" wide. The HRG instrument compartment is 45" high and either 19" or 24" deep depending on whether the circuit breakers are fused. The HRG instrument compartment will house all of the high resistance grounding system components either on the door or in the device bucket except for the grounding resistors.
- (2) The grounding resistor assembly will mount in the rear cable compartment of the switchgear on the runback support posts. It will typically mount behind the HRG instrument compartment where it cannot interfere with feeder breaker runbacks.
- (3) In a typical Siemens HRG application with a close coupled main breaker section, a general purpose instrument compartment takes up the A compartment, the main breaker goes in the B compartment and the HRG instrument compartment takes up the C & D compartments. An alternate HRG main breaker section can have the HRG instrument compartment in the A & B compartments, main breaker in the C compartment and a general instrument compartment in the D compartment.

#### Switchgear Mounted Hoist

The integrally mounted hoist, standard on walk-in outdoor and optional on indoor switchgear enclosures, travels along rails on top of the switchgear to assist in breaker handling.

#### TOC and MOC Switches

The Truck Operated Cell (TOC) Switch provides interlocking control or remote indication of the breaker racking position. The cubicle mounted auxiliary switch or Mechanism Operated Cell (MOC) switch provides interlocking control or remote indication based on the main contact position (open or closed).

#### Shutters

These provide protection against accidental contact with primary disconnects in a compartment when the breaker is removed. Shutters automatically close when the breaker is withdrawn and are padlockable and field installable.

#### Key Interlock

This provides a mechanical means for operating circuit breakers and other devices only when prescribed conditions are met.

### Test Set

A portable breaker test set is available as an option and supports testing the full range of functions and protective settings supplied with the breaker trip unit.

### Metering and Auxiliary Compartments

Compartments are available to house devices such as voltage transformers, metering, control power transformers, and supervisory devices.

### Instrument and Control Transformers

Voltage transformers and control power transformers are mounted in auxiliary compartments. These transformers are protected by primary pull-out type current-limiting fuses and secondary fuses. Current transformers are normally mounted on the compartment primary disconnect studs where they are readily accessible.

### Miscellaneous

- Each switchgear lineup includes a breaker lifting device that is adjustable for use with Size II and Size III breakers
- An optional portable breaker hoist is available if the integrated breaker hoist and track is not specified
- A test cabinet is also available as an option. The test cabinet is wall mounted necessary equipment for testing electrically-operated breakers that have been removed from the breaker compartment. The test cabinet doesn't include or replace a breaker trip unit tester
- 4" high formed steel channel sills are available for indoor switchgear enclosures

### Outdoor Switchgear

Type WL switchgear is available in two outdoor (NEMA 3R) enclosures. Walk-in and non walk-in versions are available to meet your particular application.

For protection from snow, rain and other foreign matter, both outdoor enclosures rest on a six-inch high, formed steel base which provides rigid support and a tight bottom seal. A heavy duty protective undercoating is applied to the underside of all outdoor enclosures to protect against moisture and corrosion. Shielded ventilation housings permit proper air circulation while excluding dirt and foreign matter.

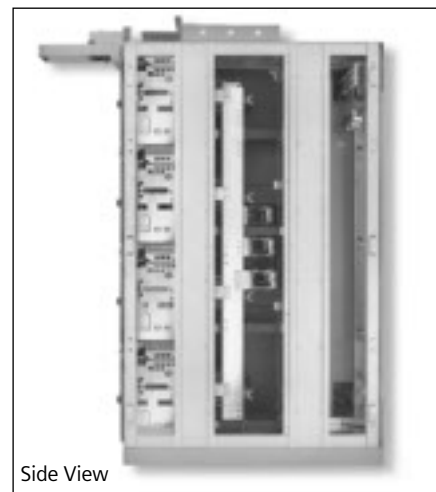
In the walk-in outdoor enclosure a lighted, unobstructed service aisle is provided at the front of the switchgear allowing inspection and maintenance

without exposure to the elements. An access door equipped with an emergency bar release is located at each end of the aisle.

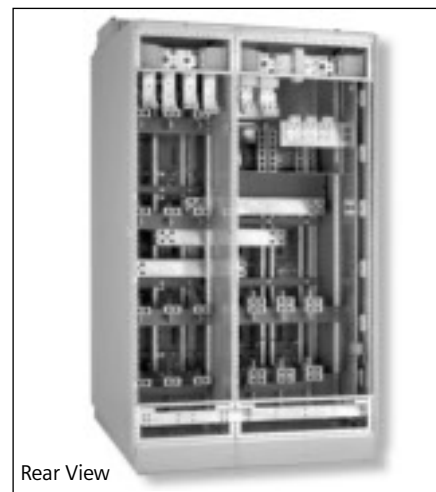
The following features are standard with walk-in outdoor enclosures.

- (1) Space heaters in breaker compartment and bus compartment.
- (2) Screens and filters for exterior door ventilation louvers.
- (3) Incandescent lighting receptacle with three-way switch at each aisle access door.
- (4) Duplex receptacle with ground fault protection at each aisle access door.
- (5) Load center for power distribution to lights, receptacles, switches and heaters.

For non walk-in outdoor enclosures, space heaters and screens/filters for ventilation louvering are standard with lighting, receptacles, switches and load centers offered as options.



Side View



Rear View

13

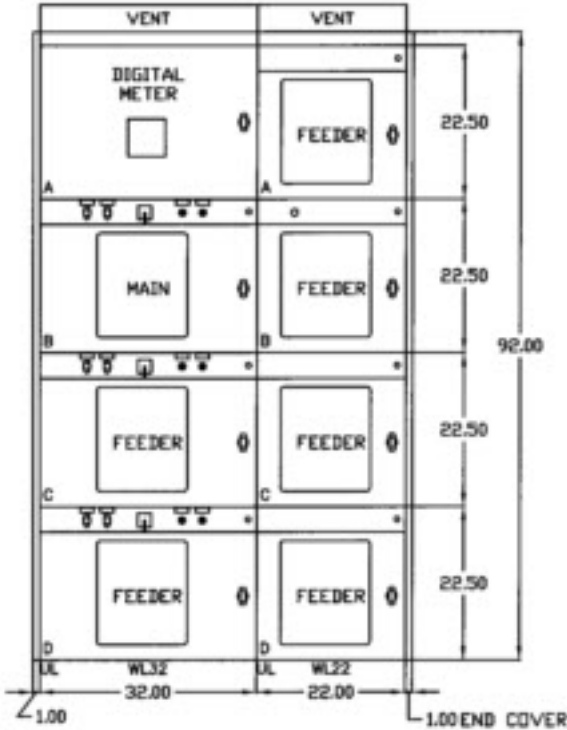
SWITCHGEAR

# Low Voltage Switchgear

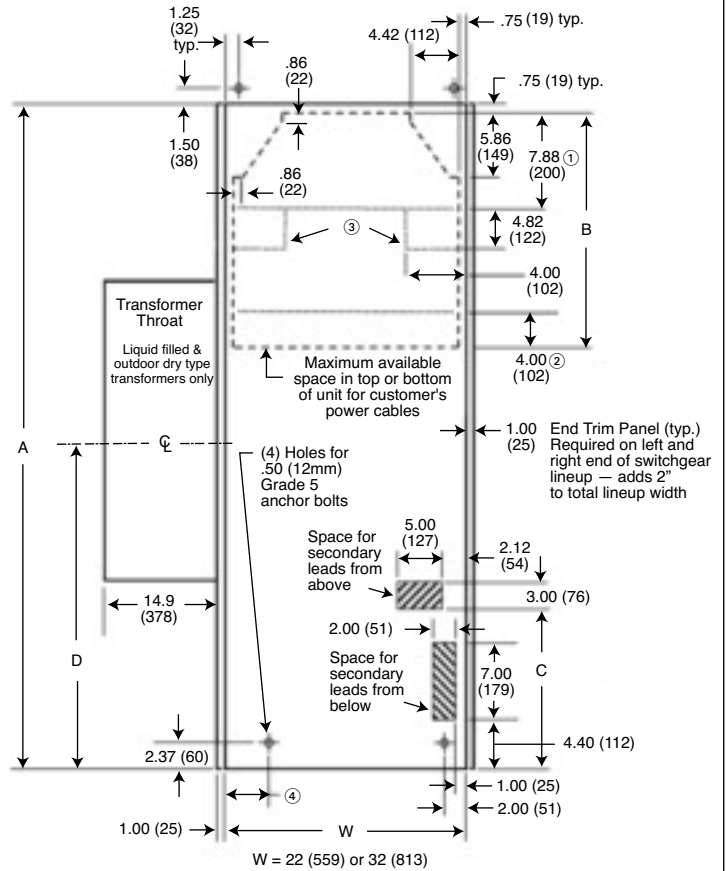
## Type WL Low Voltage Metal-Enclosed Switchgear

### Dimensions

Indoor Front Elevation View



Indoor Floor Plan and Cable Space Details



A Equipment Depth	Direction of Cables	B	C	D
60" Non-Fused with (N, S, H or L-Rating Breakers) OR 65" Fused with (F-Rating Breakers)	Below	21.50 (546) ① ②	13.88 (353)	32.59 (828)
	Above	21.25 (540) ①	18.88 (480)	37.59 (955)
70" Non-fused with (N, S, H or L-Rating Breakers) OR 75" Fused with (F-Rating Breakers)	Below	31.50 (800) ① ②	13.88 (353)	32.59 (828)
	Above	31.25 (794) ①	18.88 (480)	37.59 (955)
80" Non-fused with (N, S, H or L-Rating Breakers)	Below	41.50 (1054) ① ②	13.88 (353)	32.59 (828)
	Above	41.25 (1048) ①		
80" Fused with (F-Rating Breakers)	Below	36.50 (927) ① ②	18.88 (480)	37.59 (955)
	Above	36.25 (921) ①		

**Note:** Dimensions shown in inches and (mm).

① Reduce by 7.88" if upper neutral is present with cables above or if a lower neutral is present with cables below.

② Reduce by 4.00" if an 800-3200A breaker is located in the bottom compartment.

Reductions per notes 1 & 2 are additive. Example: cables below + lower neutral + 2000A breaker in bottom compartment = B-11.88.

③ Reduce cable space by 4.00" x 4.82" if Neutral Riser is present. (Consult Factory).

④ 4.10 (104) if W=22; 4.60 (117) if W=32.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Low Voltage Switchgear

## Type WL Low Voltage Metal-Enclosed Switchgear

Selection

### General Notes:

- A blank/instrument compartment can always be substituted for a breaker compartment
- Any 22" wide section can be 32" wide if more conduit working room is needed
- For bus duct connections – if incoming is top, Compartment A must be blank/instrument, if incoming is bottom, Compartment D must be blank/instrument
- Bused transition section is 22" wide
- For close coupled transformer connections, Compartment A must be blank/instrument
- Utility metering is always in a separate section. Section width is dependent on utility

**Note 1** – If a 4000 amp feeder breaker is installed in Compartment C, Compartment D must be a Blank or Instrument Compartment.

**Note 2** – If a 4000 amp breaker is installed in Compartment B, Compartment A must be a Blank or Instrument Compartment.

**Note 3** – Contact factory for application guidelines related to this design.

**Note 4** – If a 3200 amp breaker is installed in Compartment B, the middle level through bus is not available.

**Note 5** – If a 3200 amp breaker is installed in Compartment D, the lower level through bus is not available.

**Note 6** – If incoming is bottom, feeder breakers can mount in compartments A and/or B.

**Note 7** – If a 3200 amp breaker is installed in Compartment B, Feeder Breaker in Compartment A is limited to 1600 amp.

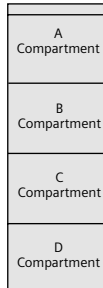
**Note 8** – If a 3200 amp breaker is in Compartment BC, the maximum breaker in Compartment A is 1600 amp and if a 4000 amp breaker is in Compartment BC, the maximum breaker in Compartment A is 800 amp.

### Switchgear Depth Dimensional Information

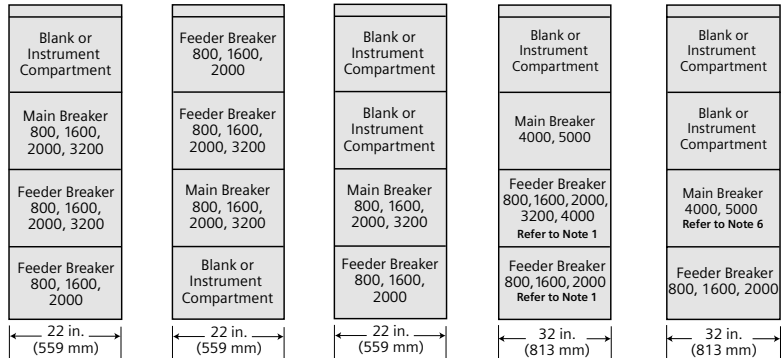
(Dimensions below are for internal frames – not total structure depth)

- Non-fused indoor – 60" standard, 70" and 80" optional
- Fused indoor – 65" standard, 75" and 80" optional
- Non-fused non-walk-in outdoor – 60" standard and 75" optional
- Fused non-walk-in outdoor – 65" standard and 75" optional
- Non-fused walk-in outdoor – 60" standard and 75" optional
- Fused walk-in outdoor – 65" standard and 75" optional
- Walk-in outdoor aisle is 42" deep
- Sections with cable connected main, tie and/or feeder breakers that are 3200 amp or greater must be minimum depth of 70" for unfused breakers and 75" for fused breakers.

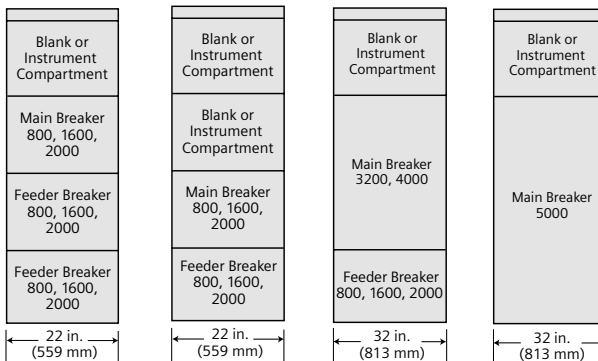
### Section Compartment Arrangement



### Main Sections – Non-Fused Breakers



### Main Sections – Fused Breakers



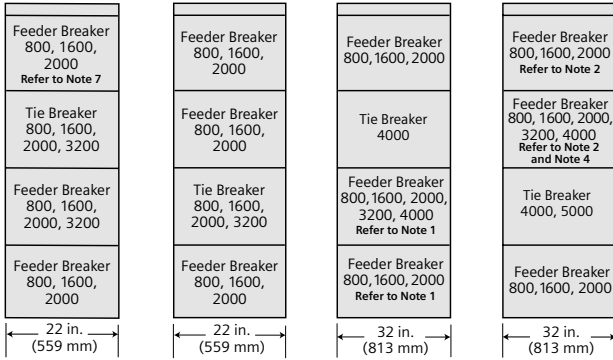
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# Low Voltage Switchgear

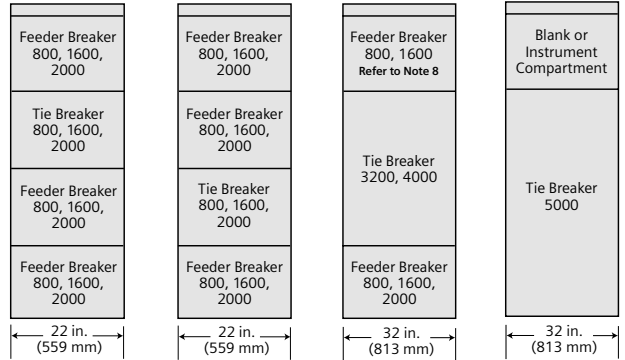
## Type WL Low Voltage Metal-Enclosed Switchgear

**Selection**

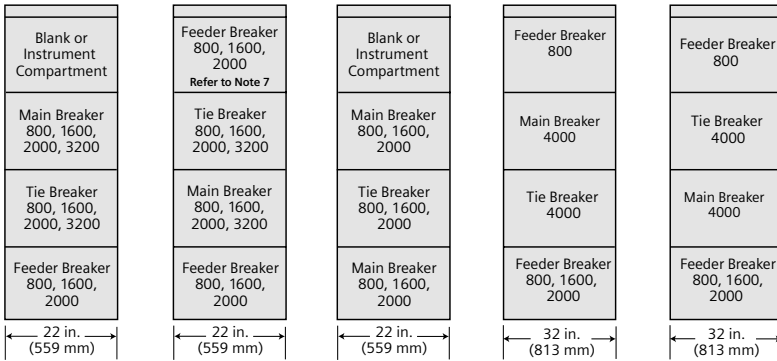
### Tie Sections – Non-Fused Breakers



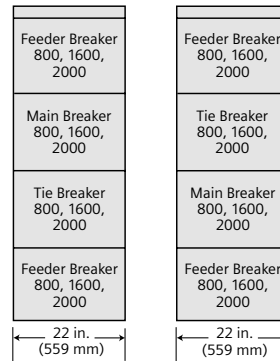
### Tie Sections – Fused Breakers



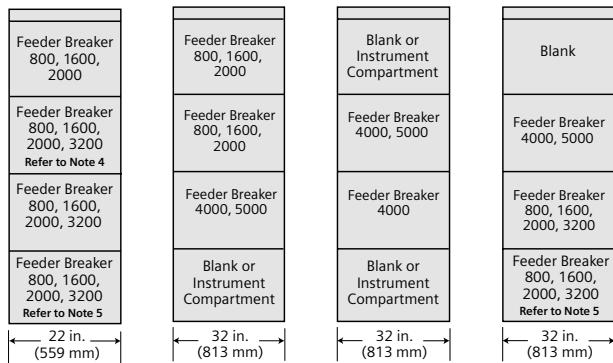
### Main and Tie Sections – Non-Fused Breakers



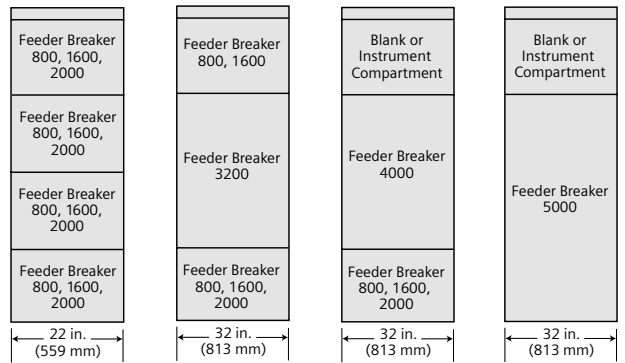
### Main and Tie Sections – Fused Breakers



### Feeder Sections – Non-Fused Breakers



### Feeder Sections – Fused Breakers



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# Low Voltage Switchgear

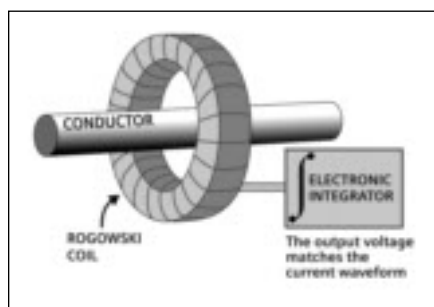
## Type WL Circuit Breakers

General

### Rogowski Coil CT Technology

A Rogowski coil is an 'air-core' toroidal coil placed round the conductor. The alternating magnetic field produced by the current induces a voltage in the coil which is proportional to the rate of change of current.

The direct output from the coil is given by  $V_{out} = M \frac{dI}{dt}$  Where  $M$  is the mutual inductance of the coil and  $dI/dt$  is the rate of change of current. To complete the transducer the voltage is integrated electronically so that the output from the integrator is a voltage that accurately reproduces the current waveform.



### Coil and Integrator:

The combination of a coil and an integrator provides an exceptionally versatile current-measuring system which can be designed to accommodate a vast range of frequencies, current levels and conductor sizes. The output is independent of frequency, has an accurate phase response and can measure complex current waveforms and transients.

### Linearity:

One of the most important properties of a Rogowski coil measuring system is that it is inherently linear. The coil contains no saturable components and the output increases linearly in proportion to current right up to the operating limit determined by voltage breakdown. The integrator is also inherently linear up to the point where the electronics saturates. Linearity makes Rogowski coils easy to calibrate because a transducer can be calibrated

at any convenient current level and the calibration will be accurate for all currents including very large ones. Also, because of their linearity, the transducers have a very wide dynamic range and an excellent transient response.

### Coil Winding

With a Rogowski coil it is important to ensure that the winding is as uniform as possible. A non-uniform winding makes the coil susceptible to magnetic pickup from adjacent conductors or other sources of magnetic fields. We have developed special machines for making accurate windings. Coils come in a range of styles including rigid and flexible coils but we have developed several other variations to meet specific needs.

### Output Indication

The output from the integrator can be used with any form of electronic indicating device that has an input impedance greater than about 10kohm such as a voltmeter, oscilloscope, transient recorder or protection system.

### Split Coils

Some designs of coil can be fitted on the conductor without the need to disconnect the conductor. Most flexible coils can be fitted this way and it is also possible to build split rigid coils. Split iron-cored devices such as current transformers are subject to appreciable amplitude and phase errors if the halves are misaligned by even a small amount. Rogowski coils do not have this problem. Misalignment of the joining faces of a split Rogowski coil has only a small effect on the amplitude and no effect on the phase.

## Electronic Trip Unit

### Selection Criteria for WL Circuit Breakers

The basic criteria for selecting circuit breakers is:

Maximum Available Short Circuit at the installation point. This value determines the short circuit current interrupting

rating or short circuit current withstand rating of the circuit breaker.

Rated Current  $I_N$  which is to flow through the respective circuit breaker continuously. This value may not be greater than the maximum rated current of the circuit breaker. The rated current for the WL is determined by the rating plug, up to the maximum frame rating.

Ambient Temperature of the circuit breaker. This is usually the temperature inside the cubicle.

Design of the circuit breaker.

Protective Functions of the circuit breaker. These are determined by the selection of the appropriate trip unit.

Dynamic Arc-Flash Sentry (Patent Pending) A unique feature of the WL trip unit allows the system designer to achieve lower levels of arc flash energy and delayed tripping for selective trip coordination purposes.

### Rating Plug

The Rating Plug is a replaceable module that enables users to reduce the rated device current for optimum adaptation to the system; e.g., during startup of a plant section. The Rating Plug should be selected so that it corresponds to the rated current of the system.

Switch-selectable  $I^2t$  or  $I^4t$  Characteristic Curve Improved Overload Protection.

The best possible protection is assured when all protective devices in the system are optimally coordinated. To achieve optimum selectivity and coordination, the long-time characteristic can be switched between  $I^2t$  and  $I^4t$ , to improve coordination with fuses or inverse relays.

### Switchable Parameter Sets

To allow the protection to adapt to changes in system needs such as switching between utility and generator feeds, WL Circuit Breakers support ETUs with two independent parameter sets. Switching between the parameter sets occurs in less than 100 ms and can be done remotely or via a contact input to an optional CubicleBUS module.

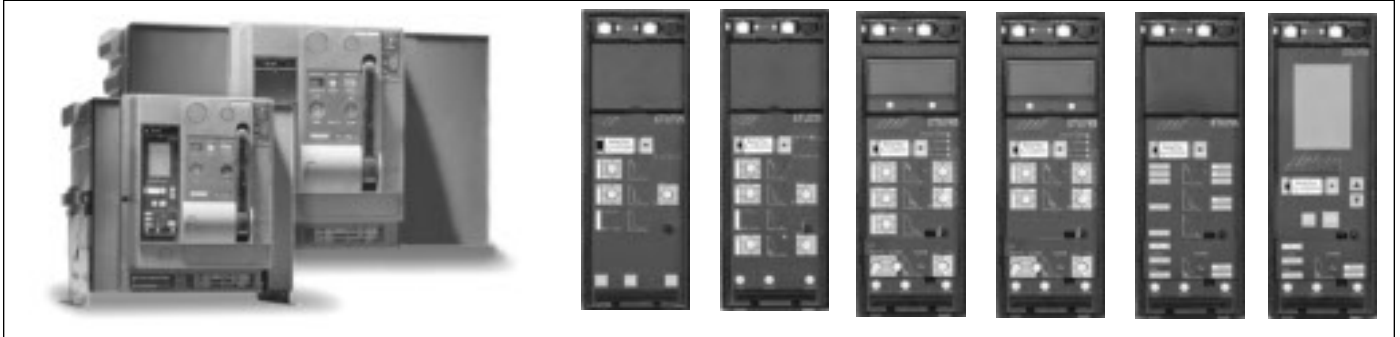
For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Low Voltage Switchgear

## Type WL Circuit Breakers

Selection

### Trip Unit Functions



Basic Protective Functions		ETU725	ETU727	ETU745	ETU748	ETU755	ETU776
Long-time overcurrent protection	L	●	●	●	●	●	●
Short-time delayed overcurrent protection	S	●	●	●	●	●	●
Instantaneous overcurrent protection	I	●	●	●	-	●	●
Neutral protection	N	-	●	●	●	●	●
Ground fault protection	G	-	●	○	○	○	○
Additional Functions							
Selectable neutral protection		-	●	●	●	●	●
Defeatable short-time delay		-	-	●	●	●	●
Defeatable instantaneous protection		-	-	●	-	●	●
Selectable thermal memory		-	-	●	●	●	●
Zone selective interlocking		-	-	○	○	○	○
Selectable I <sup>2</sup> t or fixed short-time delay		-	-	●	●	●	●
Adjustable instantaneous pick-up		①	-	●	-	●	●
Selectable I <sup>2</sup> t or I <sup>4</sup> t long-time delay		-	-	●	●	●	●
Adjustable short-time delay and pick-up		●	●	●	●	●	●
Selectable and adjustable neutral protection		-	-	●	●	●	●
Dual protective setting capability (DAS)*		-	-	-	-	●	●
Extended instantaneous protection		●	●	●	●	●	●
Parameterization and Displays							
Parameterization by rotary switches (10 steps)		●	●	●	●	-	-
Parameterization by communication (absolute values)		-	-	-	●	●	●
Parameterization by menu/keypad (absolute values)		-	-	-	-	-	●
Remote parameterization of the basic functions		-	-	-	-	●	●
Remote parameterization of the additional functions		-	-	-	-	●	●
Alphanumeric LCD		-	-	○	○	-	-
Graphical LCD		-	-	-	-	-	●
Metering Function							
Metering function <i>Plus</i>		-	-	○	○	○	○
Communication							
CubicleBUS		-	-	●	●	●	●
Communication via PROFIBUS-DP		-	-	○	○	○	○
Communication via the MODBUS		-	-	○	○	○	○
Communication via the Ethernet (BDA)		-	-	○	○	○	○

● standard    - not available    ○ optional

① Fixed short-time delay only

\* DAS- Dynamic Arc Flash Sentry, Siemens patent pending protective feature

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

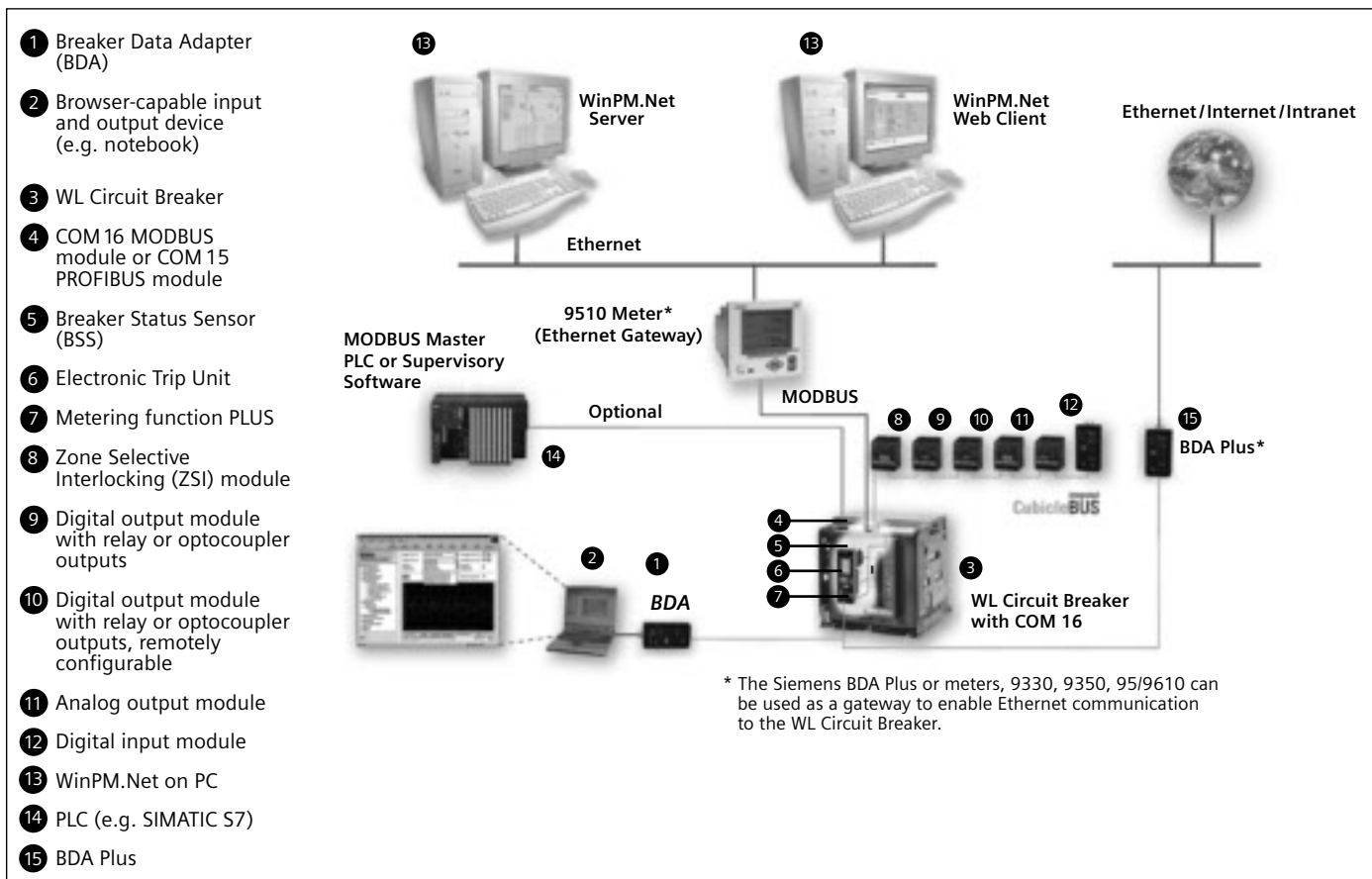
# Low Voltage Switchgear

## Type WL Circuit Breakers

General

### WL Communication Overview

#### Connection Diagram



#### Features

- Industry standard MODBUS or PROFIBUS communication available on all WL breakers from 200A to 5000A
- The high modularity of the WL Circuit Breakers and accessories allows simple retrofitting of all communication components
- The ability to connect additional input and output modules to the breaker-internal CubicleBUS of the WL opens up a range of opportunities to reduce secondary device count and wiring and to increase functionality implemented in switchgear
- Innovative software products for local configuration, operation, monitoring and diagnostics of WL Circuit Breakers using MODBUS, PROFIBUS or via Ethernet/Intranet/Internet

- Complete integration of WL Circuit Breakers in all Totally Integrated Power and Totally Integrated Automation Solutions

#### Metering Function/Metering Function PLUS

The integrated metering function can be installed on all ETU745, ETU748, ETU755, and ETU776 trip units and provides a viable alternative to external multi-function measuring instruments in many applications.

Metering Function can measure the following:

- Currents
- Voltages
- Power
- Energy
- Power Factor
- Frequency

All metered quantities are delivered as real time values with min/max recording. The metering module also contains additional alarm setpoint and protective relay functions (e.g. trip on overfrequency or undervoltage, and alarm on reverse power or over ampere demand).

The Metering Function PLUS has two additional wave form buffers and supports harmonic analysis. With the two independent wave form buffers, the current and voltage waveforms can be recorded, and allows detailed diagnostic triggering on events.

If the Metering Function /Metering Function PLUS is ordered together with the circuit breaker, it is already installed and ready for operation. As a retrofit part, the metering function is simply attached to the ETU and connected to the CubicleBUS.

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Low Voltage Switchgear

## Arc Flash Solutions

General



### Dynamic Arc Flash Sentry (DAS) Laser Scanner Sensor

SIGUARD laser scanners are optical distance sensors which detect any motion in a 190° working zone. By transmitting safe laser pulses and then evaluating every reflected pulse, they have everything safely in view. And when potentially hazardous situations do arise, they respond quickly and reliably.

They can be simply programmed using either a PC or a laptop which means that they can be quickly and flexibly adapted to new requirements.

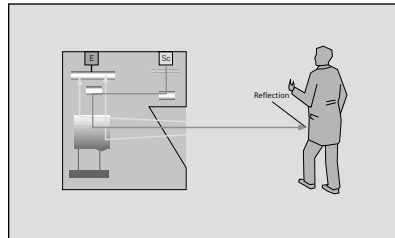
Unified, integrated communications via standard fieldbuses can be implemented in a fail-safe fashion by transmitting safety-related and standard data together. This means that also with our SIGUARD laser scanners, you can enjoy the benefits of having just one bus coupling.

### SIGUARD laser scanners LS4 – the advantages at a glance:

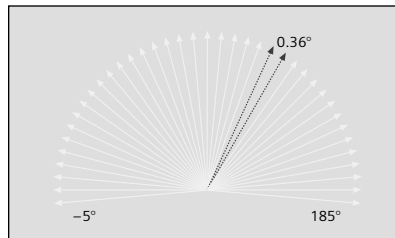
- Hazardous areas can be contactlessly and reliably secured with devices which can be universally used: on machines, production robots, conveyor systems, vehicles etc.
- Standard versions with fail-safe semiconductor outputs
- Safe direct connection to AS-Interface Safety at Work
- User-friendly version with PROFIBUS PROFI-safe connection
- When scanners are replaced, parameters are automatically transferred via PROFIBUS
- Category 3 according to EN 954-1
- Up to 4 personnel protective and warning field pairs which can be freely set
- Protective field with max. 4 m radius for personnel safety
- Extremely compact design
- Low current drain (approx. 300 mA)

### Function Description

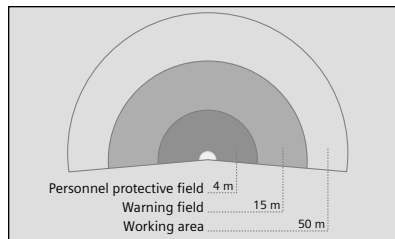
#### Mode of operation



The SIGUARD laser scanner LS4 is a scanner which optically and contactlessly scans areas – and which is predominantly used for personnel protection. The laser scanner generates a continuous train of bundled light pulses using a laser diode and an optical system. An integrated rotating mirror distributes these light pulses over the complete working area. If objects or persons enter this field, then the scanner evaluates the reflected light pulses and, using the light propagation time, continually calculates the precise position coordinates. If the defined personnel protective field is violated, then it brings the machine to an immediate stop.



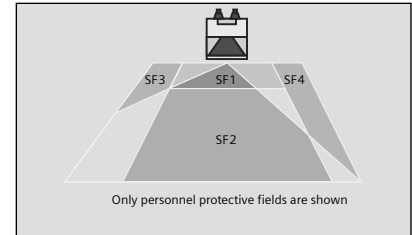
The operating range of SIGUARD laser scanners LS4 extends over 190° and is subdivided into angular segments of 0.36°. The scanning rate is 25 scans per second which means that a light pulse is transmitted every 40 ms into every segment. A special algorithm ensures that objects larger than 70 mm – this corresponds to the scanner resolution – are reliably detected. However, it also ensures that dust and other disturbing effects do not have a negative impact on the availability of the system.



SIGUARD laser scanners LS4 detect persons – even when they are wearing dark clothing – in a safety-related fashion up to 4 meters away. Persons and

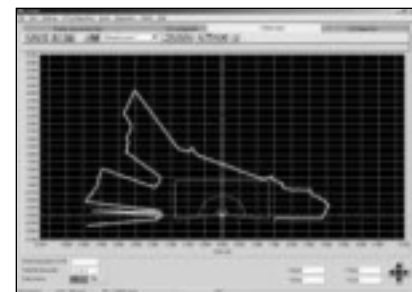
objects can be detected at a range of 15 m, for example, to output a warning message (however, this is not safety-related).

#### Flexibility already on board



SIGUARD laser scanners can be flexibly adapted to every requirement using four variable protective field pairs for personnel protection and warning fields. These protective field pairs can be simply set at the PC. The SIGUARD laser scanner can be used on stationary machines and systems, but it can also be used for mobile applications mounted on vehicles, driverless transport systems or trolleys. This means, for example, that various operating areas of a robot can be secured where the laser scanner consecutively scans the different areas. Using four programmable protective fields, driverless transport systems can be secured e.g., for fast travel, slow travel, lefthand and righthand curves.

#### Software for every application



It is extremely easy to precisely set the laser scanner thanks to the LS4soft PC operator software. The following functions are integrated:

- Protective fields can be easily configured using either a PC or laptop
- Additional functions such as protective field changeover, restart inhibit etc. can be configured using a software assistant
- Extensive range of displays – e.g., defined protective fields, actual scan contour, system settings etc.
- Safe access protection using passwords with various authorization stages
- LS4soft can run under Microsoft Windows 95/98/2000/NT/XP

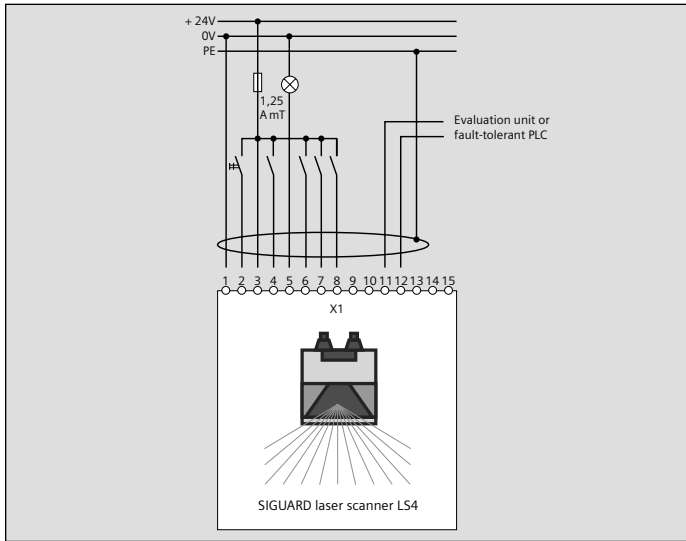


# Low Voltage Switchgear

## Arc Flash Solutions

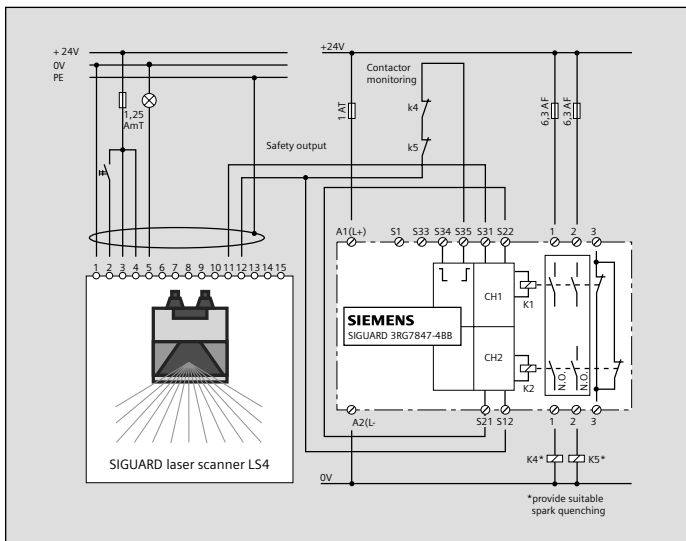
General

### Connection Examples



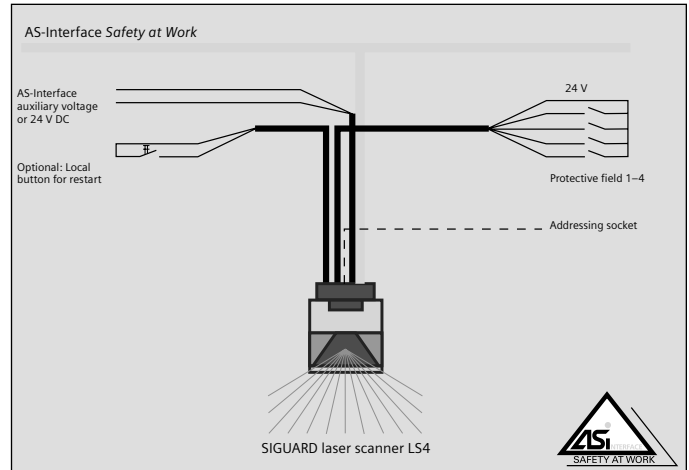
#### SIGUARD laser scanner "Standard" with protective field changeover and start button

- Start button for manual restart directly at the scanner (connection 2)
- Alarm output at connection 5 (e.g., warning lamp)
- Protective field changeover at connections 4, 6, 7 and 8
- Safety-related processing of the safe outputs (connections 11 and 12) through an evaluation unit or fault-tolerant PLC



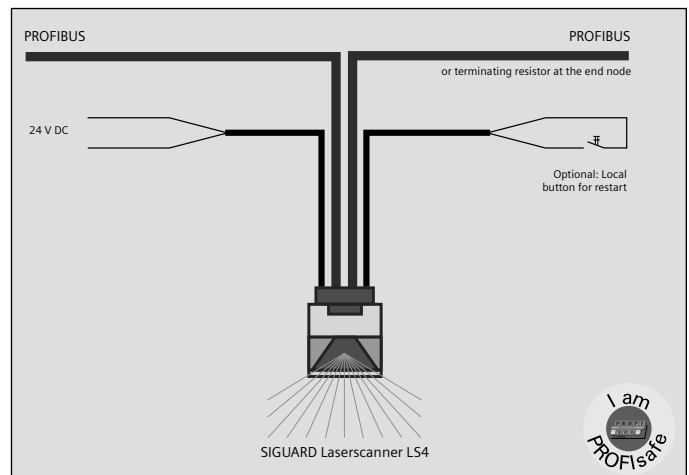
#### SIGUARD laser scanner "Standard" with 3RG7847-4BB evaluation unit

- Start button for manual restart directly at the scanner (connection 2)
- Permanently set protective field pair 1 (24 V permanently connected to connection 4)



#### SIGUARD laser scanner AS-Interface

- Directly connected to AS-Interface Safety at Work
- Safety-related shutdown using the safety monitor
- Protective field changeover as for the standard scanner
- A local button can be optionally connected for manual restart
- All of the connections are established through M12 connectors



#### SIGUARD laser scanner PROFIBUS

- Directly connected to PROFIBUS
- The shutdown signal is safely transferred via the PROFIBUS PROFIsafe profile
- Safe protective field changeover also via PROFIBUS
- Laser scanners can be quickly replaced thanks to the automatic parameter transfer
- A local button can be optionally connected for manual restart
- All of the connections are established through M12 connectors

For more information, please visit <http://automation.usa.siemens.com/consultant/> or contact your local sales office.

# Notes

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# Busway Systems Overview

## Pricing Notes

## General

### A. Footage Pricing

1. Sentron and XL-U base pricing is listed on a per foot charge. When calculating the footage charge, fractions are figured to the next larger number of whole feet (i.e., a linear run totaling 66'3" would be priced at 67 feet.
2. BD, XJ-L and ITD base pricing is listed on a per section charge.

### B. Accessories

Some busway accessories are listed as complete device prices while others are listed under accessory charges.

1. Complete device price includes all material and accessory charges for a standard device. (Busway footage included if applicable).
2. Accessory Charge includes fabrication and any miscellaneous fittings for the standard device. (No busway footage included).

**C. End Cable Tap Boxes** are designed to be installed at the beginning or end of a busway run. The busway rating determines the tap box list price. Mechanical lugs are standard. For compression lugs add 30% to tap box list price.

**D. Elbows** with an angle other than 90 degrees, the accessory charge is to be doubled.

**E. Flange Ends (Switchboard Connections / Stubs)** accessory prices are for connection to Siemens equipment. For connection to other manufacturer's equipment, multiply the flange end list price by 2.5. Standard list price includes eight inches of bus extension into equipment from mounting flange, if more than 8 inches required consult factory for pricing. Sentron Switchboards can be assembled with the Busway Flanged End pre-installed, eliminating the labor to connect the Busway to the switchboard at the job site.

**F. Service Heads** are specially constructed tap boxes suitable for outdoor use and are equipped to accept service cables through a removable insulated bottom plate. The busway should be priced through the end of the run.

**G. Phase Transpositions** can be built into a busway section to provide better voltage balance on long runs. To price, use the "Expansion Section" accessory charge for the appropriate ampere rating.

### H. Hangers

Sentron and XL-U busway are UL listed for standard hanger spacing of ten feet (on center). Purchasing busway hangers for horizontal installations is optional. Unistrut/Kindorf is commonly used by contractors as an approved alternative.

Two hangers are furnished free of charge with every straight section of BD and XJ-L. For ITD refer to pricing section. Self compensating "Spring" hangers required for vertical installations are designed to be field installed by the installer and are shipped separately. These are also used as intermediate supports where floor-to-floor height is greater than 16 feet.

**I. Ceiling, Floor And Wall Flanges** are used when busway passes through a floor or wall and are intended to cover that portion of the opening around the outside of the busway.

**They are not to be used to support the busway.**

**J. Reducers** price is determined by the rating of the larger busway. Fused reducers do not include fuses.

**K. Special Paint — Busway Sections, Accessories And Bus Plugs** Standard finish is ASA #61 light gray. For other than standard color, add 20% and consult factory for availability.

**L. For Silver Finishing of Copper Bus Bars**, add 10%.

**M. Roof Flanges** are specially constructed collars and plates built onto a section of 3R busway which passes through a flat or angled roof. Roof pitch must be given for angled roof.

### N. Circuit Breaker Type Bus Plugs

for Sentron Busways are priced as "complete devices" with circuit breakers factory installed. Circuit Breaker plugs for XJ-L, BD, XL-U and XL-X busways are priced "enclosure only." When ordered with breaker, standard procedure is to individually ship both the enclosure and circuit breaker. When ordering bus plugs with breaker factory installed, add enclosure and breaker prices together and add 20% to the total, specify when ordering and allow time for assembly.

**O. Fusible Type Bus Plugs** do not include fuses. Adapter kits for Class R, T & J fuses are available for field installation.

**P. Cubicle** list prices include labor and material for a single frame device with enclosure including line side internal bussing for connection to busway and protective device. Fuses and load side bussing are not included in the base price.

**Q.** Sentron Busway has been tested in accordance with UL1479 and offers a certified two hour fire rating for gypsum wall board construction, and a three hour fire rating for concrete slab or block penetrations. These ratings were achieved using standard busway installed with SpecSeal® sealant from Specified Technologies Inc. This material is available through Electrical Distribution.

### R. Refer to the following publications for additional technical information and physical parameters.

Sentron Busway	BUSA-05501
XL-U Busway	5.3.2
BD Busway	BUSA-5331
XJ-L Busway	BUPC-XJL-01
TROL-E-DUCT	5.2.1

# Busway Systems Overview

## Selector Chart (100-6500 Ampere)

**General**

I-T-E (then known as Bulldog Electric) was the first manufacturer to make a Busway System. Since its introduction in

1932, Busway Systems have improved and expanded into several designs to meet the ever changing needs of the

electrical industry. The Busway Selection Chart below will help you in selecting the proper product to fit your requirements.

### Busway Selector Chart

**100-6500 Ampere**

**600 Volts or Less**

Feature		Product					
		Plug-in and Feeder Busway					
		Sentron Plug-in/Feeder	XL-U Plug-in Feeder	XJ-L Plug-in	BD Plug-in	Industrial Trol-E-Duct	
Ampere Rating	100			✓		✓	
	150					✓	
	200					✓	
	225	✓	✓	✓	✓		
	400	✓	✓		✓		
	600	✓	✓		✓		
	800	✓	✓		✓		
	1000	✓	✓		✓		
	1200	✓	✓		✓		
	1350	✓	✓		✓		
	1600	✓	✓		✓		
	2000	✓	✓				
	2500	✓	✓				
	3000	✓	✓				
	3200	✓					
	4000	✓	✓				
5000	✓	✓					
6000, 6500		✓					
Conductor	Copper	✓	✓	✓	✓	✓	
	Aluminum	✓	✓		✓		
Use	Indoor	✓	✓	✓	✓	✓	
	Outdoor	✓	✓				
AC Service 50-60 Hz 400Hz <sup>Ⓢ</sup>	2W					✓	
	1Ø3W					✓	
	3Ø3W	✓	✓	✓	✓	✓	
	3Ø4W FN	✓	✓	✓	✓	✓	
	3Ø4W 200% N	✓		✓			
Voltage	600 volts or less	✓	✓	✓	✓	✓	
Construction	Ventilated		✓				
	Non-Ventilated	✓	✓	✓	✓		
Meets Electrical Standard	<b>UL</b> 857	✓	✓	✓	✓	✓	
	<b>NEMA</b> BU1	✓	✓	✓	✓	✓	
	<b>CSA/CUL</b> C22.2 NO 27	✓	✓	✓	✓		
	<b>ANCE</b> NMX-J-148ANCE	✓	✓	✓	✓		
	<b>IEC</b>	60439-1 1993	✓	Ⓢ	Ⓢ	Ⓢ	
		60439-2 1993	✓	Ⓢ	Ⓢ	Ⓢ	

Ⓢ Meets most applicable provisions of this foreign standard.

Ⓢ Consult factory for information.

# Sentron® Busway Systems

## Catalog Numbering System

## Selection

S X 4 0 2 C 1 0

**Sentron**  
SX = US Lengths

### Configuration

3 = 3Ø, 3W  
4 = 3Ø, 4W 100% Neutral  
5 = 3Ø, 4W 200% Neutral

### Ampere Rating

02 = 225A      32 = 3200A  
04 = 400A      40 = 4000A  
06 = 600A      50 = 5000A<sup>①</sup>  
08 = 800A  
10 = 1000A  
12 = 1200A  
13 = 1350A  
16 = 1600A  
20 = 2000A  
25 = 2500A  
30 = 3000A

### Bus Bar Material

C = Copper  
M = 1000 Amps/In<sup>2</sup> Copper  
A = Aluminum  
L = 750 Amps/In<sup>2</sup> Aluminum

### Ground

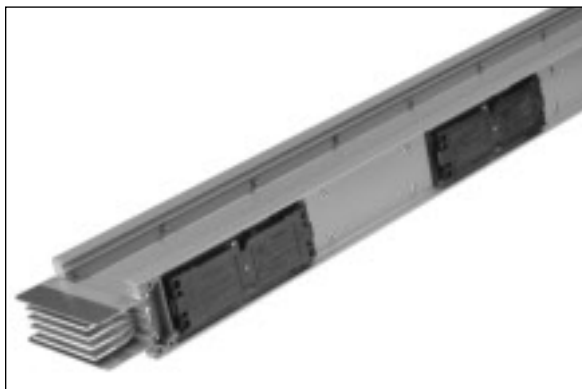
1 = Integral (Housing)  
2 = Internal Bus Bar<sup>②</sup>  
3 = Isolated Ground<sup>②</sup>

### IP Rating

0 = IP40<sup>③</sup>  
4 = IP55<sup>③</sup>  
6 = IP66<sup>③④⑤</sup>  
9 = NEMA 3R<sup>④⑤⑥</sup>

- ① Copper only
- ② Copper or aluminum ground bar
- ③ IEC Markets
- ④ NEMA Markets
- ⑤ For odd degree angle (other than 90°) specify the degree angle of the turn.
- ⑥ Indoor only (Plug-in and Feeder)
- ⑦ Outdoor use (Feeder only)
- ⑧ Elbow Stack (IP40 and IP55 only)

• Catalog Numbers for Hangers can be found on page 14-12.  
• Specials must be ordered by description (drawing must be included). Contact factory for pricing.



## Suffix part of Catalog Numbers

	P	L	0	6
Feeder			Length in Inches, ex.: 2'3" = 027 Feeder lengths available from 2'0" (024 Inches) up to 10'0" (120 inches)	
Plug-in	L	Length	04 = 4'0" 06 = 6'0" 08 = 8'0" 10 = 10'0"	
Riser	I	Length	04 = 4'0" 06 = 6'0" 08 = 8'0" 10 = 10'0"	
Elbows	S = Stack® L = 90° O = Odd degree angle <sup>⑤</sup>	Edge	Up Down	Flat Right Left
Tees	E	Edge	Up Down	Flat Right Left
Offsets	F	Edge	Up Down	Flat Right Left
Combinations	O	Edge Up Edge Down Edge Up Edge Down	Flat Left Flat Left Flat Right Flat Right	Edge Up Edge Down Edge Up Edge Down
EXpansion Fittings	P	F	T	
Center Cable Tap Boxes	T	B	Standard EXpanded	
End Cable Tap Boxes	T	Vertical Horizontal	Standard EXpanded	
End Closers	C	L	S	
FlanGe	Roof Wall	F	L	
Joint Stacks	Standard Isolation	S	T	
SerVice Heads	1 = 1-Phase 3 = 3-Phase T = Throat	Transformer Utility	H Florida Pwr/Light Houston Pwr/Light Commonwealth ED Pacific Gas/Electric Detroit Edison Other	
Reducers	Fused Non-fused	R R	F N	
Flanged End	E = Int'l Standard R = U.S. Standard O = Other	N N	D D	
Transposition	R	PG = Phase & Ground PO = Phase only GO = Ground only		

# Sentron® Straight Section Busway

## Aluminum (225 – 1000 Ampere)

Selection

### 225A Aluminum

Basic Catalog Number		SX302A1	SX302A2	SX302A3	SX402A1	SX502A1	SX402A2	SX502A2	SX402A3	SX502A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	249.00	264.00	274.00	276.00	349.00	312.00	386.00	367.00	405.00
Feeder IP55	4F	293.00	308.00	322.00	326.00	410.00	367.00	455.00	390.00	479.00
Feeder 3R	9F	374.00	393.00	411.00	415.00	524.00	471.00	580.00	497.00	608.00
Plug-in IP40	0P	268.00	282.00	293.00	295.00	370.00	332.00	405.00	349.00	421.00
Plug-in IP55	4P	318.00	335.00	348.00	349.00	436.00	372.00	481.00	417.00	504.00
Riser IP40	0R	259.00	273.00	284.00	285.00	360.00	322.00	397.00	341.00	415.00
Riser IP55	4R	259.00	321.00	336.00	337.00	424.00	360.00	470.00	403.00	491.00

### 400A Aluminum

Basic Catalog Number		SX304A1	SX304A2	SX304A3	SX404A1	SX504A1	SX404A2	SX504A2	SX404A3	SX504A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	249.00	264.00	274.00	276.00	349.00	312.00	386.00	332.00	405.00
Feeder IP55	4F	293.00	308.00	322.00	326.00	410.00	367.00	455.00	390.00	479.00
Feeder 3R	9F	374.00	393.00	411.00	415.00	524.00	471.00	580.00	342.00	608.00
Plug-in IP40	0P	268.00	282.00	293.00	295.00	370.00	332.00	405.00	349.00	424.00
Plug-in IP55	4P	318.00	335.00	348.00	349.00	436.00	393.00	481.00	391.00	504.00
Riser IP40	0R	259.00	273.00	284.00	285.00	360.00	322.00	397.00	341.00	415.00
Riser IP55	4R	305.00	321.00	336.00	337.00	424.00	380.00	470.00	403.00	491.00

### 600A Aluminum

Basic Catalog Number		SX306A1	SX306A2	SX306A3	SX406A1	SX506A1	SX406A2	SX506A2	SX406A3	SX506A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	249.00	264.00	274.00	276.00	349.00	312.00	386.00	332.00	405.00
Feeder IP55	4F	293.00	308.00	322.00	326.00	410.00	367.00	455.00	390.00	479.00
Feeder 3R	9F	374.00	393.00	411.00	415.00	524.00	471.00	580.00	497.00	608.00
Plug-in IP40	0P	268.00	282.00	293.00	295.00	370.00	332.00	405.00	349.00	424.00
Plug-in IP55	4P	318.00	335.00	348.00	349.00	436.00	393.00	481.00	417.00	504.00
Riser IP40	0R	259.00	273.00	284.00	285.00	360.00	322.00	397.00	341.00	415.00
Riser IP55	4R	305.00	321.00	336.00	337.00	424.00	380.00	470.00	403.00	491.00

### 800A Aluminum

Basic Catalog Number		SX308A1	SX308A2	SX308A3	SX408A1	SX508A1	SX408A2	SX508A2	SX408A3	SX508A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	271.00	282.00	293.00	295.00	373.00	333.00	410.00	353.00	431.00
Feeder IP55	4F	321.00	332.00	343.00	346.00	439.00	391.00	484.00	417.00	510.00
Feeder 3R	9F	409.00	424.00	440.00	441.00	559.00	500.00	617.00	529.00	646.00
Plug-in IP40	0P	290.00	298.00	310.00	311.00	390.00	352.00	429.00	370.00	449.00
Plug-in IP55	4P	343.00	357.00	368.00	370.00	462.00	417.00	510.00	415.00	533.00
Riser IP40	0R	280.00	291.00	301.00	302.00	383.00	342.00	420.00	360.00	440.00
Riser IP55	4R	332.00	343.00	357.00	358.00	451.00	404.00	497.00	429.00	521.00

### 1000A Aluminum

Basic Catalog Number		SX310A1	SX310A2	SX310A3	SX410A1	SX510A1	SX410A2	SX510A2	SX410A3	SX510A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	295.00	315.00	333.00	336.00	424.00	379.00	467.00	403.00	490.00
Feeder IP55	4F	346.00	370.00	393.00	395.00	500.00	448.00	552.00	472.00	579.00
Feeder 3R	9F	441.00	471.00	502.00	503.00	636.00	572.00	702.00	604.00	735.00
Plug-in IP40	0P	311.00	332.00	352.00	353.00	441.00	398.00	484.00	420.00	508.00
Plug-in IP55	4P	370.00	393.00	418.00	420.00	524.00	471.00	575.00	497.00	604.00
Riser IP40	0R	302.00	324.00	342.00	343.00	433.00	389.00	477.00	410.00	498.00
Riser IP55	4R	358.00	383.00	405.00	408.00	512.00	459.00	564.00	484.00	591.00

Feeder or Plug-in      Feeder Only  
 Indoor IP40      Outdoor NEMA 3R  
 Splash Proof      IP55

# Sentron® Straight Section Busway

## Aluminum (1200– 2000 Ampere)

*Selection*

### 1200A Aluminum

Basic Catalog Number		SX312A1	SX312A2	SX312A3	SX412A1	SX512A1	SX412A2	SX512A2	SX412A3	SX512A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	333.00	395.00	456.00	459.00	579.00	518.00	637.00	548.00	668.00
Feeder IP55	4F	391.00	466.00	541.00	542.00	684.00	611.00	753.00	648.00	788.00
Feeder 3R	9F	502.00	595.00	687.00	689.00	865.00	772.00	957.00	819.00	1005.00
Plug-in IP40	0P	352.00	414.00	473.00	477.00	596.00	535.00	655.00	565.00	686.00
Plug-in IP55	4P	417.00	490.00	564.00	565.00	708.00	636.00	772.00	672.00	819.00
Riser IP40	0R	342.00	404.00	466.00	467.00	587.00	528.00	646.00	556.00	677.00
Riser IP55	4R	404.00	479.00	552.00	554.00	697.00	624.00	766.00	659.00	803.00

### 1350A Aluminum

Basic Catalog Number		SX313A1	SX313A2	SX313A3	SX413A1	SX513A1	SX413A2	SX513A2	SX413A3	SX513A3
Feeder IP40	0F	398.00	398.00	518.00	521.00	656.00	587.00	722.00	622.00	758.00
Feeder IP55	4F	467.00	467.00	614.00	615.00	772.00	696.00	850.00	735.00	896.00
Feeder 3R	9F	596.00	596.00	788.00	788.00	988.00	881.00	1081.00	927.00	1129.00
Plug-in IP40	0P	415.00	415.00	535.00	539.00	673.00	605.00	741.00	639.00	772.00
Plug-in IP55	4P	492.00	492.00	637.00	639.00	803.00	718.00	881.00	760.00	912.00
Riser IP40	0R	405.00	405.00	528.00	529.00	666.00	596.00	731.00	748.00	763.00
Riser IP55	4R	480.00	480.00	625.00	627.00	788.00	706.00	865.00	748.00	912.00

### 1600A Aluminum

Basic Catalog Number		SX316A1	SX316A2	SX316A3	SX416A1	SX516A1	SX416A2	SX516A2	SX416A3	SX516A3
Feeder IP40	0F	466.00	534.00	603.00	604.00	760.00	680.00	834.00	719.00	881.00
Feeder IP55	4F	549.00	629.00	711.00	714.00	896.00	803.00	988.00	850.00	1036.00
Feeder 3R	9F	699.00	803.00	896.00	912.00	1143.00	1019.00	1253.00	1081.00	1314.00
Plug-in IP40	0P	483.00	552.00	618.00	621.00	772.00	698.00	850.00	737.00	896.00
Plug-in IP55	4P	574.00	655.00	735.00	737.00	927.00	834.00	1019.00	881.00	1067.00
Riser IP40	0R	473.00	543.00	610.00	611.00	768.00	689.00	850.00	729.00	881.00
Riser IP55	4R	562.00	642.00	722.00	727.00	912.00	819.00	1005.00	865.00	1050.00

### 2000A Aluminum

Basic Catalog Number		SX320A1	SX320A2	SX320A3	SX420A1	SX520A1	SX420A2	SX520A2	SX420A3	SX520A3
Feeder IP40	0F	570.00	637.00	706.00	708.00	896.00	803.00	974.00	974.00	1019.00
Feeder IP55	4F	672.00	753.00	834.00	834.00	1050.00	943.00	1160.00	1160.00	1222.00
Feeder 3R	9F	850.00	957.00	1067.00	1067.00	1329.00	1205.00	1469.00	1469.00	1545.00
Plug-in IP40	0P	586.00	655.00	722.00	727.00	912.00	819.00	1005.00	1005.00	1036.00
Plug-in IP55	4P	697.00	772.00	865.00	865.00	1081.00	974.00	1191.00	1191.00	1236.00
Riser IP40	0R	577.00	646.00	715.00	717.00	896.00	803.00	988.00	988.00	1036.00
Riser IP55	4R	684.00	766.00	850.00	850.00	1067.00	957.00	1174.00	1174.00	1222.00

Feeder or Plug-in      Feeder Only  
 Indoor      IP40      Outdoor      NEMA 3R  
 Splash Proof      IP55



# Sentron® Straight Section Busway

## Aluminum (2500 – 4000 Ampere)

Selection

### 2500A Aluminum

Basic Catalog Number		SX325A1	SX325A2	SX325A3	SX425A1	SX525A1	SX425A2	SX525A2	SX425A3	SX525A3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	749.00	834.00	912.00	912.00	1143.00	1036.00	1267.00	1098.00	1329.00
Feeder IP55	4F	881.00	988.00	1081.00	1081.00	1360.00	1222.00	1500.00	1298.00	1562.00
Feeder 3R	9F	1129.00	1253.00	1376.00	1376.00	1731.00	1545.00	1901.00	1638.00	1994.00
Plug-in IP40	0P	766.00	850.00	927.00	927.00	1160.00	1050.00	1284.00	1112.00	1345.00
Plug-in IP55	4P	865.00	1005.00	1112.00	1112.00	1391.00	1253.00	1531.00	1314.00	1593.00
Riser IP40	0R	759.00	834.00	927.00	927.00	1160.00	1036.00	1267.00	1098.00	1329.00
Riser IP55	4R	896.00	988.00	1098.00	1098.00	1376.00	1236.00	1514.00	1298.00	1576.00

### 3000A Aluminum

Basic Catalog Number		SX330A1	SX330A2	SX330A3	SX430A1	SX530A1	SX430A2	SX530A2	SX430A3	SX530A3
Feeder IP40	0F	896.00	957.00	1036.00	1036.00	1298.00	1174.00	1438.00	1236.00	1500.00
Feeder IP55	4F	1050.00	1143.00	1222.00	1236.00	1545.00	1391.00	1700.00	1469.00	1777.00
Feeder 3R	9F	1345.00	1452.00	1562.00	1562.00	1963.00	1762.00	2149.00	1855.00	2257.00
Plug-in IP40	0P	912.00	988.00	1050.00	1050.00	1314.00	1191.00	1452.00	1253.00	1514.00
Plug-in IP55	4P	1081.00	1160.00	1253.00	1253.00	1562.00	1407.00	1731.00	1483.00	1808.00
Riser IP40	0R	896.00	974.00	1050.00	1050.00	1314.00	1174.00	1438.00	1253.00	1514.00
Riser IP55	4R	1067.00	1160.00	1236.00	1236.00	1562.00	1407.00	1717.00	1483.00	1793.00

### 3200A Aluminum

Basic Catalog Number		SX332A1	SX332A2	SX332A3	SX432A1	SX532A1	SX432A2	SX532A2	SX432A3	SX532A3
Feeder IP40	0F	973.00	1081.00	1310.00	1310.00	1654.00	1485.00	1422.00	1345.00	1715.00
Feeder IP55	4F	1143.00	1282.00	1407.00	1423.00	1948.00	2374.00	1685.00	1593.00	2040.00
Feeder 3R	9F	1452.00	1623.00	1793.00	1793.00	2458.00	2243.00	2133.00	2026.00	2582.00
Plug-in IP40	0P	988.00	1097.00	1206.00	1206.00	1500.00	1361.00	1669.00	1437.00	1731.00
Plug-in IP55	4P	1174.00	1298.00	1438.00	1438.00	1793.00	1607.00	1978.00	1700.00	2071.00
Riser IP40	0R	973.00	1081.00	1206.00	1206.00	1500.00	1345.00	1700.00	1437.00	1731.00
Riser IP55	4R	1159.00	1298.00	1423.00	1423.00	1793.00	1593.00	1963.00	1700.00	2056.00

### 4000A Aluminum

Basic Catalog Number		SX340A1	SX340A2	SX340A3	SX440A1	SX540A1	SX440A2	SX540A2	SX440A3	SX540A3
Feeder IP40	0F	1112.00	1314.00	1500.00	1500.00	1870.00	1686.00	2071.00	1777.00	2164.00
Feeder IP55	4F	1329.00	1545.00	1777.00	1777.00	2226.00	1994.00	2443.00	2102.00	2566.00
Feeder 3R	9F	1686.00	1963.00	2241.00	2241.00	2814.00	2535.00	3092.00	2675.00	3232.00
Plug-in IP40	0P	1129.00	1329.00	1514.00	1514.00	1886.00	1700.00	2087.00	1793.00	2180.00
Plug-in IP55	4P	1345.00	1576.00	1793.00	1793.00	2241.00	2025.00	2474.00	2133.00	2582.00
Riser IP40	0R	1129.00	1314.00	1500.00	1500.00	1886.00	1700.00	2071.00	1793.00	2164.00
Riser IP55	4R	1329.00	1562.00	1777.00	1777.00	2241.00	2009.00	2458.00	2118.00	2566.00

Feeder or Plug-in      Feeder Only  
 Indoor      IP40      Outdoor      NEMA 3R  
 Splash Proof      IP55

# Sentron® Straight Section Busway

## Copper (225 – 1000 Ampere)

Selection

### 225A Copper

Basic Catalog Number		SX302C1	SX302C2	SX302C3	SX402C1	SX502C1	SX402C2	SX502C2	SX402C3	SX502C3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	380.00	430.00	478.00	479.00	606.00	542.00	668.00	572.00	698.00
Feeder IP55	4F	446.00	503.00	561.00	565.00	714.00	639.00	787.00	675.00	824.00
Feeder 3R	9F	571.00	642.00	717.00	719.00	906.00	812.00	1009.00	854.00	1043.00
Plug-in IP40	0P	401.00	452.00	499.00	500.00	627.00	561.00	687.00	592.00	719.00
Plug-in IP55	4P	476.00	533.00	591.00	592.00	741.00	668.00	817.00	705.00	854.00
Riser IP40	0R	390.00	441.00	489.00	490.00	616.00	550.00	679.00	583.00	709.00
Riser IP55	4R	461.00	520.00	578.00	579.00	728.00	652.00	800.00	691.00	840.00

### 400A Copper

Basic Catalog Number		SX304C1	SX304C2	SX304C3	SX404C1	SX504C1	SX404C2	SX504C2	SX404C3	SX504C3
Feeder IP40	0F	380.00	430.00	478.00	479.00	606.00	542.00	668.00	572.00	698.00
Feeder IP55	4F	446.00	503.00	561.00	565.00	714.00	639.00	787.00	675.00	824.00
Feeder 3R	9F	571.00	642.00	717.00	719.00	906.00	812.00	1009.00	854.00	1043.00
Plug-in IP40	0P	401.00	452.00	499.00	500.00	627.00	561.00	687.00	592.00	719.00
Plug-in IP55	4P	476.00	533.00	591.00	592.00	741.00	668.00	817.00	705.00	854.00
Riser IP40	0R	390.00	441.00	489.00	500.00	616.00	550.00	679.00	583.00	709.00
Riser IP55	4R	461.00	520.00	578.00	579.00	728.00	652.00	800.00	691.00	840.00

### 600A Copper

Basic Catalog Number		SX306C1	SX306C2	SX306C3	SX406C1	SX506C1	SX406C2	SX506C2	SX406C3	SX506C3
Feeder IP40	0F	380.00	430.00	478.00	479.00	606.00	542.00	668.00	572.00	698.00
Feeder IP55	4F	446.00	503.00	561.00	565.00	714.00	639.00	787.00	675.00	824.00
Feeder 3R	9F	571.00	642.00	717.00	719.00	906.00	812.00	1009.00	854.00	1043.00
Plug-in IP40	0P	401.00	452.00	499.00	500.00	627.00	561.00	687.00	592.00	719.00
Plug-in IP55	4P	476.00	533.00	591.00	592.00	741.00	668.00	817.00	705.00	854.00
Riser IP40	0R	390.00	441.00	489.00	490.00	616.00	550.00	679.00	583.00	709.00
Riser IP55	4R	461.00	520.00	578.00	579.00	728.00	652.00	800.00	691.00	840.00

### 800A Copper

Basic Catalog Number		SX308C1	SX308C2	SX308C3	SX408C1	SX508C1	SX408C2	SX508C2	SX408C3	SX508C3
Feeder IP40	0F	417.00	476.00	530.00	531.00	669.00	600.00	738.00	634.00	773.00
Feeder IP55	4F	490.00	556.00	624.00	625.00	788.00	708.00	872.00	749.00	906.00
Feeder 3R	9F	625.00	709.00	794.00	797.00	1009.00	906.00	1112.00	957.00	1162.00
Plug-in IP40	0P	435.00	493.00	548.00	549.00	687.00	618.00	740.00	652.00	791.00
Plug-in IP55	4P	517.00	584.00	650.00	652.00	816.00	735.00	906.00	775.00	941.00
Riser IP40	0R	428.00	483.00	537.00	539.00	679.00	608.00	747.00	642.00	781.00
Riser IP55	4R	503.00	571.00	637.00	639.00	804.00	721.00	888.00	762.00	923.00

### 1000A Copper

Basic Catalog Number		SX310C1	SX310C2	SX310C3	SX410C1	SX510C1	SX410C2	SX510C2	SX410C3	SX510C3
Feeder IP40	0F	461.00	565.00	667.00	668.00	841.00	753.00	923.00	797.00	975.00
Feeder IP55	4F	542.00	667.00	787.00	788.00	991.00	888.00	1094.00	941.00	1145.00
Feeder 3R	9F	692.00	846.00	991.00	1009.00	1264.00	1128.00	1386.00	1197.00	1454.00
Plug-in IP40	0P	479.00	583.00	685.00	686.00	854.00	773.00	941.00	816.00	991.00
Plug-in IP55	4P	568.00	692.00	812.00	816.00	1025.00	923.00	1128.00	975.00	1180.00
Riser IP40	0R	470.00	572.00	674.00	675.00	850.00	762.00	941.00	806.00	975.00
Riser IP55	4R	555.00	679.00	799.00	804.00	1009.00	906.00	1112.00	957.00	1162.00

Feeder or Plug-in

Indoor IP40  
Splash Proof IP55

Feeder Only

Outdoor NEMA 3R

# Sentron® Straight Section Busway

## Copper (1200 – 2500 Ampere)

Selection

### 1200A Copper

Basic Catalog Number		SX312C1	SX312C2	SX312C3	SX412C1	SX512C1	SX412C2	SX512C2	SX412C3	SX512C3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	598.00	703.00	805.00	806.00	1009.00	906.00	1112.00	957.00	1162.00
Feeder IP55	4F	704.00	829.00	957.00	957.00	1197.00	1078.00	1317.00	1128.00	1386.00
Feeder 3R	9F	906.00	1043.00	1214.00	1214.00	1523.00	1368.00	1675.00	1436.00	1744.00
Plug-in IP40	0P	616.00	721.00	823.00	824.00	1025.00	923.00	1128.00	975.00	1180.00
Plug-in IP55	4P	731.00	854.00	975.00	975.00	1231.00	1094.00	1351.00	1162.00	1401.00
Riser IP40	0R	606.00	710.00	812.00	816.00	1025.00	923.00	1128.00	975.00	1180.00
Riser IP55	4R	719.00	842.00	957.00	957.00	1214.00	1094.00	1333.00	1145.00	1401.00

### 1350A Copper

Basic Catalog Number		SX313C1	SX313C2	SX313C3	SX413C1	SX513C1	SX413C2	SX513C2	SX413C3	SX513C3
Feeder IP40	0F	668.00	781.00	888.00	888.00	1128.00	1009.00	1231.00	1060.00	1299.00
Feeder IP55	4F	788.00	923.00	1060.00	1060.00	1333.00	1197.00	1470.00	1264.00	1538.00
Feeder 3R	9F	1009.00	1162.00	1333.00	1351.00	1693.00	1523.00	1864.00	1607.00	1949.00
Plug-in IP40	0P	686.00	799.00	906.00	923.00	1145.00	1025.00	1264.00	1078.00	1317.00
Plug-in IP55	4P	816.00	957.00	1078.00	1078.00	1351.00	1214.00	1488.00	1282.00	1556.00
Riser IP40	0R	675.00	791.00	906.00	906.00	1128.00	1025.00	1249.00	1078.00	1299.00
Riser IP55	4R	804.00	941.00	1078.00	1078.00	1351.00	1214.00	1488.00	1282.00	1556.00

### 1600A Copper

Basic Catalog Number		SX316C1	SX316C2	SX316C3	SX416C1	SX516C1	SX416C2	SX516C2	SX416C3	SX516C3
Feeder IP40	0F	761.00	906.00	1025.00	1025.00	1299.00	1162.00	1436.00	1231.00	1488.00
Feeder IP55	4F	906.00	1060.00	1214.00	1231.00	1538.00	1386.00	1693.00	1454.00	1779.00
Feeder 3R	9F	1145.00	1351.00	1556.00	1556.00	1949.00	1744.00	2138.00	1846.00	2240.00
Plug-in IP40	0P	779.00	923.00	1043.00	1060.00	1317.00	1180.00	1454.00	1249.00	1523.00
Plug-in IP55	4P	923.00	1094.00	1249.00	1249.00	1556.00	1401.00	1727.00	1488.00	1796.00
Riser IP40	0R	771.00	906.00	1043.00	1043.00	1299.00	1180.00	1436.00	1249.00	1505.00
Riser IP55	4R	906.00	1078.00	1231.00	1231.00	1556.00	1386.00	1710.00	1470.00	1779.00

### 2000A Copper

Basic Catalog Number		SX320C1	SX320C2	SX320C3	SX420C1	SX520C1	SX420C2	SX520C2	SX420C3	SX520C3
Feeder IP40	0F	975.00	1112.00	1264.00	1264.00	1591.00	1419.00	1744.00	1505.00	1830.00
Feeder IP55	4F	1145.00	1317.00	1505.00	1505.00	1881.00	1693.00	2070.00	1779.00	2172.00
Feeder 3R	9F	1454.00	1675.00	1899.00	1899.00	2377.00	2138.00	2618.00	2257.00	2737.00
Plug-in IP40	0P	991.00	1128.00	1282.00	1282.00	1607.00	1454.00	1762.00	1523.00	1846.00
Plug-in IP55	4P	1162.00	1351.00	1523.00	1523.00	1915.00	1710.00	2103.00	1812.00	2189.00
Riser IP40	0R	975.00	1128.00	1264.00	1282.00	1591.00	1436.00	1762.00	1523.00	1830.00
Riser IP55	4R	1162.00	1333.00	1505.00	1505.00	1881.00	1710.00	2086.00	1796.00	2172.00

### 2500A Copper

Basic Catalog Number		SX325C1	SX325C2	SX325C3	SX425C1	SX525C1	SX425C2	SX525C2	SX425C3	SX525C3
Feeder IP40	0F	1231.00	1454.00	1660.00	1660.00	2070.00	1864.00	2291.00	1967.00	2394.00
Feeder IP55	4F	1470.00	1710.00	1967.00	1967.00	2463.00	2207.00	2702.00	2344.00	2839.00
Feeder 3R	9F	1864.00	2172.00	2481.00	2481.00	3113.00	2804.00	3421.00	2959.00	3591.00
Plug-in IP40	0P	1249.00	1470.00	1675.00	1675.00	2103.00	1881.00	2309.00	1983.00	2412.00
Plug-in IP55	4P	1488.00	1744.00	1983.00	1983.00	2481.00	2240.00	2737.00	2359.00	2857.00
Riser IP40	0R	1249.00	1454.00	1660.00	1660.00	2086.00	1881.00	2291.00	1983.00	2394.00
Riser IP55	4R	1470.00	1727.00	1967.00	1983.00	2481.00	2222.00	2720.00	2344.00	2857.00

Feeder or Plug-in      Feeder Only  
 Indoor      IP40      Outdoor      NEMA 3R  
 Splash Proof      IP55

# Sentron® Straight Section Busway

## Copper (3000 – 5000 Ampere)

Selection

### 3000A Copper

Basic Catalog Number		SX330C1	SX330C2	SX330C3	SX430C1	SX530C1	SX430C2	SX530C2	SX430C3	SX530C3
Busway Type	Add Suffix To Basic Catalog Number	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole 200% Neutral	4-Pole Internal Ground	4-Pole Internal Ground 200% Neutral	4-Pole Isolated Ground	4-Pole Isolated Ground 200% Neutral
		List Price Per Foot \$								
Feeder IP40	0F	1505.00	1744.00	2001.00	2001.00	2496.00	2257.00	2754.00	2377.00	2873.00
Feeder IP55	4F	1779.00	2070.00	2359.00	2377.00	2959.00	2667.00	3267.00	2822.00	3421.00
Feeder 3R	9F	2240.00	2618.00	2994.00	2994.00	3762.00	3370.00	4138.00	3558.00	4328.00
Plug-in IP40	0P	1523.00	1762.00	2018.00	2018.00	2531.00	2275.00	2770.00	2394.00	2907.00
Plug-in IP55	4P	1796.00	2103.00	2394.00	2394.00	2994.00	2702.00	3302.00	2839.00	3439.00
Riser IP40	0R	1505.00	1762.00	2001.00	2001.00	2514.00	2257.00	2770.00	2394.00	2891.00
Riser IP55	4R	1796.00	2086.00	2377.00	2377.00	2976.00	2685.00	3284.00	2839.00	3439.00

### 3200A Copper

Basic Catalog Number		SX332C1	SX332C2	SX332C3	SX432C1	SX532C1	SX432C2	SX532C2	SX432C3	SX532C3
Feeder IP40	0F	1660.00	1933.00	2207.00	2207.00	2771.00	2497.00	3045.00	2634.00	3182.00
Feeder IP55	4F	1968.00	2291.00	2618.00	2634.00	3284.00	2960.00	3610.00	3130.00	3781.00
Feeder 3R	9F	2463.00	2891.00	3318.00	3318.00	4157.00	3729.00	4585.00	3935.00	4789.00
Plug-in IP40	0P	1676.00	1950.00	2224.00	2241.00	2789.00	2515.00	3063.00	2652.00	3216.00
Plug-in IP55	4P	1984.00	2326.00	2652.00	2652.00	3318.00	2995.00	3644.00	3147.00	3797.00
Riser IP40	0R	1660.00	1950.00	2224.00	2224.00	2789.00	2497.00	3063.00	2565.00	3199.00
Riser IP55	4R	1968.00	2309.00	2634.00	2634.00	3302.00	2976.00	3627.00	3130.00	3797.00

### 4000A Copper

Basic Catalog Number		SX340C1	SX340C2	SX340C3	SX440C1	SX540C1	SX440C2	SX540C2	SX440C3	SX540C3
Feeder IP40	0F	1949.00	2291.00	2633.00	2633.00	3302.00	2976.00	3643.00	3147.00	3797.00
Feeder IP55	4F	2326.00	2720.00	3130.00	3130.00	3917.00	3523.00	4310.00	3728.00	4516.00
Feeder 3R	9F	2925.00	3439.00	3968.00	3968.00	4959.00	4464.00	5457.00	4704.00	5713.00
Plug-in IP40	0P	1967.00	2309.00	2651.00	2667.00	3317.00	2994.00	3660.00	3165.00	3831.00
Plug-in IP55	4P	2344.00	2754.00	3147.00	3165.00	3951.00	3558.00	4344.00	3746.00	4533.00
Riser IP40	0R	1967.00	2309.00	2651.00	2651.00	3317.00	2976.00	3643.00	3147.00	3815.00
Riser IP55	4R	2326.00	2737.00	3147.00	3147.00	3934.00	3541.00	4328.00	3728.00	4533.00

### 5000A Copper

Basic Catalog Number		SX350C1	SX350C2	SX350C3	SX450C1	SX550C1	SX450C2	SX550C2	SX450C3	SX550C3
Feeder IP40	0F	2326.00	2754.00	3165.00	3165.00	3968.00	3575.00	4362.00	3762.00	4567.00
Feeder IP55	4F	2754.00	3249.00	3762.00	3762.00	4704.00	4225.00	5183.00	4464.00	5404.00
Feeder 3R	9F	3489.00	4123.00	4755.00	4755.00	5952.00	5355.00	6552.00	5644.00	6842.00
Plug-in IP40	0P	2344.00	2770.00	3180.00	3180.00	3986.00	3591.00	4379.00	3780.00	4583.00
Plug-in IP55	4P	2788.00	3284.00	3780.00	3780.00	4738.00	4260.00	5200.00	4499.00	5439.00
Riser IP40	0R	2326.00	2754.00	3180.00	3180.00	3968.00	3575.00	4379.00	3780.00	4567.00
Riser IP55	4R	2770.00	3267.00	3762.00	3762.00	4720.00	4242.00	5183.00	4481.00	5422.00

Feeder or Plug-in

Indoor IP40  
Splash Proof IP55

Feeder Only

Outdoor NEMA 3R

# Sentron® Busway Systems

## Busway Accessories

## Selection

Ampere Rating	Elbow Stack	Elbow	Tee	End Tap Box	Center Tap Box	Flanged End/Swbd. Conn.	End Closure	XFMR Throat	XFMR Cable Tap 1-3 PH	XFMR Cable Tap 3-1 PH	Expansion Section	Reducer Fused	Reducer Unfused	Phase Rotation Section <sup>Ⓞ</sup>	Flanges Wall/Floor	Isolation Joint	Roof Flange
Suffix	ES	EL <sup>Ⓛ</sup>	TE	ET	CT	FE <sup>Ⓞ</sup>	EC	VT	V3	V1	XP	RF	RN	PR	GW	JI	GR

### 3-Pole

225	830.	873.	1048.	1996.	1996.	918.	218.	4270.	976.	2797.	1486.	2097.	1106.	1486.	199.	844.	1136.
400	830.	873.	1048.	1996.	1996.	976.	218.	4270.	976.	2797.	1486.	2097.	1106.	1486.	199.	844.	1136.
600	830.	873.	1048.	1996.	1996.	1268.	218.	4270.	976.	2797.	1486.	2097.	1106.	1486.	199.	844.	1136.
800	968.	1019.	1048.	2055.	2055.	1369.	218.	4750.	1035.	2988.	1777.	2404.	1268.	1777.	199.	844.	1136.
1000	968.	1019.	1165.	2156.	2156.	1560.	220.	5202.	1093.	3147.	1952.	2725.	1443.	1952.	210.	903.	1136.
1200	968.	1019.	1165.	2272.	2272.	1748.	220.	5640.	1136.	3322.	2113.	3249.	1719.	2113.	210.	903.	1136.
1350	968.	1019.	1165.	2272.	2272.	1748.	220.	5640.	1136.	3322.	2113.	3249.	1719.	2113.	210.	903.	1136.
1600	968.	1019.	1165.	2594.	2594.	2214.	228.	6528.	1253.	3555.	2477.	3905.	2069.	2477.	218.	931.	1136.
2000	1106.	1165.	1165.	2900.	2900.	2346.	228.	7476.	1443.	3963.	2929.	4562.	2404.	2929.	218.	931.	1136.
2500	1106.	1165.	1428.	3205.	3205.	2783.	279.	8613.	1719.	4357.	3396.	5538.	2929.	3396.	224.	961.	1136.
3000	1106.	1165.	1428.	3409.	3409.	3322.	279.	10537.	2025.	4750.	3905.	6398.	3396.	3905.	224.	961.	1180.
3200	1166.	1224.	1516.	3585.	3599.	4138.	279.	11047.	2113.	5013.	4226.	7010.	3716.	4226.	224.	961.	1180.
4000	1289.	1355.	1705.	3934.	3934.	4138.	279.	12053.	2302.	2451.	4867.	8234.	4357.	4867.	224.	961.	1180.
5000	1289.	1355.	1705.	4649.	4649.	4867.	279.	14253.	2638.	2809.	5741.	10085.	5333.	5741.	224.	961.	1238.

### 4-Pole

225	998.	1048.	1223.	2069.	2069.	976.	218.	4794.	1035.	2797.	1777.	2171.	1151.	1777.	199.	844.	1136.
400	998.	1048.	1223.	2069.	2069.	1005.	218.	4794.	1035.	2797.	1777.	2171.	1151.	1777.	199.	844.	1136.
600	998.	1048.	1223.	2069.	2069.	1297.	218.	4794.	1035.	2797.	1777.	2171.	1151.	1777.	199.	844.	1136.
800	1019.	1078.	1223.	2272.	2272.	1413.	218.	5450.	1136.	2988.	2069.	3046.	1602.	2069.	199.	844.	1136.
1000	1019.	1078.	1311.	2375.	2375.	1705.	220.	4022.	1194.	3147.	2302.	3571.	1894.	2302.	210.	903.	1136.
1200	1019.	1078.	1311.	2594.	2594.	1821.	220.	6178.	1253.	3322.	2638.	4007.	2113.	2638.	210.	903.	1136.
1350	1106.	1165.	1311.	2710.	2710.	1908.	228.	7243.	1385.	3396.	2827.	4445.	2346.	2827.	210.	903.	1136.
1600	1106.	1165.	1311.	3001.	3001.	2230.	228.	7957.	1443.	3555.	3424.	5086.	2696.	3424.	218.	931.	1136.
2000	1355.	1428.	1705.	3292.	3292.	2564.	228.	9268.	1719.	3963.	3730.	5945.	3147.	3730.	218.	931.	1136.
2500	1355.	1428.	1705.	3730.	3730.	3104.	279.	10945.	1952.	4357.	4342.	7389.	3905.	4342.	224.	961.	1136.
3000	1355.	1428.	1705.	4022.	4022.	3672.	279.	12446.	2244.	4750.	5042.	8671.	4591.	5042.	224.	961.	1180.
3200	1443.	1515.	1792.	4329.	4329.	3979.	279.	13510.	2360.	5013.	5480.	9502.	5028.	5480.	224.	961.	1180.
4000	1618.	1705.	1981.	4955.	4955.	4591.	279.	15623.	2579.	5552.	6353.	11149.	5902.	6353.	224.	961.	1180.
5000	1618.	1705.	1981.	5669.	5669.	5815.	279.	18816.	3046.	6353.	7621.	13757.	7273.	7621.	224.	961.	1238.

To price complete device, add the following appropriate IP feeder footage to the accessory charge.

Ampere Rating	Elbow Stack	Elbow	Tee	Cross	Tap Box End	Tap Box Center	Flanged End Swbd. Conn.	XFMR Throat	Expansion Section	Reducer Fusible	Reducer Unfused
225-1350 Al 225-1600 Cu	1'	2'	3'	4'	1'	4'	1'	4'	4'	4'	4'
1600-3200 Al 2000-4000 Cu	2'	3'	5'	6'	1'	4'	1'	4'	4'	4'	4'
4000 Al 5000 Cu	3'	4'	6'	8'	1'	4'	1'	4'	4'	4'	4'

### "M" Rating/Standard Rating Conversion Table

1000/A Square Inch "M" Rating	Standard 55°C Rating
	Sentron
225	600
400	800
600	1200
800	1350
1000	1600
1200	2000
1350	2000
1600	Ⓞ
2000	2500
2500	4000
3000	4000
3200	4000
4000	5000

### "L" Rating/Standard Rating Conversion Table

750/A Square Inch "L" Rating	Standard 55°C Rating
	Sentron
225	600
400	800
600	1000
800	1200
1000	1350
1200	1600
1350	2000
1600	2000
2000	2500
2500	3000
3000	4000
3200	4000

Ⓛ Elbows other than 90° double the labor charge.

Ⓞ For connections to other manufacturers switchboard, multiply accessory charge by 2.5 (Suffix is FO).

Ⓞ Feeder only.

Ⓞ 1600A "M" rating is a dedicated offering.

Ⓞ Consult factory for pricing.

Note: To price cross price 2 times elbow.

# Sentron® Busway Systems

## Hangers, Floor Supports

**Selection**

### Trapeze Hangers<sup>①</sup>

Catalog Number	List Price \$
SXTH1	26.00
SXTH2	35.00
SXTH3	40.00
SXTH4	54.00

### Structural Steel Hangers<sup>①</sup>

Catalog Number	List Price \$
SXSS1	36.00
SXSS2	44.00
SXSS3	51.00
SXSS4	60.00

### Wall Mounted Hangers<sup>①</sup>

Catalog Number	List Price \$
SXWH1	160.00
SXWH2	183.00
SXWH3	232.00
SXWH4	273.00

### Single Drop Rod Hangers

Aluminum		Copper	
Catalog Number	List Price \$	Catalog Number	List Price \$
SXDRA1	46.00	SXDRC1	54.00
SXDRA2	54.00	SXDRC2	66.00
SXDRA3	60.00	SXDRC3	74.00
SXDRA4	66.00	SXDRC4	80.00
SXDRA5	74.00	SXDRC5	86.00
SXDRA6	80.00	SXDRC6	92.00
SXDRA7	86.00	SXDRC7	104.00

### Spring Hanger / Floor Support

Catalog Number	List Price \$
SXSH4	235.00
SXSH6	243.00
SXSH8	255.00
SXSH10	264.00
SXSH12	273.00
SXSH14	282.00

### Lifting Kit<sup>②</sup>

Catalog Number	List Price \$
SXLK	63.00

### Sway Brace Bracket

Catalog Number	List Price \$
SXSB	91.00

### Busway Assembly Tool

Catalog Number	List Price \$
SXBAT	63.00

<sup>①</sup> See pages 14-38 to 14-39 for Hanger Application information.

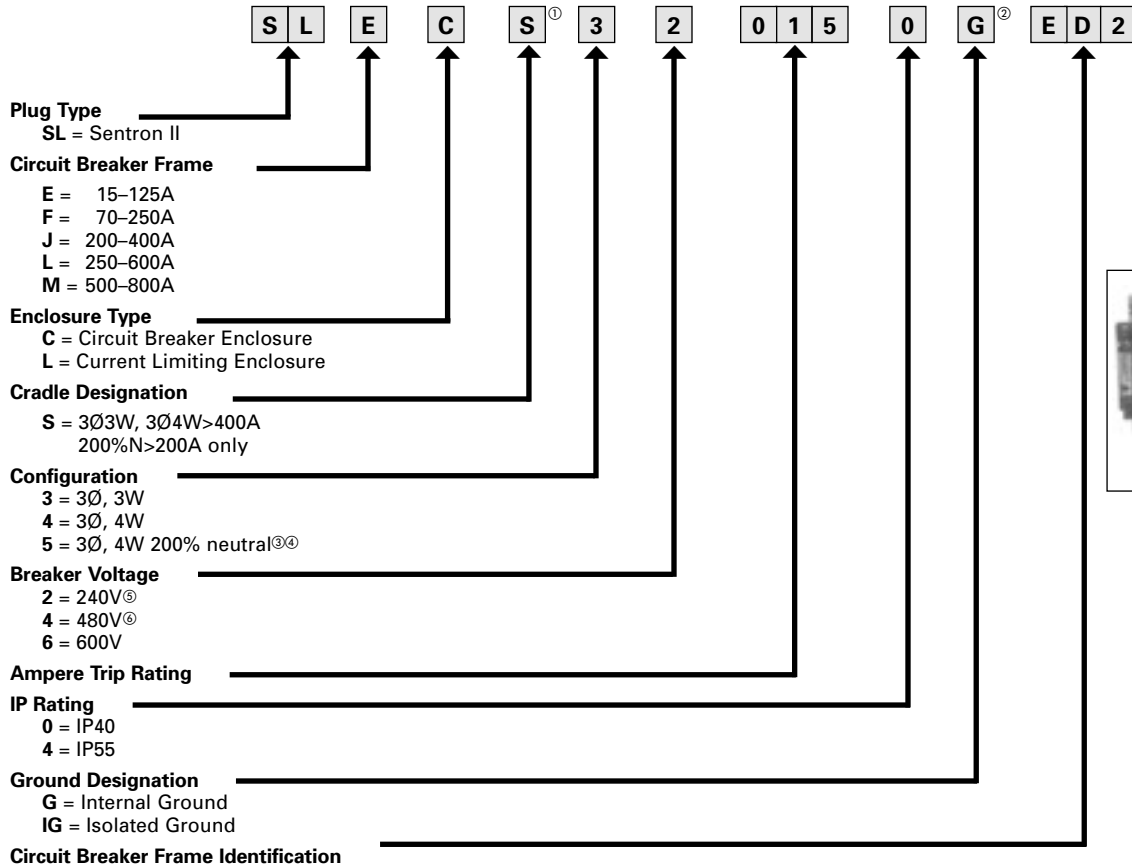
<sup>②</sup> Used for mounting 400 and 600A Sentron Bus Plugs in riser applications. One kit required per bus plug.

# Sentron® Bus Plugs

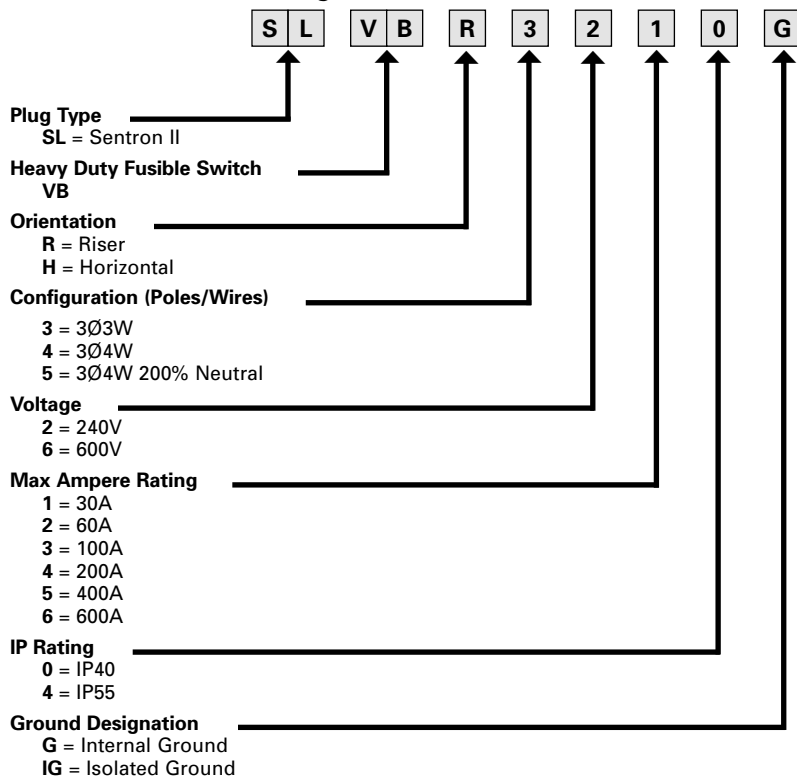
## Catalog Numbering System

## Selection / Application

### Sentron Bus Plugs—Circuit Breaker (Installed)



### Sentron SLVB Bus Plugs—Fusible



① The S digit is only used on 3- and 4-wire (100%N) plugs that are greater than 400A and 200%N plugs greater than 200A. Lower amperage plugs do not require this digit. (Ex. SLID3610, SLEC32060ED2)  
 ② The G and IG digits are used to specify internal and isolated ground respectively. Integral (housing) ground plugs do not require this digit. (Ex. SLID3610, SLEC360150ED6)  
 ③ Available through 400A only.  
 ④ Available with E, F and J Frame breakers only.  
 ⑤ Available with ED2 breakers only.  
 ⑥ Available with ED4 and HHED6 breakers only.

# Sentron® SLVB Bus Plugs

## Bus Plugs / Fusible Plugs

Selection

Ampere Rating	Catalog Number	List Price \$
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### 3-Pole, 250 Volt<sup>①</sup>

30A	SLVB*3210	734.00
	SLVB*3210G	833.00
	SLVB*3210IG	877.00
60A	SLVB*3220	807.00
	SLVB*3220G	907.00
	SLVB*3220IG	950.00
100A	SLVB*3230	1206.00
	SLVB*3230G	1307.00
	SLVB*3230IG	1349.00
200A	SLVB*3240	2017.00
	SLVB*3240G	2116.00
	SLVB*3240IG	2160.00
400A <sup>②③</sup>	SLVB*3250	5191.00
	SLVB*3250G	5291.00
	SLVB*3250IG	5377.00
600A <sup>②③</sup>	SLVB*3260	8064.00
	SLVB*3260G	8164.00
	SLVB*3260IG	8251.00

Ampere Rating	Catalog Number	List Price \$
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### 3-Pole, 600 Volt<sup>①</sup>

30A	SLVB*3610	807.00
	SLVB*3610G	907.00
	SLVB*3610IG	950.00
60A	SLVB*3620	870.00
	SLVB*3620G	969.00
	SLVB*3620IG	1013.00
100A	SLVB*3630	1227.00
	SLVB*3630G	1328.00
	SLVB*3630IG	1371.00
200A	SLVB*3640	2139.00
	SLVB*3640G	2239.00
	SLVB*3640IG	2283.00
400A <sup>②③</sup>	SLVB*3650	5537.00
	SLVB*3650G	5637.00
	SLVB*3650IG	5725.00
600A <sup>②③</sup>	SLVB*3660	8005.00
	SLVB*3660G	8106.00
	SLVB*3660IG	8205.00

Note: Replace \* in catalog number with "H" for horizontal applications and "R" for riser applications.

### Ground Detector And Potentializer Plug

Description	Catalog Number	List Price \$
For 2 or 3-pole 240 and 480 volt service. (IP40 construction only)	SLPGR3140G	819.00

Note: Available in IP40 construction only.

Description	Catalog Number	List Price \$
Spring Kit	SXSK	32.00

① All plugs shown are rated IP40; if IP55 rating is desired, substitute a "4" for "0" in position 8 (or 9 for cradle plugs) of catalog number and apply one of the following list price adders:

30A, 60A: \$229.  
100A: \$307.  
200A: \$579.  
400A, 600A: \$1039.

② 400A and larger bus plugs that require auxiliary support. See also SXSK Spring Kit.

Ampere Rating	Catalog Number	List Price \$	Catalog Number	List Price \$
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### 4-Pole, 250 Volt, ①

30A	SLVB*4210	872.00	SLVB*5210	1010.00
	SLVB*4210G	970.00	SLVB*5210G	1109.00
	SLVB*4210IG	1014.00	SLVB*5210IG	1191.00
60A	SLVB*4220	893.00	SLVB*5220	1084.00
	SLVB*4220G	992.00	SLVB*5220G	1183.00
	SLVB*4220IG	1035.00	SLVB*5220IG	1265.00
100A	SLVB*4230	1409.00	SLVB*5230	845.00
	SLVB*4230G	439.00	SLVB*5230G	1578.00
	SLVB*4230IG	1476.00	SLVB*5230IG	676.00
200A	SLVB*4240	2316.00	SLVB*5240	2613.00
	SLVB*4240G	2414.00	SLVB*5240G	1841.00
	SLVB*4240IG	1684.00	SLVB*5240IG	2348.00
400A <sup>②③</sup>	SLVB*4250	5833.00	SLVB*5250	6241.00
	SLVB*4250G	5933.00	SLVB*5250G	6500.00
	SLVB*4250IG	6032.00	SLVB*5250IG	7152.00
600A <sup>②③</sup>	SLVB*4260	8229.00	—	—
	SLVB*4260G	8328.00	—	—
	SLVB*4260IG	8427.00	—	—

Ampere Rating	Catalog Number	List Price \$	Catalog Number	List Price \$
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### 4-Pole, 600 Volt, ①

30A	SLVB*4610	906.00	SLVB*5610	1045.00
	SLVB*4610G	1005.00	SLVB*5610G	1142.00
	SLVB*4610IG	1049.00	SLVB*5610IG	1187.00
60A	SLVB*4620	937.00	SLVB*5620	1074.00
	SLVB*4620G	1036.00	SLVB*5620G	1175.00
	SLVB*4620IG	1080.00	SLVB*5620IG	1219.00
100A	SLVB*4630	1376.00	SLVB*5630	1591.00
	SLVB*4630G	1476.00	SLVB*5630G	1601.00
	SLVB*4630IG	1519.00	SLVB*5630IG	1645.00
200A	SLVB*4640	2451.00	SLVB*5640	2642.00
	SLVB*4640G	2476.00	SLVB*5640G	2773.00
	SLVB*4640IG	2519.00	SLVB*5640IG	2817.00
400A <sup>②③</sup>	SLVB*4650	5977.00	SLVB*5650	7327.00
	SLVB*4650G	6076.00	SLVB*5650G	8427.00
	SLVB*4650IG	6176.00	SLVB*5650IG	9269.00
600A <sup>②③</sup>	SLVB*4660	8838.00	—	—
	SLVB*4660G	8937.00	—	—
	SLVB*4660IG	9036.00	—	—

### Fuse Adapter Kits

Switch Rating	Std Fuse Class	Class R Catalog Number	List Price \$	Class T Catalog Number	List Price \$	Class J Catalog Number	List Price \$
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#### 250V

30A	H, K	SLR2030	105.00	—	—	—	—
60A	H, K	SLR2060	132.00	—	—	—	—
100A	H, K	SLR2100	89.00	SLT2100	92.00	—	—
200A	H, K	SLR2200	89.00	SLT2200	124.00	—	—
400A <sup>②③</sup>	H, K, J	SLR2400	132.00	SLT2400	124.00	—	—
600A <sup>②③</sup>	H, K, J	SLR2600	132.00	SLT2600	141.00	SLJ2600	529.00

#### 600V

30A	H, K, J	SLR6030	124.00	—	—	—	—
60A	H, K, J	SLR6060	124.00	—	—	—	—
100A	H, K, J	SLR6100	89.00	SLT6100	141.00	—	—
200A	H, K, J	SLR6200	89.00	SLT6200	172.00	—	—
400A <sup>②③</sup>	H, K, J	SLR6400	132.00	SLT6400	185.00	—	—
600A <sup>②③</sup>	H, K, J	SLR6600	132.00	SLT6600	210.00	SLJ6600	249.00

③ Used on 400A and larger bus plugs that require auxiliary support and that are mounted on vertical/riser busway. Kit contains two springs (part number 32-9909-04). One kit required per bus plug.



# Sentron® Bus Plugs

## Bus Plugs with Standard Circuit Breakers ①②③④

Selection

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 3-Pole, 240 Volt, ED2 Breaker</b>		
15-60A	SLEC32***0ED2	1106.00
	SLEC32***0GED2	1210.00
	SLEC32***0IGED2	1255.00
70-100A	SLEC32***0ED2	1106.00
	SLEC32***0GED2	1210.00
	SLEC32***0IGED2	1255.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 4-Pole, 240 Volt, ED2 Breaker</b>		
15-60A	SLEC42***0ED2	1262.00
	SLEC42***0GED2	1367.00
	SLEC42***0IGED2	1411.00
70-100A	SLEC42***0ED2	1262.00
	SLEC42***0GED2	1367.00
	SLEC42***0IGED2	1411.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 200% Neutral</b>		
15-60A	SLEC52***0ED2	1630.00
	SLEC52***0GED2	1734.00
	SLEC52***0IGED2	1778.00
70-100A	SLEC52***0ED2	1630.00
	SLEC52***0GED2	1734.00
	SLEC52***0IGED2	1778.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 3-Pole, 480 Volt, ED4 Breaker</b>		
15-60A	SLEC34***0ED4	1363.00
	SLEC34***0GED4	1468.00
	SLEC34***0IGED4	1512.00
70-100A	SLEC34***0ED4	1512.00
	SLEC34***0GED4	1617.00
	SLEC34***0IGED4	1662.00
110-125A	SLEC34***0ED4	1710.00
	SLEC34***0GED4	1817.00
	SLEC34***0IGED4	1662.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 4-Pole, 480 Volt, ED4 Breaker</b>		
15-60A	SLEC44***0ED4	1520.00
	SLEC44***0GED4	1624.00
	SLEC44***0IGED4	1670.00
70-100A	SLEC44***0ED4	1670.00
	SLEC44***0GED4	1773.00
	SLEC44***0IGED4	1819.00
110-125A	SLEC44***0ED4	1869.00
	SLEC44***0GED4	1973.00
	SLEC44***0IGED4	2018.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 200% Neutral</b>		
15-60A	SLEC54***0ED4	1927.00
	SLEC54***0GED4	2032.00
	SLEC54***0IGED4	2078.00
70-100A	SLEC54***0ED4	2101.00
	SLEC54***0GED4	2203.00
	SLEC54***0IGED4	2249.00
110-125A	SLEC54***0ED4	2229.00
	SLEC54***0GED4	2339.00
	SLEC54***0IGED4	2386.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 3-Pole, 600 Volt, ED6 Breaker</b>		
15-60A	SLEC36***0ED6	1503.00
	SLEC36***0GED6	1608.00
	SLEC36***0IGED6	1653.00
70-100A	SLEC36***0ED6	1668.00
	SLEC36***0GED6	1772.00
	SLEC36***0IGED6	1818.00
110-125A	SLEC36***0ED6	1870.00
	SLEC36***0GED6	1974.00
	SLEC36***0IGED6	2019.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 4-Pole, 600 Volt, ED6 Breaker</b>		
15-60A	SLEC46***0ED6	1661.00
	SLEC46***0GED6	1765.00
	SLEC46***0IGED6	1809.00
70-100A	SLEC46***0ED6	1825.00
	SLEC46***0GED6	1930.00
	SLEC46***0IGED6	1975.00
110-125A	SLEC46***0ED6	2027.00
	SLEC46***0GED6	2132.00
	SLEC46***0IGED6	2178.00

Ampere Rating	Catalog Number	List Price \$
<b>E Frame 200% Neutral</b>		
15-60A	SLEC56***0ED6	2083.00
	SLEC56***0GED6	2187.00
	SLEC56***0IGED6	2233.00
70-100A	SLEC56***0ED6	2253.00
	SLEC56***0GED6	2360.00
	SLEC56***0IGED6	2407.00
110-125A	SLEC56***0ED6	2393.00
	SLEC56***0GED6	2498.00
	SLEC56***0IGED6	2543.00

Ampere Rating	Catalog Number	List Price \$
<b>F Frame 3-Pole, 600 Volt, FXD6 Breaker</b>		
70-225A	SLFC36***0FXD6	3733.00
	SLFC36***0GFXD6	3838.00
	SLFC36***0IGFXD6	3883.00
250A	SLFC362500FXD6	4453.00
	SLFC362500GFXD6	4557.00
	SLFC362500IGFXD6	4603.00

Ampere Rating	Catalog Number	List Price \$
<b>F Frame 4-Pole, 600 Volt, FXD6 Breaker</b>		
70-225A	SLFC46***0FXD6	3855.00
	SLFC46***0GFXD6	3946.00
	SLFC46***0IGFXD6	3992.00
250A	SLFC462500FXD6	4538.00
	SLFC462500GFXD6	4665.00
	SLFC462500IGFXD6	4901.00

Ampere Rating	Catalog Number	List Price \$
<b>F Frame 200% Neutral</b>		
70-200A	SLFC56***0FXD6	4177.00
	SLFC56***0GFXD6	4281.00
	SLFC56***0IGFXD6	4326.00
225-250A	SLFC56***0FXD6	4177.00
	SLFC56***0GFXD6	4281.00
	SLFC56***0IGFXD6	4326.00

Ampere Rating	Catalog Number	List Price \$
<b>J Frame 3-Pole, 600 Volt, JXD6 Breaker</b>		
200-400A③⑤	SLJC36***0JXD6	7301.00
	SLJC36***0GJXD6	7405.00
	SLJC36***0IGJXD6	7451.00

Ampere Rating	Catalog Number	List Price \$
<b>J Frame 4-Pole, 600 Volt, JXD6 Breaker</b>		
200-400A③⑤	SLJC46***0JXD6	7940.00
	SLJC46***0GJXD6	8089.00
	SLJC46***0IGJXD6	8089.00

Ampere Rating	Catalog Number	List Price \$
<b>J Frame 200% Neutral</b>		
200A③⑤	SLJCS62000JXD6	8275.00
	SLJCS62000GJXD6	8379.00
	SLJCS62000IGJXD6	8425.00
225-400A③⑤	SLJCS56***0JXD6	8833.00
	SLJCS56***0GJXD6	8939.00
	SLJCS56***0IGJXD6	8984.00

Ampere Rating	Catalog Number	List Price \$
<b>L Frame 3-Pole, 600 Volt, LXD6 Breaker</b>		
450-600A③⑤	SL LCS36***0LXD6	10457.00
	SL LCS36***0GLXD6	10707.00
	SL LCS36***0IGLXD6	10838.00

Ampere Rating	Catalog Number	List Price \$
<b>L Frame 4-Pole, 600 Volt, LXD6 Breaker</b>		
450-600A③⑤	SL LCS46***0LXD6	10999.00
	SL LCS46***0GLXD6	11251.00
	SL LCS46***0IGLXD6	11382.00

Description	Catalog Number	List Price \$
Spring Kit	SXSK	32.00

Ampere Rating	Catalog Number	List Price \$
<b>M Frame 3-Pole, 600 Volt, MXD6 Breaker</b>		
500-800A③⑤	SLMCS36***0MXD6	12246.00
	SLMCS36***0GMXD6	12617.00
	SLMCS36***0IGMXD6	12681.00

Ampere Rating	Catalog Number	List Price \$
<b>M Frame 4-Pole, 600 Volt, MXD6 Breaker</b>		
500-800A③⑤	SLMCS46***0MXD6	12972.00
	SLMCS46***0GMXD6	13343.00
	SLMCS46***0IGMXD6	13405.00

① Replace "\*\*\*\*" with breaker trip rating.

Example: SLEC36060ED6, for 60A trip.

② All plugs shown have an IP40 rating, if IP54/55 is desired substitute "4" for "0" in position 10 (or 11 for cradle plugs) and add the following charge:

E Frame: \$149. Ex. SLEC360604ED6  
 F Frame: \$353. Ex. SLFC360704FXD6  
 J Frame: \$913. Ex. SLJC36100JXD6  
 L Frame: \$960. Ex. SL LCS365004LXD6  
 M Frame: \$1046. Ex. SLMCS368004MXD6

③ For the following breaker charges, change the catalog number suffix and add the appropriate charge:

15-60A: HHED6 \$624. Ex. SLEC36\*\*\*0HHED6  
 70-100A: HHED6 \$561. Ex. SLEC36\*\*\*0HHED6  
 110-125A: HHED6 \$761. Ex. SLEC36\*\*\*0HHED6  
 F Frame: FD6 \$446. Ex. SLFC36\*\*\*0FD6  
 F Frame: HFD6 \$2777. Ex. SLFC36\*\*\*0HFD6  
 J Frame: JD6 \$189. Ex. SLJC36\*\*\*0JD6  
 J Frame: HJD6 \$2772. Ex. SLJC36\*\*\*0HJD6  
 L Frame: LD6 \$189. Ex. SL LCS36\*\*\*0LD6  
 L Frame: HLD6 \$2247. Ex. SL LCS36\*\*\*0HLD6  
 M Frame: MD6 \$588. Ex. SLMCS36\*\*\*0MD6  
 M Frame: HMD6 \$2247. Ex. SLMCS36\*\*\*0HMD6

④ 400A and larger bus plugs that require auxiliary support. See also SXSK Spring Kit.

⑤ Used on 400A and larger bus plugs that require auxiliary support and that are mounted on vertical/riser busway. Kit contains two springs (part number 32-9909-04). One kit required per bus plug.

# Sentron® Bus Plugs

## Bus Plugs with Current Limiting Circuit Breakers ①②

Selection

Ampere Rating	Catalog Number	List Price \$
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### E Frame 3-Pole, 600 Volt, CED6 Breaker

15-60A	SLEL36***0CED6	4664.00
	SLEL36***0GCED6	4769.00
	SLEL36***0IGCED6	4813.00
70-100A	SLEL36***0CED6	4664.00
	SLEL36***0GCED6	4769.00
	SLEL36***0IGCED6	4813.00
110-125A	SLEL36***0CED6	4664.00
	SLEL36***0GCED6	4769.00
	SLEL36***0IGCED6	4813.00

### F Frame 3-Pole, 600 Volt, CFD6 Breaker

100-225A	SLFL36***0CFD6	8399.00
	SLFL36***0GCFD6	8504.00
	SLFL36***0IGCFD6	8550.00
250A	SLFL362500CFD6	8407.00
	SLFL362500GCFD6	8512.00
	SLFL362500IGCFD6	8557.00

### J Frame 3-Pole, 600 Volt, CJD6 Breaker

200-400A <sup>③</sup>	SLJL36***0CJD6	12708.00
	SLJL36***0GCJD6	12812.00
	SLJL36***0IGCJD6	12858.00

### L Frame 3-Pole, 600 Volt, CLD6 Breaker

450-600A <sup>③</sup>	SLLS36***0CLD6	16688.00
	SLLS36***0GCLD6	16940.00
	SLLS36***0IGCLD6	17070.00

Ampere Rating	Catalog Number	List Price \$
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### E Frame 4-Pole, 600 Volt, CED6 Breaker

15-60A	SLEL46***0CED6	4821.00
	SLEL46***0GCED6	4926.00
	SLEL46***0IGCED6	4971.00
70-100A	SLEL46***0CED6	4821.00
	SLEL46***0GCED6	4926.00
	SLEL46***0IGCED6	4971.00
110-125A	SLEL46***0CED6	4821.00
	SLEL46***0GCED6	4926.00
	SLEL46***0IGCED6	4971.00

### F Frame 4-Pole, 600 Volt, CFD6 Breaker

100-225A	SLFL46***0CFD6	8508.00
	SLFL46***0GCFD6	8613.00
	SLFL46***0IGCFD6	8658.00
250A	SLFL462500CFD6	8843.00
	SLFL462500GCFD6	8948.00
	SLFL462500IGCFD6	8993.00

### J Frame 4-Pole, 600 Volt, CJD6 Breaker

200-400A <sup>③</sup>	SLJL46***0CJD6	13347.00
	SLJL46***0GCJD6	13452.00
	SLJL46***0IGCJD6	13498.00

### L Frame 4-Pole, 600 Volt, CLD6 Breaker

450-600A <sup>③</sup>	SLLS46***0CLD6	17232.00
	SLLS46***0GCLD6	17483.00
	SLLS46***0IGCLD6	17613.00

Ampere Rating	Catalog Number	List Price \$
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### E Frame 200% Neutral

15-60A	SLEL56***0CED6	5373.00
	SLEL56***0GCED6	5478.00
	SLEL56***0IGCED6	5522.00
70-100A	SLEL56***0CED6	5373.00
	SLEL56***0GCED6	5478.00
	SLEL56***0IGCED6	5522.00
110-125A	SLEL56***0CED6	5373.00
	SLEL56***0GCED6	5478.00
	SLEL56***0IGCED6	5522.00

### F Frame 200% Neutral

70-200A	SLFL56***0CFD6	8843.00
	SLFL56***0GCFD6	8948.00
	SLFL56***0IGCFD6	8993.00
225-250A	SLFL56***0CFD6	8843.00
	SLFL56***0GCFD6	8948.00
	SLFL56***0IGCFD6	8993.00

### J Frame 200% Neutral

200A <sup>③</sup>	SLJL562000CJD6	13786.00
	SLJL562000GCJD6	13832.00
	SLJL562000IGCJD6	13681.00
225-400A <sup>③</sup>	SLJL56***0CJD6	14241.00
	SLJL56***0GCJD6	14346.00
	SLJL56***0IGCJD6	14392.00

① Replace "\*\*\*\*" with breaker trip rating.

Example: SLEL36060ED6, for 60A trip.

② All plugs shown have an IP40 rating, if IP54/55 is desired, substitute "4" for "0" in position 10 (or 11 for cradle plugs) and add the following charge:

E Frame: \$149. Ex. SLEL360604ED6

F Frame: \$353. Ex. SLFL360704FXD6

J Frame: \$913. Ex. SLJL361004JXD6

L Frame: \$960. Ex. SLLS365004LXD6

M Frame: \$1046. Ex. SLMCS368004MXD6

③ 400A and larger bus plugs that require auxiliary support.

See also SXSX Spring Kit.

# Sentron® Busway Systems

## Fusible Cubicles, Molded Case Circuit Breaker Cubicles

Selection

### Fusible Cubicles<sup>①②</sup>

Ampere Rating	List Price \$	
	3-Pole, 600V	4-Pole, 480/277V
	IP40	IP40
200	7800.	7925.
400	8514.	10139.
600	10942.	13066.
800	16546.	17957.
1200	20152.	22508.

### Molded Case Circuit Breaker Cubicles<sup>②</sup>

Breaker Frame	Ampere Rating	List Price \$	
		3-Pole, 600V	4-Pole, 480/277V
		IP40	IP40
JD6	200-400	10708.	11138.
LD6	300-600	16849.	17385.
MD6	600-800	22828.	24043.
ND6	800-1200	28844.	29540.
PD6	1400-1600	33682.	34147.
RD6	1800-2000	38269.	38841.

### Power Circuit Breaker<sup>②③</sup>

Breaker Frame Size <sup>②</sup>	Maximum Ampere Rating	AC Interrupting Capacity Symmetrical (RMS) Amperes			List Price \$ With Breaker	
		240 Volt	480 Volt	600 Volt	3-Pole	3-Phase, 4-Wire

#### Type RL

RL-800	800	30,000	30,000	30,000	25828.	43495.
RL-1600	1600	50,000	50,000	50,000	37361.	76130.
RL-2000	2000	65,000	65,000	65,000	54090.	83086.
RL-3200	3200	65,000	65,000	65,000	114720.	174007.
RL-4000	4000	85,000	85,000	85,000	166200.	261011.

#### Type RL (Fused)

RLF-800	800	200,000	200,000	200,000	40149.	42165.
RLF-3200	3200	200,000	200,000	200,000	68564.	70388.
RLF-4000	4000	200,000	200,000	200,000	166516.	170280.

### Solid State Molded Case Circuit Breaker Cubicles<sup>②</sup>

Breaker Frame	Ampere Rating	List Price \$	
		3-Pole, 600V	4-Pole, 480/277V
		IP40	IP40
SJD6 SJD6G SJD6NT SJD6NGT	200-400	8745. 12329. 10873. 14836.	9093. 12709. 11251. 15201.
SLD6 SLD6G SLD6NT SLD6NGT	300-600	13758. 17125. 15784. 19850.	14195. 17562. 16192. 20302.
SMD6A SMD6AG SMD6ANT SMD6ANGT	600-800	19530. 21788. 19922. 21628.	20491. 22707. 20928. 22780.
SND6A SND6AG SND6ANT SND6ANGT	800-1200	25243. 26263. 26059. 29993.	25796. 28085. 26627. 30548.
SPD6 SPD6G SPD6NT SPD6NGT	1400-1600	27502. 27590. 29484. 30840.	27880. 27982. 24281. 31232.

### Bolted Pressure Switches

Ampere Rating	List Price \$			
	480 Volt		600 Volt	
	3-Pole	4-Pole	3-Pole	4-Pole
800	18245.	24396.	25156.	25625.
1200	27475.	28135.	28832.	29529.
1600	30048.	30974.	31594.	32495.
2000	36778.	37856.	38616.	39769.
2500	43596.	45041.	45763.	47297.
3000	56168.	57867.	58982.	60832.
4000	79120.	81933.	83075.	86040.

① Fuses not included.

② For IP55 rating add 12% to list price.

③ For electrically operated, specify control voltage.

# Sentron® Busway Systems

## Meter Centers

*Selection*

### Molded Case Circuit Breaker Cubicles with Meter Tap Stack Provisions<sup>①</sup>

Busway	List Price \$	
	L Frame Breaker	N Frame Breaker
<b>Aluminum Busway</b>		
600A - 1200A	8503.	13030.
1350A - 1600A	10150.	14677.
2000A - 3000A	12346.	16871.
<b>Copper Busway</b>		
800A - 1600A	9875.	14402.
2000A	11796.	16323.
2500A - 4000A	15912.	20439.
5000A	18655.	23182.

### Meter Center Tap Stacks—IP40<sup>②</sup>

Amps	List Price \$					
	3-Pole	3-Pole Internal Ground	3-Pole Isolated Ground	4-Pole	4-Pole Internal Ground	4-Pole Isolated Ground
100	1005.	1122.	1194.	1355.	1456.	1618.
200	1063.	1180.	1268.	1428.	1530.	1689.
400	1106.	1223.	1326.	1501.	1602.	1777.
600	1165.	1281.	1385.	1560.	1675.	1850.
800	1210.	1339.	1443.	1631.	1748.	1861.
1000	1268.	1398.	1501.	1705.	1821.	2011.
1200	1311.	1456.	1560.	1763.	1894.	2097.

Note: Prices do not include meter centers.

<sup>①</sup>For IP55 rating add 12% to list price.  
<sup>②</sup>For IP55 add 28% add to list price.

# Busway Systems

## National Electric Code

## Technical

### I. General Requirements

**368.1 Scope.** This article covers service-entrance, feeder and branch-circuit busways and associated fittings.

#### 368.2 Definition.

**Busway.** A grounded metal enclosure containing factory-mounted, bare or insulated conductors, which are usually copper or aluminum bars, rods or tubes.

FPN: For cables, refer to article 370.

### II. Installation

**368.10 Uses Permitted.** Busways shall be permitted to be installed where they are located in accordance with 368.10(A) through (C).

**(A) Exposed.** Busways shall be permitted to be located in the open where visible, except as permitted in 368.10 (C).

**(B) Concealed.** Busways shall be permitted to be installed behind access panels, provided the busways are totally enclosed, of non-ventilating-type construction and installed so that the joints between sections and at fittings are accessible for maintenance purposes. Where installed behind access panels, means of access shall be provided and either of the following conditions shall be met:

(1) The space behind the access panels shall not be used for air-handling purposes.

(2) Where the space behind the access panels is used for environmental air, other than ducts and plenums, there shall be no provisions for plug-in connections and the conductors shall be insulated.

#### (C) Through walls and Floors.

Busways shall be permitted to be installed through walls and floors in accordance with (C)(1) and (C)(2).

(1) **Walls.** Unbroken lengths of busway shall be permitted to be extended through dry walls.

(2) **Floors.** Floor penetrations shall comply with (a) and (b).

(a) Busways shall be permitted to be extended vertically through dry floors if totally enclosed (unventilated) where passing through and for a minimum distance of 1.8m (6ft) above the floor to provide adequate protection from physical damage.

(b) In other than industrial establishments, where a vertical riser penetrates two or more dry floors, a minimum 100mm (4 in) high curb shall be installed around all floor openings for

riser busway to prevent liquids from entering the opening. Electrical equipment shall be located so that it will not be damaged by liquids that are retained by the curb.

FPN: See 300.21 for information concerning the spread of fire or products of combustion.

#### 368.12 Uses Not Permitted.

**(A) Physical Damage.** Busways shall not be installed where subject to severe physical damage or corrosive vapors.

**(B) Hoist ways.** Busways shall not be installed in Hoist ways.

**(C) Hazardous Locations.** Busways shall not be installed in any hazardous (Classified) location, unless specifically approved for such use.

FPN: See 501.10(B)

**(D) Wet Locations.** Busway shall not be installed outdoors or in wet damp locations unless identified for such use.

**(E) Working Platform.** Lighting busway and trolley busway shall not be installed less than 2.5 m (8 ft) above the floor or working platform unless provided with a cover identified for the purpose.

**368.17 Over current Protection.** Over current protection shall be provided in accordance with 368.17(A) through (D).

**(A) Rating of over current protection – Feeders.** A busway shall be protected against over current in accordance with the allowable current rating of the busway.

Exception No. 1: The applicable provisions of 240.4 shall be permitted.

Exception No. 2: Where used as transformer secondary ties, the provisions of 450.6(A)(3) shall be permitted.

**(B) Reduction in Ampacity Size of Busway.** Over current protection shall be required where busways are reduced in ampacity.

Exception: For industrial establishments only, omission of over current protection shall be permitted at points where busway are reduced in ampacity, provided that the length of the busway having the smaller ampacity does not exceed 15m(50ft) and has ampacity at least equal to one-third the rating or setting of the over current device next back on the line, and provided that such busway is free from contact with combustible material.

**(C) Feeder or Branch Circuits.** Where a busway is used as a feeder, devices or plug-in connections for tapping off

feeder or branch circuits from the busway shall contain the over current devices required for the protection of the feeder or branch circuits. The plug-in device shall consist of an externally operable circuit breaker or an externally operable fusible switch. Where such devices are mounted out of reach and contain disconnecting means, suitable means such as ropes, chains or sticks shall be provided for operating the disconnecting means from the floor.

Exception No.1: As permitted in 240.21.

Exception No. 2: For fixed or semi fixed luminaries (light fixtures), where the branch circuit over current device is part of the luminaries (fixture) cord plug on cord-connected luminaries (fixtures).

Exception No.3: Where luminaries (fixtures) without cords are plugged in directly into busway and the over current device is mounted on the luminaries (fixture).

**(D) Rating of Over Current Protection – Branch Circuits.** A busway used as a branch circuit shall be protected against over current in accordance with 210.20.

**368.30 Support.** Busways shall be securely supported at intervals not exceeding 1.5 m (5 ft) unless otherwise designed and marked.

#### 368.50 Branches from Busways.

Branches from busways shall be permitted to be made in accordance with 368.56(A), (B) and (C).

**(A) General.** Branches from busways shall be permitted to use any of the following wiring methods:

- (1) Type AC Armored Cable
- (2) Type MC metal-clad Cable
- (3) Type MI mineral-insulated, metal sheathed cable
- (4) Type IMC intermediate metal conduit
- (5) Type RMC rigid metal conduit
- (6) Type FMC flexible metal conduit
- (7) Type LFMC liquid tight flexible metal conduit
- (8) Type RNC rigid nonmetallic conduit
- (9) Type LFNC liquid tight flexible nonmetallic conduit
- (10) Type EMT electrical metallic tubing
- (11) Type ENT electrical nonmetallic tubing
- (12) Busways
- (13) Strut-type channel raceway
- (14) Surface Metal raceways
- (15) Surface nonmetallic raceways

# Busway Systems

## National Electric Code

## Technical

Where a separate equipment grounding conductor is used, connection of the equipment grounding conductor to the busway shall comply with 250.8 and 250.12.

### (B) Cord and Cable Assemblies.

Suitable cord and cable assemblies approved for extra-hard usage and hard usage, and listed bus drop cable shall be permitted as branches from the busway for the connection of portable equipment or the connection of stationary equipment to facilitate their interchange in accordance with 400.7 and 400.8 and the following conditions:

- (1) The cord or cable shall be attached to the building by the approved means.
- (2) The length of the cord or cable from a busway plug-in device to a suitable tension take-up support device shall not exceed 1.8 m (6 ft.).
- (3) The cord and cable shall not be installed as a vertical riser from the tension take-up support device to the equipment served.
- (4) Strain relief cable grips shall be provided for the cord or cable at the busway plug-in device and equipment terminations.

Exception to (B)(2): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, lengths exceeding 1.8 m (6 ft.) shall be permitted between the busway plug-in device and the tension take-up support device where the cord or cable is supported at intervals not exceeding 2.5 m (8 ft.).

### (C) Branches from Trolley-Type

**Busways.** Suitable cord and cable assemblies approved for extra-hard usage or hard-usage and listed bus drop cable shall be permitted as branches from trolley-type busways for the connection of moveable equipment in accordance with 400.7 and 400.8.

**368.58 Dead Ends.** A dead end of a busway shall be closed.

**368.60 Grounding.** Busway shall be grounded.

### III. Construction

**368.120 Marking.** Busway shall be marked with the voltage and current rating for which they are designed and with the manufacturers name or trademark in such a manner as to be visible after installation.

### IV. Requirements for over 600 Volts, Nominal

**368.214 Adjacent and Supporting Structures.** Metal enclosed busways shall be installed so that temperature rise from induced circulating currents in any adjacent metallic parts will not be hazardous to personnel or constitute a fire hazard.

### 368.234 Barriers and Seals.

**(A) Vapor Seals.** Busway runs that have sections located inside and outside of a building shall have a vapor seal at the building wall to prevent interchange of air between indoor and outdoor sections.

Exception: Vapor seals shall not be required in forced-cooled bus.

**(B) Fire Barriers.** Fire barriers shall be provided where fire walls, floors and ceilings are penetrated.

FPN: See 300.21 for information concerning the spread of fire or products of combustion.

**368.236 Drain Facilities.** Drain plugs, filter drains or similar methods shall be provided to remove condensed moisture from low points on a busway run.

### 368.237 Ventilated Bus Enclosures.

Ventilated busway enclosures shall be installed in accordance with Article 110, Part III and 490.24.

### 368.238 Terminations and

**Connections.** Where bus enclosures terminate at machines cooled by flammable gas, seal-off bushings, baffles or other means shall be provided to prevent accumulation of flammable gas in the busway enclosures. All conductor termination and connection hardware shall be accessible for installation, connection and maintenance.

**368.239 Switches.** Switching devices or disconnecting links provided in the busway run shall have the same momentary rating as the busway. Disconnecting links shall be plainly marked to be removable only when the bus is de-energized. Switching devices that are not load-break shall be interlocked to prevent operation under load and disconnecting link enclosures shall be interlocked to prevent access to energized parts.

### 368.240 Wiring 600 Volts or Less,

**Nominal.** Secondary control devices and wiring that are provided as part of the metal-enclosed bus run shall be insulated by fire-retardant barriers from all primary circuit elements with the

exception of short lengths of wire, such as at instrument transformer terminals.

**368.244 Expansion Fittings.** Flexible or expansion connections shall be provided in long, straight runs of bus to allow for temperature expansion or contraction or where the busway run crosses the building vibration insulation joints.

**368.258 Neutral.** Neutral bus, where required shall be sized to carry all neutral load current, including harmonic currents and shall have adequate momentary and short circuit rating consistent with system requirements.

**368.260 Grounding.** Metal-enclosed busway shall be grounded.

**368.320 Marking.** Each busway run shall be provided with a permanent nameplate on which the following information shall be provided:

- (1) Rated voltage.
- (2) Rated continuous current; if bus is forced-cooled, both the normal forced-cooled rating and the self-cooled (not forced-cooled) rating for the same temperature rise shall be given.
- (3) Rated frequency.
- (4) Rated impulse withstand voltage.
- (5) Rated 60Hz withstand voltage (dry).
- (6) Rated momentary current.
- (7) Manufacturers name or trademark.

FPN: See ANSI C37.23-1987(R1991), Guide for Metal enclosed Bus and Calculating Losses in Isolated-Phase Bus, for construction and testing requirements for metal enclosed bus.

# Busway Systems

## Sentron Busway Overview

## Overview

### Sentron Busway for Global Power Distribution Applications

Building on a solid foundation of advanced products for the construction industry, the Siemens Sentron name is recognized worldwide as synonymous with quality and consistent performance. Sentron Busway delivers impressive features and benefits that make it ideal for many types of industrial and construction implementations.

Engineered to ensure the safe and efficient distribution of power in industrial, commercial and institutional environments world-wide, Sentron ampacities range from 225A to 5000A UL and IEC. Thanks to an innovative design, you benefit from labor-saving installation and a flexible, compact bus system that is an ideal fit for most applications. In fact, Sentron Busway is one of the industry's least labor-intensive systems.

Sentron Busway installs with minimal hardware and often costs less than cable and conduit installations. The lightweight aluminum housing acts as an integral ground, joint stacks connect with splice plates featuring a single-bolt design, and bus plugs and cable tap boxes offer the industry's largest wire bending space. An optional 200% neutral within the bus bar housing accommodates harmonics common in today's power systems.

Sentron Busway conductors are insulated with a state-of-the-art epoxy insulation system, which is applied using an electrostatic spray process for optimal insulation integrity.

Exemplifying the spirit of continuing innovation, Sentron Busway is now available with economical and convenient elbow stacks for changing left, right, up or down directions at 90 degrees.

And, of course, Sentron Busway is certified to design standards worldwide, including UL, NEMA, IEC, CSA, VDE and BS.

Siemens Busway Business uses industry leading technology in all its manufacturing processes. From bus bar fabrication to Electrostatic Spray Epoxy insulation, all the processes used in the manufacturing of Siemens Sentron Busway are electronically controlled to provide for consistent, high quality results, making Sentron Busway products best in its class.

### Housing

Sentron Busway incorporates an all aluminum housing. This lightweight totally enclosed, non-ventilated housing resists rust and other elements, distributes heat away from the conductors, and provides an excellent ground path. The totally enclosed design also eliminates the need for derating of the system regardless of installation orientation. The housing is covered with an electrostatically applied light gray ANSI 61 polyester urethane powder paint that is scratch resistant and has a 1,000-hour salt spray resistance rating.

### Conductors

Sentron Busway conductors have a compact construction and can be configured as 3-phase 3-wire, 3-phase 4-wire or 3-phase 4-wire with 200% neutral. The conductors may be ordered in copper (98% conductivity), 1000A/in<sup>2</sup> M-Rated Copper, Aluminum (58% conductivity) and 750A/in<sup>2</sup> L-Rated Aluminum. The optional 200% neutral helps to handle harmonic conditions that may exist. This system is especially useful with discharge lighting (fluorescent) and computer installations. This will help to minimize overheating and prolong the life cycle of your power distribution equipment.

### Ground

Sentron Busway offers ground options to meet your specifications: standard integral aluminum housing ground and optional internal grounding bars. An optional isolated ground is also available which is especially useful in applications where a clean ground is needed.

### Plating

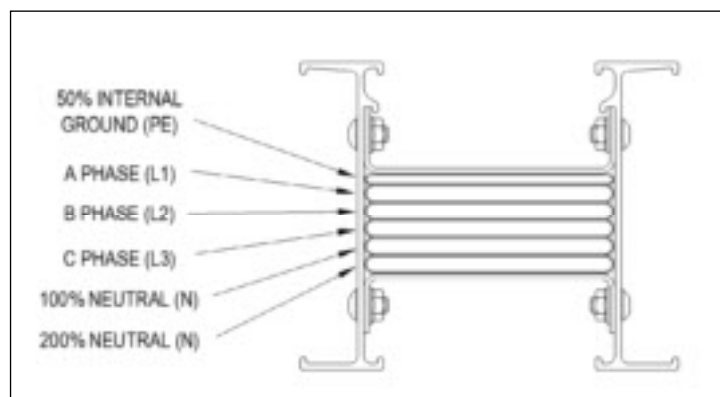
All bus bars are electroplated with tin. This unique tin plating provides excellent conductivity and resists outside elements from attaching to the bars. Optional silver plating is also available.

### Insulation

Sentron Busway is insulated with an Epoxy Powder Coating system designed by Siemens Engineers, Epoxy System Engineers and Epoxy Powder Specialists, specifically for Siemens Busway products.

The Siemens exclusive Electrostatic Spray insulation process produces uniform application of Epoxy powder over the entire conductor bar. This is further enhanced by the inline filter process and magnetic separator that helps to eliminate contaminants common to fluidized bed systems. The electrostatic application also provides a better coating consistency than that of the older fluidized bed process. The combination of electrostatic spray and lower oven temperatures produces a consistent coverage with fewer impurities and pinholes in the insulation. The lower oven temperatures reduce the risk of bar annealing, which affects the overall quality of the system.

Sentron Busway insulation is Class B, 130°C Rated. Every bus bar and completed assembly is dielectricly tested to ensure the insulation is free of defects.



# Busway Systems

## Sentron Busway Overview

## Overview

### Joint Stack

Each Sentron Busway piece is shipped with a joint stack and joint covers installed at one end of the busway and a shipping end protector at the other end. The joint stacks feature a single bolt design and a special, torque indicating, double headed break-off bolt. This eliminates the need for torque wrenches and assures proper torque at installation of 55 ft.-lbs.(68 N-m). When the proper torque value is achieved, the top bolt head will shear off. Each joint stack allows for +/- .625 inches (15.8mm) adjustability at each joint. Over adjustment is prevented by the joint covers, which will only allow a .625 inch (15.8mm) adjustment when the knockouts on the joint cover are removed. It is possible to remove any joint connection assembly to allow electrical isolation or removal of a busway length without disturbing adjacent busway lengths. Isolation joint stacks are available and used to electrically isolate a busway section(s) within a busway run. For easy visual identification, isolation joint stack assemblies are painted white.

### Plug-in Opening

Sentron Busway offer plug-in style busway which feature plug-in openings rated for finger safety to IP2X in accordance with IEC 529 and BS EN 60439-1, -2 and BS EN 60529.

Each plug-in opening has a reversible hinged dead front designed to protect the contact surfaces from dirt, dust or moisture. Gasketing is used where applications require a splash proof (IP55) rating.

### IP Ratings

Sentron Busway is available in a variety of IP ratings. Use the chart below to determine the IP rating that best fits your application needs.

### Testing

Each piece of Sentron Busway is factory tested before shipping. Tests performed include dielectric tests, which are used to insure integrity of insulation. In addition, Sentron Busway is tested in accordance with both UL and IEC standards. All Sentron Busway is manufactured and inspected in an ISO 9001:2000 registered facility.

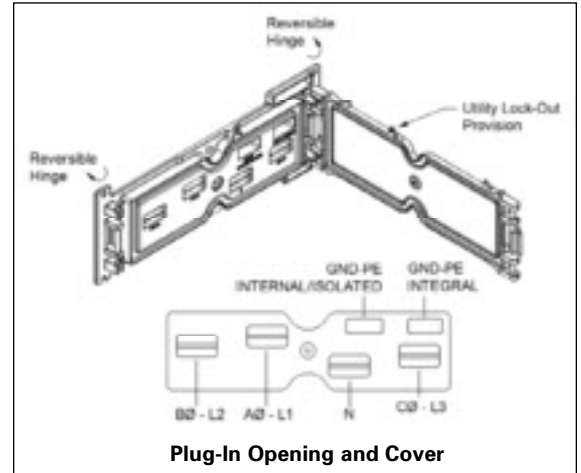
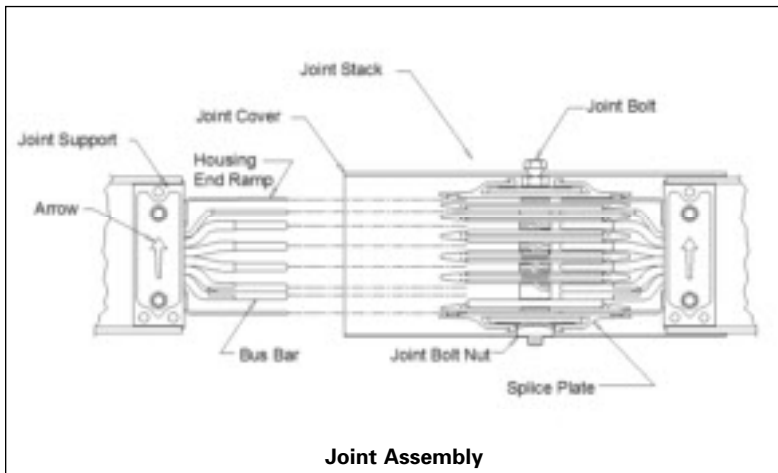
### Standards

All Sentron Busway products meet the following standards:

- UL 857
- NEMA BU1
- CSA C22.2
- IEC 439-1(1993), IEC 439-2 (1993), IEC 529 (1989)
- BS EN 60529
- BS EN 60439-1, 60439-2
- UL 1479
- DIN 4102 Parts 9&12
- BS 6387 Parts 11.1 and 11.2

### Labor Savings

Using Sentron Busway instead of cable and conduit can create savings of up to 20 - 30% on total installed costs. Sentron busway is lightweight, compact and takes half the time to install as cable and conduit. Siemens Sentron Busway - Cable/Conduit Conversion Software Program will show you side by side comparisons of busway vs. cable/conduit. These comparisons include material costs, labor costs, bill of materials, and technical information between busway and cable/conduit. Contact your local Siemens sales office to find out more information, or visit our web site at [www.sea.siemens.com](http://www.sea.siemens.com).



### Levels of Protection Description

Code	Description	Sentron Busway		Sentron Bus Plugs
		Feeder	Plug-In	
IP 2X	Plug-In outlet protects against access to live parts by .472 in. (12 mm) test probe, even with cover opened. <b>Finger Safe</b>	•	•	•
IP 40	Enclosure protects against entry of .039 in. (1.0 mm) test probe. <b>Indoor</b> (Typical UL Designation)	•	•	•
IP 55	Enclosure protects against entry of dust and water jets. <b>Splash Proof</b>	•	•	•
IP 66	Enclosure is dust tight and protects against powerful water jets. <b>Outdoor</b> (International Only)	•		
NEMA 3R	Enclosure protects against rain, sleet and damage from ice formation. <b>Outdoor</b> - NAFTA	•		



# Busway Systems

## Sentron Bus Plug Overview

## Overview

SENTRON Bus Plugs are engineered with the installer and end user in mind. The installer will benefit from the numerous features, such as factory installed circuit breakers, compact footprint, generous wirebend space, and dual interlocks. The end user will appreciate the visible position indicator, as well as the spring loaded pad lockable latch which prevents access to unauthorized personnel.

SENTRON Bus Plugs are designed with an interlock device to prevent the door from being opened when the disconnect is on. This also prevents the disconnect from being turned on while the door is open. The interlock ensures that the protective device is "OFF" prior to installation or removal of the bus plug. Once the bus plug is properly installed, a spring - loaded, padlock latch provides additional security by preventing unauthorized access to the unit.

Alignment and interlock stabs are features of the Sentron Bus Plugs engineered to prevent improper

installation of the unit. Guide stabs prevent installing the bus plug 180 degrees out of rotation. In addition, the stabs provide vertical support for vertical applications. The bus plug ground stabs are designed to ensure positive contact with both the integral and optional internal busway grounds before the bus plug fingers contact the phase and neutral bars. Sentron Bus Plugs also feature bolt-on mounting to the busway housing for secure attachment.

Sentron Bus Plugs can be configured for horizontal or vertical applications. The following Bus Plugs can be mounted (side by side) five (5) per busway side channel (Total 10 per 10' Section).

- 30-600 SLVBH Fusible (Horizontal)<sup>Ⓞ</sup>
- 30-200 SLVBR Fusible (Riser)<sup>Ⓞ</sup>
- 30-400 Circuit Breaker<sup>Ⓞ</sup>

Sentron SLVB Fusible Bus Plugs feature a direct drive mechanism. The operating handle mounts directly to the switch mechanism for fewer moving parts.

Enclosure Ratings:

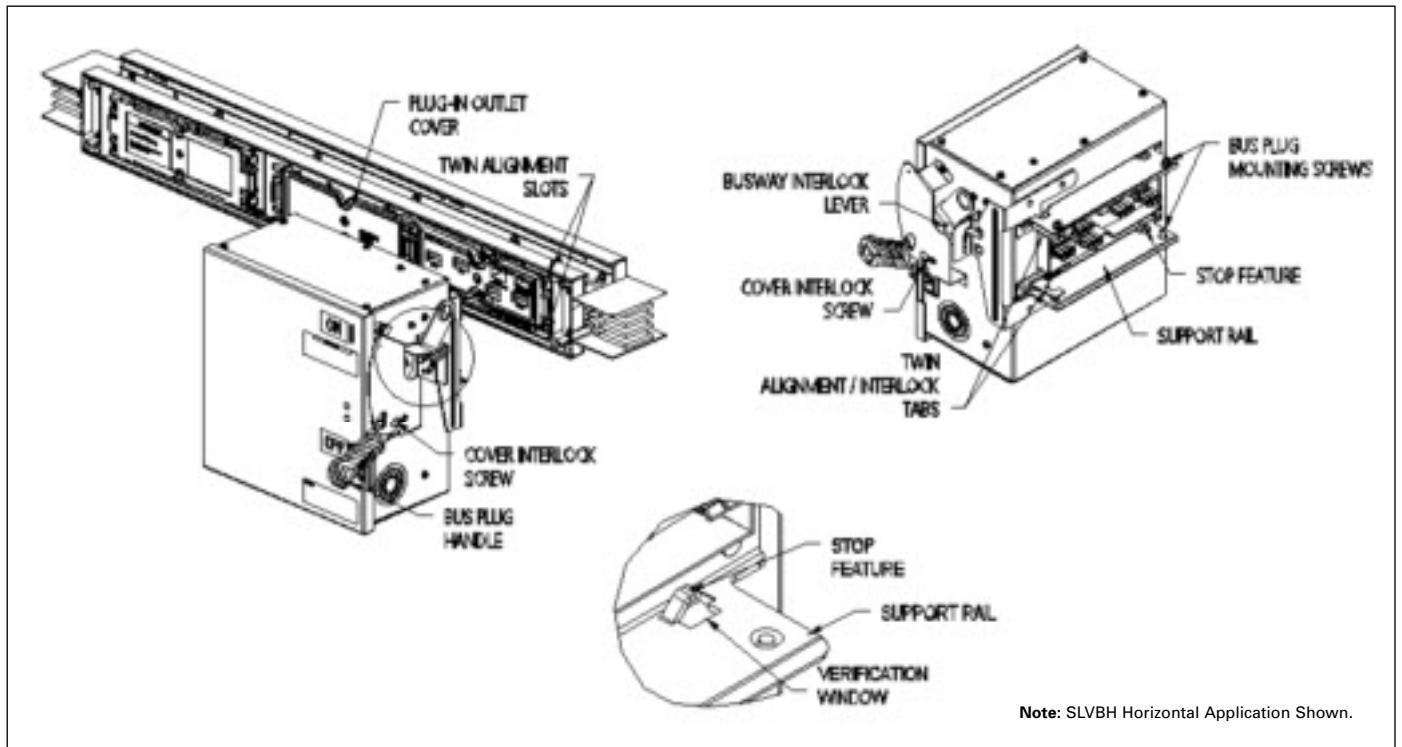
- IP40
- IP55

Conductors:

- 3-phase, 3-wire
- 3-phase, 4-wire
- 3-phase, 4-wire 200% neutral (400A and below)

Grounding:

- Integral (Housing)
- Internal
- Isolated

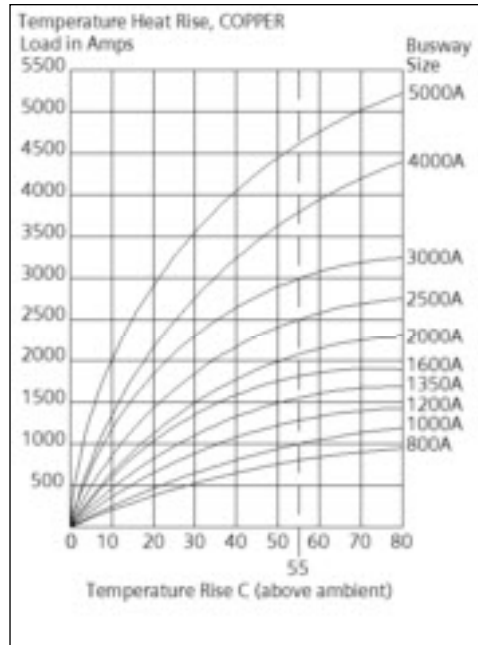
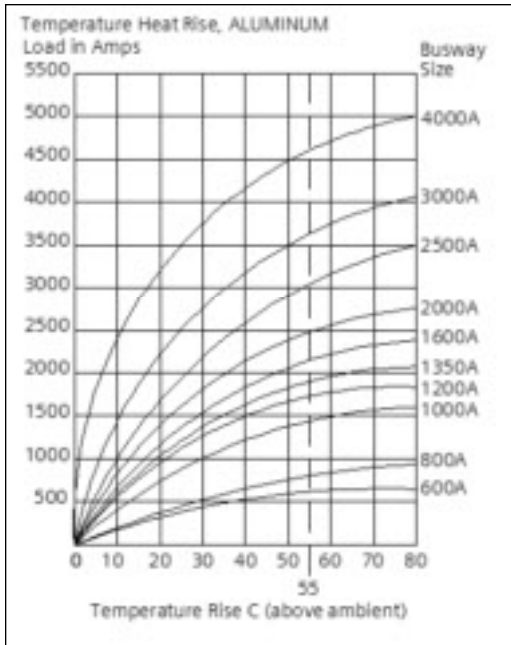


<sup>Ⓞ</sup> Contact Siemens for 200% Neutral Applications.

# Busway Systems

## Technical Data

Technical



### R, X, Z and Ohms, Voltage Drop

Ampere Rating	Bus Bar Width x 0.25 in. (6.4mm) Thick	Ohms x 10.3 per 100 feet			Voltage Drop - Concentrated Loads, Line-to-Line per 100 feet at 100% Rated Load, 35°C Ambient <sup>⑦</sup>							
		Line to Neutral R	X	Z	Power Factor 0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<b>AL L-Rated<sup>③</sup></b>												
225 —	1.75 (44.5)	3.94	1.13	4.10	0.88	1.02	1.15	1.27	1.39	1.49	1.57	1.54
400 —	1.75 (44.5)	4.08	1.23	4.26	1.66	1.91	2.15	2.38	2.58	2.77	2.91	2.83
600 —	1.75 (44.5)	4.26	1.32	4.46	2.64	3.03	3.40	3.75	4.08	4.37	4.58	4.43
800 400	2.38 (60.5)	3.42	1.06	3.58	2.82	3.24	3.64	4.02	4.36	4.67	4.90	4.74
1000 600	3.25 (82.6)	2.45	0.74	2.56	2.50	2.88	3.24	3.57	3.89	4.17	4.38	4.24
1200 800	4.38 (111.3)	1.86	0.59	1.95	2.32	2.66	2.99	3.29	3.58	3.82	4.01	3.87
1350 1000	5.38 (138.7)	1.39	0.24	1.41	1.50	1.81	2.10	2.39	2.67	2.93	3.17	3.25
1600 1200	6.50 (165.1)	1.21	0.48	1.29	2.19	2.48	2.75	3.00	3.23	3.43	3.56	3.35
2000 1350,1600	8.75 (222.3)	0.91	0.35	0.98	2.11	2.38	2.64	2.87	3.08	3.26	3.37	3.16
2500 2000	(2) 5.63 (143.0)	0.68	0.29	0.74	2.09	2.34	2.57	2.78	2.97	3.12	3.21	2.95
3000 2500	(2) 6.75 (171.5)	0.54	0.28	0.61	2.24	2.47	2.67	2.85	3.01	3.12	3.16	2.80
3200 2000	(2) 7.50 (190.5)	0.48	0.33	0.58	2.53	2.73	2.91	3.06	3.17	3.23	3.20	2.68
4000 3000,3200	(2) 9.00 (228.6)	0.62	0.21	0.51	2.34	2.61	2.85	3.08	3.27	3.43	3.51	3.20
<b>CU M-Rated<sup>③</sup></b>												
225 —	1.75 (44.5)	2.34	1.13	2.60	0.69	0.77	0.84	0.90	0.95	0.99	1.01	0.91
400 —	1.75 (44.5)	2.44	1.13	2.69	1.26	1.40	1.52	1.64	1.74	1.82	1.86	1.69
600 —	1.75 (44.5)	2.58	1.16	2.83	1.96	2.18	2.39	2.58	2.74	2.87	2.94	2.68
800 400	1.75 (44.5)	2.71	1.17	2.95	2.67	2.98	3.28	3.55	3.78	3.97	4.08	3.76
1000 —	2.25 (67.2)	2.12	0.98	2.30	2.58	2.88	3.17	3.44	3.67	3.86	3.98	3.67
1200 600	2.88 (73.2)	1.66	0.77	1.83	2.56	2.85	3.11	3.35	3.56	3.72	3.80	3.45
1350 800	3.50 (88.9)	1.30	0.64	1.45	2.34	2.59	2.82	3.03	3.20	3.33	3.39	3.04
1600 1000	4.50 (114.3)	1.06	0.56	1.20	2.37	2.60	2.66	3.01	3.17	3.29	3.32	2.94
2000 1200,1350 — 1600	6.00 (152.4)	0.77	0.44	0.89	2.27	2.48	2.50	2.83	2.96	3.05	3.07	2.66
2500 2000	8.50 (215.9)	0.55	0.35	0.65	2.15	2.34	2.50	2.64	2.75	2.82	2.81	2.39
3000 —	(2) 4.75 (120.7)	0.49	0.27	0.56	2.07	2.28	2.46	2.62	2.76	2.86	2.89	2.54
3200 —	(2) 5.50 (139.7)	0.44	0.30	0.53	2.33	2.51	2.67	2.80	2.90	2.96	2.93	2.44
4000 2500,3000,3200	(2) 6.50 (165.1)	0.36	0.15	0.39	1.76	1.97	2.17	2.35	2.51	2.63	2.71	2.49
5000 4000	(2) 8.50 (215.9)	0.30	0.21	0.37	2.49	2.69	2.86	3.00	3.11	3.17	3.15	2.63

**Notes:**

- For plug-in distributed loads, divide voltage drop values by 2.
- To determine voltage drop line-to-neutral, multiply line-to-line values by 0.577.
- Actual voltage drop for different lengths and at loadings less than full rated current can be calculated using the formula:  

$$V_d(\text{actual}) = V_d(\text{table}) \times \frac{\text{actual load}}{\text{rated load}} \times \frac{\text{actual length (ft)}}{100 \text{ feet}}$$
- For 50 Hz, multiply reactance (X) by 0.85 and resistance values do not change. For 400 Hz, multiply reactance by 3.75 and multiply resistance by 1.4. Calculate new voltage drop:  

$$V_d = \text{amps load} \times \sqrt{3(R\cos\theta + X\sin\theta)} \text{ per 100 ft, where } \cos\theta = \text{Power Factor.}$$
- For metric conversion R, X, Z values "in Ohms per meters Line to Neutral"  

$$R \times .0328$$

$$X \times .0328$$

$$Z \times .0328$$
- For metric conversion "Line to Line per meter at 25° C ambient in mV/A/m" (Vd 32.8) / A Divide Vd by 2 for distributed loads.
- Voltage Drop will decrease in lower ambient temperature. Contact Siemens for Voltage Drop in other ambient conditions.

# Busway Systems

## Technical Data

Technical

### Ground Capacity

Ampere Rating	Bus Bar Width Inches (mm)	Bars per Pole	Min. CSA for Ground Bus per UL 857 Table 14 In2 (mm2)	Sectional Area 50% Internal Ground Bar In2 (mm2)	Integral (Hsg.) Ground In2 (mm2)	Effective Current Carrying Capacity of Housing		Grd. Circuit Characteristics under Fault Conditions Ohms x 103 per 100 ft							
						% of UL Req	% of Phase Bar	Internal Ground			Housing Ground				
						R	X	Z	R	X	Z				
<b>A L-Rated</b>															
225 —	1.75 (44.5)	1	0.08 (53.5)	0.22 (141.1)	2.30 (1485.1)	1333	253		10.267	9.037	4.872	14.200	12.963	5.797	
400 —	1.75 (44.5)	1	0.17 (107.1)	0.22 (141.1)	2.30 (1485.1)	667	253		10.267	9.037	4.872	14.200	12.963	5.797	
600 —	1.75 (44.5)	1	0.17 (107.1)	0.22 (141.1)	2.30 (1485.1)	667	253		10.267	9.037	4.872	14.200	12.963	5.797	
800 400	2.38 (60.5)	1	0.17 (107.1)	0.30 (191.9)	2.40 (1550.1)	688	192		8.063	7.333	3.351	11.150	10.000	4.932	
1000 600	3.25 (82.6)	1	0.20 (126.5)	0.41 (262.1)	2.54 (1639.9)	607	147		7.208	6.628	2.833	9.202	8.442	3.662	
1200 800	4.38 (111.1)	1	0.23 (146.5)	0.55 (352.8)	2.72 (1756.6)	552	115		6.358	5.852	2.487	7.625	6.926	3.189	
1350 1000	5.38 (136.5)	1	0.29 (189.7)	0.67 (433.5)	2.88 (1859.8)	446	9		5.561	5.115	2.182	6.478	5.883	2.713	
1600 1200	6.50 (165.1)	1	0.29 (189.7)	0.81 (524.2)	3.06 (1975.4)	467	84		4.837	4.489	1.801	5.687	5.206	2.289	
2000 1350,1600	8.75 (222.3)	1	0.35 (227.7)	1.09 (705.6)	3.42 (2207.7)	425	69		3.735	3.467	1.390	4.565	4.267	1.623	
2500 2000	5.63 (142.9)	2	0.52 (332.3)	1.41 (907.3)	3.85 (2480.7)	320	59		3.169	2.955	1.145	4.129	3.837	1.526	
3000 2500	6.75 (171.5)	2	0.59 (380.0)	1.69 (1088.7)	4.20 (2711.9)	301	53		2.848	2.683	0.954	3.835	3.635	1.221	
3200 2000	7.50 (190.5)	2	0.81 (522.6)	1.88 (1209.7)	4.44 (2866.8)	229	51		2.648	2.493	0.894	3.614	3.428	1.144	
4000 3000,3200	9.00 (228.6)	2	0.81 (522.6)	2.25 (1451.6)	4.92 (3176.5)	250	50		2.446	2.339	0.715	3.500	3.378	0.916	
<b>CU M-Rated</b>															
225 —	1.75 (44.5)	1	0.05 (33.5)	0.22 (141.1)	2.30 (1485.1)	2128	261		7.380	6.330	3.803	11.338	10.083	5.183	
400 —	1.75 (44.5)	1	0.11 (67.7)	0.22 (141.1)	2.30 (1485.1)	1054	261		7.380	6.330	3.803	11.338	10.083	5.183	
600 —	1.75 (44.5)	1	0.11 (67.7)	0.22 (141.1)	2.30 (1485.1)	1054	261		7.380	6.330	3.803	11.338	10.083	5.183	
800 400	1.75 (44.5)	1	0.11 (67.7)	0.22 (141.1)	2.30 (1485.1)	1054	261		7.380	6.330	3.803	11.338	10.083	5.183	
1000 —	2.25 (57.2)	1	0.13 (85.2)	0.28 (181.5)	2.38 (1536.7)	860	207		6.715	5.993	3.029	10.194	9.191	4.409	
1200 600	2.88 (73.0)	1	0.18 (114.2)	0.36 (231.9)	2.48 (1601.8)	661	166		6.186	5.676	2.460	8.996	8.212	3.674	
1350 800	3.50 (88.9)	1	0.24 (152.3)	0.44 (282.3)	2.58 (1665.8)	510	140		5.704	5.267	2.188	8.000	7.492	2.807	
1600 1000	4.50 (114.3)	1	0.24 (152.3)	0.56 (362.9)	2.74 (1769.0)	534	113		4.719	4.323	1.893	7.411	6.880	2.756	
2000 1200,1350	6.00 (152.4)	1	0.29 (189.7)	0.75 (483.9)	2.98 (1923.8)	457	90		3.507	3.181	1.476	6.422	6.032	2.205	
— 1600	6.50 (165.1)	1	0.29 (189.7)	0.81 (524.2)	3.06 (1975.4)	467	84		4.837	4.489	1.801	5.687	5.206	2.289	
2500 2000	8.50 (215.9)	1	0.35 (227.7)	1.06 (685.5)	3.38 (2181.9)	421	70		2.294	2.020	1.087	3.072	5.419	1.764	
3000 —	4.75 (120.7)	2	0.41 (265.8)	1.19 (766.1)	3.56 (2290.0)	376	66		2.117	1.874	0.984	4.859	4.631	1.470	
3200 —	5.50 (139.7)	2	0.59 (380.0)	1.38 (887.1)	3.80 (2453.9)	277	60		1.938	1.691	0.947	4.353	4.129	1.378	
4000 2500,3000,3200	6.50 (165.1)	2	0.59 (380.0)	1.63 (1048.4)	4.12 (2660.3)	296	54		1.688	1.500	0.773	3.334	3.060	1.323	
5000 4000	8.50 (215.9)	2	0.71 (456.1)	2.13 (1371.0)	4.76 (3073.2)	278	50		1.360	1.218	0.606	1.989	1.783	0.882	

Note: Bus bar thickness = .25 in. (6.4mm), Ground bar thickness = .125 in.(3.18mm)

14 BUSWAY SYSTEMS

UL Short Circuit Ratings				UL Series Connected with Fuse			
Ampere Rating		RMS Symmetrical (kA)			Maximum Fuse Size for 200kA RMS Symmetrical Rating		
		6 cycle	1 sec.	3 sec.	Class R	Class J & T	Class L
<b>AL L-Rated</b>							
225 —		85	28	16	600	600 J & T	—
400 —		85	28	16	600	600 J & T	—
600 —		85	28	16	600	600 J & T	—
800 400		100	47	27	—	800 T	1200
1000 600		100	50	29	—	—	3000
1200 800		125	60	35	—	—	3000
1350 1000		150	75	43	—	—	3000
1600 1200		150	90	52	—	—	3000
2000 1350,1600		150	110	64	—	—	5000
2500 2000		200	130	75	—	—	5000
3000 2500		200	160	92	—	—	—
3200 2000		200	160	92	—	—	—
4000 3000,3200		200	200	115	—	—	—
<b>CU M-Rated</b>							
225 —		85	40	23	600	600 J & T	—
400 —		85	40	23	600	600 J & T	—
600 —		85	40	23	600	600 J & T	—
800 400		85	40	23	—	800 T	1600
1000 —		100	50	29	—	—	3000
1200 600		100	65	38	—	—	3000
1350 800		100	80	46	—	—	3000
1600 1000		125	95	55	—	—	4000
2000 1200,1350		150	115	66	—	—	5000
— 1600		150	90	52	—	—	3000
2500 2000		150	130	75	—	—	5000
3000 —		200	175	101	—	—	—
3200 —		200	175	101	—	—	—
4000 2500,3000,3200		200	200	115	—	—	—
5000 4000		200	200	115	—	—	—

Sentron Busway has UL approved Series Ratings. By using the appropriate line side fuse, short circuit ratings can be enhanced to 200kA for lower amperage busway.

# Busway Systems

## Straight Sections—Plug-In, Riser and Feeder

## Selection

### Straight Sections

Sentron Busway can be ordered with Aluminum or Copper bus bars. Aluminum bars are available in 225-4000 ampere sections. Copper bars are available in 225-5000 ampere sections. Sentron Busway includes an integral housing ground, and is available with an internal ground bar or an isolated ground bar in all ampere ratings. Sentron Busway housing is a four-piece aluminum design.

### Plug-In Sections

Sentron plug-in sections are designed with plug-in openings centered on 24 in. (610mm) intervals, and are located on both sides of the busway for optimum utilization. Plug-in sections are available in standard lengths of 4 ft. (1.22m), 6 ft. (1.83m), 8 ft. (2.44m) and 10 ft. (3.05m). Sentron plug-in sections meet IP40

(indoor) and IP55 (splash proof) requirements. One joint stack assembly is provided with each plug-in section.

### Riser Sections

Sentron Riser sections are designed with plug-in openings centered on 24 in. (610mm) intervals on one side of the busway only. This eliminates unusable plug-in outlets in vertical applications. Riser busway is available in standard lengths of 4 ft. (1.22m), 6 ft. (1.83m), 8 ft. (2.44m) and 10 ft. (3.05m). Sentron Riser Busway is available in IP40 (indoor) and IP55 (splash proof). One joint stack assembly is provided with each riser section.

### Plug-In Outlet Features

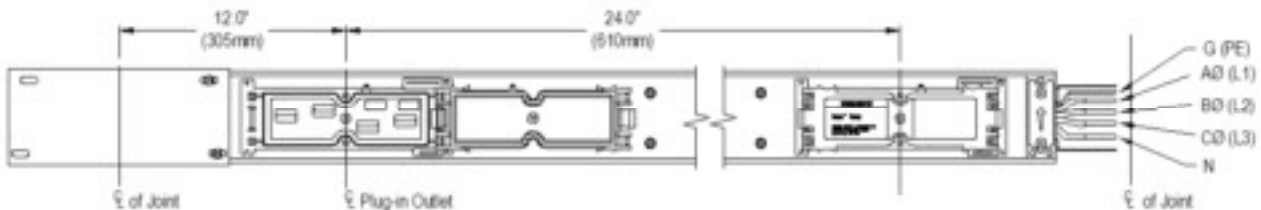
The plug-in outlet molded guard design prevents incidental finger contact with live conductors. Sentron plug-in outlets

are IP 2X rated (with the outlet cover open) which means a .472 in. (12mm) or larger probe is unable to enter a plug-in outlet. The outlet is IP40 Rated with the cover closed and IP55 Rated when configured with gaskets.

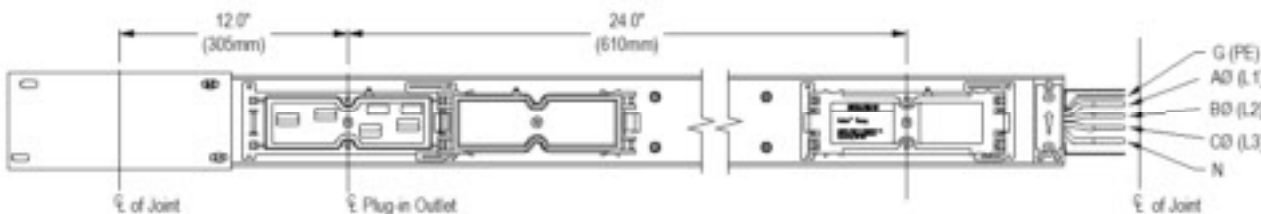
### Feeder Sections

Feeder busway carries the current of the busway system from the supply source. Feeder busway does not have plug-in outlets. Sentron Feeder busway is available in custom lengths from 2 ft. (.61m) to 10 ft. (3.05m). Feeder sections are rated as IP40 (Indoor), IP55 (Splash Proof), NEMA 3R (Outdoor), and IP66 (Severe Outdoor). One joint stack assembly is provided with each feeder section.

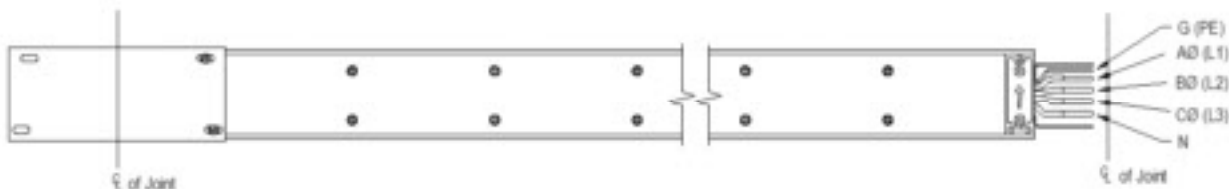
**Standard Plug-In Section (Standard plug-in outlets on both sides on 24 in. centers)**  
Suffix PL04 (4 ft.), PL06 (6 ft.), PL08 (8 ft.), PL10 (10 ft.)



**Standard Riser Section (Standard Plug-In outlets on one side on 24 in. centers)**  
Suffix RI04 (4 ft.), RI06 (6 ft.), RI08 (8 ft.), RI10 (10 ft.)



**Standard Feeder Section**  
Suffix F024 - 120 (last 3 digits = length in Inches, 024=24 in., 120=120 in.)



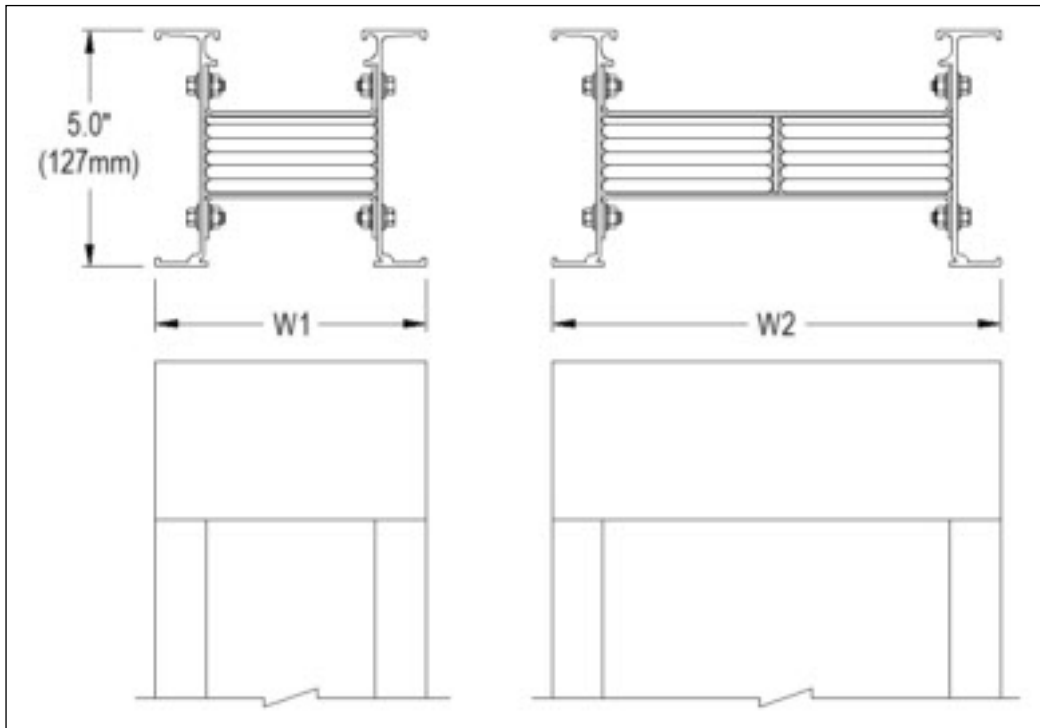
# Busway Systems

Selection

## Sentron Busway, Widths and Weights

Ampere Rating	Dimension Inches (mm)	Approximate Weight - lbs per ft. (kg per meter)						
		3Ø, 3-Wire	3Ø, 3-Wire with Internal Ground	3Ø, 4-Wire	3Ø, 4-Wire with Internal Ground	3Ø, 4-Wire 200% Neutral	3Ø, 4-Wire 200% Neutral with Internal Ground	
<b>AL</b>	<b>L-Rated</b>							
225	—	"W1" 3.9 (99)	5 (8)	5 (8)	6 (9)	6 (9)	7 (10)	7 (10)
400	—	"W1" 3.9 (99)	5 (8)	5 (8)	6 (9)	6 (9)	7 (10)	7 (10)
600	—	"W1" 3.9 (99)	5 (8)	5 (8)	6 (9)	6 (9)	7 (10)	7 (10)
800	400	"W1" 4.6 (117)	6 (9)	6 (9)	7 (10)	7 (10)	7 (11)	8 (11)
1000	600	"W1" 5.4 (137)	7 (10)	7 (11)	8 (12)	8 (12)	9 (13)	9 (14)
1200	800	"W1" 6.6 (168)	8 (12)	9 (13)	9 (14)	10 (15)	11 (16)	11 (17)
1350	1000	"W1" 7.6 (193)	9 (13)	10 (15)	11 (16)	11 (17)	12 (18)	13 (19)
1600	1200	"W1" 8.7 (221)	10 (15)	11 (17)	12 (18)	13 (19)	14 (21)	15 (22)
2000	1250,1600	"W1" 10.9 (277)	13 (19)	14 (21)	15 (23)	16 (24)	18 (26)	19 (28)
2500	2000	"W2" 13.7 (348)	15 (22)	17 (25)	8 (27)	20 (30)	22 (33)	23 (34)
3000	2500	"W2" 15.8 (402)	17 (25)	19 (28)	21 (31)	23 (34)	25 (37)	27 (40)
3200	2000	"W2" 17.3 (439)	18 (27)	20 (30)	23 (34)	25 (37)	27 (40)	29 (43)
4000	3000,3200	"W2" 20.3 (516)	22 (33)	25 (37)	27 (40)	30 (44)	32 (48)	35 (52)
<b>CU</b>	<b>M-Rated</b>							
225	—	"W1" 3.9 (99)	9 (13)	10 (14)	10 (16)	11 (17)	12 (18)	13 (19)
400	—	"W1" 3.9 (99)	9 (13)	10 (14)	10 (16)	11 (17)	12 (18)	13 (19)
600	—	"W1" 3.9 (99)	9 (13)	10 (14)	10 (16)	11 (17)	12 (18)	13 (19)
800	400	"W1" 3.9 (99)	9 (13)	10 (14)	10 (16)	11 (17)	12 (18)	13 (19)
1000	—	"W1" 4.4 (112)	10 (15)	11 (17)	12 (19)	14 (20)	15 (22)	16 (23)
1200	600	"W1" 5.1 (130)	12 (18)	14 (20)	15 (23)	16 (24)	18 (26)	19 (29)
1350	800	"W1" 5.7 (145)	14 (21)	16 (24)	17 (26)	19 (29)	21 (31)	23 (34)
1600	1000	"W1" 6.7 (170)	17 (26)	19 (29)	22 (32)	24 (35)	26 (38)	28 (42)
2000	1200,1350	"W1" 8.2 (208)	22 (32)	25 (37)	28 (41)	30 (45)	33 (50)	36 (54)
—	1600	"W1" 10.9 (277)	13 (19)	14 (21)	5 (23)	16 (24)	18 (26)	19 (28)
2500	2000	"W1" 10.7 (272)	30 (44)	34 (50)	38 (56)	42 (62)	46 (68)	50 (74)
3000	—	"W2" 11.8 (300)	33 (49)	37 (55)	42 (63)	47 (70)	51 (76)	56 (83)
3200	—	"W2" 13.3 (335)	37 (55)	2 (63)	48 (72)	53 (79)	58 (86)	64 (95)
4000	2500,3000,3200	"W2" 15.3 (389)	43 (64)	50 (75)	56 (83)	62 (92)	68 (101)	75 (112)
5000	4000	"W2" 19.3 (491)	56 (83)	4 (95)	72 (107)	80 (119)	89 (132)	97 (145)

14  
BUSWAY  
SYSTEMS



# Busway Systems

## Elbows

## Selection

Sentron Busway elbows provide a simple, convenient method of changing the direction (left, right, up or down) of a busway run. Two elbow styles are offered: elbow stack and elbow section.

Flatwise Elbow Stacks, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A"
<b>AL</b>	<b>L-Rated</b>	
225	—	1.00 (25)
400	—	1.00 (25)
600	—	1.00 (25)
800	400	1.12 (28)
1000	600	2.00 (51)
1200	800	2.50 (64)
1350	1000	3.00 (76)
1600	1200	3.50 (89)
2000	1350,1600	4.62 (117)
2500	2000	5.75 (146)
3000	2500	7.00 (178)
3200	2000	7.75 (197)
4000	3000,3200	9.35 (237)
<b>CU</b>	<b>M-Rated</b>	
225	—	1.00 (25)
400	—	1.00 (25)
600	—	1.00 (25)
800	400	1.00 (25)
1000	—	1.12 (28)
1200	600	.25 (33)
1350	800	2.00 (50)
1600	1000	2.50 (64)
2000	1200,1350	3.25 (83)
—	1600	4.62 (117)
2500	2000	4.50 (114)
3000	—	5.00 (127)
3200	—	5.75 (146)
4000	2500,3000,3200	6.75 (171)
5000	4000	8.87 (225)

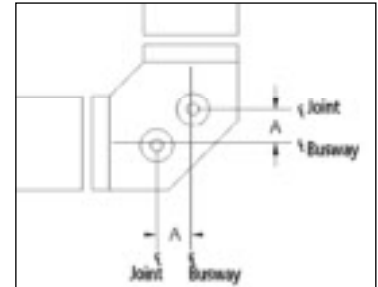
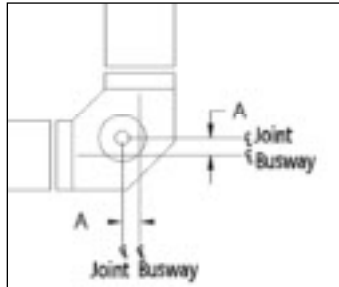
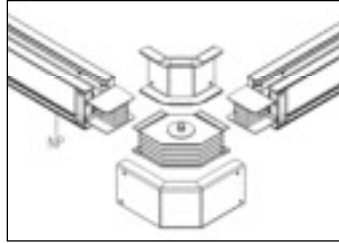
**Note:** Flatwise elbow stacks can be ordered as either right-hand (ESFR) or left-hand (ESFL) to follow the same nomenclature as an elbow section. The construction is identical and interchangeable.

### Flatwise Elbow Stacks

Flatwise elbow stacks are used for left and right directional changes. When the busway system is mounted flatwise in the horizontal plane (bus bars run parallel to the floor).

#### Flat

#### Suffix ESFR/ESFL

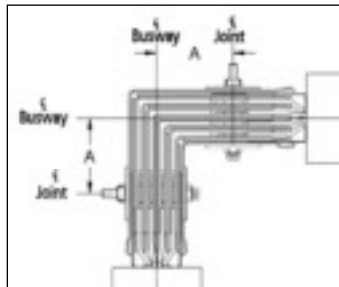


Edgewise Elbow Stacks, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A"
<b>AL</b>	<b>L-Rated</b>	
225	—	4.25 (108)
400	—	4.25 (108)
600	—	4.25 (108)
800	400	4.25 (108)
1000	600	4.25 (108)
1200	800	4.25 (108)
1350	1000	4.25 (108)
1600	1200	4.25 (108)
2000	1350,1600	4.25 (108)
2500	2000	4.25 (108)
3000	2500	4.25 (108)
3200	2000	4.25 (108)
<b>CU</b>	<b>M-Rated</b>	
225	—	4.25 (108)
400	—	4.25 (108)
600	—	4.25 (108)
800	400	4.25 (108)
1000	—	4.25 (108)
1200	600	4.25 (108)
1350	800	4.25 (108)
1600	1000	4.25 (108)
2000	1200,1350	4.25 (108)
—	1600	4.25 (108)
2500	2000	4.25 (108)
3000	—	4.25 (108)
3200	—	4.25 (108)
4000	2500,3000,3200	4.25 (108)
5000	4000	4.25 (108)

**Note:** Edge up and edge down elbow stacks are not interchangeable.

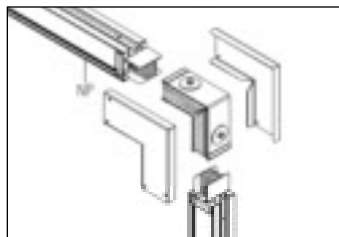
### Edgewise Elbow Stacks

Edgewise elbow stacks create up and down directional changes. The "A" phase is on the inside of the bend for edge up elbow stacks. The "A" phase is on the outside of the bend for edge down elbow stacks.



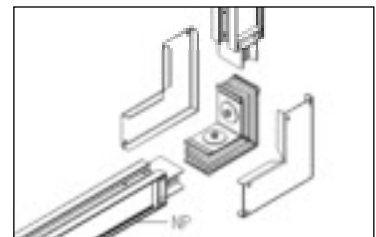
#### Edge Down

#### Suffix ESED



#### Edge Up

#### Suffix ESEU



# Busway Systems

## Elbows

## Selection

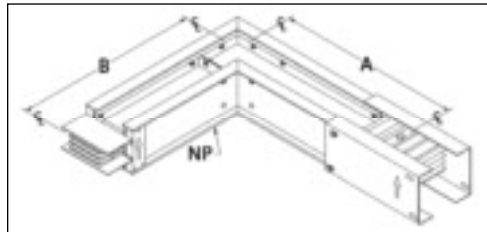
Flatwise Elbow Sections, Dimensions (standard/min.)			
Ampere Rating		Dimensions Inches (mm)	
		"A"	"B"
<b>AL</b>	<b>L-Rated</b>		
225	—	12 (305)	12 (305)
400	—	12 (305)	12 (305)
600	—	12 (305)	12 (305)
800	400	12 (305)	12 (305)
1000	600	12(305)	12 (305)
1200	800	12 (305)	12 (305)
1350	1000	12 (305)	12 (305)
1600	1200	18 (457)	18 (457)
2000	1350,1600	18 (457)	18 (457)
2500	2000	18 (457)	18 (457)
3000	2500	18 (457)	18 (457)
3200	2000	18 (457)	18 (457)
4000	3000,3200	24 (610)	24 (610)
<b>CU</b>	<b>M-Rated</b>		
225	—	12 (305)	12 (305)
400	—	12 (305)	12 (305)
600	—	12 (305)	12 (305)
800	400	12 (305)	12 (305)
1000	—	12 (305)	12 (305)
1200	600	12 (305)	12 (305)
1350	800	12 (305)	12 (305)
1600	1000	12 (305)	12 (305)
2000	1200,1350	12 (305)	12 (305)
—	1600	12 (305)	12 (305)
2500	2000	12 (305)	12 (305)
3000	—	12 (305)	12 (305)
3200	—	12 (305)	12 (305)
4000	2500,3000,3200	12 (305)	12 (305)
5000	4000	12 (305)	12 (305)

### Flatwise Elbow Sections

Flatwise elbow sections are used for left and right directional changes when the busway system is mounted in the horizontal plane (bus bars run parallel to the floor). The joint stack assembly may be moved to the opposite leg to change the orientation from left to right/right to left.

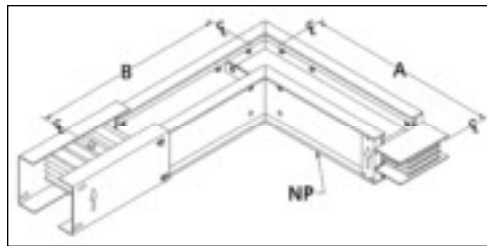
#### Flat Left

##### Suffix ELEF



#### Flat Right

##### Suffix ELFR



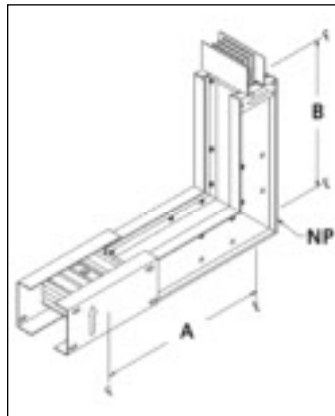
Edgewise Elbow Sections, Dimensions (standard/min.)			
Ampere Rating		Dimensions Inches (mm)	
		"A"	"B"
<b>AL</b>	<b>L-Rated</b>		
225	—	10 (254)	10 (254)
400	—	10 (254)	10 (254)
600	—	10 (254)	10 (254)
800	400	10 (254)	10 (254)
1000	600	10 (254)	10 (254)
1200	800	10 (254)	10 (254)
1350	1000	10 (254)	10 (254)
1600	1200	10 (254)	10 (254)
2000	1350,1600	10 (254)	10 (254)
2500	2000	10 (254)	10 (254)
3000	2500	10 (254)	10 (254)
3200	2000	10 (254)	10 (254)
4000	3000,3200	10 (254)	10 (254)
<b>CU</b>	<b>M-Rated</b>		
225	—	10 (254)	10 (254)
400	—	10 (254)	10 (254)
600	—	10 (254)	10 (254)
800	400	10 (254)	10 (254)
1000	—	10 (254)	10 (254)
1200	600	10 (254)	10 (254)
1350	800	10 (254)	10 (254)
1600	1000	10 (254)	10 (254)
2000	1200,1350	10 (254)	10 (254)
—	1600	10 (254)	10 (254)
2500	2000	10 (254)	10 (254)
3000	—	10 (254)	10 (254)
3200	—	10 (254)	10 (254)
4000	2500,3000,3200	10 (254)	10 (254)
5000	4000	10 (254)	10 (254)

### Edgewise Elbow Sections

Edgewise elbow sections create up and down directional changes. The "A" phase bus bar lies on the inside of the bend for edge up elbows. The "A" phase bus bar lies on the outside of the bend for edge down elbows. The joint stack assembly on edgewise elbows can not be moved in order to change orientation from up to down/down to up. Sentron Busway elbow sections are shipped with a joint stack assembly on one end for direct connection to the busway system.

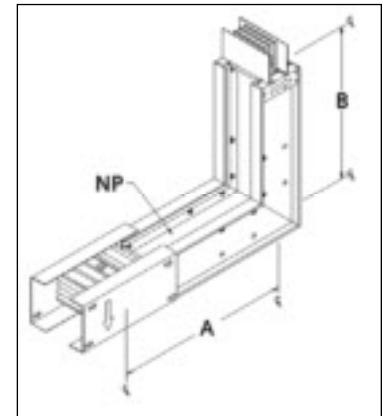
#### Edge Up

##### Suffix ELEU



#### Edge Down

##### Suffix ELED



Note : Odd angle elbow flatwise and edgewise elbow sections are available for angles 95° - 175° in 5° increments.

# Busway Systems

## Offsets

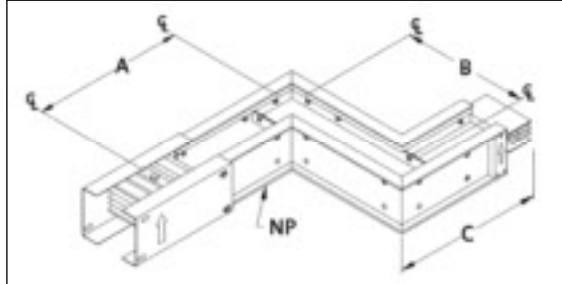
**Selection**

Offsets can be utilized to solve difficult contour problems and save space. In applications where space does not allow for two connected elbows, a single offset can bypass an obstruction. All offsets are supplied with one joint stack assembly.

Flatwise Offsets, Dimensions (standard/min.)				
Ampere Rating		Dimensions Inches (mm)		
		"A"	"B"	"C"
<b>AL</b>	<b>L-Rated</b>			
225	—	12 (305)	5 (127)	12 (305)
400	—	12 (305)	5 (127)	12 (305)
600	—	12 (305)	5 (127)	12 (305)
800	400	12 (305)	5 (127)	12 (305)
1000	600	12 (305)	5 (127)	12 (305)
1200	800	12 (305)	5 (127)	12 (305)
1350	1000	12 (305)	5 (127)	12 (305)
1600	1200	18 (457)	5 (127)	18 (457)
2000	1350,1600	18 (457)	5 (127)	18 (457)
2500	2000	18 (457)	5 (127)	18 (457)
3000	2500	18 (457)	5 (127)	18 (457)
3200	2000	18 (457)	5 (127)	18 (457)
4000	3000,3200	24 (610)	8 (203)	24 (610)
<b>CU</b>	<b>M-Rated</b>			
225	—	12 (305)	5 (127)	12 (305)
400	—	12 (305)	5 (127)	12 (305)
600	—	12 (305)	5 (127)	12 (305)
800	400	12 (305)	5 (127)	12 (305)
1000	—	12 (305)	5 (127)	12 (305)
1200	600	12 (305)	5 (127)	12 (305)
1350	800	12 (305)	5 (127)	12 (305)
1600	1000	12 (305)	5 (127)	12 (305)
2000	1200,1350	12 (305)	5 (127)	12 (305)
—	1600			
2500	2000	18 (457)	5 (127)	18 (457)
3000	—	18 (457)	5 (127)	18 (457)
3200	—	18 (457)	5 (127)	18 (457)
4000	2500,3000,3200	18 (457)	5 (127)	18 (457)
5000	4000	24 (610)	8 (203)	24 (610)

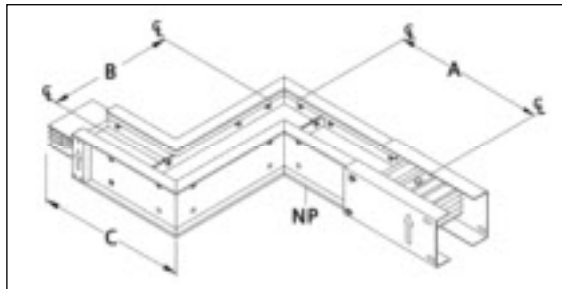
### Flat Right

#### Suffix OFFR



### Flat Left

#### Suffix OFFL

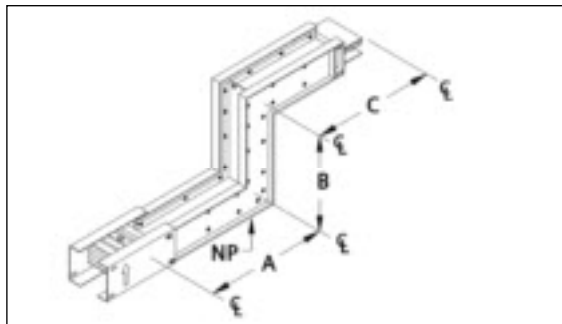


Edgewise Offsets, Dimensions (standard/min.)				
Ampere Rating		Dimensions Inches (mm)		
		"A"	"B"	"C"
<b>AL</b>	<b>L-Rated</b>			
225	—	10 (254)	6 (152)	10 (254)
400	—	10 (254)	6 (152)	10 (254)
600	—	10 (254)	6 (152)	10 (254)
800	400	10 (254)	6 (152)	10 (254)
1000	600	10 (254)	6 (152)	10 (254)
1200	800	10 (254)	6 (152)	10 (254)
1350	1000	10 (254)	6 (152)	10 (254)
1600	1200	10 (254)	6 (152)	10 (254)
2000	1350,1600	10 (254)	6 (152)	10 (254)
2500	2000	10 (254)	6 (152)	10 (254)
3000	2500	10 (254)	6 (152)	10 (254)
3200	2000	10 (254)	6 (152)	10 (254)
4000	3000,3200	10 (254)	6 (152)	10 (254)
<b>CU</b>	<b>M-Rated</b>			
225	—	10 (254)	6 (152)	10 (254)
400	—	10 (254)	6 (152)	10 (254)
600	—	10 (254)	6 (152)	10 (254)
800	400	10 (254)	6 (152)	10 (254)
1000	—	10 (254)	6 (152)	10 (254)
1200	600	10 (254)	6 (152)	10 (254)
1350	800	10 (254)	6 (152)	10 (254)
1600	1000	10 (254)	6 (152)	10 (254)
2000	1200,1350	10 (254)	6 (152)	10 (254)
—	1600			
2500	2000	10 (254)	6 (152)	10 (254)
3000	—	10 (254)	6 (152)	10 (254)
3200	—	10 (254)	6 (152)	10 (254)
4000	2500,3000,3200	10 (254)	6 (152)	10 (254)
5000	4000	10 (254)	6 (152)	10 (254)

\*Note: Leg Dimensions A and C have been reversed from prior publications.

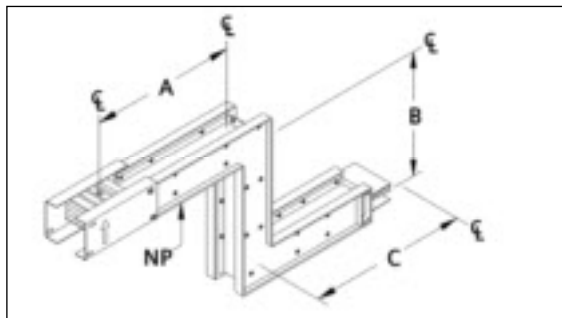
### Edge Up

#### Suffix OFEU



### Edge Down

#### Suffix OFED





# Busway Systems

## Combinations

Combinations are used to create edge to flat and flat to edge changes in the busway run. One joint stack assembly is shipped with combination.

See drawings for minimum dimensions. Consult Busway Order Service for information on custom lengths.

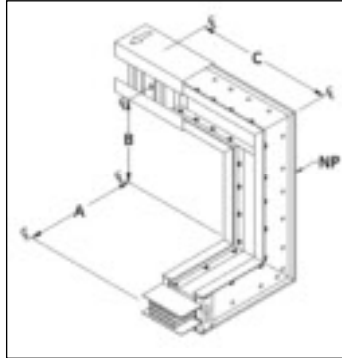
Combinations, Dimensions (standard/min.)			Dimensions Inches (mm)		
Ampere Rating			*"A"	"B"	"C"
<b>AL</b>	<b>L-Rated</b>				
225	—		10 (254)	8 (203)	12 (305)
400	—		10 (254)	8 (203)	12 (305)
600	—		10 (254)	8 (203)	12 (305)
800	400		10 (254)	8 (203)	12 (305)
1000	600		10 (254)	8 (203)	12 (305)
1200	800		10 (254)	8 (203)	12 (305)
1350	1000		10 (254)	8 (203)	12 (305)
1600	1200		10 (254)	12 (305)	18 (457)
2000	1350,1600		10 (254)	12 (305)	18 (457)
2500	2000		10 (254)	12 (305)	18 (457)
3000	2500		10 (254)	12 (305)	18 (457)
3200	2000		10 (254)	12 (305)	18 (457)
4000	3000,3200		10 (254)	16 (406)	24 (610)
<b>CU</b>	<b>M-Rated</b>				
225	—		10 (254)	8 (203)	12 (305)
400	—		10 (254)	8 (203)	12 (305)
600	—		10 (254)	8 (203)	12 (305)
800	400		10 (254)	8 (203)	12 (305)
1000	—		10 (254)	8 (203)	12 (305)
1200	600		10 (254)	8 (203)	12 (305)
1350	800		10 (254)	8 (203)	12 (305)
1600	1000		10 (254)	8 (203)	12 (305)
2000	1200,1350		10 (254)	8 (203)	12 (305)
—	1600		10 (254)	12 (305)	18 (457)
2500	2000		10 (254)	12 (305)	18 (457)
3000	—		10 (254)	12 (305)	18 (457)
3200	—		10 (254)	12 (305)	18 (457)
4000	2500,3000,3200		10 (254)	12 (305)	18 (457)
5000	4000		10 (254)	16 (406)	24 (610)

\*Note: Leg Dimensions A and C have been reversed from prior publications.

## Selection

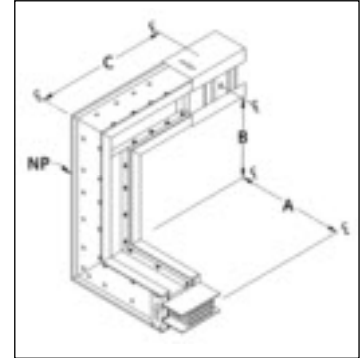
Flat Right - Edge Up

Suffix CORU



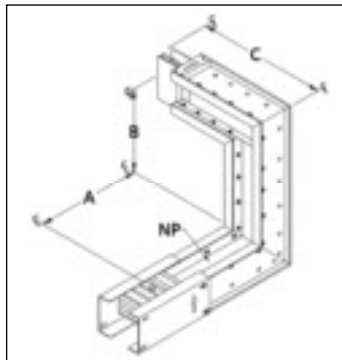
Flat Left - Edge Up

Suffix COLU



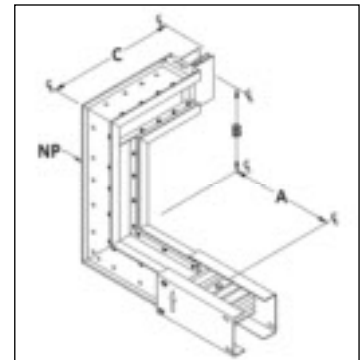
Edge Up - Flat Left

Suffix COUL



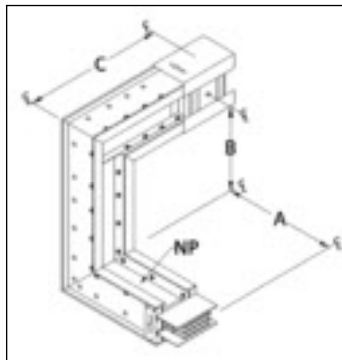
Edge Up - Flat Right

Suffix COUR



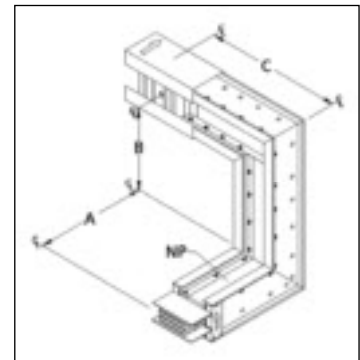
Flat Right - Edge Down

Suffix CORD



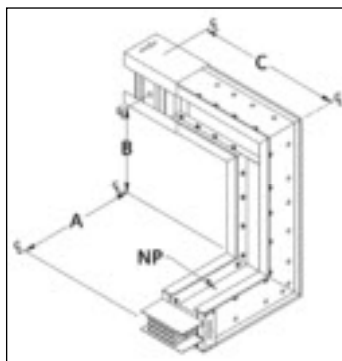
Flat Left - Edge Down

Suffix COLD



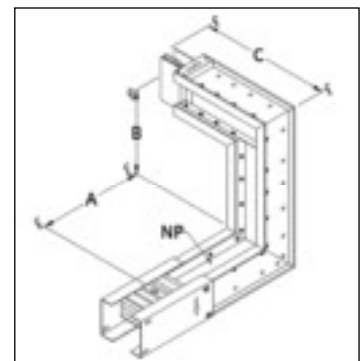
Edge Down - Flat Left

Suffix CODL



Edge Down - Flat Right

Suffix CODR



# Busway Systems

## Tees

**Selection**

Tees are used to simplify directional and plane orientation changes in a busway system. Tees can make 90° bends left or right, and up and down along the busway run. All tees are supplied with two joint stack assemblies.

Flatwise Tees, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A", "B", "C"
<b>AL</b>	<b>L-Rated</b>	
225	—	12 (305)
400	—	12 (305)
600	—	12 (305)
800	400	12 (305)
1000	600	12 (305)
1200	800	12 (305)
1350	1000	12 (305)
1600	1200	18 (457)
2000	1350,1600	18 (457)
2500	2000	18 (457)
3000	2500	18 (457)
3200	2000	18 (457)
4000	3000,3200	24 (610)
<b>CU</b>	<b>M-Rated</b>	
225	—	12 (305)
400	—	12 (305)
600	—	12 (305)
800	400	12 (305)
1000	—	12 (305)
1200	600	12 (305)
1350	800	12 (305)
1600	1000	12 (305)
2000	1200,1350	12 (305)
—	1600	18 (457)
2500	2000	18 (457)
3000	—	18 (457)
3200	—	18 (457)
4000	2500,3000,3200	18 (457)
5000	4000	24 (610)

Edgewise Tees, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "D"
<b>AL</b>	<b>L-Rated</b>	
225	—	13 (330)
400	—	13 (330)
600	—	13 (330)
800	400	13 (330)
1000	600	13 (330)
1200	800	18 (457)
1350	1000	18 (457)
1600	1200	18 (457)
2000	1350,1600	18 (457)
2500	2000	27 (686)
3000	2500	27 (686)
3200	2000	27 (686)
4000	3000,3200	29 (737)
<b>CU</b>	<b>M-Rated</b>	
225	—	13 (330)
400	—	13 (330)
600	—	13 (330)
800	400	13 (330)
1000	—	13 (330)
1200	600	13 (330)
1350	800	13 (330)
1600	1000	18 (457)
2000	1200,1350	18 (457)
—	1600	18 (457)
2500	2000	18 (457)
3000	—	27 (686)
3200	—	27 (686)
4000	2500,3000,3200	27 (686)
5000	4000	29 (737)

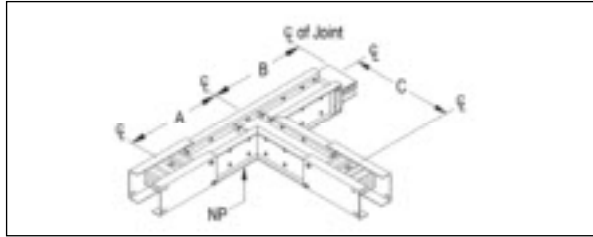
① 12.0" (305mm) For Isolated Ground.

### Flatwise Tees

Flatwise tees are used to create left and right branches.

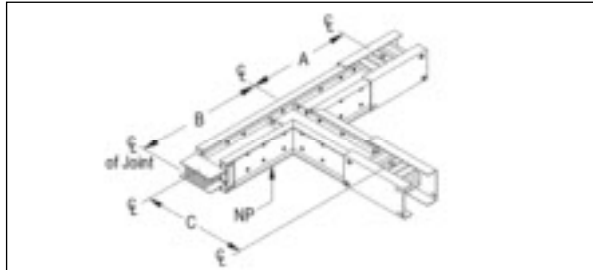
#### Flat Right

##### Suffix TEFR



#### Flat Left

##### Suffix TEFL

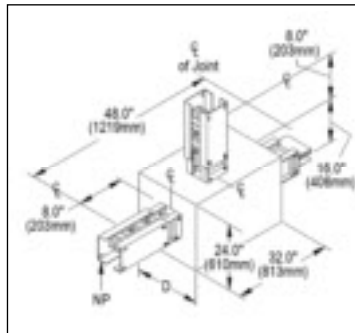


### Edgewise Tees

Edgewise tees are used to create branches that stem up or down from the busway run.

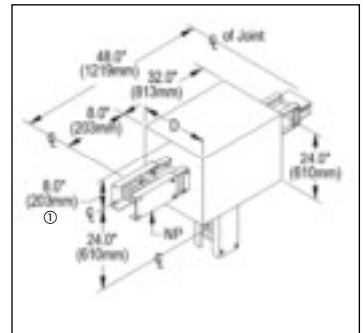
#### Edge Up

##### Suffix TEEU



#### Edge Down

##### Suffix TEED



# Busway Systems

## End Tap Boxes

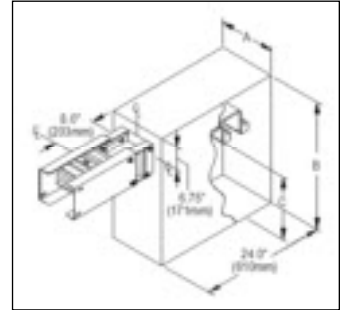
## Selection

End tap boxes are non-fusible devices used to connect cable and conduit to the end of a busway run or where busway runs connect without the need for over-current protection. End tap boxes may be installed at the end or beginning of a run. Vertical end tap boxes and horizontal end tap boxes can be installed in both horizontal and vertical applications. Extended end tap boxes are available if the application requires additional wire bending space. One joint stack assembly is shipped with each end tap box.

Standard and Extended Horizontal End Tap Boxes, Dimensions								
Ampere Rating	Dimensions Inches (mm)			Wire Bend Space		Cable Lugs Per Phase & Neutral		Ground Lugs <sup>①</sup>
	"A"	"B" Std.	"B" Ext.	"C" Std.	"C" Ext.	Qty.	Size	
<b>AL L-Rated</b>								
225 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	1	①	1
400 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	1	②	1
600 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	2	②	1
800 400	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	3	②	1
1000 600	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	4	②	1
1200 800	18 (457)	32 (813)	37 (940)	20 (508)	24 (610)	4	②	1
1350 1000	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	4	②	1
1600 1200	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	6	②	2
2000 1350,1600	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	6	②	2
2500 2000	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	8	②	2
3000 2500	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	9	②	2
3200 2000	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	9	②	2
4000 3000,3200	29 (737)	33 (838)	37 (940)	20 (508)	24 (610)	12	②	3
<b>CU M-Rated</b>								
225 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	1	①	1
400 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	1	②	1
600 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	2	②	1
800 400	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	3	②	1
1000 —	13 (330)	30 (762)	34 (863)	17 (432)	21 (533)	4	②	1
1200 600	13 (330)	33 (838)	37 (940)	20 (508)	24 (610)	4	②	1
1350 800	13 (330)	33 (838)	37 (940)	20 (508)	24 (610)	4	②	1
1600 1000	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	5	②	1
2000 1200,1350	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	6	②	2
— 1600	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	5	②	1
2500 2000	18 (457)	33 (838)	37 (940)	20 (508)	24 (610)	8	②	2
3000 —	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	9	②	2
3200 —	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	9	②	2
4000 2500,3000,3200	27 (686)	33 (838)	37 (940)	20 (508)	24 (610)	12	②	3
5000 4000	29 (737)	33 (838)	37 (940)	20 (508)	24 (610)	15	②	4

### Horizontal End Tap Box

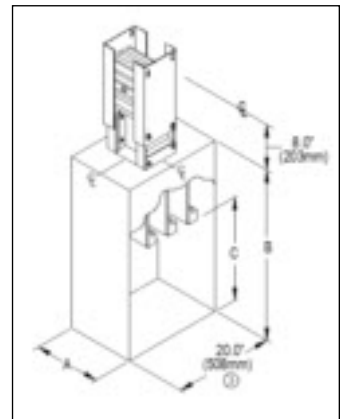
Suffix ETHS (Standard)  
Suffix ETHX (Extended)



Standard and Extended Vertical End Tap Boxes, Dimensions								
Ampere Rating	Dimensions Inches (mm)			Wire Bend Space		Cable Lugs Per Phase & Neutral		Ground Lugs <sup>①</sup>
	"A"	"B" Std.	"B" Ext.	"C" Std.	"C" Ext.	Qty.	Size	
<b>AL L-Rated</b>								
225 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	1	①	1
400 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	1	②	1
600 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	2	②	1
800 400	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	3	②	1
1000 600	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	4	②	1
1200 800	18 (457)	32 (813)	32 (813)	20 (508)	24 (610)	4	②	1
1350 1000	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	4	②	1
1600 1200	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	6	②	2
2000 1350,1600	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	6	②	2
2500 2000	27 (686)	28 (711)	32 (813)	20 (508)	24 (610)	8	②	2
3000 2500	27 (686)	28 (711)	32 (813)	20 (508)	24 (610)	9	②	2
3200 2000	29 (737)	28 (711)	32 (813)	20 (508)	24 (610)	9	②	2
4000 3000,3200	29 (737)	28 (711)	32 (813)	20 (508)	24 (610)	12	②	3
<b>CU M-Rated</b>								
225 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	1	①	1
400 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	1	②	1
600 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	2	②	1
800 400	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	3	②	1
1000 —	13 (330)	25 (635)	29 (737)	17 (432)	21 (533)	4	②	1
1200 600	13 (330)	28 (711)	32 (813)	20 (508)	24 (610)	4	②	1
1350 800	13 (330)	28 (711)	32 (813)	20 (508)	24 (610)	4	②	1
1600 1000	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	5	②	1
2000 1200,1350	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	6	②	2
— 1600	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	5	②	1
2500 2000	18 (457)	28 (711)	32 (813)	20 (508)	24 (610)	8	②	2
3000 —	27 (686)	28 (711)	32 (813)	20 (508)	24 (610)	9	②	2
3200 —	27 (686)	28 (711)	32 (813)	20 (508)	24 (610)	9	②	2
4000 2500,3000,3200	27 (686)	28 (711)	32 (813)	20 (508)	24 (610)	12	②	3
5000 4000	29 (737)	28 (711)	32 (813)	20 (508)	24 (610)	15	②	4

### Vertical End Tap Box

Suffix ETVS (Standard)  
Suffix ETVX (Extended)



① #6 AWG -350 kcmil, Cu/Al.

② #4 AWG -600 kcmil, Cu/Al.

③ 24.0" (610mm) for isolated ground.

# Busway Systems

## Center Tap Boxes

**Selection**

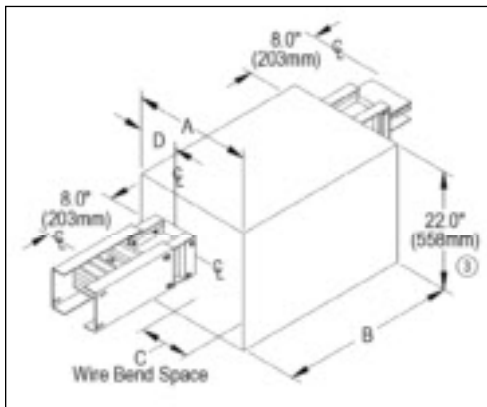
Center tap boxes are non-fusible devices utilized to feed to or take off power from the busway run. When loads served by the busway run do not require over-current protection, center tap boxes may be used. If the application requires additional wiring bending space, extended center tap boxes are available. One joint stack assembly is provided with each center tap box.

Standard and Extended Center End Tap Boxes, Dimensions										
Ampere Rating	Dimensions Inches (mm)			Wire Bend Space			Cable Lugs Per Phase & Neutral		Ground Lugs <sup>①</sup>	
	"A" Std.	"B"	"D"	"A" Ext.	"C" Std.	"C" Ext.	Qty.	Size		
<b>AL L-Rated</b>										
225 —	25 (635)	16 (406)	3.9 (99)	29 (737)	17 (432)	21 (533)	1	①	1	
225 —	25 (635)	16 (406)	3.9 (99)	29 (737)	17 (432)	21 (533)	1	②	1	
400 —	25 (635)	16 (406)	3.9 (99)	29 (737)	17 (432)	21 (533)	1	③	1	
600 —	25 (635)	16 (406)	3.9 (99)	29 (737)	17 (432)	21 (533)	2	③	1	
800 400	25 (635)	16 (406)	4.2 (107)	29 (737)	17 (432)	21 (533)	3	③	1	
1000 600	25 (635)	16 (406)	4.6 (117)	29 (737)	17 (432)	21 (533)	4	③	1	
1200 800	29 (737)	16 (406)	5.2 (132)	33 (838)	20 (508)	24 (610)	4	③	1	
1350 1000	29 (737)	16 (406)	5.7 (145)	33 (838)	20 (508)	24 (610)	4	③	1	
1600 1200	33 (838)	20 (508)	6.3 (160)	37 (940)	20 (508)	24 (610)	5	③	1	
2000 1350,1600	33 (838)	20 (508)	7.4 (188)	37 (940)	20 (508)	24 (610)	6	③	2	
2500 2000	37 (940)	24 (610)	8.7 (221)	41 (1041)	20 (508)	24 (610)	8	③	2	
3000 2500	37 (940)	24 (610)	9.7 (246)	41 (1041)	20 (508)	24 (610)	9	③	2	
3200 2000	37 (940)	24 (610)	9.7 (246)	41 (1041)	20 (508)	24 (610)	9	③	2	
4000 3000,3200	45 (1143)	28 (711)	11.9 (302)	49 (1245)	20 (508)	24 (610)	12	③	3	
<b>CU M-Rated</b>										
225 —	25 (635)	30 (762)	3.9 (99)	29 (737)	17 (432)	21 (533)	1	③	1	
400 —	25 (635)	30 (762)	3.9 (99)	29 (737)	17 (432)	21 (533)	1	③	1	
600 —	25 (635)	30 (762)	3.9 (99)	29 (737)	17 (432)	21 (533)	2	③	1	
800 400	25 (635)	30 (762)	4.2 (107)	29 (737)	17 (432)	21 (533)	3	③	1	
1000 —	25 (635)	30 (762)	4.2 (107)	29 (737)	18 (457)	22 (559)	4	③	1	
1200 600	29 (737)	33 (838)	4.5 (114)	33 (838)	22 (559)	26 (660)	4	③	1	
1350 800	29 (737)	33 (838)	4.8 (122)	33 (838)	21 (533)	25 (635)	4	③	1	
1600 1000	29 (737)	20 (508)	5.3 (135)	33 (838)	21 (533)	25 (635)	5	③	1	
2000 1200,1350	29 (737)	20 (508)	6.1 (155)	33 (838)	20 (508)	24 (610)	6	③	2	
— 1600	33 (838)	20 (508)	6.3 (160)	37 (940)	20 (508)	24 (610)	5	③	1	
2500 2000	33 (838)	24 (610)	7.3 (185)	37 (940)	23 (584)	17 (432)	8	③	2	
3000 —	33 (838)	24 (610)	7.9 (201)	37 (940)	20 (508)	24 (610)	9	③	2	
3200 —	33 (838)	24 (610)	7.9 (201)	37 (940)	20 (508)	24 (610)	9	③	2	
4000 2500,3000,3200	37 (940)	28 (711)	9.4 (239)	41 (1041)	20 (508)	24 (610)	12	③	3	
5000 4000	40(1016)	34 (863)	11.7(297)	44 (1118)	19 (483)	23 (584)	15	③	4	

### Center Tap Box

Suffix CTBS (Standard)

Suffix CTBX (Extended)



① #6 AWG -350 kcmil, Cu/Al.  
 ② #4 AWG -600 kcmil, Cu/Al.  
 ③ 24.0" (610mm) for isolated ground.

# Busway Systems

## In-Line Disconnect Cubicles and Expansion Fittings

## Selection

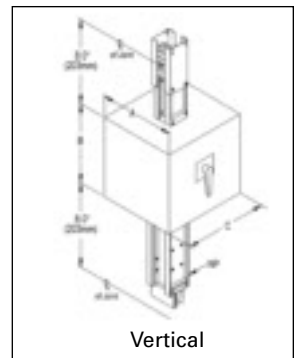
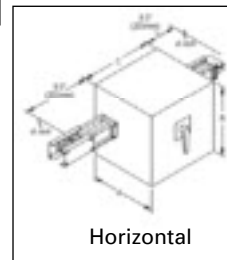
In-Line Disconnect Cubicle, Dimensions				
Description of Unit	Type of Disconnect	Dimensions Inches (mm)		
		"A"	"B"	"C"
Fusible Switch	400-600A FK Visible Blade 800-1200A Vacu-Break	36 (914)	28 (711)	28 (711)
		36 (914)	36 (914)	32 (813)
Molded Case Circuit Breaker	JD6, LD6, MD6, ND6 PD6, RD6	36 (914)	28 (711)	28 (711)
		36 (914)	36 (914)	32 (813)
Digital Sentron Series MCCB's	SJD6, SLD6, SMD6, SND6 SPD6 1600A Frame	36 (914)	28 (711)	28 (711)
		36 (914)	36 (914)	32 (813)
Power Circuit Breaker	200-5000A WL	48 (1219)	36 (914)	32 (813)
Bolted Pressure Switch	800A 1200-2500A 3000A 4000A	33 (838)	36 (914)	32 (813)
		37 (940)	40 (1016)	32 (813)
		37 (940)	40 (1016)	48 (1219)
		41 (1041)	40 (1016)	48 (1219)
ACCESS-compatible				

Note: Consult your local Siemens sales office for details on WL breakers.

### In-Line Disconnect Cubicles

Cubicles provide a means of mounting switches or circuit breakers where power feeds to or pulls from the busway system. When bolted connections are preferred, cubicles may be used in place of plug-in units. Cubicles can also be used at ampere ratings that exceed standard plug-in unit ratings. Modifications to cubicles can be made in order to accommodate key inter-locks, ground fault detector systems and power monitoring systems.

### In-Line Disconnect Cubicle



Expansion Fittings, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A"
<b>AL</b>	<b>L-Rated</b>	
225	—	13 (330)
400	—	13 (330)
600	—	13 (330)
800	400	13 (330)
1000	600	13 (330)
1200	800	18 (457)
1350	1000	18 (457)
1600	1200	18 (457)
2000	1350,1600	18 (457)
2500	2000	23 (584)
3000	2500	23 (584)
3200	2000	23 (584)
4000	3000,3200	25 (635)
<b>CU</b>	<b>M-Rated</b>	
225	—	13 (330)
400	—	13 (330)
600	—	13 (330)
800	400	13 (330)
1000	—	13 (330)
1200	600	13 (330)
1350	800	13 (330)
1600	1000	18 (457)
2000	1200,1350	18 (457)
—	1600	18 (457)
2500	2000	18 (457)
3000	—	23 (584)
3200	—	23 (584)
4000	2500,3000,3200	23 (584)
5000	4000	25 (635)

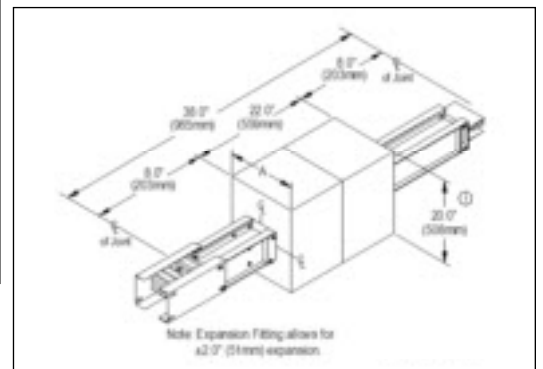
### Expansion Fittings

Expansion fittings accommodate for expansion and contraction of a busway run and building movement. Expansion fittings typically are installed in the center of long busway runs, and at the beginning of riser runs to minimize stress on the lower most device or where a busway run crosses an expansion joint of a building.

Expansion Fittings are recommended when the run exceeds 200 ft. (608m). Expansion fittings allow for a +/- 2 in. (50.8mm) movement along the length of the busway system.

### Expansion Fitting

#### Suffix XPFT



© 24.0" (610mm) for isolated ground.

# Busway Systems

## Reducers and Phase Rotation Fittings

**Selection**

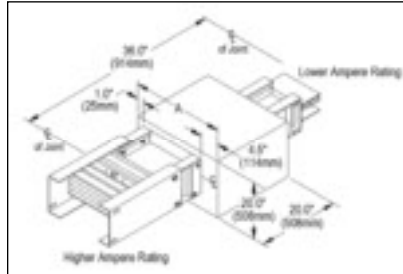
Fused Reducers, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A"
<b>AL</b>	<b>L-Rated</b>	
225	—	11.4 (289)
400	—	11.4 (289)
600	—	11.4 (289)
800	400	11.4 (289)
1000	600	11.4 (289)
1200	800	12.5 (318)
1350	1000	13.5 (343)
1600	1200	14.6 (372)
2000	1350,1600	16.9 (429)
2500	2000	19.6 (498)
3000	2500	21.3 (541)
3200	2000	22.9 (582)
4000	3000,3200	31.5 (800)
<b>CU</b>	<b>M-Rated</b>	
225	—	10.4 (264)
400	—	10.4 (264)
600	—	10.4 (264)
800	400	10.4 (264)
1000	—	10.4 (264)
1200	600	11.0 (280)
1350	800	11.6 (296)
1600	1000	12.6 (321)
2000	1200,1350	14.1 (359)
—	1600	14.6 (372)
2500	2000	16.6 (423)
3000	—	17.9 (455)
3200	—	18.9 (480)
4000	2500,3000,3200	20.9 (531)
5000	4000	31.5 (800)

### Fused Reducers

The National Electric Code requires over current protection when busway systems are reduced in ampacity. A fused reducer is used to reduce the allowable ampere rating in those sections of the busway that do not require a higher rating (i.e. at branch circuit junctures).

#### Fused Reducer

##### Suffix RFRF



### Non-Fused Reducers

Non-fused reducers are used in conjunction with the following exception to the Fused Reducer in the National Electric Code: "For industrial establishments only, omission of over current protection shall be permitted at points where busways are reduced in ampacity, provided that the length of the busway having the smaller ampacity does not exceed 50 ft. and has an ampacity of at least equal to one-third the rating or setting of the over current device next back on the line, and provided that such busway is free from contact with combustible material." Special joint stack connections are provided for non-fused reducer connections. Consult factory for specific design guidelines.

Phase Rotation Fittings, Dimensions (standard/min.)		
Ampere Rating		Dimensions Inches (mm) "A"
<b>AL</b>	<b>L-Rated</b>	
225	—	7.9 (200)
400	—	7.9 (200)
600	—	7.9 (200)
800	400	8.5 (216)
1000	600	9.4 (239)
1200	800	10.5 (267)
1350	1000	11.5 (293)
1600	1200	12.6 (321)
2000	1350,1600	14.9 (376)
2500	2000	17.6 (447)
3000	2500	19.8 (503)
3200	2000	21.3 (541)
4000	3000,3200	24.3 (617)
<b>CU</b>	<b>M-Rated</b>	
225	—	7.9 (200)
400	—	7.9 (200)
600	—	7.9 (200)
800	400	7.9 (200)
1000	—	8.4 (213)
1200	600	9.0 (229)
1350	800	9.6 (245)
1600	1000	10.6 (270)
2000	1200,1350	12.1 (372)
—	1600	12.6 (321)
2500	2000	14.6 (200)
3000	—	15.8 (402)
3200	—	17.3 (439)
4000	2500,3000,3200	19.3 (490)
5000	4000	23.3 (592)

### Phase-Rotation Fittings

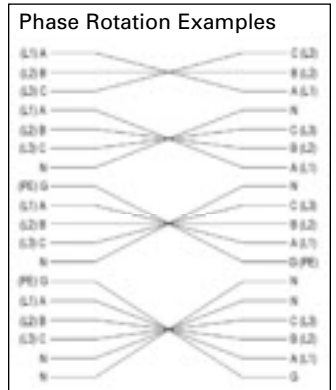
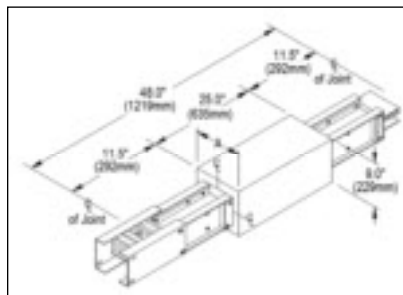
Phase-rotation fittings can be used when the application requires a phase rotation in the power supply. Phase rotation fittings can be ordered for "phase and ground", "phase only" and "ground only" rotations.

#### Phase Rotation Fitting

##### Suffix TRPG, Phase and Ground

##### TRPO, Phase Only

##### TRGO, Ground Only



# Busway Systems

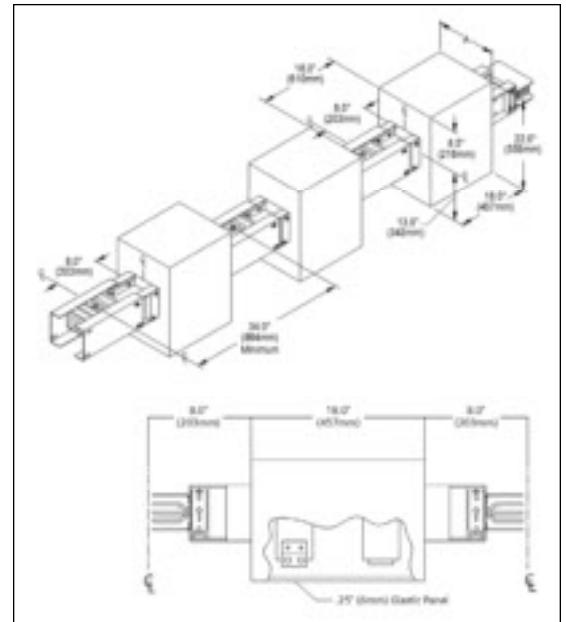
## Service Heads

## Selection

Service Heads are used to connect busway to a service entrance. In the Sentron Busway line, 3 single-phase service heads and 3-phase service head connections are available. The standard service entrance connection is the 3-phase service head which consists of one service head for all three phases. 3 single-phase service heads consist of three heads – one for each phase and may be used to meet the requirements of certain applications. To ensure ease of installation of incoming cables, both types of Sentron service heads are constructed so that the lugs face the Glastic bottom of the box. The Glastic bottom provides insulation and protection to the incoming cables.

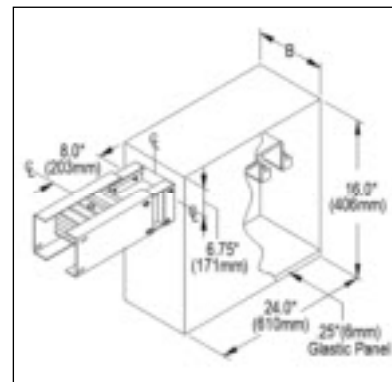
Single-Phase Service Heads, Dimensions (standard/min.)						
Ampere Rating		Dimensions Inches (mm)		Cable Lugs per Phase and Neutral		Ground Lugs <sup>①</sup>
		Single-Phase "A"		Qty.	Size	
<b>AL L-Rated</b>						
225		13 (330)		1	①	1
400	225	13 (330)		1	②	1
600	—	13 (330)		2	②	1
800	400	13 (330)		3	②	1
1000	600	13 (330)		4	②	1
1200	800	18 (457)		4	②	1
1350	1000	18 (457)		4	②	1
1600	1200	18 (457)		5	②	1
2000	1350,1600	20 (508)		6	②	2
2500	2000	27 (686)		8	②	2
3000	2500	29 (737)		9	②	2
3200	2000	29 (737)		9	②	2
4000	3000,3200	29 (737)		12	②	3
<b>CU M-Rated</b>						
225		13 (330)		1	①	1
400		13 (330)		1	②	1
600		13 (330)		2	②	1
800	400	13 (330)		3	②	1
1000	—	13 (330)		4	②	1
1200	600	13 (330)		4	②	1
1350	800	13 (330)		4	②	1
1600	1000	18 (457)		5	②	1
2000	1200,1350	20 (508)		6	②	2
—	1600	18 (457)		5	②	1
2500	2000	20 (508)		8	②	2
3000	—	27 (686)		9	②	2
3200	—	27 (686)		9	②	2
4000	2500,3000,3200	27 (686)		12	②	3
5000	4000	29 (737)		15	②	4

**Three Single-Phase Service Heads Suffix V1TX**



Three-Phase Service Heads, Dimensions (standard/min.)						
Ampere Rating		Dimensions Inches (mm)		Cable Lugs per Phase and Neutral		Ground Lugs <sup>①</sup>
		Three-Phase "B"		Qty.	Size	
<b>AL L-Rated</b>						
225		13 (330)		1	①	1
400	225	13 (330)		1	②	1
600	—	13 (330)		2	②	1
800	400	13 (330)		3	②	1
1000	600	13 (330)		4	②	1
1200	800	18 (457)		4	②	1
1350	1000	18 (457)		4	②	1
1600	1200	18 (457)		5	②	1
2000	1350,1600	18 (457)		6	②	2
2500	2000	27 (686)		8	②	2
3000	2500	27 (686)		9	②	2
3200	2000	27 (686)		9	②	2
4000	3000,3200	29 (737)		12	②	3
<b>CU M-Rated</b>						
225		13 (330)		1	①	1
400		13 (330)		1	②	1
600		13 (330)		2	②	1
800	400	13 (330)		3	②	1
1000	—	13 (330)		4	②	1
1200	600	13 (330)		4	②	1
1350	800	13 (330)		4	②	1
1600	1000	18 (457)		5	②	1
2000	1200,1350	18 (457)		6	②	2
—	1600	18 (457)		5	②	1
2500	2000	18 (457)		8	②	2
3000	—	27 (686)		9	②	2
3200	—	27 (686)		9	②	2
4000	2500,3000,3200	27 (686)		12	②	3
5000	4000	29 (737)		15	②	4

**Three-Phase Service Head Suffix V3TX**



① #6 AWG - 350 kcmil, Cu / Al.

② #4 AWG - 600 kcmil, Cu / Al.

# Busway Systems

## Hangers

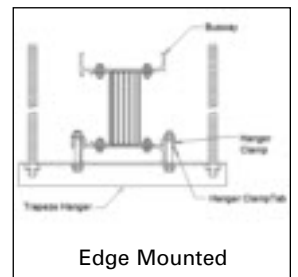
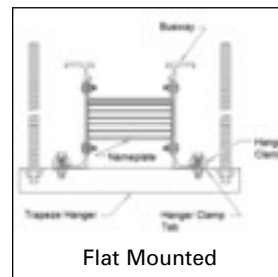
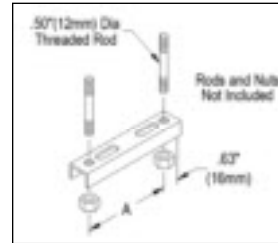
## Selection

Trapeze Hanger, Dimensions and Catalog Numbers			
Ampere Rating		"A" Dimensions Inches (mm)	Flat Mounted Catalog Number <sup>①</sup>
<b>AL</b>	<b>L-Rated</b>		
225	—	10.0 (254)	SXTH1
400	—	10.0 (254)	SXTH1
600	—	10.0 (254)	SXTH1
800	400	10.0 (254)	SXTH1
1000	600	10.0 (254)	SXTH1
1200	800	10.0 (254)	SXTH1
1350	1000	13.5 (343)	SXTH2
1600	1200	13.5 (343)	SXTH2
2000	1350,1600	13.5 (343)	SXTH2
2500	2000	13.5 (343)	SXTH3
3000	2500	13.5 (343)	SXTH3
3200	2000	13.5 (343)	SXTH3
4000	3000,3200	23.0 (584)	SXTH4
<b>CU</b>	<b>M-Rated</b>		
225	—	10.0 (254)	SXTH1
400	—	10.0 (254)	SXTH1
600	—	10.0 (254)	SXTH1
800	400	10.0 (254)	SXTH1
1000	—	10.0 (254)	SXTH1
1200	600	10.0 (254)	SXTH1
1350	800	10.0 (254)	SXTH1
1600	1000	10.0 (254)	SXTH1
2000	1200,1350	13.5 (343)	SXTH2
—	1600	13.5 (343)	SXTH2
2500	2000	13.5 (343)	SXTH2
3000	—	18.5 (470)	SXTH3
3200	—	18.5 (470)	SXTH3
4000	2500,3000,3200	18.5 (470)	SXTH3
5000	4000	23.0 (584)	SXTH4

① Use SXTH1 for Edge Mounted.

### Trapeze Hanger

A complete offering of hangers is available to support Sentron Busway in both vertical and horizontal applications. Standard trapeze hangers support Sentron Busway in horizontal applications on 10 ft. (3.05m) centers. Additional hangers may be used if structural requirements mandate their use. The contractor must supply drop rods to complete assembly for trapeze hangers.



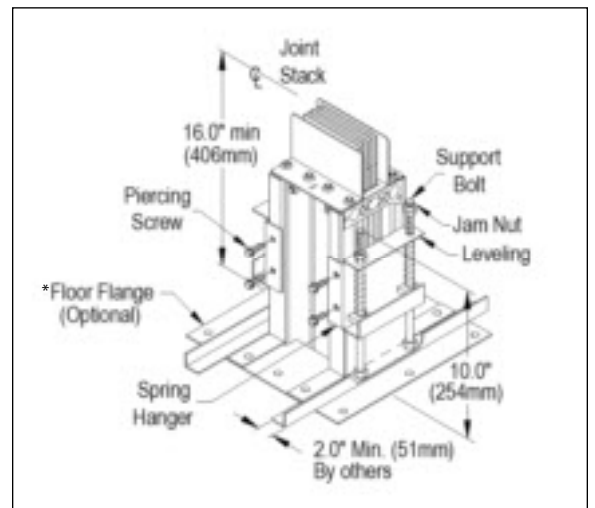
Flat Mounted

Edge Mounted

Spring Hanger, Catalog Numbers						
Ampere Rating		Catalog Assembly floor to ceiling height				
		10ft.	12 ft.	14 ft.	16 ft.	18 ft.
<b>AL</b>	<b>L-Rated</b>					
225	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
400	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
600	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
800	400	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1000	600	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1200	800	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1350	1000	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1600	1200	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
2000	1350,1600	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
2500	2000	SXSH4	SXSH4	SXSH4	SXSH6	SXSH6
3000	2500	SXSH4	SXSH6	SXSH6	SXSH6	SXSH6
3200	2000	SXSH4	SXSH6	SXSH6	SXSH6	SXSH6
4000	3000,3200	SXSH4	SXSH6	SXSH6	SXSH6	SXSH8
<b>CU</b>	<b>M-Rated</b>					
225	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
400	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
600	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
800	400	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1000	—	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1200	600	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
1350	800	SXSH4	SXSH4	SXSH4	SXSH6	SXSH6
1600	1000	SXSH4	SXSH4	SXSH6	SXSH6	SXSH6
2000	1200,1350	SXSH6	SXSH6	SXSH6	SXSH6	SXSH8
—	1600	SXSH4	SXSH4	SXSH4	SXSH4	SXSH4
2500	2000	SXSH2	SXSH6	SXSH8	SXSH8	SXSH8
3000	—	SXSH6	SXSH8	SXSH8	SXSH10	SXSH10
3200	—	SXSH6	SXSH8	SXSH8	SXSH10	SXSH12
4000	2500,3000,3200	SXSH6	SXSH8	SXSH10	SXSH12	SXSH12
5000	4000	SXSH6	SXSH10	SXSH12	SXSH14	SXSH14

### Spring Hanger

Spring hangers and floor support hangers must be used to provide secure mounting of the busway run in vertical applications. Spring hangers support the weight of the busway on each floor and also compensate for minimal building movement and thermal expansion. Maximum distance between spring hangers may not exceed 16 ft. (4.88m). When ordering 18 ft. (5.49m) floor to ceiling height assemblies, intermediate support hangers are necessary.



\*Note: Flanges do not offer support to the busway. Flanges provide a means of covering the hole created in the existing structure.



# Busway Systems

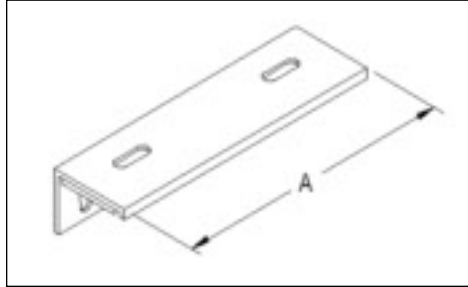
## Hangers

## Selection

Structural Steel Hanger, Dimensions and Catalog Numbers			
Ampere Rating		"A" Dimensions Inches (mm)	Catalog Number
<b>AL</b>	<b>L-Rated</b>		
225	—	10.0 (254)	<b>SXSS1</b>
400	—	10.0 (254)	<b>SXSS1</b>
600	—	10.0 (254)	<b>SXSS1</b>
800	400	10.0 (254)	<b>SXSS1</b>
1000	600	10.0 (254)	<b>SXSS1</b>
1200	800	10.0 (254)	<b>SXSS1</b>
1350	1000	13.5 (343)	<b>SXSS2</b>
1600	1200	13.5 (343)	<b>SXSS2</b>
2000	1350,1600	13.5 (343)	<b>SXSS2</b>
2500	2000	18.5 (470)	<b>SXSS3</b>
3000	2500	18.5 (470)	<b>SXSS3</b>
3200	2000	18.5 (470)	<b>SXSS3</b>
4000	3000,3200	23.0 (584)	<b>SXSS4</b>
<b>CU</b>	<b>M-Rated</b>		
225	—	10.0 (254)	<b>SXSS1</b>
400	—	10.0 (254)	<b>SXSS1</b>
600	—	10.0 (254)	<b>SXSS1</b>
800	400	10.0 (254)	<b>SXSS1</b>
1000	—	10.0 (254)	<b>SXSS1</b>
1200	600	10.0 (254)	<b>SXSS1</b>
1350	800	10.0 (254)	<b>SXSS1</b>
1600	1000	10.0 (254)	<b>SXSS1</b>
2000	1200,1350	13.5 (343)	<b>SXSS2</b>
—	1600	13.5 (343)	<b>SXSS2</b>
2500	2000	13.5 (343)	<b>SXSS2</b>
3000	—	13.5 (343)	<b>SXSS2</b>
3200	—	13.5 (343)	<b>SXSS2</b>
4000	2500,3000,3200	13.5 (343)	<b>SXSS2</b>
5000	4000	23.0 (584)	<b>SXSS4</b>

### Structural Steel Hanger

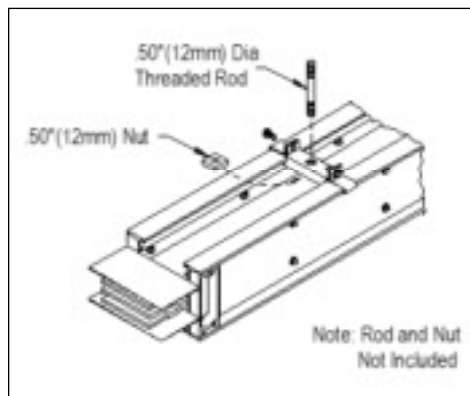
A complete offering of hangers is available to support Sentron Busway in both vertical and horizontal applications. Structural Steel hangers support Sentron Busway in horizontal applications on 10 ft. (3.05m) centers. Additional hangers may be used if structural requirements mandate their use.



Single Drop Rod Hanger, Catalog Numbers		
Ampere Rating		Catalog Number
<b>AL</b>	<b>L-Rated</b>	
225	—	—
400	—	—
600	—	<b>SXDRA1</b>
800	400	<b>SXDRA2</b>
1000	600	<b>SXDRA3</b>
1200	800	<b>SXDRA4</b>
1350	1000	<b>SXDRA5</b>
1600	1200	<b>SXDRA6</b>
2000	1350,1600	<b>SXDRA7</b>
2500	2000	—
3000	2500	—
3200	2000	—
4000	3000,3200	—
<b>CU</b>	<b>M-Rated</b>	
225	—	—
400	—	—
600	—	—
800	400	<b>SXDRC1</b>
1000	—	<b>SXDRC2</b>
1200	600	<b>SXDRC3</b>
1350	800	<b>SXDRC4</b>
1600	1000	<b>SXDRC5</b>
2000	1200,1350	<b>SXDRC6</b>
—	1600	<b>SXDRC8</b>
2500	2000	<b>SXDRC7</b>
3000	—	—
3200	—	—
4000	2500,3000,3200	—
5000	4000	—

### Single Drop Rod Hanger

A complete offering of hangers is available to support Sentron Busway in both vertical and horizontal applications. Single drop rod hangers support Sentron Busway in horizontal applications on 10 ft. (3.05m) centers. Additional hangers may be used if structural requirements mandate their use. The contractor must supply drop rods to complete assembly for single drop rod hangers.



# Busway Systems

## Hangers and End Closers

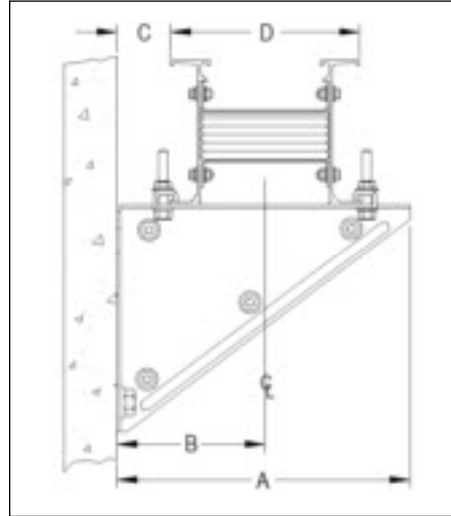
**Selection**

Wall Mounted Hanger, Dimensions and Catalog Numbers					
Ampere Rating		Dimensions Inches (mm)			Catalog Number
		"A"	"B"	"C"	
<b>AL</b>	<b>L-Rated</b>				
225	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
400	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
600	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
800	400	12.3 (311)	6.1 (156)	3.8 (97)	<b>SXWH1</b>
1000	600	12.3 (311)	6.1 (156)	3.8 (97)	<b>SXWH1</b>
1200	800	12.3 (311)	6.1 (156)	2.8 (72)	<b>SXWH1</b>
1350	1000	16.3 (413)	8.1 (206)	4.4 (111)	<b>SXWH2</b>
1600	1200	16.3 (413)	8.1 (206)	3.9 (98)	<b>SXWH2</b>
2000	1350,1600	16.3 (413)	8.1 (206)	2.8 (70)	<b>SXWH2</b>
2500	2000	20.8 (527)	10.4 (264)	3.6 (92)	<b>SXWH3</b>
3000	2500	20.8 (527)	10.4 (264)	2.5 (64)	<b>SXWH3</b>
3200	2000	20.8 (527)	10.4 (264)	1.8 (46)	<b>SXWH3</b>
4000	3000,3200	25.3 (641)	12.6 (321)	2.5 (64)	<b>SXWH4</b>
<b>CU</b>	<b>M-Rated</b>				
225	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
400	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
600	—	12.3 (311)	6.1 (156)	4.2 (107)	<b>SXWH1</b>
800	400	12.3 (311)	6.1 (156)	3.8 (97)	<b>SXWH1</b>
1000	—	12.3 (311)	6.1 (156)	3.8 (97)	<b>SXWH1</b>
1200	600	12.3 (311)	6.1 (156)	2.8 (72)	<b>SXWH1</b>
1350	800	12.3 (311)	6.1 (156)	2.8 (72)	<b>SXWH1</b>
1600	1000	12.3 (311)	6.1 (156)	2.8 (72)	<b>SXWH1</b>
2000	1200,1350	16.3 (413)	8.1 (206)	4.4 (111)	<b>SXWH2</b>
—	1600	16.3 (413)	8.1 (206)	3.9 (98)	<b>SXWH2</b>
2500	2000	16.3 (413)	8.1 (206)	2.8 (70)	<b>SXWH2</b>
3000	—	20.8 (527)	10.4 (264)	3.6 (92)	<b>SXWH3</b>
3200	—	20.8 (527)	10.4 (264)	2.5 (64)	<b>SXWH3</b>
4000	2500,3000,3200	20.8 (527)	10.4 (264)	1.8 (46)	<b>SXWH3</b>
5000	4000	25.3 (641)	12.6 (321)	2.5 (64)	<b>SXWH4</b>

### Wall Mounted Hanger

Wall Mounted Hangers are used for horizontal applications close to a wall. The busway can be mounted either edgewise or flatwise to the wall.

Wall Mounted Hanger ensures the minimum clearance between the wall and the busway run.



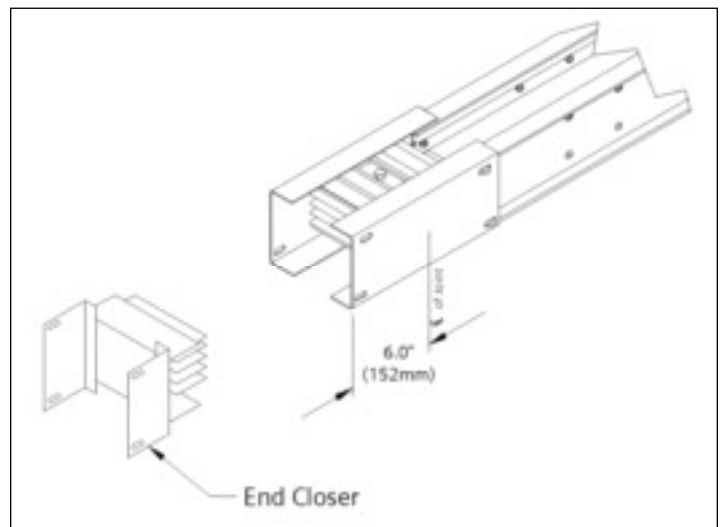
### End Closers

End closers safely terminate a busway run and protect the bus bar ends. End closers may be removed easily in order to extend a busway run. End closers are shipped with Glastic insulation pieces, however, joint stacks and inspection covers are not included.

#### End Closers

(Joint stack and covers not included)

Suffix ECLS



# Busway Systems

## Roof and Wall Flanges

**Selection**

Roof, wall and floor flanges are available for Sentron Busway. When the busway run passes through a roof, wall or ceiling, a flange should be used. Flanges do not offer support to the busway. Flanges provide a means of covering the hole created in the existing structure. Additional sealant may be required to meet fire codes and all other local requirements. No caulking or gasketing is provided with Sentron flanges.

Roof Flanges, Dimensions			
Ampere Rating		Dimensions Inches (mm)	
		"A"	"B"
<b>AL</b>	<b>L-Rated</b>		
225	—	12 (305)	18 (457)
400	—	12 (305)	18 (457)
600	—	12 (305)	18 (457)
800	400	12 (305)	18 (457)
1000	600	12 (305)	18 (457)
1200	800	12 (305)	18 (457)
1350	1000	16 (406)	22 (559)
1600	1200	16 (406)	22 (559)
2000	1350,1600	16 (406)	22 (559)
2500	2000	20.5 (521)	22 (559)
3000	2500	20.5 (521)	26.5 (673)
3200	2000	20.5 (521)	26.5 (673)
4000	3000,3200	25 (635)	31 (787)
<b>CU</b>	<b>M-Rated</b>		
225	—	12 (305)	18 (457)
400	—	12 (305)	18 (457)
600	—	12 (305)	18 (457)
800	400	12 (305)	18 (457)
1000	—	12 (305)	18 (457)
1200	600	12 (305)	18 (457)
1350	800	12 (305)	18 (457)
1600	1000	12 (305)	18 (457)
2000	1200,1350	16 (406)	22 (559)
—	1600	16 (406)	22 (559)
2500	2000	16 (406)	22 (559)
3000	—	20.5 (521)	26.5 (673)
3200	—	20.5 (521)	26.5 (673)
4000	2500,3000,3200	20.5 (521)	26.5 (673)
5000	4000	25 (635)	31 (787)

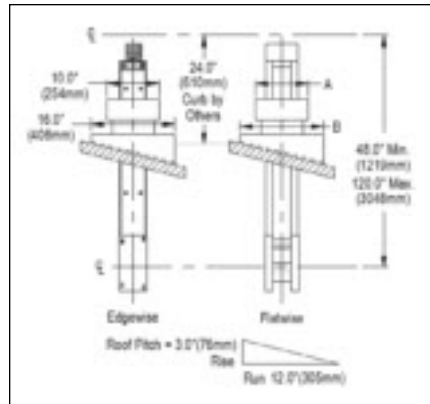
Wall, Ceiling and Floor Flanges, Dimensions			
Ampere Rating		Dimensions Inches (mm)	
		"A"	"B"
<b>AL</b>	<b>L-Rated</b>		
225	—	11 (279)	7 (178)
400	—	11 (279)	7 (178)
600	—	11 (279)	7 (178)
800	400	11 (279)	7 (178)
1000	600	12 (305)	8 (203)
1200	800	13 (330)	9 (229)
1350	1000	14 (356)	10 (254)
1600	1200	15 (381)	11 (279)
2000	1350,1600	17 (432)	13 (330)
2500	2000	20 (508)	16 (406)
3000	2500	22 (559)	18 (457)
3200	2000	24 (610)	20 (508)
4000	3000,3200	26 (660)	22 (559)
<b>CU</b>	<b>M-Rated</b>		
225	—	10 (254)	6 (152)
400	—	10 (254)	6 (152)
600	—	10 (254)	6 (152)
800	400	10 (254)	6 (152)
1000	—	11 (279)	7 (178)
1200	600	12 (305)	8 (203)
1350	800	12 (305)	8 (203)
1600	1000	13 (330)	9 (229)
2000	1200,1350	15 (381)	11 (279)
—	1600	15 (381)	11 (279)
2500	2000	17 (432)	13 (330)
3000	—	18 (457)	14 (356)
3200	—	19 (483)	15 (381)
4000	2500,3000,3200	21 (533)	17 (432)
5000	4000	26 (660)	22 (559)

### Roof Flanges

Roof flanges are available for Sentron Busway. When the busway run passes through a roof, a flange should be used. Flanges do not offer support to the busway. Flanges provide a means of covering the hole created in the existing structure. Additional sealant may be required to meet fire codes and all other local requirements. No caulking or gasketing is provided with Sentron flanges. Roof flanges provide a watertight seal for use with NEMA 3R and IP66 rated busway. Roof pitch must be indicated on drawings when ordering roof flanges.

#### Roof Flanges

##### Suffix GRFL

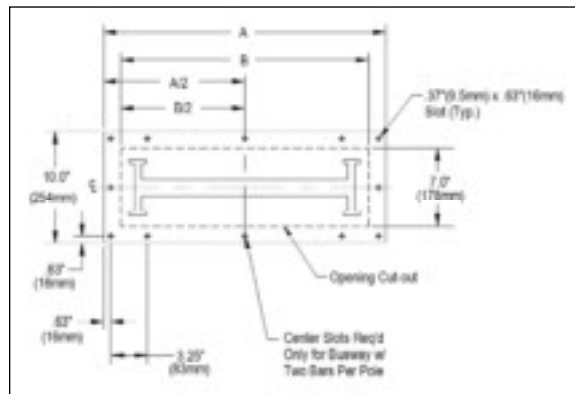


### Wall, Ceiling and Floor Flanges

Wall/Floor flanges are available for Sentron Busway. When the busway run passes through a wall or ceiling, a flange should be used. Flanges do not offer support to the busway. Flanges provide a means of covering the hole created in the existing structure. Additional sealant may be required to meet fire codes and all other local requirements. No caulking or gasketing is provided with Sentron flanges.

#### Wall, Ceiling and Floor Flanges

##### Suffix GWFL



# Busway Systems

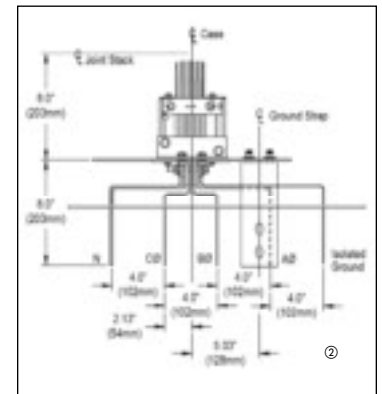
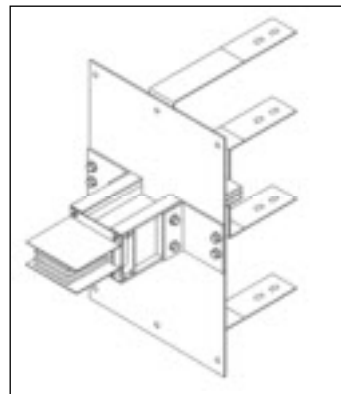
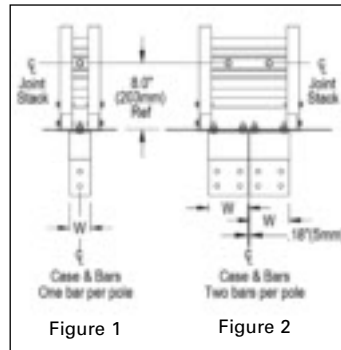
## Flanged Ends

**Selection**

Flanged ends provide a direct connection to low voltage switchgear, switchboards, motor control centers, large power panels, and other electrical distribution equipment. Flanged ends are shipped with one joint stack assembly. The switchgear manufacturer supplies lugs and mounting hardware. See illustration for flanged end drilling patterns.

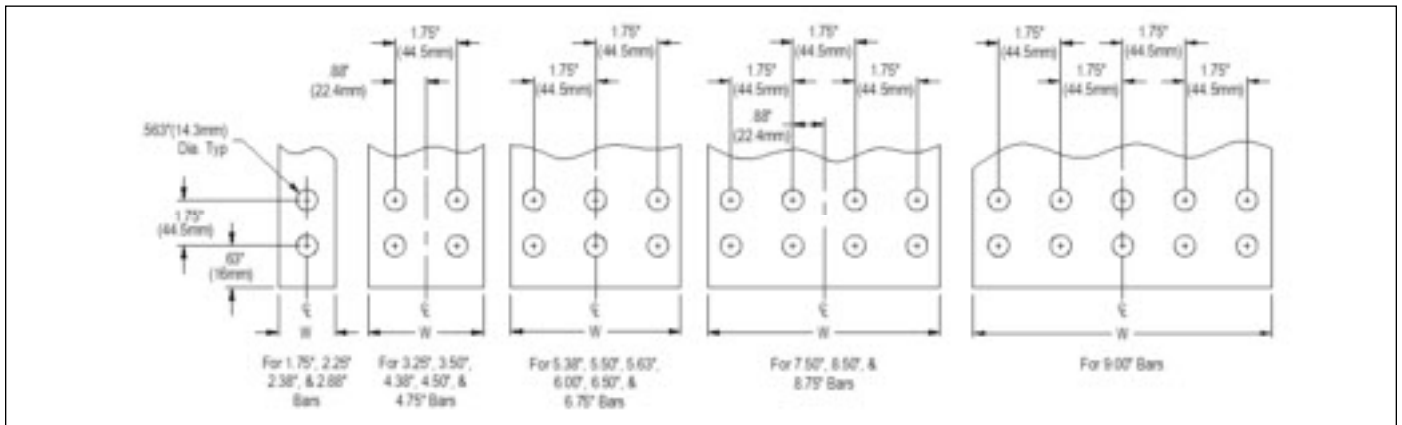
Flanged End, Dimensions		Dimensions Inches (mm)	
Ampere Rating		"W"	Fig. No.
<b>AL</b>	<b>L-Rated</b>		
225	—	1.75 (44.4)	1
400	—	1.75 (44.4)	1
600	—	1.75 (44.4)	1
800	400	2.38 (60.5)	1
1000	600	3.25 (82.6)	1
1200	800	4.38 (111.3)	1
1350	1000	5.38 (136.7)	1
1600	1200	6.50 (165.1)	1
2000	1350,1600	8.75 (222.3)	1
2500	2000	5.63 (143.0)	2
3000	2500	6.75 (171.5)	2
3200	2000	6.75 (171.5)	2
4000	3000,3200	9.00 (228.6)	2
<b>CU</b>	<b>M-Rated</b>		
225	—	1.75 (44.4)	1
400	—	1.75 (44.4)	1
600	—	1.75 (44.4)	1
800	400	1.75 (44.4)	1
1000	—	2.25 (57.2)	1
1200	600	2.88 (73.2)	1
1350	800	3.50 (88.9)	1
1600	1000	4.50 (114.3)	1
2000	1200,1350	6.00 (152.4)	1
—	1600	6.50 (165.1)	1
2500	2000	8.50 (215.9)	1
3000	—	4.75 (120.7)	2
3200	—	5.50 (139.7)	2
4000	2500,3000,3200	6.50 (165.1)	2
5000	4000	8.50 (215.9)	2

## Flanged End Suffix FRND



## Flanged End Bus Bar Drilling Pattern (NEMA)Ⓞ

(Same pattern for 2 bus bars per pole, see figure 2 above.)



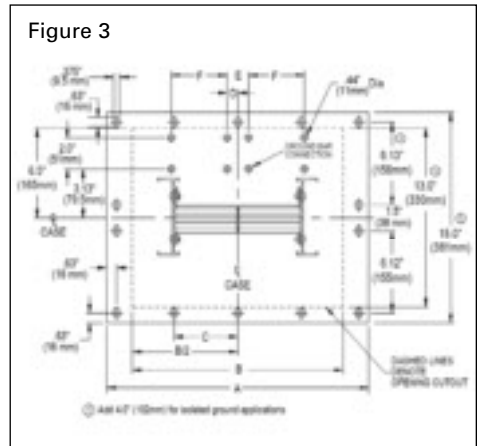
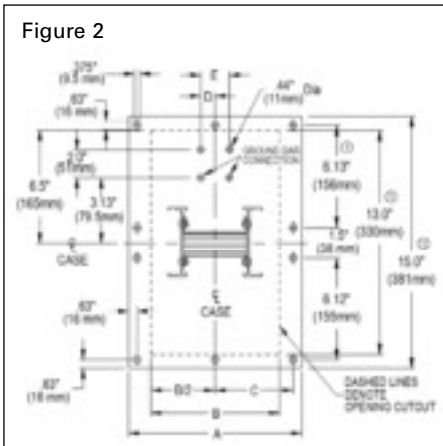
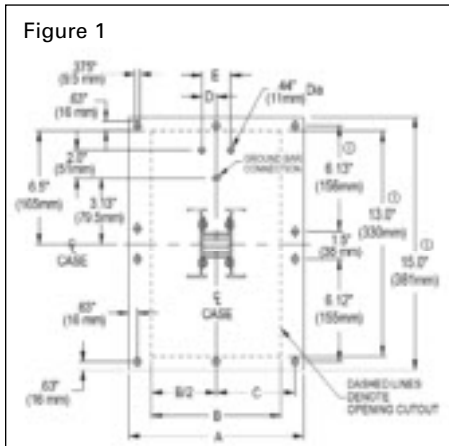
Ⓞ Other drilling patterns are available and must be specified at order entry.  
 Ⓜ See Figures 4, 5 and 6 on page 14-43.

# Busway Systems

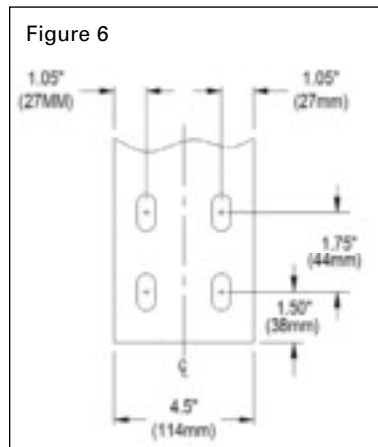
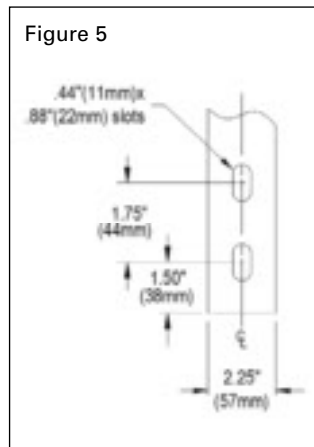
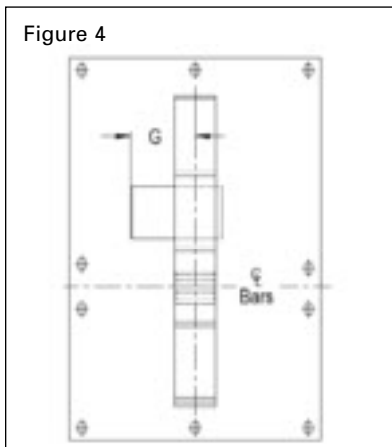
## Flanged Ends

## Selection

Flanged End, Dimensions (standard/min.)											
Ampere Rating		Dimensions Inches (mm)									
		Ref. Bar Width	Fig. No.	"A"	"B"	"C"	"D"	"E"	"F"	"G"	Fig. No.
<b>AL</b>	<b>L-Rated</b>										
225	—	2.38 (60.5)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.94 (49)	3.88 (99)	—	6.00 (152)	4, 5
400	—	2.38 (60.5)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.94 (49)	3.88 (99)	—	6.00 (152)	4, 5
600	—	2.38 (60.5)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.94 (49)	3.88 (99)	—	6.00 (152)	4, 5
800	400	2.38 (60.5)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.94 (49)	3.88 (99)	—	6.00 (152)	4, 5
1000	600	3.25 (82.6)	2	10.0 (254)	8.00 (203)	4.38 (111)	1.94 (49)	2.06 (52)	—	6.00 (152)	4, 6
1200	800	4.38 (111.3)	2	15.50 (395)	13.50 (343)	7.13 (181)	1.60 (41)	3.19 (81)	—	8.50 (216)	4, 6
1350	1000	5.38 (136.7)	2	15.50 (395)	13.50 (343)	7.13 (181)	2.10 (53)	4.19 (106)	—	8.50 (216)	4, 6
1600	1200	6.50 (165.1)	2	15.50 (395)	13.50 (343)	7.13 (181)	2.66 (67)	5.31 (135)	—	8.50 (216)	4, 6
2000	1350,1600	8.75 (222.3)	2	15.50 (395)	13.50 (343)	7.13 (181)	3.78 (96)	7.56 (192)	—	8.50 (216)	4, 6
2500	2000	5.63 (143.0)	3	20.0 (508)	18.00 (457)	4.50 (114)	0.68 (17)	1.37 (36)	4.44 (113)	13.25 (337)	4, 6
3000	2500	6.75 (171.5)	3	20.0 (508)	18.00 (457)	4.50 (114)	0.68 (17)	1.37 (36)	5.56 (141)	13.25 (337)	4, 6
3200	2000	7.50 (190.5)	3	24.0 (610)	22.0 (569)	5.50 (140)	0.68 (17)	1.37 (36)	6.32 (161)	13.25 (337)	4, 6
4000	3000,3200	9.00 (228.6)	3	24.0 (610)	22.0 (569)	5.50 (140)	0.68 (17)	1.37 (36)	7.81 (198)	14.25 (362)	4, 6
<b>CU</b>	<b>M-Rated</b>										
225	—	1.75 (44.4)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.63 (41)	3.25 (83)	—	6.00 (152)	4, 5
400	—	1.75 (44.4)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.63 (41)	3.25 (83)	—	6.00 (152)	4, 5
600	—	1.75 (44.4)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.63 (41)	3.25 (83)	—	6.00 (152)	4, 5
800	400	1.75 (44.4)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.63 (41)	3.25 (83)	—	6.00 (152)	4, 5
1000	—	2.25 (57.2)	1	10.0 (254)	8.00 (203)	4.38 (111)	1.88 (48)	3.75 (95)	—	6.00 (152)	4, 5
1200	600	2.88 (73.2)	2	10.0 (254)	8.00 (203)	4.38 (111)	0.85 (21)	1.69 (43)	—	6.00 (152)	4, 6
1350	800	3.50 (88.9)	2	10.0 (254)	8.00 (203)	4.38 (111)	1.16 (29)	2.31 (59)	—	6.00 (152)	4, 6
1600	1000	4.50 (114.3)	2	15.50 (395)	13.50 (343)	7.13 (181)	1.66 (42)	3.31 (84)	—	8.50 (216)	4, 6
2000	1200,1350	6.00 (152.4)	2	15.50 (395)	13.50 (343)	7.13 (181)	2.41 (42)	4.81 (122)	—	8.50 (216)	4, 6
—	1600	6.50 (165.1)	2	15.50 (395)	13.50 (343)	7.13 (181)	2.66 (67)	5.31 (135)	—	8.50 (216)	4, 6
2500	2000	8.50 (215.9)	1	15.50 (395)	13.50 (343)	7.13 (181)	3.66 (93)	7.31 (186)	—	8.50 (216)	4, 6
3000	—	4.75 (120.7)	3	20.0 (508)	18.00 (457)	4.50 (114)	0.68 (17)	1.37 (36)	3.56 (90)	13.25 (337)	4, 6
3200	—	5.50 (139.7)	3	20.0 (508)	18.00 (457)	4.50 (114)	0.68 (17)	1.37 (36)	4.32 (110)	13.25 (337)	4, 6
4000	2500,3000,3200	6.50 (165.1)	3	20.0 (508)	18.00 (457)	4.50 (114)	0.68 (17)	1.37 (36)	5.31 (135)	13.25 (337)	4, 6
5000	4000	8.50 (215.9)	3	24.0 (610)	22.00 (569)	5.50 (140)	0.68 (17)	1.37 (36)	7.31 (186)	14.25 (362)	4, 6



Integral and Internal Ground Strap Drilling Detail



# Busway Systems

## Panelboards and Meter Center Modules

Selection

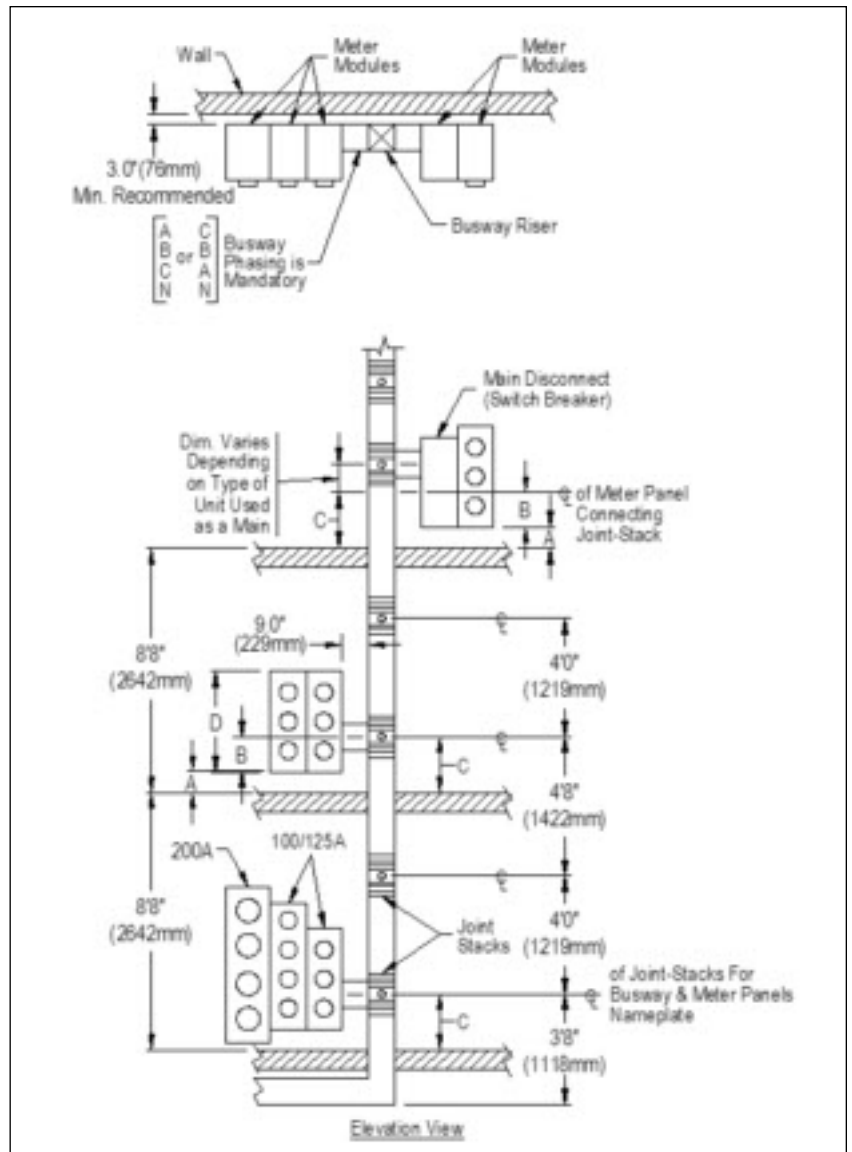
Meter center modules provide a quick and convenient method of connecting to metering devices for both commercial and industrial applications.

Meter center modules connect at the side of a busway run to special joint stacks; these special joints can be added to existing busway to accommodate meter center module connections. When using multiple metering stacks, main disconnects are available if the system reaches the 6 circuit rule (see metering bulletin for further information).

### Dimensional Data Required

#### Dimensions Inches (mm)

- "A" Distance between floor and bottom of meter center as required by the customer.
- "B" Dimension from bottom of meter center to centerline of meter center joint connection stack:  
100-125A Panel, B = 16.5 (419)  
200A Panel, B = 22.0 (559)
- "C" Equals "A" plus "B", Minimum 16.0 (406)
- "D" Individual meter center height.  
Consult Modular Metering application information.



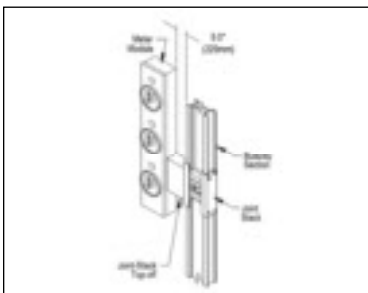
## Meter Center Cubicles

Meter center cubicles provide a quick and convenient method of connecting to metering devices for both commercial and industrial applications and have the main disconnect circuit breaker factory installed.

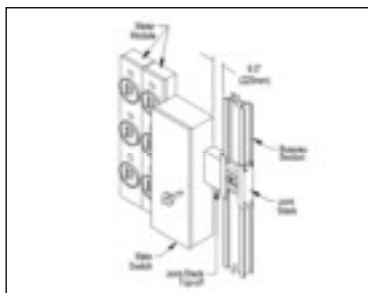
Having the main disconnect built into the device reduces the required space on the right and left side of the busway. Meter center modules connect at the side of the cubicle frame box using an SBJ4 stack. Meter center cubicles are available for 600 – 1200 Amp (L, M and N Frames). They are available with flexible meter center connections, left side, right side or both. (When ordering a meter center cubicle a SBJ4 stack must be ordered separately.)

Molded Case Circuit Breaker Cubicles with Meter Tap Stack Provisions Dimensions, Inches (mm)											
Ampere Rating		Busway Width W	L Frame Breaker (250-600A)			M Frame Breaker (250-600A)			N Frame Breaker (800-1200A)		
			A	B	C	A	B	C	A	B	C
<b>AL</b>	<b>L-Rated</b>										
225	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
400	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
600	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
800	400	4.6 (117)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1000	600	5.4 (137)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1200	800	6.6 (168)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1350	1000	7.6 (193)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1600	1200	8.7 (221)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
2000	1350,1600	10.9 (277)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
2500	2000	13.7 (348)	32 (813)	24 (610)	23.5 (597)	37 (940)	26 (660)	23.5 (597)	37 (940)	26 (660) 23.5 (597)	
3000	2500	15.8 (401)	32 (813)	24 (610)	23.5 (597)	37 (940)	26 (660)	23.5 (597)	37 (940)	26 (660) 23.5 (597)	
3200	2000	17.3 (439)	32 (813)	24 (610)	23.5 (597)	37 (940)	26 (660)	28 (711)	37 (940)	26 (660) 28 (711)	
4000	3000,3200	20.3 (516)	32 (813)	24 (610)	28 (711)	37 (940)	26 (660)	28 (711)	37 (940)	26 (660) 28 (711)	
4000	3000,3200	20.3 (516)	32 (813)	24 (610)	28 (711)	37 (940)	26 (660)	28 (711)	37 (940)	26 (660) 28 (711)	
<b>CU</b>	<b>M-Rated</b>										
225	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
400	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
600	—	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
800	400	3.9 (99)	32 (813)	24 (620)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1000	—	4.4 (112)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1200	600	5.1 (130)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1350	800	5.7 (145)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
1600	1000	6.7 (170)	32 (813)	24 (610)	16 (406)	37 (940)	26 (660)	16 (406)	37 (940)	26 (660) 16 (406)	
2000	1200,1350	8.2 (208)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
—	1600	8.7 (221)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
2500	2000	10.7 (272)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
3000	—	11.8 (300)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	20 (490)	37 (940)	26 (660) 20 (490)	
3200	—	13.3 (335)	32 (813)	24 (610)	20 (490)	37 (940)	26 (660)	23.5 (597)	37 (940)	26 (660) 23.5 (597)	
4000	2500,3000,3200	15.3 (389)	32 (813)	24 (610)	23.5 (597)	37 (940)	26 (660)	23.5 (597)	37 (940)	26 (660) 23.5 (597)	
5000	4000	19.3 (491)	32 (813)	24 (610)	28 (711)	37 (940)	26 (660)	28 (711)	37 (940)	26 (660) 28 (711)	

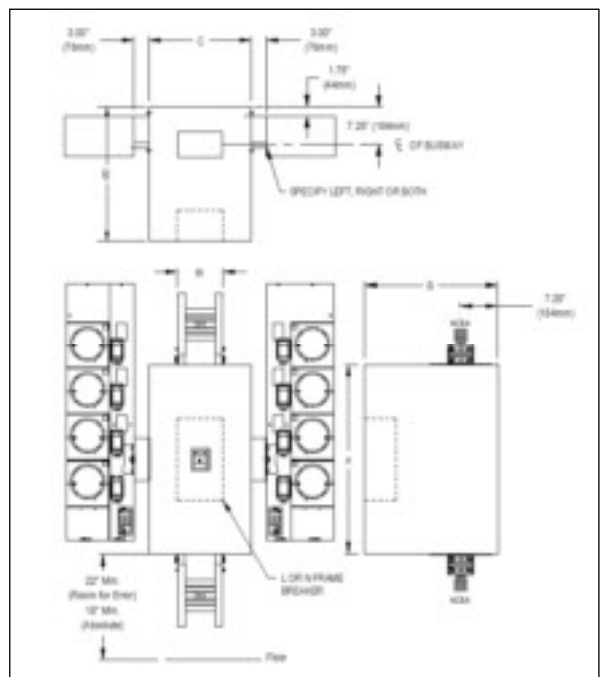
Meter Center Module



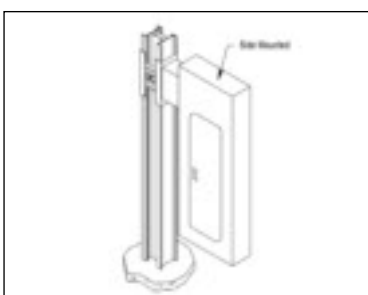
Main Disconnect Meter Module



Meter Center Cubicle



Side Mount Panelboard



# Busway Systems

## Installation and Application Information

## Selection

### Installation

In preparation for installation of your busway systems, it is important to familiarize yourself with the following installation publications:

- General Instructions For Handling, Installation, Operation and Maintenance of Busway Rated 600 volts or less (NEMA Standards Publication BU1)
- Storage, Installation and Maintenance Instructions for Sentron Busway (31-9918-01)

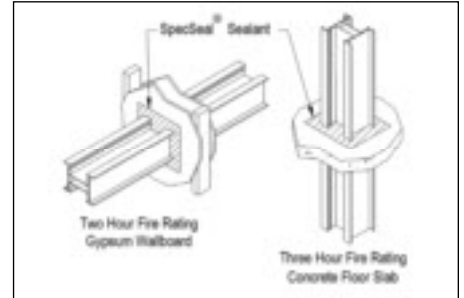
These publications should be read through thoroughly and used as reference during installation to ensure proper installation procedures. All

equipment should be inspected upon delivery. If the busway is not installed immediately, it should be stored in a clean, dry location. Factory supplied record drawings as well as installation tools should be accessible in preparation for installation.

### UL 1479 Fire Rated Installations

Sentron Busway has been tested in accordance with UL 1479 and offers a certified two hour fire rating for gypsum wallboard construction and a three hour fire rating for concrete slab or block penetrations. These ratings were achieved using standard busway installed with SpecSeal® sealant from Specified Technologies Inc. The SpecSeal® fire stop system provides superior

performance at the industry's lowest installed cost. Sentron is the first busway system to achieve a fire rating for gypsum wallboard construction.



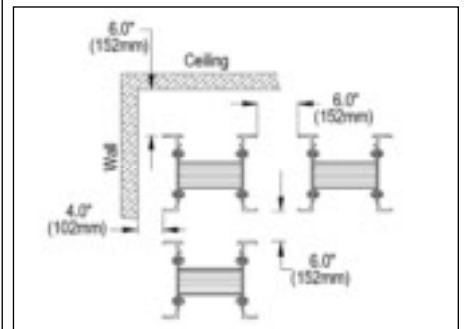
### Measuring

Critical to the success of any busway installation is the layout and the accurate measuring of the busway. First and foremost:

Select a route for your busway that will require the fewest fittings and the maximum number of 10' (3.05m) sections. It is important that the busway system be designed to meet the requirements of the National Electric Code for Busway. There are a number of techniques that may be used to ensure an accurate measurement before purchasing and installing the busway. The following tools will be required during layout and measuring:

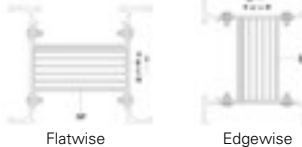
- 100' (30.48m) tape measure
- Measuring Stick
- Chalkline
- Plumb Bob
- Marker

(A laser distance measuring device may be used to speed the measuring process).



### Minimal Clearances

Minimum clearances for installing feeder busway are shown. Additional clearance may be required for plug-in devices larger than 100A fusible and 250A circuit breaker.

<b>SIEMENS</b>	
<b>Busway Order Entry Checklist</b>	
Note: Submit one checklist for each busway run.	
Date Submitted: _____	
Purchase Order #: _____	
Project Name: _____	
Submitted By: _____	
Sales Engineer: _____	
_____ Released _____ Hold for Release	
Run Designation: _____	
Busway Catalog #: _____	
Service: _____ Phase _____ Wire _____ Volts _____ Amps	
Conductor: _____ Cu _____ Al _____ "M" Rated _____ "L" Rated	
Neutral: _____ None _____ 100% _____ 200%	
Ground: _____ Case _____ Internal _____ Isolated	
IP Rating _____ IP40 (Indoor)	
_____ IP55 (Splash Proof)	
_____ NEMA 3R (Outdoor)	
Shipping Instructions: _____ Ship complete _____ Ship partial	
Special Shipping Requirements: _____	
Ship not before date: _____	
Drawing Requirements:	
_____ Approval drawings _____ # copies:	
_____ Record drawings _____ # copies:	
<b>A) Engineering Information</b>	
Check applicable information and be sure it is shown on accompanying drawing.	
1. _____ Drawing Attached (Required)	11. _____ Riser Bus
2. _____ Estimate Sheets Attached (Required)	a) _____ Load side of bus plug (top or bottom)
3. _____ Dimensions from walls, column lines, etc.	b) _____ Required distance from floor to top of panel/plugs
4. _____ Wall, floor, roof thickness and pitch	c) _____ Meter Bank (center line of tap stack)
5. _____ Floor Elevations	d) _____ Barriers and/or floor supports
_____ Floor to floor	12. _____ Transformer Connections
_____ Floor to ceiling	a) _____ Standard XFMR Service Heads
6. _____ Wall Locations	_____ 1-three phase
7. _____ Equipment Pads shown: Height _____	_____ 3-single phase
8. _____ Existing busway to be extended	b) Special drawing required
a) _____ Phasing	_____ Dimensions between phases
b) _____ Nameplate Informatio	_____ LV spade detail including drilling and thickness
c) _____ Match to competitor: Call the factory	_____ Dimension of the LV spade from tank wall
9. _____ Social Switchboard Connection: Provide Details	_____ Throat opening and hole pattern (if any)
10. _____ Phase transpositions: Provide phasing on drawing.	13. _____ Utility Vault Connection Utility Type: _____
	_____ Drawing Attached
	14. End Cable Tap Box
	_____ Horizontal
	_____ Vertical
	_____ Standard Lugs
	_____ Special Lug Requirements
	No. _____ Size _____ per phase & neutral
	No. _____ Size _____ per ground
	15. _____ Busway Mounting position in reference to floor:
	
	Flatwise Edgewise
	<b>B) Specifications (Check or fill appropriate blanks)</b>
	1. _____ Standard busway meets specifications
	2. _____ Exception to specifications
	a) Short circuit withstand _____ Ampere Symmetrical
	b) Voltage Drop Requirement _____
	c) Temperature-rise requirement _____
	d) Current density requirement _____
	e) Special Paint: Provide paint chip _____
	f) Other: _____
	Exception to electrical specifications: Call the factory.
	Other Notes: _____
	_____
	_____



# Busway Systems

## Siemens Sentron Busway Quick Reference

General

### Siemens Sentron Busway Quick Reference

#### Critical Dimensions:

Busway that passes through a wall, ceiling or floor:

- centerline of a joint to the wall, ceiling or floor = 7 in. min.
- centerline of a joint (above a floor support) to a floor = 16 in. min.
- joints cannot be positioned inside a wall, ceiling or floor (joints must be accessible for maintenance)

Feeder Busway clearances:

- from the top of the busway to a ceiling/floor/wall or other busway = 6 in. min.
- from the side of the busway to a ceiling/floor/wall or other busway = 4 in. min.

Plug-in Busway clearances:

- plug-in busway clearances depend on the configuration of bus plugs (see bus plug clearance charts in the Sentron Selection and Application Guide)
- otherwise, clearances for feeder busway apply
- note orientation of the operating handle and provide clearance for access & operation

Feeder Busway length:

- minimum length = 14.38 in.
- maximum length = 10 ft.

Plug-in & Riser length:

- available only in 4, 6, 8 and 10 ft. lengths

Flat Elbow section:

- maximum leg length = 4 ft.
- minimum leg length: Varies according to amperage and bus bar material

Edge Elbow section:

- maximum length = 4 ft.
- minimum leg length = 10 in.

Combination and Offset Elbows:

- maximum leg lengths = 4 ft.
- minimum leg length = 2.50 in. + (case size x .5)

#### Critical Details:

- Busway DRAWINGS must include all relevant dimensions
- CENTERLINE dimensions are expected (please note any dimensions that are not center line dimensions)
- WALLS and FLOORS must be located (wall & floor thickness must be included)
- Locate the FRONT of all switchboards and provide the phasing of any existing boards (advise if any PADs are located under boards)
- When using RISER plug-in busway please note the desired direction of the load side of bus plugs (G, A, B, C, N from left to right will position the load side to the bottom and "UP is On" handle operation)
- TRANSFORMER THROAT connections require complete details
- Horizontal plug-in busway must be oriented with the A phase on top (bolt head on top)
- In-Line Disconnect CUBICLES are engineered to order. The FRONT of the cubicle must be specified

#### Outdoor Busway:

- Route busway to minimize outdoor busway run length
- Avoid installing busway near exhaust pipes that may generate steam or caustic vapors

# Busway Power Distribution

## XJ-L™ Plug-In Busway

Selection

Busway Sections — Complete										
10 Foot Plug-in Sections <sup>①</sup>			5 Foot Plug-in Sections <sup>①</sup>			2 Foot Plug-in Sections <sup>①</sup>			Switchboard or Panelboard Stubs (flanged end)	
Catalog Number	List Price \$	Weight (lbs.)	Catalog Number	List Price \$	Weight (lbs.)	Catalog Number	List Price \$	Weight (lbs.)	Catalog Number	List Price \$

### 100 Ampere Busway — Copper Conductors<sup>②</sup>

#### 3-Phase, 3-Wire

600 Volts or Less

XC1003	618.00	42	XC10035	412.00	20	XC10032	240.00	8	XC1003FE	709.00
XC1003G <sup>③</sup>	709.00	42	XC10035G <sup>③</sup>	474.00	21	XC10032G <sup>③</sup>	277.00	9	XC1003FEG <sup>③</sup>	798.00
XC1003IG <sup>④</sup>	722.00	44	XC10035IG <sup>④</sup>	499.00	20	XC10032IG <sup>④</sup>	281.00	8	XC1003FEIG <sup>④</sup>	785.00
XC1003GIG <sup>③④</sup>	837.00	44	XC10035GIG <sup>③④</sup>	578.00	21	XC10032GIG <sup>③④</sup>	325.00	9	XC1003FEGIG <sup>③④</sup>	888.00

#### 3-Phase, 4-Wire

600 Volts or Less

XC1004	722.00	45	XC10045	474.00	21	XC10042	270.00	9	XC1004FE	774.00
XC1004G <sup>③</sup>	774.00	46	XC10045G <sup>③</sup>	505.00	22	XC10042G <sup>③</sup>	309.00	10	XC1004FEG <sup>③</sup>	862.00
XC1004IG <sup>④</sup>	837.00	45	XC10045IG <sup>④</sup>	547.00	21	XC10042IG <sup>④</sup>	318.00	9	XC1004FEIG <sup>④</sup>	875.00
XC1004GIG <sup>③④</sup>	976.00	46	XC10045GIG <sup>③④</sup>	630.00	22	XC10042GIG <sup>③④</sup>	368.00	10	XC1004FEGIG <sup>③④</sup>	951.00

### 225 Ampere Busway — Copper Conductors

#### 3-Phase, 3-Wire

600 Volts or Less

X2003	837.00	56	X20035	470.00	27	X20032	258.00	12	X2003FE	963.00
X2003G <sup>⑤</sup>	951.00	58	X20035G <sup>⑤</sup>	499.00	28	X20032G <sup>⑤</sup>	298.00	13	X2003FEG <sup>⑤</sup>	1103.00
X2003IG <sup>④</sup>	951.00	56	X20035IG <sup>④</sup>	544.00	27	X20032IG <sup>④</sup>	315.00	12	X2003FEIG <sup>④</sup>	1115.00
X2003GIG <sup>④⑤</sup>	1115.00	58	X20035GIG <sup>④⑤</sup>	671.00	28	X20032GIG <sup>④⑤</sup>	371.00	13	X2003FEGIG <sup>④⑤</sup>	1254.00

#### 3-Phase, 4-Wire

480 Volts or Less

X2004	913.00	60	X20045	519.00	29	X20042	286.00	14	X2004FE	1052.00
X2004G <sup>⑤</sup>	932.00	62	X20045G <sup>⑤</sup>	565.00	30	X20042G <sup>⑤</sup>	326.00	15	X2004FEG <sup>⑤</sup>	1166.00
X2004IG <sup>④</sup>	1115.00	60	X20045IG <sup>④</sup>	594.00	29	X20042IG <sup>④</sup>	326.00	14	X2004FEIG <sup>④</sup>	1204.00
X2004GIG <sup>④⑤</sup>	1204.00	62	X20045GIG <sup>④⑤</sup>	722.00	30	X20042GIG <sup>④⑤</sup>	401.00	15	X2004FEGIG <sup>④⑤</sup>	1330.00

### 400 Ampere Busway — Copper Conductors

#### 3-Phase, 3-Wire

600 Volts or Less

X4003	1127.00	69	X40035	676.00	35	X40032	338.00	15	X4003FE	1299.00
X4003G	1296.00	75	X40035G	778.00	38	X40032G	389.00	16	X4003FEG	1487.00
X4003IG	1353.00	79	X40035IG	811.00	40	X40032IG	405.00	17	X4003FEIG	1505.00
X4003GIG	1466.00	84	X40035GIG	879.00	43	X40032GIG	439.00	18	X4003FEGIG	1693.00

#### 3-Phase, 4-Wire

480 Volts or Less

X4004	1240.00	79	X40045	744.00	40	X40042	372.00	17	X4004FE	1429.00
X4004G	1409.00	84	X40045G	845.00	43	X40042G	422.00	18	X4004FEG	1617.00
X4004IG	1466.00	89	X40045IG	879.00	45	X40042IG	439.00	19	X4004FEIG	1635.00
X4004GIG	1578.00	94	X40045GIG	947.00	48	X40042GIG	473.00	20	X4004FEGIG	1823.00

① Plug-in sections do not include outlet covers.

Plug-in outlet covers are available as an option.

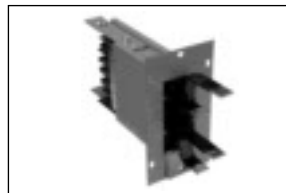
Catalog number XOC. List price \$12.00 each.

② 100A XJ-L Aluminum sections are no longer available. However, 100A Copper sections are fully compatible with existing Aluminum busway.

③ 100% Internal Ground bus included.

④ 100% Isolated Ground bus included.

⑤ 60% Internal Ground bus included.



**Hangers:** Two hangers are furnished No Charge with each 10' straight section. One hanger is furnished No Charge with each 2' and 5' straight section, and elbows.

**Additional Hangers:** Catalog Number XH2 — \$34.50 each.

# Busway Power Distribution

## XJ-L™ Plug-In Busway

Selection

Busway Accessories — Complete Devices							
90° Elbows <sup>①</sup>		End Closers		End Tap Box		Center Tap Box <sup>②</sup>	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

### 100 Ampere Busway — Copper Conductors<sup>②</sup>

#### 3-Phase, 3-Wire

600 Volts or Less

XC1003L	381.00	XE100	77.00	XC1003ETVB	858.00	—	—
XC1003LG <sup>③</sup>	426.00	XE100	77.00	XC1003ETVBG	964.00	—	—
XC1003LIG <sup>④</sup>	434.00	XE100	77.00	XC1003ETVBIG	950.00	—	—
XC1003LGIG <sup>③④</sup>	492.00	XE100	77.00	XC1003ETVBGIG	1072.00	—	—

#### 3-Phase, 4-Wire

600 Volts or Less

XC1004L	430.00	XE100	77.00	XC1004ETVB	934.00	—	—
XC1004LG <sup>③</sup>	449.00	XE100	77.00	XC1004ETVBG	1042.00	—	—
XC1004LIG <sup>④</sup>	458.00	XE100	77.00	XC1004ETVBIG	1056.00	—	—
XC1004LGIG <sup>③④</sup>	516.00	XE100	77.00	XC1004ETVBGIG	1149.00	—	—

### 225 Ampere Busway — Copper Conductors

#### 3-Phase, 3-Wire

600 Volts or Less

X2003L	949.00	XE200	86.00	X2003ETVB	1164.00	X2003M	1242.00
X2003LG <sup>⑤</sup>	1000.00	XE200	86.00	X2003ETVBG	1333.00	X2003MG <sup>⑤</sup>	1267.00
X2003LIG <sup>⑥</sup>	1025.00	XE200	86.00	X2003ETVBIG	1349.00	X2003MIG <sup>④</sup>	1267.00
X2003LGIG <sup>④⑤</sup>	1153.00	XE200	86.00	X2003ETVBGIG	1517.00	X2003MGIG <sup>④⑤</sup>	1292.00

#### 3-Phase, 4-Wire

480 Volts or Less

X2004L	975.00	XE200	86.00	X2004ETVB	1271.00	X2004M	1254.00
X2004LG <sup>⑤</sup>	1050.00	XE200	86.00	X2004ETVBG	1409.00	X2004MG <sup>⑤</sup>	1254.00
X2004LIG <sup>⑥</sup>	1216.00	XE200	86.00	X2004ETVBIG	1455.00	X2004MIG <sup>④</sup>	1280.00
X2004LGIG <sup>④⑤</sup>	1368.00	XE200	86.00	X2004ETVBGIG	1609.00	X2004MGIG <sup>④⑤</sup>	1305.00

### 400 Ampere Busway — Copper Conductors

#### 3-Phase, 3-Wire

600 Volts or Less

X4003L	1281.00	XE400	89.00	X4003ETVB	1673.00	X4003M	1675.00
X4003LG <sup>⑤</sup>	1351.00	XE400	89.00	X4003ETVBG	1916.00	X4003MG <sup>⑤</sup>	1843.00
X4003LIG <sup>⑥</sup>	1384.00	XE400	89.00	X4003ETVBIG	1938.00	X4003MIG <sup>④</sup>	1934.00
X4003LGIG <sup>④⑤</sup>	1556.00	XE400	89.00	X4003ETVBGIG	2180.00	X4003MGIG <sup>④⑤</sup>	2178.00

#### 3-Phase, 4-Wire

480 Volts or Less

X4004L	1410.00	XE400	89.00	X4004ETVB	1841.00	X4004M	1843.00
X4004LG <sup>⑤</sup>	1479.00	XE400	89.00	X4004ETVBG	2083.00	X4004MG <sup>⑤</sup>	2027.00
X4004LIG <sup>⑥</sup>	1513.00	XE400	89.00	X4004ETVBIG	2106.00	X4004MIG <sup>④</sup>	2128.00
X4004LGIG <sup>④⑤</sup>	1684.00	XE400	89.00	X4004ETVBGIG	2348.00	X4004MGIG <sup>④⑤</sup>	2396.00



<sup>①</sup> Elbows:

Catalog Numbers as listed above are not complete. A1, 2, 3 or 4 suffix denoting configuration is required. Example: Catalog Number X1003L2 is an edgewise right hand elbow. Number Identification (1)=Flatwise Right Hand, (2)=Edgewise Right Hand, (3)=Flatwise Left Hand, (4)=Edgewise Left Hand. Flatwise and Edgewise refer to busway casing or housing for XJ-L style busway.

- ⑥ 100A XJ-L Aluminum sections are no longer available. However, 100A Copper sections are fully compatible with existing Aluminum busway.
- ⑦ 100% Internal Ground bus included.
- ⑧ 100% Isolated Ground bus included.
- ⑨ 60% Internal Ground bus included.
- ⑩ Isolated ground kit for tap box W68113 — \$46.00 each.

<sup>②</sup> Center Tap Boxes are built on to a 2' straight section. Catalog number X2004MG — Rated 400 Amps. Center tap box for 100 amp use 200 AMP Plug-In Tap Box.

- ③ Must use X2003MIG.
- ④ Must use X2003MGIG.
- ⑤ Must use X2004MIG.
- ⑥ Must use X2004MGIG.

**Note:** Wall and Floor Flanges: a two piece 14 gauge steel collar which fits around busway housing. Flanges can be field assembled on busway prior to or after busway installed. Wall or Floor Flange Catalog Number — WF1 for X100 and WF2 for X200 — \$81.00 each. Packaged 5 per carton.

### Plug-In Tap Boxes or Feed-Ins<sup>④</sup>

Catalog Number	List Price \$	Catalog Number	List Price \$
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#### 3-Phase, 3-Wire

600 Volts or Less

X103PB	242.00	X2003PB	616.00
X103PBG	301.00	X2003PBG	823.00
X103PBIG	305.00	⑧	—
X103PBGIG	358.00	⑨	—

#### 3-Phase, 4-Wire

480 Volts or Less

X104PB	346.00	X2004PB	646.00
X104PBG	401.00	X2004PBG	925.00
X104PBIG	411.00	⑩	—
X104PBGIG	464.00	⑪	—

# Busway Power Distribution

## BD® Plug-In (225 — 1600 Ampere)

Selection

225–1600 Amperes

Ampere Rating	Plug In <sup>①</sup> 10'-0" Straight Length Catalog Number	Case Dimensions (inches)	Shipping Weight Lb./Ft.	10'-0" Straight Length <sup>②</sup> List Price \$	Ground Bus Adder Suffix GK <sup>③</sup> List Price Per Foot \$	90° Elbow Prefix		Switch-Board Connection <sup>④</sup> Prefix	List Price \$	Building Expansion Fitting	
						④⑤ Catalog Number	List Price \$			Catalog Number	List Price \$

### Copper

#### 3-Phase, 3-Wire

600V or Less

225	BDP302	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	9	1584.00	66.	LDP302	1520.00	FEP302	1052.00	EJP302	3333.00
400	BDP304	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	2395.00	66.	LDP304	1761.00	FEP304	1216.00	EJP304	4372.00
600	BDP306	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>2</sub>	3067.00	69.	LDP306	1963.00	FEP306	1635.00	EJP306	5171.00
800	BDP308	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	18 <sup>1</sup> / <sub>2</sub>	4486.00	69.	LDP308	2394.00	FEP308	1977.00	EJP308	7299.00
1000	BDP310	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	22	4854.00	69.	LDP310	2584.00	FEP310	2230.00	EJP310	7896.00
1350	BDP313	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	28	7338.00	98.	LDP313	3573.00	FEP313	2940.00	EJP313	10341.00
1600	BDP316	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	29	7819.00	140.	LDP316	3712.00	FEP316	3004.00	EJP316	11343.00

#### 3-Phase, 4-Wire — Full Capacity Neutral

480V or Less

225	BDP4024	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	12	2053.00	66.	LDP4024	1875.00	FEP4024	1191.00	EJP4024	4081.00
400	BDP4044	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>2</sub>	3459.00	66.	LDP4044	2293.00	FEP4044	1483.00	EJP4044	5677.00
600	BDP4064	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>2</sub>	3929.00	69.	LDP4064	2432.00	FEP4064	1837.00	EJP4064	6451.00
800	BDP4084	8 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	28	5729.00	69.	LDP4084	3167.00	FEP4084	2294.00	EJP4084	8694.00
1000	BDP4104	8 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>	32	6704.00	69.	LDP4104	3459.00	FEP4104	2420.00	EJP4104	10139.00

### Aluminum to Copper Cross Reference

Ampere Rating	Plug In <sup>①</sup> 10'-0" Straight Length Catalog Number	Case Dimensions (inches)
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Ampere Rating	Plug In <sup>①</sup> 10'-0" Straight Length Catalog Number	Case Dimensions (inches)
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### "M" Rating / Standard Rating Conversion Table

1000/A Square Inch "M" Rating	Standard 55°C Rating BDP
225	—
400	600
600	800
800	800
1000	1000
1200	—
1350	1350
1600	1600
2000	—
2500	—
3000	—
4000	—

### Aluminum

#### 3-Phase, 3-Wire

225	ABD302	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
400	ABD304	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
600	ABD306	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
800	ABD308	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1000	ABD310	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1200	ABD312	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>

#### 3-Phase, 4-Wire — Full Capacity Neutral

225	ABD4024	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
400	ABD4044	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
600	ABD4064	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
800	ABD4084	8 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1000	ABD4104	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1200	ABD4124	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>

### Copper

#### 3-Phase, 3-Wire

225	BDP302	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
400	BDP304	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
600	BDP306	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
800	BDP308	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1000	BDP310	6 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1350	BDP313	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1600	BDP316	12 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>

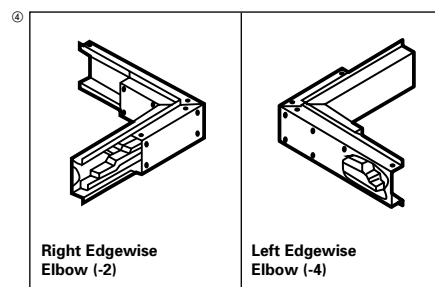
#### 3-Phase, 4-Wire — Full Capacity Neutral

225	BDP4024	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
400	BDP4044	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
600	BDP4064	4 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
800	BDP4084	8 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>
1000	BDP4104	8 <sup>1</sup> / <sub>16</sub> x 8 <sup>1</sup> / <sub>8</sub>



For inches / millimeters conversion, see Application Data Section.

- ① Consult local sales office for five foot length.
- ② List prices are for standard construction, for higher short circuit ratings add an "H" after the "D" or "P" (ABDH302 or BDPH302) and add 20% to the list price. Consult sales office for ratings.
- ③ "GK" is an internal ground bus. For any other ground configuration, consult local sales office. List price is per foot. Please use following footage for fittings:
  - Elbow - 3'
  - SWB - 1'
  - End Cable Tap Box - 1'
  - Center Cable Tap Box - 10'
  - Building Expansion - 10'



Suffix	Description	Appropriate suffix must be added to Elbow Catalog Number to order.
-1	Right Flatwise	
-2	Right Edgewise	
-3	Left Flatwise	
-4	Left Edgewise	

④ Switchboard stub includes flange to cover cutout in top of indoor switchboard and 6" of bus inside switchboard. Connecting hardware supplied by switchboard manufacturer.

# Busway Power Distribution

## BD® Plug-In (225 — 1600 Ampere)

**Selection**

225–1600 Amperes

Cable Tap Box				End Closure		Hangers <sup>③</sup>	
End <sup>①</sup> Catalog Number	List Price \$	Center <sup>②</sup> Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$

Copper

**3-Phase, 3-Wire**

**600V or Less**

ETB302	1927.00	CTB302	2813.00	ECP6	156.00	BDH10	63.00
ETB304	2319.00	CTB304	3612.00	ECP6	156.00	BDH10	63.00
ETB306	3409.00	CTB306	4614.00	ECP6			
ETB308	3447.00	CTB308	6058.00	ECP10	158.00	BDH10	63.00
ETB310	3472.00	CTB310	6388.00	ECP10			
ETB313	3497.00	CTB313	9391.00	ECA10	163.00	BDH12	65.00
ETB316	3524.00	CTB316	9872.00	ECA10			

**3-Phase, 4-Wire — Full Capacity Neutral**

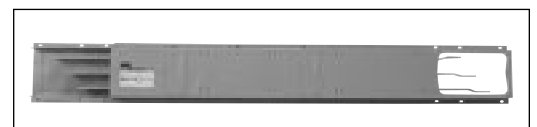
**480V or Less**

ETB4024	2155.00	CTB4024	3282.00	ECP6	156.00	BDH10	63.00
ETB4044	2598.00	CTB4044	4677.00	ECP6	156.00	BDH10	63.00
ETB4064	3802.00	CTB4064	5462.00	ECP6			
ETB4084	3992.00	CTB4084	7274.00	ECA8	164.00	BDH12	65.00
ETB4104	4042.00	CTB4104	8238.00	ECA8			
Rod-Hanger Adapter (optional) .....						UJ100	12.70 each

**14**  
BUSWAY  
SYSTEMS

① Includes busway stub. Total length added to run is 2' for 225A and 400A aluminum or 225A–600A copper; 3' for all others. Box is designed to connect to offset bus-bar ends. When it is to be connected to straight bus-bar ends, adapter will be furnished upon request.  
② Must be factory-assembled to busway. Complete device includes 10' busway.

③ Two hangers included free of charge with each busway section, elbow, tee and cross.



# Busway Power Distribution

## XL-U® Aluminum (225–5000 Ampere)

Selection

225–5000 Amperes / 600 Volts or Less  
Non-Ventilated 225–600 Amperes

Busway Catalog Number				List Price Per Foot \$ <sup>①</sup>			Accessory Charge \$								
Ampere Rating	Basic Catalog Number	Case Dimensions (inches)	Shipping Weight Lb./Ft.	Feeder Busway Suffix F	Plug-In Busway Suffix P	Ground Bus Adder Suffix G	90° <sup>②</sup> Elbow Suffix L	Tee Suffix T	Cross Suffix X	Switch-Board Connection <sup>③</sup> Suffix S	Transformer Throat	Transformer Tap 1-3 Phase	Transformer Tap 3-1 Phase	Roof Flange	

### 3-Pole

225	UH302AB	4½ x 10	8	134.	134.	47.									
400	UH304AB	4½ x 10	9	167.	167.	47.									
600	UH306AB	5½ x 10	10	208.	208.	52.	1076.	1280.	1533.	747.	747.	747.	—	—	—

### 4-Pole Full Neutral

225	UH502AB	4½ x 10	8	157.	157.	45.									
400	UH504AB	4½ x 10	9	195.	195.	45.									
600	UH506AB	5½ x 10	10	264.	264.	48.	1201.	1416.	1487.	844.	844.	844.	—	—	—

Note: For non-ventilated 225-600A busway with insulated bus bars add 15%.

## Ventilated 800–5000 Amperes With Ground Bus

Busway Sections Complete				List Price Per Foot \$ <sup>①</sup>			Accessory Charge \$								
Ampere Rating <sup>④</sup>		Basic Catalog Number	Case Dimensions (inches)	Shipping Weight Lb./Ft.	Feeder Busway Suffix F	Plug-In Busway Suffix P	Outdoor Feeder Suffix W	90° <sup>②</sup> Elbow Suffix L	Tee Suffix T	Cross Suffix X	Switch Board Connection <sup>③</sup> Suffix S	Transformer <sup>⑤</sup> Throat	Transformer Tap 1-3 Phase	Transformer Tap 3-1 Phase	Roof Flange
Edge-wise	Flat-wise														

### 3-Pole

800	800	UH308AV	4½ x 10	10	297.	311.	357.									
1000	800	UH310AV	4½ x 10	11	335.	349.	403.	1128.	1368.	1558.	785.	6679.	1444.	3599.	2585.	
1200	1000	UH312AV	5½ x 10	12	459.	472.	549.									
1350	1200	UH313AV	5½ x 10	13	525.	540.	630.	1533.	1938.	2268.	1065.	9048.	1951.	4879.	3510.	
1600	1350	UH316AV	7½ x 10	16	646.	659.	773.									
2000	1600	UH320AV	7½ x 10	19	773.	785.	924.	1533.	1938.	2268.	1065.	9048.	1951.	4879.		
2500	2000	UH325AV	9½ x 10	23	950.	962.	1141.	1533.	1938.	2268.	1065.	9048.	1951.	4879.	3510.	
3000	3000	UH330AV	7½ x 20%	32	1076.	1090.	1292.	1938.	2281.	2395.	1356.	11406.	2458.	6159.	4423.	
4000	3500	UH340AV	9½ x 20%	41	1482.	1495.	1774.	1938.	2281.	2395.	1356.	11406.	2458.	6159.	4423.	
5000	4000	UH350AV	9½ x 20%	45	1964.	1976.	2357.	1938.	2281.	2395.	1356.	11406.	2458.	6159.		

### 4-Pole Full Neutral

800	800	UH508AV	4½ x 10	11	351.	365.	421.	1648.	1648.	1964.	962.	6944.	1533.	3662.	2585.
1000	800	UH510AV	4½ x 10	12	440.	453.	527.	1648.	1648.	1964.	962.	6944.	1533.	3662.	
1200	1000	UH512AV	5½ x 10	14	552.	566.	659.								3510.
1350	1200	UH513AV	5½ x 10	15	634.	646.	760.	2256.	2256.	2698.	1318.	7489.	2155.	4638.	
1600	1350	UH516AV	7½ x 10	18	760.	773.	899.								
2000	1600	UH520AV	7½ x 10	21	950.	962.	1141.	2256.	2256.	2698.	1318.	8453.	2559.	5589.	
2500	2000	UH525AV	9½ x 10	26	1153.	1166.	1381.	2256.	2256.	2698.	1318.	9580.	3523.	7693.	3510.
3000	3000	UH530AV	7½ x 20%	35	1343.	1356.	1610.	2698.	2698.	3218.	1583.	9580.	4169.	7693.	4423.
4000	3500	UH540AV	9½ x 20%	47	1799.	1812.	2166.								
5000	4000	UH550AV	9½ x 20%	52	2737.	2750.	3282.	2698.	2698.	3218.	1583.	13712.	4169.	9618.	4423.

For inches / millimeters conversion, see Application Data Section.

Note: To form complete catalog number, use basic catalog number and substitute suffix of required item. Example: Basic busway Catalog Number U316AV—accessory switchboard stub with ground bus U316AVSG.

To price complete device, add the following feeder busway footage to the labor charges shown:

XL-U Elbow 2' XLU-EXP Section 4'  
XL-U Tee 3' XL-U SWBD Stub 1'  
XL-U Cross 4' XL-U Reducer 4'

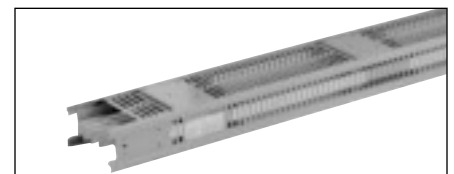
① List prices are for standard construction for higher short circuit rating add an "HH" after the "U" (UHH302ABP) and add 45% to the list price. Consult sales office for available ratings.

② For elbows other than 90°, accessory charge is doubled.

③ Switchboard stub includes flange to cover cutout in top of indoor switchboard and 8" of bus inside switchboard. Connecting hardware supplied by switchboard manufacturer.

④ Ventilated XL-U busway has two ratings; see above for edgewise or flatwise mounting. XL-U also comes in nonventilated housing; consult local sales office.

⑤ Transformer throat connection includes gasketed box sized to match throat plus flexible straps and bolts. No Busway footage is included. For connection to transformers not manufactured by Siemens, consult factory.



# Busway Power Distribution

## XL-U® Aluminum (225–5000 Ampere)

Selection

225–5000 Amperes / 600 Volts or Less  
Non-Ventilated 225–600 Amperes

Ampere Rating	Accessory Charge \$			Complete Device Price \$											
	Non <sup>①</sup> Fusible Reducer	Fusible <sup>①</sup> Reducer	Expansion Section Suffix J	Tap Box <sup>②</sup>		Wall Flange <sup>③</sup>		Floor Support		End Closure		Draft Barrier	Weather Stop	Hangers <sup>④</sup>	
				End Suffix B	Center Suffix M	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			Catalog Number	List Price \$

### 3-Pole

225	—	—	1888.	1330.	1292.	UF145	226.00	UFS145	422.00	UE145	—	422.	849.	UH145	—
400	747.	3054.	2142.	1989.	1292.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	849.	UH145	65.00
600	785.	3472.	2332.	2839.	1292.	UF145	226.00	UFS145	422.00	UE155	293.00	422.	849.	UH155	65.00

### 4-Pole Full Neutral

225	—	—	1888.	1545.	1507.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	1051.	UH145	65.00
400	747.	3054.	2142.	1723.	1507.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	1051.	UH145	65.00
600	785.	3472.	2332.	1825.	1507.	UF145	226.00	UFS145	422.00	UE155	293.00	422.	1051.	UH155	65.00

Ventilated 800–5000 Amperes with Ground Bus

Ampere Rating Edge-wise	Accessory Charge \$			Complete Device Price \$											
	Non <sup>①</sup> Fusible Reducer	Fusible <sup>①</sup> Reducer	Expansion Section Suffix J	Tap Box <sup>②</sup>		Wall Flange <sup>③</sup>		Floor Support		End Closure		Draft Barrier	Weather Stop	Hangers <sup>④</sup>	
				End Suffix B	Center Suffix M	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			Catalog Number	List Price \$

### 3-Pole

800	1051.	4410.	3142.	3054.	1356.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	899.	UH145	65.00
1000	1051.	4410.	3142.	3054.	1356.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	899.	UH145	65.00
1200	1419.	5957.	4257.	4131.	1761.	UF155	226.00	UFS145	422.00	UE155	293.00	422.	899.	UH155	65.00
1350	1419.	5957.	4257.	4131.	1761.	UF155	226.00	UFS145	422.00	UE155	293.00	422.	899.	UH155	65.00
1600	1419.	5957.	4257.	4131.	1761.	UF175	323.00	UFS179	506.00	UE175	715.00	506.	1305.	UH175	80.00
2000	1419.	5957.	4257.	4131.	1761.	UF175	323.00	UFS179	506.00	UE175	715.00	506.	1305.	UH175	80.00
2500	1419.	5957.	4257.	4473.	1761.	UF195	323.00	UFS179	506.00	UE175	715.00	506.	1305.	UH195	80.00
3000	1787.	7514.	5374.	4613.	5969.	UF275	1103.00	UFS279	709.00	UE275	1147.00	709.	1711.	UH275	96.00
4000	1787.	7514.	5374.	4854.	6235.	UF295	1103.00	UFS279	709.00	UE295	1147.00	709.	1711.	UH295	96.00
5000	1787.	7514.	5374.	4854.	6235.	UF295	1103.00	UFS279	709.00	UE295	1147.00	709.	1711.	UH295	96.00

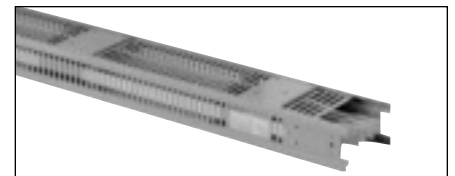
### 4-Pole Full Neutral

800	1204.	5069.	3611.	3472.	1610.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	1153.	UH145	65.00
1000	1204.	5069.	3611.	3472.	1610.	UF145	226.00	UFS145	422.00	UE145	293.00	422.	1153.	UH145	65.00
1200	1635.	6843.	4892.	4537.	2128.	UF155	226.00	UFS145	422.00	UE155	293.00	422.	1153.	UH155	65.00
1350	1635.	6843.	4892.	4537.	2128.	UF155	226.00	UFS145	422.00	UE155	293.00	422.	1153.	UH155	65.00
1600	1635.	6843.	4892.	4537.	2128.	UF175	323.00	UFS179	506.00	UE175	715.00	506.	1673.	UH175	80.00
2000	1635.	6843.	4892.	4537.	2128.	UF175	323.00	UFS179	506.00	UE175	715.00	506.	1673.	UH175	80.00
2500	2052.	6843.	4892.	5424.	2128.	UF195	323.00	UFS179	506.00	UE195	715.00	506.	1673.	UH195	80.00
3000	2052.	8643.	5424.	5766.	7350.	UF275	1103.00	UFS279	709.00	UE275	1147.00	709.	2052.	UH275	96.00
4000	2052.	8643.	6184.	6045.	7629.	UF295	1103.00	UFS279	709.00	UE295	1147.00	709.	2052.	UH295	96.00
5000	2052.	8643.	6184.	6045.	7629.	UF295	1103.00	UFS279	709.00	UE295	1147.00	709.	2052.	UH295	96.00

For inches / millimeters conversion, see Application Data Section.

- ① For reducer, consult page 14-2 (J). On fusible reducers no fuses are supplied.
- ② Tap boxes furnished with standard screw-type mechanical lugs. For compression lugs add 30% to list price.

- ③ Floor and ceiling flanges are ordered by description. Price the same as wall flanges.
- ④ For rod-hanger adapter UJ100 see page 14-51.



# Busway Power Distribution

## XL-U® Copper (225–6500 Amperes)

Selection

225–6500 Amperes / 600 Volts or Less  
Non-Ventilated 225–600 Amperes

Busway Catalog Number				List Price Per Foot \$ <sup>①</sup>			Accessory Charge \$								
Ampere Rating	Basic Catalog Number	Case Dimensions (inches)	Shipping Weight Lb./Ft.	Feeder Busway Suffix F	Plug-In Busway Suffix P	Ground Bus Adder Suffix G	90° <sup>②</sup> Elbow Suffix L	Tee Suffix T	Cross Suffix X	Switch Board Connection <sup>③</sup> Suffix S	Transformer Throat	Transformer Tap 1-3 Phase	Transformer Tap 3-1 Phase	Roof Flange	
225	UH302CB	4½ x 10	8	166.	166.	72.	—	—	—	747.	—	—	—	—	
400	UH304CB		12	248.	248.	72.	1076.	1280.	1533.	899.	—	—	—	—	
600	UH306CB		13	327.	327.	74.	—	—	—	1051.	—	—	—	—	

### 4-Pole Full Neutral

225	UH502CB	4½ x 10	9	227.	227.	72.	—	—	—	899.	—	—	—	—
400	UH504CB		13	370.	370.	72.	1280.	1533.	1787.	1076.	—	—	—	—
600	UH506CB		15	424.	424.	74.	—	—	—	1254.	—	—	—	—

### Ventilated 800–6500 Amperes With Ground Bus

Busway Sections Complete				List Price Per Foot \$ <sup>①⑥</sup>			Accessory Charge \$								
Ampere Rating <sup>④</sup>		Basic <sup>⑤</sup> Catalog Number	Case Dimensions (inches)	Shipping Weight Lb./Ft.	Feeder Busway Suffix F	Plug-In Busway Suffix P	Outdoor Feeder Suffix W	90° <sup>②</sup> Elbow Suffix L	Tee Suffix T	Cross Suffix X	Switch Board Connection <sup>③</sup> Suffix S	Transformer Throat <sup>⑤</sup>	Transformer Tap 1-3 Phase	Transformer Tap 3-1 Phase	Roof Flange
Edge-wise	Flat-wise														

### 3-Pole

800	800	UH308CV	4½ x 10	12	490.	504.	587.	1128.	1368.	1558.	1166.	6679.	1444.	3599.	2585.
1000	1000	UH310CV	4½ x 10	15	510.	524.	612.	1128.	1368.	1558.	1166.	6679.	1444.	3599.	2585.
1200	1000	UH312CV	4½ x 10	16	684.	697.	811.	1128.	1368.	1558.	1166.	6679.	1444.	3599.	2585.
1350	1200	UH313CV	4½ x 10	19	798.	811.	962.	1128.	1368.	1558.	1166.	6679.	1444.	3599.	2585.
1600	1350	UH316CV	5½ x 10	23	899.	912.	1076.	1533.	1850.	2117.	1571.	9048.	1951.	4879.	3510.
2000	1600	UH320CV	5½ x 10	26	1153.	1166.	1381.	1533.	1850.	2117.	1571.	9048.	1951.	4879.	3510.
2500	2000	UH325CV	7½ x 10	34	1457.	1482.	1761.	1533.	1850.	2117.	1571.	9048.	1951.	4879.	3510.
3000	2500	UH330CV	9½ x 10	41	1596.	1610.	1913.	1533.	1850.	2117.	1571.	9048.	1951.	4879.	3510.
4000	4000	UH340CV	7½ x 20%	57	2294.	2306.	2750.	1938.	2332.	2662.	1976.	11406.	2458.	6159.	4423.
5000	4500	UH350CV	7½ x 20%	70	2763.	2775.	3320.	1938.	2332.	2662.	1976.	11406.	2458.	6159.	4423.
6000	5000	UH360CV	9½ x 20%	85	3320.	3346.	3992.	1938.	2332.	2662.	1976.	11406.	2458.	6159.	4423.
6500	5500	UH365CV	9½ x 20%	98	3485.	3497.	4182.	1938.	2332.	2662.	1976.	11406.	2458.	6159.	4423.

### 4-Pole Full Neutral

800	800	UH508CV	4½ x 10	14	646.	659.	1153.	1381.	1673.	1901.	1419.	6944.	1520.	3662.	2585.
1000	1000	UH510CV	4½ x 10	18	735.	747.	887.	1381.	1673.	1901.	1419.	6944.	1520.	3662.	2585.
1200	1000	UH512CV	4½ x 10	19	899.	912.	1076.	1381.	1673.	1901.	1419.	6944.	1520.	3662.	2585.
1350	1200	UH513CV	4½ x 10	23	1013.	1038.	1229.	1381.	1673.	1901.	1419.	6944.	1520.	3662.	2585.
1600	1350	UH516CV	5½ x 10	28	1229.	1242.	1469.	1888.	2281.	2559.	1938.	7489.	2155.	4638.	3510.
2000	1600	UH520CV	5½ x 10	30	1482.	1495.	1774.	1888.	2281.	2559.	1938.	7489.	2155.	4638.	3510.
2500	2000	UH525CV	7½ x 10	42	1799.	1812.	2166.	1888.	2281.	2559.	1938.	7489.	2155.	4638.	3510.
3000	2500	UH530CV	7½ x 10	61	2319.	2332.	2788.	1888.	2281.	2559.	1938.	7489.	2155.	4638.	3510.
4000	4000	UH540CV	7½ x 20%	70	2990.	3003.	3586.	2268.	2737.	3041.	2319.	13712.	3523.	7693.	4423.
5000	4500	UH550CV	7½ x 20%	86	3624.	3637.	4347.	2268.	2737.	3041.	2319.	13712.	3523.	7693.	4423.
6000	5000	UH560CV	9½ x 20%	105	4436.	4448.	5322.	2268.	2737.	3041.	2319.	13712.	4169.	9618.	4423.
6500	5500	UH565CV	9½ x 20%	122	4790.	4802.	5740.	2268.	2737.	3041.	2319.	13712.	4169.	9618.	4423.

### "M" Rating / Standard Rating Conversion Table

1000/A Square Inch "M" Rating	Standard 55°C Rating XL-U
225	—
400	—
600	800
800	1200
1000	1350
1200	1600
1350	2000
1600	2500
2000	2500
2500	3000
3000	4000
4000	5000

Note: To form complete catalog number, use basic catalog number and substitute suffix of required item.

Example: Basic busway Catalog Number U316CV—accessory switchboard stub with ground bus U316CVSG.

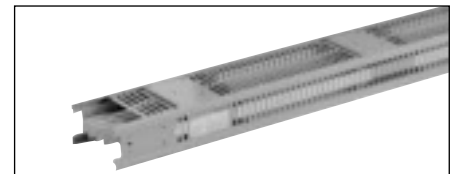
To price complete device, add the following feeder busway footage to the labor charges shown:

XL-U Elbow 2' XLU-EXP Section 4'  
XL-U Tee 3' XL-U SWBD Stub 1'  
XL-U Cross 4' XL-U Reducer 4'

① List prices are for standard construction for higher short circuit rating add an "HH" after the "U" (UHH302CBP and add 45% to the list price. Consult sales office for available ratings.

② For elbows other than 90°, accessory charge is doubled.

③ Switchboard stub includes flange to cover cutout in top of indoor switchboard and 8" of bus inside switchboard. Connecting hardware supplied by switchboard manufacturer.



④ Ventilated XL-U busway has two ratings; see above for edgewise or flatwise mounting. XL-U also comes in nonventilated housing; consult local sales office.

⑤ Transformer throat connection includes gasketed box sized to match throat plus flexible straps and bolts. No Busway footage is included. For connection to transformers not manufactured by Siemens, consult factory.

⑥ Ventilated busway has aluminum ground bus as standard. For copper ground bus multiply footage price by 1.05.



# Busway Systems

## XL-U® Copper (225–6500 Amperes)

Selection

225–6500 Amperes / 600 Volts or Less

Non-Ventilated 225–600 Amperes

Ampere Rating	Accessory Charge \$			Complete Device Price \$											
	Non <sup>①</sup> Fusible Reducer	Fusible <sup>①</sup> Reducer	Expansion Section Suffix J	Tap Box <sup>②</sup>		Wall Flange <sup>③</sup>		Floor Support		End Closure		Draft Barrier	Weather Stop	Hangers <sup>④</sup>	
				End Suffix B	Center Suffix M	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			Catalog Number	List Price \$

### 3-Pole

225	—	—	1850.	1381.	1267.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	823.	UH145	65.00
400	735.	3003.	2103.	2078.	1267.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	823.	UH145	65.00
600	735.	3003.	2103.	2965.	1267.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	823.	UH145	65.00

### 4-Pole Full Neutral

225	—	—	2205.	1698.	1482.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1038.	UH145	65.00
400	874.	3573.	2509.	1863.	1482.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1038.	UH145	65.00
600	874.	3573.	2509.	2002.	1482.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1038.	UH145	65.00

Ventilated 800–6500 Amperes with Ground Bus

Ampere Rating	Accessory Charge \$			Complete Device Price \$												
	Edge-wise 	Non <sup>①</sup> Fusible Reducer	Fusible <sup>①</sup> Reducer	Expansion Section Suffix J	Tap Box <sup>②</sup>		Wall Flange <sup>③</sup>		Floor Support		End Closure		Draft Barrier	Weather Stop	Hangers <sup>④</sup>	
					End Suffix B	Center Suffix M	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$			Catalog Number	List Price \$

### 3-Pole

800	1026.	4322.	3092.	3180.	1330.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	887.	UH145	65.00
1000	1026.	4322.	3092.	3180.	1330.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	887.	UH145	65.00
1200	1026.	4322.	3092.	4245.	1330.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	887.	UH145	65.00
1350	1026.	4322.	3092.	4245.	1330.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	887.	UH145	65.00
1600	1394.	5854.	4182.	4423.	1723.	UF155	226.00	UFS145	422.00	UE155	293.00	414.	887.	UH155	65.00
2000	1394.	5854.	4182.	4423.	1723.	UF155	226.00	UFS145	422.00	UE155	293.00	414.	887.	UH155	65.00
2500	1394.	5854.	4182.	4423.	1723.	UF175	323.00	UFS179	506.00	UE175	715.00	496.	1280.	UH175	80.00
3000	1394.	5854.	4182.	4423.	1723.	UF195	323.00	UFS179	506.00	UE195	715.00	496.	1280.	UH195	80.00
4000	1761.	7388.	5271.	4701.	6679.	UF275	1103.00	UFS279	709.00	UE275	1147.00	697.	1685.	UH275	96.00
5000	1761.	7388.	5271.	4701.	6679.	UF275	1103.00	UFS275	709.00	UE275	1147.00	697.	1685.	UH275	96.00
6000	1761.	7388.	5271.	4701.	6679.	UF295	1103.00	UFS279	709.00	UE295	1147.00	697.	1685.	UH295	96.00
6500	1761.	7388.	5271.	4701.	6679.	UF295	1103.00	UFS279	709.00	UE295	1147.00	697.	1685.	UH295	96.00

800	1178.	4968.	3548.	3662.	1571.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1128.	UH145	65.00
1000	1178.	4968.	3548.	3662.	1571.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1128.	UH145	65.00
1200	1178.	4968.	3548.	3662.	1571.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1128.	UH145	65.00
1350	1178.	4968.	3548.	3662.	1571.	UF145	226.00	UFS145	422.00	UE145	293.00	414.	1128.	UH145	65.00
1600	1596.	6729.	4815.	5082.	2090.	UF155	226.00	UFS145	422.00	UE155	293.00	414.	1128.	UH155	65.00
2000	1596.	6729.	4815.	5082.	2090.	UF155	226.00	UFS145	422.00	UE155	293.00	414.	1128.	UH155	65.00
2500	1596.	6729.	4815.	5082.	2090.	UF175	226.00	UFS179	506.00	UE175	715.00	496.	1648.	UH175	80.00
3000	1596.	6729.	4815.	5082.	2090.	UF195	226.00	UFS179	506.00	UE195	715.00	496.	1648.	UH195	80.00
4000	2027.	8491.	6058.	7034.	9353.	UF275	1103.00	UFS279	709.00	UE275	1147.00	697.	2014.	UH275	96.00
5000	2027.	8491.	6058.	7034.	9353.	UF275	1103.00	UFS279	709.00	UE275	1147.00	697.	2014.	UH275	96.00
6000	2027.	8491.	6058.	7034.	9353.	UF295	1103.00	UFS279	709.00	UE295	1147.00	1026.	2014.	UH295	96.00
6500	2027.	8491.	6058.	7034.	9353.	UF295	1103.00	UFS279	709.00	UE295	1147.00	1026.	2014.	UH295	96.00

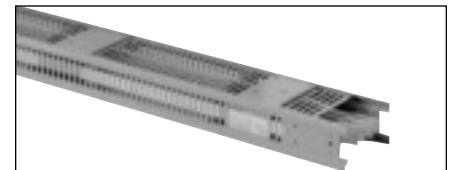
For inches / millimeters conversion, see Application Data Section.

① For reducer, consult page 14-2 (J). On fusible reducers no fuses are supplied.

② Tap boxes furnished with standard screw-type mechanical lugs. For compression lugs add 30% to list price.

③ Floor and ceiling flanges are ordered by description. Price the same as wall flanges.

④ For rod-hanger adapter UJ100 see page 14-51.



# Busway Power Distribution

## XJ-L™ Plug-In Units

Selection



Circuit Breaker Enclosure XQ45



Circuit Breaker Bus Plug  
(Receptacles and covers  
supplied by installer)  
XQ45R



Circuit Breaker Bus Plug  
Front-operable  
XEC4100

### XQ Circuit Breaker Enclosures

#### Front Operable

Breaker Type	AC Volts	Breaker Ampere Rating	Enclosures Only ①②③④⑤			
			3-Phase, 3-Wire		3-Phase, 4-Wire	
			Catalog Number	List Price \$	Catalog Number	List Price \$
QP and BQ	120/240	15-50	XQ35	184.00	XQ45	198.00
		15-50	XQ35R	264.00	XQ45R	288.00

#### Circuit Breaker Bus Plugs ②⑤ — Front Operable

Breaker Type	AC Volts	Breaker Ampere Rating	Operable Through Cover							
			3-Phase, 3-Wire				3-Phase, 4-Wire			
			Enclosure Only				Enclosure Only			
			Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
ED2	240	15-50 60-100	XEC3100	408.00	XEC3100IG	461.00	XEC4100	517.00	XEC4100IG	570.00
ED4	480	15-50 60-100								

#### Circuit Breaker Plugs ⑥ — Floor Operable

Breaker Type	AC Volts	Breaker Ampere Rating	3-Phase, 3-Wire		3-Phase, 4-Wire	
			Enclosure Only		Enclosure Only	
			Catalog Number	List Price \$	Catalog Number	List Price \$
ED2	240	15-50	XLEC3100	649.00	XLEC4100	794.00
		60-100				
ED4	480	15-50				
		60-100				
ED6	600	15-50				
		60-100				

#### Fusible Vacu-Break Switch Plugs ⑥⑦⑧

##### Floor Operable

Volts	Ampere Rating	3-Pole		4-Pole	
		Catalog Number	List Price \$	Catalog Number	List Price \$
240	30	XLVB321	706.00	XLVB421N	880.00
	60	XLVB322	775.00	XLVB422N	902.00
	100	XLVB323	1181.00	XLVB423N	1320.00
600	30	XLVB351	775.00	XLVB451N	915.00
	60	XLVB352	845.00	XLVB452N	949.00
	100	XLVB353	1203.00	XLVB453N	1355.00

For inches / millimeters conversion, see Application Data Section.

- ① XEQH floor-operating handle with "ON-OFF" labels, \$44.50 each. Designed for 2 or 3-pole breakers only. Standard package 10 per carton.
- ② Ground kit for bonded ground Catalog Number W62890. List price \$56.00.
- ③ Ground kit for isolated ground Catalog Number W68101. List price \$59.00.
- ④ XQ plug designed for 1, 2 or 3-pole breakers use.
- ⑤ Enclosures available from stock. For factory installed breakers, add enclosure and breaker prices together and add 20% to the total. When ordering circuit breaker bus plugs complete with breaker, factory-installed, allow time for assembly and SPECIFY enclosure frame size, phase and ampere rating.  
Example: One XEC3100—ED2—3P—70A—factory-assembled.

- ⑥ "On-Off" bus plug, pressure-sensitive labels, W47185: \$6.20 per pair.
- ⑦ Ground kit bonded ground Catalog Number W62891. List price \$56.00.
- ⑧ W63810 required when used on "XL" busway list price \$16.20.
- ⑨ Breaker cover for XQ Bus Plugs, XQBRKCVR: List Price \$57.00.

# Busway Power Distribution

## XL-X®, XL-U®, BD® Plug-In Units

Selection

### Circuit Breaker Plugs

#### Floor Operable

Breaker Type	AC Volts	Ampere Rating	3-Phase, 3-Wire					3-Phase, 4-Wire				
			Enclosure Only <sup>②</sup>					Enclosure Only <sup>②</sup>				
			Catalog Number <sup>②</sup> XL-X	Catalog Number <sup>②</sup> XL-U	List Price \$	Catalog Number BD Plug-In <sup>①②③</sup>	List Price \$	Catalog Number <sup>②</sup> XL-X	Catalog Number <sup>②</sup> XL-U	List Price \$	Catalog Number BD Plug-In <sup>①②③④</sup>	List Price \$
ED2	240	15-60 70-100	REC3100G	UEC3100G	833.00	BEC3100	671.00	REC4100G	UEC4100G	995.00	BEC4100	822.00
ED4	480	15-60 70-100										
ED6	600	15-60 70-100										
FD6, FXD	600	70-250	RFC3250G	UFC3250G	1748.00	BFC3250	1562.00	RFC4250G	UFC4250G	2025.00	BFC4250	1828.00
JXD6	600	200-400	RJC3400G	UJC3400G	4270.00	BJC3400	4039.00	RJC4400G	UJC4400G	4758.00	BJC4400	4886.00
JXD2	240	200-400										
JD6	600	200-400										
LXD6	600	450-600 <sup>③</sup>	RLC3600G	ULC3600G	4514.00	BLC3600	4191.00	RLC4600G	ULC4600G	5058.00	BLC4600	4990.00
LD6	600	250-600 <sup>③</sup>	RMC3800G	UMC3800G	5266.00	BMC3800	5012.00	RMC4800G	UMC4800G	5994.00	BMC4800	5792.00
MD6	600	400-600 <sup>③</sup> 700-800 <sup>③</sup>										

### I-T-E Fusible Vacu-Break® Switch Plugs Floor-Operable with Line Terminal Protection

Volts	Ampere Rating	3-Phase, 3-Wire							3-Phase, 4-Wire						
		Horsepower Ratings		Catalog		Catalog Number		Catalog Number	Horsepower Ratings, AC		Catalog Number		Catalog Number	Catalog Number	
		Standard (NEC)	Maximum (Time Delay)	XL-X	XL-U	List Price \$	BD <sup>②</sup> Plug-In <sup>①③</sup>	List Price \$	Standard (NEC)	Maximum (Time Delay)	XL-X	XL-U	List Price \$	BD <sup>②</sup> Plug-In <sup>①③</sup>	List Price \$
250 AC or 250 DC	30	3	7½	RV321G	UV321G	873.00	BOS14321	763.00	3	7½	RV421G	UV421G	1017.00	BOS16421	937.00
	60	7½	15	RV322G	UV322G	950.00	BOS14322	822.00	7½	15	RV422G	UV422G	1040.00	BOS16422	961.00
	100	15	30	RV323G	UV323G	1376.00	BOS14323	1251.00	15	30	RV423G	UV423G	1510.00	BOS16423	1389.00
600 AC	200	25	60	RV324G	UV324G	2225.00	BOS14324	2118.00	25	60	RV424G	UV424G	2539.00	BOS16424	2431.00
	400	50	125	RV325G	UV325G	5569.00	BOS14325	5486.00	50	125	RV425G	UV425G	6240.00	BOS16425	6437.00
	600 <sup>④</sup>	75	200	RV326G	UV326G	8051.00	BOS14326	7604.00	75	200	RV426G	UV426G	8230.00	BOS16426	8463.00
600 AC	30	7½	20	RV361G	UV361G	950.00	BOS14351	822.00	5	15	RV461G	UV461G	1063.00	BOS16451	971.00
	60	15	50	RV362G	UV362G	1017.00	BOS14352	891.00	15	30	RV462G	UV462G	1096.00	BOS16452	1007.00
	100	30	75	RV363G	UV363G	1398.00	BOS14353	1274.00	25	60	RV463G	UV463G	1554.00	BOS16453	1424.00
600 AC	200	60	150	RV364G	UV364G	2359.00	BOS14354	2246.00	50	125	RV464G	UV464G	2605.00	BOS16454	2500.00
	400	125	350	RV365G	UV365G	5938.00	BOS14355	5856.00	100	150	RV465G	UV465G	6397.00	BOS16455	6599.00
	600 <sup>④</sup>	125	350	RV365SG	UV365SG	5938.00	—	—	100	150	RV465SG	UV465SG	6397.00	—	—
600 <sup>④</sup>	200	500	RV366G	UV366G	7996.00	BOS14356	7662.00	150	400	RV466G	UV466G	8287.00	BOS16456	8521.00	

### Fuse Adapter Kits — RV and UV 240V AC/250V DC

Amperage	Class "J"		Class "T"		Class "R"	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
30	②	—	②	—	W56626	72.00
60	②	—	②	—	W56628	91.00
100	②	—	TFAK32	76.00	W55365	61.00
200	②	—	TFAK42	102.00	W55366	61.00
400	②	—	TFAK52	102.00	W55367	91.00
600	W49813	459.00	TFAK62	120.00	W55368	91.00

### 600V

30	②	—	②	—	W56627	101.00
60	②	—	②	—	W56629	85.00
100	②	—	TFAK35	120.00	W55365	61.00
200	②	—	TFAK45	143.00	W55366	61.00
400	②	—	TFAK55	151.00	W55367	91.00
600	W49813	459.00	TFAK65	174.00	W55368	91.00

### Field Addable Ground Kits for BD Bus Plugs

#### Fusible

Ampere Rating	Catalog Number	List Price \$
30-60	W63231	109.00
100	W63232	154.00
200	W63233	154.00
400	W63234	173.00
600	W63234	173.00

#### Circuit Breaker

BEC	W63553	173.00
BFC	W63554	173.00
BJC	W63238	263.00
BLC	W63238	263.00
BMC	W73534	168.00

Note: These are for use on busway with internal ground bus manufactured after March, 1986. For ground kits prior to this date, consult local sales office.

### Fuse Adapter Kits — BOS 240V AC/250V DC

Amperage	Class "J"		Class "T"		Class "R"	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
30	②	—	②	—	W56626	72.00
60	②	—	②	—	W56628	91.00
100	W49827	131.00	TFAK32	76.00	W55365	61.00
200	W49819	131.00	TFAK42	102.00	W55366	61.00
400	W49814	330.00	TFAK52	102.00	W55367	91.00
600	W49813	459.00	TFAK62	120.00	W55368	91.00

### 600V

30	W49832	163.00	②	—	W56627	101.00
60	W49830	163.00	②	—	W56629	85.00
100	W49828	131.00	TFAK35	120.00	W55365	61.00
200	W49818	163.00	TFAK45	143.00	W55366	61.00
400	W49816	395.00	TFAK55	151.00	W55367	91.00
600	W49815	330.00	TFAK65	174.00	W55368	91.00

① Grounding Finger — See table.

② Enclosures available from stock. For factory installed breakers, add enclosure and breaker prices together and add 20% to the total. When ordering circuit breaker bus plugs complete with breaker, factory-installed, allow time for assembly and SPECIFY enclosure frame size, phase and ampere rating.  
Example: One UEC3100—ED4—3P—70A—factory assembled

③ Bus plugs 400A and smaller require one plug-in opening. 600-800A require two plug-in openings.

④ To order 400A fusible plug with increased wire space, add "S" to the catalog number.  
Example: UV365SG, UV465SG.

⑤ Channel Spacers — Must be used with bus plugs mounted on 600, 800, or 1000 ampere ABD busway or on 800 or 1000 ampere BDP busway. Catalog Number W37940 list price \$8.90

⑥ When BD busway capacity exceeds 400A for aluminum or 600A for copper, capacity must be specified to obtain proper number and arrangement of neutral fingers.

⑦ Not required.

# Busway Power Distribution

## XL-X®, XL-U® and BD® Plug-In Units

Selection

### Shipping Weights — Pounds

#### For Circuit Breaker Bus Plugs Only

Breaker Type	Ampere Rating	3-Phase, 3-Wire				3-Phase, 4-Wire			
		Enclosure Only		Complete Assembly		Enclosure Only		Complete Assembly	
		XL-U XL-X	BD, LO-X	XL-U XL-X	BD, LO-X	XL-U XL-X	BD, LO-X	XL-U XL-X	BD, LO-X
ED2, ED4, ED6	15-100	12	14	13	9	13	15	14	10
FD6	70-250	1	27	51	37	45	28	55	38
JXD6	200-400	90	35	102	57	95	36	107	58
JXD2	200-400	90	35	102	57	95	36	107	58
JD6	200-400	95	39	117	61	100	40	122	62
LXD6	450-600	140	39	175	691	147	40	182	62
LD6	450-600	140	39	175	61	147	40	182	62
MD6	400-800	140	79	175	114	147	80	182	115

### Shipping Weights — Pounds

#### For Fusible Switch Bus Plugs Only

Switch Ampere Rating	3-Phase, 3-Wire		3-Phase, 4-Wire	
	XL-X XL-U	BD, LO-X	XL-X XL-U	BD, LO-X
	Prefix RV UV	Prefix BOS	Prefix RV UV	Prefix BOS
30,60	17	15	19	12
100	17	18	19	18
200	36	34	38	36
400	165	111	160	112
600	165	111	170	112

### Special Bus Plugs

Description	Catalog Number			List Price \$
	XL-U	XL-X	BD, LO-X	
Ground Detector and Potentializer— For 2 or 3-pole 240 and 480 Volt service.	UPGR314G	RPGR314G	PGR6314	1137.00

### Accessories

Description	Catalog Number	List Price \$
Channel Spacers—Must be used with Bus Plugs or Plug-in Branch-Run Adapters mounted on 600-, 800- or 1000-ampere ABD Busway or on 800- or 1000-ampere BDP Busway. 4 per package	W37940	8.90
"ON-OFF" Bus Plug Stickers — Pressure sensitive, per pair.	W47185	6.20

### BD Bus Plug Catalog Number Reference

Catalog Number	ABD4 Busway						BDP4 Busway							
	225 ABD402	400 ABD404	600 ABD406	800 ABD408	1000 ABD410	1200 ABD412	225 BDP402	400 BDP404	600 BDP406	800 BDP408	1000 BDP410	1350 BDP413	1600 BDP416	
BJC44001	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BJC44002	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BJC4400G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BJC4400G2	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BFC46001	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BFC46002	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	
BFC4600G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BFC4600G2	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	
BMC48001	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BMC48002	—	—	—	✓	—	—	—	—	—	✓	✓	—	—	
BMC4800G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BMC4800G2	—	—	—	✓	—	—	—	—	—	✓	✓	—	—	
BOS164251	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS164252	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BOS16425G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS16425G2	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BOS164261	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS164262	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	
BOS16426G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS16426G2	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	
BOS164551	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS164552	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BOS16455G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS16455G2	—	✓	—	✓	—	—	—	✓	✓	✓	✓	—	—	
BOS164561	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS164562	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	
BOS16456G1	—	—	✓	—	✓	✓	—	—	—	—	—	✓	✓	
BOS16456G2	—	—	—	✓	—	—	—	—	✓	✓	✓	—	—	

# Busway Power Distribution

## XL-X®, XL-U®, BD® Cubicles

Selection

Cubicles<sup>①</sup>

### Molded Case Circuit Breakers (For Use With All Types of Busway)

Breaker Type	Ampere Rating	List Price \$ — With Breaker	
		3-Phase 600V AC	3-Phase, 4-Wire 120/280V AC 277/480V AC

#### ET Heavy Duty

JD6	200–400	13433.	14093.
MD6	400–600 700–800	22939. 23496.	24092. 24675.
PD6	800	26867.	28135.
	1000	29097.	30543.
	1200	34129.	35840.
	1400	37488.	39364.
	1600	38045.	39947.
RD6	1800	43634.	45826.
	2000	44763.	46993.

#### Current-Limiting

CJD6	150–225	19947.	20948.
	250–400	22939.	24079.
CLD6	450–600	38895.	40833.
CMD6	400–800	39895.	41885.
CPD6	800	40884.	42937.
	1000	44877.	47120.
	1200	51860.	54457.
	1400	53051.	55712.
	1600	53849.	56548.
CRD6	1800	56447.	59273.
	2000	56840.	59692.

Note: Additional molded case circuit breakers not listed may be used.  
Consult local sales office for availability.

#### Fusible Switch — Vacu-Break®

Ampere Rating	3-Phase, 3-Wire				3-Phase, 4-Wire			
	250 Volts AC		600 Volts AC		120/208 Volts AC		277/480 Volts AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
200	FC3022	8351.00	FC3025	9010.00	FC4022	9809.00	FC4025	10594.00
400	FC3042	9593.00	FC3045	10367.00	FC4042	11280.00	FC4045	12179.00
600	FC3062	11266.00	FC3065	12166.00	FC4062	13243.00	FC4065	14295.00
800	—	—	FC3085	19200.00	—	—	FC4085	22558.00
1200	—	—	FC3125	23370.00	—	—	FC4125	27464.00

#### Power Circuit Breaker

Breaker Frame Size <sup>②</sup>	Maximum Ampere Rating	AC Interrupting Capacity Symmetrical (RMS) Amperes			List Price \$ With Breaker	
		240 Volt	480 Volt	600 Volt	3-Phase, 3-Wire	3-Phase, 4-Wire

#### Type RL

RL-800	800	30,000	30,000	30,000	39541.	43495.
RL-1600	1600	50,000	50,000	50,000	69210.	76130.
RL-2000	2000	65,000	65,000	65,000	75534.	83086.
RL-3200	3200	65,000	65,000	65,000	158190.	174007.
RL-4000	4000	85,000	85,000	85,000	237286.	261011.

#### Type RLF (Fused)

RL-800	800	200,000	200,000	200,000	57347.	63075.
RL-3200	3200	200,000	200,000	200,000	197731.	217502.
RL-4000	4000	200,000	200,000	200,000	276827.	304506.

#### Bolted Pressure Switches

Ampere Rating	480 Volts AC		600 Volts AC	
	3-Pole	4-Pole	3-Pole	4-Pole
800	28613.	29185.	30330.	30901.
1200	32905.	33562.	34878.	35538.
1600	35765.	36481.	37912.	38627.
2000	42919.	43777.	45493.	46352.
2500	51504.	52532.	54593.	55624.
3000	65809.	67126.	69758.	71073.
4000	94422.	96311.	100087.	101975.

No fuses supplied with fusible cubicles.

- ① Cubicle pricing includes labor and material for:
1. Single cubicle frame section complete with required busway openings.
  2. Circuit breaker or fusible switch.
  3. Mounting of circuit breaker or fusible switch and line-side connections.

Figure busway footage through cubicle to compensate for load-size connections.

For other options, consult local sales office.

② For electrically operated, specify control voltage.

# Busway Mobile Industrial Power

## Industrial Trol-E Duct®

2 and 3-Pole  
100/150 Amperes<sup>①</sup>  
600 Volt AC, 250 Volt DC

### Standard Duty TD310

Description	Catalog Number	List Price \$	Ship. Weight (lbs.)
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### Standard Straight Busway Sections

2-pole, 10 foot	TD210	1001.00	40
3-pole, 10 foot	TD310	1128.00	40

### Drop-Out Sections

2-pole, 10 foot	TD210R	1204.00	45
2-pole, 10 foot — sectionalizing	TD210RS	1432.00	45
3-pole, 10 foot	TD310R	1357.00	45
3-pole, 10 foot — sectionalizing	TD310RS	1614.00	45

### Busless Busway And Drop-Out Sections

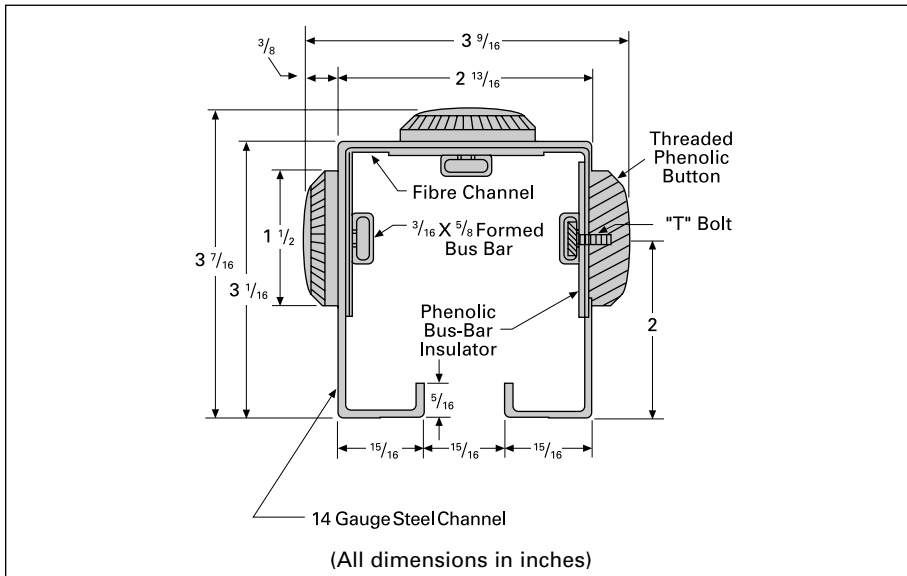
10 foot busway	TD010	800.80	36
10 foot drop-out	TD010R	963.20	36

### Accessories (Complete Assemblies)

Hanger — 2 and 3-pole	TDH3	79.00	4
Intermediate Hanger	TRH31	43.00	1
End Plate	TRB23	53.00	¾
Feed-In Adapter — 2 and 3-pole	TDF3	150.00	4
Insulated Ramp Ends (pair)	—	510.00	—

### Replacement Parts

Cover for standard hanger (contains 10 pieces)	W43771	70.00	5
Hanger with cover (see TDH3)	—	—	4
Bus Connector (contains 12 pieces)	W43101	132.00	½
Feed-In Connector (top) (contains 2 pieces)	W43100	53.00	1
Feed-In Connector (side) (contains 4 pieces)	W43099	130.00	1



For inches / millimeters conversion, see Application Data Section.

① Busway rating is 100A continuous and 150A intermittent.

**Note:** All busway sections, regardless of length, include:  
1 hanger, 1 hanger cover, 1 set of bus connectors.  
Recommended loads not to exceed 25 pounds.  
UL listed.

## Selection / Dimensions

### General

#### Straight Duct Sections Less Than 10 Feet

For each straight busway section less than 10 feet long:

1. Use base price of **\$228.** list to cover special construction.
2. Take list price of standard 10-foot section of type required and prorate for footage price, figuring fractions to the next larger number of even feet, as shown below:

#### Example:

Required: 4 feet of 3-pole Trol-E-Duct, 100/150 ampere type.  
Base price to cover special construction . . . . . **\$228.**  
Footage price (**\$112.00/foot**) prorated from TD310 . . . . . **\$448.**  
List price for 4 feet of 3-pole extra footage . . . . . **\$676.**

#### Special Curved Duct Sections

Curved busway sections should be figured on basis of **\$120.** list per linear foot, plus **\$2090.** set-up and engineering charge for each curved section. Any change of direction constitutes a curve and should be priced as above.

#### Exceptions:

1. On a circle, 2 set-up charges will apply.
2. When 2 or more identical curves are required on a job, apply only one set-up charge to each group of identical curves.

**To find the linear footage** of special curves of any number of degrees and any radius, use the formula shown below:

$$2R \times 3.1416 \times \frac{D}{360} = L$$

R = Radius in feet      D = Degrees of curve

L = Length of curve

#### Example:

Required: The length of a 75° curve with a radius of 5½ feet.

$$2 \times 5.5 \times 3.1416 \times \frac{75}{360} = 7.199 \text{ feet}$$

Fractions are figured to the next larger number of even feet, as price is always based on full linear feet.

#### Flared Ends

List price for each flared end on any straight or curved busway section **\$476.**

Special feed-in (required for busway sections with two flared ends) . . . **\$234.**

# Busway Mobile Industrial Power

## Industrial Trol-E Duct® / Trolleys, Tool Hangers

Selection / Dimensions

2 and 3-Pole Non-Fusible  
600V AC and 250V DC

Trolley Type	Number of Poles	Maximum Amperes	Minimum Radius (feet)	Catalog Number	List Price \$	Ship. Weight (lbs.)
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### Trolleys Only

Standard	2	30	5	T131	399.00	4
Standard	3	30	5	T331	406.00	4
Curve	2	60	3	T134	716.00	5
Curve	3	60	3	T334	805.00	5
Heavy Duty	2	60	5	TR1311 <sup>①</sup>	478.00	4
Heavy Duty	3	60	5	TR3311 <sup>①</sup>	530.00	4
Roller	2	20	5	TR1312	364.00	4
Roller	3	20	5	TR3312	406.00	4
Transfer	2	30	2	T25	1241.00	7
Transfer	3	30	2	T35	1308.00	7
Button	2	60	5	T132	649.00	5
Button	3	60	5	T332	659.00	5

### Trolleys Box Hangers<sup>②</sup>

Plain	—	—	—	TPTH	223.00	5
Tool	—	—	—	TBTH	292.00	6

### Box Tool Hanger With SAF To Fuse Unit<sup>②</sup>

30A 240V AC 250V DC	TBTH302F	455.00	7
30A 600V AC	TBTH306F	760.00	8

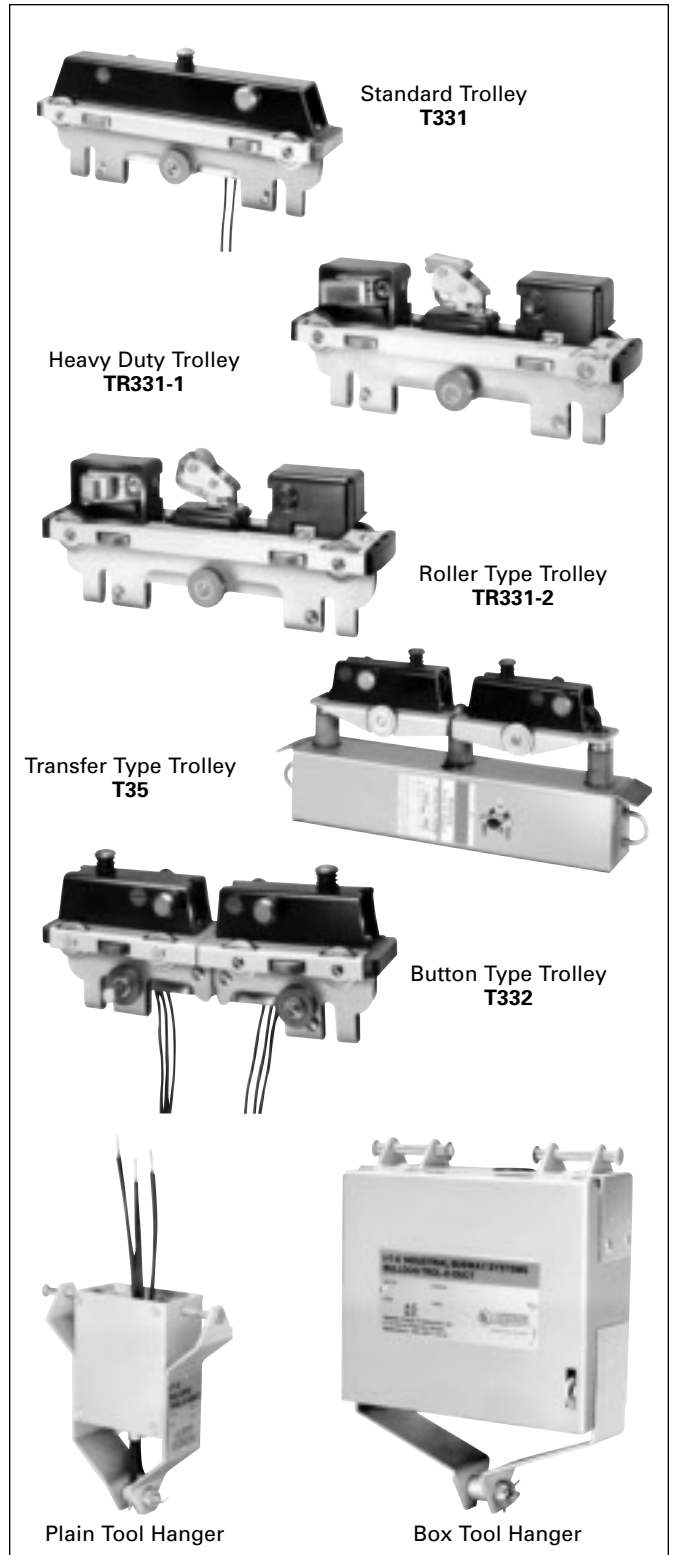
### Box Tool Hanger With Receptacle<sup>②</sup>

20A 240V AC 250V DC	TBTH202R	628.00	7
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### Cleaning Trolleys

Abrasive	3	—	5	ACT331	705.00	4
Brush	3	—	5	BCT331	705.00	4

**Note:** When trolleys are used with auxiliary equipment that has a lower rating, the rating of the auxiliary device will govern the rating of the trolley. For example: heavy-duty trolleys (maximum 60A) used with box tool hangers having SAFtoFUSE units are limited by the fuse size to a rating of 30A. Also, trolleys used with box tool hangers having receptacles are limited by the receptacles' rating to a rating of 20A, 480V AC or 250V DC.



<sup>①</sup> For 90A heavy duty trolleys, 2 or 3-pole, add \$102. to list price above.

<sup>②</sup> Plain and box tool hangers are not designed for use with curve or transfer type trolleys. They are for assembly only on standard, heavy-duty, roller or button trolleys.

# Busway Mobile Industrial Power

## Industrial Trol-E Duct®

Selection / Dimensions

4-Pole  
100/150 Amperes<sup>①</sup>  
480 Volt AC, 250 Volt DC

### Standard Duty TD410

Description	Catalog Number	List Price \$	Ship. Weight (lbs.)
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### Standard Straight Busway Sections

4-pole, 10 foot	TD410	②	44
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### Drop-Out Sections

4-pole, 10 foot	TD410R	②	49
4-pole, 10 foot — sectionalized	TD410RS	②	49

### Busway Accessories (Complete Assemblies)

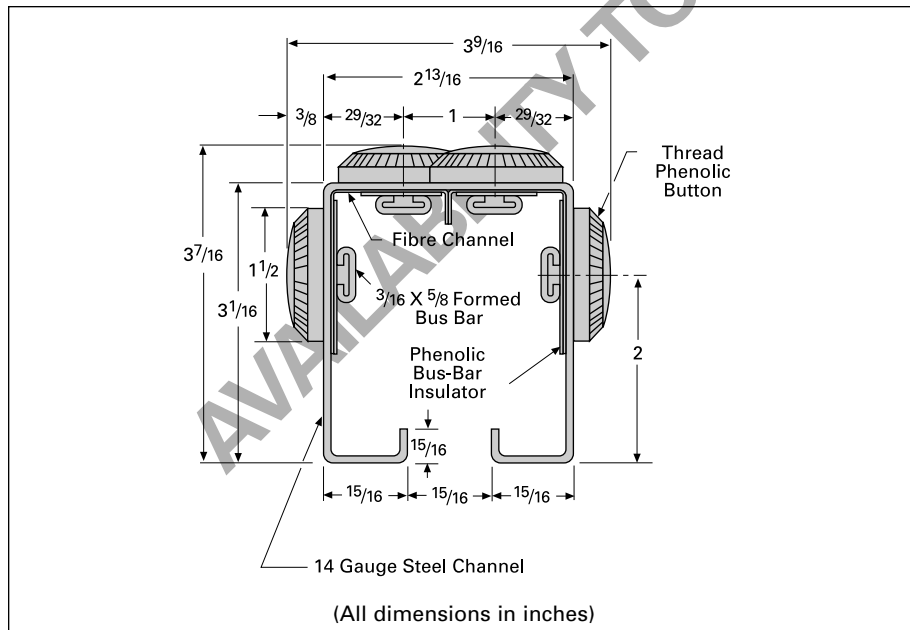
Hanger — 4-pole	TDH4	②	4½
Intermediate Hanger	TRH31	②	1
End Plate	TRB23	②	¾
Feed-In Adapter — 4-pole	TDF4	②	4½
Insulated Ramp Ends (pair)	—	②	—

### 4-Pole Trolley

30A 4-pole Button Trolley	T431	②	4
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### Replacement Parts

Cover for standard hanger (contains 10 pieces)	W43771	②	5
Hanger with cover (see TDH4)	—	②	4
Bus Connector (contains 12 pieces)	W43101	②	½
Feed-In Connector (top) (contains 2 pieces)	W43100	②	1
Feed-In Connector (side) (contains 4 pieces)	W43099	②	1



For inches / millimeters conversion, see Application Data Section.

① Busway rating is 100A continuous and 150A intermittent.  
② See Electronic Pricing.

Note: All busway sections, regardless of length, include: 1 hanger, 1 hanger cover, 1 set of bus connectors. Recommended loads not to exceed 25 pounds. UL listed.



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# TIASTAR™ Motor Control Center

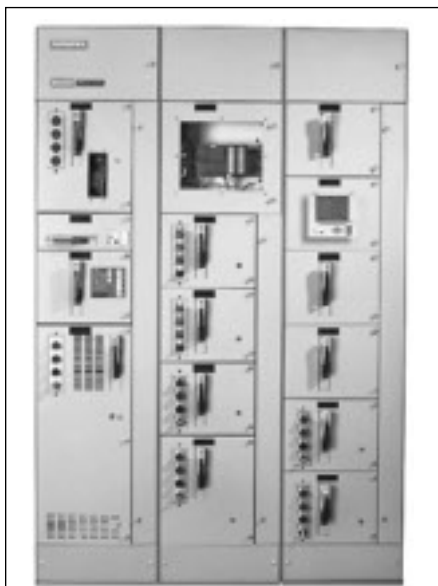
## Overview of TIASTAR

Siemens Energy & Automation introduces the TIASTAR (tie-star) Motor Control Center to meet the growing needs of our consumers. The TIASTAR MCC enhancements have been created from listening to our customers and offering a wider selection of options.

Providing the best of Siemens' proven motor control centers (MCCs), System 89 and Model 95+, TIASTAR is designed to be the industry's leading value.

From its sturdy metal cabinet to the best-of-breed Siemens technology within, TIASTAR has no equal. Siemens' TIASTAR MCC with PROFIBUS-DP communications combines heavy-duty industrial construction and user friendly features to deliver detailed diagnostics and control by communicating between MCC units and a PLC or DCS. Unlike other manufacturers' network offerings, Siemens' offering is non-proprietary and is designed to simplify, not complicate, your life. So whatever you need, you can rest assured that your TIASTAR MCC can meet your needs.

While we think Siemens' TIASTAR MCC is a wise investment, it is important for you to know that advanced capabilities can be added any time during the life of the product. Siemens doesn't think you should pay for pre-wiring or design features that don't have an immediate payback.



TIASTAR Motor Control Center

## General Features and Benefits

The most effective means for grouping low voltage motor starters, associated control and distribution equipment is through the use of motor control centers. Siemens MCCs allow grouping this equipment in a common sheet steel enclosure. All 36" motor starter units (through NEMA Size 5 for FVNR) and all feeder disconnects through 250 amperes can be mounted with drawout construction.

All devices within the MCC are powered from a common horizontal bus and three phase vertical bus located in each section. Once installed in its centralized operating plant location, manual supervision and monitoring can be performed safely, and remote supervision can be provided through the Siemens ACCESS™ data communication system.

### Domestic Design Standards

The following are the principal domestic standards which apply to motor control center design, testing, construction and application. The TIASTAR Motor Control Center complies fully with the latest version of all these standards.

#### NEMA

- AB-1 Molded Case Circuit Breakers
- ICS 1 General Standards for Industrial Control
- ICS 2 Standard for Industrial Control Devices, Controllers and Assemblies
- ICS 18 Standard for Motor Control Centers

#### UL

- 845 Motor Control Centers
- 508 Industrial Control Equipment
- 891 Switchboard Design
- 94 Test for Flammability of Plastic Materials for Parts, Devices, and Appliances
- 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures
- 991 Tests for Safety-related Controls Employing Solid-state Devices

#### NFPA – National Fire Protection Association

- 70 National Electrical Code

#### IEEE

- IEEE-STD-693-1997, IEEE Recommended Design Practice for Seismic Design of Substations

## Product Overview

### Construction Details

Siemens TIASTAR Motor Control Centers are composed of a number of vertical sections bolted together. That allows for future addition of MCC vertical units so the equipment can expand with customer needs. The standards structure is 90 in. (2286 mm) high, plus a 1.125 in. (29 mm) high channel sill. Front-only structures can be either 15 in. (381 mm) or 20 in. (508 mm) deep. Back-to-back mounted structures are 30 in. (762 mm) or 40 in. (1016 mm) deep, and consist of two horizontal and vertical buses. This allows for correct bus phasing on the front or rear. Siemens provides a 21 in. back-to-back design, consisting of a common horizontal and vertical bus structure, for applications where available footprint is limited.

### UL Listed Starters

Siemens offers a wide range of UL Listing for the industry – from NEMA Size 0 through 6, including reduced voltage, two-speed, wye-delta and part-winding type starters.

### Drives and Soft Starts

Siemens VFD (variable frequency drives) and RVSS (reduce voltage solid state starters) are available in our MCC. The range for VFD is fractional hp to 300 hp-VT and 1hp to 600 hp for RVSS. These applications are designed to meet the robust industrial environment and are cost effective for today's market.

### Power Monitoring

Siemens line of power meters provides market leading technology for power quality measurement. These products continually change to meet growing needs for power quality and energy monitoring. Siemens TIASTAR MCCs are fully capable of installing any of Siemens power meters for your needs. Please review the full line of Siemens power meters at [www.sea.siemens.com](http://www.sea.siemens.com).

### Overload Protection

Siemens understands customer needs vary from motor to motor. That is why we offer 4 lines of overload protection. For basic needs you can specify bi-metal ambient compensated overloads. If single phase is a concern our customers can specify ESP100, and for the most advanced motor protection, customers can consider SIMOCODE overloads that provide detailed information and control.

### ESP100 Solid State Overloads

ESP100 solid state overload relays are self powered, requiring no separate 120V source to power the circuit board. They provide phase loss protection, fewer connection points and high repeat trip accuracy which results in longer motor life and cost savings. NEMA Class 10, 20 and 30 trip curves are available for a variety of applications.

The ESP100 solid state overload provides phase loss protection for the motor by tripping within three seconds upon complete loss of one phase of a three phase motor branch circuit.

Each overload has at least a 2:1 current adjustment range with the adjustment dial reading out in full load amps. In addition to the markings on the dial there are audible clicks which allow for extremely fine tuning.

The heaterless construction of these overloads minimizes energy costs and the costs of cabinet ventilation or cooling. Solid state overloads can be used at temperatures from -30°C to +70°C and are rated for 50Hz and 60Hz applications.

ESP100 panel mounted overloads can be used to upgrade existing starter applications where panel mounted thermal overloads are used. In addition, ESP100 overloads can be panel mounted when used with other types of controllers, such as DP, IEC contactors, and soft starts.

ESP100 overloads can be used on high voltage applications, making them ideal for use with vacuum contactors and other high voltage control.

ESP100 overloads can be retrofitted on existing contactors using the retrofit plate suffixes or on other brands using the plates listed in the competitive retrofit plates table on page 16-48.



ESP100 Solid State Overload

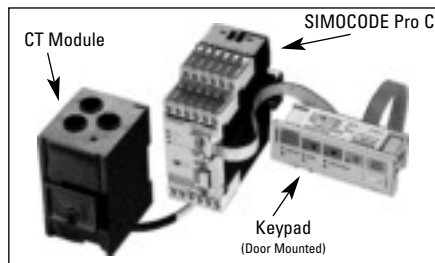
### SIMOCODE Pro

SIMOCODE Pro is the latest generation of Motor Management System ("Smart Overload") bringing a new level of flexibility and functionality within the Siemens smart motor control center. By means of a PROFIBUS DP interface, it can easily be linked to higher-level automation systems. SIMOCODE Pro implements all motor protection and control functions, determines operational, diagnostic and statistical data and organizes the communication between the automation system and MCC bucket.

The SIMOCODE Pro consists of two device series with different levels of functionality:

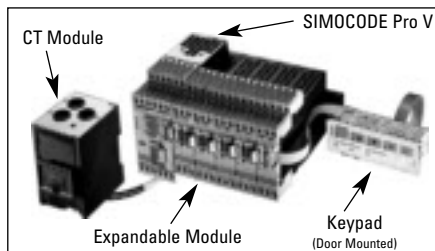
#### SIMOCODE Pro C (Compact)

The compact motor management system can be used for Full Voltage Non-reversing (FVNR) starters, Full Voltage Reversing (FVR) starters, and base overload functionality.



#### SIMOCODE Pro V (Variable)

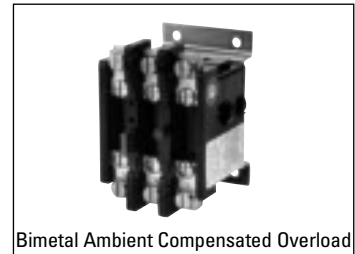
The variable motor management system has an even greater range of functions, including voltage and power monitoring and expandable modules for additional I/O, as well as temperature and ground fault protection.



**Note:** For detailed information on the SIMODE Pro please contact the local Siemens Sales Office.

### Thermal Overloads Bimetal Ambient Compensated

Bimetal ambient compensated overload relays protect both the motor and equipment by opening the control circuit when the motor experiences an overload condition. The bimetal overload relay may be set for either manual or automatic reset and can be supplied with standard Class 20 heater elements or optional Class 10 heater elements as required. An ambient compensated model of the bimetal overload is available.

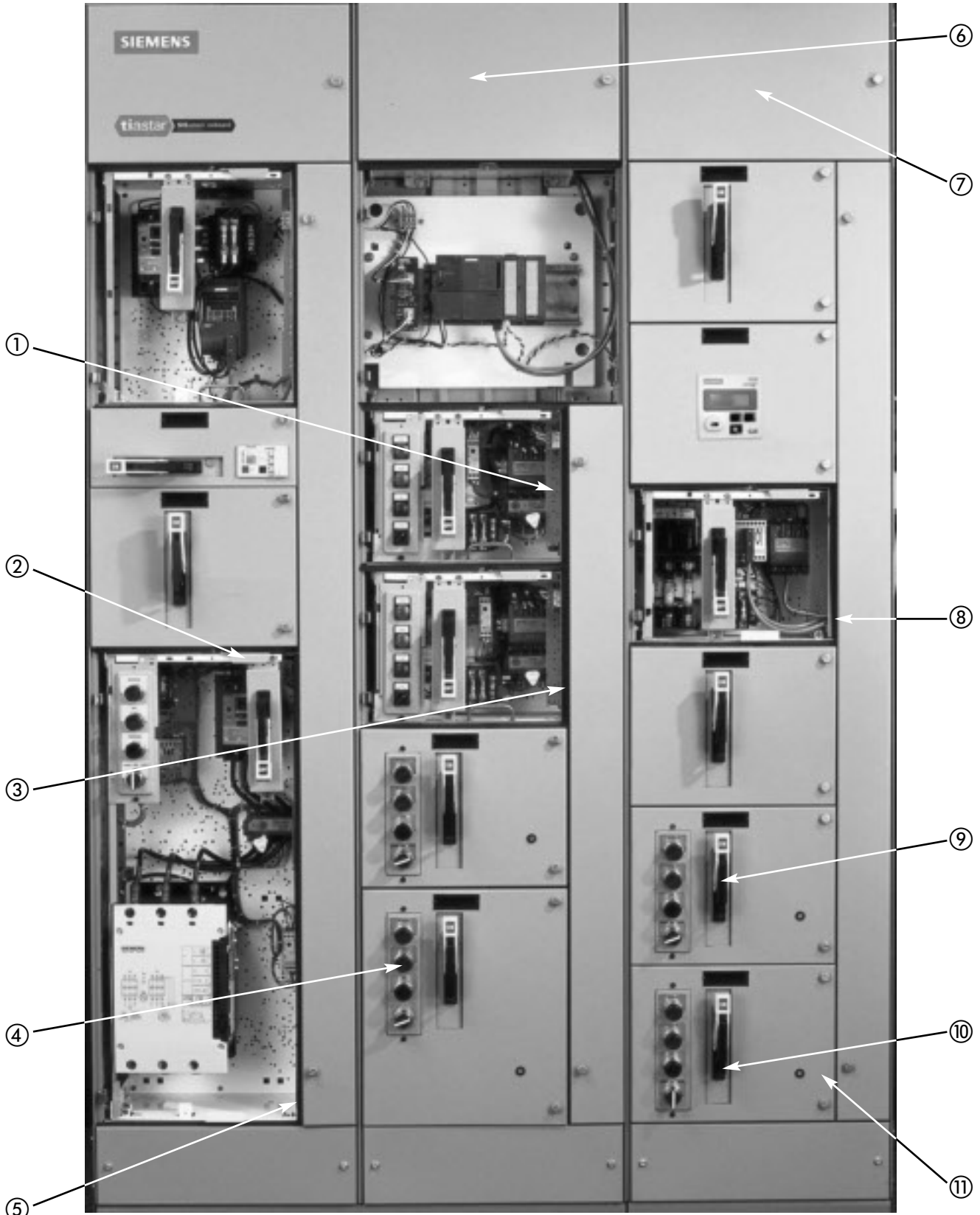


Bimetal Ambient Compensated Overload

# Motor Control Centers

Product Overview

Quality Features Exceed Standards

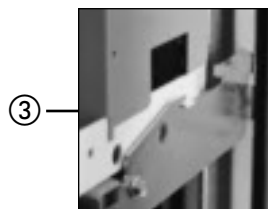




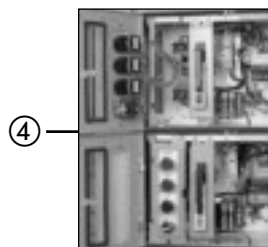
① For ease in wiring and inspection, terminal blocks are mounted on a swing-out side barrier.



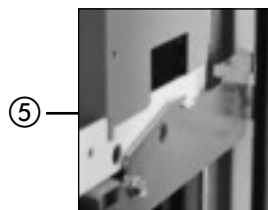
② A racking lever on all plug-in units ensures that they are fully engaged with the vertical bus. An interlock with the disconnect device ensures that a plug-in unit is not inserted or removed from the vertical bus when the unit is energized.



③ A positive stop in the "TEST" position indicates that a plug-in unit is fully withdrawn from the vertical bus.



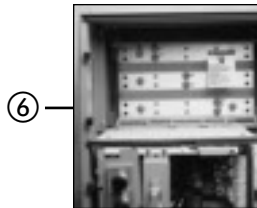
④ Pilot devices are mounted on a sturdy formed-metal panel attached with two captive screws to the MCC unit door for easy access to internal components. For unit removal and test, the pilot device panel is easily removed from the door and mounted on the unit.



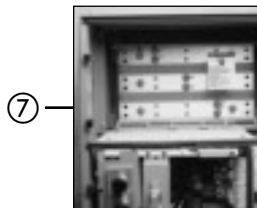
⑤ A positive stop mechanism prevents the unit from falling out of the structure during unit removal.

### Important Additional Features:

- All wiring and components meet or exceed the requirements of UL, CSA, ENEMA, EEMAC, and NEC
- Pre-wired components are professionally harnessed to industrial terminal blocks
- Full depth wire tie rods are standard in each vertical wireway
- White interior increases visibility for easy wiring, maintenance and inspection
- Modular units are fully interchangeable
- Each TIASTAR MCC is designed to satisfy your most exacting specifications
- White on black base operating handle is easy to identify

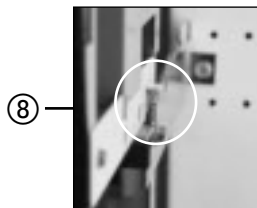


⑥ The horizontal bus compartment is isolated from the horizontal wireways by a crystal clear polycarbonate barrier that makes visible and infrared maintenance inspection a breeze. The barrier is easily removed when access to the horizontal bus is required.

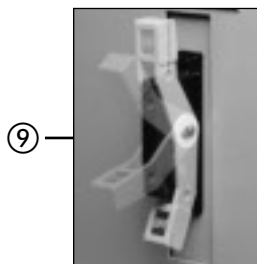


⑦ Horizontal bus design keeps the bus in the top 12" of the structure, never behind units, for easy maintenance and accessibility.

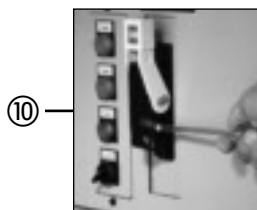
Copper bus and heavy-duty insulators safely distribute power to sections. Copper bus, standard throughout, is conservatively rated at 50-degree rise and provides up to an optional 100,000A withstand capacity.



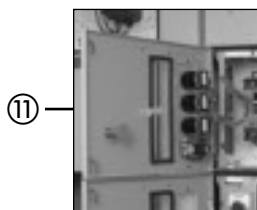
⑧ A copper clip on plug-in units engages and grounds units at all times.



⑨ The unit disconnect operating handle features a simple, rugged design. "ON" and "OFF" are clearly indicated by position, color and word. The "TRIP" indication is clearly displayed on circuit breaker equipped units.



⑩ A screwdriver operated defeater mechanism allows access to an energized unit by authorized personnel.



⑪ All doors swing open a minimum of 110° for easy unit access and removal.



⑫ Plug-in unit stab assemblies include self-aligning stab clips with spring steel backup springs. Wires from the stab clips to the line-side of the circuit breaker or disconnect switch are contained in the stab housing and are isolated phase-to-phase until the wires enter the MCC.

### Dimensions

Height: 91.125 in. (2318 mm)  
(Front Mounted Only Structure)

Width: 20 in. (508 mm)  
24 in. (610 mm)  
30 in. (762 mm)

Depth: Standard: 15 in. (381 mm)  
Optional: 20 in. (508 mm)  
Optional\*: 31 or 41 in.  
(762 or 1016 mm)

\*(Front mtd. only structures mtd.  
Back-to-Back)

(Back-to-Back structure)

Width: 20 in. (508 mm)  
30 in. (762 mm)

Depth: 21 in. (533 mm)

Vertical Wireway Height:

72 in. (1829 mm)

Width: 4 in. (127 mm)

Depth: 10 in. (203 mm)

Cross Section: 38.25 square in.  
(972 square mm)

Top Horizontal Wireway

Front Mounted Only and

Back-to-Back Mounted

Height: 12 in. (305 mm)

Depth: 7 in. (178 mm)

Bottom Horizontal Wireway

Front Mounted Only

Height: 6 in. (152 mm)

Depth: 15 in. (381 mm)

20 in. (508 mm)

or Back-to-Back Mounted

Height: 6 in. (152 mm)

Depth: 30 or 40 in.

(762 or 1016 mm)

### Structural Gauge Chart

Structural Parts

Divider Sheets .....14 ga.

Side Sheets .....14 ga.

Center Bottom Cross Ties .....12 ga.

Rear-Channel  
(Front Mounting only) .....13 ga.

Channel Sills .....7 ga.

Center-Top Channel .....13 ga.

Vertical Bus Mounting Angles .....14 ga.

Lifting Angles .....7 ga.

Rear Covers .....16 ga.

Top Plates .....13 ga.

End Covers .....16 ga.

Separator Angles .....12 ga.

Shelf Brackets .....10 ga.

Unit Parts

Top and Bottom Unit Barriers .....14 ga.

Back Pan .....13, 14 ga.

Side Barrier Plate .....18 ga.

Angles .....14 ga.

Doors .....13, 14 ga.

Finish (Ext.) ANSI 61 Light Gray

Electrostatically applied dry powder paint

is standard.

### Plating

All power bus, copper tin-plated as std.

Silver plating available by request.

### Horizontal Bus

Ampere Ratings

Standard: 600A, tin-plated Cu

Optional: 800A, Cu

1200A, Cu

1600A, Cu

2000A, Cu

2500A, Cu

### Vertical Bus

Ampere Ratings

Standard: 300A, tin-plated

Optional: 600A, Cu

### Neutral Bus (Bottom Mounted)

Optional: Full neutral Cu

Optional: Neutral landing pad

Ratings: 600A to 1600A

### Bus Bracing

Standard: 42,000A,

Optional: 65,000A, and

100,000A Sym.

### Incoming Line Terminations

Incoming line arrangements are

available in many configurations

from 600A to 2500A.

### Barriers

Standard:

Isolation Barrier: Grounded sheet  
steel with stab  
openings.

Standard: Inserts to cover unused  
openings in V-bus barrier.

Optional: Automatic shutter  
mechanism.

### Ground Bus (Bottom Mounted)

#### Required for UL labeling

Standard: .25 in. x 1 in. unplated Cu.

Optional ground bus available up to  
1200A.

Vertical ground bus available as  
option, rating 300A.

Also available with motor ground  
terminations.

### Weight Table

Dimensions inches (mm)			Type	Shipping Weight per Section in lbs. (kg)
H	W	D		
91.13 (2315)	20 (508)	15 (381)	front only	550 lbs. (250)
	20 (508)	20 (508)		600 lbs. (273)
	20 (508)	30 (762)	back-to-back	850 lbs. (386)
	30 (762)	20 (508)	front only	800 lbs. (364)
	20 (508)	21 (533)	back-to-back	900 lbs. (409)

### Wiring Specifications

Control on Units

16 gauge

19 strand bonded copper

105°C – 600V

Interconnection Control Wiring

Between Units

14 gauge

19 strand copper

105°C – 600V

Power Wiring – Sized to suit

maximum HP rating of unit

12 gauge to 2 gauge

19 strand copper

105°C – 600V

1 gauge to 500 MCM

19 strand to 37 strand copper

105°C – 600V

### Enclosure Types

NEMA 1 (Standard) – Indoor

NEMA 1A Gasketed – Indoor

NEMA 2 – Drip-proof – Indoor

NEMA 12 – Dust tight – Indoor

NEMA 3R – Rainproof – Outdoor

(Non-walk-in)

### MCC Shutter Mechanism

Automatic shutter mechanisms when

specified will be supplied at the stab

in location of each plug-in unit and

requested future space. Unused stab

openings will be covered with snap-in

hole plugs.

### Pull Box (Top Hat)

Available in 12 in., 18 in. or 24 in. high;

20 in. or 30 in. wide; 15 in. or 20 in. deep.

# Motor Control Centers

## Wiring Classifications

Siemens MCC's are available as either Class I or Class II assemblies utilizing either Type A, Type B, or Type C wiring as defined in NEMA ICS18-2001(3.1) and NEMA ICS18-2001(3.3). Below are the NEMA class and type definitions:

### Class I — Independent Units (NEMA ICS18-2001(3.2.1))

Class I motor control centers shall consist of mechanical groupings of combination motor control units, feeder tap units, other units, and electrical devices arranged in a convenient assembly. The manufacturer shall furnish drawings that include:

- Overall dimensions of the motor control center, identification of units and their location in the motor control center, locations of incoming line terminals, mounting dimensions, available conduit entrance areas, and the location of the master terminal board if required (Type C wiring only).
- Manufacturer's standard diagrams for individual units and master terminal boards (Type C wiring only) consist of one or more drawing(s) that:
  - Identify electrical devices.
  - Indicate electrical connections.
  - Indicate terminal numbering designations.

**Note:** When a combination schematic and / or wiring diagram for a unit is supplied showing optional devices, the manufacturer shall provide information to indicate which devices are actually furnished.

### Class II — Interconnected Units (NEMA ICS18-2001(3.2.2))

Class II motor control centers shall be the same as Class I motor control centers with the addition of manufacturer furnished electrical interlocking and wiring between units as specified in overall control system diagrams supplied by the purchaser. In addition to the drawings furnished for Class I motor control centers, the manufacturer shall furnish drawings that indicate factory interconnections within the motor control center.

### Class I-S and II-S — Motor Control Centers With Custom Drawing Requirements (NEMA ICS18-2001(3.2.3))

Class I-S and II-S motor control centers shall be the same as Class I and II except custom drawings shall be provided in lieu of standard drawings as specified by the user. Examples of custom drawings are:

- Special identifications for electrical devices
- Special terminal numbering designations
- Special sizes of drawings

The drawings supplied by the manufacturer shall convey the same information as drawings provided with Class I and II motor control centers, additionally modified as specified by the user.

### Types of Wiring — NEMA ICS18-2001(3.3.1)

#### Type A (NEMA ICS18-2001 (3.3.1.1))

User field wiring shall connect directly to device terminals internal to the unit and shall be provided only on Class I motor control centers.

## Technical / Dimensions

#### Type B (NEMA ICS18-2001(3.3.1.2))

a. Type B user field load wiring for combination motor control units size 3 or smaller shall be designated as B-D or B-T, according to the following:

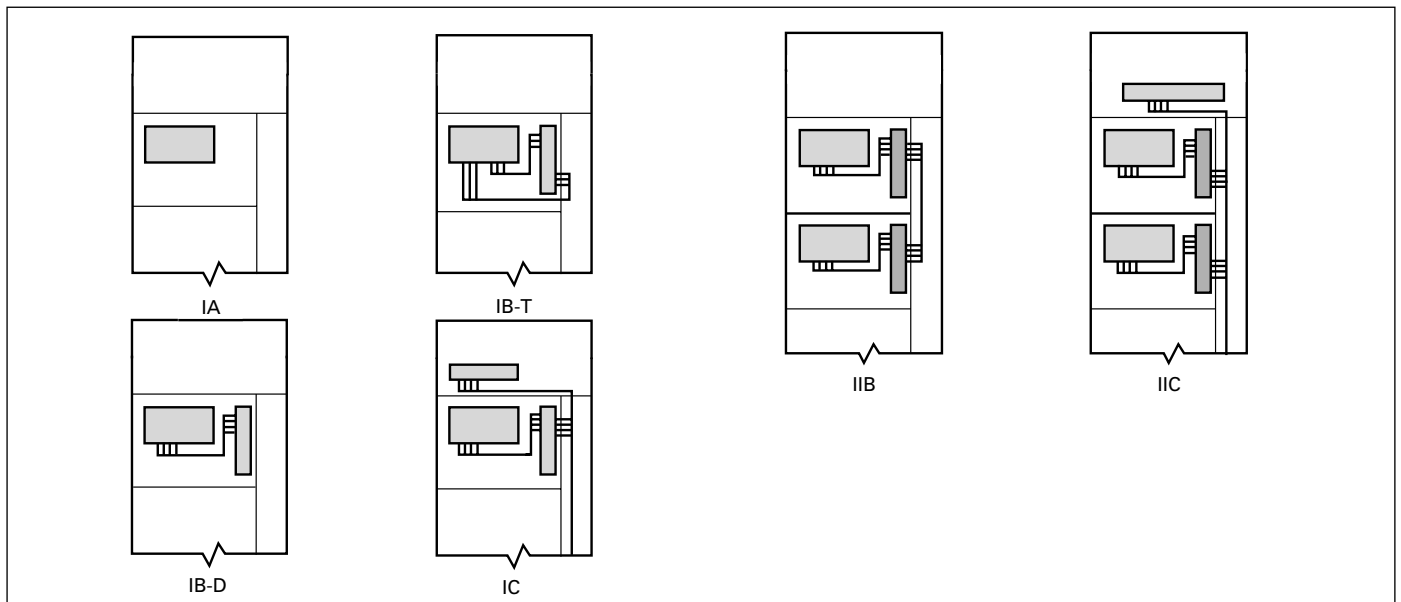
- B-D connects directly to the device terminals, which are located immediately adjacent and readily accessible to the vertical wireway.
- B-T connects directly to a **load** terminal block in, or adjacent to, the unit.

b. Type B user field load wiring for combination motor control units larger than size 3, and for feeder tap units, shall connect directly to unit device terminals.

c. Type B user field **control** wiring shall connect directly to unit terminal block(s) located in, or adjacent to, each combination motor control unit.

#### Type C (NEMA ICS18-2001(3.3.1.3))

User field control wiring shall connect directly to master terminal blocks mounted at the top or bottom of those vertical sections that contain combination motor control units or control assemblies which shall be factory wired to their master terminal blocks. User field load wiring for combination motor control units, size 3 or smaller, shall connect directly to master terminal blocks mounted at the top or bottom of vertical sections. Motor control unit load wiring shall be factory wired to the master terminal blocks. User field load wiring for combination motor control units larger than size 3, and for feeder tap units, shall connect directly to unit device terminals.



# Motor Control Centers

## Starter Ratings and Dimensions

Technical / Dimensions

### MCC Starter Ratings and Dimensions

NEMA Size	Maximum Horsepower Rating			Circuit Breaker Type (For Maximum HP at 460V)			Fusible Type (For Maximum HP at 460V)					
	208 V	230 V	460 V	Standard Breaker Type	Dimensions in Inches (mm) Unit Height <sup>①</sup> W = Width, D = Depth	kA Interrupting Rating at 480 V <sup>②③</sup>	Standard Disconnect Sw/Fuse Clip Sizes	Dimensions in Inches (mm) Unit Height <sup>①</sup> W = Width, D = Depth	kA Interrupting Rating at 480 V <sup>②③</sup>			
<b>Full Voltage — UL Listed</b>												
				—	FVNR	FVR	IR Std./Opt.	—	FVNR	FVR	IR	
0-1	7.5	7.5	10	MCP	12 (305)	18 (457)	42 / 100	—	30 / 30	12 (305)	18 (457)	100
2	10	15	25		12 (305)	24 (610)			60 / 60	12 (305)	24 (610)	
3	25	30	50		18 (457)	30 (762)			100 / 100	24 (610)	36 (914)	
4	40	50	100		FD6-ETI	24 (610)			36 (914)	FD6MCS / 200	42 (1067)	
5	75	100	200	JD6-ETI	36 (914)	72 (1829) <sup>④</sup>	42 / 100	JD6MCS / 400	72 (1829) <sup>④</sup>	72 (1829) <sup>④</sup> 30W (762W) <sup>④</sup>		
6 <sup>⑤</sup>	150	200	400	LD6-ETI	48 (1219)	72 (1829) 30W (762W)	42 / 100	MD6MCS / 600	72 (1829)	72 (1829) 30W (762W)		
7 <sup>⑤</sup>	—	300	600	ND6	72 (1829) 30W 20D (762W 508D)	N/A	—	ND6MCS / 1200	72 (1829) 40W 20D (1016W 508D)	N/A		

<b>Two Speed, Constant Or Variable Torque — UL Listed</b>												
				—	2S2W	2S1W	IR Std./Opt.	—	2S2W	2S1W	IR	
0-1	7.5	7.5	10	MCP	24 (610)	24 (610)	42 / 100	—	30 / 30	24 (610)	24 (610)	100
2	10	15	25		24 (610)	24 (610)			60 / 60	24 (610)	24 (610)	
3	25	30	50		30 (762)	36 (914)			100 / 100	36 (914)	48 (1219)	
4	40	50	100		FD6-ETI	36 (914)			48 (1219)	FD6MCS / 200	48 (1219)	
5 <sup>④</sup>	75	100	200	JD6-ETI	72 (1829) 30W (762W)	72 (1829) 30W (762W)	42 / 100	JD6MCS / 400	72 (1829) 30W (762W)	72 (1829) 30W (762W)		
6 <sup>⑤</sup>	150	200	400	LD6-ETI	72 (1829) 30W (762W)	Consult Siemens	42 / 100	MD6MCS / 600	72 (1829) 40W (1016W)	Consult Siemens		

<b>Two Speed, Constant Horsepower — UL Listed</b>												
				—	2S2W-CH	2S1W-CH	IR Std./Opt.	—	2S2W-CH	2S1W-CH	IR	
0-1	7.5	7.5	10	MCP	24 (610)	24 (610)	42 / 100	—	30 / 30	24 (610)	24 (610)	100
2	10	15	25		24 (610)	24 (610)			60 / 60	24 (610)	24 (610)	
3	25	30	50		30 (762)	36 (914)			100 / 100	36 (914)	48 (1219)	
4 <sup>④</sup>	40	50	100		FD6-ETI	30 (762)			48 (1219)	FD6MCS / 200	48 (1219)	
5 <sup>④</sup>	75	100	200	JD6-ETI	72 (1829) 30W (762W)	72 (1829) 30W (762W)	42 / 100	JD6MCS / 400	72 (1829)	72 (1829) 30W (762W)		
6 <sup>④</sup>	150	200	400	LD6-ETI	72 (1829) 30W (762W)	Consult Siemens	42 / 100	MD6MCS / 600	72 (1829) 40W (1016W)	Consult Siemens		

<b>Reduced Voltage Autotransformer Non-Reversing, Closed Transition — UL Listed</b>										
				—	RVAT <sup>⑤</sup>	IR Std./Opt.	—	RVAT <sup>⑤</sup>	IR	
2 <sup>④</sup>	10	15	25	MCP	42 (1067)	42 / 100	—	60 / 60	42 (1067)	100
3 <sup>④</sup>	25	30	50		42 (1067)			100 / 100	48 (1219)	
4 <sup>④</sup>	40	50	100		FD6-ETI			48 (1219)	FD6MCS / 200	
5 <sup>⑤</sup>	75	100	200	JD6-ETI	72 (1829), 30W (762W)	42 / 100	JD6MCS / 400	72 (1829), 30W (762W)		
6 <sup>⑤</sup>	150	200	400	LD6-ETI	72 (1829) 30W (762W)	42 / 100	MD6MCS / 800	72 (1829) 30W (762W)		
7 <sup>⑤</sup>	300	300	600	ND6	72 (1829) 50W 20D (1270W 508D)	—	ND6MCS / 1200	72 (1829) 50W 20D (1270W 508D)		

<b>Two Step Part Winding, Star Connected<sup>⑥</sup> — UL Listed</b>										
				—	RVPW	IR Std./Opt.	—	RVPW	IR	
1	10	10	15	MCP	24 (610)	42 / 100	—	60 / 60	24 (610)	100
2	20	25	40					100 / 100	24 (610)	
3	40	50	75					FD6MCS / 200	48 (1219)	
4 <sup>④</sup>	75	75	150					JD6-ETI	36 (914)	
5 <sup>④</sup>	125	150	350	LD6-ETI	72 (1829)	42 / 100	LD6MCS / 600	72 (1829) 30W (762W)		
6 <sup>⑤</sup>	—	250	500	MD6	72 (1829) 30W (762W)	42 / 100	MD6MCS / 600	72 (1829) 30W (762W)		

① The addition of oversize CPT's (above 50VA), relays, timers, etc. may increase unit height.

② Consult Siemens for other voltages.

③ Interrupting ratings are 25 kAIC when not UL Listed.

④ Stationary units (not plug-in).

⑤ Fixed mounted unit – space behind not available.

⑥ Based on each winding handling 50%. Consult Siemens for other ratings.

**Note:** For Half Size Starters, contact Siemens.



# Motor Control Centers

## Starter Ratings and Dimensions

## Technical / Dimensions

### MCC Starter Ratings and Dimensions (cont'd)

NEMA Size	Maximum Horsepower Rating			Circuit Breaker Type (For Maximum HP at 460V)			Fusible Type (For Maximum HP at 460V)				
	208 V	230 V	460 V	Standard Breaker Type	Dimensions in Inches (mm) Unit Height <sup>①</sup> W = Width, D = Depth	kA Interrupting Rating at 480 V <sup>②</sup>	Standard Disconnect Sw / Fuse Clip Sizes	Dimensions in Inches (mm) Unit Height <sup>①</sup> W = Width, D = Depth	kA Interrupting Rating at 480 V <sup>②</sup>		
<b>Reduced Voltage Wye Delta, Open and Closed Transition</b>											
				—	YDO	YDC	IR Std./Opt.	—	YDO	YDC	IR
2	20	25	40	MCP	30 (762)	42 (1067)	42 / 100	100 / 100	36 (914)	48 (1219)	100
3	25	30	60	MCP	30 (762)	42 (1067)	42 / 100	250MCS / 200	48 (1219)	60 (1524)	
4	60	60	125	FD6-ETI	36 (914)	48 (1219)	42 / 100	400MCS / 400	72 (1829) <sup>④</sup>	72 (1829) <sup>④</sup>	
5 <sup>③</sup>	150	150	300	LD6-ETI	72 (1829) <sup>④</sup> 30W (762W)	72 (1829) <sup>④</sup> 30W (762W)	42 / 100	600MCS-600	72 (1829) <sup>④</sup> 30W (508W)	72 (1829) <sup>④</sup> 30W (508W)	

### Solid State Reduced Voltage Open and Closed Transition

				—	⑤	IR Std./Opt.	—	⑤	IR
1	7.5	7.5	10	CED6-ETI	18 (457) <sup>⑥</sup>	42 / 100	(30 / 30)	18 (457) <sup>⑥</sup>	100
2	10	15	25	CED6-ETI	36 (914) <sup>⑥</sup>		(60 / 60)	36 (914) <sup>⑥</sup>	
3	25	30	50	CED6-ETI	36 (914) <sup>⑥</sup>		(ED MCS / 100)	36 (914) <sup>⑥</sup>	
4	40	50	100	CFD6-ETI	36 (914)		(ED MCS / 100)	60 (1524)	
5	75	100	200	CJD6-ETI	48 (1219) <sup>③</sup>		(ED MCS / 100)	60 (1524) <sup>③</sup>	
6	150	150	350	CLD6-ETI	72 (1829) <sup>③</sup>		(ED MCS / 100)	72 (1829) <sup>③④</sup>	

### Compact Units — Available FVNR Only — UL Listed

				—	Circuit Breaker Type	Fusible Type	IR Std./Opt.
0-1	7.5	7.5	10	MCP	6 (152) <sup>⑥</sup>	6 (152) <sup>⑥</sup>	42 / 100

- ① The addition of oversize CPT's (above 50VA), relays, timers, etc. may increase unit height.
- ② Consult Siemens for other voltages.
- ③ Stationary units — Not plug in.
- ④ Requires 30 in. (762 mm) wide structure.
- ⑤ Bypass and / or isolation requires additional space.
- ⑥ 15 HP at 230V requires additional unit space.
- ⑦ Consult Siemens.
- ⑧ The addition of relays, timers, etc. will require additional space.
- ⑨ Unit includes rated line side isolation starter and J fuses.

### Lighting Panelboards Applied in MCC's

Amp Rating	Number Of Circuits	Panel	Height In Inches (mm)		
			1Ø, 3W 240/120	3Ø, 4W 208Y/120	3Ø, 4W 277/480
<b>Main Lug Only</b>					
225	18	1 to 18	30 (762)	30 (762)	30 (762)
	30	1 to 30	36 (914)	36 (914)	36 (914)
	42	1 to 42	42 (1067)	42 (1067)	42 (1067)
<b>Main Breaker</b>					
225	18	1 to 18	30 (762)	30 (762)	30 (762)
	30	1 to 30	36 (914)	36 (914)	36 (914)
250	42	1 to 42	42 (1067)	42 (1067)	42 (1067)

### 480V<sup>①</sup> Variable Frequency Drives — NEMA 1A MCC Enclosures<sup>②</sup>

Rating HP <sup>③</sup>	Drive Type	Rated Amperes	Dimensions—In. (mm) <sup>④⑤</sup>	
			Mounting Height	Structure W D
2	MM440	4	18 (457) (Plug-in)	20 (508) 15 (381)
5	MM440	8.5	24 (610) (Plug-in)	
	MM440	7.6		
7.5	MM440	11	36 (914) (Plug-in)	
10	MM440	14		
	MM440	19		
15	MM440	23	48 (1219) (Plug-in)	
	MM440	25		
20	MM440	32	60 (1524) (Recessed Panel, Fixed Mounted)	
	MM440	34		
25	MM440	34	72 (1829) (Recessed Panel, Fixed-Mounted)	
	MM440	45		
30	MM440	46	50 (1270) 20 (508)	
	MM440	52		
50	MM440	75	50 (1270) 20 (508)	
60	MM440	240 Max.		
75-125	MM440	185 Max.	50 (1270) 20 (508)	
150-300	MM440	370 Max.	50 (1270) 20 (508)	

- ① For other available voltage ratings, consult Siemens.
- ② For other enclosure types, consult Siemens.
- ③ Ratings are for variable torque applications. Consult Siemens for other applications.
- ④ Dimensions shown are for circuit breaker or fusible disconnects.
- ⑤ Drives with bypass and / or isolation require extra mounting space. Consult Siemens for further information.

### Distribution Transformers

kVA Rating	Phase	Unit Height In Inches (mm)
1	1	Plate-Mounted in 12 in. (305 mm) space
1.5		
2		
3		
5		
7.5		
10		
15		
25		
30		
37.5	3 <sup>②</sup>	24 (610) <sup>①②</sup>
9		12 (305)
15		18 (457)
25		
30		
45	24 (610)	

- ① Transformer mounted on brackets 6 in. (152 mm) off sils.
- ② Requires 20 in. (508 mm) deep structure.

15 MOTOR CONTROL CENTERS

# Motor Control Centers

## Incoming Cable Space, Wiring Troughs, Wiring Terminations

Technical / Dimensions

The National Electrical Code establishes very specific guidelines for minimum cable bending space within motor control centers. Figures 1 through 5 below describe the most common arrangements for terminating main incoming power cables in the MCC. Consult Siemens for incoming line compartment braced for 100,000 amperes symmetrical, short circuit.

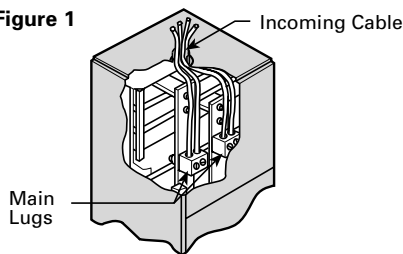
### Incoming Cable Space

Description of Incoming Service	Top or Bottom Incoming Section	Cable Entry Top or Bottom	Space Requirements in Inches (mm)	Notes
≤ 350 kcmil Two per Phase	Top — Directly on Main Bus	Either	None	See Figure 3
≤ 600 kcmil One or Two per Phase	Top	Either	Top Wireway plus 12.0 (305) or 18.0 (457)	See Figure 1
≤ 600 kcmil Three or Four per Phase	Top	Top	Top Wireway plus 18.0 (457)	See Figure 1
750 kcmil One or Two per Phase	Top	Top	Top Wireway plus 24.0 (607)	—
350 kcmil One or Two per Phase	Bottom	Bottom	Bottom Wireway plus 18.0 (457)	600 A Maximum See Figure 2
≤ 600 kcmil One or Two per Phase	Bottom	Bottom	Bottom Wireway plus 24.0 (610)	600 A Maximum See Figure 2
≤ 750 kcmil, up to eight per phase	Top or Bottom	Either	Full Structure	Consult Siemens
≤ 500 kcmil One or Two per Phase ≤ 750 kcmil One per Phase to Main Breaker	Top	Bottom	See Breaker / Disconnect	See Figure 4
≤ 500 kcmil One to Four per Phase ≤ 750 kcmil One per Phase to Main Breaker	Top	Top	See Breaker / Disconnect	See Figure 5
Busway or Cable Feed to Line Reactor	Top or Bottom	Either	Consult Siemens	Consult Siemens

Siemens MCC's are equipped with a 12 in. (305 mm) high, full-width horizontal wireway in the top and 6 in. (152 mm) in the bottom of each structure. A separate vertical wireway connects the top and bottom wiring areas in each vertical section. This wireway is 4 in. (102 mm) wide by 10 in. (254 mm) deep, or 38.25 (972) square inches (mm).

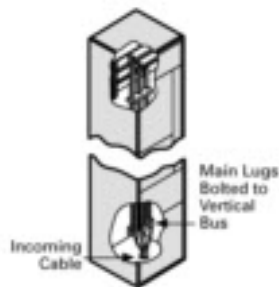
**Note:** All standard Siemens termination schemes shown herein do comply with applicable cable bending requirements of UL and the NEC.

**Figure 1**



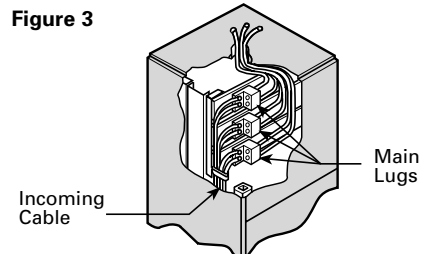
**Main Lugs at Top with Top Cable Entry**  
Can accommodate up to two 600 kcmil cables per phase when using Siemens standard mechanical lugs. A total height of 24 in. (610 mm). This includes 12 in. (305 mm) for the top wireway plus 12 in. (305mm) of unit space. Compression lugs require extra vertical space or the addition of a top hat.

**Figure 2**



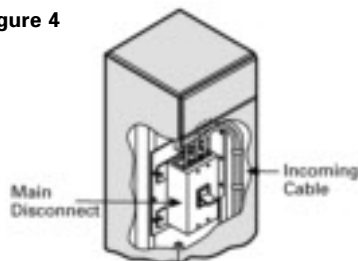
**Main Lugs at Bottom with Bottom Cable Entry**  
Lugs are bolted directly to the bottom of the vertical bus. Can accommodate up to two 350 kcmil per phase in 24 in. (610 mm) high compartment. This includes 6 in. (152 mm) for the bottom wireway plus 18 in. (457 mm) of unit space. Can accommodate up to two 600 kcmil per phase in 30 in. (762 mm) high compartment. This includes 6 in. (152 mm) for the bottom wireway plus 24 in. (610 mm) of unit space.

**Figure 3**



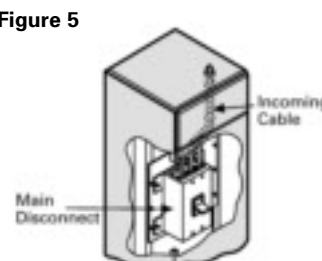
**Main Lugs at Top with Top or Bottom Cable Entry**  
In this arrangement the lugs mount directly on the horizontal bus, eliminating the need to use unit mounting space. The limitation here is 350 kcmil cable per phase.

**Figure 4**



**Main Disconnect with Bottom Cable Entry**

**Figure 5**



**Main Disconnect with Top Cable Entry**

If bottom entry is used, cables must be properly laced and supported based upon the available short circuit current. See dimensional requirements for molded case breakers and fused switches, consult local sales office.

# Motor Control Center Replacement Units

## Aftermarket Overview



### Product Description (Time Line: 2002 — Current)

Introduced in 2002, Siemens TI STAR is an advanced SISystem™ (Smart Integrated Solution System) that provides you with seamless control of your physical plant by fusing ASI, PROFIBUS®, and ACCESS™ – as well as most legacy systems – into a robust, fully integrated management system.

Units widths are normally 15" or 20" wide, and 12" tall with 6" increments. Today, we provide you with Siemens breakers and starters. The standard lead-time for delivery is 24 hrs – 3 weeks.

### Replacement Capabilities

#### Starter Units

Replacement starter units are available for all plug-in and Non plug-in units MCC designs. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

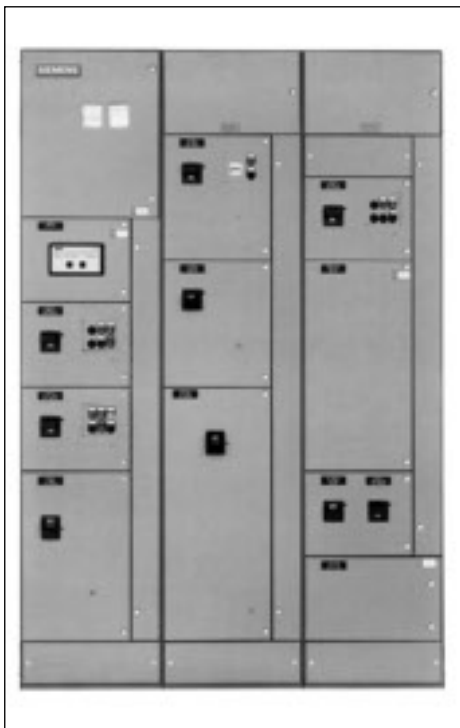
- Siemens Starter Size 1-6
- CT, CPT, PT & Pilot Devices
- CB and Fusible
- Relays, Fuses, VFD and Softstarts
- Soft Starts, SIMOCODE, ASI, PROFIBUS
- UL Labeled



15 MOTOR CONTROL CENTERS

## SIEMENS

Model 95+



### Product Description (Time Line: 1996 — 2001)

The Model 95+ retrofit buckets are designed to fit into Model 95+ MCCs. This upgrade from Model 95 included changes in handles, color, pilot devices, and stabs. Unit widths are normally 15" or 20" wide, and 12" tall with 6" increments.

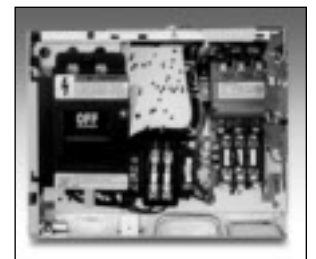
Today, we provide you with Siemens breakers and starters. The standard lead-time for delivery is 24 hrs – 3 weeks.

### Replacement Capabilities

#### Starter Units

Replacement starters are available for all plug-in and Non plug-in units. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and Fusible
- Pilot Devices, VFD, Softstarts and ASI
- Relays, Fuses
- UL Labeled



# Motor Control Center Replacement Units

## Aftermarket Overview

# SIEMENS

Model 95



### Product Description (Time Line: 1995 — 1997)

The Model 95 was originally manufactured in Raleigh, NC. Model 95 served as a style template for many old MCC buckets since installation procedures and dimensions stayed the same. Unit widths are normally 15" or 20" wide, and 12" tall with 6" increments.

The original Model came with a variety of CB and starters from ITE, C-H and Siemens 3TF & 3UA Overload. Today, we provide you with Siemens breakers and starters. The standard lead-time for delivery is 24 hrs – 3 weeks.

### Replacement Capabilities

#### Starter Units

Replacement starters are available for all plug-in and Non plug-in units. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and fusible
- Pilot Devices
- Relays and Fuses



# SIEMENS

Model 90



### Product Description (Time Line: 1986 — 1997)

The Model 90 retrofit buckets are designed to fit into Model 90 MCCs. Unit widths are normally 15" or 20" wide, and 12" tall with 6" increments.

The original Model came with a variety of CB and starters from ITE, C-H, and Siemens 3TF & 3UA Overload. Today, we provide you with Siemens breakers and starters. The standard lead-time for delivery is 24 hrs – 3 weeks.

### Replacement Capabilities

#### Starter Units

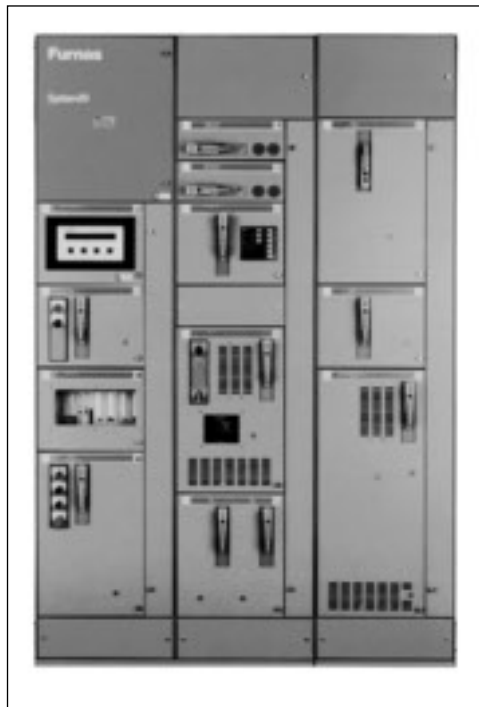
Replacement starters are available for all plug-in and Non plug-in units. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and Fusible
- Pilot Devices
- Relays and Fuses



# Motor Control Center Replacement Units

## Aftermarket Overview



### Product Description (Time Line: 1979 — 2001)

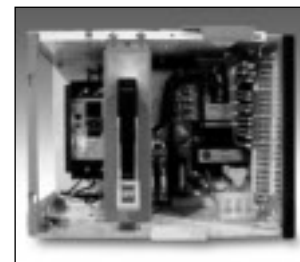
This is an upgrade from Class 89 developed by Furnas in 1965. Bucket structures are normally 15" or 20" wide, and 12" tall with 6" increments.

The original System 89 came with a variety of CB and starters from Westinghouse, GE and Furnas Electric. Today, we provide you with Siemens breakers and starters. The standard lead-time for delivery is 24 hrs – 3 weeks.

### Replacement Capabilities MCC Plant: West Chicago Starter Units

Replacement starter units are available for all plug-in and non plug-in unit MCC designs. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and Fusible
- Pilot Devices
- Relay, Fuses, VFD and Softstarts
- UL Labeled



15  
MOTOR CONTROL  
CENTERS



### Product Description (Time Line: 1975 — 1996)

The Marq21 retrofit buckets are designed to fit into Marq21 MCCs. Marq21 was created from the forge of two of the world's foremost electrical companies, Siemens-Allis. Units widths are normally 15" or 20" wide, and 12" tall with 6" increments.

The original Marq21 came with a variety of CB and starters from ITE and Allis-Chambers. The standard lead-time for delivery is 24 hrs – 3 weeks.

**Note:** Original components are not available. Today, we provide you with Sentron breakers and Siemens starters.

### Replacement Capabilities

#### Starter Units

Replacement starters are available for all plug-in and Non plug-in units. A complete units for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

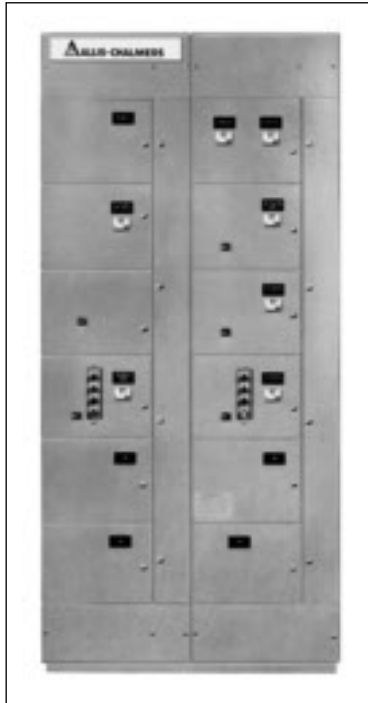
- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and fusible
- Pilot Devices
- Relays and Fuses
- UL Labeled

# Motor Control Center Replacement Units

## Aftermarket Overview



Mark 2



### Product Description (Time Line: 1972 — 1975)

The Mark 2 retrofit buckets are designed to fit into their old design. This is an upgrade from the Mark 1 in ValueLine family. Unit widths are normally 15" or 20" wide, and 12" tall with 6" increments.

The original Mark 2 came with a variety of CB and starters from Westinghouse and Allis-Chalmers. The standard leadtime for delivery is 24 hrs – 3 weeks.

### Add-on MCCs:

New TIASTAR MCC can be spliced to existing line-up.

**Note:** Original components are not available. Today, we provide you with Sentron breakers and Siemens starters.

### Replacement Capabilities

#### Starter Units

Replacement starters are available in plug-in Non plug units. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and Fusible
- Pilot Devices
- Relays, Fuses
- UL Labeled



5600



### Product Description (Time Line: 1971 — 1992)

The 5600 MCC retrofit buckets are designed to fit into their old design. 5600 units are 15" wide buckets and the fix mounted panels are 20" wide.

The original Gould came with a variety of old CB and starters from ITE, Rowan, and AMP-CAP. These buckets are available up to NEMA size 5. The standard lead-time for delivery is 24 hrs – 3 weeks.

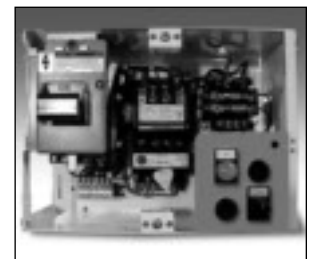
**Note:** Original components are not available. Today, we provide you with Sentron™ breakers and Siemens starters.

### Replacement Capabilities

#### Starter Units

Replacement starters are available for all plug-in and Non plug-in units. A complete unit for adding to an existing MCC includes a unit door, divider pans and all necessary mounting hardware. Features of the replacement units include:

- Siemens Starter Size 1-6
- CT, CPT, PT
- CB and Fusible
- Pilot Devices, Relays, and Fuses
- UL Labeled
- Shelf is ordered separately



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# Control Products

## What's New

### Catalog Enhancements

- Section 16 pages have been restructured according to product group for even better organization. Each product group is identified by a sub-tab on each page. The groups consist of:
  - NEMA & General Purpose Control
  - Definite Purpose Control
  - Soft Starter Control
  - Pilot Devices
- Class 97 Current Sensitive Relay dimensions and wiring diagram added. See pages 16-108 and 16-143.
- Class MRS Fractional HP Switch wiring diagrams added. See page 16-129.



### Enclosure Kits for Lighting & Heating Contractors

Enclosure kits are now available for Class LE and CLM Lighting & Heating Contactors. These enclosure kits allow you to add value by assembling enclosed lighting & heating contactors in the field. (Contactor and modification kits are sold separately.) See page 16-91.



### Handle and Mechanism Replacement Kits

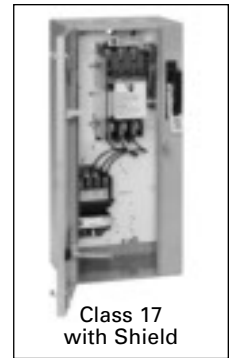
Handle & Mechanism replacement kits are now available for class 17, 18, 25, 26, & 32. The replacement kits include the operator handle, link rod, mechanism and all necessary hardware. See page 16-159.



Class 40  
with Shield



Class 14  
with Shield



Class 17  
with Shield

### Protective Shields - Protect Against Accidental Contact with NEMA Products

Protective shields can be added to open and enclosed NEMA contactors and starters, as well as fusible or non-fusible disconnect switches in combination starters and pump panels. Protective shields provide protection against accidental contact with live parts such as line and load terminals, auxiliary contacts and coil terminals.

Contactor and starter shields allow access to terminals and the reset button on overloads without removing the shield.

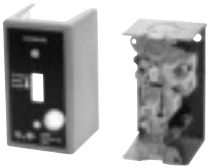
- The shields are designed for use on Class 40 contactors and Class 14 starter sizes 00 to 4.
- The same shield used on Class 14 starters can be used on either solid state or bimetal overloads.
- Shields used on disconnect switches are designed for 30-200A switches in either combination starters or pump control panels.
- Shield covers both switch and load base fuse clips when installed.

See page 16-82.

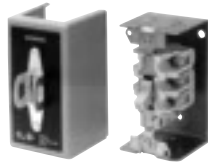
# Control Products

## NEMA & General Purpose Controls

## Product Overview



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Fractional Horsepower  
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**Class MMS & MRS**  
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**Class 14**  
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**Class 17, 18**  
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**Class 22**  
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**Class 32**  
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**Class 40**  
NEMA Contactors  
and Vacuum Contactors  
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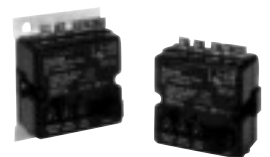
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**Class 48, 958, 3RB20**  
Overload Relays  
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**Class 83, 84, 87, 88**  
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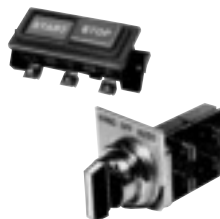
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**Class MT, MTG**  
Control Power  
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Modifications and  
Drawings  
Page 16-79



Heater Tables and  
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Page 16-148

# Manual Control

## Fractional HP Starters, Class SMF

General

### Class SMF

Class SMF fractional horsepower starters provide overload protection as well as manual on-off control for small horsepower motors in a variety of industrial and commercial applications. Available in one or two pole versions, these devices are suitable for use with AC single phase motors up to 1 HP. Two pole starters can also be used with DC motors up to ¾ HP. Typical applications include fans, conveyors, pumps, and small machine tools.

### Continuous Current Rating

16 amperes.

### Overload Trip Assembly

Motor protection is provided by a Class SMFH heater element which must be installed before the starter will operate.

### Two Speed Starters

Two speed manual starters are designed for control of small single phase AC motors having separate windings for high and low speed operation. Two toggle operated starters are used, with overload protection included for each motor winding. Surface mounting devices, and those with a gray flush plate, utilize a mechanical interlock which allows direct control of the motor by means of the toggle operators.

### Enclosures

Class SMF, NEMA Type 1 surface mounting enclosures are sheet steel with a thermo-plastic wrap-around cover for convenience in wiring. The NEMA Type 1 enclosure is also available in an oversized version which allows more wiring space. A zinc alloy die casting is used for NEMA Type 4 enclosures.

### Pilot Lights

Red or green neon pilot light units are available for flush mounting plates, NEMA Type 1 enclosures, and NEMA Type 4 enclosures. Pilot lights may be either factory or field installed. (For starters that contain a pilot light, a Red light is standard. For a Green pilot light add "G" to the end of the catalog number.)

### Terminals

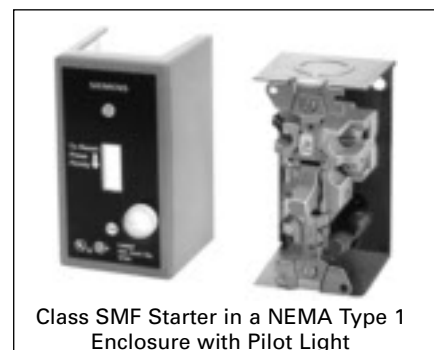
Binding head screw type terminals are suitable for #10 or smaller copper wire, and are accessible from the front. All terminals are clearly marked.

### Mounting

Open types without a pilot light fit standard single gang switch boxes, and can be used with any cover plate having a standard toggle cutout. Single-unit flush mounting types, including those with pilot lights, are suitable for wall mounting in a standard switch box or for machine cavity mounting without a box.

### Operation

Available with toggle handle or with removable key type operator to discourage unauthorized operation.



### Emergency Off Actuator

A toggle operator extender is available for Class SMF, NEMA Type 1 surface mounted units. The extender has a red vinyl button that provides a fast and easy method for locating and switching the device's toggle operator into the OFF position. The Emergency Off Actuator is available in kit form only for field installation.


### Handle Guard/Lock-Off

An optional handle guard on Class SMF, NEMA Type 1 enclosed starters prevents accidental operation of the toggle operator and also allows the toggle operator to be padlocked in either the "ON" or "OFF" position. This handle guard can be factory installed on NEMA Type 1 enclosed starters and is also available in kit form for field installation on NEMA Type 1 surface and flush mounting enclosures. Standard NEMA Type 4 metallic enclosures include provisions for padlocking the device in the OFF position.

# Manual Control

## Fractional HP Starters with Melting Alloy Overload, Class SMF

Selection

 <p>Class SMF Starter in a NEMA Type 1 Enclosure with Pilot Light</p>	<b>Ordering Information</b>				<b>Horsepower Ratings</b>																					
	<ul style="list-style-type: none"> <li>▶ Heater Elements see page 16-148.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Dimensions see pages 16-99.</li> <li>▶ Wiring Diagrams see page 16-129.</li> </ul>				<table border="1"> <tr> <td rowspan="3">Volts</td> <td colspan="3">Maximum Horsepower</td> </tr> <tr> <td colspan="2">AC Single Phase</td> <td>DC</td> </tr> <tr> <td>1-Pole</td> <td>2-Pole</td> <td>2-Pole</td> </tr> <tr> <td>115-230</td> <td>1</td> <td>1</td> <td>3/4</td> </tr> <tr> <td>277</td> <td>1</td> <td>1</td> <td>—</td> </tr> </table>				Volts	Maximum Horsepower			AC Single Phase		DC	1-Pole	2-Pole	2-Pole	115-230	1	1	3/4	277	1	1	—
	Volts	Maximum Horsepower																								
		AC Single Phase		DC																						
1-Pole		2-Pole	2-Pole																							
115-230	1	1	3/4																							
277	1	1	—																							

### Starter—Class SMF, Single Phase<sup>Ⓢ</sup>

Type of Operator	No. of Poles	Starter Features <sup>Ⓢ</sup>	General Purpose Flush Mounting Open Starter with Flush Plate (No Enclosure Provided)						NEMA Type 1 General Purpose Enclosure, Surface Mounting				NEMA Type 3R, 4 & 12 Watertight, Dust-tight Metallic Enclosure with Clear Cover		NEMA Type 4 Watertight, Dust-tight Metallic Enclosure		NEMA Type 3R, 7 & 9 Div 1 and Div 2 Class I Groups B, C, D & Class II Groups E, F, G Enclosures					
			Open Type		Gray Flush Plate		Standard Stainless Steel Flush Plate		Jumbo Stainless Steel Flush Plate		Standard		Oversized		Catalog Number		List Price \$		Catalog Number		List Price \$	
			Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Toggle	1	Standard	SMFF01	43.00	SMFFF1	48.00	SMFFS1	50.00	—	—	SMFFG1	51.00	SMFFGJ1	61.00	SMFFWN1	182.00	—	—	—	—		
		Red Pilot Light	SMFF01P	69.00	SMFFF1P	72.00	SMFFS1P	77.00	SMFFSJ1P	90.00	SMFFG1P	77.00	SMFFGJ1P	86.00	SMFFWN1P	189.00	—	—	—	—		
	2	Standard	SMFF02	51.00	SMFFF2	56.00	SMFFS2	61.00	—	—	SMFFG2	61.00	SMFFGJ2	69.00	SMFFWN2	249.00	—	—	—	—		
		Red Pilot Light	SMFF02P	77.00	SMFFF2P	82.00	SMFFS2P	86.00	SMFFSJ2P	100.00	SMFFG2P	86.00	SMFFGJ2P	96.00	SMFFWN2P	258.00	—	—	—	—		
Key	1	Standard	SMFF03	61.00	SMFFF3	65.00	SMFFS3	69.00	—	—	SMFFG3	69.00	SMFFGJ3	77.00	SMFFWN3	198.00	—	—	—	—		
		Red Pilot Light	SMFF03P	86.00	SMFFF3P	82.00	SMFFS3P	96.00	SMFFSJ3P	107.00	SMFFG3P	96.00	SMFFGJ3P	103.00	SMFFWN3P	207.00	—	—	—	—		
	2	Standard	SMFF04	69.00	SMFFF4	72.00	SMFFS4	77.00	—	—	SMFFG4	77.00	SMFFGJ4	86.00	SMFFWN4	268.00	—	—	—	—		
		Red Pilot Light	SMFF04P	96.00	SMFFF4P	100.00	SMFFS4P	103.00	SMFFSJ4P	117.00	SMFFG4P	103.00	SMFFGJ4P	111.00	SMFFWN4P	276.00	—	—	—	—		

### Starter With Handle Guard/Lock-Off—Class SMF, Single Phase<sup>Ⓢ</sup>

Toggle	1	Standard	—	—	④	—	④	—	④	—	SMFFG5	61.00	SMFFGJ5	69.00	—	—	SMFFW1 <sup>Ⓢ</sup>	193.00	SMFFR1 <sup>Ⓢ</sup>	211.00
		Red Pilot Light	—	—	④	—	④	—	④	—	SMFFG5P	86.00	SMFFGJ5P	96.00	—	—	SMFFW1P <sup>Ⓢ</sup>	262.00	—	—
		(2) 3/4" NPT Outlets	—	—	④	—	④	—	④	—	—	—	—	—	—	—	—	—	—	—
		(2) 3/4" NPT Outlets and Red Pilot Light	—	—	④	—	④	—	④	—	—	—	—	—	—	—	—	SMFFW1PH	279.00	—
	2	Standard	—	—	④	—	④	—	④	—	SMFFG6	69.00	SMFFGJ6	77.00	—	—	SMFFW2 <sup>Ⓢ</sup>	203.00	SMFFR2 <sup>Ⓢ</sup>	219.00
		Red Pilot Light	—	—	④	—	④	—	④	—	SMFFG6P	98.00	SMFFGJ6P	103.00	—	—	SMFFW2P <sup>Ⓢ</sup>	272.00	—	—
		(2) 3/4" NPT Outlets	—	—	④	—	④	—	④	—	—	—	—	—	—	—	SMFFW2H	219.00	SMFFR2H	237.00
		(2) 3/4" NPT Outlets and Red Pilot Light	—	—	④	—	④	—	④	—	—	—	—	—	—	—	SMFFW2PH	289.00	—	—

### One Starter in Duplex Enclosure—Class SMF, Single Phase<sup>Ⓢ</sup>

Type of Operator	Number of Poles	Starter Features <sup>Ⓢ</sup>	General Purpose Flush Mounting Open Starter with Flush Plate - (No Enclosure Provided)				NEMA Type 1 General Purpose Enclosure Surface Mounting		Replacement Starters	
			Gray Flush Plate For Wall or Cavity Mounting		Stainless Steel Flush Plate For Wall or Cavity Mounting		Catalog Number		List Price \$	
			Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Toggle	2	Standard	—	—	—	—	SMFFG02	96.00	—	—
		Red Pilot Light	—	—	—	—	SMFFG02P	121.00	—	—
Key	2	Red Pilot Light	—	—	—	—	SMFFG04P	121.00	—	—

### Two Starters in Duplex Enclosure—Class SMF, Single Phase<sup>Ⓢ</sup>

Toggle	2 Per Starter	Standard	SMFFF222	138.00	—	—	SMFFG222	147.00	—	—
		Red Pilot Light on Each Starter	SMFFF222P	233.00	SMFFS22P	242.00	SMFFG222P	242.00	—	—
		Red Pilot Light on Each Starter	SMFFF44P	268.00	SMFFS44P	276.00	SMFFG44P	276.00	—	—

### Starter And "Auto-Off-Hand" SPDT Selector Switch (AC Only)—Class SMF, Single Phase<sup>Ⓢ</sup>

Toggle	1	Standard	SMFFF71	125.00	—	—	SMFFG71	133.00	—	—
		Red Pilot Light	SMFFF71P	151.00	SMFFS71P	160.00	SMFFG71P	160.00	—	—
	2	Standard	SMFFF72	133.00	—	—	SMFFG72	142.00	—	—
		Red Pilot Light	SMFFF72P	160.00	SMFFS72P	168.00	SMFFG72P	168.00	—	—
Key	2	Red Pilot Light	SMFFF74P	176.00	SMFFS74P	186.00	SMFFG74P	186.00	—	—

### Two Speed Starters (AC Only)—Class SMF, Single Phase<sup>Ⓢ</sup>

Toggle	1	Mechanical Interlock	SMFFF11	182.00	—	—	SMFFG11	189.00	SMFF01T	51.00
		Mechanical Interlock and (2) Red Pilot Lights	SMFFF11P	276.00	—	—	SMFFG11P	285.00	SMFF01PT	77.00
		Mechanical Interlock, HIGH-OFF-LOW Selector Switch and (2) Red Pilot Lights	—	—	SMFFS101P	285.00	—	—	SMFF01PT	77.00
	2	Mechanical Interlock	SMFFF22	198.00	—	—	SMFFG22	207.00	SMFF02T	61.00
		Mechanical Interlock and (2) Red Pilot Lights	SMFFF22P	293.00	—	—	SMFFG22P	302.00	SMFF02PT	86.00
		Mechanical Interlock, HIGH-OFF-LOW Selector Switch and (2) Red Pilot Lights	—	—	SMFFS202P	302.00	—	—	SMFF02PT	86.00

<sup>Ⓢ</sup> One heater element required.

<sup>Ⓢ</sup> Furnished with (1) 3/4" NPT Outlet in bottom (reversible for top feed).

<sup>Ⓢ</sup> Two heater elements required.

<sup>Ⓢ</sup> Order Open Type starter plus separate handle guard kit.

<sup>Ⓢ</sup> For starters that contain a pilot light, a Red light is standard. For a Green pilot light add "G" to the end of the catalog number.

# Manual Control

## Fractional HP Switches, Class MMS, MRS

General

### Class MMS, MRS

Class MMS and MRS motor starting switches provide manual "ON-OFF" control of single or three phase AC motors where overload protection is not required or is provided separately. Compact construction and a 600 volt rating make these switches suitable for a wide range of industrial and commercial uses. Typical applications include small machine tools, pumps, fans, conveyors and many other types of electrical machinery. They can also be used on non-motor loads such as resistance heating applications.

#### Continuous Current Rating

**MMS & MRS:** 30 amperes at 250 volts max, 26.4 amperes at 277 volts, 20 amperes at 600 volts max, 30 amperes resistive at 600 volts max.

#### Two Speed—Class MRS

Two speed manual switches may be used with separate winding three phase or single phase AC motors where overload protection is not required or is provided separately. Two switches are employed to give "ON-OFF" control in each speed.

#### Reversing—Class MRS

Reversing manual switches provide a compact means of starting, stopping and reversing AC motors where overload protection is not required or is provided separately. They are suitable for use with three phase squirrel cage motors and for single phase motors which can be reversed by reconnecting motor leads. Two switches are used, one to connect the motor forward rotation and one for reverse.

### Enclosures

Class MMS, MRS, NEMA Type 1 surface mounting enclosures are sheet steel with a thermo-plastic wrap-around cover for convenience in wiring. The NEMA Type 1 enclosure is also available in an oversized version which allows more wiring space. A zinc alloy die casting is used for NEMA Type 4 enclosures.

### Pilot Lights

Red or green neon pilot light units are available for flush mounting plates, NEMA Type 1 enclosures, and NEMA Type 4 enclosures. Pilot lights may be either factory or field installed. (For switches that contain a pilot light, a Red light is standard. For a Green pilot light add "G" to the end of the catalog number.)

### Terminals

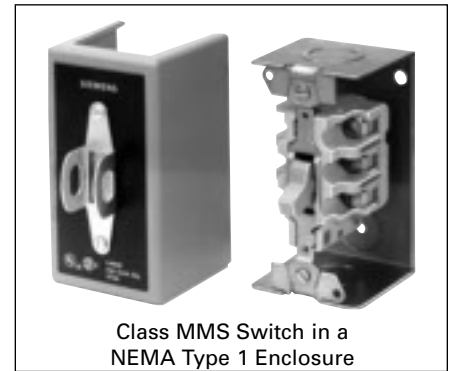
Binding head screw type terminals are suitable for #10 or smaller copper wire, and are accessible from the front. All terminals are clearly marked.

### Mounting

Open types without a pilot light fit standard single gang switch boxes, and can be used with any cover plate having a standard toggle cutout. Single-unit flush mounting types, including those with pilot lights, are suitable for wall mounting in a standard switch box or for machine cavity mounting without a box.

### Operation

Available with toggle handle or with removable key type operator to discourage unauthorized operation.



### Emergency Off Actuator

A toggle operator extender is available for Class MMS, MRS, NEMA Type 1 surface mounted units. The extender has a red vinyl button that provides a fast and easy method for locating and switching the device's toggle operator into the OFF position. The Emergency Off Actuator is available in kit form only for field installation.

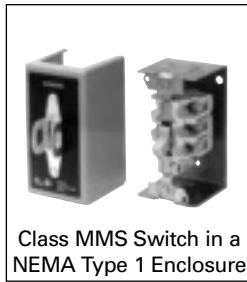
### Handle Guard/Lock-Off

An optional handle guard on Class MMS, MRS, NEMA Type 1 enclosed switches prevents accidental operation of the toggle operator and also allows the toggle operator to be padlocked in either the "ON" or "OFF" position. This handle guard is available in kit form for field installation on NEMA Type 1 surface and flush mounting enclosures. Standard NEMA Type 4 metallic enclosures include provisions for padlocking the device in the OFF position.

# Manual Control

## Switches<sup>①</sup>, Class MMS, MRS

Selection



**Ordering Information**

- ▶ Heater Elements not Required.
- ▶ Field Modification Kits see page 16-79.
- ▶ Dimensions see pages 16-99.
- ▶ Wiring Diagrams see page 16-129.

		Horsepower Ratings			DC Ratings			
Device	No of Poles	Motor Type AC	Maximum HP			DC Ratings		
			115V	230V	450-575V	90V	115V	230V
Class MMS	2	Single Phase	2	2	3	1	2	1 1/2
	3	3-Phase	2	7/2	10	1	2	1 1/2
Class MRS Reversing	2	Single Phase	2	2	3	1	2	1 1/2
	3	3-Phase	2	7/2	10	1	2	1 1/2
Class MMS Two Speed	2	Single Phase	2	2	3	1	2	1 1/2
	3	3-Phase, Constant or Variable Torque	2	7/2	10	1	2	1 1/2
	3	3-Phase, Constant Horsepower	2	7/2	10	1	2	1 1/2

### Switch—Class MMS, Single Phase and 3-Phase

Type of Operator	No of Poles	Switch Features <sup>④</sup>	General Purpose Flush Mounting Open Switch with Flush Plate (No Enclosure Provided)				NEMA Type 1 General Purpose Enclosure Surface Mounting				NEMA Type 3R, 4 & 12 Watertight, Dust-tight Metallic Enclosure with Clear Cover	NEMA Type 4 <sup>⑤</sup> Watertight, Dust-tight Metallic Enclosure	NEMA Type 7 & 9 <sup>⑥</sup> Class I Groups B, C & D & Class II Groups E, F, G Enclosures							
			Open Type		Standard Stainless Steel Flush Plate		Jumbo Stainless Steel Flush Plate		Standard					Oversized						
			Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Toggle	2	Standard	MMSK01	32.00	MMSKF1	36.00	MMSKS1	40.50	—	—	MMSKG1	40.50	MMSKJ1	49.00	MMSKWN1	170.00	MMSKW1	189.00	MMSKR1	207.00
		Red Pilot Light 115V AC	MMSK01A <sup>②</sup>	75.00	MMSKF1A	80.00	MMSKS1A	83.00	MMSKSJ1A	97.00	MMSKG1A	83.00	MMSKJ1A	91.00	MMSKWN1A	212.00	MMSKW1A	258.00	—	—
		Red Pilot Light 230V AC	MMSK01B <sup>③</sup>	75.00	MMSKF1B	80.00	MMSKS1B	83.00	MMSKSJ1B	97.00	MMSKG1B	83.00	MMSKJ1B	91.00	MMSKWN1B	212.00	MMSKW1B	258.00	—	—
	3	Standard	MMSK02	82.00	MMSKF2	86.00	MMSKS2	90.00	—	—	MMSKG2	90.00	MMSKJ2	100.00	MMSKWN2	212.00	MMSKW2	233.00	MMSKR2	254.00
		Red Pilot Light 208-240V AC	MMSK02B <sup>③</sup>	125.00	MMSKF2B	130.00	MMSKS2B	133.00	MMSKSJ2B	147.00	MMSKG2B	133.00	MMSKJ2B	142.00	MMSKWN2B	281.00	MMSKW2B	302.00	—	—
		Red Pilot Light 440-600V AC	MMSK02C <sup>③</sup>	125.00	MMSKF2C	130.00	MMSKS2C	133.00	MMSKSJ2C	147.00	MMSKG2C	133.00	MMSKJ2C	142.00	MMSKWN2C	281.00	MMSKW2C	302.00	—	—
Key	2	Standard	MMSK03	49.00	MMSKF3	54.00	MMSKS3	57.00	—	—	MMSKG3	57.00	MMSKJ3	69.00	MMSKWN3	187.00	—	—	—	—
		Red Pilot Light 115V AC	MMSK03A	91.00	MMSKF3A	97.00	MMSKS3A	101.00	MMSKSJ3A	111.00	MMSKG3A	101.00	MMSKJ3A	107.00	MMSKWN3A	229.00	—	—	—	—
		Red Pilot Light 230V AC	MMSK03B	91.00	MMSKF3B	97.00	MMSKS3B	101.00	MMSKSJ3B	111.00	MMSKG3B	101.00	MMSKJ3B	107.00	MMSKWN3B	229.00	—	—	—	—
	3	Standard	MMSK04	127.00	MMSKF4	103.00	MMSKS4	107.00	—	—	MMSKG4	107.00	MMSKJ4	117.00	MMSKWN4	237.00	—	—	—	—
		Red Pilot Light 208-240V AC	MMSK04B	142.00	MMSKF4B	147.00	MMSKS4B	151.00	MMSKSJ4B	163.00	MMSKG4B	151.00	MMSKJ4B	160.00	MMSKWN4B	306.00	—	—	—	—
		Red Pilot Light 440-600V AC	MMSK04C	142.00	MMSKF4C	147.00	MMSKS4C	151.00	MMSKSJ4C	163.00	MMSKG4C	151.00	MMSKJ4C	160.00	MMSKWN4C	306.00	—	—	—	—

### Reversing Switch—Class MRS, Single Phase and 3-Phase

Type of Operator	Number of Poles	Suitable Motor Types	Switch Features <sup>④</sup> (Including Mechanical Interlock)	General Purpose Flush Mounting Open Switch with Flush Plate (No Enclosure Provided)		NEMA Type 1 General Purpose Enclosure Surface Mounting		Replacement Switch Class MRS	
				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Toggle	2	Single Phase 3-Lead Repulsion-Induction	Standard	MRSKF11	163.00	MRSKG11	172.00	MRSK01T	40.50
			Red Pilot Device—115V AC	MRSKF11A	233.00	MRSKG11A	242.00	MRSK01AT	83.00
			Red Pilot Device—230V AC	MRSKF11B	233.00	MRSKG11B	242.00	MRSK01BT	83.00
	3	3-Phase; Also Single Phase Capacitor, Split Phase, or 4-Lead Repulsion-Induction	Standard	MRSKF22	258.00	MRSKG22	268.00	MRSK02T	90.00
			Red Pilot Light—110-120V AC	MRSKF22A	328.00	MRSKG22A	336.00	MRSK02AT	133.00
			Red Pilot Light—208-220V AC	MRSKF22B	328.00	MRSKG22B	336.00	MRSK02BT	133.00
		Red Pilot Light—440-600V AC	MRSKF22C	328.00	MRSKG22C	336.00	MRSK02CT	133.00	

### Two Speed Switch—Class MMS, Single Phase and 3-Phase

Type of Operator	Number of Poles	Suitable Motor Types	Switch Features <sup>④</sup> (Including Mechanical Interlock)	General Purpose Flush Mounting Open Switch with Flush Plate (No Enclosure Provided)		NEMA Type 1 General Purpose Enclosure Surface Mounting		Replacement Switch Class MRS	
				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Toggle	2	Single Phase Two Winding (3-Lead)	Standard	MMSKF11	163.00	MMSKG11	172.00	MRSK01T	40.50
			(2) Red Pilot Devices—115V AC	MMSKF11A	302.00	MMSKG11A	310.00	MRSK01AT	83.00
			(2) Red Pilot Devices—230V AC	MMSKF11B	302.00	MMSKG11B	310.00	MRSK01BT	83.00
	3	3-Phase Separate Winding (Wye-Connected)	Standard	MMSKF22	258.00	MMSKG22	268.00	MRSK02T	90.00
			(2) Red Pilot Lights—208-240V AC	MMSKF22B	396.00	MMSKG22B	405.00	MRSK02BT	133.00
			(2) Red Pilot Lights—440-600V AC	MMSKF22C	396.00	MMSKG22C	405.00	MRSK02CT	133.00

① Manual switches do not include overloads.

② Furnished with (1) 3/4" NPT outlet in bottom (reversible for top feed). In order to obtain a 3/4" NPT outlet in top and bottom, add suffix letter "H" to type number and add \$16 to List Price.

③ Do not use as replacement interiors for NEMA Type 4 metallic enclosures. For replacement unit, order Type MMSK01 or MMSK02 and separate pilot light kit.

④ For switches that contain a pilot light, a Red light is standard. For a Green pilot light add "G" to the end of the catalog number.

# Manual Control

## Starters and Switches, Class 11 - 3RV

General

### Class 11 - 3RV

Class 11 across the line manual starters and switches provide control for machinery where remote start stop control is not required.

**Class 11 - 3RV** manual starters are used for single and poly-phase motors up to 20HP @ 575V. Starters have bimetallic heater elements to provide class 10 overcurrent protection. Each starter has a fourth bimetallic strip that reacts only to the ambient temperature inside the control panel. This ambient compensation helps prevent the starter from nuisance tripping when the panel temperature is higher than the ambient temperature of the motor.

A built-in differential trip bar causes the starter to trip faster on a phase loss condition to help reduce motor damage.

Magnetic trip elements in each starter take the device off line when it senses current of 13 times the maximum FLA dial setting.

**Class 11 - 3RV** switches provide control for inherently protected motors. Typical applications include metal and woodworking machinery, grinders, power saws, conveyors, fans, pumps,

blowers, textile and packaging machinery, and paper cutters.

Each switch is provided with magnetic trip elements which take the device off line when it senses current of 13 times the maximum switch rating.

**Class 11 - 3RV** manual starters can be used as Type E self-protected manual combination starters (up to 22 amps) per UL508 or as components in Group Installation per NEC 430.53. When using the Class 11 - 3RV as a manual combination starter upstream protection is not required.

**Class 11 - 3RV** controllers are available with low voltage protection which will automatically open the power poles when the voltage drops or the power is interrupted.

Controllers with the LVP option provide the OSHA requirements for protecting personnel from potential injury caused by the automatic start-up of machinery following a voltage drop or power interruption when low voltage protection is specified.

**Class 11 - 3RV** is available as Open style, or in NEMA 1, NEMA 7 & 9 or NEMA 7 & 9 / 3 & 4 enclosures.

Standard Features include:

- ON/OFF rotary handle with lockout and visible trip indication
- Adjustment dial for setting to motor FLA (Starters only)
- Low Voltage Protection (LVP) Option
- Short Circuit trip at 13 times the maximum setting of the FLA dial or rated current
- Ambient compensated up to 140°F
- Phase loss sensitivity
- Test trip function
- LVP Option Meets OSHA Requirements
- UL Listed
- CSA Certified



OPEN TYPE  
Starter



NEMA 1  
General Purpose



NEMA 7 & 9  
Div 1 & Div 2  
Class I Group C & D  
Class II Group E, F & G




NEMA 3 & 4, NEMA 7 & 9  
Div 1 & Div 2  
Class I Group C & D  
Class II Group E, F & G

# Manual Control

## Starters and Switches, Class 11 - 3RV

Selection

 <p>Class 11 Manual Motor Starter</p>	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ No heaters required.</li> <li>▶ Field modification kits see page 16-79.</li> <li>▶ Dimensions see page 16-101.</li> <li>▶ Wiring Diagrams see page 16-129.</li> <li>▶ For applications requiring a low voltage protection coil see table at right.</li> </ul>	<b>Low Voltage Protection Coil Table</b> <table border="1"> <thead> <tr> <th>60 Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>120V</td> <td>*F</td> </tr> <tr> <td>208V</td> <td>*D</td> </tr> <tr> <td>240V</td> <td>*G</td> </tr> <tr> <td>460V</td> <td>*H</td> </tr> </tbody> </table> <p>*Add corresponding letter to end of base Class 11 catalog number for low voltage protection coil. <b>\$96.00</b> list adder.</p> <p>Note: The LVP option for Open type 3RV is available from the factory, please order separately from the field modification kits on page 16-80.</p> <p>The coil voltage should correspond with the line voltage.</p>	60 Hz Voltage	Letter	120V	*F	208V	*D	240V	*G	460V	*H
	60 Hz Voltage	Letter										
120V	*F											
208V	*D											
240V	*G											
460V	*H											

### Manual Starter—Class 11 - 3RV

FLA Adjustment Range <sup>①</sup>	Max HP						Enclosure							
	Single Phase HP Ratings		3-Phase HP Ratings				Open Type		NEMA 1 General Purpose		NEMA 7 & 9 Class I Groups C & D Class II Groups E, F & G		NEMA 3 & 4, NEMA 7 & 9 <sup>④</sup> Watertight (Outdoor use) Class I Groups C & D Class II Groups E, F & G	
	115V	230V	200V	230V	460V	575V	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
0.11-0.16	—	—	—	—	—	—	3RV1021-0AA10 <sup>②</sup>	145.00	11AD3B	160.00	11AD3H	555.00	11AD3W	652.00
0.14-0.2	—	—	—	—	—	—	3RV1021-0BA10 <sup>②</sup>	145.00	11BD3B	160.00	11BD3H	555.00	11BD3W	652.00
0.18-0.25	—	—	—	—	—	—	3RV1021-0CA10 <sup>②</sup>	145.00	11CD3B	160.00	11CD3H	555.00	11CD3W	652.00
0.22-0.32	—	—	—	—	—	—	3RV1021-0DA10 <sup>②</sup>	145.00	11DD3B	160.00	11DD3H	555.00	11DD3W	652.00
0.28-0.4	—	—	—	—	—	—	3RV1021-0EA10 <sup>②</sup>	145.00	11ED3B	160.00	11ED3H	555.00	11ED3W	652.00
0.35-0.5	—	—	—	—	—	—	3RV1021-0FA10 <sup>②</sup>	160.00	11FD3B	189.00	11FD3H	586.00	11FD3W	682.00
0.45-0.63	—	—	—	—	—	—	3RV1021-0GA10 <sup>②</sup>	160.00	11GD3B	189.00	11GD3H	586.00	11GD3W	682.00
0.55-0.8	—	—	—	—	—	1/2	3RV1021-0HA10 <sup>②</sup>	160.00	11HD3B	189.00	11HD3H	586.00	11HD3W	682.00
0.7-1	—	—	—	—	1/2	1/2	3RV1021-0JA10 <sup>②</sup>	160.00	11JD3B	189.00	11JD3H	586.00	11JD3W	682.00
0.9-1.25	—	—	—	—	3/4	3/4	3RV1021-0KA10 <sup>②</sup>	160.00	11KD3B	189.00	11KD3H	586.00	11KD3W	682.00
1.1-1.6	—	1/2	—	—	3/4	1	3RV1021-1AA10 <sup>②</sup>	160.00	11LD3B	189.00	11LD3H	586.00	11LD3W	682.00
1.4-2	—	1/2	—	—	1	1 1/2	3RV1021-1BA10 <sup>②</sup>	160.00	11MD3B	189.00	11MD3H	586.00	11MD3W	682.00
1.8-2.5	—	1/2	1/2	1/2	1 1/2	1 1/2	3RV1021-1CA10 <sup>②</sup>	160.00	11ND3B	189.00	11ND3H	586.00	11ND3W	682.00
2.2-3.2	1/2	1/2	3/4	3/4	1 1/2	2	3RV1021-1DA10 <sup>②</sup>	160.00	11PD3B	189.00	11PD3H	586.00	11PD3W	682.00
2.8-4	1/2	1/2	3/4	1	2	3	3RV1021-1EA10 <sup>②</sup>	160.00	11QD3B	189.00	11QD3H	586.00	11QD3W	682.00
3.5-5	1/2	1/2	1	1	3	3	3RV1021-1FA10 <sup>②</sup>	160.00	11RD3B	189.00	11RD3H	586.00	11RD3W	682.00
4.5-6.3	1/2	3/4	1 1/2	1 1/2	5	5	3RV1021-1GA10 <sup>②</sup>	160.00	11SD3B	189.00	11SD3H	586.00	11SD3W	682.00
5.5-8	1/2	1	2	2	5	5	3RV1021-1HA10 <sup>②</sup>	160.00	11TD3B	189.00	11TD3H	586.00	11TD3W	682.00
7-10	1/2	1 1/2	3	3	7 1/2	10	3RV1021-1JA10 <sup>②</sup>	160.00	11UD3B	189.00	11UD3H	586.00	11UD3W	682.00
9-12.5	1/2	2	3	3	7 1/2	10	3RV1021-1KA10 <sup>②</sup>	191.00	11VD3B	233.00	11VD3H	689.00	11VD3W	785.00
11-16	1	3	5	5	10	15 <sup>③</sup>	3RV1021-4AA10 <sup>②</sup>	191.00	11WD3B	233.00	11WD3H	689.00	11WD3W	785.00
14-20	1 1/2	3	5	7 1/2	15	20 <sup>③</sup>	3RV1021-4BA10 <sup>②</sup>	191.00	11XD3B	233.00	11XD3H	689.00	11XD3W	785.00
17-22	2	3	7 1/2	7 1/2	15	20 <sup>③</sup>	3RV1021-4CA10 <sup>②</sup>	191.00	11YD3B	233.00	11YD3H	689.00	11YD3W	785.00
20-25	2 <sup>③</sup>	5 <sup>③</sup>	7 1/2 <sup>③</sup>	7 1/2 <sup>③</sup>	15 <sup>③</sup>	20 <sup>③</sup>	3RV1021-4DA10 <sup>②</sup>	191.00	11ZD3B	233.00	11ZD3H	689.00	11ZD3W	785.00

### Manual Switch—Class 11 - 3RV

Rated Current <sup>①</sup>	Max HP						Enclosure							
	Single Phase HP Ratings		3-Phase HP Ratings				Open Type		NEMA 1 General Purpose		NEMA 7 & 9 Class I Groups C & D Class II Groups E, F & G		NEMA 3 & 4, NEMA 7 & 9 Watertight Class I Groups C & D Class II Groups E, F & G	
	115V	230V	200V	230V	460V	575V	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1	—	—	—	—	1/2 <sup>③</sup>	1/2 <sup>③</sup>	3RV1321-0JC10 <sup>②</sup>	154.00	111D3B	189.00	111D3H	586.00	111D3W	682.00
5	1/2 <sup>③</sup>	1/2 <sup>③</sup>	1 <sup>③</sup>	1 <sup>③</sup>	3 <sup>③</sup>	3 <sup>③</sup>	3RV1321-1FC10 <sup>②</sup>	154.00	112D3B	189.00	112D3H	586.00	112D3W	682.00
10	1/2 <sup>③</sup>	1 1/2 <sup>③</sup>	3 <sup>③</sup>	3 <sup>③</sup>	7 1/2 <sup>③</sup>	10 <sup>③</sup>	3RV1321-1JC10 <sup>②</sup>	154.00	113D3B	189.00	113D3H	586.00	113D3W	682.00
20	1 1/2 <sup>③</sup>	3 <sup>③</sup>	5 <sup>③</sup>	7 1/2 <sup>③</sup>	15 <sup>③</sup>	20 <sup>③</sup>	3RV1321-4BC10 <sup>②</sup>	185.00	114D3B	233.00	114D3H	689.00	114D3W	785.00
25	2 <sup>③</sup>	5 <sup>③</sup>	7 1/2 <sup>③</sup>	7 1/2 <sup>③</sup>	15 <sup>③</sup>	20 <sup>③</sup>	3RV1321-4DC10 <sup>②</sup>	185.00	115D3B	233.00	115D3H	689.00	115D3W	785.00

① Instantaneous Magnetic Trip will occur at 13 times the maximum FLA dial setting or rated switch current.  
② Discount Code: IEC.

③ Shaded Ratings apply for Manual Motor Controllers Only! These Ratings do not apply as UL Listed Manual Combination Starters.

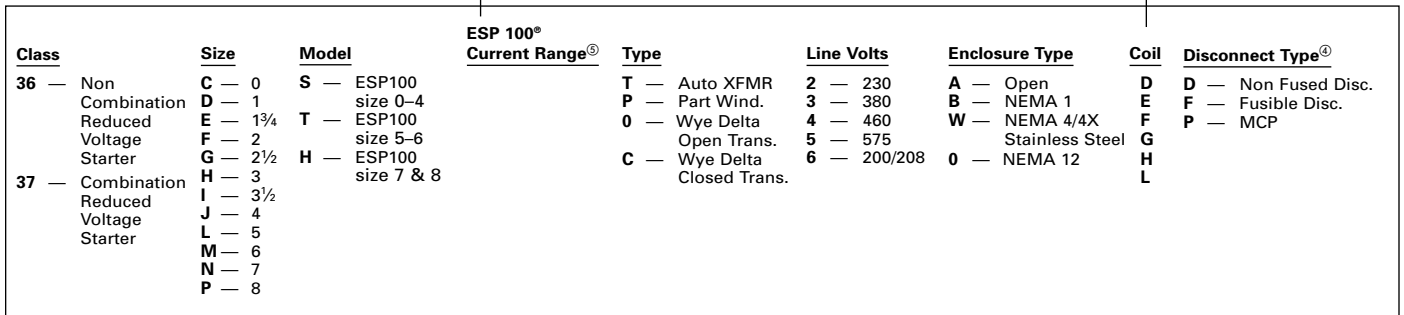
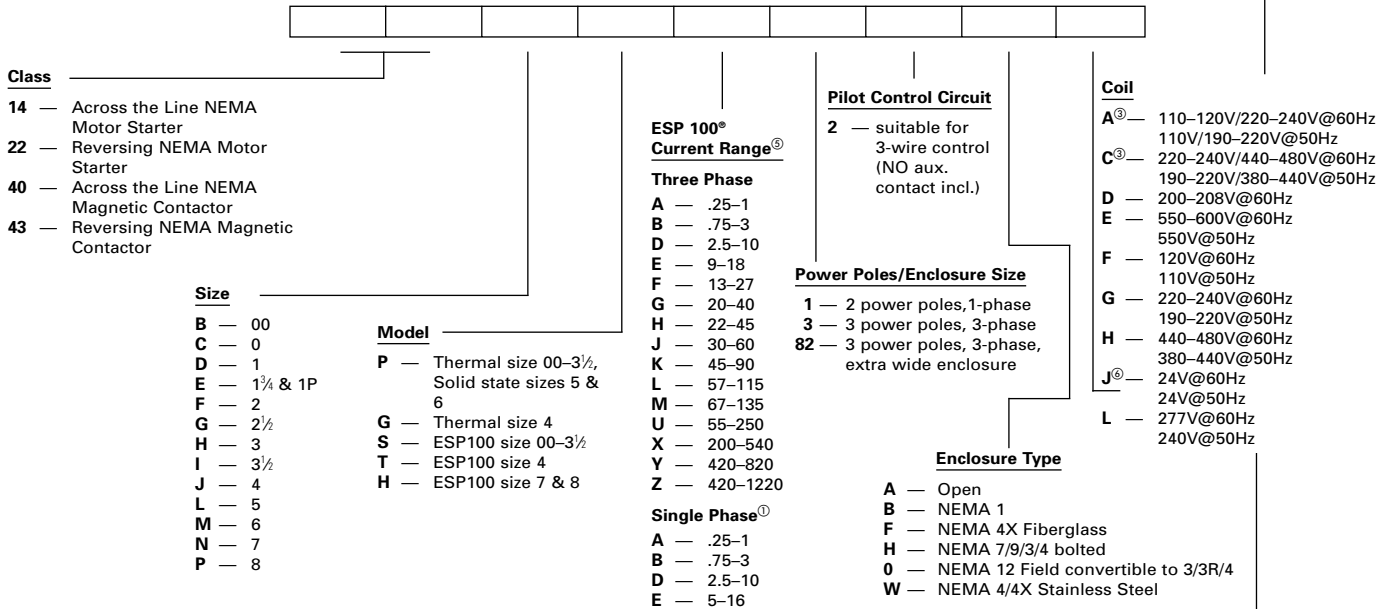
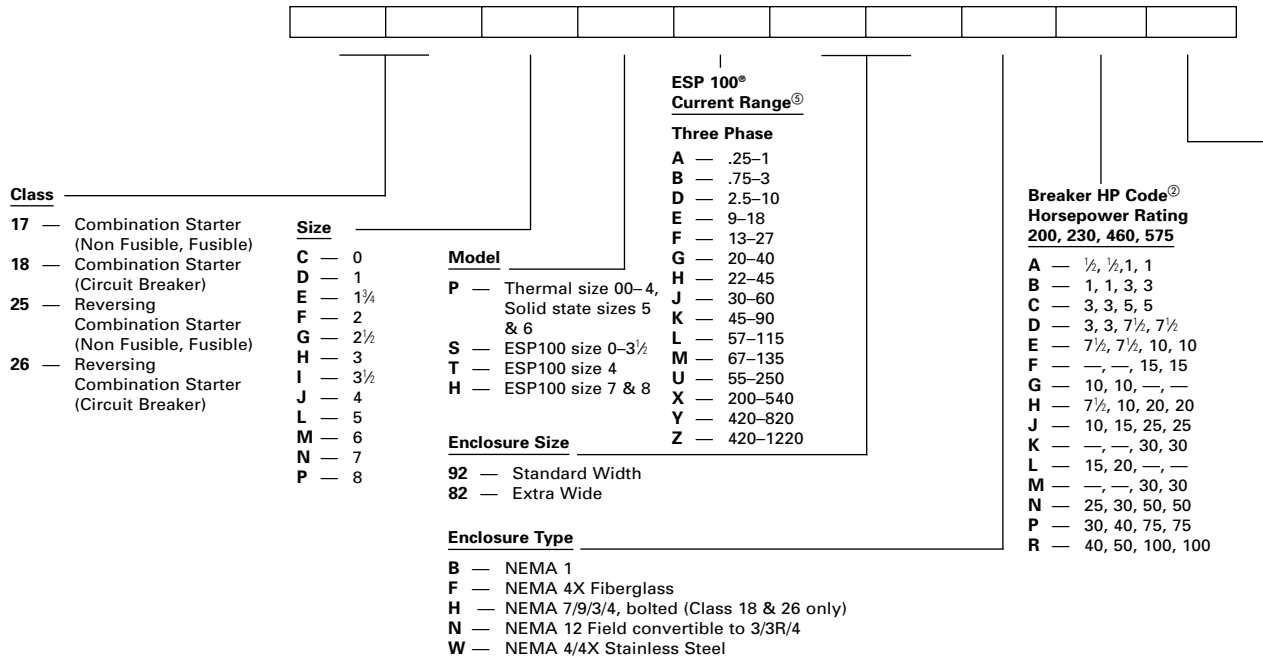
④ Add 1 to the end of the catalog number for 1/2 inch drain hole with plug. Add \$53. to the list price. Drain fitting not supplied, order separately XDB-2.



# Heavy Duty Control

## Catalog Numbering System

General



① Single phase ESP100 available on Class 14 Starters only.  
② Not used on Class 17, 25 or with ESP100 versions.

③ Not available on sizes 5-8.  
④ For Class 37 only.

⑤ Position used for ESP100 only.  
⑥ Not available on sizes 7 and 8.

# Heavy Duty Starters

## Features and Benefits

General



### Standard Features

Size 00–4 magnetic starters include the following standard features:

- Rugged Industrial Design
- Half Sizes for Cost and Space Savings
- Dual Voltage, Dual Frequency Coils
- Solid State or Ambient Compensated Bimetal Overload Protection
- Wide Range of Accessories
- Easy Coil Access
- Overload Test Feature
- Straight Thru Wiring
- Gravity Dropout
- Large Silver Cadmium Contacts

### Application

Heavy Duty starters are designed for across the line starting of single phase and polyphase motors.

These controls are available in NEMA Sizes 00 through 8. In addition to the usual NEMA Starter Sizes, Siemens offers three exclusive Half Sizes; 1¾, 2½ and 3½. These integral sizes offer the same rugged, industrial construction as our NEMA Sizes and ensure efficient operating performance. Half Sizes provide a real cost savings by cutting down on over capacity when NEMA Sizes exceed the motor ratings. All Siemens Heavy Duty controls, including our popular Half Sizes comply with applicable NEMA and UL tests.

All starters are supplied with a NO holding interlock that in conjunction with an appropriate pilot device will provide low voltage protection or release.

NEMA starters are ideal for applications requiring dependability and durability. Typical applications include use with machine tools, air conditioning equipment, material handling equipment, compressors, hoists and various production and industrial equipment as well as in demanding automotive applications.

Starters are available as an open type or in NEMA 1, 12/3/3R, 4 (painted), 4/4X (stainless), 4X (fiberglass), and 7 & 9 enclosures.

### Gravity Dropout

For added reliability, the gravity dropout of the armature and contacts is assisted by stainless steel springs which help provide quick, precise opening of the contacts.

### 45 Degree, Wedge Action Contacts

The 45 degree, wedge action contacts reduce tracking and provide faster arc quenching. The resulting self-cleaning and reduced contact bounce mean cooler operation and longer life for the large silver cadmium oxide contacts.

### Terminal Design

Control terminals are self-rising pressure type.

### Molded Coil

Magnetic coils are carefully wound and then sealed in epoxy. Encapsulation helps seal out moisture, promotes heat transfer and resists electrical, mechanical and thermal stresses.

### Dual Voltage/Frequency Coil

Starters are available with dual voltage, dual frequency coils. They are designed to operate on either 50 or 60 Hertz.

### Molded Stationary Contact Block

Thermoset materials resist arc tracking and the stresses of heat and severe impact.

### Field Modification Kits

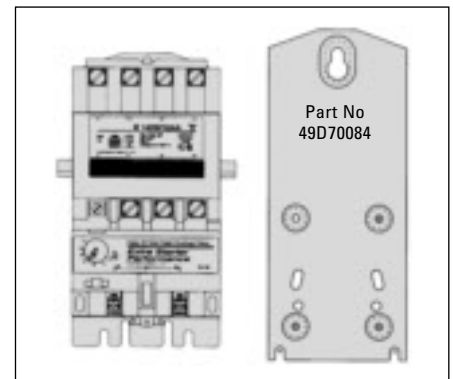
All starters can be modified in the field with a complete range of accessories. These include pushbuttons, selector switches, pilot lights, auxiliary contacts and surge suppressors.

### Auxiliary Equipment

- NEMA starters are available with built-in START-STOP push buttons for 3-wire control or a HAND-OFF-AUTO selector switch for 2-wire control
- Field modifications such as auxiliary contacts, pilot lights, push buttons, selector switches, and fuse blocks

are available to meet particular application requirements

- Normally opened or normally closed auxiliary power pole kits are available for Sizes 00 through 1¾
- Transformers can be ordered as either factory or field modifications. In some cases these may require a larger enclosure
- A full line of replacement parts are available including contact kits, coils, and overload relays



Siemens Sizes 00–1¾ have as standard, universal mounting which fits the following:

Cutler Hammer—Citation Series  
—Freedom Series

GE —300 Line

Square D —Type S

The Starter with its existing backplate mounts onto the piggyback mounting plate and is secured in place with three mounting screws. The piggyback mounting plate fits the following:

Allen-Bradley —Bulletin 509  
—Bulletin 709

Westinghouse —Series A200

### Size 5 & 6 Starters Additional Features

- Solid State Overload (3RB type) Standard
- Latest technology in arc quenching to extend contactor life
- Wide variety of enclosures in all starter configurations

### Size 7 & 8 Starters Additional Features

- New Compact Design
- Can be mounted in any position
- Same coil voltage is AC or DC

# Heavy Duty Starters

## Features and Benefits



ESP100<sup>®</sup> starters combine the rugged characteristics of a NEMA rated contactor with a solid state overload that provides phase loss protection. It offers the industrial user greater protection and added life for motors in heavy duty applications. The inherent benefits of the ESP100<sup>®</sup> ultimately result in a cost savings to the user.

### ESP100<sup>®</sup> Solid State Overload Relays

These standard features of the ESP100<sup>®</sup> provide Extra Starter Performance.

- True phase loss protection; trips within 3 seconds
- High accuracy trip curves;  $\pm 2\%$  repeat trip accuracy
- Ease of use. Mount, wire, and set FLA
- Overload is self protected against short circuits
- Overload is self powered and requires no hard wiring or separate power source
- Heaterless construction minimizes energy costs and the costs of cabinet ventilation or cooling
- Class 20 protection is standard. Class 10 and 30 protection are available
- Provides motor protection for 50/60 Hertz

### Half Size Starters

Half-Size starters feature all the rugged performance characteristics of our NEMA rated starter sizes, but are fractionally sized to more closely match your exact motor rating. As a result, significant economic savings are made possible without sacrificing the reliability you expect from a heavy duty starter.

These additional starter sizes have the reserve capacity to handle occasional plugging and jogging applications without derating. Superior operating performance in heavy duty applications is assured by the large current carrying parts, not by derating the device.

Exclusive “half-sizes” save potentially hundreds, even thousands of dollars per project.

Using the table below, simply match the specific size starter to the horsepower rating of your motor. Every half-size starter saves you money—up to 31%.

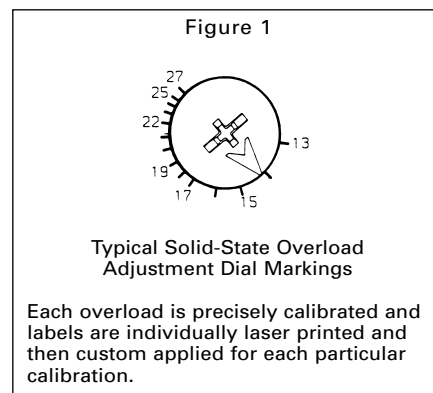
All “half-sizes” comply to applicable NEMA and UL standards.

### Savings for Siemens “Half-Size” Starters in NEMA 1 Enclosures, FVNR

Motor Size		Starter Size	Half Size	List Price \$	“Half-Size” Savings Over Next Full Size
230V	460V				
7 1/2	10	1	—	<b>393.</b>	—
10	15	—	1 1/4	<b>521.</b>	31%
15	25	2	—	<b>737.</b>	—
20	30	—	2 1/2	<b>969.</b>	20%
30	50	3	—	<b>1202.</b>	—
40	75	—	3 1/2	<b>2321.</b>	13%
50	100	4	—	<b>2666.</b>	—

## Selection

**ESP100<sup>®</sup> FLA Adjustment Dial—Set the adjustment dial on the overload to the FLA of the motor.**



# Heavy Duty Motor Starters

## Solid State Overload with Manual Reset, Class 14

## Selection



### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Field Modification Kits see pages 16-79.
- ▶ Factory Modifications see pages 16-94.
- ▶ Dimensions see pages 16-102 open and 16-115 enclosed.
- ▶ Wiring Diagrams see page 16-130.
- ▶ Replacement Parts see pages 16-155.
- ▶ Shipped as standard Class 20. For Class 10 or Class 30 see page 16-96.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>①</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>①</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure													
200 Volts	230 Volts	460 Volts	575 Volts				Open Type Standard Auxiliary Contacts <sup>②</sup>	NEMA 1 General Purpose	NEMA 4/4X Stainless <sup>③</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>④</sup>	NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant	NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use	NEMA 12 NEMA 3/3R <sup>⑤</sup> Industrial Use Weatherproof	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/8	1/8	1/8	00	—	0.25-1	14BSA32A*	272.00	14BSA32B*	289.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
1/4	3/8	1 1/2	2	00	—	0.75-3	14BSB32A*	272.00	14BSB32B*	289.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
1/2	1 1/2	2	—	00	—	2.5-10	14BSD32A*	272.00	14BSD32B*	289.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
1/8	1/8	1/8	1/8	0	—	0.25-1	14CSA32A*	332.00	14CSA32B*	349.00	14CSA32W*	651.00	14CSA32H*	716.00	14CSA32H*	1434.00	14CSA32M*	452.00	—	—
1/4	3/8	1 1/2	2	0	—	0.75-3	14CSB32A*	332.00	14CSB32B*	349.00	14CSB32W*	651.00	14CSB32H*	716.00	14CSB32H*	1434.00	14CSB32M*	452.00	—	—
2	2	5	5	0	—	2.5-10	14CSD32A*	332.00	14CSD32B*	349.00	14CSD32W*	651.00	14CSD32H*	716.00	14CSD32H*	1434.00	14CSD32M*	452.00	—	—
3	3	—	—	0	—	9-18	14CSE32A*	332.00	14CSE32B*	349.00	14CSE32W*	651.00	14CSE32H*	716.00	14CSE32H*	1434.00	14CSE32M*	452.00	—	—
1/8	1/8	1/8	1/8	1	—	0.25-1	14DSA32A*	375.00	14DSA32B*	393.00	14DSA32W*	702.00	14DSA32H*	773.00	14DSA32H*	1477.00	14DSA32M*	496.00	—	—
1/4	3/8	1 1/2	2	1	—	0.75-3	14DSB32A*	375.00	14DSB32B*	393.00	14DSB32W*	702.00	14DSB32H*	773.00	14DSB32H*	1477.00	14DSB32M*	496.00	—	—
2	2	5	5	1	—	2.5-10	14DSD32A*	375.00	14DSD32B*	393.00	14DSD32W*	702.00	14DSD32H*	773.00	14DSD32H*	1477.00	14DSD32M*	496.00	—	—
3	3	10	10	1	—	9-18	14DSE32A*	375.00	14DSE32B*	393.00	14DSE32W*	702.00	14DSE32H*	773.00	14DSE32H*	1477.00	14DSE32M*	496.00	—	—
7 1/2	7 1/2	—	—	1	—	13-27	14DSF32A*	375.00	14DSF32B*	393.00	14DSF32W*	702.00	14DSF32H*	773.00	14DSF32H*	1477.00	14DSF32M*	496.00	—	—
—	—	15	15	—	1 1/4	13-27	14ESF32A*	504.00	14ESF32B*	521.00	14ESF32W*	831.00	14ESF32H*	914.00	14ESF32H*	1606.00	14ESF32M*	625.00	—	—
10	10	—	—	—	1 1/4	20-40	14ESG32A*	504.00	14ESG32B*	521.00	14ESG32W*	831.00	14ESG32H*	914.00	14ESG32H*	1606.00	14ESG32M*	625.00	—	—
—	—	15	20	2	—	13-27	14FSF32A*	651.00	14FSF32B*	737.00	14FSF32W*	1357.00	14FSF32H*	1492.00	14FSF32H*	2029.00	14FSF32M*	926.00	—	—
10	15	25	25	2	—	22-45	14FSH32A*	651.00	14FSH32B*	737.00	14FSH32W*	1357.00	14FSH32H*	1492.00	14FSH32H*	2029.00	14FSH32M*	926.00	—	—
—	—	30	30	—	2 1/2	22-45	14GSH32A*	840.00	14GSH32B*	969.00	14GSH32W*	1719.00	14GSH32H*	1891.00	14GSH32H*	2528.00	14GSH32M*	1176.00	—	—
15	20	—	—	—	2 1/2	30-60	14GSJ32A*	840.00	14GSJ32B*	969.00	14GSJ32W*	1719.00	14GSJ32H*	1891.00	14GSJ32H*	2528.00	14GSJ32M*	1176.00	—	—
—	—	30	40	3	—	30-60	14HSJ32A*	1030.00	14HSJ32B*	1202.00	14HSJ32W*	2081.00	14HSJ32H*	2289.00	14HSJ32H*	3627.00	14HSJ32M*	1426.00	—	—
25	30	50	50	3	—	45-90	14HSK32A*	1030.00	14HSK32B*	1202.00	14HSK32W*	2081.00	14HSK32H*	2289.00	14HSK32H*	3627.00	14HSK32M*	1426.00	—	—
30	40	75	75	—	3 1/2	57-115	14ISL32A*	1960.00	14ISL32B*	2322.00	14ISL32W*	3821.00	14ISL32H*	4203.00	14ISL32H*	4519.00	14ISL32M*	3063.00	—	—
40	50	100	100	4	—	67-135	14JTM32A*	2305.00	14JTM32B*	2666.00	14JTM32W*	4165.00	14JTM32H*	4582.00	14JTM32H*	4864.00	14JTM32M*	3407.00	—	—
75	100	200	200	5	—	55-250	14LPU32A*	5573.00	14LPU32B*	6238.00	14LPU32E <sup>⑥</sup>	8133.00	—	—	—	14LPU32H*	11269.00	14LPU32M*	8133.00	—
150	200	400	400	6	—	160-540	14MPX32A*	13198.00	14MPX32B*	17507.00	14MPX32E <sup>⑥</sup>	21814.00	—	—	—	—	—	14MPX32M*	19832.00	—
—	300	600	600	7 <sup>⑤</sup>	—	420-820	14NHV32A*	19547.00	14NHV32B*	23855.00	14NHV32E*	28162.00	—	—	—	—	—	14NHV32M*	26181.00	—
—	450	900	900	8 <sup>⑥</sup>	—	420-1220	14PHZ32A*	29223.00	14PHZ32B*	33530.00	14PHZ32E*	37837.00	—	—	—	—	—	14PHZ32M*	35855.00	—

### Open Type & Standard Width Enclosure, Single Phase, 2-Pole<sup>③</sup>

Max Hp		NEMA Size	Overload Amp Range	Enclosure													
115 Volts	208/230 Volts			Open Type	NEMA 1 General Purpose	NEMA 4/4X Stainless <sup>③</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>④</sup>	NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant	NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use	NEMA 12 NEMA 3/3R <sup>⑤</sup> Industrial Use Weatherproof	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/4	0	0.75-3	14CSB12A*	276.00	14CSB12B*	293.00	14CSB12W*	595.00	14CSB12F*	654.00	14CSB12H*	1379.00	14CSB12M*	396.00	—	—
1/4	1/2	0	2.5-10	14CSD12A*	276.00	14CSD12B*	293.00	14CSD12W*	595.00	14CSD12F*	654.00	14CSD12H*	1379.00	14CSD12M*	396.00	—	—
1	2	0	5.0-16	14CSE12A*	276.00	14CSE12B*	293.00	14CSE12W*	595.00	14CSE12F*	654.00	14CSE12H*	1379.00	14CSE12M*	396.00	—	—
1/8	1/4	1	0.75-3	14DSB12A*	319.00	14DSB12B*	336.00	14DSB12W*	647.00	14DSB12F*	711.00	14DSB12H*	1422.00	14DSB12M*	440.00	—	—
1/4	1/2	1	2.5-10	14DSD12A*	319.00	14DSD12B*	336.00	14DSD12W*	647.00	14DSD12F*	711.00	14DSD12H*	1422.00	14DSD12M*	440.00	—	—
1	2	1	5.0-16	14DSE12A*	319.00	14DSE12B*	336.00	14DSE12W*	647.00	14DSE12F*	711.00	14DSE12H*	1422.00	14DSE12M*	440.00	—	—

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating. For higher Hp single phase motors, use 3-phase starters, wire and set per diagram on page 16-130.


- ① Dual voltage coils not available in size 5-8 starters.
- ② For conduit hubs and conversion instructions, see page 16-87.
- ③ Coils D, F, or G will be wired for incoming voltage. J coil will be wired for separate source. Coils E, H, and L do not apply to single phase starters.
- ④ Enclosure is NEMA Type 4 (painted steel).

- ⑤ F coil 100-250V AC 50/60Hz, or DC, H coil 150-500V AC 50/60Hz, or DC
- ⑥ Only available F coil 100-250V AC 50/60Hz, or DC
- ⑦ Standard Auxiliary Contacts, Same as Contactors, refer to page 16-44.
- ⑧ For 316 Stainless Steel option see page 16-98.

# Heavy Duty Motor Starters

## Solid State Overload with Manual Reset, Class 14

Selection

 <p>NEMA 1</p>	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-115.</li> <li>▶ Wiring Diagrams see page 16-130.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240</td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480</td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240	A	200-208	D	220-240	G	277	L	220-240/440-480	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110-120/220-240	A																					
200-208	D																					
220-240	G																					
277	L																					
220-240/440-480	C																					
440-480	H																					
575-600	E																					

### Extra Wide Enclosure, 3-Phase, 3-Pole<sup>①</sup>

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel <sup>③</sup>		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G, Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>②</sup> Industrial Use Weatherproof	
							Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
1/8	1/8	1/8	1/2	00	—	0.25-1	14BSA82B*	506.00	Use Size 0	—	—	—	Use Size 0	—
1/4	3/4	1 1/2	2	00	—	0.75-3	14BSB82B*	506.00	Use Size 0	—	—	—	Use Size 0	—
1 1/2	1 1/2	2	—	00	—	2.5-10	14BSD82B*	506.00	Use Size 0	—	—	—	Use Size 0	—
1/8	1/8	1/2	1/2	0	—	0.25-1	14CSA82B*	567.00	14CSA82W*	961.00	14CSA82H*	2196.00	14CSA820*	625.00
1/4	3/4	1 1/2	2	0	—	0.75-3	14CSB82B*	567.00	14CSB82W*	961.00	14CSB82H*	2196.00	14CSB820*	625.00
2	2	5	5	0	—	2.5-10	14CSD82B*	567.00	14CSD82W*	961.00	14CSD82H*	2196.00	14CSD820*	625.00
3	3	—	—	0	—	9-18	14CSE82B*	567.00	14CSE82W*	961.00	14CSE82H*	2196.00	14CSE820*	625.00
1/8	1/8	1/2	1/2	1	—	0.25-1	14DSA82B*	609.00	14DSA82W*	1064.00	14DSA82H*	2264.00	14DSA820*	668.00
1/4	3/4	1 1/2	2	1	—	0.75-3	14DSB82B*	609.00	14DSB82W*	1064.00	14DSB82H*	2264.00	14DSB820*	668.00
2	2	5	5	1	—	2.5-10	14DSD82B*	609.00	14DSD82W*	1064.00	14DSD82H*	2264.00	14DSD820*	668.00
3	3	10	10	1	—	9-18	14DSE82B*	609.00	14DSE82W*	1064.00	14DSE82H*	2264.00	14DSE820*	668.00
7 1/2	7 1/2	—	—	1	—	13-27	14DSF82B*	609.00	14DSF82W*	1064.00	14DSF82H*	2264.00	14DSF820*	668.00
—	—	15	15	—	1 1/4	13-27	14ESF82B*	739.00	14ESF82W*	1193.00	14ESF82H*	2393.00	14ESF820*	797.00
10	10	—	—	—	1 1/4	20-40	14ESG82B*	739.00	14ESG82W*	1193.00	14ESG82H*	2393.00	14ESG820*	797.00
—	—	15	20	2	—	13-27	14FSF82B*	885.00	14FSF82W*	1951.00	14FSF82H*	3479.00	14FSF820*	1254.00
10	15	25	25	2	—	22-45	14FSH82B*	885.00	14FSH82W*	1951.00	14FSH82H*	3479.00	14FSH820*	1254.00
—	—	30	30	—	2 1/2	22-45	14GSH82B*	1074.00	14GSH82W*	2140.00	14GSH82H*	4314.00	14GSH820*	1443.00
15	20	—	—	—	2 1/2	30-60	14GSJ82B*	1074.00	14GSJ82W*	2140.00	14GSJ82H*	4314.00	14GSJ820*	1443.00
—	—	30	40	3	—	30-60	14HSJ82B*	1391.00	14HSJ82W*	3821.00	14HSJ82H*	5483.00	14HSJ820*	2356.00
25	30	50	50	3	—	45-90	14HSK82B*	1391.00	14HSK82W*	3821.00	14HSK82H*	5483.00	14HSK820*	2356.00
30	40	75	75	—	3 1/2	57-115	14ISL82B*	2409.00	14ISL82W*	4751.00	14ISL82H*	9048.00	14ISL820*	3286.00
40	50	100	100	4	—	67-135	14JTM82B*	2752.00	14JTM82W*	5096.00	14JTM82H*	9368.00	14JTM820*	3631.00

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating. For higher Hp single phase motors, use 3-phase starters, wire and set per diagram on page 16-130.

① To receive a single phase starter in an extra wide enclosure, order the enclosure kit from pg 16-96 and the open style starter from page 16-14 or 16-16 as separate items.  
 ② For conduit hubs and conversion instructions, see page 16-87.

③ For 316 Stainless Steel option see page 16-97.

# Heavy Duty Motor Starters

## Ambient Compensated Bimetal Overload with Manual and Auto Reset, Class 14 Selection



### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. Single phase starters require 1 heater element. 3-phase starters require 3 heater elements.
- ▶ Field Modification Kits page 16-79.
- ▶ Factory Modifications page 16-94.
- ▶ Dimensions see page 16-103 open and 16-115 enclosed.
- ▶ Wiring Diagrams see page 16-130.
- ▶ Replacement Parts see page 16-155.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240	A
200-208	D
220-240	G
277	L
220-240/440-480	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts				Open Type Standard Auxiliary Contacts <sup>4</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>2</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel <sup>5</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>2</sup> Industrial Use Weatherproof	
							Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$
1 1/2	1 1/2	2	2	9	00	—	14BP32A*81	233.00	14BP32B*81	249.00	Use Size 0	—	Use Size 0	—	Use Size 0	—		
3	3	5	5	18	0	—	14CP32A*81	293.00	14CP32B*81	310.00	14CP32W*81	612.00	14CP32F*81	673.00	14CP32H*81	1395.00	14CP320*81	414.00
7 1/2	7 1/2	10	10	27	1	—	14DP32A*81	336.00	14DP32B*81	354.00	14DP32W*81	664.00	14DP32F*81	729.00	14DP32H*81	1440.00	14DP320*81	457.00
10	10	15	15	40	—	1 1/4	14EP32A*81	465.00	14EP32B*81	482.00	14EP32W*81	793.00	14EP32F*81	873.00	14EP32H*81	1568.00	14EP320*81	586.00
10	15	25	25	45	2	—	14FP32A*81	612.00	14FP32B*81	698.00	14FP32W*81	1319.00	14FP32F*81	1450.00	14FP32H*81	1991.00	14FP320*81	888.00
15	20	30	30	60	—	2 1/2	14GP32A*81	801.00	14GP32B*81	930.00	14GP32W*81	1680.00	14GP32F*81	1847.00	14GP32H*81	2490.00	14GP320*81	1137.00
25	30	50	50	90	3	—	14HP32A*81	991.00	14HP32B*81	1163.00	14HP32W*81	2042.00	14HP32F*81	2247.00	14HP32H*81	3589.00	14HP320*81	1387.00
30	40	75	75	115	—	3 1/2	14IP32A*81	1922.00	14IP32B*81	2284.00	14IP32W*81	3782.00	14IP32F*81	4160.00	14IP32H*81	4479.00	14IP320*81	3024.00
40	50	100	100	135	4	—	14JG32A*81	2266.00	14JG32B*81	2628.00	14JG32W*81	4126.00	14JG32F*81	4539.00	14JG32H*81	4824.00	14JG320*81	3368.00

### Open Type & Standard Width Enclosure, Single Phase, 2-Pole<sup>3</sup>

Max Hp			Contactor Amp Rating	NEMA Size	Half Size	Enclosure											
115 Volts	208/230 Volts					Open Type		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>2</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel <sup>5</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>2</sup> Industrial Use Weatherproof	
						Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$	Catalog No	Price \$
1/2	1	9	00	—	14BP12A*81	203.00	14BP12B*81	219.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—	
1	2	18	0	—	14CP12A*81	262.00	14CP12B*81	279.00	14CP12W*81	582.00	14CP12F*81	639.00	14CP12H*81	1365.00	14CP120*81	383.00	
2	3	27	1	—	14DP12A*81	306.00	14DP12B*81	323.00	14DP12W*81	633.00	14DP12F*81	696.00	14DP12H*81	1409.00	14DP120*81	426.00	
3	5	35	1P	—	14EP12A*81	400.00	14EP12B*81	418.00	14EP12W*81	728.00	14EP12F*81	801.00	14EP12H*81	1503.00	14EP120*81	521.00	
3	7 1/2	45	2	—	14FP12A*81	555.00	14FP12B*81	418.00	14FP12W*81	1262.00	14FP12F*81	1389.00	14FP12H*81	1934.00	14FP120*81	831.00	
5	10	60	—	2 1/2	14GP12A*81	754.00	14GP12B*81	875.00	14GP12W*81	1623.00	14GP12F*81	1786.00	14GP12H*81	2442.00	14GP120*81	1090.00	

### Extra Wide Enclosure, 3-Phase, 3-Pole<sup>1</sup>

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>2</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel <sup>5</sup>		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>2</sup> Industrial Use Weatherproof	
							Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
1 1/2	1 1/2	2	2	9	00	—	14BP82B*81	467.00	Use Size 0	—	Use Size 0	—	Use Size 0	—
3	3	5	5	18	0	—	14CP82B*81	528.00	14CP82W*81	982.00	14CP82H*81	2156.00	14CP820*81	586.00
7 1/2	7 1/2	10	10	27	1	—	14DP82B*81	570.00	14DP82W*81	1025.00	14DP82H*81	2224.00	14DP820*81	629.00
10	10	15	15	40	—	1 1/4	14EP82B*81	700.00	14EP82W*81	1154.00	14EP82H*81	2355.00	14EP820*81	758.00
10	15	25	25	45	2	—	14FP82B*81	846.00	14FP82W*81	1912.00	14FP82H*81	3440.00	14FP820*81	1215.00
15	20	30	30	60	—	2 1/2	14GP82B*81	1035.00	14GP82W*81	2101.00	14GP82H*81	4275.00	14GP820*81	1404.00
25	30	50	50	90	3	—	14HP82B*81	1352.00	14HP82W*81	3782.00	14HP82H*81	5443.00	14HP820*81	2317.00
30	40	75	75	115	—	3 1/2	14IP82B*81	2284.00	14IP82W*81	4712.00	14IP82H*81	8899.00	14IP820*81	3248.00
40	50	100	100	135	4	—	14JG82B*81	2628.00	14JG82W*81	5057.00	14JG82H*81	9244.00	14JG820*81	3592.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All Starter Sizes carry one maximum Hp rating. For higher Hp single phase motors, use 3-phase starters, wire and set per diagram on page 16-130.

- <sup>1</sup> To receive a single phase starter in an extra wide enclosure, order the enclosure kit from pg 16-90 and the open style starter from pg 16-14 or 16-16 as separate items.
- <sup>2</sup> For conduit hubs and conversion instructions, see page 16-87.

- <sup>3</sup> Coils D, F, or G will be wired for incoming voltage. S coil will be wired for separate source. Coils E, H, and L do not apply to single phase starters.
- <sup>4</sup> Standard Auxiliary Contacts, Same as Contactors, refer to page 16-44.
- <sup>5</sup> For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

## Features and Benefits



### Combination Starter Features

Combination starters include the following features:

- Manufactured with Cold Forming "TOX" Process
- Solid State Overloads Standard on Sizes 5-8
- Easy to Install
- Wide Range of Enclosure Types Available
- Heavy Duty Quarter Turns
- 100kA Short Circuit Current Rating when Protected with Class R Fuses to 600V or MCP to 480V
- Visible Blade Disconnect
- Industrial Type Disconnect Handle

### Application

A combination starter meets National Electrical Code requirements for:

1. A means of providing short circuit motor protection with fused or breaker disconnection of line voltage.
2. A means of safeguarding personnel from contact with live parts and from accidental starting of machinery by disconnecting the motor and the controller.
3. A motor controller with overload protection.

Prewired combination starters eliminate the cost of wiring between separate disconnect and starter. Factory testing assures field performance. Combination starters also provide a more compact and attractive installation than separate units.

### Enclosure Types

Combination starters are available in NEMA 1, 12/3/3R/4 (painted), 4/4X (stainless), 4X fiberglass and 7 & 9 enclosures. Enclosures protect personnel from contact with live parts and depending upon the construction,

protect the control in varying degrees from physical damage and harmful atmospheres. All enclosures are supplied with corrosion resistant finishes.

### New Heavy Duty Disconnect Switches

The disconnect switch that goes the distance in durability, performance and reliability has been made even better to give you greater advantages:

- Visible blades for the highest level of safety
- Double break switching action to reduce arcing, increase lifetime and eliminate the "electric hinge"
- More rugged positive action switch
- Oversized lugs are standard
- Line side shield to help guard personnel from contact with live parts
- Higher horsepower rating for design E high efficiency motors
- Now UL listed for IlSCO, Burndy and T&B crimp type lugs
- The 200A switch now accepts up to 300 MCM versus 250 MCM wire size

Its rugged construction - with a high fault withstand rating of 100kA at 600 VAC when fused with class R rated fuses - meets the most stringent industry standards set forth by the automotive, petro-chemical, and pulp and paper industries. UL recognized and CSA certified, our disconnect switches are available either non-fusible or fusible with class R and class J fuse clips.



### Enclosure Kits for NEMA Combination Starters Description

Now you can assemble a non-stocked combination starter per your unanticipated needs in minutes. Say, for example, your customer needs a fusible combination starter that you don't have in stock. You need in now, but don't sweat it. Simply start with the newly offered enclosure kit which has the

handle preinstalled. You install the required starter and fusible disconnect, connect the power wire and you are finished. Within minutes, you have the required combination starter in your hands. No more waiting on the factory. You need it, your got it!

### What Is In It For You!

- **Reduce Lead-time** - What used to take days to get now takes minutes
- **Reduced Inventory** - Instead of stocking scores of various combination starters, simply stock a few enclosure kits, disconnect kits, circuit breaker kits and open starters. With these basic "building blocks" you virtually have hundreds of products on-hand
- **Quality** - The same high level of quality you have been accustomed to with our products will also be found in these new enclosure kits
- **UL Listed** - By correctly following the instructions included with the kits, the product you build is UL/CSA Listed

Refer to page 16-90 for more details.

### Siemens Type ETI Circuit Breaker

The ETI circuit breaker is a device designed specifically for application in motor circuits. The ETI is a magnetic only protective device designed to provide protection against short circuit current.

The instantaneous-only type ETI circuit breaker employs adjustable magnetic trip settings to allow broader application ranges and a higher degree of motor short circuit protection.



### Heavy Duty Starters

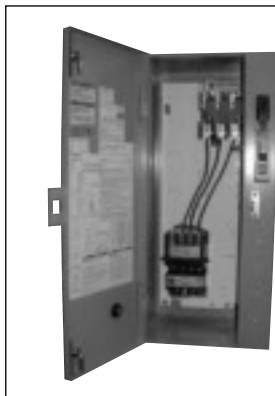
These combination starters use the same starters described in the heavy duty starter section of this catalog. ESP 100 solid state overload starters and ambient compensated bimetal overload starters are available.

## General

# Combination Heavy Duty Starters

Non-Fusible with Solid State Overload, Class 17

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ For Fusible Styles see page 16-21.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>ⓐ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>ⓐ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Standard Width Enclosure, 3 Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted (thru Sz 4) Industrial Use Weatherproof Watertight, Dust-tight	
Catalog Number	List Price \$	Catalog Number	List Price \$					Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/8	1/8	1/8	0	—	0.25-1	30	17CSA92B*	823.00	17CSA92W*	1650.00	17CSA92F*	1814.00	17CSA92N*	1030.00
1/4	1/4	1/4	1/4	0	—	0.75-3	30	17CSB92B*	823.00	17CSB92W*	1650.00	17CSB92F*	1814.00	17CSB92N*	1030.00
2	2	5	5	0	—	2.5-10	30	17CSD92B*	823.00	17CSD92W*	1650.00	17CSD92F*	1814.00	17CSD92N*	1030.00
3	3	—	—	0	—	9-18	30	17CSE92B*	823.00	17CSE92W*	1650.00	17CSE92F*	1814.00	17CSE92N*	1030.00
1/2	1/2	1/2	1/2	1	—	0.25-1	30	17DSA92B*	865.00	17DSA92W*	1693.00	17DSA92F*	1863.00	17DSA92N*	1072.00
1	1	1	1	1	—	0.75-3	30	17DSB92B*	865.00	17DSB92W*	1693.00	17DSB92F*	1863.00	17DSB92N*	1072.00
2	2	5	5	1	—	2.5-10	30	17DSD92B*	865.00	17DSD92W*	1693.00	17DSD92F*	1863.00	17DSD92N*	1072.00
3	3	10	10	1	—	9-18	30	17DSE92B*	865.00	17DSE92W*	1693.00	17DSE92F*	1863.00	17DSE92N*	1072.00
7 1/2	7 1/2	—	—	1	—	13-27	60	17DSF92B*	865.00	17DSF92W*	1693.00	17DSF92F*	1863.00	17DSF92N*	1072.00
—	—	15	15	—	1 3/4	13-27	60	17ESF92B*	995.00	17ESF92W*	1822.00	17ESF92F*	2003.00	17ESF92N*	1202.00
10	10	—	—	—	1 3/4	20-40	60	17ESG92B*	995.00	17ESG92W*	1822.00	17ESG92F*	2003.00	17ESG92N*	1202.00
—	—	15	20	2	—	13-27	60	17FSF92B*	1348.00	17FSF92W*	2623.00	17FSF92F*	2886.00	17FSF92N*	1641.00
10	15	25	25	2	—	22-45	60	17FSH92B*	1348.00	17FSH92W*	2623.00	17FSH92F*	2886.00	17FSH92N*	1641.00
—	—	30	30	—	2 1/2	22-45	100 <sup>ⓐ</sup>	17GSH92B*	1822.00	17GSH92W*	4045.00	17GSH92F*	4450.00	17GSH92N*	2201.00
15	20	—	—	—	2 1/2	30-60	100	17GSJ92B*	1822.00	17GSJ92W*	4045.00	17GSJ92F*	4450.00	17GSJ92N*	2201.00
—	—	30	40	3	—	30-60	100	17HSJ92B*	2219.00	17HSJ92W*	4440.00	17HSJ92F*	4886.00	17HSJ92N*	2598.00
20 <sup>ⓐ</sup>	25 <sup>ⓐ</sup>	50	50	3	—	45-90	100	17HSK92B*	2219.00	17HSK92W*	4440.00	17HSK92F*	4886.00	17HSK92N*	2598.00
30	40	75	75	—	3 1/2	57-115	200	17ISL92B*	3899.00	17ISL92W*	6741.00	17ISL92F*	7415.00	17ISL92N*	4950.00
40	50	100	100	4	—	67-135	200	17JTM92B*	4243.00	17JTM92W*	7086.00	17JTM92F*	7795.00	17JTM92N*	5294.00
75	100	200	200	5	—	55-250	400 <sup>ⓐ</sup>	17LPU92B*	9476.00	17LPU92W* <sup>ⓑ</sup>	16730.00	—	—	17LPU92N*	11949.00
150	200	400	400	6	—	160-540	800	17MPX92B*	24941.00	17MPX92W* <sup>ⓑ</sup>	32694.00	—	—	17MPX92N*	27912.00
—	300	600	600	7 <sup>ⓐ</sup>	—	420-820	1200	17NHY92B*	31118.00	—	—	—	—	17NHY92N*	33444.00
—	450	900	900	8 <sup>ⓐ</sup>	—	420-1220	1600	17PHZ92B*	41812.00	—	—	—	—	17PHZ92N*	44139.00

## Standard Width Enclosure, Single Phase, (Catalog Numbers are three phase, wire for single phase in the field)

Max Hp				NEMA Size	Overload Amp Range <sup>ⓐ</sup>	Disc Amp Rating	Enclosure							
115 Volts	208/230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
Catalog Number	List Price \$	Catalog Number	List Price \$				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/8	0	0.75-3	30	17CSB92B*	823.00	17CSB92W*	1650.00	17CSB92F*	1814.00	17CSB92N*	1030.00		
1/4	1/4	0	2.5-10	30	17CSD92B*	823.00	17CSD92W*	1650.00	17CSD92F*	1814.00	17CSD92N*	1030.00		
1	2	0	9-18	30	17CSE92B*	823.00	17CSE92W*	1650.00	17CSE92F*	1814.00	17CSE92N*	1030.00		
1/2	1/2	1	0.75-3	30	17DSB92B*	865.00	17DSB92W*	1693.00	17DSB92F*	1863.00	17DSB92N*	1072.00		
1	1	1	2.5-10	30	17DSD92B*	865.00	17DSD92W*	1693.00	17DSD92F*	1863.00	17DSD92N*	1072.00		
1	2	1	9-18	30	17DSE92B*	865.00	17DSE92W*	1693.00	17DSE92F*	1863.00	17DSE92N*	1072.00		

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

ⓐ Dual voltage coils not available in modified starters or in starter sizes 5-8.

ⓑ For conduit hubs and conversion instructions, see page 16-87.

ⓐ For 60A disconnect, order fusible cat. no. page 16-21.

ⓑ For 25 HP and 200A disconnect, order fusible cat. no. page 16-21.

ⓐ For 30HP and 200A disconnect, order fusible cat. no. page 16-21.

ⓑ For 600A disconnect, order fusible cat. no. page 16-21.

ⓐ Enclosure is NEMA Type 4 (painted steel).

ⓐ For a single phase motor, multiply the motor nameplate by 0.75 and set the OL dial to the resulting value.

ⓑ F coil 100-250V AC 50/60Hz, or DC, H coil 150-500V AC 50/60Hz, or DC

ⓐ Only available

F coil 100-250V AC 50/60Hz, or DC


ⓑ For 316 Stainless Steel option see page 16-97.



# Combination Heavy Duty Starters

## Non-Fusible with Solid State Overload, Class 17

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ For Fusible Styles see page 16-21.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-117.</li> <li>▶ Wiring Diagrams see page 16-131.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110–120/220–240<sup>ⓐ</sup></td><td>A</td></tr> <tr><td>200–208</td><td>D</td></tr> <tr><td>220–240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220–240/440–480<sup>ⓑ</sup></td><td>C</td></tr> <tr><td>440–480</td><td>H</td></tr> <tr><td>575–600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110–120/220–240 <sup>ⓐ</sup>	A	200–208	D	220–240	G	277	L	220–240/440–480 <sup>ⓑ</sup>	C	440–480	H	575–600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110–120/220–240 <sup>ⓐ</sup>	A																					
200–208	D																					
220–240	G																					
277	L																					
220–240/440–480 <sup>ⓑ</sup>	C																					
440–480	H																					
575–600	E																					

### Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/8	1/8	1/8	0	—	0.25–1	30	17CSA82B*	1037.00	17CSA82W*	2295.00	17CSA82N*	1416.00
1/2	3/4	1 1/2	2	0	—	0.75–3	30	17CSB82B*	1037.00	17CSB82W*	2295.00	17CSB82N*	1416.00
2	2	5	5	0	—	2.5–10	30	17CSD82B*	1037.00	17CSD82W*	2295.00	17CSD82N*	1416.00
3	3	—	—	0	—	9–18	30	17CSE82B*	1037.00	17CSE82W*	2295.00	17CSE82N*	1416.00
1/8	1/8	1/8	1/8	1	—	0.25–1	30	17DSA82B*	1082.00	17DSA82W*	2339.00	17DSA82N*	1461.00
1/2	3/4	1 1/2	2	1	—	0.75–3	30	17DSB82B*	1082.00	17DSB82W*	2339.00	17DSB82N*	1461.00
2	2	5	5	1	—	2.5–10	30	17DSD82B*	1082.00	17DSD82W*	2339.00	17DSD82N*	1461.00
3	3	10	10	1	—	9–18	30	17DSE82B*	1082.00	17DSE82W*	2339.00	17DSE82N*	1461.00
7 1/2	7 1/2	—	—	1	—	13–27	60	17DSF82B*	1082.00	17DSF82W*	2339.00	17DSF82N*	1461.00
—	—	15	15	—	1 1/4	13–27	60	17ESF82B*	1210.00	17ESF82W*	2468.00	17ESF82N*	1589.00
10	10	—	—	—	1 1/4	20–40	60	17ESG82B*	1210.00	17ESG82W*	2468.00	17ESG82N*	1589.00
—	—	15	20	2	—	13–27	60	17FSF82B*	1563.00	17FSF82W*	3270.00	17FSF82N*	2029.00
10	15	25	25	2	—	22–45	60	17FSH82B*	1563.00	17FSH82W*	3270.00	17FSH82N*	2029.00
—	—	30	30	—	2 1/2	22–45	100 <sup>ⓐ</sup>	17GSH82B*	2253.00	17GSH82W*	5337.00	17GSH82N*	2977.00
15	20	—	—	—	2 1/2	30–60	100	17GSJ82B*	2253.00	17GSJ82W*	5337.00	17GSJ82N*	2977.00
—	—	30	40	3	—	30–60	100	17HSJ82B*	2649.00	17HSJ82W*	5733.00	17HSJ82N*	3373.00
20 <sup>ⓐ</sup>	20 <sup>ⓑ</sup>	50	50	3	—	45–90	100	17HSK82B*	2649.00	17HSK82W*	5733.00	17HSK82N*	3373.00

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one Hp rating.


ⓐ Dual voltage coils not available in modified starters.  
 ⓑ For conduit hubs and conversion instructions, see page 16-87.  
 Ⓒ For 60A disconnect, order fusible cat. no. page 16-22.

ⓐ For 25 HP and 200A disconnect, order fusible cat. no. page 16-22.  
 ⓑ For 30HP and 200A disconnect, order fusible cat. no. page 16-22.  
 Ⓒ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

Non-Fusible with Ambient Compensated Bimetal Overload, Class 17

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148. (3 required)</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-117.</li> <li>▶ Wiring Diagrams see page 16-131.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>ⓐ</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>ⓐ</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>ⓐ</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>ⓐ</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110-120/220-240 <sup>ⓐ</sup>	A																					
200-208	D																					
220-240	G																					
277	L																					
220-240/440-480 <sup>ⓐ</sup>	C																					
440-480	H																					
575-600	E																					

## Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30	17CP92B*81	784.00	17CP92W*81	1612.00	17CP92F*81	1773.00	17CP92N*81	991.00
7½ <sup>ⓐ</sup>	7½ <sup>ⓐ</sup>	10	10	27	1	—	30	17DP92B*81	827.00	17DP92W*81	1654.00	17DP92F*81	1820.00	17DP92N*81	1033.00
10	10	15	15	40	—	1¼	60	17EP92B*81	957.00	17EP92W*81	1784.00	17EP92F*81	1962.00	17EP92N*81	1163.00
10	15	25	25	45	2	—	60	17FP92B*81	1309.00	17FP92W*81	2584.00	17FP92F*81	2743.00	17FP92N*81	1602.00
15	20	30	30	60	—	2½	100	17GP92B*81	1784.00	17GP92W*81	4006.00	17GP92F*81	4407.00	17GP92N*81	2163.00
25 <sup>ⓐ</sup>	30 <sup>ⓐ</sup>	50	50	90	3	—	100	17HP92B*81	2180.00	17HP92W*81	4403.00	17HP92F*81	4844.00	17HP92N*81	2559.00
30	40	75	75	115	—	3½	200	17IP92B*81	3859.00	17IP92W*81	6703.00	17IP92F*81	7374.00	17IP92N*81	4910.00
40	50	100	100	135	4	—	200	17JP92B*81	4204.00	17JP92W*81	7048.00	17JP92F*81	7753.00	17JP92N*81	5254.00

## Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30	17CP82B*81	1000.00	17CP82W*81	2256.00	17CP82N*81	1379.00
7½ <sup>ⓐ</sup>	7½ <sup>ⓐ</sup>	10	10	27	1	—	30	17DP82B*81	1043.00	17DP82W*81	2301.00	17DP82N*81	1422.00
10	10	15	15	40	—	1¼	60	17EP82B*81	1172.00	17EP82W*81	2430.00	17EP82N*81	1551.00
10	15	25	25	45	2	—	60	17FP82B*81	1526.00	17FP82W*81	3231.00	17FP82N*81	1991.00
15	20	30	30	60	—	2½	100	17GP82B*81	2214.00	17GP82W*81	5298.00	17GP82N*81	2938.00
25 <sup>ⓐ</sup>	30 <sup>ⓐ</sup>	50	50	90	3	—	100	17HP82B*81	2610.00	17HP82W*81	5694.00	17HP82N*81	3334.00

## Standard Width Enclosure, Single Phase, (Catalog Numbers are three phase, wire for single phase in the field)

Max Hp		Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
115 Volts	208/230 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
						Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1	2	18	0	—	30	17CP92B*81	784.00	17CP92W*81	1612.00	17CP92F*81	1773.00	17CP92N*81	991.00
2	3	27	1	—	30	17DP92B*81	827.00	17DP92W*81	1654.00	17DP92F*81	1820.00	17DP92N*81	1033.00
3	5	35	1P	—	60	17EP92B*81	957.00	17EP92W*81	1784.00	17EP92F*81	1962.00	17EP92N*81	1163.00
3	7½	45	2	—	60	17FP92B*81	1309.00	17FP92W*81	2584.00	17FP92F*81	2743.00	17FP92N*81	1602.00
5	10	60	—	2½	100	17GP92B*81	1784.00	17GP92W*81	4006.00	17GP92F*81	4407.00	17GP92N*81	2163.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

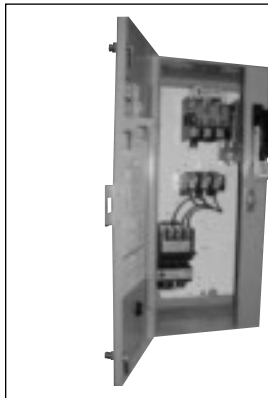
ⓐ Dual voltage coils not available in modified starters.  
 ⓑ For conduit hubs and conversion instructions, see page 16-87.

ⓐ For 60A disc, order fusible cat. no. page 16-23.  
 ⓑ For 200A disc, order fusible cat. no. page 16-23.  
 ⓐ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

Fusible with Solid State Overload, Class 17

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>Ⓞ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>Ⓞ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Standard Width Enclosure, 3-Phase, 3-Pole<sup>Ⓢ</sup>

Max Hp										Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Fuse Clip Size Amps/Volts		NEMA 1 General Purpose	NEMA 4/4X Stainless <sup>Ⓜ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>Ⓢ</sup>	NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant	NEMA 12, NEMA 3/3R, <sup>Ⓜ</sup> NEMA 4 Painted (thru Sz 4) Industrial Use Weatherproof Watertight, Dust-tight				
1/8	1/4	1/2	3/4	1	1 1/2	0.25-1	30	30A/250V		Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
1/8	1/8	—	—	0	—	0.25-1	30	30A/250V		17CSA92B*10	848.00	17CSA92W*10	1675.00	17CSA92F*10	1843.00		
1/4	1/4	—	—	0	—	0.25-1	30	30A/600V		17CSA92B*11	866.00	17CSA92W*11	1693.00	17CSA92F*11	1863.00		
1/2	3/4	—	—	0	—	0.75-3	30	30A/250V		17CSB92B*10	848.00	17CSB92W*10	1675.00	17CSB92F*10	1843.00		
—	—	1 1/2	2	0	—	0.75-3	30	30A/600V		17CSB92B*11	866.00	17CSB92W*11	1693.00	17CSB92F*11	1863.00		
2	2	—	—	0	—	2.5-10	30	30A/250V		17CSD92B*10	848.00	17CSD92W*10	1675.00	17CSD92F*10	1843.00		
—	—	5	5	0	—	2.5-10	30	30A/600V		17CSD92B*11	866.00	17CSD92W*11	1693.00	17CSD92F*11	1863.00		
3	3	—	—	0	—	9-18	30	30A/250V		17CSE92B*10	848.00	17CSE92W*10	1675.00	17CSE92F*10	1843.00		
1/8	1/8	—	—	1	—	0.25-1	30	30A/250V		17DSA92B*10	891.00	17DSA92W*10	1719.00	17DSA92F*10	1891.00		
—	—	1/2	1/2	1	—	0.25-1	30	30A/600V		17DSA92B*11	909.00	17DSA92W*11	1737.00	17DSA92F*11	1911.00		
1/4	3/4	—	—	1	—	0.75-3	30	30A/250V		17DSB92B*10	891.00	17DSB92W*10	1719.00	17DSB92F*10	1891.00		
—	—	1 1/2	2	1	—	0.75-3	30	30A/600V		17DSB92B*11	909.00	17DSB92W*11	1737.00	17DSB92F*11	1911.00		
2	2	—	—	1	—	2.5-10	30	30A/250V		17DSD92B*10	891.00	17DSD92W*10	1719.00	17DSD92F*10	1891.00		
—	—	5	5	1	—	2.5-10	30	30A/600V		17DSD92B*11	909.00	17DSD92W*11	1737.00	17DSD92F*11	1911.00		
3	3	—	—	1	—	9-18	30	30A/250V		17DSE92B*10	891.00	17DSE92W*10	1719.00	17DSE92F*10	1891.00		
—	—	10	10	1	—	9-18	30	30A/600V		17DSE92B*11	909.00	17DSE92W*11	1737.00	17DSE92F*11	1911.00		
5	5	—	—	1	—	13-27	30	30A/250V		17DSF92B*10	891.00	17DSF92W*10	1719.00	17DSF92F*10	1891.00		
7 1/2	7 1/2	—	—	1	—	13-27	60	60A/250V		17DSF92B*12	909.00	17DSF92W*12	1737.00	17DSF92F*12	1911.00		
—	—	15	15	—	1 1/4	13-27	60	60A/600V		17ESF92B*13	1055.00	17ESF92W*13	1882.00	17ESF92F*13	2052.00		
10	10	—	—	—	1 1/4	20-40	60	60A/250V		17ESG92B*12	1038.00	17ESG92W*12	1865.00	17ESG92F*12	2071.00		
—	—	15	20	2	—	13-27	60	60A/600V		17FSF92B*13	1409.00	17FSF92W*13	2684.00	17FSF92F*13	2953.00		
10	15	—	—	2	—	22-45	60	60A/250V		17FSH92B*12	1390.00	17FSH92W*12	2667.00	17FSH92F*12	2935.00		
—	—	25	25	2	—	22-45	60	60A/600V		17FSH92B*13	1409.00	17FSH92W*13	2684.00	17FSH92F*13	2953.00		
—	—	30	30	—	2 1/2	22-45	60	60A/600V		17GSH92B*13	1882.00	17GSH92W*13	4106.00	17GSH92F*13	4517.00		
15	20	—	—	—	2 1/2	22-45	100	100A/600V		17GSH92B*15	1959.00	17GSH92W*15	4182.00	17GSH92F*15	4600.00		
—	—	30	30	—	2 1/2	30-60	100	100A/250V		17GSJ92B*14	1959.00	17GSJ92W*14	4182.00	17GSJ92F*14	4600.00		
—	—	40	40	3	—	30-60	100	100A/600V		17HSJ92B*15	2356.00	17HSJ92W*15	4578.00	17HSJ92F*15	5037.00		
20	25	—	—	3	—	45-90	100	100A/250V		17HSK92B*14	2356.00	17HSK92W*14	4578.00	17HSK92F*14	5037.00		
—	—	50	50	3	—	45-90	100	100A/600V		17HSK92B*15	2356.00	17HSK92W*15	4578.00	17HSK92F*15	5037.00		
25	30	—	—	—	—	45-90	200	200A/250V		17HSK92B*16	2528.00	17HSK92W*16	4750.00	17HSK92F*16	5226.00		
30	40	—	—	—	3 1/2	57-115	200	200A/250V		17ISL92B*16	4208.00	17ISL92W*16	7051.00	17ISL92F*16	7756.00		
—	—	75	75	—	3 1/2	57-115	200	200A/600V		17ISL92B*17	4208.00	17ISL92W*17	7051.00	17ISL92F*17	7756.00		
40	50	—	—	4	—	67-135	200	200A/250V		17JTM92B*16	4553.00	17JTM92W*16	7396.00	17JTM92F*16	8136.00		
—	—	100	100	4	—	67-135	200	200A/600V		17JTM92B*17	4553.00	17JTM92W*17	7396.00	17JTM92F*17	8136.00		
75	100	—	—	5	—	55-250	400	400A/250V		17LPU92B*18	10114.00	17LPU92E*18 <sup>Ⓞ</sup>	17368.00	—	—		
—	100	—	—	5	—	55-250	600	600A/250V <sup>Ⓢ</sup>		17LPU92B*20	10390.00	17LPU92E*20 <sup>Ⓞ</sup>	17644.00	—	—		
—	—	—	125	5	—	55-250	400	200A/600V		17LPU92B*17	9786.00	17LPU92E*17 <sup>Ⓞ</sup>	17039.00	—	—		
—	—	200	200	5	—	55-250	400	400A/600V		17LPU92B*19	10114.00	17LPU92E*19 <sup>Ⓞ</sup>	17368.00	—	—		
—	—	200	—	5	—	55-250	600	600A/600V <sup>Ⓢ</sup>		17LPU92B*21	10390.00	17LPU92E*21 <sup>Ⓞ</sup>	17644.00	—	—		
150	200	—	—	6	—	160-540	600	600A/250V		17MPX92B*20	25854.00	17MPX92E*20 <sup>Ⓞ</sup>	33108.00	—	—		
—	—	400	400	6	—	160-540	600	600A/600V		17MPX92B*21	25854.00	17MPX92E*21 <sup>Ⓞ</sup>	33108.00	—	—		
—	—	400	400	6	—	160-540	800	800A/600V		17MPX92B*23	26997.00	17MPX92E*23 <sup>Ⓞ</sup>	34251.00	—	—		
—	—	600	600	7 <sup>Ⓢ</sup>	—	420-820	1200	1200A/600V		17NHY92B*23	33174.00	—	—	—	—		
—	—	900	900	8 <sup>Ⓢ</sup>	—	420-1220	1600	1600A/600V		17PHZ92B*25	46953.00	—	—	—	—		

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

- Ⓚ Dual voltage coils not available in modified starters or in starter sizes 5-8.
- Ⓛ For conduit hubs and conversion instructions, see page 16-87.
- Ⓜ Use Class J fuses only.
- Ⓨ Enclosure is NEMA Type 4 (painted steel).

- Ⓢ Single phase wiring page 16-130.
- Ⓣ F coil 100-250V AC 50/60Hz, or DC, H coil 150-500V AC 50/60Hz, or DC
- Ⓤ Only available F coil 100-250V AC 50/60Hz, or DC
- ⓖ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

Fusible with Solid State Overload, Class 17

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>①</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>①</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Fuse Clip Size Amps/Volts	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts						NEMA 1 General Purpose		NEMA 4/4X St-less <sup>②</sup> Watertight, Dust-tight, Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>③</sup>		NEMA 12, NEMA 3/3R, <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
									Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/8	1/8	—	—	0	—	0.25-1	30	30A/250V	17CSA82B*10	1064.00	17CSA82W*10	2322.00	17CSA82N*10	1443.00
—	—	1/8	1/8	0	—	0.25-1	30	30A/600V	17CSA82B*11	1082.00	17CSA82W*11	2339.00	17CSA82N*11	1461.00
1/4	1/4	—	—	0	—	0.75-3	30	30A/250V	17CSB82B*10	1064.00	17CSB82W*10	2322.00	17CSB82N*10	1443.00
—	—	1 1/2	2	0	—	0.75-3	30	30A/600V	17CSB82B*11	1082.00	17CSB82W*11	2339.00	17CSB82N*11	1461.00
2	2	—	—	0	—	2.5-10	30	30A/250V	17CSD82B*10	1064.00	17CSD82W*10	2322.00	17CSD82N*10	1443.00
—	—	5	5	0	—	2.5-10	30	30A/600V	17CSD82B*11	1082.00	17CSD82W*11	2339.00	17CSD82N*11	1461.00
3	3	—	—	0	—	9-18	30	30A/250V	17CSE82B*10	1064.00	17CSE82W*10	2322.00	17CSE82N*10	1443.00
1/8	1/8	—	—	1	—	0.25-1	30	30A/250V	17DSA82B*10	1107.00	17DSA82W*10	2365.00	17DSA82N*10	1486.00
—	—	1/8	1/8	1	—	0.25-1	30	30A/600V	17DSA82B*11	1125.00	17DSA82W*11	2384.00	17DSA82N*11	1504.00
1/4	1/4	—	—	1	—	0.75-3	30	30A/250V	17DSB82B*10	1107.00	17DSB82W*10	2365.00	17DSB82N*10	1486.00
—	—	1 1/2	2	1	—	0.75-3	30	30A/600V	17DSB82B*11	1125.00	17DSB82W*11	2384.00	17DSB82N*11	1504.00
2	2	—	—	1	—	2.5-10	30	30A/250V	17DSD82B*10	1107.00	17DSD82W*10	2365.00	17DSD82N*10	1486.00
—	—	5	5	1	—	2.5-10	30	30A/600V	17DSD82B*11	1125.00	17DSD82W*11	2384.00	17DSD82N*11	1504.00
3	3	—	—	1	—	9-18	30	30A/250V	17DSE82B*10	1107.00	17DSE82W*10	2365.00	17DSE82N*10	1486.00
—	—	10	10	1	—	9-18	30	30A/600V	17DSE82B*11	1125.00	17DSE82W*11	2384.00	17DSE82N*11	1504.00
5	5	—	—	1	—	13-27	30	30A/250V	17DSF82B*10	1107.00	17DSF82W*10	2365.00	17DSF82N*10	1486.00
7 1/2	7 1/2	—	—	1	—	13-27	60	60A/250V	17DSF82B*12	1125.00	17DSF82W*12	2384.00	17DSF82N*12	1504.00
—	—	15	15	—	1 1/4	13-27	60	60A/600V	17ESF82B*13	1270.00	17ESF82W*13	2512.00	17ESF82N*13	1650.00
10	10	—	—	—	1 1/4	20-40	60	60A/250V	17ESG82B*12	1254.00	17ESG82W*12	2512.00	17ESG82N*12	1633.00
—	—	15	20	2	—	13-27	60	60A/600V	17FSF82B*13	1623.00	17FSF82W*13	3331.00	17FSF82N*13	2088.00
10	15	—	—	2	—	22-45	60	60A/250V	17FSH82B*12	1606.00	17FSH82W*12	3314.00	17FSH82N*12	2072.00
—	—	25	25	2	—	22-45	60	60A/600V	17FSH82B*13	1623.00	17FSH82W*13	3331.00	17FSH82N*13	2088.00
—	—	—	30	—	2 1/2	22-45	60	60A/600V	17GSH82B*13	2313.00	17GSH82W*13	5398.00	17GSH82N*13	3038.00
—	—	30	—	—	2 1/2	22-45	100	100A/600V	17GSH82B*15	2391.00	17GSH82W*15	5475.00	17GSH82N*15	3114.00
15	20	—	—	—	2 1/2	30-60	100	100A/250V	17GSJ82B*14	2391.00	17GSJ82W*14	5475.00	17GSJ82N*14	3114.00
—	—	30	40	3	—	30-60	100	100A/600V	17HSJ82B*15	2787.00	17HSJ82W*15	5871.00	17HSJ82N*15	3510.00
20	25	—	—	3	—	45-90	100	100A/250V	17HSK82B*14	2787.00	17HSK82W*14	5871.00	17HSK82N*14	3510.00
—	—	50	50	3	—	45-90	100	100A/600V	17HSK82B*15	2787.00	17HSK82W*15	5871.00	17HSK82N*15	3510.00
25	30	—	—	3	—	45-90	200	200A/250V	17HSK82B*16	2955.00	17HSK82W*16	6044.00	17HSK82N*16	3682.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

- ① Dual voltage coils not available in modified starters.
- ② For conduit hubs and conversion instructions, see page 16-87.
- ③ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

Fusible with Ambient Compensated Bimetal Overload, Class 17

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. (3 required)
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>ⓐ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>ⓐ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Standard Width Enclosure, 3-Phase, 3-Pole<sup>ⓑ</sup>

Max Hp				Cont-actor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Fuse Clip Size Amps/Volts	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts						NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓐ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
									Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	—	—	18	0	—	30	30A/250V	17CP92B*1081	810.00	17CP92W*1081	1637.00	17CP92F*1081	1802.00	17CP92N*1081	1016.00
—	—	5	5	18	0	—	30	30A/600V	17CP92B*1181	827.00	17CP92W*1181	1655.00	17CP92F*1181	1821.00	17CP92N*1181	1034.00
5	5	—	—	27	1	—	30	30A/250V	17DP92B*1081	854.00	17DP92W*1081	1680.00	17DP92F*1081	1848.00	17DP92N*1081	1059.00
—	—	10	10	27	1	—	30	30A/600V	17DP92B*1181	872.00	17DP92W*1181	1698.00	17DP92F*1181	1868.00	17DP92N*1181	1077.00
7½	7½	—	—	27	1	—	60	60A/250V	17DP92B*1281	872.00	17DP92W*1281	1698.00	17DP92F*1281	1868.00	17DP92N*1281	1077.00
10	10	—	—	40	—	1¼	60	60A/250V	17EP92B*1281	1000.00	17EP92W*1281	1827.00	17EP92F*1281	2011.00	17EP92N*1281	1206.00
—	—	15	15	40	—	1¼	60	60A/600V	17EP92B*1381	1016.00	17EP92W*1381	1844.00	17EP92F*1381	2029.00	17EP92N*1381	1223.00
10	15	—	—	45	2	—	60	60A/250V	17FP92B*1281	1353.00	17FP92W*1281	2628.00	17FP92F*1281	2891.00	17FP92N*1281	1646.00
—	—	25	25	45	2	—	60	60A/600V	17FP92B*1381	1370.00	17FP92W*1381	2645.00	17FP92F*1381	2910.00	17FP92N*1381	1663.00
—	—	—	30	60	—	2½	60	60A/600V	17GP92B*1381	1844.00	17GP92W*1381	4066.00	17GP92F*1381	4473.00	17GP92N*1381	2223.00
—	—	30	—	60	—	2½	100	100A/600V	17GP92B*1581	1922.00	17GP92W*1581	4143.00	17GP92F*1581	4580.00	17GP92N*1581	2301.00
15	20	—	—	60	—	2½	100	100A/250V	17GP92B*1481	1922.00	17GP92W*1481	4143.00	17GP92F*1481	4580.00	17GP92N*1481	2301.00
20	25	—	—	90	3	—	100	100A/250V	17HP92B*1481	2317.00	17HP92W*1481	4540.00	17HP92F*1481	4994.00	17HP92N*1481	2696.00
—	—	50	50	90	3	—	100	100A/600V	17HP92B*1581	2317.00	17HP92W*1581	4540.00	17HP92F*1581	4994.00	17HP92N*1581	2696.00
25	30	—	—	90	3	—	200	200A/250V	17HP92B*1681	2490.00	17HP92W*1681	4712.00	17HP92F*1681	5184.00	17HP92N*1681	3987.00
30	40	—	—	115	—	3½	200	200A/250V	17IP92B*1681	4168.00	17IP92W*1681	7013.00	17IP92F*1681	7714.00	17IP92N*1681	5220.00
—	—	75	75	115	—	3½	200	200A/600V	17IP92B*1781	4168.00	17IP92W*1781	7013.00	17IP92F*1781	7714.00	17IP92N*1781	5220.00
40	50	—	—	135	4	—	200	200A/250V	17JP92B*1681	4514.00	17JP92W*1681	7357.00	17JP92F*1681	8092.00	17JP92N*1681	5564.00
—	—	100	100	135	4	—	200	200A/600V	17JP92B*1781	4514.00	17JP92W*1781	7357.00	17JP92F*1781	8092.00	17JP92N*1781	5564.00

## Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				Cont-actor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Fuse Clip Size Amps/Volts	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts						NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Industrial Use Weatherproof 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓐ</sup>		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
									Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	—	—	18	0	—	30	30A/250V	17CP82B*1081	1026.00	17CP82W*1081	2283.00	17CP82N*1081	1405.00
—	—	5	5	18	0	—	30	30A/600V	17CP82B*1181	1044.00	17CP82W*1181	2301.00	17CP82N*1181	1423.00
5	5	—	—	27	1	—	30	30A/250V	17DP82B*1081	1068.00	17DP82W*1081	2326.00	17DP82N*1081	1447.00
—	—	10	10	27	1	—	30	30A/600V	17DP82B*1181	1086.00	17DP82W*1181	2344.00	17DP82N*1181	1465.00
7½	7½	—	—	27	1	—	60	60A/250V	17DP82B*1281	1086.00	17DP82W*1281	2344.00	17DP82N*1281	1465.00
10	10	—	—	40	—	1¼	60	60A/250V	17EP82B*1281	1216.00	17EP82W*1281	2474.00	17EP82N*1281	1595.00
—	—	15	15	40	—	1¼	60	60A/600V	17EP82B*1381	1233.00	17EP82W*1381	2491.00	17EP82N*1381	1612.00
10	15	—	—	45	2	—	60	60A/250V	17FP82B*1281	1569.00	17FP82W*1281	3274.00	17FP82N*1281	2034.00
—	—	25	25	45	2	—	60	60A/600V	17FP82B*1381	1586.00	17FP82W*1381	3291.00	17FP82N*1381	2051.00
—	—	—	30	60	—	2½	60	60A/600V	17GP82B*1381	2274.00	17GP82W*1381	5358.00	17GP82N*1381	2998.00
—	—	30	—	60	—	2½	100	100A/600V	17GP82B*1581	2352.00	17GP82W*1581	5436.00	17GP82N*1581	3075.00
15	20	—	—	60	—	2½	100	100A/250V	17GP82B*1481	2352.00	17GP82W*1481	5436.00	17GP82N*1481	3075.00
20	25	—	—	90	3	—	100	100A/250V	17HP82B*1481	2748.00	17HP82W*1481	5832.00	17HP82N*1481	3471.00
—	—	50	50	90	3	—	100	100A/600V	17HP82B*1581	2748.00	17HP82W*1581	5832.00	17HP82N*1581	3471.00
25	30	—	—	90	3	—	200	200A/250V	17HP92B*1681	2490.00	17HP92W*1681	4712.00	17HP92N*1681	3987.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

<sup>ⓐ</sup> Dual voltage coils not available in modified starters.

<sup>ⓑ</sup> For conduit hubs and conversion instructions, see page 16-87.

<sup>ⓒ</sup> Single phase wiring page 16-130.

<sup>ⓓ</sup> For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

## MCP Type with Solid State Overload, Class 18

Selection



### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see pages 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>ⓓ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>ⓓ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓜ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>Ⓞ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3, 4 Div 1 and Div 2 Class I Groups C&D Class II Groups E, F&G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12, NEMA 3/3R <sup>Ⓜ</sup> NEMA 4 Painted (thru Sz 4) Industrial Use Weatherproof Watertight, Dust-tight	
200	230	460	575					Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	0.75-3	3	18CSB92B*	1133.00	18CSB92W*	1960.00	18CSB92F*	2157.00	18CSB92H*	2360.00	18CSB92N*	1340.00
2	2	5	5	0	—	2.5-10	10	18CSD92B*	1133.00	18CSD92W*	1960.00	18CSD92F*	2157.00	18CSD92H*	2360.00	18CSD92N*	1340.00
3	3	—	—	0	—	9-18	25	18CSE92B*	1133.00	18CSE92W*	1960.00	18CSE92F*	2157.00	18CSE92H*	2360.00	18CSE92N*	1340.00
1/2	1/2	1	1	1	—	0.75-3	3	18DSB92B*	1176.00	18DSB92W*	2002.00	18DSB92F*	2204.00	18DSB92H*	2416.00	18DSB92N*	1382.00
2	2	5	5	1	—	2.5-10	10	18SD92B*	1176.00	18SD92W*	2002.00	18SD92F*	2204.00	18SD92H*	2416.00	18SD92N*	1382.00
3	3	7 1/2	10	1	—	9-18	25	18DSE92B*	1176.00	18DSE92W*	2002.00	18DSE92F*	2204.00	18DSE92H*	2416.00	18DSE92N*	1382.00
7 1/2	7 1/2	10	—	1	—	13-27	30	18DSF92B*	1176.00	18DSF92W*	2002.00	18DSF92F*	2204.00	18DSF92H*	2416.00	18DSF92N*	1382.00
—	—	15	15	—	1 1/4	13-27	40	18ESF92B*	1305.00	18ESF92W*	2133.00	18ESF92F*	2346.00	18ESF92H*	3067.00	18ESF92N*	1512.00
10	10	—	—	—	1 1/4	20-40	50	18ESG92B*	1305.00	18ESG92W*	2133.00	18ESG92F*	2346.00	18ESG92H*	3067.00	18ESG92N*	1512.00
—	—	15	20	2	—	13-27	40	18FSF92B*	1305.00	18FSF92W*	2925.00	18FSF92F*	3218.00	18FSF92H*	3214.00	18FSF92N*	1942.00
10	15	25	25	2	—	22-45	50	18FSH92B*	1650.00	18FSH92W*	2925.00	18FSH92F*	3218.00	18FSH92H*	3214.00	18FSH92N*	1942.00
—	—	30	30	—	2 1/2	22-45	50	18GSH92B*	2192.00	18GSH92W*	4415.00	18GSH92F*	4856.00	18GSH92H*	4250.00	18GSH92N*	2572.00
15	20	—	—	—	2 1/2	30-60	100	18GSJ92B*	2192.00	18GSJ92W*	4415.00	18GSJ92F*	4856.00	18GSJ92H*	4250.00	18GSJ92N*	2572.00
—	—	30	30	3	—	30-60	50	18HSJ92B*	2381.00	18HSJ92W*	4605.00	18HSJ92F*	5065.00	18HSJ92H*	5285.00	18HSJ92N*	2760.00
25	30	50	50	3	—	45-90	100	18HSK92B*	2381.00	18HSK92W*	4605.00	18HSK92F*	5065.00	18HSK92H*	5285.00	18HSK92N*	2760.00
30	40	75	75	—	3 1/2	57-115	125	18ISL92B*	4837.00	18ISL92W*	7680.00	18ISL92F*	8448.00	18ISL92H*	6749.00	18ISL92N*	5888.00
40	50	100	100	4	—	67-135	150	18JTM92B*	5182.00	18JTM92W*	8024.00	18JTM92F*	8827.00	18JTM92H*	8214.00	18JTM92N*	6233.00
50	75	150	200	5	—	55-250	250	18LPT92B*	11967.00	18LPT92E* <sup>Ⓢ</sup>	19220.00	—	—	18LPT92H*	16720.00	18LPT92N*	13862.00
75	100	200	—	5	—	55-250	400	18LPU92B*	11967.00	18LPU92E* <sup>Ⓢ</sup>	19811.00	—	—	—	—	18LPU92N*	13862.00
100	125	250	300	6	—	160-540	400	18MPW92B*	25349.00	18MPW92E* <sup>Ⓢ</sup>	29657.00	—	—	—	—	18MPW92N*	27676.00
150	200	400	400	6	—	160-540	600	18MPX92B*	25940.00	18MPX92E* <sup>Ⓢ</sup>	30247.00	—	—	—	—	18MPX92N*	28266.00
—	250	500	500	7 <sup>Ⓞ</sup>	—	420-820	800	18NHV92B*	35021.00	—	—	—	—	—	—	18NHV92N*	37346.00
—	300	600	600	7 <sup>Ⓞ</sup>	—	420-820	1000	18NH92B*	35021.00	—	—	—	—	—	—	18NH92N*	37346.00
—	400	800	800	8 <sup>Ⓞ</sup>	—	420-1220	1200	18PHZ92B*	52095.00	—	—	—	—	—	—	18PHZ92N*	54420.00
—	450	900	900	8 <sup>Ⓞ</sup>	—	420-1220	1600	18PH192B*	52095.00	—	—	—	—	—	—	18PH192N*	54420.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.


- Ⓞ Dual voltage coils not available in modified starters or in starter sizes 5-8.
- Ⓢ For conduit hubs and conversion instructions, see page 16-87.
- Ⓣ Enclosure is NEMA Type 4 (painted steel).

- Ⓜ F coil 100-250V AC 50/60Hz, or DC, H coil 150-500V AC 50/60Hz, or DC
- Ⓞ Only available F coil 100-250V AC 50/60Hz, or DC
- Ⓢ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

## MCP Type with Solid State Overload, Class 18

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-117.</li> <li>▶ Wiring Diagrams see page 16-131.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110-120/220-240 <sup>①</sup>	A																					
200-208	D																					
220-240	G																					
277	L																					
220-240/440-480 <sup>①</sup>	C																					
440-480	H																					
575-600	E																					

### Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>③</sup>		NEMA 12, NEMA 3/3R, <sup>④</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	0.75-3	3	18CSB82B*	1348.00	18CSB82W*	2605.00	18CSB82N*	1727.00
2	2	5	5	0	—	2.5-10	10	18CSD82B*	1348.00	18CSD82W*	2605.00	18CSD82N*	1727.00
3	3	—	—	0	—	9-18	25	18CSE82B*	1348.00	18CSE82W*	2605.00	18CSE82N*	1727.00
1/2	1/2	1	1	1	—	0.75-3	3	18DSB82B*	1391.00	18DSB82W*	2649.00	18DSB82N*	1770.00
2	2	5	5	1	—	2.5-10	10	18DSD82B*	1391.00	18DSD82W*	2649.00	18DSD82N*	1770.00
3	3	7 1/2	10	1	—	9-18	25	18DSE82B*	1391.00	18DSE82W*	2649.00	18DSE82N*	1770.00
7 1/2	7 1/2	10	—	1	—	13-27	30	18DSF82B*	1391.00	18DSF82W*	2649.00	18DSF82N*	1770.00
—	—	15	15	—	1 1/4	13-27	40	18ESF82B*	1520.00	18ESF82W*	2779.00	18ESF82N*	1899.00
10	10	—	—	—	1 1/4	20-40	50	18ESG82B*	1520.00	18ESG82W*	2779.00	18ESG82N*	1899.00
—	—	15	20	2	—	13-27	40	18FSF82B*	1865.00	18FSF82W*	3571.00	18FSF82N*	2330.00
10	15	25	25	2	—	22-45	50	18FSH82B*	1865.00	18FSH82W*	3571.00	18FSH82N*	2330.00
—	—	30	30	—	2 1/2	22-45	50	18GSH82B*	2623.00	18GSH82W*	5708.00	18GSH82N*	3347.00
15	20	—	—	—	2 1/2	30-60	100	18GSJ82B*	2623.00	18GSJ82W*	5708.00	18GSJ82N*	3347.00
—	—	30	30	3	—	30-60	50	18HSJ82B*	2812.00	18HSJ82W*	5897.00	18HSJ82N*	3536.00
25	30	50	50	3	—	45-90	100	18HSK82B*	2812.00	18HSK82W*	5897.00	18HSK82N*	3536.00

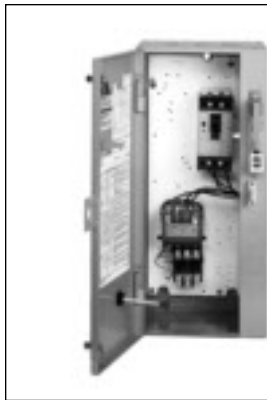
**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available in modified starters.  
 ② For conduit hubs and conversion instructions, see page 16-87.  
 ③ For 316 Stainless Steel option see page 16-97.

# Combination Heavy Duty Starters

## MCP Type with Ambient Compensated Bimetal Overload, Class 18

Selection



### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. (3 required)
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-117.
- ▶ Wiring Diagrams see page 16-131.
- ▶ Replacement Parts see page 16-155.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>ⓐ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>ⓐ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp					Contactor Amp Rating	NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts	NEMA 1 General Purpose					NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight			
				Catalog Number					List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	
1/2	1/2	1	1	18	0	—	3	18CP92BA*81	1094.00	18CP92WA*81	1922.00	18CP92FA*81	2114.00	18CP92HA*81	2322.00	18CP92NA*81	1301.00	
1	1	3	3	18	0	—	10	18CP92BB*81	1094.00	18CP92WB*81	1922.00	18CP92FB*81	2114.00	18CP92HB*81	2322.00	18CP92NB*81	1301.00	
3	3	5	5	18	0	—	25	18CP92BC*81	1094.00	18CP92WC*81	1922.00	18CP92FC*81	2114.00	18CP92HC*81	2322.00	18CP92NC*81	1301.00	
1/2	1/2	1	1	27	1	—	3	18DP92BA*81	1137.00	18DP92WA*81	1965.00	18DP92FA*81	2162.00	18DP92HA*81	2377.00	18DP92NA*81	1344.00	
1	1	3	3	27	1	—	10	18DP92BB*81	1137.00	18DP92WB*81	1965.00	18DP92FB*81	2162.00	18DP92HB*81	2377.00	18DP92NB*81	1344.00	
3	3	7 1/2	7 1/2	27	1	—	25	18DP92BD*81	1137.00	18DP92WD*81	1965.00	18DP92FD*81	2162.00	18DP92HD*81	2377.00	18DP92ND*81	1344.00	
7 1/2	7 1/2	10	10	27	1	—	30	18DP92BE*81	1137.00	18DP92WE*81	1965.00	18DP92FE*81	2162.00	18DP92HE*81	2377.00	18DP92NE*81	1344.00	
—	—	15	15	40	—	1 1/4	40	18EP92BF*81	1266.00	18EP92WF*81	2094.00	18EP92FF*81	2304.00	18EP92HF*81	3028.00	18EP92NF*81	1473.00	
10	10	—	—	40	—	1 1/4	50	18EP92BG*81	1266.00	18EP92WG*81	2094.00	18EP92FG*81	2304.00	18EP92HG*81	3028.00	18EP92NG*81	1473.00	
—	—	20	20	45	2	—	40	18FP92BH*81	1612.00	18FP92WH*81	2886.00	18FP92FH*81	3176.00	18FP92HH*81	3175.00	18FP92NH*81	1905.00	
10	15	25	25	45	2	—	50	18FP92BJ*81	1612.00	18FP92WJ*81	2886.00	18FP92FJ*81	3176.00	18FP92HJ*81	3175.00	18FP92NJ*81	1905.00	
10	15	30	30	60	—	2 1/2	50	18GP92BK*81	2154.00	18GP92WK*81	4376.00	18GP92FK*81	4815.00	18GP92HK*81	4212.00	18GP92NK*81	2533.00	
15	20	—	—	60	—	2 1/2	100	18GP92BL*81	2154.00	18GP92WL*81	4376.00	18GP92FL*81	4815.00	18GP92HL*81	4212.00	18GP92NL*81	2533.00	
—	—	30	30	90	3	—	50	18HP92BM*81	2343.00	18HP92WM*81	4565.00	18HP92FM*81	5023.00	18HP92HM*81	5247.00	18HP92NM*81	2722.00	
25	30	50	50	90	3	—	100	18HP92BN*81	2343.00	18HP92WN*81	4565.00	18HP92FN*81	5023.00	18HP92HN*81	5247.00	18HP92NN*81	2722.00	
30	40	75	75	115	—	3 1/2	125	18IP92BP*81	4798.00	18IP92WP*81	7641.00	18IP92FP*81	8406.00	18IP92HP*81	6711.00	18IP92NP*81	5850.00	
40	50	100	100	135	4	—	150	18JP92BR*81	5143.00	18JP92WR*81	7986.00	18JP92FR*81	8786.00	18JP92HR*81	8175.00	18JP92NR*81	—	

### Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp					Contactor Amp Rating	NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Enclosure					
200 Volts	230 Volts	460 Volts	575 Volts	NEMA 1 General Purpose					NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel 316 Stainless Steel (optional) <sup>ⓑ</sup>		NEMA 12, NEMA 3/3R, <sup>ⓐ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight			
				Catalog Number					List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	
1/2	1/2	1	1	18	0	—	3	18CP82BA*81	1309.00	18CP82WA*81	2567.00	18CP82NA*81	1688.00	
1	1	3	3	18	0	—	10	18CP82BB*81	1309.00	18CP82WB*81	2567.00	18CP82NB*81	1688.00	
3	3	5	5	18	0	—	25	18CP82BC*81	1309.00	18CP82WC*81	2567.00	18CP82NC*81	1688.00	
1/2	1/2	1	1	27	1	—	3	18DP82BA*81	1353.00	18DP82WA*81	2610.00	18DP82NA*81	1732.00	
1	1	3	3	27	1	—	10	18DP82BB*81	1353.00	18DP82WB*81	2610.00	18DP82NB*81	1732.00	
3	3	7 1/2	7 1/2	27	1	—	25	18DP82BD*81	1353.00	18DP82WD*81	2610.00	18DP82ND*81	1732.00	
7 1/2	7 1/2	10	10	27	1	—	30	18DP82BE*81	1353.00	18DP82WE*81	2610.00	18DP82NE*81	1732.00	
—	—	15	15	40	—	1 1/4	40	18EP82BF*81	1482.00	18EP82WF*81	2739.00	18EP82NF*81	1861.00	
10	10	—	—	40	—	1 1/4	50	18EP82BG*81	1482.00	18EP82WG*81	2739.00	18EP82NG*81	1861.00	
—	—	20	20	45	2	—	40	18FP82BH*81	1826.00	18FP82WH*81	3532.00	18FP82NH*81	2291.00	
10	15	25	25	45	2	—	50	18FP82BJ*81	1826.00	18FP82WJ*81	3532.00	18FP82NJ*81	2291.00	
10	15	30	30	60	—	2 1/2	50	18GP82BK*81	1826.00	18GP82WK*81	3532.00	18GP82NK*81	2291.00	
15	20	—	—	60	—	2 1/2	100	18GP82BL*81	2584.00	18GP82WL*81	5668.00	18GP82NL*81	3308.00	
—	—	30	30	90	3	—	50	18HP82BM*81	2774.00	18HP82WM*81	5859.00	18HP82NM*81	3498.00	
25	30	50	50	90	3	—	100	18HP82BN*81	2774.00	18HP82WN*81	5859.00	18HP82NN*81	3498.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

ⓐ Dual voltage coils not available in modified starters.  
 ⓑ For conduit hubs and conversion instructions, see page 16-87.

ⓐ For 316 Stainless Steel option see page 16-97.



# Reversing Heavy Duty Starters

## Solid State Overload with Manual Reset, Class 22

Selection



### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see pages 16-104 open and 16-120 enclosed.
- ▶ Wiring Diagrams see page 16-132.
- ▶ Replacement Parts see page 16-155.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>Ⓣ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>Ⓣ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole<sup>Ⓢ</sup>

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure										
200 Volts	230 Volts	460 Volts	575 Volts				Open Type <sup>Ⓣ</sup>	NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓢ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 <sup>Ⓢ</sup> NEMA 3/3R Industrial Use Weatherproof	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
1/8	1/8	1/8	1/8	00	—	0.25-1	22BSA32A*	598.00	22BSA32B*	633.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	
1/4	1/4	1/2	2	00	—	0.75-3	22BSB32A*	598.00	22BSB32B*	633.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	
1/2	1/2	2	—	00	—	2.5-10	22BSD32A*	598.00	22BSD32B*	633.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	
1/8	1/8	1/2	1/2	0	—	0.25-1	22CSA32A*	702.00	22CSA32B*	737.00	22CSA32W*	1133.00	22CSA32F*	1246.00	22CSA32H*	2330.00	
1/4	1/4	1/2	2	0	—	0.75-3	22CSB32A*	702.00	22CSB32B*	737.00	22CSB32W*	1133.00	22CSB32F*	1246.00	22CSB32H*	2330.00	
2	2	5	5	0	—	2.5-10	22CSD32A*	702.00	22CSD32B*	737.00	22CSD32W*	1133.00	22CSD32F*	1246.00	22CSD32H*	2330.00	
3	3	—	—	0	—	9-18	22CSE32A*	702.00	22CSE32B*	737.00	22CSE32W*	1133.00	22CSE32F*	1246.00	22CSE32H*	2330.00	
1/8	1/8	1/2	1/2	1	—	0.25-1	22DSA32A*	789.00	22DSA32B*	840.00	22DSA32W*	1391.00	22DSA32F*	1531.00	22DSA32H*	2442.00	
1/4	1/4	1/2	2	1	—	0.75-3	22DSB32A*	789.00	22DSB32B*	840.00	22DSB32W*	1391.00	22DSB32F*	1531.00	22DSB32H*	2442.00	
2	2	5	5	1	—	2.5-10	22DSD32A*	789.00	22DSD32B*	840.00	22DSD32W*	1391.00	22DSD32F*	1531.00	22DSD32H*	2442.00	
3	3	10	10	1	—	9-18	22DSE32A*	789.00	22DSE32B*	840.00	22DSE32W*	1391.00	22DSE32F*	1531.00	22DSE32H*	2442.00	
7 1/2	7 1/2	—	—	1	—	13-27	22DSF32A*	789.00	22DSF32B*	840.00	22DSF32W*	1391.00	22DSF32F*	1531.00	22DSF32H*	2442.00	
—	—	15	15	—	1 1/4	13-27	22ESF32A*	1047.00	22ESF32B*	1098.00	22ESF32W*	1650.00	22ESF32F*	1814.00	22ESF32H*	2701.00	
10	10	—	—	—	1 1/4	20-40	22ESG32A*	1047.00	22ESG32B*	1098.00	22ESG32W*	1650.00	22ESG32F*	1814.00	22ESG32H*	2701.00	
—	—	15	20	2	—	13-27	22FSF32A*	1461.00	22FSF32B*	1598.00	22FSF32W*	2494.00	22FSF32F*	2743.00	22FSF32H*	4054.00	
10	15	25	25	2	—	22-45	22FSH32A*	1461.00	22FSH32B*	1598.00	22FSH32W*	2494.00	22FSH32F*	2743.00	22FSH32H*	4054.00	
—	—	30	30	—	2 1/2	22-45	22GSH32A*	1926.00	22GSH32B*	2115.00	22GSH32W*	3227.00	22GSH32F*	3549.00	22GSH32H*	5165.00	
15	20	—	—	—	2 1/2	30-60	22GSJ32A*	1926.00	22GSJ32B*	2115.00	22GSJ32W*	3227.00	22GSJ32F*	3549.00	22GSJ32H*	5165.00	
—	—	30	40	3	—	30-60	22HSJ32A*	2399.00	22HSJ32B*	2640.00	22HSJ32W*	3968.00	22HSJ32F*	4365.00	22HSJ32H*	6491.00	
25	30	50	50	3	—	45-90	22HSK32A*	2399.00	22HSK32B*	2640.00	22HSK32W*	3968.00	22HSK32F*	4365.00	22HSK32H*	6491.00	
30	40	75	75	—	3 1/2	57-115	22ISL32A*	5112.00	22ISL32B*	5561.00	22ISL32W*	7903.00	22ISL32F*	8694.00	22ISL32H*	11730.00	
40	50	100	100	4	—	67-135	22JTM32A*	5802.00	22JTM32B*	6250.00	22JTM32W*	8594.00	22JTM32F*	9454.00	22JTM32H*	12418.00	
75	100	200	200	5	—	55-250	22LPU32A*	11113.00	22LPU32B*	13707.00	22LPU32E* <sup>Ⓣ</sup>	16739.00	—	—	—	22LPU320*	15127.00
150	200	400	400	6	—	160-540	22MPX32A*	26172.00	22MPX32B*	30480.00	22MPX32E* <sup>Ⓣ</sup>	34788.00	—	—	—	22MPX320*	33665.00
—	300	600	600	7 <sup>Ⓢ</sup>	—	420-820	22NHY32A*	37088.00	22NHY32B*	41395.00	—	—	—	—	—	22NHY320*	43721.00
—	450	900	900	8 <sup>Ⓢ</sup>	—	420-1220	22PHZ32A*	54541.00	22PHZ32B*	58849.00	—	—	—	—	—	22PHZ320*	61175.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All Starter Sizes carry one maximum Hp rating.

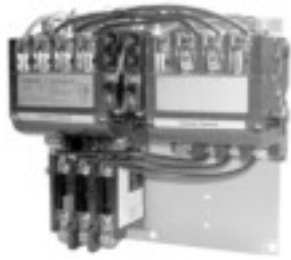
- Ⓣ Dual voltage coils not available in size 5-8 starters.
- Ⓢ For conduit hubs and conversion instructions, see page 16-87.

- Ⓢ For single phase, select a starter with bimetal OL on page 16-28.
- Ⓢ Enclosure is rated only NEMA 4 (painted steel).
- Ⓢ Only available  
F coil 100-250V AC 50/60Hz, or DC  
H coil 150-500V AC 50/60Hz, or DC

- Ⓢ Only available  
F coil 100-250V AC 50/60Hz, or DC
- Ⓢ Auxiliary contacts  
22B-22E 4th pole built-in  
22F-22J 2 NO & 2 NC

# Reversing Heavy Duty Starters

## Ambient Compensated Bimetal Overload with Manual and Auto Reset, Class 22 Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148. Single phase starters require 1 heater element. 3-phase starters require 3 heater elements.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-104 open and 16-120 enclosed.</li> <li>▶ Wiring Diagrams see page 16-132.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240</td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480</td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240	A	200-208	D	220-240	G	277	L	220-240/440-480	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110-120/220-240	A																					
200-208	D																					
220-240	G																					
277	L																					
220-240/440-480	C																					
440-480	H																					
575-600	E																					

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp					Contactor Amp Rating	NEMA Size	Half Size	Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts	Open Type <sup>3</sup>				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>1</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant Indoor/Outdoor Use		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures		NEMA 12 <sup>1</sup> NEMA 3/3R Industrial Use Weatherproof			
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				
1 1/2	1 1/2	2	2	9	00	—	22BP32A*81	561.00	22BP32B*81	595.00	Use Size 0	—	Use Size 0	—	Use Size 0	—			
3	3	5	5	18	0	—	22CP32A*81	664.00	22CP32B*81	698.00	22CP32W*81	1094.00	22CP32F*81	1203.00	22CP32H*81	2291.00	22CP320*81	854.00	
7 1/2	7 1/2	10	10	27	1	—	22DP32A*81	750.00	22DP32B*81	801.00	22DP32W*81	1353.00	22DP32F*81	1489.00	22DP32H*81	2403.00	22DP320*81	957.00	
10	10	15	15	40	—	1 1/4	22EP32A*81	1008.00	22EP32B*81	1060.00	22EP32W*81	1612.00	22EP32F*81	1773.00	22EP32H*81	2663.00	22EP320*81	1215.00	
10	15	25	25	45	2	—	22FP32A*81	1422.00	22FP32B*81	1559.00	22FP32W*81	2456.00	22FP32F*81	2702.00	22FP32H*81	4014.00	22FP320*81	1819.00	
15	20	30	30	60	—	2 1/2	22GP32A*81	1887.00	22GP32B*81	2077.00	22GP32W*81	3187.00	22GP32F*81	3506.00	22GP32H*81	5126.00	22GP320*81	2490.00	
25	30	50	50	90	3	—	22HP32A*81	2360.00	22HP32B*81	2602.00	22HP32W*81	3928.00	22HP32F*81	4322.00	22HP32H*81	6452.00	22HP320*81	3170.00	
30	40	75	75	115	—	3 1/2	22IP32A*81	5075.00	22IP32B*81	5522.00	22IP32W*81	7866.00	22IP32F*81	8653.00	22IP32H*81	11691.00	22IP320*81	6401.00	
40	50	100	100	135	4	—	22JG32A*81	5763.00	22JG32B*81	6212.00	22JG32W*81	8554.00	22JG32F*81	9410.00	22JG32H*81	12381.00	22JG320*81	7090.00	

### Open Type & Standard Width Enclosure, Single Phase, 3-Wire, 2-Pole<sup>2</sup>

Max Hp				Contactor Amp Rating	NEMA Size	Enclosure									
115 Volts	208/230 Volts	1	2			Open Type	NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>1</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 <sup>1</sup> NEMA 3/3R Industrial Use Weatherproof
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1	9	00	22BP12A*81	521.00	22BP12B*81	555.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
1	2	18	0	22CP12A*81	625.00	22CP12B*81	658.00	22CP12W*81	1055.00	22CP12F*81	1162.00	22CP12H*81	1162.00	22CP120*81	814.00
2	3	27	1	22DP12A*81	711.00	22DP12B*81	762.00	22DP12W*81	1314.00	22DP12F*81	1446.00	22DP12H*81	1446.00	22DP120*81	917.00
3	5	35	1P	22EP12A*81	969.00	22EP12B*81	1021.00	22EP12W*81	1572.00	22EP12F*81	1730.00	22EP12H*81	1730.00	22EP120*81	1176.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All Starter Sizes carry one maximum Hp rating.

<sup>1</sup> For conduit hubs and conversion instructions, see page 16-87.

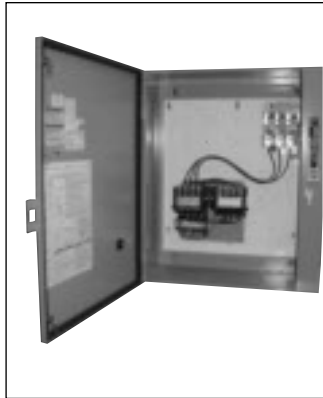
<sup>2</sup> Coil D, F, or G will be wired for Incoming Voltage. J coil will be wired for 24V separate source. Coils E, H, and L do not apply to single phase starters.

<sup>3</sup> Auxiliary contacts 22B-22E 4th pole built-in 22F-22J 2 NO & 2 NC

# Combination Reversing Heavy Duty Starters

Non-Fusible, Class 25

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. (3 required)
- ▶ Fuse clips see page 16-95.
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-122.
- ▶ Wiring Diagrams see page 16-133.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>Ⓚ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>Ⓚ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Standard Width Enclosure with Solid State Overload, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓚ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>Ⓚ</sup> NEMA 3/3R NEMA 4 Painted (thru Sz 4) Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	2	0	—	0.25-1	30	25CSA92B*	1323.00	25CSA92W*	2373.00	25CSA92F*	2611.00	25CSA92N*	1616.00
1/2	3/4	1 1/2	2	0	—	0.75-3	30	25CSB92B*	1323.00	25CSB92W*	2373.00	25CSB92F*	2611.00	25CSB92N*	1616.00
2	2	5	5	0	—	2.5-10	30	25CSD92B*	1323.00	25CSD92W*	2373.00	25CSD92F*	2611.00	25CSD92N*	1616.00
3	3	—	—	0	—	9-18	30	25CSE92B*	1323.00	25CSE92W*	2373.00	25CSE92F*	2611.00	25CSE92N*	1616.00
1/2	3/4	1 1/2	2	1	—	0.25-1	30	25DSA92B*	1409.00	25DSA92W*	2459.00	25DSA92F*	2705.00	25DSA92N*	1702.00
1/2	3/4	1 1/2	2	1	—	0.75-3	30	25DSB92B*	1409.00	25DSB92W*	2459.00	25DSB92F*	2705.00	25DSB92N*	1702.00
2	2	5	5	1	—	2.5-10	30	25DSD92B*	1409.00	25DSD92W*	2459.00	25DSD92F*	2705.00	25DSD92N*	1702.00
3	3	10	10	1	—	9-18	30	25DSE92B*	1409.00	25DSE92W*	2459.00	25DSE92F*	2705.00	25DSE92N*	1702.00
7 1/2	7 1/2	—	—	1	—	13-27	60	25DSF92B*	1409.00	25DSF92W*	2459.00	25DSF92F*	2705.00	25DSF92N*	1702.00
—	—	15	15	—	1 3/4	13-27	60	25ESF92B*	1667.00	25ESF92W*	2718.00	25ESF92F*	2991.00	25ESF92N*	1960.00
10	10	—	—	—	1 3/4	20-40	60	25ESG92B*	1667.00	25ESG92W*	2718.00	25ESG92F*	2991.00	25ESG92N*	1960.00
—	—	15	20	2	—	13-27	60	25FSF92B*	2330.00	25FSF92W*	3933.00	25FSF92F*	4326.00	25FSF92N*	2709.00
10	15	25	25	2	—	22-45	60	25FSH92B*	2330.00	25FSH92W*	3933.00	25FSH92F*	4326.00	25FSH92N*	2709.00
—	—	30	30	—	2 1/2	22-45	100 <sup>Ⓚ</sup>	25GSH92B*	3364.00	25GSH92W*	6173.00	25GSH92F*	6790.00	25GSH92N*	3864.00
15	20	—	—	—	2 1/2	30-60	100	25GSJ92B*	3364.00	25GSJ92W*	6173.00	25GSJ92F*	6790.00	25GSJ92N*	3864.00
—	—	30	40	3	—	30-60	100	25HSJ92B*	3838.00	25HSJ92W*	6646.00	25HSJ92F*	7312.00	25HSJ92N*	4338.00
20 <sup>Ⓚ</sup>	25 <sup>Ⓚ</sup>	50	50	3	—	45-90	100	25HSK92B*	3838.00	25HSK92W*	6646.00	25HSK92F*	7312.00	25HSK92N*	4338.00
30	40	75	75	—	3 1/2	57-115	200	25ISL92B*	7310.00	25ISL92W*	10859.00	25ISL92F*	11946.00	25ISL92N*	8680.00
40	50	100	100	4	—	67-135	200	25JTM92B*	7999.00	25JTM92W*	11548.00	25JTM92F*	12703.00	25JTM92N*	9369.00
75	100	200	200	5	—	55-250	400 <sup>Ⓚ</sup>	25LPU92B*	15576.00	25LPU92E* <sup>Ⓚ</sup>	23408.00	—	—	25LPU92N*	18833.00
150	200	400	400	6	—	160-540	800	25MPX92B*	38686.00	25MPX92E* <sup>Ⓚ</sup>	42993.00	—	—	25MPX92N*	41012.00
—	300	600	600	7 <sup>Ⓚ</sup>	—	420-820	1200	25NH92B*	52457.00	—	—	—	—	25NH92N*	54783.00
—	450	900	900	8 <sup>Ⓚ</sup>	—	420-1220	1600	25PH92B*	67132.00	—	—	—	—	25PH92N*	69459.00

## Standard Width Enclosure with Ambient Compensated Bimetal Overload, 3-Phase, 3-Pole

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓚ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>Ⓚ</sup> NEMA 3/3R NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30	25CP92B*81	1284.00	25CP92W*81	2335.00	25JP92W*81	11510.00	25CP92N*81	1577.00
7 1/2 <sup>Ⓚ</sup>	7 1/2 <sup>Ⓚ</sup>	10	10	27	1	—	30	25DP92B*81	1370.00	25DP92W*81	2421.00	25DP92F*81	2664.00	25DP92N*81	1663.00
10	10	15	15	40	—	1 1/4	60	25EP92B*81	1629.00	25EP92W*81	2680.00	25EP92F*81	2947.00	25EP92N*81	1922.00
10	15	25	25	45	2	—	60	25FP92B*81	2291.00	25FP92W*81	3893.00	25FP92F*81	4284.00	25FP92N*81	2670.00
15	20	30	30	60	—	2 1/2	100	25GP92B*81	3325.00	25GP92W*81	6134.00	25GP92F*81	6747.00	25GP92N*81	3825.00
25 <sup>Ⓚ</sup>	30 <sup>Ⓚ</sup>	50	50	90	3	—	100	25HP92B*81	3799.00	25HP92W*81	6608.00	25HP92F*81	7268.00	25HP92N*81	4299.00
30	40	75	75	115	—	3 1/2	200	25IP92B*81	7271.00	25IP92W*81	10820.00	25IP92F*81	11903.00	25IP92N*81	8640.00
40	50	100	100	135	4	—	200	25JP92B*81	7673.00	25JP92W*81	11510.00	25JP92F*81	12662.00	25JP92N*81	9329.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

Ⓚ Dual voltage coils not available in modified starters or in starter sizes 5-8.

Ⓚ For conduit hubs and conversion instructions, see page 16-87.

Ⓚ For 60A disconnect, order fusible cat. no.

Ⓚ For 25HP and 200A disconnect, order fusible cat. no.

Ⓚ For 30HP and 200A disconnect, order fusible cat. no.

Ⓚ For 600A disconnect, order fusible cat. no.

Ⓚ Enclosure is NEMA Type 4 (painted steel).

Ⓚ F coil 100-250V AC 50/60Hz, or DC, H coil 150-500V AC 50/60Hz, or DC

Ⓚ Only available

F coil 100-250V AC 50/60Hz, or DC

# Combination Reversing Heavy Duty Starters

MCP Type, Class 26

Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. (3 required)
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-122.
- ▶ Wiring Diagrams see page 16-133.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>ⓓ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>ⓓ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## Standard Width Enclosure with Solid State Overload, 3-Phase, 3-Pole

Max Hp				NEMA Size	Half Size	Overload Amp Range	Motor Circuit ETI Amps	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓢ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div I and Div 2 Class I Groups C & D Class III Groups E, F & G Class III Bolted Enclosure Indoor/Outdoor Use		NEMA 12 <sup>Ⓢ</sup> NEMA 3/3R NEMA 4 Painted (thru Sz 4) Industrial Use, Weatherproof, Watertight, Dust-tight	
Interrupter								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	0.75-3	3	26CSB92B*	1581.00	26CSB92W*	2632.00	26CSB92F*	2896.00	26CSB92H*	3241.00	26CSB92N*	1874.00
2	2	5	5	0	—	2.5-10	10	26CSD92B*	1581.00	26CSD92W*	2632.00	26CSD92F*	2896.00	26CSD92H*	3241.00	26CSD92N*	1874.00
3	3	—	—	0	—	9-18	25	26CSE92B*	1581.00	26CSE92W*	2632.00	26CSE92F*	2896.00	26CSE92H*	3241.00	26CSE92N*	1874.00
1/2	1/2	1	1	1	—	0.75-3	3	26DSB92B*	1684.00	26DSB92W*	2735.00	26DSB92F*	3009.00	26DSB92H*	3358.00	26DSB92N*	1977.00
2	2	5	5	1	—	2.5-10	10	26DSD92B*	1684.00	26DSD92W*	2735.00	26DSD92F*	3009.00	26DSD92H*	3358.00	26DSD92N*	1977.00
3	3	7 1/2	10	1	—	9-18	25	26DSE92B*	1684.00	26DSE92W*	2735.00	26DSE92F*	3009.00	26DSE92H*	3358.00	26DSE92N*	1977.00
7 1/2	7 1/2	10	—	1	—	13-27	30	26DSF92B*	1684.00	26DSF92W*	2735.00	26DSF92F*	3009.00	26DSF92H*	3358.00	26DSF92N*	1977.00
—	—	15	15	—	1 1/4	13-27	40	26ESF92B*	1942.00	26ESF92W*	2994.00	26ESF92F*	3293.00	26ESF92H*	3488.00	26ESF92N*	2235.00
10	10	—	—	—	1 1/4	20-40	50	26ESG92B*	1942.00	26ESG92W*	2994.00	26ESG92F*	3293.00	26ESG92H*	3488.00	26ESG92N*	2235.00
—	—	15	20	2	—	13-27	40	26FSF92B*	2666.00	26FSF92W*	4268.00	26FSF92F*	4696.00	26FSF92H*	4970.00	26FSF92N*	3045.00
10	15	25	25	2	—	22-45	50	26FSH92B*	2666.00	26FSH92W*	4268.00	26FSH92F*	4696.00	26FSH92H*	4970.00	26FSH92N*	3045.00
—	—	30	30	—	2 1/2	22-45	50	26GSH92B*	3493.00	26GSH92W*	6301.00	26GSH92F*	6932.00	26GSH92H*	5159.00	26GSH92N*	3993.00
15	20	—	—	—	2 1/2	30-60	100	26GSJ92B*	3493.00	26GSJ92W*	6301.00	26GSJ92F*	6932.00	26GSJ92H*	5159.00	26GSJ92N*	3993.00
—	—	30	30	3	—	30-60	50	26HSJ92B*	3968.00	26HSJ92W*	6776.00	26HSJ92F*	7453.00	26HSJ92H*	8265.00	26HSJ92N*	4468.00
25	30	50	50	3	—	45-90	100	26HSK92B*	3968.00	26HSK92W*	6776.00	26HSK92F*	7453.00	26HSK92H*	8265.00	26HSK92N*	4468.00
30	40	75	75	—	3 1/2	57-115	125	26ISL92B*	8250.00	26ISL92W*	11799.00	26ISL92F*	12979.00	26ISL92H*	11804.00	26ISL92N*	9619.00
40	50	100	100	4	—	67-135	150	26JTM92B*	8939.00	26JTM92W*	12488.00	26JTM92F*	13736.00	26JTM92H*	15846.00	26JTM92N*	10308.00
50	75	150	200	5	—	55-250	250	26LPT92B*	18065.00	26LPT92W* <sup>Ⓢ</sup>	27129.00	—	—	—	—	26LPT92N*	21321.00
75	100	200	—	5	—	55-250	400	26LPU92B*	18065.00	26LPU92W* <sup>Ⓢ</sup>	27129.00	—	—	—	—	26LPU92N*	21321.00
100	125	250	300	6	—	160-540	400	26MPW92B*	38646.00	26MPW92W* <sup>Ⓢ</sup>	43182.00	—	—	—	—	26MPW92N*	41163.00
150	200	400	400	6	—	160-540	600	26MPX92B*	38646.00	26MPX92W* <sup>Ⓢ</sup>	43182.00	—	—	—	—	26MPX92N*	41163.00
—	250	500	500	7 <sup>Ⓢ</sup>	—	420-820	800	26NHV92B*	52418.00	—	—	—	—	—	—	26NHV92N*	54934.00
—	300	600	600	7 <sup>Ⓢ</sup>	—	420-820	1000	26NH92B*	52418.00	—	—	—	—	—	—	26NH92N*	54934.00
—	400	800	800	8 <sup>Ⓢ</sup>	—	420-1220	1200	26PH92B*	77979.00	—	—	—	—	—	—	26PH92N*	80305.00
—	450	900	900	8 <sup>Ⓢ</sup>	—	420-1220	1600	26PH192B*	77979.00	—	—	—	—	—	—	26PH192N*	80305.00

## Standard Width Enclosure with Ambient Compensated Bimetal Overload, 3-Phase, 3-Pole

1/2	1/2	1	1	0	—	18	3	26CP92BA*81	1542.00	26CP92WA*81	2594.00	26CP92FA*81	2853.00	26CP92HA*81	3204.00	26CP92NA*81	1835.00
1	1	3	3	0	—	18	10	26CP92BB*81	1542.00	26CP92WB*81	2594.00	26CP92FB*81	2853.00	26CP92HB*81	3204.00	26CP92NB*81	1835.00
3	3	5	5	0	—	18	25	26CP92BC*81	1542.00	26CP92WC*81	2594.00	26CP92FC*81	2853.00	26CP92HC*81	3204.00	26CP92NC*81	1835.00
1/2	1/2	1	1	1	—	27	3	26DP92BA*81	1645.00	26DP92WA*81	2696.00	26DP92FA*81	2966.00	26DP92HA*81	3320.00	26DP92NA*81	1938.00
1	1	3	3	1	—	27	10	26DP92BB*81	1645.00	26DP92WB*81	2696.00	26DP92FB*81	2966.00	26DP92HB*81	3320.00	26DP92NB*81	1938.00
3	3	7 1/2	7 1/2	1	—	27	25	26DP92BD*81	1645.00	26DP92WD*81	2696.00	26DP92FD*81	2966.00	26DP92HD*81	3320.00	26DP92ND*81	1938.00
7 1/2	7 1/2	10	10	1	—	27	30	26DP92BE*81	1645.00	26DP92WE*81	2696.00	26DP92FE*81	2966.00	26DP92HE*81	3320.00	26DP92NE*81	1938.00
—	—	15	15	—	1 1/4	40	40	26EP92BF*81	1905.00	26EP92WF*81	2955.00	26EP92FF*81	3251.00	26EP92HF*81	3448.00	26EP92NF*81	2198.00
10	10	—	—	—	1 1/4	40	50	26EP92BG*81	1905.00	26EP92WG*81	2955.00	26EP92FG*81	3251.00	26EP92HG*81	3448.00	26EP92NG*81	2198.00
—	—	20	20	2	—	45	40	26FP92BH*81	2628.00	26FP92WH*81	4230.00	26FP92FH*81	4655.00	26FP92HH*81	4931.00	26FP92NH*81	3007.00
10	15	25	25	2	—	45	50	26FP92BJ*81	2628.00	26FP92WJ*81	4230.00	26FP92FJ*81	4655.00	26FP92HJ*81	4931.00	26FP92NJ*81	3007.00
10	15	30	30	—	2 1/2	60	50	26GP92BK*81	3454.00	26GP92WK*81	6263.00	26GP92FK*81	6891.00	26GP92HK*81	7752.00	26GP92NK*81	3954.00
15	20	—	—	—	2 1/2	60	100	26GP92BL*81	3454.00	26GP92WL*81	6263.00	26GP92FL*81	6891.00	26GP92HL*81	7752.00	26GP92NL*81	3954.00
—	—	30	30	3	—	90	50	26HP92BM*81	3928.00	26HP92WM*81	6738.00	26HP92FM*81	7412.00	26HP92HM*81	8226.00	26HP92NM*81	4428.00
25	30	50	50	3	—	90	100	26HP92BN*81	3928.00	26HP92WN*81	6738.00	26HP92FN*81	7412.00	26HP92HN*81	8226.00	26HP92NN*81	4428.00
30	40	75	75	—	3 1/2	115	125	26IP92BP*81	8210.00	26IP92WP*81	11760.00	26IP92FP*81	12936.00	26IP92HP*81	13378.00	26IP92NP*81	9580.00
40	50	100	100	4	—	135	150	26JP92BR*81	8899.00	26JP92WR*81	12449.00	26JP92FR*81	13694.00	26JP92HR*81	15808.00	26JP92NR*81	10269.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

Ⓢ Dual voltage coils not available in modified starters or in starter sizes 5-8.

Ⓢ For conduit hubs and conversion instructions, see page 16-87.

Ⓢ Enclosure is NEMA Type 4 (painted steel).

Ⓢ F coil 100-250V AC 50/60Hz, or DC,

H coil 150-500V AC 50/60Hz, or DC

Ⓢ Only available

F coil 100-250V AC 50/60Hz, or DC

# Two Speed Heavy Duty Starters

## Features and Benefits

General

### Features

- Rugged Industrial Design
- Dual Voltage, Dual Frequency Coils
- Compact Design
- Snap-On Front Removable Auxiliary Contacts
- Electrical and Mechanical Interlocks
- Half Sizes — Space and Cost Savings
- Industrial Type Disconnect Operating Handle
- Visible Blade Disconnect Thru Size 4
- Adjustable Motor Circuit Protector
- 100,000 Amp Fault Protection with MCP or Class R Fuses
- Pilot Device Locations identified on All Enclosures
- UL Listed File #E14900
- CSA Certified File #LR6535

### Applications

Multi-speed magnetic starters automatically reconnect multi-speed motor windings for the desired speed in response to a signal received from push button stations or other pilot devices.

These starters are available for two speed motors.

**Consequent Pole** multi-speed motors having two speeds on a single winding (consequent pole) require a starter which reconnects the motor leads to half the number of effective motor poles at the high speed point. In this type of motor, **the low speed is one half the high speed.**

**Separate Windings** motors having separate windings for each speed provide more varied speed combinations in that the low speed need not be one half the high speed.

**Starters for separate winding motors consist of a starter unit for each speed.**

Multi-speed motor starters are available for constant torque, variable torque and constant horsepower motors.

**Constant Torque** motors maintain constant torque at all speeds. Horsepower varies directly with speed. This type of motor is applicable to conveyors, mills and similar applications.

**Variable Torque** motors produce a torque characteristic which varies as the square of the speed. This type of

motor is applicable to fans, blowers and centrifugal pumps.

**Constant Horsepower** motors maintain constant horsepower at all speeds and therefore torque varies inversely with speed. This type of motor is applicable where the same horsepower is required at all speeds. **The higher current required at low speed requires derating on starters for constant horsepower applications.** This type of motor is applicable to metal working machines such as drills, lathes, mills, bending machines, punch presses, and power wrenches.

### Operation

Magnetic starters for multi-speed applications select the desired speed in accordance with the pilot control.

The shock to machinery upon the reduction of speed is greater than when the speed is increased. Therefore, the pilot control should be wired so that the stop button must be depressed before dropping to a lower speed or time delays should be used for applications requiring full automatic operations. The multi-speed controls are available with the necessary interlocks or relays to provide this type of operation.

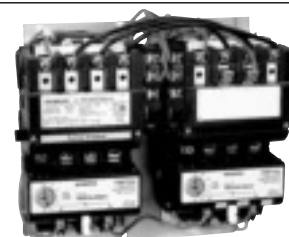
These controls may be modified for compelling or acceleration pilot control.

**Selective Control** permits the operator to start the motor at any speed and to change to a higher speed by merely pushing a button. To change to a lower speed it is necessary to first depress the stop button and to then press the proper speed button. Selective control is a function of the pilot control selected and requires no starter modifications.

**Compelling Control** requires that the motor always be started at the lower speed and that the push buttons be operated in speed sequence to go to the next higher speed. To change to a lower speed, the stop button must be depressed and then the push buttons operated in speed sequence until the desired speed is reached. Compelling control can be added from the factory modification section page 16-98.

**Acceleration Control** provides that the motor be accelerated automatically with timers by progressively energizing the controls from the push button station from the lowest to highest speed. To change to a lower speed the stop button is depressed and then it is necessary to proceed as if starting from rest. Acceleration control can be added from the factory modification section page 16-98.

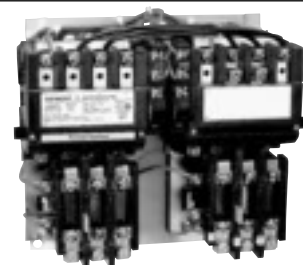
**Deceleration Control** provides that the motor be decelerated automatically with a timer when going from high speed to low speed. The timer allows the motor to decelerate from high speed to a lower speed before automatically restarting the motor in low speed. Deceleration control can be added from the factory modification section page 16-98.



Open Style Two Speed Starter  
(ESP100 Overload)



Internal View of NEMA 1 Enclosure  
Sz 2 2S2W starter with CPT  
(ESP 100 Overload)

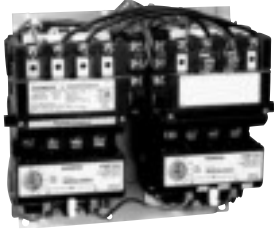


Open Style Two Speed Starter  
(Ambient Compensated Overload)

# Two Speed Heavy Duty Starters

## Constant or Variable Torque with Solid Overload, Class 30

Selection



2S2W starter  
(ESP 100 Overload)

Ordering Information	Coil Table	Low Speed FLA Table																																																												
<ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (†) with the letter that corresponds to the correct low speed FLA in the FLA table.®</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-104 open and 16-123 enclosed.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> <th>Size</th> <th>FLA</th> <th>†</th> </tr> </thead> <tbody> <tr> <td>24 Separate Control</td> <td>J</td> <td>0,1</td> <td>0.25-1</td> <td>A</td> </tr> <tr> <td>120 Separate Control</td> <td>F</td> <td>0,1</td> <td>0.75-3</td> <td>B</td> </tr> <tr> <td>110-120/220-240</td> <td>A</td> <td>0,1</td> <td>2.5-10</td> <td>D</td> </tr> <tr> <td>200-208</td> <td>D</td> <td>0-1<sup>3/4</sup></td> <td>9-18</td> <td>E</td> </tr> <tr> <td>220-240</td> <td>G</td> <td>1-4</td> <td>13-27</td> <td>F</td> </tr> <tr> <td>277</td> <td>L</td> <td>1<sup>3/4</sup></td> <td>20-40</td> <td>G</td> </tr> <tr> <td>220-240/440-480</td> <td>C</td> <td>2-4</td> <td>22-45</td> <td>H</td> </tr> <tr> <td>440-480</td> <td>H</td> <td>2<sup>1/2</sup>-4</td> <td>30-60</td> <td>J</td> </tr> <tr> <td>575-600</td> <td>E</td> <td>3-4</td> <td>45-90</td> <td>K</td> </tr> <tr> <td></td> <td></td> <td>3<sup>1/2</sup>-4</td> <td>57-115</td> <td>L</td> </tr> <tr> <td></td> <td></td> <td>4</td> <td>67-135</td> <td>M</td> </tr> </tbody> </table>	60Hz Voltage	Letter	Size	FLA	†	24 Separate Control	J	0,1	0.25-1	A	120 Separate Control	F	0,1	0.75-3	B	110-120/220-240	A	0,1	2.5-10	D	200-208	D	0-1 <sup>3/4</sup>	9-18	E	220-240	G	1-4	13-27	F	277	L	1 <sup>3/4</sup>	20-40	G	220-240/440-480	C	2-4	22-45	H	440-480	H	2 <sup>1/2</sup> -4	30-60	J	575-600	E	3-4	45-90	K			3 <sup>1/2</sup> -4	57-115	L			4	67-135	M	
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	For other voltages and frequencies, see Factory Modifications page 16-94.																																																													

### One Winding Consequent Pole, 3-Phase (Constant or Variable Torque)

Max Hp					NEMA Size	Half Size	Overload Amp Range	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts	Open Type®				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>①</sup> NEMA 3/3R Industrial Use Weatherproof			
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	1 1/2	0	—	0.75-3	30CSB132A2V*	1370.00	30CSB132B2V*	1405.00	30CSB132W2V*	2231.00	30CSB132F2V*	2455.00	30CSB132O2V*	1672.00	
2	2	5	5	0	—	2.5-10	30CSD132A2V*	1370.00	30CSD132B2V*	1405.00	30CSD132W2V*	2231.00	30CSD132F2V*	2455.00	30CSD132O2V*	1672.00	
3	3	—	—	0	—	9-18	30CSE132A2V*	1370.00	30CSE132B2V*	1405.00	30CSE132W2V*	2231.00	30CSE132F2V*	2455.00	30CSE132O2V*	1672.00	
1 1/2	1 3/4	1 1/2	1 1/2	1	—	0.75-3	30DSB132A2V*	1456.00	30DSB132B2V*	1508.00	30DSB132W2V*	2317.00	30DSB132F2V*	2549.00	30DSB132O2V*	1774.00	
2	2	5	5	1	—	2.5-10	30DSD132A2V*	1456.00	30DSD132B2V*	1508.00	30DSD132W2V*	2317.00	30DSD132F2V*	2549.00	30DSD132O2V*	1774.00	
3	3	10	10	1	—	9-18	30DSE132A2V*	1456.00	30DSE132B2V*	1508.00	30DSE132W2V*	2317.00	30DSE132F2V*	2549.00	30DSE132O2V*	1774.00	
7 1/2	7 1/2	—	—	1	—	13-27	30DSF132A2V*	1456.00	30DSF132B2V*	1508.00	30DSF132W2V*	2317.00	30DSF132F2V*	2549.00	30DSF132O2V*	1774.00	
—	—	15	15	—	1 3/4	13-27	30ESF132A2V*	1844.00	30ESF132B2V*	1895.00	30ESF132W2V*	2705.00	30ESF132F2V*	2976.00	30ESF132O2V*	2163.00	
10	10	—	—	—	1 3/4	20-40	30ESG132A2V*	1844.00	30ESG132B2V*	1895.00	30ESG132W2V*	2705.00	30ESG132F2V*	2976.00	30ESG132O2V*	2163.00	
—	—	15	15	2	—	13-27	30FSF132A2V*	2524.00	30FSF132B2V*	2680.00	30FSF132W2V*	3679.00	30FSF132F2V*	4047.00	30FSF132O2V*	3059.00	
10	15	25	25	2	—	22-45	30FSH132A2V*	2524.00	30FSH132B2V*	2680.00	30FSH132W2V*	3679.00	30FSH132F2V*	4047.00	30FSH132O2V*	3059.00	
—	—	30	30	—	2 1/2	22-45	30GSH132A2V*	3145.00	30GSH132B2V*	3342.00	30GSH132W2V*	4600.00	30GSH132F2V*	5061.00	30GSH132O2V*	3963.00	
15	20	—	—	—	2 1/2	30-60	30GSJ132A2V*	3145.00	30GSJ132B2V*	3342.00	30GSJ132W2V*	4600.00	30GSJ132F2V*	5061.00	30GSJ132O2V*	3963.00	
—	—	40	40	3	—	30-60	30HSJ132A2V*	3765.00	30HSJ132B2V*	4006.00	30HSJ132W2V*	5487.00	30HSJ132F2V*	6036.00	30HSJ132O2V*	4868.00	
25	30	50	50	3	—	45-90	30HSK132A2V*	3765.00	30HSK132B2V*	4006.00	30HSK132W2V*	5487.00	30HSK132F2V*	6036.00	30HSK132O2V*	4868.00	
30	40	75	75	—	3 1/2	57-115	30ISL132A2V*	8589.00	30ISL132B2V*	9536.00	30ISL132W2V*	12570.00	30ISL132F2V*	13826.00	30ISL132O2V*	11243.00	
40	50	100	100	4	—	67-135	30JTM132A2V*	9622.00	30JTM132B2V*	10570.00	30JTM132W2V*	13604.00	30JTM132F2V*	14965.00	30JTM132O2V*	12277.00	

### Two Separate Windings, 3-Phase (Constant or Variable Torque)

Max Hp					NEMA Size	Half Size	Overload Amp Range	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts	Open Type®				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>①</sup> NEMA 3/3R Industrial Use Weatherproof			
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	1 1/2	0	—	0.75-3	30CSB132A1V*	991.00	30CSB132B1V*	1026.00	30CSB132W1V*	1852.00	30CSB132F1V*	2037.00	30CSB132O1V*	1293.00	
2	2	5	5	0	—	2.5-10	30CSD132A1V*	991.00	30CSD132B1V*	1026.00	30CSD132W1V*	1852.00	30CSD132F1V*	2037.00	30CSD132O1V*	1293.00	
3	3	—	—	0	—	9-18	30CSE132A1V*	991.00	30CSE132B1V*	1026.00	30CSE132W1V*	1852.00	30CSE132F1V*	2037.00	30CSE132O1V*	1293.00	
1 1/2	1 3/4	1 1/2	1 1/2	1	—	0.75-3	30DSB132A1V*	1094.00	30DSB132B1V*	1147.00	30DSB132W1V*	1956.00	30DSB132F1V*	2151.00	30DSB132O1V*	1412.00	
2	2	5	5	1	—	2.5-10	30DSD132A1V*	1094.00	30DSD132B1V*	1147.00	30DSD132W1V*	1956.00	30DSD132F1V*	2151.00	30DSD132O1V*	1412.00	
3	3	10	10	1	—	9-18	30DSE132A1V*	1094.00	30DSE132B1V*	1147.00	30DSE132W1V*	1956.00	30DSE132F1V*	2151.00	30DSE132O1V*	1412.00	
7 1/2	7 1/2	—	—	1	—	13-27	30DSF132A1V*	1094.00	30DSF132B1V*	1147.00	30DSF132W1V*	1956.00	30DSF132F1V*	2151.00	30DSF132O1V*	1412.00	
—	—	15	15	—	1 3/4	13-27	30ESF132A1V*	1353.00	30ESF132B1V*	1405.00	30ESF132W1V*	2214.00	30ESF132F1V*	2436.00	30ESF132O1V*	1672.00	
10	10	—	—	—	1 3/4	20-40	30ESG132A1V*	1353.00	30ESG132B1V*	1405.00	30ESG132W1V*	2214.00	30ESG132F1V*	2436.00	30ESG132O1V*	1672.00	
—	—	15	15	2	—	13-27	30FSF132A1V*	1852.00	30FSF132B1V*	1991.00	30FSF132W1V*	3007.00	30FSF132F1V*	3308.00	30FSF132O1V*	2370.00	
10	15	25	25	2	—	22-45	30FSH132A1V*	1852.00	30FSH132B1V*	1991.00	30FSH132W1V*	3007.00	30FSH132F1V*	3308.00	30FSH132O1V*	2370.00	
—	—	30	30	—	2 1/2	22-45	30GSH132A1V*	2343.00	30GSH132B1V*	2533.00	30GSH132W1V*	3782.00	30GSH132F1V*	4161.00	30GSH132O1V*	3153.00	
15	20	30	30	—	2 1/2	30-60	30GSJ132A1V*	2343.00	30GSJ132B1V*	2533.00	30GSJ132W1V*	3782.00	30GSJ132F1V*	4161.00	30GSJ132O1V*	3153.00	
—	—	40	40	3	—	30-60	30HSJ132A1V*	2835.00	30HSJ132B1V*	3075.00	30HSJ132W1V*	4557.00	30HSJ132F1V*	5013.00	30HSJ132O1V*	3911.00	
25	30	50	50	3	—	45-90	30HSK132A1V*	2835.00	30HSK132B1V*	3075.00	30HSK132W1V*	4557.00	30HSK132F1V*	5013.00	30HSK132O1V*	3911.00	
30	40	75	75	—	3 1/2	57-115	30ISL132A1V*	6298.00	30ISL132B1V*	6745.00	30ISL132W1V*	9778.00	30ISL132F1V*	10756.00	30ISL132O1V*	8451.00	
40	50	100	100	4	—	67-135	30JTM132A1V*	6987.00	30JTM132B1V*	7435.00	30JTM132W1V*	10466.00	30JTM132F1V*	11513.00	30JTM132O1V*	9140.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

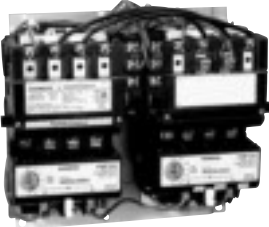
① For conduit hubs and conversion instructions, see page 16-87.  
② If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

③ Auxiliary contacts  
30C-30E 4th pole built-in  
30F-30J 2 NO & 2 NC

# Two Speed Heavy Duty Starters

## Constant HP with Solid State Overload, Class 30

Selection

 <p>2S2W starter (ESP 100 Overload)</p>	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (t) with the letter that corresponds to the correct FLA in High/Low Speed FLA Table.®</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-104 open and 16-123 enclosed.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b>		<b>High/Low Speed FLA Table®</b>		
		60Hz Voltage	Letter	Size	FLA	†
24 Separate Control	J	0,1	0.25-1	A		
120 Separate Control	F	0,1	0.75-3	B		
110-120/220-240	A	0,1	2.5-10	D		
200-208	D	0-1 <sup>3/4</sup>	9-18	E		
220-240	G	1-4	13-27	F		
277	L	1 <sup>3/4</sup>	20-40	G		
220-240/440-480	C	2-4	22-45	H		
440-480	H	2 <sup>1/2</sup> -4	30-60	J		
575-600	E	3-4	45-90	K		
		3 <sup>1/2</sup> -4	57-115	L		
		4	67-135	M		
		For other voltages and frequencies, see Factory Modifications page 16-94.				

### One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts				Open Type®		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>②</sup> NEMA 3/3R Industrial Use Weatherproof	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	0	—	—	30CS††32A2H*	1370.00	30CS††32B2H*	1405.00	30CS††32W2H*	2231.00	30CS††32F2H*	2455.00	30CS††32O2H*	1672.00
5	5	7½	7½	1	—	—	30DS††32A2H*	1456.00	30DS††32B2H*	1508.00	30DS††32W2H*	2317.00	30DS††32F2H*	2549.00	30DS††32O2H*	1774.00
7½	7½	10	10	—	1¼	—	30ES††32A2H*	1844.00	30ES††32B2H*	1895.00	30ES††32W2H*	2705.00	30ES††32F2H*	2976.00	30ES††32O2H*	2163.00
7½	10	20	20	2	—	—	30FS††32A2H*	2524.00	30FS††32B2H*	2680.00	30FS††32W2H*	3679.00	30FS††32F2H*	4047.00	30FS††32O2H*	3059.00
10	15	25	25	—	2½	—	30GS††32A2H*	3145.00	30GS††32B2H*	3342.00	30GS††32W2H*	4600.00	30GS††32F2H*	5061.00	30GS††32O2H*	3963.00
20	25	40	40	3	—	—	30HS††32A2H*	3765.00	30HS††32B2H*	4006.00	30HS††32W2H*	5487.00	30HS††32F2H*	6036.00	30HS††32O2H*	4868.00
25	30	50	50	—	3½	—	30IS††32A2H*	8589.00	30IS††32B2H*	9536.00	30IS††32W2H*	12570.00	30IS††32F2H*	13826.00	30IS††32O2H*	11243.00
30	40	75	75	4	—	—	30JT††32A2H*	9622.00	30JT††32B2H*	10570.00	30JT††32W2H*	13604.00	30JT††32F2H*	14965.00	30JT††32O2H*	12277.00

### Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts				Open Type®		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>②</sup> NEMA 3/3R Industrial Use Weatherproof	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	0	—	—	30CS††32A1H*	991.00	30CS††32B1H*	1026.00	30CS††32W1H*	1852.00	30CS††32F1H*	2037.00	30CS††32O1H*	1293.00
5	5	7½	7½	1	—	—	30DS††32A1H*	1094.00	30DS††32B1H*	1147.00	30DS††32W1H*	1956.00	30DS††32F1H*	2151.00	30DS††32O1H*	1412.00
7½	7½	10	10	—	1¼	—	30ES††32A1H*	1353.00	30ES††32B1H*	1405.00	30ES††32W1H*	2214.00	30ES††32F1H*	2436.00	30ES††32O1H*	1672.00
7½	10	20	20	2	—	—	30FS††32A1H*	1852.00	30FS††32B1H*	1991.00	30FS††32W1H*	3007.00	30FS††32F1H*	3308.00	30FS††32O1H*	2370.00
10	15	25	25	—	2½	—	30GS††32A1H*	2343.00	30GS††32B1H*	2533.00	30GS††32W1H*	3782.00	30GS††32F1H*	4161.00	30GS††32O1H*	3153.00
20	25	40	40	3	—	—	30HS††32A1H*	2835.00	30HS††32B1H*	3075.00	30HS††32W1H*	4557.00	30HS††32F1H*	5013.00	30HS††32O1H*	3938.00
25	30	50	50	—	3½	—	30IS††32A1H*	6298.00	30IS††32B1H*	6745.00	30IS††32W1H*	9778.00	30IS††32F1H*	10756.00	30IS††32O1H*	8451.00
30	40	75	75	4	—	—	30JT††32A1H*	6987.00	30JT††32B1H*	7435.00	30JT††32W1H*	10466.00	30JT††32F1H*	11513.00	30JT††32O1H*	9140.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

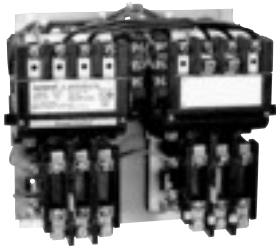
① For conduit hubs and conversion instructions, see page 16-87.

② First (t) for high speed, second (t) for low speed. Use motor nameplate information to select FLA. If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

③ Auxiliary contacts  
30C-30E 4th pole built-in  
30F-30J 2 NO & 2 NC

# Two Speed Heavy Duty Starters

## Constant or Variable Torque with Ambient Compensated Bimetal Overload, Class 30 Selection



2S2W starter  
(Amb. Comp. Bimetal OL)

### Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148 (6 required)<sup>②</sup>
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see pages 16-104 open and 16-123 enclosed.
- ▶ Wiring Diagrams see page 16-134.
- ▶ Replacement Parts see page 16-155.

### Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240	A
200-208	D
220-240	G
277	L
220-240/440-480	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

### One Winding Consequent Pole, 3 Phase (Constant or Variable Torque)

Max Hp							Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts	Cont-actor Amp Rating	NEMA Size	Half Size	Open Type <sup>③</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>④</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>⑤</sup> NEMA 3/3R Industrial Use Weatherproof	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30CP32A2V*81	1293.00	30CP32B2V*81	1326.00	30CP32W2V*81	2154.00	30CP32F2V*81	2370.00	30CP32O2V*81	1594.00
7½	7½	10	10	27	1	—	30DP32A2V*81	1379.00	30DP32B2V*81	1430.00	30DP32W2V*81	2240.00	30DP32F2V*81	2464.00	30DP32O2V*81	1698.00
10	10	15	15	40	—	1¾	30EP32A2V*81	1766.00	30EP32B2V*81	1819.00	30EP32W2V*81	2628.00	30EP32F2V*81	2891.00	30EP32O2V*81	2084.00
10	15	25	25	45	2	—	30FP32A2V*81	2446.00	30FP32B2V*81	2602.00	30FP32W2V*81	3600.00	30FP32F2V*81	3961.00	30FP32O2V*81	2981.00
15	20	30	30	60	—	2½	30GP32A2V*81	3067.00	30GP32B2V*81	3266.00	30GP32W2V*81	4523.00	30GP32F2V*81	4976.00	30GP32O2V*81	3886.00
25	30	50	50	90	3	—	30HP32A2V*81	3687.00	30HP32B2V*81	3928.00	30HP32W2V*81	5410.00	30HP32F2V*81	5951.00	30HP32O2V*81	4789.00
30	40	75	75	115	—	3½	30IP32A2V*81	8512.00	30IP32B2V*81	9459.00	30IP32W2V*81	12492.00	30IP32F2V*81	13742.00	30IP32O2V*81	11165.00
40	50	100	100	135	4	—	30JG32A2V*81	9546.00	30JG32B2V*81	11211.00	30JG32W2V*81	13525.00	30JG32F2V*81	14878.00	30JG32O2V*81	12199.00

### Two Separate Windings, 3-Phase (Constant or Variable Torque)

Max Hp							Enclosure									
200 Volts	230 Volts	460 Volts	575 Volts	Cont-actor Amp Rating	NEMA Size	Half Size	Open Type <sup>③</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>④</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>⑤</sup> NEMA 3/3R Industrial Use Weatherproof	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30CP32A1V*81	914.00	30CP32B1V*81	947.00	30CP32W1V*81	1774.00	30CP32F1V*81	1952.00	30CP32O1V*81	1215.00
7½	7½	10	10	27	1	—	30DP32A1V*81	1016.00	30DP32B1V*81	1068.00	30DP32W1V*81	1877.00	30DP32F1V*81	2065.00	30DP32O1V*81	1336.00
10	10	15	15	40	—	1¾	30EP32A1V*81	1275.00	30EP32B1V*81	1326.00	30EP32W1V*81	2137.00	30EP32F1V*81	2352.00	30EP32O1V*81	1594.00
10	15	25	25	45	2	—	30FP32A1V*81	1774.00	30FP32B1V*81	1912.00	30FP32W1V*81	2928.00	30FP32F1V*81	3221.00	30FP32O1V*81	2291.00
15	20	30	30	60	—	2½	30GP32A1V*81	2266.00	30GP32B1V*81	2456.00	30GP32W1V*81	3704.00	30GP32F1V*81	4076.00	30GP32O1V*81	3075.00
25	30	50	50	90	3	—	30HP32A1V*81	2756.00	30HP32B1V*81	2998.00	30HP32W1V*81	4479.00	30HP32F1V*81	4928.00	30HP32O1V*81	3859.00
30	40	75	75	115	—	3½	30IP32A1V*81	6220.00	30IP32B1V*81	6669.00	30IP32W1V*81	9701.00	30IP32F1V*81	10671.00	30IP32O1V*81	8374.00
40	50	100	100	135	4	—	30JG32A1V*81	6910.00	30JG32B1V*81	7357.00	30JG32W1V*81	10390.00	30JG32F1V*81	11429.00	30JG32O1V*81	9064.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① For conduit hubs and conversion instructions, see page 16-87.

② If motor FLA are unknown, select heater elements on the basis that low speed FLA will be no greater than 50% of high speed FLA.

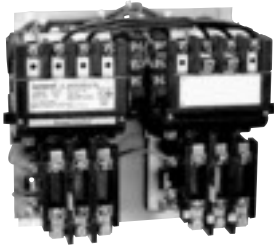
③ Auxiliary contacts  
30C-30E 4th pole built-in  
30F-30J 2 NO & 2 NC



# Two Speed Heavy Duty Starters

## Constant HP with Ambient Compensated Bimetal Overload, Class 30

Selection

 <p>2S2W starter (Amb. Comp. Bimetal OL)</p>	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148 (6 required)<sup>②</sup></li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-104 open and 16-123 enclosed.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240</td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480</td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240	A	200-208	D	220-240	G	277	L	220-240/440-480	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
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277	L																					
220-240/440-480	C																					
440-480	H																					
575-600	E																					

### One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp								Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts	Cont-actor Amp Rating	NEMA Size	Half Size		Open Type <sup>①</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>①</sup> NEMA 3/3R Industrial Use Weatherproof			
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
2	2	3	3	18	0	—		30CP32A2H*81	1293.00	30CP32B2H*81	1326.00	30CP32W2H*81	2154.00	30CP32F2H*81	2370.00	30CP3202H*81	1594.00		
5	5	7½	7½	27	1	—		30DP32A2H*81	1379.00	30DP32B2H*81	1430.00	30DP32W2H*81	2240.00	30DP32F2H*81	2464.00	30DP3202H*81	1698.00		
7½	7½	10	10	40	—	1¼		30EP32A2H*81	1766.00	30EP32B2H*81	1819.00	30EP32W2H*81	2628.00	30EP32F2H*81	2891.00	30EP3202H*81	2084.00		
7½	10	20	20	45	2	—		30FP32A2H*81	2446.00	30FP32B2H*81	2602.00	30FP32W2H*81	3600.00	30FP32F2H*81	3961.00	30FP3202H*81	2981.00		
10	15	25	25	60	—	2½		30GP32A2H*81	3067.00	30GP32B2H*81	3266.00	30GP32W2H*81	4523.00	30GP32F2H*81	4976.00	30GP3202H*81	3886.00		
20	25	40	40	90	3	—		30HP32A2H*81	3687.00	30HP32B2H*81	3928.00	30HP32W2H*81	5410.00	30HP32F2H*81	5951.00	30HP3202H*81	4789.00		
25	30	50	50	115	—	3½		30IP32A2H*81	8512.00	30IP32B2H*81	9459.00	30IP32W2H*81	12492.00	30IP32F2H*81	13742.00	30IP3202H*81	11165.00		
30	40	75	75	135	4	—		30JG32A2H*81	9546.00	30JG32B2H*81	10493.00	30JG32W2H*81	13525.00	30JG32F2H*81	14878.00	30JG3202H*81	12199.00		

### Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp								Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts	Cont-actor Amp Rating	NEMA Size	Half Size		Open Type <sup>①</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>①</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12 <sup>①</sup> NEMA 3/3R Industrial Use Weatherproof			
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
2	2	3	3	18	0	—		30CP32A1H*81	914.00	30CP32B1H*81	947.00	30CP32W1H*81	1774.00	30CP32F1H*81	1952.00	30CP3201H*81	1215.00		
5	5	7½	7½	27	1	—		30DP32A1H*81	1016.00	30DP32B1H*81	1068.00	30DP32W1H*81	1877.00	30DP32F1H*81	2065.00	30DP3201H*81	1336.00		
7½	7½	10	10	40	—	1¼		30EP32A1H*81	1275.00	30EP32B1H*81	1068.00	30EP32W1H*81	2137.00	30EP32F1H*81	2352.00	30EP3201H*81	1594.00		
7½	10	20	20	45	2	—		30FP32A1H*81	1774.00	30FP32B1H*81	1912.00	30FP32W1H*81	2928.00	30FP32F1H*81	3221.00	30FP3201H*81	2291.00		
10	15	25	25	60	—	2½		30GP32A1H*81	2266.00	30GP32B1H*81	2456.00	30GP32W1H*81	3704.00	30GP32F1H*81	4076.00	30GP3201H*81	3075.00		
20	25	40	40	90	3	—		30HP32A1H*81	2756.00	30HP32B1H*81	2998.00	30HP32W1H*81	4479.00	30HP32F1H*81	4928.00	30HP3201H*81	3859.00		
25	30	50	50	115	—	3½		30IP32A1H*81	6220.00	30IP32B1H*81	6669.00	30IP32W1H*81	9701.00	30IP32F1H*81	10671.00	30IP3201H*81	8374.00		
30	40	75	75	135	4	—		30JG32A1H*81	6910.00	30JG32B1H*81	7357.00	30JG32W1H*81	10390.00	30JG32F1H*81	11429.00	30JG3201H*81	9064.00		

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

② If motor FLA are unknown, select heater element on the basis that low speed FLA will be no greater than 50% of high speed FLA.

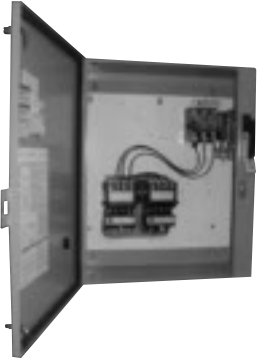
③ Auxiliary contacts 30C-30E 4th pole built-in 30F-30J 2 NO & 2 NC

① For conduit hubs and conversion instructions, see page 16-87.

# Combination Two Speed Heavy Duty Starters

Non-Fusible, Constant or Variable Torque with Solid Overload, Class 32

Selection

	<p><b>Ordering Information</b></p> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (t) with the letter that corresponds to the correct low speed FLA in the FLA table.®</li> <li>▶ Fuse clips see page 16-95.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b>		<b>Low Speed FLA Table</b>		
		60Hz Voltage	Letter	Size	FLA	†
24 Separate Control	J	0,1	0.25-1	A		
120 Separate Control	F	0,1	0.75-3	B		
110-120/220-240 <sup>①</sup>	A	0,1	2.5-10	D		
200-208	D	0-1 <sup>3</sup> / <sub>4</sub>	9-18	E		
220-240	G	1-4	13-27	F		
277	L	1 <sup>3</sup> / <sub>4</sub>	20-40	G		
220-240/440-480 <sup>①</sup>	C	2-4	22-45	H		
440-480	H	2 <sup>1</sup> / <sub>2</sub> -4	30-60	J		
575-600	E	3-4	45-90	K		
		3 <sup>1</sup> / <sub>2</sub> -4	57-115	L		
		4	67-135	M		
For other voltages and frequencies, see Factory Modifications page 16-94.						

## One Winding Consequent Pole, 3-Phase (Constant or Variable Torque)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	2	0	—	0.75-3	30	32CSB192B2V2*	2214.00	32CSB192W2V2*	3541.00	32CSB192F2V2*	3894.00	32CSB192N2V2*	2498.00
2	2	5	5	0	—	2.5-10	30	32CSD192B2V2*	2214.00	32CSD192W2V2*	3541.00	32CSD192F2V2*	3894.00	32CSD192N2V2*	2498.00
3	3	—	—	0	—	9-18	30	32CSE192B2V2*	2214.00	32CSE192W2V2*	3541.00	32CSE192F2V2*	3894.00	32CSE192N2V2*	2498.00
1 1/2	1 1/4	1 1/2	2	1	—	0.75-3	30	32DSB192B2V2*	2317.00	32DSB192W2V2*	3645.00	32DSB192F2V2*	4009.00	32DSB192N2V2*	2602.00
2	2	5	5	1	—	2.5-10	30	32DSD192B2V2*	2317.00	32DSD192W2V2*	3645.00	32DSD192F2V2*	4009.00	32DSD192N2V2*	2602.00
3	3	10	10	1	—	9-18	30	32DSE192B2V2*	2317.00	32DSE192W2V2*	3645.00	32DSE192F2V2*	4009.00	32DSE192N2V2*	2602.00
7 1/2	7 1/2	—	—	1	—	13-27	60	32DSF192B2V2*	2317.00	32DSF192W2V2*	3645.00	32DSF192F2V2*	4009.00	32DSF192N2V2*	2602.00
—	—	15	15	—	1 1/4	13-27	60	32ESF192B2V2*	2928.00	32ESF192W2V2*	4256.00	32ESF192F2V2*	4682.00	32ESF192N2V2*	3214.00
10	10	—	—	—	1 1/4	20-40	60	32ESG192B2V2*	2928.00	32ESG192W2V2*	4256.00	32ESG192F2V2*	4682.00	32ESG192N2V2*	3214.00
—	—	15	15	2	—	13-27	60	32FSF192B2V2*	3713.00	32FSF192W2V2*	5368.00	32FSF192F2V2*	5904.00	32FSF192N2V2*	4161.00
10	15	25	25	2	—	22-45	60	32FSH192B2V2*	3713.00	32FSH192W2V2*	5368.00	32FSH192F2V2*	5904.00	32FSH192N2V2*	4161.00
—	—	30	30	—	2 1/4	22-45	100	32GSH192B2V2*	4652.00	32GSH192W2V2*	6306.00	32GSH192F2V2*	6936.00	32GSH192N2V2*	5100.00
15	20	—	—	—	2 1/4	30-60	100	32GSJ192B2V2*	4652.00	32GSJ192W2V2*	6306.00	32GSJ192F2V2*	6936.00	32GSJ192N2V2*	5100.00
—	—	40	40	3	—	30-60	100	32HSJ192B2V2*	5315.00	32HSJ192W2V2*	8141.00	32HSJ192F2V2*	8955.00	32HSJ192N2V2*	6298.00
20	25	50	50	3	—	45-90	100	32HSK192B2V2*	5315.00	32HSK192W2V2*	8141.00	32HSK192F2V2*	8955.00	32HSK192N2V2*	6298.00
30	40	75	75	—	3 1/2	57-115	200	32ISL192B2V2*	11345.00	32ISL192W2V2*	15791.00	32ISL192F2V2*	17371.00	32ISL192N2V2*	14086.00
40	50	100	100	4	—	67-135	200	32JTM192B2V2*	12381.00	32JTM192W2V2*	16825.00	32JTM192F2V2*	18508.00	32JTM192N2V2*	15120.00

## Two Separate Windings, 3-Phase (Constant or Variable Torque)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	2	0	—	0.75-3	30	32CSB192B1V2*	1835.00	32CSB192W1V2*	3162.00	32CSB192F1V2*	3478.00	32CSB192N1V2*	2119.00
2	2	5	5	0	—	2.5-10	30	32CSD192B1V2*	1835.00	32CSD192W1V2*	3162.00	32CSD192F1V2*	3478.00	32CSD192N1V2*	2119.00
3	3	—	—	0	—	9-18	30	32CSE192B1V2*	1835.00	32CSE192W1V2*	3162.00	32CSE192F1V2*	3478.00	32CSE192N1V2*	2119.00
1 1/2	1 1/4	1 1/2	2	1	—	0.75-3	30	32DSB192B1V2*	1956.00	32DSB192W1V2*	3282.00	32DSB192F1V2*	3611.00	32DSB192N1V2*	2240.00
2	2	5	5	1	—	2.5-10	30	32DSD192B1V2*	1956.00	32DSD192W1V2*	3282.00	32DSD192F1V2*	3611.00	32DSD192N1V2*	2240.00
3	3	10	10	1	—	9-18	30	32DSE192B1V2*	1956.00	32DSE192W1V2*	3282.00	32DSE192F1V2*	3611.00	32DSE192N1V2*	2240.00
7 1/2	7 1/2	—	—	1	—	13-27	60	32DSF192B1V2*	1956.00	32DSF192W1V2*	3282.00	32DSF192F1V2*	3611.00	32DSF192N1V2*	2240.00
—	—	15	15	—	1 1/4	13-27	60	32ESF192B1V2*	2438.00	32ESF192W1V2*	3765.00	32ESF192F1V2*	4142.00	32ESF192N1V2*	2722.00
10	10	—	—	—	1 1/4	20-40	60	32ESG192B1V2*	2438.00	32ESG192W1V2*	3765.00	32ESG192F1V2*	4142.00	32ESG192N1V2*	2722.00
—	—	15	15	2	—	13-27	60	32FSF192B1V2*	3024.00	32FSF192W1V2*	4678.00	32FSF192F1V2*	5146.00	32FSF192N1V2*	3472.00
10	15	25	25	2	—	22-45	60	32FSH192B1V2*	3024.00	32FSH192W1V2*	4678.00	32FSH192F1V2*	5146.00	32FSH192N1V2*	3472.00
—	—	30	30	—	2 1/4	22-45	100	32GSH192B1V2*	3842.00	32GSH192W1V2*	5496.00	32GSH192F1V2*	6046.00	32GSH192N1V2*	4290.00
15	20	—	—	—	2 1/4	30-60	100	32GSJ192B1V2*	3842.00	32GSJ192W1V2*	5496.00	32GSJ192F1V2*	6046.00	32GSJ192N1V2*	4290.00
—	—	40	40	3	—	30-60	100	32HSJ192B1V2*	4388.00	32HSJ192W1V2*	7210.00	32HSJ192F1V2*	7932.00	32HSJ192N1V2*	5368.00
20	25	50	50	3	—	45-90	100	32HSK192B1V2*	4388.00	32HSK192W1V2*	7210.00	32HSK192F1V2*	7932.00	32HSK192N1V2*	5368.00
30	40	75	75	—	3 1/2	57-115	200	32ISL192B1V2*	8554.00	32ISL192W1V2*	13000.00	32ISL192F1V2*	14300.00	32ISL192N1V2*	11294.00
40	50	100	100	4	—	67-135	200	32JTM192B1V2*	9243.00	32JTM192W1V2*	13690.00	32JTM192F1V2*	15059.00	32JTM192N1V2*	11984.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

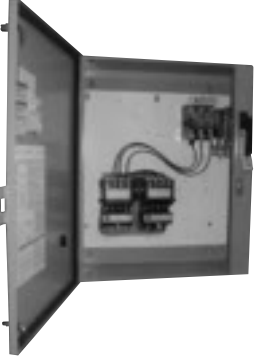
① Dual voltage coils not available in modified starters.  
② For conduit hubs and conversion instructions, see page 16-87.

③ If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

# Combination Two Speed Heavy Duty Starters

Non-Fusible, Constant Horsepower with Solid State Overload, Class 32

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (†) with the letter that corresponds to the correct FLA in the High/Low Speed FLA Table.®</li> <li>▶ Fuse clips see page 16-95.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b>		<b>High/Low Speed FLA Table®</b>		
		60Hz Voltage	Letter	Size	FLA	†
24 Separate Control	J	0,1	0.25-1	A		
120 Separate Control	F	0,1	0.75-3	B		
110-120/220-240 <sup>①</sup>	A	0,1	2.5-10	D		
200-208	D	0-1 <sup>3/4</sup>	9-18	E		
220-240	G	1-4	13-27	F		
277	L	1 <sup>3/4</sup>	20-40	G		
220-240/440-480 <sup>①</sup>	C	2-4	22-45	H		
440-480	H	2 <sup>1/2</sup> -4	30-60	J		
575-600	E	3-4	45-90	K		
		3 <sup>1/2</sup> -4	57-115	L		
		4	67-135	M		
		For other voltages and frequencies see Factory Modifications page 16-94.				

## One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	0	—	—	30	32CS††92B2H2*	2214.00	32CS††92W2H2*	3541.00	32CS††92F2H2*	3894.00	32CS††92N2H2*	2498.00
5	5	7½	7½	1	—	—	30	32DS††92B2H2*	2317.00	32DS††92W2H2*	3645.00	32DS††92F2H2*	4679.00	32DS††92N2H2*	2602.00
7½	7½	10	10	—	1¾	—	60	32ES††92B2H2*	2928.00	32ES††92W2H2*	4256.00	32ES††92F2H2*	4679.00	32ES††92N2H2*	3214.00
7½	10	20	20	2	—	—	60	32FS††92B2H2*	3713.00	32FS††92W2H2*	5368.00	32FS††92F2H2*	5904.00	32FS††92N2H2*	4161.00
10	15	25	25	—	2½	—	100	32GS††92B2H2*	4652.00	32GS††92W2H2*	6306.00	32GS††92F2H2*	6936.00	32GS††92N2H2*	5100.00
20	25	40	40	3	—	—	100	32HS††92B2H2*	5315.00	32HS††92W2H2*	8141.00	32HS††92F2H2*	8955.00	32HS††92N2H2*	6298.00
25	30	50	50	—	3½	—	200	32IS††92B2H2*	11345.00	32IS††92W2H2*	15791.00	32IS††92F2H2*	17371.00	32IS††92N2H2*	14086.00
30	40	75	75	4	—	—	200	32JT††92B2H2*	12381.00	32JT††92W2H2*	16825.00	32JT††92F2H2*	18508.00	32JT††92N2H2*	15120.00

## Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	0	—	—	30	32CS††92B1H2*	1835.00	32CS††92W1H2*	3162.00	32CS††92F1H2*	3478.00	32CS††92N1H2*	2119.00
5	5	7½	7½	1	—	—	30	32DS††92B1H2*	1956.00	32DS††92W1H2*	3282.00	32DS††92F1H2*	3611.00	32DS††92N1H2*	2240.00
7½	7½	10	10	—	1¾	—	60	32ES††92B1H2*	2438.00	32ES††92W1H2*	3765.00	32ES††92F1H2*	4142.00	32ES††92N1H2*	2722.00
7½	10	20	20	2	—	—	60	32FS††92B1H2*	3024.00	32FS††92W1H2*	4678.00	32FS††92F1H2*	5146.00	32FS††92N1H2*	3472.00
10	15	25	25	—	2½	—	100	32GS††92B1H2*	3842.00	32GS††92W1H2*	5496.00	32GS††92F1H2*	6046.00	32GS††92N1H2*	4290.00
20	25	40	40	3	—	—	100	32HS††92B1H2*	4388.00	32HS††92W1H2*	7210.00	32HS††92F1H2*	7932.00	32HS††92N1H2*	5368.00
25	30	50	50	—	3½	—	200	32IS††92B1H2*	8554.00	32IS††92W1H2*	13000.00	32IS††92F1H2*	14300.00	32IS††92N1H2*	11294.00
30	40	75	75	4	—	—	200	32JT††92B1H2*	9243.00	32JT††92W1H2*	13690.00	32JT††92F1H2*	15059.00	32JT††92N1H2*	11984.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.


① Dual voltage coils not available in modified starters.

② For conduit hubs and conversion instructions, see page 16-87.

③ First † for high speed, second † for low speed. Use motor nameplate information to select FLA. If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

# Combination Two Speed Heavy Duty Starters

Non-Fusible, Constant or Variable Torque with Ambient Compensated Bimetal Overload, Class 32 *Selection*

	<b>Ordering Information</b>	<b>Coil Table</b>																			
	<ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148. (6 required)</li> <li>▶ Fuse clips see page 16-95.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">60Hz Voltage</th> <th style="text-align: left;">Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600
60Hz Voltage	Letter																				
24 Separate Control	J																				
120 Separate Control	F																				
110-120/220-240 <sup>①</sup>	A																				
200-208	D																				
220-240	G																				
277	L																				
220-240/440-480 <sup>①</sup>	C																				
440-480	H																				
575-600	E																				

## One Winding Consequent Pole, 3-Phase (Constant or Variable Torque)

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30	32CP92B2V2*81	2137.00	32CP92W2V2*81	3463.00	32CP92F2V2*81	3809.00	32CP92N2V2*81	2421.00
7½	7½	10	10	27	1	—	30	32DP92B2V2*81	2240.00	32DP92W2V2*81	3566.00	32DP92F2V2*81	3923.00	32DP92N2V2*81	2524.00
10	10	15	15	40	—	1¼	60	32EP92B2V2*81	2852.00	32EP92W2V2*81	4178.00	32EP92F2V2*81	4596.00	32EP92N2V2*81	3135.00
10	15	25	25	45	2	—	60	32FP92B2V2*81	3635.00	32FP92W2V2*81	5289.00	32FP92F2V2*81	5818.00	32FP92N2V2*81	4083.00
15	20	30	30	60	—	2½	100	32GP92B2V2*81	4575.00	32GP92W2V2*81	6229.00	32GP92F2V2*81	6851.00	32GP92N2V2*81	5022.00
20	25	50	50	90	3	—	100	32HP92B2V2*81	5237.00	32HP92W2V2*81	8064.00	32HP92F2V2*81	8871.00	32HP92N2V2*81	6220.00
30	40	75	75	115	—	3½	200	32IP92B2V2*81	11269.00	32IP92W2V2*81	15713.00	32IP92F2V2*81	17286.00	32IP92N2V2*81	14008.00
40	50	100	100	135	4	—	200	32JP92B2V2*81	12302.00	32JP92W2V2*81	16749.00	32JP92F2V2*81	18423.00	32JP92N2V2*81	15041.00

## Two Separate Windings, 3-Phase (Constant or Variable Torque)


Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	18	0	—	30	32CP92B1V2*81	1758.00	32CP92W1V2*81	3084.00	32CP92F1V2*81	3393.00	32CP92N1V2*81	2042.00
7½	7½	10	10	27	1	—	30	32DP92B1V2*81	1877.00	32DP92W1V2*81	3205.00	32DP92F1V2*81	3526.00	32DP92N1V2*81	2163.00
10	10	15	15	40	—	1¼	60	32EP92B1V2*81	2360.00	32EP92W1V2*81	3687.00	32EP92F1V2*81	4056.00	32EP92N1V2*81	2645.00
10	15	25	25	45	2	—	60	32FP92B1V2*81	2946.00	32FP92W1V2*81	4600.00	32FP92F1V2*81	5061.00	32FP92N1V2*81	3394.00
15	20	30	30	60	—	2½	100	32GP92B1V2*81	3765.00	32GP92W1V2*81	5419.00	32GP92F1V2*81	5962.00	32GP92N1V2*81	4213.00
20	25	50	50	90	3	—	100	32HP92B1V2*81	4307.00	32HP92W1V2*81	7134.00	32HP92F1V2*81	7847.00	32HP92N1V2*81	5289.00
30	40	75	75	115	—	3½	200	32IP92B1V2*81	8478.00	32IP92W1V2*81	12922.00	32IP92F1V2*81	14215.00	32IP92N1V2*81	11217.00
40	50	100	100	135	4	—	200	32JP92B1V2*81	9166.00	32JP92W1V2*81	13611.00	32JP92F1V2*81	14973.00	32JP92N1V2*81	11906.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available in modified starters.  
② For conduit hubs and conversion instructions, see page 16-87.

# Combination Two Speed Heavy Duty Starters

Non-Fusible, Constant Horsepower with Ambient Compensated Bimetal Overload, Class 32 Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148. (6 Required)</li> <li>▶ Fuse clips see page 16-95.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>24 Separate Control</td> <td>J</td> </tr> <tr> <td>120 Separate Control</td> <td>F</td> </tr> <tr> <td>110-120/220-240<sup>Ⓛ</sup></td> <td>A</td> </tr> <tr> <td>200-208</td> <td>D</td> </tr> <tr> <td>220-240</td> <td>G</td> </tr> <tr> <td>277</td> <td>L</td> </tr> <tr> <td>220-240/440-480<sup>Ⓛ</sup></td> <td>C</td> </tr> <tr> <td>440-480</td> <td>H</td> </tr> <tr> <td>575-600</td> <td>E</td> </tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>Ⓛ</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>Ⓛ</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
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## One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓛ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>Ⓛ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	18	0	—	30	32CP92B2H2*81	2137.00	32CP92W2H2*81	3463.00	32CP92F2H2*81	3809.00	32CP92N2H2*81	2421.00
5	5	7½	7½	27	1	—	30	32DP92B2H2*81	2240.00	32DP92W2H2*81	3566.00	32DP92F2H2*81	3923.00	32DP92N2H2*81	2524.00
7½	7½	10	10	40	—	1¼	60	32EP92B2H2*81	2852.00	32EP92W2H2*81	4178.00	32EP92F2H2*81	4596.00	32EP92N2H2*81	3135.00
7½	10	20	20	45	2	—	60	32FP92B2H2*81	3635.00	32FP92W2H2*81	5289.00	32FP92F2H2*81	5818.00	32FP92N2H2*81	4083.00
10	15	25	25	60	—	2½	100	32GP92B2H2*81	4575.00	32GP92W2H2*81	6229.00	32GP92F2H2*81	6851.00	32GP92N2H2*81	5022.00
20	25	40	40	90	3	—	100	32HP92B2H2*81	5237.00	32HP92W2H2*81	8064.00	32HP92F2H2*81	8860.00	32HP92N2H2*81	6220.00
25	30	50	50	115	—	3½	200	32IP92B2H2*81	11269.00	32IP92W2H2*81	15713.00	32IP92F2H2*81	17286.00	32IP92N2H2*81	14008.00
30	40	75	75	135	4	—	200	32JP92B2H2*81	12302.00	32JP92W2H2*81	16749.00	32JP92F2H2*81	18423.00	32JP92N2H2*81	15041.00

## Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓛ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>Ⓛ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
2	2	3	3	18	0	—	30	32CP92B1H2*81	1758.00	32CP92W1H2*81	3084.00	32CP92F1H2*81	3393.00	32CP92N1H2*81	2042.00
5	5	7½	7½	27	1	—	30	32DP92B1H2*81	1877.00	32DP92W1H2*81	3205.00	32DP92F1H2*81	3526.00	32DP92N1H2*81	2163.00
7½	7½	10	10	40	—	1¼	60	32EP92B1H2*81	2360.00	32EP92W1H2*81	3687.00	32EP92F1H2*81	4056.00	32EP92N1H2*81	2645.00
7½	10	20	20	45	2	—	60	32FP92B1H2*81	2946.00	32FP92W1H2*81	4600.00	32FP92F1H2*81	5061.00	32FP92N1H2*81	3394.00
10	15	25	25	60	—	2½	100	32GP92B1H2*81	3765.00	32GP92W1H2*81	5419.00	32GP92F1H2*81	5962.00	32GP92N1H2*81	4213.00
20	25	40	40	90	3	—	100	32HP92B1H2*81	4307.00	32HP92W1H2*81	7134.00	32HP92F1H2*81	7847.00	32HP92N1H2*81	5289.00
25	30	50	50	115	—	3½	200	32IP92B1H2*81	8478.00	32IP92W1H2*81	12923.00	32IP92F1H2*81	14215.00	32IP92N1H2*81	11217.00
30	40	75	75	135	4	—	200	32JP92B1H2*81	9166.00	32JP92W1H2*81	13611.00	32JP92F1H2*81	14973.00	32JP92N1H2*81	11906.00

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.


<sup>Ⓛ</sup> Dual voltage coils not available in modified starters.

<sup>Ⓛ</sup> For conduit hubs and conversion instructions, see page 16-87.

# Combination Two Speed Heavy Duty Starters

MCP Type, Constant or Variable Torque with Solid State Overload, Class 32

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (t) with the letter that corresponds to the correct low speed FLA in the FLA table.®</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>ⓐ</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>ⓐ</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>ⓐ</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>ⓐ</sup>	C	440-480	H	575-600	E	<b>Low Speed FLA Table</b> <table border="1"> <thead> <tr> <th>Size</th> <th>FLA</th> <th>†</th> </tr> </thead> <tbody> <tr><td>0,1</td><td>0.25-1</td><td>A</td></tr> <tr><td>0,1</td><td>0.75-3</td><td>B</td></tr> <tr><td>0,1</td><td>2.5-10</td><td>D</td></tr> <tr><td>0-1<sup>3</sup>/<sub>4</sub></td><td>9-18</td><td>E</td></tr> <tr><td>1-4</td><td>13-27</td><td>F</td></tr> <tr><td>1<sup>3</sup>/<sub>4</sub></td><td>20-40</td><td>G</td></tr> <tr><td>2-4</td><td>22-45</td><td>H</td></tr> <tr><td>2<sup>1</sup>/<sub>2</sub>-4</td><td>30-60</td><td>J</td></tr> <tr><td>3-4</td><td>45-90</td><td>K</td></tr> <tr><td>3<sup>1</sup>/<sub>2</sub>-4</td><td>57-115</td><td>L</td></tr> <tr><td>4</td><td>67-135</td><td>M</td></tr> </tbody> </table>	Size	FLA	†	0,1	0.25-1	A	0,1	0.75-3	B	0,1	2.5-10	D	0-1 <sup>3</sup> / <sub>4</sub>	9-18	E	1-4	13-27	F	1 <sup>3</sup> / <sub>4</sub>	20-40	G	2-4	22-45	H	2 <sup>1</sup> / <sub>2</sub> -4	30-60	J	3-4	45-90	K	3 <sup>1</sup> / <sub>2</sub> -4	57-115	L	4	67-135	M
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## One Winding Consequent Pole, 3-Phase (Constant or Variable Torque)

Max Hp							Overload Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size	NEMA 1 General Purpose			NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>ⓑ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight			
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
1/2	1/2	1	1	0	—	0.75-3	3	32CSB192B2V*	2619.00	32CSB192W2V*	3945.00	32CSB192F2V*	4340.00	32CSB192N2V*	2903.00	
2	2	5	5	0	—	2.5-10	10	32CSD192B2V*	2619.00	32CSD192W2V*	3945.00	32CSD192F2V*	4340.00	32CSD192N2V*	2903.00	
3	3	—	—	0	—	9-18	25	32CSE192B2V*	2619.00	32CSE192W2V*	3945.00	32CSE192F2V*	4340.00	32CSE192N2V*	2903.00	
1 1/2	1 1/2	1	1	1	—	0.75-3	3	32DSB192B2V*	2722.00	32DSB192W2V*	4049.00	32DSB192F2V*	4455.00	32DSB192N2V*	3007.00	
2	2	5	5	1	—	2.5-10	10	32DSD192B2V*	2722.00	32DSD192W2V*	4049.00	32DSD192F2V*	4455.00	32DSD192N2V*	3007.00	
3	3	7 1/2	10	1	—	9-18	25	32DSE192B2V*	2722.00	32DSE192W2V*	4049.00	32DSE192F2V*	4455.00	32DSE192N2V*	3007.00	
7 1/2	7 1/2	10	—	1	—	13-27	30	32DSF192B2V*	2722.00	32DSF192W2V*	4049.00	32DSF192F2V*	4455.00	32DSF192N2V*	3007.00	
—	—	15	15	—	1 1/4	13-27	40	32ESF192B2V*	3377.00	32ESF192W2V*	4703.00	32ESF192F2V*	5174.00	32ESF192N2V*	3661.00	
10	10	—	—	—	1 1/4	20-40	50	32ESG192B2V*	3377.00	32ESG192W2V*	4703.00	32ESG192F2V*	5174.00	32ESG192N2V*	3661.00	
—	—	15	20	2	—	13-27	40	32FSF192B2V*	4161.00	32FSF192W2V*	5815.00	32FSF192F2V*	6397.00	32FSF192N2V*	4610.00	
10	15	25	25	2	—	22-45	50	32FSH192B2V*	4161.00	32FSH192W2V*	5815.00	32FSH192F2V*	6397.00	32FSH192N2V*	4610.00	
—	—	30	30	—	2 1/2	22-45	50	32GSH192B2V*	4954.00	32GSH192W2V*	6608.00	32GSH192F2V*	7268.00	32GSH192N2V*	5401.00	
15	20	—	—	—	2 1/2	30-60	100	32GSJ192B2V*	4954.00	32GSJ192W2V*	6608.00	32GSJ192F2V*	7268.00	32GSJ192N2V*	5401.00	
—	—	30	30	3	—	30-60	100	32HSJ192B2V*	5616.00	32HSJ192W2V*	8443.00	32HSJ192F2V*	9287.00	32HSJ192N2V*	6599.00	
25	30	50	50	3	—	45-90	100	32HSK192B2V*	5616.00	32HSK192W2V*	8443.00	32HSK192F2V*	9287.00	32HSK192N2V*	6599.00	
30	40	75	75	—	3 1/2	57-115	125	32ISL192B2V*	12483.00	32ISL192W2V*	16928.00	32ISL192F2V*	18621.00	32ISL192N2V*	15223.00	
40	50	100	100	4	—	67-135	150	32JTM192B2V*	13518.00	32JTM192W2V*	17962.00	32JTM192F2V*	19760.00	32JTM192N2V*	16256.00	

## Two Separate Windings, 3-Phase (Constant or Variable Torque)

Max Hp							Overload Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size	NEMA 1 General Purpose			NEMA 4/4X Stainless <sup>ⓐ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>ⓑ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight			
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$		
1/2	1/2	1	1	0	—	0.75-3	3	32CSB192B1V*	2240.00	32CSB192W1V*	3566.00	32CSB192F1V*	3923.00	32CSB192N1V*	2524.00	
2	2	5	5	0	—	2.5-10	10	32CSD192B1V*	2240.00	32CSD192W1V*	3566.00	32CSD192F1V*	3923.00	32CSD192N1V*	2524.00	
3	3	—	—	0	—	9-18	25	32CSE192B1V*	2240.00	32CSE192W1V*	3566.00	32CSE192F1V*	3923.00	32CSE192N1V*	2524.00	
1 1/2	1 1/2	1	1	1	—	0.75-3	3	32DSB192B1V*	2360.00	32DSB192W1V*	3687.00	32DSB192F1V*	4056.00	32DSB192N1V*	2645.00	
2	2	5	5	1	—	2.5-10	10	32DSD192B1V*	2360.00	32DSD192W1V*	3687.00	32DSD192F1V*	4056.00	32DSD192N1V*	2645.00	
3	3	7 1/2	10	1	—	9-18	25	32DSE192B1V*	2360.00	32DSE192W1V*	3687.00	32DSE192F1V*	4056.00	32DSE192N1V*	2645.00	
7 1/2	7 1/2	10	—	1	—	13-27	30	32DSF192B1V*	2360.00	32DSF192W1V*	3687.00	32DSF192F1V*	4056.00	32DSF192N1V*	2645.00	
—	—	15	15	—	1 1/4	13-27	40	32ESF192B1V*	2886.00	32ESF192W1V*	4213.00	32ESF192F1V*	4634.00	32ESF192N1V*	3170.00	
10	10	—	—	—	1 1/4	20-40	50	32ESG192B1V*	2886.00	32ESG192W1V*	4213.00	32ESG192F1V*	4634.00	32ESG192N1V*	3170.00	
—	—	15	20	2	—	13-27	40	32FSF192B1V*	3472.00	32FSF192W1V*	5126.00	32FSF192F1V*	5640.00	32FSF192N1V*	3920.00	
10	15	25	25	2	—	22-45	50	32FSH192B1V*	3472.00	32FSH192W1V*	5126.00	32FSH192F1V*	5640.00	32FSH192N1V*	3920.00	
—	—	30	30	—	2 1/2	22-45	50	32GSH192B1V*	4144.00	32GSH192W1V*	5798.00	32GSH192F1V*	6379.00	32GSH192N1V*	4592.00	
15	20	—	—	—	2 1/2	30-60	100	32GSJ192B1V*	4144.00	32GSJ192W1V*	5798.00	32GSJ192F1V*	6379.00	32GSJ192N1V*	4592.00	
—	—	30	30	3	—	30-60	100	32HSJ192B1V*	4686.00	32HSJ192W1V*	7513.00	32HSJ192F1V*	8264.00	32HSJ192N1V*	5668.00	
25	30	50	50	3	—	45-90	100	32HSK192B1V*	4686.00	32HSK192W1V*	7513.00	32HSK192F1V*	8264.00	32HSK192N1V*	5668.00	
30	40	75	75	—	3 1/2	57-115	125	32ISL192B1V*	9692.00	32ISL192W1V*	14137.00	32ISL192F1V*	15552.00	32ISL192N1V*	12432.00	
40	50	100	100	4	—	67-135	150	32JTM192B1V*	10380.00	32JTM192W1V*	14827.00	32JTM192F1V*	16310.00	32JTM192N1V*	13121.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.


ⓐ Dual voltage coils not available in modified starters.  
 ⓑ For conduit hubs and conversion instructions, see page 16-87.

ⓒ If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

# Combination Two Speed Heavy Duty Starters

MCP Type, Constant Horsepower with Solid State Overload, Class 32

Selection

	<p><b>Ordering Information</b></p> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Replace the (†) with the letter that corresponds to the correct FLA in the High/Low Speed FLA table.®</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<p><b>Coil Table</b></p> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600	E	<p><b>High/Low Speed FLA Table<sup>®</sup></b></p> <table border="1"> <thead> <tr> <th>Size</th> <th>FLA</th> <th>†</th> </tr> </thead> <tbody> <tr><td>0,1</td><td>0.25-1</td><td>A</td></tr> <tr><td>0,1</td><td>0.75-3</td><td>B</td></tr> <tr><td>0,1</td><td>2.5-10</td><td>D</td></tr> <tr><td>0-1¾</td><td>9-18</td><td>E</td></tr> <tr><td>1-4</td><td>13-27</td><td>F</td></tr> <tr><td>1¾</td><td>20-40</td><td>G</td></tr> <tr><td>2-4</td><td>22-45</td><td>H</td></tr> <tr><td>2½-4</td><td>30-60</td><td>J</td></tr> <tr><td>3-4</td><td>45-90</td><td>K</td></tr> <tr><td>3½-4</td><td>57-115</td><td>L</td></tr> <tr><td>4</td><td>67-135</td><td>M</td></tr> </tbody> </table>	Size	FLA	†	0,1	0.25-1	A	0,1	0.75-3	B	0,1	2.5-10	D	0-1¾	9-18	E	1-4	13-27	F	1¾	20-40	G	2-4	22-45	H	2½-4	30-60	J	3-4	45-90	K	3½-4	57-115	L	4	67-135	M
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## One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Over-load Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>③</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
Catalog Number	List Price \$	Catalog Number	List Price \$					Catalog Number	List Price \$	Catalog Number	List Price \$				
2	2	3	3	0	—	—	10	32CS††92B2H*	2619.00	32CS††92W2H*	3945.00	32CS††92F2H*	4340.00	32CS††92N2H*	2903.00
5	5	7½	7½	1	—	—	25	32DS††92B2H*	2722.00	32DS††92W2H*	4049.00	32DS††92F2H*	4455.00	32DS††92N2H*	3007.00
7½	7½	10	10	—	1¼	—	40	32ES††92B2H*	3377.00	32ES††92W2H*	4703.00	32ES††92F2H*	5174.00	32ES††92N2H*	3661.00
7½	10	20	20	2	—	—	50	32FS††92B2H*	4161.00	32FS††92W2H*	5815.00	32FS††92F2H*	6397.00	32FS††92N2H*	4610.00
10	15	25	25	—	2½	—	100	32GS††92B2H*	4954.00	32GS††92W2H*	6608.00	32GS††92F2H*	7268.00	32GS††92N2H*	5401.00
20	25	40	40	3	—	—	100	32HS††92B2H*	5616.00	32HS††92W2H*	8443.00	32HS††92F2H*	9287.00	32HS††92N2H*	6599.00
25	30	50	50	—	3½	—	125	32IS††92B2H*	12483.00	32IS††92W2H*	16928.00	32IS††92F2H*	18621.00	32IS††92N2H*	15223.00
30	40	75	75	4	—	—	150	32JT††92B2H*	13518.00	32JT††92W2H*	17962.00	32JT††92F2H*	19760.00	32JT††92N2H*	16256.00

## Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp				NEMA Size	Half Size	Over-load Amp Range	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>③</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
Catalog Number	List Price \$	Catalog Number	List Price \$					Catalog Number	List Price \$	Catalog Number	List Price \$				
2	2	3	3	0	—	—	10	32CS††92B1H*	2240.00	32CS††92W1H*	3566.00	32CS††92F1H*	3923.00	32CS††92N1H*	2524.00
5	5	7½	7½	1	—	—	25	32DS††92B1H*	2360.00	32DS††92W1H*	3687.00	32DS††92F1H*	4056.00	32DS††92N1H*	2645.00
7½	7½	10	10	—	1¼	—	40	32ES††92B1H*	2886.00	32ES††92W1H*	4213.00	32ES††92F1H*	4634.00	32ES††92N1H*	3170.00
7½	10	20	20	2	—	—	50	32FS††92B1H*	3472.00	32FS††92W1H*	5126.00	32FS††92F1H*	5640.00	32FS††92N1H*	3920.00
10	15	25	25	—	2½	—	100	32GS††92B1H*	4144.00	32GS††92W1H*	5798.00	32GS††92F1H*	6379.00	32GS††92N1H*	4592.00
20	25	40	40	3	—	—	100	32HS††92B1H*	4686.00	32HS††92W1H*	7513.00	32HS††92F1H*	8264.00	32HS††92N1H*	5668.00
25	30	50	50	—	3½	—	125	32IS††92B1H*	9692.00	32IS††92W1H*	14137.00	32IS††92F1H*	15552.00	32IS††92N1H*	12432.00
30	40	75	75	4	—	—	150	32JT††92B1H*	10380.00	32JT††92W1H*	14827.00	32JT††92F1H*	16310.00	32JT††92N1H*	13121.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available in modified starters.  
② For conduit hubs and conversion instructions, see page 16-87.

③ First † for high speed, second † for low speed. Use motor nameplate information to select FLA. If motor FLA are unknown, select overload on the basis that low speed FLA will be no greater than 50% of high speed FLA.

# Combination Two Speed Heavy Duty Starters

MCP Type, Constant or Variable Torque w/Ambient Compensated Bimetal Overload, Class 32 Selection



## Ordering Information

- ▶ Replace the (\*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.
- ▶ Heater elements see page 16-148. (6 Required)
- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-124.
- ▶ Wiring Diagrams see page 16-134.
- ▶ Replacement Parts see page 16-155.

## Coil Table

60Hz Voltage	Letter
24 Separate Control	J
120 Separate Control	F
110-120/220-240 <sup>Ⓚ</sup>	A
200-208	D
220-240	G
277	L
220-240/440-480 <sup>Ⓚ</sup>	C
440-480	H
575-600	E

For other voltages and frequencies, see Factory Modifications page 16-94.

## One Winding Consequent Pole, 3-Phase (Constant or Variable Torque)

Max Hp				NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓚ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>Ⓚ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	3	32CP92B2VA*81	2542.00	32CP92W2VA*81	3868.00	32CP92F2VA*81	4255.00	32CP92N2VA*81	2826.00
1	1	3	3	0	—	10	32CP92B2VB*81	2542.00	32CP92W2VB*81	3868.00	32CP92F2VB*81	4255.00	32CP92N2VB*81	2826.00
3	3	5	5	0	—	25	32CP92B2VC*81	2542.00	32CP92W2VC*81	3868.00	32CP92F2VC*81	4255.00	32CP92N2VC*81	2826.00
1 1/2	1 1/2	1	1	1	—	3	32DP92B2VA*81	2645.00	32DP92W2VA*81	3972.00	32DP92F2VA*81	4370.00	32DP92N2VA*81	2928.00
1	1	3	3	1	—	10	32DP92B2VB*81	2645.00	32DP92W2VB*81	3972.00	32DP92F2VB*81	4370.00	32DP92N2VB*81	2928.00
3	3	7 1/2	7 1/2	1	—	25	32DP92B2VD*81	2645.00	32DP92W2VD*81	3972.00	32DP92F2VD*81	4370.00	32DP92N2VD*81	2928.00
7 1/2	7 1/2	10	10	1	—	30	32DP92B2VE*81	2645.00	32DP92W2VE*81	3972.00	32DP92F2VE*81	4370.00	32DP92N2VE*81	2928.00
—	—	15	15	—	1 1/4	40	32EP92B2VF*81	3300.00	32EP92W2VF*81	4626.00	32EP92F2VF*81	5089.00	32EP92N2VF*81	3584.00
10	10	—	—	—	1 1/4	50	32EP92B2VG*81	3300.00	32EP92W2VG*81	4626.00	32EP92F2VG*81	5089.00	32EP92N2VG*81	3584.00
—	—	20	20	2	—	40	32FP92B2VH*81	4083.00	32FP92W2VH*81	5738.00	32FP92F2VH*81	6313.00	32FP92N2VH*81	4531.00
10	15	25	25	2	—	50	32FP92B2VJ*81	4083.00	32FP92W2VJ*81	5738.00	32FP92F2VJ*81	6313.00	32FP92N2VJ*81	4531.00
10	15	30	30	—	2 1/2	50	32GP92B2VK*81	4875.00	32GP92W2VK*81	6531.00	32GP92F2VK*81	7184.00	32GP92N2VK*81	5324.00
15	20	—	—	—	2 1/2	100	32GP92B2VL*81	4875.00	32GP92W2VL*81	6531.00	32GP92F2VL*81	7184.00	32GP92N2VL*81	5324.00
—	—	30	30	3	—	50	32HP92B2VM*81	5540.00	32HP92W2VM*81	8365.00	32HP92F2VM*81	9203.00	32HP92N2VM*81	6522.00
25	30	50	50	3	—	100	32HP92B2VN*81	5540.00	32HP92W2VN*81	8365.00	32HP92F2VN*81	9203.00	32HP92N2VN*81	6522.00
30	40	75	75	—	3 1/2	125	32IP92B2VP*81	12406.00	32IP92W2VP*81	16850.00	32IP92F2VP*81	18536.00	32IP92N2VP*81	15145.00
40	50	100	100	4	—	150	32JP92B2VR*81	13439.00	32JP92W2VR*81	17886.00	32JP92F2VR*81	19675.00	32JP92N2VR*81	16178.00

## Two Separate Windings, 3-Phase (Constant or Variable Torque)

Max Hp				NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>Ⓚ</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>Ⓚ</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	3	32CP92B1VA*81	2163.00	32CP92W1VA*81	3489.00	32CP92F1VA*81	3838.00	32CP92N1VA*81	2446.00
1	1	3	3	0	—	10	32CP92B1VB*81	2163.00	32CP92W1VB*81	3489.00	32CP92F1VB*81	3838.00	32CP92N1VB*81	2446.00
3	3	5	5	0	—	25	32CP92B1VC*81	2163.00	32CP92W1VC*81	3489.00	32CP92F1VC*81	3838.00	32CP92N1VC*81	2446.00
1/2	1/2	1	1	1	—	3	32DP92B1VA*81	2284.00	32DP92W1VA*81	3610.00	32DP92F1VA*81	3971.00	32DP92N1VA*81	2567.00
1	1	3	3	1	—	10	32DP92B1VB*81	2284.00	32DP92W1VB*81	3610.00	32DP92F1VB*81	3971.00	32DP92N1VB*81	2567.00
3	3	7 1/2	7 1/2	1	—	25	32DP92B1VD*81	2284.00	32DP92W1VD*81	3610.00	32DP92F1VD*81	3971.00	32DP92N1VD*81	2567.00
7 1/2	7 1/2	10	10	1	—	30	32DP92B1VE*81	2284.00	32DP92W1VE*81	3610.00	32DP92F1VE*81	3971.00	32DP92N1VE*81	2567.00
—	—	15	15	—	1 1/4	40	32EP92B1VF*81	2809.00	32EP92W1VF*81	4135.00	32EP92F1VF*81	4549.00	32EP92N1VF*81	3093.00
10	10	—	—	—	1 1/4	50	32EP92B1VG*81	2809.00	32EP92W1VG*81	4135.00	32EP92F1VG*81	4549.00	32EP92N1VG*81	3093.00
—	—	20	20	2	—	40	32FP92B1VH*81	3394.00	32FP92W1VH*81	5048.00	32FP92F1VH*81	5554.00	32FP92N1VH*81	3842.00
10	15	25	25	2	—	50	32FP92B1VJ*81	3394.00	32FP92W1VJ*81	5048.00	32FP92F1VJ*81	5554.00	32FP92N1VJ*81	3842.00
10	15	30	30	—	2 1/2	50	32GP92B1VK*81	4066.00	32GP92W1VK*81	5719.00	32GP92F1VK*81	6293.00	32GP92N1VK*81	4514.00
15	20	—	—	—	2 1/2	100	32GP92B1VL*81	4066.00	32GP92W1VL*81	5719.00	32GP92F1VL*81	6293.00	32GP92N1VL*81	4514.00
—	—	30	30	3	—	50	32HP92B1VM*81	4610.00	32HP92W1VM*81	7435.00	32HP92F1VM*81	8178.00	32HP92N1VM*81	5591.00
25	30	50	50	3	—	100	32HP92B1VN*81	4610.00	32HP92W1VN*81	7435.00	32HP92F1VN*81	8178.00	32HP92N1VN*81	5591.00
30	40	75	75	—	3 1/2	125	32IP92B1VP*81	9615.00	32IP92W1VP*81	14060.00	32IP92F1VP*81	15466.00	32IP92N1VP*81	12354.00
40	50	100	100	4	—	150	32JP92B1VR*81	10304.00	32JP92W1VR*81	14748.00	32JP92F1VR*81	16224.00	32JP92N1VR*81	13043.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

Ⓚ Dual voltage coils not available in modified starters.


Ⓚ For conduit hubs and conversion instructions, see page 16-87.



# Combination Two Speed Heavy Duty Starters

MCP, Constant Horsepower w/ Ambient Compensated Bimetal Overload, Class 32

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Heater elements see page 16-148. (6 Required)</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-124.</li> <li>▶ Wiring Diagrams see page 16-134.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>②</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>②</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
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## One Winding Consequent Pole, 3-Phase (Constant Horsepower)

Max Hp						Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	3	32CP92B2HA*81	2542.00	32CP92W2HA*81	3868.00	32CP92F2HA*81	4255.00	32CP92N2HA*81	2826.00
1 1/2	1 1/2	3	3	0	—	10	32CP92B2HB*81	2542.00	32CP92W2HB*81	3868.00	32CP92F2HB*81	4255.00	32CP92N2HB*81	2826.00
2	2	—	—	0	—	25	32CP92B2HC*81	2542.00	32CP92W2HC*81	3868.00	32CP92F2HC*81	4255.00	32CP92N2HC*81	2826.00
1/2	1/2	1	1	1	—	3	32DP92B2HA*81	2645.00	32DP92W2HA*81	3972.00	32DP92F2HA*81	4370.00	32DP92N2HA*81	2928.00
1 1/2	1 1/2	3	3	1	—	10	32DP92B2HB*81	2645.00	32DP92W2HB*81	3972.00	32DP92F2HB*81	4370.00	32DP92N2HB*81	2928.00
3	3	7 1/2	7 1/2	1	—	25	32DP92B2HD*81	2645.00	32DP92W2HD*81	3972.00	32DP92F2HD*81	4370.00	32DP92N2HD*81	2928.00
5	5	—	—	1	—	30	32DP92B2HE*81	2645.00	32DP92W2HE*81	3972.00	32DP92F2HE*81	4370.00	32DP92N2HE*81	2928.00
—	—	10	10	—	1 3/4	40	32EP92B2HF*81	3300.00	32EP92W2HF*81	4626.00	32EP92F2HF*81	5089.00	32EP92N2HF*81	3584.00
7 1/2	7 1/2	—	—	—	1 3/4	50	32EP92B2HG*81	3300.00	32EP92W2HG*81	4626.00	32EP92F2HG*81	5089.00	32EP92N2HG*81	3584.00
—	7 1/2	15	20	2	—	40	32FP92B2HH*81	4083.00	32FP92W2HH*81	5738.00	32FP92F2HH*81	6313.00	32FP92N2HH*81	4531.00
7 1/2	10	20	—	2	—	50	32FP92B2HJ*81	4083.00	32FP92W2HJ*81	5738.00	32FP92F2HJ*81	6313.00	32FP92N2HJ*81	4531.00
—	—	30	30	—	2 1/2	50	32GP92B2HK*81	4875.00	32GP92W2HK*81	6531.00	32GP92F2HK*81	7184.00	32GP92N2HK*81	5324.00
10	15	30	40	3	—	50	32HP92B2HM*81	5540.00	32HP92W2HM*81	8365.00	32HP92F2HM*81	9203.00	32HP92N2HM*81	6522.00
20	25	40	—	3	—	100	32HP92B2HN*81	5540.00	32HP92W2HN*81	8365.00	32HP92F2HN*81	9203.00	32HP92N2HN*81	6522.00
25	30	50	50	—	3 1/2	125	32IP92B2HP*81	12406.00	32IP92W2HP*81	16850.00	32IP92F2HP*81	18536.00	32IP92N2HP*81	15145.00
30	40	75	75	4	—	150	32JP92B2HR*81	13439.00	32JP92W2HR*81	17886.00	32JP92F2HR*81	19675.00	32JP92N2HR*81	16178.00

## Two Separate Windings, 3-Phase (Constant Horsepower)

Max Hp						Motor Circuit Interrupter ETI Amps	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted Industrial Use Weatherproof Watertight, Dust-tight	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	1/2	1	1	0	—	3	32CP92B1HA*81	2163.00	32CP92W1HA*81	3489.00	32CP92F1HA*81	3838.00	32CP92N1HA*81	2446.00
1 1/2	1 1/2	3	3	0	—	10	32CP92B1HB*81	2163.00	32CP92W1HB*81	3489.00	32CP92F1HB*81	3838.00	32CP92N1HB*81	2446.00
2	2	—	—	0	—	25	32CP92B1HC*81	2163.00	32CP92W1HC*81	3489.00	32CP92F1HC*81	3838.00	32CP92N1HC*81	2446.00
1/2	1/2	1	1	1	—	3	32DP92B1HA*81	2284.00	32DP92W1HA*81	3610.00	32DP92F1HA*81	3971.00	32DP92N1HA*81	2567.00
1 1/2	1 1/2	3	3	1	—	10	32DP92B1HB*81	2284.00	32DP92W1HB*81	3610.00	32DP92F1HB*81	3971.00	32DP92N1HB*81	2567.00
3	3	7 1/2	7 1/2	1	—	25	32DP92B1HD*81	2284.00	32DP92W1HD*81	3610.00	32DP92F1HD*81	3971.00	32DP92N1HD*81	2567.00
5	5	—	—	1	—	30	32DP92B1HE*81	2284.00	32DP92W1HE*81	3610.00	32DP92F1HE*81	3971.00	32DP92N1HE*81	2567.00
—	—	10	10	—	1 3/4	40	32EP92B1HF*81	2809.00	32EP92W1HF*81	4135.00	32EP92F1HF*81	4549.00	32EP92N1HF*81	3093.00
7 1/2	7 1/2	—	—	—	1 3/4	50	32EP92B1HG*81	2809.00	32EP92W1HG*81	4135.00	32EP92F1HG*81	4549.00	32EP92N1HG*81	3093.00
—	7 1/2	15	20	2	—	40	32FP92B1HH*81	3394.00	32FP92W1HH*81	5048.00	32FP92F1HH*81	5554.00	32FP92N1HH*81	3842.00
7 1/2	10	20	—	2	—	50	32FP92B1HJ*81	3394.00	32FP92W1HJ*81	5048.00	32FP92F1HJ*81	5554.00	32FP92N1HJ*81	3842.00
—	—	30	30	—	2 1/2	50	32GP92B1HK*81	4066.00	32GP92W1HK*81	5719.00	32GP92F1HK*81	6293.00	32GP92N1HK*81	4514.00
10	15	30	40	3	—	50	32HP92B1HM*81	4610.00	32HP92W1HM*81	7435.00	32HP92F1HM*81	7955.00	32HP92N1HM*81	5591.00
20	25	40	—	3	—	100	32HP92B1HN*81	4610.00	32HP92W1HN*81	7435.00	32HP92F1HN*81	7955.00	32HP92N1HN*81	5591.00
25	30	50	50	—	3 1/2	125	32IP92B1HP*81	9615.00	32IP92W1HP*81	14060.00	32IP92F1HP*81	15466.00	32IP92N1HP*81	12354.00
30	40	75	75	4	—	150	32JP92B1HR*81	10304.00	32JP92W1HR*81	14748.00	32JP92F1HR*81	16224.00	32JP92N1HR*81	13043.00


Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available in modified starters.  
② For conduit hubs and conversion instructions, see page 16-87.

# Heavy Duty Contractors

## 3-Phase, Class 40

## Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-106 open and 16-115 enclosed.</li> <li>▶ Wiring Diagrams see page 16-140.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
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110-120/220-240 <sup>①</sup>	A																					
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220-240	G																					
277	L																					
220-240/440-480 <sup>①</sup>	C																					
440-480	H																					
575-600	E																					

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				Contactor Amp Rating	NEMA Size	Half Size	Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts				Open Type <sup>②</sup>	NEMA 1 General Purpose	NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant	NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use	NEMA 12 <sup>②</sup> NEMA 3/3R Industrial Use Weatherproof						
200 Volts	230 Volts	460 Volts	575 Volts	Amp Rating	NEMA Size	Half Size	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1 1/2	1 1/2	2	2	9	00	—	40BP32A*	198.00	40BP32B*	216.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
3	3	5	5	18	0	—	40CP32A*	249.00	40CP32B*	268.00	40CP32W*	578.00	40CP32F*	635.00	40CP32H*	1137.00	40CP320*	371.00
7 1/2	7 1/2	10	10	27	1	—	40DP32A*	293.00	40DP32B*	310.00	40DP32W*	621.00	40DP32F*	684.00	40DP32H*	1189.00	40DP320*	414.00
10	10	15	15	40	—	1 1/4	40EP32A*	422.00	40EP32B*	440.00	40EP32W*	750.00	40EP32F*	824.00	40EP32H*	1319.00	40EP320*	414.00
10	15	25	25	45	2	—	40FP32A*	534.00	40FP32B*	621.00	40FP32W*	1240.00	40FP32F*	1364.00	40FP32H*	1912.00	40FP320*	810.00
15	20	30	30	60	—	2 1/2	40GP32A*	698.00	40GP32B*	827.00	40GP32W*	1577.00	40GP32F*	1735.00	40GP32H*	2377.00	40GP320*	1033.00
25	30	50	50	90	3	—	40HP32A*	861.00	40HP32B*	1033.00	40HP32W*	1912.00	40HP32F*	2103.00	40HP32H*	2860.00	40HP320*	1258.00
30	40	75	75	115	—	3 1/2	40IP32A*	1723.00	40IP32B*	2084.00	40IP32W*	3584.00	40IP32F*	3943.00	40IP32H*	4282.00	40IP320*	2826.00
40	50	100	100	135	4	—	40JG32A*	2067.00	40JG32B*	2430.00	40JG32W*	3928.00	40JG32F*	4322.00	40JG32H*	4626.00	40JG320*	3170.00
75	100	200	200	270	5	—	40LP32A*	4506.00	40LP32B*	5168.00	40LP32E* <sup>③</sup>	7064.00	—	—	40LP32H*	9597.00	40LP320*	7064.00
150	200	400	400	540	6	—	40MP32A*	12044.00	40MP32B*	15223.00	40MP32E* <sup>③</sup>	19530.00	—	—	—	—	40MP320*	17549.00
—	300	600	600	810	7 <sup>④⑤</sup>	—	40NH32A*	17042.00	40NH32B*	20487.00	40NH32E* <sup>③</sup>	24794.00	—	—	—	—	40NH320*	22812.00
—	450	900	900	1215	8 <sup>④⑤</sup>	—	40PH32A*	27103.00	40PH32B*	31893.00	40PH32E* <sup>③</sup>	35929.00	—	—	—	—	40PH320*	27103.00

### Extra Wide Enclosure, 3-Phase, 3-Pole

Max Hp				Contactor Amp Range	NEMA Size	Half Size	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 <sup>④</sup> General Purpose	NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use	NEMA 12 <sup>②</sup> NEMA 3/3R Industrial Use Weatherproof				
200 Volts	230 Volts	460 Volts	575 Volts	Amp Range	NEMA Size	Half Size	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1 1/2	1 1/2	2	2	9	00	—	40BP82B*	467.00	Use Size 0	—	Use Size 0	—	Use Size 0	—
3	3	5	5	18	0	—	40CP82B*	528.00	40CP82W*	982.00	40CP82H*	1929.00	40CP820*	586.00
7 1/2	7 1/2	10	10	27	1	—	40DP82B*	570.00	40DP82W*	1025.00	40DP82H*	1973.00	40DP820*	629.00
10	10	15	15	40	—	1 3/4	40EP82B*	700.00	40EP82W*	1154.00	40EP82H*	2101.00	40EP820*	758.00
10	15	25	25	45	2	—	40FP82B*	846.00	40FP82W*	1912.00	40FP82H*	2695.00	40FP820*	1215.00
15	20	30	30	60	—	2 1/2	40GP82B*	1035.00	40GP82W*	2101.00	40GP82H*	3160.00	40GP820*	1404.00
25	30	50	50	90	3	—	40HP82B*	1352.00	40HP82W*	3782.00	40HP82H*	3420.00	40HP820*	2317.00
30	40	75	75	115	—	3 1/2	40IP82B*	2284.00	40IP82W*	4712.00	40IP82H*	4840.00	40IP820*	3248.00
40	50	100	100	135	4	—	40JG82B*	2628.00	40JG82W*	5057.00	40JG82H*	5185.00	40JG820*	3592.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

- ① Dual voltage coils not available in size 5-8 starters.
- ② For conduit hubs and conversion instructions, see page 16-87.

③ Enclosure is NEMA Type 4 (painted steel).

- ④ Only available  
F coil 100-250V AC 50/60Hz, or DC  
H coil 150-500V AC 50/60Hz, or DC

- ⑤ Only available  
F coil 100-250V AC 50/60Hz, or DC


Standard Auxiliary Contacts			
Type	Size (3rd Character)	Configuration	Internal / External
All FVNR Starters & Contactors	B Thru E	1N.O.	Internal
	F Thru J	1N.O.	External
	L Thru M	2N.O., 2N.C.	External
	N Thru P	1N.O., 1N.C.	External

⑥ Lugs are not included, refer to page 16-86.

# Heavy Duty Contactors

## Single Phase, 4-Pole & Vacuum, Class 40

## Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-106 open and 16-115 enclosed.</li> <li>▶ Wiring Diagrams see page 16-140.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
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440-480	H																					
575-600	E																					

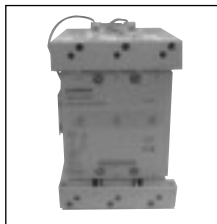
### Open Type & Standard Width Enclosure, Single Phase, 2-Pole<sup>③④</sup>

Max Hp					Enclosure											
115 Volts	208/230 Volts	Contactor Amp Rating	NEMA Size	Half Size	Open Type <sup>⑤</sup>		NEMA 1 General Purposes		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosure Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>②</sup> Industrial Use Weatherproof	
					Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
1/8	1	9	00	—	40BP12A*	172.00	40BP12B*	189.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
1	2	18	0	—	40CP12A*	224.00	40CP12B*	242.00	40CP12W*	551.00	40CP12F*	607.00	40CP12H*	1112.00	40CP120*	344.00
2	3	27	1	—	40DP12A*	268.00	40DP12B*	285.00	40DP12W*	595.00	40DP12F*	655.00	40DP12H*	1163.00	40DP120*	388.00
3	5	35	1P	—	40EP12A*	344.00	40EP12B*	362.00	40EP12W*	1206.00	40EP12F*	1327.00	40EP12H*	1240.00	40EP120*	465.00
3	7 1/2	45	2	—	40FP12A*	500.00	40FP12B*	586.00	40FP12W*	1206.00	40FP12F*	1327.00	40FP12H*	1877.00	40FP120*	775.00
5	10	60	—	2 1/2	40GP12A*	647.00	40GP12B*	775.00	40GP12W*	1526.00	40GP12F*	1679.00	40GP12H*	2163.00	40GP120*	982.00
7 1/2	15	90	3	—	40HP12A*	793.00	40HP12B*	965.00	40HP12W*	1844.00	40HP12F*	2029.00	40HP12H*	2791.00	40HP120*	1189.00
—	—	115	—	3 1/2	40IP12A*	1568.00	40IP12B*	1930.00	40IP12W*	3428.00	40IP12F*	3772.00	40IP12H*	4126.00	40IP120*	2670.00
—	—	135	4	—	40JG12A*	1912.00	40JG12B*	2274.00	40JG12W*	3773.00	40JG12F*	4151.00	40JG12H*	4471.00	40JG120*	3015.00

### Open Type & Standard Width Enclosure, 4-Pole

Max Hp					Enclosure													
200 Volts	230 Volts	460 Volts	575 Volts	Contactor Amp Rating	NEMA Size	Half Size	Open Type		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>②</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosure Indoor/Outdoor Use		NEMA 12 NEMA 3/3R <sup>②</sup> Industrial Use Weatherproof	
							Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
1/8	1 1/2	2	2	9	00	—	40BP22A*	224.00	40BP22B*	242.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
2	3	5	5	18	0	—	40CP22A*	319.00	40CP22B*	242.00	40CP22W*	647.00	40CP22F*	711.00	40CP22H*	1206.00	40CP220*	440.00
3	7 1/2	10	10	27	1	—	40DP22A*	362.00	40DP22B*	379.00	40DP22W*	689.00	40DP22F*	758.00	40DP22H*	1258.00	40DP220*	482.00
5	10	15	15	40	—	1 1/4	40EP22A*	491.00	40EP22B*	509.00	40EP22W*	819.00	40EP22F*	901.00	40EP22H*	1387.00	40EP220*	612.00

### Vacuum Contactors, 3-Phase, 3-Pole<sup>③</sup>



Max Hp				Contactor Amp Rating	NEMA Size	Open Type	
200V	230V	460V	575V			Catalog Number	List Price \$
40	50	100	100	135	4	40JV32A*	2397.00
75	100	200	200	270	5	40LV32A*	4842.00
150	200	400	400	540	6	40MV32A*	13539.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available for vacuum contactors. Refer to Page 16-94 for a complete list of available coil voltages.

② For conduit hubs and conversion instructions, see page 16-87.

③ To order single phase contactor in an extra wide enclosure, order the enclosure kit from Page 16-90 and the open style contactor as separate items.

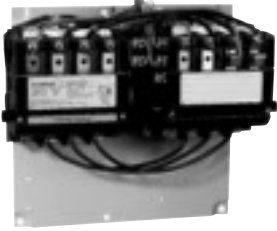
④ Coils D, F, or G will be wired for incoming voltage. J coil will be wired for separate source. Coils E, H, and L do not apply to single phase starters.

⑤ 1 NO Auxiliary.

# Reversing Heavy Duty Contactors

## Class 43

## Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the (*) with a letter from the coil table. Dual voltage coils are wired on high voltage unless specified on order.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see pages 16-107 open and 16-120 enclosed.</li> <li>▶ Wiring Diagrams see page 16-140.</li> <li>▶ Replacement Parts see page 16-155.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr><td>24 Separate Control</td><td>J</td></tr> <tr><td>120 Separate Control</td><td>F</td></tr> <tr><td>110-120/220-240<sup>①</sup></td><td>A</td></tr> <tr><td>200-208</td><td>D</td></tr> <tr><td>220-240</td><td>G</td></tr> <tr><td>277</td><td>L</td></tr> <tr><td>220-240/440-480<sup>①</sup></td><td>C</td></tr> <tr><td>440-480</td><td>H</td></tr> <tr><td>575-600</td><td>E</td></tr> </tbody> </table> <p>For other voltages and frequencies, see Factory Modifications page 16-94.</p>	60Hz Voltage	Letter	24 Separate Control	J	120 Separate Control	F	110-120/220-240 <sup>①</sup>	A	200-208	D	220-240	G	277	L	220-240/440-480 <sup>①</sup>	C	440-480	H	575-600	E
	60Hz Voltage	Letter																				
24 Separate Control	J																					
120 Separate Control	F																					
110-120/220-240 <sup>①</sup>	A																					
200-208	D																					
220-240	G																					
277	L																					
220-240/440-480 <sup>①</sup>	C																					
440-480	H																					
575-600	E																					

### Open Type & Standard Width Enclosure, 3-Phase, 3-Pole

Max Hp				Cont-actor Amp Rating	NEMA Size	Half Size	Enclosure											
200 Volts	230 Volts	460 Volts	575 Volts				Open Type <sup>②</sup>		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>③</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 <sup>④</sup> NEMA 3/3R Industrial Use Weatherproof	
Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	
1/2	1/2	2	2	9	00	—	43BP32A*	517.00	43BP32B*	551.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—
3	3	5	5	18	0	—	43CP32A*	621.00	43CP32B*	655.00	43CP32W*	1051.00	43CP32F*	1156.00	43CP32H*	2137.00	43CP320*	810.00
7 1/2	7 1/2	10	10	27	1	—	43DP32A*	707.00	43DP32B*	758.00	43DP32W*	1309.00	43DP32F*	1442.00	43DP32H*	2360.00	43DP320*	914.00
10	10	15	15	40	—	1 1/4	43EP32A*	965.00	43EP32B*	1016.00	43EP32W*	1568.00	43EP32F*	1725.00	43EP32H*	2620.00	43EP320*	1172.00
10	15	25	25	45	2	—	43FP32A*	1344.00	43FP32B*	1482.00	43FP32W*	2377.00	43FP32F*	2616.00	43FP32H*	3938.00	43FP320*	1740.00
15	20	30	30	60	—	2 1/2	43GP32A*	1784.00	43GP32B*	1973.00	43GP32W*	3084.00	43GP32F*	3393.00	43GP32H*	5023.00	43GP320*	2387.00
25	30	50	50	90	3	—	43HP32A*	2231.00	43HP32B*	2473.00	43HP32W*	3799.00	43HP32F*	4179.00	43HP32H*	6323.00	43HP320*	3042.00
30	40	75	75	115	—	3 1/2	43IP32A*	4875.00	43IP32B*	5324.00	43IP32W*	7668.00	43IP32F*	8435.00	43IP32H*	11491.00	43IP320*	6203.00
40	50	100	100	135	4	—	43JG32A*	5566.00	43JG32B*	6013.00	43JG32W*	8357.00	43JG32F*	9193.00	43JG32H*	12182.00	43JG320*	6892.00
75	100	200	200	270	5	—	43LP32A*	11113.00	43LP32B*	13707.00	43LP32E* <sup>⑤</sup>	16739.00	—	—	—	—	43LP320*	15534.00
100	200	400	400	540	6	—	43MP32A*	26172.00	43MP32B*	30480.00	43MP32E* <sup>⑤</sup>	34788.00	—	—	—	—	43MP320*	32124.00
—	300	600	600	810	7 <sup>⑥</sup>	—	43NH32A*	37088.00	43NH32B*	41395.00	43NH32E*	45703.00	—	—	—	—	43NH320*	43721.00
—	450	900	900	1215	8 <sup>⑥</sup>	—	43PH32A*	72272.00	—	—	—	—	—	—	—	—	—	—

### Open Type & Standard Width Enclosure, Single Phase, 3-Wire, 2-Pole<sup>①</sup>

Max Hp			Cont-actor Amp Rating	NEMA Size	Enclosure											
115 Volts	208/230 Volts	—			Open Type		NEMA 1 General Purpose		NEMA 4/4X Stainless <sup>③</sup> Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel		NEMA 4X Fiberglass Watertight, Dust-tight Corrosion Resistant		NEMA 7 & 9 NEMA 3 & 4 Div 1 and Div 2 Class I Groups C & D Class II Groups E, F & G Class III Bolted Enclosures Indoor/Outdoor Use		NEMA 12 <sup>④</sup> NEMA 3/3R Industrial Use Weatherproof	
Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	
1 1/2	1	9	00	43BP12A*	500.00	43BP12B*	534.00	Use Size 0	—	Use Size 0	—	Use Size 0	—	Use Size 0	—	
1	2	18	0	43CP12A*	603.00	43CP12B*	637.00	43CP12W*	1033.00	43CP12F*	1137.00	43CP12H*	2231.00	43CP120*	793.00	
2	3	27	1	43DP12A*	689.00	43DP12B*	741.00	43DP12W*	1293.00	43DP12F*	1423.00	43DP12H*	2343.00	43DP120*	896.00	
3	5	35	1P	43EP12A*	947.00	43EP12B*	1000.00	43EP12W*	1551.00	43EP12F*	1706.00	43EP12H*	2602.00	43EP120*	1154.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① Dual voltage coils not available in size 5-8 starters.

② For conduit hubs and conversion instructions, see page 16-87.

③ Enclosure is NEMA Type 4 (painted steel).

④ Coils D, F, or G will be wired for incoming voltage. J coil will be wired for separate source. Coils E, H, and L do not apply to single phase starters.

⑤ Only available

F coil 100-250V AC 50/60Hz, or DC  
H coil 150-500V AC 50/60Hz, or DC

⑥ Only available

F coil 100-250V AC 50/60Hz, or DC

⑦ Auxiliary contacts

43B-43E 4th pole built-in  
43F-43J 2 NO & 2 NC

# Overload Relays

## Solid State ESP100 & 3RB20, Special Use 958, Oil Field 958L, and Thermal

General

### Features

#### • Solid State ESP100, 958 & 958L Overloads

- Phase Loss Protection—Trips Within 3 Seconds
- Ambient Insensitive
- Heaterless Design
- Self-Powered
- ±2% Repeat Trip Accuracy
- NEMA Class 10, 20 & 30 Trip Curves Available
- FLA Adjustment Dial with Wide Adjustment Range (Fig. 1)
- Short Circuit Self Protected
- Thermal Memory Circuit
- Conformally Coated Circuit Board
- 22°F to 159°F (-30°C to 70°C)
- NC Contact Rated NEMA A600, P600 (10 Amps 600VAC Max., 5 Amps 600VDC Max.)
- “Must Hold Amps” Adjustment Dial (958 only)

#### • Ambient Compensated Bimetal Overloads

- Automatic or manual reset adjustment
- A manual test button is provided to test the operation of the 3-pole overload relay control contacts
- ±15% nominal trip current adjustment
- Accept either standard Class 20 or Quick Trip (NEMA Class 10) heater elements without any other changes or adjustments
- Available with a normally open contact for an alarm circuit (SPDT) up to 60A
- Compensated bimetal overload relays provide a constant trip time in ambient temperatures from -20°F to +170°F for a given heater rating

#### • UL Listed File #E22655 or Component Recognized

#### • CSA Certified File #LR6535

#### • 3RB20 Solid State Overload Relay

- Marking Strip
- STOP button
- 1 NO and 1 NC contacts
- Trip class 10 or 20
- Test function and switch position indicator
- 4:1 current adjustment dial e.g. 160-630A
- Phase loss protection
- Self-powered

### Application

#### ESP100 Solid State Overloads

ESP100 solid state overload relays are self powered, requiring no separate 120V source to power the circuit board. They provide phase loss protection, fewer connection points and high repeat trip accuracy which results in longer motor life and cost savings. NEMA Class 10, 20 and 30 trip curves are available for a variety of applications.

The ESP100 solid state overload provides phase loss protection for the motor by tripping within three seconds upon complete loss of one phase of a three phase motor branch circuit.

Each overload has at least a 2:1 current adjustment range with the adjustment dial reading out in full load amps. In addition to the markings on the dial there are audible clicks which allow for extremely fine tuning.

The heaterless construction of these overloads minimizes energy costs and the costs of cabinet ventilation or cooling. Solid state overloads can be used at temperatures from -30°C to +70°C and are rated for 50Hz and 60Hz applications.

ESP100 panel mounted overloads can be used to upgrade existing starter applications where panel mounted thermal overloads are used. In addition, ESP100 overloads can be panel mounted when used with other types of controllers, such as DP, IEC contactors, and soft starts.

ESP100 overloads can be used on high voltage applications, making them ideal for use with vacuum contactors and other high voltage control.

ESP100 overloads can be retrofitted on existing contactors using the retrofit plate suffixes or on other brands using the plates listed in the competitive retrofit plates table on page 16-48.

#### 958 ESP100 Special Use Solid State Overloads

958 ESP100 special use solid state overloads provide excellent protection of hermetically sealed compressors and

artificially cooled motors which require ambient insensitivity and quick trip response times. Combined with a series lockout relay, they can provide unsurpassed protection for hermetically sealed compressor motors in air conditioning applications. The combination of high trip speed, current adjustment, and ease of installation makes it suitable for these applications. The trip curves have been custom tailored to provide proper overload protection on such loads without causing nuisance tripping.

958 overload dials denote must hold amps. Must trip amps are 112% of the must hold setting.

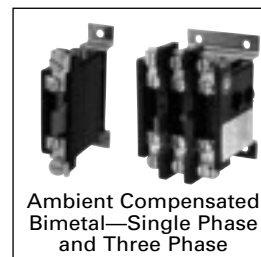
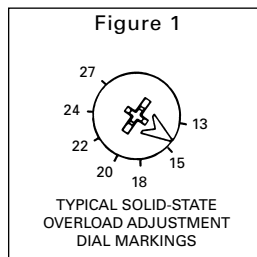
#### 958L ESP100 Oil Field Solid State Overload Relays

958L ESP100 solid state overloads are designed specifically for the oil market and the cyclical loads experienced with these types of pumping applications. These overloads provide protection on all standard motors, oil well pump motors, multi-torque connections, and ultra-high slip motors.

Rotors can be damaged in 8 to 15 seconds during motor stall conditions if electrical power is not removed. To prevent damage during motor stall, the 958L solid-state overload removes power in 7 seconds at 250% locked rotor current. Therefore, die cast or fabricated rotors will be protected from damage saving the user both time and money.

#### Ambient Compensated Bimetal Overloads


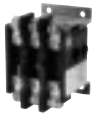

These thermal type overload relays are used to protect motors from excessive heat resulting from sustained motor overloads, rapid motor cycling and stalled rotor conditions. Although these devices function based on thermal principles they are designed to compensate for the ambient air temperature surrounding the overload. This helps prevent the occurrence of nuisance tripping when there are high surrounding ambient temperatures. The percentage of overload determines the length of time required to open the circuit.



# Overload Relays

## Solid State and Thermal, Class 48, ESP100 and 3RB20

Selection

 <b>ESP100 Solid State Overload Relay</b>	 <b>Ambient Compensated Bimetal 3-Phase Overload Relay</b>	 <b>3RB20 Solid State Overload Relay</b>	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ For Thermal Overloads, order heater elements by code number at <b>\$13.00</b> each.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Dimensions see page 16-108.</li> <li>▶ To retrofit existing Thermal Furnas Brand Starters with the ESP100 Solid State Overload Relay add the appropriate suffix to the end of the catalog number from the Retrofit Plates table shown below and also add <b>\$14.30</b> to the list price. Example: 48ASE3M201P. Or order the Plate Kit Separate 49ASMP1, 2, or 3.</li> </ul>
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### Solid State—Class 48 ESP100, 3-Phase, Single Phase (Panel Mount and Replacement)®

Full Load Amp Current Range	Phase	Frame <sup>①</sup> Size	Manual Reset Class 10 Catalog Number	List Price \$	Manual Reset Class 20 Catalog Number	List Price \$	Manual Reset Class 30 Catalog Number	List Price \$
0.25-1	3	A	48ASA3M10	117.00	48ASA3M20	117.00	48ASA3M30	117.00
0.75-3	3	A	48ASB3M10	117.00	48ASB3M20	117.00	48ASB3M30	117.00
2.5-10	3	A	48ASD3M10	117.00	48ASD3M20	117.00	48ASD3M30	117.00
9-18	3	A1	48ASE3M10	117.00	48ASE3M20	117.00	48ASE3M30	117.00
13-27	3	A1	48AF3M10	117.00	48AF3M20	117.00	48AF3M30	117.00
20-40	3	A1	48AG3M10	151.00	48AG3M20	151.00	48AG3M30	151.00
13-27	3	B	48BSF3M10	163.00	48BSF3M20	163.00	48BSF3M30	163.00
22-45	3	B	48BSH3M10	163.00	48BSH3M20	163.00	48BSH3M30	163.00
30-60	3	B	48BSJ3M10	198.00	48BSJ3M20	198.00	48BSJ3M30	198.00
45-90	3	B	48BSK3M10	198.00	48BSK3M20	198.00	48BSK3M30	198.00
57-115	3	B	48BSL3M10	289.00	48BSL3M20	289.00	48BSL3M30	289.00
67-135	3	B	48BSM3M10	289.00	48BSM3M20	289.00	48BSM3M30	289.00
81-162 <sup>②</sup>	3	B	48BSN3M10	289.00	48BSN3M20	289.00	48BSN3M30	289.00
100-210 <sup>③</sup>	3	A	48ASS3M10	143.00	48ASS3M20	143.00	48ASS3M30	143.00
100-270 <sup>③</sup>	3	A	48ASU3M10	143.00	48ASU3M20	143.00	48ASU3M30	143.00
200-540 <sup>④</sup>	3	A	48ASX3M10	143.00	48ASX3M20	143.00	48ASX3M30	143.00
250-750 <sup>⑤</sup>	3	A	48CSH3M10	143.00	48CSH3M20	143.00	48CSH3M30	143.00
420-820 <sup>⑥</sup>	3	A	48CSY3M10	143.00	48CSY3M20	143.00	48CSY3M30	143.00
420-1220 <sup>⑥</sup>	3	A	48CSZ3M10	143.00	48CSZ3M20	143.00	48CSZ3M30	143.00
0.25-1	1	A	48ASA1M10	107.00	48ASA1M20	107.00	48ASA1M30	107.00
0.75-3	1	A	48ASB1M10	107.00	48ASB1M20	107.00	48ASB1M30	107.00
2.5-10	1	A	48ASD1M10	107.00	48ASD1M20	107.00	48ASD1M30	107.00
5-16	1	A	48ASE1M10	107.00	48ASE1M20	107.00	48ASE1M30	107.00

### Solid State—3RB206, 3-Phase<sup>⑦</sup>

For Contactor Size	Setting Range Amps	Manual/Automatic Reset			
		Class 10 Catalog Number	List Price \$	Class 20 Catalog Number	List Price \$
5	55-250	3RB2066-1GC2	377.00 <sup>⑧</sup>	3RB2066-2GC2	397.00 <sup>⑧</sup>
6	160-630	3RB2066-1MC2	540.00 <sup>⑧</sup>	3RB2066-2MC2	560.00 <sup>⑧</sup>

### Ambient Compensated Bimetal—Open Type Class 48 Single Phase, 3-Phase (Panel Mount Only)<sup>⑨</sup>

Poles	Amp Rating	Auxiliary Contacts	Contact Rating	Catalog Number	List Price \$
1	25	1 NC	5A (B600)	48DA18AA4	38.00
	60	1 NC	&	48GA18AA4	56.00
	100	1 NC	5A (P300)	48HA18AA4	72.00
	180	1 NC		48JA18AA4	117.00
3	30	1 NC	10A (A600)	48DC38AA4	77.00
	30	1 NO/NC	&	48DC39AA4	111.00
	60	1 NC	5A (P300)	48GC38AA4	111.00
	60	1 NO/NC		48GC39AA4	147.00
	100	3 NC	5A (B600) & 5A (P300)	48HA38AA4	198.00
	180	3 NC		48JA38AA4	285.00

### Retrofit Plates for Contactors, Class 48

Replacement for Starter Sizes	ESP100 Overload Frame Size	Retrofit Plate Suffix	Plate Kit Separate	Price Adder \$
Size 00-1¼	A or A1	1P	49ASMP1	14.30
Size 2, 2½	B	2P	49ASMP2	14.30
Size 3, 3½	B	3P	49ASMP3	14.30
Size 4	B	4P	49ASMP3	14.30

① To determine frame size of replacement solid state overload, refer to retrofit plates table above.  
 ② Temperature rating -20° to 60°C.  
 ③ Requires use of 300:5 Current Transformers-3 of 97CT005.  
 ④ Requires use of 600:5 Current Transformers-3 of 97CT008.

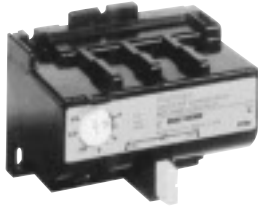
⑤ Requires use of 1200:5 Current Transformers-3 of 97CT012.  
 ⑥ Overload has busbar connections.  
 ⑦ Discount Code: IEC.  
 ⑧ Requires use of 750:5 Current Transformers-3 of 97CT009.

⑨ See note under Ordering Information to retrofit existing Thermal Starters with ESP100 Solid State Overload Relay.  
 ⑩ For replacement of Starter Mounted Overload Relay, refer to page 16-157.

# Overload Relays

## Special Use Solid State Overloads, Class 958 and 958L

Selection



### Ordering Information

- ▶ Field Modification Kits see page 16-79.
- ▶ Dimensions see page 16-108.

### Current Transformers

Rating	Catalog No.	List Price \$
150:5	97CT002	158.00
200:5	97CT003	158.00
250:5	97CT004	158.00
300:5	97CT005	158.00
400:5	97CT006	158.00
600:5	97CT008	158.00
750:5	97CT009	158.00
1200:5	97CT012	158.00

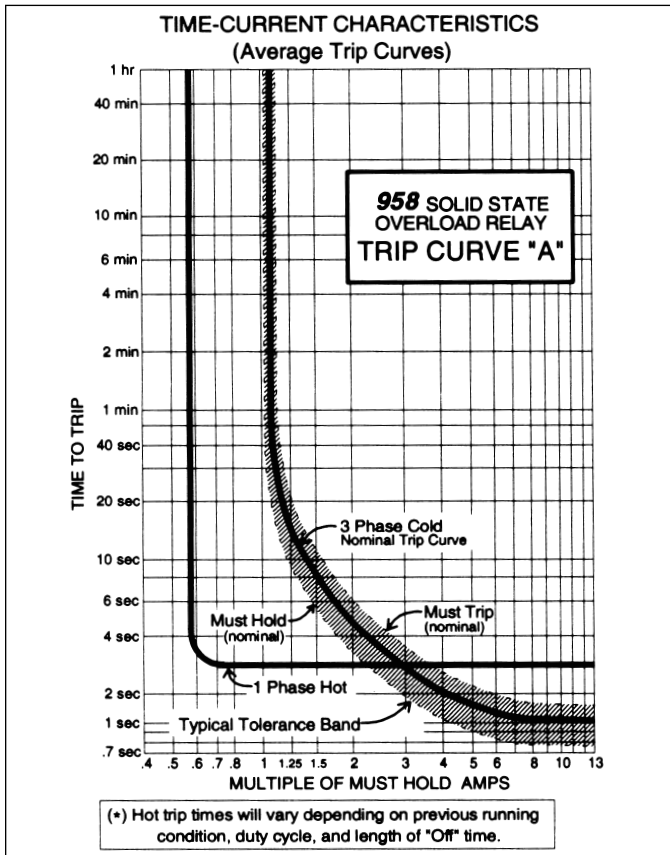
### Standard Class 958—Manual Reset, Trip Curve A

Full Load Amp Current Range	Phase	For Use On Controller Sizes	Catalog Number	List Price \$
15-30	3	1-1 3/4	958AA32A	323.00
22-44	3	1 3/4	958BA32A	323.00
33-66	3	2-3	958CA32A	374.00
50-100	3	3-3 1/2	958DA32A	374.00
75-150	3	4	958EA32A	410.00
90-180	3	4	958FA32A <sup>Ⓞ</sup>	430.00

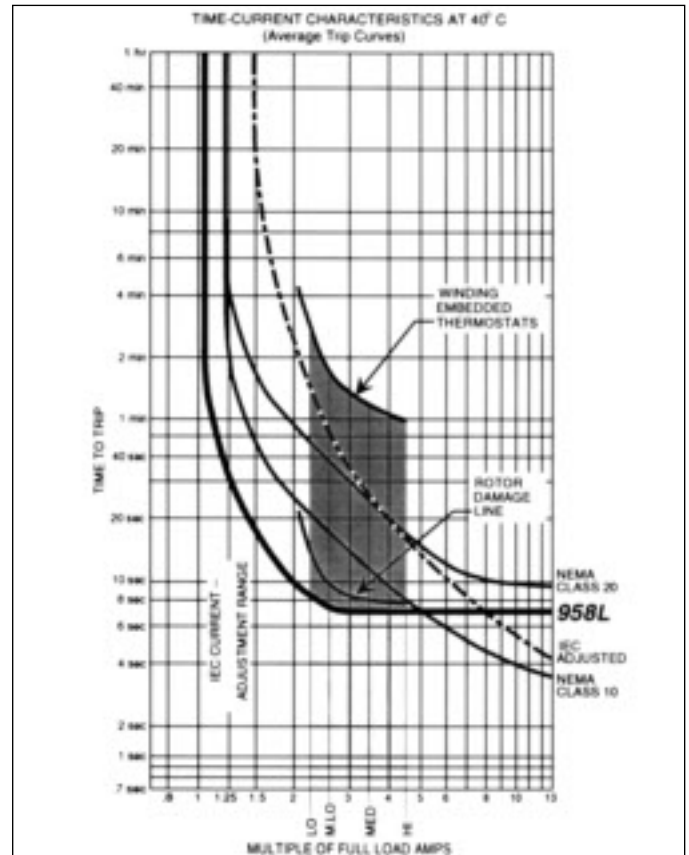
### Oil Field Class 958L—Manual Reset

Full Load Amp Current Range	Phase	For Use On Controller Sizes	Catalog Number	List Price \$
5.6-11.6	3	0-1 3/4	958L109307U	158.00
7-14	3	0-1 3/4	958L109308U	158.00
11-22	3	1, 1 3/4	958L109309U	158.00
14-28	3	1, 1 3/4	958L109330U	158.00
18-36	3	1 3/4	958L109331U	193.00
20-40	3	1 3/4	958L109332U	193.00
18-36	3	2-4	958L109313U	206.00
28-56	3	2 1/2-4	958L109314U	239.00
35-70	3	3-4	958L109329U	239.00
43-86	3	3-4	958L109315U	239.00
50-90	3	3-4	958L109311U	239.00
60-126	3	4	958L109316U	330.00
75-150	3	—	958L109312U	186.00
84-174	3	—	958L109327U	186.00
105-210	3	—	958L109328U	186.00
132-264	3	—	958L109522U	186.00
264-528	3	—	958L109523U	186.00

### Trip Curve A



### 958L Trip Curve



<sup>Ⓞ</sup>Temperature rating -20° to +60°C.

# Current Sensitive Relay

## Class 97

General

### Features

- Start Up Delay
- Trip Delay
- Overcurrent or Undercurrent Trip Applications
- Manual or Automatic Reset

Start-up delay, trip delay and current trip (undercurrent trip on Model 97U and overcurrent trip on the Model 97A) adjustments are provided to match the current sensitive relay to a specific application. Reset can be switch selectable for manual or automatic.

### Description

The Class 97 current sensitive relay is a device that monitors motor current and provides an instantaneous output if the motor current is over (Model 97A) or under (Model 97U) an adjustable set point. These over or under current conditions may be the result of a change in system status such as a jam, broken belt or dry well. Control voltage of 120V AC or 240V AC is required to operate the relay. An SPDT, 2.5 amp relay output contact is provided. No current transformers are required below 100 amps (56 amps for undercurrent relay).

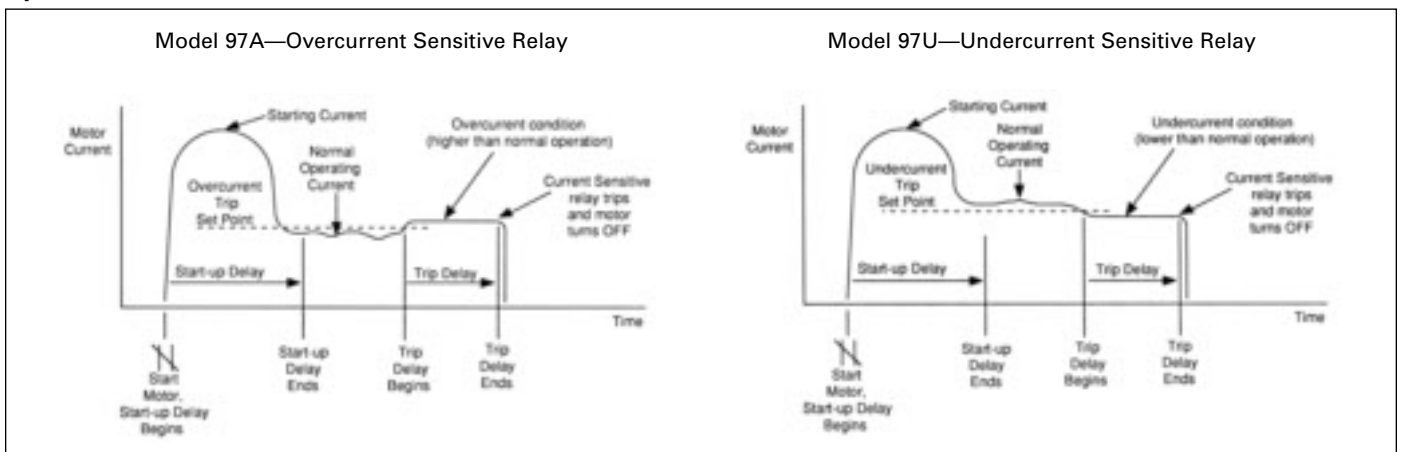
### Electrical Data

Supply Voltage:	100–140VAC, 60Hz (240VAC available)
Start Up Time Delay:	1–6 seconds. Begins when motor current is above 10% of current trip point. Output is inhibited if motor current is below 10% of current set point.
Trip Time Delay:	Model 97U 0.5–2.5 seconds Model 97A 0.2–2.5 seconds
Reset:	Manual or Automatic switch selectable
Fault Indicator:	LED, ON during fault
Contact Rating:	1 SPDT, 2.5 amp @ 250VAC (NEMA C300)
Wire Termination:	Saddle clamp Wire range: Two #12 to #18 gauge
Sensing Loop Wire Size:	6 gauge maximum except 97AAF3010 2/0 gauge maximum
Operating Temperature Range:	–25°C to +60°C
Set Point Repeatability:	±2% over temperature range of 0° to +60°C ±4% over temperature range of –25° to 0°C
Current Transformers (Optional):	Refer to page 16-49 for Selection



Class 97 Current Sensitive Relay

### Operation

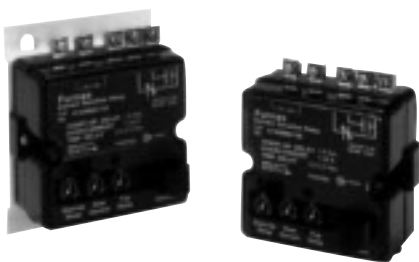




# Current Sensitive Relay

## Class 97

## Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ For Current Transformers refer to page 16-49.</li> <li>▶ Dimensions see pages 16-108.</li> <li>▶ Wiring Diagrams see page 16-143.</li> </ul>
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### Undercurrent

Reset Type	Mounting	Control Voltage	Current Trip Amp Adjustment Range	Hp Range @ 460VAC <sup>①</sup>	Max Continuous Operation Current	Catalog Number	List Price \$
Man/ Auto	Panel Mount	120VAC	2-7	3-7½	125A	97UMM0207	388.00
			4-16	5-15	140A	97UMM0416	388.00
			7-28	10-30	140A	97UMM0728	388.00
		240VAC	14-56	20-60	140A	97UMM1456	388.00
			2-7	3-7½	125A	97UMM0207G	388.00
			4-16	5-15	140A	97UMM0416G	388.00
	Free Standing	120VAC	7-28	10-30	140A	97UMM0728G	388.00
			14-56	20-60	140A	97UMM1456G	388.00
			2-7	3-7½	125A	97UMF0207	352.00
		240VAC	4-16	5-15	140A	97UMF0416	352.00
			7-28	10-30	140A	97UMF0728	352.00
			14-56	20-60	140A	97UMF1456	352.00

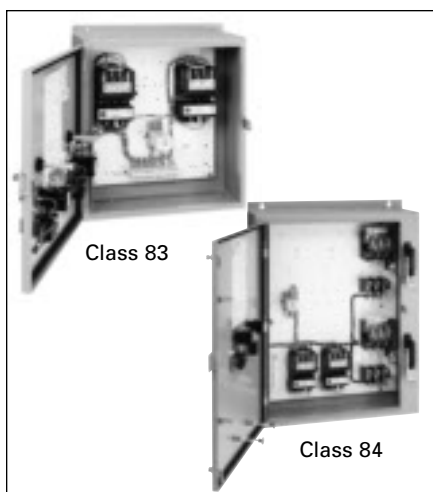
### Overcurrent

Reset Type	Mounting	Control Voltage	Current Trip Amp Adjustment Range	Hp Range @ 460VAC <sup>①</sup>	Max Continuous Operation Current	Catalog Number	List Price \$	
Man/ Auto	Panel Mount	120VAC	2-7	3-7½	125A	97AMM0207	388.00	
			4-16	5-15	140A	97AMM0416	388.00	
			7-28	10-30	140A	97AMM0728	388.00	
		240VAC	14-56	20-60	140A	97AMM1456	388.00	
			30-100	30-75	140A	97AMM3010	388.00	
			2-7	3-7½	125A	97AMM0207G	388.00	
		Free Standing	120VAC	14-56	20-60	140A	97AMM1456G	388.00
				30-100	30-75	140A	97AMM3010G	388.00
				2-7	3-7½	125A	97AMF0207	352.00
	240VAC		4-16	5-15	140A	97AMF0416	352.00	
			7-28	10-30	140A	97AMF0728	352.00	
			14-56	20-60	140A	97AMF1456	352.00	
	30-100		30-75	140A	97AMF3010	352.00		
			2-7	3-7½	125A	97AMF0207G	352.00	
			4-16	5-15	140A	97AMF0416G	352.00	
	7-28	10-30	140A	97AMF0728G	352.00			
		14-56	20-60	140A	97AMF1456G	352.00		
		30-100	30-75	140A	97AMF3010G	352.00		

<sup>①</sup> These catalog numbers can also be used on voltage systems other than 460VAC by changing the Hp range proportionally.

# Duplex Heavy Duty Controllers

General



## Features

- Heavy Duty NEMA Starters
- Solid State or Thermal Overload Relays
- Fusible or MCP
- Heavy Duty Disconnect Handle
- Flexibility with Field Modifications
- Alternator Transfer on De-energization
- UL Listed for Outdoor Use and Service Equipment File #E14900

## Application

Duplex pump controls are designed to perform one or both of two distinct functions: duplexing and alternation. The duplexing function provides capacity for system peaking or above normal demand without having the full motor capacity spinning at all times. It also provides standby capacity for use when one of the motors or pumps is disabled. The duplexing function is also referred to as lead/lag or main/standby. When two pumps or compressors are controlled by a duplex controller, they are started in sequence as necessary to attain preset values of pressure, flow or liquid level.

Two field devices such as pressure switches or float switches provide electrical signals to the duplex controller. One remote device is set to initiate the

starting of the lead motor. This motor is rated to handle normal system demand. The second motor is usually the same rating and is referred to as the lag motor. It is only energized when the system demand is greater than the capacity of the lead motor. The lag motor is started when the second remote device is signalling for more output than the lead motor can produce.

The alternation function reverses the lead and lag mode for the two motors in a duplex system. Upon alternation the first motor as described above becomes the lag motor and the second motor assumes the lead function. The alternation is usually programmed to occur at any time both pumps come to rest. The alternation function equalizes wear on the two machines and extends the life of seals and bearings.

## Enclosure Types

Duplex controllers are available in NEMA 1, 12/3/3R, 4 (painted) and 4/4X (stainless) enclosures. Enclosures protect personnel from contact with live parts and depending upon the construction, protect the control in varying degrees from physical damage and harmful atmospheres. All enclosures are supplied with corrosion resistant finishes.

## Heavy Duty Starters

These Duplex controllers use the same starters described in the heavy duty starter section of this catalog. ESP 100 solid state overload starters and ambient compensated bimetal overload starters are available.

## Siemens Type ETI Circuit Breaker

The ETI circuit breaker is a device designed specifically for application in motor circuits. The ETI is a magnetic only protective device designed to provide protection against short circuit current.

The instantaneous-only type ETI circuit breaker employs adjustable magnetic trip settings to allow broader application ranges and a higher degree of motor short circuit protection.

## Features

Two control transformers may be provided for low voltage control to safeguard personnel from high voltage. One transformer is required for each starter to provide independent control circuits.

A Hand-Off-Auto selector switch for each starter may be mounted in the enclosure door or furnished separately for remote control. Test push buttons or pilot lights may also be installed on the enclosure.

Solid-state or Ambient Compensated Bimetal Overload Relays are supplied as standard.

## New Heavy Duty Disconnect Switches

The disconnect switch that goes the distance in durability, performance and reliability has been made even better to give you greater advantages:

- Visible blades for the highest level of safety
- Double break switching action to reduce arcing, increase lifetime and eliminate the "electric hinge"
- More rugged positive action switch
- Oversized lugs are standard
- Line side shield to help guard personnel from contact with live parts
- Higher horsepower rating for design E high efficiency motors
- Now UL listed for IlSCO, Burndy and T&B crimp type lugs
- The 200A switch now accepts up to 300 MCM versus 250 MCM wire size

Its rugged construction - with a high fault withstand rating of 100kA at 600 VAC when fused with class R rated fuses - meets the most stringent industry standards set forth by the automotive, petro-chemical, and pulp and paper industries. UL recognized and CSA certified, our disconnect switches are available either non-fusible or fusible with class R and class J fuse clips.

# Duplex Heavy Duty Controllers

## Non - Combination, Class 83

## Selection

Ordering Information	Coil Table	
<ul style="list-style-type: none"> <li>▶ Standard coil voltage supplied will be 120V, separate control. For non-alternator styles (see factory modifications) change the 9th character using the coil table.</li> <li>▶ Heater elements for bimetal overloads see page 16-148 (6-Required).</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-126.</li> <li>▶ Wiring Diagrams see page 16-141.</li> <li>▶ Replacement Parts see pages 16-155.</li> </ul>	60Hz Voltage	Letter
	24 Separate Control <sup>Ⓜ</sup>	J
	120 Separate Control	F
	200-208 <sup>Ⓜ</sup>	D
	220-240 <sup>Ⓜ</sup>	G
	277 <sup>Ⓜ</sup>	L
	440-480 <sup>Ⓜ</sup>	H
	550-600 <sup>Ⓜ</sup>	E

### Non-Combination (with Solid-State Overload)

Max Hp				NEMA Size	Half Size	Overload Amp Range	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts				NEMA 1 General Purpose		NEMA 12/3R <sup>Ⓜ</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4/4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
							Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/6	1/6	1/3	1/2	0	—	0.25-1	83CSA92BF	1482.00	83CSA920F	1629.00	83CSA92EF	1956.00	83CSA92WF	3463.00
1/2	3/4	1 1/2	2	0	—	0.75-3	83CSB92BF	1482.00	83CSB920F	1629.00	83CSB92EF	1956.00	83CSB92WF	3463.00
2	2	5	5	0	—	2.5-10	83CSD92BF	1482.00	83CSD920F	1629.00	83CSD92EF	1956.00	83CSD92WF	3463.00
3	3	—	—	0	—	9-18	83CSE92BF	1482.00	83CSE920F	1629.00	83CSE92EF	1956.00	83CSE92WF	3463.00
1/6	1/6	1/3	1/2	1	—	0.25-1	83DSA92BF	1577.00	83DSA920F	1723.00	83DSA92EF	2067.00	83DSA92WF	3575.00
1/2	3/4	1 1/2	2	1	—	0.75-3	83DSB92BF	1577.00	83DSB920F	1723.00	83DSB92EF	2067.00	83DSB92WF	3575.00
2	2	5	5	1	—	2.5-10	83DSD92BF	1577.00	83DSD920F	1723.00	83DSD92EF	2067.00	83DSD92WF	3575.00
3	3	10	10	1	—	9-18	83DSE92BF	1577.00	83DSE920F	1723.00	83DSE92EF	2067.00	83DSE92WF	3575.00
7 1/2	7 1/2	—	—	1	—	13-27	83DSF92BF	1577.00	83DSF920F	1723.00	83DSF92EF	2067.00	83DSF92WF	3575.00
—	—	15	15	—	1 3/4	13-27	83ESF92BF	1835.00	83ESF920F	1981.00	83ESF92EF	2326.00	83ESF92WF	3834.00
10	10	—	—	—	1 3/4	20-40	83ESG92BF	1835.00	83ESG920F	1981.00	83ESG92EF	2326.00	83ESG92WF	3834.00
—	—	15	20	2	—	13-27	83FSF92BF	2335.00	83FSF920F	2714.00	83FSF92EF	3360.00	83FSF92WF	4868.00
10	15	25	25	2	—	22-45	83FSH92BF	2335.00	83FSH920F	2714.00	83FSH92EF	3360.00	83FSH92WF	4868.00
—	—	30	30	—	2 1/2	22-45	83GSH92BF	2791.00	83GSH920F	3282.00	83GSH92EF	4721.00	83GSH92WF	6229.00
15	20	—	—	—	2 1/2	30-60	83GSJ92BF	2791.00	83GSJ920F	3282.00	83GSJ92EF	4721.00	83GSJ92WF	6229.00
—	—	30	40	3	—	30-60	83HSJ92BF	3170.00	83HSJ920F	3661.00	83HSJ92EF	5100.00	83HSJ92WF	6967.00
25	30	50	50	3	—	45-90	83HSK92BF	3170.00	83HSK920F	3661.00	83HSK92EF	5100.00	83HSK92WF	6967.00
30	40	75	75	—	3 1/2	57-115	83ISL92BF	5704.00	83ISL920F	7331.00	83ISL92EF	8994.00	83ISL92WF	10860.00
40	50	100	100	4	—	67-135	83JSM92BF	6392.00	83JSM920F	8020.00	83JSM92EF	9683.00	83JSM92WF	11549.00

### Non-Combination (with Ambient Compensated Bimetal Overload)

Max Hp				NEMA Size	Half Size	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts			NEMA 1 General Purpose		NEMA 12/3R <sup>Ⓜ</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4/4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
						Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	0	—	83CP92BF81	1405.00	83CP920F81	1551.00	83CP92EF81	1877.00	83CP92WF81	3385.00
7 1/2	7 1/2	10	10	1	—	83DP92BF81	1498.00	83DP920F81	1645.00	83DP92EF81	1991.00	83DP92WF81	3498.00
10	10	15	15	—	1 3/4	83EP92BF81	1758.00	83EP920F81	1905.00	83EP92EF81	2249.00	83EP92WF81	3756.00
10	15	25	25	2	—	83FP92BF81	2256.00	83FP920F81	2636.00	83FP92EF81	3282.00	83FP92WF81	4789.00
15	20	30	30	—	2 1/2	83GP92BF81	2714.00	83GP920F81	3205.00	83GP92EF81	4643.00	83GP92WF81	6151.00
25	30	50	50	3	—	83HP92BF81	3093.00	83HP920F81	3584.00	83HP92EF81	5022.00	83HP92WF81	6888.00
30	40	75	75	—	3 1/2	83IP92BF81	5626.00	83IP920F81	7254.00	83IP92EF81	8917.00	83IP92WF81	10784.00
40	50	100	100	4	—	83JP92BF81	6315.00	83JP920F81	7943.00	83JP92EF81	9605.00	83JP92WF81	11472.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

Ⓜ NEMA 12 is field convertible to NEMA 3/3R. For conduit hubs and conversion instructions, see page 16-87.

Ⓜ Not available on standard alternator style ('92' in the catalog number).

# Duplex Heavy Duty Controllers

## Combination Disconnect (Fusible & Non-Fusible), Class 84

Selection

Ordering Information	Coil Table																
<ul style="list-style-type: none"> <li>▶ Standard coil voltage supplied will be 120V, separate control. For non-alternator styles (see factory modifications) change the 10th character using the coil table.</li> <li>▶ Heater elements for bimetal overloads see page 16-148 (6-Required).</li> <li>▶ For factory installed fusible disconnect, see page 16-95.</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-126.</li> <li>▶ Wiring Diagrams see page 16-141.</li> <li>▶ Replacement Parts see pages 16-155.</li> </ul>	<table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>24 Separate Control<sup>②</sup></td> <td>J</td> </tr> <tr> <td>120 Separate Control</td> <td>F</td> </tr> <tr> <td>200-208<sup>②</sup></td> <td>D</td> </tr> <tr> <td>220-240<sup>②</sup></td> <td>G</td> </tr> <tr> <td>277<sup>②</sup></td> <td>L</td> </tr> <tr> <td>440-480<sup>②</sup></td> <td>H</td> </tr> <tr> <td>550-600<sup>②</sup></td> <td>E</td> </tr> </tbody> </table>	60Hz Voltage	Letter	24 Separate Control <sup>②</sup>	J	120 Separate Control	F	200-208 <sup>②</sup>	D	220-240 <sup>②</sup>	G	277 <sup>②</sup>	L	440-480 <sup>②</sup>	H	550-600 <sup>②</sup>	E
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550-600 <sup>②</sup>	E																

### Two Disconnect Switches with Solid-State Overload

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 12/3R <sup>①</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/6	1/6	1/3	1/2	0	—	0.25-1	30	84CSA92BDF	2335.00	84CSA920DF	2791.00	84CSA92EDF	4152.00	84CSA92WDF	5660.00
1/2	3/4	1 1/2	2	0	—	0.75-3	30	84CSB92BDF	2335.00	84CSB920DF	2791.00	84CSB92EDF	4152.00	84CSB92WDF	5660.00
2	2	5	5	0	—	2.5-10	30	84CSD92BDF	2335.00	84CSD920DF	2791.00	84CSD92EDF	4152.00	84CSD92WDF	5660.00
3	3	—	—	0	—	9-18	30	84CSE92BDF	2335.00	84CSE920DF	2791.00	84CSE92EDF	4152.00	84CSE92WDF	5660.00
1/6	1/6	1/3	1/2	1	—	0.25-1	30	84DSA92BDF	2430.00	84DSA920DF	2886.00	84DSA92EDF	4247.00	84DSA92WDF	5754.00
1/2	3/4	1 1/2	2	1	—	0.75-3	30	84DSB92BDF	2430.00	84DSB920DF	2886.00	84DSB92EDF	4247.00	84DSB92WDF	5754.00
2	2	5	5	1	—	2.5-10	30	84DSD92BDF	2430.00	84DSD920DF	2886.00	84DSD92EDF	4247.00	84DSD92WDF	5754.00
3	3	10	10	1	—	9-18	30	84DSE92BDF	2430.00	84DSE920DF	2886.00	84DSE92EDF	4247.00	84DSE92WDF	5754.00
7 1/2	7 1/2	—	—	1	—	13-27	30	84DSF92BDF	2430.00	84DSF920DF	2886.00	84DSF92EDF	4247.00	84DSF92WDF	5754.00
—	—	15	15	—	1 3/4	13-27	60	84ESF92BDF	2688.00	84ESF920DF	3145.00	84ESF92EDF	4506.00	84ESF92WDF	6013.00
10	10	—	—	—	1 3/4	20-40	60	84ESG92BDF	2688.00	84ESG920DF	3145.00	84ESG92EDF	4506.00	84ESG92WDF	6013.00
—	—	15	20	2	—	13-27	60	84FSF92BDF	3489.00	84FSF920DF	4135.00	84FSF92EDF	6298.00	84FSF92WDF	7806.00
10	15	25	25	2	—	22-45	60	84FSH92BDF	3489.00	84FSH920DF	4135.00	84FSH92EDF	6298.00	84FSH92WDF	7806.00
—	—	30	30	—	2 1/2	22-45	100	84GSH92BDF	5022.00	84GSH920DF	5859.00	84GSH92EDF	9915.00	84GSH92WDF	11423.00
15	20	—	—	—	2 1/2	30-60	100	84GSJ92BDF	5022.00	84GSJ920DF	5859.00	84GSJ92EDF	9915.00	84GSJ92WDF	11423.00
—	—	30	40	3	—	30-60	100	84HSJ92BDF	5401.00	84HSJ920DF	6238.00	84HSJ92EDF	10294.00	84HSJ92WDF	12161.00
25	30	50	50	3	—	45-90	100	84HSK92BDF	5401.00	84HSK920DF	6238.00	84HSK92EDF	10294.00	84HSK92WDF	12161.00
30	40	75	75	—	3 1/2	57-115	200	84ISL92BDF	9166.00	84ISL920DF	11483.00	84ISL92EDF	15420.00	84ISL92WDF	17287.00
40	50	100	100	4	—	67-135	200	84JSM92BDF	9855.00	84JSM920DF	12174.00	84JSM92EDF	16109.00	84JSM92WDF	17976.00

### Two Disconnect Switches with Ambient Compensated Bimetal Overload

Max Hp				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts					NEMA 1 General Purpose		NEMA 12/3R <sup>①</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4/4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
3	3	5	5	0	—	30	30	84CP92BDF81	2327.00	84CP920DF81	2714.00	84CP92EDF81	4075.00	84CP92WDF81	5582.00
7 1/2	7 1/2	10	10	1	—	30	30	84DP92BDF81	2352.00	84DP920DF81	2809.00	84DP92EDF81	4170.00	84DP92WDF81	5677.00
10	10	15	15	—	1 3/4	60	60	84EP92BDF81	2610.00	84EP920DF81	3067.00	84EP92EDF81	4428.00	84EP92WDF81	5936.00
10	15	25	25	2	—	60	60	84FP92BDF81	3411.00	84FP920DF81	4058.00	84FP92EDF81	6220.00	84FP92WDF81	7727.00
15	20	30	30	—	2 1/2	100	100	84GP92BDF81	4944.00	84GP920DF81	5780.00	84GP92EDF81	9838.00	84GP92WDF81	11345.00
25	30	50	50	3	—	100	100	84HP92BDF81	5324.00	84HP920DF81	6159.00	84HP92EDF81	10218.00	84HP92WDF81	12083.00
30	40	75	75	—	3 1/2	200	200	84IP92BDF81	9089.00	84IP920DF81	11406.00	84IP92EDF81	15344.00	84IP92WDF81	17210.00
40	50	100	100	4	—	200	200	84JP92BDF81	9778.00	84JP920DF81	12095.00	84JP92EDF81	16032.00	84JP92WDF81	17898.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① NEMA 12 is field convertible to NEMA 3/3R. For conduit hubs and conversion instructions, see page 16-87.

② Not available on standard alternator style ('92' in the catalog number).

# Duplex Heavy Duty Controllers

## Combination Circuit Breaker, Class 84

Selection

Ordering Information	Coil Table																
<ul style="list-style-type: none"> <li>▶ Standard coil voltage supplied will be 120V, separate control. For non-alternator styles (see factory modifications) change the 10th character using the coil table.</li> <li>▶ Heater elements for bimetal overloads see page 16-148 (6-Required).</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-126.</li> <li>▶ Wiring Diagrams see page 16-141.</li> <li>▶ Replacement Parts see pages 16-155.</li> </ul>	<table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>24 Separate Control<sup>®</sup></td> <td>J</td> </tr> <tr> <td>120 Separate Control</td> <td>F</td> </tr> <tr> <td>200-208<sup>®</sup></td> <td>D</td> </tr> <tr> <td>220-240<sup>®</sup></td> <td>G</td> </tr> <tr> <td>277<sup>®</sup></td> <td>L</td> </tr> <tr> <td>440-480<sup>®</sup></td> <td>H</td> </tr> <tr> <td>550-600<sup>®</sup></td> <td>E</td> </tr> </tbody> </table>	60Hz Voltage	Letter	24 Separate Control <sup>®</sup>	J	120 Separate Control	F	200-208 <sup>®</sup>	D	220-240 <sup>®</sup>	G	277 <sup>®</sup>	L	440-480 <sup>®</sup>	H	550-600 <sup>®</sup>	E
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220-240 <sup>®</sup>	G																
277 <sup>®</sup>	L																
440-480 <sup>®</sup>	H																
550-600 <sup>®</sup>	E																

### 2 Motor Circuit Protectors (with Solid-State Overload)

Max Hp								Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size	Over-load Amp Range	Motor Circuit Interrupter ETI	NEMA 1 General Purpose		NEMA 12/3R <sup>®</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4/4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/6	1/6	1/3	1/2	0	—	0.25-1	3	84CSA92BMF	3015.00	84CSA920MF	3472.00	84CSA92EMF	4833.00	84CSA92WMF	6341.00
1/2	3/4	1 1/2	2	0	—	0.75-3	3	84CSB92BMF	3015.00	84CSB920MF	3472.00	84CSB92EMF	4833.00	84CSB92WMF	6341.00
2	2	5	5	0	—	2.5-10	10	84CSD92BMF	3015.00	84CSD920MF	3472.00	84CSD92EMF	4833.00	84CSD92WMF	6341.00
3	3	—	—	0	—	9-18	25	84CSE92BMF	3015.00	84CSE920MF	3472.00	84CSE92EMF	4833.00	84CSE92WMF	6341.00
1/6	1/6	1/3	1/2	1	—	0.25-1	3	84DSA92BMF	3110.00	84DSA920MF	3566.00	84DSA92EMF	4928.00	84DSA92WMF	6435.00
1/2	3/4	1 1/2	2	1	—	0.75-3	3	84DSB92BMF	3110.00	84DSB920MF	3566.00	84DSB92EMF	4928.00	84DSB92WMF	6435.00
2	2	5	5	1	—	2.5-10	10	84DSD92BMF	3110.00	84DSD920MF	3566.00	84DSD92EMF	4928.00	84DSD92WMF	6435.00
3	3	10	10	1	—	9-18	25	84DSE92BMF	3110.00	84DSE920MF	3566.00	84DSE92EMF	4928.00	84DSE92WMF	6435.00
7 1/2	7 1/2	—	—	1	—	13-27	30	84DSF92BMF	3110.00	84DSF920MF	3566.00	84DSF92EMF	4928.00	84DSF92WMF	6435.00
—	—	15	15	—	1 3/4	13-27	40	84ESF92BMF	3378.00	84ESF920MF	3825.00	84ESF92EMF	5186.00	84ESF92WMF	6694.00
10	10	—	—	—	1 3/4	20-40	50	84ESG92BMF	3378.00	84ESG920MF	3825.00	84ESG92EMF	5186.00	84ESG92WMF	6694.00
—	—	15	20	2	—	13-27	40	84FSF92BMF	4152.00	84FSF920MF	4798.00	84FSF92EMF	6962.00	84FSF92WMF	8468.00
10	15	25	25	2	—	22-45	50	84FSH92BMF	4152.00	84FSH920MF	4798.00	84FSH92EMF	6962.00	84FSH92WMF	8468.00
—	—	30	30	—	2 1/2	22-45	50	84GSH92BMF	5384.00	84GSH920MF	6220.00	84GSH92EMF	10277.00	84GSH92WMF	11785.00
15	20	—	—	—	2 1/2	30-60	100	84GSJ92BMF	5384.00	84GSJ920MF	6220.00	84GSJ92EMF	10277.00	84GSJ92WMF	11785.00
—	—	30	40	3	—	30-60	50	84HSJ92BMF	5763.00	84HSJ920MF	6599.00	84HSJ92EMF	10656.00	84HSJ92WMF	12523.00
25	30	50	50	3	—	45-90	100	84HSK92BMF	5763.00	84HSK920MF	6599.00	84HSK92EMF	10656.00	84HSK92WMF	12523.00
30	40	75	75	—	3 1/2	57-115	125	84ISL92BMF	11234.00	84ISL920MF	13543.00	84ISL92EMF	17489.00	84ISL92WMF	19355.00
40	50	100	100	4	—	67-135	150	84JSM92BMF	11923.00	84JSM920MF	14232.00	84JSM92EMF	18178.00	84JSM92WMF	20043.00

### 2 Motor Circuit Protectors (with Ambient Compensated Bimetal Overload)

Max Hp								Enclosure							
200 Volts	230 Volts	460 Volts	575 Volts	NEMA Size	Half Size	Over-load Amp Range	Motor Circuit Interrupter ETI	NEMA 1 General Purpose		NEMA 12/3R <sup>®</sup> Industrial Use Weatherproof		NEMA 4 Painted Watertight Dust-tight		NEMA 4/4X Stainless Watertight, Dust-tight Corrosion Resistant 304 Stainless Steel	
								Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
1/2	3/4	1 1/2	2	0	—	—	3	84CPB92BMF81	2938.00	84CPB920MF81	3394.00	84CPB92EMF81	4755.00	84CPB92WMF81	6263.00
2	2	5	5	0	—	—	10	84CPD92BMF81	2938.00	84CPD920MF81	3394.00	84CPD92EMF81	4755.00	84CPD92WMF81	6263.00
3	3	—	—	0	—	—	25	84CPE92BMF81	2938.00	84CPE920MF81	3394.00	84CPE92EMF81	4755.00	84CPE92WMF81	6263.00
1/2	3/4	1 1/2	2	1	—	—	3	84DPB92BMF81	3032.00	84DPB920MF81	3489.00	84DPB92EMF81	4850.00	84DPB92WMF81	6358.00
2	2	5	5	1	—	—	10	84DPD92BMF81	3032.00	84DPD920MF81	3489.00	84DPD92EMF81	4850.00	84DPD92WMF81	6358.00
3	3	10	10	1	—	—	25	84DPE92BMF81	3032.00	84DPE920MF81	3489.00	84DPE92EMF81	4850.00	84DPE92WMF81	6358.00
7 1/2	7 1/2	—	—	1	—	—	30	84DPF92BMF81	3032.00	84DPF920MF81	3489.00	84DPF92EMF81	4850.00	84DPF92WMF81	6358.00
—	—	15	15	—	1 3/4	—	40	84EPF92BMF81	3291.00	84EPF920MF81	3747.00	84EPF92EMF81	5108.00	84EPF92WMF81	6616.00
10	10	—	—	—	1 3/4	—	50	84EPG92BMF81	3291.00	84EPG920MF81	3747.00	84EPG92EMF81	5108.00	84EPG92WMF81	6616.00
—	—	15	20	2	—	—	40	84FPF92BMF81	4075.00	84FPF920MF81	4721.00	84FPF92EMF81	6883.00	84FPF92WMF81	8391.00
10	15	25	25	2	—	—	50	84FPH92BMF81	4075.00	84FPH920MF81	4721.00	84FPH92EMF81	6883.00	84FPH92WMF81	8391.00
—	—	30	30	—	2 1/2	—	50	84GPH92BMF81	5307.00	84GPH920MF81	6142.00	84GPH92EMF81	10201.00	84GPH92WMF81	11709.00
15	20	—	—	—	2 1/2	—	100	84GPG92BMF81	5307.00	84GPG920MF81	6142.00	84GPG92EMF81	10201.00	84GPG92WMF81	11709.00
—	—	30	40	3	—	—	50	84HPJ92BMF81	5687.00	84HPJ920MF81	6522.00	84HPJ92EMF81	10580.00	84HPJ92WMF81	12446.00
25	30	50	50	3	—	—	100	84HPK92BMF81	5687.00	84HPK920MF81	6522.00	84HPK92EMF81	10580.00	84HPK92WMF81	12446.00
30	40	75	75	—	3 1/2	—	125	84IPL92BMF81	11157.00	84IPL920MF81	13465.00	84IPL92EMF81	17411.00	84IPL92WMF81	19278.00
40	50	100	100	4	—	—	150	84JPM92BMF81	11846.00	84JPM920MF81	14155.00	84JPM92EMF81	18100.00	84JPM92WMF81	19967.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

① NEMA 12 is field convertible to NEMA 3/3R. For conduit hubs and conversion instructions, see page 16-87.

② Not available on standard alternator style ('92' in the catalog number).

# Pump Control Panels

## Class 87, 88

General

### Features

- Fully Gasketed NEMA 3R Rainproof Enclosures
- 100,000 Amp Interrupting Capacity with Class R Fuses
- Heavy Duty NEMA Starters
- Solid State or Ambient Compensated Bimetal Overload Relays
- Heavy Duty Disconnect Handle
- Available in Reduced Voltage Versions
- Bold Pilot Legend on Front
- Generous Accessory Space
- Copper Grounding Lug For Three #6 Wires
- UL Listed for Outdoor Use and Service Equipment File #E14900

### Application

Heavy duty pump control panels are designed to withstand the most demanding environments. Typical applications include irrigation, agriculture, petrochemical, wastewater treatment and wherever motor control is challenged by harsh elements.

Rugged pump control panels utilized cold forming "tox" process. They are more rainproof, sleet and ice resistant than in the past.

Installation is easy. Panels are factory wired to provide flexible control and protect against short circuits and overloads. Ample space is provided for field modifications and installation of accessories.

The pump control panels feature a full sized removable auxiliary panel for the mounting of accessories. The fusible version features fuse clips for full sized RK5 or compact class J fuses and accessory mounting space for the most commonly used accessories.

Class 87 pump panels become jockey pump panels with the addition of a pressure switch. The jockey pump's primary function is to maintain water pressure at a preset level and thus compensate for possible shortage of water in the pumping system. When the water pressure drops below the preset level, the pressure switch energizes the starter which in turn activates the jockey pump. The water pressure is then brought back up to the desired level. This insures the maintenance of proper water pressure at all times.

### Features

Specified by Fortune 500 companies, ESP100 or thermal starters offer prolonged service under severe duty conditions. NEMA rated, these starters utilize large silver cadmium oxide contacts and wide copper heat sinks to ensure rapid heat dissipation and maximum electrical life.

**ESP100 solid state overload relays** provide phase loss protection for the motor by tripping within three seconds upon complete loss of one phase in a three phase circuit. Each overload has a 2:1 (4:1 in lower ranges) FLA adjustment range with an adjustment dial reading out in FLA. This feature allows for extreme fine tuning. Their heaterless construction minimizes energy costs and costs of cabinet ventilation or cooling. The class 87 pump panel comes with class 10 trip standard.

**The ambient compensated bimetal overload relays** are designed to parallel thermal characteristics of typical pump motors. They prevent nuisance trips that may result from operation of the control in a higher ambient temperature than that at the pump. These relays are trip-free, tamperproof and can be set to reset automatically or manually.

#### HOA and Start Pushbutton

Every pump panel comes with an HOA and a start pushbutton.

#### Half Size Starters

Siemens motor matched starters feature all the rugged performance characteristics of our NEMA rated starter sizes, but are fractionally sized to more closely match your exact motor rating. As a result, significant economic savings are made possible without sacrificing the reliability you expect from a heavy duty starter.

These additional starter sizes have the reserve capacity to handle occasional plugging and jogging without de-rating the device.

Siemens motor matched can save hundreds, even thousands of dollars per project.

Siemens motor matched starters comply with NEMA, UL and CSA standards.



# Pump Control Panels

## Class 87, 88

General

Panels are predrilled for easy repositioning of the fuse trailer block to accommodate 250 and 600 volt fuses and full sized RK or compact J fuses. Circuit breakers are also available.

### New Heavy Duty Fusible Disconnect Switch

The disconnect switch has been made even better to give you greater advantages:

- Visible blades for the highest level of safety
- Double Break Switching Action to reduce arcing, increase lifetime and eliminate the "electric hinge"
- Oversized lugs are standard
- Line side shield to help guard personnel from contact with live parts

### Motor Circuit Protector

The motor circuit protector provides fast, accurate fault clearing that will minimize damage to the motor and control apparatus and protect branch circuit conductors. Continuous current ratings and adjustable trip ranges meet NEC requirements for full load and locked rotor currents. The adjustable instantaneous trip point can be set precisely to assure fault protection and eliminate nuisance tripping.

### Removable Door

Enclosure door may be lifted off to make wiring easier.

### Mounting Flanges

Convenient flanges at top and bottom of the enclosure provide easy mounting. They fit pole or flat surfaces using keyhole slots.

### Quarter Turn Latches

Quarter turns are utilized to secure the door.

### Wind Catches

A wind catch is provided to prevent the door from slamming shut (or open) due to high wind conditions.

### Safety Disconnect Handle

Up to three padlocks can be used to lock the disconnect in the OFF position. Maintenance work can be performed without hazard to personnel.

### External Reset

The overload relay may be quickly reset by means of a button on the front of the enclosure.

### Bold Pilot Legend

Provides positive indication of the selector switch position for use to stop the pump motor.

### Ground Lugs

Insures proper connecting of ground wires and lightning arresters.

### UL Listed

Assures proper construction throughout control panel.

### Reduced Voltage

Available in part winding, wye delta and auto transformer types, these controls may be necessary where the power company limits the amount of current drawn from its lines, or where starting torque must be reduced.

### Fully gasketed NEMA 3/12 weather-proof enclosures are supplied with Class 88 reduced voltage starters.

**Part Winding Starters** apply starting current in timed steps to minimize voltage fluctuations.

**Auto Transformer Starters** maintain a closed circuit during transition and eliminate voltage or current surges. They draw less current than part winding starters and are well suited for starting motors over 20 Hp.

**Wye Delta starters** and motors are used in areas where the power supply is inadequate to supply full starting current without objectionable voltage drop or for applications where low starting torque is required. Centrifugal pumps and similar apparatus requiring a low starting torque are typical applications. Both ends of all three windings of the wye delta motor are brought out so that they may be accessible for reconnecting from wye to delta.

### Auxiliary Equipment

**Pilot Lights** are easily installed on the enclosure. Oil Tight and Heavy Duty, they meet NEMA A600 requirements.

**Lightning Arresters** protect the control panel from lightning induced surges.

**Undervoltage and Phase Sensing Relays** protect the pump against low voltage, voltage imbalance, loss of phase and phase reversal.

**Anti-Backspin Timers** prevent the motor from starting during motor/shaft backspin.

### The TOX Box

Siemens uses the TOX process to manufacture the enclosures for the pump panels.

Advantages of the TOX process:

- Joints are 50-70% stronger
- Since the TOX process compresses the metal at the joint, it does not leave the high stresses in the metal
- Increased corrosion resistance. The protective layer on the metal is not damaged in the process, but instead flows with the material

### Class 87 NEMA Vacuum Starter Pump Control Panels

The Siemens vacuum starter pump controllers are designed for the harshest environments. Typical environments include chemical, petrochemical, waste water treatment and mining. Contaminations present in these severe environments are detrimental to conventional air-break contacts decreasing their life expectancy and reliability. The Siemens vacuum starter pump controllers are well suited for these environments because the contacts are contained in hermetically sealed contact tubes. This prevents contamination in the atmosphere from affecting the operation of the contacts. Additionally, neither arcs nor arcing gases are produced which dramatically increases the electrical endurance of the contacts.

# Pump Control Panels

## Standard Pump Panel with Solid State Overload, Class 87

Selection

Ordering Information	Coil Table	
<ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-127.</li> <li>▶ Wiring Diagrams see page 16-143.</li> <li>▶ Replacement Parts see pages 16-155.</li> <li>▶ Sizes 1-4 will be supplied standard with a 240/480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> <li>▶ Sizes 5 &amp; 6 will be supplied standard with a 480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> </ul>	60Hz Voltage	Letter
	24 Separate Control	J
	120 Separate Control	F
	110-120/220-240	A <sup>ⓐ</sup>
	200-208	D
	220-240	G
	220-240/440-480	C <sup>ⓐ</sup>
	277	L
	440-480	H
	550-600	E

### Fusible Disconnect

Max HP				NEMA Size	Half Size	Overload Amp Range	Disc Amp Rating	Fuse Clip Amps/Volts	Catalog Number	List Price \$
200V	230V	460V	575V							
—	—	1	1	1	—	0.75-3 <sup>ⓐ</sup>	30	30A/600V	87DSB6FC	1137.00
—	—	5	5	1	—	2.5-10	30	30A/600V	87DSD6FC	1137.00
—	—	7 1/2	10	1	—	9-18	30	30A/600V	87DSE6FC	1137.00
—	—	7 1/2	10	1	—	9-18	60	60A/600V	87DSE60C	1154.00
—	—	15	15	—	1 3/4	13-27	30	30A/600V	87ESF6FC	1336.00
—	—	15	15	—	1 3/4	13-27	60	60A/600V	87ESF60C	1353.00
—	—	15	20	2	—	13-27	60	60A/600V	87FSF6FC	1533.00
—	—	25	25	2	—	22-45	60	60A/600V	87FSH6FC	1533.00
—	—	25	25	2	—	22-45	100	100A/600V	87FSH60C	1629.00
—	—	30	30	—	2 1/2	22-45	60	60A/600V	87GSH6FC	2188.00
—	—	30	30	—	2 1/2	22-45	100	100A/600V	87GSH60C	2284.00
—	—	50	50	3	—	45-90	100	100A/600V	87HSK6FC	2473.00
—	—	50	50	3	—	45-90	200	200A/600V	87HSK60C	2653.00
—	—	75	75	—	3 1/2	57-115	200	200A/600V	87ISL6FC	4204.00
—	—	100	100	4	—	67-135	200	200A/600V	87JSM6FC	4549.00
—	—	200	200	5	—	100-270	400	400A/600V	87KSU6FH	9890.00
—	—	250	—	6	—	200-540	600	600A/600V	87MSW6FH	24970.00
2	2	—	—	1	—	2.5-10	30	30A/250V	87DSD6LC	1120.00
3	3	—	—	1	—	9-18	30	30A/250V	87DSE6LC	1120.00
7 1/2	7 1/2	—	—	1	—	13-27	30	30A/250V	87DSF6LC	1120.00
7 1/2	7 1/2	—	—	1	—	13-27	60	60A/250V	87DSF6PC	1137.00
10	10	—	—	—	1 3/4	20-40	60	60A/250V	87ESG6LC	1336.00
10	15	—	—	2	—	22-45	60	60A/250V	87FSH6LC	1508.00
10	15	—	—	2	—	22-45	100	100A/250V	87FSH6PC	1612.00
15	20	—	—	—	2 1/2	30-60	60	60A/250V	87GSJ6LC	2128.00
15	20	—	—	—	2 1/2	30-60	100	100A/250V	87GSJ6PC	2231.00
25	30	—	—	3	—	45-90	100	100A/250V	87HSK6LC	2421.00
25	30	—	—	3	—	45-90	200	200A/250V	87HSK6PC	2619.00
30	40	—	—	—	3 1/2	57-115	200	200A/250V	87ISL6LC	4170.00
40	50	—	—	4	—	67-135	200	200A/250V	87JSM6LC	4514.00
75	100	—	—	5	—	55-250	400	400A/250V	87KSU6LH	9683.00

### Circuit Breaker

Max HP				NEMA Size	Half Size	Overload Amp Range	Motor Circuit Interrupter ETI Amps	Catalog Number	List Price \$
200V	230V	460V	575V						
1/2	1/2	1	1	1	—	0.75-3 <sup>ⓐ</sup>	3	87DSB6MC	1430.00
1	1	3	3	1	—	2.5-10	10	87DSC6MC	1430.00
2	2	5	5	1	—	2.5-10	10	87DSD6MC	1430.00
3	3	7 1/2	10	1	—	9-18	25	87DSE6MC	1430.00
7 1/2	7 1/2	10	—	1	—	13-27	30	87DSF6MC	1430.00
—	—	15	15	—	1 3/4	13-27	40	87ESF6MC	1602.00
10	10	—	—	—	1 3/4	20-40	50	87ESG6MC	1602.00
—	—	15	20	2	—	13-27	40	87FSF6MC	1774.00
10	15	25	25	2	—	22-45	50	87FSH6MC	1774.00
—	—	30	30	—	2 1/2	22-45	50	87GSH6MC	2317.00
15	20	—	—	—	2 1/2	30-60	100	87GSJ6MC	2317.00
25	30	50	50	3	—	45-90	100	87HSK6MC	2507.00
30	40	75	75	—	3 1/2	57-115	125	87ISL6MC	4962.00
40	50	100	100	4	—	67-135	150	87JSM6MC	5307.00
50	75	150	200	5	—	55-250	250	87KST6MH	12070.00
75	100	200	200	5	—	55-250	400	87KSU6MH	12070.00
100	125	250	300	6	—	160-540	400	87MSW6MH	26168.00
150	200	400	400	6	—	160-540	600	87MSX6MH	30084.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

ⓐ Not available on Size 5 and larger.

ⓐ For an overload amp range of 0.25-1A, change the 5th character from a 'B' to an 'A'.



# Pump Control Panels

## Pump Panel with Ambient Compensated Bimetal Overload, Class 87

Selection

Ordering Information	Coil Table	
<ul style="list-style-type: none"> <li>▶ Heater elements for bimetal overloads see page 16-148 (6-Required).</li> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-127.</li> <li>▶ Wiring Diagrams see page 16-143.</li> <li>▶ Replacement Parts see pages 16-155.</li> <li>▶ Sizes 1-4 will be supplied standard with a 230/480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> <li>▶ Sizes 5 &amp; 6 will be supplied standard with a 480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> </ul>	60Hz Voltage	Letter
	24 Separate Control	J
	120 Separate Control	F
	110-120/220-240	A <sup>ⓐ</sup>
	200-208	D
	220-240	G
	220-240/440-480	C <sup>ⓐ</sup>
	277	L
	440-480	H
	550-600	E

### Fusible Disconnect

Max HP				NEMA Size	Half Size	Disc Amp Rating	Fuse Clip Amps/Volts	Catalog Number	List Price \$
200V	230V	460V	575V						
—	—	10	10	1	—	30	30A/600V	87DAE6FC	1098.00
—	—	10	10	1	—	60	60A/600V	87DAE60C	1116.00
—	—	15	15	—	1 ¾	30	30A/600V	87EAF6FC	1296.00
—	—	15	15	—	1 ¾	60	60A/600V	87EAF60C	1314.00
—	—	25	25	2	—	60	60A/600V	87FAJ6FC	1495.00
—	—	25	25	2	—	100	100A/600V	87FAJ60C	1589.00
—	—	30	30	—	2 ½	60	60A/600V	87GAK6FC	2149.00
—	—	30	30	—	2 ½	100	100A/600V	87GAK60C	2244.00
—	—	50	50	3	—	100	100A/600V	87HAN6FC	2433.00
—	—	50	50	3	—	200	200A/600V	87HAN60C	2614.00
—	—	75	75	—	3 ½	200	200A/600V	87IAP6FC	4165.00
—	—	100	100	4	—	200	200A/600V	87JAR6FC	4510.00
7 ½	7 ½	—	—	1	—	30	30A/250V	87DAE6LC	1082.00
7 ½	7 ½	—	—	1	—	60	60A/250V	87DAE6PC	1098.00
10	10	—	—	—	1 ¾	60	60A/250V	87EAG6LC	1296.00
10	15	—	—	2	—	60	60A/250V	87FAJ6LC	1469.00
10	15	—	—	2	—	100	100A/250V	87FAJ6PC	1572.00
15	20	—	—	—	2 ½	100	100A/250V	87GAL6LC	2192.00
25	30	—	—	3	—	100	100A/250V	87HAN6LC	2381.00
25	30	—	—	3	—	200	200A/250V	87HAN6PC	2580.00
30	40	—	—	—	3 ½	200	200A/250V	87IAP6LC	4131.00
40	50	—	—	4	—	200	200A/250V	87JAR6LC	4475.00

### Circuit Breaker

Max HP				NEMA Size	Half Size	Motor Circuit Interrupter ETI Amps	Catalog Number	List Price \$
200V	230V	460V	575V					
½	½	1	1	1	—	3	87DAA6MC	1391.00
1	1	3	3	1	—	10	87DAB6MC	1391.00
3	3	7 ½	7 ½	1	—	25	87DAD6MC	1391.00
7 ½	7 ½	10	10	1	—	30	87DAE6MC	1391.00
7 ½	7 ½	15	15	—	1 ¾	40	87EAF6MC	1563.00
10	10	—	—	—	1 ¾	50	87EAG6MC	1720.00
—	—	15	20	2	—	40	87FAH6MC	1736.00
10	15	25	25	2	—	50	87FAJ6MC	1736.00
—	—	30	30	—	2 ½	50	87GAK6MC	2278.00
15	20	—	—	—	2 ½	100	87GAL6MC	2278.00
25	30	50	50	3	—	100	87HAN6MC	2468.00
30	40	75	75	—	3 ½	125	87IAP6MC	4923.00
40	50	100	100	4	—	150	87JAR6MC	5268.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

ⓐ Not available on Size 5 or above.

# Reduced Voltage Pump Panels

## Auto Transformer & Part winding (2 Step) with Solid State Overload, Class 88

**Selection**

Ordering Information	Coil and Control Voltage
<ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-127.</li> <li>▶ Wiring Diagrams see page 16-143.</li> <li>▶ Replacement Parts see pages 16-155.</li> </ul>	<p>The coil voltage on the contactors will be the motor voltage. A CPT will be supplied to provide the control voltage. The control voltage will be 120V.</p> <p>To change the control voltage to customer supplied (no CPT included), change the 9th character to the following:</p> <p>for 24V , use "J"</p> <p>for 120V, use "F"</p>

### Auto Transformer Type

Motor Voltage	Max Hp	OL amp range	NEMA Size	Half Size	Fusible Disconnect			Circuit Breaker		
					Fuse Clip Size Amps/Volts	Catalog Number	List Price \$	Circuit Breaker Amps	Catalog Number	List Price \$
230	15	22-45	2	—	60A/250V	88FSHT2FG	7159.00	50	88FSHT2MG	7254.00
	20	30-60	—	2 ½	100A/250V	88GSJT2FG	9683.00	100	88GSJT2MG	9880.00
	30	45-90	3	—	100A/250V	88HSKT2FG	10334.00	100	88HSKT2MG	11320.00
	40	57-115	—	3 ½	200A/250V	88ISLT2FG	14680.00	125	88ISLT2MG	16213.00
	50	67-135	4	—	200A/250V	88JSMT2FG	15506.00	150	88JSMT2MG	17042.00
	75	100-210	5	—	—	—	—	250	88KSST2MG	26740.00
	100	100-270	5	—	400A/250V	88KSUT2FG	26853.00	400	88KSUT2MG	28706.00
	200	200-540	6	—	—	—	—	600	88MSXT2MH	48033.00
460	25	22-45	2	—	60A/600V	88FSHT4FH	7634.00	50	88FSHT4MH	7757.00
	30	22-45	—	2 ½	60A/600V	88GSHT4FH	10045.00	50	88GSHT4MH	10144.00
	50	45-90	3	—	100A/600V	88HSKT4FH	10700.00	100	88HSKT4MH	11230.00
	75	57-115	—	3 ½	200A/600V	88ISLT4FH	15179.00	125	88ISLT4MH	16412.00
	100	67-135	4	—	200A/600V	88JSMT4FH	16936.00	150	88JSMT4MH	17446.00
	150	55-250	5	—	—	—	—	250	88KSST4MH	27464.00
	200	55-250	5	—	400A/600V	88KSUT4FH	29592.00	400	88KSUT4MH	31032.00
	400	160-540	6	—	600A/600V	88MSXT4FH	43290.00	600	88MSXT4MH	48029.00

### Part Winding 2 Step

Motor Voltage	Max Hp	OL amp range	NEMA Size	Half Size	Fusible Disconnect			Circuit Breaker		
					Fuse Clip Size Amps/Volts	Catalog Number	List Price \$	Circuit Breaker Amps	Catalog Number	List Price \$
230	20	20-40	—	1 ¾	100A/250V	88ESGP2FG	4282.00	100	88ESGP2MG	4014.00
	25	22-45	2	—	100A/250V	88FSHP2FG	4635.00	100	88FSHP2MG	4489.00
	40	30-60	—	2 ½	200A/250V	88GSJP2FG	6548.00	100	88GSJP2MG	6376.00
	50	45-90	3	—	200A/250V	88HSP2FG	7099.00	150	88HSP2MG	6927.00
	60	57-115	—	3 ½	200A/250V	88ISLP2FG	12578.00	250	88ISLP2MG	13543.00
	75	67-135	4	—	400A/250V	88JSMP2FG	13276.00	250	88JSMP2MG	14232.00
	125	100-210	5	—	—	—	—	400	88KSP2MG	25078.00
	150	100-270	5	—	600A/250V	88KSUP2FG	25672.00	600	88KSUP2MG	26285.00
460	30	13-27	—	1 ¾	100A/600V	88ESFP4FH	4282.00	50	88ESFP4MH	4014.00
	40	22-45	2	—	100A/600V	88FSHP4FH	4635.00	100	88FSHP4MH	4489.00
	60	30-60	—	2 ½	200A/600V	88GSJP4FH	6548.00	100	88GSJP4MH	6376.00
	75	30-60	3	—	200A/600V	88HSP4FH	7099.00	125	88HSP4MH	6927.00
	100	57-115	—	3 ½	200A/600V	88ISLP4FH	12578.00	150	88ISLP4MH	13543.00
	150	67-135	4	—	400A/600V	88JSMP4FH	13276.00	250	88JSMP4MH	14232.00
	250	55-250	5	—	—	—	—	400	88KSP4MH	26285.00
	350	55-250	5	—	600A/600V	88KSUP4FH	25672.00	600	88KSUP4MH	47288.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Reduced Voltage Pump Panels

## Wye Delta with Solid State Overload, Class 88

Selection

Ordering Information	Coil and Control Voltage
<ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-127.</li> <li>▶ Wiring Diagrams see page 16-143.</li> <li>▶ Replacement Parts see pages 16-155.</li> </ul>	<p>The coil voltage on the contactors will be the motor voltage. A CPT will be supplied to provide the control voltage. The control voltage will be 120V.</p> <p>To change the control voltage to customer supplied (no CPT included), change the 9th character to the following: for 24V, use "J" for 120V, use "F"</p>

### Wye Delta

Motor Voltage	Max Hp	NEMA Size	Half Size	Fuse Clip Amps/ Volts	MCP Amps	Open Transition				Closed Transition			
						Fusible Disconnect		Circuit Breaker		Fusible Disconnect		Circuit Breaker	
						Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
200V	10	1	—	60A/250V	50	88DSF06FD	5384.00	88DSF06MD	5719.00	88DSFC6FD	6944.00	88DSFC6MD	7280.00
	15	—	1 ¼	100A/250V	100	88ESG06FD	6048.00	88ESG06MD	6022.00	88ESGC6FD	7341.00	88ESGC6MD	7624.00
	20	—	—	100A/250V	100	88FSH06FD	6892.00	88FSH06MD	6608.00	88FSHC6FD	8167.00	88FSHC6MD	8219.00
	30	—	2 ½	200A/250V	125	88GSJ06FD	8640.00	88GSJ06MD	8744.00	88GSJC6FD	10166.00	88GSJC6MD	10613.00
	40	3	—	200A/250V	150	88HSK06FD	9304.00	88HSK06MD	9752.00	88HSC6FD	11269.00	88HSC6MD	11716.00
	50	—	3 ½	200A/250V	250	88ISL06FD	16351.00	88ISL06MD	17463.00	88ISLC6FD	18789.00	88ISLC6MD	20331.00
	60	4	—	400A/250V	250	88ISL06FD	16351.00	88JSM06MD	18496.00	88ISLC6FD	18789.00	88JSMC6MD	21779.00
	75	5	—	400A/250V	400	88KSS06FD	25506.00	88KSS06MD	29820.00	88KSSC6FD	34060.00	88KSSC6MD	33974.00
	150	5	—	600A/250V	600	88KSU06FD	30833.00	88KSU06MD	30282.00	88KSUC6FD	35141.00	88KSUC6MD	34590.00
300	6	—	—	800	—	—	88MSX06MD	56221.00	—	—	88MSXC6MD	66766.00	
230V	10	1	—	60A/250V	50	88DSF02FG	5384.00	88DSF02MG	5719.00	88DSFC2FG	6944.00	88DSFC2MG	7280.00
	15	—	1 ¼	60A/250V	50	88ESG02FG	5952.00	88ESG02MG	6022.00	88ESGC2FG	7245.00	88ESGC2MG	7624.00
	25	2	—	100A/250V	100	88FSH02FG	6892.00	88FSH02MG	6608.00	88FSHC2FG	8167.00	88FSHC2MG	8219.00
	30	—	2 ½	200A/250V	100	88GSJ02FG	8640.00	88GSJ02MG	8744.00	88GSJC2FG	10166.00	88GSJC2MG	10613.00
	50	3	—	200A/250V	150	88HSK02FG	9304.00	88HSK02MG	9752.00	88HSC2FG	11269.00	88HSC2MG	11716.00
	60	—	3 ½	200A/250V	250	88ISL02FG	16351.00	88ISL02MG	17463.00	88ISLC2FG	18789.00	88ISLC2MG	20331.00
	75	4	—	400A/250V	250	88JSM02FG	16953.00	88JSM02MG	18496.00	88JSMC2FG	20237.00	88JSMC2MG	21779.00
	100	5	—	400A/250V	400	88KSS02FG	25506.00	88KSS02MG	29820.00	88KSSC2FG	34060.00	88KSSC2MG	33974.00
	150	5	—	600A/250V	600	88KSU02FG	30833.00	88KSU02MG	30282.00	88KSUC2FG	35141.00	88KSUC2MG	34590.00
350	6	—	—	1200	—	—	88MSX02MG	56221.00	—	—	88MSXC2MG	66766.00	
460V	15	1	—	60A/600V	30	88DSE04FH	5384.00	88DSE04MH	5719.00	88DSEC4FH	6944.00	88DSEC4MH	7280.00
	30	—	1 ¼	60A/600V	50	88ESF04FH	5970.00	88ESF04MH	6022.00	88ESFC4FH	7262.00	88ESFC4MH	7624.00
	40	2	—	100A/600V	100	88FSH04FH	6548.00	88FSH04MH	6608.00	88FSHC4FH	8348.00	88FSHC4MH	8408.00
	60	—	2 ½	200A/600V	100	88GSJ04FH	8296.00	88GSJ04MH	8744.00	88GSJC4FH	10355.00	88GSJC4MH	10803.00
	75	3	—	200A/600V	125	88HSK04FH	8296.00	88HSK04MH	9752.00	88HSC4FH	10355.00	88HSC4MH	12639.00
	100	—	3 ½	200A/600V	150	88ISL04FH	14232.00	88ISL04MH	17463.00	88ISLC4FH	19427.00	88ISLC4MH	21296.00
	150	4	—	400A/600V	250	88JSM04FH	16953.00	88JSM04MH	18496.00	88JSMC4FH	20995.00	88JSMC4MH	22537.00
	200	5	—	400A/600V	400	88KSS04FH	25506.00	88KSS04MH	29820.00	88KSSC4FH	34835.00	88KSSC4MH	34749.00
	300	5	—	600A/600V	600	88KSU04FH	30833.00	88KSU04MH	30282.00	88KSUC4FH	37009.00	88KSUC4MH	36458.00
700	6	—	—	1200	—	—	88MSX04MH	56221.00	—	—	88MSXC4MH	66766.00	
575V	15	1	—	60A/600V	30	88DSE05FE	5384.00	88DSE05ME	5719.00	88DSEC5FE	6944.00	88DSEC5ME	7280.00
	30	—	1 ¼	60A/600V	50	88ESF05FE	5970.00	88ESF05ME	6022.00	88ESFC5FE	7262.00	88ESFC5ME	7624.00
	40	2	—	60A/600V	50	88FSF05FE	6548.00	88FSF05ME	6608.00	88FSFC5FE	8348.00	88FSFC5ME	8408.00
	60	—	2 ½	100A/600V	100	88GSH05FE	8296.00	88GSH05ME	8744.00	88GSHC5FE	10355.00	88GSHC5ME	10803.00
	75	3	—	200A/600V	125	88HSJ05FE	9304.00	88HSJ05ME	9752.00	88HSC5FE	12190.00	88HSC5ME	12639.00
	100	—	3 ½	200A/600V	150	88ISK05FE	14232.00	88ISK05ME	17463.00	88ISKC5FE	19427.00	88ISKC5ME	21296.00
	150	4	—	400A/600V	250	88JSM05FE	14232.00	88JSM05ME	18496.00	88JSMC5FE	19427.00	88JSMC5ME	22537.00
	200	5	—	400A/600V	400	88KSS05FE	25506.00	88KSS05ME	29820.00	88KSSC5FE	34835.00	88KSSC5ME	34749.00
	300	5	—	600A/600V	400	88KSU05FE	30833.00	88KSU05ME	30282.00	88KSUC5FE	37009.00	88KSUC5ME	36458.00
700	6	—	—	1200	—	—	88MSX05ME	56221.00	—	—	88MSXC5ME	66766.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Vacuum Starter Pump Panels

With Solid-State Overload Relay, Class 87

*Selection*

Ordering Information	Coil Table	
<ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-127.</li> <li>▶ Wiring Diagrams see page 16-143.</li> <li>▶ Replacement Parts see pages 16-155.</li> <li>▶ Sizes 4-6 will be supplied standard with a 480 volt coil. To change the coil voltage, change the 8th character in the catalog number to the letter shown in the coil table.</li> </ul>	60Hz Voltage	***
	24 Separate Control	J
	120 Separate Control	F
	200-208	D
	220-240	G
277	L	
440-480	H	
550-600	E	

## Fusible Disconnect

Max Hp		NEMA Size	Overload Range	Fuse Clip Amps/Volts	Catalog Number	List Price \$
460 Volts	575 Volts					
100	100	4	55-250A	200A/600V	87JCM4F*	7894.00
200	200	5	55-250A	400A/600V	87KCU4F*	12707.00

## Circuit Breaker

Max Hp		NEMA Size	Overload Range	Circuit Breaker Rating Amps	Catalog Number	List Price \$
460 Volts	575 Volts					
100	100	4	55-250A	250A	87JCM4M*	8734.00
200	200	5	55-250A	400A	87KCT4M*	15002.00
250	300	6	160-540A	400A	87MCW4M*	33467.00
400	400	6	160-540A	600A	87MCX4M*	33467.00

**Note:** Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Reduced Voltage Heavy Duty Starters

## Features and Benefits

Siemens manufactures the three commonly used electromechanical reduced voltage starters. Each one is designed for specific application requirements and consists of auto transformer, wye-delta and partwinding starters.

The reduced voltage starter:

- Reduces inrush current
- Provides smoother acceleration of the load
- Reduces starting torque
- Reduces stresses on mechanical linkages

Combination and non-combination reduced voltage starter sizes range from 0 to 6 including Siemens exclusive motormatched half-sizes. Enclosure types include 1, 3R/12, 4 painted and 4/4X stainless steel. All starters are UL listed and CSA certified.

## General



### Auto Transformer Starter

- Maximum torque per amp
- Three coil auto transformer for balanced starting currents
- 50, 65 and 80% voltage taps
- Closed circuit transition
- Adjustable starting time
- ESP100 overload as standard
- CPT supplied as standard
- Wide range of factory modifications



### Wye-Delta Starter

- Lowest starting torque
- Closed or open circuit transition
- Adjustable starting time
- ESP100 overload as standard
- CPT supplied as standard
- Wide range of factory modifications



### Part-Winding Starter

- Simplest design – most economical
- Adjustable starting time
- ESP100 overload as standard
- CPT supplied as standard
- Wide range of factory modifications

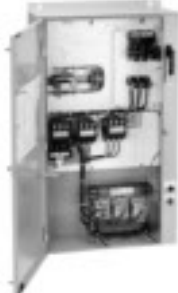
## Various Methods of Electro-Mechanical Reduced Voltage Motor Starting —A General Comparison

Characteristic	Autotransformer			Part-Winding 2 step	Wye-Delta
	50% Tap	65% Tap	80% Tap		
Starting current drawn from line as % of that which would be drawn upon full voltage starting	25%	42%	64%	65%	33%
Starting current drawn by the motor	50%	65%	80%	65%	58%
Starting torque developed as % of that which would be developed on full voltage starting	25%	42%	64%	40%	33%
Smoothness of acceleration	First in order of Smoothness			Third in order of Smoothness	Second in order of Smoothness
Allowable accelerating times (typical)	15 seconds at 200HP max. or 30 seconds on 200HP based on NEMA medium duty transformers			5 seconds max. Limited by motor design	5-60 seconds Limited by motor design
Starting current and torque and adjustments	Adjustable within limits of various taps			Fixed	Fixed

# Reduced Voltage Heavy Duty Starters

## Auto Transformer with Solid State Overload, Class 36 & 37

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-125.</li> <li>▶ Wiring Diagrams see page 16-136.</li> <li>▶ Replacement Parts see page 16-155.</li> <li>▶ For additional enclosure options see page 16-97.</li> </ul>	<b>Coil and Control Voltage</b> <p>The coil voltage will always match the motor voltage. As standard, a CPT is supplied and 120V control voltage is utilized. To change to 120V separate control voltage (CPT not supplied), change the 9th character to "F". To change to 24VAC separate control voltage (CPT not supplied), change the 9th character to "J".</p>
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### NEMA 1 General Purpose Enclosures

Motor Volts	Max HP	NEMA Size	Half Size	Overload Amp Range	Non-combination Enclosures		Combination Non-Fusible Disconnect		Fuse Clip Size Amps/Volts	Combination Fusible Disconnect		Motor Circuit Interrupter ETI Amps	Combination Circuit Breaker	
					Catalog Number	List Price \$	Catalog Number	List Price \$		Catalog Number	List Price \$		Catalog Number	List Price \$
200	10	—	1¼	20-40	36ESGT6BD	4622.00	37ESGT6BDD	5656.00	60A/250V	37ESGT6BDF	5794.00	50	37ESGT6BDP	5991.00
	10	2	—	22-45	36FSHT6BD	4923.00	37FSHT6BDD	5957.00	60A/250V	37FSHT6BDF	6208.00	50	37FSHT6BDP	6405.00
	15	—	2½	30-60	36GSJT6BD	5354.00	37GSJT6BDD	6663.00	100A/250V	37GSJT6BDF	7112.00	100	37GSJT6BDP	6966.00
	25	3	—	45-90	36HSKT6BD	5784.00	37HSKT6BDD	7094.00	100A/250V	37HSKT6BDF	7542.00	100	37HSKT6BDP	7417.00
	30	—	3½	57-115	36ISLT6BD	10351.00	37ISLT6BDD	12160.00	200A/250V	37ISLT6BDF	12539.00	125	37ISLT6BDP	13297.00
	40	4	—	67-135	36JSMT6BD	11178.00	37JSMT6BDD	12987.00	200A/250V	37JSMT6BDF	14297.00	150	37JSMT6BDP	14125.00
	50	5	—	55-250	—	—	—	—	—	—	—	250	37LST6BDP	24838.00
	75	5	—	55-250	36LTUT6BD	19108.00	37LTUT6BDD	22347.00	400A/250V	37LTUT6BDF	22658.00	400	37LTUT6BDP	24838.00
150	6	—	160-540	36MTXT6BD	34218.00	37MTXT6BDD	41654.00	600A/250V	37MTXT6BDF	41846.00	600	37MTXT6BDP	42653.00	
230	10	—	1¼	20-40	36ESGT2BG	4622.00	37ESGT2BGD	5656.00	60A/250V	37ESGT2BGF	5794.00	50	37ESGT2BGP	5991.00
	15	2	—	22-45	36FSHT2BG	4923.00	37FSHT2BGD	5957.00	60A/250V	37FSHT2BGF	6208.00	50	37FSHT2BGP	6405.00
	20	—	2½	30-60	36GSJT2BG	5354.00	37GSJT2BGD	6663.00	100A/250V	37GSJT2BGF	7112.00	100	37GSJT2BGP	6966.00
	30	3	—	45-90	36HSKT2BG	5784.00	37HSKT2BGD	7094.00	100A/250V	37HSKT2BGF	7542.00	100	37HSKT2BGP	7417.00
	40	—	3½	57-115	36ISLT2BG	10351.00	37ISLT2BGD	12160.00	200A/250V	37ISLT2BGF	12539.00	125	37ISLT2BGP	13297.00
	50	4	—	67-135	36JSMT2BG	11178.00	37JSMT2BGD	12987.00	200A/250V	37JSMT2BGF	14297.00	150	37JSMT2BGP	14125.00
	75	5	—	55-250	—	—	—	—	—	—	—	250	37LST2BGP	24838.00
	100	5	—	55-250	36LTUT2BG	19108.00	37LTUT2BGD	22347.00	400A/250V	37LTUT2BGF	22658.00	400	37LTUT2BGP	24838.00
200	6	—	160-540	36MTXT2BG	35442.00	37MTXT2BGD	42877.00	600A/250V	37MTXT2BGF	43069.00	600	37MTXT2BGP	43875.00	
460	15	—	1¼	13-27	36ESFT4BH	4531.00	37ESFT4BHD	5656.00	30A/600V	37ESFT4BHF	5794.00	40	37ESFT4BHP	5991.00
	25	2	—	22-45	36FSHT4BH	4923.00	37FSHT4BHD	5957.00	60A/600V	37FSHT4BHF	6069.00	50	37FSHT4BHP	6405.00
	30	—	2½	22-45	36GSHT4BH	5578.00	37GSHT4BHD	6887.00	60A/600V	37GSHT4BHF	6991.00	50	37GSHT4BHP	7189.00
	50	3	—	45-90	36HSKT4BH	6233.00	37HSKT4BHD	7542.00	100A/600V	37HSKT4BHF	7989.00	100	37HSKT4BHP	7844.00
	75	—	3½	57-115	36ISLT4BH	10351.00	37ISLT4BHD	12160.00	200A/600V	37ISLT4BHF	12539.00	125	37ISLT4BHP	13297.00
	100	4	—	67-135	36JSMT4BH	11385.00	37JSMT4BHD	13194.00	200A/600V	37JSMT4BHF	14504.00	150	37JSMT4BHP	14331.00
	150	5	—	55-250	—	—	—	—	—	—	—	250	37LST4BHP	26508.00
	200	5	—	55-250	36LTUT4BH	20780.00	37LTUT4BHD	24019.00	400A/600V	37LTUT4BHF	24328.00	400	37LTUT4BHP	26508.00
400	6	—	160-540	36MTXT4BH	37544.00	37MTXT4BHD	44979.00	600A/600V	37MTXT4BHF	45172.00	600	37MTXT4BHP	45978.00	
575	15	—	1¼	13-27	36ESFT5BE	4531.00	37ESFT5BED	5656.00	30A/600V	37ESFT5BEF	5794.00	40	37ESFT5BEP	5991.00
	25	2	—	22-45	36FSHT5BE	4923.00	37FSHT5BED	5957.00	60A/600V	37FSHT5BEF	6069.00	50	37FSHT5BEP	6405.00
	30	—	2½	22-45	36GSHT5BE	5578.00	37GSHT5BED	6887.00	60A/600V	37GSHT5BEF	6991.00	50	37GSHT5BEP	7189.00
	50	3	—	45-90	36HSKT5BE	6233.00	37HSKT5BED	7542.00	100A/600V	37HSKT5BEF	7989.00	100	37HSKT5BEP	7844.00
	75	—	3½	57-115	36ISLT5BE	10351.00	37ISLT5BED	12160.00	200A/600V	37ISLT5BEF	12539.00	125	37ISLT5BEP	13297.00
	100	4	—	67-135	36JSMT5BE	11385.00	37JSMT5BED	13194.00	200A/600V	37JSMT5BEF	14504.00	150	37JSMT5BEP	14331.00
	200	5	—	55-250	36LTUT5BE	20780.00	37LTUT5BED	24019.00	400A/600V	37LTUT5BEF	24328.00	250	37LTUT5BEP	26508.00
	400	6	—	160-540	36MTXT5BE	37544.00	37MTXT5BED	44979.00	600A/600V	37MTXT5BEF	45172.00	600	37MTXT5BEP	45978.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Reduced Voltage Heavy Duty Starters

## 2 Step Part Winding with Solid State Overload, Class 36 & 37

Selection



### Ordering Information

- ▶ Field Modification Kits see page 16-79.
- ▶ Factory Modifications see page 16-94.
- ▶ Dimensions see page 16-125.
- ▶ Wiring Diagrams see page 16-136.
- ▶ Replacement Parts see page 16-155.
- ▶ For additional enclosure options see page 16-97.

### Coil and Control Voltage

The coil voltage will always match the motor voltage.  
As standard, a CPT is supplied and 120V control voltage is utilized.  
To change to 120V separate control voltage (CPT not supplied), change the 9th character to "F".  
To change to 24VAC separate control voltage (CPT not supplied), change the 9th character to "J".

### NEMA 1 General Purpose Enclosures


Motor Volts	Max HP	NEMA Size	Half Size	Overload Amp Range	Non-combination Enclosures		Combination Non-Fusible Disconnect		Fuse Clip Size Amps/Volts	Combination Fusible Disconnect		Motor Circuit Interrupter ETI Amps	Combination Circuit Breaker	
					Catalog Number	List Price \$	Catalog Number	List Price \$		Catalog Number	List Price \$		Catalog Number	List Price \$
200	7 1/2	0	—	9-18	36CSEP6BD	1844.00	37CSEP6BDD	2877.00	60A/250V	37CSEP6BDF	2903.00	30	37CSEP6BDP	3325.00
	10	1	—	9-18	36DSEP6BD	1965.00	37DSEP6BDD	2998.00	60A/250V	37DSEP6BDF	3248.00	50	37DSEP6BDP	3446.00
	15	—	1 1/4	20-40	36ESGP6BD	2309.00	37ESGP6BDD	3342.00	100A/250V	37ESGP6BDF	3938.00	100	37ESGP6BDP	3790.00
	20	2	—	22-45	36FSP6BD	2766.00	37FSP6BDD	4075.00	100A/250V	37FSP6BDF	4523.00	100	37FSP6BDP	4376.00
	30	—	2 1/2	30-60	36GSP6BD	3317.00	37GSP6BDD	5126.00	200A/250V	37GSP6BDF	5505.00	125	37GSP6BDP	6263.00
	40	3	—	45-90	36HSP6BD	3868.00	37HSP6BDD	5677.00	200A/250V	37HSP6BDF	6056.00	150	37HSP6BDP	6814.00
	50	—	3 1/2	57-115	36ISLP6BD	7495.00	37ISLP6BDD	10734.00	200A/250V	37ISLP6BDF	11036.00	250	37ISLP6BDP	13225.00
	75	4	—	67-135	36JSP6BD	8185.00	37JSP6BDD	11424.00	400A/250V	37JSP6BDF	11734.00	400	37JSP6BDP	13914.00
	100	5	—	55-250	—	—	—	—	—	—	—	600	37LSP6BDP	25492.00
	150	5	—	55-250	36LTP6BD	17058.00	37LTP6BDD	24492.00	600A/250V	37LTP6BDF	24686.00	600	37LTP6BDP	25492.00
230	7 1/2	0	—	9-18	36CSEP2BG	1844.00	37CSEP2BGD	2877.00	60A/250V	37CSEP2BGF	2903.00	30	37CSEP2BGP	3325.00
	10	1	—	9-18	36DSEP2BG	1965.00	37DSEP2BGD	2998.00	60A/250V	37DSEP2BGF	3248.00	50	37DSEP2BGP	3446.00
	15	—	1 1/4	20-40	36ESGP2BG	2309.00	37ESGP2BGD	3342.00	100A/250V	37ESGP2BGF	3938.00	100	37ESGP2BGP	3790.00
	20	2	—	22-45	36FSP2BG	2766.00	37FSP2BGD	4075.00	100A/250V	37FSP2BGF	4523.00	100	37FSP2BGP	4376.00
	30	—	2 1/2	30-60	36GSP2BG	3317.00	37GSP2BGD	5126.00	200A/250V	37GSP2BGF	5505.00	125	37GSP2BGP	6263.00
	40	3	—	45-90	36HSP2BG	3868.00	37HSP2BGD	5677.00	200A/250V	37HSP2BGF	6056.00	150	37HSP2BGP	6814.00
	50	—	3 1/2	57-115	36ISLP2BG	7495.00	37ISLP2BGD	10734.00	200A/250V	37ISLP2BGF	11036.00	250	37ISLP2BGP	13225.00
	75	4	—	67-135	36JSP2BG	8185.00	37JSP2BGD	11424.00	400A/250V	37JSP2BGF	11734.00	250	37JSP2BGP	13914.00
	125	5	—	55-250	—	—	—	—	—	—	—	400	37LSP2BGP	25492.00
	150	5	—	55-250	36LTP2BG	17058.00	37LTP2BGD	24492.00	600A/250V	37LTP2BGF	24686.00	600	37LTP2BGP	25492.00
460	10	0	—	2.5-10	36CSDP4BH	1844.00	37CSDP4BHD	2877.00	30A/600V	37CSDP4BHF	2903.00	30	37CSDP4BHP	3325.00
	15	1	—	9-18	36DSEP4BH	1965.00	37DSEP4BHD	2998.00	60A/600V	37DSEP4BHF	3024.00	30	37DSEP4BHP	3446.00
	30	—	1 1/4	13-27	36ESFP4BH	2309.00	37ESFP4BHD	3342.00	60A/600V	37ESFP4BHF	3721.00	50	37ESFP4BHP	3790.00
	40	2	—	22-45	36FSP4BH	2766.00	37FSP4BHD	4075.00	100A/600V	37FSP4BHF	4178.00	100	37FSP4BHP	4376.00
	60	—	2 1/2	30-60	36GSP4BH	3317.00	37GSP4BHD	5126.00	200A/600V	37GSP4BHF	5505.00	100	37GSP4BHP	6263.00
	75	3	—	30-60	36HSP4BH	3868.00	37HSP4BHD	5677.00	200A/600V	37HSP4BHF	6056.00	125	37HSP4BHP	6814.00
	100	—	3 1/2	57-115	36ISLP4BH	7495.00	37ISLP4BHD	10734.00	200A/600V	37ISLP4BHF	11036.00	150	37ISLP4BHP	13225.00
	150	4	—	67-135	36JSP4BH	8185.00	37JSP4BHD	11424.00	400A/600V	37JSP4BHF	11734.00	250	37JSP4BHP	13914.00
	250	5	—	55-250	—	—	—	—	—	—	—	400	37LSP4BHP	25492.00
	350	5	—	55-250	36LTP4BH	17058.00	37LTP4BHD	24492.00	600A/600V	37LTP4BHF	24686.00	600	37LTP4BHP	25492.00
575	10	0	—	2.5-10	36CSDP5BE	1844.00	37CSDP5BED	2877.00	30A/600V	37CSDP5BEF	2903.00	30	37CSDP5BEP	3325.00
	15	1	—	2.5-10	36DSDP5BE	1965.00	37DSDP5BED	2998.00	60A/600V	37DSDP5BEF	3024.00	30	37DSDP5BEP	3446.00
	30	—	1 1/4	13-27	36ESFP5BE	2309.00	37ESFP5BED	3342.00	60A/600V	37ESFP5BEF	3721.00	50	37ESFP5BEP	3790.00
	40	2	—	13-27	36FSP5BE	2766.00	37FSP5BED	4075.00	60A/600V	37FSP5BEF	4178.00	50	37FSP5BEP	4376.00
	60	—	2 1/2	22-45	36GSP5BE	3317.00	37GSP5BED	5126.00	100A/600V	37GSP5BEF	5505.00	100	37GSP5BEP	6263.00
	75	3	—	30-60	36HSP5BE	3868.00	37HSP5BED	5677.00	200A/600V	37HSP5BEF	6056.00	125	37HSP5BEP	6814.00
	100	—	3 1/2	57-115	36ISKP5BE	7495.00	37ISKP5BED	10734.00	400A/600V	37ISKP5BEF	11036.00	150	37ISKP5BEP	13225.00
	150	4	—	67-135	36JSP5BE	8185.00	37JSP5BED	11424.00	400A/600V	37JSP5BEF	11734.00	250	37JSP5BEP	13914.00
	250	5	—	55-250	—	—	—	—	400A/600V	37LSP5BEF	24686.00	—	—	—
	350	5	—	55-250	36LTP5BE	17058.00	37LTP5BED	24492.00	600A/600V	37LTP5BEF	24686.00	400	37LTP5BEP	25492.00
600	6	—	160-540	36MTXP5BE	35580.00	37MTXP5BED	43445.00	1200A/600V	37MTXP5BEF	44540.00	1200	37MTXP5BEP	47271.00	

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Reduced Voltage Heavy Duty Starters

Wye Delta, Open Transition with Solid State Overload, Class 36 & 37

Selection

	Ordering Information	Coil and Control Voltage
	<ul style="list-style-type: none"> <li>▶ Field Modification Kits see page 16-79.</li> <li>▶ Factory Modifications see page 16-94.</li> <li>▶ Dimensions see page 16-125.</li> <li>▶ Wiring Diagrams see page 16-138.</li> <li>▶ Replacement Parts see page 16-155.</li> <li>▶ For additional enclosure options see page 16-97.</li> </ul>	<p>The coil voltage will always match the motor voltage. As standard, a CPT is supplied and 120V control voltage is utilized. To change to 120V separate control voltage (CPT not supplied), change the 9th character to "F". To change to 24VAC separate control voltage (CPT not supplied), change the 9th character to "J".</p>

## NEMA 1 General Purpose Enclosures

Motor Volts	Max HP	NEMA Size	Half Size	Overload Amp Range	Non-combination Enclosures		Combination Non-Fusible Disconnect		Fuse Clip Size Amps/Volts	Combination Fusible Disconnect		Motor Circuit Interrupter ETI Amps	Combination Circuit Breaker	
					Catalog Number	List Price \$	Catalog Number	List Price \$		Catalog Number	List Price \$		Catalog Number	List Price \$
200	10	1	—	13-27	36DSF06BD	2998.00	37DSF06BDD	4031.00	60A/250V	37DSF06BDF	4100.00	50	37DSF06BDP	4479.00
	15	—	1/4	20-40	36ESG06BD	3266.00	37ESG06BDD	4600.00	100A/250V	37ESG06BDF	4669.00	100	37ESG06BDP	4782.00
	20	2	—	22-45	36FSH06BD	3541.00	37FSH06BDD	4850.00	100A/250V	37FSH06BDF	5298.00	100	37FSH06BDP	5151.00
	30	—	2 1/2	30-60	36GSJ06BD	4342.00	37GSJ06BDD	5221.00	200A/250V	37GSJ06BDF	6875.00	125	37GSJ06BDP	7289.00
	40	3	—	45-90	36HSK06BD	5134.00	37HSK06BDD	6944.00	200A/250V	37HSK06BDF	7323.00	150	37HSK06BDP	8081.00
	50	—	3 1/2	57-115	36ISL06BD	9632.00	37ISL06BDD	11441.00	200A/250V	37ISL06BDF	13611.00	250	37ISL06BDP	15360.00
	60	4	—	67-135	36JSM06BD	10666.00	37JSM06BDD	13904.00	400A/250V	37JSM06BDF	14215.00	250	37JSM06BDP	16395.00
	75	5	—	55-250	36LTS06BD	19143.00	37LTS06BDD	25965.00	400A/250V	37LTS06BDF	27490.00	400	37LTS06BDP	27577.00
	150	5	—	55-250	36LTU06BD	19143.00	37LTU06BDD	25965.00	600A/250V	37LTU06BDF	27490.00	600	37LTU06BDP	27577.00
	300	6	—	160-540	36MTX06BD	40922.00	37MTX06BDD	48787.00	1200A/250V	37MTX06BDF	49880.00	1200	37MTX06BDP	52611.00
230	10	1	—	13-27	36DSF02BG	2998.00	37DSF02BGD	4031.00	60A/250V	37DSF02BGF	4100.00	50	37DSF02BGP	4479.00
	15	—	1/4	20-40	36ESG02BG	3266.00	37ESG02BGD	4600.00	60A/250V	37ESG02BGF	4669.00	50	37ESG02BGP	4782.00
	25	2	—	22-45	36FSH02BG	3541.00	37FSH02BGD	4850.00	100A/250V	37FSH02BGF	5298.00	100	37FSH02BGP	5151.00
	30	—	2 1/2	30-60	36GSJ02BG	4342.00	37GSJ02BGD	5221.00	200A/250V	37GSJ02BGF	6875.00	100	37GSJ02BGP	7289.00
	50	3	—	45-90	36HSK02BG	5134.00	37HSK02BGD	6944.00	200A/250V	37HSK02BGF	7323.00	150	37HSK02BGP	8081.00
	60	—	3 1/2	57-115	36ISL02BG	9632.00	37ISL02BGD	11441.00	200A/600V	37ISL02BGF	13611.00	250	37ISL02BGP	15360.00
	75	4	—	67-135	36JSM02BG	10666.00	37JSM02BGD	13904.00	400A/250V	37JSM02BGF	14215.00	250	37JSM02BGP	16395.00
	100	5	—	55-250	36LTS02BG	19143.00	37LTS02BGD	25965.00	400A/250V	37LTS02BGF	27490.00	400	37LTS02BGP	27577.00
	150	5	—	55-250	36LTU02BG	19143.00	37LTU02BGD	25965.00	600A/250V	37LTU02BGF	27490.00	600	37LTU02BGP	27577.00
	350	6	—	160-540	36MTX02BG	40922.00	37MTX02BGD	48787.00	1200A/250V	37MTX02BGF	49880.00	1200	37MTX02BGP	52611.00
460	15	1	—	9-18	36DSE04BH	2998.00	37DSE04BHD	4031.00	30A/600V	37DSE04BHF	4100.00	30	37DSE04BHP	4479.00
	30	—	1/4	13-27	36ESF04BH	3266.00	37ESF04BHD	4600.00	60A/600V	37ESF04BHF	4669.00	50	37ESF04BHP	4782.00
	40	2	—	22-45	36FSH04BH	3541.00	37FSH04BHD	4850.00	100A/600V	37FSH04BHF	4954.00	100	37FSH04BHP	5151.00
	60	—	2 1/2	22-45	36GSJ04BH	4342.00	37GSJ04BHD	5221.00	200A/600V	37GSJ04BHF	6531.00	100	37GSJ04BHP	7289.00
	75	3	—	45-90	36HSK04BH	5134.00	37HSK04BHD	6944.00	200A/600V	37HSK04BHF	7323.00	125	37HSK04BHP	8081.00
	100	—	3 1/2	57-115	36ISL04BH	9632.00	37ISL04BHD	11441.00	200A/600V	37ISL04BHF	11820.00	150	37ISL04BHP	15360.00
	150	4	—	67-135	36JSM04BH	10666.00	37JSM04BHD	13904.00	400A/600V	37JSM04BHF	14215.00	250	37JSM04BHP	16395.00
	200	5	—	55-250	36LTS04BH	19143.00	37LTS04BHD	25965.00	400A/600V	37LTS04BHF	26770.00	400	37LTS04BHP	27577.00
	300	5	—	55-250	36LTU04BH	19143.00	37LTU04BHD	25965.00	600A/600V	37LTU04BHF	26770.00	600	37LTU04BHP	27577.00
	700	6	—	160-540	36MTX04BH	40922.00	37MTX04BHD	48787.00	1600A/600V	37MTX04BHF	49880.00	1200	37MTX04BHP	52611.00
575	15	1	—	9-18	36DSE05BE	2998.00	37DSE05BED	4031.00	30A/600V	37DSE05BEF	4100.00	30	37DSE05BEP	4479.00
	30	—	1/4	13-27	36ESF05BE	3266.00	37ESF05BED	4600.00	60A/600V	37ESF05BEF	4669.00	50	37ESF05BEP	4782.00
	40	2	—	13-27	36FSF05BE	3541.00	37FSF05BED	4850.00	100A/600V	37FSF05BEF	4954.00	50	37FSF05BEP	5151.00
	60	—	2 1/2	22-45	36GSH05BE	4342.00	37GSH05BED	5221.00	100A/600V	37GSH05BEF	6531.00	100	37GSH05BEP	7289.00
	75	3	—	30-60	36HSJ05BE	5134.00	37HSJ05BED	6944.00	200A/600V	37HSJ05BEF	7323.00	125	37HSJ05BEP	8081.00
	100	—	3 1/2	57-115	36ISK05BE	9632.00	37ISK05BED	11441.00	200A/600V	37ISK05BEF	11820.00	150	37ISK05BEP	15360.00
	150	4	—	67-135	36JSM05BE	10666.00	37JSM05BED	13904.00	400A/600V	37JSM05BEF	14215.00	250	37JSM05BEP	16395.00
	200	5	—	55-250	36LTS05BE	19143.00	37LTS05BED	21507.00	400A/600V	37LTS05BEF	26770.00	250	37LTS05BEP	27577.00
	300	5	—	55-250	36LTU05BE	19143.00	37LTU05BED	25965.00	600A/600V	37LTU05BEF	26770.00	400	37LTU05BEP	27577.00
	700	6	—	160-540	36MTX05BE	40922.00	37MTX05BED	48787.00	1600A/600V	37MTX05BEF	49880.00	1600	37MTX05BEP	52611.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.



# Reduced Voltage Heavy Duty Starters

Wye Delta, Closed Transition with Solid State Overload, Class 36 & 37

Selection

Ordering Information	Coil and Control Voltage
<ul style="list-style-type: none"> <li>► Field Modification Kits see page 16-79.</li> <li>► Factory Modifications see page 16-94.</li> <li>► Dimensions see page 16-125.</li> <li>► Wiring Diagrams see page 16-138.</li> <li>► Replacement Parts see page 16-155.</li> <li>► For additional enclosure options see page 16-97.</li> </ul>	<p>The coil voltage will always match the motor voltage. As standard, a CPT is supplied and 120V control voltage is utilized. To change to 120V separate control voltage (CPT not supplied), change the 9th character to "F". To change to 24VAC separate control voltage (CPT not supplied), change the 9th character to "J".</p>

## NEMA 1 General Purpose Enclosures

Motor Volts	Max HP	NEMA Size	Half Size	Overload Amp Range	Non-combination Enclosures		Combination Non-Fusible Disconnect		Fuse Clip Size Amps/Volts	Combination Fusible Disconnect		Motor Circuit Interrupter ETI Amps	Combination Circuit Breaker	
					Catalog Number	List Price \$	Catalog Number	List Price \$		Catalog Number	List Price \$		Catalog Number	List Price \$
200	10	1	—	13-27	36DSFC6BD	4557.00	37DSFC6BDD	5591.00	60A/250V	37DSFC6BDF	5661.00	50	37DSFC6BDP	6040.00
	15	—	1 1/4	20-40	36ESGC6BD	4858.00	37ESGC6BDD	5894.00	100A/250V	37ESGC6BDF	5962.00	100	37ESGC6BDP	6384.00
	20	2	—	22-45	36FSHC6BD	5151.00	37FSHC6BDD	6462.00	100A/250V	37FSHC6BDF	6573.00	100	37FSHC6BDP	6763.00
	30	—	2 1/2	30-60	36GSJC6BD	6212.00	37GSJC6BDD	8020.00	200A/250V	37GSJC6BDF	8399.00	125	37GSJC6BDP	9157.00
	40	3	—	45-90	36HSC6BD	7099.00	37HSC6BDD	8908.00	200A/250V	37HSC6BDF	9287.00	150	37HSC6BDP	10045.00
	50	—	3 1/2	57-115	36ISLC6BD	12501.00	37ISLC6BDD	15740.00	200A/250V	37ISLC6BDF	16050.00	250	37ISLC6BDP	18230.00
	60	4	—	67-135	36JSMC6BD	13948.00	37JSMC6BDD	17186.00	400A/250V	37JSMC6BDF	17497.00	250	37JSMC6BDP	19677.00
	75	5	—	55-250	36LTC6BD	23450.00	37LTC6BDD	30885.00	400A/250V	37LTC6BDF	31797.00	400	37LTC6BDP	31884.00
	150	5	—	55-250	36LTC6BD	23450.00	37LTC6BDD	30885.00	600A/250V	37LTC6BDF	31797.00	600	37LTC6BDP	31884.00
	300	6	—	160-540	36MTXC6BD	51467.00	37MTXC6BDD	59331.00	1200A/250V	37MTXC6BDF	60425.00	1200	37MTXC6BDP	63156.00
230	10	1	—	13-27	36DSFC2BG	4557.00	37DSFC2BGD	5591.00	60A/250V	37DSFC2BGF	5661.00	50	37DSFC2BGP	6040.00
	15	—	1 1/4	20-40	36ESGC2BG	4858.00	37ESGC2BGD	5894.00	60A/250V	37ESGC2BGF	5962.00	50	37ESGC2BGP	6384.00
	25	2	—	22-45	36FSHC2BG	5151.00	37FSHC2BGD	6462.00	100A/250V	37FSHC2BGF	6573.00	100	37FSHC2BGP	6763.00
	30	—	2 1/2	30-60	36GSJC2BG	6212.00	37GSJC2BGD	8020.00	200A/250V	37GSJC2BGF	8399.00	100	37GSJC2BGP	9157.00
	50	3	—	45-90	36HSC2BG	7099.00	37HSC2BGD	8908.00	200A/250V	37HSC2BGF	9287.00	150	37HSC2BGP	10045.00
	60	—	3 1/2	57-115	36ISLC2BG	12501.00	37ISLC2BGD	15740.00	200A/250V	37ISLC2BGF	16050.00	250	37ISLC2BGP	18230.00
	75	4	—	67-135	36JSMC2BG	13948.00	37JSMC2BGD	17186.00	400A/250V	37JSMC2BGF	17497.00	250	37JSMC2BGP	19677.00
	100	5	—	55-250	36LTC2BG	23450.00	37LTC2BGD	30885.00	400A/250V	37LTC2BGF	31797.00	400	37LTC2BGP	31884.00
	150	5	—	55-250	36LTC2BG	23450.00	37LTC2BGD	30885.00	600A/250V	37LTC2BGF	31797.00	600	37LTC2BGP	31884.00
	350	6	—	160-540	36MTXC2BG	51467.00	37MTXC2BGD	59331.00	1200A/250V	37MTXC2BGF	60425.00	1200	37MTXC2BGP	63156.00
460	15	1	—	9-18	36DSEC4BH	4557.00	37DSEC4BHD	5591.00	30A/600V	37DSEC4BHF	5661.00	30	37DSEC4BHP	6040.00
	30	—	1 1/4	13-27	36ESFC4BH	4858.00	37ESFC4BHD	5894.00	60A/600V	37ESFC4BHF	5962.00	50	37ESFC4BHP	6384.00
	40	2	—	22-45	36FSHC4BH	5340.00	37FSHC4BHD	6651.00	100A/600V	37FSHC4BHF	6755.00	100	37FSHC4BHP	6952.00
	60	—	2 1/2	30-60	36GSJC4BH	6401.00	37GSJC4BHD	8210.00	200A/600V	37GSJC4BHF	8589.00	100	37GSJC4BHP	9347.00
	75	3	—	45-90	36HSC4BH	8451.00	37HSC4BHD	9829.00	200A/600V	37HSC4BHF	10208.00	125	37HSC4BHP	10966.00
	100	—	3 1/2	57-115	36ISLC4BH	13465.00	37ISLC4BHD	16704.00	200A/600V	37ISLC4BHF	17014.00	150	37ISLC4BHP	19195.00
	150	4	—	67-135	36JSMC4BH	14706.00	37JSMC4BHD	17944.00	400A/600V	37JSMC4BHF	18255.00	250	37JSMC4BHP	20435.00
	200	5	—	55-250	36LTC4BH	25320.00	37LTC4BHD	32755.00	400A/600V	37LTC4BHF	33667.00	400	37LTC4BHP	33753.00
	300	5	—	55-250	36LTC4BH	25320.00	37LTC4BHD	32755.00	600A/600V	37LTC4BHF	33667.00	600	37LTC4BHP	33753.00
	700	6	—	160-540	36MTXC4BH	51467.00	37MTXC4BHD	59331.00	1600A/600V	37MTXC4BHF	60425.00	1200	37MTXC4BHP	63156.00
575	15	1	—	9-18	36DSEC5BE	4557.00	37DSEC5BED	5591.00	30A/600V	37DSEC5BEF	5661.00	30	37DSEC5BEP	6040.00
	30	—	1 1/4	13-27	36ESFC5BE	4858.00	37ESFC5BED	5894.00	60A/600V	37ESFC5BEF	5962.00	50	37ESFC5BEP	6384.00
	40	2	—	13-27	36FSHC5BE	5340.00	37FSHC5BED	6651.00	100A/600V	37FSHC5BEF	6755.00	50	37FSHC5BEP	6952.00
	60	—	2 1/2	22-45	36GSHC5BE	6401.00	37GSHC5BED	8210.00	100A/600V	37GSHC5BEF	8589.00	100	37GSHC5BEP	9347.00
	75	3	—	30-60	36HSJC5BE	8451.00	37HSJC5BED	9829.00	200A/600V	37HSJC5BEF	10208.00	125	37HSJC5BEP	10966.00
	100	—	3 1/2	57-115	36ISKC5BE	13465.00	37ISKC5BED	16704.00	200A/600V	37ISKC5BEF	17014.00	150	37ISKC5BEP	19195.00
	150	4	—	67-135	36JSMC5BE	14714.00	37JSMC5BED	17944.00	400A/600V	37JSMC5BEF	18255.00	250	37JSMC5BEP	20435.00
	200	5	—	55-250	36LTC5BE	25320.00	37LTC5BED	32755.00	400A/600V	37LTC5BEF	33667.00	250	37LTC5BEP	33753.00
	300	5	—	55-250	36LTC5BE	25320.00	37LTC5BED	32755.00	600A/600V	37LTC5BEF	33667.00	400	37LTC5BEP	33753.00
	700	6	—	160-540	36MTXC5BE	51467.00	37MTXC5BED	59331.00	1600A/600V	37MTXC5BEF	60425.00	1600	37MTXC5BEP	63156.00

Note: Hp's shown above are based on the overload amp range for the FLA's (per the National Electric Code) of typical industrial motors. All starter sizes carry one maximum Hp rating.

# Lighting and Heating Control

## Electrically Held Lighting Contactors

General

### Features

- Compact Design
- Silver Cadmium Oxide Contacts
- Pressure Type Terminals
- Straight Thru Wiring
- Wide Variety of Contact Configurations
- 12-Poles Maximum
- Available From 20 Amps–400 Amps  
Up to 12-Poles 20, 30 and 60 Amps  
3-Poles On 100–400 Amps
- Full Line of Enclosures  
NEMA 1  
NEMA 3R/12  
NEMA 4/4X (Stainless Steel)
- Available In Combination Form with  
Choice of:
  - Fusible Disconnect
  - Non-Fusible Disconnect
  - Circuit Breaker
- All Combination Lighting Contactors  
are UL Service Entrance Listed
- Full Line of Factory And Field  
Modifications
- UL Listed Files #E14900
- CSA Certified File LR 6535

### Application

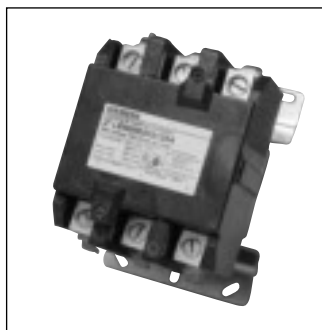
Siemens electrically held lighting contactors provide a safe, convenient means of local or remote switching for tungsten and ballast lamp loads, mercury arc lamps, and 3-phase resistive heating.

Class LE electrically held lighting and heating contactors are used in applications where it is not critical that the contacts remain in the closed position during loss of control power.

These lighting contactors are rated at 480V Tungsten, 600V Ballast. They are available in 2–12 poles with a variety of NO and NC contact arrangements.

Typical applications include:


- Industrial and Commercial Buildings
- Stadiums
- Airports
- Non-Critical Resistive Heaters and  
other Non-Inductive Loads



# Lighting and Heating Control

## Electrically Held Lighting Contactors, Class LE

Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Replace the *** with a number from the coil table.</li> <li>▶ Field modifications see page 16-79.</li> <li>▶ Factory modification kits see page 16-94.</li> <li>▶ Dimensions see page 16-110 open page 16-128 enclosed.</li> <li>▶ Wiring Diagrams see page 16-144.</li> <li>▶ Replacement parts see page 16-158.</li> </ul>	<b>Coil Table</b> <table border="1"> <thead> <tr> <th>60Hz Voltage</th> <th>Number</th> </tr> </thead> <tbody> <tr><td>24</td><td>024</td></tr> <tr><td>120</td><td>120</td></tr> <tr><td>208</td><td>208</td></tr> <tr><td>240</td><td>240</td></tr> <tr><td>277</td><td>277</td></tr> <tr><td>480</td><td>480</td></tr> <tr><td>600</td><td>600</td></tr> </tbody> </table>	60Hz Voltage	Number	24	024	120	120	208	208	240	240	277	277	480	480	600	600
	60Hz Voltage	Number																
24	024																	
120	120																	
208	208																	
240	240																	
277	277																	
480	480																	
600	600																	

### Open and Non-combination Enclosed Contactors

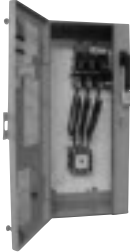
Max. Amp Rating	Number of Poles	Normally Closed Contacts	Normally Open Contacts	Open Type		NEMA 1 General Purpose		NEMA 12 NEMA 3/3R <sup>①</sup> Industrial Use Weatherproof		NEMA 4/4X Stainless Steel <sup>①</sup> Watertight, Dust-tight, Corrosion Resistant, 304 Stainless Steel	
				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
20	2	0	2	LEN00B200***A	242.00	LEN01B200***A	268.00	LEN02B200***A	414.00	LEN04B200***A	554.00
				LEN00B002***A	242.00	LEN01B002***A	268.00	LEN02B002***A	414.00	LEN04B002***A	554.00
	3	0	3	LEN00B300***A	268.00	LEN01B300***A	293.00	LEN02B300***A	440.00	LEN04B300***A	651.00
				LEN00B003***A	268.00	LEN01B003***A	293.00	LEN02B003***A	440.00	LEN04B003***A	651.00
	4	4	0	LEN00B400***A	344.00	LEN01B400***A	371.00	LEN02B400***A	517.00	LEN04B400***A	728.00
				LEN00B202***A	344.00	LEN01B202***A	371.00	LEN02B202***A	517.00	LEN04B202***A	728.00
		1	3	LEN00B103***A	344.00	LEN01B103***A	371.00	LEN02B103***A	517.00	LEN04B103***A	728.00
				LEN00B004***A	344.00	LEN01B004***A	371.00	LEN02B004***A	517.00	LEN04B004***A	728.00
	6	2	4	LEN00B204***A	448.00	LEN01B204***A	534.00	LEN02B204***A	621.00	LEN04B204***A	758.00
				LEN00B006***A	448.00	LEN01B006***A	534.00	LEN02B006***A	621.00	LEN04B006***A	758.00
	8	4	4	LEN00B404***A	612.00	LEN01B404***A	698.00	LEN02B404***A	784.00	LEN04B404***A	925.00
				LEN00B206***A	612.00	LEN01B206***A	698.00	LEN02B206***A	784.00	LEN04B206***A	925.00
LEN00B008***A				612.00	LEN01B008***A	698.00	LEN02B008***A	784.00	LEN04B008***A	925.00	
9	4	5	LEN00B405***A	664.00	LEN01B405***A	750.00	LEN02B405***A	853.00	LEN04B405***A	976.00	
			LEN00B207***A	664.00	LEN01B207***A	750.00	LEN02B207***A	853.00	LEN04B207***A	976.00	
10	4	6	LEN00B406***A	715.00	LEN01B406***A	801.00	LEN02B406***A	919.00	LEN04B406***A	1028.00	
			LEN00B208***A	715.00	LEN01B208***A	801.00	LEN02B208***A	919.00	LEN04B208***A	1028.00	
			LEN00B010***A	715.00	LEN01B010***A	801.00	LEN02B010***A	919.00	LEN04B010***A	1028.00	
12	4	8	LEN00B408***A	819.00	LEN01B408***A	905.00	LEN02B408***A	1022.00	LEN04B408***A	1147.00	
			LEN00B210***A	819.00	LEN01B210***A	905.00	LEN02B210***A	1022.00	LEN04B210***A	1147.00	
30 <sup>②</sup>	3	0	3	LEN00C003***A	293.00	LEN01C003***A	310.00	LEN02C003***A	462.00	LEN04C003***A	702.00
				LEN00C006***A	603.00	LEN01C006***A	621.00	LEN02C006***A	793.00	LEN04C006***A	991.00
				LEN00C009***A	914.00	LEN01C009***A	930.00	LEN02C009***A	1120.00	LEN04C009***A	1400.00
				LEN00C012***A	1223.00	LEN01C012***A	1240.00	LEN02C012***A	1430.00	LEN04C012***A	1788.00
60 <sup>②</sup>	3	0	3	LEN00D003***A	534.00	LEN01D003***A	621.00	LEN02D003***A	861.00	LEN04D003***A	1293.00
				LEN00D006***A	1154.00	LEN01D006***A	1240.00	LEN02D006***A	1644.00	LEN04D006***A	2140.00
				LEN00D009***A	1774.00	LEN01D009***A	1861.00	LEN02D009***A	2305.00	LEN04D009***A	2995.00
				LEN00D012***A	2395.00	LEN01D012***A	2481.00	LEN02D012***A	3004.00	LEN04D012***A	3904.00
100	3	0	3	LEN00E003***A	861.00	LEN01E003***A	1033.00	LEN02E003***A	1309.00	LEN04E003***A	1981.00
200	3	0	3	LEN00F003***A	2067.00	LEN01F003***A	2430.00	LEN02F003***A	3231.00	LEN04F003***A	4036.00
300	3	0	3	LEN00G003***A	4506.00	LEN01G003***A	5168.00	LEN02G003***A	7431.00	LEN04G003***A	8133.00
400	3	0	3	LEN00H003***A	12578.00	LEN01H003***A	14232.00	LEN02H003***A	17635.00	LEN04H003***A	19616.00

① For conduit hubs and conversion instructions, see page 16-87.  
 ② Can be field assembled. Order mounting kit 49MCMPPMA and required number of contactors.  
 Example, 3, three pole contactors and 1 mounting plate for a 9-pole open assembly.

# Lighting and Heating Control

## Combination Electrically Held Lighting Contactors, Class LE

Selection

	Ordering Information		Coil Table										
	<ul style="list-style-type: none"> <li>▶ Replace the *** with a number from the coil table.</li> <li>▶ Field modification kits see page 16-79.</li> <li>▶ Factory modifications see page 16-94.</li> <li>▶ Dimensions see page 16-128.</li> <li>▶ Wiring Diagrams see page 16-144.</li> <li>▶ Replacement parts see page 16-155.</li> </ul>		60Hz Voltage	Number									
	24	024	120	120	208	208	240	240	277	277	480	480	600

### Combination Lighting Contactors

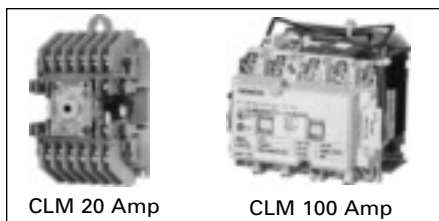
Disconnect Type	Max. Amp Rating	Number of NO Poles	Disc Amp Rating	Disc Amp/Fuse Clip Rating	Circuit Breaker Rating	NEMA 1 General Purpose		NEMA 12, NEMA 3/3R <sup>①</sup> NEMA 4 Painted (thru 100 amps) Industrial Use Weatherproof, Watertight, Dust-tight		NEMA 4/4X Stainless Steel <sup>①</sup> Watertight, Dust-tight, Corrosion Resistant 304 Stainless Steel	
						Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Non-Fusible	20	3	30A	—	—	LEDB1B003***A	768.00	LEDB2B003***A	855.00	LEDB4B003***A	1512.00
	30	3	30A	—	—	LEDB1C003***A	784.00	LEDB2C003***A	991.00	LEDB4C003***A	1612.00
	60	3	60A	—	—	LEDD1D003***A	1233.00	LEDD2D003***A	1526.00	LEDD4D003***A	2507.00
	100	3	100A	—	—	LEDF1E003***A	2051.00	LEDF2E003***A	2430.00	LEDF4E003***A	4272.00
	200	3	200A	—	—	LEDH1F003***A	4006.00	LEDH2F003***A	5057.00	LEDH4F003***A	6849.00
	300	3	400A	—	—	LEDK1G003***A	8408.00	LEDK2G003***A	10958.00	LEDK4G003***A	15662.00
Fusible	20	3	—	30A/250V	—	LEFA1B003***A	793.00	LEFA2B003***A	880.00	LEFA4B003***A	1512.00
		3	—	30A/600V	—	LEFB1B003***A	810.00	LEFB2B003***A	898.00	LEFB4B003***A	1529.00
	30	3	—	30A/250V	—	LEFA1C003***A	810.00	LEFA2C003***A	1016.00	LEFA4C003***A	1637.00
		3	—	30A/600V	—	LEFB1C003***A	827.00	LEFB2C003***A	1033.00	LEFB4C003***A	1654.00
	60	3	—	60A/250V	—	LEFC1D003***A	1266.00	LEFC2D003***A	1559.00	LEFC4D003***A	2542.00
		3	—	60A/600V	—	LEFD1D003***A	1293.00	LEFD2D003***A	1586.00	LEFD4D003***A	2567.00
	100	3	—	100A/250V	—	LEFE1E003***A	2137.00	LEFE2E003***A	2516.00	LEFE4E003***A	4359.00
		3	—	100A/600V	—	LEFF1E003***A	2180.00	LEFF2E003***A	2559.00	LEFF4E003***A	4403.00
	200	3	—	200A/250V	—	LEFG1F003***A	4152.00	LEFG2F003***A	5203.00	LEFG4F003***A	6996.00
		3	—	200A/600V	—	LEFH1F003***A	4186.00	LEFH2F003***A	5237.00	LEFH4F003***A	7030.00
	300	3	—	400A/250V	—	LEFJ1G003***A	8650.00	LEFJ2G003***A	11199.00	LEFJ4G003***A	15903.00
		3	—	400A/600V	—	LEFK1G003***A	8718.00	LEFK2G003***A	11269.00	LEFK4G003***A	15972.00
Circuit Breaker	20	3	—	—	20A	LEBT1B003***A	1077.00	LEBT2B003***A	1164.00	LEBT4B003***A	1796.00
	30	3	—	—	30A	LEBV1C003***A	1094.00	LEBV2C003***A	1301.00	LEBV4C003***A	1922.00
	60	3	—	—	60A	LEBY1D003***A	1533.00	LEBY2D003***A	1826.00	LEBY4D003***A	2809.00
	100	3	—	—	100A	LEBZ1E003***A	2214.00	LEBY2D003***A	1826.00	LEBZ4E003***A	4437.00

① For conduit hubs and conversion instructions, see page 16-87.

# Lighting and Heating Contractors

## Mechanically and Magnetically Held Lighting Contactors

## Selection



### Mechanically Latched Lighting and Heating Contactor

The CLM Lighting Contactors can be used with metal halide, mercury vapor, quartz halogen, tungsten and fluorescent lighting. They provide reliable and convenient lighting control in numerous applications, such as industrial plants, schools, hospitals, office buildings, shopping centers, airports, stadiums . . . literally everywhere lighting is required.

The CLMs are listed under UL 508 with no derating when used open or enclosed. Combination lighting contactors are listed for UL service entrance.

UL listed File #E60310  
CSA Certified File LR 6535

### Type CLM 20 Amp Lighting Contactor Solid State Control Modules

The CLM 20 amp lighting contactor is an electromagnetically operated, mechanically latched three wire control contactor. The most commonly used method of control is a three position momentary contact switch with a center-off position. The controlling device must be able to make the coil inrush current but need not break it. The coil current is interrupted by the control contacts within the CLM contactor. Power for the control line may come from a separate source or directly from the line side of the CLM contactor. The CLM contactor can also be controlled by devices such as:

- Break-glass control stations
- Timers having single pole, double throw contacts
- Photo-electric cells<sup>Ⓞ</sup>
- Energy management systems<sup>Ⓞ</sup>
- Microprocessors<sup>Ⓞ</sup>
- Occupancy sensors<sup>Ⓞ</sup>

Control modules make it possible to use a controlling device that does not have enough current-carrying capacity to control the CLM contactor directly. Control modules are also used when

the control station is to be located at a distance greater than the allowable contactor line run.

Another use for control modules occurs when the controlling device is only available as a single pole single-throw contact necessitating a two wire control line.

Still another application for control modules is when start-stop three wire control is needed.

Control modules also can make it possible to operate the CLM coil from its own incoming line at one voltage while providing the control at a second, perhaps lower voltage.

### Two Wire Control Module (Accessory 47)

The advantages of two wire controls are:

1. Control station can have lower ampacity rating.
2. Control station can be located an extended distance from the CLM contactor.
3. Control module can frequently be controlled directly from microprocessor.
4. Control devices can be two wire single pole, single-throw types.
5. Control voltage may be different than the CLM coil circuit and at a lower voltage level.

**Note:** If the control power to the solid state control module is lost while the module is energized the lighting contactor will open. If the line power to the lighting contactor is lost while the contactor is energized the contactor will not change state with return of line voltage. Power will be restored to the load if the control module is still energized. Control station should be the maintained type.

### Three Wire Control Module (Accessory 48)

1. The accessory 48 consists of two relays with contacts appropriately interconnected which provides for an interlocking that prevents both relays from being energized simultaneously.
2. This module has similar characteristics to the two wire module (Accessory 47) except there is no change of switch contact position upon loss of control line power. Control stations should be the momentary type.

### Stop-Start Control Module (Accessory 49)

Stop-start three wire maintained control is an arrangement used mostly when controlling motors, but can be used in lighting applications.

Any number of momentary contact control stations consisting of normally open start buttons and normally closed stop buttons can be used. Start buttons are connected in parallel and stop buttons in series.

### Operation (Magnetic Latch)

A permanent magnet is built into the contactor structure of the 30A, 60A, 100A, and 200A contactors that will maintain the contactor in its energized state indefinitely without using control power. When energized, a DC current is applied that produces a magnetic field that reinforces the polarity of the permanent magnet, and the contactor pulls in immediately. The current to the coil is disconnected by the coil clearing interlock. In order to drop out the contactor, it is necessary to apply a field through the OFF coil in the reverse direction to the permanent magnet.

This momentarily cancels the magnetic attraction and the contactor drops out. Coil and module failures are possible when used with solid state relays and PLC outputs. 24-volt systems are ok to use, but 120 volts and above should be discouraged. If higher values cannot be avoided, an interposing relay should be used.

### (Mechanically Latched)

The 300 & 400A lighting and heating contactors operate using a latching mechanism.

**Closing** – When the “close” pushbutton is operated, the closing coil is energized, closing the contactor. As the contactor closes, the latch lever hooks over the latch pin to mechanically latch the contactor closed. The coil-clearing auxiliary contact de-energizes the closing coil.

**Opening** – When the “Trip” pushbutton is operated, the trip solenoid coil is energized, unhooking the latch lever from the latch pin, which allows the contactor to open. As the contactor opens, the coil-clearing auxiliary contact de-energizes the trip solenoid coil.

<sup>Ⓞ</sup> Operation through control modules.

# Lighting Control

## Mechanically and Magnetically Held Lighting contactors, Class CLM

Selection



### Ordering Information

- ▶ Replace \*\*\* with a number from the coil table.
- ▶ Field modification kits see page 16-79.
- ▶ Factory modifications see page 16-94.
- ▶ Dimensions see page 16-111 open page 16-128 enclosed.
- ▶ Wiring Diagrams see page 16-145.
- ▶ Replacement parts see page 16-158.

### Coil Table

60Hz Voltage	Number
24 <sup>ⓐ</sup>	024
120	120
208	208
240	240
277	277
480	480
600 <sup>ⓑ</sup>	600

### Open and Non-combination Enclosed Contactors

Max Amp Rating	Number of Poles	Open Type <sup>Ⓓ</sup>		Enclosure					
		Catalog Number	List Price \$	NEMA 1 General Purpose		NEMA 12 NEMA 3/3R <sup>Ⓔ</sup> Industrial Use Weatherproof		NEMA 4/4X Stainless Steel <sup>ⓑ</sup> Watertight, Dust-tight, Corrosion Resistant, 304 Stainless Steel	
				Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
20	2	see table below	see table below	CLM1B02***	438.00	CLM2B02***	543.00	CLMSB02***	1046.00
	3			CLM1B03***	460.00	CLM2B03***	567.00	CLMSB03***	1067.00
	4			CLM1B04***	491.00	CLM2B04***	592.00	CLMSB04***	1080.00
	6			CLM1B06***	610.00	CLM2B06***	711.00	CLMSB06***	1321.00
	8			CLM1B08***	896.00	CLM2B08***	1102.00	CLMSB08***	1533.00
	10			CLM1B10***	986.00	CLM2B10***	1193.00	CLMSB10***	1623.00
30	2	CLM0C02***	429.00	CLM1C02***	446.00	CLM2C02***	550.00	CLMSC02***	757.00
	3	CLM0C03***	455.00	CLM1C03***	471.00	CLM2C03***	575.00	CLMSC03***	783.00
	4	CLM0C04***	481.00	CLM1C03***	471.00	CLM2C04***	602.00	CLMSC04***	808.00
	5	CLM0C05***	602.00	CLM1C05***	618.00	CLM2C05***	722.00	CLMSC05***	929.00
	6	CLM0C06***	1192.00	CLM1C06***	1561.00	CLM2C06***	1584.00	—	—
	8	CLM0C08***	1296.00	CLM1C08***	1666.00	CLM2C08***	1688.00	—	—
60	2	CLM0D02***	830.00	CLM1D02***	899.00	CLM2D02***	1088.00	CLMSD02***	1518.00
	3	CLM0D03***	864.00	CLM1D03***	933.00	CLM2D03***	1122.00	CLMSD03***	1553.00
	4	CLM0D04***	1036.00	CLM1D04***	1106.00	CLM2D04***	1295.00	CLMSD04***	1967.00
	5	CLM0D05***	1381.00	CLM1D05***	1450.00	CLM2D05***	1639.00	CLMSD05***	2311.00
	6	CLM0D06***	2016.00	CLM1D06***	2523.00	CLM2D06***	2521.00	—	—
	8	CLM0D08***	2517.00	CLM1D08***	3024.00	CLM2D08***	3022.00	—	—
100	2	CLM0E02***	1106.00	CLM1E02***	1260.00	CLM2E02***	1485.00	CLMSE02***	2139.00
	3	CLM0E03***	1174.00	CLM1E03***	1329.00	CLM2E03***	1553.00	CLMSE03***	2208.00
	4	CLM0E04***	1432.00	CLM1E04***	1588.00	CLM2E04***	1811.00	CLMSE04***	2708.00
	5	CLM0E05***	1983.00	CLM1E05***	2139.00	CLM2E05***	2362.00	CLMSE05***	3259.00
	200	2	CLM0F02***	2725.00	CLM1F02***	3225.00	CLM2F02***	3965.00	CLMSF02***
3		CLM0F03***	2948.00	CLM1F03***	3639.00	CLM2F03***	4380.00	CLMSF03***	5138.00
4		CLM0F04***	3760.00	CLM1F04***	4449.00	CLM2F04***	5447.00	CLMSF04***	6568.00
5		CLM0F05***	4858.00	CLM1F05***	5547.00	CLM2F05***	6548.00	CLMSF05***	7893.00
300		2	CLM0G02***	4570.00	CLM1G02***	5637.00	CLM2G02***	7533.00	—
	3	CLM0G03***	4724.00	CLM1G03***	6189.00	CLM2G03***	8084.00	—	—
400	2	CLM0H02***	10936.00	CLM1H02***	13666.00	CLM2H02***	15993.00	—	—
	3	CLM0H03***	12580.00	CLM1H03***	15312.00	CLM2H03***	17638.00	—	—

### Open 20 Amp Contactors

Max Amp Rating	Number of Poles <sup>Ⓓ</sup>	110–120V Coil 50/60Hz		208–240V Coil 50/60Hz		265–277V Coil 50/60Hz		440–480V Coil 50/60Hz	
		Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
20	2	CLM22031	424.00	CLM22061	424.00	CLM22071	424.00	CLM22091	424.00
	3	CLM32031	449.00	CLM32061	449.00	CLM32071	449.00	CLM32091	449.00
	4	CLM42031	469.00	CLM42061	469.00	CLM42071	469.00	CLM42091	469.00
	6	CLM62031	728.00	CLM62061	728.00	CLM62071	728.00	CLM62091	728.00
	8	CLM82031	810.00	CLM82061	810.00	CLM82071	810.00	CLM82091	810.00
	10	CLM102031	900.00	CLM102061	900.00	CLM102071	900.00	CLM102091	900.00
	12	CLM122031	1035.00	CLM122061	1035.00	CLM122071	1035.00	CLM122091	1035.00

Ⓓ Contactors with 2–6-poles will be assembled with all poles located in the top portion of the contactor. Contactors with 8–12-poles will be assembled with 6-poles in the top portion and the remaining poles in the bottom portion of the contactor.

Ⓔ 24 volt coils are not available on 20, 300 and 400 amp contactor sizes. For 24 volt control of 20 amp contactor select solid state control module.


ⓑ For conduit hubs and conversion instructions, see page 16-87.

Ⓒ CLM 30 & 60A 6-12-pole can be field assembled. Order mounting kit 49MCMPPMA and the appropriate number of 2-5 pole contactors.

ⓓ 600 volt coils are not available on 20 amp contactors.

# Lighting Control

## Combination Mechanically and Magnetically Held Lighting contactors, Class CLM Selection

	Ordering Information	Coil Table	
	<ul style="list-style-type: none"> <li>▶ Replace *** with a number from the coil table.</li> <li>▶ Field modification kits see page 16-79.</li> <li>▶ Factory modifications see page 16-94.</li> <li>▶ Dimensions see page 16-128.</li> <li>▶ Wiring Diagrams see page 16-145.</li> <li>▶ Replacement parts see page 16-158.</li> </ul>	60Hz Voltage	Number
		24 <sup>①</sup>	024
		120	120
		208	208
		240	240
		277	277
		480	480
		600 <sup>③</sup>	600

### Combination Lighting Contactors

Disconnect Type	Contactor Amp Rating	Number of NO Poles	Disc Amp Rating	Disc Amp/Fuse Clip Rating	Circuit Breaker Rating	Enclosure					
						NEMA 1 General Purpose		NEMA 12, NEMA 3/3R <sup>②</sup> NEMA 4 Painted (thru 100 amps) Industrial Use Weatherproof, Watertight, Dust-tight		NEMA 4/4X Stainless Steel Watertight, Dust-tight, Corrosion Resistant, 304 Stainless Steel	
						Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
Non-Fusible	20	3	30A	—	—	CMNB14***	768.00	CMNB24***	855.00	CMNBS4***	1486.00
	30	3	30A	—	—	CMNC14***	784.00	CMNC24***	991.00	CMNCS4***	1612.00
	60	3	60A	—	—	CMND15***	1233.00	CMND25***	1526.00	CMNDS5***	2507.00
	100	3	100A	—	—	CMNE16***	2051.00	CMNE26***	2430.00	CMNES6***	4272.00
	200	3	200A	—	—	CMNF17***	3990.00	CMNF27***	5057.00	CMNFS7***	6849.00
	300	3	400A	—	—	CMNG18***	8408.00	CMNG28***	10958.00	CMNGS8***	15662.00
Fusible	20	3	—	30A/250V	—	CMFB10***	793.00	CMFB20***	880.00	CMFBS0***	1512.00
		3	—	30A/600V	—	CMFB11***	810.00	CMFB21***	898.00	CMFBS1***	1529.00
	30	3	—	30A/250V	—	CMFC10***	810.00	CMFC20***	1016.00	CMFCS0***	1637.00
		3	—	30A/600V	—	CMFC11***	827.00	CMFC21***	1033.00	CMFCS1***	1654.00
	60	3	—	60A/250V	—	CMFD12***	1266.00	CMFD22***	1559.00	CMFDS2***	2542.00
		3	—	60A/600V	—	CMFD13***	1293.00	CMFD23***	1586.00	CMFDS3***	2567.00
	100	3	—	100A/250V	—	CMFE14***	2137.00	CMFE24***	2516.00	CMFES4***	4359.00
		3	—	100A/600V	—	CMFE15***	2180.00	CMFE25***	2559.00	CMFES5***	4403.00
	200	3	—	200A/250V	—	CMFF16***	4152.00	CMFF26***	5203.00	CMFFS6***	6996.00
		3	—	200A/600V	—	CMFF17***	4186.00	CMFF27***	5237.00	CMFFS7***	7030.00
	300	3	—	400A/250V	—	CMFG18***	8650.00	CMFG28***	11199.00	CMFGS8***	15903.00
		3	—	400A/600V	—	CMFG19***	8718.00	CMFG29***	11269.00	CMFGS9***	15972.00
Circuit Breaker	20	3	—	—	20A	CMBB14***	1077.00	CMBB24***	1164.00	CMBBS4***	1796.00
	30	3	—	—	30A	CMBC15***	1094.00	CMBC25***	1301.00	CMBCS5***	1922.00
	60	3	—	—	60A	CMBD18***	1533.00	CMBD28***	1826.00	CMBDS8***	2809.00
	100	3	—	—	100A	CMBE18***	1533.00	CMBE28***	2594.00	CMBES8***	4437.00
	200	3	—	—	200A	CMBF10***	4944.00	CMBF20***	5997.00	CMBFS0***	7788.00
	300	3	—	—	300A	CMBG11***	10898.00	CMBG21***	12793.00	CMBGS1***	18151.00

16 CONTROL PRODUCTS

NEMA & General Purpose Control

## Lighting & Heating Contactor Ratings CLM

### Maximum AC/DC Voltage and Amp Ratings

Load Type	Amperes Continuous	Poles to Load	
		1 for 1-Phase	2 for 1-Phase 3 for 3-Phase
Tungsten	20	250V AC	250V AC
Ballast	20	347V AC	600V AC
General	30	347V AC	600V AC
General	20	125V DC	250V DC

Inrush Current Over Fuse Size (amps RMS) at AC Control Voltage 20A CLM					
Amps	120V	240V	277V	347V	480V
Inrush	5.0	2.5	2.2	1.8	1.3
Fuse	2.0	1.0	1.0	0.75	0.5

Contactor Ratings			
Load Type	Amperes Continuous	Max Volts Line to Line	Max Volts Line to Neutral
Tungsten	30-400	480	277
Ballast	30-400	600	346
Heating	30-400	600	346

AC Coil Data			
Contactor Amperes	No. Poles	Inrush VA	Dropout VA
20	2-12	625	6
30	2-5	410	40
60	2-3	410	40
60	4-5	600	40
100/200	2-3	900	200
100/200	4-5	1300	130
300/400	2-3	1600	550

① 24 volt coils are not available on 20 and 300 amp contactors. Use solid state control module on 20 amp size.

② For conduit hubs and conversion instructions, see page 16-87.

③ 600 volt coils are not available on 20 amp contactors.

# Industrial Control Power Transformers

## Class MT

General

### Features

- Epoxy-encapsulated (50–5000VA); Completely seals the transformer coils against moisture, dust, dirt and industrial contaminants for maximum protection in hostile and industrial environments
- Fuse clips (most models). Factory mounted for integral fusing on the secondary side to save panel space, save wiring time and save the cost of buying an add-on fuse block or kit
- Integrally molded barriers. Between terminals and transformer, protect against electrical creepage. Up to 30% greater terminal contact area permits low-loss connections. Extra-deep barriers reduce the chance of shorts from frayed leads or careless wiring
- Terminals. Molded into the transformer, are difficult to break during wiring. A full quarter-inch of thread on the 10-32 terminal screws prevents stripping and pullout
- Jumpers supplied. Two jumper links are standard with all transformers which can be wired for dual primary voltages

### Operation

Industrial control circuits and motor control loads typically require more current when they are initially energized than under normal operating conditions. This period of high current demand, referred to as inrush, may be as great as ten times the current required under steady state (normal) operating conditions, and can last up to 40 milliseconds. A transformer in a circuit subject to inrush will typically attempt to provide the load with the required current during the inrush period. However, it will be at the expense of the secondary voltage stability by allowing the voltage to the load to decrease as the current increases. This period of secondary voltage instability, resulting from increased current, can be of such magnitude that the transformer is unable to supply sufficient voltage to energize the load. The transformer must therefore be designed and constructed to accommodate the high inrush current, while maintaining secondary voltage stability. According to NEMA standards, the secondary voltage would typically be at 85% of the rated voltage.



Industrial Control Power Transformers are specifically designed and built to provide adequate voltage to the load while accommodating the high current levels present at inrush. These transformers deliver excellent secondary voltage regulation and meet or exceed the standards established by NEMA, ANSI, UL and CSA. Their rugged construction and excellent electrical characteristics ensure reliable operation of electromagnetic devices and trouble-free performance.

### Specifications

- Laminations are built with silicon steel to minimize core losses and to increase optimum performance and efficiency
- Copper magnet wire of the highest quality assures efficient operation
- Factory mounted type “K” fuse clips are standard on all secondary transformers where possible
- Two jumper links are standard with all transformers which can be wired for dual primary voltages
- UL listed and CSA certified
- 50/60 Hz rated
- Insulation materials are of the highest rating available for the temperature class

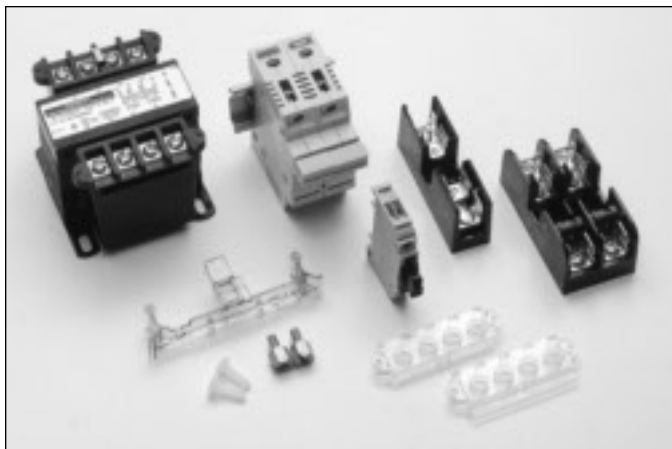
- Mounting brackets are heavy gauge steel to add strength to core construction and provide stable mounting. Slotted mounting feet permit easy installation
- Attractive black finish; easy-to-read nameplate with complete rating data and wiring diagram
- Class 105°C (221°F) insulation system. 55°C (131°F) temperature rise. (50–750VA typical)
- Class 180°C (356°F) insulation system. 120°C (248°F) temperature rise. (1000–5000VA typical)
- Optional field mounted 2-pole primary Class CC fuse block is available



# Industrial Control Power Transformers

## Class MTG

## General



### Features

- Class MTG Industrial Control Transformers are 100% certified for all domestic and International Applications
- The MTG line has full compliance with IEC Safety standards EN 61 558
- CE Mark in accordance with requirements for EN 61 558
- Meets IP-20 specifications per IEC 529 for finger-safe protection when used with Siemens Touch Safe snap on terminal cover kits. Meets IP-00 specifications when covers are not used.
- UL Listed (File # E46323)
- CSA Certified (File #LR27533)
- Exceeds applicable requirements for control transformers as determined by NEMA and ANSI
- Insulation requirements is twice that of UL506
- Proven Epoxy-encapsulated coils operate cooler and completely seal the transformer coils against moisture, dust, dirt and industrial contaminants for maximum protection in hostile and industrial environments
- Available in 50 to 750 VA sizes, in all standard voltage combinations
- Class 105°C (221°F) insulation system. 55°C (131°F) temperature rise. (50–750VA typical)
- Class 180°C (356°F) insulation system. 120°C (248°F) temperature rise. (1000–5000VA typical)
- Primary and secondary fusing capability available as field installed kits for domestic or international fusing
- Integrally-molded terminals and barriers between terminals make breakage virtually impossible during wiring. The MTG transformer construction is the same as our high quality Class MT transformers

### Optional Field Installed Fuse Clip Kits For Panel Mounting

- 2-Pole primary Class CC fuse block
- 1-Pole secondary midget fuse block for  $1\frac{3}{32} \times 1\frac{1}{2}$  fuses
- 2-Pole primary international type fuse blocks
- 1-Pole secondary international type fuse blocks

### Optional Touch-Safe Snap-On Terminal Cover Kits

The Touch-Safe terminal covers are designed to comply with IEC 742 and IP 20 requirements. When installed,

the covers prevent contact with current carrying parts on the transformer and are available for 4 terminal configurations. The international fuse block kits have inherent touch safe terminals and fuse clips.

### Siemens Meets International Standards

CSA (Canadian Standards Association) was utilized as a Competent Body in reviewing, interpreting and properly complying with the requirements of IEC-742 to place a CE mark on its MTG Series product. As a National Certification Body, CSA also has the proper documentation and reports on file for MTG Series to utilize the CB Scheme ensuring acceptance throughout the world.

The standard Siemens MTG product is available with terminal covers which meets the requirements of IEC-529, IP20 degree of protection and meets the applicable requirements for covers per IEC-742.

### IEC-742

The requirements for industrial control circuit transformers to be used in the European Common Market are identified by the International Electrotechnical Commission (IEC) and specified under IEC-742, Non-Short Circuit Proof Isolating Transformers, under the Low Voltage Directive 73/23/EEC. Manufacturers of control transformers indicate compliance with these requirements by placing a CE mark on the product.

- Winding to winding insulation requirements may be twice that for IEC-742 compared to UL506
- The electrical clearances between current carrying parts are one-third greater to comply with IEC-742 requirements for units up to 250VA with voltages up to 440 volts ac
- Transformers manufactured to IEC-742 requirements will have a minimum of 10% higher overload capacity than those manufactured only to UL506 requirements

While no requirement exists in IEC-742 for the electrical connections to be either finger safe or touch proof, the specification does state that IF a transformer is supplied with a cover to prevent incidental contact with current carrying parts, that cover must utilize two separate methods or places of securing it to the component, with neither being dependent upon the other. Additionally, one of these methods MUST require a tool to remove it.

### IEC-529

The requirements for finger-safe or touch-proof electrical connections are identified by the International Electrotechnical Commission (IEC) under specification 529, Classification of Degrees of Protection Provided by Enclosures. These various degrees of protection are identified and differentiated by IP ratings.

The IP specification which most closely approximates protection to a human finger is IP20. This IP rating would be the most common degree of touch-proof connection for electrical components such as transformers.

### EN 61 558

The requirements for industrial control transformers to be used in the European Common Market are identified by the IEC and specified in EN 61 558, Safety of Power Control Transformers, under Low Voltage Directive 73/23/EEC. CE mark on the product indicates compliance.

# Industrial Control Power Transformers

## Class MT, MTG

General

### Transformer Selection Process

Selecting a transformer for industrial control circuit applications requires knowledge of the following terms:

**Inrush VA** is the product of load voltage (V) multiplied by the current (A) that is required during circuit start-up. It is calculated by adding the inrush VA requirements of all devices (contactors, timers, relays, pilot lights, solenoids, etc.), which will be energized together. Inrush VA requirements are best obtained from the component manufacturer.

**Sealed VA** is the product of load voltage (V) multiplied by the current (A) that is required to operate the circuit after initial start-up or under normal operating conditions. It is calculated by adding the sealed VA requirements of all electrical components of the circuit that will be energized at any given time. Sealed VA requirements are best obtained from the component manufacturer. Sealed VA is also referred to as steady state VA.

**Primary Voltage** is the voltage available from the electrical distribution system and its operational frequency, which is connected to the transformer supply voltage terminals.

**Secondary Voltage** is the voltage required for load operation which is connected to the transformer load voltage terminals.



Fuse Clip Kit KCCFPX2R

### Primary Fuse Kit

In addition to factory installed secondary fusing, Siemens offers a primary fuse kit for class MT transformers size 50–750 VA for field installation. The primary fuse kit includes a 2-pole Class CC fuse block, instructions and all associated mounting and wiring hardware. Additionally, this fuse kit will fit most competitors' units. To order this kit, use catalog number **KCCFPX2R**. The primary fuse kit, when installed, will add a maximum of 0.69 in. (18 mm) to the transformer "A" dimension and 1.94 in. (49 mm) to the "C" dimension.

Once the circuit variables have been determined, transformer selection is a simple 5-step process as follows:

1. Determine the Application Inrush VA by using the following industry accepted formula:  
Application Inrush VA =  $\sqrt{(\text{Inrush VA})^2 + (\text{Sealed VA})^2}$
2. Refer to the Regulation Data Chart. If the primary voltage is basically stable and does not vary by more than 5% from nominal, the 90% secondary voltage column should be used. If the primary voltage varies between 5% and 10% of nominal, the 95% secondary voltage column should be used.
3. After determining the proper secondary voltage column, read down until a value equal to or greater than the Application Inrush VA is found. In no case should a figure less than the Application Inrush VA be used.
4. Read left to the Transformer VA Rating column to determine the proper transformer for this application. As a final check, make sure that the Transformer VA Rating is equal to or greater than the total sealed requirements. If not, select a transformer with a VA rating equal to or greater than the total sealed VA.
5. Refer to the following pages to determine the proper catalog number based on the transformer VA, and primary and secondary voltage requirements.

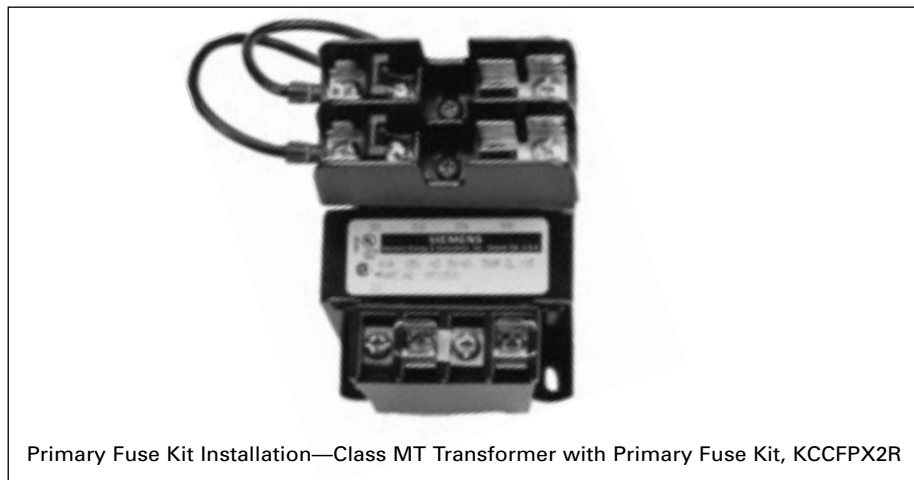
### Regulation Data Chart

Transformer VA Ratings	Inrush VA At 20% Power Factor		
	NEMA/IEC 95% Sec Voltage	NEMA/IEC 90% Sec Voltage	NEMA/IEC 85% Sec Voltage
25	100/—	130/—	150/—
50	170/190	200/220	240/270
75	310/350	410/460	540/600
100	370/410	540/600	730/810
150	780/860	930/1030	1150/1270
200	810/900	1150/1270	1450/1600
250	1400/1540	1900/2090	2300/2530
300	1900/2090	2700/2970	3850/4240
350	3100/3410	3650/4020	4800/5280
500	4000/4400	5300/5830	7000/7700
750	8300/9130	11000/12100	14000/15400
1000 <sup>①</sup>	15000/—	21000/—	27000/—
1000 <sup>②</sup>	9000/—	13000/—	18500/—
1500	10500/—	15000/—	205000/—
2000	17000/—	25500/—	34000/—
3000	24000/—	36000/—	47500/—
5000	55000/—	92500/—	115000/—

To comply with NEMA standards, which require all magnetic devices to operate successfully at 85% of rated voltage, the 90% secondary voltage column is most often used in selecting a transformer.

① For units with Class 105°C insulation systems.

② For units with Class 180°C insulation systems.




Primary Fuse Kit Installation—Class MT Transformer with Primary Fuse Kit, KCCFPX2R

# Industrial Control Power Transformers

## Domestic, Class MT

## Selection

	Ordering Information	Voltage Table		
	<ul style="list-style-type: none"> <li>▶ Use the Voltage Table to determine the primary and secondary voltage required.</li> <li>▶ Field Modifications see page 16-79.</li> <li>▶ Dimensions see page 16-113.</li> <li>▶ Wiring Diagrams see page 16-147.</li> </ul>	Primary Volts 50/60 Hz	Secondary Volts	Letter
		240 X 480, 230 X 460, 220 X 440	120/115/110	A
		240 X 480	24	B
		120 X 240	24	C
		115 X 230	24	D
		550/575/600	110/115/120	E
		208/277	120	F
		208/230/460	115	G
		230/460/575	95/115	H
		380/400/415	110 X 220	I
		208/230/460, 200/220/440,240/480	24 X 115, 23 X 110, 25 X 120	J
		240/416/480/600, 230/400/460/575, 220/380/440/550, 208/500	99/120/130, 95/115/125, 91/110/120, 85/100/110	L
		240 X 480	120 X 240	M

VA Rating	Voltage Letter A <sup>①②</sup>		Voltage Letter B <sup>②③</sup>		Voltage Letter C <sup>②③</sup>		Voltage Letter D <sup>②③</sup>		Voltage Letter E <sup>①②</sup>		Voltage Letter F <sup>①②</sup>	
	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
50	MT0050A	46.00	MT0050B	54.00	MT0050C	54.00	MT0050D	54.00	MT0050E	54.00	MT0050F	54.00
75	MT0075A	55.00	MT0075B	65.00	MT0075C	65.00	MT0075D	65.00	MT0075E	63.00	MT0075F	57.00
100	MT0100A	62.00	MT0100B	71.00	MT0100C	71.00	MT0100D	71.00	MT0100E	66.00	MT0100F	66.00
150	MT0150A	66.00	MT0150B	91.00	MT0150C	91.00	MT0150D	91.00	MT0150E	79.00	MT0150F	79.00
200	MT0200A	82.00	MT0200B	116.00	MT0200C	116.00	MT0200D	116.00	MT0200E	98.00	MT0200F	98.00
250	MT0250A	96.00	MT0250B	136.00	MT0250C	136.00	MT0250D	136.00	MT0250E	121.00	MT0250F	121.00
300	MT0300A	105.00	MT0300B	143.00	MT0300C	143.00	MT0300D	143.00	MT0300E	143.00	MT0300F	143.00
350	MT0350A	113.00	MT0350B	150.00	MT0350C	150.00	MT0350D	150.00	MT0350E	153.00	MT0350F	151.00
500	MT0500A	139.00	MT0500B	188.00	MT0500C	188.00	MT0500D	188.00	MT0500E	163.00	MT0500F	163.00
750	MT0750A	192.00	MT0750B	168.00	—	—	—	—	MT0750E	186.00	MT0750F	172.00
1000	MT1000A	234.00	—	—	—	—	—	—	MT1000E	288.00	—	—
1500	MT1500A	333.00	—	—	—	—	—	—	—	—	—	—
2000	MT2000A	405.00	—	—	—	—	—	—	—	—	—	—
3000	MT3000A	563.00	—	—	—	—	—	—	—	—	—	—
5000	MT5000A	945.00	—	—	—	—	—	—	—	—	—	—

VA Rating	Voltage Letter G <sup>①②</sup>		Voltage Letter H <sup>②④</sup>		Voltage Letter I <sup>②④</sup>		Voltage Letter J <sup>②③</sup>		Voltage Letter L <sup>①②</sup>		Voltage Letter M <sup>②④</sup>	
	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
50	MT0050G	75.00	MT0050H	75.00	MT0050I	54.00	MT0050J	75.00	MT0050L	77.00	MT0050M	77.00
75	MT0075G	80.00	MT0075H	80.00	MT0075I	65.00	MT0075J	80.00	—	—	MT0075M	82.00
100	MT0100G	84.00	MT0100H	84.00	MT0100I	71.00	MT0100J	84.00	MT0100L	86.00	MT0100M	86.00
150	MT0150G	108.00	MT0150H	108.00	MT0150I	91.00	MT0150J	108.00	MT0150L	113.00	MT0150M	113.00
200	MT0200G	140.00	MT0200H	140.00	MT0200I	116.00	MT0200J	140.00	—	—	MT0200M	145.00
250	MT0250G	148.00	MT0250H	148.00	MT0250I	136.00	MT0250J	148.00	MT0250L	153.00	MT0250M	153.00
300	MT0300G	173.00	MT0300H	173.00	MT0300I	143.00	MT0300J	173.00	—	—	MT0300M	180.00
350	MT0350G	182.00	MT0350H	—	MT0350I	150.00	MT0350J	182.00	MT0350L	188.00	MT0350M	188.00
500	MT0500G	203.00	MT0500H	203.00	MT0500I	188.00	MT0500J	203.00	MT0500L	211.00	MT0500M	211.00
750	MT0750G	281.00	MT0750H	281.00	MT0750I	236.00	—	—	MT0750L	293.00	MT0750M	293.00
1000	MT1000G	332.00	MT1000H	332.00	MT1000I	332.00	—	—	—	—	—	—
1500	MT1500G	430.00	MT1500H	430.00	MT1500I	374.00	—	—	—	—	—	—
2000	MT2000G	574.00	MT2000H	574.00	MT2000I	574.00	—	—	—	—	—	—
3000	MT3000G	718.00	MT3000H	718.00	MT3000I	718.00	—	—	—	—	—	—
5000	MT5000G	1149.00	MT5000H	1149.00	—	—	—	—	—	—	—	—

① Includes secondary fuse clip on sizes 50–750VA.

② A 2-pole primary Class CC fuse kit is available for field installation. See page 16-79 for details. Catalog Number: KCCFPX2R.


③ Includes secondary fuse clip on sizes 50–500VA.

④ Does not include secondary fuse clip on any size.

# Industrial Control Power Transformers

## International, Class MTG

## Selection

	<b>Ordering Information</b> <ul style="list-style-type: none"> <li>▶ Use the Voltage Table to determine the primary and secondary voltage required.</li> <li>▶ Field Modifications see page 16-79.</li> <li>▶ Dimensions see page 16-113.</li> <li>▶ Wiring Diagrams see page 16-147.</li> </ul>	<b>Voltage Table</b>		
	<b>Primary Volts 50/60 Hz</b>	<b>Secondary Volts</b>	<b>Letter</b>	
	240 X 480, 230 X 460, 220 X 440 240 X 480 120 X 240 550/575/600 380/400/415 208/230/460, 200/220/440, 240/480 380	120/115/110 24 24 110/115/120 110 X 220 24 X 115, 23 X 110, 25 X 120 24	A B C E I J P	

VA Rating	Voltage Letter A		Voltage Letter B		Voltage Letter C		Voltage Letter E		Voltage Letter I		Voltage Letter J		Voltage Letter P	
	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$	Catalog No	List Price \$
50	MTG0050A	62.00	MTG0050B	71.00	MTG0050C	71.00	MTG0050E	71.00	MTG0050I	100.00	MTG0050J	72.00	MTG0050P	71.00
75	MTG0075A	72.00	MTG0075B	86.00	MTG0075C	86.00	MTG0075E	80.00	MTG0075I	105.00	MTG0075J	81.00	MTG0075P	86.00
100	MTG0100A	82.00	MTG0100B	97.00	MTG0100C	97.00	MTG0100E	87.00	MTG0100I	110.00	MTG0100J	110.00	MTG0100P	97.00
150	MTG0150A	87.00	MTG0150B	122.00	MTG0150C	122.00	MTG0150E	105.00	MTG0150I	145.00	MTG0150J	153.00	MTG0150P	122.00
200	MTG0200A	109.00	MTG0200B	155.00	MTG0200C	155.00	MTG0200E	150.00	MTG0200I	158.00	MTG0200J	184.00	MTG0200P	155.00
250	MTG0250A	125.00	MTG0250B	183.00	MTG0250C	183.00	MTG0250E	187.00	MTG0250I	200.00	MTG0250J	193.00	MTG0250P	183.00
300	MTG0300A	141.00	MTG0300B	192.00	MTG0300C	192.00	MTG0300E	192.00	MTG0300I	219.00	MTG0300J	247.00	MTG0300P	192.00
350	MTG0350A	150.00	MTG0350B	218.00	MTG0350C	218.00	MTG0350E	229.00	MTG0350I	243.00	MTG0350J	258.00	MTG0350P	218.00
500	MTG0500A	186.00	MTG0500B	252.00	MTG0500C	252.00	MTG0500E	252.00	MTG0500I	272.00	MTG0500J	272.00	MTG0500P	252.00
750	MTG0750A	257.00	MTG0750B	354.00	MTG0750C	354.00	MTG0750E	354.00	MTG0750I	378.00	MTG0750J	517.00	MTG0750P	354.00
1000	MTG1000A	309.00	MTG1000B	460.00	MTG1000C	—	—	—	—	—	MTG1000J	574.00	—	—
1500	MTG1500A	424.00	—	—	—	—	—	—	—	—	—	—	—	—
2000	MTG2000A	475.00	—	—	—	—	—	—	—	—	—	—	—	—
3000	MTG3000A	689.00	—	—	—	—	—	—	—	—	—	—	—	—
5000	MTG5000A	1033.00	—	—	—	—	—	—	—	—	—	—	—	—

# Field Modification Kits

## Class SMF, MMS, MRS

Selection

### Accessories—Class SMF

Description	Catalog Number	List Price \$
Handle Guard Kit with Padlock Provision	SMFFL1	8.60
Emergency Off Actuator	SMFPB1	22.00
Additional Key for Key Operated Devices	SMFFK1	2.90

### Pilot Light Kits—Class MMS, MRS<sup>①</sup>

Device	Voltage Rating	Red Pilot Light		Green Pilot Light	
		Catalog Number	List Price \$	Catalog Number	List Price \$
Class SMF	115–277V AC	SMFPL10	26.00	SMFPL10G	26.00

### Enclosures—Class SMF

Enclosure Type	For Use With SMF	Catalog Number	List Price \$
Standard Size NEMA 1 General Purpose	F01, F01P, F02, F02P, F03, F03P, F04, F04P	SMFFE2	23.00
Oversized NEMA Type 1 General Purpose	F01, F01P, F02, F02P, F03, F03P, F04, F04P	SMFFE1	26.00
NEMA 3R, 4, 12 Watertight Dust-tight	F01, F01P, F02, F02P, F03, F03P, F04, F04P	SMF40BC1	138.00

### Nameplates—Class SMF

For Use On	Nameplate Marking	Without Pilot Light		With Pilot Light	
		Catalog Number	List Price \$	Catalog Number	List Price \$
Standard commercial switch box cover including stainless steel plates	None	SMFFN2	13.00	—	—
Stainless Steel Plate	None	SMFFSN3	30.50	SMFFSN4	30.50
NEMA 1 surface mounted enclosure or gray flush plate	None	SMFFN30	13.00	SMFFN40	13.00
	High	SMFFN31	13.00	SMFFN41	13.00
	Low	SMFFN32	13.00	SMFFN42	13.00

### Replacement Parts—Class SMF, MMS

Description	Catalog Number	List Price \$
Replacement Toggle Kits: Type FW and KW (NEMA 4 Metallic Enclosure)	SMFHW1	26.00

### Accessories—Class MMS, MRS

Description	Catalog Number	List Price \$
Handle Guard Kit with Padlock Provision	SMFFL1	8.60
Emergency Off Actuator	SMFPB1	22.00
Additional Key for Key Operated Devices	SMFFK1	2.90

### Pilot Light Kits—Class MMS, MRS<sup>①</sup>

Device	Voltage Rating	Red Pilot Light		Green Pilot Light	
		Catalog Number	List Price \$	Catalog Number	List Price \$
Class MMS	110–120V AC	SMFPL11	43.00	SMFPL11G	43.00
	208–277V AC	SMFPL12	43.00	SMFPL12G	43.00
	440–600V AC	SMFPL13	43.00	SMFPL13G	43.00

### Enclosures—Class MMS

Enclosure Type	For Use With MMS	Catalog Number	List Price \$
Standard Size NEMA 1 General Purpose	K01, K01P, K01B, K02, K02A, K02B, K03, K03A, K03B, K04, K04A, K04B	MMSKE3	26.00
Oversized NEMA Type 1 General Purpose	K01, K02B, K02C, K03, K03A, K03B, K04, K04B, K04C, K02	MMSKE1	26.00
Jumbo NEMA Type 1 General Purpose	K01, K02B, K02C, K03, K03A, K03B, K04, K04B, K04C, K02	MMSKE2	51.00
NEMA 3R, 4, 12 Watertight Dust-tight	K01, K02B, K02C, K03, K03A, K03B, K04, K04B, K04C	SMF40BC1	138.00

### Nameplates—Class MMS









For Use On	Nameplate Marking	Without Pilot Light		With Pilot Light	
		Catalog Number	List Price \$	Catalog Number	List Price \$
Standard commercial switch box cover including stainless steel plates	None	SMFFN1	13.00	—	—
NEMA 1 surface mounted enclosure or gray flush plate	None	SMFFN10	13.00	SMFFN20	13.00
	High	SMFFN11	13.00	SMFFN21	13.00
	Low	SMFFN12	13.00	SMFFN22	13.00
	Forward	SMFFN13	13.00	—	—
	Reverse	SMFFN14	13.00	SMFFN24	13.00

<sup>①</sup> Pilot lights can be field installed on standard NEMA 1 general purpose surface mount enclosures, and NEMA 3R, 4 and 12 enclosures only. For flush mounting units a complete switch unit with pilot light must be ordered.

# Field Modification Kits

## Class 11 - 3RV

## Selection

	Description	Type	Catalog Number	List Price \$	
	<b>Auxiliary Contact Blocks</b>				
	<b>Plug in contact block</b> 1 block per 3RV mountable at the front	1 SPDT contact, NO/NC 1 NO + 1 NC 1 SPDT contact NO/NC electronic contact <sup>Ⓞ</sup>	<b>3RV1901-1D</b> <b>3RV1901-1E</b> <b>3RV1901-1G</b>	<b>21.50</b> <b>26.00</b> <b>80.00</b>	
	<b>Side mount auxiliary contact with screw connection</b> 1 side mount auxiliary contact per 3RV mountable on the left-hand side	1 NO + 1 NC 2 NO 2 NC 2 NO + 2 NC	<b>3RV1901-1A</b> <b>3RV1901-1B</b> <b>3RV1901-1C</b> <b>3RV1901-1J</b>	<b>26.00</b> <b>26.00</b> <b>26.00</b> <b>26.00</b>	
	<b>Signaling Contact Block</b>				
	<b>Signaling contact</b> 1 signaling contact per 3RV mountable on the left-hand side. Can also be fitted together with side mount auxiliary contact.	1NO + 1NC for any trip + 1NO + 1NC for short circuit trip only.	<b>3RV1921-1M</b>	<b>43.00</b>	
	<b>Auxiliary Releases</b>				
	<b>Undervoltage release</b> 1 undervoltage release per 3RV mountable on the right-hand side. Cannot be fitted together with shunt trip.	AC 50Hz — 230V 415V	AC 60Hz 120V 208V 240V 480V	<b>3RV1902-1AF0</b> <b>3RV1902-1AM1</b> <b>3RV1902-1AP0</b> <b>3RV1902-1AV1</b>	<b>66.00</b> <b>66.00</b> <b>66.00</b> <b>66.00</b>
	<b>Undervoltage release with early make contacts (2NO)</b> 1 undervoltage release per 3RV mountable at the right-hand side. Cannot be fitted together with shunt trip.	AC 50Hz 230V 415V	AC 60Hz 240V 480V	<b>3RV1922-1CP0</b> <b>3RV1922-1CV1</b>	<b>83.00</b> <b>83.00</b>
	<b>Shunt trip</b> 1 shunt trip per 3RV mountable at the right-hand side. Cannot be fitted together with undervoltage release.	AC 50Hz/60Hz <sup>Ⓞ</sup> 20–24V 90–110V 200–240V 350–415V	DC <sup>Ⓞ</sup> 20–70V 70–190V 190–330V 330–500V	<b>3RV1902-1DB0</b> <b>3RV1902-1DF0</b> <b>3RV1902-1DP0</b> <b>3RV1902-1DV0</b>	<b>66.00</b> <b>66.00</b> <b>66.00</b> <b>66.00</b>
	<b>Pilot Lights</b>	AC 50Hz/60Hz			
	For NEMA 1 enclosure only. Kit includes Red, Green, and Amber lenses	24V 120V 240V 480V 600V		<b>49SBLBJ</b> <b>49SBLBF</b> <b>49SBLBG</b> <b>49SBLBH</b> <b>49SBLBE</b>	<b>130.00<sup>Ⓞ</sup></b> <b>130.00<sup>Ⓞ</sup></b> <b>130.00<sup>Ⓞ</sup></b> <b>130.00<sup>Ⓞ</sup></b> <b>130.00<sup>Ⓞ</sup></b>
	<b>Lug Kit</b>	Required for Type E Manual Combination Starter	For 3RV with amp range: 0.11-22A up to 480V Max. 0.11-12.5A up to 575V Max	<b>3RV1928-1H</b>	<b>16.00</b>
	<b>Mounting</b>				
	<b>Push-in Mounting Hole Kit</b> For screw panel mounting of the 3RV	Four mounting holes required for each 3RV.	<b>3RB1900-0B</b>	<b>1.10</b>	
	<b>Sealing device</b>				
	<b>Adjustment Dial covers</b>	For sealing the FLA adjustment dial (Kit includes 10 covers)	<b>3RV1908-0P</b>	<b>2.10</b>	
	<b>Front mount auxiliary cover</b>	For sealing the front mount auxiliary opening. (Kit includes 10 covers)	<b>3RV1901-0H</b>	<b>53.00</b>	
	<b>Door Operators</b>				
	<b>Thru-the-door operators</b> Rotary operating mechanism, rated NEMA 12, lockable with up to 3 padlocks in the OFF position. Includes extension shift and connecting element for the 3RV.	With Black Handle	130 mm depth 330 mm depth with supporting bracket	<b>3RV1926-0B</b> <b>3RV1926-0K</b>	<b>104.00</b> <b>124.00</b>









Ⓛ 100% on time.  
Ⓜ 5 sec. max. on time.  
Ⓨ Discount Code: PILO.

Ⓩ Compatible for use in dusty atmospheres. Contacts rated for 1-300mA @ 3-60V.

# Field Modification Kits

## Pilot Devices

*Selection*

Push Buttons and Selector Switches	Class	Enclosure Type	Controller Size or (Lighting Rating)	Type	Catalog Number	List Price \$	
 <b>49SBPB5</b>	14, 40, LEN, CLM <sup>Ⓞ</sup>	Open	00-4	Start, Stop Push Buttons	<b>49SAPB5</b>	<b>69.00</b>	
				Hand-Off-Auto Selector Switch	<b>49SASB1</b>	<b>69.00</b>	
				Off-On Selector Switch	<b>49SASB4</b>	<b>69.00</b>	
		1	00-4 or (20–100A)	1	Start, Stop Push Buttons	<b>49SBPB5</b>	<b>69.00</b>
					Hand-Off-Auto Selector Switch	<b>49SBSB1</b>	<b>69.00</b>
					Off-On Selector Switch	<b>49SBSB4</b>	<b>69.00</b>
				5-8 or (200–400A)	Start, Stop Push Buttons	<b>49SAP05</b>	<b>69.00</b>
					Hand-Off-Auto Selector Switch	<b>49SAS01</b>	<b>69.00</b>
					Keyed Hand-Off-Auto (key removable in all positions)	<b>49SAS09</b>	<b>133.00</b>
		12, 4/4X	00-8 or (20–400A)	1	Off-On Selector Switch	<b>49SAS04</b>	<b>69.00</b>
					Start, Stop Push Buttons	<b>49SAP05</b>	<b>69.00</b>
					Hand-Off-Auto Selector Switch	<b>49SAS01</b>	<b>69.00</b>
				12, 4/4X	Keyed Hand-Off-Auto (key removable in all positions)	<b>49SAS09</b>	<b>133.00</b>
					Off-On Selector Switch	<b>49SAS04</b>	<b>69.00</b>
					Start, Stop Push Buttons	<b>49SAP05</b>	<b>69.00</b>
 <b>49SBSB1</b>	22, 43	Open	00-4	Forward-Off-Reverse Selector Switch	<b>49SASB2</b>	<b>69.00</b>	
				Hand-Off-Auto Selector Switch	<b>49SBSB2</b>	<b>69.00</b>	
				Forward, Reverse, Stop Push Buttons	<b>49SAP02</b>	<b>130.00</b>	
		1	5-8	Forward-Off-Reverse Selector Switch	<b>49SAS02</b>	<b>69.00</b>	
				Forward, Reverse, Stop Push Buttons	<b>49SAP02</b>	<b>130.00</b>	
				Forward-Off-Reverse Selector Switch	<b>49SAS02</b>	<b>69.00</b>	
		12, 4/4X	0-8	Forward, Reverse, Stop Push Buttons	<b>49SAP02</b>	<b>130.00</b>	
				Forward-Off-Reverse Selector Switch	<b>49SAS02</b>	<b>69.00</b>	
				High-Off-Low Selector Switch	<b>49SASB3</b>	<b>69.00</b>	
 <b>49SAP05</b>	30 (2S1W)	Open	0-4	High-Off-Low Selector Switch	<b>49SASB3</b>	<b>69.00</b>	
				High-Off-Low Selector Switch	<b>49SBSB3</b>	<b>69.00</b>	
				High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>	
		1	0-1 3/4	High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	
				High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>	
				High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	
12, 4/4X	0-4	High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>			
		High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>			
		High-Off-Low Selector Switch	<b>49SASB3</b>	<b>69.00</b>			
 <b>49SAS01</b>	30 (2S2W)	Open	0-4	High-Off-Low Selector Switch	<b>49SASB3</b>	<b>69.00</b>	
				High-Off-Low Selector Switch	<b>49SBSB3</b>	<b>69.00</b>	
				High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>	
		1	0-4	High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	
				High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	
				Start, Stop Push Buttons	<b>49SAP05</b>	<b>69.00</b>	
12, 4/4X	0-4	Hand-Off-Auto Selector Switch	<b>49SAS01</b>	<b>69.00</b>			
		Keyed Hand-Off-Auto (key removable in all positions)	<b>49SAS09</b>	<b>133.00</b>			
		Off-On Selector Switch	<b>49SAS04</b>	<b>69.00</b>			
 <b>49SAS01</b>	17, 18, 36, 37, 83, 84, LED, LEF, LEB, CMN <sup>Ⓞ</sup> , CMF <sup>Ⓞ</sup> , CMB <sup>Ⓞ</sup>	1, 12, 4/4X	0-8 (20-400A)	Forward, Reverse, Stop Push Buttons	<b>49SAP02</b>	<b>130.00</b>	
				Forward-Off-Reverse Selector Switch	<b>49SAS02</b>	<b>69.00</b>	
				High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>	
				High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	
 <b>49SAS01</b>	25, 26	1, 12, 4/4X	0-8	Start, Stop Push Buttons	<b>49SAP05</b>	<b>69.00</b>	
				Hand-Off-Auto Selector Switch	<b>49SAS01</b>	<b>69.00</b>	
				Keyed Hand-Off-Auto (key removable in all positions)	<b>49SAS09</b>	<b>133.00</b>	
 <b>49SAS01</b>	32	1, 12, 4/4X	0-4	Off-On Selector Switch	<b>49SAS04</b>	<b>69.00</b>	
				Forward, Reverse, Stop Push Buttons	<b>49SAP02</b>	<b>130.00</b>	
				Forward-Off-Reverse Selector Switch	<b>49SAS02</b>	<b>69.00</b>	
 <b>49SAS01</b>	32	1, 12, 4/4X	0-4	High, Low, Stop Push Buttons	<b>49SAP03</b>	<b>130.00</b>	
				High-Off-Low Selector Switch	<b>49SAS03</b>	<b>69.00</b>	

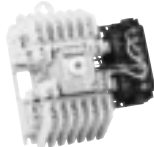
Ⓞ To be used for replacement of switch only. Does not include relay or extra contact block on 30-400A CLM and CM Lighting Contactors. Class 49SB not available for these devices.

# Field Modification Kits

## NEMA, Lighting and Heating Contactors, 20 Amp CLM, CMB, CMF, CMN

Selection

### Solid State Control Module Kits For Lighting and Heating Contactors<sup>①</sup>

	CLM 20 Amp Contactor Kit Description	Accessory	Catalog Number	List Price \$	Accessory	Catalog Number	List Price \$	Accessory	Catalog Number	List Price \$
	120V AC, 50/60 Hz		47 (2-Wire Control) (2W)	CLM4379771		415.00	48 (3-Wire Control) (3W)		CLM4379781	454.00
24V AC/DC, 50/60 Hz	CLM4379772	415.00		CLM4379782	454.00	CLM4379792		484.00		
240/277V AC, 50/60 Hz	CLM4379773	415.00		CLM4379783	454.00	CLM4379793		484.00		
12V AC/DC, 50/60 Hz	CLM4379774	415.00		CLM4379784	454.00	CLM4379794		484.00		

### Protective Shielding for NEMA Products



### Class 14, 22, 30, 40, 43

Contactor or Starter Size	00-1%	List Price \$	2-2½	List Price \$	3-3½	List Price \$	4	List Price \$
Contactor Shield Catalog Number	49PSC1	45.00	49PSC2	52.00	49PSC3	62.00	49PSC4	76.00
Starter Shield Catalog Number	49PSS1	52.00	49PSS2	59.00	49PSS3	78.00	49PSS4	83.00

### Class 17, 25, 32, 87

Disconnect Size	Catalog Number	List Price \$
30A	49PSD5	74.00
60 & 100A	49PSD6	79.00
200A	49PSD7	84.00

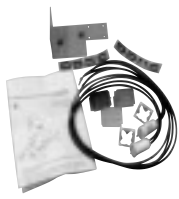


<sup>①</sup> These kits are only for use with 20A mechanically held lighting contactors.



# Field Modification Kits

## Pilot Lights

Selection

Description	Class	Enclosure Type	Controller Size or (Lighting Rating)	Lens Color(s)	Legend(s)	Voltage	Catalog Number	List Price \$	
 <p><b>49SBLBF</b></p>	14, 40, 22, <sup>ⓐ</sup> 43, <sup>ⓐ</sup> 30 (2S2W) <sup>ⓐ</sup> LEN, CLM	1	00-4 or (20-200A)	Red, Green, Amber	ON, RUN, OFF <sup>ⓐ</sup> , OL TRIPPED <sup>ⓐ</sup> , FORWARD, REVERSE, LOW, HIGH	24 Vac	<b>49SBLBJ</b>	<b>130.00</b>	
						120 Vac	<b>49SBLBF</b>	<b>130.00</b>	
						208/240/277 Vac	<b>49SBLBG</b>	<b>130.00</b>	
						480 Vac	<b>49SBLBH</b>	<b>130.00</b>	
						600 Vac	<b>49SBLBE</b>	<b>130.00</b>	
						24 Vac (Full Voltage)	<b>49SPL0BRJ</b>	<b>130.00</b>	
	1	5-8 or (300-400A)	Red (Transformer Type)	ON	120 Vac	<b>49SPL0BRF</b>	<b>130.00</b>		
					240 Vac	<b>49SPL0BRG</b>	<b>130.00</b>		
					480 Vac	<b>49SPL0BRH</b>	<b>130.00</b>		
					600 Vac	<b>49SPL0BRE</b>	<b>130.00</b>		
					24 Vac (Full Voltage)	<b>49SPL0AGJ</b>	<b>182.00</b>		
					120 Vac	<b>49SPL0AGF</b>	<b>182.00</b>		
12, 4/4X	0-8 or (20-400A)	Green (Transformer Type)	OFF <sup>ⓐ</sup>	240 Vac	<b>49SPL0AGG</b>	<b>182.00</b>			
				480 Vac	<b>49SPL0AGH</b>	<b>182.00</b>			
				600 Vac	<b>49SPL0AGE</b>	<b>182.00</b>			
				24 Vac (Full Voltage)	<b>49SBLBJ</b>	<b>130.00</b>			
				120 Vac	<b>49SBLBF</b>	<b>130.00</b>			
				208/240/277 Vac	<b>49SBLBG</b>	<b>130.00</b>			
 <p><b>49SPL0BRF</b></p>	30 (2S1W) <sup>ⓐ</sup>	1	2-4	Red (Transformer Type)	ON	480 Vac	<b>49SBLBH</b>	<b>130.00</b>	
						600 Vac	<b>49SPL0BRE</b>	<b>130.00</b>	
						24 Vac (Full Voltage)	<b>49SPL0AGJ</b>	<b>182.00</b>	
						120 Vac	<b>49SPL0AGF</b>	<b>182.00</b>	
						240 Vac	<b>49SPL0AGG</b>	<b>182.00</b>	
						480 Vac	<b>49SPL0AGH</b>	<b>182.00</b>	
	12, 4/4X	0-4	Green (Transformer Type)	OFF <sup>ⓐ</sup>	600 Vac	<b>49SPL0AGE</b>	<b>182.00</b>		
					24 Vac (Full Voltage)	<b>49SPL0BRJ</b>	<b>130.00</b>		
					120 Vac	<b>49SPL0BRF</b>	<b>130.00</b>		
					240 Vac	<b>49SPL0BRG</b>	<b>130.00</b>		
					480 Vac	<b>49SPL0BRH</b>	<b>130.00</b>		
					600 Vac	<b>49SPL0BRE</b>	<b>130.00</b>		
 <p><b>49SBLBL</b></p>	17, 18, 25, <sup>ⓐ</sup> 26, <sup>ⓐ</sup> 32, <sup>ⓐ</sup> 36, 37, 83, 84, 87, 88, LED, LEF, LEB, CMN, CMF, CMB	1, 12, 4/4X	0-6 (20-400A)	Red (Transformer Type)	ON	24 Vac (Full Voltage)	<b>49SPL0AGJ</b>	<b>182.00</b>	
						120 Vac	<b>49SPL0AGF</b>	<b>182.00</b>	
						240 Vac	<b>49SPL0AGG</b>	<b>182.00</b>	
						480 Vac	<b>49SPL0AGH</b>	<b>182.00</b>	
						600 Vac	<b>49SPL0AGE</b>	<b>182.00</b>	
						24 Vac (Full Voltage)	<b>49SPL0BRJ</b>	<b>130.00</b>	
	1	0-1 3/4 00-4 or (20-200A)	Red, Green, Amber	—	—	—	120 Vac	<b>49SPL0BRF</b>	<b>130.00</b>
							240 Vac	<b>49SPL0BRG</b>	<b>130.00</b>
							480 Vac	<b>49SPL0BRH</b>	<b>130.00</b>
							600 Vac	<b>49SPL0BRE</b>	<b>130.00</b>
							24 Vac (Full Voltage)	<b>49SPL0AGJ</b>	<b>182.00</b>
							120 Vac	<b>49SPL0AGF</b>	<b>182.00</b>

ⓐ "Off" PL requires: (1) N.C. aux contact, 49AB01 on sizes 00-4.  
 ⓑ Class 22, 25, 26, 30, 32, 43, 83 & 84 requires qty. of (2) pilot light kits. Does not apply to 49SB kits. Select

appropriate legend plate as a separate item per type of starter; either "FORWARD" & "REVERSE" or "LOW" & "HIGH".  
 ⓑ 2S2W is starter size 0-4.






ⓐ Includes NC aux contact for NEMA starter Size 0-4.  
 ⓑ "OL TRIPPED" requires (1) N.O. OL aux 49ASNO for ESP 100 OL relay. Use suffix "91" for amb. comp. OL size 00-2%. Not available sizes 3-4.

# Field Modification Kits

## NEMA, Reduced Voltage and Lighting

Selection


### Starter/Contactor Auxiliary Contact Kits

Description	Class	Size	Type	Catalog Number	List Price \$
	14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 40, 43, 83, 84, 87, 88	00-4	1 NO	49AB10	51.00
			1 NC	49AB01	51.00
			1 NC Early Break	49AB01EB	51.00
			1 NC Late Break	49AB01LB	51.00
			1 NC Extra Late Break	49AB01XLB	51.00
			1 NO Extra Late Make	49AB10XLM	51.00
			1 NO & 1 NC	49AB11	103.00
			2 NO	49AB20	103.00
			4 NO	49AB40	206.00
			3 NO & 1 NC	49AB31	206.00
			2 NO & 2 NC	49AB22	206.00
	14, 17, 18, 22, 25, 26, 36, 37, 40, 43, 87, 88	5, 6	2 NO	3RH1921-1EA20	21.50 <sup>Ⓢ</sup>
			1 NO & 1 NC	3RH1921-1DA11	21.50 <sup>Ⓢ</sup>
			2 NC	3RH1921-1EA02	21.50 <sup>Ⓢ</sup>
	14, 17, 18, 22, 25, 26, 40, 43	7, 8	1 NO & 1 NC (Inside L or R)	49CAL18-11	34.00
			1 NO & 1 NC (Outside L or R)	49CAL18-11B	34.00
	LEN, LED, LEF, LEB	20-60 Amps	1 NO	49ACR0	14.30
			1 NC	49ACRC	14.30
			2 NO	49ACR7	28.50
			1 NO & 1 NC	49ACR6	28.50
			2 NC	49ACR8	28.50
		100 Amps	1 NO	49D22125001	51.00
			1 NC	49D22125002	51.00
			1 NO/NC SPDT	49CE42SPDT	51.00
		200-400 Amps	1 NO/NC SPDT	3RH1921-1DA11	21.50 <sup>Ⓢ</sup>
			CLM, CMN, CMF, CMB	20 Amps	1 NO/NC SPDT
2 NO/NC SPDT	CLM4097292				193.00
30-200 Amps	1 NO & 1 NC			CLMFCAK11	71.00
	2 NC			CLMFCAK02	71.00
	2 NO			CLMFCAK20	71.00
	1 Coil Clearing NO & NC			CLMFCCK11	71.00
300-400 Amps	1 NO & 1 NC			CLMHCAK11	71.00
	2 NC			CLMHCAK02	71.00
	2 NO			CLMHCAK20	71.00
	1 Coil Clearing NO & NC			CLMHCCK11	71.00

### Disconnect Auxiliary Switch Kits

Description	Class	Disconnect Amp or CB Rating	Type	Catalog Number	List Price \$
Non-fusible or Fusible Type	17, 25, 32, 37, 83, 84, 87, 88, LED, LEF, CMN, CMF	30 - 200A	2 NO/2 NC DPDT (NEMA A600)	HA261234	266.00
MCP	18, 26, 32, 37, 83, 84, 87, 88, LEB, CMB	3A-125A	1 NO/1 NC 240V	A02ED62	540.00 <sup>Ⓢ</sup>
		250A	1 NO/1 NC 480V	A02FD64	540.00 <sup>Ⓢ</sup>
		400A-600A	(2) 1 NO/1 NC SPDT-480V	A02JLD64	540.00 <sup>Ⓢ</sup>

### Control Power Transformer Kits<sup>Ⓢ</sup>

Description	Recommended Transformer Size		VA Rating	Catalog Number	List Price \$	Transformer Table				
	Control Size	Transformer VA				Primary Volts	Secondary Volts	Code		
 Transformer 50/60HZ	0-2½	45 or 50	45 VA	KT*050 <sup>Ⓢ</sup>	155.00	120	24	G		
	3-3½	75	50 VA	KT*050P	207.00	208	24	1		
	4	100	100 VA	KT*100	216.00	208	120	H		
	5-6	150	150 VA	KT*150	289.00	240/480	24	4		
	7-8	300	200 VA	KT*200	323.00	240/480	120	8		
	<b>Lighting Control</b>			300 VA	KT*300	398.00	277	24	5	
	<b>CLM</b>			500 VA	KT*500	475.00	277	120	7	
	20A, 2 - 12P	150	Replace * with code from Transformer table. Kits used with NEMA 1 general purpose lift-off cover type require extra wide enclosure. Class 14 Sizes 0-2½ Class 30 (2S2W) Sizes 0-2½ Class 30 (2S1W) Sizes 0-1½			600	24	6		
	30A, 3P	100				600	24	7		
	30A, 6 - 12P	200				600	120	6		
	60A, 3P	100				600	120	9		
	60A, 4 - 6P	150								
	60A, 8 - 12P	250								
	100/200A, 3P	200								
	100/200A, 5P	250								
300/400A, 3P	250									
<b>LEN</b>										
20A, 3 - 12P	25									
30/60A, 3 - 6P	25									
30/60A, 9 - 12P	50									
100/200A, 3P	75									
300/400A, 3P	150									

Ⓢ 45VA transformer kits will include secondary but not primary fusing. Sizes 50VA and higher include

2-pole primary fusing and 1-pole secondary fusing.  
Ⓢ Discount Code: IEC.

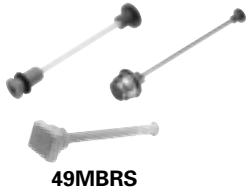










Ⓢ Discount Code: MCCB.

# Field Modification Kits

## NEMA, Reduced Voltage and Lighting

Selection

### Miscellaneous Kits

Description	Class	Enclosure Type	Controller Size	Catalog Number	List Price \$	
 <p>Overload Resets</p> <p>49MBRS</p>	Single Reset (Red)	14, 22, 30	4/4X	00-4	<b>49MARSR</b> 28.50	
	Single Reset (Blue)	14, 22, 30, 17, 18, 25, 26, 32	1, 12, 4/4X	00-4	<b>49MBRS</b> 25.00	
	Miniature Universal Reset	For use in any manufacturer's enclosure — 8 inches	36, 37	1, 12	—	<b>49MARB</b> 17.90
	ESP100 Reset Extender	For use with Siemens MCC's and other deep enclosures. Attaches to OL devices	—	—	—	<b>49ASRE</b> 14.60
 <p>Oil Tight Boot</p>		For Single and Multi Unit using 49MARSR Resets	—	4, 4X	—	<b>52AABA</b> 16.40
 <p>Starter Mounting Adapter Plate</p>		Fits Allen Bradley 509 and 709, Westinghouse A200	14	Open	00-1	<b>49D70084</b> 14.60
 <p>ESP100 Mounting Plate</p>		ESP100 Mounting Plate Kit	48	Open	00-1 $\frac{3}{4}$ 2-2 $\frac{1}{2}$ 3-4	<b>49ASMP1</b> 14.30 <b>49ASMP2</b> 14.30 <b>49ASMP3</b> 14.30
 <p>Furnas Brand Thermal Overload Retrofit Kit, Sizes 0-1<math>\frac{1}{4}</math></p>		A, A1 Frame Size				<b>49ASRFTC</b> 14.60
 <p>Overload Lug Extender</p>		Includes terminal block and stabs for connection to contactor terminals to provide connections at bottom of ESP100 overload	All	All	0-1 (9-40A Ranges)	<b>49ASLE</b> 23.00
 <p>Overload Tamper Resistant Cover</p>		Can be closed with wire seal to deter tampering of ESP100 overload FLA adjustment dial (Clear cover)	All	All	0-4 (9-135A Ranges)	<b>49ASTC</b> (Bag of 10) 29.50
 <p>Fuse Block 30A Max Suitable for Class CC fuses</p>	For 1 $\frac{1}{2}$ × 1 $\frac{1}{2}$ Fuses	1 Fuse	All	All		<b>49MAFB1</b> 17.90
		2 Fuses	All	All		<b>49MAFB2</b> 26.00
	For Rejection-Type Fuses	2 Fuses	All	All		<b>49MAFB4</b> 26.00
 <p>Dust Seal</p>		For ESP100 overload	All	All	00-4	<b>49ASDS</b> (Bag of 10) 29.50
 <p>Replacement Dial Cover</p>		For ESP100 overload without pass through windows	All	All	00-1 (0.25-10A)	<b>49ASDL</b> (Bag of 10) 29.50
 <p>Replacement Separate Mounting Kit (Included with standard 48AS and 48CS overloads)</p>		For ESP100 overload without pass through windows	48AS, 48CS	All	00-1 (0.25-10A)	<b>49ASMS</b> 14.60

16 CONTROL PRODUCTS

NEMA & General Purpose Control


# Field Modification Kits

## NEMA, Reduced Voltage and Lighting

Selection

### Miscellaneous Kits

Description	Class	Enclosure Type	Controller Size	Catalog Number	List Price \$	
 <p>Mechanical Interlock for Horizontally Mounted Contactors</p>	Includes wire	14, 40	Open	00-1	49CCF22H	61.00
				1 1/4	49EEF22H	61.00
	Interlock Only	14, 40	Open	2, 2 1/2	49GGF22H	61.00
				3, 3 1/2	49HHP22H	77.00
				4	49JJG22H	116.00
	Wire Kit Only	14, 40	Open	5, 6	3RT1954-2A	43.00 <sup>①</sup>
	Base Plate Only			5	3RA1963-2A	357.00 <sup>①</sup>
Mechanical Interlock	14, 40	Open	6	3RA1973-2A	463.00 <sup>①</sup>	
			5	3RA1962-2A	187.00 <sup>①</sup>	
Includes wire & mounting plate	14, 40	Open	6	3RA1972-2A	213.00 <sup>①</sup>	
			7	49VM750H	168.00	
Includes mounting plate (Different Frame Sizes)	14, 40	Open	8	49VM1650H	1342.00	
			00-1	49CCF22HP	69.00	
Surge Suppressor	All but Class LE, CLM	All	1 1/4	49EEF22HP	69.00	
			2, 2 1/2	49GGF22HP	69.00	
			3, 3 1/2	49HHP22HP	96.00	
			4	49JJG22HP	143.00	
			Left	49L107944	99.00	
Right	49L107945	99.00				
Surge Suppressor	All but Class LE, CLM	All	2, 2 1/2	49D26344	35.00	
			3, 3 1/2			
Auxiliary Power Pole	NO 36A at 600V AC Max NC 25A at 600V AC Max	All but Class LE, CLM	All	00-1 1/4	49SAF0	96.00
				49SAFC	96.00	
Auxiliary Power Pole	2 NC (mounts to contactor or power pole) 2 NO (mounts to contactor or power pole) 2 NO (mounts to contactor only) 1 NO (mounts to contactor only)	LEN, LED, LEF, LEB	All	20 Amps	49LN02A	101.00
					49LN20A	101.00
					49LS20A	101.00
					49LS10A	101.00
Main Contacts Lighting Contactors	Top or Bottom, 2-Pole Top, 3-Pole Top or Bottom, 4-Pole Top or Bottom, 6-Pole	CLM	All	20 Amps	CLM4097331	258.00
					CLM4097332	290.00
					CLM4097333	355.00
					CLM4097334	419.00
Mounting Kit for Open Heating & Lighting 6 - 12-poles	LEN, CLM	Open	30, 60 Amp	49MCMPPMA	24.00	
Load Side Power Take Off Kit	Includes 3 power lugs for making extra connections to the load side of the contactor	All but Class LE, CLM	All	00-1 1/4	49SAE	30.50
Lug Kit for Contactors	For AL/CU Wire	14, 40	All	2-2 1/2 3-3 1/2 4	49SAAF <sup>④</sup>	43.00
					49SAAH <sup>④</sup>	51.00
					75D35994001 <sup>④</sup>	89.00
					For AL/CU Wire	14, 40
Use CU Only	14, 40	All	7 8	49ATK750-3 <sup>③</sup> 49ATK1650-6 <sup>③</sup>	252.00 626.00	
Ground Lug Kit Meets CSA Standard 22.2 No 14-1973	1 Conductor 2-14 For AL/CU Wire	All	All	All	49D11960001	8.90
Lightning Arrestor		All	All	All	49D45584002	276.00
Backspin Timer	On delay timer that reduces risk of starting into a backspin	87, 88	All	All	3RP20 25-1AQ30	64.00
					3RP20 25-1AP30	64.00
Hole Plug	Covers the hole that is typically used for the conduit hub	87	All	1-4	49D41149006	23.00

Illustration	Description	Contactor	Wire Size	Catalog Number	List Price \$
 <p><b>3RT1966-4G</b></p>	<p><b>Lug Kit</b> 1 Kit = 1 Terminal block. 1 kit necessary for each line and load.</p>	<p>NEMA size 4 (Vacuum) NEMA size 5 NEMA size 6</p>	<p>2/0 to 600 MCM, max. one 500MCM &amp; one 600MCM</p>	<p>3RT1966-4G</p>	<p>158.00</p>

① Discount Code: IEC.

② Surge Suppression for NEMA sizes 5 - 8 are supplied internal with the coil. For size 4 panel mount.

③ Only 3 lugs are supplied for line or load. If lugs for line and load are required order 2 kits.






④ Lug Kit for contactors include 3 terminals for line or load.

# Field Modification Kits

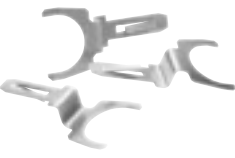
## NEMA, Reduced Voltage and Lighting

Selection




### Fused and Non-Fused Disconnect Switch Kits (Includes load base plus line and load fuse clips)<sup>②</sup>

	Basic Switch Ampere Rating	Switch Catalog Number Non-Fused	List Price \$	Switch Catalog Number Fused	List Price \$	Kit Description	Load Base Catalog Number Class J	List Price \$	Load Base Catalog Number Class H <sup>③</sup>	List Price \$	Lug Wire Size
	30	HNB612	77.00	HFB21	84.00	30A, 250V	—	—	HBB21	56.00	#14-2 AWG (Cu/Al)
				HFB612	137.00	30A, 600V	HBB612	81.00	HBB612	81.00	
	60	HNB623	313.00	HFB22	141.00	60A, 250V	—	—	HBB22	83.00	#14-2 AWG (Cu/Al)
				HFB62	169.00	60A, 600V	HBB62	97.00	HBB62	97.00	
	100	HNB623	313.00	HFB63	208.00	100A, 250V	—	—	HBB63	176.00	#14-1/0 AWG (Cu/Al)
						100A, 600V	HBB63	176.00			
	200	HNB64	327.00	HFB64	447.00	200A, 250V	—	—	HBB64	256.00	#6-300 AWG (Cu/Al)
						200A, 600V	HBB64	256.00			



### Class R Fuse Conversion Kits

	Catalog Number	Description	List Price \$
	HR21	30A, 240V	83.00
	HR612	30A, 600V	83.00
	HR612	60A, 240V	83.00
	HR62	60A, 600V	83.00
	HR63	100A, 240/600V	54.00
	HR64	200A, 240/600V	54.00

### Hazardous Location Accessories For Enclosure Types 7 & 9

		Description	Conduit Size Inches	Catalog Number	List Price \$
<b>Breather/Drain</b>		Install in bottom as drain. Install in top as breather. Suitable for Class I groups C & D and for Class II groups F & G applications only for 1/2" NPT.		51AADB	41.00 <sup>①</sup>
<b>Hole Plugs</b>		For tapered NPT conduit openings.	1/2 3/4 1 1 1/2 2 2 1/2	51AAHA 51AAHB 51AAHC 51AAHD 51AAHE 51AAHF	4.20 <sup>①</sup> 4.60 <sup>①</sup> 5.10 <sup>①</sup> 8.20 <sup>①</sup> 13.80 <sup>①</sup> 21.00 <sup>①</sup>
<b>Reducer Bushings</b>		Cast aluminum, UL Recognized and CSA Certified. Used to reduce existing tapered NPT conduit opening when required.	3/4-1/2 1-1/2 1 1/2-3/4 1 1/2-1 2 1/2-3/4 2 1/2-1 2 1/2-1 1/2 2 1/2-2 3-1 3-1 1/2 3-2 3-2 1/2	51AARBA 51AARCA 51AARDB 51AARDC 51AARFB 51AARFC 51AARFD 51AARFE 51AARGC 51AARGD 51AARGE 51AARGF	4.20 <sup>①</sup> 4.60 <sup>①</sup> 10.20 <sup>①</sup> 10.20 <sup>①</sup> 31.00 <sup>①</sup> 29.50 <sup>①</sup> 25.50 <sup>①</sup> 25.50 <sup>①</sup> 41.50 <sup>①</sup> 41.50 <sup>①</sup> 32.50 <sup>①</sup> 32.50 <sup>①</sup>

### Conduit Hubs

Description	Conduit Size	Class	Controller Size	Enclosure Type	Catalog Number	List Price \$
 Conduit Hubs For Enclosures Noncombination - NEMA 12 may be field modified for NEMA 3/3R. Combination - NEMA 12 may be field modified for NEMA 3/3R/4 enclosure.	Metal Hub 3/4" 1" 1 1/2" 2" 2 1/2"	All	All	12, 3, 3R, 4	49MACML 49MACMD 49MACMN 49MACMF 49MACMG	19.00 21.00 26.00 33.00 72.00
 Use UL Listed conduit hub for the appropriate NEMA type. NEMA 3R requires the location of the conduit hub to be at a level above the lowest live part and holes of 1/8" dia. to be added in the bottom of the enclosure. Does not apply to class 87 Pump Panels.	Metal Hub 1" 1 1/2" 2" 2 1/2"	87	All	3R	75D41149001 75D41149003 75D41149004 75D41149005	19.00 19.00 19.00 19.00

① Discount Code: PILO.  
② Discount code: HDSS.



③ For Class R fuses order Class H kit from this table and the Class R conversion kit.

# Field Modification Kits

## NEMA, Overload Relays

Selection

### Sirius 3RB20

Illustration	Description	For Overload Type	Catalog Number	List Price \$	
 Reset plunger with reset button   Flexible reset	<b>Reset mechanisms</b>  <b>Reset plunger</b> Mounts directly to overload relay. Requires separate reset operator in enclosure door. Kit includes reset plunger, holder and funnel.	3RB206	<b>3RU1900-1A</b>	<b>12.80<sup>①</sup></b>	
	<b>Flexible cable reset mechanism</b> Requires a 6.5 mm hole in the enclosure with a maximum enclosure thickness of 8 mm.	Cable length 15.75 in (400mm)	3RB206	<b>3RU1900-1B</b>	<b>59.00<sup>①</sup></b>
		Cable length 23.62 in (600mm)		<b>3RU1900-1C</b>	<b>64.00<sup>①</sup></b>
	<b>Covers</b> Tamper resistant cover for current setting and manual/ automatic reset button.		3RB206	<b>3RB2984-0</b>	<b>6.00<sup>①</sup></b>


### Competitive Retrofit Overload Plates

Manufacturer	NEMA Size	Plate Part Number	List Price \$
A-B	0, 1	<b>49D57090</b>	<b>15.60</b>
A-B	2	<b>49D57161</b>	<b>15.60</b>
Sq. D	0, 1	<b>49D57091</b>	<b>15.60</b>

### Electronic Coil System with Remaining Lifetime Indication and 24VDC PLC Output

Class	Size	Model Type	21 - 27V		96 - 127V		200 - 277V	
			Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
All	5	P	—	—	<b>3RT1965-5PF31<sup>①</sup></b>	<b>575.00</b>	<b>3RT1965-5PP31<sup>①</sup></b>	<b>575.00</b>
		V	—	—	<b>3RT1966-5PF31<sup>①</sup></b>	<b>660.00</b>	<b>3RT1966-5PP31<sup>①</sup></b>	<b>660.00</b>
	6	P	—	—	<b>3RT1975-5PF31<sup>①</sup></b>	<b>937.00</b>	<b>3RT1975-5PP31<sup>①</sup></b>	<b>937.00</b>
		V	—	—	<b>3RT1976-5PF31<sup>①</sup></b>	<b>958.00</b>	<b>3RT1976-5PP31<sup>①</sup></b>	<b>958.00</b>

### Overload Auxiliary Contact Kit

Description	Class	Size	Type	Catalog Number	List Price \$
	All ESP100	00-4	1 NO (NEMA A600)	<b>49ASN0</b>	<b>35.00</b>
			1 NC (NEMA A600)	<b>49ASNC</b>	<b>35.00</b>

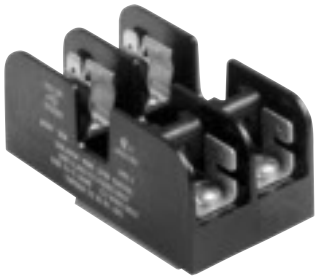

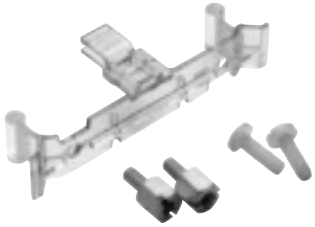
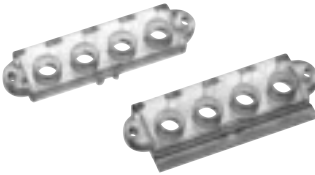
① Discount Code: IEC.

# Field Modification Kits



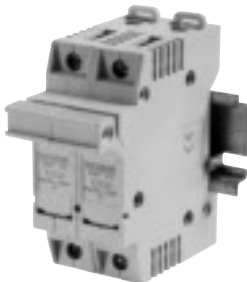


## Class MT, MTG

**Selection**

### Fuse Blocks, Touch-Safe Terminal Covers

Catalog Number	Description	List Price \$
 <b>KCCFP2RG</b>	2-Pole Primary Class CC Fuse Block for domestic fusing. Max 600V.- (Single pole cover kits, if required are listed below. One cover kit required per pole.)	<b>32.00</b>
 <b>KCCF1G</b>	1-Pole Secondary Midget Fuse Block for 13/32 × 1½ domestic Fusing. Max 250V. (Single pole cover kits, if required are listed below.)	<b>11.60</b>
 <b>KCCFBCK</b>	Single Pole Fuse Block cover Kit for domestic fuse blocks listed above. (For primary or secondary) 2-Kits required for 2-pole fuse block.	<b>13.00</b>
 <b>KTTSC4P</b>	Snap-On Transformer Terminal Touch-Safe Cover Kit. (Includes primary and secondary covers.)	<b>11.60</b>

### International Fusing<sup>®</sup>

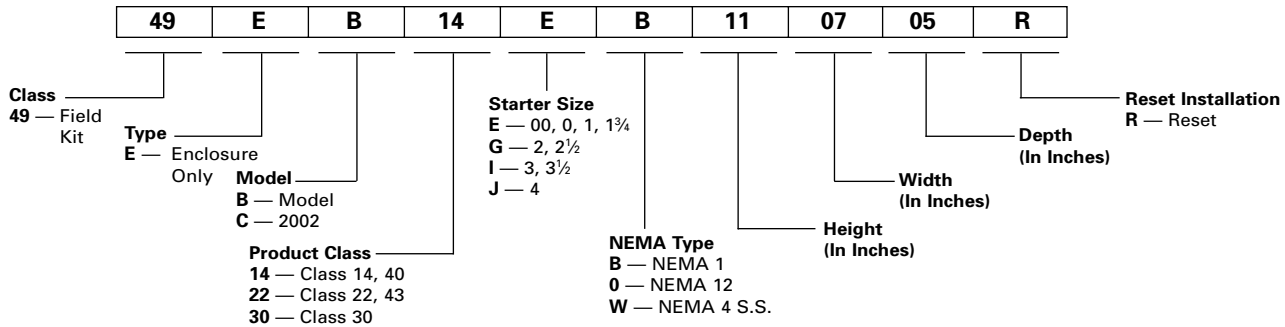
Catalog Number	Description	List Price \$
 <b>8WA1011-1SF12</b>	1-Pole Fuse Block, Touch-Safe. Up to 6.3A for 5 mm × 20 mm or 5 mm × 25 mm (Requires DIN Rail Mounting)	<b>7.80<sup>①</sup></b>
 <b>3NW7011</b>	1-Pole Fuse Block, Touch-Safe 25A, for 10 × 38 mm Cylindrical Fuses. (Requires DIN Rail Mounting.)	<b>12.00<sup>①</sup></b>
 <b>3NW7021</b>	2-Pole Fuse Block, Touch-Safe 25A, for 10 × 38 mm Cylindrical Fuses. (Requires DIN Rail Mounting.)	<b>27.00<sup>①</sup></b>
 <b>3NW7111</b>	1-Pole Fuse Block, Touch-Safe 4-50A, for 14 × 51 mm Cylindrical Fuses. (Requires DIN Rail Mounting.)	<b>29.00<sup>①</sup></b>
 <b>8WA1815</b>	Fuse Block DIN Rail Mounting for separate screw mounting to panel. (Max 2-pole 2-25A size per rail.) (Max 1-pole 4-50A size per rail.)	<b>3.80<sup>①</sup></b>

① Discount Code: IEC.

# Heavy Duty Control

## Non-Combination Enclosure Kits, Class 49

Selection



### Non-Reversing Starters & Contactors Class 14, 40

Size	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Dust-tight, Corrosion Resistant③⑥					NEMA 12/3/3R① Industrial Use, Weatherproof③⑤				
	Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
	Model C Enclosure	List Price \$	Model C Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$
00-1½	49EC14EB110705R	61.00	49EC14IB201208R	200	235.00	49EB14EW130806R	414.00	49EB22EW131306R	689.00	49EB14E0130806R	224.00	49EB22E0131306R	293.00	49EB22E0131306R	293.00
2, 2½	49EC14GB140807R	130.00	49EC14IB201208R	200	235.00	49EB14GW160907R	879.00	49EB22GW161406R	1301.00	49EB14G0160907R	354.00	49EB22G0161406R	603.00	49EB22G0161406R	603.00
3, 3½	49EC14IB201208R	235.00	49EC14IB201208R	100	235.00	49EB14JW261408R	1861.00	49EB14JW261408R	1861.00	49EB14J0261408R	1102.00	49EB14J0261408R	1102.00	49EB14J0261408R	1102.00
3, 3½	—	—	49EC14JB251409R	250	361.00	—	—	—	—	—	—	—	—	—	—
4	49EC14JB251409R	361.00	49EC14JB251409R	300	361.00	49EB14JW261408R	1861.00	49EB22JW302410R	2791.00	49EB14J0261408R	1102.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00

### Reversing Starters & Reversing Contactors Class 22, 43

Size	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Dust-tight, Corrosion Resistant③⑥					NEMA 12/3/3R① Industrial Use, Weatherproof③⑤				
	Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
	Model C Enclosure	List Price \$	Model C Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$
00-1½	49EC14IB201208R	235.00	49EC14IB201208R	200	235.00	49EB22EW131306R	689.00	49EB22EW131306R	689.00	49EB22E0131306R	293.00	49EB22E0131306R	293.00	49EB22E0131306R	293.00
2, 2½	49EC14IB201208R	235.00	49EC14IB201208R	200	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	603.00	49EB22G0161406R	603.00
3, 3½	49EC14JB251409R	361.00	49EC14JB251409R	250	361.00	49EB22JW261808R	2791.00	49EB22JW302410R	2791.00	49EB22J0261808R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00
4	49EC14JB251409R	361.00	49EC14JB251409R	300	361.00	49EB22JW302410R	2791.00	49EB22JW302410R	2791.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00

### Two-Speed Two-Winding Starters Class 30

Size	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Dust-tight, Corrosion Resistant③⑥					NEMA 12/3/3R① Industrial Use, Weatherproof③⑤				
	Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
	Model C Enclosure	List Price \$	Model C Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$
00-1½	49EC14IB201208R②	235.00	49EC14JB251409R②	200	361.00	49EB30EW131306R	689.00	49EB30GW161808R	1301.00	49EB30E0131306R	293.00	49EB30G0161808R	603.00	49EB30G0161808R	603.00
2, 2½	49EC14IB201208R②	235.00	49EC14JB251409R②	200	361.00	49EB30GW161406R	1301.00	49EB30GW161808R	1301.00	49EB30G0161406R	603.00	49EB30G0161808R	603.00	49EB30G0161808R	603.00
3, 3½	49EC14JB251409R②	361.00	49EB22JB302410R③	300	422.00	49EB30JW261808R	2791.00	49EB22JW302410R	2791.00	49EB30I0261808R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00
4	49EC14JB251409R②	361.00	49EB22JB302410R③	300	422.00	49EB22JW302410R	2791.00	49EB22JW302410R	2791.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00

### Two-Speed One-Winding Starters Class 30

Size	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Dust-tight, Corrosion Resistant③⑥					NEMA 12/3/3R① Industrial Use, Weatherproof③⑤				
	Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
	Model C Enclosure	List Price \$	Model C Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$	Model B Enclosure	List Price \$	Model B Enclosure	Max CPT VA	List Price \$
00-1½	49EC14IB201208R②	235.00	49EC14JB251409R②	200	361.00	49EB30EW131306R	689.00	49EB30GW161808R	1301.00	49EB30E0131306R	293.00	49EB30G0161808R	603.00	49EB30G0161808R	603.00
2, 2½	49EB30GB161808R③	422.00	49EB22JB302410R③	300	422.00	49EB30GW161808R	1301.00	49EB22IW261808R	2791.00	49EB30G0161808R	603.00	49EB22I0261808R	1326.00	49EB22I0261808R	1326.00
3, 3½	49EB30IB192208R③	448.00	49EB22JB302410R③	300	422.00	49EB22JW302410R	2791.00	49EB22JW302410R	2791.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00
4	49EB22JB302410R③	422.00	49EB22JB302410R③	300	422.00	49EB22JW302410R	2791.00	49EB22JW302410R	2791.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00	49EB22J0302410R	1326.00

Note: Dimensions...See appropriate Product Class Outline Drawing beginning on page 16-115.

① For conduit hubs and conversion instructions, see page 16-87.

② Clamshell enclosure suitable for one operating device and two pilot lights. See Field Mods page 16-79.

③ Hinged cover enclosure suitable for one or more class 52 operating devices and one or more class 52 pilot lights. See Field Mods page 16-79.

④ Install NEMA 1 hole plug cat. no. 3SB1902-0AR (included) when the cover OL reset is not needed.

⑤ Install NEMA 12 hole plug cat. no. 52ABH6 (not included) when the cover OL reset is not needed.

⑥ Install NEMA 4X stainless steel hole plug cat. no. 52ABHS (not included) when the cover OL reset is not needed.



# Heavy Duty Control

## Lighting Enclosure Tables

Selection

### Lighting & Heating Contactors Class LE

Size	Pole	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Corrosion Resistant③⑤					NEMA 12/3/3R① Industrial Use③⑤				
		Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
		Model C Enclosure		Model C Enclosure			Model B Enclosure		Model B Enclosure			Model B Enclosure		Model B Enclosure		
		Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$	Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$	Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$
20A	2-12	49EC14EB110705R	61.00	49EC14IB201208R	200VA	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	—	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	—	603.00
30A	3	49EC14EB110705R	61.00	49EC14IB201208R	200VA	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	—	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	—	603.00
30A	6-9	49EC14IB201208R	235.00	49EC14IB201208R	200VA	235.00	49EB14JW261408R	1861.00	49EB14JW261408R	—	1861.00	49EB14J0261408R	1102.00	49EB14J0261408R	—	1102.00
30A	12	49EC14IB201208R	235.00	49EC14JB251409R	250VA	361.00	49EB14JW261408R	1861.00	—	—	—	49EB14J0261408R	1102.00	—	—	—
60A	3	49EC14EB110705R	61.00	49EC14IB201208R	200VA	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	—	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	—	603.00
60A	6-9	49EC14IB201208R	235.00	49EC14IB201208R	200VA	235.00	49EB14JW261408R	1861.00	49EB14JW261408R	—	1861.00	49EB14J0261408R	1102.00	49EB14J0261408R	—	1102.00
60A	12	49EC14IB201208R	235.00	49EC14JB251409R	250VA	361.00	49EB14JW261408R	1861.00	—	—	—	49EB14J0261408R	1102.00	—	—	—
100A	3	49EC14IB201208R	235.00	49EC14IB201208R	200VA	235.00	49EB14JW261408R	1861.00	49EB14JW261408R	—	1861.00	49EB14J0261408R	1102.00	49EB14J0261408R	—	1102.00

### Lighting & Heating Contactors Class CLM

Size	Pole	NEMA 1 General Purpose (Clamshell)②④					NEMA 4/4X Stainless① Watertight, Corrosion Resistant③⑤					NEMA 12/3/3R① Industrial Use③⑤				
		Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)			Without CPT		With CPT (Extra Wide)		
		Model C/B Enclosure		Model C/B Enclosure			Model B Enclosure		Model B Enclosure			Model B Enclosure		Model B Enclosure		
		Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$	Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$	Catalog Number	List Price \$	Catalog Number	Max CPT	List Price \$
20A	2-12	49EC14GB140807R	130.00	49EC14IB201208R	200VA	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	—	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	—	603.00
30A	2-5	49EC14EB110705R	61.00	49EC14IB201208R	200VA	235.00	49EB22GW161406R	1301.00	49EB22GW161406R	—	1301.00	49EB22G0161406R	603.00	49EB22G0161406R	—	603.00
30A	6-12	49EB30GB161808R	422.00	49EB30GB161808R	200VA	422.00	49EB30GW161808R	1301.00	49EB30GW161808R	—	1301.00	49EB30G0161808R	603.00	49EB30G0161808R	—	603.00
60A	2-5	49EC14GB140807R	130.00	49EC14IB201208R	200VA	235.00	—	—	—	—	—	—	—	—	—	—
60A	6-12	49EB30IB192208R	448.00	49EB30IB192208R	250VA	448.00	—	—	—	—	—	—	—	—	—	—
100A	2-5	49EC14IB201208R	235.00	49EC14IB201208R	200VA	235.00	—	—	—	—	—	—	—	—	—	—

Note: Dimensions...See appropriate Product Class Outline Drawing beginning on page 16-115.

① For conduit hubs and conversion instructions, see page 16-87.

② Clamshell enclosure suitable for one operating device and two pilot lights. See Field Mods page 16-79.

③ Hinged cover enclosure suitable for one or more class 52 operating devices and one or more class 52 pilot lights. See Field Mods page 16-79.

④ Install NEMA 1 hole plug cat. no. 3SB1902-0AR (included) when the cover OL reset is not needed.

⑤ Install NEMA 12 hole plug cat. no. 52ABH6 (not included) when the cover OL reset is not needed.

⑥ Install NEMA 4X stainless steel hole plug cat. no. 52ABHS (not included) when the cover OL reset is not needed.

## Discount Schedule NEMA

Siemens Power Distribution & Control, SPEEDFAX™ 2007-2008 Product Catalog

16-91

# Combination Starter Enclosure Kits

## Features and Benefits

### Features

- Manufactured with a cold forming "TOX" process
- 100kA short circuit rating when protected with class R fuses to 600V or MCP to 480V and when installing listed components from the instruction guide
- Enclosure types available, Nema 1, 12, 3/3R and painted NEMA 4. Nema 12 field convertible to 3/3R/4 with the appropriate conduit hub and drain hole
- Pre-Drilled mounting panels
- Heavy duty quarter turns
- Industrial type disconnect handle

### Disconnect Type Enclosure Kit

- Used to assemble both non-fusible and fusible combination starters
- Accommodates Class 14 full voltage non-reversing (FVNR) NEMA starters 00 – 4 including Siemens exclusive half sizes
- Handle mechanism, power wire, mounting panel, reset assembly, and instruction guide included. Hardware for panel mounted devices and disconnect switch are not included

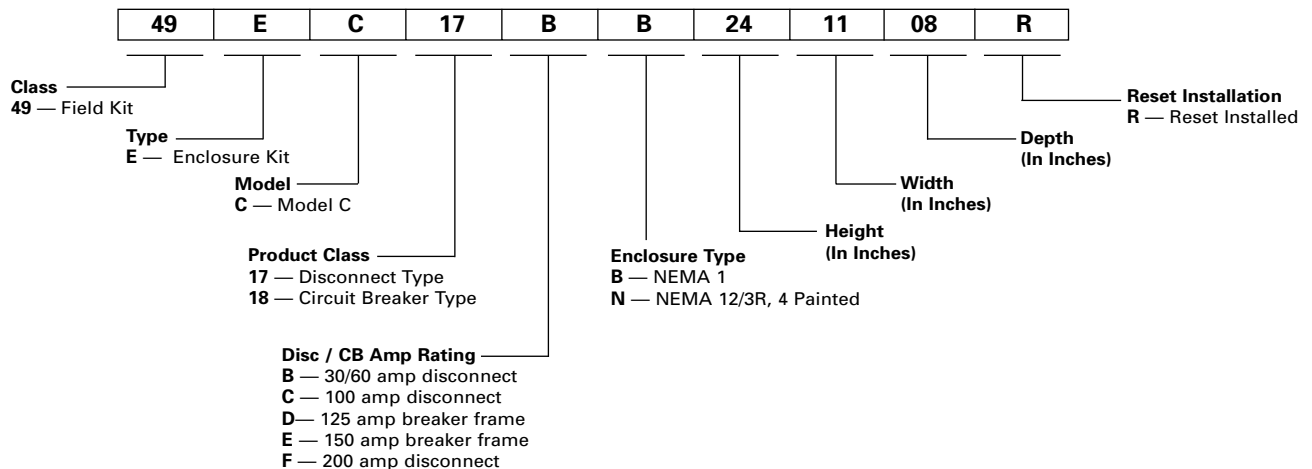
### MCP Type Enclosure Kit

- Used to assemble combination starters with circuit breakers
- Accommodates Class 14 full voltage non-reversing (FVRN) NEMA starters 00 – 4 including Siemens exclusive half sizes
- Handle mechanism, power wire, mounting panel, reset assembly and instruction guide included. Circuit breaker not included however, mounting hardware for the circuit breaker is

### How to Select the Required Kits to Assemble a Combination Starter

- From the catalog, select a class 14 open type starter with the required starter size and overload relay type.
- Based on the starter size, select the enclosure kit from table 1a for fusible or non-fusible combination starters or select from table 1b for combination starters with an MCP.
- For a non-fusible combination starter, select the disconnect switch kit from table 2a. For a fusible combination starter, select the appropriate disconnect switch, fuse clip kit, and class R rejection kit from table 2b (for H fusing, class R rejection kit not required). For combination starters with MCP, select the appropriate circuit breaker kit from table 3.

### Nomenclature for Combination Enclosure Kits

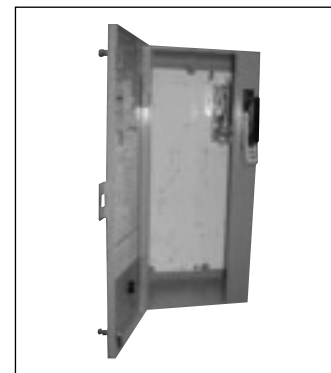


# Combination Starter Enclosure Kits

Selection

**Table 1a - FVNR Combination Starter Kits for use with Disconnect Devices**

Starter Size	Disc. Amp Rating	NEMA 1 General Purpose		Nema 12, 3/3R, 4 Painted <sup>①</sup> Industrial Use, Weatherproof, Watertight, Dust-tight	
		Catalog Number	List Price \$	Catalog Number	List Price \$
0 - 2	60	49EC17BB241108R	292.00	49EC17BN241108R	334.00
2 ½ - 3	100	49EC17CB242008R	390.00	49EC17CN242008R	546.00
3 ½ - 4	200	49EC17FB362408R	901.00	49EC17FN362408R	948.00



**Table 1b. – FVNR Combination Starter Kits for use with MCP Devices**

Starter Size	Max MCP Amps	NEMA 1 General Purpose		Nema 12, 3/3R, 4 Painted <sup>①</sup> Industrial Use, Weatherproof, Watertight, Dust-tight	
		Catalog Number	List Price \$	Catalog Number	List Price \$
0 - 2	50	49EC18DB241108R	292.00	49EC18DN241108R	334.00
2 ½ - 3	100	49EC18DB242008R	390.00	49EC18DN242008R	546.00
3 ½	125	49EC18DB362408R	824.00	49EC18DN362408R	877.00
4	150	49EC18EB362408R	901.00	49EC18EN362408R	948.00

**Table 2a – Non-Fusible Disconnect Kits**

Disconnect Switch		
Switch Rating	Catalog Number	List Price \$
30A	HNB612	77.00
60A	HNB623	313.00
100A	HNB623	313.00
200A	HNB64	327.00

**Table 2b – Fusible Disconnect Kits**

Fuse Clip Ratings	Class	Disconnect Switch		Fuse Clip Kit		Rejection Clips for Class R Fusing	
		Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
30A-250V	H	HFB21	84.00	HBB21	56.00	HR21	83.00
30A-600V	H	HFB612	137.00	HBB612	81.00	HR612	83.00
60A-250V	H	HFB22	141.00	HBB22	83.00	HR612	83.00
60A-600V	H	HFB62	169.00	HBB62	97.00	HR62	83.00
100A-250V	H	HFB63	208.00	HBB63	176.00	HR63	54.00
100A-600V	H	HFB63	208.00	HBB63	176.00	HR63	54.00
200A-250V	H	HFB64	447.00	HBB64	256.00	HR64	54.00
200A-600V	H	HFB64	447.00	HBB64	256.00	HR64	54.00

**Table 3 – Circuit Breaker Kits**

Starter Size	MCP Type Used with Solid State Overload Relay			MCP Type Used with Thermal Overload Relay	
	Overload Amp Range	Motor Circuit Interrupter Amps	Circuit Breaker Kit	Motor Circuit Interrupter Amps	Circuit Breaker Kit
0	0.75-3	3	ED63A003	3	ED63A003
	2.5-10	10	ED63A010	10	ED63A010
	9-18	25	ED63A025	25	ED63A025
1	0.75-3	3	ED63A003	3	ED63A003
	2.5-10	10	ED63A010	10	ED63A010
	9-18	25	ED63A025	25	ED63A025
	13-27	30	ED63A030	30	ED63A030
1 ½	13-27	40	ED63A040	40	ED63A040
	20-40	50	ED63A050	50	ED63A050
2	13-27	40	ED63A040	40	ED63A040
	22-45	50	ED63A050	50	ED63A050
2 ½	22-45	50	ED63A050	50	ED63A050
	30-60	100	ED63A100	100	ED63A100
3	30-60	50	ED63A050	50	ED63A050
	45-90	100	ED63A100	100	ED63A100
3 ½	57-115	125	ED63A125	125	ED63A125
	67-135	150	FXD63A150L	150	FXD63A150L

<sup>①</sup> For conduit hubs and conversion instructions, see page 16-87.

# Factory Modifications

Selection

## Ordering Information

- ▶ All modifications will consist of Siemens standard components as available. Standard equipment dimensions and enclosure construction may not apply when certain modifications and special features are added.
- ▶ Catalog Number Suffixes indicate numbers or letters added to the end of a catalog number. Example: 14DSE32BA becomes 14DSE32BA**A1**.

## Pilot Devices

Description	Modification	Class	Enclosure Type	Suffix	List Price \$
Push Buttons	Start, Stop	14, 17, 18, 36, 37, 40, 83, 84, CLM, CM, LE	All	<b>A1</b>	200. <sup>②</sup>
	Forward, Reverse, Stop	22, 25, 26, 43	All <sup>③</sup>	<b>A2</b>	360.
	High, Low, Stop	30, 32	All		
	E-Stop	14 <sup>④</sup> , 17, 18, 22 <sup>④</sup> , 25, 26, 30 <sup>④</sup> , 32, 36, 37, 40 <sup>④</sup> , 43 <sup>④</sup>	All <sup>④</sup>	<b>ES</b>	271.
	Test Push Buttons	83, 84	All	<b>K1</b>	200.
Selector Switches	Hand-Off-Auto	14, 17, 18, 36, 37, 40, 83, 84, LE	All	<b>A3</b>	200. <sup>②</sup>
		CM, CLM	All	<b>A3</b>	780.
	For 24 volt HOA control, 20 Amp contactor only	CM, CLM	1	<b>EM</b>	736.
	Off-On	14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 40, 43, 83, 84, CLM, CM, LE	All	<b>A4</b>	200. <sup>②</sup>
	Auto-Off	14, 17, 18, 40, 83, 84, CM, CLM, LE	All <sup>④</sup>	<b>A6</b>	200. <sup>②</sup>
	Forward-Off-Reverse	22, 25, 26, 43	All	<b>A5</b>	200.
	High-Off-Low	30, 32	All		
	Hand-Off-Auto (Keyed)	14, 17, 18, 36, 37, 40, 83, 84, LE, CLM, CM	All <sup>④</sup>	<b>A9</b>	601. <sup>②</sup>
Auto-Off-Low-High	30, 32	All <sup>④</sup>	<b>A0</b>	227.	

## Pilot Lights

Class	Enclosure Type	Lens Color →	Red	Green	Red	Green	Red	Green	Amber	White	Red Push-To-Test	Green Push To-Test	Green Push To-Test
		Legend →	On For/Rev Low/High	On For/Rev Low/High	Run	Run	Off	Off	OL Tripped	Control Power On	On For/Rev Low/High	On For/Rev Low/High	Off
		Suffix →	FA	FB	FC	FD	FJ	FK	FL <sup>④</sup>	FW <sup>①</sup>	FS <sup>①</sup>	FT <sup>①</sup>	FU <sup>①</sup>
14, 40, 17, 18, 36, 37, 87, 88, LE, CLM, CM	All		215.	215.	215.	215.	315.	315.	315.	215.	273.	273.	375.
22, 25, 26, 30, 32, 43, 83, 84	All		429.	429.	409. <sup>③</sup>	409. <sup>③</sup>	315.	315.	315.	215.	548.	548.	375.

## Coil Options

Class 14, 17, 18, 22, 25, 26, 30, 32, 40, 43, 83 <sup>④</sup> , 84 <sup>④</sup> , 87, 88					
Volts 60 HZ	Volts 50 HZ	Coil Letter Change	Controller Size — List Price \$		
			00-2½	3, 3½	4
24 Separate Control 120 Separate Control 110-120/220-240 200-208 220-240 277 220-240/440-480 440-480 575-600	24 110 110/190-220 — 190-220 240 190-220/380-440 380-440 550	J F A D G L C H E	NC	NC	NC
DC Coil <sup>②</sup>	24V 48V 125V 250V	S <sup>⑦</sup> U V W	156.	302.	402.

AC (50-60 HZ) or DC	Coil Letter Change	Controller Size 4 (Vacuum Only) Size 5 & 6 (ALL)
23-26V 42-48V 110-127V 200-220V 220-240V 240-277V 380-420V 440-480V 575-600V	J U F D G L K H E	NC

## Miscellaneous Options

	Class	Change the 92 to	List Price \$
Omit Alternator (deduct)	83, 84	95	222.
Duplex with Separate Relay Alternation	83, 84	93	NC
Duplex with lead pump transfer switch	83, 84	94	NC

① Not Available on Class 14, 40, 22, 43, 30 (size 00-4) and Class LE, CLM (20-30amp) NEMA 1 clamshell enclosures.

② DC coils include 1 NC, late break aux. contact. This aux. contact takes up one side of the starter (00-4 only).

③ Price x 2 for Classes 22, 25, 26, 30, 32, 43, 83, 84.

④ Bimetal OL - Size 00 - 2 1/2 available. Solid-state OL - Size 00 - 4, 7 & 8 available.

⑤ For Class 83, 84 two devices are provided. Price x 2.

⑥ For Class 83, 84 standard enclosure (92) alternating relay available in 24V or 120V control only.

⑦ S coil is not available for size 4 contactors or starters.

⑧ Class 83 and 84 only.

# Factory Modifications

## Selection

Ordering Information	Transformer Table		
<ul style="list-style-type: none"> <li>▶ Replace (*) with letter from Transformer Table.</li> <li>▶ Prices shown are additions to standard equipment prices as listed in the catalog and are not to be used as separate selling prices. All modifications will consist of Siemens standard components as available. Standard equipment dimensions and enclosure construction may not apply when certain modifications and special features are added.</li> <li>▶ Catalog Number Suffixes indicate numbers or letters added to the end of a catalog number. Example: 14DSE32BA becomes 14DSE32BABB.</li> </ul>	Primary Volts	Secondary Volts	Letter
	120	24	B
	208	24	S
	208	120	T
	240	24	J
	240	120	F
	277	24	N
	277	120	P
	380	110	U
	415	100	W
	480	240	R
	480/240	24	D
	480/240	120	A
	600	24	E
	600	120	C

### Control Power Transformers

Description	Catalog No Suffix	Product Class	Enclosure Type	20-60	100	—	200	300-400	—	—	← Lighting & Heating Ratings (Amps)
				0-2½	3	3½, 4	5	6	7	8	
Standard Capacity <sup>①</sup> with 1-Secondary Fuse	B*	14, 17, 18, 22, 25, 26, 30, 32, 40, 43, 83 <sup>②</sup> , 84 <sup>③</sup> , 87	1, 3, 4, 12	247.	—	—	—	—	—	—	—
			7 & 9	284.	—	—	—	—	—	—	—
Standard Capacity with 2-Primary and 1-Secondary Fuse	D*	14, 17, 18, 22, 25, 26, 30, 32, 40, 43, 83 <sup>②</sup> , 84 <sup>③</sup> , 87, LE, CLM, CM	1, 3, 4, 12	447.	712.	712.	822.	822.	905.	905.	—
			7 & 9	484.	753.	753.	868.	868.	1050.	1050.	—
100VA Extra Capacity with 2-Primary and 1-Secondary Fuse	C*	14, 17, 18, 22, 25, 26, 30, 32, 40, 43, 83 <sup>②</sup> , 84 <sup>③</sup> , 87, LE, CLM, CM	1, 3, 4, 12	636.	913.	913.	1004.	1004.	1095.	1095.	—
			7 & 9	675.	1068.	1068.	1233.	1233.	1373.	1373.	—
150VA Extra Capacity with 2-Primary and 1-Secondary Fuse	C*1	14, 17, 18, 22, 25, 26, 30, 32, 40, 43, 83 <sup>②</sup> , 84 <sup>③</sup> , 87, LE, CLM, CM	1, 3, 4, 12	795.	1088.	1088.	1179.	1179.	1179.	1179.	—
			All	831.	1082.	1082.	1197.	1197.	—	—	—
		36, 37, 88	All	831.	1082.	1082.	1197.	1197.	—	—	—
			All	986.	1288.	1288.	1361.	1361.	—	—	—

### Factory Assembled Fuse Clips—Class 25, 32, 84<sup>④</sup>

Fuse Clip Amps	Volts	Rejection Clip Suffix <sup>②③</sup>	List Price \$
30	250	10	27.
30	600	11	47.
60	250	12	47.
60	600	13	65.
100	250	14	146.
100	600	15	146.
200	250	16	329.
200	600	17	329.
400	250	18	675.
400	600	19	675.
600	250	20	969.
600	600	21	969.
800	600	23	2180.
1600	600	25	5449.

**Note:** Factory will furnish the same voltage coils as transformer secondary voltage (except with class 36,37).

① The standard control transformer supplied for starter sizes 0 through 2½ will be rated 45VA and have the appropriate secondary fuse. Primary fuses will not be

supplied as standard. For primary fuse option select appropriate suffix from table.

② For ESP100 styles add the rejection clip suffix to the end of the base style catalog number. For thermal styles add the rejection clip suffix immediately before the 81 in the part number.

③ For Class J fuse clips, add suffix "DJ".

④ Class 84 Duplex Controllers require two fusible disconnects thus multiply the price adder by two.

⑤ Price x 2 Class 83 and 84.

# Factory Modifications

Selection

## Ordering Information

- Prices shown are additions to standard equipment prices as listed in the catalog and are not to be used as separate selling prices. All modifications will consist of Siemens standard components as available. Standard equipment dimensions and enclosure construction may not apply when certain modifications and special features are added.
- Catalog Number Suffixes indicate numbers or letters added to the end of a catalog number. Example: 14DSE32BA becomes 14DSE32BA**G01**.

## Additional Auxiliary Contacts

Class	NO Contacts	NC Contacts	Catalog Number Suffix	Controller Size — List Price \$			
				00-1 <sup>3</sup> / <sub>4</sub>	2-4	5-6	7-8
14, 17, 18, 40, 83 <sup>ⓐ</sup> , 84 <sup>ⓑ</sup>	—	1	G01	102.	102.	—	—
	—	2	G02	201.	201.	201.	—
	1	—	G10	102.	102.	—	—
	1	1	G11	201.	201.	201.	201.
	1	2	G12	303.	303.	—	—
	2	—	G20	201.	201.	201.	—
	2	1	G21	303.	303.	—	—
	2	2	G22	403.	403.	403.	—
	2	3	G23	505.	505.	—	—
	3	1	G31	403.	403.	403.	—
	3	2	G32	505.	505.	—	—
	3	3	G33	604.	—	—	—
	4	—	G40	403.	403.	403.	—
	4	1	G41	505.	505.	—	—
4	2	G42	604.	—	—	—	
4	4	G44	806.	—	—	—	
5	—	G50	505.	505.	—	—	
5	1	G51	604.	—	—	—	
5	3	G53	806.	—	—	—	
6	—	G60	604.	—	—	—	
6	2	G62	806.	—	—	—	
7	1	G71	806.	—	—	—	
8	—	G80	806.	—	—	—	
22, 25, 26, 43 & 30, 32 (2-winding)	—	2	G02 <sup>ⓐ</sup>	201.	201.	—	—
	2	—	G20 <sup>ⓐ</sup>	201.	201.	—	—
	2	2	G22 <sup>ⓐ</sup>	403.	403.	403.	—
	4	0	G40 <sup>ⓐ</sup>	403.	403.	403.	—
	4	4	G44 <sup>ⓐ</sup>	806.	806.	—	—
	6	2	G62 <sup>ⓐ</sup>	806.	806.	—	—
30, 32 (1-winding)	8	0	G80 <sup>ⓐ</sup>	806.	806.	—	—
	0	2	G02 <sup>ⓐ</sup>	—	201.	—	—
	2	—	G20 <sup>ⓐ</sup>	—	201.	—	—
	2	2	G22 <sup>ⓐ</sup>	403.	403.	—	—
	4	—	G40 <sup>ⓐ</sup>	403.	403.	—	—
	4	4	G44 <sup>ⓐ</sup>	—	806.	—	—
6	2	G62 <sup>ⓐ</sup>	—	806.	—	—	
8	—	G80 <sup>ⓐ</sup>	—	806.	—	—	
LE, CLM, CM	1	1	G11	201.	—	—	—
CLM, CM	0	2	G02 <sup>ⓐ</sup>	201.	—	—	—
	2	0	G20 <sup>ⓐ</sup>	201.	—	—	—
	2	2	G22 <sup>ⓐ</sup>	201.	—	—	—
	2	2	G22 <sup>ⓐ</sup>	201.	—	—	—

CONTROL PRODUCTS 16

NEMA & General Purpose Control

## Overload Options

Class 14, 17, 18, 22, 25, 26, 30, 32, 36, 37							
Description	Trip Class	Phase	Contacts	Catalog Number Suffix	Controller Size—List Price \$		
					00-2 <sup>1</sup> / <sub>2</sub>	3-4	5, 6
Ambient Compensated Bimetal	Class 10 or 20 (K or E heaters)	3-Phase or Single Phase	NO & NC, SPDT	91	54. <sup>ⓐ</sup>	—	—
			NC	81	NC	—	—
ESP100 or 3RB20 (Sz 5-6)	Class 10 Class 30	3-Phase	NC	51	NC	NC	NC
			NC	53	NC	NC	—

ⓐ Auxiliary contacts will be added evenly across contactors. (i.e. Class 22, G02 suffix will add 2 NC contacts (one per contactor).)

ⓑ Double the price addition for Class 30 and 32.

ⓒ For class 83 and 84 contacts will be added to both starters. Price x 2.

# Factory Modifications

Selection

## Ordering Information

- Prices shown are additions to standard equipment prices as listed in the catalog and are not to be used as separate selling prices. All modifications will consist of Siemens standard components as available. Standard equipment dimensions and enclosure construction may not apply when certain modifications and special features are added.
- Catalog Number Suffixes indicate numbers or letters added to the end of a catalog number. Example: 14DSE32BA becomes 14DSE32BAA1.

## Control Options

Description	Class	Enclosure Type	Catalog Number Suffix	List Price \$
Lighting Control Modules	CLM 20 Amp	All	2W, 3W, 3WS	466. 725. 765.
Surge Suppression for 120V AC Coil <sup>Ⓞ</sup>	14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 83, 84, 87, 88	All	SS	82.
Disconnect Switch Interlock 2 NO/2 NC	DPDT	1, 3, 4, 4X, 12	GY	134.
Motor Circuit Protector Interlock NO/NC	SPDT	18, 26, 32, 37, CM, LE	GY	264.
Lightning Arrestor	All	All	L	365.
Circuit Breaker Shunt Trip	18, 26, 32, 37, 84, 87, 88, CM, LE	All	L6	753.
Circuit Breaker Undervoltage Trip	18, 26, 32, 37, 84, 87, 88, CM, LE	All	L7	753.
Circuit Breaker Alarm Switch Trip	18, 26, 32, 37, 84, 87, 88, CM, LE	All	L8	753.
NO alarm aux contact for ESP OL <sup>Ⓞ</sup>	14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 83, 84, 87, 88	All	L9	50.
Ground Lug – 1 Conductor	All	All	L10	73.
Control Circuit Fuse and Holder (Transformer Primary Fusing)	All	All	F1 (1 fuse) F2 (2 fuses)	200. 200.
Control Circuit Circuit Breaker Internally Operated	All <sup>Ⓞ</sup>	All	F4	795.
Space Heater (120V separate control)	All <sup>Ⓞ</sup>	All	SH	639.
Space Heater with Thermostat (120V separate control)	All <sup>Ⓞ</sup>	All	ST	686.
Surge Capacitor	87, 88	All	SC	439.
Alarm Package (includes horn, light, relay & push-button)	83, 84, 87, 88	All	M7	1371.
Backspin Protection	87, 88	All	T5	712.
Minimum Run Timer 0.2 sec. - 3 mins.	87, 88	All	T6	712.
Blown Fuse Indicator Light	17, 25, 32, 37, 84, 87, 88, CM, LE	All	L11	456.
Single Phase 120VAC Combination Starter	17, 18	All	Z1 <sup>Ⓞ</sup>	NC
Single Phase 240VAC Combination Starter	17, 18	All	Z1 <sup>Ⓞ</sup>	NC

## Reversing Options

Description	Class	Catalog Number Suffix	Controller Size — List Price \$								
			0	1	1¼	2	2½	3	3½	4	5
Reversing in one speed only 2 speed 1 winding	30, 32	R6	1033.	1095.	1335.	1571.	1940.	2281.	2620.	3081.	—
Reversing in one speed only 2 speed 2 winding		R7	1000.	1137.	1361.	1602.	2003.	2356.	2702.	3181.	—
Reversing in both speeds 2 speed 1 winding		R8	1395.	1607.	2158.	2539.	3213.	3780.	4983.	5862.	—
Reversing in both speeds 2 speed 2 winding		R9	1551.	1772.	2518.	2962.	3618.	3617.	4937.	5809.	—
Reversing for Reduced Voltage	36, 37	R	1240.	1314.	1314.	3597.	3597.	8237.	8237.	8237.	9844.

## Enclosure Options Class 36, 37

Class	Enclosure Type	Change the 8th Character of the Catalog Number to:	Controller Size — List Price \$					
			0–1¼	2, 2½	3	3½, 4	5	6
36	NEMA 12/3R <sup>Ⓞ</sup>	N	913.	1142.	1371.	1826.	2466.	3425.
37	NEMA 4 (Painted)	E	1095.	1233.	1781.	2804.	5205.	6850.
37	NEMA 4 (Stainless Steel)	W	1314.	1479.	2137.	3363.	—	—

## Enclosure Options Class 14, 17, 18

Class	Enclosure Type	Change the 7th Character of the Catalog Number with Bimetal OL to:	Change the 8th Character of the Catalog Number with ESP OL to:	Controller Size – List Price Adder \$				
				00–1 3/4	2–2 1/2	3	3 1/2–4	5–8
14	NEMA 4/4X (316 Stainless Steel)	X	X	50.	165.	165.	165.	—
14 (Extra Wide)	NEMA 4/4X (316 Stainless Steel)	X	X	87.	87.	189.	189.	—
17 & 18	NEMA 4/4X (316 Stainless Steel)	X	X	272.	272.	272.	390.	—

Note: Add price to the standard 304 stainless steel unit price.

<sup>Ⓞ</sup> Supplied as NEMA 12, field convertible to NEMA 3R.  
<sup>Ⓢ</sup> For bimetal OL, order cat. no. with "91" suffix.  
<sup>Ⓣ</sup> Specify the single phase voltage when ordering.

<sup>Ⓞ</sup> Surge Suppression for NEMA sizes 5 – 8 are supplied internal with the coil.

# Factory Modifications

## Dimensions

### Ordering Information

- ▶ Prices shown are additions to standard equipment prices as listed in the catalog and are not to be used as separate selling prices. All modifications will consist of Siemens standard components as available. Standard equipment dimensions and enclosure construction may not apply when certain modifications and special features are added.
- ▶ Catalog Number Suffixes indicate numbers or letters added to the end of a catalog number. Example: 14DSE32BA becomes 14DSE32BAR40.

### Control Relays

Description	Class	Enclosure Type	Suffix	List Price \$
Control Relay <sup>①</sup> 4-Poles Max	All	1, 3, 4, 7, 9, 12	R40	1077.
			R22	
			R04	
Under Voltage, Phase Failure, Phase Sequence, Phase Unbalance (460V) Under Voltage, Phase Failure, Phase Sequence, Phase Unbalance (230V) Under Voltage, Phase Failure, Phase Sequence, Phase Unbalance (575V)	All	1, 3, 4, 7 & 9, 12	R1 <sup>②</sup>	1007.
R2 <sup>②</sup>				
R4 <sup>②</sup>				
Ground Fault Relay	All	1, 3, 4, 7, 9, 12	R5	536.
Electronic On Delay Relay (.15s–100h) 24V/120V <sup>③</sup>			T1	1004.
Electronic On Delay Relay (.15s–100h) 24V/240V <sup>③④</sup>			T2	
Electronic Off Delay Relay (.15s–100s) 120V <sup>③</sup>			T3	
Electronic Off Delay Relay (.15s–100s) 240V <sup>③④</sup>	T4			
24 hour time clock 24 hour time clock with day omission 7 day time clock	LE, CLM, CM	All	T7 T8 T9	1004.
Compelling Relay	30, 32	1, 4, 12	A6	602.
Acceleration Control			A7	1371.
Deceleration Control			A8	

### Meters—Mounted on Enclosure

Description	Class	Enclosure Type	Suffix	List <sup>③</sup> Price \$
Ammeter (includes a C.T. if necessary)	14 <sup>④</sup> , 17, 18, 22 <sup>④</sup> , 25, 26, 36, 37, 40 <sup>④</sup> , 43 <sup>④</sup> , 83, 84	1, 12	M1	1807.
Ammeter and Switch (3-Phase with 3 C.T.'s)			M2	2739.
Voltmeter			M3	1807.
Voltmeter and Switch (3-Phase)			M4	2739.
Elapsed Time Meter <sup>⑤</sup>			M5	530.
Wattmeter			M6	3706.

### Function Identification Plates

Description	Class	Suffix	List Price \$
Function identification plate, with marking as specified	All	N1	89.

### Terminal Blocks<sup>①</sup>

Description	Class	Suffix	List Price \$
3 Point Terminal	All	TC3 <sup>⑤</sup>	219.
6 Point Terminal		TC6 <sup>⑤</sup>	439.
9 Point Terminal		TC9 <sup>⑤</sup>	658.

### Special Ratings

Description	Class	Suffix	List Price \$
Service Entrance Rating	17, 18, 25, 26, 32, 37, 84, 87	N3	237.

① Supplied mounted and unwired.

② Not available on Class 36, 37.

③ Price x 2 Class 83 and 84.

④ ETM available with 120V coil only.

⑤ For terminal point more than 9 terminals use additional suffixes. Max 3 suffixes can be selected.

⑥ Available 3-Phase only.

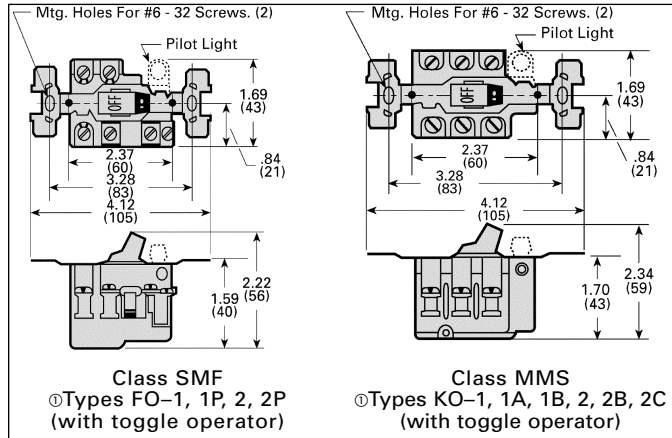


# Manual Control

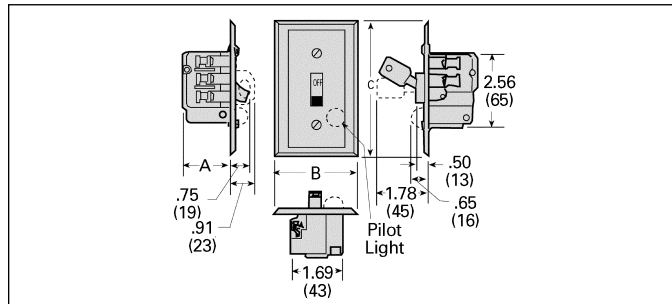
## Class SMF, MMS

## Dimensions

### Class SMF and MMS Open Type

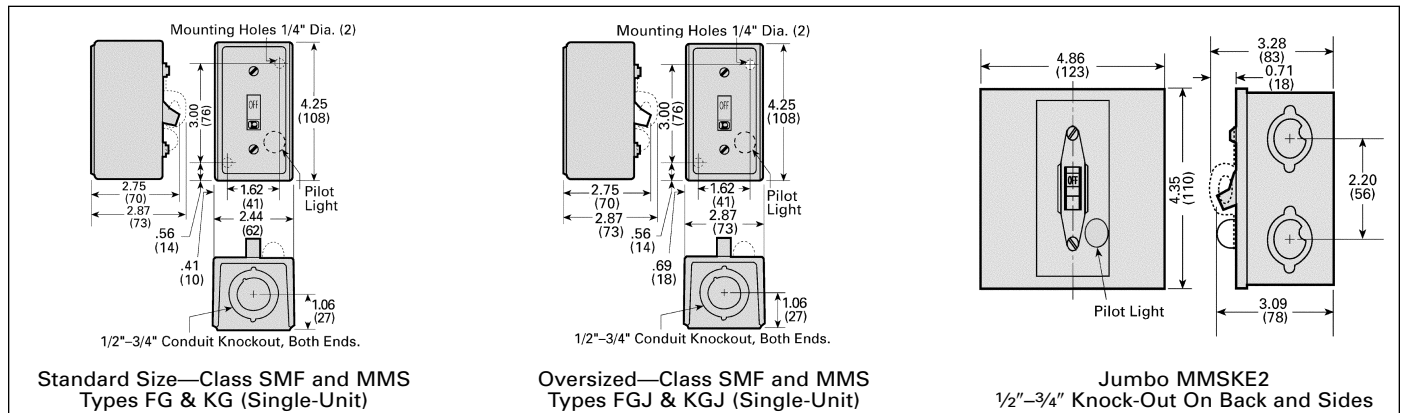


### NEMA Type 1B General Purpose Flush Mounting



Device	Type of Operator	Type	Dimensions in Inches (mm)		
			A	B	C
Class SMF Fractional HP Starter	Toggle	FF1, 1P, 2, 2P	1.44 (37)	2.75 (70)	4.50 (114)
		FS1, 1P, 2, 2P	1.44 (37)	3.50 (89)	5.25 (133)
	Key	FF3, 3P, 4, 4P	1.44 (37)	2.75 (70)	4.50 (114)
		FS3, 3P, 4, 4P	1.44 (37)	3.50 (89)	5.25 (133)
Class MMS Motor Starting Switch	Toggle	KF1, 1A, 1B, 2, 2B, 2C	1.75 (44)	2.75 (70)	4.50 (114)
		KS1, 1A, 1B, 2, 2B, 2C	1.75 (44)	3.50 (89)	5.25 (133)
	Key	KF3, 3A, 3B, 4, 4B, 4C	1.75 (44)	2.75 (70)	4.50 (114)
		KS3, 3A, 3B, 4, 4B, 4C	1.75 (44)	3.50 (89)	5.25 (133)

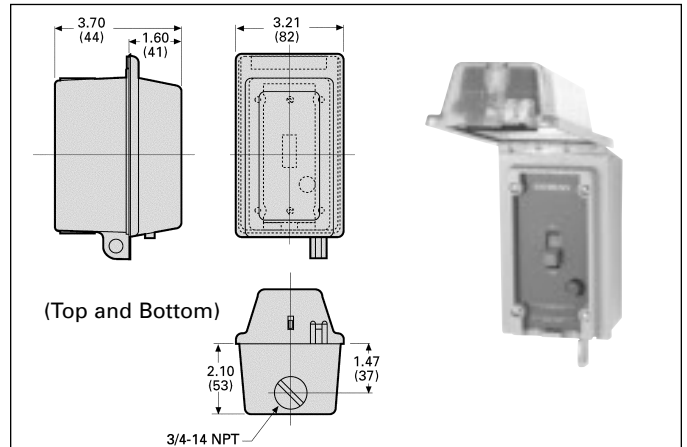
### NEMA Type 1 General Purpose Surface Mounting Enclosures



**Note:** Dimensions for reference, not for construction.  
 Dimensions are in inches (mm).

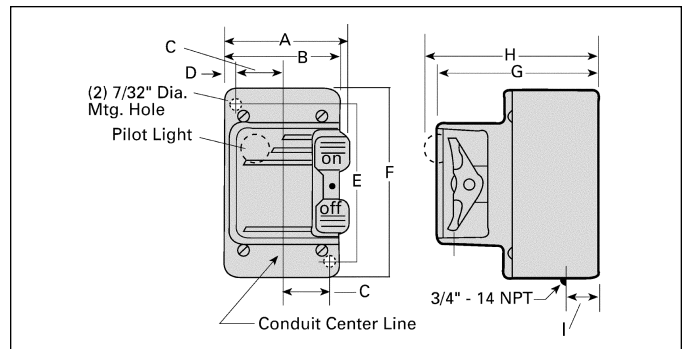
ⓐ Dimensions typical for key operator devices.

### NEMA Type 3R, 4 and 12



Device	Class	Type
Fractional HP Starter	SMF	FWN1, 1P, FWN2, 2P FWN3, 3P, FW4, 4P
Motor Starting Switch	MMS	KWN1, 1A, 1B, KWN2, 2B, 2C KWN3, 3A, 3B, KWN4, 4B, 4C

### NEMA Type 4 Watertight Die Cast Zinc Enclosure



Dimensions in Inches (mm)								
A	B	C	D	E	F	G	H	I
3.00 (76)	2.75 (70)	1.13 (28)	0.25 (6)	3.75 (95)	4.69 (119)	4.25 (108)	4.56 (116)	0.78 (20)

Device	Class	Type
Fractional HP Starter	SMF	FW1, 1P, 2, 2P
Motor Starting Switch	MMS	KW1, 1A, 1B, 2, 2B, 2C

# Manual Control

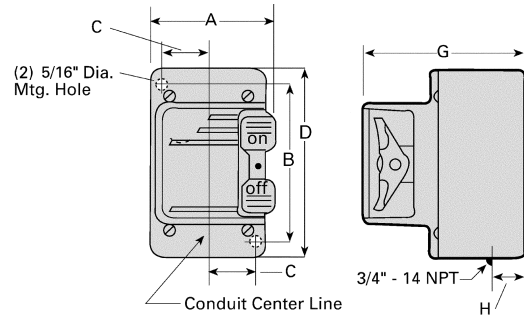
## Class SMF, MMS

## Dimensions

### NEMA Type 7 and 9 Cast Aluminum Enclosure

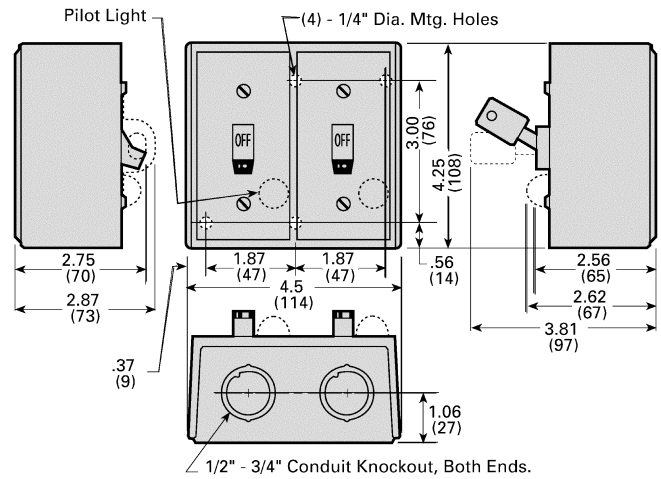
Dimensions in Inches (mm)					
A	B	C	D	G	H
4.00 (101)	5.75 (146)	1.38 (35)	6.36 (161)	4.38 (111)	1.20 (30)

Device	Class	Type
Fractional HP Starter	SMF	FR1, FR2
Motor Starting Switch	MMS	KR1, KR2



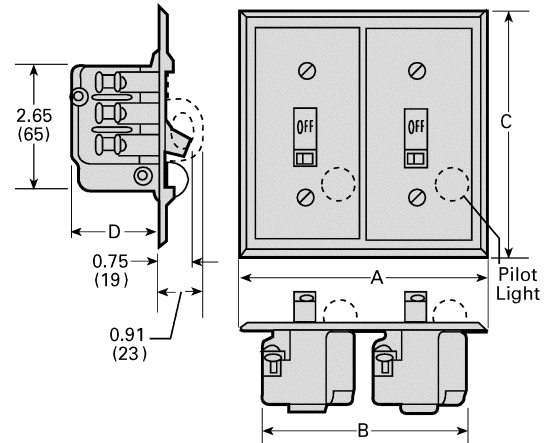
### NEMA Type 1 General Purpose Enclosure For Two Unit Devices

Device	Type of Operator	Class	Type
One Starter	Toggle	SMF	FG02, 02P
	Key	SMF	FG04P
Two Starters	Toggle	SMF	FG222, 222P
	Key	SMF	FG44P
One Starter and One Sel. Switch <sup>①</sup>	Toggle	SMF	FG71, 71P, 72, 72P
	Key	SMF	FG74P
Reversing Switch <sup>②</sup>	Toggle	MRS	KG11, 11A, 11B, 22, 22A, 22B, 22C
Two Speed Starter	Toggle	SMF	FG11, 11P, 22, 22P
Two Speed Switch	Toggle	MMS	KG11, 11A, 11B, 22, 22B, 22C



### NEMA Type 1B General Purpose Flush Mounting For Two Unit Devices

Device <sup>③</sup>	Type of Operator	Class	Type	A	B	C	D
Two Starters	Toggle	SMF	FF22, 22P	5.25 (133)	3.75 (95)	5.25 (133)	1.44 (37)
			FS22P	4.56 (116)	3.50 (89)	4.50 (114)	1.44 (37)
	Key	SMF	FF44P	5.25 (133)	3.75 (95)	5.25 (133)	1.44 (37)
			FS44P	4.56 (116)	3.50 (89)	4.50 (114)	1.44 (37)
One Starter and One Selector Switch <sup>④</sup>	Toggle	SMF	FF71, 71P, 72, 72P	5.25 (133)	0.75 (19)	5.25 (133)	2.00 (51)
			FS71P, 72P	4.56 (116)	3.50 (89)	4.50 (114)	2.00 (51)
	Key	SMF	FF74P	5.25 (133)	3.75 (95)	5.25 (133)	2.00 (51)
			FS74P	4.56 (116)	3.50 (89)	4.50 (114)	2.00 (51)
Reversing Switch	Toggle	MRS	KF11, 11A, 11B KF22, 22A 22B, 22C	5.25 (133)	3.75 (95)	5.25 (133)	1.75 (44)
Two Speed Switch	Toggle	SMF	FF11, 11P, 22, 22P	5.25 (133)	3.75 (95)	5.25 (133)	1.44 (37)
Two Speed Switch	Toggle	MMS	KF11, 11A, 11B 22, 22B, 22C	5.25 (133)	3.75 (95)	5.25 (133)	1.44 (37)



**Note:** Dimensions for reference, not for construction. Dimensions are in inches (mm).

① Selector switch is on the left, increases overall depth to 3.50 in. (89 mm).

② Only one pilot light (located on right) is used on MRS switches.

③ Dimensions include factory wired power connections.

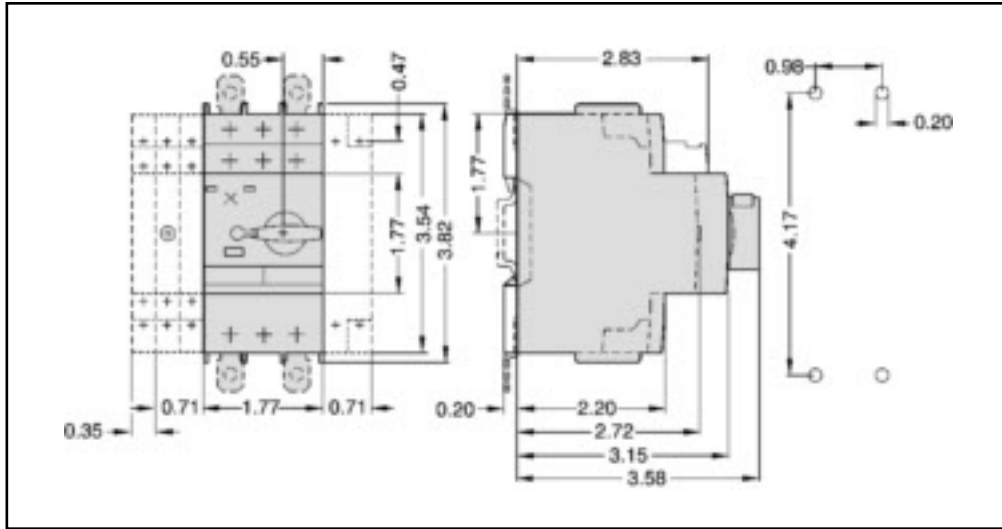
④ Selector switch is on the left, extends 1.62 in. (41 mm) from mounting surface.

# Manual Control

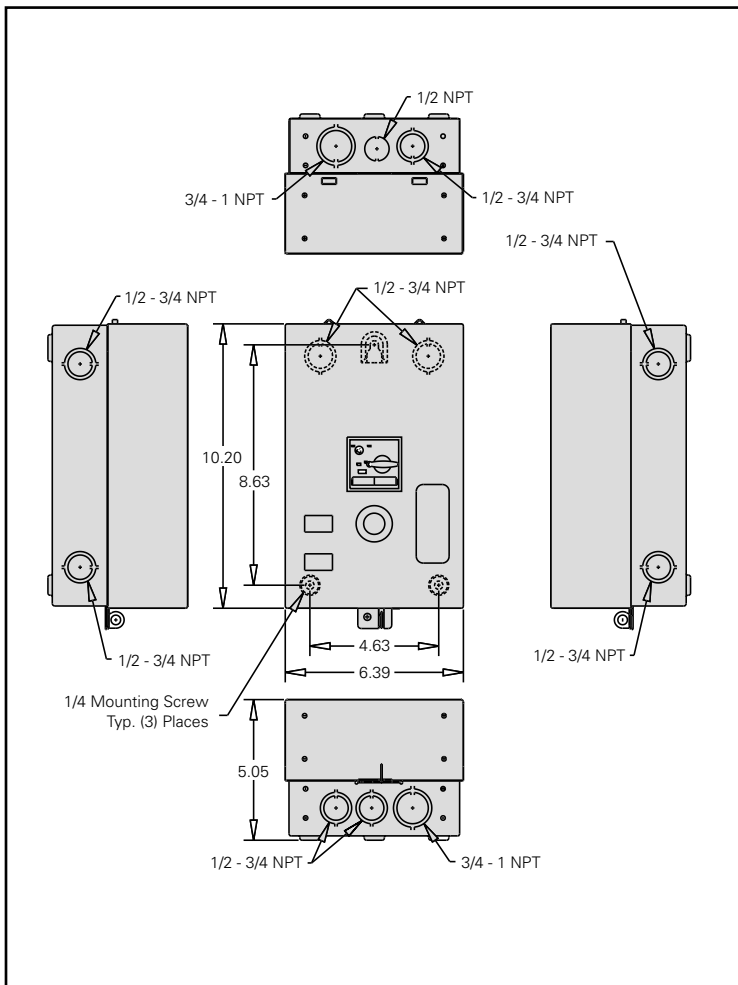
## Class 11 - 3RV

## Dimensions

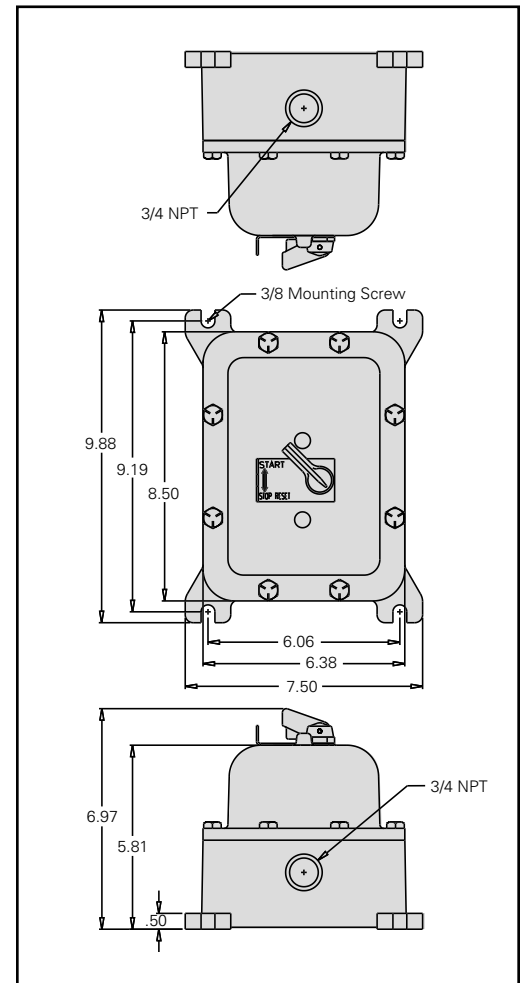
3RV102



### Class 11 - NEMA 1 Enclosure



### Class 11 - NEMA 7 & 9, 3 & 4, and NEMA 7 & 9 Enclosure

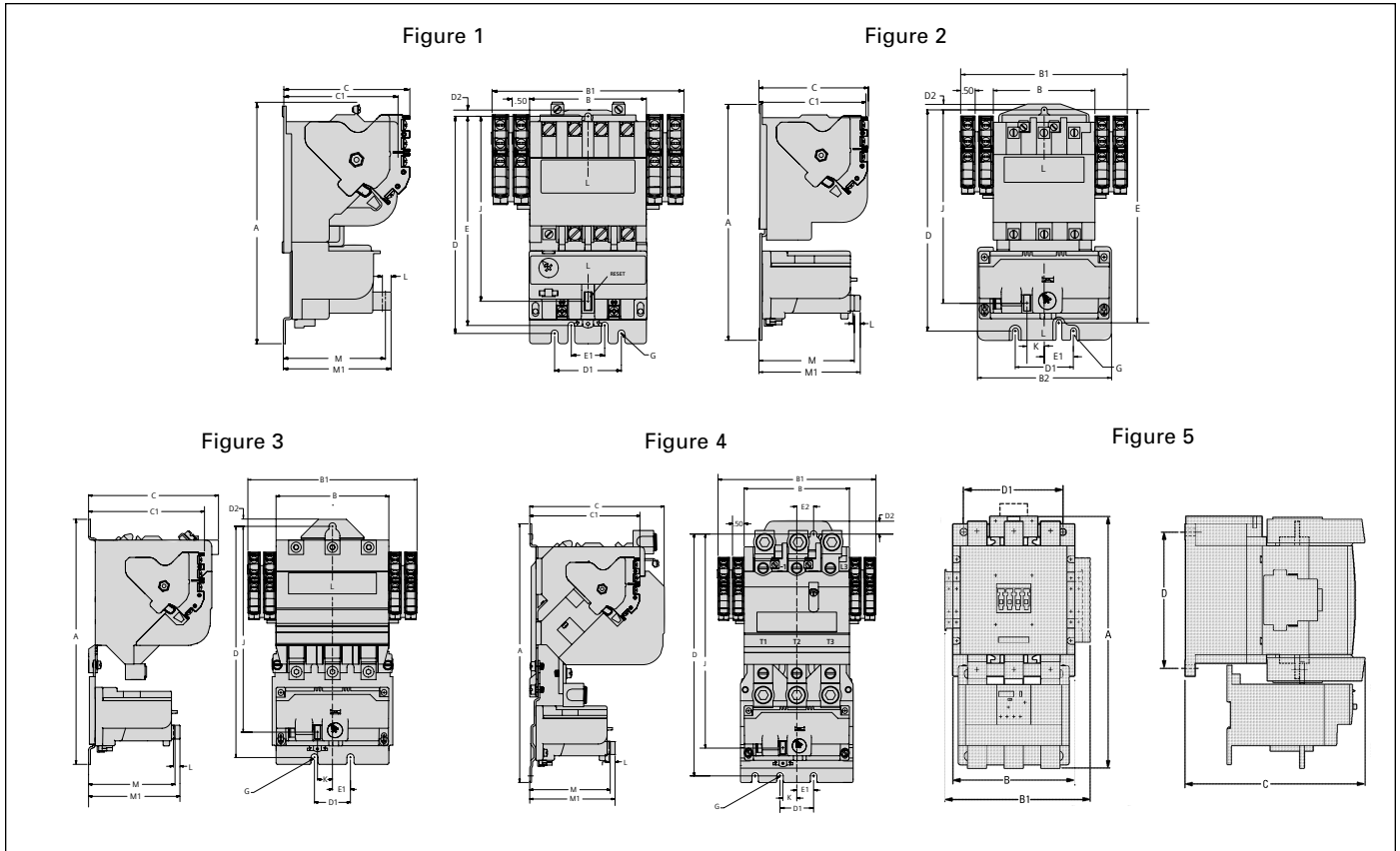


**Note:** Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

# Heavy Duty Motor Starters

## Solid State Overload, Class 14

## Dimensions



### Open Type Solid State Overload

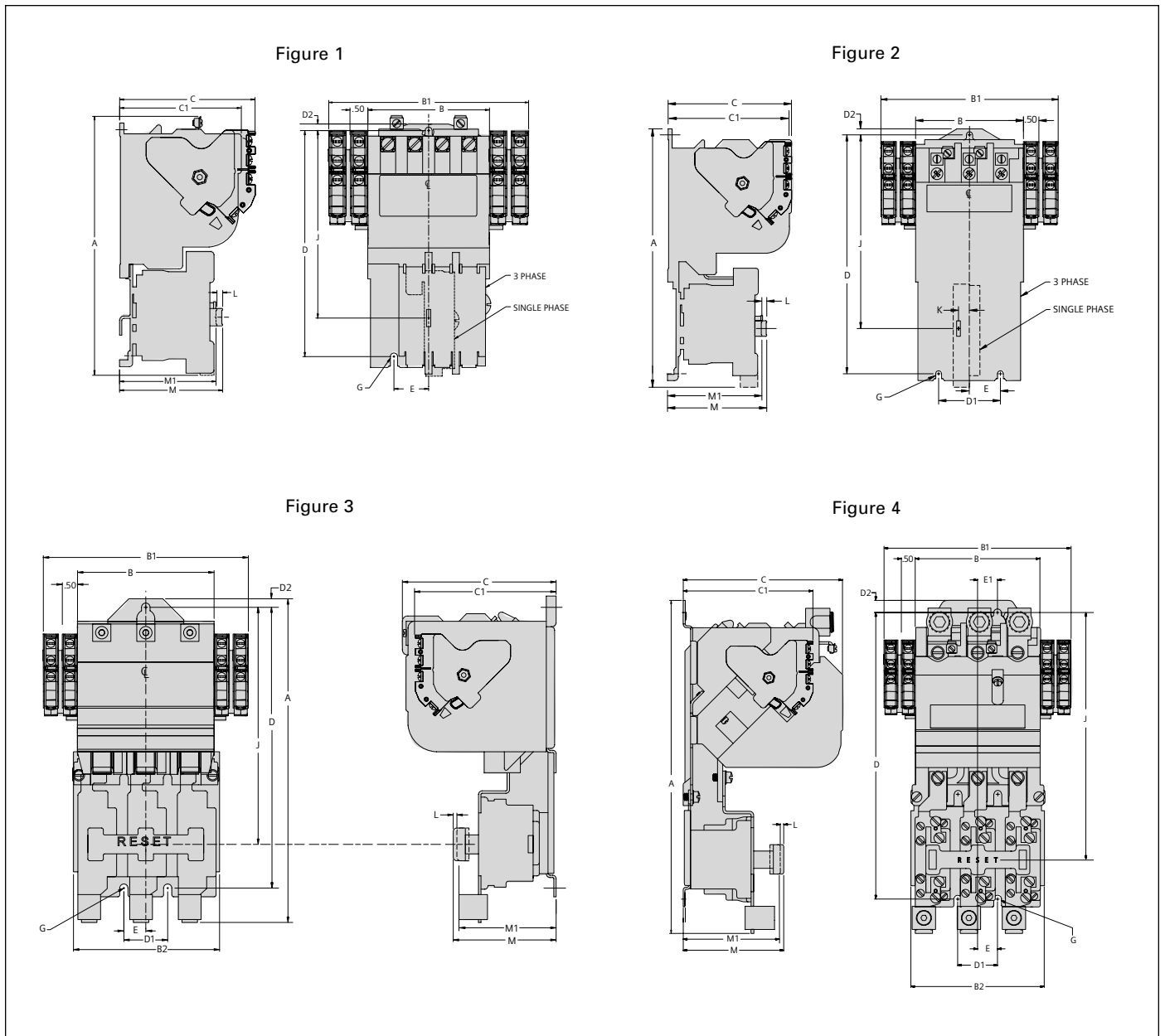
Size	Figure	Outline Dimensions					Mounting Dimensions						Mounting Screw	Reset Dimensions					
		A	B	B1	B2	C	C1	D	D1	D2	E	E1		E2	G	J	K	L	M
00-1/4	1	7.44 (189)	3.50 (89)	5.75 (146)	—	3.75 (95)	3.50 (89)	6.50 (165)	2.00 (51)	0.19 (5)	6.27 (159)	1.00 (25)	—	#10	5.55 (141)	—	0.26 (7)	3.06 (78)	3.22 (82)
2-2 1/2	2	8.13 (207)	3.50 (89)	5.75 (146)	4.60 (117)	4.00 (102)	3.77 (96)	7.62 (194)	2.00 (51)	0.19 (5)	—	1.00 (25)	—	#10	6.67 (169)	0.60 (15)	0.26 (7)	3.28 (83)	3.49 (88)
3-3 1/2	3	9.78 (248)	4.50 (114)	6.75 (171)	—	4.66 (118)	5.19 (132)	9.22 (234)	1.44 (37)	0.28 (7)	—	0.72 (18)	—	0.25 (6)	8.22 (209)	0.60 (15)	0.26 (7)	3.44 (87)	3.64 (92)
4	4	11.06 (281)	4.50 (114)	6.75 (171)	—	4.66 (118)	5.75 (146)	10.34 (263)	1.44 (37)	0.44 (11)	—	0.72 (18)	0.72 (18)	0.25 (6)	9.16 (233)	0.72 (18)	0.26 (7)	3.44 (87)	3.64 (92)
5	5	12.76 (324)	5.71 (145)	6.89 (175)	—	8.54 (217)	—	7.09 (180)	4.72 (120)	—	—	—	—	0.35 (9)	—	—	—	—	—
6	5	13.03 (331)	6.30 (160)	7.48 (190)	—	9.29 (236)	—	7.09 (180)	5.12 (130)	—	—	—	—	0.35 (9)	—	—	—	—	—

Note: Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

# Heavy Duty Motor Starters & Contactors

## Ambient Compensated Bimetal Class 14

## Dimensions



### Open Type Ambient Compensated Bimetal Overload

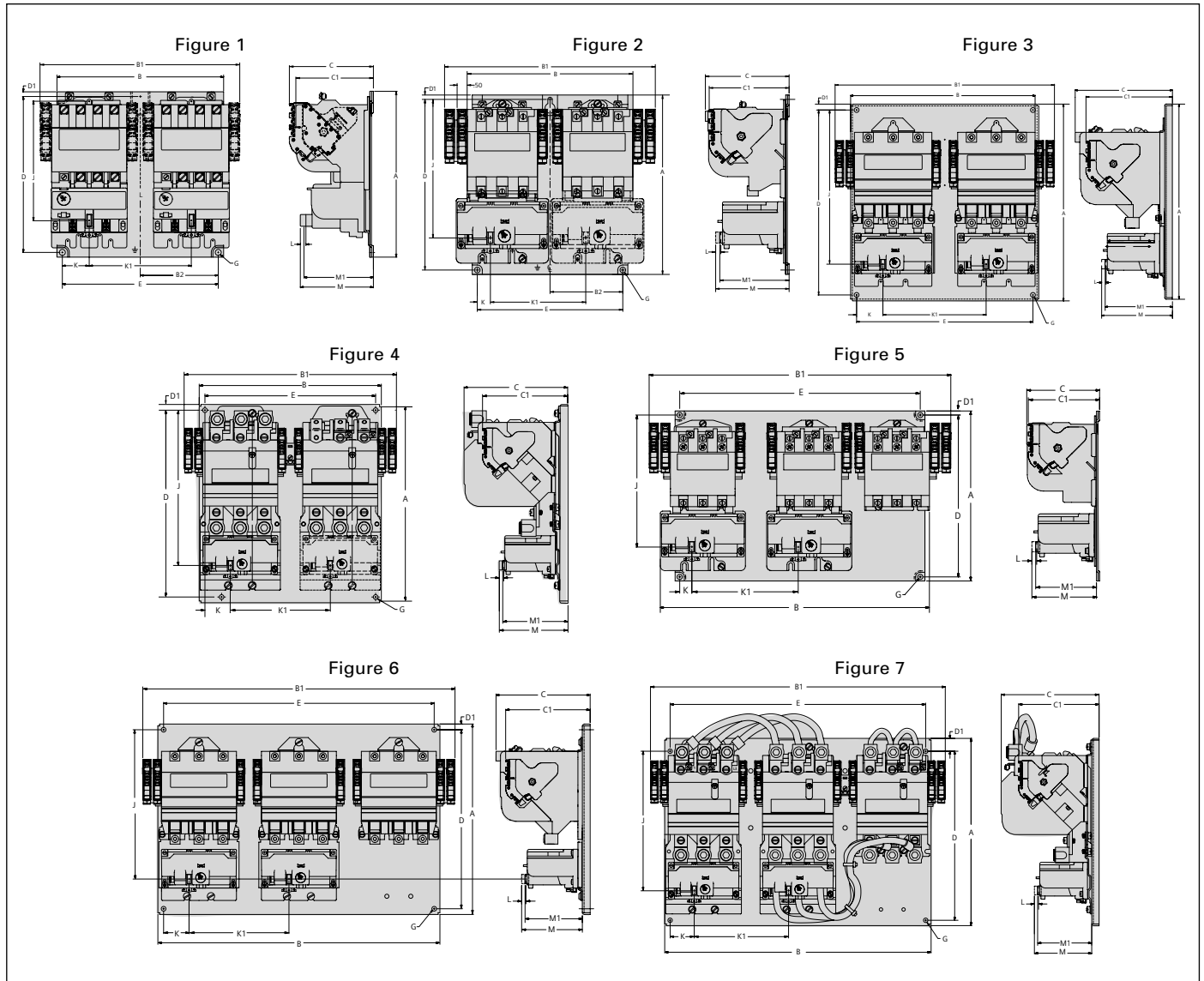
Size	Figure	Outline Dimensions					Mounting Dimensions					Mounting Screw	Reset Dimensions				
		A	B	B1	C	C1	D	D1	D2	E	E1		G	J	K	L	M
00-1¼	1	7.45 (189)	3.50 (89)	5.75 (146)	3.89 (99)	3.50 (89)	6.50 (165)	—	0.19 (4.8)	1.00 (25)	—	#10	5.39 (137)	—	0.16 (4)	2.97 (75)	2.81 (71)
2-2½	2	8.38 (213)	3.50 (89)	5.75 (146)	4.00 (102)	3.77 (96)	7.75 (197)	2.00 (51)	0.19 (4.8)	1.00 (25)	—	#10	6.28 (160)	0.36 (9)	0.16 (4)	3.22 (82)	3.06 (78)
3-3½	3	10.66 (271)	4.50 (114)	6.75 (171)	5.06 (129)	4.66 (118)	9.25 (235)	1.44 (37)	0.28 (7)	0.72 (18)	—	0.25 (6)	7.81 (198)	—	0.12 (3)	3.39 (86)	3.27 (83)
4	4	12.02 (305)	4.50 (114)	6.75 (171)	5.75 (146)	4.66 (118)	10.34 (263)	1.44 (37)	0.44 (11)	0.72 (18)	0.72 (18)	0.25 (6)	8.78 (223)	—	0.12 (3)	3.63 (92)	3.51 (89)

**Note:** Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

# Reversing & Multispeed Heavy Duty Starters

Solid State Overload Class 22, 30

Dimensions



16  
CONTROL  
PRODUCTS

NEMA & General  
Purpose Control

## Class 22 Reversing & Class 30 2 Speed/2 Winding

Size	Figure	Outline Dimensions						Mounting Dimensions			Mounting Screw	Reset Dimensions					
		A	B	B1	B2	C	C1	D	D1	E		J	K	K1	L	M	M1
00-1¼	1	7.69	8.25	10.50	3.62	3.61	3.92	7.25	0.22	7.25	#10	5.77	1.25	4.75	0.26	3.40	3.23
2-2½	2	8.94	8.25	10.50	3.62	4.17	3.98	8.50	0.22	7.25	#10	6.89	0.65	4.75	0.26	3.66	3.45
3-3½	3	11.44	10.94	12.75	—	5.65	5.03	10.75	0.34	10.25	#10	8.97	1.53	6.00	0.26	4.12	3.91
4	4	11.91	10.94	12.75	—	6.22	5.11	11.22	0.34	10.25	0.25	9.32	1.53	6.00	0.21	4.12	3.91

## Class 30 2 Speed/1 Winding

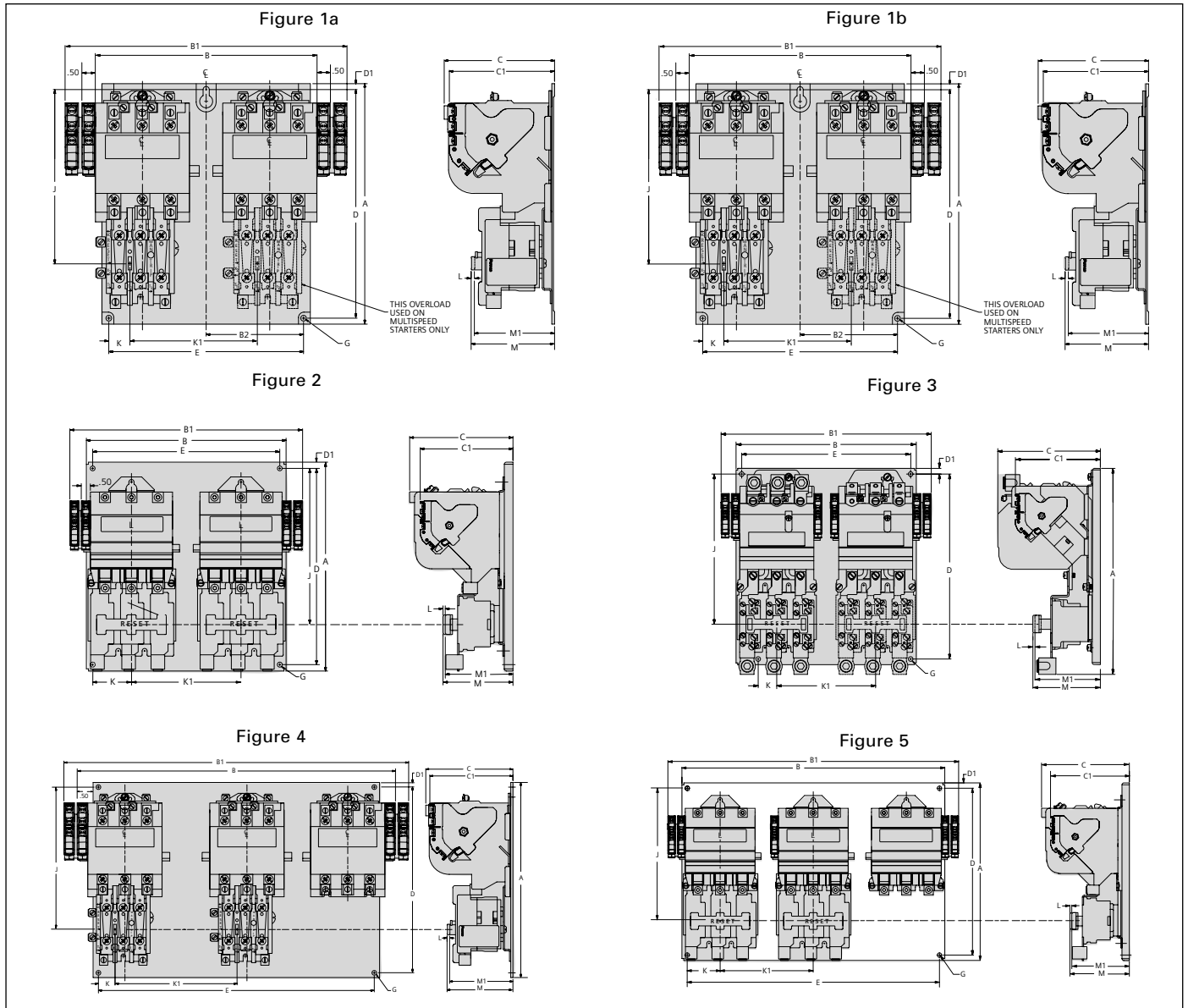
Size	Figure	Outline Dimensions						Mounting Dimensions			Mounting Screw	Reset Dimensions					
		A	B	B1	B2	C	C1	D	D1	E		J	K	K1	L	M	M1
00-1¼	1	7.69	8.25	10.50	3.62	3.61	3.92	7.25	0.22	7.25	#10	5.77	1.25	4.75	0.26	3.40	3.23
2-2½	5	9.19	14.55	16.30	—	3.94	3.85	8.75	0.22	13.00	#10	7.14	0.65	5.75	0.26	3.50	3.29
3-3½	6	11.44	16.94	18.75	—	5.65	5.07	10.75	0.34	16.25	#10	8.97	1.53	6.00	0.26	3.66	3.45
4	7	11.91	16.94	18.75	—	6.22	5.12	10.75	0.82	16.25	#10	8.87	1.53	6.00	0.26	3.66	3.45

Note: Dimensions for reference, not for construction.  
Contact sales office for dimensions not listed.  
Dimensions are in inches (mm).

# Reversing & Multispeed Heavy Duty Starters

## Ambient Compensated Bimetal Overload Class 22, 30

### Dimensions



### Class 22 Reversing & Class 30 2 Speed/2 Winding with Bimetal Overload

Size	Figure	Outline Dimensions						Mounting Screw			Mounting Dimensions G	Reset Dimensions					
		A	B	B1	B2	C	C1	D	D1	E		J	K	K1	L	M	M1
00-1 1/4	1a	7.69	8.25	10.50	3.62	3.92	3.61	7.25	0.22	7.25	#10	5.60	1.25	4.75	0.16	3.12	3.07
2-2 1/2	1b	8.94	8.25	10.50	3.62	4.17	3.98	8.50	0.22	7.25	#10	6.46	0.79	4.75	0.16	3.10	3.05
3-3 1/2	2	11.44	10.94	12.94	—	5.66	5.08	10.75	0.34	10.25	#10	8.56	2.12	6.00	0.12	3.83	3.71
4	3	12.50	10.94	12.75	—	6.22	5.16	11.22	0.34	10.25	0.25	9.11	2.12	6.00	0.12	4.09	3.97

### Class 30 2 Speed/1 Winding with Bimetal Overload

Size	Figure	Outline Dimensions						Mounting Screw			Mounting Dimensions G	Reset Dimensions					
		A	B	B1	B2	C	C1	D	D1	E		J	K	K1	L	M	M1
00-1 1/4	1a	7.69	8.25	10.50	3.62	3.92	3.61	7.25	0.22	7.25	#10	5.60	1.25	4.75	0.16	3.12	3.07
2-2 1/2	4	9.19	14.56	16.25	—	4.11	3.92	8.75	0.22	13.00	0.25	6.71	0.78	5.75	0.16	3.10	3.05
3-3 1/2	5	11.44	16.94	18.75	—	5.66	5.08	10.75	0.34	16.25	0.25	8.56	2.12	6.00	0.12	3.83	3.71

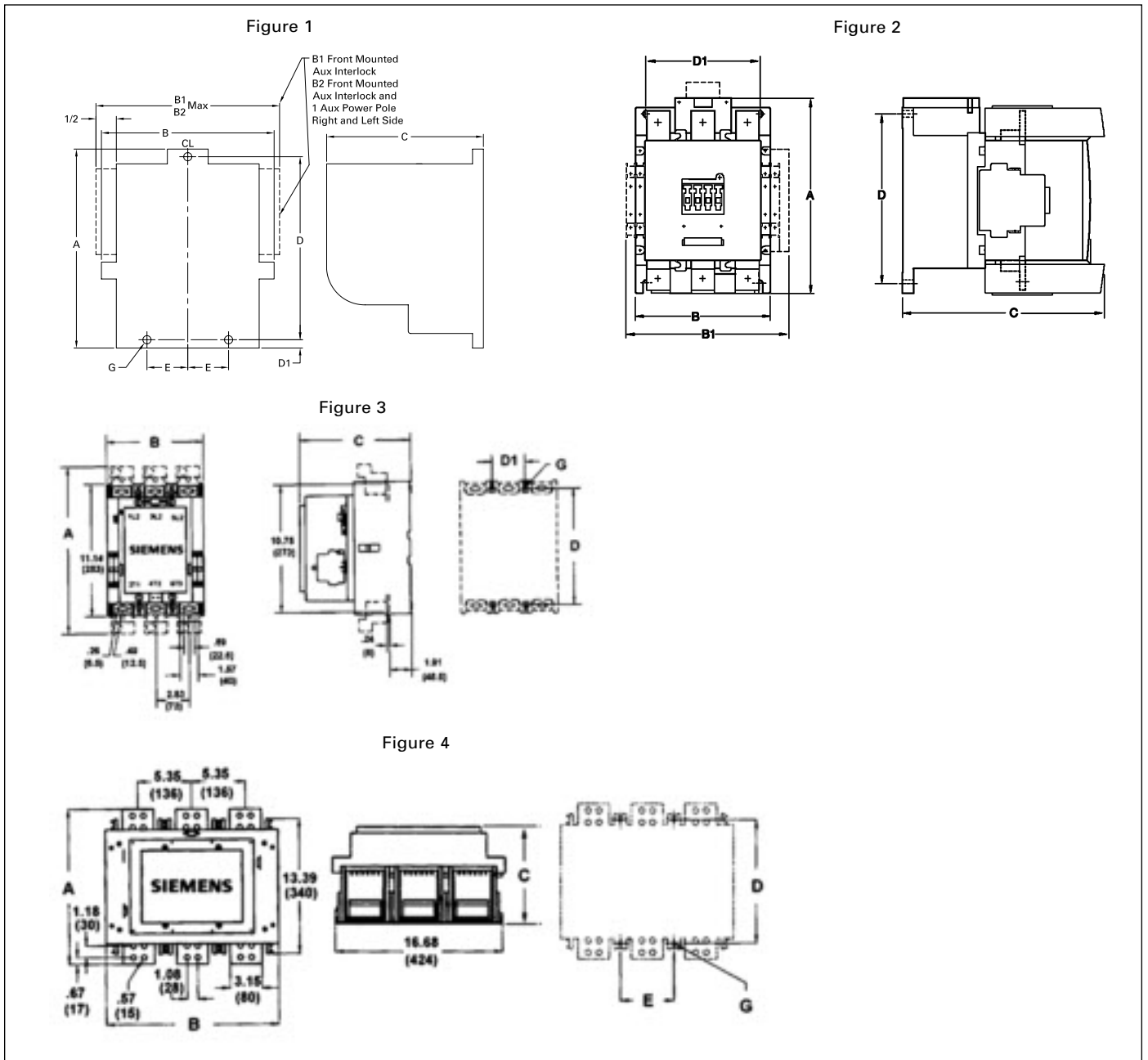
Note: Dimensions for reference, not for construction.  
Contact sales office for dimensions not listed.  
Dimensions are in inches (mm).

# Heavy Duty Contactors

## Class 40

## Dimensions

### Full Voltage Open Type NEMA Contactor Size 00-8



16 CONTROL PRODUCTS

NEMA & General Purpose Control

#### Open Type

Size	3rd Character of Catalog No. ①	Outline Dimensions						Mounting Dimensions			Mounting Screw
		Fig	A	B	B1	B2	C	D	D1	E	
00-1¼	C, D, E	1	4.31 (110)	3.94 (100)	4.25 (108)	4.75 (121)	3.75 (70)	3.94 (100)	0.19 (5)	1.00 (25)	#10
2-2½	FG	1	4.88 (124)	3.94 (100)	4.25 (108)	—	4.00 (102)	4.50 (114)	0.19 (5)	1.00 (25)	#10
3-3½	H, I	1	6.13 (156)	5.13 (130)	5.50 (140)	—	5.06 (129)	5.63 (143)	0.25 (6)	0.75 (19)	0.25 (6)
4	J	1	7.81 (198)	5.19 (132)	5.50 (140)	—	5.75 (146)	6.56 (167)	0.81 (21)	0.75 (19)	0.5 (13)
5	L	2	8.27 (210)	5.71 (145)	6.89 (175)	—	8.54 (217)	7.09 (180)	4.72 (120)	—	0.35 (9)
6	M	2	8.43 (214)	6.3 (160)	7.48 (190)	—	9.29 (236)	7.09 (180)	5.12 (130)	—	0.35 (9)
7	N	3	14.05 (357)	8.27 (210)	—	—	9.53 (242)	9.80 (249)	2.83 (72)	—	0.25 (6)
8	P	4	15.41 (392)	17.23 (438)	—	—	10.56 (268)	12.28 (312)	—	5.35 (136)	0.35 (9)

Note: Dimensions for reference, not for construction. Contact sales office for dimensions not listed. Dimensions are in inches (mm).

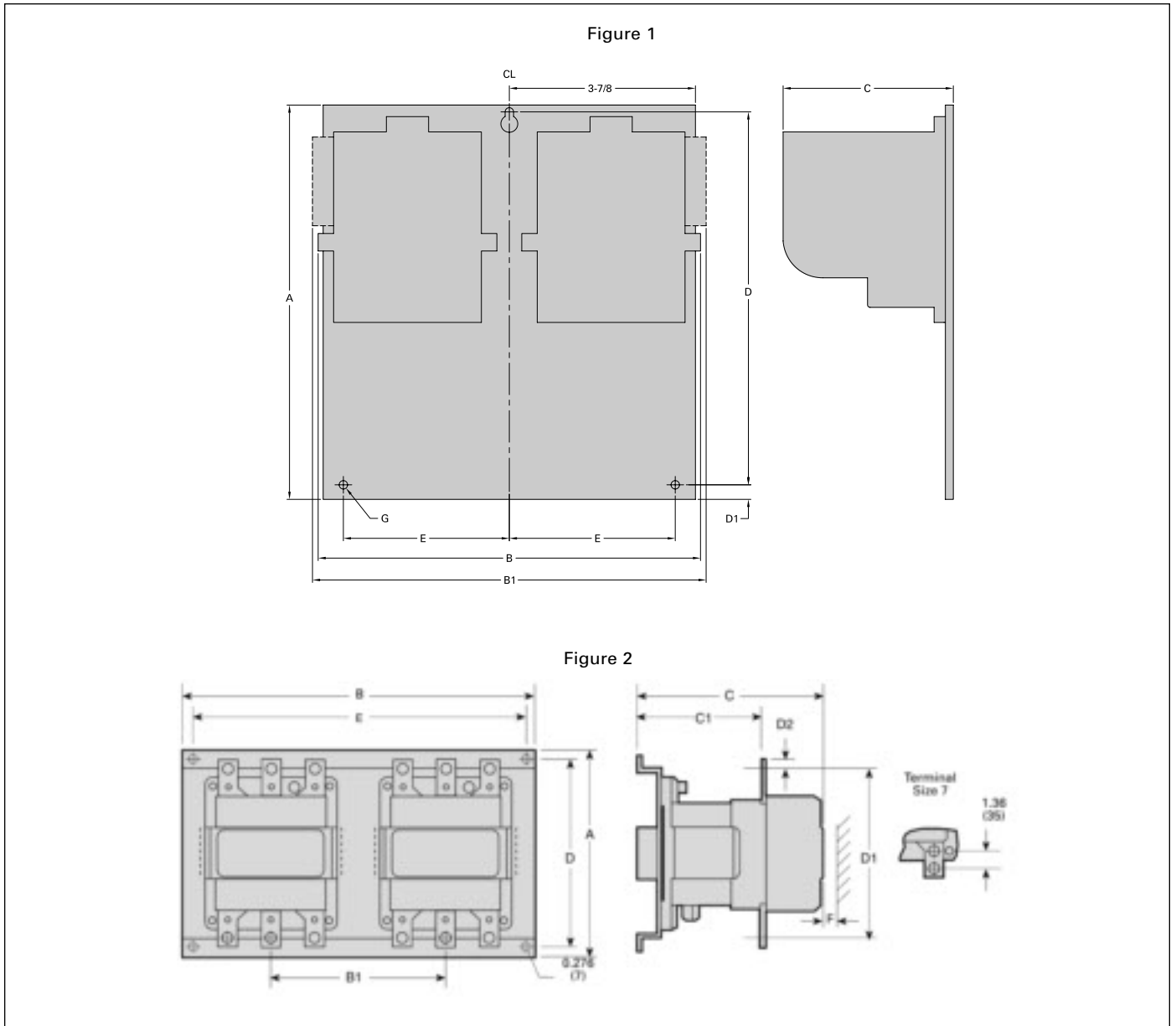
① 3rd character of catalog number identifies contactor rating.



# Magnetic Reversing Contactors

Class 43

Dimensions



## Open Type Horizontal Mounted

Size	Fig.	Outline Dimensions					Mounting Dimensions					Mounting Screw
		A	B	B1	C	C1	D	D1	E	F	G	
00-1¼	1	7.69 (195)	7.75 (197)	9.25 (235)	3.88 (98)	—	7.25 (184)	0.25 (6)	3.63 (92)	—	#10	
2, 2½	1	8.94 (227)	7.75 (197)	9.25 (235)	4.56 (116)	—	8.5 (216)	0.25 (6)	3.63 (92)	—	#10	
3-3½	1	11.44 (291)	10.94 (278)	11.50 (292)	5.19 (132)	—	10.75 (273)	0.38 (6)	5.13 (130)	—	0.25	
4	1	8.50 (216)	10.94 (278)	11.50 (292)	6.25 (159)	—	7.81 (198)	0.38 (6)	5.13 (130)	—	0.25	
5	2	18.07 (459)	14.20 (361)	—	9.44 (240)	—	17.20 (437)	—	9.61 (244)	—	—	
6	2	11.61 (295)	18.88 (480)	9.45 (240)	10.85 (276)	7.44 (189)	10.44 (265)	10.71 (272)	17.72 (450)	1.18 (30)	—	

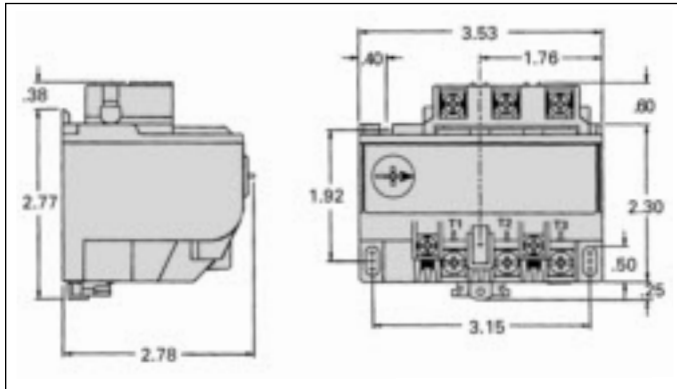
**Note:** Dimensions for reference, not for construction.  
Contact sales office for dimensions not listed.  
Dimensions are in inches (mm).

# Overload Relays & Current Sensitive Relays

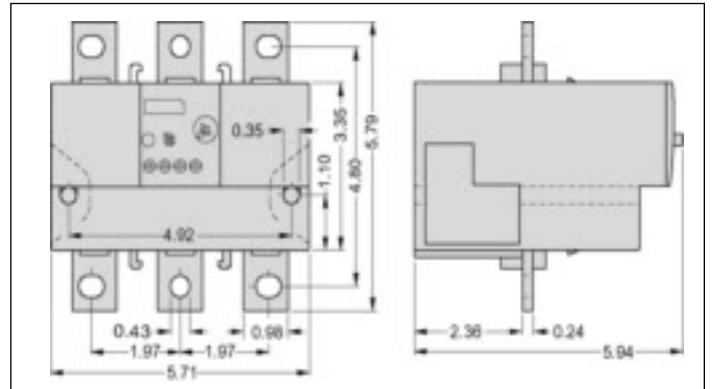
## Solid State Overload

## Dimensions

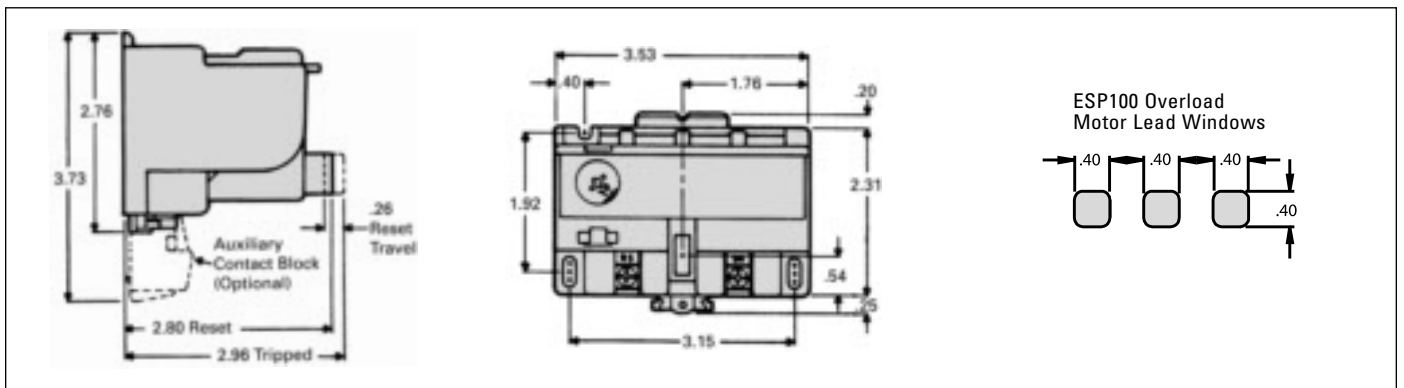
Dimensions "A" Frame—ESP100 Solid State Overload



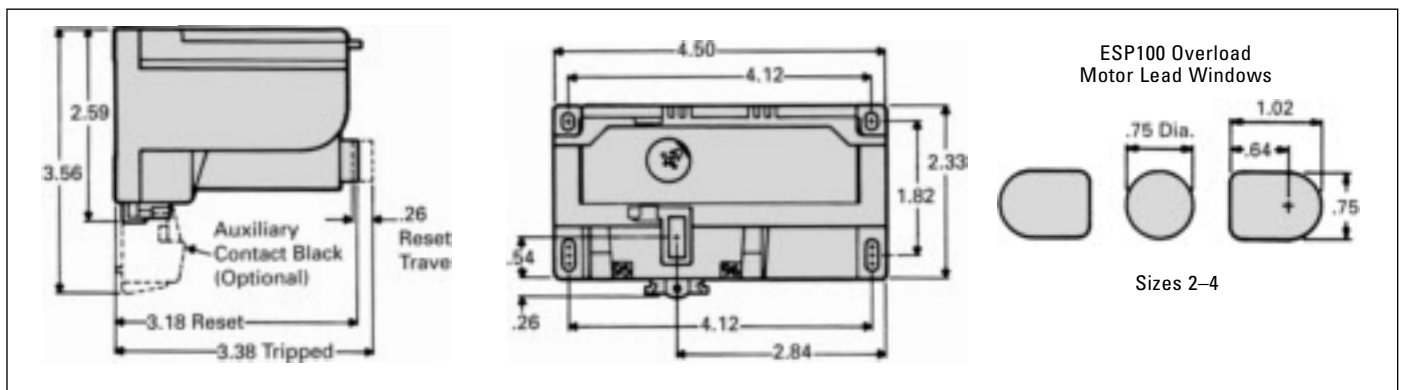
Overload (55 - 630 Amps), SIRIUS 3RB20



Dimensions "A1" Frame—ESP100 Solid State Overload

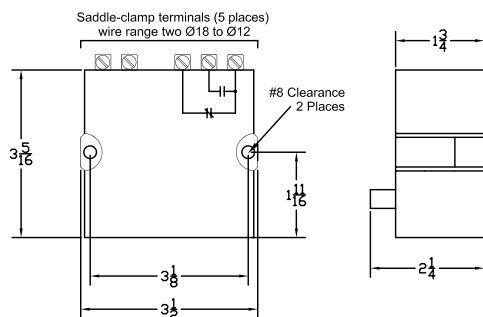


Dimensions "B" Frame—ESP100 Solid State Overload

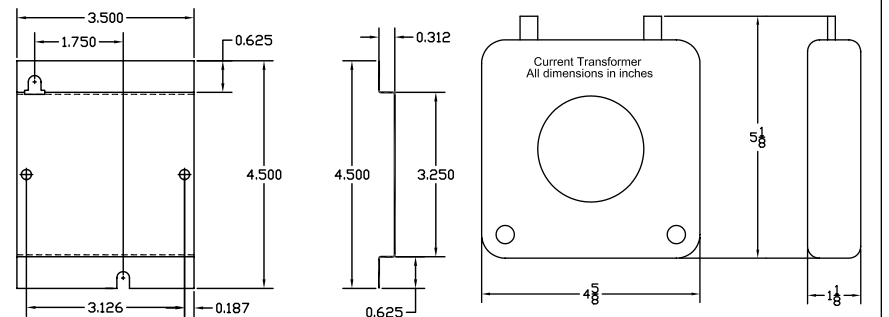


## Current Sensitive Relay

Free Standing



Mounting Panel

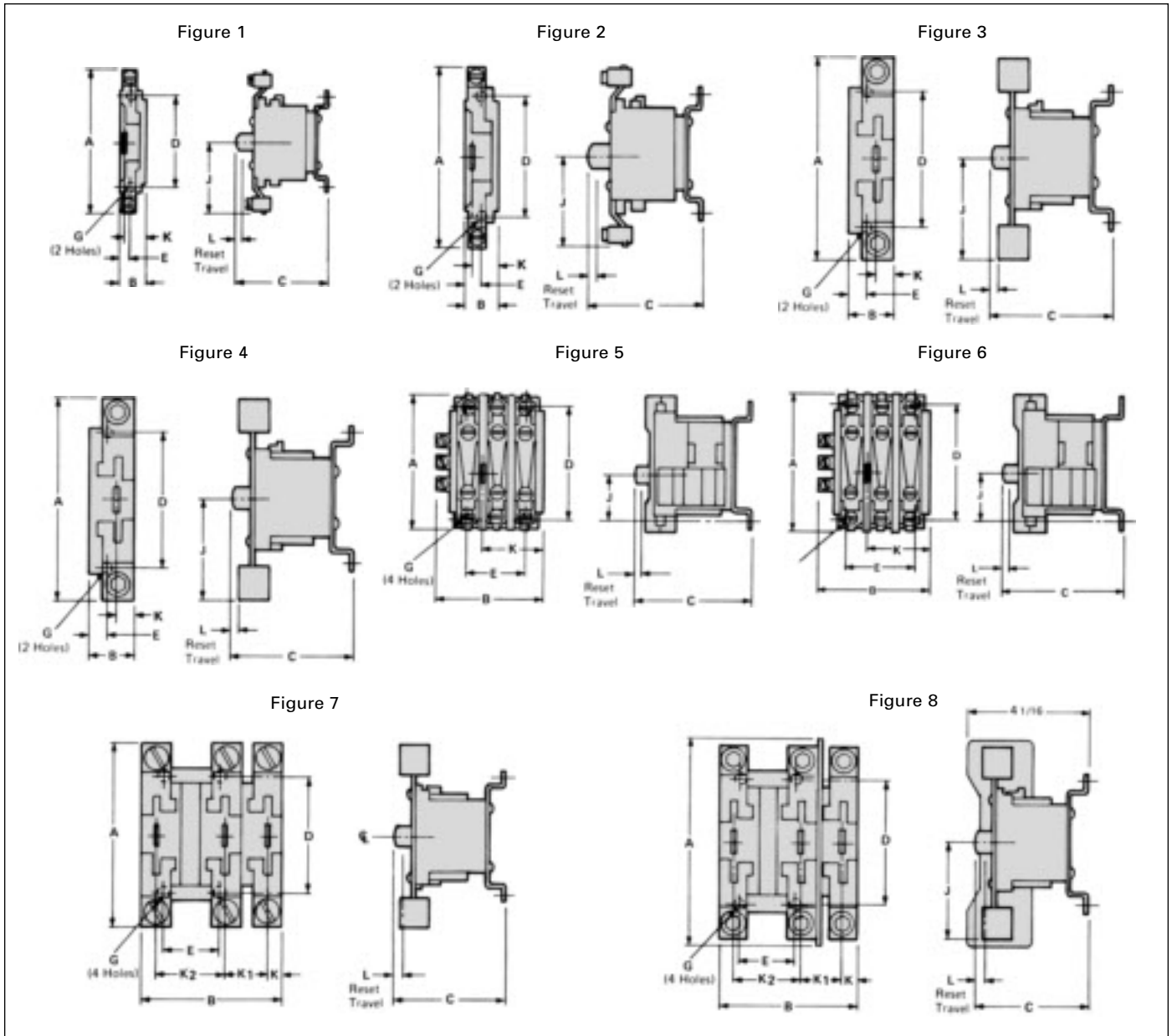


Note: Dimensions for reference, not for construction.  
Dimensions in inches.

# Overload Relays

## Panel Mounted Class 48 — Bimetal

### Dimensions



Description	Amp Rating	Fig	Outline Dimensions			Mounting Dimensions		Reset Dimensions			Mounting Screw G	Max Wire Size	Approx Ship Wt Lbs (Kg)	Ref Dwg
			A	B	C	D	E	J	K	L				
1-Pole Bimetal	25	1	3 1/2 (89)	7/8 (22)	3 3/8 (81)	3 (76)	1/2 (13)	1 3/4 (44)	3/4 (19)	1/8 (3)	#10	8	2 (1)	D51820
Ambient	60	2	4 1/8 (124)	7/8 (22)	3 3/8 (81)	3 (76)	1/2 (13)	2 1/8	3/4 (19)	1/8 (3)	#10	1	2 (1)	D51830
Compensated	100	3	4 7/8 (124)	1 1/4 (32)	3 3/8 (90)	3 1/2 (89)	9/16 (14)	2 1/8	1/2 (13)	1/8 (3)	#10	00	3 (1)	D51833
	180	4	5 1/2 (151)	1 1/4 (32)	3 3/8 (90)	3 1/2 (89)	9/16 (14)	3 (76)	1/2 (13)	1/8 (3)	#10	250 MCM	4 (2)	D52206

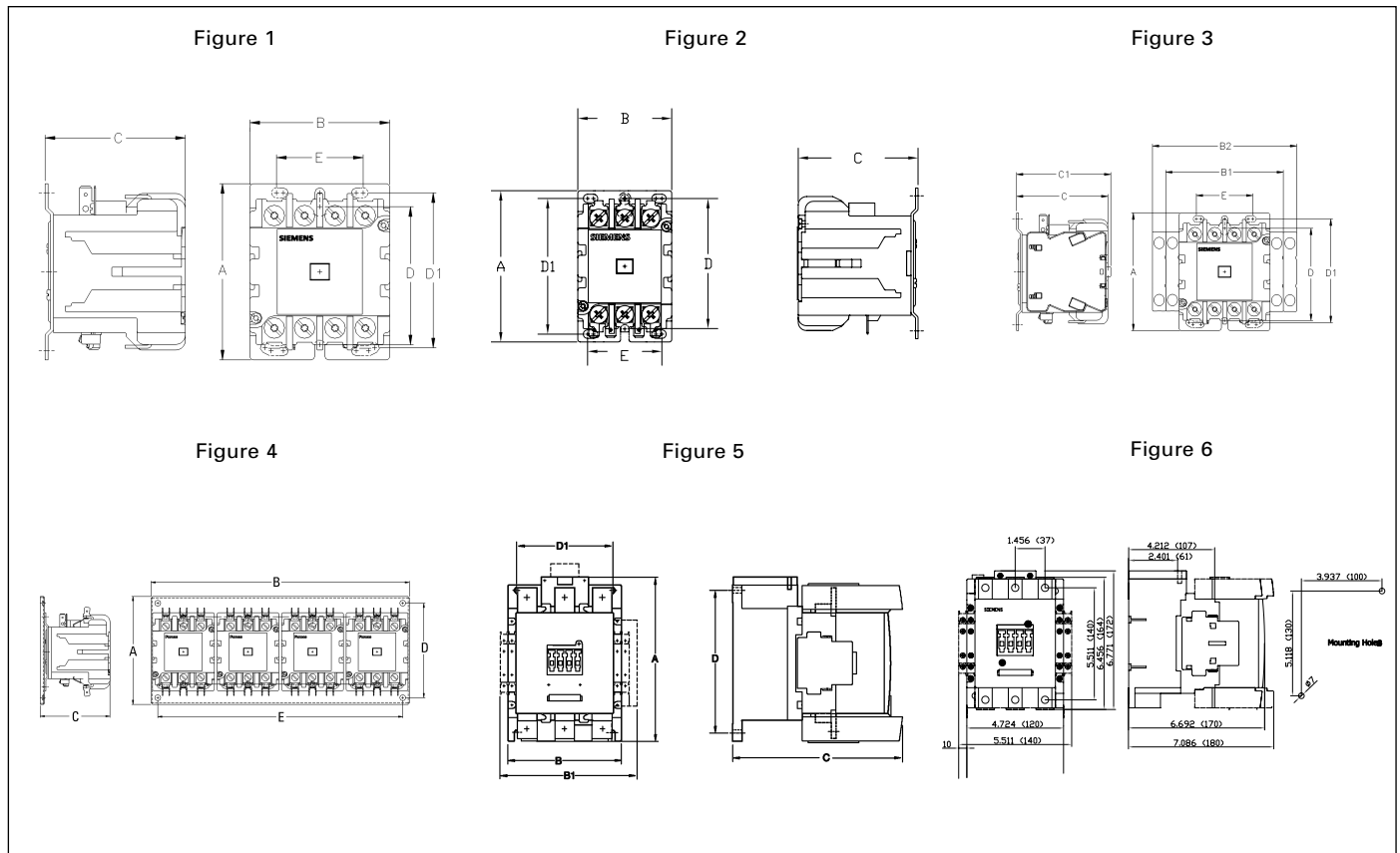
Description	Amp Rating	Fig	Outline Dimensions			Mounting Dimensions		Reset Dimensions					Mtg Screw G	Max Wire Size	Approx Ship Wt Lbs (Kg)	Ref Dwg
			A	B	C	D	E	J	K	K1	K2	L				
3-Pole Bimetal	30	5	3 3/8 (92)	3 3/8 (78)	3 3/8 (79)	3 (76)	1 1/2 (38)	1 1/4 (32)	1 13/16 (46)	—	—	3/16 (5)	#10	8	3 (1)	D54791
Ambient	60	6	3 3/8 (98)	3 3/8 (78)	3 3/8 (79)	3 (76)	1 1/2 (38)	1 1/4 (32)	1 13/16 (46)	—	—	3/16 (5)	#10	2	3 (1)	D54823
Compensated	100	7	4 7/8 (124)	4 7/8 (113)	3 3/8 (90)	3 1/2 (89)	1 3/8 (41)	2 1/8 (62)	9/16 (14)	1 15/16 (49)	2 (51)	1/8 (3)	#10	00	4 (2)	D51868
	180	8	6 1/2 (165)	4 7/8 (113)	3 3/8 (90)	3 1/2 (89)	1 3/8 (41)	3 (76)	9/16 (14)	1 15/16 (49)	2 (51)	1/8 (3)	#10	250 MCM	5 (2)	D52038

Note: Dimensions for reference, not for construction. Dimensions in inches (mm).

# Lighting & Heating Contactors

Electrically Held, Class LE

Dimensions



## Open Type Lighting and Heating Contactors

Contact Rating Amps	Poles	Figure	Outline Dimensions						Mounting Dimensions			Mounting Screw
			A	B	B1	B2	C	C1	D	D1	E	
20-30	2	2	3.36	2	—	—	2.69	—	1.63	—	1.63	#10
20-30	3	2	3.97	2.25	—	—	2.88	—	3.13	3.25	1.81	#10
20	4	1	3.62	2.87	—	—	2.88	—	3.13	3.25	1.78	#10
20	8	3	3.62	—	3.71	—	2.88	2.97	3.13	3.25	1.78	#10
20	12	3	3.62	—	—	4.55	2.88	2.97	3.13	3.25	1.78	#10
60	3	2	4.06	2.88	—	—	3.06	—	3.13	3.25	2.25	#10
30-60	6	4	3.87	6.15	—	—	3.06	—	3.18	—	—	#10
30-60	9-12	4	5.25	18.62	—	—	3.31	—	4.62	—	18.00	0.281
100	3	6	5.19	4.00	—	—	4.75	—	4.63	4.37	2.88	#10
200	3	5	6.77	4.72	5.91	—	7.09	—	5.12	3.94	—	0.28
300	3	5	8.27	5.71	6.89	—	8.54	—	7.09	4.72	—	0.35
400	3	5	8.43	6.3	7.48	—	9.29	—	7.09	5.12	—	0.35

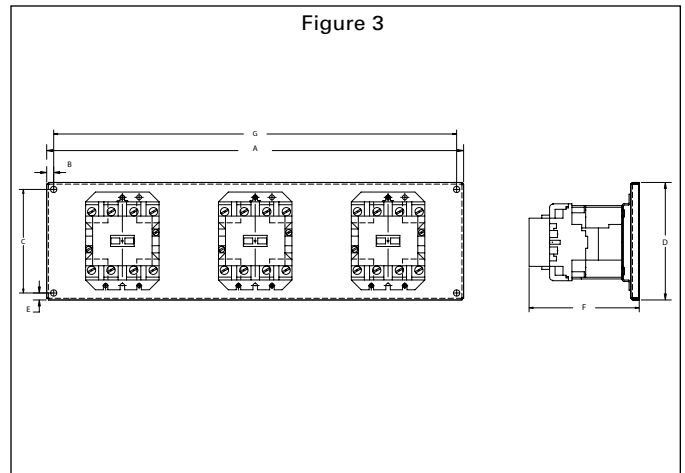
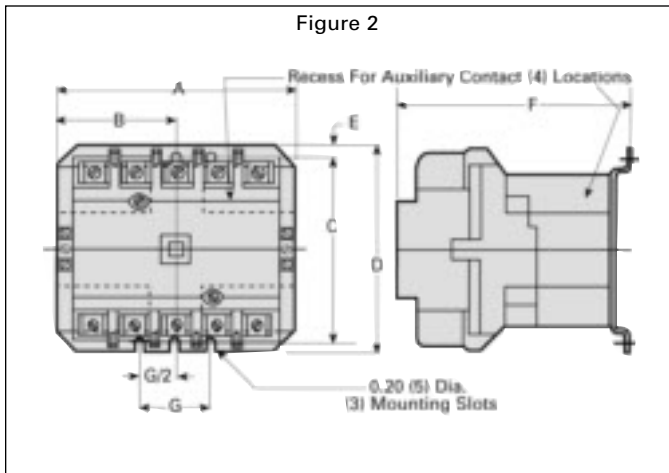
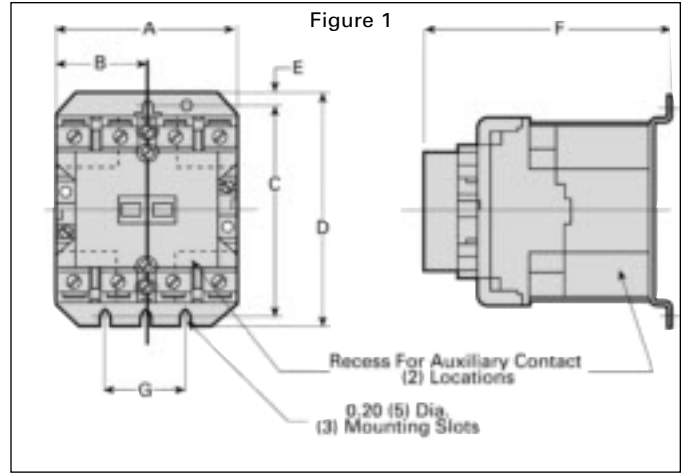
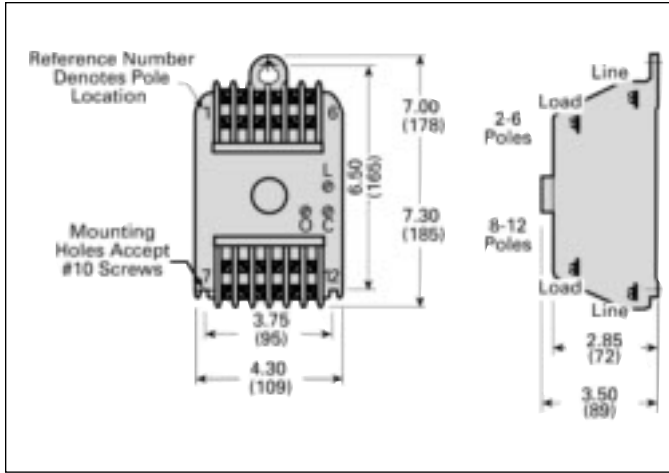
Note: Dimensions for reference, not for construction.  
Dimensions in inches (mm).

# Lighting & Heating Contactors

## Mechanically / Magnetically Held Lighting Contractors, Class CLM

### Dimensions

#### CLM Contactor, 20 Amp



#### Open Type Lighting and Heating Contactors

Class	Figure Number	Amp Rating	Number of Poles	A	B	C	D	E	F	G
CLM	1	30	2-4	3.31 (84)	1.65 (42)	3.95 (100)	4.38 (111)	0.23 (6)	4.61 (117)	1.50 (38)
	1	30	5	4.19 (106)	2.09 (53)	3.95 (100)	4.38 (111)	0.23 (6)	4.61 (117)	1.50 (38)
	2	60	2, 3	3.31 (84)	1.65 (42)	3.95 (100)	4.38 (111)	0.23 (6)	4.94 (125)	1.50 (38)
	2	60	4, 5	5.06 (129)	2.53 (64)	3.95 (100)	4.38 (111)	0.23 (6)	4.94 (125)	1.50 (38)
	2	100	2, 3	4.62 (117)	2.31 (59)	6.00 (152)	6.62 (168)	0.38 (10)	6.75 (171)	1.88 (48)
	2	100	4, 5	7.25 (184)	3.62 (92)	6.00 (152)	6.62 (168)	0.38 (10)	6.75 (171)	1.88 (48)
	2	200	2, 3	4.62 (117)	2.31 (59)	6.00 (152)	6.62 (168)	0.38 (10)	6.75 (171)	1.88 (48)
	2	200	4, 5	7.25 (184)	3.62 (92)	6.00 (152)	6.62 (168)	0.38 (10)	6.75 (171)	1.88 (48)
	3	30, 60	6-12	18.62	0.312	4.62	5.25	0.312	4.98	18.00

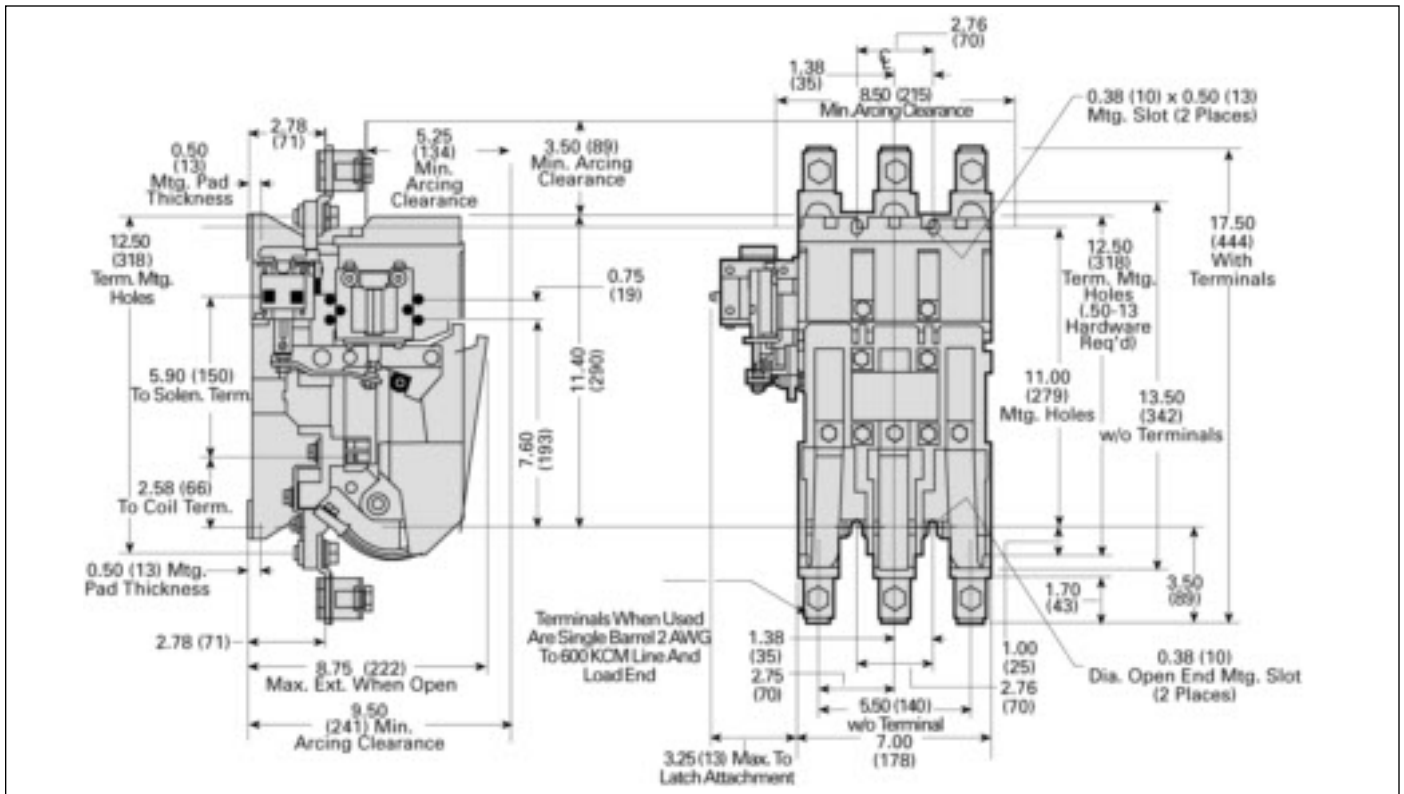
Note: Dimensions for reference, not for construction.  
Dimensions in inches (mm).

# Lighting Control

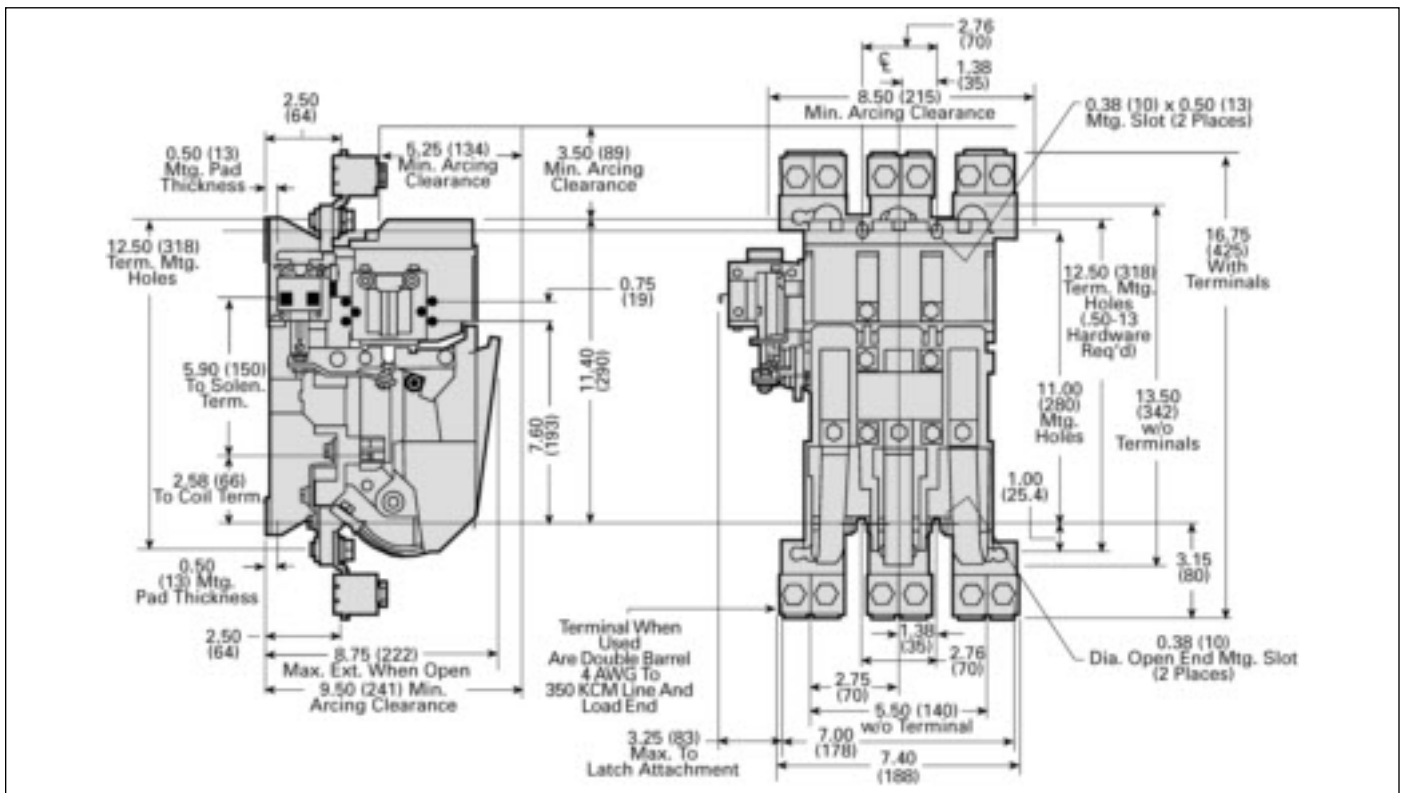
## Mechanically Latched 300 and 400 Amps, Class CLM

*Dimensions*

### CLM Contactors 300 Amp



### CLM Contactors 400 Amp

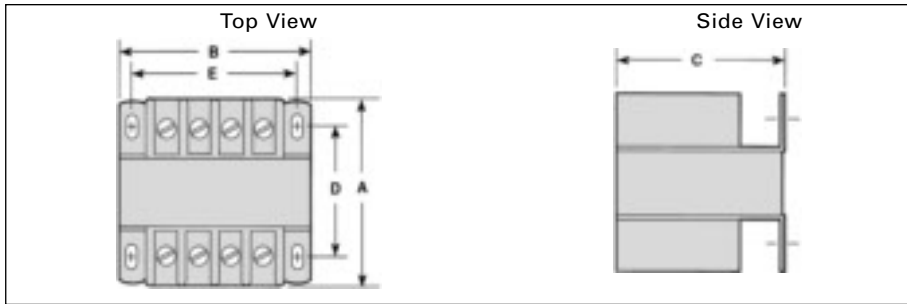


Note: Dimensions for reference, not for construction.  
Dimensions in inches (mm).

# Industrial Control Power Transformers

## Class MT

## Dimensions



**Dimension "C" does not include the added height required for secondary fuse clips—0.50 in. (13 mm) maximum for type "K" clips.**

The Primary Fuse Kit, when installed, will add a maximum of 0.69 in. (18 mm) to the transformer "A" dimension and 1.94 in. (49 mm) to the "C" dimension.

① A 2-pole Primary Class CC Fuse Block Kit is available for field installation. See page 16-74 for details. Catalog Number KCCFPX2R

Note: Dimensions for reference, not for construction.  
Dimensions in inches (mm).

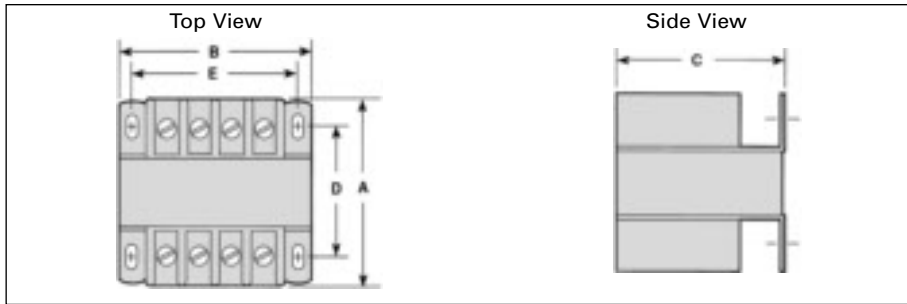
## Class MT

VA Rating	Voltage Letters	Approximate Dimensions Inches (mm)					Mounting Slots	Ship Wt Lbs (Kg)
		A	B	C	D	E		
50 <sup>①</sup>	A, B, C, D, E, F, I, M	3.00 (76)	3.00 (76)	2.56 (65)	2.00 (51)	2.50 (64)	13/64 (5) X 3/8 (10)	2.6 (1)
	G	3.13 (79)	3.00 (76)	2.56 (65)	2.13 (54)	2.50 (64)	13/64 (5) X 3/8 (10)	2.8 (1)
	H	3.00 (76)	3.00 (76)	3.00 (76)	2.56 (65)	2.50 (64)	13/64 (5) X 3/8 (10)	3.5 (2)
	J	3.25 (83)	3.00 (76)	2.56 (65)	2.25 (57)	2.50 (64)	13/64 (5) X 3/8 (10)	3.4 (2)
	L	4.00 (102)	3.38 (86)	2.88 (73)	2.44 (62)	2.81 (71)	13/64 (5) X 3/8 (10)	4.0 (2)
75 <sup>①</sup>	A, B, C, D, E, F, I, M	3.50 (89)	3.00 (76)	2.56 (65)	2.50 (64)	2.50 (64)	13/64 (5) X 3/8 (10)	3.5 (2)
	G	3.38 (86)	3.38 (86)	2.88 (73)	2.38 (60)	2.81 (71)	13/64 (5) X 3/8 (10)	4.3 (2)
	H	3.13 (79)	3.38 (86)	2.88 (73)	2.38 (60)	2.81 (71)	13/64 (5) X 3/8 (10)	4.5 (2)
	J	3.50 (89)	3.38 (86)	2.88 (73)	2.50 (64)	2.81 (71)	13/64 (5) X 3/8 (10)	4.8 (2)
	L	4.63 (117)	3.38 (86)	3.19 (81)	3.06 (78)	3.13 (79)	13/64 (5) X 3/8 (10)	6.6 (3)
100 <sup>①</sup>	A, B, C, D, E, F, I, M	3.38 (86)	3.38 (86)	2.88 (73)	2.38 (60)	2.81 (71)	13/64 (5) X 3/8 (10)	4.2 (2)
	G	3.69 (94)	3.38 (86)	2.88 (73)	2.69 (68)	2.81 (71)	13/64 (5) X 3/8 (10)	4.9 (2)
	H	3.88 (98)	3.38 (86)	2.88 (73)	2.88 (73)	2.81 (71)	13/64 (5) X 3/8 (10)	6.0 (3)
	J	3.63 (92)	3.75 (95)	3.19 (81)	2.50 (64)	3.13 (79)	13/64 (5) X 3/8 (10)	5.9 (3)
	L	4.63 (117)	3.38 (86)	3.19 (81)	3.06 (78)	3.13 (79)	13/64 (5) X 3/8 (10)	6.6 (3)
150 <sup>①</sup>	A, B, C, D, E, F, I, M	4.00 (102)	3.75 (95)	3.19 (81)	2.88 (73)	3.13 (79)	13/64 (5) X 3/8 (10)	6.7 (3)
	G	4.19 (106)	3.75 (95)	3.19 (81)	3.06 (78)	3.13 (79)	13/64 (5) X 3/8 (10)	7.4 (3)
	H	4.25 (108)	3.75 (95)	3.19 (81)	3.25 (83)	3.13 (79)	13/64 (5) X 3/8 (10)	7.7 (4)
	J	4.38 (111)	3.75 (95)	3.19 (81)	3.25 (83)	3.13 (79)	13/64 (5) X 3/8 (10)	7.9 (4)
	L	4.44 (113)	4.50 (114)	3.81 (97)	2.88 (73)	3.75 (95)	13/64 (5) X 3/8 (10)	8.8 (4)
200 <sup>①</sup>	A, B, C, D, E, F, I, M	4.00 (102)	4.50 (114)	3.81 (97)	2.50 (64)	3.75 (95)	13/64 (5) X 3/8 (10)	8.5 (4)
	G	4.25 (108)	4.50 (114)	3.81 (97)	2.75 (70)	3.75 (95)	13/64 (5) X 3/8 (10)	9.4 (4)
	H	4.25 (108)	4.50 (114)	3.81 (97)	2.75 (70)	3.75 (95)	13/64 (5) X 3/8 (10)	9.0 (4)
	J	4.50 (114)	4.50 (114)	3.81 (97)	3.00 (76)	3.75 (95)	13/64 (5) X 3/8 (10)	10.6 (5)
	L	4.38 (111)	4.50 (114)	3.81 (97)	2.88 (73)	3.75 (95)	13/64 (5) X 3/8 (10)	10.0 (5)
250 <sup>①</sup>	A, B, C, D, E, F, I, M	4.75 (121)	4.50 (114)	3.81 (97)	3.25 (83)	3.75 (95)	13/64 (5) X 3/8 (10)	11.1 (5)
	G	4.75 (121)	4.50 (114)	3.81 (97)	3.19 (81)	3.75 (95)	13/64 (5) X 3/8 (10)	9.7 (4)
	H	5.25 (133)	4.50 (114)	3.81 (97)	3.75 (95)	3.75 (95)	13/64 (5) X 3/8 (10)	13.9 (6)
	J	5.86 (149)	4.50 (114)	3.81 (97)	4.38 (111)	3.75 (95)	13/64 (5) X 3/8 (10)	14.7 (7)
	L	4.75 (121)	4.50 (114)	3.81 (97)	3.25 (83)	3.75 (95)	13/64 (5) X 3/8 (10)	11.3 (5)
300 <sup>①</sup>	A, B, C, D, E, F, I, M	5.25 (133)	4.50 (114)	3.81 (97)	3.75 (95)	3.75 (95)	13/64 (5) X 3/8 (10)	13.6 (6)
	G	5.25 (133)	4.50 (114)	3.81 (97)	3.75 (95)	3.75 (95)	13/64 (5) X 3/8 (10)	13.6 (6)
	H	5.13 (130)	4.50 (114)	3.81 (97)	3.63 (92)	3.75 (95)	13/64 (5) X 3/8 (10)	11.7 (5)
	J	5.13 (130)	5.25 (133)	4.75 (121)	3.88 (98)	4.38 (111)	5/16 (8) X 11/16 (17)	15.5 (7)
	L	5.25 (133)	4.50 (114)	3.81 (97)	3.75 (95)	3.75 (95)	13/64 (5) X 3/8 (10)	13.6 (6)
350 <sup>①</sup>	A, B, C, D, E, F, I, M	5.25 (133)	4.50 (114)	3.81 (97)	4.38 (111)	3.75 (95)	13/64 (5) X 3/8 (10)	15.6 (7)
	G	8.25 (149)	4.50 (114)	3.81 (97)	3.75 (95)	4.38 (111)	13/64 (5) X 3/8 (10)	16.5 (8)
	H	5.00 (127)	4.50 (114)	3.81 (97)	3.75 (95)	4.38 (111)	13/64 (5) X 3/8 (10)	16.5 (8)
	J	5.38 (137)	5.25 (133)	4.75 (121)	4.13 (105)	4.38 (111)	5/16 (8) X 11/16 (17)	16.8 (8)
	L	5.63 (143)	5.25 (133)	4.44 (113)	4.75 (121)	4.38 (111)	5/16 (8) X 11/16 (17)	18.6 (8)
500 <sup>①</sup>	A, B, C, D, E, F, I, M	5.50 (140)	5.25 (133)	4.75 (121)	4.25 (108)	4.38 (111)	5/16 (8) X 11/16 (17)	19.2 (9)
	G	6.00 (152)	5.25 (133)	4.75 (121)	4.75 (121)	4.38 (111)	5/16 (8) X 11/16 (17)	21.0 (9)
	H	5.88 (149)	5.25 (133)	4.75 (121)	4.63 (117)	4.38 (111)	5/16 (8) X 11/16 (17)	21.5 (10)
	J	6.86 (175)	5.25 (133)	4.75 (121)	5.25 (133)	4.38 (111)	5/16 (8) X 11/16 (17)	21.5 (10)
	L	7.00 (178)	5.25 (133)	4.44 (113)	6.13 (156)	4.38 (111)	5/16 (8) X 11/16 (17)	23.4 (11)
750	A, B, E, F, I	7.00 (178)	5.25 (133)	4.75 (121)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	28.1 (13)
	G	7.38 (187)	5.25 (133)	4.75 (121)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	30.0 (14)
	H	7.00 (178)	5.25 (133)	4.75 (121)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	28.0 (13)
	J	5.63 (143)	6.75 (171)	5.75 (146)	4.13 (105)	6.06 (154)	5/16 (8) X 9/16 (14)	30.5 (14)
	L	7.00 (178)	5.25 (133)	4.75 (121)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	30.0 (14)
1000	A, E, I	7.86 (200)	5.25 (133)	4.44 (113)	5.50 (140)	4.38 (111)	9/32 (7) X 13/32 (10)	28.1 (13)
	G	7.13 (181)	6.38 (162)	5.38 (137)	4.50 (114)	5.19 (132)	5/16 (8) X 11/16 (17)	30.0 (14)
	H	7.50 (191)	6.38 (162)	5.38 (137)	4.50 (114)	5.19 (132)	5/16 (8) X 11/16 (17)	29.2 (13)
	J	6.75 (171)	6.75 (171)	5.69 (144)	3.56 (90)	6.06 (154)	9/32 (7) X 9/16 (14)	30.0 (14)
	L	7.50 (191)	6.75 (171)	5.69 (144)	4.44 (113)	6.06 (154)	9/32 (7) X 9/16 (14)	33.5 (15)
1500	A, I	8.25 (210)	6.75 (171)	5.69 (144)	5.25 (133)	6.06 (154)	9/32 (7) X 9/16 (14)	33.5 (15)
	G	7.00 (178)	6.75 (171)	5.69 (144)	4.44 (113)	6.06 (154)	9/32 (7) X 9/16 (14)	38.0 (17)
	H	8.25 (210)	6.75 (171)	5.69 (144)	5.25 (133)	6.06 (154)	9/32 (7) X 9/16 (14)	42.5 (19)
	J	7.56 (192)	9.00 (229)	7.31 (186)	4.56 (116)	6.50 (165)	9/32 (7) X 9/16 (14)	42.5 (19)
	L	7.50 (191)	9.00 (229)	7.56 (192)	4.04 (103)	6.50 (165)	7/16 (11) X 3/4 (19)	53.0 (24)
3000	A, I	8.00 (203)	9.00 (229)	7.56 (192)	4.63 (117)	6.50 (165)	7/16 (11) X 3/4 (19)	63.7 (29)
	G	8.63 (219)	9.00 (229)	7.56 (192)	5.25 (133)	6.50 (165)	7/16 (11) X 3/4 (19)	63.7 (29)
	H	8.63 (219)	9.00 (229)	7.56 (192)	5.25 (133)	6.50 (165)	7/16 (11) X 3/4 (19)	63.7 (29)
	J	10.0 (254)	9.00 (229)	7.56 (192)	7.50 (190)	7.20 (183)	7/16 (11) X 3/4 (19)	140.0 (64)
	L	10.50 (267)	9.00 (229)	10.19 (259)	6.50 (165)	6.50 (165)	7/16 (11) X 3/4 (19)	102.0 (46)
5000	G	13.50 (343)	9.00 (229)	10.56 (268)	8.25 (210)	6.50 (165)	7/16 (11) X 3/4 (19)	102.0 (46)
	H							

# Industrial Control Power Transformers

## Class MTG

## Dimensions



Dimension "C" does not include the added height required for secondary fuse clips—0.50 in. (13 mm) maximum for type "K" clips.

The Primary Fuse Kit, when installed, will add a maximum of 0.69 in. (18 mm) to the transformer "A" dimension and 1.94 in. (49 mm) to the "C" dimension.

Note: Dimensions for reference, not for construction.  
Dimensions in inches (mm).

## Class MTG

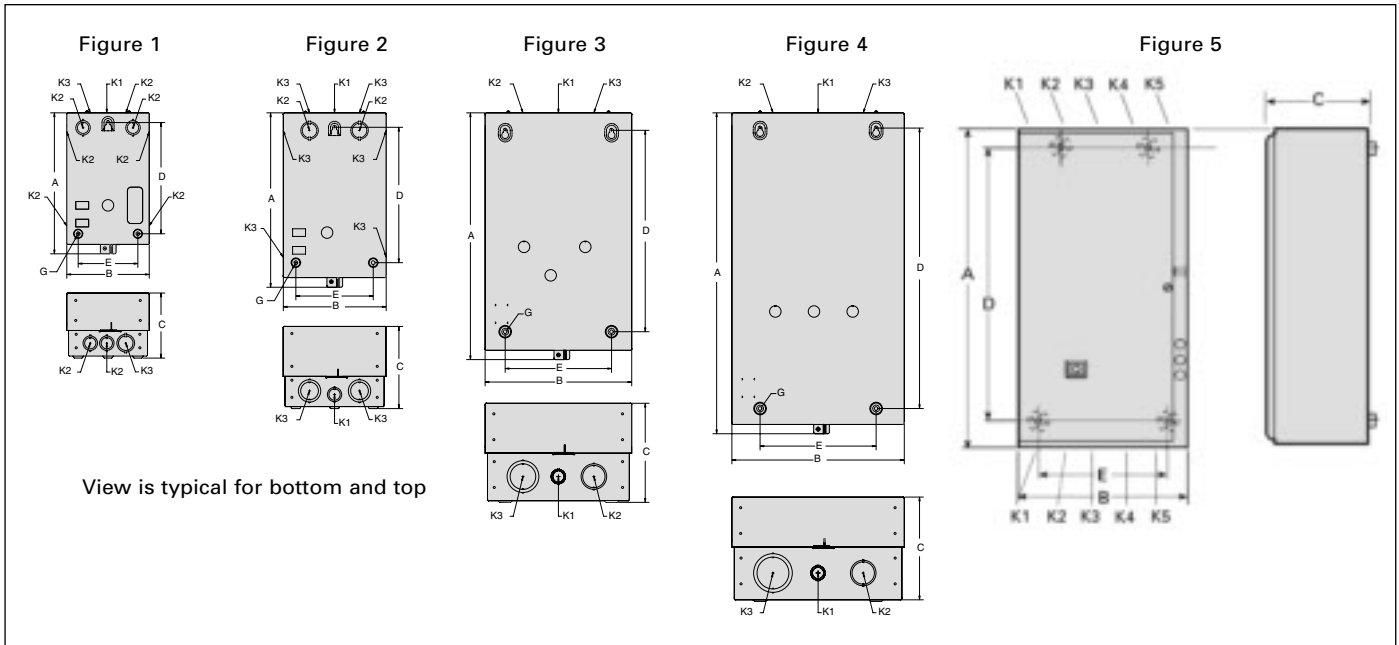
VA Rating	Voltage Letters	Approximate Dimensions Inches (mm)					Mounting Slots	Approx Ship Wt Lbs (Kg)
		A	B	C	D	E		
50	A	3.38 (86)	3.00 (76)	3.00 (76)	2.50 (64)	2.50 (64)	13/64 (5) X 15/32 (12)	3.5 (2)
	B, C, P	3.25 (83)	3.00 (76)	3.00 (76)	2.25 (57)	2.50 (64)	13/64 (5) X 15/32 (12)	3.4 (2)
	E, I	3.38 (86)	3.00 (76)	3.00 (76)	2.50 (64)	2.50 (64)	13/64 (5) X 15/32 (12)	3.5 (2)
	J	3.25 (83)	3.38 (86)	3.25 (83)	2.25 (57)	2.81 (71)	13/64 (5) X 15/32 (12)	4.2 (2)
75	A	3.50 (89)	3.38 (86)	3.25 (83)	2.50 (64)	2.81 (71)	13/64 (5) X 15/32 (12)	4.8 (2)
	B, C, P	3.25 (83)	3.38 (86)	3.25 (83)	2.25 (57)	2.81 (71)	13/64 (5) X 15/32 (12)	4.2 (2)
	E, I	3.50 (89)	3.38 (86)	3.25 (83)	2.50 (64)	2.81 (71)	13/64 (5) X 15/32 (12)	4.8 (2)
	J	3.63 (92)	3.75 (95)	3.50 (89)	2.50 (64)	3.13 (79)	13/64 (5) X 15/32 (12)	5.9 (3)
100	A	3.63 (92)	3.75 (95)	3.50 (89)	2.50 (64)	3.13 (79)	13/64 (5) X 15/32 (12)	5.9 (3)
	B, C, P	3.63 (92)	3.75 (95)	3.50 (89)	2.50 (64)	3.13 (79)	13/64 (5) X 15/32 (12)	5.9 (3)
	E, I	3.63 (92)	3.75 (95)	3.50 (89)	2.50 (64)	3.13 (79)	13/64 (5) X 15/32 (12)	5.9 (3)
	J	4.38 (111)	3.75 (95)	3.50 (89)	3.19 (81)	3.13 (79)	13/64 (5) X 15/32 (12)	7.9 (4)
150	A	4.00 (102)	4.50 (114)	4.00 (102)	2.50 (64)	3.75 (95)	13/64 (5) X 15/32 (12)	8.5 (4)
	B, C, P	4.00 (102)	4.50 (114)	4.00 (102)	2.50 (64)	3.75 (95)	13/64 (5) X 15/32 (12)	8.5 (4)
	E, I	4.00 (102)	4.50 (114)	4.00 (102)	2.50 (64)	3.75 (95)	13/64 (5) X 15/32 (12)	8.5 (4)
	J	4.00 (102)	4.50 (114)	4.00 (102)	2.81 (71)	3.75 (95)	13/64 (5) X 15/32 (12)	8.5 (4)
200	A	4.50 (114)	4.50 (114)	4.00 (102)	3.19 (81)	3.75 (95)	13/64 (5) X 15/32 (12)	10.6 (5)
	B, C, P	4.38 (111)	4.50 (114)	4.00 (102)	2.81 (71)	3.75 (95)	13/64 (5) X 15/32 (12)	10.0 (5)
	E, I	4.50 (114)	4.50 (114)	4.00 (102)	3.19 (81)	3.75 (95)	13/64 (5) X 15/32 (12)	10.6 (5)
	J	5.00 (127)	4.50 (114)	4.00 (102)	3.50 (89)	3.75 (95)	13/64 (5) X 15/32 (12)	10.6 (5)
250	A	4.38 (111)	4.50 (114)	4.00 (102)	3.19 (81)	3.75 (95)	13/64 (5) X 15/32 (12)	11.3 (5)
	B, C, P	4.75 (121)	4.50 (114)	4.00 (102)	3.19 (81)	3.75 (95)	13/64 (5) X 15/32 (12)	11.3 (5)
	E, I	4.75 (121)	4.50 (114)	4.00 (102)	3.19 (81)	3.75 (95)	13/64 (5) X 15/32 (12)	11.3 (5)
	J	5.50 (140)	4.50 (114)	4.00 (102)	4.06 (103)	3.75 (95)	13/64 (5) X 15/32 (12)	15.2 (7)
300	A	5.13 (130)	4.50 (114)	4.00 (102)	3.75 (95)	3.75 (95)	13/64 (5) X 15/32 (12)	13.2 (6)
	B, C, P	5.13 (130)	4.50 (114)	4.00 (102)	3.75 (95)	3.75 (95)	13/64 (5) X 15/32 (12)	13.2 (6)
	E, I	5.13 (130)	4.50 (114)	4.00 (102)	3.75 (95)	3.75 (95)	13/64 (5) X 15/32 (12)	13.2 (6)
	J	5.38 (137)	5.25 (133)	4.50 (114)	4.25 (108)	4.38 (111)	5/16 (8) X 11/16 (17)	16.8 (8)
350	A	5.00 (127)	5.25 (133)	4.50 (114)	3.75 (95)	4.38 (111)	5/16 (8) X 11/16 (17)	14.9 (7)
	B, C, P	5.00 (127)	5.25 (133)	4.50 (114)	3.75 (95)	4.38 (111)	5/16 (8) X 11/16 (17)	14.9 (7)
	E, I	5.00 (127)	5.25 (133)	4.50 (114)	3.75 (95)	4.38 (111)	5/16 (8) X 11/16 (17)	14.9 (7)
	J	5.50 (140)	5.25 (133)	4.50 (114)	4.25 (108)	4.38 (111)	5/16 (8) X 11/16 (17)	19.2 (9)
500	A	6.00 (152)	5.25 (133)	4.50 (114)	4.75 (121)	4.38 (111)	5/16 (8) X 11/16 (17)	21.0 (9)
	B, C, P	5.50 (140)	5.25 (133)	4.50 (114)	4.25 (108)	4.38 (111)	5/16 (8) X 11/16 (17)	19.2 (9)
	E, I	6.00 (152)	5.25 (133)	4.50 (114)	4.75 (121)	4.38 (111)	5/16 (8) X 11/16 (17)	21.0 (9)
	J	7.25 (184)	5.25 (133)	4.50 (114)	6.00 (153)	4.38 (111)	5/16 (8) X 11/16 (17)	27.0 (12)
750	A	7.38 (187)	5.25 (133)	4.50 (114)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	30.0 (14)
	B, C, P	7.00 (178)	5.25 (133)	4.50 (114)	5.38 (137)	4.38 (111)	5/16 (8) X 11/16 (17)	28.1 (13)
	E, I	7.38 (187)	5.25 (133)	4.50 (114)	5.75 (146)	4.38 (111)	5/16 (8) X 11/16 (17)	30.0 (14)
	J	5.56 (141)	6.38 (162)	7.19 (183)	4.38 (111)	5.31 (135)	5/16 (8) X 11/16 (17)	30.0 (14)
1000	A	5.31 (135)	6.38 (162)	5.31 (135)	4.06 (103)	5.31 (135)	5/16 (8) X 11/16 (17)	26.3 (12)
	B, C	5.56 (141)	6.38 (162)	7.19 (183)	4.31 (110)	5.31 (135)	5/16 (8) X 11/16 (17)	26.3 (12)
	J	7.00 (178)	6.38 (162)	7.19 (183)	5.75 (146)	5.31 (135)	5/16 (8) X 11/16 (17)	40.0 (18)
1500	A	6.13 (156)	6.75 (171)	7.50 (191)	4.94 (125)	6.13 (156)	9/32 (7) X 9/16 (14)	40.0 (18)
2000	A	6.44 (164)	6.75 (171)	7.50 (191)	5.25 (133)	6.13 (156)	9/32 (7) X 9/16 (14)	45.1 (21)
3000	A	6.25 (159)	9.00 (229)	9.38 (238)	4.56 (116)	6.50 (165)	7/16 (11) X 3/4 (19)	65.2 (30)
5000	A	8.75 (222)	9.00 (229)	9.38 (238)	6.50 (165)	6.50 (165)	7/16 (11) X 3/4 (19)	104.8 (48)



# Heavy Duty Motor Starters & Contactors

Enclosed, Class 14, 40

Dimensions



## NEMA 1 General Purpose Enclosure (Standard width for use with or without CPT)<sup>①</sup>

Size	Max CPT Size	Figure	Outline Dimensions			Mounting Dimensions		Mounting Screw	Conduit Size					Approx Ship Wt Lbs (Kg)	Ref Dwg
			A	B	C	D	E		G	K1	K2	K3	K4		
00-1¼	w/o CPT	1	10 <sup>3</sup> / <sub>32</sub> (279)	6 <sup>3</sup> / <sub>32</sub> (163)	5 <sup>1</sup> / <sub>32</sub> (128)	8 <sup>7</sup> / <sub>32</sub> (209)	4 <sup>5</sup> / <sub>16</sub> (117)	¼	½	½-¾	¾-1	—	—	10 (5)	D68870
2-2½	w/o CPT	2	13 <sup>1</sup> / <sub>32</sub> (344)	7 <sup>9</sup> / <sub>32</sub> (202)	6 <sup>3</sup> / <sub>16</sub> (162)	10 <sup>1</sup> / <sub>4</sub> (260)	6 (152)	¼	½-¾	¾-1	1-1¼	—	—	15 (7)	D68870
3-3½	(100VA)	3	19 <sup>1</sup> / <sub>8</sub> (486)	11 <sup>3</sup> / <sub>8</sub> (289)	7 <sup>1</sup> / <sub>16</sub> (195)	15 <sup>5</sup> / <sub>8</sub> (397)	8 <sup>1</sup> / <sub>4</sub> (210)	¼	½-¾	1-1¼	1½-2	—	—	26 (12)	D68870
4	(300VA)	4	24 <sup>1</sup> / <sub>8</sub> (632)	13 <sup>3</sup> / <sub>8</sub> (340)	8 <sup>3</sup> / <sub>8</sub> (206)	21 <sup>3</sup> / <sub>4</sub> (552)	9 (229)	¼	½-¾	1¼-1½	2-2½	—	—	37 (17)	D68870
5	(300VA)	5	40 (1016)	20 (508)	11 (279)	37 <sup>3</sup> / <sub>8</sub> (956)	15 <sup>1</sup> / <sub>4</sub> (387)	¼	2-3	1¼-1½	½-¾	1¼-1½	2-3	135 (36)	D65608
6	(300VA)	5	48 (1219)	20 (508)	12 <sup>1</sup> / <sub>2</sub> (317)	45 <sup>3</sup> / <sub>16</sub> (1148)	10 (254)	¼	2-2½	1¼-1½	½-¾	1¼-1½	2-2½	150 (44)	D65608

## NEMA 1 General Purpose Enclosure (Extra wide for use with CPT)<sup>①</sup>

Size	Max CPT Size	Figure	Outline Dimensions			Mounting Dimensions		Mounting Screw	Conduit Size					Approx Ship Wt Lbs (Kg)	Ref Dwg
			A	B	C	D	E		G	K1	K2	K3	K4		
00-1¼	(200VA)	3	19 <sup>1</sup> / <sub>8</sub> (486)	11 <sup>3</sup> / <sub>8</sub> (289)	7 <sup>1</sup> / <sub>16</sub> (195)	15 <sup>5</sup> / <sub>8</sub> (397)	8 <sup>1</sup> / <sub>4</sub> (210)	¼	½-¾	1-1¼	1½-2	—	—	26 (12)	D68870
2-2½	(200VA)	3	19 <sup>1</sup> / <sub>8</sub> (486)	11 <sup>3</sup> / <sub>8</sub> (289)	7 <sup>1</sup> / <sub>16</sub> (195)	15 <sup>5</sup> / <sub>8</sub> (397)	8 <sup>1</sup> / <sub>4</sub> (210)	¼	½-¾	1-1¼	1½-2	—	—	26 (12)	D68870
3-3½	(250VA)	4	24 <sup>1</sup> / <sub>8</sub> (632)	13 <sup>3</sup> / <sub>8</sub> (340)	8 <sup>3</sup> / <sub>8</sub> (206)	21 <sup>3</sup> / <sub>4</sub> (552)	9 (229)	¼	½-¾	1-1¼-1½	2-2½	—	—	37 (17)	D68870

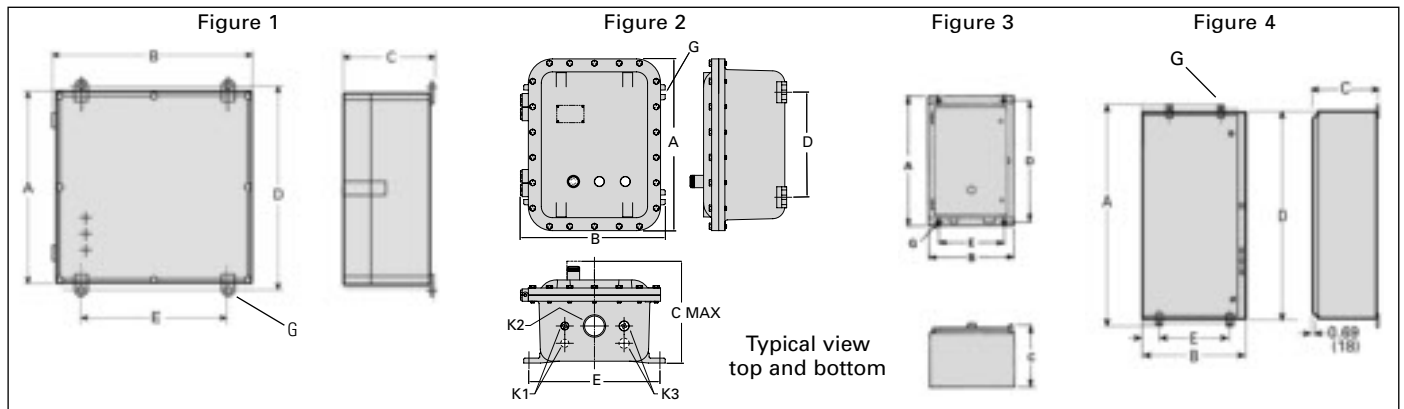
Note: Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

① Clamshell enclosure Size 00 - 4; Standard width and Extra wide.

# Heavy Duty Motor Starters & Contactors

Enclosed, Class 14, 40

Dimensions



## NEMA 4X Fiberglass Enclosures (Standard width for use with or without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2½	1	14.620 (371)	11.880 (302)	6.890 (175)	15.000 (381)	9.750 (248)	¼	—	—	—	11 (4.9)	24-139-861-001
3-4	1	23.780 (604)	23.780 (604)	6.890 (175)	24.125 (612.7)	21.250 (539.7)	¼	—	—	—	28 (12.7)	24-139-861-003

## NEMA 7/9/3/4 Hazardous Location Enclosure (Standard width for use with or without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1¼ w/o CPT	2	15.250 (387)	10.688 (272)	10.000 (254)	8.500 (216)	9.125 (132)	¾	½	1½	¾	33 (14.9)	24-139-865-002
2-2½ (0-1¼ w/ CPT)	2	17.750 (451)	14.688 (373)	10.375 (264)	10.625 (270)	13.250 (337)	¾	½	2	¾	60 (27.0)	24-139-865-003
3-3½ w/o CPT	2	17.750 (451)	14.688 (373)	10.375 (264)	10.625 (270)	13.250 (337)	¾	½	2	¾	60 (27.0)	24-139-865-003
4	2	28.688 (729)	17.750 (451)	11.750 (298)	18.375 (467)	15.750 (400)	½	½	3	¾	140 (63.5)	24-139-865-004
5	2	48.875 (1038)	22.875 (581)	14 7/8 (377)	29 (373)	21¾ (533)	¾	½	3	¾	352 (159)	24-139-865-006

## NEMA 7/9/3/4 Hazardous Location Enclosure (Extra wide for use with CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2½ <sup>Ⓢ</sup>	2	17.750 (451)	14.688 (373)	10.375 (264)	10.625 (270)	13.250 (337)	¾	½	2	¾	60 (27.0)	24-139-865-003
3-3½	2	28.688 (729)	17.750 (451)	11.750 (298)	18.375 (467)	15.750 (400)	½	½	3	¾	140 (63.5)	24-139-865-004

## NEMA 12/3/3R Industrial Use Enclosure (Standard width for use without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1¼	3	13.000 (330)	7.750 (197)	5.438 (138)	12.250 (311)	5.000 (127)	¼	—	—	—	12 (5)	D41547
2-2½	3	16.000 (406)	8.125 (206)	6.063 (154)	15.250 (387)	5.000 (127)	¼	—	—	—	18 (8)	D41547
3-4	3	26.000 (660)	13.125 (333)	7.563 (192)	25.250 (641)	10.000 (254)	¼	—	—	—	49 (22)	D41552

## NEMA 12/3/3R Industrial Use Enclosure (Extra wide for use with CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1¼	3	13.000 (330)	12.625 (321)	5.375 (137)	12.250 (311)	10.000 (254)	¼	—	—	—	30 (14)	D17150
2-2 ½	3	16.000 (406)	13.250 (337)	6.125 (156)	15.250 (387)	11.000 (279)	¼	—	—	—	33 (15)	D17150
3-3 ½	3	26.000 (660)	13.125 (333)	7.563 (192)	25.250 (641)	10.000 (254)	¼	—	—	—	49 (22)	D41552
4	3	29.063 (738)	23.188 (589)	9.250 (235)	27.563 (700)	20.000 (508)	¾	—	—	—	64 (29)	D17150
5	4	40.000 (1016)	20.000 (508)	11.000 (279)	41.000 (1041)	10.000 (254)	¾	—	—	—	—	D65608007
6	4	48.000 (1219)	20.000 (508)	12.500 (317)	49.000 (1244)	10.000 (254)	¾	—	—	—	—	D65608009

## NEMA 4/4X Stainless Steel Enclosure (Standard width for use without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1¼	3	13.000 (330)	7.750 (197)	5.438 (138)	12.250 (311)	5.000 (127)	¼	—	—	—	17.5 (8)	D41546
2-2½	3	16.000 (406)	8.125 (206)	6.063 (154)	15.250 (387)	5.000 (127)	¼	—	—	—	36 (16)	D41546
3-4	3	26.000 (660)	13.125 (333)	7.563 (192)	25.250 (641)	10.000 (254)	¼	—	—	—	67 (30)	D41551

## NEMA 4/4X Stainless Steel Enclosure (Extra wide for use with CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1¼	3	13.000 (330)	12.625 (321)	5.375 (137)	12.250 (311)	10.000 (254)	¼	—	—	—	30 (14)	D41917
2-2½	3	16.000 (406)	13.250 (337)	6.000 (152)	15.250 (387)	11.000 (279)	¼	—	—	—	33 (15)	D42935
3-3½	3	26.000 (660)	13.125 (333)	7.563 (192)	25.250 (641)	10.000 (254)	¼	—	—	—	67 (30)	D41551
4	3	29.000 (737)	23.188 (589)	9.250 (235)	27.500 (699)	20.000 (508)	¾	—	—	—	64 (29)	D43292
5 (Painted)	4	40.000 (1016)	20.000 (508)	11.000 (279)	41.000 (1041)	10.000 (254)	¾	—	—	—	—	D65608007
6 (Painted)	4	48.000 (1219)	20.000 (508)	12.500 (317)	49.000 (1244)	10.000 (254)	¾	—	—	—	—	D65608009

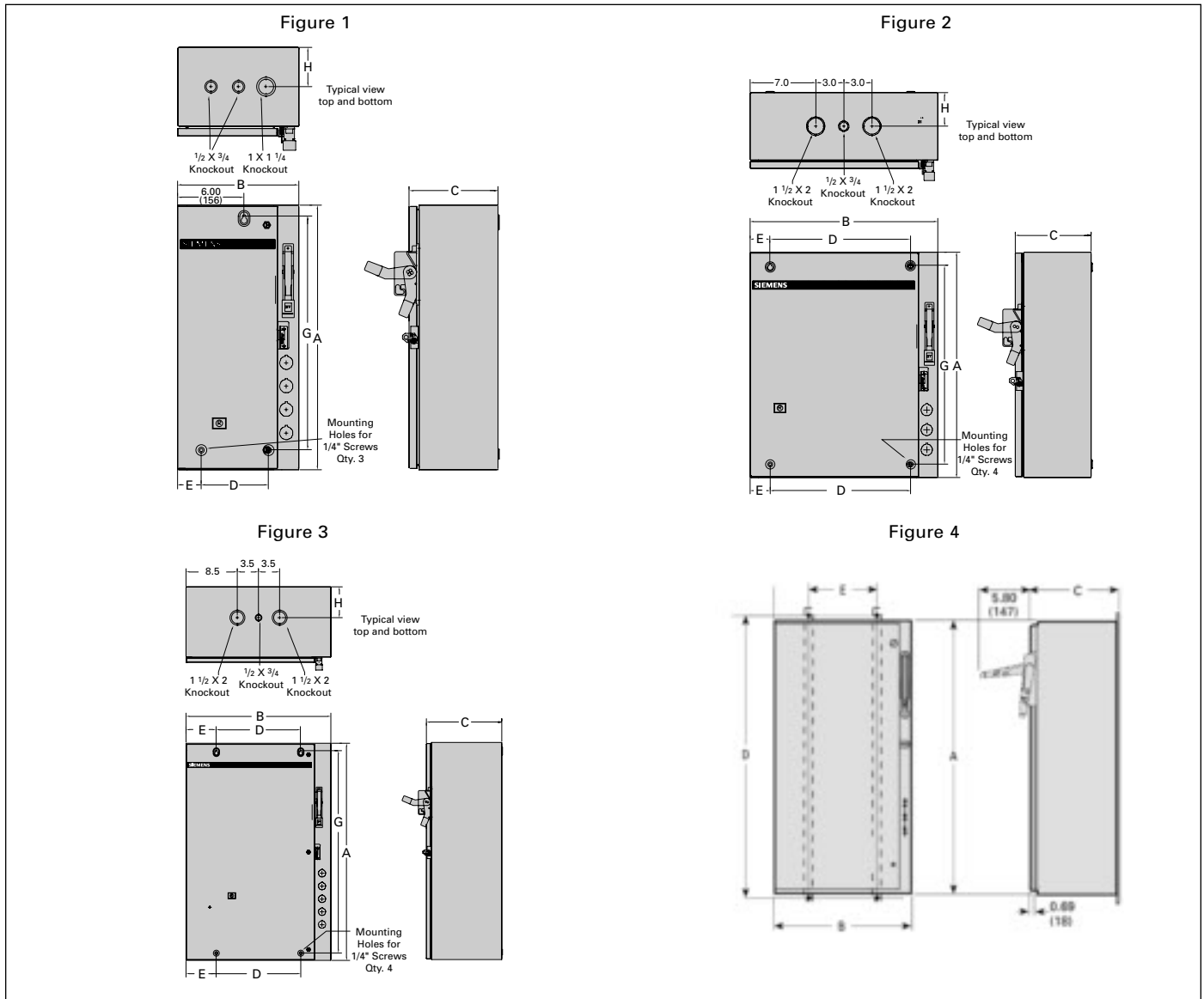
Note: Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

Ⓢ Used for addition of CPT only on size 2 ½. If pilot devices are needed, use size 3-3/4 enclosure.

# Combination Heavy Duty Starters

Enclosed, Class 17, 18

Dimensions



## NEMA 1 Standard Width 0-6

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2	1	24 (610)	11 (279)	8 (203)	6.125 (156)	2.125 (54)	21.00 (533)	3.50 (90)	35 (16)	D68774001
2 1/2, 3	2	24 (610)	20 (508)	8 (203)	15.00 (381)	2.125 (54)	21.00 (533)	3.50 (90)	48 (22)	D68774002
3 1/2, 4	3	36 (914)	24 (610)	8 (203)	14.00 (356)	5.00 (127)	33.50 (851)	5.00 (127)	101 (46)	D68774003
5	4	72.156 (1833)	20 (508)	11.031 (280)	71 (1803)	16 (406)	—	—	250 (113)	D56032005
6	4	79.125 (2010)	22 (559)	13 (330)	78 (1981)	18 (457)	—	—	275 (125)	D56032006

## NEMA 1 Extra Wide 0-3

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2	2	24 (610)	20 (508)	8 (203)	15.00 (381)	2.125 (54)	21.00 (533)	3.50 (90)	48 (22)	D68774002
2 1/2, 3	3	36 (914)	24 (610)	8 (203)	14.00 (356)	5.00 (127)	33.50 (851)	5.00 (127)	101 (46)	D68774003

Note: Dimensions in inches (mm).  
 Dimensions for reference, not for construction.  
 Contact sales office for dimensions not listed.

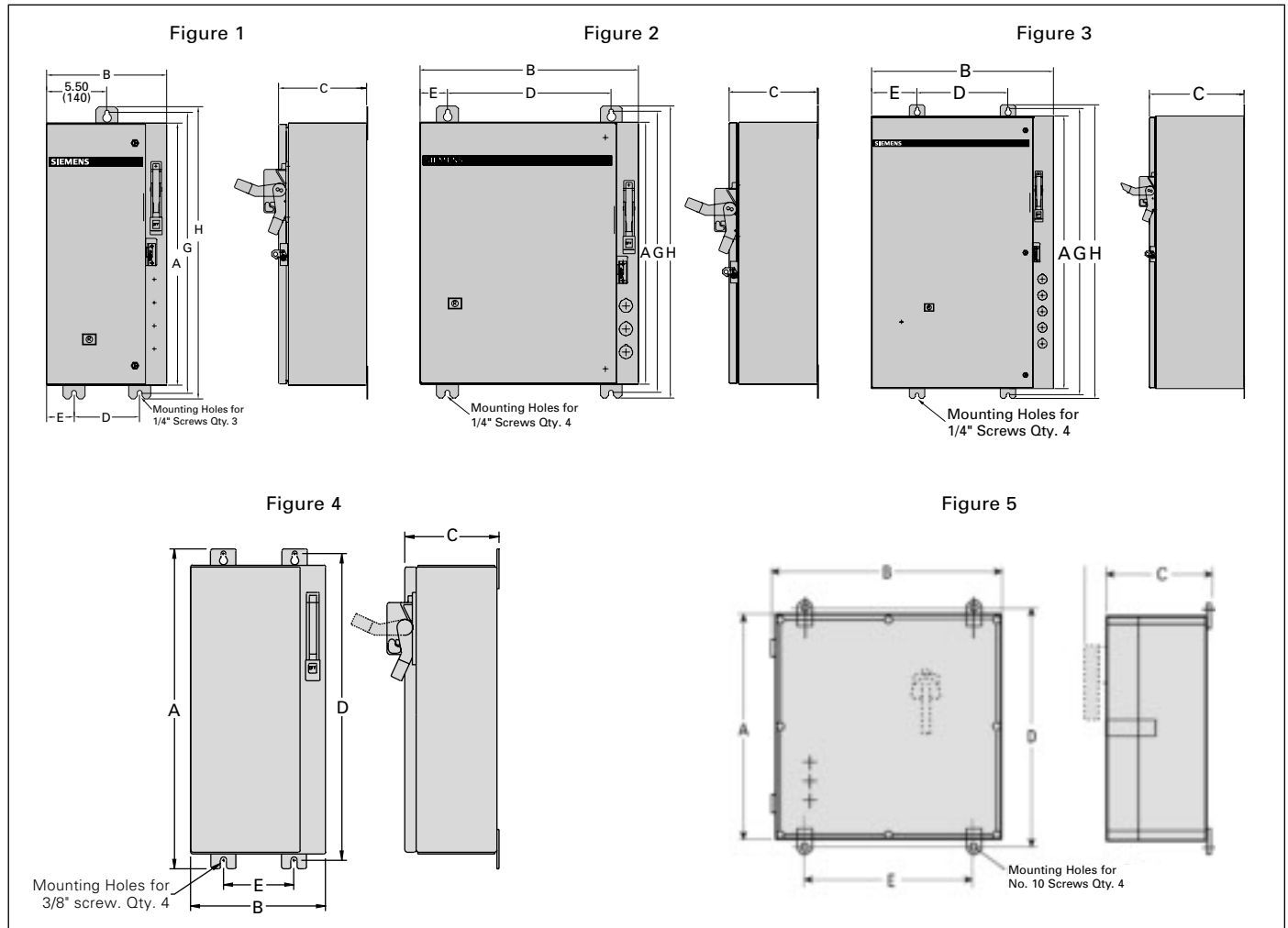
16 CONTROL PRODUCTS

NEMA & General Purpose Control

# Combination Heavy Duty Starters

Enclosed, Class 17, 18

Dimensions



## NEMA 12/3/3R/4 (Painted), 4/4X (Stainless) Standard Width 0-6

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2	1	24 (610)	11 (279)	8 (203)	6.00 (152)	2.50 (64)	25.75 (654)	26.75 (680)	35 (16)	D56033
2½, 3	2	24 (610)	20 (508)	8 (203)	15.00 (381)	2.50 (64)	25.75 (654)	26.75 (680)	48 (22)	D56033
3½, 4	3	36 (914)	24 (610)	8 (203)	12 (305)	6.00 (152)	37.75 (959)	38.75 (984)	101 (46)	D56033
5 (Painted)	4	72.156 (1833)	20 (508)	11.031 (280)	71 (1830)	16 (406)	—	—	250 (113)	D56032005
6 (Painted)	4	79.125 (2010)	22 (559)	13 (330)	78 (1981)	18 (457)	—	—	275 (125)	D56032006

## NEMA 12/3/3R/4 (Painted), 4/4X (Stainless) Extra Wide 0-3

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2	2	24 (610)	20 (508)	8 (203)	15.00 (381)	2.50 (64)	25.75 (654)	26.75 (654)	49 (22)	D56033
2½, 3	3	36 (914)	24 (610)	8 (203)	12.00 (305)	6.00 (152)	37.75 (959)	38.75 (984)	102 (46)	D56033

## NEMA 4X Fiberglass Standard Width 0-4

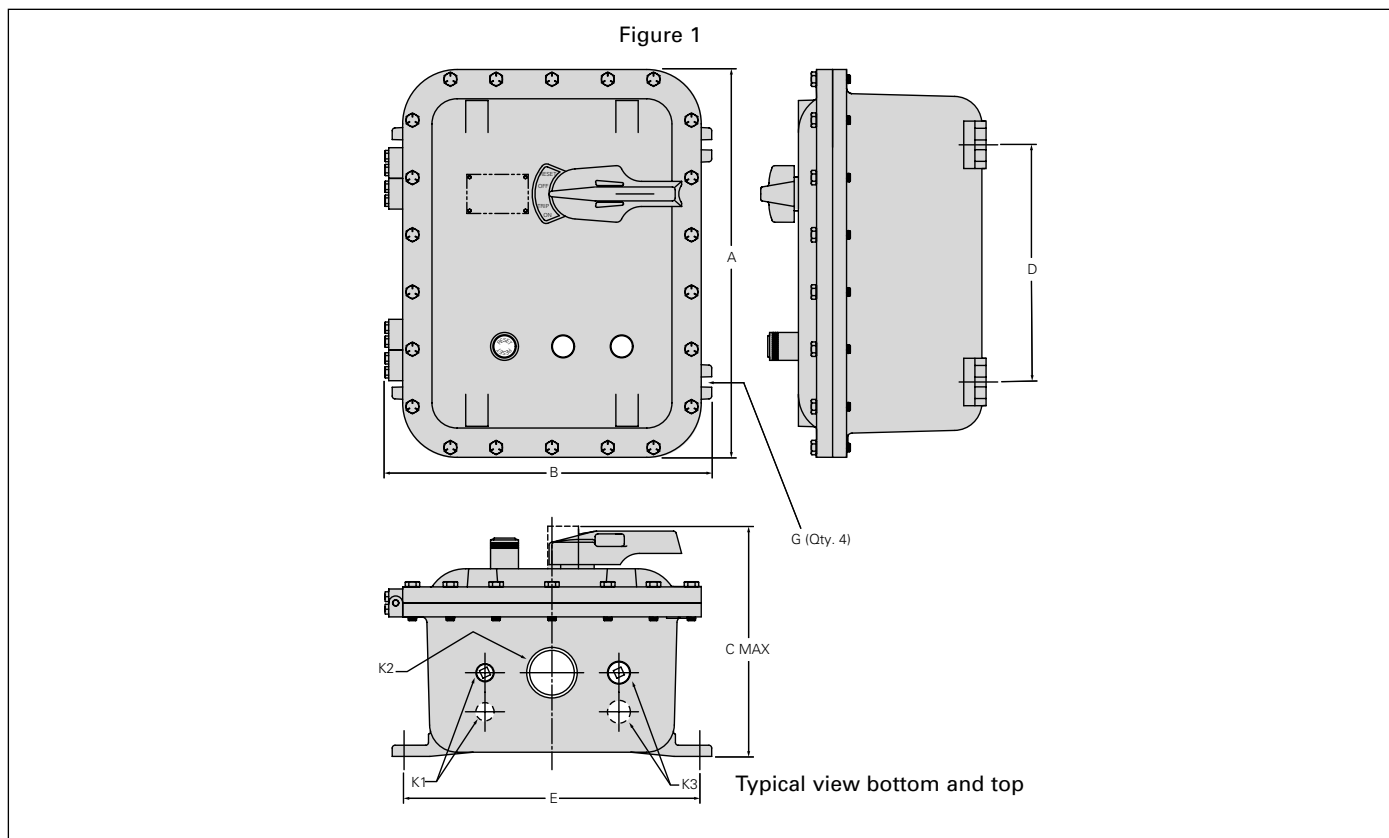
Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-1¼	5	23.75 (603)	14.62 (371)	7.12 (181)	24.09 (612)	12.20 (310)	—	—	42 (19)	
2-3½	5	23.75 (603)	23.75 (603)	8.50 (216)	24.06 (611)	21.30 (541)	—	—	44 (20)	
4	5	39.37 (1000)	29.52 (750)	12.20 (310)	40.94 (1040)	27.95 (710)	—	—	55 (25)	

Note: Dimensions in inches (mm).  
 Dimensions for reference, not for construction.  
 Contact sales office for dimensions not listed.

# Combination Heavy Duty Starters

Enclosed, Class 18

Dimensions



## NEMA 7 & 9, 3, 4 Standard Width 0-4

Size	Figure	Outline Dimensions			Mounting Dimensions		Mounting Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1/4	1	17.38 (441)	14.69 (373)	10.38 (264)	10.63 (270)	13.25 (337)	3/8	3/4	2	1/2	60 (27)	24-139-865-003
2-3/2	1	28.25 (718)	17.75 (451)	11.19 (284)	18.38 (467)	15.75 (400)	3/8	3/4	2 1/2	1/2	160 (72)	24-139-865-004
4	1	32.25 (819)	20.00 (508)	11.50 (292)	22.50 (572)	17.75 (451)	5/8	3/4	2 1/2	1/2	250 (113)	24-139-865-005
5	1	40.875 (1038)	22.875 (581)	14.875 (378)	29 (737)	21.75 (552)	5/8	1/2	3	3/4	360 (163)	—

**Note:** Dimensions in inches (mm). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

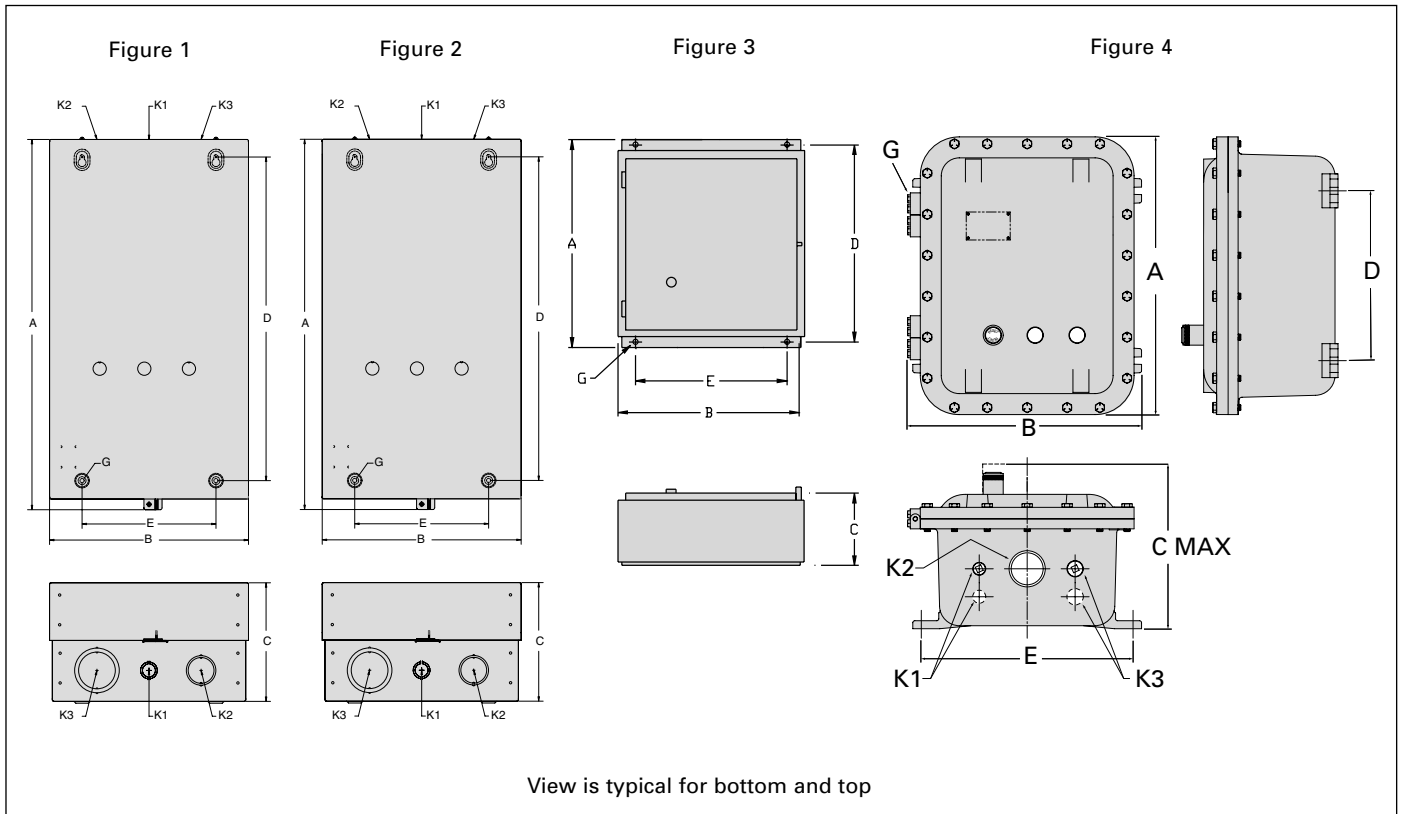
16 CONTROL PRODUCTS

NEMA & General Purpose Control

# Reversing Heavy Duty Starters & Contactors

Enclosed, Class 22, 43

Dimensions



16  
CONTROL  
PRODUCTS

## NEMA 1 General Purpose Enclosure (Standard width for use with and without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions			Mounting Screw	Conduit Size				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	K1	K2	K3	K4			
00-2½ (200 VA)	1	19¾ (486)	11¾ (289)	7½ (195)	15¾ (397)	8¼ (210)	¼	½-¾	1-1¼	1½-2	—	30 (14)	D68870	
3-4 (300 VA)	2	24¾ (632)	13¾ (340)	8¾ (206)	21¾ (552)	9 (229)	¼	½-¾	1¼-1½	2-2½	—	52 (24)	D68870	
5								Contact Sales Office						
6								Contact Sales Office						

NEMA & General  
Purpose Control

## NEMA 4/4X Stainless Steel Enclosure (with or without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg	
		A	B	C	D	E	G	K1	K2	K3			
0-1¾	3	13 (330)	12¾ (321)	5¾ (137)	12¼ (311)	10 (254)	¼	—	—	—	30 (14)	D41917	
2-2½	3	16 (406)	13¼ (337)	6 (152)	15¼ (387)	11 (279)	¼	—	—	—	33 (15)	D42935	
3-3½ (w/o CPT)	3	25½ (637)	17¾ (437)	7¾ (187)	24¾ (618)	14 (356)	¼	—	—	—	53 (24)	D17423	
3-3½ (w/ CPT)	3	29 (737)	23¾ (589)	9¼ (235)	27½ (699)	20 (508)	⅜	—	—	—	64 (29)	D43292	
4								Contact Sales Office					
5 (Painted)								Contact Sales Office					
6 (Painted)								Contact Sales Office					

## NEMA 7/9/3/4 Hazardous Location Enclosure (with or without CPT)

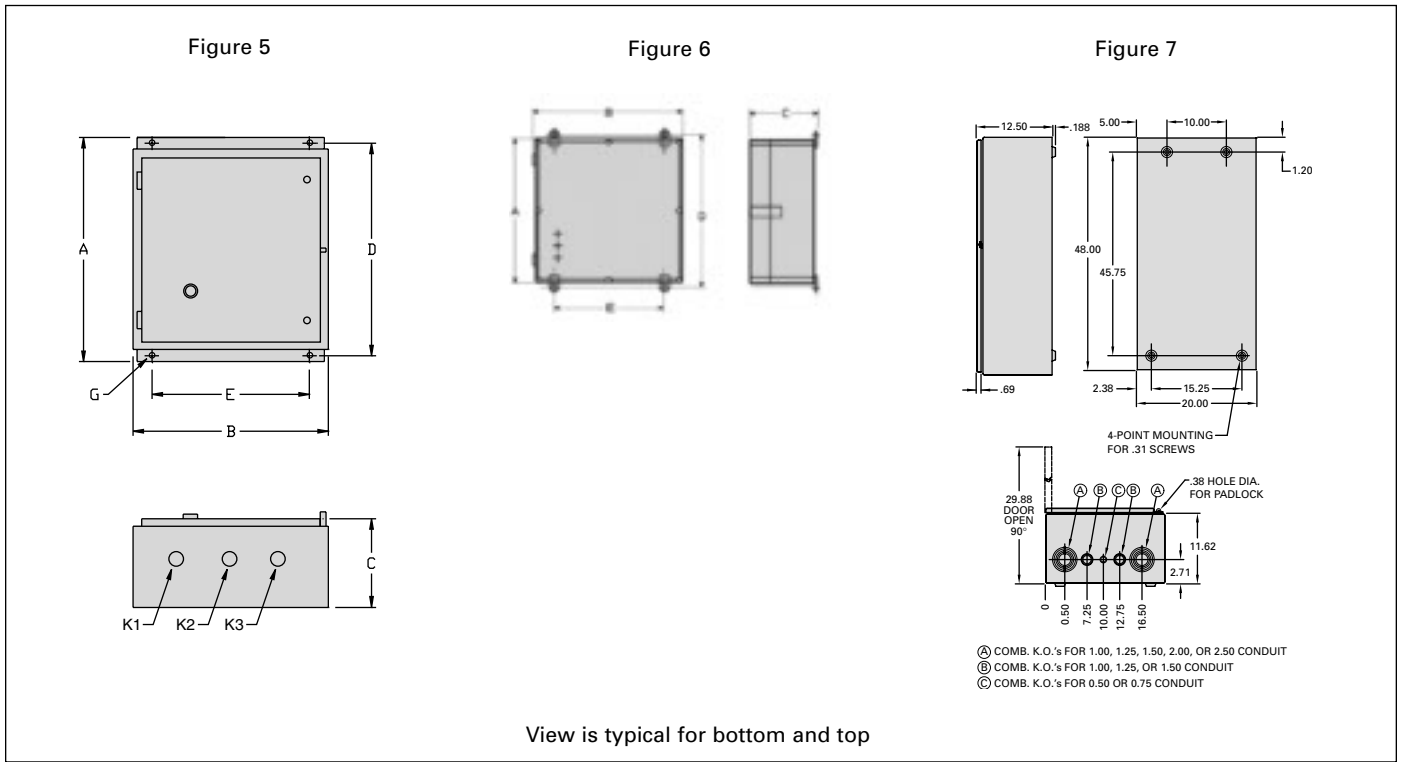
Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	K1	K2	K3		
0-2½	4	28¼ (718)	16¼ (413)	9¼ (235)	18¾ (467)	15¾ (400)	½	½	3	¾	140	24-139-865-004
3-4	4	32¼ (819)	18¼ (464)	9¾ (243)	22½ (572)	17¾ (451)	½	½	3	¾	150	24-139-865-005

Note: Dimensions in inches (mm).  
Dimensions for reference, not for construction.  
Contact sales office for dimensions not listed.

# Reversing Heavy Duty Starters & Contactors

Enclosed, Class 22, 43

Dimensions



## NEMA 12/3/3R Industrial Use Enclosure (with or without CPT)

Size	Figure	Outline Dimensions			Mounting Dimensions			Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	K1	K2	K3		
0-1½	5	13 (330)	12½ (321)	5½ (137)	12¼ (311)	10 (254)	¼	—	—	—	30 (14)	D17150
2-2½	5	16 (406)	13¼ (337)	6½ (156)	15¼ (387)	11 (279)	¼	—	—	—	33 (15)	D17150
3-3½ (w/o CPT)	5	25½ (637)	17¾ (437)	7¾ (187)	24¾ (618)	14 (356)	¼	—	—	—	53 (24)	D17150
3-3½ (w/ CPT)	5	29½ (738)	23¾ (589)	9¼ (235)	27¾ (700)	20 (508)	⅝	—	—	—	64 (29)	D17150
4												
5												
6 (300 VA CPT max.)	7	48 (1219)	20 (508)	12½ (318)	45¼ (1162)	10 (254)	¼	—	—	—		

## NEMA 4X Fiberglass Enclosure (with or without CPT)

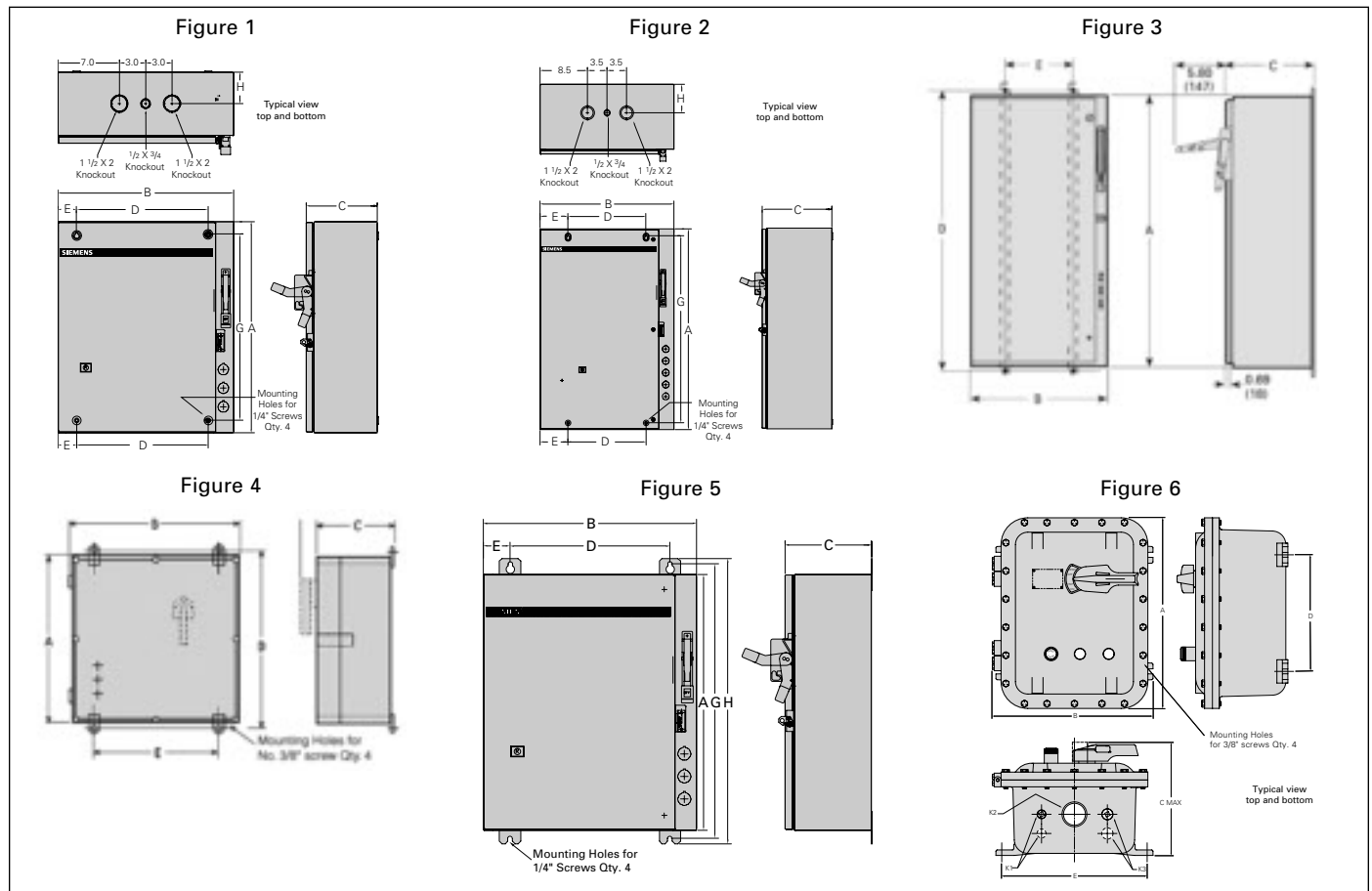
Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2½	6	23.78 (604)	14.68 (373)	6.89 (175)	22½ (579)	13½ (351)	¼	—	—	—	35	
3-3½	6	23.78 (604)	23.78 (604)	6.89 (175)	22½ (579)	22½ (579)	¼	—	—	—	38	
4												

Note: Dimensions in inches (mm).  
 Dimensions for reference, not for construction.  
 Contact sales office for dimensions not listed.

# Combination Reversing Heavy Duty Starters

Enclosed, Class 25, 26

Dimensions



## NEMA 1 Standard Width 0-6

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2½	1	24 (610)	20 (508)	8 (203)	15.00 (381)	2.125 (54)	21.00 (533)	3.50 (90)	60 (27)	D68774002
3-4	2	36 (914)	24 (610)	8 (203)	14.00 (356)	5.00 (127)	33.50 (851)	5.00 (127)	121 (55)	D68774003
5 (Painted)	3	72.156 (1833)	20 (508)	11.031 (280)	71 (1803)	16 (406)	—	—	250 (113)	D56032005
6 (Painted)	3	79.125 (2010)	22 (559)	13 (330)	78 (1981)	18 (457)	—	—	275 (125)	D56032006

## NEMA 12/3R/4 (Painted), 4/4X (Stainless) Standard Width 0-6

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-2½	5	24 (610)	20 (508)	8 (203)	15.00 (381)	3.50 (90)	25.75 (654)	26.75 (654)	63 (29)	D68774005
3-4	5	36 (914)	24 (610)	8 (203)	12 (305)	6.00 (152)	37.75 (959)	38.75 (984)	124 (56)	D68774006
5 (Painted)	3	72.156 (1833)	20 (508)	11.031 (280)	71 (1803)	16 (406)	—	—	250 (113)	D56032005
6 (Painted)	3	79.125 (2010)	22 (559)	13 (330)	78 (1981)	18 (457)	—	—	275 (125)	D56032006

## NEMA 4X Fiberglass 0-4

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2½	4	23.780 (604)	14.680 (373)	6.890 (175)	24.125 (612.7)	12.250 (311)	¾	—	—	—	18 (8)	24-139-861-001
3-4	4	23.780 (604)	23.780 (604)	6.890 (175)	24.125 (612.7)	21.250 (539.7)	¾	—	—	—	28 (12.7)	24-139-861-003

## NEMA 7/9/3/4 Hazardous Location 0-4

Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2½	6	28.688 (729)	17.750 (451)	11.750 (298)	18.375 (467)	15.750 (400)	¾	½	3	¾	140 (63.5)	24-139-865-004
3-4												

Note: Dimensions in inches (mm).  
 Dimensions for reference, not for construction.  
 Contact sales office for dimensions not listed.

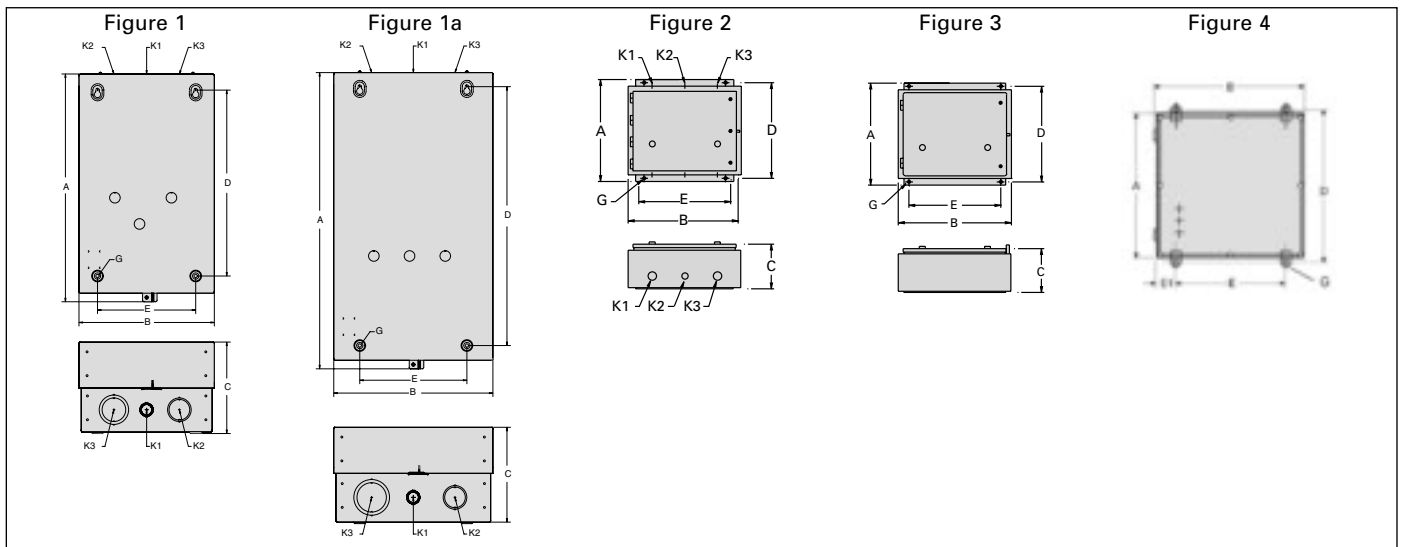
Contact Sales Office



# Two Speed Heavy Duty Starters

Enclosed, Class 30

Dimensions



## 2 Speed 1 Winding

NEMA 1 General Purpose Enclosure (Standard width for use with or without CPT)												
Size	Fig	Outline Dimensions			Mounting Dimensions		Mtg Screw G	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1 3/4 w/o CPT	1	19 1/8 (486)	11 3/8 (289)	7 1/16 (195)	15 3/8 (397)	8 1/4 (210)	1/4	1/2-3/4	1-1 1/4	1 1/2-2	26 (12)	D68870
0-1 3/4 (200 VA)	1a	24 7/8 (632)	13 3/8 (340)	8 1/8 (206)	21 3/4 (552)	9 (229)	1/4	1/2-3/4	1 1/4-1 1/2	2-2 1/2	52 (24)	D68870
2-2 1/2	2	16 (406)	17.13 (435)	7.63 (194)	15.25 (387)	14 (355)	1/4	1/2-3/4	1 1/4-1 1/2	1 1/2-1 1/2	39 (20)	D42932001
3-3 1/2	2	18.31 (465)	21.19 (538)	7.38 (187)	17.56 (446)	18 (457)	1/4	1 1/4-1 1/2	1/2-3/4	1 1/2-2	60 (27)	D72956002
NEMA 4/4X Stainless Steel Enclosure (Standard width for use with or without CPT)												
0-1 3/4 w/o CPT	3	13 (330)	12 3/8 (321)	5 3/8 (137)	12 1/4 (311)	10 (254)	1/4	—	—	—	34 (15)	D41917000
0-1 3/4 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	47 (21)	
2-2 1/2 w/o CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	47 (21)	
2-2 1/2 w/ CPT	3	25 1/16 (637)	17 3/16 (437)	7 3/8 (187)	24 3/16 (618)	14 (355)	1/4	—	—	—	55 (25)	
3-3 1/2	3	29 (737)	23 3/16 (589)	9 1/4 (235)	27 1/2 (699)	20 (508)	5/16	—	—	—	61 (28)	D43292001
4	3	29 (737)	23 3/16 (589)	9 1/4 (235)	27 1/2 (699)	20 (508)	5/16	—	—	—	61 (28)	D43292001
NEMA 12/3R Industrial Use Enclosure (Standard width for use with or without CPT)												
0-1 3/4 w/o CPT	3	13 (330)	12 3/8 (321)	5 3/8 (137)	12 1/4 (311)	10 (254)	1/4	—	—	—	34 (15)	
0-1 3/4 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	47 (21)	D17150010
2-2 1/2 w/o CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	47 (21)	D17150010
2-2 1/2 w/ CPT	3	25 1/16 (637)	17 3/16 (437)	7 3/8 (187)	24 3/16 (618)	14 (355)	1/4	—	—	—	55 (25)	
3-4	3	29 (737)	23 3/16 (589)	9 1/4 (235)	27 1/2 (699)	20 (508)	5/16	—	—	—	61 (28)	D19673000
NEMA 4X Fiberglass Enclosure (Standard width for use with or without CPT)												
0-2 1/2	4	23.780 (604)	23.780 (604)	6.890 (175)	—	—	1/4	—	—	—	28 (13)	24139861003
3-4	4	39.37 (1000)	29.53 (750)	12.60 (320)	—	—	—	—	—	—	—	24139861004

## 2 Speed 2 Winding

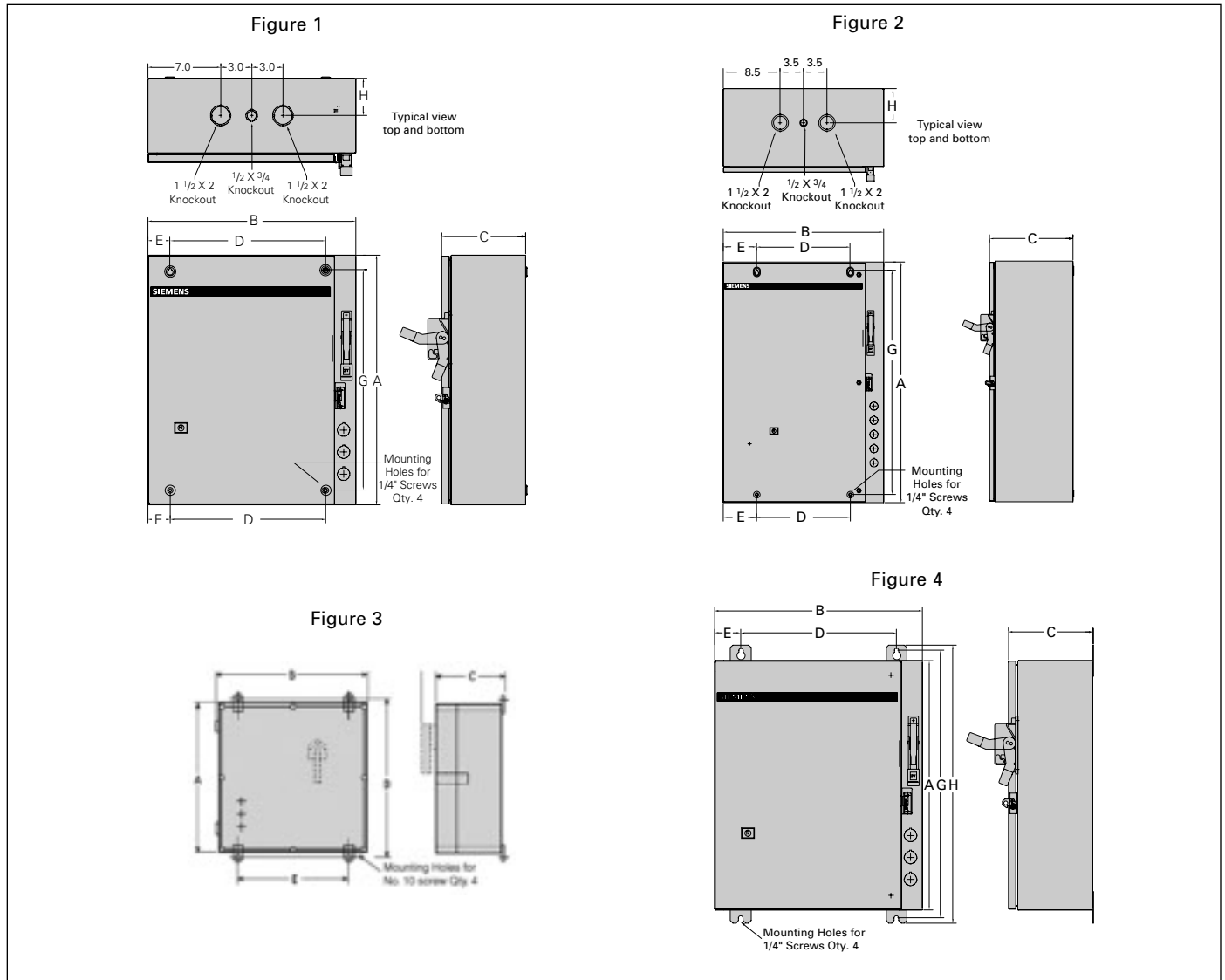
NEMA 1 General Purpose Enclosure (Standard width for use with or without CPT)												
Size	Fig	Outline Dimensions			Mounting Dimensions		Mtg Screw G	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-2 1/2 w/o CPT	1	19 1/8 (486)	11 3/8 (289)	7 1/16 (195)	15 3/8 (397)	8 1/4 (210)	1/4	1/2-3/4	1-1 1/4	1 1/2-2	30 (14)	D68870
0-2 1/2 (200 VA)	1a	24 7/8 (632)	13 3/8 (340)	8 1/8 (206)	21 3/4 (552)	9 (229)	1/4	1/2-3/4	1 1/4-1 1/2	2-2 1/2	52 (24)	D68870
3-4 w/o CPT	1a	24 7/8 (632)	13 3/8 (340)	8 1/8 (206)	21 3/4 (552)	9 (229)	1/4	1/2-3/4	1 1/4-1 1/2	2-2 1/2	52 (24)	D68870
NEMA 4/4X Stainless Steel Enclosure (Standard width for use with or without CPT)												
0-1 3/4 w/o CPT	3	13 (330)	12 3/8 (321)	5 3/8 (137)	12 1/4 (311)	10 (254)	1/4	—	—	—	34 (15)	
0-1 3/4 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	41 (19)	
2-2 1/2 w/o CPT	3	16 (406)	13 1/4 (337)	6 (152)	15 1/4 (387)	11 (279)	1/4	—	—	—	41 (19)	
2-2 1/2 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	41 (19)	
3-3 1/2 w/o CPT	3	25 1/16 (637)	17 3/16 (437)	7 3/8 (187)	24 3/16 (618)	14 (355)	1/4	—	—	—	55 (25)	
3-3 1/2 w/ CPT	3	29 (737)	23 3/16 (589)	9 1/4 (235)	27 1/2 (699)	20 (508)	5/16	—	—	—	61 (28)	D43292001
4	3	29 (737)	23 3/16 (589)	9 1/4 (235)	27 1/2 (699)	20 (508)	5/16	—	—	—	61 (28)	D43292001
NEMA 12/3R Industrial Use Enclosure (Standard width for use with or without CPT)												
0-1 3/4 w/o CPT	3	13 (330)	12 3/8 (321)	5 3/8 (137)	12 1/4 (311)	10 (254)	1/4	—	—	—	34 (15)	
0-1 3/4 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	41 (19)	D17150010
2-2 1/2 w/o CPT	3	16 (406)	13 1/4 (337)	6 1/8 (156)	15 1/4 (387)	11 (279)	1/4	—	—	—	41 (19)	
2-2 1/2 w/ CPT	3	16 (406)	17 1/8 (435)	7 5/8 (194)	15 1/4 (387)	14 (355)	1/4	—	—	—	41 (19)	D17150010
3-3 1/2 w/o CPT	3	25 1/16 (637)	17 3/16 (437)	7 3/8 (187)	24 3/16 (618)	14 (355)	1/4	—	—	—	55 (25)	
3-4 w/ CPT	3	29 1/16 (738)	23 3/16 (589)	9 1/4 (235)	27 3/16 (700)	20 (508)	5/16	—	—	—	61 (28)	D19673000
NEMA 4X Fiberglass Enclosure (Standard width for use with or without CPT)												
0-2 1/2	4	23.780 (604)	23.780 (604)	6.890 (175)	—	—	1/4	—	—	—	28 (13)	24139861003
3-4	4	39.37 (1000)	29.53 (750)	12.60 (320)	—	—	—	—	—	—	—	24139861004

Note: Dimensions in inches (mm). Dimensions for reference, not for construction. Contact sales office for dimensions not listed.

# Combination Two Speed Heavy Duty Starters

Enclosed, Class 32

Dimensions



16  
CONTROL  
PRODUCTS

NEMA & General  
Purpose Control

## NEMA 1 Standard Width 0-4

Size	Figure	Outline Dimensions			Mounting Dimensions				Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E	G	H		
0-1 $\frac{1}{4}$ (1 Winding)	1	24 (610)	20 (508)	8 (203)	15.00 (381)	2.125 (54)	21.00 (533)	3.50 (90)	68 (31)	D68774
2-4 (1 Winding)	2	36 (914)	24 (610)	8 (203)	14.00 (356)	5.00 (127)	33.50 (851)	3.50 (90)	71 (32)	D68774
0-2 $\frac{1}{2}$ (2 Winding)	1	24 (610)	20 (508)	8 (203)	15.00 (381)	2.125 (54)	21.00 (533)	3.50 (90)	135 (61)	D68774
3-4 (2 Winding)	2	36 (914)	24 (610)	8 (203)	14.00 (356)	5.00 (127)	33.50 (851)	3.50 (90)	138 (63)	D68774

## NEMA 12/3/3R/4 (Painted), 4/4X Stainless Standard Width 0-4

0-1 $\frac{1}{4}$ (1 Winding)	4	24 (610)	20 (508)	8 (203)	15.00 (381)	2.50 (64)	25.75 (654)	26.75 (680)	68 (31)	D68774
2-4 (1 Winding)	4	36 (914)	24 (610)	8 (203)	12 (305)	6.00 (152)	37.75 (959)	38.75 (984)	71 (32)	D68774
0-2 $\frac{1}{2}$ (2 Winding)	4	24 (610)	20 (508)	8 (203)	15.00 (381)	2.50 (64)	25.75 (654)	26.75 (680)	135 (61)	D68774
3-4 (2 Winding)	4	36 (914)	24 (610)	8 (203)	12 (305)	6.00 (152)	37.75 (959)	38.75 (984)	138 (63)	D68774

## Nema 4X Fiberglass 0-4

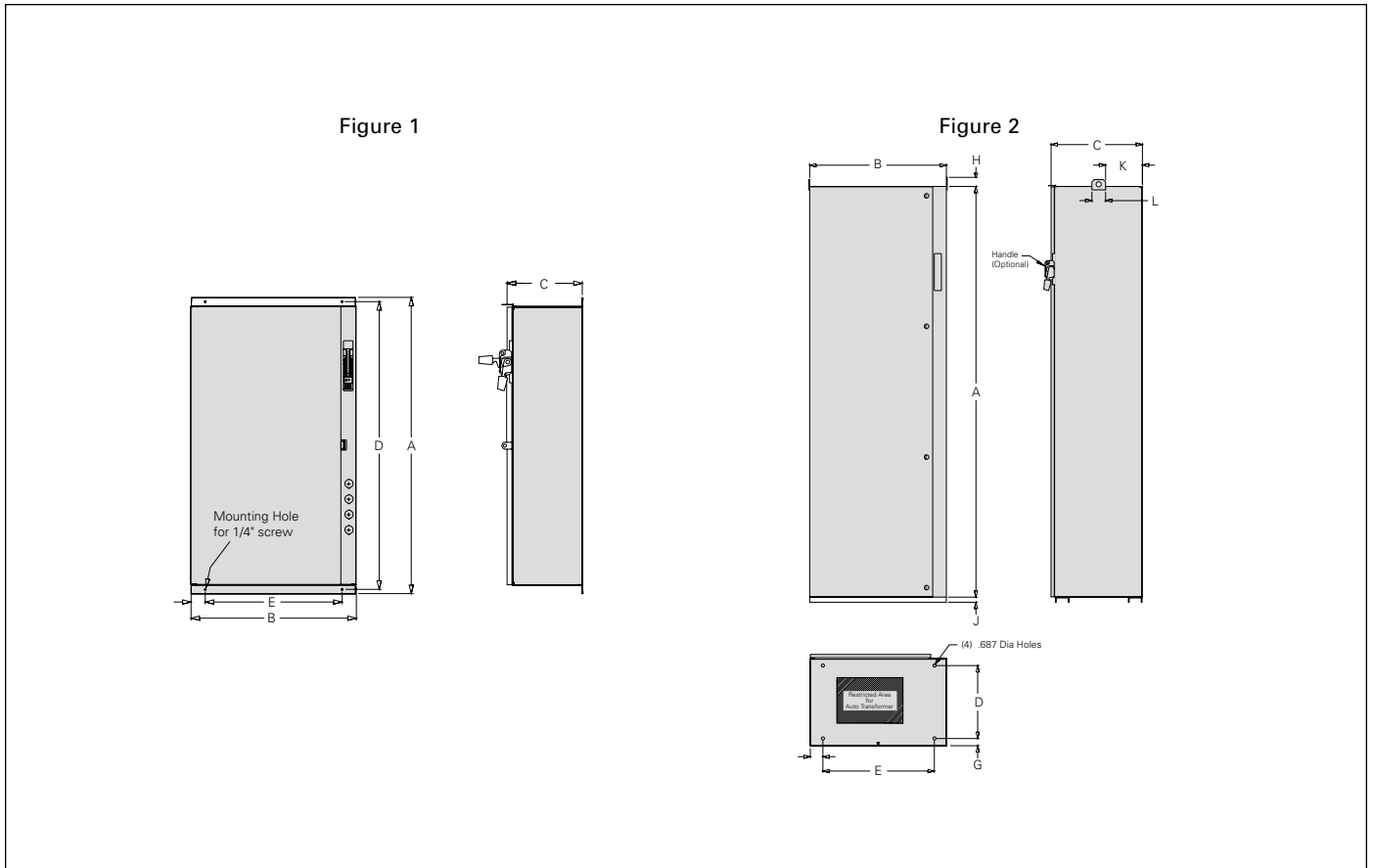
Size	Figure	Outline Dimensions			Mounting Dimensions		Mtg Screw	Conduit Size			Approx Ship Wt Lbs (Kg)	Ref Dwg
		A	B	C	D	E		K1	K2	K3		
0-1 $\frac{1}{4}$	3	23.780 (604)	14.680 (373)	6.890 (175)	24.125 (613)	12.250 (311)	1/4	—	—	—	18 (8)	
2-4	3	23.780 (604)	23.780 (604)	6.890 (175)	24.125 (613)	21.250 (540)	1/4	—	—	—	28 (13)	

Note: Dimensions in inches (mm).  
Dimensions for reference, not for construction.  
Contact sales office for dimensions not listed.

# Reduced Voltage Starters

Class 36, 37

Dimensions



## Class 36, 37, NEMA 1, 4, 4X, 12/3R, Combination and Non-combination

Reduced Voltage Auto Transformer Size	Part Winding & Wye Delta		Figure	A	B	C	D	E	G	H	I	J	K	L
	Disconnect	Circuit Breaker												
1 3/4-2 1/2	0-2	0-2 1/2	1	43 5/16	24 5/32	11	42 11/32	20	2 1/16	—	—	—	—	—
3-3 1/2	2 1/2-3 1/2	3-3 1/2	1	55 5/16	28 9/32	11	54 11/32	24	2 1/8	—	—	—	—	—
4	4	4	1	74 21/32	28 9/32	11	73 13/32	24	2 1/8	—	—	—	—	—
5, 6	5, 6	5, 6	2	90	29 30/31	20	16	24 7/16	2 16/21	1 23/40	2	1 1/8	8 3/40	3

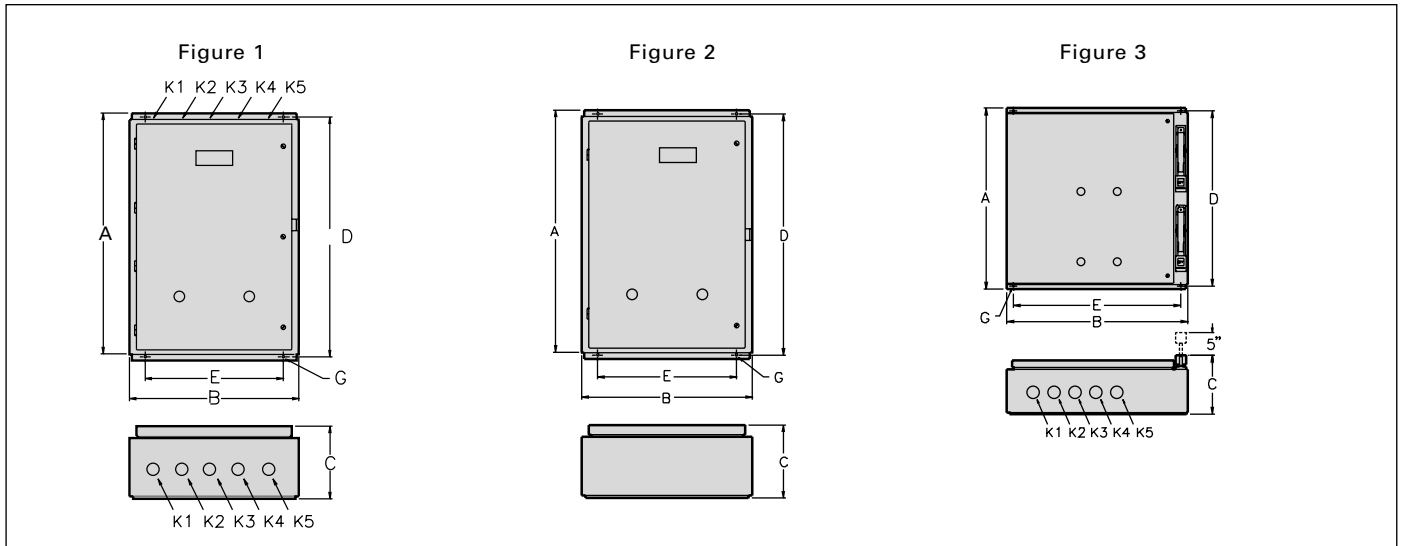
16 CONTROL PRODUCTS

NEMA & General Purpose Control

# Duplex Heavy Duty Controllers

## Class 83, 84

## Dimensions



### Class 83 Non-Combination Type

Enclosure Type	Size	Figure	Outline Dimensions			Mounting Dimensions		Mounting Screw	Conduit Size					Approx Ship Wt Lbs	
			A	B	C	D	E		G	K1	K2	K3	K4		K5
NEMA 1	0-1 1/4	1	19 1/2	16 5/8	6 1/2	18 3/4	13	1/4	1 1/4-1 1/2	1/2-3/4	1/2	1/2-3/4	1 1/4-1 1/2	1 1/2-2	20
	2, 2 1/2	1	25 1/16	17 7/16	7 3/8	24 7/16	14	1/4	1 1/4-1 1/2	1/2-3/4	1/2-3/4	1 1/4-1 1/2	1 1/2-2	57	
	3-4	1	29 11/16	23 3/16	9 1/4	27 9/16	20	5/16	2-2 1/2	1 1/4-1 1/2	1/2-3/4	1 1/4-1 1/2	2-2 1/2-3	93	
NEMA 12	0-1 1/4	2	19 1/2	16 5/8	6 1/2	18 3/4	13	1/4	—	—	—	—	—	20	
	2, 2 1/2	2	25 1/16	17 7/16	7 3/8	24 7/16	14	1/4	—	—	—	—	—	57	
	3-4	2	23 1/2	23 3/16	11 1/4	27 9/16	20	5/16	—	—	—	—	—	93	
NEMA 4/4X <sup>Ⓢ</sup>	0-1 1/4	2	19 1/2	16 5/8	6 1/2	18 3/4	13	1/4	—	—	—	—	—	20	
	2, 2 1/2	2	25 1/16	17 7/16	7 3/8	24 7/16	14	1/4	—	—	—	—	—	57	
	3-4	2	29 1/16	23 3/16	9 1/4	27 9/16	20	5/16	—	—	—	—	—	93	

### Class 84 Combination Type

Enclosure Type	Size	Figure	Outline Dimensions			Mounting Dimensions		Mounting Screw	Conduit Size					Approx Ship Wt Lbs
			A	B	C	D	E		G	K1	K2	K3	K4	
NEMA 1	0-2 1/2	3	34 1/8	24 5/8	7 9/16	33	20	3/8	7/8-1 1/8	7/8-1 1/8	1 1/8-1 3/4	1 1/8-1 3/4	1 3/4-1 7/8	70
	3-4	3	56	28 1/2	9 1/16	54 1/16	24 1/4	3/8	—	—	—	—	—	106
NEMA 4/4X/12 <sup>Ⓢ</sup>	0-4 <sup>Ⓢ</sup>	3	34 1/8	24 5/8	7 9/16	33	20	3/8	—	—	—	—	—	—

Ⓢ Dimensions may vary for size 3 & 4 stainless steel enclosures.

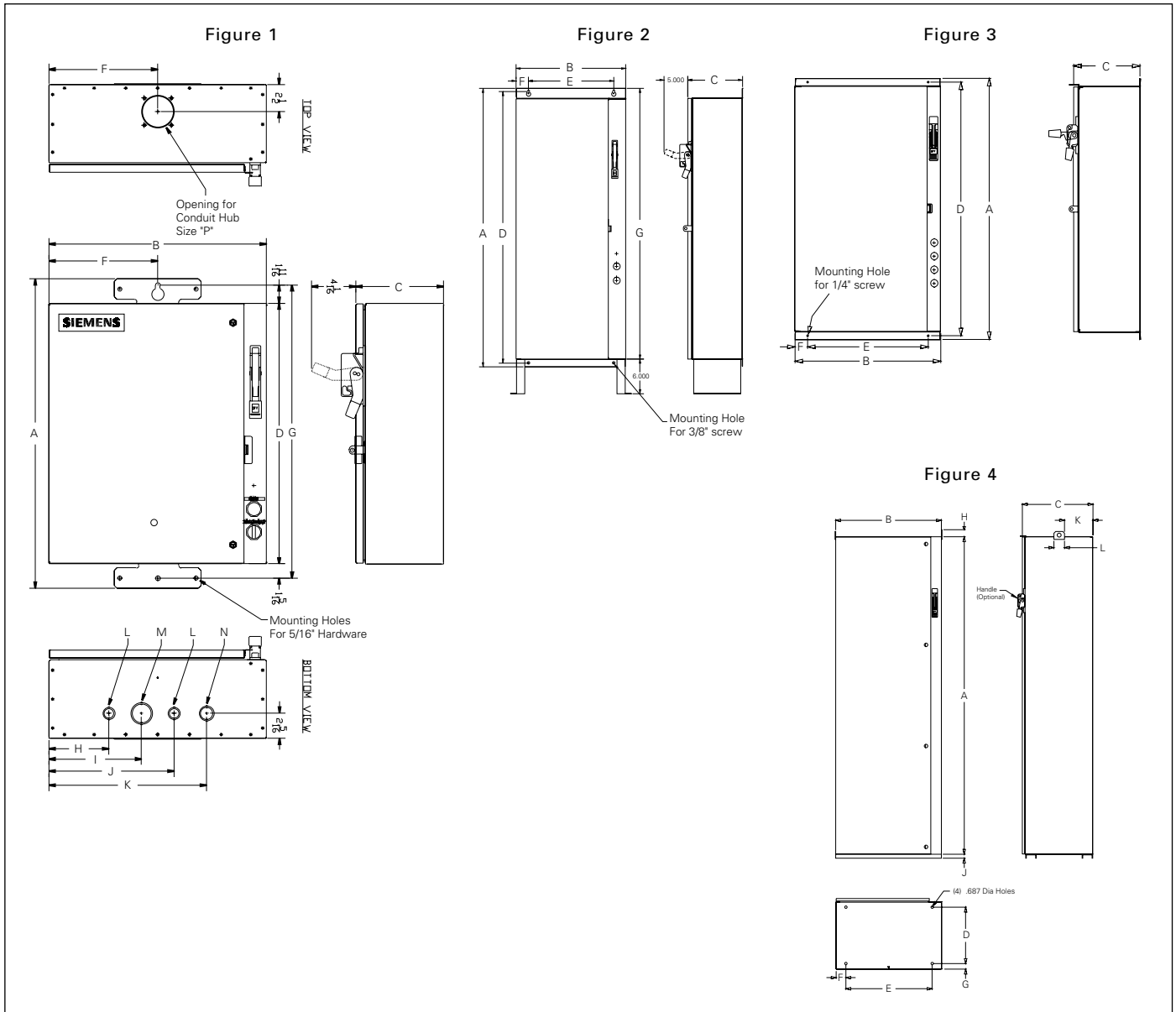
Ⓢ NEMA 4 Painted, 4X Stainless Steel.

# Pump Control Panels

## Class 87, 88

## Dimensions

### Outline Drawings



### Class 87 Standard Pump Panel

Size	Figure	A	B	C	D	E	F	G	H	I	J	K	Conduit Knockout				Hub
													L	M	N	P	
1 - 2 1/2	1	28 1/2	20	8 1/16	24	—	10	27	5 1/2	8 1/2	11 1/2	14 1/2	1 1/2 x 3/4	1 1/4 x 1	3/4 x 1	1 1/2	
3 - 4	1	40 1/2	24	8 3/32	36	—	12	39	8 7/16	11 15/16	15 7/16	—	1 31/32 x 2 15/32	7/8 x 1 1/8	—	2 1/2	
5	2	72 5/32	20	10	71	16	2 1/8	70 29/32	—	—	—	—	—	—	—	—	
6	2	79 1/8	22	12 15/16	78	18	2 1/8	77 7/8	—	—	—	—	—	—	—	—	
4 (Vac)	2	55 3 1/32	24 3/8	9 22/32	54 26/32	20 1/4	2 1/8	54 23/32	26 3/16	—	5	27 14/32	—	—	—	—	

### Class 88 Reduced Voltage Pump Panels

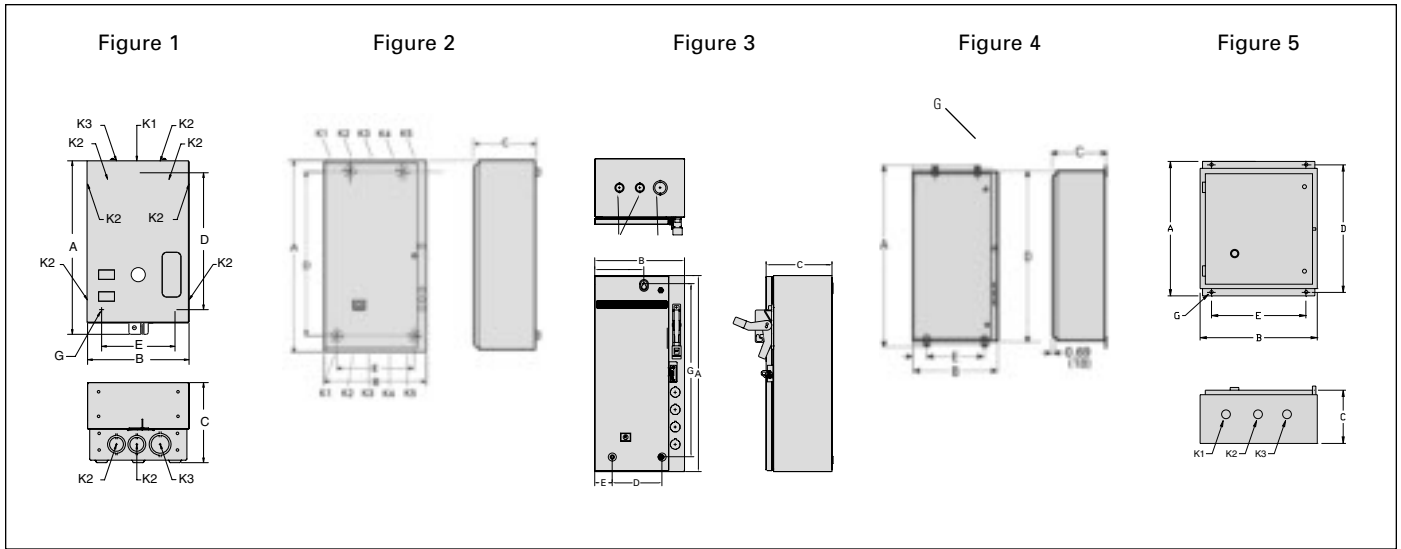
RVAT Size	Part Winding & Wye Delta		Figure	A	B	C	D	E	F	H	I	J	K	L
	Fusible Disconnect	Circuit Breaker												
2-2 1/2	1-2	1-2 1/2	3	43 5/16	24 5/32	11	42 11/32	20	2 1/16	—	—	—	—	—
3-3 1/2	2 1/2-3 1/2	3-3 1/2	3	55 5/16	28 9/32	11	54 11/32	24	2 1/8	—	—	—	—	—
4	4	4	3	74 2 1/32	28 9/32	11	73 13/32	24	2 1/8	—	—	—	—	—
5, 6	5, 6	5, 6	4	90	30	20	16	24 7/16	2 3/4	1 1/2	—	1 1/8	8 1/16	3

**Note:** Dimensions in inches (millimeters). Dimensions for reference, not for construction. Contact Sales Office for dimensions not listed.

# Lighting Contactors

LE, CLM, CM

Dimensions



## Enclosed Class LE, CLM, CM

Non-Combination	LE Lighting Rating	CLM Lighting Rating	Fig	Outline Dimensions			Mounting Dimensions			Mtg Screw	Conduit Size				
				A	B	C	D	E	G		K1	K2	K3	K4	K5
NEMA 1	without CPT	20A (2-12p), 30-60A (3p)	30A (3p)	1	10 <sup>31</sup> / <sub>32</sub>	6 <sup>13</sup> / <sub>32</sub>	5 <sup>1</sup> / <sub>32</sub>	8 <sup>7</sup> / <sub>32</sub>	4 <sup>5</sup> / <sub>8</sub>	1/4	1/2	1/2-3/4	3/4-1	—	—
		—	20A (2-12p), 30-60A (3p)	1	13 <sup>17</sup> / <sub>32</sub>	7 <sup>31</sup> / <sub>32</sub>	6 <sup>3</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>4</sub>	6	1/4	1/2-3/4	3/4-1	1-1 <sup>1</sup> / <sub>4</sub>	—	—
		30-60A (6-12p), 100A (3p)	100A	1	19 <sup>1</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>8</sub>	7 <sup>11</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	1/4	1/2-3/4	1-1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub> -2	—	—
		—	200A	1	24 <sup>7</sup> / <sub>8</sub>	13 <sup>3</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>4</sub>	9	1/4	1/2-3/4	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	—	—
		200-400A	—	5	26	17 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	25 <sup>3</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>2</sub>	1/4	1/2-3/4	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	—	—
	—	300-400A	2	48	20	12 <sup>1</sup> / <sub>2</sub>	45 <sup>5</sup> / <sub>16</sub>	10	1/4	2-2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub> -2 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	2-2 <sup>1</sup> / <sub>2</sub>	
	with CPT	20A (2-12p), 30-60A (3-9p), 100A (3p)	20-100A	1	19 <sup>1</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>8</sub>	7 <sup>11</sup> / <sub>16</sub>	15 <sup>5</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>4</sub>	1/4	1/2-3/4	1-1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub> -2	—	—
		—	30-60A (6-12p)	3	16	17 <sup>1</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>4</sub>	14	1/4	1/2-3/4	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	—	—
		30-60A (12p)	200A	1	24 <sup>7</sup> / <sub>8</sub>	13 <sup>3</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>4</sub>	9	1/4	1/2-3/4	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	2-2 <sup>1</sup> / <sub>2</sub>	—	—
		200-400A	—	5	26	17 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	25 <sup>3</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>2</sub>	1/4	—	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	—	—
—		300-400A	2	48	20	12 <sup>1</sup> / <sub>2</sub>	45 <sup>5</sup> / <sub>16</sub>	10	1/4	2-2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub> -2 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub> -1 <sup>1</sup> / <sub>2</sub>	2-2 <sup>1</sup> / <sub>2</sub>	
NEMA 12/3R & 4/4X	without CPT	20A (2-12p), 30-60A (3p)	20-30A	5	16	13 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>4</sub>	11	1/4	—	—	—	—	—
		—	30-60A (6-12p)	3	16	17 <sup>1</sup> / <sub>8</sub>	7 <sup>7</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>4</sub>	14	1/4	—	—	—	—	—
		30-60A (6-9p), 100A (3p)	—	5	26	13 <sup>3</sup> / <sub>8</sub>	7 <sup>9</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>4</sub>	10	1/4	—	—	—	—	—
		200-400A	200A	5	26	17 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	23 <sup>3</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>2</sub>	1/4	—	—	—	—	—
		—	60-100A	5	16	13	9 <sup>1</sup> / <sub>2</sub>	15 <sup>1</sup> / <sub>8</sub>	11	1/4	—	—	—	—	—
	—	300-400A	4	48	20	12 <sup>1</sup> / <sub>2</sub>	49	10	1/4	—	—	—	—	—	
	with CPT	20A (2-12p), 30-60A (3p)	20-30A	5	16	13 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>4</sub>	11	1/4	—	—	—	—	—
		—	30-60A (6-9p), 100A (3p)	—	5	26	13 <sup>3</sup> / <sub>8</sub>	7 <sup>9</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>4</sub>	10	1/4	—	—	—	—
		—	60-100A	5	16	13	9 <sup>1</sup> / <sub>2</sub>	15 <sup>1</sup> / <sub>8</sub>	11	1/4	—	—	—	—	—
		200-400A	200A	5	26	17 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	25 <sup>3</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>2</sub>	1/4	—	—	—	—	—
—		300-400A	4	48	20	12 <sup>1</sup> / <sub>2</sub>	49	10	1/4	—	—	—	—	—	

Combination	Type	LE, CM		Fig	Outline Dimensions			D	E	G	K1	K2	K3
		Lighting Ratings	Fig		A	B	C						
NEMA 12/3R & 4/4X	with & without CPT	Fusible and Non-fusible Disconnect	20-60A	3	24	11	8						
			100A	3	24	20	8						
			200A	3	46	20	10						
			300A	3	76	22	13						
		Circuit Breaker	20-100A	3	24	11	8						

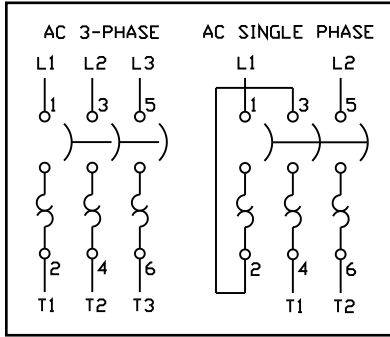
**CONTROL PRODUCTS 16**  
**NEMA & General Purpose Control**

# Manual Control

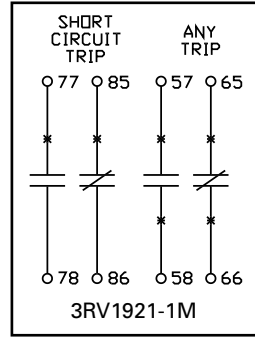
## Class 11 - 3RV, SMF, MMS

## Wiring Diagrams

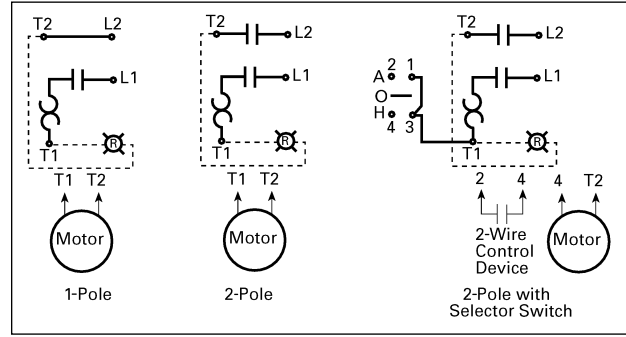
### Class 11 - 3RV



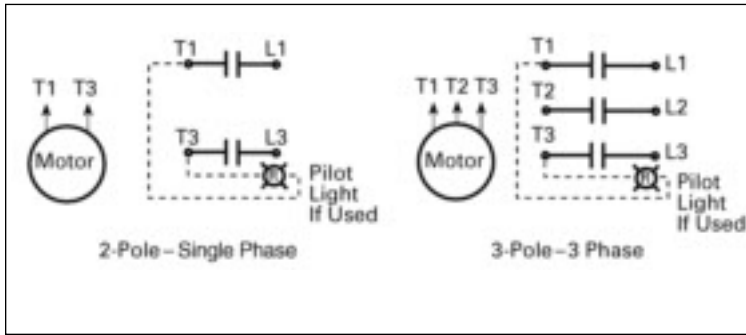
### Signaling Contact for Class 11 - 3RV



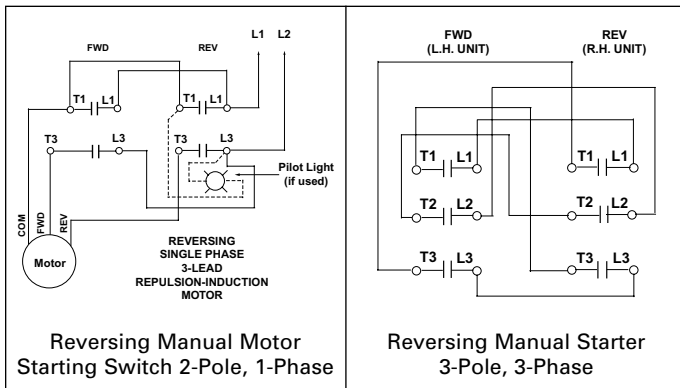
### Typical Wiring Diagrams—Class SMF



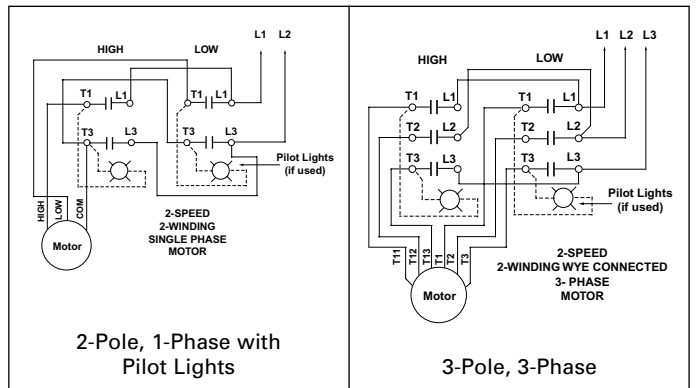
### Typical Wiring Diagrams—MMS



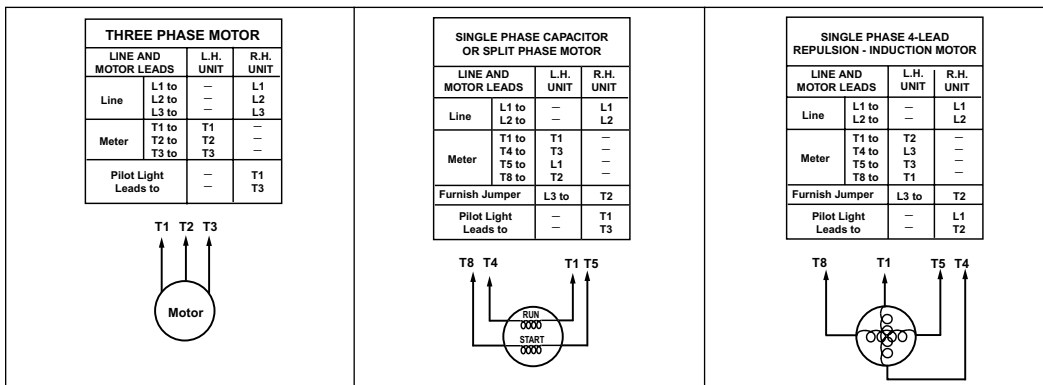
### AC Reversing Manual Starter and Manual Motor Starting Switches



### AC 2-Speed Manual Motor Starting Switches



### 3-Pole Reversing Switches



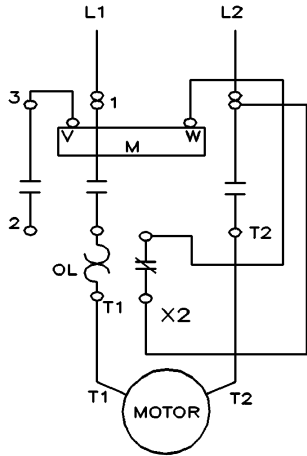
# Heavy Duty Motor Starters

## Class 14

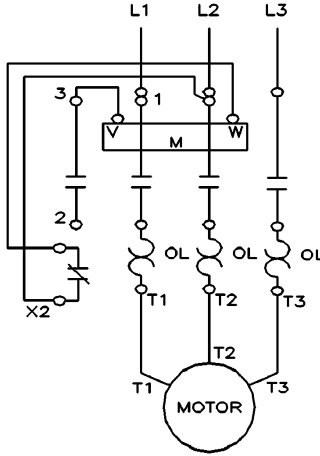
## Wiring Diagrams

### 3-Phase and Single Phase Magnetic Starters

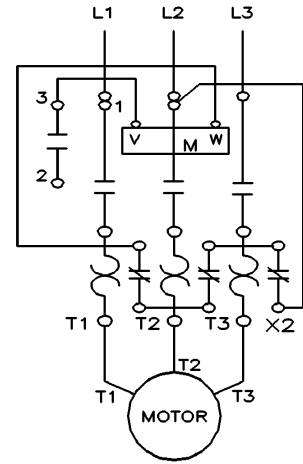
Ambient Compensated  
Single Phase Sizes 00-2 1/2



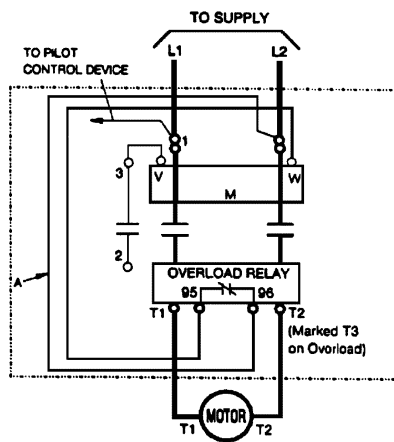
Ambient Compensated  
3-Phase Sizes 00-2 1/2



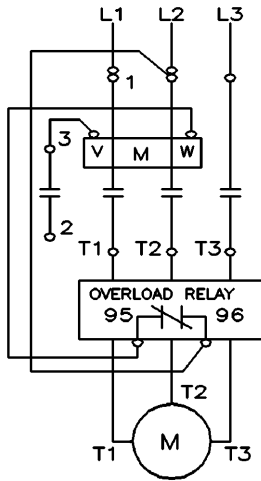
Ambient Compensated  
3-Phase Sizes 3-4



Solid State Overload  
Single Phase Sizes 0-1



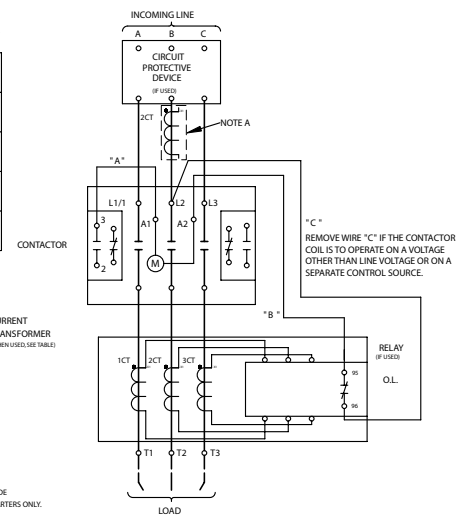
Solid State Overload  
3-Phase Sizes 00-4



Solid State Overload  
3-Phase Sizes 5-8

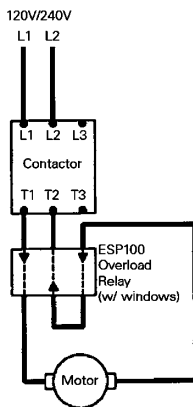
POWER WIRING:  
USE 75°C COPPER WIRE ONLY.

SIZE	CT RATIO
5	300:5
6	600:5
7	750:5
8	1200:5



NOTES:  
A: 2CT IS LOCATED ON THE LINE SIDE  
OF CONTACTOR ON SIZE 7 STARTERS ONLY.

Solid State Overload 3-Phase  
Wired as 1-Phase<sup>①②③</sup>



① Warning: The ESP100 Starter and Single Phase Motor must be wired with polarity as shown. Neutral and L1 wires must be wired as indicated on the drawing. Polarity is indicated by the arrows.

② Full Load Amps (FLA): Adjustment of the ESP100 solid state overload relay (OL) must be made as follows to accommodate the single phase motor: For an approximate setting of a single phase motor application, multiply the motor nameplate FLA by .75 and set the

dial on the overload relay (OL) to resulting value.  
③ The 3-phase for frame size A (without windows) can not be wired for single phase. Use the proper version for single phase.

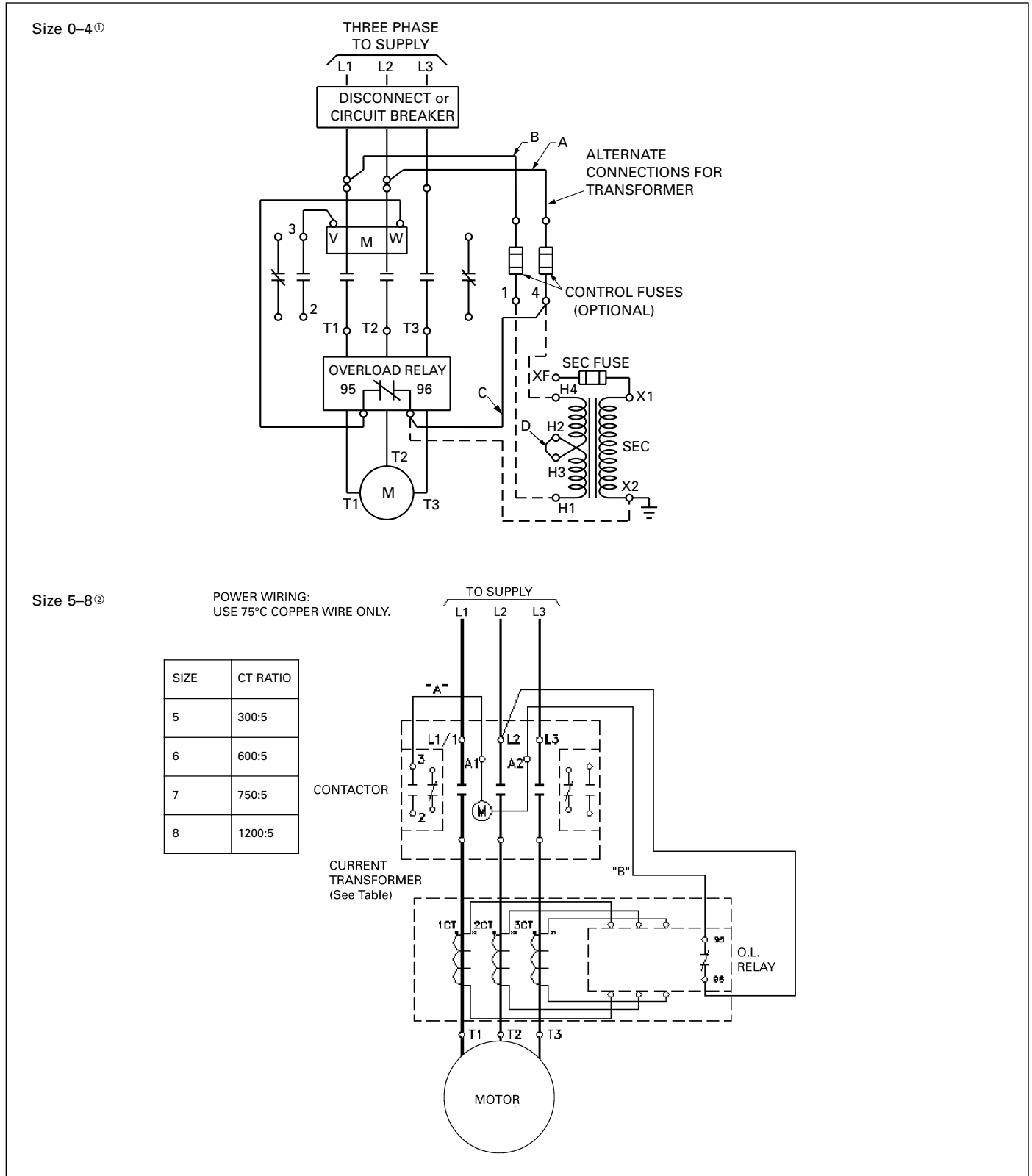


# Combination Heavy Duty Starters

Class 17, 18

Wiring Diagrams

3-Phase



① Remove wire "C" if control transformer is used. For separate control voltage source, remove jumpers "A" and "B" and connect source to control fuse line terminals.

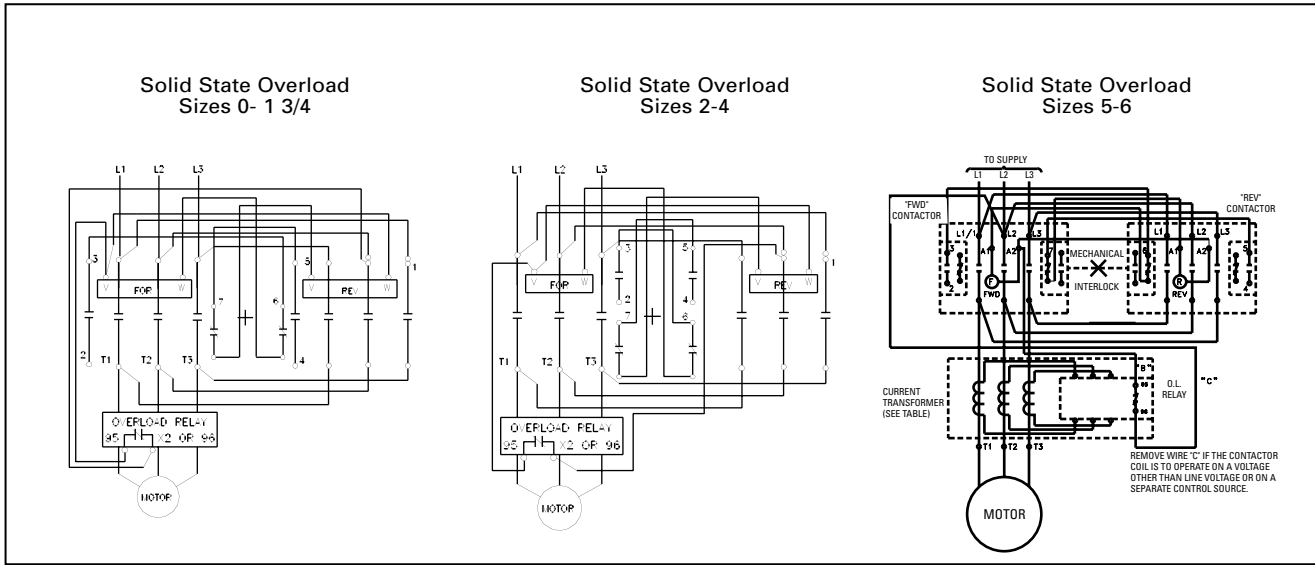
② Remove wire "C" if the contactor coil is to operate on a voltage other than line voltage or in a separate control source.

# Reversing Heavy Duty Starters

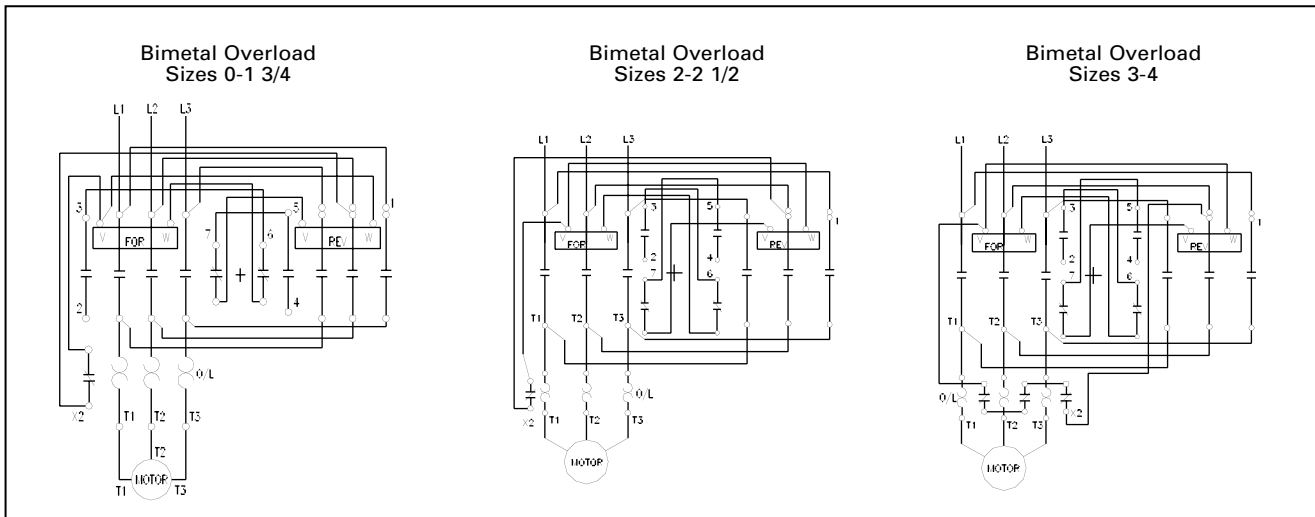
## Class 22

## Wiring Diagrams

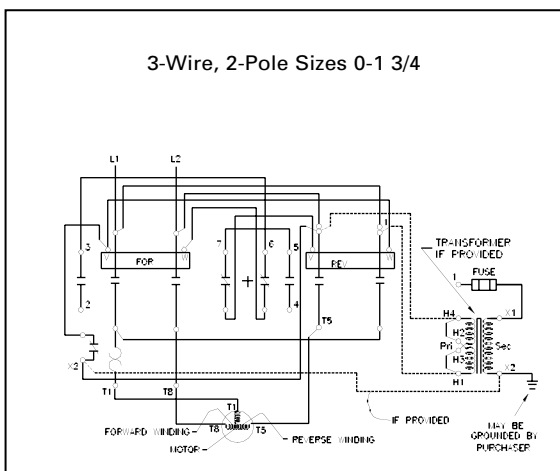
### 3-Phase Solid State Overload



### 3-Phase Ambient Compensated Overload



### Single Phase Ambient Compensated Overload

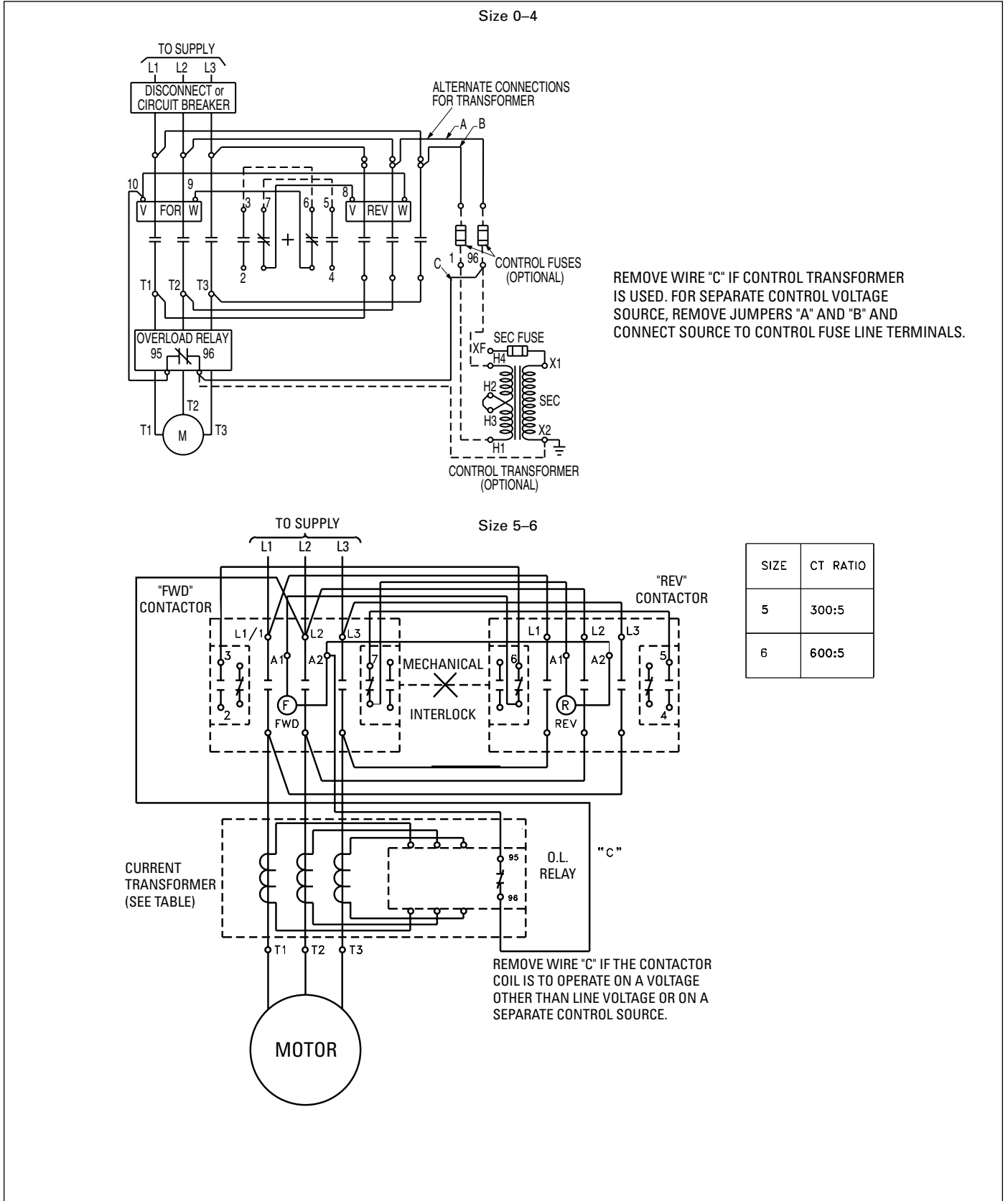


# Combination Reversing Heavy Duty Starters

Class 25, 26

Wiring Diagrams

3-Phase

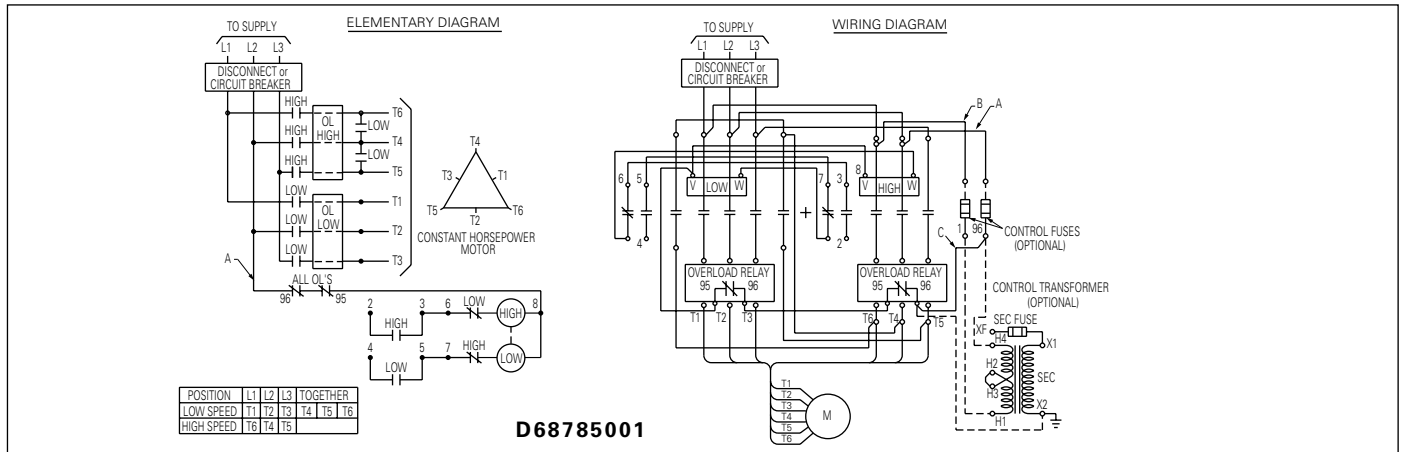


# Two Speed Heavy Duty Starters

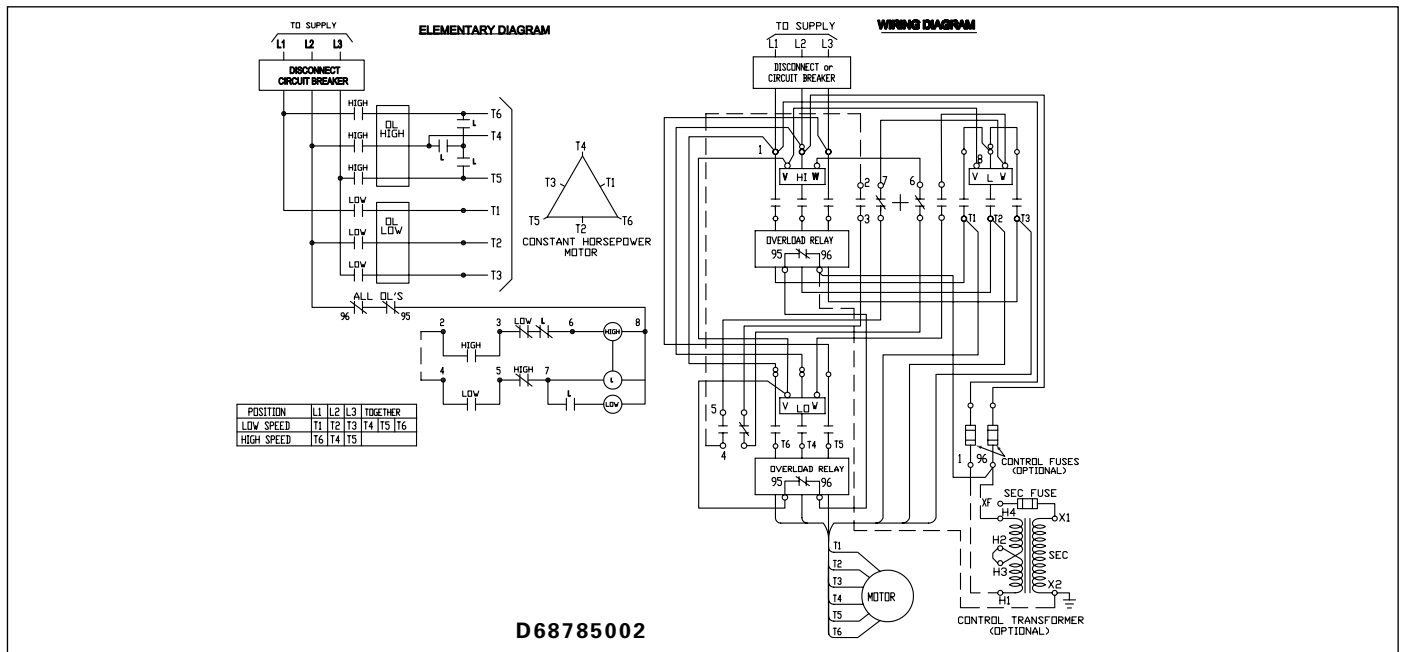
## Class 30 & 32 Non-Combination and Combination Starters

## Wiring Diagrams

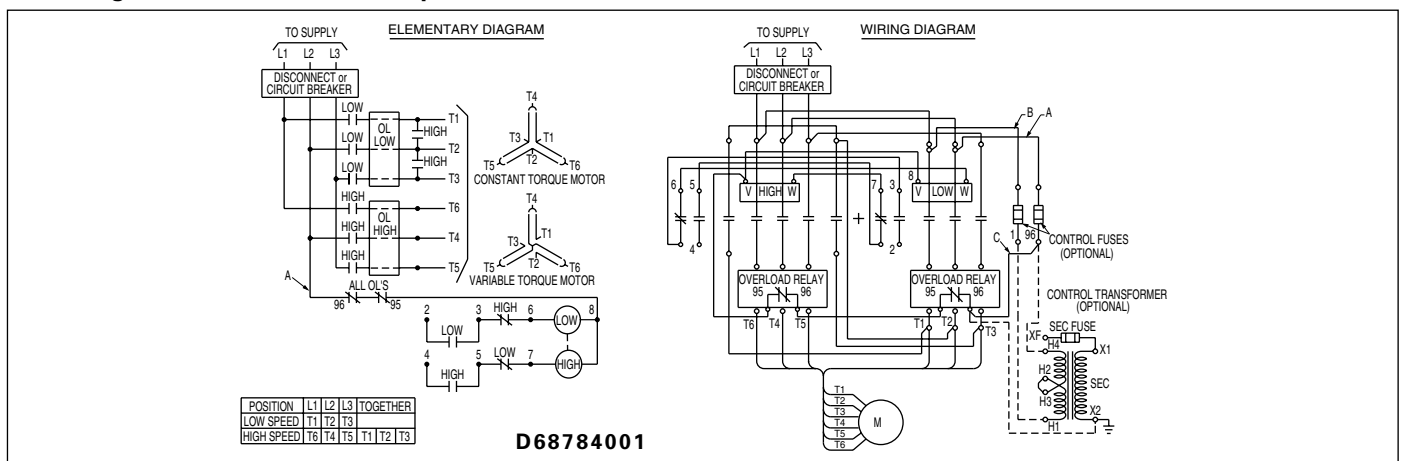
### 1 Winding Constant Horsepower Size 0-1<sup>3</sup>/<sub>4</sub>



### 1 Winding Constant Horsepower Size 2-4



### 1 Winding Constant or Variable Torque Size 0-1<sup>3</sup>/<sub>4</sub>



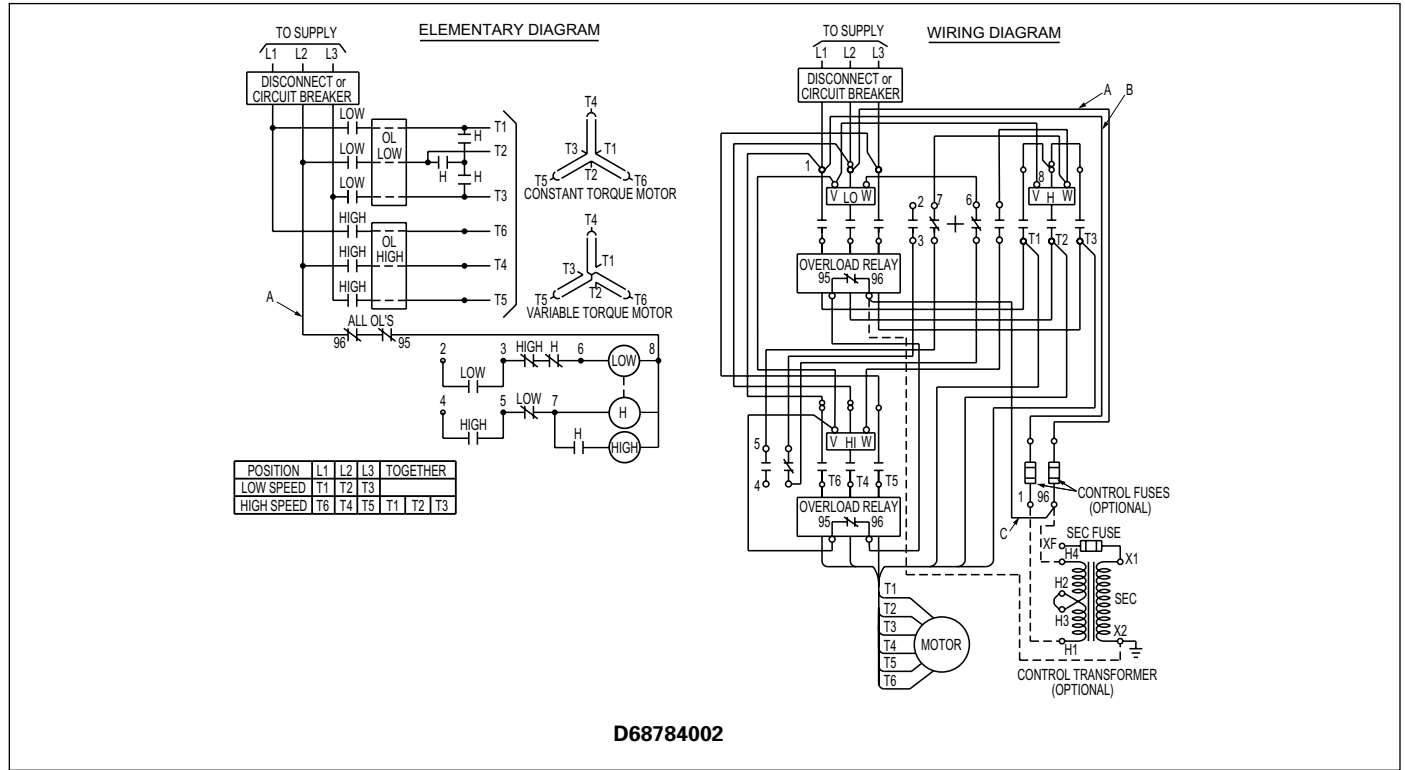
Note: For separate control voltage source, remove jumpers "A" and "B" and connect source to control fuse terminal. Remove jumper "C" if control transformer is used.

# Two Speed Heavy Duty Starters

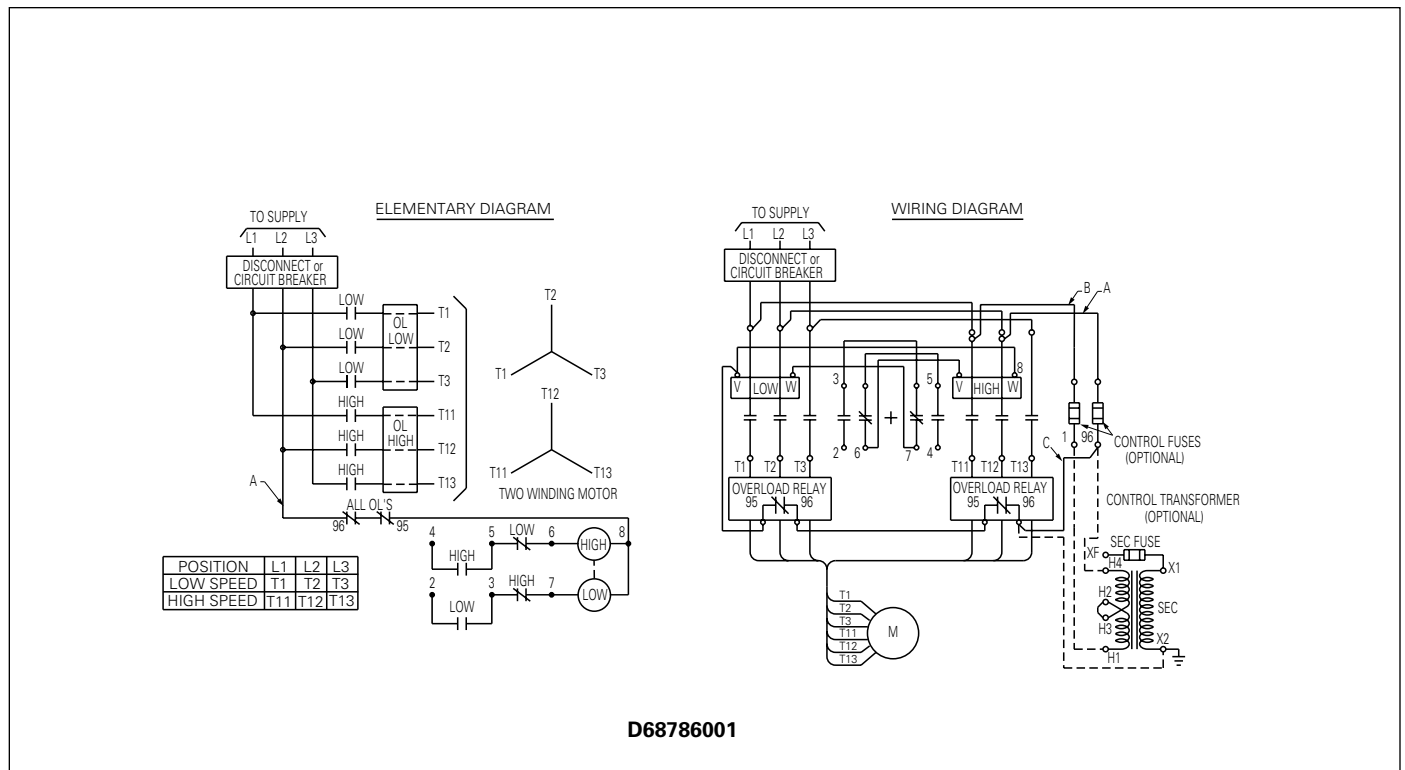
## Class 30 & 32 Non-Combination and Combination Starters

## Wiring Diagrams

### 1 Winding Constant or Variable Torque Size 2-4



### 2 Winding Constant Horsepower & 2 Winding Constant or Variable Torque Size 0-4



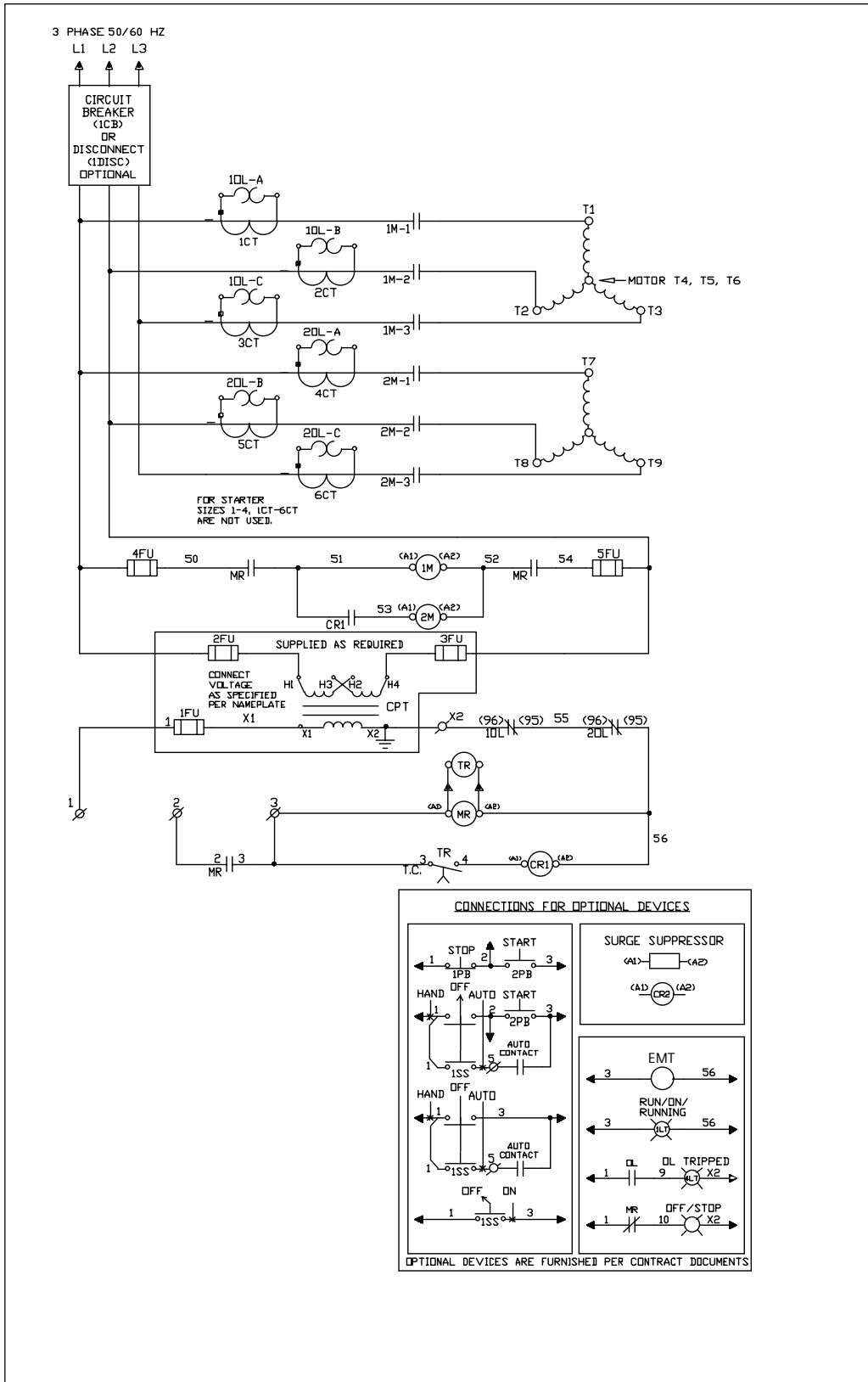
**Note:** For separate control voltage source, remove jumpers "A" and "B" and connect source to control fuse terminal. Remove jumper "C" if control transformer is used.

# Reduced Voltage Starters & Pump Panels

Class 36, 37, 88

Wiring Diagrams

Part Winding



16 CONTROL PRODUCTS

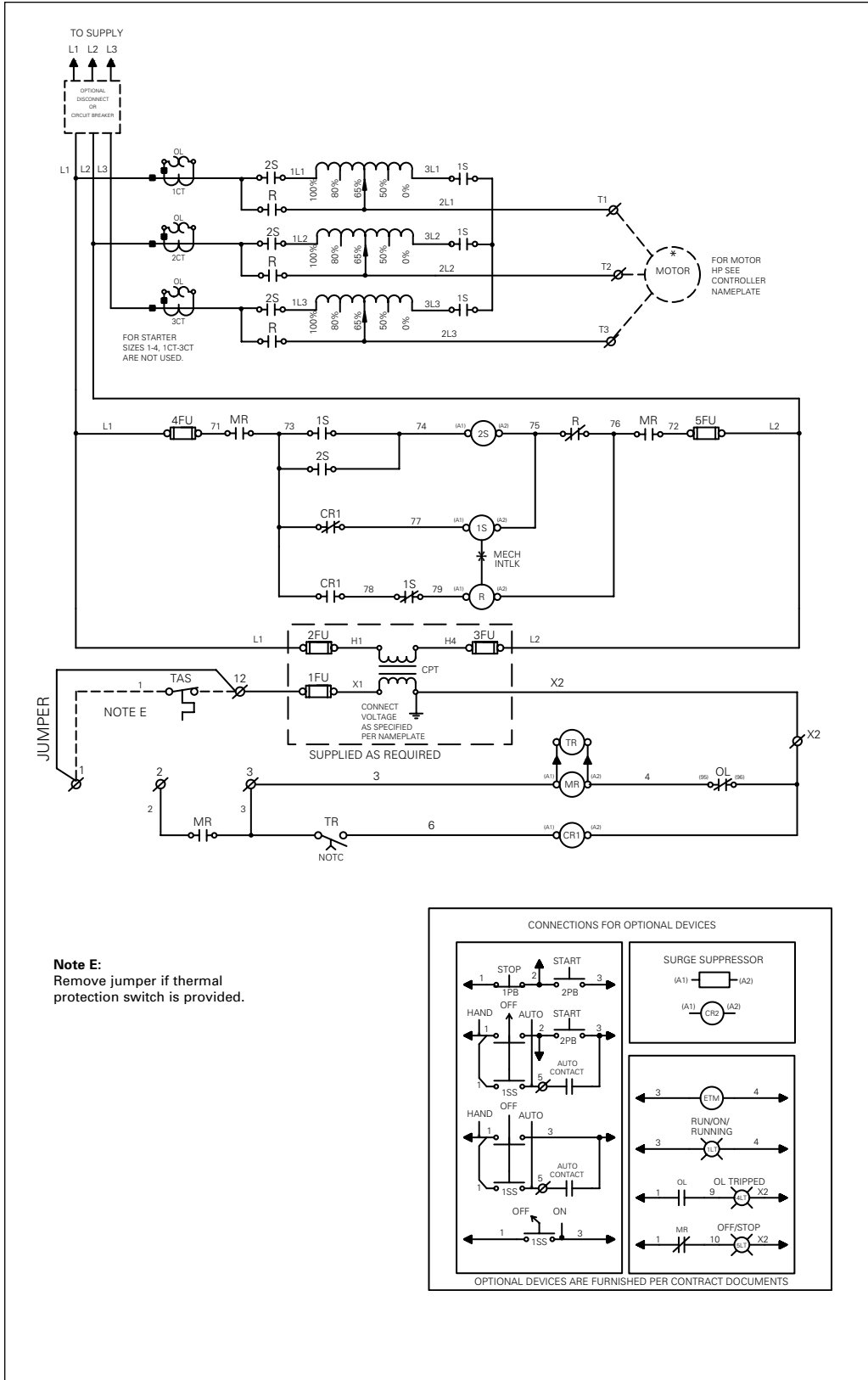
NEMA & General Purpose Control

# Reduced Voltage Starters & Pump Panels

Class 36, 37, 88

Wiring Diagrams

## Auto Transformer

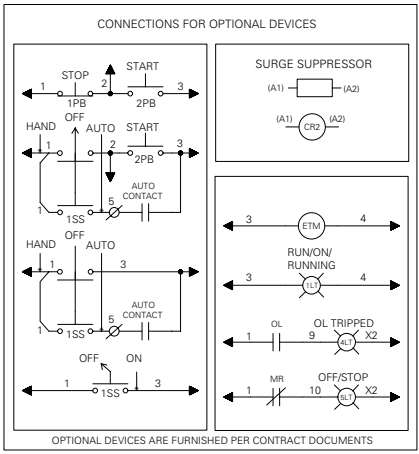
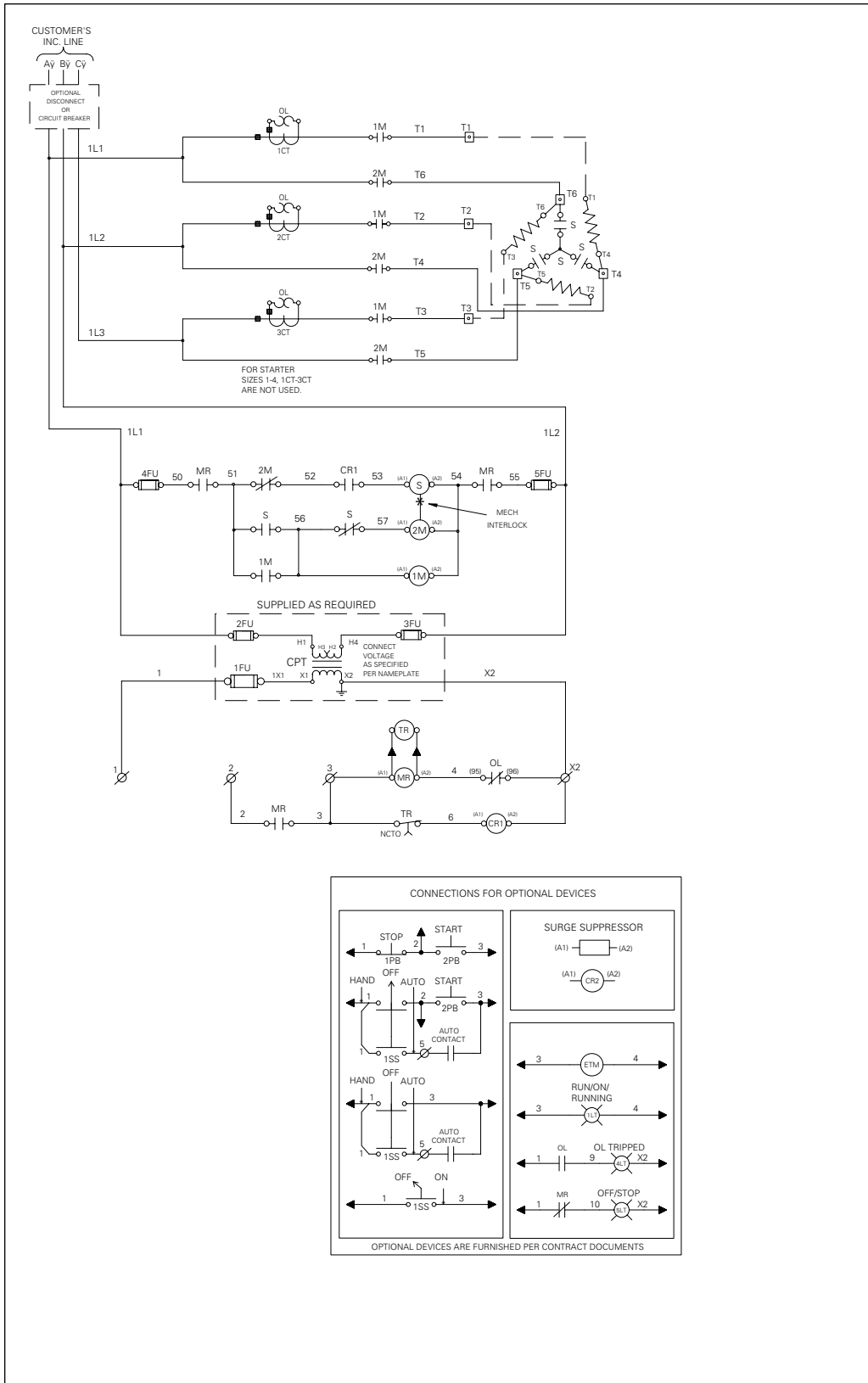


# Reduced Voltage Starters & Pump Panels

Class 36, 37, 88

Wiring Diagrams

Wye Delta (Open Transition)



16 CONTROL PRODUCTS

16 NEMA & General Purpose Control

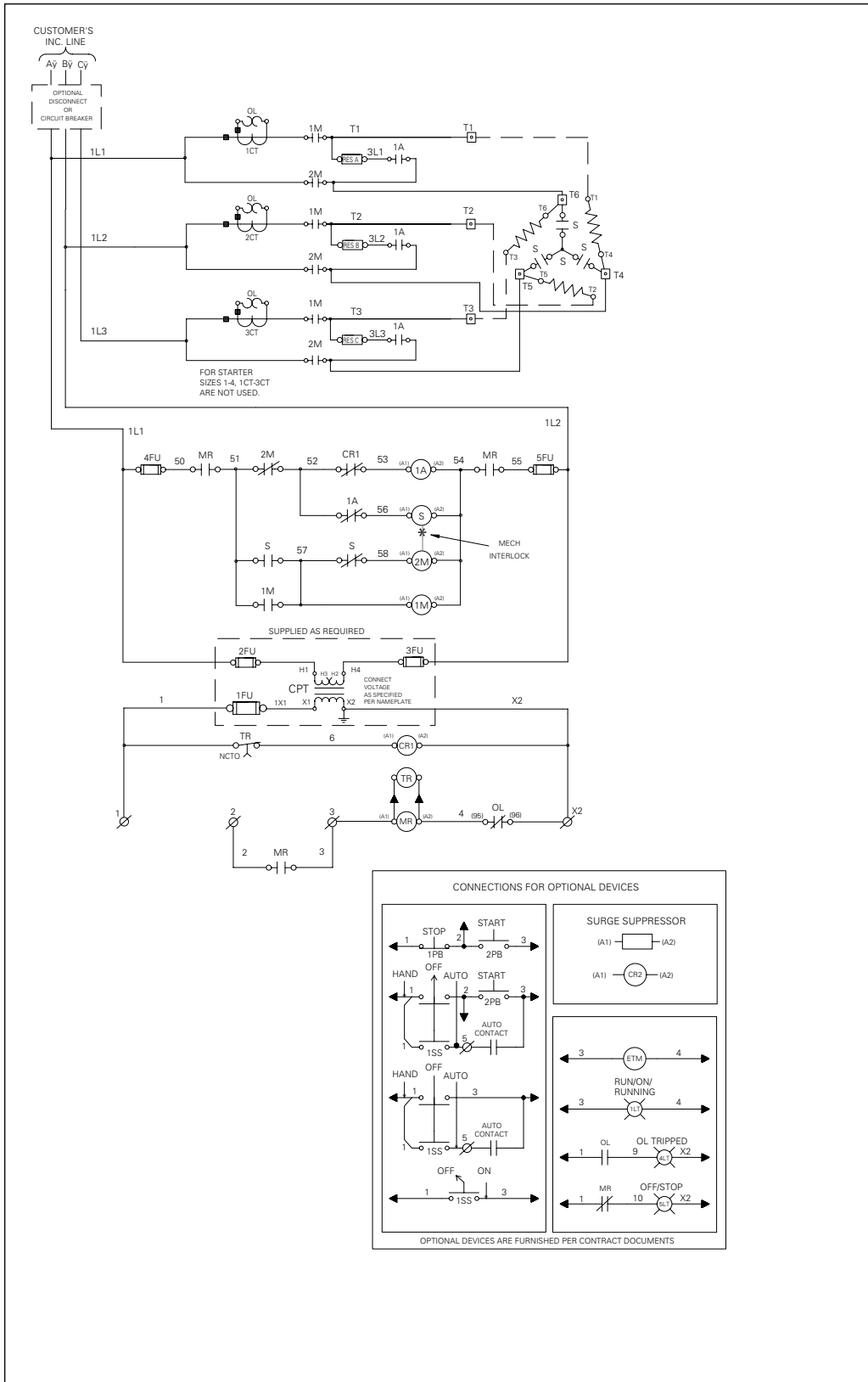


# Reduced Voltage Starters & Pump Panels

Class 36, 37, 88

Wiring Diagrams

Wye Delta (Closed Transition)



16 CONTROL PRODUCTS

NEMA & General Purpose Control

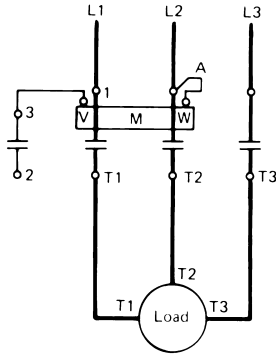
# Heavy Duty Contactors and Reversing Contactors

Class 40, 43

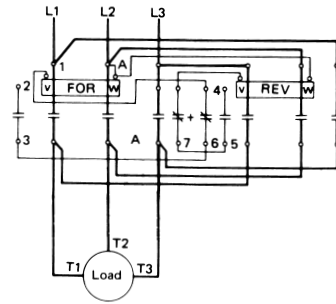
Wiring Diagrams

## 3-Phase Magnetic Contactors and Reversing Contactors

3-Phase Contactors—Size 00-4

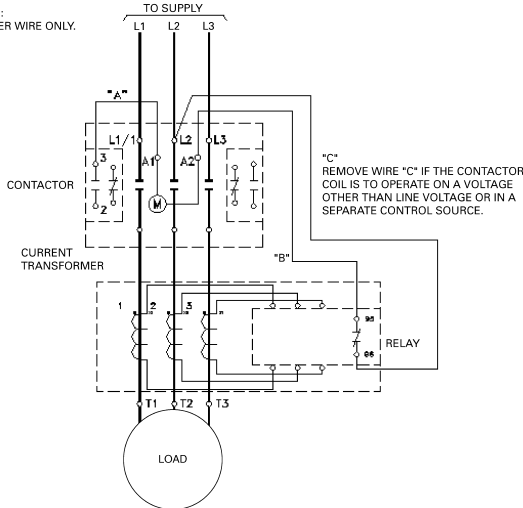


3-Phase Reversing Contactors—Size 00-4

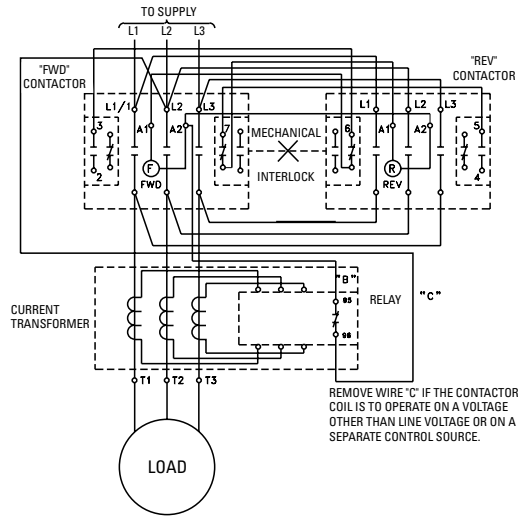


3-Phase Contactors—Size 5, 6

POWER WIRING:  
USE 75°C COPPER WIRE ONLY.



3-Phase Reversing Contactors—Size 5, 6

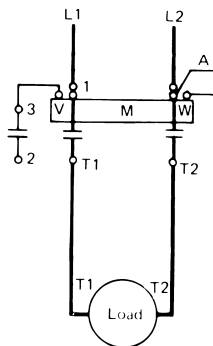


16  
CONTROL  
PRODUCTS

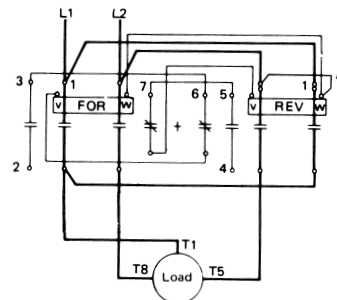
16  
NEMA & General  
Purpose Control

## Single Phase Magnetic Contactors and Reversing Contactors

Single Phase Contactors—Size 00-4



Single Phase Reversing Contactors—Size 00-1P

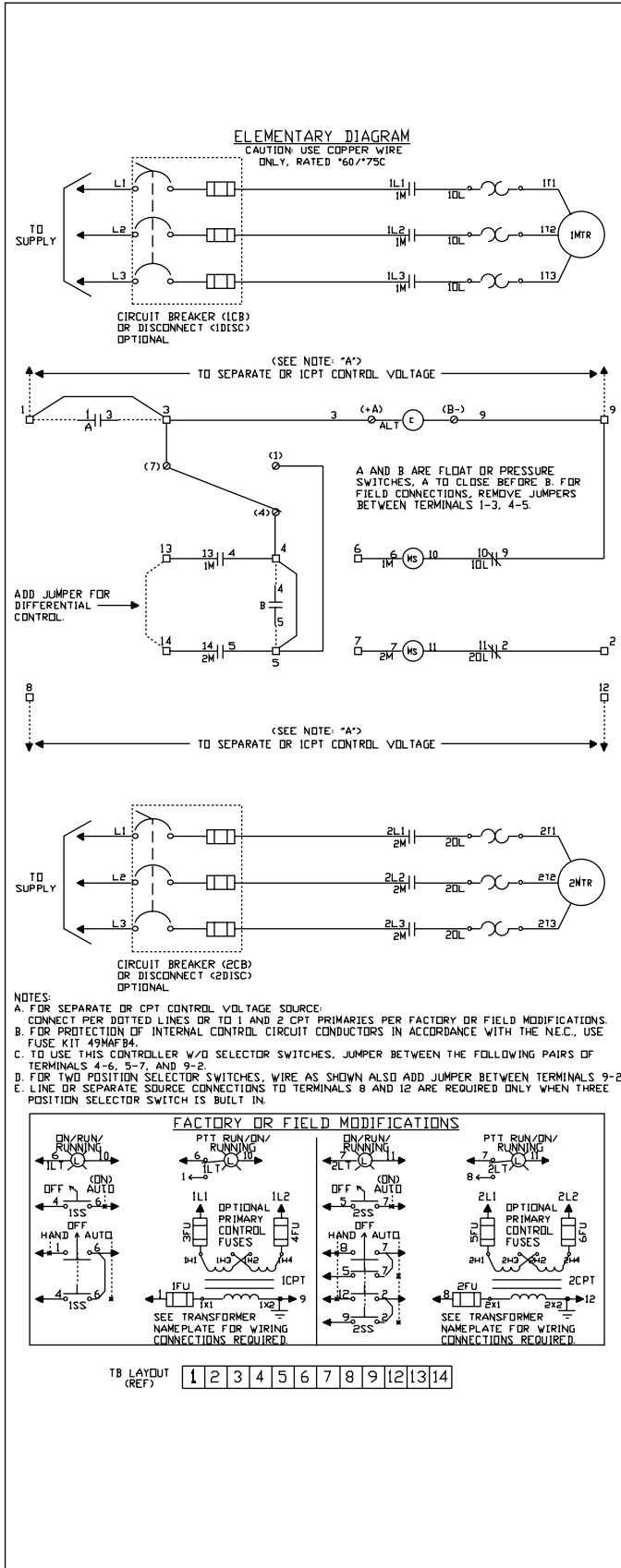


# Duplex Heavy Duty Controllers

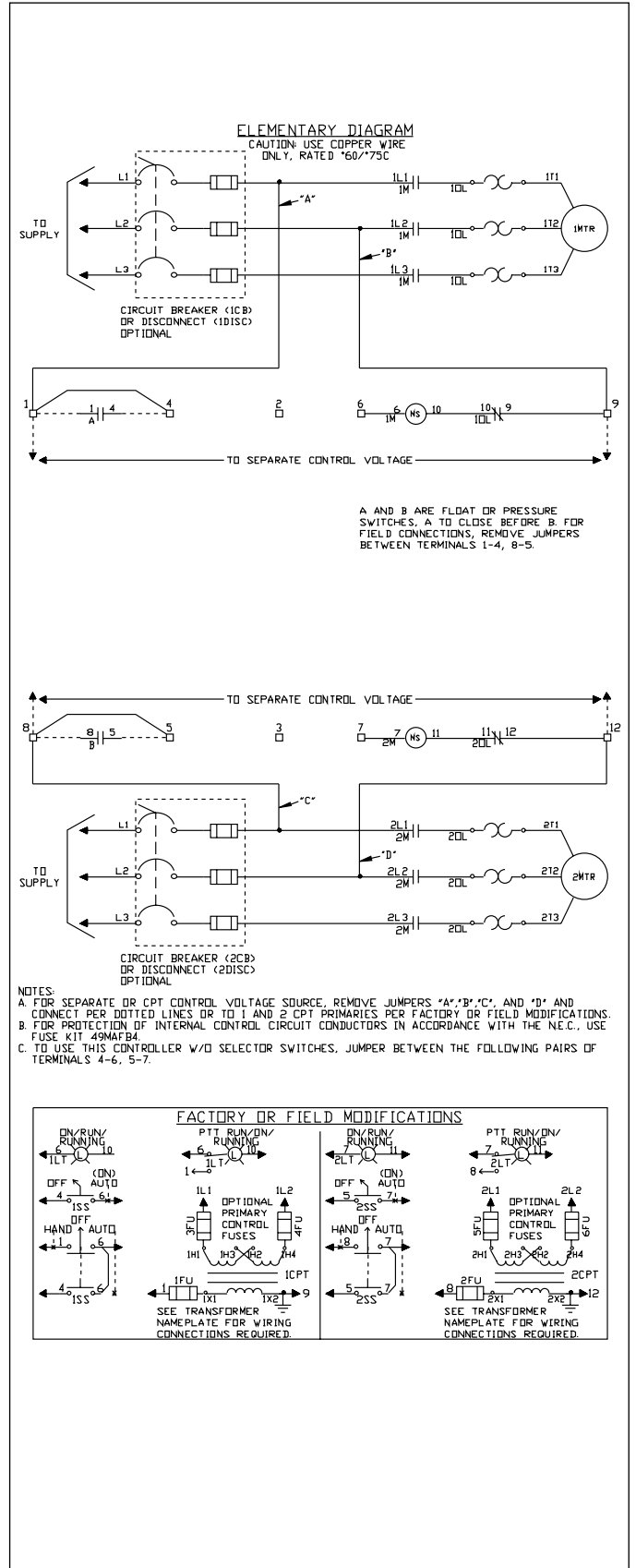
## Class 83, 84

Wiring

### Standard Duplex Pump Panel (92)



### Duplex Panel w/o alternator (95)



16 CONTROL PRODUCTS

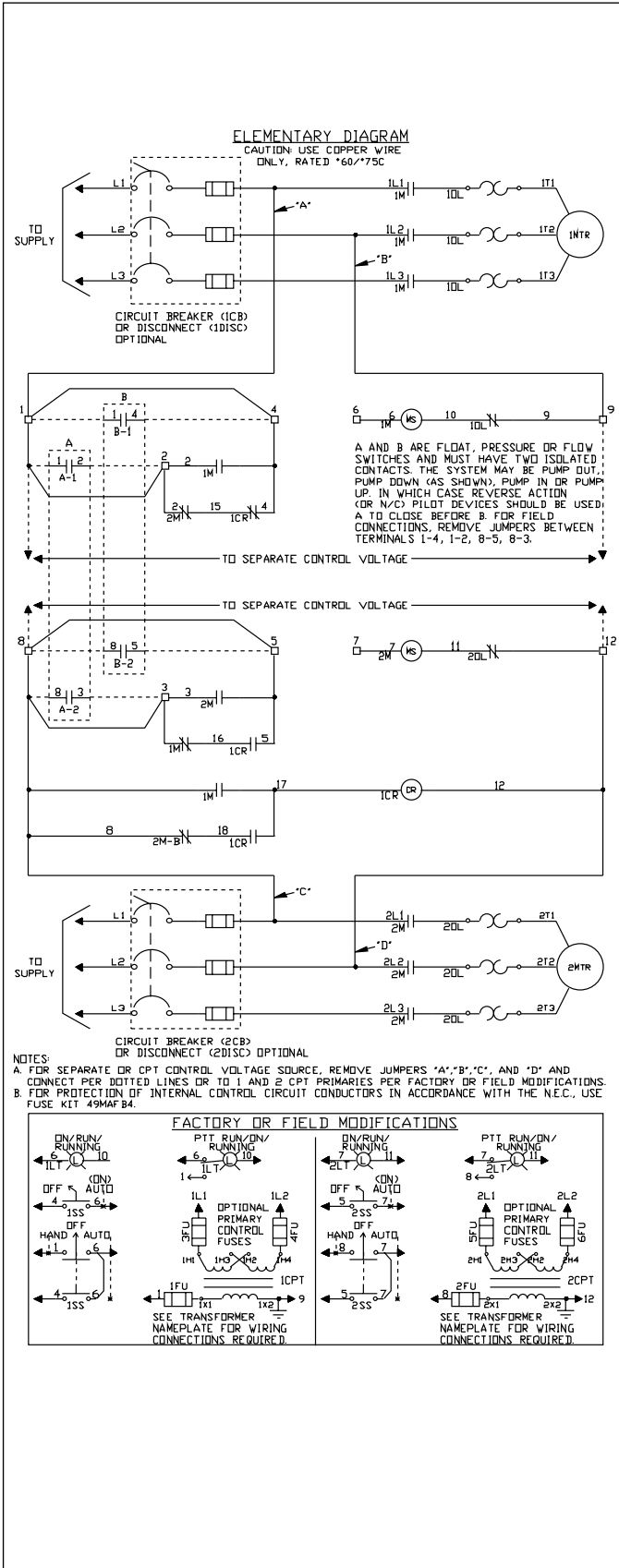
NEMA & General Purpose Control

# Duplex Heavy Duty Controllers

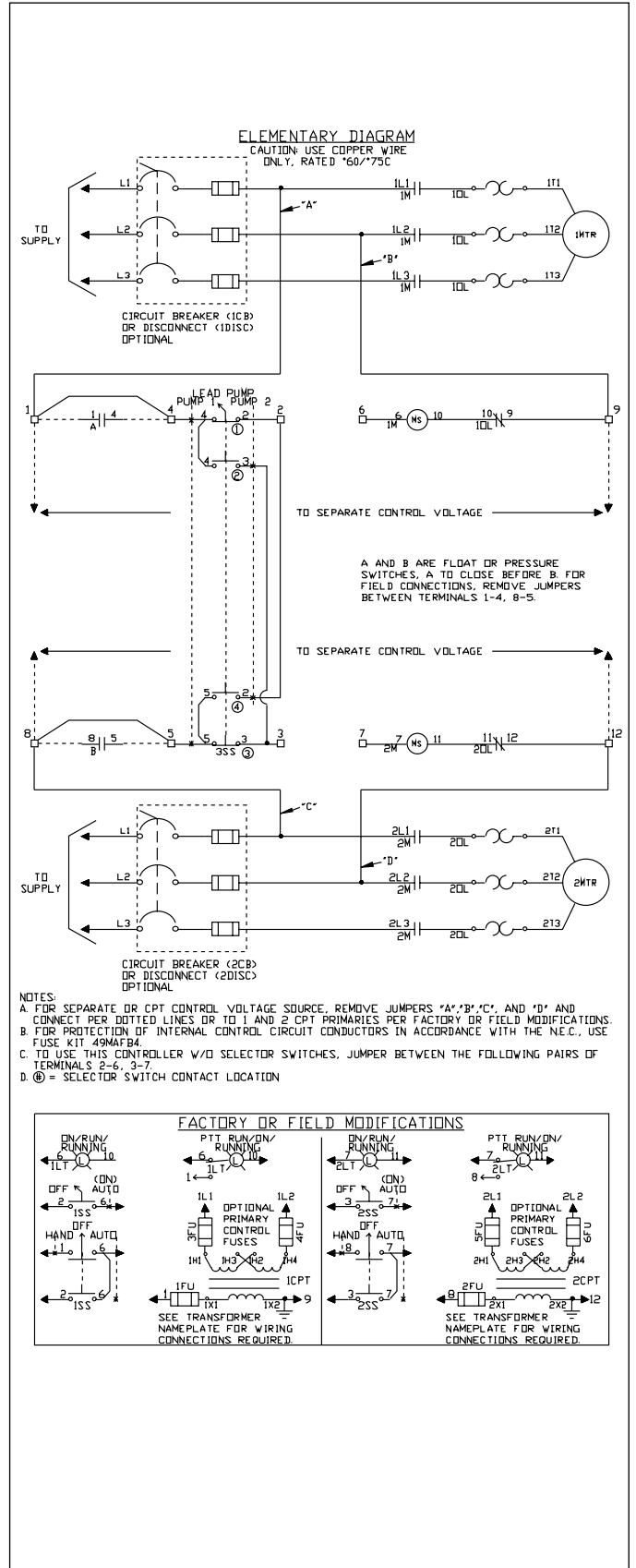
## Class 83, 84

Wiring

### Duplex Panel with Relay Alternation (93)



### Duplex Panel with Lead Pump Transfer Switch (94)

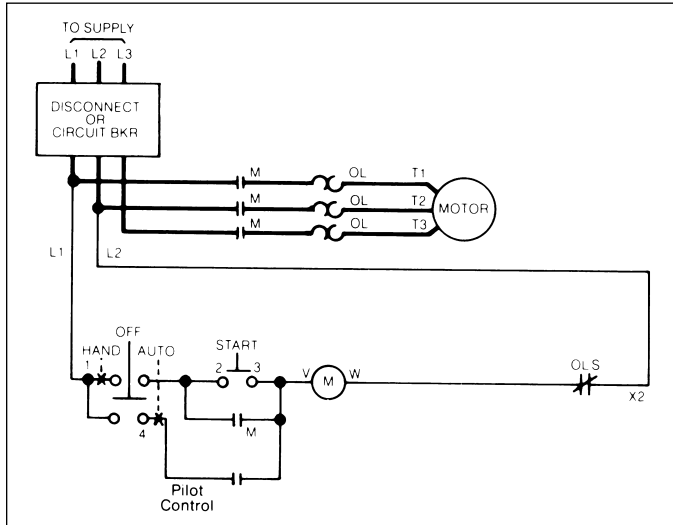


# Standard Pump Panels & Current Sensitive Relays

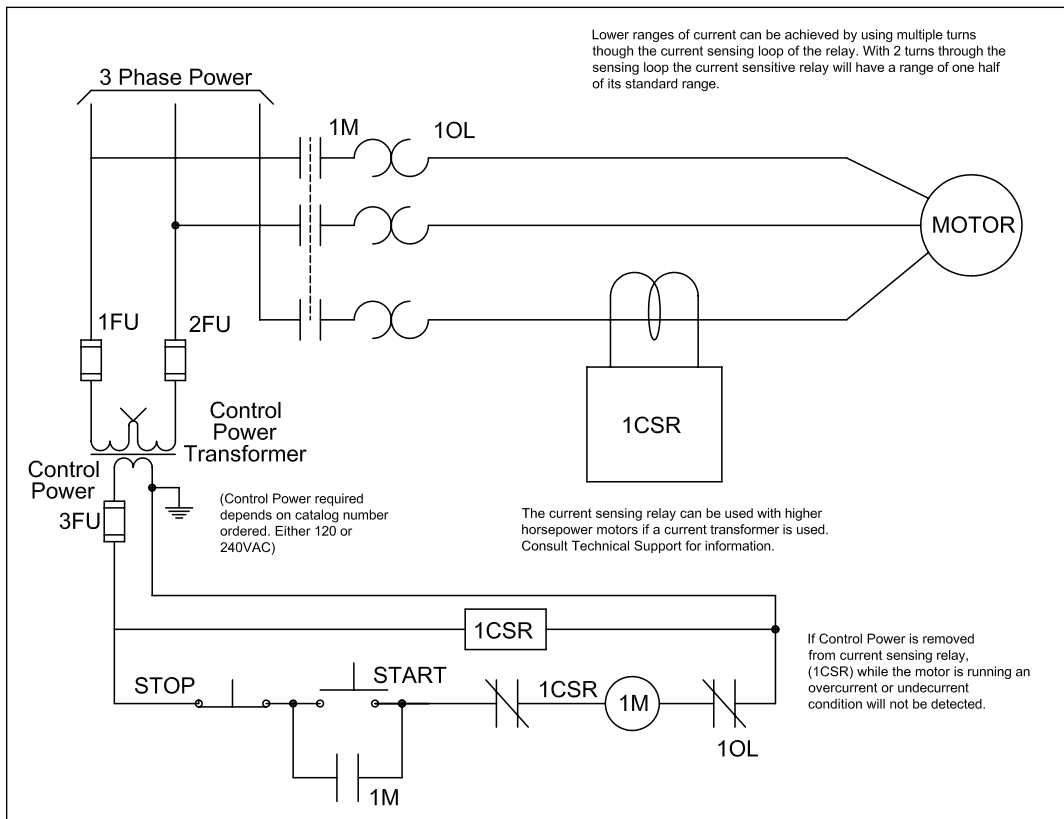
## Class 87, 97

Wiring

### Standard Pump Panel



### Current Sensitive Relay



16 CONTROL PRODUCTS

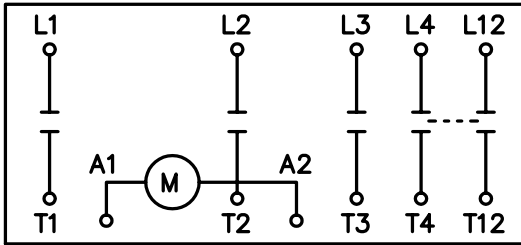
NEMA & General Purpose Control

# Lighting and Heating Contactors

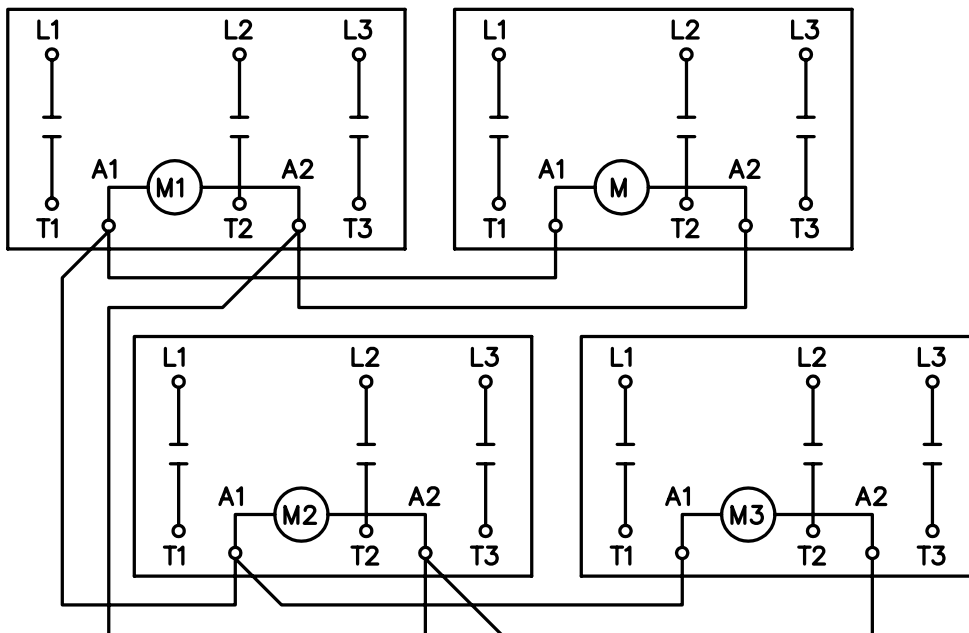
Electrically Held, Class LE

Wiring Diagrams

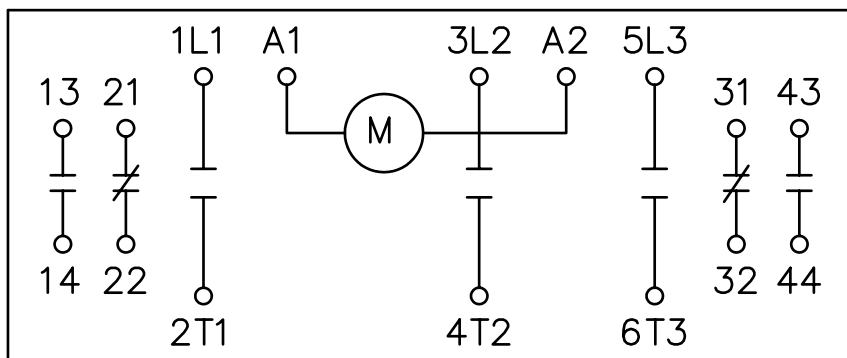
20 AMP



30 – 100 AMP



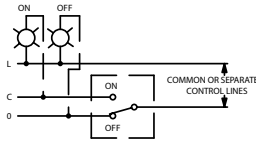
200 – 400 AMP



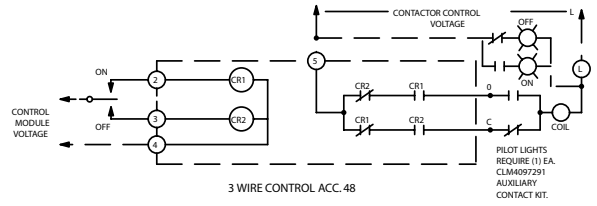
# Lighting and Heating Contactors

## Mechanically Latched 20 Amp, Class CLM

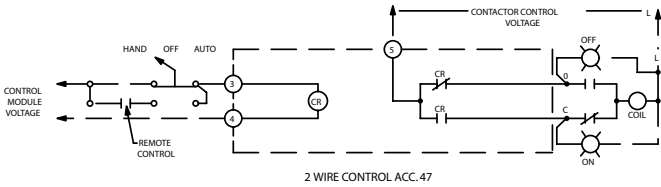
## Wiring Diagrams



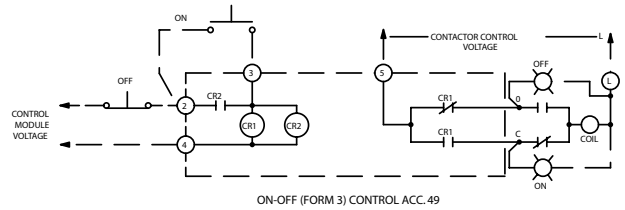
TYPICAL OFF-ON SELECTOR SWITCH



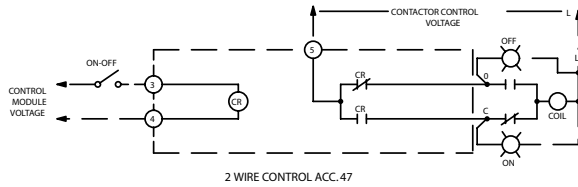
3 WIRE CONTROL ACC. 48



2 WIRE CONTROL ACC. 47



ON-OFF (FORM 3) CONTROL ACC. 49



2 WIRE CONTROL ACC. 47

CONNECTIONS TO CONTROL MODULES	
MODULE TERMINAL	CONNECT TO:
1	NOT USED
2	CONT. STATION FOR ACC. 48 & 49
3	CONT. STATION FOR ACC. 47, 48 & 49
4	MODULE CONTROL VOLTAGE *
5	CONTACTOR CONTROL VOLTAGE
O	TERMINAL O ON CONTACTOR
C	TERMINAL C ON CONTACTOR

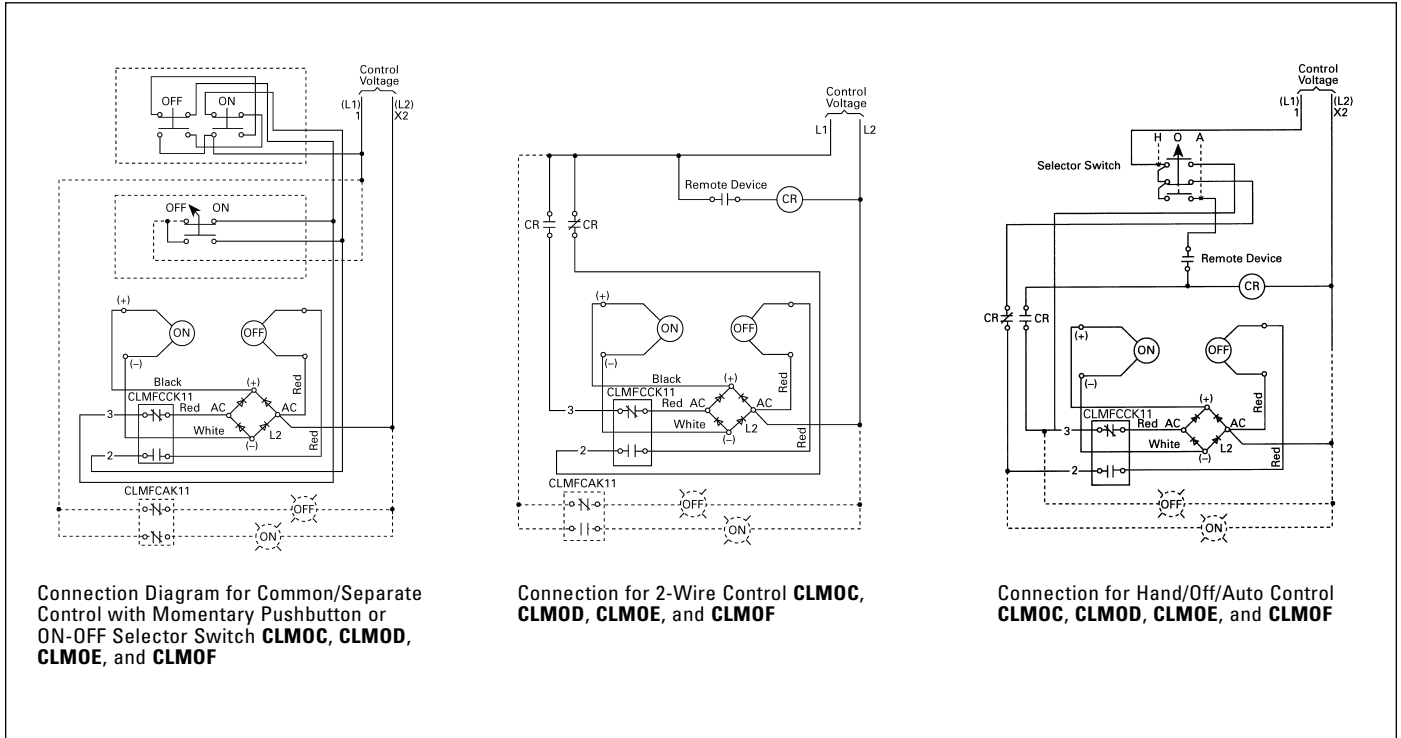
\* FOR 24 VDC CONTROL MODULES  
CONNECT TERMINAL 4 TO NEGATIVE (-)

# Lighting and Heating Contactors

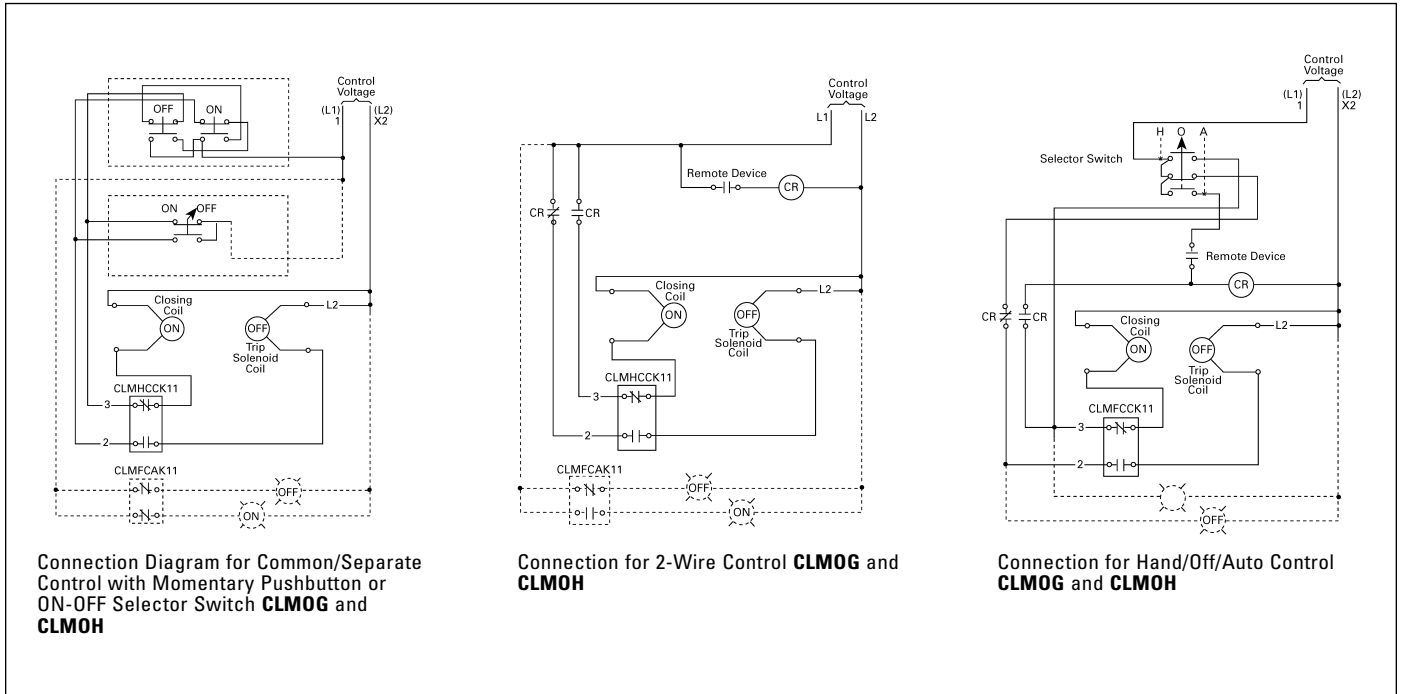
## Mechanically Latched 30–400 Amps, Class CLM

## Wiring Diagrams

### Mechanically Latched, CLM 30–200 Amps<sup>①</sup>



### Mechanically Latched Type CLM 300 and 400 Amp<sup>①</sup>



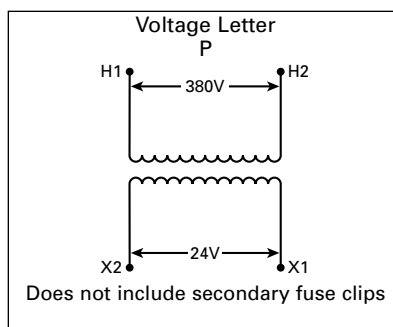
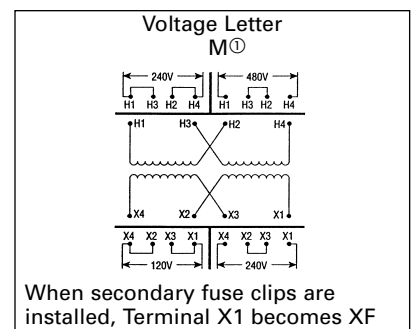
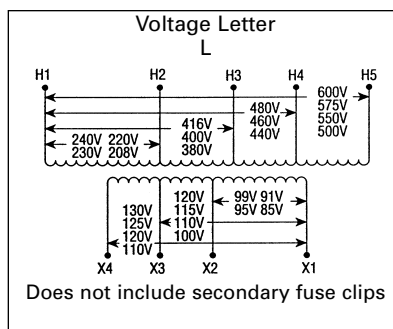
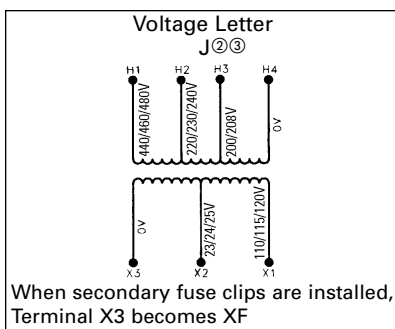
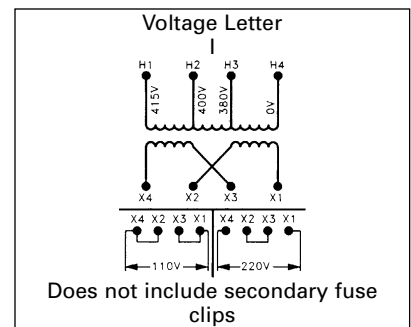
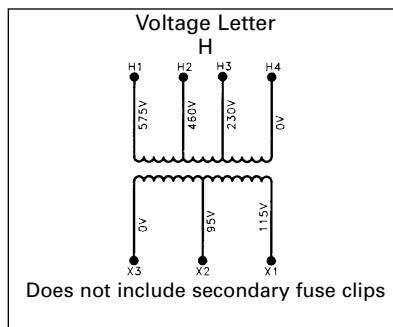
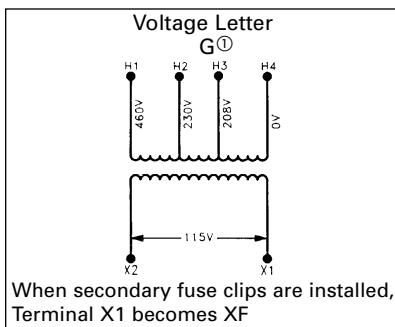
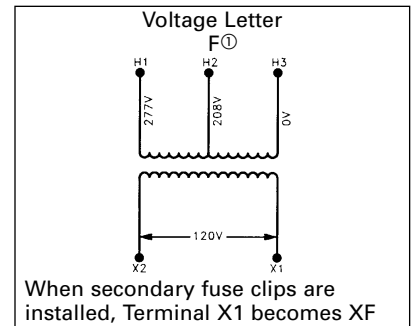
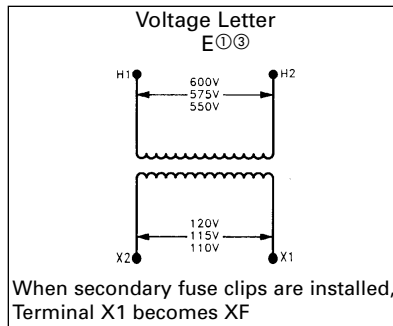
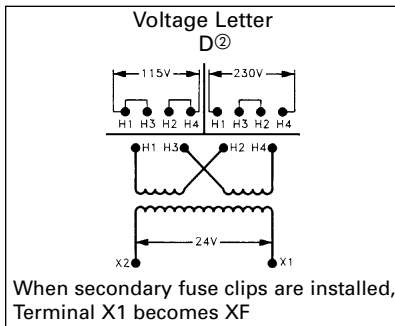
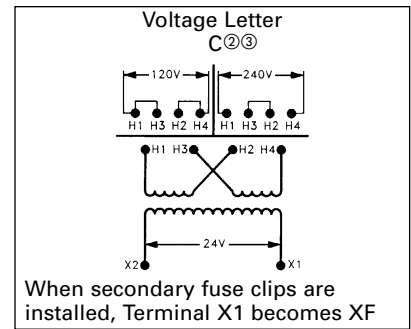
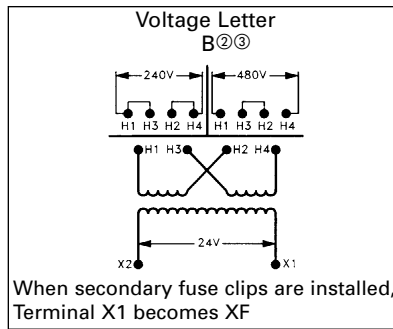
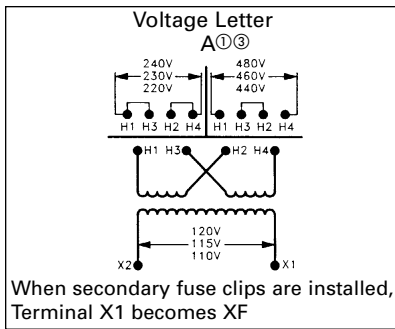
<sup>①</sup> Control relay is required for 2-wire and Hand/Off/Auto Control, as shown in diagram.



# Industrial Control Power Transformers

## Class MT, MTG

## Wiring Diagrams



① Includes secondary fuse clips on sizes 50-750VA  
 ② Includes secondary fuse clips on sizes 50-500VA  
 ③ Secondary fuse clips are not included on MTG transformers.

# Overload Relay Heater Tables

## Selection of Heater Elements for Overload Relays

General

**Use only when motor full load current is not known.** Motor amps will vary depending on the type and manufacturer of the motor. These average values, for motors with service factor of 1.15, are to be used only as a guide. The formulas at the bottom of the page may be used to obtain approximate amps for other motors.

**Note:** RPM shown for 60 cycle motors. For 50 cycle motors, multiply RPM by .83.

**CAUTION:** Actual motor amps may be higher or lower than the values listed below for a particular motor. For more reliable motor protection, select heater elements by using the full load motor nameplate amps.

**Single Phase** motor full load amps of the same horsepower, voltage and speed vary over wide ranges. The following table conforms with table 430.148 of the NEC.

### 1-Phase

Hp	Full Load Current (60Hz)	
	115 Volts	230 Volts
1/8	4.4	2.2
1/4	5.8	2.9
1/2	7.2	3.6
3/4	9.8	4.9
1	13.8	6.9
1 1/2	16	8
2	20	10
3	24	12
5	34	17
7 1/2	56	28
10	80	40
10	100	50

### 3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	
1/4	1800	1.09	0.95	0.48	0.38	0.55
	1200	1.61	1.40	0.70	0.56	0.81
	900	1.84	1.60	0.80	0.64	0.93
1/2	1800	1.37	1.19	0.60	0.48	0.64
	1200	1.83	1.59	0.80	0.64	0.92
	900	2.07	1.80	0.90	0.72	1.04
3/4	1800	1.98	1.72	0.86	0.69	0.99
	1200	2.47	2.15	1.08	0.86	1.24
	900	2.74	2.38	1.19	0.95	1.38
1	1800	2.83	2.46	1.23	0.98	1.42
	1200	3.36	2.82	1.46	1.17	—
	900	3.75	3.26	1.63	1.30	1.88
1 1/2	3600	3.22	2.80	1.40	1.12	1.70
	1800	4.09	3.56	1.78	1.42	2.06
	1200	4.32	3.76	1.88	1.50	2.28
2	3600	4.95	4.30	2.15	1.72	2.60
	1800	5.01	4.36	2.18	1.74	2.69
	1200	5.59	4.86	2.43	1.94	2.94
3	3600	6.07	5.28	2.64	2.11	3.20
	1800	6.44	5.60	2.80	2.24	3.39
	1200	6.44	5.60	2.80	2.24	3.39
4	3600	7.87	6.84	3.42	2.74	4.14
	1800	9.09	7.90	3.95	3.16	4.77
	1200	9.09	7.90	3.95	3.16	4.77
5	3600	9.59	8.34	4.17	3.34	5.02
	1800	10.8	9.40	4.70	3.76	5.70
	1200	11.7	10.2	5.12	4.10	6.20
7 1/2	3600	13.1	11.4	5.70	4.55	6.80
	1800	15.5	13.5	5.76	5.41	8.20
	1200	16.6	14.4	7.21	5.78	8.74
10	3600	18.2	15.8	7.91	6.32	9.59
	1800	18.3	15.9	7.92	6.33	9.60
	1200	22.4	19.5	9.79	7.81	11.50
15	3600	24.7	21.5	10.7	8.55	13.00
	1800	25.1	21.8	10.9	8.70	13.20
	1200	26.5	23.0	11.5	9.19	13.90
20	3600	29.2	25.4	12.7	10.1	15.40
	1800	30.8	25.8	13.4	10.7	16.30
	1200	32.2	28.0	14.0	11.2	16.90
30	3600	35.1	30.5	15.2	12.2	18.50
	1800	41.9	36.4	18.2	14.5	22.00
	1200	45.1	39.2	19.6	15.7	23.70
40	3600	47.6	41.4	20.7	16.5	25.00
	1800	51.2	44.5	22.2	17.8	26.90
	1200	58.0	50.4	25.2	20.1	30.50
50	3600	58.9	51.2	25.6	20.5	31.00
	1800	60.7	52.8	26.4	21.1	31.90
	1200	63.1	54.9	27.4	21.9	33.20

### 3-Phase

Hp	Syn Speed RPM	Full Load Current (60Hz)				50 Hz
		200 Volts	230 Volts	460 Volts	575 Volts	
25	3600	69.9	60.8	30.4	24.3	36.80
	1800	74.5	64.8	32.4	25.9	39.20
	1200	75.4	65.6	32.8	26.2	39.60
	900	77.4	67.3	33.7	27.0	40.70
30	3600	84.8	73.7	36.8	29.4	—
	1800	86.9	75.6	37.8	30.2	45.70
	1200	90.6	78.8	39.4	31.5	47.60
	900	94.1	81.8	40.9	32.7	49.50
40	3600	111	96.4	48.2	38.5	—
	1800	116	101	50.4	40.3	61.00
	1200	117	102	50.6	40.4	61.20
	900	121	105	52.2	41.7	63.20
50	3600	138	120	60.1	48.2	—
	1800	143	124	62.2	49.7	75.20
	1200	145	126	63.0	50.4	76.20
	900	150	130	65.0	52.0	78.50
60	3600	164	143	71.7	57.3	—
	1800	171	149	74.5	59.4	90.00
	1200	173	150	75.0	60.0	91.10
	900	177	154	77.0	61.5	93.10
75	3600	206	179	89.6	71.7	—
	1800	210	183	91.6	73.2	111.00
	1200	212	184	92.0	73.5	112.00
	900	222	193	96.5	77.5	117.00
100	3600	266	231	115	92.2	—
	1800	271	236	118	94.8	144.00
	1200	275	239	120	95.6	145.00
	900	290	252	126	101	153.00
125	3600	—	292	146	116	—
	1800	—	293	147	117	177.00
	1200	—	298	149	119	180.00
	900	—	305	153	122	186.00
150	3600	—	343	171	137	—
	1800	—	348	174	139	210.00
	1200	—	350	174	139	210.00
	900	—	365	183	146	211.00
200	3600	—	458	229	184	—
	1800	—	452	226	181	274.00
	1200	—	460	230	184	276.00
	900	—	482	241	193	279.00
250	3600	—	559	279	223	—
	1800	—	568	284	227	343.00
	1200	—	573	287	229	345.00
	900	—	600	300	240	347.00
300	1800	—	278	339	271	392.00
	1200	—	684	342	274	395.00
400	1800	—	896	448	358	—

#### Formula—Approximate Full Load Amps for Other Motors

208 Volt Full Load Amp  $\approx$  230 Volt current  $\times$  110%

2-Phase FLA  $\approx$  0.866  $\times$  the 3-Phase FLA

2-Phase, 3-wire current in common wire  $\approx$  1.41  $\times$  that in the other 2 lines

25Hz 1500 RPM, amps  $\approx$  amps of 60Hz, 3600 RPM

25Hz 750 RPM, amps  $\approx$  amps of 60Hz, 1800 RPM

Service factor 1.0  $\approx$  amps  $\times$  0.9

50°C–55°C motor  $\approx$  amps  $\times$  0.9

# Overload Relay Heater Tables

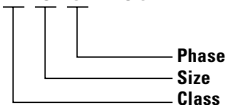
## Selection of Heater Elements for Overload Relays

**General**

To Select Heater Catalog Number Use

- Product Class
- Controller Size
- Motor Amp
- Phase

Catalog No 14 C P 32 B C 81



1. Find heater table number below, using the Product Class, Controller Size and Phase. Heater table number is found in the column under the type of overload and phase.

2. Refer to the specified table and use the controller size and motor amps to select the heater catalog number.

a. If motor amps are not known, an approximate value may be found on the previous page. These values should be used with caution and only when motor amps are not available.

Heaters shown on the following pages provide a maximum trip rating of 125% of minimum motor amperes for 40°C motors (service factor 1.15). For other motors (service factor 1.0), select the next lower listed heater catalog number within the designated table which provides a maximum trip rating of approximately 115%.

Overload relays do not provide protection against short circuits. To ensure proper coordination with short circuit protective device, select heaters from the information packaged with the control device.

Class	Description	Size or Amperage	Controller Size Letter	Heater Table Number			
				Bimetal Standard Trip (Class 20)		Bimetal Quick Trip (Class 10)	
				Compensated E Heaters Green Reset		Compensated K Heaters Green Reset	
				1Ph	3Ph	1Ph	3Ph
SMF	Manual	All	—	See Page 16-150			
14, 22	Magnetic Non-reversing, Reversing	00-4	B-J	213	233	313	332
17, 18 25, 26 30, 32 <sup>ⓐ</sup> 83, 84 87, 89	Combination Reversing Combination Multi Speed Pump Controllers Motor Control Centers	0-4	C-J	—	233	—	332
48	Panel Mounted Overload Relay	25-180A	D-J	216	238	316	335

ESP100 starters do not require heater elements.

ⓐ **Overload Relay Selection Multi-Speed**

Each speed requires a separate set of overloads. The adjustment range must be selected on the basis of the full-load current for each particular speed.

# Manual Control

## Heater Elements, Class SMF

General



Heater Elements Class SMF

### Ordering Information

- Determine number of heater elements required from Table A.
- Determine motor full load current and service factor.  
**NOTE: If motor amps are unknown, an approximate value may be found on page 16-148. These values should be used with caution and only when motor amps are not available.**
- If the motor and controller are in the same ambient temperature:
  - For 1.15 to 1.25 service factor motors use 100% of motor full load current for heater element selection.
  - For 1.0 service factor motors use 90% of motor full load current for heater element selection.
- If the motor and controller are in different ambient temperatures multiply motor full load current by the multiplier in Table B. Use the resultant full load current for heater element selection.
- Select proper heater element from table below.
- 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 heater element is installed in the starter before operating the motor.

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH01	0.157-0.173	13.00
SMFH02	0.174-0.192	13.00
SMFH03	0.193-0.212	13.00
SMFH04	0.213-0.235	13.00
SMFH05	0.236-0.261	13.00
SMFH06	0.262-0.289	13.00
SMFH07	0.290-0.321	13.00
SMFH08	0.322-0.355	13.00
SMFH09	0.356-0.399	13.00
SMFH10	0.41-0.44	13.00
SMFH11	0.45-0.49	13.00
SMFH12	0.50-0.53	13.00
SMFH13	0.54-0.58	13.00
SMFH14	0.59-0.65	13.00
SMFH15	0.66-0.71	13.00
SMFH16	0.72-0.78	13.00
SMFH17	0.79-0.85	13.00
SMFH18	0.86-0.96	13.00
SMFH19	0.97-1.04	13.00
SMFH20	1.05-1.16	13.00
SMFH21	1.17-1.25	13.00
SMFH22	1.30-1.39	13.00
SMFH23	1.38-1.54	13.00
SMFH24	1.48-1.63	13.00
SMFH25	1.57-1.75	13.00
SMFH26	1.66-1.86	13.00

Heater Catalog Number	Motor Full-Load Current (Amps)	List Price \$
SMFH27	1.80-1.99	13.00
SMFH28	1.96-2.15	13.00
SMFH29	2.16-2.38	13.00
SMFH30	2.39-2.75	13.00
SMFH31	2.76-2.84	13.00
SMFH32	2.85-3.06	13.00
SMFH33	3.07-3.45	13.00
SMFH34	3.46-3.70	13.00
SMFH35	3.71-4.07	13.00
SMFH36	4.08-4.32	13.00
SMFH37	4.33-4.90	13.00
SMFH38	4.91-5.35	13.00
SMFH39	5.36-5.85	13.00
SMFH40	5.86-6.41	13.00
SMFH41	6.42-6.79	13.00
SMFH42	6.80-7.57	13.00
SMFH43	7.58-8.15	13.00
SMFH44	8.16-8.98	13.00
SMFH45	8.99-9.67	13.00
SMFH46	9.68-9.95	13.00
SMFH47	9.96-10.8	13.00
SMFH48	10.9-12.1	13.00
SMFH49	12.2-13.1	13.00
SMFH50	13.2-13.9	13.00
SMFH51	14.0-15.0	13.00
SMFH52	15.1-16.0	13.00

**Table A**  
Number of Heater Elements

Device	Number of Heater Elements	Notes
SMFF*1 SMFF*2 SMFF*3 SMFF*4 SMFF*5 SMFF*6	1	All single pole and two pole SMF starters require only 1 Heater Element.
SMFF*22 SMFF*44	2	Duplex Unit. One Heater Element per starter.
SMFF*11 SMFF*22	2	Two Speed Starter. One Heater Element per speed.

**Table B—Special Applications**  
Heater Element Selection

Continuous Duty Motor Service Factor	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
	Full Load Current Multiplier		
1.15 to 1.25	1.0	0.9	1.05
1.0	0.9	0.8	0.95

# Overload Relay Heater Tables

## Full Load Motor Amps, Single Phase, Trip Class 20 – Tables 213, 216

Selection

Table 213 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
0.37-0.40	—	—	E3	13.00
0.41-0.44	0.41-0.44	—	E4	13.00
0.45-0.47	0.45-0.47	—	E5	13.00
0.48-0.52	0.48-0.52	—	E6	13.00
0.53-0.57	0.53-0.57	—	E7	13.00
0.58-0.62	0.58-0.62	—	E8	13.00
0.63-0.69	0.63-0.69	—	E9	13.00
0.70-0.74	0.70-0.74	—	E11	13.00
0.75-0.81	0.75-0.81	—	E12	13.00
0.82-0.85	0.82-0.85	—	E13	13.00
0.86-0.93	0.86-0.93	—	E14	13.00
0.94-1.03	0.94-1.03	—	E16	13.00
1.04-1.11	1.04-1.11	—	E17	13.00
1.12-1.22	1.12-1.22	—	E18	13.00
1.23-1.34	1.23-1.34	—	E23	13.00
1.35-1.53	1.35-1.53	—	E24	13.00
1.54-1.71	1.54-1.71	—	E26	13.00
1.72-1.92	1.72-1.92	—	E27	13.00
1.93-2.12	1.93-2.12	—	E28	13.00
2.13-2.24	2.13-2.24	—	E29	13.00
2.25-2.43	2.25-2.43	—	E31	13.00
2.44-2.57	2.44-2.57	—	E32	13.00
2.58-2.86	2.58-2.86	—	E33	13.00
2.87-3.16	2.87-3.16	—	E34	13.00
3.17-3.35	3.17-3.35	—	E36	13.00
3.36-3.58	3.36-3.58	—	E37	13.00
3.59-3.90	3.59-3.90	—	E38	13.00
3.91-4.25	3.91-4.25	—	E39	13.00
4.26-4.77	4.26-4.77	—	E41	13.00
4.78-5.35	4.78-5.35	—	E42	13.00
5.36-5.76	5.36-5.76	—	E44	13.00
5.77-6.33	5.77-6.33	—	E46	13.00
6.34-6.98	6.34-6.98	—	E47	13.00
6.99-7.37	6.99-7.37	—	E48	13.00
7.38-7.71	7.38-7.71	—	E49	13.00
7.72-8.51	7.72-8.51	—	E50	13.00
8.52-9.31	8.52-9.31	—	E51	13.00
9.32-10.1	9.32-10.1	—	E52	13.00
10.2-10.9	10.2-10.9	—	E53	13.00
11.0-12.2	11.0-12.2	—	E54	13.00
12.3-13.5	12.3-13.5	—	E55	13.00
13.6-15.7	13.6-15.7	—	E56	13.00
15.8-17.3	15.8-17.3	19.4-22.0	E57	13.00
17.4-19.9	17.4-19.9	22.1-23.5	E60	13.00
20.0-21.7	20.0-21.7	23.6-25.0	E61	13.00
21.8-23.4	21.8-23.4	25.1-27.0	E62	13.00
23.5-24.0	23.5-23.7	27.1-28.9	E65	13.00
—	23.8-25.1	29.0-31.0	E66	13.00
—	25.2-27.9	31.1-34.8	E67	13.00
—	28.0-32.2	34.9-36.9	E69	13.00
—	32.3-34.0	37.0-43.9	E70	13.00
—	—	44.0-46.0	E72	13.00
—	—	46.1-48.3	E73	13.00
—	—	48.4-55.0	E74	13.00
—	—	55.1-60.0	E76	13.00

Table 216 for Class 48

Full Load Amps			Heater Catalog No	List Price \$
48DA, 48GA	48HA	48JA		
0.34-0.36	—	—	E3	13.00
0.37-0.40	—	—	E4	13.00
0.41-0.43	—	—	E5	13.00
0.44-0.47	—	—	E6	13.00
0.48-0.51	—	—	E7	13.00
0.52-0.56	—	—	E8	13.00
0.57-0.62	—	—	E9	13.00
0.63-0.67	—	—	E11	13.00
0.68-0.73	—	—	E12	13.00
0.74-0.77	—	—	E13	13.00
0.78-0.84	—	—	E14	13.00
0.85-0.93	—	—	E16	13.00
0.94-1.00	—	—	E17	13.00
1.01-1.10	—	—	E18	13.00
—	—	—	E19	13.00
1.11-1.21	—	—	E23	13.00
1.22-1.38	—	—	E24	13.00
1.39-1.54	—	—	E26	13.00
1.55-1.73	—	—	E27	13.00
1.74-1.91	—	—	E28	13.00
1.92-2.02	—	—	E29	13.00
2.03-2.19	—	—	E31	13.00
2.20-2.32	—	—	E32	13.00
2.33-2.58	—	—	E33	13.00
2.59-2.85	—	—	E34	13.00
2.86-3.02	—	—	E36	13.00
3.03-3.23	—	—	E37	13.00
3.24-3.52	—	—	E38	13.00
3.53-3.83	—	—	E39	13.00
3.84-4.30	—	—	E41	13.00
4.31-4.82	—	—	E42	13.00
4.83-5.19	—	—	E44	13.00
5.20-5.71	—	—	E46	13.00
5.72-6.29	—	—	E47	13.00
6.30-6.64	—	—	E48	13.00
6.65-6.95	—	—	E49	13.00
6.96-7.67	—	—	E50	13.00
7.68-8.39	—	—	E51	13.00
8.40-9.19	—	—	E52	13.00
9.20-9.94	—	—	E53	13.00
9.95-10.9	—	—	E54	13.00
11.0-12.2	—	—	E55	13.00
12.3-14.2	—	—	E56	13.00
14.3-15.6	—	—	E57	13.00
—	—	—	E59	13.00
15.7-17.9	—	—	E60	13.00
18.0-19.6	—	—	E61	13.00
19.7-22.3	—	—	E62	13.00
22.4-24.0	—	—	E65	13.00
24.1-25.9	—	—	E66	13.00
26.0-29.5	27.1-30.0	—	E67	13.00
29.6-32.5	30.1-33.2	—	E69	13.00
32.6-33.5	33.3-35.7	—	E70	13.00
33.6-36.9	35.8-39.4	—	E71	13.00
37.0-39.2	39.5-43.4	—	E72	13.00
39.3-43.1	43.5-46.9	—	E73	13.00
43.2-47.4	47.0-51.5	—	E74	13.00
47.5-50.0	51.6-57.0	—	E76	13.00
50.1-55.2	57.1-62.8	—	E77	13.00
55.3-60.0	62.9-69.1	—	E78	13.00
—	69.2-75.0	—	E79	13.00
—	75.1-83.3	—	E80	13.00
—	—	50.0-55.9	E88	13.00
—	—	56.0-60.9	E89	13.00
—	—	61.0-65.9	E91	13.00
—	—	66.0-69.9	E92	13.00
—	—	70.0-75.9	E93	13.00
—	—	76.0-81.9	E94	13.00
—	83.4-86.9	82.0-86.9	E96	13.00
—	87.0-92.9	87.0-92.9	E97	13.00
—	93.0-100.0	93.0-97.9	E98	13.00
—	—	98.0-107.9	E99	13.00
—	—	108.0-113.9	E101	13.00
—	—	114.0-125.0	E102	13.00
—	—	126.0-138.0	E103	13.00
—	—	139.0-153.0	E104	13.00
—	—	154.0-163.0	E106	13.00
—	—	164.0-180.0	E107	13.00

# Overload Relay Heater Tables

## Full Load Motor Amps, 3-Phase, Trip Class 20 – Tables 233, 238

Selection

Table 233 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1¼	Size 2, 2½	Size 3, 3½	Size 4		
0.38-0.40	—	—	—	—	E6	13.00
0.41-0.43	—	—	—	—	E7	13.00
0.44-0.48	—	—	—	—	E8	13.00
0.49-0.53	—	—	—	—	E9	13.00
0.54-0.57	—	—	—	—	E11	13.00
0.58-0.62	—	—	—	—	E12	13.00
0.63-0.66	—	—	—	—	E13	13.00
0.67-0.72	—	—	—	—	E14	13.00
0.73-0.80	—	—	—	—	E16	13.00
0.81-0.85	—	—	—	—	E17	13.00
0.86-0.92	—	—	—	—	E18	13.00
0.93-0.99	—	—	—	—	E19	13.00
1.00-1.08	—	—	—	—	E23	13.00
1.09-1.23	—	—	—	—	E24	13.00
1.24-1.37	—	—	—	—	E26	13.00
1.38-1.54	—	—	—	—	E27	13.00
1.55-1.69	—	—	—	—	E28	13.00
1.70-1.80	—	—	—	—	E29	13.00
1.81-1.94	—	—	—	—	E31	13.00
1.95-2.07	—	—	—	—	E32	13.00
2.08-2.26	—	—	—	—	E33	13.00
2.27-2.54	2.27-2.54	—	—	—	E34	13.00
2.55-2.69	2.55-2.69	—	—	—	E36	13.00
2.70-2.88	2.70-2.88	—	—	—	E37	13.00
2.89-3.14	2.89-3.14	—	—	—	E38	13.00
3.15-3.40	3.15-3.40	—	—	—	E39	13.00
3.41-3.81	3.41-3.81	—	—	—	E41	13.00
3.82-4.26	3.82-4.26	—	—	—	E42	13.00
4.27-4.62	4.26-4.62	—	—	—	E44	13.00
4.63-5.09	4.63-5.09	—	—	—	E46	13.00
5.10-5.61	5.10-5.61	—	—	—	E47	13.00
5.62-5.91	5.62-5.91	—	—	—	E48	13.00
5.92-6.15	5.92-6.15	—	—	—	E49	13.00
6.16-6.70	6.16-6.70	—	—	—	E50	13.00
6.71-7.54	6.71-7.54	—	—	—	E51	13.00
7.55-8.29	7.55-8.29	—	—	—	E52	13.00
8.30-8.99	8.30-8.99	—	—	—	E53	13.00
9.00-9.85	9.00-9.85	—	—	—	E54	13.00
9.86-10.4	9.86-10.4	—	—	—	E55	13.00
10.5-12.0	10.5-12.0	10.5-12.0	—	—	E56	13.00
12.1-13.6	12.1-13.6	12.1-13.6	—	—	E57	13.00
13.7-15.6	13.7-15.6	13.7-15.6	—	—	E60	13.00
15.7-17.0	15.7-17.0	15.7-17.1	—	—	E61	13.00
17.1-18.4	17.1-19.4	17.2-19.4	—	—	E62	13.00
18.5-19.4	19.5-20.9	19.5-20.9	—	—	E65	13.00
19.5-21.3	21.0-22.2	21.0-22.2	—	—	E66	13.00
21.4-24.4	22.3-25.3	22.3-25.3	—	—	E67	13.00
24.5-25.9	25.4-26.9	25.4-26.9	30.0-33.5	—	E69	13.00
26.0-27.0	27.0-30.2	27.0-30.2	33.6-36.4	—	E70	13.00
—	—	—	36.5-39.6	—	E71	13.00
—	30.3-33.3	30.3-33.3	—	—	E72	13.00
—	33.4-36.0	33.4-35.3	39.7-43.6	—	E73	13.00
—	—	—	43.7-46.5	—	E73A	13.00
—	—	35.4-41.5	46.6-51.6	—	E74	13.00
—	—	41.6-45.0	51.7-54.4	—	E76	13.00
—	—	45.1-52.3	54.5-58.0	—	E77	13.00
—	—	52.4-55.7	58.1-63.0	—	E78	13.00
—	—	55.8-60.0	63.1-67.7	—	E79	13.00
—	—	—	67.8-72.4	—	E80	13.00
—	—	—	—	—	E88	13.00
—	—	—	—	56.9-60.9	E89	13.00
—	—	—	—	61.0-63.9	E91	13.00
—	—	—	—	64.0-67.7	E92	13.00
—	—	—	—	67.8-72.4	E93	13.00
—	—	—	72.5-80.0	72.5-77.7	E94	13.00
—	—	—	80.1-88.1	77.8-85.9	E96	13.00
—	—	—	88.2-91.5	86.0-91.9	E97	13.00
—	—	—	91.6-96.8	92.0-96.7	E98	13.00
—	—	—	96.9-99.0	96.8-105	E99	13.00
—	—	—	99.1-108.0	—	E101	13.00
—	—	—	—	—	E102	13.00
—	—	—	—	106-115	E103	13.00
—	—	—	—	116-130	E104	13.00

Table 238 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
0.30-0.32	—	—	—	E3	13.00
0.33-0.35	—	—	—	E4	13.00
0.36-0.38	—	—	—	E5	13.00
0.39-0.41	—	—	—	E6	13.00
0.42-0.44	—	—	—	E7	13.00
0.45-0.49	—	—	—	E8	13.00
0.50-0.54	—	—	—	E9	13.00
0.55-0.58	—	—	—	E11	13.00
0.59-0.63	—	—	—	E12	13.00
0.64-0.67	—	—	—	E13	13.00
0.68-0.73	—	—	—	E14	13.00
0.74-0.81	—	—	—	E16	13.00
0.82-0.87	—	—	—	E17	13.00
0.88-0.94	—	—	—	E18	13.00
0.95-1.00	—	—	—	E19	13.00
1.01-1.10	—	—	—	E23	13.00
1.11-1.26	—	—	—	E24	13.00
1.27-1.40	—	—	—	E26	13.00
1.41-1.58	—	—	—	E27	13.00
1.59-1.74	—	—	—	E28	13.00
1.75-1.85	—	—	—	E29	13.00
1.86-1.99	—	—	—	E31	13.00
2.00-2.11	—	—	—	E32	13.00
2.12-2.31	—	—	—	E33	13.00
2.32-2.59	—	—	—	E34	13.00
2.60-2.75	—	—	—	E36	13.00
2.76-2.95	—	—	—	E37	13.00
2.96-3.21	—	—	—	E38	13.00
3.22-3.48	—	—	—	E39	13.00
3.49-3.89	—	—	—	E41	13.00
3.90-4.35	—	—	—	E42	13.00
4.36-4.73	—	—	—	E44	13.00
4.74-5.21	—	—	—	E46	13.00
5.22-5.74	—	—	—	E47	13.00
5.75-6.05	—	—	—	E48	13.00
6.06-6.46	—	—	—	E49	13.00
6.47-6.95	—	—	—	E50	13.00
6.96-8.09	—	—	—	E51	13.00
8.10-9.29	—	—	—	E52	13.00
9.30-10.4	—	—	—	E53	13.00
—	—	—	—	E54	13.00
10.5-10.9	—	—	—	E55	13.00
11.0-12.0	—	—	—	E56	13.00
12.1-14.5	—	—	—	E57	13.00
14.6-16.8	—	—	—	E60	13.00
16.9-18.4	16.9-18.4	—	—	E61	13.00
18.5-20.9	18.5-20.9	—	—	E62	13.00
21.0-22.5	21.0-22.5	—	—	E65	13.00
22.6-24.3	22.6-24.7	—	—	E66	13.00
24.4-27.2	24.8-27.2	27.1-30.0	—	E67	13.00
27.3-29.2	27.3-29.2	30.1-33.2	—	E69	13.00
29.3-30.0	29.3-32.0	33.3-35.7	—	E70	13.00
—	—	32.1-34.9	35.8-39.4	E71	13.00
—	—	—	39.5-43.4	E72	13.00
—	—	35.0-37.8	43.5-46.9	E73	13.00
—	37.9-41.7	—	—	E73A	13.00
—	41.8-45.9	47.0-51.5	—	E74	13.00
—	46.0-49.0	51.6-57.0	—	E76	13.00
—	49.1-54.2	57.1-62.8	—	E77	13.00
—	54.3-60.0	62.9-69.1	—	E78	13.00
—	—	69.2-75.0	—	E79	13.00
—	—	75.1-83.3	—	E80	13.00
—	—	—	50.0-55.9	E88	13.00
—	—	—	56.0-60.9	E89	13.00
—	—	—	61.0-65.9	E91	13.00
—	—	—	66.0-69.9	E92	13.00
—	—	—	70.0-75.9	E93	13.00
—	—	—	76.0-81.9	E94	13.00
—	—	83.4-86.9	82.0-86.9	E96	13.00
—	—	87.0-92.9	87.0-92.9	E97	13.00
—	93.0-100.0	93.0-97.9	—	E98	13.00
—	—	98.0-107.9	—	E99	13.00
—	—	108-113.9	—	E101	13.00
—	—	114-125.9	—	E102	13.00
—	—	126-138.9	—	E103	13.00
—	—	—	139-153.9	E104	13.00
—	—	—	154-163.9	E106	13.00
—	—	—	164-180.9	E107	13.00

CONTROL PRODUCTS 16

NEMA & General Purpose Control

# Overload Relay Heater Tables

## Full Load Motor Amps, Single Phase, Trip Class 10 – Tables 313, 316

Selection

Table 313 for Class 14, 22 (1-Phase)

Full Load Amps			Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1P	Size 2, 2½		
1.85-2.05	1.85-2.05	—	K21	13.00
2.06-2.35	2.06-2.35	—	K22	13.00
2.36-2.64	2.36-2.64	—	K24	13.00
2.65-2.96	2.65-2.96	—	K27	13.00
2.97-3.31	2.97-3.31	—	K28	13.00
3.32-3.51	3.32-3.51	—	K29	13.00
3.52-3.87	3.52-3.87	—	K31	13.00
3.88-4.31	3.88-4.31	—	K32	13.00
4.32-4.79	4.32-4.79	—	K33	13.00
4.80-5.21	4.80-5.21	—	K34	13.00
5.22-5.75	5.22-5.75	—	K36	13.00
5.76-6.11	5.76-6.11	—	K37	13.00
6.12-6.95	6.12-6.95	—	K39	13.00
6.96-7.73	6.96-7.73	—	K41	13.00
7.74-8.47	7.74-8.47	—	K42	13.00
8.48-9.52	8.48-9.52	—	K43	13.00
9.53-10.4	9.53-10.4	—	K49	13.00
10.5-11.1	10.5-11.1	—	K50	13.00
11.2-12.4	11.2-12.4	—	K52	13.00
12.5-13.5	12.5-13.5	—	K53	13.00
13.6-15.1	13.6-15.1	—	K54	13.00
15.2-16.6	15.2-16.6	—	K55	13.00
16.7-17.6	16.7-17.6	—	K57	13.00
17.7-18.8	17.7-18.8	18.7-19.7	K58	13.00
18.9-21.6	18.9-21.6	19.8-21.3	K60	13.00
21.7-22.7	21.7-22.7	21.4-22.8	K61	13.00
22.8-25.3	22.8-25.3	22.9-24.2	K62	13.00
—	25.4-26.6	24.3-26.5	K63	13.00
—	26.7-30.1	26.6-29.3	K64	13.00
—	30.2-33.0	29.4-32.0	K67	13.00
—	33.1-34.1	32.1-35.6	K68	13.00
—	—	35.7-37.9	K69	13.00
—	—	38.0-40.3	K70	13.00
—	—	40.4-44.3	K72	13.00
—	—	44.4-49.5	K73	13.00
—	—	49.6-52.1	K74	13.00
—	—	52.2-53.7	K75	13.00
—	—	53.8-60.0	K76	13.00

Table 316 for Class 48

Full Load Amps				Heater Catalog No	List Price \$
48DA	48GA	48HA	48JA		
1.69-1.88	—	—	—	K21	13.00
1.89-2.05	—	—	—	K22	13.00
2.06-2.21	—	—	—	K23	13.00
2.22-2.44	—	—	—	K24	13.00
2.45-2.70	—	—	—	K26	13.00
2.71-2.92	—	—	—	K27	13.00
2.93-3.27	—	—	—	K28	13.00
3.28-3.56	—	—	—	K29	13.00
3.57-3.83	—	—	—	K31	13.00
3.84-4.23	—	—	—	K32	13.00
4.24-4.57	—	—	—	K33	13.00
4.58-4.97	—	—	—	K34	13.00
4.98-5.67	—	—	—	K36	13.00
5.68-6.11	—	—	—	K37	13.00
6.12-6.91	—	—	—	K39	13.00
6.92-7.65	—	—	—	K41	13.00
7.66-8.4	—	—	—	K42	13.00
8.5-8.9	—	—	—	K43	13.00
9.0-10.1	9.12-9.6	—	—	K49	13.00
10.2-11.2	9.7-10.4	—	—	K50	13.00
11.3-12.3	10.5-11.4	—	—	K52	13.00
12.4-13.3	11.5-12.1	—	—	K53	13.00
13.4-14.1	12.2-12.9	—	—	K54	13.00
14.2-15.0	13.0-13.7	—	—	K55	13.00
15.1-16.2	13.8-14.8	—	—	K56	13.00
16.3-17.5	14.9-16.4	—	—	K57	13.00
17.6-18.6	16.5-18.2	—	—	K58	13.00
18.7-19.9	18.3-19.5	—	—	K60	13.00
20.0-21.3	19.6-20.9	—	—	K61	13.00
21.4-22.8	21.0-22.8	23.2-25.1	—	K62	13.00
22.9-25.1	22.9-24.7	25.2-27.3	—	K63	13.00
25.2-27.6	24.8-27.6	27.4-30.4	—	K64	13.00
27.7-30.0	27.7-30.5	30.5-33.3	—	K67	13.00
—	30.6-33.9	33.4-36.5	—	K68	13.00
—	34.0-37.3	36.6-39.3	—	K69	13.00
—	37.4-40.2	39.4-43.5	—	K70	13.00
—	40.3-41.9	43.6-46.6	43.0-46.5	K72	13.00
—	42.0-45.9	46.7-51.1	46.6-50.9	K73	13.00
—	46.0-50.9	51.2-56.3	51.0-55.9	K74	13.00
—	51.0-52.9	56.4-61.1	56.0-59.1	K75	13.00
—	53.0-57.7	61.2-64.9	59.2-68.7	K76	13.00
—	57.8-60.0	65.0-71.9	—	K77	13.00
—	—	72.0-80.7	68.8-80.7	K78	13.00
—	—	80.8-92.7	80.8-92.7	K85	13.00
—	—	92.8-100.0	92.8-103.9	K86	13.00
—	—	—	104.0-113.5	K87	13.00
—	—	—	113.6-127.9	K89	13.00
—	—	—	128.0-143.9	K92	13.00
—	—	—	144.0-163.9	K94	13.00
—	—	—	164.0-180.0	K96	13.00

# Overload Relay Heater Tables

## Full Load Motor Amps, 3-Phase, Trip Class 10 – Tables 332, 335

Selection

Table 332 for Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87 (3-Phase)

Table 335 for Class 48

Full Load Amps					Heater Catalog No	List Price \$
Size 00, 0, 1	Size 1¼	Size 2, 2½	Size 3, 3½	Size 4		
1.52-1.65	1.52-1.65	—	—	—	K21	13.00
1.66-1.79	1.66-1.79	—	—	—	K22	13.00
1.80-1.94	1.80-1.94	—	—	—	K23	13.00
1.95-2.15	1.95-2.15	—	—	—	K24	13.00
2.16-2.37	2.16-2.37	—	—	—	K26	13.00
2.38-2.56	2.38-2.56	—	—	—	K27	13.00
2.57-2.87	2.57-2.87	—	—	—	K28	13.00
2.88-3.13	2.88-3.13	—	—	—	K29	13.00
3.14-3.37	3.14-3.37	—	—	—	K31	13.00
3.38-3.72	3.38-3.72	—	—	—	K32	13.00
3.73-4.00	3.73-4.00	—	—	—	K33	13.00
4.01-4.35	4.01-4.35	—	—	—	K34	13.00
4.36-4.99	4.36-4.99	—	—	—	K36	13.00
5.00-5.38	5.00-5.38	—	—	—	K37	13.00
5.39-5.79	5.39-5.79	—	—	—	K39	13.00
5.80-6.43	5.80-6.43	—	—	—	K41	13.00
6.44-6.83	6.44-6.83	—	—	—	K42	13.00
6.84-7.83	6.84-7.83	—	—	—	K43	13.00
7.84-8.23	7.84-8.23	—	—	—	K49	13.00
8.24-9.59	8.24-9.59	—	—	—	K50	13.00
9.60-9.90	9.60-9.90	—	—	—	K52	13.00
10.0-10.7	10.0-10.7	—	—	—	K53	13.00
10.8-11.6	10.8-11.6	12.1-12.7	—	—	K54	13.00
11.7-12.3	11.7-12.3	12.8-13.5	—	—	K55	13.00
12.4-13.4	12.4-13.4	13.6-14.6	—	—	K56	13.00
13.5-14.2	13.5-14.2	14.7-15.9	—	—	K57	13.00
14.3-15.1	14.3-15.1	16.0-16.9	—	—	K58	13.00
15.2-17.5	15.2-17.5	17.0-18.2	—	—	K60	13.00
17.6-18.7	17.6-18.7	18.3-19.5	—	—	K61	13.00
18.8-20.0	18.8-20.0	19.6-20.9	—	—	K62	13.00
20.1-21.5	20.1-21.5	21.0-23.1	—	—	K63	13.00
21.6-23.9	21.6-23.9	23.2-25.4	—	—	K64	13.00
24.0-25.8	24.0-25.8	25.5-27.9	—	—	K67	13.00
—	—	28.0-30.5	—	—	K68	13.00
—	—	—	—	—	K69	13.00
—	29.6-32.7	30.6-33.5	36.8-40.0	—	K70	13.00
—	32.8-36.0	33.6-37.2	40.1-42.4	—	K72	13.00
—	—	37.3-40.7	42.5-46.3	—	K73	13.00
—	—	40.8-43.0	46.4-49.6	—	K74	13.00
—	—	43.1-47.9	49.7-52.3	49.7-52.3	K75	13.00
—	—	48.0-52.7	52.4-57.5	52.4-57.5	K76	13.00
—	—	52.8-58.3	57.6-63.9	57.6-63.0	K77	13.00
—	—	58.4-60.0	64.0-67.9	63.1-68.1	K78	13.00
—	—	—	68.0-74.3	68.2-74.3	K83	13.00
—	—	—	74.4-77.9	74.4-79.9	K85	13.00
—	—	—	78.0-83.1	80.0-87.4	K86	13.00
—	—	—	83.2-91.4	87.5-90.0	K87	13.00
—	—	—	91.5-99.9	90.1-100.0	K88	13.00
—	—	—	100.0-108.0	100.1-108.0	K89	13.00
—	—	—	—	108.1-119.0	K90	13.00
—	—	—	—	119.1-130.0	K92	13.00
—	—	—	—	—	K94	13.00
—	—	—	—	—	K96	13.00

Full Load Amps				Heater Catalog No	List Price \$
48DC	48GC	48HA	48JA		
1.56-1.69	—	—	—	K21	13.00
1.70-1.84	—	—	—	K22	13.00
1.85-1.98	—	—	—	K23	13.00
1.99-2.19	—	—	—	K24	13.00
2.20-2.43	—	—	—	K26	13.00
2.44-2.63	—	—	—	K27	13.00
2.64-2.95	—	—	—	K28	13.00
2.96-3.21	—	—	—	K29	13.00
3.22-3.45	—	—	—	K31	13.00
3.46-3.81	—	—	—	K32	13.00
3.82-4.10	—	—	—	K33	13.00
4.11-4.46	—	—	—	K34	13.00
4.47-5.10	—	—	—	K36	13.00
5.11-5.49	—	—	—	K37	13.00
5.50-6.21	—	—	—	K39	13.00
6.22-6.76	—	—	—	K41	13.00
6.77-7.62	—	—	—	K42	13.00
7.63-8.07	—	—	—	K43	13.00
8.08-9.19	—	—	—	K49	13.00
9.20-10.0	—	—	—	K50	13.00
10.1-11.0	—	—	—	K52	13.00
11.1-12.0	—	—	—	K53	13.00
12.1-12.7	—	—	—	K54	13.00
12.8-13.5	—	—	—	K55	13.00
13.6-14.5	—	—	—	K56	13.00
14.6-15.7	—	—	—	K57	13.00
15.8-16.7	—	—	—	K58	13.00
16.8-17.9	—	—	—	K60	13.00
18.0-19.2	18.0-19.2	—	—	K61	13.00
19.3-20.5	19.3-20.5	23.2-25.1	—	K62	13.00
20.6-22.5	20.6-22.5	25.2-27.3	—	K63	13.00
22.6-24.8	22.6-24.8	27.4-30.4	—	K64	13.00
24.9-27.6	24.9-27.6	30.5-33.3	—	K67	13.00
27.7-30.0	—	33.4-36.5	—	K68	13.00
—	27.7-30.1	36.6-39.3	—	K69	13.00
—	30.2-33.1	39.4-43.5	—	K70	13.00
—	33.2-36.7	43.6-46.6	43.0-46.5	K72	13.00
—	36.8-40.1	46.7-51.1	46.6-50.9	K73	13.00
—	40.2-45.5	51.2-56.3	51.0-55.9	K74	13.00
—	45.6-47.9	56.4-61.1	56.0-59.1	K75	13.00
—	48.0-52.7	61.2-64.9	59.2-68.7	K76	13.00
—	52.8-55.1	65.0-71.9	—	K77	13.00
—	55.2-60.0	72.0-80.7	68.8-80.7	K78	13.00
—	—	80.8-92.7	80.8-92.7	K85	13.00
—	—	92.8-100.0	92.8-103.9	K86	13.00
—	—	—	104.0-113.5	K87	13.00
—	—	—	113.6-127.9	K89	13.00
—	—	—	128.0-143.9	K92	13.00
—	—	—	144.0-163.9	K94	13.00
—	—	—	164.0-180.0	K96	13.00

16  
CONTROL  
PRODUCTS

NEMA & General  
Purpose Control



# Replacement Parts

## Starters and Contactors – AC Coils

Selection

### Ordering Information

► 4th character of starter or contactor catalog number indicates model.

### AC Coils — For Class 14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 40, 43, 83, 84, 87, 88

	Size	Model	Volts		Catalog Number	List Price \$
			60Hz	50Hz		
	00-2½	P S (ESP100)	24 120 110-120/220-240 208 220-240 277 220-240/440-480 440-480 575-600	24 110 110/190-220 — 190-220 240 190-220/380-440 380-440 550	75D73070J 75D73070F 75D73070A 75D73070D 75D73070G 75D73070L 75D73070C 75D73070H 75D73070E	67.00 67.00 67.00 67.00 67.00 67.00 67.00 67.00 67.00
	3, 3½	P S (ESP100)	24 120 110-120/220-240 208 220-240 277 220-240/440-480 440-480 575-600	24 110 110/190-220 — 190-220 240 190-220/380-440 380-440 550	75D73251J 75D73251F 75D73251A 75D73251D 75D73251G 75D73251L 75D73251C 75D73251H 75D73251E	144.00 144.00 144.00 144.00 144.00 144.00 144.00 144.00 144.00
	4	G T (ESP100)	24 120 120/220-240 208 220-240 277 220-240/440-480 440-480 575-600	24 110 110/190-220 — 190-220 240 190-220/380-440 380-440 550	75D70131J 75D70131F 75D70131A 75D70131D 75D70131G 75D70131L 75D70131C 75D70131H 75D70131E	173.00 173.00 173.00 173.00 173.00 173.00 173.00 173.00 173.00
	4, 5	V (Vacuum)	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	3RT1966-5AB31 3RT1966-5AF31 3RT1966-5AM31 3RT1966-5AP31 3RT1966-5AU31 3RT1966-5AV31 3RT1966-5AR31 3RT1966-5AT31	176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup> 176.00 <sup>①</sup>
	5	P	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	3RT1965-5AB31 3RT1965-5AF31 3RT1965-5AM31 3RT1965-5AP31 3RT1965-5AU31 3RT1965-5AV31 3RT1965-5AR31 3RT1965-5AT31	165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup> 165.00 <sup>①</sup>
	6	P V (Vacuum)	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	23-26 110-127 200-220 220-240 240-277 380-420 440-480 575-600	3RT1975-5AB31 3RT1975-5AF31 3RT1975-5AM31 3RT1975-5AP31 3RT1975-5AU31 3RT1975-5AV31 3RT1975-5AR31 3RT1975-5AT31	213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup> 213.00 <sup>①</sup>
	7	H	100-250 150-500	100-250 150-500	75ZAF750-70 75ZAF750-71	587.00 587.00
	8	H	100-250	100-250	75ZAF1650-70	1029.00 <sup>②</sup>

① Discount Code: SIRIUS 3R, Contactors, OL's, MSP's.

② Set of 2 coils. Recommend to change printed circuit board when changing coils. **49ZP1650** for List Price see page 16-156.


# Replacement Parts

## Starters and Contactors – DC Coils, Late Break Aux Contacts, Rectifiers, Contact Kits *Selection*

### Ordering Information


- ▶ 4th character of starter or contactor catalog number indicates model.
- ▶ DC Coils for Size 00-4 require Late Break Interlock.

### DC Coils — For Class 14, 17, 18, 22, 25, 26, 30, 32, 40, 43

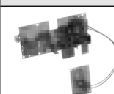
	Size	Model	Volts DC	Catalog Number	List Price \$
	00-2½	P S (ESP 100)	12	75D73070R	99.00
			24	75D73070S	99.00
			32	75D73070T	99.00
			48	75D73070U	99.00
			125	75D73070V	99.00
	3, 3½	P S (ESP 100)	12	75D73251R	213.00
			24	75D73251S	213.00
			32	75D73251T	213.00
			48	75D73251U	213.00
			125	75D73251V	213.00
	4	G T (ESP 100)	250	75D73251W	213.00
			48	75D70131U	338.00
125			75D70131V	338.00	
4, 5	V (Vacuum)	250	75D70131W	338.00	
		23-26	3RT1966-5AB31	176.00 <sup>①</sup>	
		42-48	3RT1966-5AD31	176.00 <sup>①</sup>	
		110-127	3RT1966-5AF31	176.00 <sup>①</sup>	
			240-277	3RT1966-5AU31	176.00 <sup>①</sup>

Note: For sizes 7 & 8 contactors the AC coils are used for DC see page 16-155.


### Late Break Auxiliary Contacts

	Control Size	Model	Catalog Number	List Price \$
	00-4	P, G, S, T	49AB01LB	51.00 <sup>②</sup>

### Board for Size 8 Contactor

	Control Size	Model	Catalog Number	List Price
	8	H	49ZP1650	1811.00

### Contact Kits – Single Pole Stationary and Movable Contacts, Contact Spring<sup>③</sup>

Description	Size	Number of Poles in Kit	Model (4th position in part number)	Catalog Number	List Price \$
 <p>Class 14, 17, 18, 22, 25, 26, 30, 32, 36, 37, 40, 43, 83, 84, 87, 88</p>	Internal Aux Contact (00-1-¾)		P, S	75AF14	20.00
	00		P, S	75BF14	22.00
	0		P, S	75CF14	34.00
	1	1	P, S	75DF14	45.00
	1¾-1P		P, S	75EF14	67.00
	2	1	P, S	75FP14	81.00
	2½	1	P, S	75GP14	120.00
	3		P, S	75HF14	144.00
	3½	1	P, S	75IF14	223.00
	4	1	G, T	75JG14	290.00
	4 (Vacuum)	3 (Bottles)	V, C	3RT1966-6V	1161.00 <sup>①</sup>
	5	3	P	3RT1966-6A	1054.00 <sup>①</sup>
5 (Vacuum)	3 (Bottles)	V, C	3RT1966-6V	1704.00 <sup>①</sup>	
6	3	P	3RT1976-6A	1395.00 <sup>①</sup>	
6 (Vacuum)	3 (Bottles)	V, C	3RT1976-6V	2130.00 <sup>①</sup>	
7	3	H	49ZL750	4428.00	
14, 40	8	3	H	49ZL1650	5468.00

① Discount Code: IEC.

② Discount Code: NEMA Control.

③ On 3-phase controls, all 3-poles should be replaced - 3 kits required.

# Replacement Parts

## Starters and Contactors – Coil VA Ratings and Overload Relays

Selection

### Coil VA Ratings

Device Type	Contactors Size	Amps	Volts	Number of Poles	Total Inrush VA	Total Sealed VA
NEMA Starter	00 thru 2 1/2	—	—	—	218	25
	3 thru 3 1/2	—	—	—	310	26
	4	—	—	—	510	51
	5	—	—	—	590	6.7
	6	—	—	—	830	9.2
	7	—	—	—	850	12
	8	—	—	—	1900	48
	4,5,6 (Vacuum)	—	—	—	630	7.4
Lighting Contactor Mechanically Held (CLM)	—	20	—	2-12	6	625
	—	30	—	2-5	40	410
	—	60	—	2-3	40	410
	—	60	—	4-5	40	600
	—	100 - 200	—	2-3	200	900
	—	100 - 200	—	4-5	130	1300
	—	300 - 400	—	3	550	1600
Lighting Contactor Electrically Held (LE)	—	20	24	3	49.6	6.9
	—	20	120	3	51.3	6.57
	—	20	208	3	75.79	11.94
	—	20	240	3	86.78	14.25
	—	20	277	3	79.1	11.97
	—	20	480	3	83.7	12.9
	—	20	600	3	84.1	13.2
	—	20	24	12	73.31	12.66
	—	20	120	12	75.1	13.1
	—	20	208	12	73.97	13.25
	—	20	240	12	89.15	14.85
	—	20	277	12	78.55	12.77
	—	20	480	12	84	12.9
	—	20	600	12	81.9	13.4
	—	30	24	3	49.67	7.08
	—	30	120	3	51.94	6.48
	—	30	208	3	76.57	11.78
	—	30	240	3	64.44	8.99
	—	30	277	3	77.85	14.2
	—	30	480	3	83.6	13.1
	—	30	600	3	82.1	13.4
	—	60	24	3	74.94	13.16
	—	60	120	3	75.77	13.59
	—	60	208	3	78.73	12.05
	—	60	240	3	89.92	14.42
	—	60	277	3	84.89	12.93
	—	60	480	3	87.6	12.7
	—	60	600	3	85.4	13.8
	—	100	24	3	182.28	32.85
	—	100	120	3	191.42	32.26
	—	100	208	3	187.78	31.15
	—	100	240	3	215.32	35.63
	—	100	277	3	175.92	30.62
—	100	480	3	198.2	34.8	
—	100	600	3	171.1	29.6	
—	200	All Voltages Electrically Held	3	300	5.8	
—	300		3	590	6.7	
—	400		3	830	9.2	

### Overload Relays<sup>①②</sup> – For Class 14, 17, 18, 22, 25, 26, 30, 32, 83, 84, 87

Size	Half Size	Model	Number Poles	Ambient Comp Bimetal			
				Catalog Number (1) NC	List Price \$	Catalog Number (1) NO/NC	List Price \$
00-1	—	P	1	48DC18AA3	116.00	48DC39AA3	155.00
			3	48DC38AA3	120.00		
1P	—	P	1	48EC18AA3	151.00	48EC39AA3	191.00
—	1 1/4	P	3	48EC38AA3	155.00		
2	—	P	1	48GC18AA3	165.00	48GC39AA3	205.00
			3	48GC38AA3	169.00		
—	2 1/2	P	1	48GC18AA3	165.00	48GC39AA3	205.00
—	—	P	3	48GC38AA3	169.00		
3	—	P	3	48HC38AA3	286.00		
—	3 1/2	P	3	48HC38AA3	286.00		
4	—	G	3	48JC38AA3	430.00		

For Starter and Contactor replacement parts not found in this section, please refer to Field Modification kits found starting on page 16-79.

① For replacement Solid State overload relays, please see the Overload Relay section found starting on page 16-47.


② Includes overload mounting plate to be coupled to contactor mounting plate.

# Replacement Parts

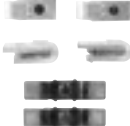
## Lighting and Heating Contactors, Type LE, CLM, CMF, CMN

Selection


### AC Coils – 20-400 Amps

 3RT1955-5AF31	Type	Contactor Size	Catalog Number							List Price \$
			24VAC	120VAC	208VAC	240VAC	277VAC	480VAC	600VAC	
LE	20, 30, 60 Amp	75D70646J	75D70646F	75D70646D	75D70646G	75D70646L	75D70646H	75D70646E	56.00	
	100 Amp	75D54772J	75D54772F	75D54772D	75D54772G	75D54772L	75D54772H	75D54772E	93.00	
	200 Amp	3RT1955-5AB31	3RT1955-5AF31	3RT1955-5AM31	3RT1955-5AP31	3RT1955-5AU31	3RT1955-5AR31	3RT1955-5AT31	133.00 <sup>①</sup>	
	300 Amp	3RT1965-5AB31	3RT1965-5AF31	3RT1965-5AM31	3RT1965-5AP31	3RT1965-5AU31	3RT1965-5AR31	3RT1965-5AT31	165.00 <sup>①</sup>	
	400 Amp	3RT1975-5AB31	3RT1975-5AF31	3RT1975-5AM31	3RT1975-5AP31	3RT1975-5AU31	3RT1975-5AR31	3RT1975-5AT31	213.00 <sup>①</sup>	


### Main Contacts (Includes 3 Moving and 6 Fixed Contacts)

 3RT1965-6A	Type	Contactor Size	Catalog Number	List Price \$	
	LE	20-100 Amp		Not Replaceable	—
		200 Amp		3RT1956-6A	554.00 <sup>①</sup>
		300 Amp		3RT1965-6A	847.00 <sup>①</sup>
		400 Amp		3RT1975-6A	1193.00 <sup>①</sup>


### Lighting Contact Assembly - 20 Amp (Power Poles)

	Type	Contactor Size	Catalog Number (Verify catalog number on side of contact assembly)	List Price \$
	LE	20 Amp	49LN02A, 2 NC Contacts Non-Stackable	101.00
			49LN20A, 2 NO Contacts Non-Stackable	101.00
			49LS20A, 2 NO Contacts Stackable	101.00
			49LS10A, 1 NO Contact Stackable	101.00

### AC Coils 20 Amps<sup>②</sup>

 CLM4097341	Type	Contactor Size	Number of Poles	120V, 60Hz 110V, 50Hz	List Price \$	240V, 60Hz 208V, 50Hz	List Price \$	277V 50/60Hz	List Price \$	480V, 60Hz 440V, 50Hz	List Price \$
	CLM	20 Amp	2-12	CLM4097341	103.00	CLM4097342	103.00	CLM4097343	103.00	CLM4097344	103.00

### AC Coils 30-400 Amps<sup>③</sup>

 CLMC4C120	Type	Contactor Size	Number of Poles	Catalog Number							List Price \$
				24V AC	120V AC	208V AC	220/240V AC	277V AC	480V AC	600V AC	
CLM†C	30 Amp	2-3-Pole	CLMC4C024	CLMC4C120	CLMC4C208	CLMC4C240	CLMC4C277	CLMC4C480	CLMC4C600	119.00	
		4-Pole	CLMC4C024	CLMC4C120	CLMC4C208	CLMC4C240	CLMC4C277	CLMC4C480	CLMC4C600	119.00	
		5-Pole	CLMC5C024	CLMC5C120	CLMC5C208	CLMC5C240	CLMC5C277	CLMC5C480	CLMC5C600	119.00	
CLM†D	60 Amp	2-3-Pole	CLMD3C024	CLMD3C120	CLMD3C208	CLMD3C240	CLMD3C277	CLMD3C480	CLMD3C600	141.00	
		4-Pole	CLMD5C024	CLMD5C120	CLMD5C208	CLMD5C240	CLMD5C277	CLMD5C480	CLMD5C600	141.00	
		5-Pole	CLMD5C024	CLMD5C120	CLMD5C208	CLMD5C240	CLMD5C277	CLMD5C480	CLMD5C600	141.00	
CLM†E	100, 200 Amp	2-3-Pole	CLME3C024	CLME3C120	CLME3C208	CLME3C240	CLME3C277	CLME3C480	CLME3C600	237.00	
		4-Pole	CLME5C024	CLME5C120	CLME5C208	CLME5C240	CLME5C277	CLME5C480	CLME5C600	237.00	
		5-Pole	CLME5C024	CLME5C120	CLME5C208	CLME5C240	CLME5C277	CLME5C480	CLME5C600	237.00	
CLM†G Latching Coil Unlatch Coil	300 Amp	2-3-Pole	—	CLMGL3C120	CLMGL3C208	CLMGL3C240	CLMGL3C277	CLMGL3C480	CLMGL3C600	511.00	
		2-3-Pole	—	CLMGU3C120	CLMGU3C208	CLMGU3C240	CLMGU3C277	CLMGU3C480	CLMGU3C600	511.00	
CLM†H Latching Coil Unlatch Coil	400 Amp	2-3-Pole	—	CLMHL3C120	CLMHL3C208	CLMHL3C240	CLMHL3C277	CLMHL3C480	CLMHL3C600	583.00	
		2-3-Pole	—	CLMHU3C120	CLMHU3C208	CLMHU3C240	CLMHU3C277	CLMHU3C480	CLMHU3C600	583.00	

### Control Module Rectifier<sup>③</sup>

Type	Device	Contactor Size	Number of Poles	Catalog Number	List Price \$
CLM	CLM†C to CLM†F	30-200 Amps	All	CLMKCMR	167.00

① Discount code: IEC.

② Coil kits for 20 amp CLM contactors include the coil clearing auxiliary contact.

③ For 30-200 amp CLM contactors, in the event that either the coil or the control module fails, it is recommended that both be replaced.

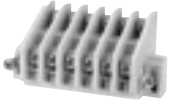
# Replacement Parts

## Lighting Contactors, CLM, CMB, CMF, CMN & Combination Replacement Handles Selection

### Ordering Information

- ▶ **For CLM:** 5th character of contactor catalog number indicates Frame Size.
- ▶ **For CMB, CMF, CMN:** 4th character of contactor catalog number indicates Frame Size.

### Main Contacts 20 Amp Lighting Contactors

 <p>CLM4097334</p>	Type	Contact Size	Number of Poles	Location	Catalog Number	List Price \$
	CLM	20 Amp	2	Top or Bottom	CLM4097331	258.00 <sup>①</sup>
			3	Top	CLM4097332	290.00 <sup>①</sup>
			4	Top or Bottom	CLM4097333	355.00 <sup>①</sup>
			6	Top or Bottom	CLM4097334	419.00 <sup>①</sup>


### Main Contacts 30–400 Amp Lighting Contactors

Type	Frame Size	Contact Size	Number of Poles	Catalog Number	List Price \$
CLM	C	30 Amp	2	CLMCCK02	133.00
			3	CLMCCK03	192.00
			4	CLMCCK04	223.00
			5	CLMCCK05	268.00
	D	60 Amp	2	CLMDCK02	155.00
			3	CLMDCK03	252.00
			4	CLMDCK04	533.00
			5	CLMDCK05	564.00
	E	100 Amp	2	CLMECK02	300.00
			3	CLMECK03	449.00
			4	CLMECK04	600.00
			5	CLMECK05	752.00
	F	200 Amp	2	CLMFCK02	578.00
			3	CLMFCK03	863.00
			4	CLMFCK04	1151.00
			5	CLMFCK05	1438.00
	G	300 Amp	2	CLMGCK02	1428.00
			3	CLMGCK03	2118.00
	H	400 Amp	2	CLMHCK02	2766.00
			3	CLMHCK03	4152.00

### Auxiliary Contact Blocks 20 Amp Lighting Contactors<sup>②</sup>

Type	Contact Size	Contacts	Catalog Number	List Price \$
CLM	20 Amp	1 Form C NO, NC Contact	CLM4097291	97.00 <sup>①</sup>
		2 Form C NO, NC Contacts	CLM4097292	193.00 <sup>①</sup>

### Auxiliary Contact Blocks 30–400 Amp Lighting Contactors

 <p>CLMFCAK11</p>	Type	Frame Size	Contact Size	Contact Configuration	Catalog Number	List Price \$
	CLM	C to F <sup>②</sup>	30–200 Amps	1 NO and 1 NC	CLMFCAK11	71.00
				2 NC	CLMFCAK02	71.00
	CLM	G to H <sup>①</sup>	300–400 Amps	2 NO	CLMFCAK20	71.00
1 Coil Clearing NO and NC				CLMFCAK11	71.00	
CLM	G to H <sup>①</sup>	300–400 Amps	1 NO and 1 NC	CLMHCAK11	71.00	
			2 NC	CLMHCAK02	71.00	
CLM	G to H <sup>①</sup>	300–400 Amps	2 NO	CLMHCAK20	71.00	
			1 Coil Clearing NO and NC	CLMHCAK11	71.00	

### Combination Starters Class 17, 18, 25, 26 & 32 Replacement Handle Assemblies

NEMA 1, 4, 12 Enclosure Class 17, 25, 32				
Disc Size	Standard Width	List Price \$	Extra Wide	List Price \$
30-100A	75D68257103	269.00	75D68257103	269.00
200A	75D68257105	269.00	—	—

NEMA 1, 4, 12 Enclosure Class 18, 26, 32				
Circuit Breaker	Standard Width	List Price \$	Extra Wide	List Price \$
3-100A	75D68257080	269.00	75D68257080	269.00
125A	75D68257096	269.00	—	—
150A	75D68257089	269.00	—	—

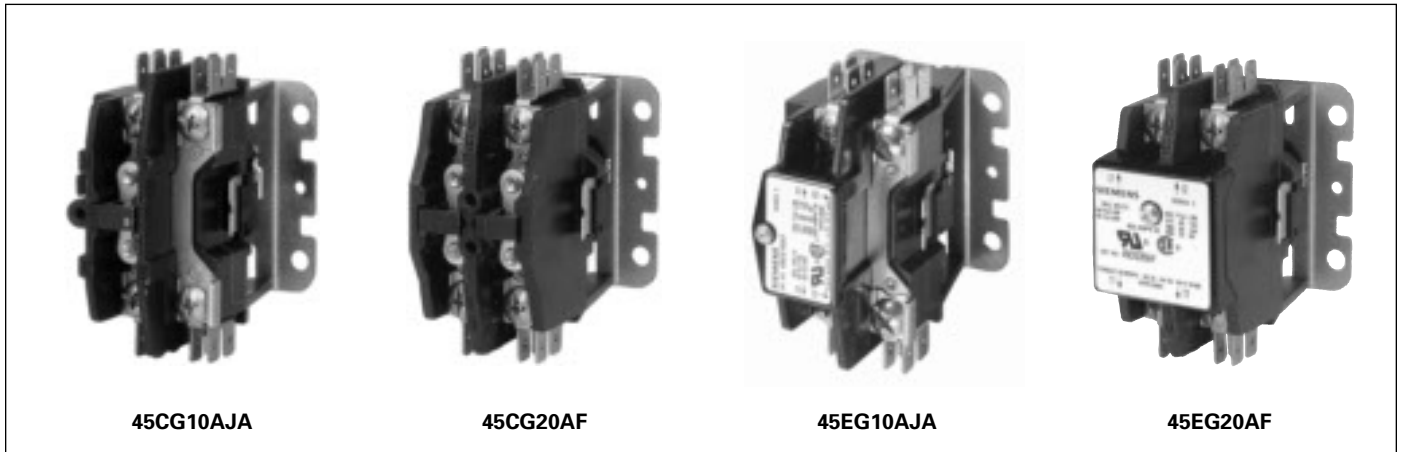
① Maximum 1 block per contactor.  
 ② Maximum 2 blocks per contactor.

# Definite Purpose Control

## Definite Purpose Contactors

General

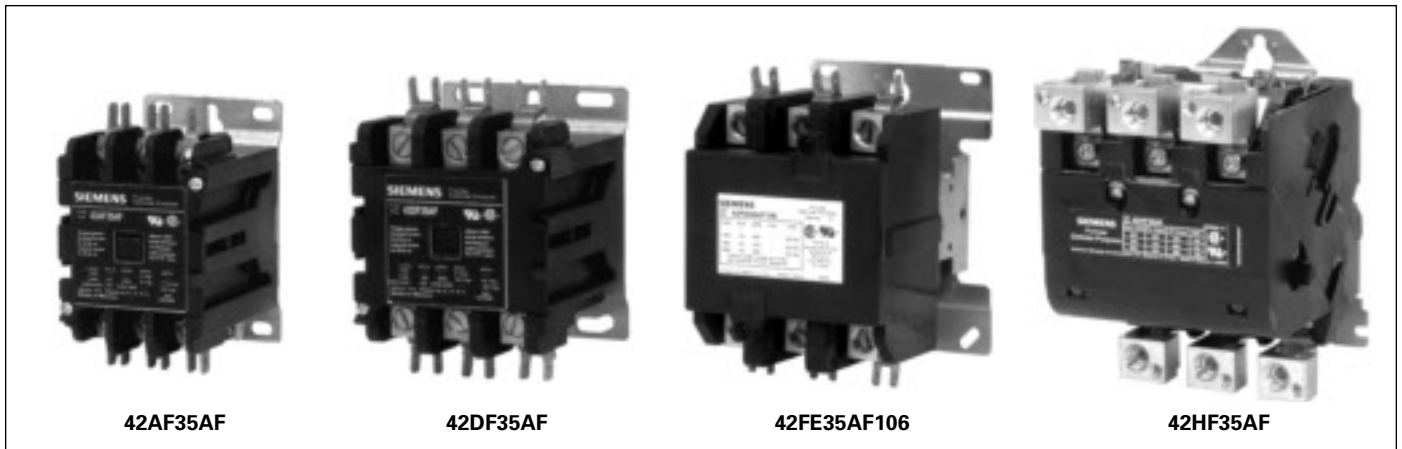
### Class 45



#### Benefits

- Power Termination Options
- Compact Size
- One Pole Version Includes Shunt Bar
- Interchangeable Mounting Durable Metal Back Plate
- Standard Class B Coil Insulation
- Quiet Operation
- Weld-resistant Silver Cadmium Oxide Contacts
- Power Terminal Operations
- Reinforced Thermalset Polyester Housing
- Contact Covers and Taped Coils Come Standard

### Class 42



#### Benefits

- Compact Size
- Interchangeable Mounting Durable Metal Back Plate
- Power Terminations Options
- Reinforced Thermalset Polyester Housing
- Quiet Operation
- Weld-resistant Silver Cadmium Oxide Contacts
- Optional Din Rail Mounting
- Snap-on Electrical/Mechanical Interlocks
- Visual Contact Position Indication
- Low VA Coils Standard for 25A–40A

#### Common Definite Purpose Applications

- Air Conditioning
- Heating
- Ventilating
- Refrigeration
- Food and Beverage Industry
- Conveyors
- Elevators
- Lighting
- Pool and Spa
- Welding
- Pump and Compressor

For further products and dimensions see supplement catalog **DPBR-18010-0905**. New supplement catalog to be ready Summer 2007.

# Definite Purpose Control

## Definite Purpose Contactors

Selection

Ordering Information	Coil Table		
<ul style="list-style-type: none"> <li>▶ Use complete catalog number. Replace the (*) with letter from the coil table.</li> <li>▶ For additional information see Definite Purpose Catalog <b>DPBR-18010-0905</b>.</li> </ul>	60Hz	50Hz Voltage	Letter
	24	24	J
	110-120	110	F
	200-208	—	D
	208-240	190-220	G
	277	240	L
	440-480	380-440	H
	550-600	550	E

### Class 45

FLA	120V Hp	240V		277V		480V		600V		Non Inductive Amps	Poles	Catalog No	List Price \$
		LRA	Hp	LRA	Hp	LRA	Hp	LRA	Hp				
20	—	120	—	110	—	100	—	80	—	25	1	45CG10A*A	44.50
25	—	150	—	150	—	100	—	80	—	35	1	45DG10A*A	48.50
30	—	180	—	180	—	150	—	120	—	40	1	45EG10A*A	55.00
35	—	200	—	180	—	150	—	120	—	50	1	45FG10A*A	61.00
40	—	240	—	240	—	200	—	160	—	55	1	45GG10A*A	66.00
20	—	—	—	120	—	100	—	80	—	30	2	45CG20A*	66.00
25	—	—	—	150	—	125	—	100	—	35	2	45DG20A*	87.00
30	—	—	—	180	—	135	—	110	—	40	2	45EG20A*	96.00
35	—	—	—	200	—	135	—	110	—	50	2	45FG20A*	102.00
40	—	—	—	240	—	200	—	160	—	55	2	45GG20A*	107.00

### Class 42 25-150 FLA 60Hz 600V AC Max

FLA	120V Hp	240V		277V		480V		600V		Non Inductive Amps	Poles	Catalog No	List Price \$
		LRA	Hp	LRA	Hp	LRA	Hp	LRA	Hp				
25	2	150	3	—	—	125	—	100	—	35	2	42AF15A*	101.00
25	—	150	5	—	—	125	7.5	100	7.5	35	3	42AF35A*	117.00
25	—	150	5	—	—	125	7.5	100	7.5	35	4	42AF25A*	158.00
30	2	180	5	—	—	150	—	120	—	40	2	42BF15A*	122.00
30	—	180	7.5	—	—	150	10	120	10	40	3	42BF35A*	130.00
30	—	180	7.5	—	—	150	10	120	10	40	4	42BF25A*	172.00
40	3	240	7.5	—	—	200	—	160	—	50	2	42CF15A*	137.00
40	—	240	10	—	—	200	15	160	15	50	3	42CF35A*	152.00
40	—	240	10	—	—	200	15	160	15	50	4	42CF25A*	196.00
50	3	300	10	—	—	250	—	200	—	63	2	42DF15A*	282.00
50	—	300	15	—	—	250	30	200	30	63	3	42DF35A*	299.00
60	5	360	10	—	—	300	—	240	—	75	2	42EF15A*	320.00
60	—	360	20	—	—	300	40	240	40	75	3	42EF35A*	333.00
75	—	450	25	—	—	375	—	300	—	93	2	42FE15A*106	383.00
75	—	450	25	—	—	375	40	300	40	93	3	42FE35A*106	428.00
90	—	540	—	—	—	450	—	360	—	120	2	42GE15A*106	496.00
90	—	540	30	—	—	450	60	360	60	120	3	42GE35A*106	536.00
120	—	720	—	—	—	600	—	480	—	150	2	42HF15A*	607.00
120	—	720	—	—	—	600	—	480	—	150	3	42HF35A*	660.00
150	—	900	—	—	—	750	—	600	—	160	2	42IF15A*	1172.00
150	—	900	—	—	—	750	—	600	—	160	3	42IF35A*	1293.00

16 CONTROL PRODUCTS

Definite Purpose Control

# SIRIUS Soft Starters

## Introduction

### Overview

#### Products at a glance



3RW30/3RW31



3RW40



3RW44



Class 73/74 Enclosed

#### SIRIUS soft starters

##### for standard applications

##### SIRIUS 3RW30 soft starters

- SIRIUS 3RW30/31 soft starters for soft starting and smooth ramp-down of single-phase or three-phase asynchronous motors<sup>1)</sup>
- Rating range of up to 60 Hp at 460 V (50 °C ambient)
- Application areas:
  - Fans
  - Pumps
  - Building/construction machines
  - Presses
  - Escalators
  - Transport systems
  - Air conditioning systems
  - Ventilators
  - Assembly lines
  - Compressors and coolers
  - Operating mechanisms

3RW30, 3RW31 16-164

##### SIRIUS 3RW40 soft starters

- SIRIUS 3RW40 soft starters with integrated functions
  - solid-state motor overload and intrinsic device protection and adjustable current limiting for the soft starting and stopping of three-phase asynchronous motors
- Rating range from 75 to 300 Hp at 460 V (50 °C ambient)
- Application areas:
  - Fans
  - Pumps
  - Building/construction machines
  - Presses
  - Escalators
  - Transport systems
  - Air conditioning systems
  - Ventilators
  - Assembly lines
  - Compressors and coolers
  - Operating mechanisms

3RW40 16-165

##### for High Feature applications

##### SIRIUS 3RW44 soft starters

- In addition to soft starting and soft ramp-down, the solid-state SIRIUS 3RW44 soft starters provide numerous functions for higher-level requirements
- Rating range from - up to 600 Hp at 460 V in inline circuit
- Application areas:
  - Pumps
  - Ventilators
  - Compressors
  - Cooling systems
  - Industrial refrigerating systems
  - Water transport
  - Conveying systems
  - Hydraulics
  - Machine tools
  - Mills

3RW44 16-166

##### For enclosed applications

##### Enclosures in NEMA 1, 3, 4, & 12 types UL/CSA listed

- Complete starter includes 3RW40 or 3RW44 and CPT
- Combination options include circuit breaker or fusible DBC
- Application areas:
  - Compressors
  - Pumps
  - Stamping presses
  - Cooling towers
  - Molding and extruding
  - Chippers and debarkers
  - Lumber processing
  - Pulp & paper processing
  - Conveyors
  - Textiles
  - HVAC

Class 73/74 16-168/16-169

<sup>1)</sup> 3RW30 single phase devices do not have ramp down functionality.



# SIRIUS Soft Starters

## General Data

### Overview

The advantages of the SIRIUS soft starters at a glance:

- Soft starting and soft stop<sup>1)</sup>
- Stepless starting
- Reduction of current peaks
- Avoidance of mains voltage fluctuations during starting
- Reduced load on the power supply network
- Reduction of the mechanical load in the operating mechanism
- Considerable space savings and reduced wiring compared with mechanical reduced voltage starters
- Maintenance-free switching
- Very easy handling
- Fits perfectly in the SIRIUS modular system



		SIRIUS 3RW30/31 Standard applications	SIRIUS 3RW40	SIRIUS 3RW44 High Feature applications
Rated current at 50 °C	A	2.6 ... 85	117 ... 385	26 ... 1076
Rated operating voltage	V	200 ... 575	200 ... 600	200 ... 690
Motor rating at 460 V				
• Inline circuit	Hp	1.1 ... 60	75 ... 300	15 ... 950
• Inside-delta circuit	Hp	—	—	22 ... 600
Temperature range	°C	-25 ... +60	-25 ... +60	0 ... +60
Soft starting/ramp-down		✓ <sup>1)</sup>	✓	✓
Voltage ramp		✓	✓	✓
Starting/stopping voltage	%	40 ... 100	40 ... 100	20 ... 100
Starting and ramp-down time	s	0 ... 20	0 ... 20	1 ... 360
Torque control		—	—	✓
Starting/stopping torque	%	—	—	20 ... 100
Torque limit	%	—	—	20 ... 200
Ramp time	s	—	—	1 ... 360
Integral bypass contact system		✓ <sup>2)</sup>	✓	✓
Intrinsic device protection		—	✓	✓
Motor overload protection		—	✓	✓
Thermistor motor protection		—	✓	✓
Adjustable current limiting		—	✓	✓
Inside-delta circuit		—	—	✓
Breakaway pulse		—	—	✓
Creep speed in both directions		—	—	✓
Pump ramp-down		—	—	✓ <sup>6)</sup>
DC braking		—	—	✓ <sup>3) 6)</sup>
Combined braking		—	—	✓ <sup>3) 6)</sup>
Motor heating		—	—	—
Communication		—	—	with PROFIBUS DP (option)
External display and operator module		—	—	(option )
LCD Operating measured value display		—	—	✓
Error logbook		—	—	✓
Event list		—	—	✓
Slave pointer function		—	—	✓
Trace function		—	—	✓ <sup>4)</sup>
Programmable control inputs and outputs		—	—	—
Number of parameter sets		1 (2 with 3RW31)	1	3
Parameterization software (Softstarter ES)		—	—	✓
Power semiconductors (thyristors)		2 controlled phases	2 controlled phases	3 controlled phases
Spring-loaded terminals		✓ (only 3RW30 03)	✓	✓
Screw terminals		✓	✓	✓
UL/CSA		✓ <sup>5)</sup>	✓	✓
CE marking		✓	✓	✓
Soft starting under heavy starting conditions		—	—	✓ <sup>6)</sup>
Configuring support		—	—	—

- ✓ Function is available
- Function not available

1) Soft stop not available for 3RW31.  
 2) Not available for 3RW30 03.  
 3) Not possible in inside-delta circuit.  
 4) Trace function with Softstarter ES software.

Win-SOFTSTARTER Technical Assistance 1-800-241-4453

5) For 3RW30 03 up to 230 V.  
 6) Calculate soft starter and motor with size allowance where required.

You can find further information on the Internet at:  
<http://sielect.sea.siemens.com>

# SIRIUS Soft Starters

## Standard Applications—SIRIUS 3RW3 Soft Starters

Selection

### Selection and ordering data



Rated operating voltage $U_e$	At ambient temperature 50 °C					Size	Order No.	List Price \$	Weight per PU approx.	
	Rated operating current $I_e$	Rated output of three-phase induction motors for rated operating voltage $U_e$								
		115 V	200 V	230 V	460 V					575 V
V	A	hp	hp	hp	hp	hp		kg		
<b>Soft starters for easy starting conditions and high operating frequency</b>										
200 ... 400	2.6	-	0.5	0.5	-	-	3RW30 03-□CB54	308.00	0.200	
<b>Order No. extension for rated connection method<sup>1)</sup></b>										
with screw-type terminals							22.5 mm	1		
with spring-loaded terminals							22.5 mm	2		
<b>Soft starters for three-phase asynchronous motors</b>										
200 ... 460	4.8	-	1	1	3	-	S00	3RW30 14-1CB□4	406.00	0.302
	7.8	-	2	2	5	-	S00	3RW30 16-1CB□4	484.00	0.305
	11	-	3	3	7.5	-	S0	3RW30 24-1AB□4	496.00	0.490
	14	-	3	3	10	-	S0	3RW30 25-1AB□4	567.00	0.481
	21	-	5	5	15	-	S0	3RW30 26-1AB□4	587.00	0.489
	27	-	7.5	7.5	20	-	S2	3RW30 34-1AB□4	763.00	0.794
	32	-	7.5	10	20	-	S2	3RW30 35-1AB□4	942.00	0.779
	38	-	10	10	25	-	S2	3RW30 36-1AB□4	1177.00	0.791
	54	-	15	20	40	-	S3	3RW30 44-1AB□4	1301.00	1.660
	64	-	20	20	40	-	S3	3RW30 45-1AB□4	1639.00	1.800
460 ... 575	85	-	25	30	60	-	S3	3RW30 46-1AB□4	1978.00	1.810
	11	-	-	-	7.5	10	S0	3RW30 24-1AB□5	668.00	0.490
	14	-	-	-	10	10	S0	3RW30 25-1AB□5	723.00	0.489
	21	-	-	-	15	15	S0	3RW30 26-1AB□5	780.00	0.489
	27	-	-	-	20	25	S2	3RW30 34-1AB□5	916.00	0.791
	32	-	-	-	20	30	S2	3RW30 35-1AB□5	1132.00	0.793
	38	-	-	-	25	30	S2	3RW30 36-1AB□5	1412.00	0.792
	54	-	-	-	40	50	S3	3RW30 44-1AB□5	1561.00	1.660
	64	-	-	-	40	60	S3	3RW30 45-1AB□5	1967.00	1.810
	85	-	-	-	60	75	S3	3RW30 46-1AB□5	2375.00	1.800
<b>Order No. extension for rated control supply voltage <math>U_s</math></b>										
AC/DC 24 V								0		
AC/DC 110 ... 230 V								1		
<b>Soft starters with two-ramp control for three-phase induction motors with two speeds (double pole-reversing)</b>										
200 ... 460	11	-	3	3	7.5	-	S0	3RW31 24-1CB14	613.00	0.468
	14	-	3	3	10	-	S0	3RW31 25-1CB14	657.00	0.475
	21	-	5	5	15	-	S0	3RW31 26-1CB14	722.00	0.464
460 ... 575	11	-	-	-	7.5	10	S0	3RW31 24-1CB15	735.00	0.467
	14	-	-	-	10	10	S0	3RW31 25-1CB15	795.00	0.476
	21	-	-	-	15	15	S0	3RW31 26-1CB15	858.00	0.475
<b>Soft starters for single-phase motors</b>										
115 ... 240	21	1.5	3	3	-	-	S0	3RW30 26-1AA12	313.00	0.439
	32	2	5	5	-	-	S2	3RW30 35-1AA12	501.00	0.729
	64	5	10	10	-	-	S3	3RW30 45-1AA12	864.00	1.390

1) Units have removable terminals.

2) 3RW30 46-1AB05 soft starters (AC/DC 24 V version):  
Delivery time on request.

Selection of the soft starter depends on the motor's rated current.

The SIRIUS 3RW3 solid-state soft starters are designed for easy starting conditions.  $J_{Load} < 10 \times J_{Motor}$ . In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger unit. Siemens recommends the use of the selection and simulation program Win-Soft starter. See Technical specifications for information about rated currents for ambient temperatures >50 °C.

# SIRIUS Soft Starters

## Standard Applications—SIRIUS 3RW40 Soft Starters

Selection

### Overview

#### SIRIUS 3RW40

SIRIUS 3RW40 soft starters have all the same advantages as the 3RW30/31 soft starters including soft start and soft stop,<sup>1)</sup> and internal bypass. At the same time they come with additional functions, i.e. selectable solid-state motor overload, intrinsic device protection and adjustable current limiting, as well as a new patented two-phase control method (Polarity Balancing) that is unique in this rating range.

SIRIUS 3RW40 soft starters are part of the SIRIUS modular system. This results in advantages such as identical sizes and a uniform connection system. Thanks to their particularly compact design, SIRIUS 3RW40 soft starters are only half as big as comparable wye-delta starters. Hence they can be mounted in compact space requirements in the control cabinet. Configuring and installation are carried out quickly and easily thanks to the 3-wire connection.

#### SIRIUS 3RW40 for three-phase motors

Soft starters rated up to 300 Hp (at 460 V) for standard applications in three-phase power systems. Extremely small sizes, low power losses and simple commissioning are just three of the many advantages of the SIRIUS 3RW40 soft starters.

### Area of application

The SIRIUS 3RW40 solid-state soft starters are suitable for soft starting and stopping of three-phase asynchronous motors.

Using the patented two-phase control, the current is kept at minimum values in all three phases throughout the entire starting time and typical direct current components are eliminated. This not only enables the two-phase starting of motors up to 300 Hp (at 460 V) but also avoids the current and torque peaks which occur i.e. with wye-delta starters or other mechanical starters.

#### Application areas

- Fans
- Pumps
- Building/construction machines
- Presses
- Escalators
- Transport systems
- Air conditioning systems
- Ventilators
- Assembly lines
- Compressors and coolers
- Operating mechanisms

#### Applicable standards

- IEC 60947-2
- UL/CSA #E143112



3RW40 56-6BB44



3RW40 76-6BB44

Ambient temperature 50 °C <sup>3)</sup>					Size	Order No.	List Price \$	Approx. weight per PU
Rated operating current $I_e$	Rated output of three-phase induction motors for rated operating voltage $U_e$							
A	200 V hp	230 V hp	460 V hp	575 V hp				
<b>Inline circuit, rated operating voltage 200 ... 460 V</b>								
117	30	40	75	–	S6	3RW40 55-□BB□4	2237.00	5.700
145	40	50	100	–		3RW40 56-□BB□4	2460.00	5.700
205	60	75	150	–	S12	3RW40 73-□BB□4	2879.00	7.000
248	75	100	200	–		3RW40 74-□BB□4	3243.00	7.000
315	100	125	250	–		3RW40 75-□BB□4	3578.00	7.000
385	125	1250	300	–		3RW40 76-□BB□4	4585.00	7.000
<b>Inline circuit, rated operating voltage 400 ... 600 V</b>								
117	–	–	75	100	S6	3RW40 55-□BB□5	2573.00	5.700
145	–	–	100	150		3RW40 56-□BB□5	2829.00	5.700
205	–	–	150	200	S12	3RW40 73-□BB□5	3321.00	7.000
248	–	–	200	250		3RW40 74-□BB□5	3735.00	7.000
315	–	–	250	300		3RW40 75-□BB□5	4115.00	7.000
385	–	–	300	400		3RW40 76-□BB□5	5278.00	7.000

#### Order No. extension for connection method

- with spring-loaded terminals
- with screw-type terminals

#### Order No. extension for the rated control supply voltage $U_s$ <sup>2)</sup>

- 115 V AC
- 230 V AC

1) Soft stop not available on 3RW31.

2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

3) For other temperature ratings, see the Industrial Controls catalog CPPC-06000-0806.

Selection of the soft starter depends on the motor's rated current.

The SIRIUS 3RW40 solid-state soft starters are designed for easy starting conditions.  $J_{Load} < 10 \times J_{Motor}$ . In the event of deviating conditions or increased duty cycle, it may be necessary to choose a larger device. Siemens recommends the use of the selection and simulation program Win-SOFTSTARTER.

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# SIRIUS Soft Starters

## High Feature Applications—SIRIUS 3RW44 Soft Starters

Selection

### Overview

#### SIRIUS 3RW44

In addition to soft starting and soft stopping, the solid-state SIRIUS 3RW44 soft starters provide numerous functions for higher-level requirements. They cover a rating range up to 900Hp at 460 V in the inline circuit<sup>1)</sup>.

The SIRIUS 3RW44 soft starters are characterized by a compact design for space-saving and clearly arranged control cabinet layouts. For optimized motor starting and stopping, the innovative SIRIUS 3RW44 soft starters are an attractive alternative with considerable savings potential compared to applications with a frequency converter. The new torque control and adjustable current limiting enable these high feature soft starters to be used in nearly every conceivable task. They reliably mitigate the sudden torque applications and current peaks during motor starting and stopping. This creates savings potential when calculating the size of the controlgear and when servicing the machinery installed. Be it for inline circuits or inside-delta circuits – the SIRIUS 3RW44 soft starter offers savings especially in terms of size and equipment costs.

Combinations of various starting, operating and ramp-down possibilities ensure an optimum adaptation to the application-specific requirements. Operating and commissioning can be performed by means of the user-friendly keypad and a menu-

prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected by means of just a few settings with a previously selected language. Four-key operation and plain-text displays for each menu point guarantee full clarity at every moment of the parameterization and operation.

#### Applicable standards

- IEC 60947-4-2
- UL/CSA #E143112

#### Area of application

The SIRIUS 3RW44 solid-state soft starters are suitable for the torque-controlled soft starting and smooth ramp-down as well as braking of three-phase asynchronous motors.

#### Application areas, e.g.

- Pumps
- Ventilators
- Compressors
- Water transport
- Conveying systems and lifts
- Hydraulics
- Mills
- Saws
- Crushers
- Mixers
- Centrifuges
- Industrial cooling and refrigerating systems

1) Current range available up to 600Hp at 460 V.

### Selection and ordering data



3RW44 27-1BC44



3RW44 36-6BC44



3RW44 47-6BC44



Ambient temperature 50 °C <sup>1)</sup>					Order No.	List Price \$	Approx. weight per PU kg
Rated operating current $I_e$	Rated output of three-phase induction motors for rated operating voltage $U_e$						
A	200 V hp	230 V hp	460 V hp	575 V hp			
<b>Inline circuit, rated operating voltage 200 ... 460 V</b>							
26	7.5	7.5	15	–	3RW44 22-@BC@4	2337.00	4.900
32	10	10	20	–	3RW44 23-@BC@4	2472.00	4.900
42	10	15	25	–	3RW44 24-@BC@4	2494.00	4.900
51	15	15	30	–	3RW44 25-@BC@4	2963.00	4.900
68	20	20	50	–	3RW44 26-@BC@4	3109.00	4.900
82	25	25	60	–	3RW44 27-@BC@4	3735.00	4.900
<b>Order No. extension for connection method</b>					3 1		
• with spring-loaded terminals							
• with screw-type terminals							
100	30	30	75	–	3RW44 34-@BC@4	4406.00	7.900
117	30	40	75	–	3RW44 35-@BC@4	4652.00	7.900
145	40	50	100	–	3RW44 36-@BC@4	6039.00	7.900
180	50	60	125	–	3RW44 43-@BC@4	6565.00	10.300
215	60	75	150	–	3RW44 44-@BC@4	6922.00	10.300
280	75	100	200	–	3RW44 45-@BC@4	7503.00	10.300
315	100	125	250	–	3RW44 46-@BC@4	8342.00	10.300
385	125	150	300	–	3RW44 47-@BC@4	9282.00	10.300
494	150	200	400	–	3RW44 53-@BC@4	10959.00	50.000
551	150	200	450	–	3RW44 54-@BC@4	12580.00	50.000
615	200	250	500	–	3RW44 55-@BC@4	13979.00	50.000
693	200	250	550	–	3RW44 56-@BC@4	15656.00	50.000
780	250	300	600	–	3RW44 57-@BC@4	19570.00	50.000
<b>Order No. extension for connection method</b>					2 6		
• with spring-loaded terminals							
• with screw-type terminals							
<b>Order No. extension for the rated control supply voltage <math>U_s</math></b>					3 4		
• 115 V AC							
• 230 V AC							

1) For other temperature ratings, see technical information in 2006 Industrial Catalog CPPC-06000-0106.

# SIRIUS Soft Starters

## High Feature Applications—SIRIUS 3RW44 Soft Starters

Selection

### Selection and ordering data



3RW44 27-1BC44



3RW44 36-6BC44



3RW44 47-6BC44



Ambient temperature 50 °C <sup>2)</sup>					Order No.	List Price \$	Approx. weight per PU
Rated operating current $I_e$	Rated output of three-phase induction motors for rated operating voltage $U_e$						
A	200 V	230 V	460 V	575 V			
	hp	hp	hp	hp			kg
<b>Inline circuit, rated operating voltage 400 ... 600 V</b>							
26	–	–	15	<b>20</b>	<b>3RW44 22-□BC□5</b>	<b>2695.00</b>	4.900
32	–	–	20	<b>25</b>	<b>3RW44 23-□BC□5</b>	<b>2852.00</b>	4.900
42	–	–	25	<b>30</b>	<b>3RW44 24-□BC□5</b>	<b>2874.00</b>	4.900
51	–	–	30	<b>40</b>	<b>3RW44 25-□BC□5</b>	<b>3410.00</b>	4.900
68	–	–	50	<b>50</b>	<b>3RW44 26-□BC□5</b>	<b>3578.00</b>	4.900
82	–	–	60	<b>75</b>	<b>3RW44 27-□BC□5</b>	<b>4305.00</b>	4.900
<b>Order No. extension for connection method</b>							
• with spring-loaded terminals					3 1		
• with screw-type terminals							
100	–	–	75	<b>75</b>	<b>3RW44 34-□BC□5</b>	<b>5077.00</b>	7.900
117	–	–	75	<b>100</b>	<b>3RW44 35-□BC□5</b>	<b>5356.00</b>	7.900
145	–	–	100	<b>125</b>	<b>3RW44 36-□BC□5</b>	<b>6945.00</b>	7.900
180	–	–	125	<b>150</b>	<b>3RW44 43-□BC□5</b>	<b>7559.00</b>	10.300
215	–	–	150	<b>200</b>	<b>3RW44 44-□BC□5</b>	<b>7962.00</b>	10.300
280	–	–	200	<b>250</b>	<b>3RW44 45-□BC□5</b>	<b>8633.00</b>	10.300
315	–	–	250	<b>300</b>	<b>3RW44 46-□BC□5</b>	<b>9595.00</b>	10.300
385	–	–	300	<b>400</b>	<b>3RW44 47-□BC□5</b>	<b>10680.00</b>	10.300
494	–	–	400	<b>500</b>	<b>3RW44 53-□BC□4</b>	<b>12603.00</b>	50,000
551	–	–	450	<b>550</b>	<b>3RW44 54-□BC□4</b>	<b>14470.00</b>	50,000
615	–	–	500	<b>600</b>	<b>3RW44 55-□BC□4</b>	<b>16081.00</b>	50,000
693	–	–	550	<b>700</b>	<b>3RW44 56-□BC□4</b>	<b>18004.00</b>	50,000
780	–	–	600	<b>800</b>	<b>3RW44 57-□BC□4</b>	<b>22510.00</b>	50,000

### Order No. extension for connection method

- with spring-loaded terminals
- with screw-type terminals

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### Order No. extension for the rated control supply voltage $U_s$ <sup>1)</sup>

- 115 V AC
- 230 V AC

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1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

2) For other temperature ratings, see technical information in the Industrial Controls Catalog CPPC-06000-0803.

Soft starter selection depends on the motor's rated current.

The 3RW44 solid-state soft starters are designed for normal starting (class 10). (Inertia load of the overall operating mechanism  $J_{Load} < 10 \times J_{Motor}$ ; starting current 350 %  $\times I_e$  for 20 s or similar load.) For any other conditions of use, the devices should be selected using the selection and simulation program Win-SOFTSTARTER. See technical specifications for information about rated currents for ambient temperatures > 40 °C and operating frequency.

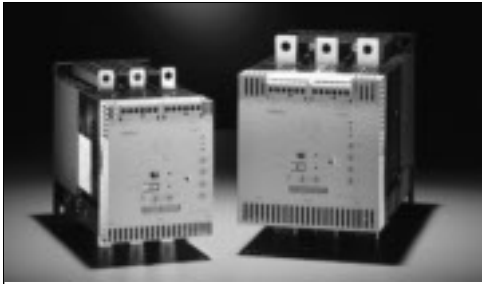
16 CONTROL PRODUCTS

Soft Starter Control

# Control Products

## Enclosed 3RW40

## Selection



### 3RW40 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Voltage ramp up and ramp down
- Current limit adjustment of 125 - 550%
- Internal overload class 10, 15, or 20
- Internal self protection
- Fault monitoring

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW40 is designed for normal starting applications (Class 10 applications).
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 73 non-combination starters include:

- NEMA rated enclosure
- 3RW40 Sirius softstarter with built-in OL and bypass
- Control circuit transformer
- Line side power terminal block
- Reset button

Ideal applications for 3RW40 enclosed softstarters:

- Fans
- Pumps
- Building/construction machines
- Presses
- Escalators
- Transport systems
- Air conditioning systems
- Ventilators
- Assembly lines
- Compressors and chillers

The 3RW40 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 73 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW40 for Standard Applications

### Enclosed Non-Combination (Starter Only)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 10 Light Duty (350% * Ie for 10s) <sup>②</sup>																																																																																																																	
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)		List Price \$		NEMA 3R		List Price \$		NEMA 12		List Price \$		NEMA 4		List Price \$		NEMA 4/4X Stainless Steel		List Price \$																																																																																														
							73AS3_BFA	73AS3_DFA	73AS3_0FA	73AS3_EFA	73AS3_WFA	73BS3_BFA	73BS3_DFA	73BS3_0FA	73BS3_EFA	73BS3_WFA	73CS3_BFA	73CS3_DFA	73CS3_0FA	73CS3_EFA	73CS3_WFA	73DS3_BFA	73DS3_DFA	73DS3_0FA	73DS3_EFA	73DS3_WFA	73ES3_BFA	73ES3_DFA	73ES3_0FA	73ES3_EFA	73ES3_WFA	73FS3_BFA	73FS3_DFA	73FS3_0FA	73FS3_EFA	73FS3_WFA																																																																																			
117	30	40	75	—	56	3RW4055-6BB34	73AS3_BFA	4700.00	73AS3_DFA	4700.00	73AS3_0FA	4700.00	73AS3_EFA	5000.00	73AS3_WFA	5800.00	3RW4056-6BB34	73BS3_BFA	5100.00	73BS3_DFA	5200.00	73BS3_0FA	5100.00	73BS3_EFA	5400.00	73BS3_WFA	6300.00	205	60	75	150	—	112	3RW4073-6BB34	73CS3_BFA	5700.00	73CS3_DFA	5600.00	73CS3_0FA	5700.00	73CS3_EFA	6000.00	73CS3_WFA	6800.00	248	75	100	200	—	149	3RW4074-6BB34	73DS3_BFA	6100.00	73DS3_DFA	6100.00	73DS3_0FA	6100.00	73DS3_EFA	6500.00	73DS3_WFA	7300.00	315	100	125	250	—	186	3RW4075-6BB34	73ES3_BFA	6800.00	73ES3_DFA	6800.00	73ES3_0FA	6800.00	73ES3_EFA	7200.00	73ES3_WFA	7900.00	385	125	150	300	—	224	3RW4076-6BB34	73FS3_BFA	8900.00	73FS3_DFA	8900.00	73FS3_0FA	8900.00	73FS3_EFA	9400.00	73FS3_WFA	11800.00	200V	6	6	6	6	6	230V	2	2	2	2	2	380V	3	3	3	3	3	460V	4	4	4	4	4
117	—	—	75	100	—	3RW4055-6BB35	73AS35BFA	5000.00	73AS35DFA	5100.00	73AS350FA	5000.00	73AS35EFA	5100.00	73AS35WFA	6200.00	145	—	—	100	150	—	3RW4056-6BB35	73BS35BFA	5500.00	73BS35DFA	5600.00	73BS350FA	5500.00	73BS35EFA	5800.00	73BS35WFA	6700.00	205	—	—	150	200	—	3RW4073-6BB35	73CS35BFA	6200.00	73CS35DFA	6200.00	73CS350FA	6200.00	73CS35EFA	6600.00	73CS35WFA	7400.00	248	—	—	200	250	—	3RW4074-6BB35	73DS35BFA	6700.00	73DS35DFA	6600.00	73DS350FA	6700.00	73DS35EFA	7100.00	73DS35WFA	7800.00	315	—	—	250	300	—	3RW4075-6BB35	73ES35BFA	7500.00	73ES35DFA	7200.00	73ES350FA	7500.00	73ES35EFA	7900.00	73ES35WFA	8600.00	385	—	—	300	400	—	3RW4076-6BB35	73FS35BFA	9800.00	73FS35DFA	9800.00	73FS350FA	9800.00	73FS35EFA	10300.00	73FS35WFA	12600.00																		

### Enclosed Non-Combination (Starter Only)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 20 Severe Duty (350% * Ie for 20s) <sup>②</sup>																																																																																																																							
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)		List Price \$		NEMA 3R		List Price \$		NEMA 12		List Price \$		NEMA 4		List Price \$		NEMA 4/4X Stainless Steel		List Price \$																																																																																																				
							73AS3_BFA	73AS3_DFA	73AS3_0FA	73AS3_EFA	73AS3_WFA	73BS3_BFA	73BS3_DFA	73BS3_0FA	73BS3_EFA	73BS3_WFA	73CS3_BFA	73CS3_DFA	73CS3_0FA	73CS3_EFA	73CS3_WFA	73DS3_BFA	73DS3_DFA	73DS3_0FA	73DS3_EFA	73DS3_WFA	73ES3_BFA	73ES3_DFA	73ES3_0FA	73ES3_EFA	73ES3_WFA	73FS3_BFA	73FS3_DFA	73FS3_0FA	73FS3_EFA	73FS3_WFA																																																																																									
112	30	40	75	—	56	3RW4055-6BB34	73AS3_BFA	4700.00	73AS3_DFA	4700.00	73AS3_0FA	4700.00	73AS3_EFA	5000.00	73AS3_WFA	5800.00	132	40	50	100	—	75	3RW4056-6BB34	73BS3_BFA	5100.00	73BS3_DFA	5200.00	73BS3_0FA	5100.00	73BS3_EFA	5400.00	73BS3_WFA	6300.00	185	60	60	125	—	93	3RW4073-6BB34	73CS3_BFA	5700.00	73CS3_DFA	5600.00	73CS3_0FA	5700.00	73CS3_EFA	6000.00	73CS3_WFA	6800.00	205	60	75	150	—	112	3RW4074-6BB34	73DS3_BFA	6100.00	73DS3_DFA	6100.00	73DS3_0FA	6100.00	73DS3_EFA	6500.00	73DS3_WFA	7300.00	280	75	100	200	—	149	3RW4075-6BB34	73ES3_BFA	6800.00	73ES3_DFA	6800.00	73ES3_0FA	6800.00	73ES3_EFA	7200.00	73ES3_WFA	7900.00	340	100	125	250	—	186	3RW4076-6BB34	73FS3_BFA	8900.00	73FS3_DFA	8900.00	73FS3_0FA	8900.00	73FS3_EFA	9400.00	73FS3_WFA	11800.00	200V	6	6	6	6	6	230V	2	2	2	2	2	380V	3	3	3	3	3	460V	4	4	4	4	4
112	—	—	75	75	—	3RW4055-6BB35	73AS35BFA	5000.00	73AS35DFA	5100.00	73AS350FA	5000.00	73AS35EFA	5100.00	73AS35WFA	6200.00	132	—	—	100	125	—	3RW4056-6BB35	73BS35BFA	5500.00	73BS35DFA	5600.00	73BS350FA	5500.00	73BS35EFA	5800.00	73BS35WFA	6700.00	185	—	—	125	150	—	3RW4073-6BB35	73CS35BFA	6200.00	73CS35DFA	6200.00	73CS350FA	6200.00	73CS35EFA	6600.00	73CS35WFA	7400.00	205	—	—	150	200	—	3RW4074-6BB35	73DS35BFA	6700.00	73DS35DFA	6600.00	73DS350FA	6700.00	73DS35EFA	7100.00	73DS35WFA	7800.00	280	—	—	200	250	—	3RW4075-6BB35	73ES35BFA	7500.00	73ES35DFA	7200.00	73ES350FA	7500.00	73ES35EFA	7900.00	73ES35WFA	8600.00	340	—	—	250	300	—	3RW4076-6BB35	73FS35BFA	9800.00	73FS35DFA	9800.00	73FS350FA	9800.00	73FS35EFA	10300.00	73FS35WFA	12600.00																								

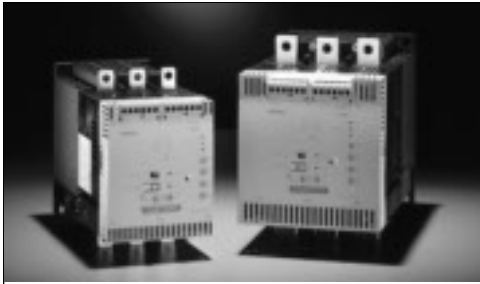
① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. Ie = FLA rating of motor.

# Control Products

## Enclosed 3RW40

## Selection



### 3RW40 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Voltage ramp up and ramp down
- Current limit adjustment of 125 - 550%
- Internal overload class 10, 15, or 20
- Internal self protection
- Fault monitoring

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW40 is designed for normal starting applications (Class 10 applications).
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 non-combination starters include:

- NEMA rated enclosure
- Circuit breaker disconnect with shunt trip
- 3RW40 Sirius softstarter with built-in OL and bypass
- Control circuit transformer

Ideal applications for 3RW40 enclosed softstarters:

- Fans
- Pumps
- Building/construction machines
- Presses
- Escalators
- Transport systems
- Air conditioning systems
- Ventilators
- Assembly lines
- Compressors and chillers

The 3RW40 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW40 for Standard Applications

### Enclosed Circuit Breaker Combination (Starter with Circuit Breaker Disconnect)

Rated Operating Current	MAX HP <sup>①</sup>				KW 380V	Class 10 Light Duty (350% * Ie for 10s) <sup>②</sup>										
	200V	230V	460V	575V		OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel	List Price \$
	117	30	40	75		—	56	3RW4055-6BB34	74AS3_BFAP	6300.00	74AS3_DFAP	6300.00	74AS3_OFAP	6300.00	74AS3_EFAP	6700.00
145	40	50	100	—	75	3RW4056-6BB34	74BS3_BFAP	6900.00	74BS3_DFAP	6900.00	74BS3_OFAP	6900.00	74BS3_EFAP	7300.00	74BS3_WFAP	10100.00
205	60	75	150	—	112	3RW4073-6BB34	74CS3_BFAP	8100.00	74CS3_DFAP	8100.00	74CS3_OFAP	8100.00	74CS3_EFAP	8600.00		
248	75	100	200	—	149	3RW4074-6BB34	74DS3_BFAP	8500.00	74DS3_DFAP	8500.00	74DS3_OFAP	8500.00	74DS3_EFAP	9000.00		
315	100	125	250	—	186	3RW4075-6BB34	74ES3_BFAP	10700.00	74ES3_DFAP	10700.00	74ES3_OFAP	10700.00	74ES3_EFAP	11300.00		
385	125	150	300	—	224	3RW4076-6BB34	74FS3_BFAP	12200.00	74FS3_DFAP	12200.00	74FS3_OFAP	12200.00	74FS3_EFAP	12900.00		
						200V	6		6		6		6		6	
						230V	2		2		2		2		2	
						380V	3		3		3		3		3	
						460V	4		4		4		4		4	
117	—	—	75	100	—	3RW4055-6BB35	74AS35BFAP	6700.00	74AS35DFAP	6600.00	74AS35OFAP	6600.00	74AS35EFAP	7000.00	74AS35WFAP	9900.00
145	—	—	100	150	—	3RW4056-6BB35	74BS35BFAP	7300.00	74BS35DFAP	7300.00	74BS35OFAP	7300.00	74BS35EFAP	7700.00	74BS35WFAP	10600.00
205	—	—	150	200	—	3RW4073-6BB35	74CS35BFAP	8300.00	74CS35DFAP	8600.00	74CS35OFAP	8600.00	74CS35EFAP	9100.00		
248	—	—	200	250	—	3RW4074-6BB35	74DS35BFAP	9100.00	74DS35DFAP	9000.00	74DS35OFAP	9000.00	74DS35EFAP	9500.00		
315	—	—	250	300	—	3RW4075-6BB35	74ES35BFAP	11400.00	74ES35DFAP	11400.00	74ES35OFAP	11400.00	74ES35EFAP	12000.00		
385	—	—	300	400	—	3RW4076-6BB35	74FS35BFAP	12200.00	74FS35DFAP	12200.00	74FS35OFAP	12200.00	74FS35EFAP	13800.00		

### Enclosed Circuit Breaker Combination (Starter with Circuit Breaker Disconnect)

Rated Operating Current	MAX HP <sup>①</sup>				KW 380V	Class 20 Severe Duty (350% * Ie for 20s) <sup>②</sup>										
	200V	230V	460V	575V		OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel	List Price \$
	112	30	40	75		—	56	3RW4055-6BB34	74AS3_BFAP	6300.00	74AS3_DFAP	6300.00	74AS3_OFAP	6300.00	74AS3_EFAP	6700.00
132	40	50	100	—	75	3RW4056-6BB34	74BS3_BFAP	6900.00	74BS3_DFAP	6900.00	74BS3_OFAP	6900.00	74BS3_EFAP	7300.00	74BS3_WFAP	10100.00
185	60	60	125	—	93	3RW4073-6BB34	74CS3_BFAP	8100.00	74CS3_DFAP	8100.00	74CS3_OFAP	8100.00	74CS3_EFAP	8600.00		
205	60	75	150	—	112	3RW4074-6BB34	74DS3_BFAP	8500.00	74DS3_DFAP	8500.00	74DS3_OFAP	8500.00	74DS3_EFAP	9000.00		
280	75	100	200	—	149	3RW4075-6BB34	74ES3_BFAP	10700.00	74ES3_DFAP	10700.00	74ES3_OFAP	10700.00	74ES3_EFAP	11300.00		
340	100	125	250	—	186	3RW4076-6BB34	74FS3_BFAP	12200.00	74FS3_DFAP	12200.00	74FS3_OFAP	12200.00	74FS3_EFAP	12900.00		
						200V	6		6		6		6		6	
						230V	2		2		2		2		2	
						380V	3		3		3		3		3	
						460V	4		4		4		4		4	
112	—	—	75	75	—	3RW4055-6BB35	74AS35BFAP	6700.00	74AS35DFAP	6600.00	74AS35OFAP	6600.00	74AS35EFAP	7000.00	74AS35WFAP	9900.00
132	—	—	100	125	—	3RW4056-6BB35	74BS35BFAP	7300.00	74BS35DFAP	7300.00	74BS35OFAP	7300.00	74BS35EFAP	7700.00	74BS35WFAP	10600.00
185	—	—	125	150	—	3RW4073-6BB35	74CS35BFAP	8300.00	74CS35DFAP	8600.00	74CS35OFAP	8600.00	74CS35EFAP	9100.00		
205	—	—	150	200	—	3RW4074-6BB35	74DS35BFAP	9100.00	74DS35DFAP	9000.00	74DS35OFAP	9000.00	74DS35EFAP	9500.00		
280	—	—	200	250	—	3RW4075-6BB35	74ES35BFAP	11400.00	74ES35DFAP	11400.00	74ES35OFAP	11400.00	74ES35EFAP	12000.00		
340	—	—	250	300	—	3RW4076-6BB35	74FS35BFAP	12200.00	74FS35DFAP	12200.00	74FS35OFAP	12200.00	74FS35EFAP	13800.00		

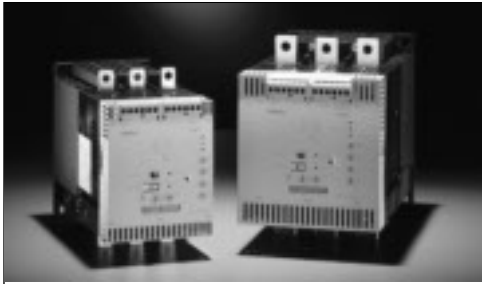
① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. Ie = FLA rating of motor.

# Control Products

## Enclosed 3RW40

## Selection



### 3RW40 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Voltage ramp up and ramp down
- Current limit adjustment of 125 - 550%
- Internal overload class 10, 15, or 20
- Internal self protection
- Fault monitoring

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW40 is designed for normal starting applications (Class 10 applications).
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 combination starters include:

- NEMA rated enclosure
- Fusible disconnect
- 3RW40 Sirius softstarter with built-in OL and bypass
- Control circuit transformer

Ideal applications for 3RW40 enclosed softstarters:

- Fans
- Pumps
- Building/construction machines
- Presses
- Escalators
- Transport systems
- Air conditioning systems
- Ventilators
- Assembly lines
- Compressors and chillers

The 3RW40 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW40 for Standard Applications

### Enclosed Fusible Combination (Starter with Fusible Disconnect)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 10 Light Duty (350% * Ie for 10s) <sup>②</sup>											
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel	List Price \$
117	30	40	75	—	56	3RW4055-6BB34	74AS3_BFAF	5700.00	74AS3_DFAF	5700.00	74AS3_OFAP	5700.00	74AS3_EFAP	6000.00	74AS3_WFAF	8900.00	
145	40	50	100	—	75	3RW4056-6BB34	74BS3_BFAF	7200.00	74BS3_DFAF	7200.00	74BS3_OFAP	7200.00	74BS3_EFAP	7600.00	74BS3_WFAF	10400.00	
205	60	75	150	—	112	3RW4073-6BB34	74CS3_BFAF	8300.00	74CS3_DFAF	8200.00	74CS3_OFAP	8200.00	74CS3_EFAP	8700.00			
248	75	100	200	—	149	3RW4074-6BB34	74DS3_BFAF	8700.00	74DS3_DFAF	8700.00	74DS3_OFAP	8700.00	74DS3_EFAP	9200.00			
315	100	125	250	—	186	3RW4075-6BB34	74ES3_BFAF	10900.00	74ES3_DFAF	10900.00	74ES3_OFAP	10900.00	74ES3_EFAP	11500.00			
385	125	150	300	—	224	3RW4076-6BB34	74FS3_BFAF	12300.00	74FS3_DFAF	12400.00	74FS3_OFAP	12300.00	74FS3_EFAP	13000.00			
						200V	6		6		6		6		6		
						230V	2		2		2		2		2		
						380V	3		3		3		3		3		
						460V	4		4		4		4		4		
117	—	—	75	100	—	3RW4055-6BB35	74AS35BFAF	6100.00	74AS35DFAF	6000.00	74AS350FAF	6100.00	74AS35EFAP	6300.00	74AS35WFAF	9300.00	
145	—	—	100	150	—	3RW4056-6BB35	74BS35BFAF	7700.00	74BS35DFAF	7600.00	74BS350FAF	7700.00	74BS35EFAP	8000.00	74BS35WFAF	10900.00	
205	—	—	150	200	—	3RW4073-6BB35	74CS35BFAF	8500.00	74CS35DFAF	8800.00	74CS350FAF	8800.00	74CS35EFAP	9300.00			
248	—	—	200	250	—	3RW4074-6BB35	74DS35BFAF	9200.00	74DS35DFAF	9200.00	74DS350FAF	9200.00	74DS35EFAP	9700.00			
315	—	—	250	300	—	3RW4075-6BB35	74ES35BFAF	11600.00	74ES35DFAF	11600.00	74ES350FAF	11600.00	74ES35EFAP	12200.00			
385	—	—	300	400	—	3RW4076-6BB35	74FS35BFAF	12200.00	74FS35DFAF	12200.00	74FS350FAF	12200.00	74FS35EFAP	13900.00			

### Enclosed Fusible Combination (Starter with Fusible Disconnect)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 20 Severe Duty (350% * Ie for 20s) <sup>②</sup>											
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel	List Price \$
112	30	40	75	—	56	3RW4055-6BB34	74AS3_BFAF	5700.00	74AS3_DFAF	5700.00	74AS3_OFAP	5700.00	74AS3_EFAP	6000.00	74AS3_WFAF	8900.00	
132	40	50	100	—	75	3RW4056-6BB34	74BS3_BFAF	7200.00	74BS3_DFAF	7200.00	74BS3_OFAP	7200.00	74BS3_EFAP	7600.00	74BS3_WFAF	10400.00	
185	60	60	125	—	93	3RW4073-6BB34	74CS3_BFAF	8300.00	74CS3_DFAF	8200.00	74CS3_OFAP	8200.00	74CS3_EFAP	8700.00			
205	60	75	150	—	112	3RW4074-6BB34	74DS3_BFAF	8700.00	74DS3_DFAF	8700.00	74DS3_OFAP	8700.00	74DS3_EFAP	9200.00			
280	75	100	200	—	149	3RW4075-6BB34	74ES3_BFAF	10900.00	74ES3_DFAF	10900.00	74ES3_OFAP	10900.00	74ES3_EFAP	11500.00			
340	100	125	250	—	186	3RW4076-6BB34	74FS3_BFAF	12300.00	74FS3_DFAF	12400.00	74FS3_OFAP	12300.00	74FS3_EFAP	13000.00			
						200V	6		6		6		6		6		
						230V	2		2		2		2		2		
						380V	3		3		3		3		3		
						460V	4		4		4		4		4		
112	—	—	75	75	—	3RW4055-6BB35	74AS35BFAF	6100.00	74AS35DFAF	6000.00	74AS350FAF	6100.00	74AS35EFAP	6300.00	74AS35WFAF	9300.00	
132	—	—	100	125	—	3RW4056-6BB35	74BS35BFAF	7700.00	74BS35DFAF	7600.00	74BS350FAF	7700.00	74BS35EFAP	8000.00	74BS35WFAF	10900.00	
185	—	—	125	150	—	3RW4073-6BB35	74CS35BFAF	8500.00	74CS35DFAF	8800.00	74CS350FAF	8800.00	74CS35EFAP	9300.00			
205	—	—	150	200	—	3RW4074-6BB35	74DS35BFAF	9200.00	74DS35DFAF	9200.00	74DS350FAF	9200.00	74DS35EFAP	9700.00			
280	—	—	200	250	—	3RW4075-6BB35	74ES35BFAF	11600.00	74ES35DFAF	11600.00	74ES350FAF	11600.00	74ES35EFAP	12200.00			
340	—	—	250	300	—	3RW4076-6BB35	74FS35BFAF	12200.00	74FS35DFAF	12200.00	74FS350FAF	12200.00	74FS35EFAP	13900.00			

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. Ie = FLA rating of motor.



# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 5, 10, 15, 20, or 30
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 73 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Control circuit transformer

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 73 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Non-Combination (Starter Only)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 10 Light Duty (350% * I <sub>e</sub> for 10s) <sup>②</sup>										
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)		List Price \$	List Price \$		List Price \$	List Price \$	NEMA 4/4X Stainless Steel		List Price \$
								NEMA 1	NEMA 3R	NEMA 12	NEMA 4					
26	7.5	7.5	15	—	12	3RW4422-1BC34	73AT3_BFA	3800.00	73AT3_DFA	3700.00	73AT3_OFA	3800.00	73AT3_EFA	3900.00	73AT3_WFA	4200.00
32	10	10	20	—	15	3RW4423-1BC34	73BT3_BFA	4000.00	73BT3_DFA	3900.00	73BT3_OFA	4000.00	73BT3_EFA	4200.00	73BT3_WFA	4400.00
42	10	15	25	—	19	3RW4424-1BC34	73CT3_BFA	4300.00	73CT3_DFA	4300.00	73CT3_OFA	4300.00	73CT3_EFA	4600.00	73CT3_WFA	4800.00
51	15	15	30	—	22	3RW4425-1BC34	73DT3_BFA	4600.00	73DT3_DFA	4500.00	73DT3_OFA	4600.00	73DT3_EFA	4900.00	73DT3_WFA	5000.00
68	20	25	50	—	37	3RW4426-1BC34	73ET3_BFA	4800.00	73ET3_DFA	4800.00	73ET3_OFA	4800.00	73ET3_EFA	5100.00	73ET3_WFA	5200.00
82	25	30	60	—	45	3RW4427-1BC34	73FT3_BFA	5200.00	73FT3_DFA	5300.00	73FT3_OFA	5200.00	73FT3_EFA	5500.00	73FT3_WFA	6400.00
100	30	30	75	—	56	3RW4434-6BC34	73GT3_BFA	6100.00	73GT3_DFA	6100.00	73GT3_OFA	6000.00	73GT3_EFA	6300.00	73GT3_WFA	7100.00
117	30	40	75	—	56	3RW4435-6BC34	73HT3_BFA	6800.00	73HT3_DFA	6800.00	73HT3_OFA	6700.00	73HT3_EFA	7100.00	73HT3_WFA	7900.00
145	40	50	100	—	75	3RW4436-6BC34	73JT3_BFA	7600.00	73JT3_DFA	7600.00	73JT3_OFA	7600.00	73JT3_EFA	8000.00	73JT3_WFA	8700.00
180	60	60	125	—	93	3RW4443-6BC34	73KT3_BFA	8800.00	73KT3_DFA	8800.00	73KT3_OFA	8800.00	73KT3_EFA	9300.00	73KT3_WFA	9900.00
215	60	75	150	—	112	3RW4444-6BC34	73LT3_BFA	9600.00	73LT3_DFA	9600.00	73LT3_OFA	9600.00	73LT3_EFA	10100.00	73LT3_WFA	10800.00
280	75	100	200	—	149	3RW4445-6BC34	73MT3_BFA	11900.00	73MT3_DFA	11800.00	73MT3_OFA	11800.00	73MT3_EFA	12400.00	73MT3_WFA	14700.00
315	100	125	250	—	186	3RW4446-6BC34	73NT3_BFA	13300.00	73NT3_DFA	13300.00	73NT3_OFA	13300.00	73NT3_EFA	13900.00	73NT3_WFA	16100.00
385	125	150	300	—	224	3RW4447-6BC34	73PT3_BFA	15000.00	73PT3_DFA	14900.00	73PT3_OFA	14900.00	73PT3_EFA	15700.00	73PT3_WFA	17800.00
494	150	200	400	—	298	3RW4453-6BC34	73QT_BFA		73QT_DFA		73QT_OFA		73QT_EFA			
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFA		73RT_DFA		73RT_OFA		73RT_EFA			
615	200	250	500	—	373	3RW4455-6BC34	73ST_BFA		73ST_DFA		73ST_OFA		73ST_EFA			
693	200	250	550	—		3RW4456-6BC34	73TT_BFA		73TT_DFA		73TT_OFA		73TT_EFA			
780	200	250	600	—	447	3RW4457-6BC34	73WT_BFA		73WT_DFA		73WT_OFA		73WT_EFA			
						200V	6	6	6	6	6	6	6	6	6	6
						230V	2	2	2	2	2	2	2	2	2	2
						380V	3	3	3	3	3	3	3	3	3	3
						460V	4	4	4	4	4	4	4	4	4	4
26	—	—	15	20	—	3RW4422-1BC35	73AT35BFA	4000.00	73AT35DFA	4000.00	73AT35OFA	4000.00	73AT35EFA	4200.00	73AT35WFA	4400.00
32	—	—	20	25	—	3RW4423-1BC35	73BT35BFA	4300.00	73BT35DFA	4300.00	73BT35OFA	4300.00	73BT35EFA	4600.00	73BT35WFA	4700.00
42	—	—	25	30	—	3RW4424-1BC35	73CT35BFA	4700.00	73CT35DFA	4600.00	73CT35OFA	4700.00	73CT35EFA	5000.00	73CT35WFA	5100.00
51	—	—	30	40	—	3RW4425-1BC35	73DT35BFA	5000.00	73DT35DFA	4900.00	73DT35OFA	4900.00	73DT35EFA	5300.00	73DT35WFA	5400.00
68	—	—	50	50	—	3RW4426-1BC35	73ET35BFA	5300.00	73ET35DFA	5200.00	73ET35OFA	5300.00	73ET35EFA	5600.00	73ET35WFA	5700.00
82	—	—	60	75	—	3RW4427-1BC35	73FT35BFA	5700.00	73FT35DFA	5800.00	73FT35OFA	5700.00	73FT35EFA	6000.00	73FT35WFA	6900.00
100	—	—	75	75	—	3RW4434-6BC35	73GT35BFA	6600.00	73GT35DFA	6700.00	73GT35OFA	6600.00	73GT35EFA	7000.00	73GT35WFA	7700.00
117	—	—	75	100	—	3RW4435-6BC35	73HT35BFA	7400.00	73HT35DFA	7500.00	73HT35OFA	7400.00	73HT35EFA	7800.00	73HT35WFA	8500.00
145	—	—	100	125	—	3RW4436-6BC35	73JT35BFA	8400.00	73JT35DFA	8400.00	73JT35OFA	8400.00	73JT35EFA	8900.00	73JT35WFA	9500.00
180	—	—	125	150	—	3RW4443-6BC35	73KT35BFA	9700.00	73KT35DFA	9600.00	73KT35OFA	9700.00	73KT35EFA	10200.00	73KT35WFA	10800.00
215	—	—	150	200	—	3RW4444-6BC35	73LT35BFA	10700.00	73LT35DFA	10600.00	73LT35OFA	10700.00	73LT35EFA	11300.00	73LT35WFA	11800.00
280	—	—	200	250	—	3RW4445-6BC35	73MT35BFA	13100.00	73MT35DFA	13100.00	73MT35OFA	13100.00	73MT35EFA	13800.00	73MT35WFA	16000.00
315	—	—	250	300	—	3RW4446-6BC35	73NT35BFA	14800.00	73NT35DFA	14700.00	73NT35OFA	14700.00	73NT35EFA	15500.00	73NT35WFA	17600.00
385	—	—	300	400	—	3RW4447-6BC35	73PT35BFA	16600.00	73PT35DFA	16600.00	73PT35OFA	16600.00	73PT35EFA	17500.00	73PT35WFA	19500.00
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFA		73QT35DFA		73QT35OFA		73QT35EFA			
551	—	—	450	600	—	3RW4454-6BC35	73RT35BFA		73RT35DFA		73RT35OFA		73RT35EFA			
615	—	—	500	700	—	3RW4455-6BC35	73ST35BFA		73ST35DFA		73ST35OFA		73ST35EFA			
693	—	—	550	750	—	3RW4456-6BC35	73TT35BFA		73TT35DFA		73TT35OFA		73TT35EFA			
780	—	—	600	850	—	3RW4457-6BC35	73WT35BFA		73WT35DFA		73WT35OFA		73WT35EFA			

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. I<sub>e</sub> = FLA rating of motor.

# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 10, 15, or 20
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 73 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Control circuit transformer
- Line side power terminal block
- Reset button

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 73 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Non-Combination (Starter Only)

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 20 Severe Duty (350% * Ie for 20s) <sup>②</sup>										
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel
26	7.5	7.5	15	—	12	3RW4422-1BC34	73AT3_BFA	3800.00	73AT3_DFA	3700.00	73AT3_OFA	3800.00	73AT3_EFA	3900.00	73AT3_WFA	4200.00
32	10	10	20	—	15	3RW4423-1BC34	73BT3_BFA	4000.00	73BT3_DFA	3900.00	73BT3_OFA	4000.00	73BT3_EFA	4200.00	73BT3_WFA	4400.00
42	10	15	25	—	19	3RW4424-1BC34	73CT3_BFA	4300.00	73CT3_DFA	4300.00	73CT3_OFA	4300.00	73CT3_EFA	4600.00	73CT3_WFA	4800.00
51	15	15	30	—	22	3RW4425-1BC34	73DT3_BFA	4600.00	73DT3_DFA	4500.00	73DT3_OFA	4600.00	73DT3_EFA	4900.00	73DT3_WFA	5000.00
68	20	25	50	—	37	3RW4426-1BC34	73ET3_BFA	4800.00	73ET3_DFA	4800.00	73ET3_OFA	4800.00	73ET3_EFA	5100.00	73ET3_WFA	5200.00
82	25	30	60	—	45	3RW4427-1BC34	73FT3_BFA	5200.00	73FT3_DFA	5300.00	73FT3_OFA	5200.00	73FT3_EFA	5500.00	73FT3_WFA	6400.00
97	30	30	60	—	45	3RW4434-6BC34	73GT3_BFA	6100.00	73GT3_DFA	6100.00	73GT3_OFA	6000.00	73GT3_EFA	6300.00	73GT3_WFA	7100.00
113	30	40	75	—	56	3RW4435-6BC34	73HT3_BFA	6800.00	73HT3_DFA	6800.00	73HT3_OFA	6700.00	73HT3_EFA	7100.00	73HT3_WFA	7900.00
134	40	50	75	—	56	3RW4436-6BC34	73JT3_BFA	7600.00	73JT3_DFA	7600.00	73JT3_OFA	7600.00	73JT3_EFA	8000.00	73JT3_WFA	8700.00
175	50	60	100	—	75	3RW4443-6BC34	73KT3_BFA	8800.00	73KT3_DFA	8800.00	73KT3_OFA	8800.00	73KT3_EFA	9300.00	73KT3_WFA	9900.00
195	60	75	125	—	93	3RW4444-6BC34	73LT3_BFA	9600.00	73LT3_DFA	9600.00	73LT3_OFA	9600.00	73LT3_EFA	10100.00	73LT3_WFA	10800.00
243	75	75	150	—	112	3RW4445-6BC34	73MT3_BFA	11900.00	73MT3_DFA	11800.00	73MT3_OFA	11800.00	73MT3_EFA	12400.00	73MT3_WFA	14700.00
263	75	100	200	—	149	3RW4446-6BC34	73NT3_BFA	13300.00	73NT3_DFA	13300.00	73NT3_OFA	13300.00	73NT3_EFA	13900.00	73NT3_WFA	16100.00
326	100	125	250	—	186	3RW4447-6BC34	73PT3_BFA	15000.00	73PT3_DFA	14900.00	73PT3_OFA	14900.00	73PT3_EFA	15700.00	73PT3_WFA	17800.00
494	150	150	400	—	298	3RW4453-6BC34	73QT_BFA		73QT_DFA		73QT_OFA		73QT_EFA			
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFA		73RT_DFA		73RT_OFA		73RT_EFA			
615	200	200	500	—	373	3RW4455-6BC34	73ST_BFA		73ST_DFA		73ST_OFA		73ST_EFA			
634	200	250	500	—	373	3RW4456-6BC34	73TT_BFA		73TT_DFA		73TT_OFA		73TT_EFA			
650	200	250	550	—	373	3RW4457-6BC34	73WT_BFA		73WT_DFA		73WT_OFA		73WT_EFA			
						200V	6		6		6		6		6	
						230V	2		2		2		2		2	
						380V	3		3		3		3		3	
						460V	4		4		4		4		4	
26	—	—	15	20	—	3RW4422-1BC35	73AT35BFA	4000.00	73AT35DFA	4000.00	73AT35OFA	4000.00	73AT35EFA	4200.00	73AT35WFA	4400.00
32	—	—	20	25	—	3RW4423-1BC35	73BT35BFA	4300.00	73BT35DFA	4300.00	73BT35OFA	4300.00	73BT35EFA	4600.00	73BT35WFA	4700.00
42	—	—	25	30	—	3RW4424-1BC35	73CT35BFA	4700.00	73CT35DFA	4600.00	73CT35OFA	4700.00	73CT35EFA	5000.00	73CT35WFA	5100.00
51	—	—	30	40	—	3RW4425-1BC35	73DT35BFA	5000.00	73DT35DFA	4900.00	73DT35OFA	4900.00	73DT35EFA	5000.00	73DT35WFA	5400.00
68	—	—	50	50	—	3RW4426-1BC35	73ET35BFA	5300.00	73ET35DFA	5200.00	73ET35OFA	5300.00	73ET35EFA	5600.00	73ET35WFA	5700.00
82	—	—	60	75	—	3RW4427-1BC35	73FT35BFA	5700.00	73FT35DFA	5800.00	73FT35OFA	5700.00	73FT35EFA	6000.00	73FT35WFA	6900.00
97	—	—	60	75	—	3RW4434-6BC35	73GT35BFA	6600.00	73GT35DFA	6700.00	73GT35OFA	6600.00	73GT35EFA	7000.00	73GT35WFA	7700.00
113	—	—	75	100	—	3RW4444-6BC35	73HT35BFA	7400.00	73HT35DFA	7500.00	73HT35OFA	7400.00	73HT35EFA	7800.00	73HT35WFA	8500.00
134	—	—	75	125	—	3RW4436-6BC35	73JT35BFA	8400.00	73JT35DFA	8400.00	73JT35OFA	8400.00	73JT35EFA	8900.00	73JT35WFA	9500.00
175	—	—	100	150	—	3RW4443-6BC35	73KT35BFA	9700.00	73KT35DFA	9600.00	73KT35OFA	9700.00	73KT35EFA	10200.00	73KT35WFA	10800.00
195	—	—	125	200	—	3RW4444-6BC35	73LT35BFA	10700.00	73LT35DFA	10600.00	73LT35OFA	10700.00	73LT35EFA	11300.00	73LT35WFA	11800.00
243	—	—	150	200	—	3RW4445-6BC35	73MT35BFA	13100.00	73MT35DFA	13100.00	73MT35OFA	13100.00	73MT35EFA	13800.00	73MT35WFA	16000.00
263	—	—	200	250	—	3RW4446-6BC35	73NT35BFA	14800.00	73NT35DFA	14700.00	73NT35OFA	14700.00	73NT35EFA	15500.00	73NT35WFA	17600.00
326	—	—	250	300	—	3RW4447-6BC35	73PT35BFA	16600.00	73PT35DFA	16600.00	73PT35OFA	16600.00	73PT35EFA	17500.00	73PT35WFA	19500.00
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFA		73QT35DFA		73QT35OFA		73QT35EFA			
551	—	—	450	550	—	3RW4454-6BC35	73RT35BFA		73RT35DFA		73RT35OFA		73RT35EFA			
615	—	—	500	600	—	3RW4455-6BC35	73ST35BFA		73ST35DFA		73ST35OFA		73ST35EFA			
634	—	—	550	650	—	3RW4456-6BC35	73TT35BFA		73TT35DFA		73TT35OFA		73TT35EFA			
780	—	—	600	700	—	3RW4457-6BC35	73WT35BFA		73WT35DFA		73WT35OFA		73WT35EFA			

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. Ie = FLA rating of motor.

# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 5, 10, 15, 20, or 30
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Circuit breaker with disconnect
- Control circuit transformer
- Reset button

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Combination with Circuit Breaker Disconnect

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 10 Light Duty (350% * I <sub>e</sub> for 10s) <sup>②</sup>											
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)	NEMA 1	List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel	List Price \$
26	7.5	7.5	15	—	12	3RW4422-1BC34	74AT3_BFAP	4700.00	74AT3_DFAP	4700.00	74AT3_OFAP	4700.00	74AT3_EFAP	5000.00	74AT3_WFAP	5700.00	
32	10	10	20	—	15	3RW4423-1BC34	74BT3_BFAP	4900.00	74BT3_DFAP	4900.00	74BT3_OFAP	4900.00	74BT3_EFAP	5200.00	74BT3_WFAP	5900.00	
42	10	15	25	—	19	3RW4424-1BC34	74CT3_BFAP	5000.00	74CT3_DFAP	5000.00	74CT3_OFAP	5000.00	74CT3_EFAP	5300.00	74CT3_WFAP	6000.00	
51	15	15	30	—	22	3RW4425-1BC34	74DT3_BFAP	5500.00	74DT3_DFAP	5500.00	74DT3_OFAP	5500.00	74DT3_EFAP	5800.00	74DT3_WFAP	7100.00	
68	20	25	50	—	37	3RW4426-1BC34	74ET3_BFAP	5800.00	74ET3_DFAP	5800.00	74ET3_OFAP	5800.00	74ET3_EFAP	6100.00	74ET3_WFAP	7300.00	
82	25	30	60	—	45	3RW4427-1BC34	74FT3_BFAP	6400.00	74FT3_DFAP	6400.00	74FT3_OFAP	6400.00	74FT3_EFAP	6800.00	74FT3_WFAP	7700.00	
100	30	30	75	—	56	3RW4434-6BC34	74GT3_BFAP	6800.00	74GT3_DFAP	6800.00	74GT3_OFAP	6800.00	74GT3_EFAP	7200.00	74GT3_WFAP	8100.00	
117	30	40	75	—	56	3RW4435-6BC34	74HT3_BFAP	7900.00	74HT3_DFAP	7900.00	74HT3_OFAP	7900.00	74HT3_EFAP	8300.00	74HT3_WFAP	11100.00	
145	40	50	100	—	75	3RW4436-6BC34	74JT3_BFAP	8400.00	74JT3_DFAP	8400.00	74JT3_OFAP	8400.00	74JT3_EFAP	8900.00	74JT3_WFAP	11300.00	
180	60	60	125	—	93	3RW4443-6BC34	74KT3_BFAP	10300.00	74KT3_DFAP	10300.00	74KT3_OFAP	10300.00	74KT3_EFAP	10900.00			
215	60	75	150	—	112	3RW4444-6BC34	74LT3_BFAP	11400.00	74LT3_DFAP	11400.00	74LT3_OFAP	11400.00	74LT3_EFAP	12000.00			
280	75	100	200	—	149	3RW4445-6BC34	74MT3_BFAP	14500.00	74MT3_DFAP	14500.00	74MT3_OFAP	14500.00	74MT3_EFAP	15300.00			
315	100	125	250	—	186	3RW4446-6BC34	74NT3_BFAP	16000.00	74NT3_DFAP	16100.00	74NT3_OFAP	16100.00	74NT3_EFAP	16800.00			
385	125	150	300	—	224	3RW4447-6BC34	74PT3_BFAP	17600.00	74PT3_DFAP	17700.00	74PT3_OFAP	17600.00	74PT3_EFAP	18500.00			
494	150	200	400	—	298	3RW4453-6BC34	73QT_BFAP		73QT_DFAP		73QT_OFAP		73QT_EFAP				
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFAP		73RT_DFAP		73RT_OFAP		73RT_EFAP				
615	200	250	500	—	373	3RW4455-6BC34	73ST_BFAP		73ST_DFAP		73ST_OFAP		73ST_EFAP				
693	200	250	550	—		3RW4456-6BC34	73TT_BFAP		73TT_DFAP		73TT_OFAP		73TT_EFAP				
780	200	250	600	—	447	3RW4457-6BC34	73WT_BFAP		73WT_DFAP		73WT_OFAP		73WT_EFAP				
						200V	6		6		6		6				
						230V	2		2		2		2				
						380V	3		3		3		3				
						460V	4		4		4		4				
26	—	—	15	20	—	3RW4422-1BC35	74AT35BFAP	5000.00	74AT35DFAP	5000.00	74AT35OFAP	5000.00	74AT35EFAP	5300.00	74AT35WFAP	6000.00	
32	—	—	20	25	—	3RW4423-1BC35	74BT35BFAP	5200.00	74BT35DFAP	5200.00	74BT35OFAP	5200.00	74BT35EFAP	5600.00	74BT35WFAP	6200.00	
42	—	—	25	30	—	3RW4424-1BC35	74CT35BFAP	5400.00	74CT35DFAP	5300.00	74CT35OFAP	5300.00	74CT35EFAP	5700.00	74CT35WFAP	6300.00	
51	—	—	30	40	—	3RW4425-1BC35	74DT35BFAP	5900.00	74DT35DFAP	5900.00	74DT35OFAP	5900.00	74DT35EFAP	6200.00	74DT35WFAP	7500.00	
68	—	—	50	50	—	3RW4426-1BC35	74ET35BFAP	6300.00	74ET35DFAP	6200.00	74ET35OFAP	6200.00	74ET35EFAP	6600.00	74ET35WFAP	7800.00	
82	—	—	60	75	—	3RW4427-1BC35	74FT35BFAP	6900.00	74FT35DFAP	6900.00	74FT35OFAP	6900.00	74FT35EFAP	7300.00	74FT35WFAP	8100.00	
100	—	—	75	75	—	3RW4434-6BC35	74GT35BFAP	7400.00	74GT35DFAP	7400.00	74GT35OFAP	7300.00	74GT35EFAP	7800.00	74GT35WFAP	8600.00	
117	—	—	75	100	—	3RW4435-6BC35	74HT35BFAP	8500.00	74HT35DFAP	8500.00	74HT35OFAP	8500.00	74HT35EFAP	9000.00	74HT35WFAP	11800.00	
145	—	—	100	125	—	3RW4436-6BC35	74JT35BFAP	9100.00	74JT35DFAP	9200.00	74JT35OFAP	9200.00	74JT35EFAP	9400.00	74JT35WFAP	12100.00	
180	—	—	125	150	—	3RW4443-6BC35	74KT35BFAP	11200.00	74KT35DFAP	11200.00	74KT35OFAP	11200.00	74KT35EFAP	11800.00			
215	—	—	150	200	—	3RW4444-6BC35	74LT35BFAP	12500.00	74LT35DFAP	12500.00	74LT35OFAP	12500.00	74LT35EFAP	13200.00			
280	—	—	200	250	—	3RW4445-6BC35	74MT35BFAP	15800.00	74MT35DFAP	15800.00	74MT35OFAP	15800.00	74MT35EFAP	16600.00			
315	—	—	250	300	—	3RW4446-6BC35	74NT35BFAP	17400.00	74NT35DFAP	17500.00	74NT35OFAP	17400.00	74NT35EFAP	18400.00			
385	—	—	300	400	—	3RW4447-6BC35	74PT35BFAP	19300.00	74PT35DFAP	19400.00	74PT35OFAP	19300.00	74PT35EFAP	20300.00			
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFAPP		73QT35DFAP		73QT35OFAP		73QT35EFAP				
551	—	—	450	600	—	3RW4454-6BC35	73RT35BFAPP		73RT35DFAP		73RT35OFAP		73RT35EFAP				
615	—	—	500	700	—	3RW4455-6BC35	73ST35BFAPP		73ST35DFAP		73ST35OFAP		73ST35EFAP				
693	—	—	550	750	—	3RW4456-6BC35	73TT35BFAPP		73TT35DFAP		73TT35OFAP		73TT35EFAP				
780	—	—	600	850	—	3RW4457-6BC35	73WT35BFAPP		73WT35DFAP		73WT35OFAP		73WT35EFAP				

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. I<sub>e</sub> = FLA rating of motor.

# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 5, 10, 15, 20, or 30
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Circuit breaker with disconnect
- Control circuit transformer
- Reset button

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Combination with Circuit Breaker Disconnect

Rated Operating Current	MAX HP <sup>①</sup>				KW	Class 20 Severe Duty (350% * I <sub>e</sub> for 20s) <sup>②</sup>										
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)		List Price \$	List Price \$		List Price \$		List Price \$		NEMA 4/4X Stainless Steel
26	7.5	7.5	15	—	12	3RW4422-1BC34	74AT3_BFAP	4700.00	74AT3_DFAP	4700.00	74AT3_OFAP	4700.00	74AT3_EFAP	5000.00	74AT3_WFAP	5700.00
32	10	10	20	—	15	3RW4423-1BC34	74BT3_BFAP	4900.00	74BT3_DFAP	4900.00	74BT3_OFAP	4900.00	74BT3_EFAP	5200.00	74BT3_WFAP	5900.00
42	10	15	25	—	19	3RW4424-1BC34	74CT3_BFAP	5000.00	74CT3_DFAP	5000.00	74CT3_OFAP	5000.00	74CT3_EFAP	5300.00	74CT3_WFAP	6000.00
51	15	15	30	—	22	3RW4425-1BC34	74DT3_BFAP	5500.00	74DT3_DFAP	5500.00	74DT3_OFAP	5500.00	74DT3_EFAP	5800.00	74DT3_WFAP	7100.00
68	20	25	50	—	37	3RW4426-1BC34	74ET3_BFAP	5800.00	74ET3_DFAP	5800.00	74ET3_OFAP	5800.00	74ET3_EFAP	6100.00	74ET3_WFAP	7300.00
82	25	30	60	—	45	3RW4427-1BC34	74FT3_BFAP	6400.00	74FT3_DFAP	6400.00	74FT3_OFAP	6400.00	74FT3_EFAP	6800.00	74FT3_WFAP	7700.00
97	30	30	60	—	45	3RW4434-6BC34	74GT3_BFAP	6800.00	74GT3_DFAP	6800.00	74GT3_OFAP	6800.00	74GT3_EFAP	7200.00	74GT3_WFAP	8100.00
113	30	40	75	—	56	3RW4435-6BC34	74HT3_BFAP	7900.00	74HT3_DFAP	7900.00	74HT3_OFAP	7900.00	74HT3_EFAP	8300.00	74HT3_WFAP	11100.00
134	40	50	75	—	56	3RW4436-6BC34	74JT3_BFAP	8400.00	74JT3_DFAP	8400.00	74JT3_OFAP	8400.00	74JT3_EFAP	8900.00	74JT3_WFAP	11300.00
175	50	60	100	—	75	3RW4443-6BC34	74KT3_BFAP	10300.00	74KT3_DFAP	10300.00	74KT3_OFAP	10300.00	74KT3_EFAP	10900.00		
195	60	75	125	—	93	3RW4444-6BC34	74LT3_BFAP	11400.00	74LT3_DFAP	11400.00	74LT3_OFAP	11400.00	74LT3_EFAP	12000.00		
243	75	75	150	—	112	3RW4445-6BC34	74MT3_BFAP	14500.00	74MT3_DFAP	14500.00	74MT3_OFAP	14500.00	74MT3_EFAP	15300.00		
263	75	100	200	—	149	3RW4446-6BC34	74NT3_BFAP	16000.00	74NT3_DFAP	16100.00	74NT3_OFAP	16100.00	74NT3_EFAP	16800.00		
326	100	125	250	—	186	3RW4447-6BC34	74PT3_BFAP	17600.00	74PT3_DFAP	17700.00	74PT3_OFAP	17600.00	74PT3_EFAP	18500.00		
494	150	150	400	—	298	3RW4453-6BC34	73QT_BFAP		73QT_DFAP		73QT_OFAP		73QT_EFAP			
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFAP		73RT_DFAP		73RT_OFAP		73RT_EFAP			
615	200	200	500	—	373	3RW4455-6BC34	73ST_BFAP		73ST_DFAP		73ST_OFAP		73ST_EFAP			
634	200	250	500	—	373	3RW4456-6BC34	73TT_BFAP		73TT_DFAP		73TT_OFAP		73TT_EFAP			
650	200	250	550	—	373	3RW4457-6BC34	73WT_BFAP		73WT_DFAP		73WT_OFAP		73WT_EFAP			
						200V	6		6		6		6		6	
						230V	2		2		2		2		2	
						380V	3		3		3		3		3	
						460V	4		4		4		4		4	
26	—	—	15	20	—	3RW4422-1BC35	74AT35BFAP	5000.00	74AT35DFAP	5000.00	74AT35OFAP	5000.00	74AT35EFAP	5300.00	74AT35WFAP	6000.00
32	—	—	20	25	—	3RW4423-1BC35	74BT35BFAP	5200.00	74BT35DFAP	5200.00	74BT35OFAP	5200.00	74BT35EFAP	5600.00	74BT35WFAP	6200.00
42	—	—	25	30	—	3RW4424-1BC35	74CT35BFAP	5400.00	74CT35DFAP	5300.00	74CT35OFAP	5300.00	74CT35EFAP	5700.00	74CT35WFAP	6300.00
51	—	—	30	40	—	3RW4425-1BC35	74DT35BFAP	5900.00	74DT35DFAP	5900.00	74DT35OFAP	5900.00	74DT35EFAP	6200.00	74DT35WFAP	7500.00
68	—	—	50	50	—	3RW4426-1BC35	74ET35BFAP	6300.00	74ET35DFAP	6200.00	74ET35OFAP	6200.00	74ET35EFAP	6600.00	74ET35WFAP	7800.00
82	—	—	60	75	—	3RW4427-1BC35	74FT35BFAP	6900.00	74FT35DFAP	6900.00	74FT35OFAP	6900.00	74FT35EFAP	7300.00	74FT35WFAP	8100.00
97	—	—	60	75	—	3RW4434-6BC35	74GT35BFAP	7400.00	74GT35DFAP	7400.00	74GT35OFAP	7300.00	74GT35EFAP	7800.00	74GT35WFAP	8600.00
113	—	—	75	100	—	3RW4435-6BC35	74HT35BFAP	8500.00	74HT35DFAP	8500.00	74HT35OFAP	8500.00	74HT35EFAP	9000.00	74HT35WFAP	11800.00
134	—	—	75	125	—	3RW4436-6BC35	74JT35BFAP	9100.00	74JT35DFAP	9200.00	74JT35OFAP	9200.00	74JT35EFAP	9400.00	74JT35WFAP	12100.00
175	—	—	100	150	—	3RW4443-6BC35	74KT35BFAP	11200.00	74KT35DFAP	11200.00	74KT35OFAP	11200.00	74KT35EFAP	11800.00		
195	—	—	125	200	—	3RW4444-6BC35	74LT35BFAP	12500.00	74LT35DFAP	12500.00	74LT35OFAP	12500.00	74LT35EFAP	13200.00		
243	—	—	150	200	—	3RW4445-6BC35	74MT35BFAP	15800.00	74MT35DFAP	15800.00	74MT35OFAP	15800.00	74MT35EFAP	16600.00		
263	—	—	200	250	—	3RW4446-6BC35	74NT35BFAP	17400.00	74NT35DFAP	17500.00	74NT35OFAP	17400.00	74NT35EFAP	18400.00		
326	—	—	250	300	—	3RW4447-6BC35	74PT35BFAP	19300.00	74PT35DFAP	19400.00	74PT35OFAP	19300.00	74PT35EFAP	20300.00		
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFAP		73QT35DFAP		73QT35OFAP		73QT35EFAP			
551	—	—	450	550	—	3RW4454-6BC35	73RT35BFAP		73RT35DFAP		73RT35OFAP		73RT35EFAP			
615	—	—	500	600	—	3RW4455-6BC35	73ST35BFAP		73ST35DFAP		73ST35OFAP		73ST35EFAP			
693	—	—	550	650	—	3RW4456-6BC35	73TT35BFAP		73TT35DFAP		73TT35OFAP		73TT35EFAP			
780	—	—	600	700	—	3RW4457-6BC35	73WT35BFAP		73WT35DFAP		73WT35OFAP		73WT35EFAP			

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. I<sub>e</sub> = FLA rating of motor.

# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 5, 10, 15, 20, or 30
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Fusible disconnect
- Control circuit transformer
- Reset button

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Combination with Fusible Disconnect

Rated Operating Current	MAX HP <sup>①</sup>				KW 380V	Class 10 Light Duty <sup>②</sup>											
	200V	230V	460V	575V		OPEN Style (Starter Only)		List Price \$		List Price \$		List Price \$		List Price \$		NEMA 4/4X Stainless Steel	List Price \$
						NEMA 1	NEMA 3R	NEMA 12	NEMA 4								
26	7.5	7.5	15	—	12	3RW4422-1BC34	74AT3_BFAF	4600.00	74AT3_DFAF	4500.00	74AT3_OFAF	4500.00	74AT3_EFAF	4800.00	74AT3_WFAF	5500.00	
32	10	10	20	—	15	3RW4423-1BC34	74BT3_BFAF	4800.00	74BT3_DFAF	4800.00	74BT3_OFAF	4800.00	74BT3_EFAF	5100.00	74BT3_WFAF	5800.00	
42	10	15	25	—	19	3RW4424-1BC34	74CT3_BFAF	5100.00	74CT3_DFAF	5100.00	74CT3_OFAF	5100.00	74CT3_EFAF	5400.00	74CT3_WFAF	6100.00	
51	15	15	30	—	22	3RW4425-1BC34	74DT3_BFAF	5500.00	74DT3_DFAF	5400.00	74DT3_OFAF	5400.00	74DT3_EFAF	5700.00	74DT3_WFAF	7000.00	
68	20	25	50	—	37	3RW4426-1BC34	74ET3_BFAF	5700.00	74ET3_DFAF	5700.00	74ET3_OFAF	5700.00	74ET3_EFAF	6000.00	74ET3_WFAF	7300.00	
82	25	30	60	—	45	3RW4427-1BC34	74FT3_BFAF	6400.00	74FT3_DFAF	6400.00	74FT3_OFAF	6400.00	74FT3_EFAF	6800.00	74FT3_WFAF	7700.00	
100	30	30	75	—	56	3RW4434-6BC34	74GT3_BFAF	6800.00	74GT3_DFAF	6800.00	74GT3_OFAF	6800.00	74GT3_EFAF	7200.00	74GT3_WFAF	8100.00	
117	30	40	75	—	56	3RW4435-6BC34	74HT3_BFAF	7600.00	74HT3_DFAF	7600.00	74HT3_OFAF	7600.00	74HT3_EFAF	8000.00	74HT3_WFAF	10800.00	
145	40	50	100	—	75	3RW4436-6BC34	74JT3_BFAF	8800.00	74JT3_DFAF	8800.00	74JT3_OFAF	8800.00	74JT3_EFAF	9300.00	74JT3_WFAF	11700.00	
180	60	60	125	—	93	3RW4443-6BC34	74KT3_BFAF	11000.00	74KT3_DFAF	11000.00	74KT3_OFAF	11000.00	74KT3_EFAF	11600.00			
215	60	75	150	—	112	3RW4444-6BC34	74LT3_BFAF	11900.00	74LT3_DFAF	11900.00	74LT3_OFAF	11900.00	74LT3_EFAF	12400.00			
280	75	100	200	—	149	3RW4445-6BC34	74MT3_BFAF	14900.00	74MT3_DFAF	14900.00	74MT3_OFAF	14900.00	74MT3_EFAF	15700.00			
315	100	125	250	—	186	3RW4446-6BC34	74NT3_BFAF	16400.00	74NT3_DFAF	16400.00	74NT3_OFAF	16400.00	74NT3_EFAF	17300.00			
385	125	150	300	—	224	3RW4447-6BC34	74PT3_BFAF	18000.00	74PT3_DFAF	18100.00	74PT3_OFAF	18000.00	74PT3_EFAF	18900.00			
494	150	200	400	—	298	3RW4453-6BC34	73QT_BFAF		73QT_DFAF		73QT_OFAF		73QT_EFAF				
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFAF		73RT_DFAF		73RT_OFAF		73RT_EFAF				
615	200	250	500	—	373	3RW4455-6BC34	73ST_BFAF		73ST_DFAF		73ST_OFAF		73ST_EFAF				
693	200	250	550	—		3RW4456-6BC34	73TT_BFAF		73TT_DFAF		73TT_OFAF		73TT_EFAF				
780	200	250	600	—	447	3RW4457-6BC34	73WT_BFAF		73WT_DFAF		73WT_OFAF		73WT_EFAF				
						200V	6	6	6	6	6	6	6				
						230V	2	2	2	2	2	2	2				
						380V	3	3	3	3	3	3	3				
						460V	4	4	4	4	4	4	4				
26	—	—	15	20	—	3RW4422-1BC35	74AT35BFAF	4800.00	74AT35DFAF	4800.00	74AT35OFAF	4800.00	74AT35EFAF	5100.00	74AT35WFAF	5800.00	
32	—	—	20	25	—	3RW4423-1BC35	74BT35BFAF	5100.00	74BT35DFAF	5100.00	74BT35OFAF	5100.00	74BT35EFAF	5400.00	74BT35WFAF	6100.00	
42	—	—	25	30	—	3RW4424-1BC35	74CT35BFAF	5500.00	74CT35DFAF	5500.00	74CT35OFAF	5500.00	74CT35EFAF	5800.00	74CT35WFAF	6500.00	
51	—	—	30	40	—	3RW4425-1BC35	74DT35BFAF	5800.00	74DT35DFAF	5800.00	74DT35OFAF	5800.00	74DT35EFAF	6100.00	74DT35WFAF	7400.00	
68	—	—	50	50	—	3RW4426-1BC35	74ET35BFAF	6200.00	74ET35DFAF	6100.00	74ET35OFAF	6100.00	74ET35EFAF	6500.00	74ET35WFAF	7700.00	
82	—	—	60	75	—	3RW4427-1BC35	74FT35BFAF	6900.00	74FT35DFAF	6900.00	74FT35OFAF	6900.00	74FT35EFAF	7300.00	74FT35WFAF	8200.00	
100	—	—	75	75	—	3RW4434-6BC35	74GT35BFAF	7400.00	74GT35DFAF	7400.00	74GT35OFAF	7400.00	74GT35EFAF	7800.00	74GT35WFAF	8700.00	
117	—	—	75	100	—	3RW4435-6BC35	74HT35BFAF	8200.00	74HT35DFAF	8200.00	74HT35OFAF	8200.00	74HT35EFAF	8800.00	74HT35WFAF	11500.00	
145	—	—	100	125	—	3RW4436-6BC35	74JT35BFAF	9600.00	74JT35DFAF	9600.00	74JT35OFAF	9600.00	74JT35EFAF	10100.00	74JT35WFAF	12500.00	
180	—	—	125	150	—	3RW4443-6BC35	74KT35BFAF	11900.00	74KT35DFAF	11900.00	74KT35OFAF	11900.00	74KT35EFAF	12500.00			
215	—	—	150	200	—	3RW4444-6BC35	74LT35BFAF	12900.00	74LT35DFAF	12900.00	74LT35OFAF	12900.00	74LT35EFAF	13600.00			
280	—	—	200	250	—	3RW4445-6BC35	74MT35BFAF	16100.00	74MT35DFAF	16100.00	74MT35OFAF	16100.00	74MT35EFAF	17000.00			
315	—	—	250	300	—	3RW4446-6BC35	74NT35BFAF	17800.00	74NT35DFAF	17900.00	74NT35OFAF	17800.00	74NT35EFAF	18700.00			
385	—	—	300	400	—	3RW4447-6BC35	74PT35BFAF	19700.00	74PT35DFAF	19800.00	74PT35OFAF	19700.00	74PT35EFAF	20700.00			
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFAF		73QT35DFAF		73QT35OFAF		73QT35EFAF				
551	—	—	450	600	—	3RW4454-6BC35	73RT35BFAF		73RT35DFAF		73RT35OFAF		73RT35EFAF				
615	—	—	500	700	—	3RW4455-6BC35	73ST35BFAF		73ST35DFAF		73ST35OFAF		73ST35EFAF				
693	—	—	550	750	—	3RW4456-6BC35	73TT35BFAF		73TT35DFAF		73TT35OFAF		73TT35EFAF				
780	—	—	600	850	—	3RW4457-6BC35	73WT35BFAF		73WT35DFAF		73WT35OFAF		73WT35EFAF				

① Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

② Starter selection is dependent on type of application. le = FLA rating of motor.

# Control Products

## Enclosed 3RW44

## Selection



### 3RW44 Enclosed features:

- Available in NEMA 1, 12, 3R, 4, and 4 stainless steel
- Compact size
- Built-in bypass contactor
- Multiple starting/stopping techniques including torque control
- Internal overload class 5, 10, 15, 20, or 30
- Built-in graphical LCD keypad
- Internal self protection
- Fault monitoring
- 3 parameter sets
- Communication capable via opt. Profibus module
- Programmable inputs and outputs
- External keypad available

### Ordering Information

- Enclosed devices should be ordered by the FLA of the motor.
- The 3RW44 is designed for normal starting applications.
- For factory modifications see page 16-177.
- For complete derating and application info see the 2006 Industrial Controls catalog CPPC-06000-0106.
- For dimensional drawings see page 16-178.

### Class 74 non-combination starters include:

- NEMA rated enclosure
- 3RW44 Sirius softstarter with built-in OL and bypass
- Fusible disconnect
- Control circuit transformer
- Reset button

Ideal applications for 3RW44 enclosed softstarters:

- Fans
- Pumps
- Conveying systems and lifts
- Hydraulics
- Machine tools
- Mills saws
- Crushers and grinders
- Mixers
- HVAC systems

The 3RW44 severe duty rating table should be applied for high inertia applications such rock crushers, chippers, screw compressors, ect.

Class 74 starters are built to UL and CSA standards.

For all technical information, please consult the 2006 Industrial Controls Catalog or contact your local sales support center.

## 3RW44 For High Feature Applications

### Enclosed Combination with Fusible Disconnect

Rated Operating Current	MAX HP <sup>Ⓛ</sup>				KW	Class 20 Severe Duty (350% * I <sub>e</sub> for 20s) <sup>Ⓜ</sup>										
	200V	230V	460V	575V		380V	OPEN Style (Starter Only)		List Price \$	NEMA 3R	List Price \$	NEMA 12	List Price \$	NEMA 4	List Price \$	NEMA 4/4X Stainless Steel
26	7.5	7.5	15	—	12	3RW4422-1BC34	74AT3_BFAF	4600.00	74AT3_DFAF	4500.00	74AT3_OFAF	4500.00	74AT3_EFAF	4800.00	74AT3_WFAF	5500.00
32	10	10	20	—	15	3RW4423-1BC34	74BT3_BFAF	4800.00	74BT3_DFAF	4800.00	74BT3_OFAF	4800.00	74BT3_EFAF	5100.00	74BT3_WFAF	5800.00
42	10	15	25	—	19	3RW4424-1BC34	74CT3_BFAF	5100.00	74CT3_DFAF	5100.00	74CT3_OFAF	5100.00	74CT3_EFAF	5400.00	74CT3_WFAF	6100.00
51	15	15	30	—	22	3RW4425-1BC34	74DT3_BFAF	5500.00	74DT3_DFAF	5400.00	74DT3_OFAF	5400.00	74DT3_EFAF	5700.00	74DT3_WFAF	7000.00
68	20	25	50	—	37	3RW4426-1BC34	74ET3_BFAF	5700.00	74ET3_DFAF	5700.00	74ET3_OFAF	5700.00	74ET3_EFAF	6000.00	74ET3_WFAF	7300.00
82	25	30	60	—	45	3RW4427-1BC34	74FT3_BFAF	6400.00	74FT3_DFAF	6400.00	74FT3_OFAF	6400.00	74FT3_EFAF	6800.00	74FT3_WFAF	7700.00
97	30	30	60	—	45	3RW4434-6BC34	74GT3_BFAF	6800.00	74GT3_DFAF	6800.00	74GT3_OFAF	6800.00	74GT3_EFAF	7200.00	74GT3_WFAF	8100.00
113	30	40	75	—	56	3RW4435-6BC34	74HT3_BFAF	7600.00	74HT3_DFAF	7600.00	74HT3_OFAF	7600.00	74HT3_EFAF	8000.00	74HT3_WFAF	10800.00
134	40	50	75	—	56	3RW4436-6BC34	74JT3_BFAF	8800.00	74JT3_DFAF	8800.00	74JT3_OFAF	8800.00	74JT3_EFAF	9300.00	74JT3_WFAF	11700.00
175	50	60	100	—	75	3RW4443-6BC34	74KT3_BFAF	11000.00	74KT3_DFAF	11000.00	74KT3_OFAF	11000.00	74KT3_EFAF	11600.00		
195	60	75	125	—	93	3RW4444-6BC34	74LT3_BFAF	11900.00	74LT3_DFAF	11900.00	74LT3_OFAF	11900.00	74LT3_EFAF	12400.00		
243	75	75	150	—	112	3RW4445-6BC34	74MT3_BFAF	14900.00	74MT3_DFAF	14900.00	74MT3_OFAF	14900.00	74MT3_EFAF	15700.00		
263	75	100	200	—	149	3RW4446-6BC34	74NT3_BFAF	16400.00	74NT3_DFAF	16400.00	74NT3_OFAF	16400.00	74NT3_EFAF	17300.00		
326	100	125	250	—	186	3RW4447-6BC34	74PT3_BFAF	18000.00	74PT3_DFAF	18100.00	74PT3_OFAF	18000.00	74PT3_EFAF	18900.00		
494	150	150	400	—	298	3RW4453-6BC34	73QT_BFAF		73QT_DFAF		73QT_OFAF		73QT_EFAF			
551	150	200	450	—	336	3RW4454-6BC34	73RT_BFAF		73RT_DFAF		73RT_OFAF		73RT_EFAF			
615	200	200	500	—	373	3RW4455-6BC34	73ST_BFAF		73ST_DFAF		73ST_OFAF		73ST_EFAF			
634	200	250	500	—	373	3RW4456-6BC34	73TT_BFAF		73TT_DFAF		73TT_OFAF		73TT_EFAF			
650	200	250	550	—	373	3RW4457-6BC34	73WT_BFAF		73WT_DFAF		73WT_OFAF		73WT_EFAF			
						200V	6	6	6	6	6	6	6	6	6	6
						230V	2	2	2	2	2	2	2	2	2	2
						380V	3	3	3	3	3	3	3	3	3	3
						460V	4	4	4	4	4	4	4	4	4	4
26	—	—	15	20	—	3RW4422-1BC35	74AT35BFAF	4800.00	74AT35DFAF	4800.00	74AT35OFAF	4800.00	74AT35EFAF	5100.00	74AT35WFAF	5800.00
32	—	—	20	25	—	3RW4423-1BC35	74BT35BFAF	5100.00	74BT35DFAF	5100.00	74BT35OFAF	5100.00	74BT35EFAF	5400.00	74BT35WFAF	6100.00
42	—	—	25	30	—	3RW4424-1BC35	74CT35BFAF	5500.00	74CT35DFAF	5500.00	74CT35OFAF	5500.00	74CT35EFAF	5800.00	74CT35WFAF	6500.00
51	—	—	30	40	—	3RW4425-1BC35	74DT35BFAF	5800.00	74DT35DFAF	5800.00	74DT35OFAF	5800.00	74DT35EFAF	6100.00	74DT35WFAF	7400.00
68	—	—	50	50	—	3RW4426-1BC35	74ET35BFAF	6200.00	74ET35DFAF	6100.00	74ET35OFAF	6100.00	74ET35EFAF	6500.00	74ET35WFAF	7700.00
82	—	—	60	75	—	3RW4427-1BC35	74FT35BFAF	6900.00	74FT35DFAF	6900.00	74FT35OFAF	6900.00	74FT35EFAF	7300.00	74FT35WFAF	8200.00
97	—	—	60	75	—	3RW4434-6BC35	74GT35BFAF	7400.00	74GT35DFAF	7400.00	74GT35OFAF	7400.00	74GT35EFAF	7800.00	74GT35WFAF	8700.00
113	—	—	75	100	—	3RW4435-6BC35	74HT35BFAF	8200.00	74HT35DFAF	8200.00	74HT35OFAF	8200.00	74HT35EFAF	8800.00	74HT35WFAF	11500.00
134	—	—	75	125	—	3RW4436-6BC35	74JT35BFAF	9600.00	74JT35DFAF	9600.00	74JT35OFAF	9600.00	74JT35EFAF	10100.00	74JT35WFAF	12500.00
175	—	—	100	150	—	3RW4443-6BC35	74KT35BFAF	11900.00	74KT35DFAF	11900.00	74KT35OFAF	11900.00	74KT35EFAF	12500.00		
195	—	—	125	200	—	3RW4444-6BC35	74LT35BFAF	12900.00	74LT35DFAF	12900.00	74LT35OFAF	12900.00	74LT35EFAF	13600.00		
243	—	—	150	200	—	3RW4445-6BC35	74MT35BFAF	16100.00	74MT35DFAF	16100.00	74MT35OFAF	16100.00	74MT35EFAF	17000.00		
263	—	—	200	250	—	3RW4446-6BC35	74NT35BFAF	17800.00	74NT35DFAF	17900.00	74NT35OFAF	17800.00	74NT35EFAF	18700.00		
326	—	—	250	300	—	3RW4447-6BC35	74PT35BFAF	19700.00	74PT35DFAF	19800.00	74PT35OFAF	19700.00	74PT35EFAF	20700.00		
494	—	—	400	500	—	3RW4453-6BC35	73QT35BFAF		73QT35DFAF		73QT35OFAF		73QT35EFAF			
551	—	—	450	550	—	3RW4454-6BC35	73RT35BFAF		73RT35DFAF		73RT35OFAF		73RT35EFAF			
615	—	—	500	600	—	3RW4455-6BC35	73ST35BFAF		73ST35DFAF		73ST35OFAF		73ST35EFAF			
693	—	—	550	650	—	3RW4456-6BC35	73TT35BFAF		73TT35DFAF		73TT35OFAF		73TT35EFAF			
780	—	—	600	700	—	3RW4457-6BC35	73WT35BFAF		73WT35DFAF		73WT35OFAF		73WT35EFAF			

<sup>Ⓛ</sup> Starter size is dependent on the nameplate Full Load Amps (FLA) rating of the motor. HPs are for reference only. Enclosed ratings are at 40°C.

<sup>Ⓜ</sup> Starter selection is dependent on type of application. I<sub>e</sub> = FLA rating of motor.

# Control Products

## Factory Modifications

Selection

Modification	3RW Version	Enclosed Style	Enclosure NEMA Type	Mod Suffix	List Price Adder \$
<b>Modification</b> Available modifications in STANDARD enclosure					
<b>Pilot Devices</b>					
<b>Push Buttons</b>					
Start/Stop	3RW40/44	73/74	ALL	A1	260.
<b>Selector Switches</b>					
Hand-Off-Auto	3RW40/44	73/74	ALL	A3	260.
Hand-Off-Auto (keyed)	3RW40/44	73/74	ALL	S3	390.
Off-On	3RW40/44	73/74	ALL	A4	260.
<b>Pilot Light</b>					
Red 'On'	3RW40/44	73/74	ALL	FA	250.
Green 'On'	3RW40/44	73/74	ALL	FB	250.
Red 'Run'	3RW40/44	73/74	ALL	FC	250.
Green 'Run'	3RW40/44	73/74	ALL	FD	250.
Red 'Off'	3RW40/44	73/74	ALL	FJ	250.
Green 'Off'	3RW40/44	73/74	ALL	FK	250.
Amber 'Fault'	3RW40/44	73/74	ALL	FL	250.
White 'Control Power On'	3RW40/44	73/74	ALL	FW	250.
Red 'On' Push-to-Test	3RW40/44	73/74	ALL	FS	360.
Green 'On' Push-to-Test	3RW40/44	73/74	ALL	FT	360.
Green 'Off' Push-to-Test	3RW40/44	73/74	ALL	FU	360.
Custom pilot light (state color and nameplate text)	3RW40/44	73/74	ALL	FZ	300.
<b>Through the Door Metering</b>					
External keypad for 3RW44	3RW44	73/74	N1, N12	K1	1100.
Elapse time meter	3RW40/44		N1, N12 (120V)	M5	300.
<b>Control Options</b>					
Profibus Communication Module (installed-connection cable not supplied)	3RW44	73/74	ALL	P1	1000.
Ground Lug - 1 Conductor	3RW40/44	73/74	ALL	L10	100.
Alarm Package - Includes horn, light, relay & push button	3RW40/44	73/74	N1, N3, N12	M7	500.
Electronic 8 function timing relay (.05s - 100h) supplied mounted and unwired	3RW40/44	73/74	ALL	TR	400.
Control Relay supplied mounted and unwired (4-pole max)	3RW40/44	73/74	ALL	R04	300.
				R22	300.
				R40	300.
Circuit Breaker Shunt Trip (included std in 3RW40 versions)	3RW44	74	ALL	L6	500.
Service Entrance Labeled	3RW40/44	74	ALL	N3	100.
Function identification plate, with marking as specified	3RW40/44	73/74	ALL	N1	100.
Terminal Block 3 point	3RW40/44	73/74	ALL	TC3	150.
Terminal Block 6 point	3RW40/44	73/74	ALL	TC6	150.
Terminal Block 9 point	3RW40/44	73/74	ALL	TC9	150.
Terminal Block 12 point	3RW40/44	73/74	ALL	TC12	150.

### Options Requiring the Modified Options Box Size

Modification	3RW Version	Enclosed Style	Enclosed NEMA Type	Mod Suffix	List Price Adder \$							
MODIFIED BOX ADDER (change 8th character to a 'G')	3RW40				117 - 285	315	385					
					A - D	E	F					
								0				
								2600.	2600.	500.		
		73	N1/12/3R/4	N4SS	800.	800.	0					
								2600.	2600.	500.		
								800.	0	0		
								2600.Ⓢ	—	—		
	3RW44				26 - 51	68	82 - 117	145 - 215	280 - 385			
					A - D	E	F - H	J - L	M - P			
										0		
								900.	3400.	2600.	2500.	0
		73	N1/12/3R/4	N4SS	1100.	1000.	800.	500.	0			
								3000.	2600.	2500.	600.Ⓢ	—
		74	N1/12/3R/4	N4SS	1100.	1000.	800.	500.	0			
								3000.	2600.	2500.	600.Ⓢ	—
<b>Mod Box Options</b>												
	3RW40 current size (3rd character)						117 A	145 - 205 B, C	248 D	315 - 385 E, F		
	3RW44 current size (3rd character)				26 - 42 A, B, C	51 - 68 D, E	82 - 117 F, G, H	145 - 215 J, K, L	280 M	315 - 385 N, P		
<b>Contactor Options</b>												
Isolation contactor	3RW40/44	73/74	N1/12/3R/4	IC	700.	1200.	1700.	1800.	2600.	4300.		
Emergency HP Rated Bypass Starter	3RW40Ⓢ	73/74	N1/12/3R/4	A12			3500.	5000.	6600.	10000.		
*Includes keyed selector switch to select between soft start and across the line start	3RW44	73/74	N1/12/3R/4	A12	1300.	1600.	1900.	3200.	4100.	5800.		
<b>Extra Capacity CPT</b>												
100 VA Extra	3RW40/44	73/74	ALL	CA	600.	600.	600.	600.	600.	600.		
<b>Control Options</b>												
Space Heater (120V separate control)	3RW40/44	73/74	ALL	SH	300.							
Space Heater with Thermostat (120V separate control)	3RW40/44	73/74	ALL	ST	500.							
Lightning Arrestor	3RW40/44	73/74	ALL	L	600.							

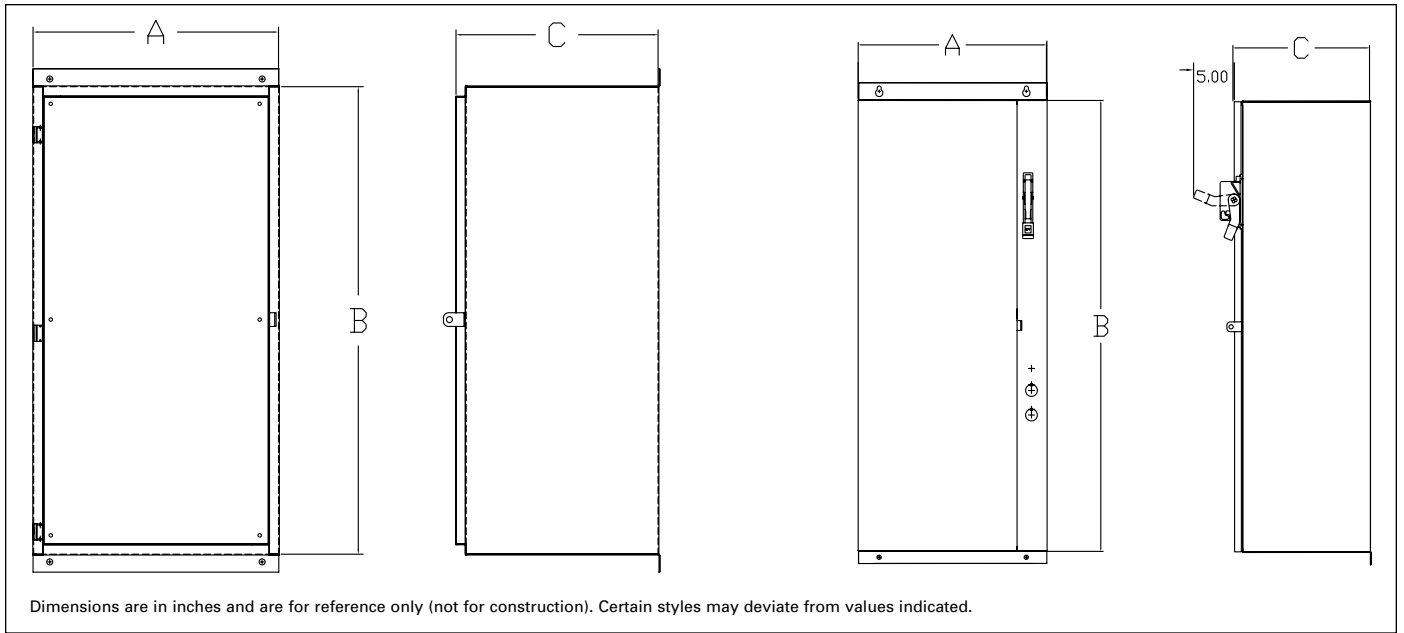
Ⓢ Limited to N4SS offering.

Ⓢ An isolation contactor is included for 3RW40.

# Control Products

## Class 73, 74

## Dimensions



### Non-Combination Class 73

#### N1, N12, N4 Standard Enclosure

	Amps	A	B	C
3RW40	117-145	36	18	15
	205-315	36	22	20
	385	54	36	20
3RW44	26-68	26	12.5	15
	82-117	36	18	15
	145-215	36	22	20
	280-385	54	36	20

#### N4 Stainless Steel Standard Enclosure

	Amps	A	B	C
3RW40	117	36	18	15
	145-205	36	22	20
	248-385	54	36	20
3RW44	26-51	26	12.5	15
	68-82	36	18	15
	100-117	36	22	20
	145-385	54	36	20

#### N1, N12, N4 Modified Enclosure

	Amps	A	B	C
3RW40	117-385	56	36	20
3RW44	26-51	36	22	20
	68-385	54	36	20

#### N4 Stainless Steel Modified Enclosure

	Amps	A	B	C
3RW40	117-385	54	36	20
3RW44	26-51	36	22	20
	68-385	54	36	20

### Combination Type Class 74

#### N1, N12, N4 Standard Enclosure

	Amps	A	B	C
3RW40	117-145	50	25	20
	145-205	66	25	20
	248-315	90	30	20
	385	90	40	20
3RW44	26-68	36	23	15
	82-117	50	25	20
	145-215	66	25	20
	280	90	30	20
	315-384	90	40	20

#### N4 Stainless Steel Standard Enclosure

	Amps	A	B	C
3RW40	117-145	54	36	20
	205-300	90	40	20
3RW44	26-42	36	23	15
	51-100	50	25	20
	117-145	54	36	20
	180-385	90	40	20

#### N1, N12, N4 Modified Enclosure

	Amps	A	B	C
3RW40	117-248	76	30	20
	315	90	30	20
	385	90	40	20
3RW44	26-215	76	30	20
	280	90	30	20
	315-385	90	40	20

#### N4 Stainless Steel Modified Enclosure

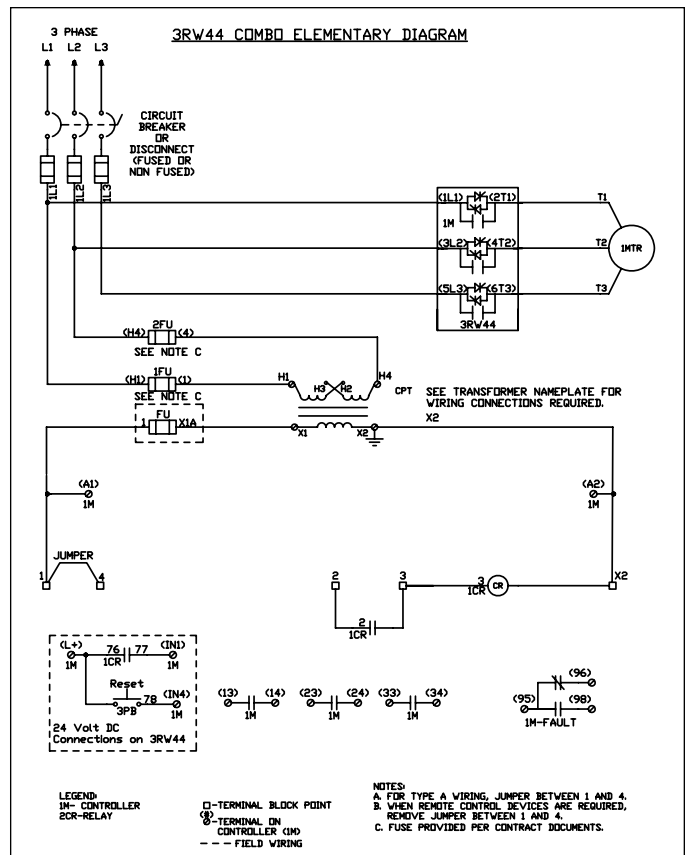
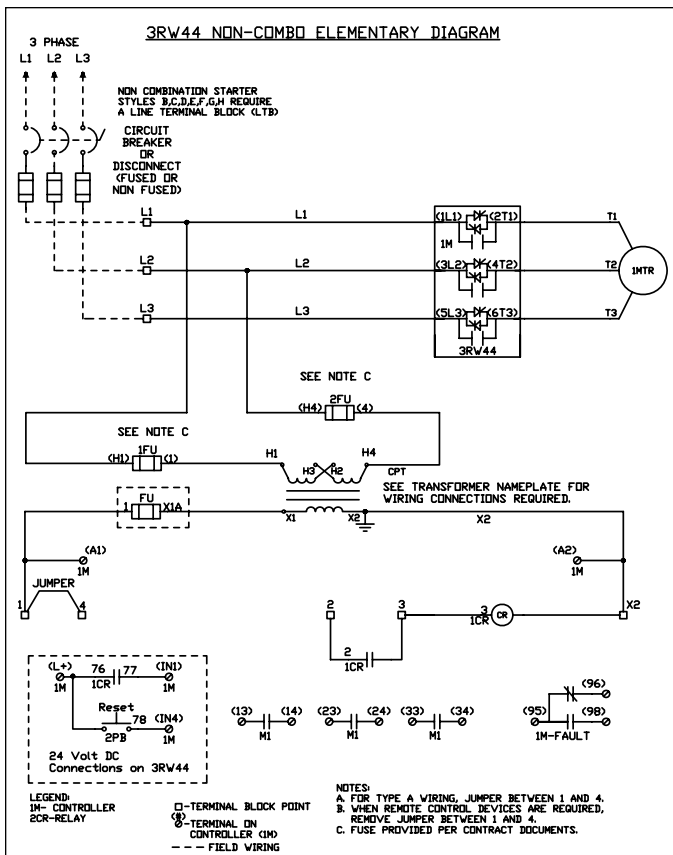
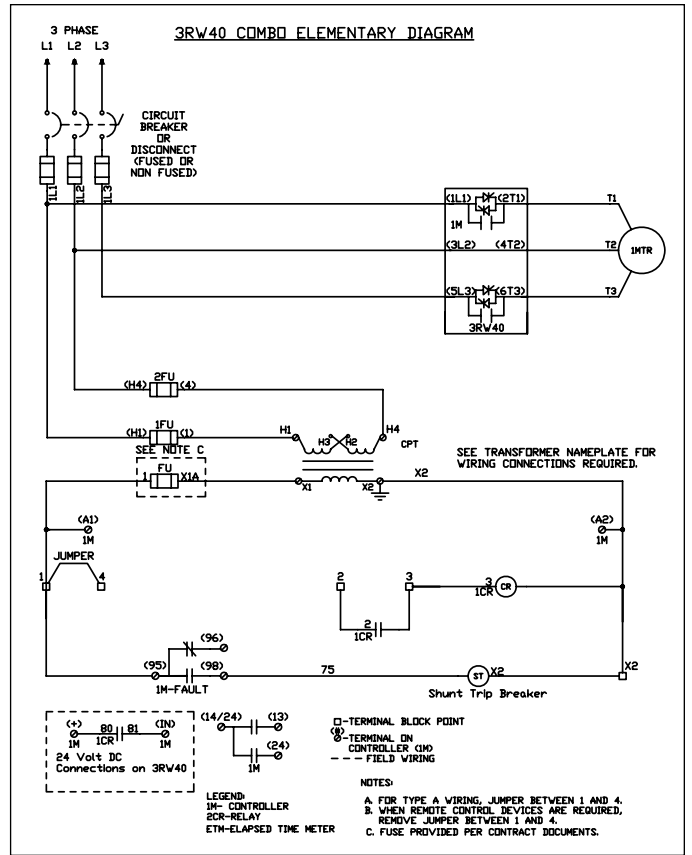
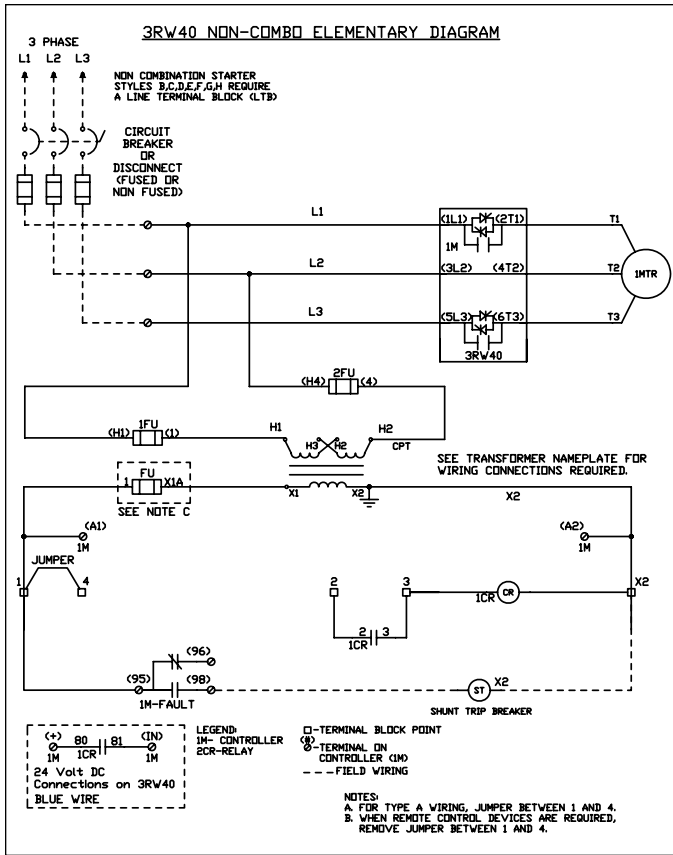
	Amps	A	B	C
3RW40	117-145	76	30	20
3RW44	26-145	76	30	20



# Control Products

## Class 73, 74

## Wiring Diagrams



# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

General

### Features

- Snap In Legend Inserts
- Flush and Surface Mounted Types
- Convertible Selector
- Double Break Contacts
- Dual Voltage Pilot Light with Snap In Lens
- Conversion Kits
- UL Listed File #E22655
- CSA Certified File #LR6535

### Application

Standard duty control stations are used with magnetic controllers to control the starting, stopping, reversing or speed of applicable motors.

Stations are assembled of one, two or three push button, selector switch or pilot light units in a variety of combinations to provide compact control units for remote control of magnetic starters and contactors.

Station enclosures are available in Type 1 surface mounted, 1B flush plate mounted and 4 watertight.

### Features

Type 1 surface mounted bases are constructed of 14 gauge sheet steel, primed and finished in baked gray enamel. The base is predrilled to receive a variety of contact blocks, pilot lights and accessory devices. Covers are of 20 gauge sheet steel, wrap-around construction, primed and finished in baked gray enamel. Furnas Type 4 watertight heavy duty push button stations are supplied with a provision to padlock the stop button in the depressed position. Enclosures are predrilled and tapped for 3/4" conduit.

Contact blocks have double break, fine silver contacts with a NEMA B600 rating. Type 4 stations have a NEMA A600 rating.

The pilot light assembly is dual voltage with clearly marked pressure type terminals for 120 volt or 240 volt connection.

The lens of the pilot light snaps into the cover and is available in both red and green.

Push buttons are equipped with an operator into which a selected legend insert is snapped. Legend inserts are molded thermoplastic and come in a wide variety of legends and colors.

The selector switch operator can be instantly set for two or three positions at any time.

### Mushroom Head

50ZMH mounts on any standard push button operator. The Mushroom Head is red molded thermoplastic, 1 1/2" in diameter, and provides a large operator for emergency stop or similar applications.

### Mechanical Interlock

50ZAM is a base mounted zinc plate, dichromate dipped, steel assembly. When mounted in conjunction with Duplex Contact Block 50ZAC3 (one NO and one NO) the interlock prevents one contact from being closed while the other contact is closed.

### Padlock Attachment Kit

50ZAL can be mounted to any Type 1 surface mounted station by the lower screw which fastens the cover to the station base. Made of heavy steel, chrome plated, the attachment provides for the padlocking of a push button in the depressed position or a selector switch in any position. When used with a push button operator, raised Legend Insert D53493003 (Red Stop) must be used.

### Pendant Bracket

Adapts standard Type 1 surface mounted stations for suspension from a cable or chain. Bracket 50ZAP2 is used for one and two unit stations, 50ZAP3 for three unit stations.

### Electrical Ratings

NEMA AC Ratings 50/60Hz

Nema B600 5 Continuous Amps

Volts	Make	Break
120	30	3
240	15	1.5
480	7.5	0.75
600	6	0.6
VA	3600	360

### Ordering Information

- Legend Inserts see page 16-187.
- Accessories see page 16-187.



2 Push Buttons  
Surface Mounting, NEMA 1



2 Push Buttons  
Flush Mounting, NEMA 1B



1 Push Button  
Surface Mounting



1 Selector Switch  
Flush Mounting



2 Push Buttons  
1 Selector Switch






1 Pilot Light  
2 Push Buttons

# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

5A 600V AC NEMA B600

### Selection and ordering data



	Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$ 1 unit	Packs Unit	
1 unit surface mount-momentary pushbutton 	A = Momentary flush pushbutton green, surface, label "START"	NEMA 1	1NO - 1NC with common jumper (50ZAC1)	1	50AA3D	49.00	1	
	A = Momentary flush pushbutton red, surface, label "STOP"	NEMA 1	1NO - 1NC with common jumper (50ZAC1)	1	50AA3E	49.00	1	
	A = Momentary raised pushbutton red, surface, label "STOP"	NEMA 1	1NO - 1NC with common jumper (50ZAC1)	1	50AA3F	49.00	1	
	A = Momentary mushroom head red, surface, label "STOP"	NEMA 1	1NO - 1NC with common jumper (50ZAC1)	1	50AA3G	58.00	1	
	A = Momentary flush pushbutton less insert, surface	NEMA 1	1NO - 1NC with common jumper (50ZAC1)	1	50AA3A	47.00	1	
	A = 3 position selector switch, surface, label "HAND-OFF-AUTO"	NEMA 1	2 NO 2SPST (50ZAC8)	1	50AA3C3	49.00	1	
	A = 3 position selector switch, surface, label "Off-On"	NEMA 1	2 NO 2SPST (50ZAC8)	1	50AA3C6	49.00	1	
	A = 2/3 selector switch, surface, multiple legends	NEMA 1	2 NO 2SPST (50ZAC8)	1	50AA3B9	49.00	1	
	A = Indicator light, red, surface	NEMA 1	120/240V dual voltage 120PSB lamp	1	50BA3Y	115.00	1	
	A = Indicator light, green, surface	NEMA 1	120/240V dual voltage 120PSB lamp	1	50BA3Z	115.00	1	
A = Indicator light, less lens, surface	NEMA 1	120/240V dual voltage 120PSB lamp	1	50BA32	109.00	1		
1 unit flush mount-momentary pushbutton 	A = Momentary flush pushbutton green, flush, label "START"	NEMA 1B	1NO - 1NC with common jumper (50ZAC1)	1	50AA2D	62.00	1	
	A = Momentary flush pushbutton red, flush, label "STOP"	NEMA 1B	1NO - 1NC with common jumper (50ZAC1)	1	50AA2E	62.00	1	
	A = Momentary raised pushbutton red, flush, label "STOP"	NEMA 1B	1NO - 1NC with common jumper (50ZAC1)	1	50AA2F	62.00	1	
	A = Momentary flush pushbutton less insert, flush	NEMA 1B	1NO - 1NC with common jumper (50ZAC1)	1	50AA2A	60.00	1	
	A = Momentary flush pushbutton less insert, flush, chrome plate	NEMA 1B	1NO - 1NC with common jumper (50ZAC1)	1	50AA6A	66.00	1	
	A = 3 position selector switch, flush, label "HAND-OFF-AUTO"	NEMA 1B	2 NO 2SPST (50ZAC8)	1	50AA2C3	62.00	1	
	A = 3 position selector switch, flush, label "Off-On"	NEMA 1B	2 NO 2SPST (50ZAC8)	1	50AA2C6	62.00	1	
	A = 2/3 selector switch, multiple legends, flush	NEMA 1B	2 NO 2SPST (50ZAC8)	1	50AA2B9	62.00	1	
	A = 2/3 selector switch, multiple legends, chrome plate, flush	NEMA 1B	2 NO 2SPST (50ZAC8)	1	50AA6B9	68.00	1	
	A = Indicator light, red, flush	NEMA 1B	120/240V dual voltage	1	50BA2Y	127.00	1	
	A = Indicator light, green, flush	NEMA 1B	120/240V dual voltage	1	50BA2Z	127.00	1	
	A = Indicator light, less lens, flush	NEMA 1B	120/240V dual voltage	1	50BA22	121.20	1	
	A = Indicator light, less lens, chrome plate, flush	NEMA 1B	120PSB lamp	1	50BA62	127.00	1	
	2 unit surface mount-momentary pushbutton 	B = Momentary pushbutton green, surface, label "START" A = Momentary pushbutton red, surface, label "STOP"	NEMA 1	1NO, 1NC (50ZAC2)	2	50CA3DE	49.00	1
		B = Momentary pushbutton green, surface, label "START" A = Momentary raised pushbutton red, surface, label "STOP"	NEMA 1	1NO, 1NC (50ZAC2)	2	50CA3DF	49.00	1
		B = Momentary pushbutton green, surface, label "START" A = Momentary mushroom head pushbutton red, surface, label "STOP"	NEMA 1	1NO, 1NC (50ZAC2)	2	50CA3DG	64.00	1
B = Momentary pushbutton, less insert, surface A = Momentary pushbutton, less insert, surface		NEMA 1	1NO, 1NC (50ZAC2)	2	50CA3AA	45.00	1	
B = Momentary pushbutton, surface, label "FORWARD" A = Momentary pushbutton, surface, label "REVERSE"		NEMA 1	2 NO (50ZAC3)	2	50DA3KL	49.00	1	

# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

5A 600V AC NEMA B600

### Selection and ordering data

Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$	Pack	
					1 unit	Unit	
2 unit surface mount-momentary pushbutton 	B = Momentary pushbutton, surface, label "OPEN"	NEMA 1	2 NO (50ZAC3)	2	50DA3HJ	49.00	1
	A = Momentary pushbutton, surface, label "CLOSE"						
	B = Momentary pushbutton, surface, label "UP"	NEMA 1	2 NO (50ZAC3)	2	50DA3NP	49.00	1
	A = Momentary pushbutton, surface, label "DOWN"						
	B = Momentary pushbutton, surface, less insert	NEMA 1	2 NO (50ZAC3)	2	50DA3AA	45.00	1
	A = Momentary pushbutton, surface, less insert						
	B = Momentary pushbutton, surface, label "FORWARD"	NEMA 1	2 NO mechanically interlocked (50ZA3C w/ 50ZAM)	2	50RA3KL	52.00	1
	A = Momentary pushbutton, surface, label "REVERSE"						
	B = Momentary pushbutton, surface, label "OPEN"	NEMA 1	2 NO mechanically interlocked (50ZA3C w/ 50ZAM)	2	50RA3HJ	62.00	1
	A = Momentary pushbutton, surface, label "CLOSE"						
	B = Momentary pushbutton, surface, label "UP"	NEMA 1	2 NO mechanically interlocked (50ZA3C w/ 50ZAM)	2	50RA3NP	62.00	1
	A = Momentary pushbutton, surface, label "DOWN"						
	B = Momentary pushbutton, surface, label "ON"	NEMA 1	2 NO mechanically interlocked (50ZA3C w/ 50ZAM)	2	50RA334	62.00	1
	A = Momentary pushbutton, surface, label "OFF"						
	B = Momentary pushbutton, less insert surface	NEMA 1	2 NO mechanically interlocked (50ZA3C w/ 50ZAM)	2	50RA3AA	58.00	1
	A = Momentary pushbutton, less insert, surface						
	B = Momentary pushbutton, surface, label "FORWARD"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	2	50EA3KL	73.00	1
	A = Momentary pushbutton, surface, label "REVERSE"						
	B = Momentary pushbutton, surface, label "OPEN"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	2	50EA3HJ	73.00	1
	A = Momentary pushbutton, surface, label "CLOSE"						
	B = Momentary pushbutton, surface, label "UP"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	2	50EA3NP	73.00	1
	A = Momentary pushbutton, surface, label "DOWN"						
	B = Momentary pushbutton, surface, label "ON"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	2	50EA334	73.00	1
	A = Momentary pushbutton, surface, label "OFF"						
	B = Momentary pushbutton, surface, less insert	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	2	50EA3AA	69.00	1
	A = Momentary pushbutton, surface, less insert						
2 unit flush mount-momentary push-button 	B = Momentary pushbutton green, flush, label "START"	NEMA 1B	1NO, 1NC (50ZAC2)	2	50CA2DE	62.00	1
	A = Momentary pushbutton red, flush, label "STOP"						
	B = Momentary pushbutton green, flush, label "START"	NEMA 1B	1NO, 1NC (50ZAC2)	2	50CA2DF	62.00	1
	A = Momentary raised pushbutton red, flush, label "STOP"						
	B = Momentary pushbutton green, flush, label "START"	NEMA 1B	1NO, 1NC (50ZAC2)	2	50CA2AA	58.00	1
	A = Momentary mushroom head pushbutton red, flush, label "STOP"						
	B = Momentary pushbutton, less insert, flush	NEMA 1B	1NO, 1NC (50ZAC2)	2	50CA6AA	64.00	1
	A = Momentary pushbutton, less insert, flush						

# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

5A 600V AC NEMA B600

### Selection and ordering data

Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$	Packs
					1 unit	Unit
B = Momentary pushbutton, flush, label "FORWARD" A = Momentary pushbutton, flush, label "REVERSE"	NEMA 1B	2 NO (50ZAC3)	2	50DA2KL	62.00	1
	NEMA 1B	2 NO (50ZAC3)	2	50DA2HJ	62.00	1
B = Momentary pushbutton, flush, label "UP" A = Momentary pushbutton, flush, label "DOWN"	NEMA 1B	2 NO (50ZAC3)	2	50DA2NP	62.00	1
	NEMA 1B	2 NO (50ZAC3)	2	50DA2AA	58.00	1
B = Momentary pushbutton, less insert, chrome plate, flush A = Momentary pushbutton, less insert, chrome plate, flush	NEMA 1B	2 NO (50ZAC3)	2	50DA6AA	62.00	1
	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA2KL	73.00	1
B = Momentary pushbutton, flush, label "OPEN" A = Momentary pushbutton, flush, label "CLOSE"	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA2HJ	73.00	1
	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA2NP	73.00	1
B = Momentary pushbutton, flush, label "ON" A = Momentary pushbutton, flush, label "OFF"	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA234	73.00	1
	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA2AA	69.00	1
B = Momentary pushbutton, less insert, chrome plate, flush A = Momentary pushbutton, less insert, chrome plate, flush	NEMA 1B	2 NO mechanically inter-locked (50ZA3C w/ 50ZAM)	2	50RA6AA	76.00	1
	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA2KL	86.00	1
B = Momentary pushbutton, flush, label "OPEN" A = Momentary pushbutton, flush, label "CLOSE"	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA2HJ	86.00	1
	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA2NP	86.00	1
B = Momentary pushbutton, flush, label "ON" A = Momentary pushbutton, flush, label "OFF"	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA234	86.00	1
	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA2AA	82.00	1
B = Momentary pushbutton, less insert, chrome plate, flush A = Momentary pushbutton, less insert, chrome plate, flush	NEMA 1B	2 NO, 2 NC (2 - 50ZAC2)	2	50EA6AA	88.00	1

2 unit flush mount momentary pushbutton






# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

5A 600V AC NEMA B600

### Selection and ordering data

Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$	Pack	
					1 unit	Unit	
2 unit surface mount-momentary pushbutton 	B = Momentary pushbutton green, surface, label "START"	NEMA 1	1NO, 1NC (50ZAC1)	2	50FA3DC3	73.00	1
	A = Maintained selector switch, surface, label "HAND-OFF-AUTO"		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Momentary pushbutton less insert, surface	NEMA 1	1NO, 1NC (50ZAC1)	2	50FA3AB9	73.00	1
	A = Maintained selector switch, multiple legends, surface		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Indicator light, red, surface	NEMA 1	120/240V dual voltage (120PSB lamp)	2	50HA3YC3	180.00	1
	A = Maintained selector switch, surface, label "HAND-OFF-AUTO"		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Indicator light, red, surface	NEMA 1	120/240V dual voltage (120PSB lamp)	2	50HA32B9	180.00	1
	A = Maintained selector switch, multiple legends, surface		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Indicator light, green, surface	NEMA 1	120/240V dual voltage (120PSB lamp)	2	50GA3ZY	180.00	1
	A = Indicator light, red, surface						
B = Indicator light, less lens, surface	NEMA 1	120/240V dual voltage (120PSB lamp)	2	50GA322	168.00	1	
A = Indicator light, less lens, surface							
2 unit flush mount-momentary pushbutton 	B = Momentary pushbutton green, flush, label "START"	NEMA 1B	1NO, 1NC (50ZAC1)	2	50FA2DC3	86.00	1
	A = Maintained selector switch, flush, label "HAND-OFF-AUTO"		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Momentary pushbutton less insert, flush	NEMA 1B	1NO, 1NC (50ZAC1)	2	50FA2AB9	84.00	1
	A = Maintained selector switch, multiple legends, flush		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Momentary pushbutton less insert chrome plate, flush	NEMA 1B	1NO, 1NC (50ZAC1)	2	50FA6AB9	91.00	1
	A = Maintained selector switch, multiple legends, flush		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Indicator light, red, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50HA2YC3	189.00	1
	A = Maintained selector switch, flush, label "HAND-OFF-AUTO"		2 NO 2SPDT w/ common jumper (50ZAC8)				
	B = Indicator light, less lens, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50HA22B9	189.00	1
	A = Maintained selector switch, multiple legends, flush		2 NO 2SPDT w/ common jumper (50ZAC8)				
B = Indicator light, less lens, chrome plate, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50HA62B9	189.00	1	
A = Maintained selector switch, multiple legends, flush		2 NO 2SPDT w/ common jumper (50ZAC8)					
B = Indicator light, green, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50GA2ZY	182.00	1	
A = Indicator light, red, flush							
B = Indicator light, less lens, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50GA222	176.00	1	
A = Indicator light, less lens, flush							
B = Indicator light, less lens, chrome plate, flush	NEMA 1B	120/240V dual voltage (120PSB lamp)	2	50GA622	182.00	1	
A = Indicator light, less lens, chrome plate, flush							
3 unit surface mount 	C = Momentary pushbutton, surface, label "FORWARD"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	3	50MA3KLE	98.00	1
	B = Momentary pushbutton, surface, label "REVERSE"		1NO - 1NC with common jumper (50ZAC1)				
	A = Momentary pushbutton, surface, label "STOP"						
	C = Momentary pushbutton, surface, label "UP"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	3	50MA3NPE	98.00	1
	B = Momentary pushbutton, surface, label "DOWN"		1NO - 1NC with common jumper (50ZAC1)				
	A = Momentary pushbutton, surface, label "STOP"						
	C = Momentary pushbutton, surface, label "OPEN"	NEMA 1	2 NO, 2 NC (2 - 50ZAC2)	3	50MA3HJE	98.00	1
	B = Momentary pushbutton, surface, label "CLOSE"		1NO - 1NC with common jumper (50ZAC1)				
	A = Momentary pushbutton, surface, label "STOP"						

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Pilot Devices

# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

5A 600V AC NEMA B600

### Selection and ordering data

Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$	Pack	
					1 unit	Unit	
3 unit surface mount 	NEMA 1	2 NO, 2 NC (2 - 50ZAC2) 1NO - 1NC with common jumper (50ZAC1)	3	50MA3TUE	98.00	1	
							C = Momentary pushbutton, surface, label "FAST"
							B = Momentary pushbutton, surface, label "SLOW"
	NEMA 1	2 NO, 2 NC (2 - 50ZAC2) 1NO - 1NC with common jumper (50ZAC1)	3	50MA3DME	98.00	1	
							C = Momentary pushbutton, surface, label "START"
							B = Momentary pushbutton, surface, label "JOG"
	NEMA 1	2 NO, 2 NC (2 - 50ZAC2) 1NO - 1NC with common jumper (50ZAC1)	3	50MA3AAA	92.00	1	
							C = Momentary pushbutton, surface, label less insert
							B = Momentary pushbutton, surface, label less insert
	NEMA 1	2 NO, 2 NC (2 - 50ZAC2) 1NO - 1NC with common jumper (50ZAC1)	3	50LA3DEC3	148.00	1	
							C = Momentary pushbutton, surface, label "START"
							B = Momentary pushbutton, surface, label "STOP"
	NEMA 1	1 NO, 1 NC (50ZAC2) 2 NO, 2 SPST with common jumper (50ZAC8)	3	50LA3AAB9	144.00	1	
							C = Momentary pushbutton, less insert, surface
							B = Momentary pushbutton, less insert, surface
	NEMA 1	120/240V dual voltage (120PSB lamp) 1 NO, 1 NC (50ZAC2)	3	50JA3YDE	180.00	1	
							C = Indicator light, red, surface
							B = Momentary pushbutton, surface, label "START"
	NEMA 1	120/240V dual voltage (120PSB lamp) 1 NO, 1 NC (50ZAC2)	3	50JA3ZDE	180.00	1	
							C = Indicator light, green, surface
							B = Momentary pushbutton, surface, label "START"
	NEMA 1	120/240V dual voltage (120PSB lamp) 1 NO, 1 NC (50ZAC2)	3	50JA32AA	170.00	1	
							C = Indicator light, less lens, surface
							B = Momentary pushbutton, less insert, surface
	NEMA 1	120/240V dual voltage (120PSB lamp) 2 NO, 2 SPST with common jumper (50ZAC8)	3	50NA3ZYC3	230.00	1	
							C = Indicator light, green, surface
							B = Indicator light, red, surface
	NEMA 1	120/240V dual voltage (120PSB lamp) 2 NO, 2 SPST with common jumper (50ZAC8)	3	50NA322B9	218.00	1	
							C = Indicator light, less lens, surface
							B = Indicator light, less lens, surface

# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

*Heavy Duty - 10A 600V NEMA B600*

### Selection and ordering data



Operator identification	Degree of protection	Contacts / voltage	Number of command points	Order No.	List Price \$ 1 unit	Pack Unit
A = Momentary pushbutton, surface, label "START" – Green	NEMA 4	1NO - 1NC	1	50HA1E1	213.00	1
A = Momentary pushbutton, surface, label "STOP" – Red	NEMA 4	1NO - 1NC	1	50HA1E2	213.00	1
A = Momentary pushbutton, surface, label "RESET" – Green	NEMA 4	1NO - 1NC	1	50HA1E4	213.00	1
A = Momentary pushbutton, surface, label "JOG" – Green	NEMA 4	1NO - 1NC	1	50HA1E5	213.00	1
A = Maintained selector switch, surface, label "SAFE-RUN"	NEMA 4	1NO - 1NC	1	50HA1E6	222.00	1
A = Maintained selector switch, surface, label "OFF-ON"	NEMA 4	1NO - 1NC	1	50HA1E7	222.00	1
A = Maintained selector switch, surface, label "JOG-RUN" – Green	NEMA 4	1NO - 1NC	1	50HA1E8	222.00	1
A = Maintained selector switch, surface, label "HAND-OFF-AUTO"	NEMA 4	1NO - 1NC	1	50HA1E9	222.00	1
B = Momentary pushbutton, surface, label "START" – Green	NEMA 4	1NO - 1NC	2	50HA2E1	301.00	1
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				
B = Momentary pushbutton, surface, label "FORWARD" – Green	NEMA 4	1NO - 1NC	2	50HA2E2	301.00	1
A = Momentary pushbutton, surface, label "REVERSE" – Red		1NO - 1NC				
B = Momentary pushbutton, surface, label "UP" – Green	NEMA 4	1NO - 1NC	2	50HA2E3	301.00	1
A = Momentary pushbutton, surface, label "DOWN" – Red		1NO - 1NC				
B = Momentary pushbutton, surface, label "OPEN" – Green	NEMA 4	1NO - 1NC	2	50HA2E4	301.00	1
A = Momentary pushbutton, surface, label "CLOSE" – Red		1NO - 1NC				
B = Momentary pushbutton, surface, label "FAST" – Green	NEMA 4	1NO - 1NC	2	50HA2E5	301.00	1
A = Momentary pushbutton, surface, label "SLOW" – Red		1NO - 1NC				
C = Momentary pushbutton, surface, label "FORWARD" – Green	NEMA 4	1NO - 1NC	3	50HA3E1	395.00	1
B = Momentary pushbutton, surface, label "REVERSE" – Green		1NO - 1NC				
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				
C = Momentary pushbutton, surface, label "UP" – Green	NEMA 4	1NO - 1NC	3	50HA3E2	395.00	1
B = Momentary pushbutton, surface, label "DOWN" – Green		1NO - 1NC				
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				
C = Momentary pushbutton, surface, label "OPEN" – Green	NEMA 4	1NO - 1NC	3	50HA3E3	395.00	1
B = Momentary pushbutton, surface, label "CLOSE" – Green		1NO - 1NC				
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				
C = Momentary pushbutton, surface, label "START" – Green	NEMA 4	1NO - 1NC	3	50HA3E9	395.00	1
B = Momentary pushbutton, surface, label "JOG" – Green		1NO - 1NC				
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				
C = Momentary pushbutton, surface, label "FAST" – Green	NEMA 4	1NO - 1NC	3	50HA3E4	395.00	1
B = Momentary pushbutton, surface, label "SLOW" – Green		1NO - 1NC				
A = Momentary pushbutton, surface, label "STOP" – Red		1NO - 1NC				



# Pushbutton Units and Indicator Lights




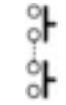

## Class 50 Standard Duty Pushbutton Stations

## Standard Duty Station Accessories

### Selection and ordering data

Legend inscription insert for snap-on mounting

Inscription	Color	Order No.	List Price \$ 1 unit	Pack Unit
Close	Orange	50D53493005	2.00	1
Down	Orange	50D53493010	2.00	1
Fast	Black	50D53493013	2.00	1
Forward	Green	50D53493006	2.00	1
High	Black	50D53493015	2.00	1
Hoist	Green	50D53493011	2.00	1
Jog	Black	50D53493008	2.00	1
Low	Black	50D53493016	2.00	1
Lower	Orange	50D53493012	2.00	1
Off	Red	50D53493018	2.00	1
On	Green	50D53493017	2.00	1
Open	Green	50D53493004	2.00	1
Reverse	Orange	50D53493007	2.00	1
Slow	Black	50D53493014	2.00	1
Start	Green	50D53493001	2.00	1
Stop	Red	50D53493002	2.00	1
Stop (raised)	Red	50D53493003	2.00	1
Up	Green	50D53493009	2.00	1

Version	Suitable for	Color	Order No.	List Price \$ 1 unit	Pack Unit
 50ZAC1	<b>Mushroom head</b>	Red	50ZMH	16.40	1
 50ZAC2	<b>Padlock attachment</b>	Used only for raised buttons	50ZAL	24.50	1
 50ZAC8	<b>Mechanical interlock kit</b>		50ZAM	12.40	1
 50ZAC3	<b>Contact blocks</b>				
	1NO, 1NC	Single button	50ZAC1	24.50	1
	2NO, 2SPST	Selector switch	50ZAC8	24.50	1
	1NO, 1NC	Two button	50ZAC2	24.50	1
	1NO, 1NO	Two button	50ZAC3	24.50	1
	<b>Pilot light</b>	120/240V Dual Voltage, no lens	50ZAC6	60.00	1
	<b>Pilot light lens</b>	Red	50ZPL01	6.20	1
		Green	50ZPL02	6.20	1
	<b>Pendant Bracket</b>	1 & 2 unit station	50ZAP2	8.20	1
		3 unit station	50ZAP3	8.20	1
	<b>Replacement lamps</b>	Class 50 type 1, 1B 120V	50D21983001	8.50	1
	Slide base, lamp type 120PSB				

### Heavy Duty Station Accessories

Version	Suitable for	Color	Order No.	List Price \$ 1 unit	Pack Unit
	<b>Pushbutton caps</b>				
	NEMA 4 control stations	Red	BHP15X	66.00	1
	NEMA 4 control stations	Black	BHP16X	66.00	1

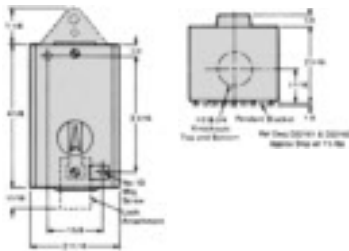
# Pushbutton Units and Indicator Lights

## Class 50 Standard Duty Pushbutton Stations

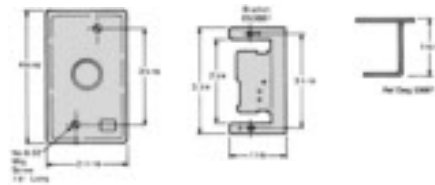
*Standard Duty - 5A 600V NEMA B600*

### Dimension drawings

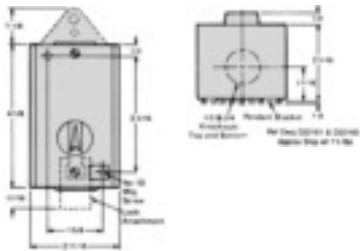
1 Unit Station Surface Mounting—Type 1



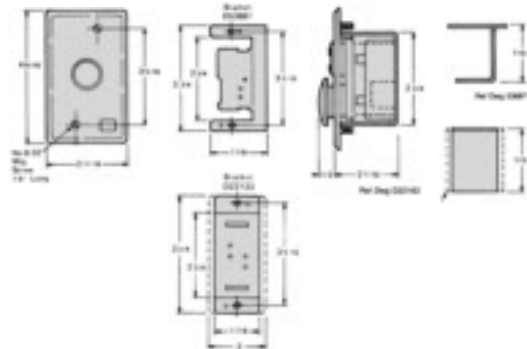
1 Unit Station Flush Mounting—Type 1B



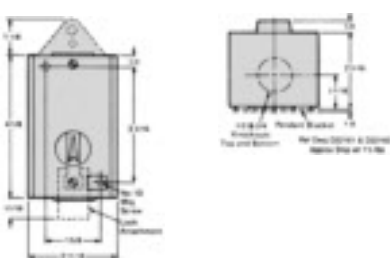
2 Pushbutton Stations Surface Mounting—Type 1



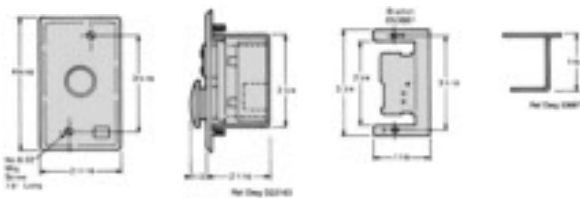
2 Pushbutton Stations Flush Mounting—Type 1B



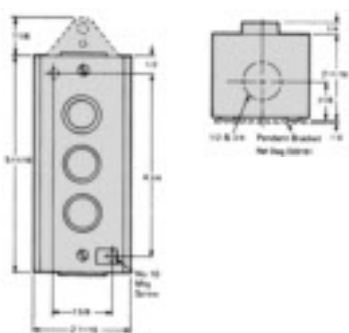
2 Unit Stations Surface Mounting—Type 1



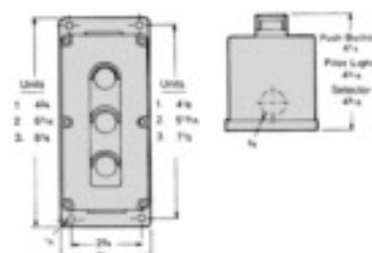
2 Unit Station Flush Mounting—Type 1B



3 Unit Stations Surface Mounting



1 Unit Stations—Type 4



# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Pushbutton Complete Units

### Features

- Octagonal Mounting Nuts
- Meets Type 1, 3, 4, 12, 13 and Automotive Standards
- Heavy Duty Rated NEMA A600 Contacts
- Positive Indexing Selectors
- Bifurcated Movable Contacts
- Attractive Chrome Plating
- Boots Not Required for Type 4
- UL Listed File # E22655
- CSA Certified File # LR6535
- Touchsafe Terminals

### Application

Oil tight pilot controls and accessories are designed to provide long, trouble free service in the most demanding industrial applications. These controls are oil and dust tight and meet Type 3, 4, 12 and 13 specifications.

### Rugged

Industrial control operators are durable one piece castings. Heavy duty plastic buttons resist oils and corrosion. Silver contacts with gold flashing carry heavy duty ratings while allowing for low-voltage applications.

### Flexible

Accessories modify standard push buttons, selector switches and pilot lights. Building block construction of contact blocks makes possible many circuitry combinations.

### Industrial Appearance

Pilot controls add luster to panels. Chrome plating covers exposed metal parts.

### Push Button Operators

The Operator Base consists of a durable, one piece casting equipped with a heavy duty actuator with a stainless steel spring, a neoprene actuator sealing ring to prevent oil and dust from penetrating to the contact blocks, a neoprene gasket to seal operator mounting hole and a chrome plated lock nut.

### Mushroom Head Push Button Operators

The Mushroom Head base construction is identical to the push button base. The actuator is molded of high impact material for either a 1 5/8 inch or 2 1/2 inch diameter molded head.

### Contact Blocks

Contact Blocks have double break bifurcated silver contacts, with gold flashing as

standard, which improve contact fidelity. Contact blocks are heavy duty rated NEMA A600 and suitable for applications down to 5V/1mA solid state outputs. Molded bodies and pushers resist arcing and tracking. All units have stainless steel springs that resist corrosion and provide strong contact pressure. Captive mounting screws speed panel assembly.

### Push Pull Operators

Push Pull Operators combine two or three functions in one unit. The maintained operator has two positions, typically pull to start, push to stop. The momentary operator with three positions provides spring return from both pull and push positions. These units are also available with a pilot light.

### 2 Button Maintained Operator

Maintained Push Buttons consist of two push buttons and a latching assembly. When actuated the button remains depressed and is freed only by the release operator to which it is linked. The button assembly adjusts for mounting from a 1 13/16 inch to a 2 5/8 inch center.

### Transformer Type Pilot Lights

Transformer Type Pilot Lights are available with a 120, 240, 480 or 600 Volt primary (50/60 Hertz) and a separate secondary winding which supplies reduced voltage to a miniature bayonet base 6 Volt lamp. These units are suitable for applications where vibration is present and long bulb life is desirable.

### Full Voltage Type Pilot Lights

Full Voltage Pilot Lights are available for 6, 12, 24, 120 and 240 Volt AC and DC applications. The 240 Volt pilot light is supplied with a 120 Volt lamp and a voltage dropping resistor

### LED Type Pilot Lights

LED's (light emitting diodes) can be used in pilot lights instead of incandescent bulbs because of their long life (up to 10 years), resistance to vibration and ambient sensitivity.

### Selector Operators

Selector Operators have positive action indexing. Operators are available with either a short or long lever. The molded black lever is designed to accept a color insert. A white insert is provided as standard. Each operator is equipped with a cam to actuate plungers of contact blocks assembled behind the operator. Two, three and four position operators are available with seven different cams.

Lever color inserts are available in 8 colors.

### Electrical Ratings

NEMA AC Ratings 50/60Hz

NEMA A600 10 Continuous Amps

Volts	Make	Break
120	60	6
240	30	3
480	15	1.5
600	12	1.2
VA	7200	720

### Ordering Information

- Accessories see page 16-211.
- Selector Position and Contact Operation page 16-209.
- Legend Plates see page 16-219.
- Enclosures see page 16-220.



Pilot Light



Push Button



Selector Operator






Selector Push Operation

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Pushbutton Complete Units

### Selection and ordering data

Momentary	Version	Color of actuator	Contact blocks	Flush cap order no. <sup>1)</sup>	Extended cap order no. <sup>1)</sup>	List Price	Mushroom head order no. <sup>1)</sup>	List Price	Pack
						\$		\$	Unit
	<b>Pushbutton unit with assembled contact blocks</b>	black	1 NO	52PA8A1K	52PA8B1K	34.50	52PB9□1K	59.00	1
		red	1 NO	52PA8A2K	52PA8B2K	34.50	52PB9□2K	59.00	
		green	1 NO	52PA8A3K	52PA8B3K	34.50	52PB9□3K	59.00	
		yellow	1 NO	52PA8A4K	52PA8B4K	34.50	52PB9□4K	59.00	
Pushbutton with flush cap		blue	1 NO	52PA8A5K	52PA8B5K	34.50	52PB9□5K	59.00	
		gray	1 NO	52PA8A6K	52PA8B6K	34.50	52PB9□6K	59.00	
		orange	1 NO	52PA8A8K	52PA8B8K	34.50	52PB9□8K	59.00	
		black	1 NC	52PA8A1J	52PA8B1J	34.50	52PB9□1J	59.00	1
		red	1 NC	52PA8A2J	52PA8B2J	34.50	52PB9□2J	59.00	
		green	1 NC	52PA8A3J	52PA8B3J	34.50	52PB9□3J	59.00	
		yellow	1 NC	52PA8A4J	52PA8B4J	34.50	52PB9□4J	59.00	
Pushbutton with extended cap		blue	1 NC	52PA8A5J	52PA8B5J	34.50	52PB9□5J	59.00	
		gray	1 NC	52PA8A6J	52PA8B6J	34.50	52PB9□6J	59.00	
		orange	1 NC	52PA8A8J	52PA8B8J	34.50	52PB9□8J	59.00	
		black	1 NO + 1 NC	52PA8A1A	52PA8B1A	47.00	52PB9□1A	71.00	1
		red	1 NO + 1 NC	52PA8A2A	52PA8B2A	47.00	52PB9□2A	71.00	
		green	1 NO + 1 NC	52PA8A3A	52PA8B3A	47.00	52PB9□3A	71.00	
		yellow	1 NO + 1 NC	52PA8A4A	52PA8B4A	47.00	52PB9□4A	71.00	
		blue	1 NO + 1 NC	52PA8A5A	52PA8B5A	47.00	52PB9□5A	71.00	
		gray	1 NO + 1 NC	52PA8A6A	52PA8B6A	47.00	52PB9□6A	71.00	
		orange	1 NO + 1 NC	52PA8A8A	52PA8B8A	44.00	52PB9□8A	71.00	
		black	2 NO	52PA8A1F	52PA8B1F	47.00	52PB9□1F	71.00	1
		red	2 NO	52PA8A2F	52PA8B2F	47.00	52PB9□2F	71.00	
		green	2 NO	52PA8A3F	52PA8B3F	47.00	52PB9□3F	71.00	
		yellow	2 NO	52PA8A4F	52PA8B4F	47.00	52PB9□4F	71.00	
Pushbutton with 1 5/8" mushroom head		blue	2 NO	52PA8A5F	52PA8B5F	47.00	52PB9□5F	71.00	
		gray	2 NO	52PA8A6F	52PA8B6F	47.00	52PB9□6F	71.00	
		orange	2 NO	52PA8A8F	52PA8B8F	47.00	52PB9□8F	71.00	
		black	2 NC	52PA8A1G	52PA8B1G	47.00	52PB9□1G	71.00	1
		red	2 NC	52PA8A2G	52PA8B2G	47.00	52PB9□2G	71.00	
		green	2 NC	52PA8A3G	52PA8B3G	47.00	52PB9□3G	71.00	
		yellow	2 NC	52PA8A4G	52PA8B4G	47.00	52PB9□4G	71.00	
		blue	2 NC	52PA8A5G	52PA8B5G	47.00	52PB9□5G	71.00	
		gray	2 NC	52PA8A6G	52PA8B6G	47.00	52PB9□6G	71.00	
		orange	2 NC	52PA8A8G	52PA8B8G	47.00	52PB9□8G	71.00	
		black	2 NO + 2 NC	52PA8A1B	52PA8B1B	72.00	52PB9□1B	96.00	1
		red	2 NO + 2 NC	52PA8A2B	52PA8B2B	72.00	52PB9□2B	96.00	
		green	2 NO + 2 NC	52PA8A3B	52PA8B3B	72.00	52PB9□3B	96.00	
		yellow	2 NO + 2 NC	52PA8A4B	52PA8B4B	72.00	52PB9□4B	96.00	
		blue	2 NO + 2 NC	52PA8A5B	52PA8B5B	72.00	52PB9□5B	96.00	
		gray	2 NO + 2 NC	52PA8A6B	52PA8B6B	72.00	52PB9□6B	96.00	
		orange	2 NO + 2 NC	52PA8A8B	52PA8B8B	72.00	52PB9□8B	96.00	

Order no. change  
 Small operating head - 1 5/8" (41.3 mm)  
 Large operating head - 2.5" (63.5 mm)

D  
E








1) For other contact block assemblies replace the 8th digit of the catalog number as follows:  
 C = 3 NO + 3 NC  
 D = 4 NO + 4 NC  
 E = 1 NC (EB)  
 H = 1 NO (EM)

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Push Pull Operators

### Selection and ordering data

	Version	Color of actuator	Contact blocks	Order no.	List Price \$	Order no.	List Price \$	Pack Unit
2 position push-pull   52PA2A2A   52PA2ACA   52PA2V2A   52PA2W2A   52PA3W2U	<b>2 Position Push Pull Maintained, Non Illuminated</b>							
	Metal Mushroom Head, 1 5/8" (41.3 mm)	red	1 NC + 1 NO	52PA2A2A	98.00			1
		green	1 NC + 1 NO	52PA2A3A	98.00			
		chrome	1 NC + 1 NO	52PA2ACA	98.00			
	Small Plastic Mushroom Head, 1 5/8" (41.3 mm)	black	1 NC + 1 NO	52PA2W1A	88.00			
		red	1 NC + 1 NO	52PA2W2A	88.00			
		green	1 NC + 1 NO	52PA2W3A	88.00			
	Large Plastic Mushroom Head, 2 1/2" (63.5 mm)	black	1 NC + 1 NO	52PA2V1A	106.00			
		red	1 NC + 1 NO	52PA2V2A	106.00			
		green	1 NC + 1 NO	52PA2V3A	106.00			
	<b>3 Position Push Pull Momentary, Non-Illuminated (Spring return to center-pull to start, push to stop)<sup>1)</sup></b>							
	Metal Mushroom Head, 1 5/8" (41.3 mm)	red	1 NC + 1 NO	52PA3A2U	96.00			1
	green	1 NC + 1 NO	52PA3A3U	96.00				
	chrome	1 NC + 1 NO	52PA3ACU	96.00				
Small Plastic Mushroom Head, 1 5/8" (41.3 mm)	black	1 NC + 1 NO	52PA3W1U	96.00				
	red	1 NC + 1 NO	52PA3W2U	96.00				
	green	1 NC + 1 NO	52PA3W3U	96.00				
Large Plastic Mushroom Head, 2 1/2" (63.5 mm)	black	1 NC + 1 NO	52PA3V1U	106.00				
	red	1 NC + 1 NO	52PA3V2U	106.00				
	green	1 NC + 1 NO	52PA3V3U	106.00				
2 position push pull with fully illuminated mushroom head   52PA2D2A   52PA2DRA	<b>2 Position Push Pull Maintained, Illuminated</b>			<b>Operators with incandescent lamp</b>		<b>Operators with LED lamp<sup>****2)</sup></b>		
	24V Full Voltage, type 757, or 24V LED	less operating head	1 NC + 1 NO	52PA2DNA	119.00	****	—	1
	1 3/4" (44.5 mm)	chrome red	1 NC + 1 NO	52PA2D2A	137.00	52PE2D2A	151.00	
		chrome green	1 NC + 1 NO	52PA2D3A	137.00	52PE2D3A	151.00	
		chrome amber	1 NC + 1 NO	52PA2D9A	137.00	52PE2D9A	151.00	
		full red	1 NC + 1 NO	52PA2DRA	137.00	52PE2DRA	151.00	
		full green	1 NC + 1 NO	52PA2DSA	137.00	52PE2DSA	151.00	
		full amber	1 NC + 1 NO	52PA2DTA	137.00	52PE2DTA	151.00	
	120V transformer with 6V 755 type lamp, or 6V LED	less operating head	1 NC + 1 NO	52PA2GNA	119.00	****	—	1
	1 3/4" (44.5 mm)	chrome red	1 NC + 1 NO	52PA2G2A	137.00	52PE2G2A	151.00	
		chrome green	1 NC + 1 NO	52PA2G3A	137.00	52PE2G3A	151.00	
		chrome amber	1 NC + 1 NO	52PA2G9A	137.00	52PE2G9A	151.00	
		full red	1 NC + 1 NO	52PA2GRA	137.00	52PE2GRA	151.00	
		full green	1 NC + 1 NO	52PA2GSA	137.00	52PE2GSA	151.00	
		full amber	1 NC + 1 NO	52PA3GTA	137.00	52PE2GTA	151.00	
	240V transformer with 6V 755 type lamp, or 6V LED	less operating head	1 NC + 1 NO	52PA2HNA	119.00	****	—	1
	1 3/4" (44.5 mm)	chrome red	1 NC + 1 NO	52PA2H2A	137.00	52PE2H2A	151.00	
		chrome green	1 NC + 1 NO	52PA2H3A	137.00	52PE2H3A	151.00	
		chrome amber	1 NC + 1 NO	52PA2H9A	137.00	52PE2H9A	151.00	
	480V transformer with 6V 755 type lamp, or 6V LED	less operating head	1 NC + 1 NO	52PA2JNA	119.00	****	—	1
	1 3/4" (44.5 mm)	chrome red	1 NC + 1 NO	52PA2J2A	137.00	52PE2J2A	151.00	
		chrome green	1 NC + 1 NO	52PA2J3A	137.00	52PE2J3A	151.00	
		chrome amber	1 NC + 1 NO	52PA2J9A	137.00	52PE2J9A	151.00	
	600V transformer with 6V 755 type lamp, or 6V LED	less operating head	1 NC + 1 NO	52PA2KNA	119.00	****	—	1
1 3/4" (44.5 mm)	chrome red	1 NC + 1 NO	52PA2K2A	137.00	52PE2K2A	151.00		
	chrome green	1 NC + 1 NO	52PA2K3A	137.00	52PE2K3A	151.00		
	chrome amber	1 NC + 1 NO	52PA2K9A	137.00	52PE2K9A	151.00		

1) Blocks cannot be interchanged (start-stop circuit).

2) LED color must match lens color.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

### Push Pull Operators

#### Selection and ordering data

	Version	Color of actuator	Contact blocks	Order no. operators with incandescent lamp	List Price \$	Order no. operators with LED type <sup>2)</sup>	List Price \$	Pack Unit			
3 position push-pull illuminated	<b>3 Position Push Pull Momentary, Illuminated, spring return to center<sup>1)</sup></b>										
	24V Full Voltage 757 type, or 24V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PA3DNU</b>	<b>119.00</b>	*****	—	—	1		
		chrome red	1NC + 1NO	<b>52PA3D2U</b>	<b>137.00</b>	<b>52PE3D2U</b>	<b>151.00</b>				
		chrome green	1NC + 1NO	<b>52PA3D3U</b>	<b>137.00</b>	<b>52PE3D3U</b>	<b>151.00</b>				
		chrome amber	1NC + 1NO	<b>52PA3D9U</b>	<b>137.00</b>	<b>52PE3D9U</b>	<b>151.00</b>				
		full red	1NC + 1NO	<b>52PA3DRU</b>	<b>137.00</b>	<b>52PE3DRU</b>	<b>151.00</b>				
		full green	1NC + 1NO	<b>52PA3DSU</b>	<b>137.00</b>	<b>52PE3DSU</b>	<b>151.00</b>				
		full amber	1NC + 1NO	<b>52PA3DTU</b>	<b>137.00</b>	<b>52PE3DTU</b>	<b>151.00</b>				
		120V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PA3GNU</b>	<b>119.00</b>	*****	—		—	1
			chrome red	1NC + 1NO	<b>52PA3G2U</b>	<b>137.00</b>	<b>52PE3G2U</b>	<b>151.00</b>			
			chrome green	1NC + 1NO	<b>52PA3G3U</b>	<b>137.00</b>	<b>52PE3G3U</b>	<b>151.00</b>			
			chrome amber	1NC + 1NO	<b>52PA3G9U</b>	<b>137.00</b>	<b>52PE3G9U</b>	<b>151.00</b>			
			full red	1NC + 1NO	<b>52PA3GRU</b>	<b>137.00</b>	<b>52PE3GRU</b>	<b>151.00</b>			
	full green		1NC + 1NO	<b>52PA3GSU</b>	<b>137.00</b>	<b>52PE3GSU</b>	<b>151.00</b>				
	240V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PA3HNU</b>	<b>119.00</b>	*****	—	—	1		
		chrome red	1NC + 1NO	<b>52PA3H2U</b>	<b>137.00</b>	<b>52PE3H2U</b>	<b>151.00</b>				
		chrome green	1NC + 1NO	<b>52PA3H3U</b>	<b>137.00</b>	<b>52PE3H3U</b>	<b>151.00</b>				
		chrome amber	1NC + 1NO	<b>52PA3H9U</b>	<b>137.00</b>	<b>52PE3H9U</b>	<b>151.00</b>				
		full red	1NC + 1NO	<b>52PA3GRU</b>	<b>137.00</b>	<b>52PE3GRU</b>	<b>151.00</b>				
		full green	1NC + 1NO	<b>52PA3GSU</b>	<b>137.00</b>	<b>52PE3GSU</b>	<b>151.00</b>				
	480V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PA3JNU</b>	<b>119.00</b>	*****	—	—	1		
		chrome red	1NC + 1NO	<b>52PA3J2U</b>	<b>137.00</b>	<b>52PE3J2U</b>	<b>151.00</b>				
		chrome green	1NC + 1NO	<b>52PA3J3U</b>	<b>137.00</b>	<b>52PE3J3U</b>	<b>151.00</b>				
		chrome amber	1NC + 1NO	<b>52PA3J9U</b>	<b>137.00</b>	<b>52PE3J9U</b>	<b>151.00</b>				
full red		1NC + 1NO	<b>52PA3GRU</b>	<b>137.00</b>	<b>52PE3GRU</b>	<b>151.00</b>					
full green		1NC + 1NO	<b>52PA3GSU</b>	<b>137.00</b>	<b>52PE3GSU</b>	<b>151.00</b>					
600V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PA3KNU</b>	<b>119.00</b>	*****	—	—	1			
	chrome red	1NC + 1NO	<b>52PA3K2U</b>	<b>137.00</b>	<b>52PE3K2U</b>	<b>151.00</b>					
	chrome green	1NC + 1NO	<b>52PA3K3U</b>	<b>137.00</b>	<b>52PE3K3U</b>	<b>151.00</b>					
	chrome amber	1NC + 1NO	<b>52PA3K9U</b>	<b>137.00</b>	<b>52PE3K9U</b>	<b>151.00</b>					
	full red	1NC + 1NO	<b>52PA3GRU</b>	<b>137.00</b>	<b>52PE3GRU</b>	<b>151.00</b>					
	full green	1NC + 1NO	<b>52PA3GSU</b>	<b>137.00</b>	<b>52PE3GSU</b>	<b>151.00</b>					



52PA3D2U



52PA3DRU

1) Blocks cannot be interchanged (start-stop circuit).

2) LED color must match lens color.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Selector Switch Complete Units

### Selection and ordering data

	Version	Lever type	Contact blocks	Cam <sup>1)</sup>	Order no.	List Price	Pack
						\$	unit
<b>Selector Switches with 2 switching positions</b>							
Short lever assembled selector switch	Maintained operation	Short lever, non-Illuminated	1NO	A	52SA2AABK1	42.50	1
		Short lever, non-Illuminated	1NC	A	52SA2AABJ1	42.50	
		Short lever, non-Illuminated	1NO + 1NC	A	52SA2AABA1	55.00	
		Long lever, non-Illuminated	1NO	A	52SB2AABK1	42.50	
		Long lever, non-Illuminated	1NC	A	52SB2AABJ1	42.50	
		Long lever, non-Illuminated	1NO + NC	A	52SB2AABA1	55.00	
	Spring return from right operation	Short lever, non-Illuminated	1NO	A	52SA2ACBK1	59.00	1
		Short lever, non-Illuminated	1NC	A	52SA2ACBJ1	59.00	
		Short lever, non-Illuminated	1NO + 1NC	A	52SA2ACBA1	72.00	
		Long lever, non-Illuminated	1NO	A	52SB2ACBK1	59.00	
Long lever, non-Illuminated		1NC	A	52SB2ACBJ1	59.00		
Long lever, non-Illuminated		1NO + 1NC	A	52SB2ACBA1	72.00		
<b>Selector Switches with 3 switching positions</b>							
Long lever assembled selector switch	Maintained operation	Short lever, non-Illuminated	1NO + 1NC	C	52SA2CABA1	55.00	1
		Short lever, non-Illuminated	2NC + 1NO	G	52SA2GABJ2K1	67.00	
		Short lever, non-Illuminated	2NO + 2NC	C	52SA2CABA2	80.00	
		Long lever, non-Illuminated	1NO + 1NC	C	52SB2CABA1	55.00	
		Long lever, non-Illuminated	2NC + 1NO	G	52SB2GABJ2K1	67.00	
		Long lever, non-Illuminated	2NO + 2NC	C	52SB2CABA2	80.00	
	Spring return from right <sup>2)</sup>	Short lever, non-Illuminated	1NO + 1NC	C	52SA2CCBA1	72.00	1
		Short lever, non-Illuminated	2NC + 1NO	G	52SA2GCBJ2K1	84.00	
		Short lever, non-Illuminated	2NO + 2NC	C	52SA2CCBA2	96.00	
		Long lever, non-Illuminated	1NO + 1NC	C	52SB2CCBA1	72.00	
Long lever, non-Illuminated		2NC + 1NO	G	52SB2GCBJ2K1	84.00		
Long lever, non-Illuminated		2NO + 2NC	C	52SB2CCBA2	96.00		
Spring return from right & left operation	Short lever, non-Illuminated	1NO + 1NC	C	52SA2CDBA1	72.00	1	
	Short lever, non-Illuminated	2NC + 1NO	G	52SA2GDBJ2K1	84.00		
	Short lever, non-Illuminated	2NO + 2NC	C	52SA2CDBA2	96.00		
	Long lever, non-Illuminated	1NO + 1NC	C	52SB2CDBA1	72.00		
	Long lever, non-Illuminated	2NC + 1NO	G	52SB2GDBJ2K1	84.00		
	Long lever, non-Illuminated	2NO + 2NC	C	52SB2CDBA2	96.00		
<b>Key-operated selector switches, 2 switching positions</b>							
Assembled keyed selector switch	Maintained operation	Key removable in left positions	1NO	A	52SC6AFK1	92.00	1
		Key removable in left positions	1NC	A	52SC6AFJ1	92.00	
		Key removable in left positions	1NO + 1NC	A	52SC6AFA1	105.00	
	Spring return from right operation	Key removable in left positions	1NO	A	52SC6AXK1	108.00	1
		Key removable in left positions	1NC	A	52SC6AXJ1	108.00	
		Key removable in left positions	1NO + 1NC	A	52SC6AXA1	121.00	
<b>Key-operated selector switches, 3 switching positions</b>							
	Maintained operation	Key removable in all positions	1NC + 1NO	C	52SC6CEA1	105.00	1
		Key removable in all positions	2NC + 1NO	G	52SC6GEJ2K1	117.00	
		Key removable in all positions	2NO + 2NC	C	52SC6CEA2	129.00	
	Spring return from right operation <sup>3)</sup>	Key removable in all positions	1NO + 1NC	C	52SC6CZA1	121.00	1
		Key removable in all positions	2NC + 1NO	G	52SC6GZJ2K1	133.00	
		Key removable in all positions	2NO + 2NC	C	52SC6CZA2	145.00	
Spring return from right & left operation	Key removable in all positions	1NO + 1NC	C	52SC6CVA1	121.00	1	
	Key removable in all positions	2NC + 1NO	G	52SC6GVJ2K1	133.00		
	Key removable in all positions	2NO + 2NC	C	52SC6CVA2	145.00		

1) For contact operation, see cam selection table on page 16-209.

2) Spring return from left available by substituting "BB" for "CB" in the order number. Eg. 52SA2CBBA1.


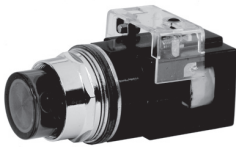
3) Spring return from left available by substituting "CY" for "CZ" in the order number. Eg. 52SC6CYA1.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Indicator Light Operators

### Selection and ordering data

Version	Color of actuator	Order no.	List Price	Order no.	List Price	Pack	
			\$	Operators with LED lamp <sup>3)</sup>	\$		Unit
<b>Indicator light with plastic lens - Full voltage type AC/DC<sup>1) 2)</sup></b>							
Pilot light 	6-8V with 755 type, or 6V LED	red	52PA4B2	72.00	52PE4B2	86.00	1
		green	52PA4B3	72.00	52PE4B3	86.00	
		amber	52PA4B9	72.00	52PE4B9	86.00	
		less lens	52PA4BN	66.00	—	—	
	12V with 756 type	red	52PA4C2	72.00			1
		green	52PA4C3	72.00			
		amber	52PA4C9	72.00			
		less lens	52PA4CN	66.00			
	24V with 757 type, or 24V LED	red	52PA4D2	72.00	52PE4D2	86.00	1
		green	52PA4D3	72.00	52PE4D3	86.00	
		amber	52PA4D9	72.00	52PE4D9	86.00	
		less lens	52PA4DN	66.00	—	—	
	120V with 120MB type, or 120V LED	red	52PC4E2	72.00	52PE4E2	86.00	1
		green	52PC4E3	72.00	52PE4E3	86.00	
		amber	52PC4E9	72.00	52PE4E9	86.00	
		less lens	52PC4EN	66.00	—	—	
<b>Indicator light with plastic lens - Transformer type AC<sup>1) 2)</sup></b>							
	120V with 6V 755 type lamp, or 6V LED	red	52PA4G2	88.00	52PE4G2	102.00	1
		green	52PA4G3	88.00	52PE4G3	102.00	
		amber	52PA4G9	88.00	52PE4G9	102.00	
		less lens	52PA4GN	82.00	—	—	
	240V with 6V 755 type lamp, or 6V LED	red	52PA4H2	88.00	52PE4H2	102.00	1
		green	52PA4H3	88.00	52PE4H3	102.00	
		amber	52PA4H9	88.00	52PE4H9	102.00	
		less lens	52PA4HN	82.00	—	—	
	277V with 6V 755 type lamp, or 6V LED	red	52PA4T2	88.00	52PE4T2	102.00	1
		green	52PA4T3	88.00	52PE4T3	102.00	
		amber	52PA4T9	88.00	52PE4T9	102.00	
		less lens	52PA4TN	82.00	—	—	
	480V with 6V 755 type lamp, or 6V LED	red	52PA4J2	88.00	52PE4J2	102.00	1
		green	52PA4J3	88.00	52PE4J3	102.00	
		amber	52PA4J9	88.00	52PE4J9	102.00	
		less lens	52PA4JN	82.00	—	—	
	600V with 6V 755 type lamp, or 6V LED	red	52PA4K2	88.00	52PE4K2	102.00	1
		green	52PA4K3	88.00	52PE4K3	102.00	
amber		52PA4K9	88.00	52PE4K9	102.00		
less lens		52PA4KN	82.00	—	—		
<b>Indicator light with plastic lens - Resistor type AC/DC<sup>1) 2)</sup></b>							
240V with 120V 120MB type lamp, or 120V LED	red	52PC4N2	72.00	52PE4N2	86.00	1	
	green	52PC4N3	72.00	52PE4N3	86.00		
	amber	52PC4N9	72.00	52PE4N9	86.00		
	less lens	52PC4NN	66.00	—	—		

Color code table: blue  
clear  
white

5  
A  
B

5  
A  
B

1) All illuminated devices come with std. Touch-safe shield per UL stds.

2) For factory installed glass lens, replace the 5th character with "5".

3) LED color must match lens color. Consult Factory for Neon types.





# Pushbutton Units and Indicator Lights

30 mm Heavy Duty, Watertight/Oiltight, Class 52

Push to Test Units

## Selection and ordering data

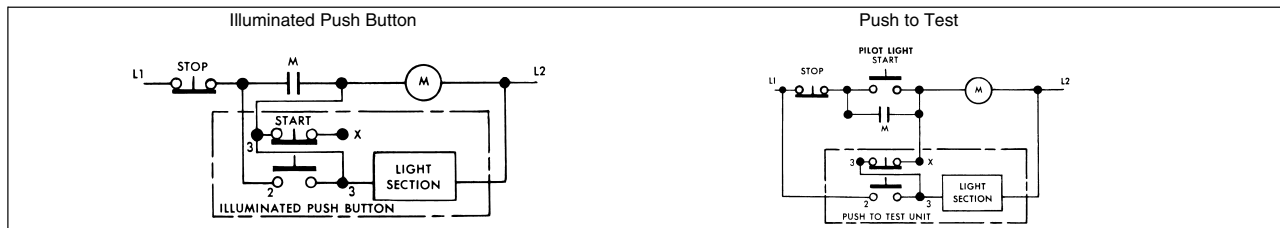
	Version	Color of actuator	Contact blocks	Order no.	List Price	Order no.	List Price	Pack
				Operators with Incandescent lamp	\$	Operators with LED lamp <sup>2)</sup>	\$	Unit
Push to test/illuminated pushbutton   52PA6D2A	<b>Illuminated pushbuttons/Push to test indicator light with plastic lens - Full voltage type AC/DC<sup>1)3)</sup></b>							
	6-8V with 755 type, or 6V LED	red	1NO + 1NC	52PA6B2A	96.00	52PE6B2A	110.00	1
		green	1NO + 1NC	52PA6B3A	96.00	52PE6B3A	110.00	
		amber	1NO + 1NC	52PA6B9A	96.00	52PE6B9A	110.00	
		less lens	1NO + 1NC	52PA6BNA	91.00	—	—	
	24V with 757 type, or 24V LED	red	1NO + 1NC	52PA6D2A	96.00	52PE6D2A	110.00	1
		green	1NO + 1NC	52PA6D3A	96.00	52PE6D3A	110.00	
		amber	1NO + 1NC	52PA6D9A	96.00	52PE6D9A	110.00	
	less lens	1NO + 1NC	52PA6DNA	91.00	—	—		
 52PA6G2A	<b>Illuminated pushbuttons/Push to test indicator light with plastic lens - Transformer type AC<sup>1)3)</sup></b>							
	120V with 6V 755 type lamp, or 6V LED	red	1NC + 1NO	52PA6G2A	112.00	52PE6G2A	126.00	1
		green	1NC + 1NO	52PA6G3A	112.00	52PE6G3A	126.00	
		amber	1NC + 1NO	52PA6G9A	112.00	52PE6G9A	126.00	
		less lens	1NC + 1NO	52PA6GNA	107.00	—	—	
	240V with 6V 755 type lamp, or 6V LED	red	1NC + 1NO	52PA6H2A	112.00	52PE6H2A	126.00	1
		green	1NC + 1NO	52PA6H3A	112.00	52PE6H3A	126.00	
		amber	1NC + 1NO	52PA6H9A	112.00	52PE6H9A	126.00	
		less lens	1NC + 1NO	52PA6HNA	107.00	—	—	
	480V with 6V 755 type lamp, or 6V LED	red	1NC + 1NO	52PA6J2A	112.00	52PE6J2A	126.00	1
		green	1NC + 1NO	52PA6J3A	112.00	52PE6J3A	126.00	
		amber	1NC + 1NO	52PA6J9A	112.00	52PE6J9A	126.00	
		less lens	1NC + 1NO	52PA6JNA	107.00	—	—	
	600V with 6V 755 type lamp, or 6V LED	red	1NC + 1NO	52PA6K2A	112.00	52PE6K2A	126.00	1
		green	1NC + 1NO	52PA6K3A	112.00	52PE6K3A	126.00	
		amber	1NC + 1NO	52PA6K9A	112.00	52PE6K9A	126.00	
	less lens	1NC + 1NO	52PA6KNA	107.00	—	—		
Push to test indicator light with plastic lens - Resistor type AC/DC <sup>3)</sup>	<b>Push to test indicator light with plastic lens - Resistor type AC/DC<sup>3)</sup></b>							
	120V with 24V 757 type lamp, or 24V LED	red	1NC + 1NO	52PA6M2A	96.00	52PE6M2A	110.00	1
		green	1NC + 1NO	52PA6M3A	96.00	52PE6M3A	110.00	
		amber	1NC + 1NO	52PA6M9A	96.00	52PE6M9A	110.00	
		less lens	1NC + 1NO	52PA6MNA	91.00	—	—	
	240V with 24V 757 type lamp, or 24V LED	red	1NC + 1NO	52PA6N2A	96.00	52PE6N2A	110.00	1
		green	1NC + 1NO	52PA6N3A	96.00	52PE6N3A	110.00	
		amber	1NC + 1NO	52PA6N9A	96.00	52PE6N9A	110.00	
	less lens	1NC + 1NO	52PA6NNA	91.00	—	—		

Color code table: blue  
clear  
white

5  
A  
B

5  
A  
B

## Wiring Diagrams



1) All illuminated devices come with std. Touch-safe shield per UL stds.  
2) LED color must match lens color. Consult Factory for Neon types.

3) For factory installed lens guard, add suffix "V".

# Pushbutton Units and Indicator Lights

30 mm Heavy Duty, Watertight/Oiltight, Class 52

*Pushbutton Operators Only*

## Selection and ordering data

Version	Color of actuator	Order no.	List Price	Pack	
			\$	Unit	
<b>Pushbutton with flush cap</b>	black	52PA8A1	22.00	1	
	red	52PA8A2	22.00		
	green	52PA8A3	22.00		
	yellow	52PA8A4	22.00		
	blue	52PA8A5	22.00		
	gray	52PA8A6	22.00		
	orange	52PA8A8	22.00		
	less cap	52PA8	20.50		
	kit with all colors	52PA8AN	25.50		
	<b>Pushbutton with extended cap</b>	black	52PA8B1		22.00
red		52PA8B2	22.00		
green		52PA8B3	22.00		
yellow		52PA8B4	22.00		
blue		52PA8B5	22.00		
gray		52PA8B6	22.00		
orange		52PA8B8	22.00		
less cap		52PA8	20.50		
kit with all colors		52PA8BN	25.50		
<b>Pushbutton with mushroom cap</b> 1 5/8" (41.3mm)		black	52PB9D1	46.50	1
	red	52PB9D2	46.50		
	green	52PB9D3	46.50		
	yellow	52PB9D4	46.50		
	blue	52PB9D5	46.50		
	gray	52PB9D6	46.50		
	orange	52PB9D8	46.50		
	less cap	52PB9	38.50		
	kit with all colors	52PB9DN	49.00		
	<b>Pushbutton with mushroom cap</b> 2 1/2" (63.5mm)	black	52PB9E1	55.00	
red		52PB9E2	55.00		
green		52PB9E3	55.00		
yellow		52PB9E4	55.00		
blue		52PB9E5	55.00		
gray		52PB9E6	55.00		
orange		52PB9E8	55.00		
less cap		52PB9	38.50		
less cap with lens kit		52PB9EN	49.00		
<b>2 position push pull maintained, non illuminated</b>		Metal Mushroom Head, 1 5/8" (41.3 mm) (Threaded)	red	52PA2A2	73.00
	green		52PA2A3	73.00	
	chrome		52PA2AC	73.00	
	Small Plastic Mushroom Head, 1 5/8" (41.3 mm) (Set Screw)	black	52PA2W1	63.00	1
		red	52PA2W2	63.00	
		green	52PA2W3	63.00	
	Large Plastic Mushroom Head, 2 1/2" (63.5 mm) (Set Screw)	black	52PA2V1	71.00	1
		red	52PA2V2	71.00	
		green	52PA2V3	71.00	

Flush pushbutton operator



2 position push pull operator



# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Selector Switch Operators

### Selection and ordering data

Version	Lever type	Color of lever insert	Cam Code <sup>2)</sup>	Input Voltage	Order no.	List Price \$	Pack unit	
<b>Selector Switches with 2 switching positions</b>								
Maintained operation	Non-Illuminated, short lever	White	A		52SA2AAB	30.50	1	
	Non-Illuminated, long lever	White	A		52SB2AAB	30.50		
	Illuminated, short lever <sup>1)</sup> with full voltage 24V, 757 type lamp		A	24V	52SA7ADN	73.00	1	
	Illuminated, short lever <sup>1)</sup> with 50/60 Hz transformer 6V, 755 type lamp		A	120V 240V 24V	52SA7AGN 52SA7AHN 52SA7AAN	91.00 91.00 91.00	1	
Spring return from right operation	Non-Illuminated, short lever	White	A		52SA2ACB	47.00	1	
	Non-Illuminated, long lever	White	A		52SB2ACB	47.00		
<b>Selector Switches with 3 switching positions</b>								
Maintained operation	Non-Illuminated, short lever	White	B		52SA2BAB	30.50	1	
	Non-Illuminated, long lever	White	B		52SB2BAB	30.50		
	Non-Illuminated, short lever	White	C <sup>3)</sup>		52SA2CAB	30.50		
	Non-Illuminated, long lever	White	C <sup>3)</sup>		52SB2CAB	30.50		
	Non-Illuminated, short lever	White	D		52SA2DAB	30.50		
	Non-Illuminated, long lever	White	D		52SB2DAB	30.50		
	Non-Illuminated, short lever	White	E		52SA2EAB	30.50		
	Non-Illuminated, long lever	White	E		52SB2EAB	30.50		
	Non-Illuminated, short lever	White	G		52SA2GAB	30.50		
	Non-Illuminated, long lever	White	G		52SB2GAB	30.50		
	Illuminated, short lever <sup>1)</sup> with full voltage 24V, 757 type lamp		B C <sup>3)</sup>	24V 24V	52SA7BDN 52SA7CDN	73.00 73.00	1	
	Illuminated, short lever <sup>1)</sup> with 50/60 Hz transformer 6V, 755 type lamp		B C <sup>3)</sup> B C <sup>3)</sup> B C	120V 120V 240V 240V 24V 24V	52SA7BGN 52SA7CGN 52SA7BHN 52SA7CHN 52SA7BLN 52SA7CLN	91.00 91.00 91.00 91.00 91.00 91.00	1	
	Spring return from right operation	Non-Illuminated, short lever	White	B		52SA2BCB	47.00	1
		Non-Illuminated, long lever	White	B		52SB2BCB	47.00	
Non-Illuminated, short lever		White	C <sup>3)</sup>		52SA2CCB	47.00		
Non-Illuminated, long lever		White	C <sup>3)</sup>		52SB2CCB	47.00		
Non-Illuminated, short lever		White	D		52SA2DCB	47.00		
Non-Illuminated, long lever		White	D		52SB2DCB	47.00		
Non-Illuminated, short lever		White	E		52SA2ECB	47.00		
Non-Illuminated, long lever		White	E		52SB2ECB	47.00		
Non-Illuminated, short lever		White	G		52SA2GCB	47.00		
Non-Illuminated, long lever		White	G		52SB2GCB	47.00		
Spring return from left operation		Non-Illuminated, short lever	White	B		52SA2BBB	47.00	1
		Non-Illuminated, long lever	White	B		52SB2BBB	47.00	
	Non-Illuminated, short lever	White	C <sup>3)</sup>		52SA2CBB	47.00		
	Non-Illuminated, long lever	White	C <sup>3)</sup>		52SB2CBB	47.00		
	Non-Illuminated, short lever	White	D		52SA2DBB	47.00		
	Non-Illuminated, long lever	White	D		52SB2DBB	47.00		
	Non-Illuminated, short lever	White	E		52SA2EBB	47.00		
	Non-Illuminated, long lever	White	E		52SB2EBB	47.00		
	Non-Illuminated, short lever	White	G		52SA2GBB	47.00		
	Non-Illuminated, long lever	White	G		52SB2GBB	47.00		
Spring return from left and right operation	Non-Illuminated, short lever	White	B		52SA2BDB	47.00	1	
	Non-Illuminated, long lever	White	B		52SB2BDB	47.00		
	Non-Illuminated, short lever	White	C <sup>3)</sup>		52SA2CDB	47.00		
	Non-Illuminated, long lever	White	C <sup>3)</sup>		52SB2CDB	47.00		
	Non-Illuminated, short lever	White	D		52SA2DDB	47.00		
	Non-Illuminated, long lever	White	D		52SB2DDB	47.00		
	Non-Illuminated, short lever	White	E		52SA2EDB	47.00		
	Non-Illuminated, long lever	White	E		52SB2EDB	47.00		
	Non-Illuminated, short lever	White	G		52SA2GDB	47.00		
	Non-Illuminated, long lever	White	G		52SB2GDB	47.00		
<b>Selector Switches with 4 switching positions</b>								
Maintained operation	Non-Illuminated, short lever	White	H		52SA2HAB	30.50	1	
	Non-Illuminated, long lever	White	H		52SB2HAB	30.50		

1) Illuminated selector switches are provided without lenses. Lens kit must be ordered separately on page 16-211.

2) For contact operation, see cam selection chart on page 16-209.

3) The C cam is limited to 4 contact blocks, 1 or 2 pole.




# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Selector Switch Operators

### Selection and ordering data

Version	Button	Position	Color of lever insert	Cam Code <sup>2)</sup>	Order no.	List Price	Pack
						\$	unit
 <p><b>Selector Pushbutton Operators</b></p> <p>NEMA 12/13 only Flush type cap</p> <p>1/2" raised type cap</p>	Flush	2	Black	P	52SA3P1	47.00	1
			Black	Q	52SA3Q1	47.00	
			Black	R	52SA3R1	47.00	
	Flush	2	Red	P	52SA3P2	47.00	1
			Red	Q	52SA3Q2	47.00	
			Red	R	52SA3R2	47.00	
	Flush	3	Black	S	52SA3S1	47.00	1
			Red	S	52SA3S2	47.00	
	Extended	2	Black	P	52SA4P1	47.00	1
			Black	Q	52SA4Q1	47.00	
			Black	R	52SA4R1	47.00	
	Extended	2	Red	P	52SA4P2	47.00	1
			Red	Q	52SA4Q2	47.00	
			Red	R	52SA4R2	47.00	
	Extended	3	Black	S	52SA4S1	47.00	1
			Red	S	52SA4S2	47.00	

1) For contact operation, see cam selection chart on page 16-209.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Selector Switch Operators

### Selection and ordering data

Version	Key removal position	Lock No.	Cam Code 1)	Order no.	List Price \$	Pack unit
<b>2 Pos spring return from right to center</b>						
	Left	501CH	A	52SC6AX	80.00	1
<b>Key-operated selector Switches with 2 switching positions</b>						
Maintained operation	Both	501CH	A	52SC6AE	80.00	1
	Left	501CH	A	52SC6AF	80.00	
<b>Key-operated selector Switches with 3 switching positions</b>						
Maintained operation	All	501CH	B	52SC6BE	80.00	1
			C 2)	52SC6CE	80.00	
			D	52SC6DE	80.00	
			E	52SC6EE	80.00	
			G	52SC6GE	80.00	
	Left	501CH	B	52SC6BF	80.00	1
			C 2)	52SC6CF	80.00	
			D	52SC6DF	80.00	
			E	52SC6EF	80.00	
			G	52SC6GF	80.00	
	Right	501CH	B	52SC6BG	80.00	1
			C 2)	52SC6CG	80.00	
			D	52SC6DG	80.00	
			E	52SC6EG	80.00	
			G	52SC6GG	80.00	
	Center	501CH	B	52SC6BH	80.00	1
			C 2)	52SC6CH	80.00	
			D	52SC6DH	80.00	
			E	52SC6EH	80.00	
			G	52SC6GH	80.00	
	Left and right	501CH	B	52SC6BJ	80.00	1
			C 2)	52SC6CJ	80.00	
			D	52SC6DJ	80.00	
			E	52SC6EJ	80.00	
			G	52SC6GJ	80.00	
	Left and center	501CH	B	52SC6BK	80.00	1
			C 2)	52SC6CK	80.00	
			D	52SC6DK	80.00	
			E	52SC6EK	80.00	
			G	52SC6GK	80.00	
	Right and center	501CH	B	52SC6BM	80.00	1
			C 2)	52SC6CM	80.00	
			D	52SC6DM	80.00	
			E	52SC6EM	80.00	
			G	52SC6GM	80.00	
Spring return from right operation	Center	501CH	B	52SC6BU	96.00	1
			C 2)	52SC6CU	96.00	
			D	52SC6DU	96.00	
			E	52SC6EU	96.00	
			G	52SC6GU	96.00	
	Left and center	501CH	B	52SC6BZ	96.00	1
			C 2)	52SC6CZ	96.00	
			D	52SC6DZ	96.00	
			E	52SC6EZ	96.00	
			G	52SC6GZ	96.00	
Spring return from left operation	Center	501CH	B	52SC6BT	96.00	1
			C 2)	52SC6CT	96.00	
			D	52SC6DT	96.00	
			E	52SC6ET	96.00	
			G	52SC6GT	96.00	
	Right	501CH	B	52SC6BW	96.00	1
			C 2)	52SC6CW	96.00	
			D	52SC6DW	96.00	
			E	52SC6EW	96.00	
			G	52SC6GW	96.00	
	Right and center	501CH	B	52SC6BY	96.00	1
			C 2)	52SC6CY	96.00	
			D	52SC6DY	96.00	
			E	52SC6EY	96.00	
			G	52SC6GY	96.00	
Spring return from left and right operation	Center	501CH	B	52SC6BV	96.00	1
			C 2)	52SC6CV	96.00	
			D	52SC6DV	96.00	
			E	52SC6EV	96.00	
			G	52SC6GV	96.00	
Lock types keyed different from standard - up to 25 different keys.....				5 3)		
To order special locks for keyed selector switches, append corresponding 'X' suffix to part number. (Same list price as standard key)		#550CH		X298		1
		#549CH		X299		
		#548CH		X300		
		#547CH		X301		
		#506CH		X302		

Ordering example  
52SC6AEX298

1) For contact operation, see cam selection chart on page 16-209.

2) C cam limited to 4 single or double pole blocks on spring return operators.

3) Change the "6" to a "5" in the fifth position and add suffix "X", 25 diff. available.










# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Complete Units

## Selection and ordering data

Version	Color of actuator	Contact blocks	Flush cap order no. <sup>1)</sup>	Extended cap order no. <sup>1)</sup>	List Price	Mushroom head order no. <sup>1)</sup>	List Price	Pack
					\$		\$	Unit
<b>Pushbutton unit with assembled contact blocks</b>	black	1 NO	52PX8A1K	52PX8B1K	34.50	52PX9□1K	59.00	1
	red	1 NO	52PX8A2K	52PX8B2K	34.50	52PX9□2K	59.00	
	green	1 NO	52PX8A3K	52PX8B3K	34.50	52PX9□3K	59.00	
	yellow	1 NO	52PX8A4K	52PX8B4K	34.50	52PX9□4K	59.00	
Flush assembled pushbutton	blue	1 NO	52PX8A5K	52PX8B5K	34.50	52PX9□5K	59.00	1
	gray	1 NO	52PX8A6K	52PX8B6K	34.50	52PX9□6K	59.00	
	orange	1 NO	52PX8A8K	52PX8B8K	34.50	52PX9□8K	59.00	
	black	1 NC	52PX8A1J	52PX8B1J	34.50	52PX9□1J	59.00	1
	red	1 NC	52PX8A2J	52PX8B2J	34.50	52PX9□2J	59.00	
	green	1 NC	52PX8A3J	52PX8B3J	34.50	52PX9□3J	59.00	
	yellow	1 NC	52PX8A4J	52PX8B4J	34.50	52PX9□4J	59.00	
	blue	1 NC	52PX8A5J	52PX8B5J	34.50	52PX9□5J	59.00	1
Extended assembled pushbutton	gray	1 NC	52PX8A6J	52PX8B6J	34.50	52PX9□6J	59.00	
	orange	1 NC	52PX8A8J	52PX8B8J	34.50	52PX9□8J	59.00	
	black	1 NO + 1 NC	52PX8A1A	52PX8B1A	47.00	52PX9□1A	71.00	1
	red	1 NO + 1 NC	52PX8A2A	52PX8B2A	47.00	52PX9□2A	71.00	
	green	1 NO + 1 NC	52PX8A3A	52PX8B3A	47.00	52PX9□3A	71.00	
	yellow	1 NO + 1 NC	52PX8A4A	52PX8B4A	47.00	52PX9□4A	71.00	
	blue	1 NO + 1 NC	52PX8A5A	52PX8B5A	47.00	52PX9□5A	71.00	1
	gray	1 NO + 1 NC	52PX8A6A	52PX8B6A	47.00	52PX9□6A	71.00	
Mushroom head assembled pushbutton	orange	1 NO + 1 NC	52PX8A8A	52PX8B8A	47.00	52PX9□8A	71.00	
	black	2 NO	52PX8A1F	52PX8B1F	47.00	52PX9□1F	71.00	1
	red	2 NO	52PX8A2F	52PX8B2F	47.00	52PX9□2F	71.00	
	green	2 NO	52PX8A3F	52PX8B3F	47.00	52PX9□3F	71.00	
	yellow	2 NO	52PX8A4F	52PX8B4F	47.00	52PX9□4F	71.00	
	blue	2 NO	52PX8A5F	52PX8B5F	47.00	52PX9□5F	71.00	1
	gray	2 NO	52PX8A6F	52PX8B6F	47.00	52PX9□6F	71.00	
	orange	2 NO	52PX8A8F	52PX8B8F	47.00	52PX9□8F	71.00	
Mushroom head assembled pushbutton	black	2 NC	52PX8A1G	52PX8B1G	47.00	52PX9□1G	71.00	1
	red	2 NC	52PX8A2G	52PX8B2G	47.00	52PX9□2G	71.00	
	green	2 NC	52PX8A3G	52PX8B3G	47.00	52PX9□3G	71.00	
	yellow	2 NC	52PX8A4G	52PX8B4G	47.00	52PX9□4G	71.00	
	blue	2 NC	52PX8A5G	52PX8B5G	47.00	52PX9□5G	71.00	1
	gray	2 NC	52PX8A6G	52PX8B6G	47.00	52PX9□6G	71.00	
	orange	2 NC	52PX8A8G	52PX8B8G	47.00	52PX9□8G	71.00	
	black	2 NO + 2 NC	52PX8A1B	52PX8B1B	72.00	52PX9□1B	96.00	1
Mushroom head assembled pushbutton	red	2 NO + 2 NC	52PX8A2B	52PX8B2B	72.00	52PX9□2B	96.00	
	green	2 NO + 2 NC	52PX8A3B	52PX8B3B	72.00	52PX9□3B	96.00	
	yellow	2 NO + 2 NC	52PX8A4B	52PX8B4B	72.00	52PX9□4B	96.00	
	blue	2 NO + 2 NC	52PX8A5B	52PX8B5B	72.00	52PX9□5B	96.00	1
	gray	2 NO + 2 NC	52PX8A6B	52PX8B6B	72.00	52PX9□6B	96.00	
	orange	2 NO + 2 NC	52PX8A8B	52PX8B8B	72.00	52PX9□8B	96.00	

Order no. change

Small operating head - 1 5/8" (41.3 mm)

Large operating head - 2.5" (63.5 mm)

D  
E




1) For other contact block assemblies replace the 8th digit of the catalog number as follows:  
 C = 3 NO + 3 NC  
 D = 4 NO + 4 NC  
 E = 1 NC (EB)  
 H = 1 NO (EM)

# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Push Pull Operators Complete Units

## Selection and ordering data

	Version	Color of actuator	Contact blocks	Order no.	List Price	Order no.	List Price	Pack	
					\$		\$	Unit	
2 position push-pull 	<b>2 Position Push Pull Maintained, Non Illuminated</b>								
	Small Plastic Mushroom Head, 1 5/8" (41.3 mm)	black	1 NC + 1 NO	<b>52PX2W1A</b>	<b>88.00</b>			1	
		red	1 NC + 1 NO	<b>52PX2W2A</b>	<b>88.00</b>				
		green	1 NC + 1 NO	<b>52PX2W3A</b>	<b>88.00</b>				
	Large Plastic Mushroom Head, 2 1/2" (63.5 mm)	black	1 NC + 1 NO	<b>52PX2V1A</b>	<b>106.00</b>			1	
		red	1 NC + 1 NO	<b>52PX2V2A</b>	<b>106.00</b>				
green		1 NC + 1 NO	<b>52PX2V3A</b>	<b>106.00</b>					
3 position push pull 	<b>3 Position Push Pull Momentary, Non-Illuminated, spring return to center-pull to start, push to stop<sup>1)</sup></b>								
	Small Plastic Mushroom Head, 1 5/8" (41.3 mm)	black	1 NC + 1 NO	<b>52PX3W1U</b>	<b>96.00</b>			1	
		red	1 NC + 1 NO	<b>52PX3W2U</b>	<b>96.00</b>				
		green	1 NC + 1 NO	<b>52PX3W3U</b>	<b>96.00</b>				
	Large Plastic Mushroom Head, 2 1/2" (63.5 mm)	black	1 NC + 1 NO	<b>52PX3V1U</b>	<b>104.00</b>			1	
		red	1 NC + 1 NO	<b>52PX3V2U</b>	<b>104.00</b>				
green		1 NC + 1 NO	<b>52PX3V3U</b>	<b>104.00</b>					
2 position push pull illuminated 	<b>2 Position Push Pull Maintained, Illuminated</b>			<b>Operators with incandescent lamp</b>		<b>Operators with LED lamp <sup>2)</sup></b>			
	24V Full Voltage with 757 type large Plastic Mushroom Head, or 24V LED, 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX2DNA</b>	<b>137.00</b>	*****		1	
		chrome red	1 NC + 1 NO	<b>52PX2D2A</b>	<b>137.00</b>	<b>52PX2D2AY</b>	<b>151.00</b>		
		chrome green	1 NC + 1 NO	<b>52PX2D3A</b>	<b>137.00</b>	<b>52PX2D3AY</b>	<b>151.00</b>		
		chrome amber	1 NC + 1 NO	<b>52PX2D9A</b>	<b>137.00</b>	<b>52PX2D9AY</b>	<b>151.00</b>		
		full red	1 NC + 1 NO	<b>52PX2DRA</b>	<b>137.00</b>	<b>52PX2DRAY</b>	<b>151.00</b>	1	
		full green	1 NC + 1 NO	<b>52PX2DSA</b>	<b>137.00</b>	<b>52PX2DSAY</b>	<b>151.00</b>		
		full amber	1 NC + 1 NO	<b>52PX2DTA</b>	<b>173.00</b>	<b>52PX2DTAY</b>	<b>151.00</b>		
		120V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX2GNA</b>	<b>137.00</b>	*****		1
			chrome red	1 NC + 1 NO	<b>52PX2G2A</b>	<b>137.00</b>	<b>52PX2G2AY</b>	<b>151.00</b>	
			chrome green	1 NC + 1 NO	<b>52PX2G3A</b>	<b>137.00</b>	<b>52PX2G3AY</b>	<b>151.00</b>	
			chrome amber	1 NC + 1 NO	<b>52PX2G9A</b>	<b>137.00</b>	<b>52PX2G9AY</b>	<b>151.00</b>	
			full red	1 NC + 1 NO	<b>52PX2GRA</b>	<b>137.00</b>	<b>52PX2GRAY</b>	<b>151.00</b>	1
	full green		1 NC + 1 NO	<b>52PX2GSA</b>	<b>137.00</b>	<b>52PX2GSAY</b>	<b>151.00</b>		
	full amber	1 NC + 1 NO	<b>52PX2GTA</b>	<b>137.00</b>	<b>52PX2GTAY</b>	<b>151.00</b>			
	240V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX2HNA</b>	<b>119.00</b>	*****			
		chrome red	1 NC + 1 NO	<b>52PX2H2A</b>	<b>137.00</b>	<b>52PX2H2AY</b>	<b>151.00</b>	1	
		chrome green	1 NC + 1 NO	<b>52PX2H3A</b>	<b>137.00</b>	<b>52PX2H3AY</b>	<b>151.00</b>		
		chrome amber	1 NC + 1 NO	<b>52PX2H9A</b>	<b>137.00</b>	<b>52PX2H9AY</b>	<b>151.00</b>		
		480V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX2JNA</b>	<b>119.00</b>	*****		1
			chrome red	1 NC + 1 NO	<b>52PX2J2A</b>	<b>137.00</b>	<b>52PX2J2AY</b>	<b>151.00</b>	
	chrome green		1 NC + 1 NO	<b>52PX2J3A</b>	<b>137.00</b>	<b>52PX2J3AY</b>	<b>151.00</b>		
	chrome amber		1 NC + 1 NO	<b>52PX2J9A</b>	<b>137.00</b>	<b>52PX2J9AY</b>	<b>151.00</b>		
	600V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX2KNA</b>	<b>119.00</b>	*****		1	
chrome red		1 NC + 1 NO	<b>52PX2K2A</b>	<b>137.00</b>	<b>52PX2K2AY</b>	<b>151.00</b>			
chrome green		1 NC + 1 NO	<b>52PX2K3A</b>	<b>137.00</b>	<b>52PX2K3AY</b>	<b>151.00</b>			
chrome amber		1 NC + 1 NO	<b>52PX2K9A</b>	<b>137.00</b>	<b>52PX2K9AY</b>	<b>151.00</b>			

1) Blocks cannot be interchanged (start-stop circuit).  
 2) LED color must match lens color.




# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Push Pull Operators

## Selection and ordering data

	Version	Color of actuator**	Contacts	Order # Operators with incandescent lamp	List Price \$	Order # Operators with LED lamp <sup>2)</sup>	List Price \$	Pack Unit
<p>3 position push pull illuminated</p> 	<b>3 Position Push Pull Momentary, Illuminated, spring return to center<sup>1)</sup></b>							
	24V Full Voltage with 757 type, or 24V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PX3DNU</b>	<b>119.00</b>	****	—	1
		chrome red	1NC + 1NO	<b>52PX3D2U</b>	<b>137.00</b>	<b>52PX3D2UY</b>	<b>151.00</b>	
		chrome green	1NC + 1NO	<b>52PX3D3U</b>	<b>137.00</b>	<b>52PX3D3UY</b>	<b>151.00</b>	
		chrome amber	1NC + 1NO	<b>52PX3D9U</b>	<b>137.00</b>	<b>52PX3D9UY</b>	<b>151.00</b>	
		full red	1NC + 1NO	<b>52PX3DRU</b>	<b>119.00</b>	<b>52PX3DRUY</b>	<b>151.00</b>	1
		full green	1NC + 1NO	<b>52PX3DSU</b>	<b>119.00</b>	<b>52PX3DSUY</b>	<b>151.00</b>	
		full amber	1NC + 1NO	<b>52PX3DTU</b>	<b>119.00</b>	<b>52PX3DTUY</b>	<b>151.00</b>	
	120V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PX3GNU</b>	<b>119.00</b>	****	—	1
		chrome red	1NC + 1NO	<b>52PX3G2U</b>	<b>137.00</b>	<b>52PX3G2UY</b>	<b>151.00</b>	
		chrome green	1NC + 1NO	<b>52PX3G3U</b>	<b>137.00</b>	<b>52PX3G3UY</b>	<b>151.00</b>	
		chrome amber	1NC + 1NO	<b>52PX3G9U</b>	<b>137.00</b>	<b>52PX3G9UY</b>	<b>151.00</b>	
		full red	1NC + 1NO	<b>52PX3GRU</b>	<b>119.00</b>	<b>52PX3GRUY</b>	<b>151.00</b>	1
		full green	1NC + 1NO	<b>52PX3GSU</b>	<b>119.00</b>	<b>52PX3GSUY</b>	<b>151.00</b>	
		full amber	1NC + 1NO	<b>52PX3GTU</b>	<b>119.00</b>	<b>52PX3GTUY</b>	<b>151.00</b>	
	240V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1NC + 1NO	<b>52PX3HNU</b>	<b>119.00</b>	****	—	
		chrome red	1NC + 1NO	<b>52PX3H2U</b>	<b>137.00</b>	<b>52PX3H2UY</b>	<b>151.00</b>	1
		chrome green	1NC + 1NO	<b>52PX3H3U</b>	<b>137.00</b>	<b>52PX3H3UY</b>	<b>151.00</b>	
		chrome amber	1NC + 1NO	<b>52PX3H9U</b>	<b>137.00</b>	<b>52PX3H9UY</b>	<b>151.00</b>	
	480V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX3JNU</b>	<b>119.00</b>	****	—	1
		chrome red	1 NC + 1 NO	<b>52PX3J2U</b>	<b>137.00</b>	<b>52PX3J2UY</b>	<b>151.00</b>	
		chrome green	1 NC + 1 NO	<b>52PX3J3U</b>	<b>137.00</b>	<b>52PX3J3UY</b>	<b>151.00</b>	
		chrome amber	1 NC + 1 NO	<b>52PX3J9U</b>	<b>137.00</b>	<b>52PX3J9UY</b>	<b>151.00</b>	
	600V transformer with 6V 755 type lamp, or 6V LED 1 3/4" (44.5 mm)	less operating head	1 NC + 1 NO	<b>52PX3KNU</b>	<b>119.00</b>	****	—	1
		chrome red	1 NC + 1 NO	<b>52PX3K2U</b>	<b>137.00</b>	<b>52PX3K2UY</b>	<b>151.00</b>	
chrome green		1 NC + 1 NO	<b>52PX3K3U</b>	<b>137.00</b>	<b>52PX3K3UY</b>	<b>151.00</b>		
chrome amber		1 NC + 1 NO	<b>52PX3K9U</b>	<b>137.00</b>	<b>52PX3K9UY</b>	<b>151.00</b>		



1) Blocks cannot be interchanged (start-stop circuit).  
 2) LED color must match lens color.

# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Selector Switch Complete Units

## Selection and ordering data

	Version	Lever type	Contact blocks	Cam <sup>1)</sup>	Order no.	List Price	Pack
						\$	unit
<b>Selector Switches with 2 switching positions</b>							
Short lever assembled selector switch	Maintained operation	Short lever, non-Illuminated	1 NO	A	52SX2AABK1	42.50	1
		Short lever, non-Illuminated	1 NC	A	52SX2AABJ1	42.50	
		Short lever, non-Illuminated	1 NO + 1 NC	A	52SX2AABA1	55.00	
	Long lever assembled selector switch	Long lever, non-Illuminated	1 NO	A	52SW2AABK1	42.50	1
		Long lever, non-Illuminated	1 NC	A	52SW2AABJ1	42.50	
		Long lever, non-Illuminated	1 NO + 1NC	A	52SW2AABA1	55.00	
	Spring return from right operation	Short lever, non-Illuminated	1 NO	A	52SX2ACBK1	59.00	1
		Short lever, non-Illuminated	1 NC	A	52SX2ACBJ1	59.00	
		Short lever, non-Illuminated	1 NO + 1 NC	A	52SX2ACBA1	72.00	
		Long lever, non-Illuminated	1 NO	A	52SW2ACBK1	59.00	1
		Long lever, non-Illuminated	1 NC	A	52SW2ACBJ1	59.00	
		Long lever, non-Illuminated	1 NO + 1NC	A	52SW2ACBA1	72.00	
<b>Selector Switches with 3 switching positions</b>							
	Maintained operation	Short lever, non-Illuminated	1 NO + 1 NC	C	52SX2CABA1	55.00	1
		Short lever, non-Illuminated	2 NC + 1 NO	G	52SX2GABJ2K1	67.00	
		Short lever, non-Illuminated	2 NO + 2 NC	C	52SX2CABA2	80.00	
		Long lever, non-Illuminated	1 NO + 1 NC	C	52SW2CABA1	55.00	1
		Long lever, non-Illuminated	2 NC + 1 NO	G	52SW2GABJ2K1	67.00	
		Long lever, non-Illuminated	2 NO + 2 NC	C	52SW2CABA2	80.00	
	Spring return from right	Short lever, non-Illuminated	1 NO + 1 NC	C	52SX2CCBA1	72.00	1
		Short lever, non-Illuminated	2 NC + 1 NO	G	52SX2GCBJ2K1	84.00	
		Short lever, non-Illuminated	2 NO + 2 NC	C	52SX2CCBA2	96.00	
		Long lever, non-Illuminated	1 NO + 1 NC	C	52SW2CCBA1	72.00	1
		Long lever, non-Illuminated	2 NC + 1 NO	G	52SW2GCBJ2K1	84.00	
		Long lever, non-Illuminated	2 NO + 2 NC	C	52SW2CCBA2	96.00	
	Spring return from right & left operation	Short lever, non-Illuminated	1 NO + 1 NC	C	52SX2CDBA1	72.00	1
		Short lever, non-Illuminated	2 NC + 1 NO	G	52SX2GDBJ2K1	84.00	
		Short lever, non-Illuminated	2 NO + 2 NC	C	52SX2CDBA2	96.00	
		Long lever, non-Illuminated	1 NO + 1 NC	C	52SW2CDBA1	72.00	1
		Long lever, non-Illuminated	2 NC + 1 NO	G	52SW2GDBJ2K1	84.00	
		Long lever, non-Illuminated	2 NO + 2 NC	C	52SW2CDBA2	96.00	
	Spring return from left	Short lever, non-Illuminated	1 NO + 1 NC	C	52SX2CBBA1	72.00	1
		Short lever, non-Illuminated	2 NC + 1 NO	G	52SX2GBBJ2K1	84.00	
		Short lever, non-Illuminated	2 NO + 2 NC	C	52SX2CBBA2	96.00	
		Long lever, non-Illuminated	1 NO + 1 NC	C	52SW2CBBA1	72.00	1
		Long lever, non-Illuminated	2 NC + 1 NO	G	52SW2GBBJ2K1	84.00	
		Long lever, non-Illuminated	2 NO + 2 NC	C	52SW2CBBA2	96.00	

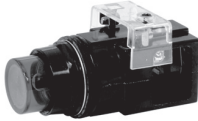
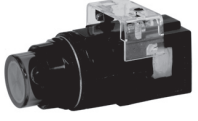

1) For contact operation, see cam selection table on page 16-209.

# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Indicator Light Operators

## Selection and ordering data

	Version	Color of actuator	Order no.	List Price	Order no.	List Price	Pack
			Operators with Incandescent lamp	\$	Operators with LED lamp <sup>3)</sup>	\$	Unit
	<b>Indicator light with plastic lens - Full voltage type AC/DC<sup>1)2)</sup></b>						
	6-8V with 755 type, or 6V LED	red	52PX4B2	72.00	52PX4B2Y	86.00	1
		green	52PX4B3	72.00	52PX4B3Y	86.00	
		amber	52PX4B9	72.00	52PX4B9Y	86.00	
		less lens	52PX4BN	66.00	****		1
	12V with 756 type	red	52PX4C2	72.00			
		green	52PX4C3	72.00			
		amber	52PX4C9	72.00			
		less lens	52PX4CN	66.00			
	24V with 757 type, or 24V LED	red	52PX4D2	72.00	52PX4D2Y	86.00	1
		green	52PX4D3	72.00	52PX4D3Y	86.00	
		amber	52PX4D9	72.00	52PX4D9Y	86.00	
		less lens	52PX4DN	66.00	****		
	120V with 120MBtype, or 120V LED	red	52PY4E2	72.00	52PX4E2Y	86.00	1
		green	52PY4E3	72.00	52PX4E3Y	86.00	
		amber	52PY4E9	72.00	52PX4E9Y	86.00	
less lens		52PY4EN	66.00	****			
	<b>Indicator light with plastic lens - Transformer type AC/DC<sup>1)2)</sup></b>						
	120V with 6V 755 type lamp, or 6V LED	red	52PX4G2	88.00	52PX4G2Y	102.00	1
		green	52PX4G3	88.00	52PX4G3Y	102.00	
		amber	52PX4G9	88.00	52PX4G9Y	102.00	
		less lens	52PX4GN	82.00	****		
	240V with 6V 755 type lamp, or 6V LED	red	52PX4H2	88.00	52PX4H2Y	102.00	1
		green	52PX4H3	88.00	52PX4H3Y	102.00	
		amber	52PX4H9	88.00	52PX4H9Y	102.00	
		less lens	52PX4HN	82.00	****		
	277V with 6V 755 type lamp, or 6V LED	red	52PX4T2	88.00	52PX4J2Y	102.00	1
		green	52PX4T3	88.00	52PX4J3Y	102.00	
		amber	52PX4T9	88.00	52PX4J9Y	102.00	
		less lens	52PX4TN	82.00	****		
	480V with 6V 755 type lamp, or 6V LED	red	52PX4J2	88.00	52PX4K2Y	102.00	1
		green	52PX4J3	88.00	52PX4K3Y	102.00	
		amber	52PX4J9	88.00	52PX4K9Y	102.00	
less lens		52PX4JN	82.00	****			
600V with 6V 755 type lamp, or 6V LED	red	52PX4K2	88.00	52PX4T2Y	102.00	1	
	green	52PX4K3	88.00	52PX4T3Y	102.00		
	amber	52PX4K9	88.00	52PX4T9Y	102.00		
	less lens	52PX4KN	82.00	****			
	<b>Indicator light with plastic lens - Resistor type AC/DC *</b>						
	240V with 120V 2.5W 120MB type lamp, or 120V LED	red	52PY4N2	72.00	52PX4N2Y	86.00	1
		green	52PY4N3	72.00	52PX4N3Y	86.00	
		amber	52PY4N9	72.00	52PX4N9Y	86.00	
		less lens	52PY4NN	66.00	****		
Color code table	blue	5		5			
	clear	A		A			
	white	B		B			

1) All illuminated devices come with std. Touch-safe shield per UL stds.  
2) For factory installed glass lens, replace the 5th character with "5".

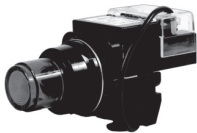

3) LED color must match lens color. Consult Factory for Neon types.

# Pushbutton Units and Indicator Lights

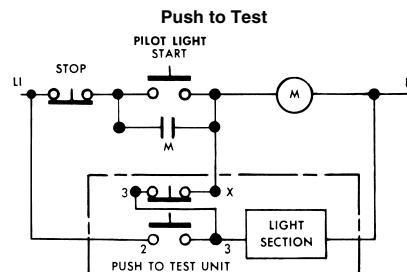
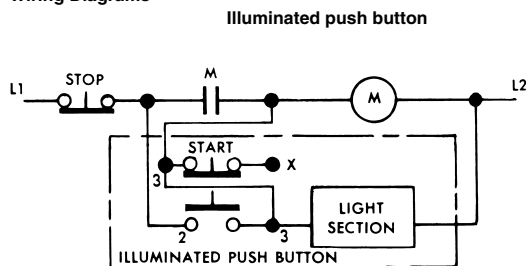
30 mm, Black Max Corrosion Resistant, Class 52

Push to Test Units

## Selection and ordering data

Version	Color of actuator	Contact blocks	Order no.	List Price	Order no.	List Price	Pack		
			<b>Operators with Incandescent lamp<sup>3)</sup></b>	\$	<b>Operators with LED lamp<sup>2)3)</sup></b>	\$	Unit		
Push to test/illuminated pushbutton  	<b>Illuminated pushbutton/Push to test indicator plastic lens - Full indicator light with plastic lens - Full voltage type AC/DC<sup>1)</sup></b>								
	6-8V with 755 type, or 6V LED	red	1 NO + 1 NC	<b>52PX6B2A</b>	96.00	<b>52PX6B2AY</b>	110.00	1	
		green	1 NO + 1 NC	<b>52PX6B3A</b>	96.00	<b>52PX6B3AY</b>	110.00		
		amber	1 NO + 1 NC	<b>52PX6B9A</b>	96.00	<b>52PX6B9AY</b>	110.00		
		less lens	1 NO + 1 NC	<b>52PX6BNA</b>	91.00	****	—		
	24V with 757 type, or 24V LED	red	1 NO + 1 NC	<b>52PX6D2A</b>	96.00	<b>52PX6D2AY</b>	110.00	1	
		green	1 NO + 1 NC	<b>52PX6D3A</b>	96.00	<b>52PX6D3AY</b>	110.00		
		amber	1 NO + 1 NC	<b>52PX6D9A</b>	96.00	<b>52PX6D9AY</b>	110.00		
		less lens	1 NO + 1 NC	<b>52PX6DNA</b>	91.00	****	—		
		<b>Illuminated pushbutton/Push to test plastic lens indicator light with plastic lens - Transformer type AC/DC<sup>1)</sup></b>							
		120V with 6V 755 type lamp, or 6V LED	red	1 NC + 1 NO	<b>52PX6G2A</b>	112.00	<b>52PX6G2AY</b>	126.00	1
			green	1 NC + 1 NO	<b>52PX6G3A</b>	112.00	<b>52PX6G3AY</b>	126.00	
		amber	1 NC + 1 NO	<b>52PX6G9A</b>	112.00	<b>52PX6G9AY</b>	126.00		
		less lens	1 NC + 1 NO	<b>52PX6GNA</b>	107.00	****	—		
240V with 6V 755 type lamp, or 6V LED		red	1 NC + 1 NO	<b>52PX6H2A</b>	112.00	<b>52PX6H2AY</b>	126.00	1	
		green	1 NC + 1 NO	<b>52PX6H3A</b>	112.00	<b>52PX6H3AY</b>	126.00		
		amber	1 NC + 1 NO	<b>52PX6H9A</b>	112.00	<b>52PX6H9AY</b>	126.00		
		less lens	1 NC + 1 NO	<b>52PX6HNA</b>	112.00	****	—		
480V with 6V 755 type lamp, or 6V LED		red	1 NC + 1 NO	<b>52PX6J2A</b>	112.00	<b>52PX6J2AY</b>	126.00	1	
		green	1 NC + 1 NO	<b>52PX6J3A</b>	112.00	<b>52PX6J3AY</b>	126.00		
		amber	1 NC + 1 NO	<b>52PX6J9A</b>	112.00	<b>52PX6J9AY</b>	126.00		
		less lens	1 NC + 1 NO	<b>52PX6JNA</b>	107.00	****	—		
600V with 6V 755 type lamp, or 6V LED		red	1 NC + 1 NO	<b>52PX6K2A</b>	112.00	<b>52PX6K2AY</b>	126.00	1	
		green	1 NC + 1 NO	<b>52PX6K3A</b>	112.00	<b>52PX6K3AY</b>	126.00		
		amber	1 NC + 1 NO	<b>52PX6K9A</b>	112.00	<b>52PX6K9AY</b>	126.00		
		less lens	1 NC + 1 NO	<b>52PX6KNA</b>	107.00	****	—		
<b>Illuminated pushbutton/Push to test indicator indicator light with plastic lens - Resistor type AC/DC</b>		120V with 24V 757 type lamp, or 24V LED	red	1 NC + 1 NO	<b>52PX6M2A</b>	96.00	<b>52PX6M2AY</b>	110.00	1
		green	1 NC + 1 NO	<b>52PX6M3A</b>	96.00	<b>52PX6M3AY</b>	110.00		
		amber	1 NC + 1 NO	<b>52PX6M9A</b>	96.00	<b>52PX6M9AY</b>	110.00		
		less lens	1 NC + 1 NO	<b>52PX6MNA</b>	96.00	****	—		
	240V with 24V 757 type lamp, or 24V LED	red	1 NC + 1 NO	<b>52PX6N2A</b>	96.00	<b>52PX6N2AY</b>	110.00	1	
		green	1 NC + 1 NO	<b>52PX6N3A</b>	96.00	<b>52PX6N3AY</b>	110.00		
		amber	1 NC + 1 NO	<b>52PX6N9A</b>	96.00	<b>52PX6N9AY</b>	110.00		
		less lens	1 NC + 1 NO	<b>52PX6NNA</b>	91.00	****	—		
	Color code table	blue		<b>5</b>		<b>5</b>			
		clear		<b>A</b>		<b>A</b>			
		white		<b>B</b>		<b>B</b>			

## Wiring Diagrams



1) All illuminated devices come with std. Touch-safe shield per UL stds.  
2) LED color must match lens color. Consult Factory for Neon types.




3) For factory installed lens guard add suffix "Y".

# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

*Push to Test Units*

## Selection and ordering data

	Version	Color of actuator	Order no.	List Price	Pack
				\$	Unit
Flush pushbutton operator 	<b>Pushbutton with flush cap</b>	black	52PX8A1	22.00	1
		red	52PX8A2	22.00	
		green	52PX8A3	22.00	
		yellow	52PX8A4	22.00	
		blue	52PX8A5	22.00	
		gray	52PX8A6	22.00	
		orange	52PX8A8	22.00	
		less cap	52PX8	20.50	
		kit - with all colors	52PX8AN	25.50	
Extended pushbutton operator 	<b>Pushbutton with extended cap</b>	black	52PX8B1	22.00	1
		red	52PX8B2	22.00	
		green	52PX8B3	22.00	
		yellow	52PX8B4	22.00	
		blue	52PX8B5	22.00	
		gray	52PX8B6	22.00	
		orange	52PX8B8	22.00	
		less cap	52PX8	20.50	
		kit - with all colors	52PX8BN	25.50	
Mushroom head pushbutton operator 	<b>Pushbutton with mushroom cap</b> 1 5/8" (41.3mm)	black	52PX9D1	46.50	1
		red	52PX9D2	46.50	
		green	52PX9D3	46.50	
		yellow	52PX9D4	46.50	
		blue	52PX9D5	46.50	
		gray	52PX9D6	46.50	
		orange	52PX9D8	46.50	
		less cap	52PX9	38.50	
		kit - with all colors	52PX9DN	49.00	
	<b>Pushbutton with mushroom cap</b> 2 1/2" (63.5mm)	black	52PX9E1	55.00	
		red	52PX9E2	55.00	
		green	52PX9E3	55.00	
		yellow	52PX9E4	55.00	
		blue	52PX9E5	55.00	
		gray	52PX9E6	55.00	
orange		52PX9E8	55.00		
less cap		52PX9	38.50		
kit - with all colors		52PX9EN	49.00		
<b>2 position push pull maintained, non illuminated</b> Small Plastic Mushroom Head, 1 5/8" (41.3mm)	black	52PX2W1	63.00	1	
	red	52PX2W2	63.00		
	green	52PX2W3	63.00		
Large Plastic Mushroom Head, 2 1/4" (57.2mm)	black	52PX2V1	82.00	1	
	red	52PX2V2	82.00		
	green	52PX2V3	82.00		

# Pushbutton Units and Indicator Lights

30 mm, Black Max Corrosion Resistant, Class 52

Selector Switch Operators

## Selection and ordering data



Version	Lever type	Color of lever insert	Cam <sup>1)</sup>	Order no.	List Price	Pack
					\$	unit
<b>Selector Switches with 2 switching positions</b>						
Maintained operation	Short lever, non-Illuminated	white	A	52SX2AAB	30.50	1
	Long lever, non-Illuminated	white	A	52SW2AAB	30.50	
Spring return from right operation	Short lever, non-Illuminated	white	A	52SX2ACB	47.00	1
	Long lever, non-Illuminated	white	A	52SW2ACB	47.00	
<b>Selector Switches with 3 switching positions</b>						
Maintained operation	Short lever, non-Illuminated	white	B	52SX2BAB	30.50	1
	Long lever, non-Illuminated	white	B	52SW2BAB	30.50	
	Short lever, non-Illuminated	white	C <sup>2)</sup>	52SX2CAB	30.50	
	Long lever, non-Illuminated	white	C <sup>2)</sup>	52SW2CAB	30.50	
	Short lever, non-Illuminated	white	D	52SX2DAB	30.50	
	Long lever, non-Illuminated	white	D	52SW2DAB	30.50	
	Short lever, non-Illuminated	white	E	52SX2EAB	30.50	
	Long lever, non-Illuminated	white	E	52SW2EAB	30.50	
	Short lever, non-Illuminated	white	G	52SX2GAB	30.50	
	Long lever, non-Illuminated	white	G	52SW2GAB	30.50	
Spring return from right operation	Short lever, non-Illuminated	white	B	52SX2BCB	47.00	1
	Long lever, non-Illuminated	white	B	52SW2BCB	47.00	
	Short lever, non-Illuminated	white	C <sup>2)</sup>	52SX2CCB	47.00	
	Long lever, non-Illuminated	white	C <sup>2)</sup>	52SW2CCB	47.00	
	Short lever, non-Illuminated	white	D	52SX2DCB	47.00	
	Long lever, non-Illuminated	white	D	52SW2DCB	47.00	
	Short lever, non-Illuminated	white	E	52SX2ECB	47.00	
	Long lever, non-Illuminated	white	E	52SW2ECB	47.00	
	Short lever, non-Illuminated	white	G	52SX2GCB	47.00	
	Long lever, non-Illuminated	white	G	52SW2GCB	47.00	
Spring return from left operation	Short lever, non-Illuminated	white	B	52SX2BBB	47.00	1
	Long lever, non-Illuminated	white	B	52SW2BBB	47.00	
	Short lever, non-Illuminated	white	C <sup>2)</sup>	52SX2CBB	47.00	
	Long lever, non-Illuminated	white	C <sup>2)</sup>	52SW2CBB	47.00	
	Short lever, non-Illuminated	white	D	52SX2DBB	47.00	
	Long lever, non-Illuminated	white	D	52SW2DBB	47.00	
	Short lever, non-Illuminated	white	E	52SX2EBB	47.00	
	Long lever, non-Illuminated	white	E	52SW2EBB	47.00	
	Short lever, non-Illuminated	white	G	52SX2GBB	47.00	
	Long lever, non-Illuminated	white	G	52SW2GBB	47.00	
Spring return from left and right operation	Short lever, non-Illuminated	white	B	52SX2BDB	47.00	1
	Long lever, non-Illuminated	white	B	52SW2BDB	47.00	
	Short lever, non-Illuminated	white	C <sup>2)</sup>	52SX2CDB	47.00	
	Long lever, non-Illuminated	white	C <sup>2)</sup>	52SW2CDB	47.00	
	Short lever, non-Illuminated	white	D	52SX2DDB	47.00	
	Long lever, non-Illuminated	white	D	52SW2DDB	47.00	
	Short lever, non-Illuminated	white	E	52SX2EDB	47.00	
	Long lever, non-Illuminated	white	E	52SW2EDB	47.00	
	Short lever, non-Illuminated	white	G	52SX2GDB	47.00	
	Long lever, non-Illuminated	white	G	52SW2GDB	47.00	
<b>Selector Switches with 4 switching positions</b>						
Maintained operation	Non-Illuminated, Short lever	white	H	52SX2HAB	30.50	1
	Non-Illuminated, Long lever	white	H	52SW2HAB	30.50	

1) For contact operation, see cam selection table on page 16/209.

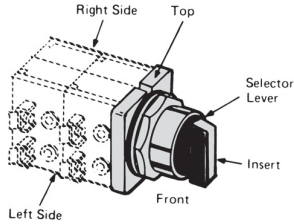
2) C- Cam is limited to 4 contact blocks, 1 or 2 pole, SR only.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

### Cam Selection

#### Selection and ordering data



#### Ordering Information

- Contact blocks are ordered separately, see page 16-213.
- Under Selector Position find the selector operation required (2 or 3 position).
- Select the contact operation required for each selector lever position (X indicates when contacts are closed).
- The cam letter column identifies the cam of the selector operator.
- Contact block must be assembled in position shown for each circuit application.
- Cam D, E or G may be ordered at the same price by changing the 6th character of the selector catalog number. Example: Selector with D cam **51SA2DA**.
- C Cam on spring return selectors is limited to 4 contact blocks.
- Selector operators in enclosures are limited to depth of 1 contact block. (2 blocks wide).

Selector position	Lever or key operators (viewed from front)				Cam letter	Contact block catalog no.	Mounting (viewed from front)	
	Left		Right				Left	Right
	Left	Right	Left	Right				
2	X	O			<b>A</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	or R
	O		X				L	or R
	Illuminated				<b>A</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	
	X	O					L	
	O		X					
3	X	O	O		<b>B</b>	<b>52BAK (NO)</b> <b>52BAJ (NC)</b>	L	R
	O	O	X				L	
	X	X	O		<b>C</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	and R
	O	X	X				L	or R
	X	O	X		<b>D</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	or R
	O	O	O				L	or R
	X	O	O		<b>E</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	or R
	O	X	O				L	or R
	X	O	O		<b>G</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	
	O	X	O				L	
	O	O	X		<b>C</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	
	O	O	X				L	
	O	X	O		<b>B</b>	<b>52BAK (NO)</b> <b>52BAJ (NC)</b>	L	R
	O	O	X				L	R
4	X	O	O	O	<b>H</b>	<b>52BAK (NO)</b> <b>52BAJ (NC)</b>	L	R
	O	X	O	O			L	R
	O	O	X	O				
	O	O	O	X			L	
<b>Selector pushbutton operators</b>								
2		<b>Left</b>						
		<b>N</b>	<b>D</b>	<b>N</b>	<b>Right</b>			
	X	O	O	O	<b>Q</b>	<b>52BAK (NO)</b> <b>52BAJ (NC)</b>	L	R
	X	X	O	O			L	R
	O	X	O	X	<b>P</b>	<b>52BAJ (NC)</b> <b>52BAK (NO)</b>	L	or R
	O	O	O	X			L	or R
	X	O	O	O	<b>R</b>		L	R
	O	X	X	O			L	R
	X	O	X	X				R
	O	X	O	O				R
	O	O	O	X			L	
	O	O	O	X			L	
3	X	X	O	O	<b>S</b>		L	R
	X	O	X	O			L	R
	O	X	O	O				
	O	O	O	X			L	

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Custom Selector Switch Designs

### Selection and ordering data

#### Assembled Non-illuminated Selector Switches

- Determine contact block and location from above.
- Select block suffix. Ex: **J = 52BAJ**.
- Now select position suffix.
- **1-52BAJ** block mounted on right side, suffix will be **J 1**.
- Additional suffixes allow for multiple quantities and locations.
- Repeat process for next block if required.
- Add list price of blocks to operator list price.
- Consult factory for delivery.

**Example 1:**    X O O  
                   O O X  
 HAND-OFF-AUTO Maintained Switch  
 Catalog No **52SA2CAB A 1 = 52A2CABA1**  
 (52BJK block mounted on right side)

**Example 2:**    X O O    **52BAJ (L)** } **J2**  
                   O X O    **52BAJ (R)** }  
                   O O X    **52BAK (L or R)** } **K1**  
 G Cam required  
 Catalog No **52SA2GAB J2 K1 = 52SA2GABJ2K1**

Block Suffix	Position Suffix	
	Suffix	Quantity and Location
		Left      Right
A = 1 NO - 1 NC, <b>52BJK</b>	0	1      —
E = NC Late Break, <b>52BAE</b>	1	—      1
H = NO Early Make, <b>52BAH</b>	2	1      1
J = NC, <b>52BAJ</b>	3	2      —
K = NO, <b>52BAK</b>	4	—      2
	5	2      1
	6	1      2
	7	2      2
	8	3      —
	9	—      3










# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Accessories and Spare Parts

### Selection and ordering data



















Version	Suitable for	Lamp voltage	Color	Order no.	List Price \$	
	<b>Flush actuator button</b> For flush type, non-illuminated pushbuttons		black	<b>52RA1A1</b>	1.60	
			red	<b>52RA1A2</b>	1.60	
			green	<b>52RA1A3</b>	1.60	
			yellow	<b>52RA1A4</b>	1.60	
			blue	<b>52RA1A5</b>	1.60	
			gray	<b>52RA1A6</b>	1.60	
			orange	<b>52RA1A8</b>	1.60	
			kit- all colors	<b>52RA1AN</b>	11.20	
				<b>Extended actuator button</b> For extended type, non-illuminated pushbuttons		black
red	<b>52RA1B2</b>	1.60				
green	<b>52RA1B3</b>	1.60				
yellow	<b>52RA1B4</b>	1.60				
blue	<b>52RA1B5</b>	1.60				
gray	<b>52RA1B6</b>	1.60				
orange	<b>52RA1B8</b>	1.60				
1 of each color cap	<b>52RA1BN</b>	11.20				
	<b>Mushroom head - Plastic</b> For small 1 5/8"(41.3mm) type, non-illuminated mushroom pushbuttons and push-pull; set screw					black
			red	<b>52RB3D2</b>	8.20	
			green	<b>52RB3D3</b>	8.20	
			yellow	<b>52RB3D4</b>	8.20	
			blue	<b>52RB3D5</b>	8.20	
			gray	<b>52RB3D6</b>	8.20	
			orange	<b>52RB3D8</b>	8.20	
			1 of each color cap	<b>52RB3DN</b>	65.60	
				<b>Mushroom head - Metal</b> For small 1 5/8"(41.3mm) type, non-illuminated push-pull; set screw		chrome
red	<b>52RB3F2</b>	17.80				
green	<b>52RB3F3</b>	17.80				
	<b>Mushroom head - Plastic</b> For large 2 1/2"(63.5mm) type, non-illuminated mushroom pushbuttons and push-pull; set screw		black	<b>52RB3E1</b>	16.40	
			red	<b>52RB3E2</b>	16.40	
			green	<b>52RB3E3</b>	16.40	
			yellow	<b>52RB3E4</b>	16.40	
			blue	<b>52RB3E5</b>	16.40	
			gray	<b>52RB3E6</b>	16.40	
			orange	<b>52RB3E8</b>	16.40	
			1 kit of each color cap	<b>52RB3EN</b>	131.00	
				<b>Illuminated mushroom head</b> Illuminated metal		red
green	<b>52RB3H3</b>	18.00				
amber	<b>52RB3H9</b>	18.00				
Illuminated plastic				green	<b>52RB3JG</b>	18.00
				red	<b>52RB3JR</b>	18.00
				amber	<b>52RB3JA</b>	18.00
	<b>Replacement Lens for Pilot Lights</b> Plastic lens		red	<b>52RA4P2</b>	5.80	
			green	<b>52RA4P3</b>	5.80	
			blue	<b>52RA4P5</b>	5.80	
			amber	<b>52RA4P9</b>	5.80	
			clear	<b>52RA4PA</b>	5.80	
			white	<b>52RA4PB</b>	5.80	
	Glass lens			red	<b>52RA4G2</b>	22.50
				green	<b>52RA4G3</b>	22.50
				blue	<b>52RA4G5</b>	22.50
				amber	<b>52RA4G9</b>	22.50
				clear	<b>52RA4GA</b>	22.50
				white	<b>52RA4GB</b>	22.50
	<b>Replacement Lens for Push to test/Illuminated pushbuttons</b> Plastic lens		red	<b>52RA5P2</b>	5.80	
			green	<b>52RA5P3</b>	5.80	
			blue	<b>52RA5P5</b>	5.80	
			amber	<b>52RA5P9</b>	5.80	
			clear	<b>52RA5PA</b>	5.80	
			white	<b>52RA5PB</b>	5.80	

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Accessories and Spare Parts

### Selection and ordering data

Version	Suitable for	Lamp voltage	Color	Order no.	List Price
					\$
	<b>Replacement lens kit for illuminated selector switches</b> Knob & Insert		red	52RA6P2	5.80
			green	52RA6P3	5.80
			blue	52RA6P5	5.80
			amber	52RA6P9	5.80
			clear	52RA6PA	5.80
			white	52RA6PB	5.80
	<b>Lever inserts</b> Short lever		red	52RA2A2	0.40
			green	52RA2A3	0.40
			blue	52RA2A5	0.40
			yellow	52RA2A4	0.40
			gray	52RA2A6	0.40
			orange	52RA2A8	0.40
			white	52RA2AB	0.40
			red	52RA2B2	0.40
	Long lever		green	52RA2B3	0.40
			blue	52RA2B5	0.40
			yellow	52RA2B4	0.40
			gray	52RA2B6	0.40
			orange	52RA2B8	0.40
			white	52RA2BB	0.40
	<b>Replacement lens for compact style pilot lights</b> Replacement lenses		red	52RA7P2	5.80
			green	52RA7P3	5.80
			blue	52RA7P5	5.80
			amber	52RA7P9	5.80
			clear	52RA7PA	5.80
			white	52RA7PB	5.80
	<b>① Clear protective boot</b> Offers protection from ice and foreign substances from interfering with button operation	Flush pushbutton operators		52AABA	16.40
		<b>② Pushbutton guard</b> Prevents accidental operation of the pushbutton	Non-Illuminated pushbuttons	52AAGP	8.20
			Black Max styles, non-Illuminated push-buttons	52AXGP	8.20
		<b>Lens guard</b> Push to test buttons and pilot lights		52AAGL	8.20
			Black Max styles, push to test buttons and pilot lights	52AXGL	8.20
		<b>③ Guard for mushroom head</b> Additional hole spacing is required on adjacent devices	1 5/8"(41.3mm) mushroom head pushbutton and push-pull operators	52AAGM	33.00
			Black Max styles, 1 5/8"(41.3mm) mushroom head pushbutton and push-pull operators	52AXGM	33.00
		<b>④ Pushbutton locknut</b> Replacement front ring	Pushbutton and push-to-test device	52AANP	2.70
			Black Max styles	52AXNP	2.70
		<b>⑤ Push-pull/pilot light locknut</b> Replacement front ring	Mushroom head and pilot light indicators	52AANL	2.70
			Black Max styles	52AXNL	2.70
	<b>⑥ Selector switch locknut</b> Replacement front ring	Selector switch	52AANS	2.70	
		Black Max styles, selector switch	52AXNS	2.70	
	<b>Padlock attachments</b> Flush pushbutton operators Extended operators <sup>1)</sup>		52AALA	24.50	
			52AALB	24.50	
			52AALS	49.00	
	<b>⑦ Padlock cover</b> Can be used to lock devices in the off position	Pushbuttons, selector switches, and non-illuminated mushroom heads	52AALE	47.00	
		Pushbuttons, selector switches, and illuminated mushroom heads			
	<b>⑧ Lock nut wrench</b>	All devices	52MAWB	24.50	
	<b>⑨ Hole plugs</b>	Corrosion resistant	52AAH6	8.20	
		Steel, gray	52ABH6	8.20	
	<b>Spare keys</b>	Stainless steel	52ABHS	24.50	
		501CH (1 key)	D28671015	5.60	
	<b>Grounding kit</b>	All devices	52AL109145	4.20	
	<b>⑩ Touchsafe shield</b> Illuminated devices (Current revisions only)		52AASH	2.40	
	<b>⑪ Black boot</b>	Extended or flush pushbuttons	52AAB1	16.40	
	<b>⑫ Rubber gasket (5)</b>	All devices	52AAD	2.40	
	<b>⑬ Yellow 90 mm ESTOP ring</b>	All E-Stops	52AAR	4.50	


1) Must be used with step raised cap- 52PA8C2.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Accessories and Spare Parts

### Selection and ordering data

Version	Suitable for	Lamp voltage	Color	Order no.	List Price
					\$
<b>Lamps with screw connection, miniature bayonet (BA 9s style)</b>					
<b>Incandescent lamps,</b>					
	Flashing, type 267 lamp (replaces 755 lamp)	51, 52	6 V AC	<b>52AABNF</b>	<b>12.40</b>
	6V type 755 lamp	51, 52	6 V AC	<b>52AABN</b>	<b>8.20</b>
	12V type 756	51, 52	12 V AC	<b>52AACN</b>	<b>8.20</b>
	24V type 757	51, 52	24 V AC	<b>52AADN</b>	<b>7.50</b>
	120V, 2.5W, type #120MB	52	120V AC	<b>52AAENC1</b>	<b>8.20</b>
	Neon (uses resistors) type B2A (NE-51H)	52	120 V AC	<b>52AAPN</b>	<b>16.90</b>
	48V	51, 52	48 V	<b>3SB1902-1AP</b>	<b>12.50</b>
<b>Candelabra, 120 V, Full voltage type 3S6/5<sup>1</sup></b>	52 older revision styles	120 V		<b>52AAENC</b>	<b>8.20</b>
7 Watts					
LED's BA9s Style length 28 mm diameter 10 mm current 15 ma	52	6 V UC	red	<b>52AEB2</b>	<b>22.50</b>
	52	6 V UC	green	<b>52AEB3</b>	<b>22.50</b>
	52	6 V UC	yellow	<b>52AEB4</b>	<b>22.50</b>
	52	6 V UC	white	<b>52AEBB</b>	<b>22.50</b>
	52	6 V UC	blue	<b>52AEB5</b>	<b>22.50</b>
	52	24 V UC	red	<b>52AED2</b>	<b>22.50</b>
	52	24 V UC	green	<b>52AED3</b>	<b>22.50</b>
	52	24 V UC	yellow	<b>52AED4</b>	<b>22.50</b>
	52	24 V UC	white	<b>52AEDB</b>	<b>22.50</b>
	52	24 V UC	blue	<b>52AED5</b>	<b>22.50</b>
	52	120 V AC	red	<b>52AEE2</b>	<b>22.50</b>
	52	120 V AC	green	<b>52AEE3</b>	<b>22.50</b>
	52	120 V AC	yellow	<b>52AEE4</b>	<b>22.50</b>
	52	120 V AC	white	<b>52AEEB</b>	<b>22.50</b>
	52	120 V AC	blue	<b>52AEE5</b>	<b>22.50</b>
LED's, cluster type For use with Class 52 pilot lights only (7 LED's)	52	6 V UC	red	<b>52AEB27</b>	<b>28.00</b>
	52	6 V UC	green	<b>52AEB37</b>	<b>28.00</b>
	52	6 V UC	yellow	<b>52AEB47</b>	<b>28.00</b>
52	24 V UC	red	<b>52AED27</b>	<b>28.00</b>	
52	24 V UC	green	<b>52AED37</b>	<b>28.00</b>	
52	24 V UC	yellow	<b>52AED47</b>	<b>28.00</b>	
52	120 V AC	red	<b>52AEE27</b>	<b>28.00</b>	
52	120 V AC	green	<b>52AEE37</b>	<b>28.00</b>	
52	120 V AC	yellow	<b>52AEE47</b>	<b>28.00</b>	

### Touchsafe contact blocks with gold flashing



52 BAJ



52 BAK



52 BAR

		Plunger Color		
1 NO		White	<b>52BAK</b>	<b>12.40</b>
1 NC		Red	<b>52BAJ</b>	<b>12.40</b>
1 NO - 1 NC		Black	<b>52BJK</b>	<b>24.50</b>
1 NO early make	closes before 52BAK opens after 52 BAJ	Green	<b>52BAH</b>	<b>12.40</b>
1 NC late break		Yellow	<b>52BAE</b>	<b>12.40</b>
1 NO - 1 NC	Reed switch	—	<b>52BAR<sup>2)</sup></b>	<b>49.50</b>
	UL listed for class 1 division 2 .25A Max, 200V AC, 10 Watt max .5A Max, 200V DC, 10 Watt max			
1 NC extra late break		Blue	<b>52BAU</b>	<b>12.40</b>
1 NO	Not touch safe		<b>52BAKE</b>	<b>15.40</b>
1 NC	Not touch safe		<b>52BAJE</b>	<b>15.40</b>

1) Design change made in 2003 from candelabra to BA 9s type bulbs. Contact technical support for further information.

2) Hermetically sealed.

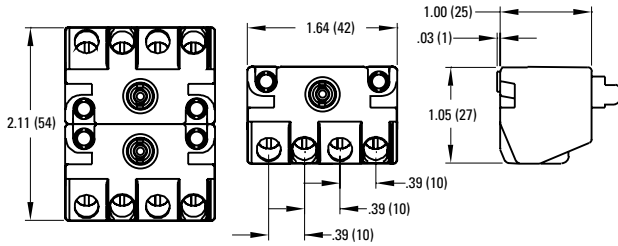
# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

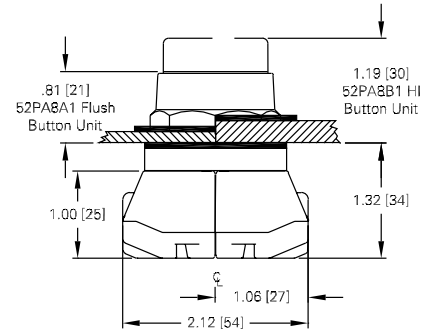
## Dimensional Drawings

Dimension drawings, inch (mm)

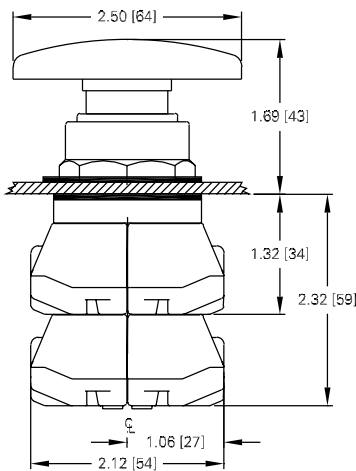
Contact block



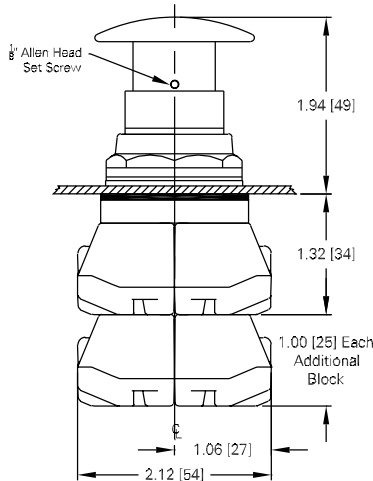
Non-illuminated momentary pushbutton flush, extended, styles with one contact block



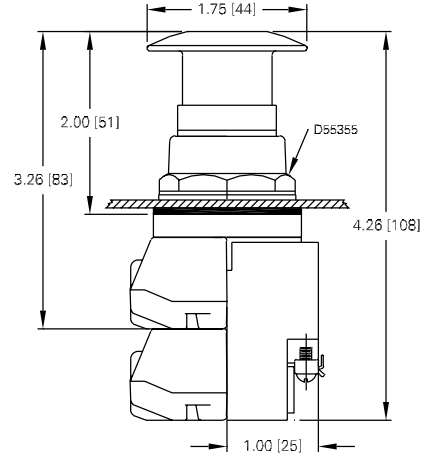
Large mushroom head momentary pushbutton



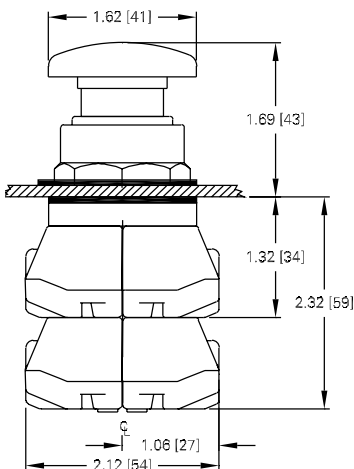
2 position maintained non-illuminated



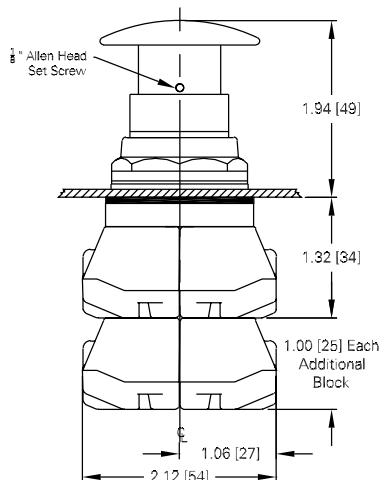
2 position maintained push-pull illuminated



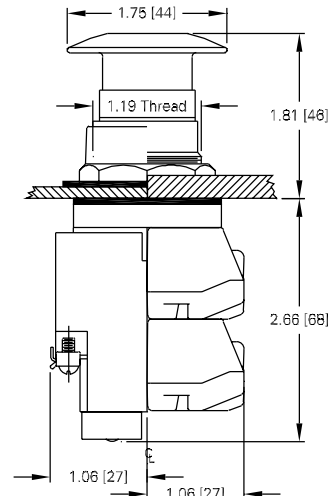
Small mushroom head momentary pushbutton



3 position maintained non-illuminated



3 position maintained push-pull illuminated



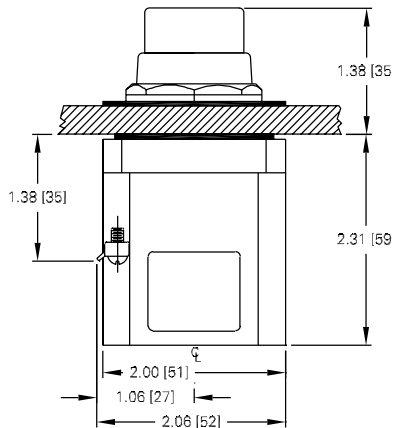
# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

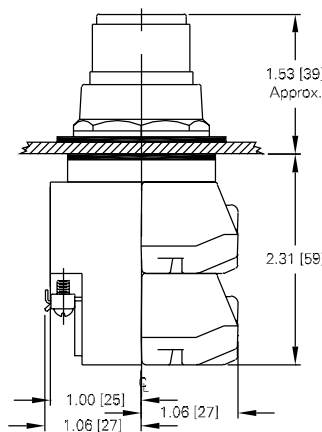
## Dimensional Drawings

### Dimension drawings, inch (mm)

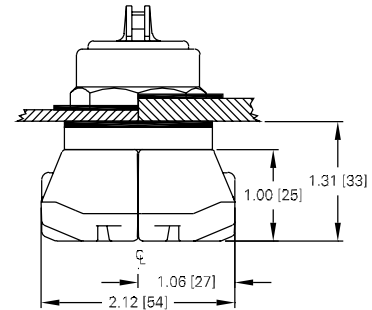
**Pilot light  
full voltage and transformer**



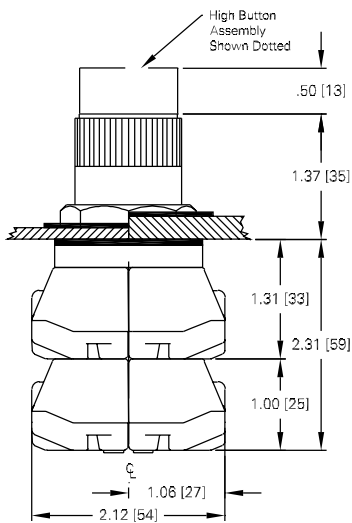
**Push to test illuminated pushbutton**



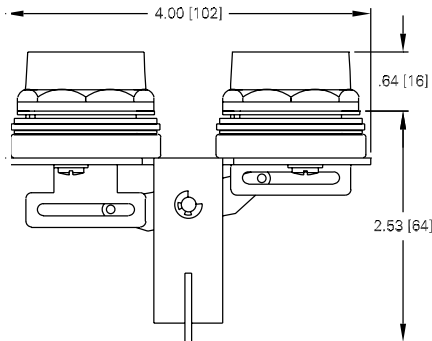
**Selector switches and keyed selector switches  
illuminated and non-illuminated**



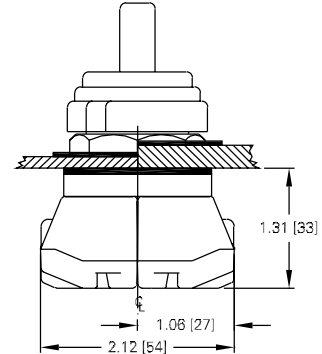
**Selector push operator**



**2 button maintained operator**



**Maintained toggle operator**



# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Class 52 Oiltight Pushbutton Station

### Selection and ordering data

	Actuator identification C = top device in station B = middle device in station A = bottom device in station	Degree of protection	Contact / voltage	No. of command points	Order no.	List Price \$	Pack Unit
1 unit control station	A = Momentary flush pushbutton black, label "START"	NEMA 12	1NO - 1NC	1	<b>52C101A</b>	<b>131.00</b>	
	A = Momentary raised pushbutton red, label "STOP"	NEMA 12	1NO - 1NC	1	<b>52C103A</b>	<b>131.00</b>	
	A = Momentary mushroom head red, label "STOP"	NEMA 12	1NO - 1NC	1	<b>52C104A</b>	<b>155.00</b>	
	A = Maintained metal mushroom head red, label "EMERGENCY STOP"	NEMA 12	1NO - 1NC	1	<b>52C117A</b>	<b>183.00</b>	
	A = 2 position selector switch "OFF-ON"	NEMA 12	1NO - 1NC	1	<b>52C159A</b>	<b>140.00</b>	
	A = 3 position selector switch "HAND-OFF-AUTO"	NEMA 12	1NO - 1NC	1	<b>52C156A</b>	<b>140.00</b>	
	A = Indicator light, red	NEMA 12	120V Transformer type	1	<b>52C131A</b>	<b>155.00</b>	
	A = Indicator light, green	NEMA 12	120V Transformer type	1	<b>52C135A</b>	<b>155.00</b>	
	A = Momentary flush pushbutton black, label "START"	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C101S</b>	<b>209.00</b>	
	A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C103S</b>	<b>209.00</b>	
	A = Momentary mushroom head red, label "STOP"	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C104S</b>	<b>233.00</b>	
	A = Maintained metal mushroom head red, label "EMERGENCY STOP" (metal head)	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C116S</b>	<b>249.00</b>	
	A = 2 position selector switch "OFF-ON"	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C159S</b>	<b>216.00</b>	
	A = 3 position selector switch "HAND-OFF-AUTO"	NEMA 4X Stainless Steel	1NO - 1NC	1	<b>52C156S</b>	<b>216.00</b>	
	A = Momentary flush pushbutton black, label "START"	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C101X</b>	<b>159.00</b>	
	A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C103X</b>	<b>159.00</b>	
	A = Momentary mushroom head red, label "STOP"	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C104X</b>	<b>183.00</b>	
	A = Maintained metal mushroom head red, label "EMERGENCY STOP" (metal head)	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C116X</b>	<b>199.00</b>	
A = 2 position selector switch "OFF-ON"	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C159X</b>	<b>166.00</b>		
A = 3 position selector switch "HAND-OFF-AUTO"	NEMA 4X Fiberglass	1NO - 1NC	1	<b>52C156X</b>	<b>166.00</b>		
2 unit control station	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"	NEMA 12	1NO, 1NC 1NO, 1NC	2	<b>52C201A</b>	<b>189.00</b>	
	B = Momentary flush pushbutton green, label "START" A = Momentary Mushroom head pushbutton red, label "STOP"	NEMA 12	1NO, 1NC 1NO, 1NC	2	<b>52C202A</b>	<b>213.00</b>	
	B = Momentary flush pushbutton, label "FORWARD" A = Momentary flush pushbutton, label "REVERSE"	NEMA 12	1NO, 1NC 1NO, 1NC	2	<b>52C204A</b>	<b>189.00</b>	
	B = Momentary flush pushbutton, label "UP" A = Momentary flush pushbutton, label "DOWN"	NEMA 12	1NO, 1NC 1NO, 1NC	2	<b>52C223A</b>	<b>200.00</b>	
	B = Indicator light, red, label "RUN" A = Maintained selector switch, label "HAND-OFF-AUTO"	NEMA 12	120V Transformer type	2	<b>52C224A</b>	<b>249.00</b>	
	B = Indicator light, red A = Indicator light, green	NEMA 12	120V Transformer type	2	<b>52C230A</b>	<b>255.00</b>	
	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC	2	<b>52C201S</b>	<b>265.00</b>	
	B = Momentary flush pushbutton green, label "START" A = Momentary Mushroom head pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC	2	<b>52C202S</b>	<b>290.00</b>	
	B = Momentary flush pushbutton, label "UP" A = Momentary flush pushbutton, label "DOWN"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC	2	<b>52C223S</b>	<b>265.00</b>	
	B = Indicator light, red, label "RUN" A = Maintained selector switch, label "HAND-OFF-AUTO"	NEMA 4X Stainless Steel	120V Transformer type 1NO, 1NC	2	<b>52C224S</b>	<b>314.00</b>	
	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC	2	<b>52C201X</b>	<b>225.00</b>	
	B = Momentary flush pushbutton green, label "START" A = Momentary Mushroom head pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC	2	<b>52C202X</b>	<b>249.00</b>	
	B = Momentary flush pushbutton, label "UP" A = Momentary flush pushbutton, label "DOWN"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC	2	<b>52C223X</b>	<b>225.00</b>	
	B = Indicator light, red, label "RUN" A = Maintained selector switch, label "HAND-OFF-AUTO"	NEMA 4X Fiberglass	120V Transformer type 1NO, 1NC	2	<b>52C224X</b>	<b>274.00</b>	




# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Class 52 Oiltight Pushbutton Station

### Selection and ordering data

	Actuator identification	Degree of protection	Contact / voltage	No. of command points	Order no.	List Price	Pack
						\$	Unit
3 unit control station 	C = Indicator light, red	NEMA 12	120V 1NO, 1NC	3	<b>52C307A</b>	<b>279.00</b>	
	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"		1NO, 1NC 1NO, 1NC				
	C = Momentary flush pushbutton black, label "FORWARD" B = Momentary flush pushbutton black, label "REVERSE" A = Momentary raised pushbutton red, label "STOP"	NEMA 12	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C301A</b>	<b>255.00</b>	
	C = Momentary flush pushbutton black, label "UP" B = Momentary flush pushbutton black, label "DOWN" A = Momentary raised pushbutton red, label "STOP"	NEMA 12	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C332A</b>	<b>265.00</b>	
	C = Momentary flush pushbutton black, label "OPEN" B = Momentary flush pushbutton black, label "STOP" A = Momentary raised pushbutton red, label "CLOSE"	NEMA 12	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C333A</b>	<b>265.00</b>	
	C = Momentary flush pushbutton black, label "HI" B = Momentary flush pushbutton, black label "LOW" A = Momentary raised pushbutton red, label "STOP"	NEMA 12	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C334A</b>	<b>265.00</b>	
	C = Indicator light, red	NEMA 4X Stainless Steel	120V 1NO, 1NC	3	<b>52C307S</b>	<b>413.00</b>	
	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"		1NO, 1NC 1NO, 1NC				
	C = Momentary flush pushbutton black, label "FORWARD" B = Momentary flush pushbutton black, label "REVERSE" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C301S</b>	<b>372.00</b>	
	C = Momentary flush pushbutton black, label "UP" B = Momentary flush pushbutton black, label "DOWN" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C332S</b>	<b>372.00</b>	
	C = Momentary flush pushbutton black, label "OPEN" B = Momentary flush pushbutton black, label "STOP" A = Momentary raised pushbutton red, label "CLOSE"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C333S</b>	<b>372.00</b>	
	C = Momentary flush pushbutton black, label "HI" B = Momentary flush pushbutton, black label "LOW" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Stainless Steel	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C334S</b>	<b>372.00</b>	
	C = Indicator light, red	NEMA 4X Fiberglass	120V 1NO, 1NC	3	<b>52C307X</b>	<b>331.00</b>	
	B = Momentary flush pushbutton black, label "START" A = Momentary raised pushbutton red, label "STOP"		1NO, 1NC 1NO, 1NC				
	C = Momentary flush pushbutton black, label "FORWARD" B = Momentary flush pushbutton black, label "REVERSE" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C301X</b>	<b>290.00</b>	
	C = Momentary flush pushbutton black, label "UP" B = Momentary flush pushbutton black, label "DOWN" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C332X</b>	<b>290.00</b>	
	C = Momentary flush pushbutton black, label "OPEN" B = Momentary flush pushbutton black, label "STOP" A = Momentary raised pushbutton red, label "CLOSE"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C333X</b>	<b>290.00</b>	
	C = Momentary flush pushbutton black, label "HI" B = Momentary flush pushbutton, black label "LOW" A = Momentary raised pushbutton red, label "STOP"	NEMA 4X Fiberglass	1NO, 1NC 1NO, 1NC 1NO, 1NC	3	<b>52C334X</b>	<b>290.00</b>	

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

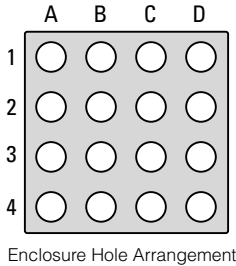
Empty Enclosures

### Selection and ordering data



Version	Number of command points	Degree of protection	Order No.	List Price	Pack Unit
Standard enclosures come with 2 1/4" leg center for legend spacing. Automotive end plates require 2 1/2" spacing. For more than 2 contact blocks on the right or left, use extra deep enclosure.	1	NEMA Type 12/13	<b>P30EMS01</b>	<b>82.00</b>	
	1	NEMA Type 12/13 extra deep	<b>P30EMS01D</b>	<b>82.00</b>	
	1	NEMA Type 4/4X stainless steel	<b>P30EMS014</b>	<b>148.00</b>	
	1	NEMA Type 4/4X Fiberglass	<b>P30EMS01X</b>	<b>98.00</b>	
Mounting hole arrangement  1 thru 4 are in one row 6 holes are 3 down and 2 across 9 holes are 3 down and 3 across 12 holes are 4 down and 3 across 16 holes are 4 down and 4 across	2	NEMA Type 12/13	<b>P30EMS02</b>	<b>91.00</b>	
	2	NEMA Type 12/13 extra deep	<b>P30EMS02D</b>	<b>102.00</b>	
	2	NEMA Type 4/4X stainless steel	<b>P30EMS024</b>	<b>155.00</b>	
	2	NEMA Type 4/4X Fiberglass	<b>P30EMS02X</b>	<b>115.00</b>	
	3	NEMA Type 12/13	<b>P30EMS03</b>	<b>107.00</b>	
	3	NEMA Type 12/13 extra deep	<b>P30EMS03D</b>	<b>102.00</b>	
	3	NEMA Type 4/4X stainless steel	<b>P30EMS034</b>	<b>213.00</b>	
	3	NEMA Type 4/4X Fiberglass	<b>P30EMS03X</b>	<b>131.00</b>	
	4	NEMA Type 12/13	<b>P30EMS04</b>	<b>131.00</b>	
	4	NEMA Type 12/13 extra deep	<b>P30EMS04D</b>	<b>149.00</b>	
	4	NEMA Type 4/4X stainless steel	<b>P30EMS044</b>	<b>279.00</b>	
	4	NEMA Type 4/4X Fiberglass	<b>P30EMS04X</b>	<b>153.00</b>	
	6	NEMA Type 12/13	<b>P30EMS06</b>	<b>165.00</b>	
	6	NEMA Type 12/13 extra deep	<b>P30EMS06D</b>	<b>189.00</b>	
	6	NEMA Type 4/4X stainless steel	<b>P30EMS064</b>	<b>410.00</b>	
	9	NEMA Type 12/13	<b>P30EMS09</b>	<b>215.00</b>	
9	NEMA Type 12/13 extra deep	<b>P30EMS09D</b>	<b>243.00</b>		
9	NEMA Type 4/4X stainless steel	<b>P30EMS094</b>	<b>509.00</b>		
12	NEMA Type 12/13	<b>P30EMS12</b>	<b>289.00</b>		
12	NEMA Type 12/13 extra deep	<b>P30EMS12D</b>	<b>328.00</b>		
12	NEMA Type 4/4X stainless steel	<b>P30EMS124</b>	<b>616.00</b>		
16	NEMA Type 12/13	<b>P30EMS16</b>	<b>371.00</b>		
16	NEMA Type 12/13 extra deep	<b>P30EMS16D</b>	<b>421.00</b>		
16	NEMA Type 4/4X stainless steel	<b>P30EMS164</b>	<b>812.00</b>		

### Order Form



#### Ordering Information

To order non-standard control stations select catalog numbers from the previous pages, determine the required position in the enclosure and fill in the table below. If a special legend plate is required, specify description in the table. The combined list prices of the components is the list price of the station.

- Select enclosure
- Vertical or Horizontal. Outline Diagram at left starting at the top left-hand corner. Example: 3 unit vertical outline location No. 1A, 2A and 3A. 3 unit horizontal outline location No. 1A, 1B, and 1C
- List location No. and applicable catalog numbers in the table below. Use complete catalog numbers where possible

Order No./Item No.

Customer

Enclosure Catalog No.

Location	Operator PB-SEL.-PL	Accessories Key Lock, Boot, Etc,	Legend Plate Legend or Blank	Special Marking



# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

## Legend Plates for Class 51 & 52

### Design

The 30 mm legend plates are approved for the use with both Class 51 and Class 52 devices. Automotive legend plates require 2 1/2" mounting centers. Plastic legend plates will have white letters engraved.

When ordering custom engraved legend plates, specify the required inscription text. See page 16-218.

### Selection and ordering data

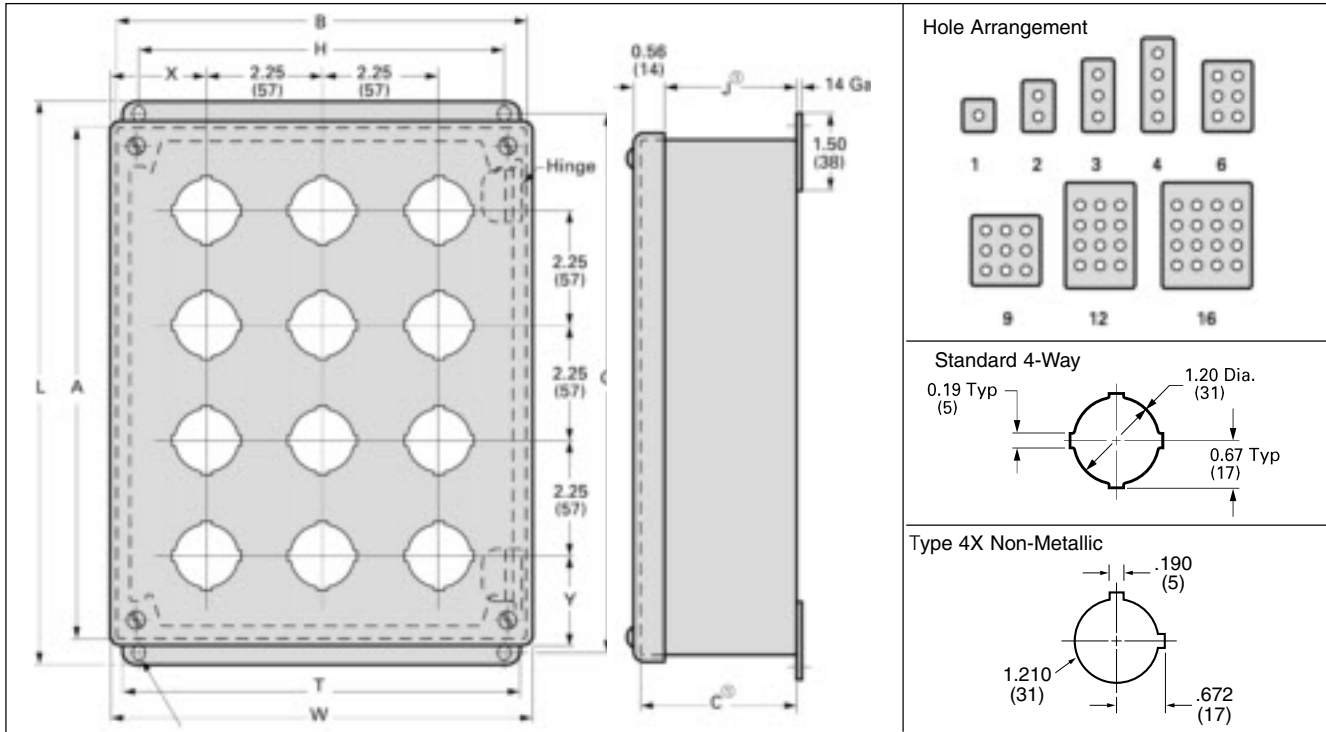
Inscription	Large (1 7/16" x 2") Order No.	List Price \$	Automotive <sup>1)</sup> (2 7/16" x 2 7/16") Order No.	List Price \$	Large Plastic <sup>2)</sup> (1 7/16" x 2") Order No.	List Price \$	Automotive Plastic <sup>1)2)</sup> (2 7/16" x 2 7/16") Order No.	List Price \$
"Blank (brushed aluminum)"	52NL02	2.40	52NA02	4.20	—	—	—	—
"Blank (red)"	52NL02R	2.40	52NA02R	4.20	52ND02R	2.40	52NE02R	4.20
"Blank (Black)"	52NL02B	2.40	52NA02B	4.20	52ND02B	2.40	52NE02B	4.20
<b>Inscribed legend plates with large brushed aluminum background</b>								
Close	52NL18	2.40	52NA18	4.20	—	—	—	—
Down	52NL10	2.40	52NA10	4.20	—	—	—	—
Emerg Stop	52NL16	2.40	52NA16	4.20	—	—	—	—
Emerg Stop (red)	52NL16R	2.40	52NA16R	4.20	—	—	—	—
Fast-Slow	52NL33	2.40	52NA33	4.20	—	—	—	—
Forward	52NL05	2.40	52NA05	4.20	—	—	—	—
For-Off-Rev	52NL38	2.40	52NA38	4.20	—	—	—	—
For-Rev	52NL31	2.40	52NA31	4.20	—	—	—	—
Hand-Off-Auto	52NL37	2.40	52NA37	4.20	—	—	—	—
High	52NL07	2.40	52NA07	4.20	—	—	—	—
High-Low	52NL30	2.40	52NA30	4.20	—	—	—	—
High-Off-Low	52NL44	2.40	52NA44	4.20	—	—	—	—
In	52NL21	2.40	52NA21	4.20	—	—	—	—
Jog	52NL13	2.40	52NA13	4.20	—	—	—	—
Jog-Forward	52NL24	2.40	52NA24	4.20	—	—	—	—
Jog-Reverse	52NL25	2.40	52NA25	4.20	—	—	—	—
Low	52NL08	2.40	52NA08	4.20	—	—	—	—
Lower	52NL20	2.40	52NA20	4.20	—	—	—	—
Man-Auto	52NL35	2.40	52NA35	4.20	—	—	—	—
Off	52NL12	2.40	52NA12	4.20	—	—	—	—
Off-On	52NL26	2.40	52NA26	4.20	—	—	—	—
On	52NL11	2.40	52NA11	4.20	—	—	—	—
On-Off-Auto	52NL40	2.40	52NA40	4.20	—	—	—	—
Open	52NL17	2.40	52NA17	4.20	—	—	—	—
Open-Close	52NL34	2.40	52NA34	4.20	—	—	—	—
Out	52NL22	2.40	52NA22	4.20	—	—	—	—
Pull to Start and Push to Stop	52NL47	2.40	52NA47	4.20	—	—	—	—
Raise	52NL19	2.40	52NA19	4.20	—	—	—	—
Raise-Lower	52NL36	2.40	52NA36	4.20	—	—	—	—
Reset	52NL14	2.40	52NA14	4.20	—	—	—	—
Reverse	52NL06	2.40	52NA06	4.20	—	—	—	—
Run	52NL23	2.40	52NA23	4.20	—	—	—	—
Run-Jog	52NL29	2.40	52NA29	4.20	—	—	—	—
Safe-Run	52NL27	2.40	52NA27	4.20	—	—	—	—
Slow-Off-Fast	52NL39	2.40	52NA39	4.20	—	—	—	—
Start	52NL03	2.40	52NA03	4.20	—	—	—	—
Start-Jog	52NL28	2.40	52NA28	4.20	—	—	—	—
Start-Stop	52NL32	2.40	52NA32	4.20	—	—	—	—
Stop	52NL04	2.40	52NA04	4.20	—	—	—	—
Stop (red)	52NL04R	2.40	52NA04R	4.20	—	—	—	—
Up	52NL09	2.40	52NA09	4.20	—	—	—	—
Up-Down	52NL49	2.40	52NA49	4.20	—	—	—	—
Up-Off-Down	52NL42	2.40	52NA42	4.20	—	—	—	—
Open-Off-Close	52NL41	2.40	52NA41	4.20	—	—	—	—
<b>Inscription plates with custom engraving</b>								
"Custom engraved (brushed aluminum)"	52NL02E	10.70	52NA02E	12.40	—	—	—	—
"Custom engraved (red)"	52NL02RE	10.70	52NA02RE	12.40	52ND02RE	10.70	52NE02RE	12.40
"Custom engraved (Black)"	52NL02BE	10.70	52NA02BE	12.40	52ND02BE	10.70	52NE02BE	12.40
Max. number of rows	2		2		2		2	
Letter height	5/32"		1/4"		5/32"		1/4"	
Characters per row	14		16		14		16	

1) Automotive requires 2 1/2" mounting centers  
2) White letters on plastic nameplate.

# Pushbutton Units and Indicator Lights

## 30 mm Heavy Duty, Watertight/Oiltight, Class 52

### Dimensional Drawings



#### Type 12/13 and 4X Stainless Steel

Units	Enclosure Size			Mounting		Overall					
	A	B	C	G	H	L	W	J	T	X	Y
1	3.50 (89)	3.25 (83)	2.75 (70)	4.00 (102)	2.38 (60)	4.50 (114)	3.47 (88)	2.31 (59)	3.00 (76)	1.73 (44)	1.86 (47)
2	5.75 (146)	3.25 (83)	2.75 (70)	6.25 (159)	2.38 (60)	6.75 (171)	3.47 (88)	2.31 (59)	3.00 (76)	1.73 (44)	1.86 (47)
3	8.00 (203)	3.25 (83)	2.75 (70)	8.50 (216)	2.38 (60)	9.00 (229)	3.47 (88)	2.31 (59)	3.00 (76)	1.73 (44)	1.86 (47)
4	10.25 (260)	3.25 (83)	2.75 (70)	10.75 (273)	2.38 (60)	11.25 (286)	3.47 (88)	2.31 (59)	3.00 (76)	1.73 (44)	1.86 (47)
6	9.50 (241)	6.25 (159)	3.00 (76)	10.00 (254)	5.38 (137)	10.50 (267)	6.47 (164)	2.56 (65)	6.00 (152)	2.11 (54)	2.61 (66)
9	9.50 (241)	8.50 (216)	3.00 (76)	10.00 (254)	7.62 (194)	10.50 (267)	8.72 (221)	2.56 (65)	8.25 (210)	2.11 (54)	2.61 (66)
12	11.75 (298)	8.50 (216)	3.00 (76)	12.25 (311)	7.62 (194)	12.75 (324)	8.72 (221)	2.56 (65)	8.25 (210)	2.11 (54)	2.61 (66)
16 <sup>2)</sup>	11.75 (298)	10.75 (273)	3.00 (76)	12.25 (311)	9.88 (251)	12.75 (324)	10.97 (279)	2.56 (65) <sup>2)</sup>	10.50 (267)	2.11 (54)	2.61 (66)

#### Type 12/13 Extra Deep Enclosures

Units	Enclosure Size			Mounting		Overall					
	A	B	C	G	H	L	W	J	T	X	Y
1	4.00	4.00	4.75	4.50	3.12	5.00	4.22	4.31	3.75	2.11	2.11
2	6.00	4.00	4.75	6.50	3.12	7.00	4.22	4.31	3.75	2.11	1.98
3	8.00	4.00	4.75	8.50	3.12	9.00	4.22	4.31	3.75	2.11	1.86
4	10.00	4.00	4.75	10.50	3.12	11.00	4.22	4.31	3.75	2.11	1.73
6	9.50	6.25	4.75	10.00	5.38	10.50	6.47	4.31	6.00	2.11	2.61
9	9.50	8.50	4.75	10.00	7.62	10.50	8.72	4.31	8.25	2.11	2.61
12	11.75	8.50	4.75	12.25	7.62	12.75	8.72	4.31	8.25	2.11	2.61
16 <sup>2)</sup>	11.75	10.75	4.75	12.25	9.88	12.75	10.97	4.31	10.50	2.11	2.61

#### Type 4X Non-Metallic

Units <sup>3)</sup>	Enclosure Size			Mounting		Overall	
	A	B	C	G	H	L	W
1	6.00	3.19	3.63	4.88	2.94	6.63	3.81
2	6.00	3.19	3.63	4.88	2.94	6.63	3.81
3	8.26	3.19	3.63	7.13	2.94	8.88	3.81
4	10.51	3.19	3.63	9.37	2.94	11.13	3.81

All dimensions shown in inches and (millimeters). For reference purposes only. Not to be used for design or construction purposes.

- 1) Grounding stud in body of enclosure.
- 2) For stainless steel add 1.75 (45) to depth.
- 3) No flange for mounting.

## Contents

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# Standby Power Systems **NEW**

## Standby Power Systems

General

Siemens offers a complete line of standby power systems. From standby power generators, portable generators, transfer switches, and manual transfer kits, Siemens has all of your back up power needs covered. You can count on Siemens to deliver high quality, industry leading designs. Our standby generators are designed for quiet operation with sound attenuated enclosures, specially designed fans and radiators, and a high tech enclosure material that provides excellent sound absorption.

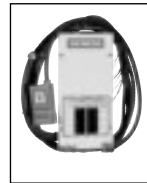
### Standby Generators

- Powered by natural gas or liquid propane vapor
- Permanently attached to the house via a fuel line and conductors hard wired to the load center
- Completely automatic – detects power outages and switches power over to the generator (automatic transfer switch required)
- Restores power to pre-selected circuits or entire building
- Returns power to utility once restored
- Self tests weekly
- Available in 7 to 150 kW units, single and three phase



### Automatic Transfer Switches

- Completes the automatic system
- Once activated by the generator controller, switches load to and from generator
- Available in 100 to 800A versions, single and three phase, indoor and outdoor



### Portable Generators

- Gasoline fueled
- 15 and 17.5 kW units available, single phase
- Provided with 7 various receptacles and circuit protection



### Mechanical Interlock Kits

- Interlocks two main breakers together (generator and utility) such that both cannot be "ON" at the same time
- Wide variety of kits available to convert most Siemens load centers and meter combinations into standby power panels



For more information including a detailed selection and application guide, generator sizing guides, cut sheets, detailed dimensions, owner's manuals, and other useful information, visit our web site at [www.sea.siemens.com/generators](http://www.sea.siemens.com/generators). For technical support, call (800) 844-0029.

# Standby Power Systems

## Standby Generators

Selection

- 7 through 150 kW
- 1-Phase, 120/240 Volts AC
- 3-Phase, 120/208 Volts AC
- 3-Phase, 277/480 Volts AC

### Features and Ratings

- UL 2200 Listed
- Natural gas or liquid propane vapor options
- Composite mounting pad provided on air cooled units
- Automatic Transfer Switch compatibility:
  - Air cooled units compatible with "ST" and "SR" type
  - 20-60 kW units compatible with "SR" type
  - 70-150 kW units compatible with "X" type
- 16 kW units and larger are provided with the patented Quiet Test™ feature. This feature allows the generator to run at lower RPM's during the weekly test cycle, greatly reducing noise pollution.
- Rugged, textured paint finish provides superior corrosion resistance
- Aluminum enclosure option ideal for harsh environments



Liquid Cooled Generator



Air Cooled Generator

### Catalog Logic Table

Siemens Standby Generator	kW Rating	Voltage R=120/240, 1Ø C=120/208, 3Ø I = 277/480, 3Ø	Fuel G=Natural Gas P=Propane B=Accepts both	Enclosure A=Aluminum S=Steel
SG	007	R	B	S
SG	010	R	B	S
SG	013	R	B	S
SG	016	R	B	S, A
SG	018	R, C	B	S, A
SG	020	R, C	B	S, A
SG	025	R,C	B	S, A
SG	035	R, C, I	B	S, A
SG	045	R, C, I	B	S, A
SG	060	R, C, I	G, P	S, A
SG	070	R, C, I	G, P	S, A
SG	080	R, C, I	G, P	S, A
SG	100	R, C, I	G, P	S, A
SG	130	R, C, I	G, P	S, A
SG	150	R, C, I	G, P	S, A

### Generator Information

Dimensions (inches)	Controller Type	Cooling System	Transfer Switch Compatible
48 x 24 x 29	R	Air	ST, SR
48 x 24 x 29	R	Air	ST, SR
48 x 24 x 29	R	Air	ST, SR
48 x 24 x 29	R	Air	ST, SR
72 x 30 x 38	R	Liquid	SR
72 x 30 x 38	R	Liquid	SR
72 x 30 x 38	R	Liquid	SR
77 x 34 x 46	R	Liquid	SR
77 x 34 x 46	R	Liquid	SR
89 x 34 x 48	R	Liquid	SR
97 x 37 x 47	H	Liquid	X
116 x 37 x 55	H	Liquid	X
116 x 37 x 55	H	Liquid	X
116 x 37 x 55	H	Liquid	X
116 x 37 x 55	H	Liquid	X

### Catalog number example

Requirements:

- Standby Generator
- 35 kW
- 3-Phase, 120/208 V~
- Natural Gas
- Aluminum Enclosure

1	2	3	4	5
SG	035	C	B	A

Example = SG035CBA

17  
STANDBY  
GENERATORS

# Standby Power Systems

## Standby Generator Controllers

## Selection

Siemens standby generators are provided with controllers. The primary purpose of the controller is to monitor utility power, operate the automatic transfer switch, control the weekly self test cycle, and to monitor the generator for any potential system faults. There are two types of controllers, the "R" and "H" types.

### "R" Type Controller



The "R" type controller is provided on all 7 through 60 kW generators. These controllers are compatible with the "ST" and "SR" type transfer switches. Built in governor control is provided, along with LED displays for potential system faults.

The automatic transfer switch, which is sold separately, is controlled by the R controller.

#### Control Functions

- Full system monitoring
  - Oil Pressure
  - Coolant Temperature
  - Engine Speed
  - Coolant Level
  - Cranking Time
  - Starter Lockout
  - Utility Sensing
  - Quiet Test™

#### LED Indicators

- Over Speed
- Over Crank
- Low Oil Pressure
- High Coolant Temperature
- Low Coolant Level
- Low Fuel Pressure
- Low Battery Voltage
- Quiet Test™ Control

### "H" Type Controller



The "H" type controller is provided on all 70 through 150 kW generators. These controllers are compatible with the "X" type transfer switches.

#### Control Functions

- All R control functions plus:
  - Full range standby operation
  - Full system status
    - 3Ø AC Volts and current
    - Alternator frequency
    - kW, kVA, power factor
    - Fuel pressure
    - Alarms and warnings
    - Transfer switch status
    - Operating hours
    - Service reminders
    - Trending
    - Utility Sensing
  - Fault protection for generator windings
  - 3Ø sensing voltage regulator
  - Isochronous speed regulation

#### System Features

- Two 4-line 20-character LCD displays
- Engine governor and voltage regulator built into controller
- Hermetically sealed circuit board in a die-cast aluminum enclosure
- Waterproof connections
- Audible alarm
- Service-friendly diagnostics
- Built in PLC for user I/O's
- Integrated automatic transfer switch controller for Siemens "X" type transfer switches
- Advanced engine sensors eliminate false signals and interference
- Quiet-Test™ control
- Industry standard 2-wire start

# Standby Power Systems

## Portable Generators

## Selection

### Portable Generators

Portable generators are contained in a steel frame with wheels for easy relocation. The generators are powered by gasoline stored in a provided gas tank. These generators are ideal for locations where space or local codes do not allow a permanently installed standby generator. They are also great for construction site temporary power, eliminating the need for temporary power poles and utility hook ups.

### Features and Ratings

- Provided with 7 receptacles
  - 12V DC, 10A
  - 120V AC, 20A Duplex
  - 120V AC, 20A Duplex GFCI
  - 120V AC, 30A Locking Type (2)
  - 120/240V AC, 30A Locking Type
  - 120/240V AC, 50A
- Full pressure lubrication
- Single point lifting
- Spin-on oil filter
- Automatic idle control
- Dimensions (in): 39 x 31 x 49
- 16 gallon fuel tank
- Low oil pressure shutdown
- Solid state voltage regulator
- GFCI protection
- Anti-vibration system
- Circuit breakers included
- Battery charge cables
- Maintenance free battery
- Full 1-1/4" tubular frame
- Wheel kit
- Electronic governor
- Tune-up kit

Catalog Number	PG015	PG017 <sup>Ⓞ</sup>
Rated Power	15 kW	17.5 kW
Surge	22.5 kW	26.2 kW
Rated Amps @ 60Hz 120/240, 1Ø, 1.0 pf	62.5	73.0
Engine RPM	3,600	3,600
Engine Cooling	Air	Air
Fuel Capacity (gallons)	16	16
Dimensions (inches)	39 x 31 x 49	39 x 31 x 49
Weight (lbs)	450	475

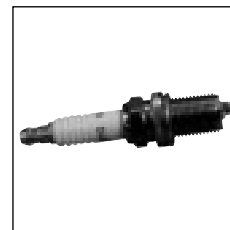
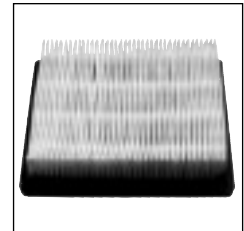


## Standby and Portable Generator Maintenance Kits

### Maintenance Kits

Generators require routine servicing just like any other engine. It is recommended that the oil and filters be changed once a year, or every 100 hours of use, whichever comes first. Maintenance kits are provided for each engine type and include an oil filter, air filter, spark plugs, and tools.

Catalog Number	Description	Usage
GENMKIT1	Oil and air filter kit	7 kW
GENMKIT2	Oil and air filter kit	10 kW
GENMKIT3	Oil and air filter kit	13, 16 kW
GENMKIT4	Oil and air filter kit	20 kW
GENMKIT5	Oil and air filter kit	25 kW
GENMKIT6	Oil and air filter kit	35, 45 kW
GENMKIT7	Oil and air filter kit	60 kW
GENMKIT8	Oil and air filter kit	70, 80, 130, 150 kW
GENMKIT9	Oil and air filter kit	100 kW
GENPAINT	Touch up paint	All devices
PORTMKIT1	Oil and air filter kit	Portable 15, 17.5 kW



<sup>Ⓞ</sup> The 17.5 kW portable generator is provided with a manual transfer kit. The kit includes a load center (G2020L1125CU), factory installed interlock kit (ECSBPK01), a 50A utility main, 50A generator main, a

mixture of branch circuits, a 15' power cord, and an inlet box as shown. The kit is not sold separately and is not provided on the 15 kW portable generator.

# Standby Power Systems

## Transfer Switches

**Selection**

### Automatic Transfer Switches

There are 3 types of transfer switches. "ST" type transfer switches are provided with branch circuits are compatible with the air cooled generators. "SR" type are compatible with generators containing the "R" type controller (7-60 kW). The "X" type transfer switches are compatible with the "H" type controller (70-150 kW generators).

### Transfer Switch Catalog Number Logic

Transfer Type	Enclosure Type T=Indoor R=Outdoor	Amperage	Voltage R= 120/240V 1Ø C= 120/208 3Ø I = 277/480V 3Ø	Service Disconnect D=Provided	Branch Circuits Included
S	T	100	R		10, 12, 16
S	R	100, 200	R	D	
S	R	100, 200	R, C, I		
S	R	400	R, C	D	
X	R, T	100, 150, 200, 300, 400, 600, 800	R, C, I		

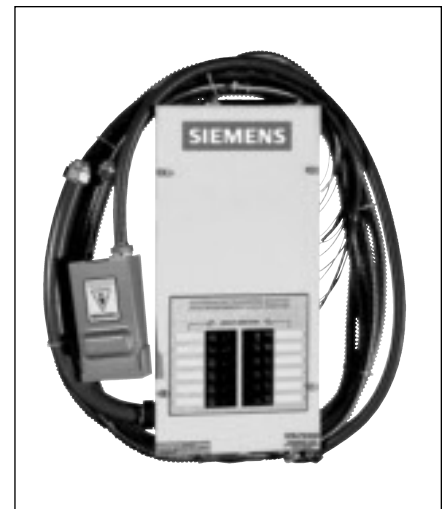
### "ST" Type Transfer Switches

#### Transfer Switches With Back Up Circuits

Siemens offers 3 models of automatic transfer switches with back up circuits. These panels provide transfer capability to a select number of critical circuits, as opposed to the entire house. For the chosen critical circuits, the conductors in the main house panel are removed from the breaker and connected with wire nuts to the pre-wired conductors on the transfer switch.

#### Features and Ratings

- UL 1008 Listed
- 100A
- 120/240, 1Ø
- Indoor NEMA Type 1
- Open Transition
- 10KAIC
- Express install kit included
- Dimensions (inches) 27 x 13 x 7
- Conduit length: 30 feet from ATS to junction box, 5 feet from junction box to generator, 2 feet from ATS to load center
- Suitable for use only on air cooled products (7-16 kW)



Catalog Number	Breakers Provided						Suggested Use
	Q250	Q240	Q230	Q220	Q120	Q115	
ST100R12 (12 ckt)			1	1	3	3	10 kW Generators
ST100R10 (10 ckt)		1	1		3	5	13 kW Generators
ST100R16 (16 ckt)	1	1		1	5	5	16 kW Generators



# Standby Power Systems

## “SR” Type Transfer Switches

Selection

### Features and Ratings

- UL 1008 Listed
- 100-400A
- Outdoor NEMA Type 3R
- 1-Phase and 3-Phase
- Open Transition
- Service entrance rated option
- Compatible with “R” type controllers found in 7-60 kW generators



Catalog Number	Amp	Voltage			NEMA			Service Disconnect Included
		120/240 1Ø	120/208 3Ø	277/480 3Ø	1	3R	12	
SR100R	100	•				•		
SR100RD	100	•				•		•
SR100C	100		•			•		
SR100I	100			•		•		
SR200R	200	•				•		
SR200RD	200	•				•		•
SR200C	200		•			•		
SR200I	200			•		•		
SR400R	400	•				•		
SR400RD	400	•				•		•
SR400C	400		•			•		

AMPS	100	100*	200	200*	400	400*	400
<b>Voltage</b>	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø	120/240 1Ø 120/208 3Ø	120/240 1Ø	277/480 3Ø
<b>Withstand Rating</b> 1Ø 3Ø	10 kAIC 14 kAIC	10 kAIC	10 kAIC 25 kAIC	10 kAIC	18 kAIC 18 kAIC	18 kAIC	35 kAIC
<b>Dimensions</b> 12/240 & 120/208 277/480	24 x 20 x 7 36 x 24 x 10	24 x 13 x 7	24 x 15 x 7 48 x 30 x 12	24 x 13 x 7	36 x 24 x 10	40 x 30 x 10	48 x 30 x 12
<b>Weight (lbs)</b> 120/240 1Ø 120/208 3Ø 277/480 3Ø	31 49 95	39	31 49 105	40	88 107	100	105

\* Service entrance rated, main disconnect provided (type QP for 100A, QN for 200A).

# Standby Power Systems

## "X" Type Transfer Switches

*Selection*

### Features and Ratings

- UL 1008 Listed
- 100-800A
- Indoor NEMA Type 1 and 12
- Outdoor NEMA Type 3R
- 1-Phase and 3-Phase options
- Open Transition
- Compatible with "H" type controllers found in 70-150 kW generators
- 7 day programmable exerciser



Catalog Number	Amp	Voltage			NEMA		
		120/240 1Ø	120/208 3Ø	277/480 3Ø	1	3R	12
XT100R	100	●			●		
XT100C	100		●		●		
XT100I	100			●	●		
XR100R	100	●				●	
XR100C	100		●			●	
XR100I	100			●		●	
XT150R	150	●			●		
XT150C	150		●		●		
XT150I	150			●	●		
XR150R	150	●				●	
XR150C	150		●			●	
XR200I	200			●		●	
XT200R	200	●			●		
XT200C	200		●		●		
XT200I	200			●	●		
XR200R	200	●				●	
XR200C	200		●			●	
XR200I	200			●		●	
XT300R	300	●			●		
XT300C	300		●		●		
XT300I	300			●	●		
XR300R	300	●				●	
XR300C	300		●			●	
XR300I	300			●		●	
XT400R	400	●			●		
XT400C	400		●		●		
XT400I	400			●	●		
XR400R	400	●				●	
XR400C	400		●			●	
XR400I	400			●		●	
XT600R	600	●					●
XT600C	600		●				●
XT600I	600			●			●
XR600R	600	●				●	
XR600C	600		●			●	
XR600I	600			●		●	
XT800R	800	●					●
XT800C	800		●				●
XT800I	800			●			●
XR800R	800	●				●	
XR800C	800		●			●	
XR800I	800			●		●	

AMPS	100	150	200	300	400	600	800
<b>Voltage</b>	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø	120/240 1Ø 120/208 3Ø 277/480 3Ø
<b>NEMA Rating</b>	1 / 3R	1 / 3R	1 / 3R	1 / 3R	1 / 3R	12 / 3R	12 / 3R
<b>Withstand Rating</b> 120/240 & 120/208 277/480	14 kAIC 14 kAIC	10 kAIC 25 kAIC	10 kAIC 25 kAIC	18 kAIC 35 kAIC	18 kAIC 35 kAIC	42 kAIC 42 kAIC	65 kAIC 65 kAIC
<b>Dimensions</b> 120/240 & 120/208 277/480	36 x 24 x 10 36 x 24 x 10	36 x 24 x 10 48 x 30 x 12	36 x 24 x 10 48 x 30 x 12	36 x 24 x 10 48 x 30 x 12	36 x 24 x 10 48 x 30 x 12	66 x 36 x 20 66 x 36 x 20	66 x 36 x 20 66 x 36 x 20
<b>Weight (lbs)</b> 120/240 & 120/208 277/480	105 120	110 145	110 145	130 165	130 165	650 650	680 680

# Standby Power Systems

## Manual Transfer Interlock Kits

### Manual Transfer Interlock Kits

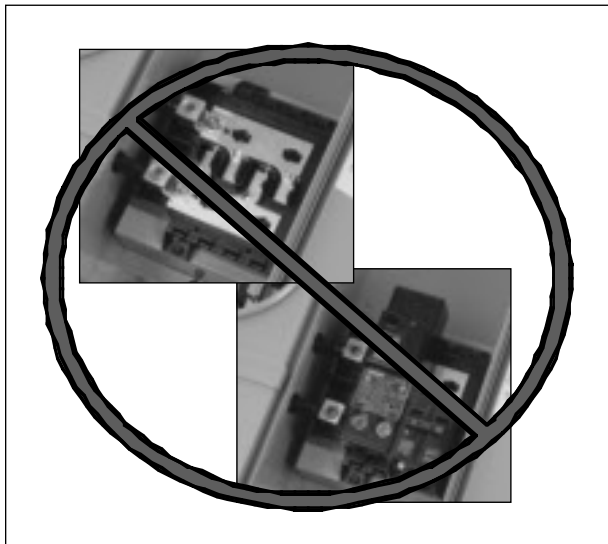
These interlock kits are used to interlock two main breakers in a load center or meter combination together so that both cannot be "ON" at the same time. This is required to prevent dangerous feedback between the two power systems. These kits work on most Siemens load centers and meter combinations.

### Standard Features

- UL listed for use in most Siemens load centers and meter combinations
- Suitable for use with optional standby systems in accordance with article 702 of the National Electric Code®
- Corrosion resistant finish
- Easy assembly requiring no modifications to the load center or meter combination
- Remains attached to the main breakers when load center cover is removed

### Misapplications

Follow all directions and precautions detailed in the instructions sheets. Do not use the interlock kits in such a manner that power is not prevented from being fed back to the utility lines when the utility main breaker is in the "OFF" position. Examples would be meter combinations in which the conductors from the meter land on lugs, as opposed to a main breaker (see below).



## Selection

Description	Catalog Number Breaker Types Utility / Standby	Image
Attaches to two double pole circuit breakers across from one another as shown	<b>ECSBPK01</b> QP / QP	
Attaches to two double pole circuit breakers side by side to one another as shown	<b>ECSBPK02</b> QP / QP	
Used on Ultimate main breaker load centers 150-225A as shown	<b>ECSBPK03</b> MBK / QP	
Used on Ultimate main breaker load centers 100-125A as shown	<b>ECSBPK04</b> MBK / QP	
Attaches to type QN main breakers and double pole breakers as shown	<b>ECSBPK05</b> QN / QP	
Attaches to type QNR main breakers and double pole breakers as shown	<b>ECSBPK06</b> QNR / QP	
Attaches to two type QNR or QN main breakers as shown	<b>ECSBPK07</b> QN(R) / QN(R)	
Attaches to two type QNR or QN main breakers as shown	<b>ECSBPK08</b> QPP / QP	

# Standby Power Systems

## Manual Transfer Interlock Kits

*Selection*

### Acceptable Usage of Interlock Kits by Load Center/Meter Combination

Siemens Outdoor Load Centers	
W0816B1200CT	3
W0816L1200CT	1 2 3 5 7
W0816ML1125CU	1 2
W1212L1125CU	1 2 4
W1224B1100CU	4
W1224L1125CU	1 2 4
W1224L1200CU	1 2 3 5 7
W1224L1225CU	1 2 3 5 7
W1624B1100CU	4
W1624L1125CU	1 2 4
W2020B1100CU	4
W2030L1150CU	1 2 3 5 7
W2040B1200CU	3
W2040L1200CU	1 2 3 5 7
W3040B1200CU	3
W3040L1125CU	1 2 4
W3040L1200CU	1 2 3 5 7
W4040B1200CU	3
W4040L1200CU	1 2 3 5 7
W4242B1225CU	3
W4242L1225CU	1 2 3 5 7

Siemens Indoor Load Centers	
E0816ML1125*	1 2
E1020MB1100FCGP	1 2
E1224ML1100*	1 2
G1212L1125*	1 2 4
G1224B1100*	4
G1224L1125*	1 2 4
G1224L1200CU	1 2 3 5 7
G1624B1100*	4
G1624L1125*	1 2 4
G1630B1150	3
G2020B1100*	4
G2020L1125*	1 2 4
G2030B1150*	3
G2030L1125CUSG	1 2 4
G2030L1150*	1 2 3 5 7
G2040B1200*	3
G2040L1200*	1 2 3 5 7
G2424B1100CU	4
G2424B1125	4
G2424L1125	1 2 4
G2430B1150	3
G2430L1125CUSG	1 2 4
G2440B1200	3
G2440L1125CU	1 2 4
G2440L1200*	1 2 3 5 7
G3030B1100CU	4
G3030B1150*	3
G3030L1200*	1 2 3 5 7
G3040B1200*	3
G3040L1125CU	1 2 4
G3040L1200*	1 2 3 5 7
G4040B1200*	3
G4040L1125CU	1 2 4
G4040L1200*	1 2 3 5 7
G4242B1225CU	3
G4242L1225CU	1 2 3 5 7

Siemens Meter Combinations	
MC0816B1150RTH	5 7
MC0816B1150T	5 7
MC0816B1150TH	5 7
MC0816B1200FCTM	2
MC0816B1200RT	5 7
MC0816B1200RTB	5 7
MC0816B1200RTH	5 7
MC0816B1200SCTM	2
MC0816B1200T	5 7
MC0816B1200TH	5 7
MC0816B1350RLTM	5 7
MV0816B1400RLTM	5 7
MC1224B1100FEC	2
MC1224B1100SEC	2
MC1224B1125	1 2
MC1224B1125FEC	2
MC1224B1125SEC	2
MC1632B1100SEC	2
MC1632B1125FEC	2
MC2040B1150	5 7
MC2040B1200	5 7
MC2040B1200R	5 7
MC2442B1200FEC	2
MC2442B1200SEC	2
MC3040B1200SECW	5 7
MC3042B1200FED	3
MC3042B1200SED	3
MC3042B1225FED	3
MC3042B1225SED	3
MC4040B1200SECW	5 7
MC0816B1200RJBT	8
MC0816B1150RJBT	8
MC0816B1200RCT	8
MC0816B1150RCT	8
MC0816B1200CT	8
MC0816B1150CT	8
MC2040B1150RCT	9
MC2040B1150CT	9
MC2040B1200RCT	9
MC2040B1200CT	9

#### Notes

- Numbers 1 through 9 in these tables represent the interlock kit number. Example: 1 = ECSBPK01
- Standby power interlock kits are not intended for use with AFCI, GFCI, 3-pole, or ½" frame breakers
- Standby power interlock kits are not intended for use with 4 space, 125A load centers
- These kits are not intended for use in meter combination devices where the conductors coming from the meter compartment land on lugs in the load center side, as opposed to a main breaker. Examples would include devices that start with MM0406L, MM0606L, or MC1212L

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## Siemens Design Assistant Disc

To assist consulting electrical engineers and designers, Siemens has introduced the Design Assistant. This disc, available at no charge from your local Consultant Account Manager, includes tools and reference that will make your job easier. Some of the contents are:

### Design Calculators

- Available Fault Current Calculator
- Advanced Voltage Drop Calculator
- Panelboard Schedule (Excel™ and CADD)
- Equipment Sizing Assistant
- Conduit Fill Calculator
- Circuit Breaker Time Current Curve Program
- Basic Lighting Calculator
- Switchboard Heat Output Calculator
- Switchboard Weight Calculator
- TVSS Sizing Assistant
- Motor Data Calculator
- and more...

### Training

- Step2000 Training Programs (19 books in all), including Basics of Electricity, Drives, Panelboards, MCC's, PLC's and Energy Measurement.

### Specifications

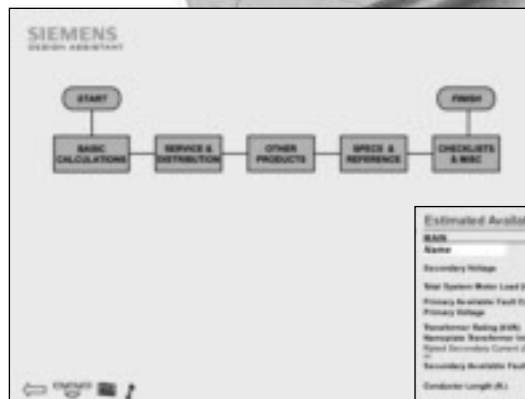
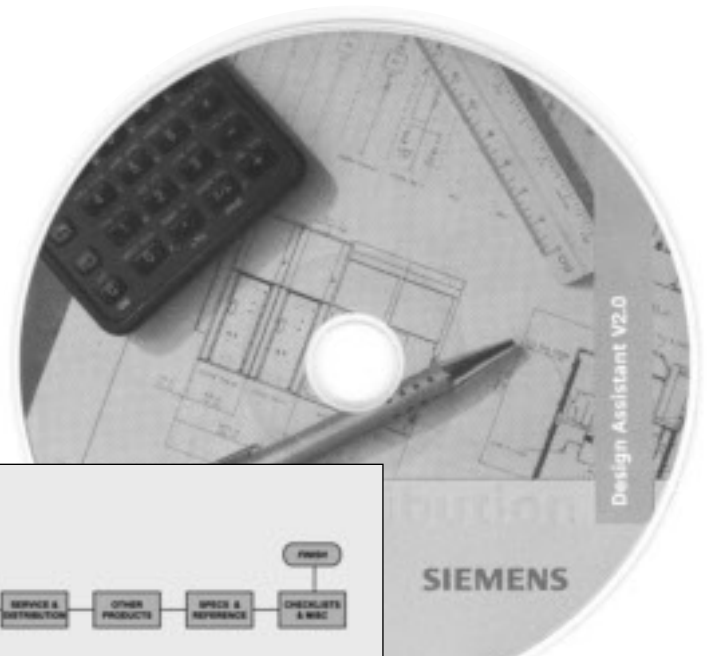
- Specifications in Microsoft Word™ format for all our Division 16 and Division 26 products (more than 45 sections), including commissioning

### Technical Information

- Checklists and Common Forms
- CADD Blocks of switchboards and substations
- Technical Information and White Papers

### Reference

- All our Selection & Application Guides, brochures, installation manuals, and more
- Full pdf versions of our SpeedFax and Industrial Controls Catalogs



For a copy of the Siemens Design Assistant Disc, contact your local Consultant Account Manager or Sales Engineer.

# Technical

## Types of Power Distribution Systems

There are several basic considerations which must be included by the system design engineer to select and design the best power distribution system which will supply power to both present and future loads most economically. Among these are:

- Safety
- Reliability
- Maintenance
- Flexibility
- Voltage Regulation
- Initial Investment
- Simplicity of Operation

The characteristics of electrical service available at the building site, the types of loads, the quality of service required, and the size and configuration of building are also important factors that will influence system design and circuit arrangement.

Four basic circuit arrangements are used for the distribution of electric power. They are the radial, primary selective, secondary selective, and secondary network circuit arrangements. The following discussion of these circuit arrangements covers both the high-voltage and low-voltage circuits. The reader should recognize that the high-voltage circuits and substations may be owned by either the utility company or the building owner, depending upon the electric rates, the practice, and requirements of the particular electric utility serving the specific building site.

### Radial System

If power is brought into a building at utilization voltage, the simplest and the lowest cost means of distributing the power is to use a radial circuit arrangement. The radial system is the simplest that can be used, and has the lowest system investment. It is suitable for smaller installations where continuity of service is not critical.

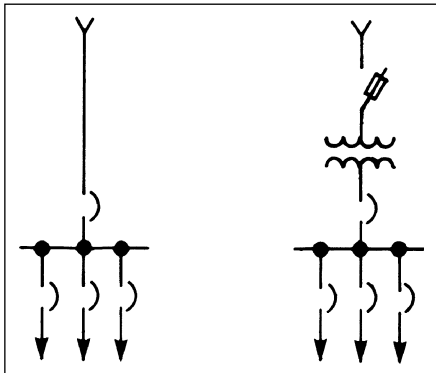


Figure 1. Radial Systems

The low voltage service entrance circuit comes into the building through service entrance equipment and terminates at a main switchgear assembly, switchboard or panelboard. Feeder circuits are provided to the loads or to other subswitchboards, distribution cabinets, or panelboards.

Figure 1 shows the two forms of radial circuit arrangements most frequently used. Under normal operating conditions, the entire load is served through the single incoming supply circuit, and in the case of high voltage service, through the transformer. A fault in the supply circuit, the transformer, or the main bus will cause an interruption of service to all loads. A fault on one of the feeder or branch circuits should be isolated from the rest of the system by the circuit protective device on that circuit. Under this condition, continuity of service is maintained for all loads except those served from the faulted circuit.

The need for continuity of service often requires multiple paths of power supply as opposed to the single path of power supply in the radial system.

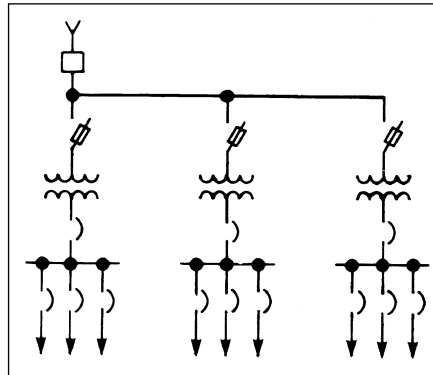


Figure 2. Expanded Radial System—Single Primary Feeder

A fault in a primary feeder in the arrangement shown in Figure 2 will cause the main protective device to operate and interrupt service to all loads. If the fault were in a transformer, service could be restored to all loads except those served from that transformer. If the fault were in a primary feeder, service could not be restored to any loads until the source of trouble had been eliminated. Since it is to be expected that more faults will occur on the feeders than in the transformers, it becomes logical to consider providing individual circuit protection on the primary feeders as shown in Figure 3. This arrangement has the advantage of

## Selection

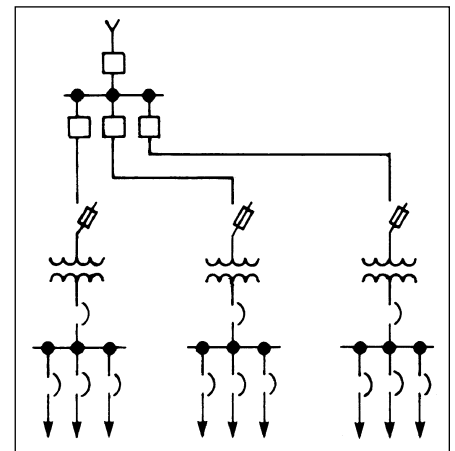


Figure 3. Expanded Radial Systems individual Primary Feeder Protection

making it possible to limit outages due to a feeder or transformer fault to the loads associated with the faulted equipment. If circuit breakers are used for primary feeder protection, the cost of this system will be high. Even if fused switches are used, the cost of the arrangement of Figure 3 will exceed the cost of the arrangement of Figure 2.

### Primary Selective System

The circuit arrangement of Figure 4 provides means of reducing both the extent and duration of an outage caused by a primary feeder fault. This operating feature is provided through the use of duplicate primary feeder circuits and load interrupter switches that permit connection of each secondary substation transformer to either of the two primary feeder circuits. Each primary feeder circuit must have sufficient capacity to carry the total load in the building.

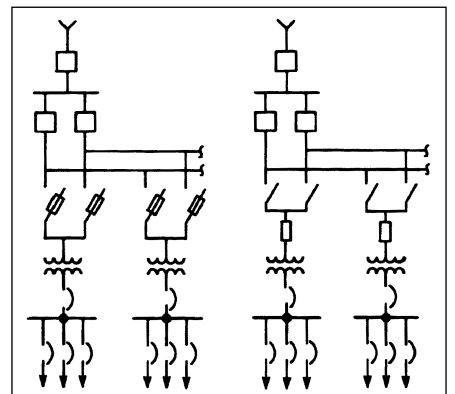


Figure 4. Primary Selective Systems

Under normal operating conditions, the appropriate switches are closed in an attempt to divide the load equally between the two primary feeder circuits. Then, should a primary feeder fault occur, there is an interruption of service to only half of the load. Service can be restored to all loads by switching the deenergized transformers to the other primary feeder circuit. The primary selective switches are usually manually operated and outage time for half the load is determined by the time it takes to accomplish the necessary switching. An automatic throwover switching arrangement could be used to avoid the interruption of service to half the load. However, the additional cost of the automatic feature may not be justified in many applications. If a fault occurs in a secondary substation transformer, service can be restored to all loads except those served from the faulted transformer.

The higher degree of service continuity afforded by the primary selective arrangement is realized at a cost somewhat higher than a simple radial system due to the extra primary cables and switchgear.

### Secondary Selective System

Under normal conditions, the secondary selective arrangement of Figure 5 is operated as two separate radial systems. The secondary tie circuit breaker in each secondary substation is normally open.

The load served from a secondary selective substation should be divided equally between the two bus sections. If a fault occurs on a primary feeder or in a transformer, service is interrupted to all loads associated with the faulted feeder or transformer. Service may be restored to all secondary buses by first opening the main secondary switch or circuit breaker associated with the faulted transformer and primary feeder, and then closing the tie breaker. The two transformer secondary circuit breakers in each substation should be interlocked with the secondary tie breaker in such a manner that all three cannot be in the closed position simultaneously. This prevents parallel operation of the two transformers and thereby minimizes the interrupting duty imposed on the secondary switching devices. It also eliminates the possibility of interrupting service to all loads on the bus when a fault occurs in either a primary feeder or a transformer.

The cost of the secondary selective system will depend upon the spare capacity in the transformers and primary feeders. The minimum transformer and primary feeder capacity will be determined

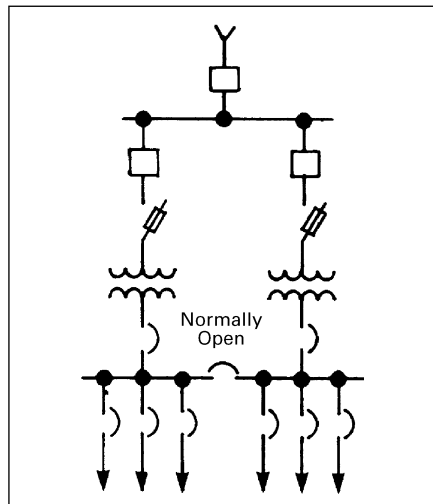


Figure 5. Secondary Selective System Using Close-Coupled Double-Ended Substation

by essential loads that must be served under emergency operating conditions. If service is to be provided for all loads under emergency conditions, then each primary feeder should have sufficient capacity to carry the total load, and each transformer should be capable of carrying the total load in each substation.

This type of system will be more expensive than either the radial or primary selective system, but it makes restoration of service to all essential loads possible in the event of either a primary feeder or transformer fault. The higher cost results from the duplication of transformer capacity in each secondary substation. This cost may be reduced by shedding nonessential loads.

A modification of the secondary selective circuit arrangement is shown in Figure 6. In this arrangement there is only one transformer in each secondary substation, but adjacent substations are interconnected in pairs by a normally open low voltage tie circuit. When the primary feeder or transformer supplying one secondary substation bus is out of service, the essential loads on that substation bus can be supplied over the tie circuit. The operating aspects of this system are somewhat complicated if the two substations are separated by distance. The best arrangement is to use close-coupled, double-ended substations.

### Secondary Network System

Many buildings with radial distribution systems are served at utilization voltage from utility secondary network systems. The network supply system assures a relatively high degree of service reliability. The utility network may take the form of a

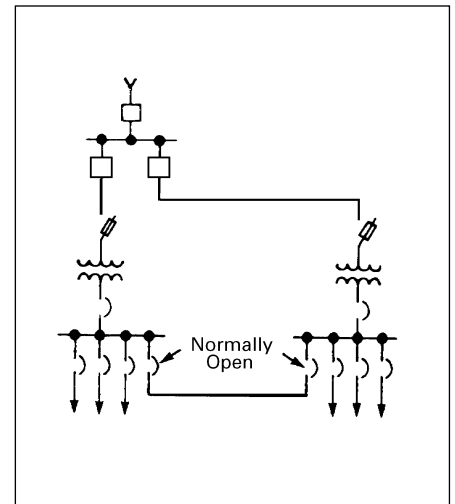


Figure 6. Secondary Selective System Using Two Single-Ended Substations With Cable or Bus Tie

distributed network or a spot network. If the building demand is in the order of 750 kVA or higher, a spot network will often be established to serve the building. In buildings where a high degree of service reliability is required, and where spot network supply may not be available, the distributed secondary network system is often used. This is particularly true of institutional buildings such as hospitals. The network may take the form of several secondary substations interconnected by low voltage circuits. However, the most common practice is to use some form of the spot network circuit arrangement.

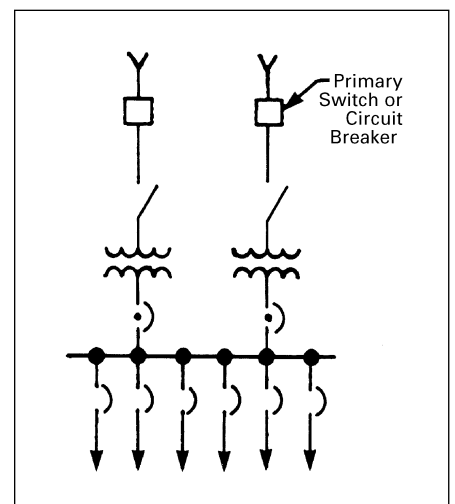


Figure 7. Simple Spot Network System

A simple spot network, such as shown in Figure 7, consists of two or more identical transformers supplied over separate primary feeder circuits. The transformers are connected to a common low voltage



bus through network protectors and are operated in parallel. A network protector is an electrically operated power circuit breaker controlled by network relays in such a way that the circuit breaker automatically opens when power flows from the low voltage bus toward the transformer. When voltages in the system are such that power would flow toward the low voltage bus from the transformer, it will close automatically.

Network protectors are normally equipped with relays which operate for faults in the network transformer or high voltage feeder only. The network is often operated on the assumption that network failure will "burn" open.

Network protectors without supplementary protection do not meet the requirements of the NEC for overcurrent, ground fault, or short circuit protection. Protection of the network or collector bus may be added by providing sensing devices, including ground fault detection, with tripping of the network protectors. The most common use of the network protector, however, has been by utilities in vaults where failure of the network devices could cause damage limited to the vault. High integrity design involving wide phase separation and the use of "catastrophe" fusing minimize the danger and extent of a network failure. A conventional circuit breaker with time overcurrent and instantaneous trip devices plus network relays can meet the NEC requirements. However, the full reliability of the network may be compromised since selectivity between these devices is difficult to obtain.

Under normal operating conditions, the total load connected to the bus is shared equally by the transformers. Should a fault occur in a transformer or on a primary feeder, the network protector associated with the faulted transformer or feeder will open on reverse power flow to isolate the fault from the low voltage bus. The remaining transformer or transformers in the substation will continue to carry the load and there will be no interruption of service to the loads, except for a voltage dip during the time that it takes for the protective equipment to operate.

If only two transformers are used in a spot network substation, each transformer must be capable of carrying the total load served from the low voltage bus. The amount of spare transformer capacity in the substation can be reduced by using a primary

selective switching arrangement with each transformer, or by using three or more transformers. If the primary selective switching arrangement is used, the total load can be about 160 percent of the nameplate rating of one of the transformers. This produces an overload on one transformer until such time as the remaining transformer can be switched to the other feeder in the case of a primary feeder fault.

The interrupting duty imposed on the low voltage protective devices in a spot network substation is higher than in radial, primary selective, or secondary selective substations having the same load capability because of the spare transformer capacity required in the spot network substation and because the transformers are operated in parallel.

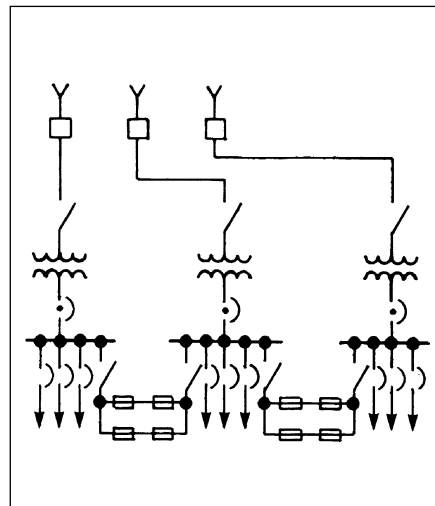


Figure 8. Secondary Network System

The spare transformer capacity, the network protectors, and the higher interrupting duty will make the secondary network arrangement much more expensive than the other arrangements. At the same time, these elements make the reliability of the network system greater than for the other system configurations.

The secondary network may also take the form shown in Figure 8. In this arrangement there is only one transformer in each secondary substation, and the substations are interconnected by normally closed low voltage tie circuits. The tie circuits permit interchange of power between substations to accommodate unequal loading on the substations and to provide multiple paths of power flow to the

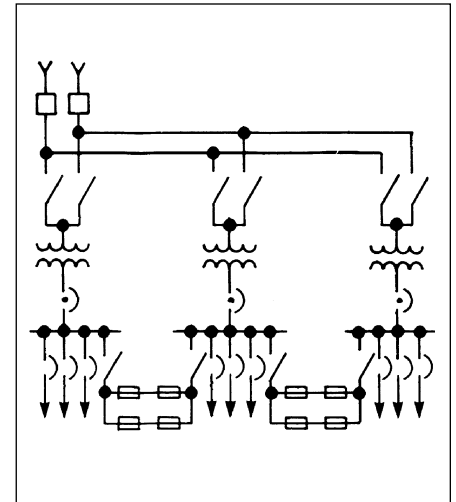


Figure 9. Primary Selective Secondary Network System

various load buses. In normal operation, the substations are about equally loaded and the current flowing in the tie circuits is relatively small. However, if a network protector opens to isolate a transformer on a primary feeder fault, the load on the associated bus is then carried by the adjacent network units and is supplied over the tie circuits. This arrangement provides for continuous power supply to all low voltage load buses, even though a primary feeder circuit or a transformer is taken out of service.

In the network arrangement in Figure 9, if there were three incoming primary feeder circuits and three transformers, the combined capacity of two of the transformers should be sufficient to carry the entire load on the three substations on the basis that only one feeder is out of service at one time. Generally, these transformers would all have the same ratings. With this arrangement, as with the spot network arrangement, a reduction in spare transformer capacity can be achieved, if a primary selective switching arrangement is used at each substation transformer. However, if three or more primary feeder circuits are available, the reduction in transformer capacity achieved through the use of a primary selective arrangement may be small.

Cable ties or busway ties, as shown in Figures 8 and 9, will require careful consideration during contingencies and of the safety aspects with regard to backfeeds. Key or other mechanical interlocking of switches or circuit breakers may be essential.

The term "low magnitude" arcing ground fault is a deceptive description of this type fault. What is meant by this is that the fault current magnitude is low compared to that of a bolted fault. Even so, the arc energy released at the point of the fault can cause much damage and may result in a fire. A ground fault is an insulation failure between an energized conductor and ground. A phase-to-ground arcing fault, unlike a phase-to-phase bolted fault, is a high-impedance type fault. The factors that contribute to this high impedance are the resistance of the arc and the impedance of the return path. This return path is usually metal conduit, raceway, busway housing or switchboard frames. Another contributing factor is the spasmodic nature of the arc. The circuit breaker or fuse protecting the circuit detects the fault current, but the actual ground fault current magnitude is ever changing due to arc elongating blowout effects, self-clearing attempts and arc reignition.

These current limiting effects make the circuit breaker or fuse incapable of detecting the actual damage that is occurring. This is not to imply that these devices are inadequate. The problem is one of system protection because the circuit breaker must be adjusted (or fuse size selected) so as to hold without tripping under momentary overload conditions, such as motor starting current or transformer inrush current. Therefore, the circuit breaker or fuse cannot open quickly enough under relatively low magnitude faults to limit the arcing damage.

Figure 10 illustrates the basic problem. Shown is a typical distribution system with a 1600 ampere main service entrance unit with a circuit breaker (single line "a") or fused service protector (single line "b"). A ground fault of 1500 amperes on the bus would affect but would not open either device. A 4000 ampere ground fault would be cleared in approximately 35 seconds by the circuit breaker and in 230 seconds by the fuse. To allow a fault of this magnitude to persist for this length of time would create more than 92,000 kW seconds of arc energy. As a result of tests made, it has been determined that an arc with a value of 1050 kW seconds of energy would vaporize about 1.0 cubic in. of copper or 2.5 cubic in. of aluminum. Obviously a fault of the magnitude shown in Figure 10 could cause a considerable amount of damage.

The nature of low-level arcing ground faults makes impractical their detection

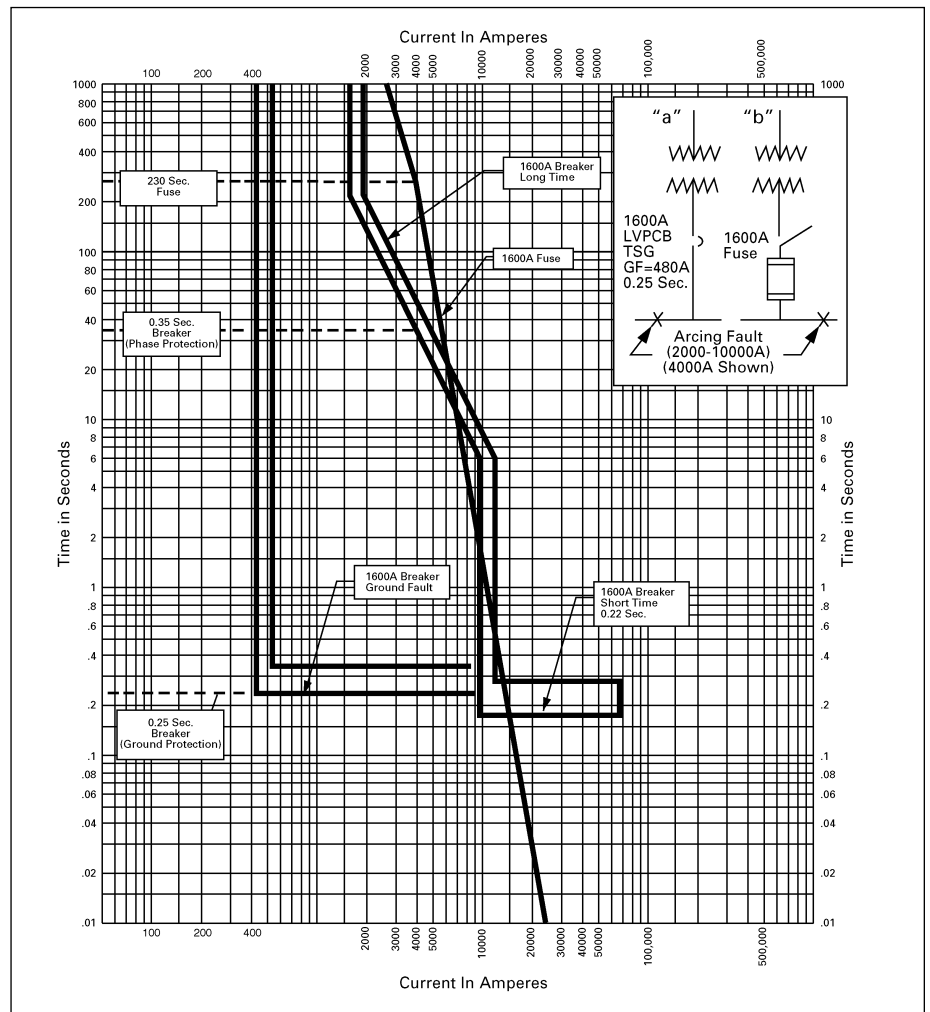


Figure 10. Ground Fault Protection

by a traditional overcurrent devices. To complete total protection of the system against all possible types of faults, other means are utilized to detect ground fault currents, including:

- **Zero sequence method**
- **Source ground current (or ground return) method**
- **Residual connection method**

### Zero Sequence Method

This is commonly used when ground fault protection is provided for equipment employing electromechanical trip devices. The scheme uses a core balance type current transformer (ground sensor) which encircles all phase conductors (and neutral on four wire system) to detect ground faults.

The operation of this system is such that under normal operating conditions (eg., no ground fault on the system) there is

no output from the ground sensor to the tripping relay because the vector sum of all the currents through the sensor window is zero.

$$(I_a + I_b + I_c + I_n = 0)$$

If a ground fault occurs on the system, there is now an additional current ( $I_g$ ) seen by ground sensor which returns to the source by a path other than through the sensor window. The sensor now sees an unbalance caused by  $I_g$  and operates the ground relay which trips the circuit protector.

$$(I_a + I_b + I_c + I_n = I_g)$$

The ground sensor is located downstream from the point at which the system is grounded and can be mounted either on the line side or load side of the main disconnect device. This method can be used on incoming main disconnect or on feeders.

### Source Ground Current (or Ground Return) Method

This method of detecting the ground fault current  $I_g$  locates the ground sensor on the neutral connection to ground at the service entrance. This means that the ground sensor only detects ground fault current. This type of detection has some limitations because it is detecting the ground fault return current. On multiple source systems with multiple connections to ground, this ground fault current can return by more than one path, therefore, some sensitivity in detecting these faults would be lost.

### Residual Connection Method

Current sensors, one on each of the phase conductors and on the neutral conductors, are connected in common. This common (or residual connection) measures the vector summation of the phase currents and the neutral current. Under normal conditions, this vector summation will be zero, and no current will be applied to the ground relay.

If a fault involving ground occurs, the current summation is not equal to zero. Current flows into common connection which is applied to the relay. This method of detecting ground fault current is used in circuit breakers with electronic trip device.

### Residual Ground Current Sensing

#### 3-Wire System

This system is used with electronic trip units, and always includes three current sensors mounted on the circuit breaker. A trip element is connected in series with each sensor to provide phase overcurrent protection. By adding a ground trip element in the residual (neutral) circuit of the three current sensors, it will sense ground fault current only, and not load current. This permits more sensitive settings to protect against low magnitude ground faults. This scheme is shown in Figure 14.

Under normal conditions, the vector sum of the current in all of the phases equals zero. No current would flow in the GND element, which is also true under the condition of a phase-to-phase fault.

A phase-to-ground fault would cause a current to flow in the GND trip element. If the magnitude of this current exceeds the pickup setting for the required time, the trip unit will operate to trip the breaker.

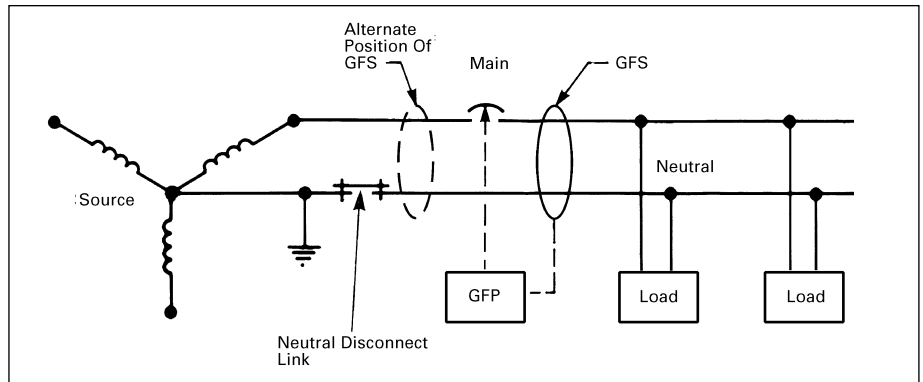


Figure 11. Schematic for Zero Sequence

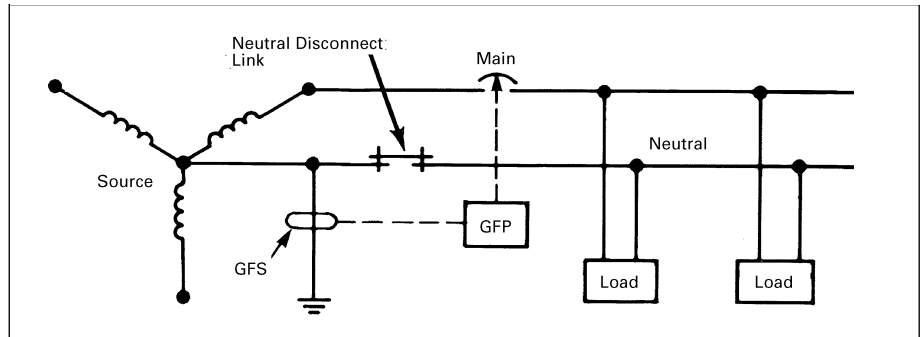


Figure 12. Schematic for Source Ground Current

**GFS** = Ground Fault Sensor  
**GFP** = Ground Fault Protection (Relay or Trip Unit)

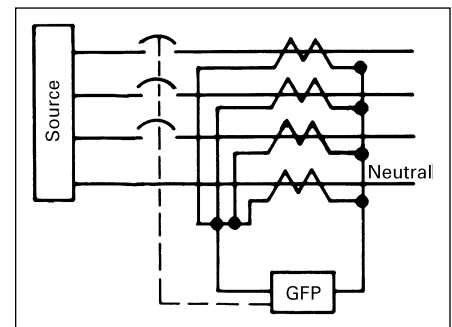


Figure 13. Schematic for Residual Method

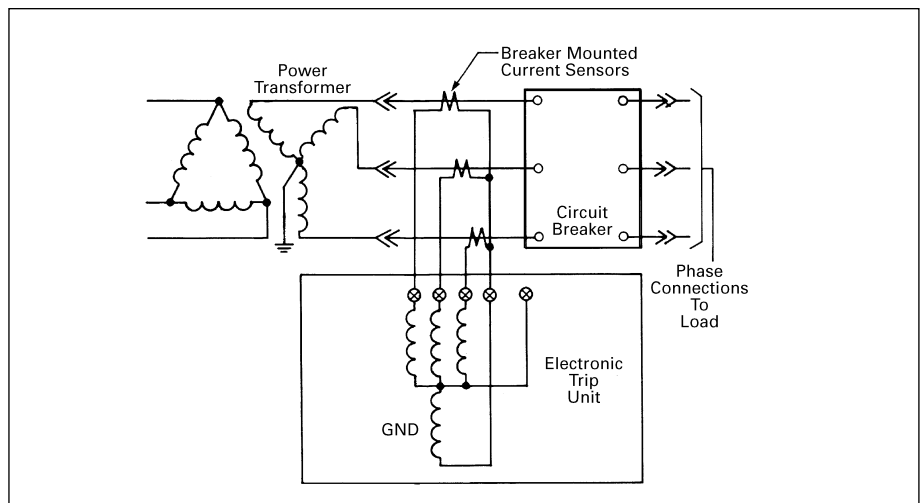


Figure 14. Schematic for Ground Protection on 3-Wire Systems, Residual Sensing

### 4-Wire System

To avoid false tripping, a fourth current sensor is connected in the neutral conductor to sense normal neutral current. This fourth sensor is connected so that it cancels the normal neutral current which is developed in the residual circuit as shown in Figure 15.

Under normal conditions, the vector sum of the current in all phases equals the neutral current. Disregarding the effects of the neutral sensor connection, the neutral current would flow through the GND element. Since this is normal neutral current, pickup of the GND element is not desired. Therefore, the neutral sensor is added to sense the same neutral current as the GND sensor — but opposite in polarity. The result is a circulating current between the phase sensing current sensors and the neutral sensor, with no current flowing through the GND sensor. This is similar to a differential relay circuit. When a phase-to-ground fault occurs, the vector sum of the phase currents will no longer equal the neutral current because the ground

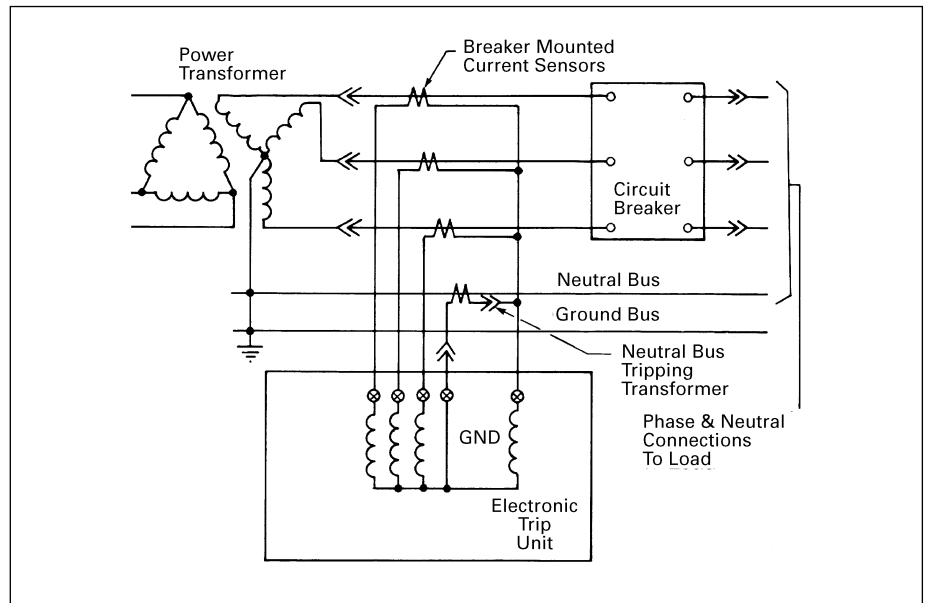


Figure 15. Schematic for Ground Protection on 4-Wire Systems, Residual Sensing

fault current returns via the ground bus and bypasses the neutral. If the magnitude of the phase-to-ground

current exceeds the pickup setting of the GND element for the required time, the trip unit will operate to open the breaker.

## Types Of Coordinated Ground Fault Tripping Systems

There are two types of Coordinated Ground Fault Systems:

- **Time / Current Selective**
- **Zone Selective (Zone Interlock)**

### Time / Current Selective

In this system the time / current characteristics of the Ground Fault Protection (GFP) devices used with each disconnect are coordinated so that the nearest disconnect supplying the ground fault location will open. Any upstream disconnects remain closed and continue to supply the remaining load current. Each set of GFP devices should have a specified time-current operating characteristic. When disconnects are connected in series, each downstream device should use a time-current setting that will cause it to open and clear the circuit before any upstream disconnect tripping mechanism is actuated. The time-current bands of disconnects in series must not overlap and must be separated from each other sufficiently to allow for the clearing time of each disconnecting means used. The time / current selective system is recommended for applications where damage levels associated with the time / current settings used are tolerable. This type of system does not require

interlocking wiring between the GFP devices associated with main feeder and branch disconnecting devices.

Figure 16, on the next page, illustrates time / current selective coordination in a system involving a 4000 ampere main circuit breaker and a 1600 ampere feeder circuit breaker in an incoming service switchboard. These feed a distribution switchboard with a 600 ampere sub-feeder to a 100 ampere branch breaker. The system is coordinated so that only the circuit breaker nearest the location of the ground fault trips.

### Zone Selective (Zone Interlock)

In this system each disconnecting means should open as quickly as possible when a ground fault occurs in the zone where this disconnect is the nearest supply source.

The GFP device for an upstream disconnecting means should have at least two modes of operation. If a ground fault occurs between it and the nearest downstream disconnect, it should operate in its fast tripping mode.

When a ground fault occurs beyond the downstream disconnect, the downstream GFP device should open in its fast tripping mode and simultaneously

send a restraining signal to the upstream device and transfer that device to a time-delay tripping mode. The upstream time-delay tripping characteristic selected should be such that the downstream disconnect will open and clear the circuit before the upstream disconnect tripping mechanism is actuated. The time-current characteristic of the upstream device should be such as to offer backup protection in the event of malfunction of the downstream equipment.

Alternatively, a restraining signal from a downstream device may be used to prevent the tripping of an upstream disconnect on ground fault instead of causing it to operate in the time-delay tripping mode. This may be done where backup protection is less important than continuity of service to critical loads supplied by the upstream unit. There are very few instances in which this is justified, and a careful study of the entire system should be made before using this type of interlocking.

For a zone selective system, the time-current bands of disconnects in series, although used only for backup protection, should not overlap and should be separate from each other sufficiently to allow for the opening time of each disconnecting means used.

### Time/Current Selective Ground Coordination

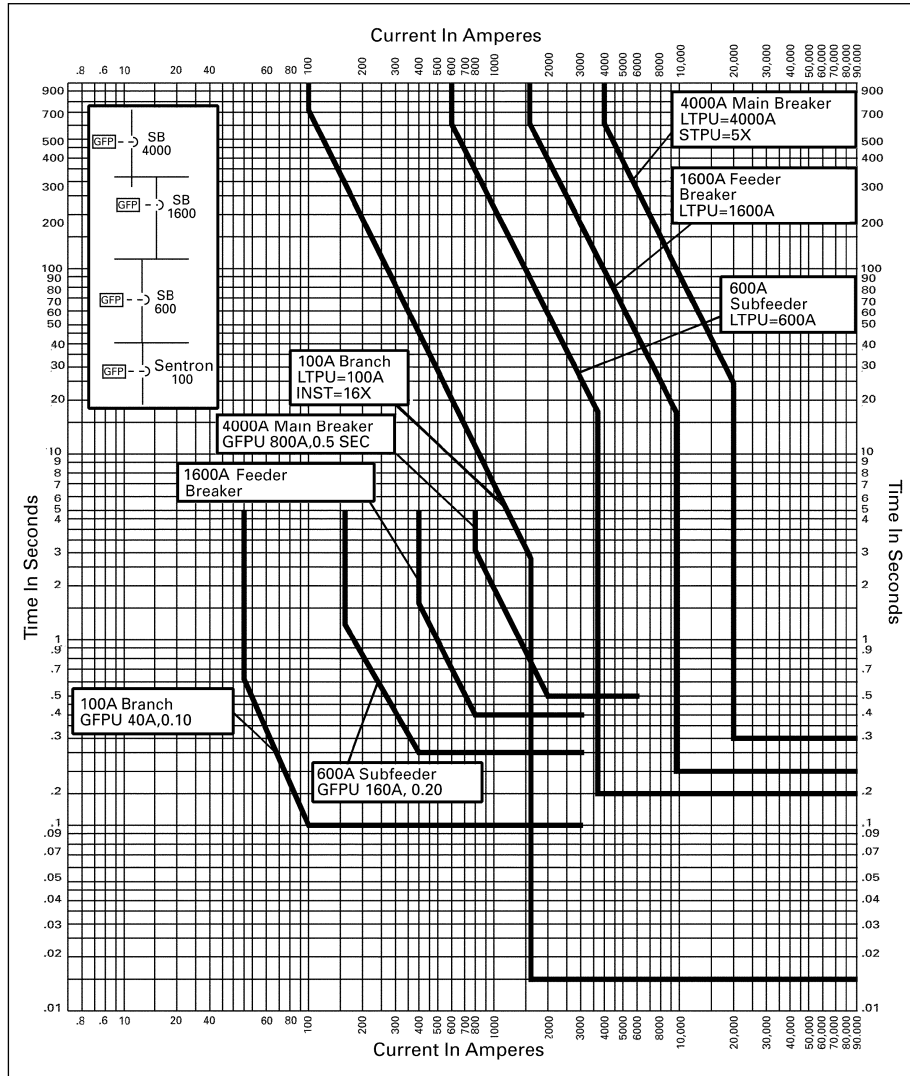


Figure 16. Fully Coordinated Multizone GFP System

The zone selective or zone interlock system provides fast tripping of the nearest disconnect upstream of the ground fault. The damage level is the lowest that is possible because the ground fault is cleared as quickly as the protective equipment can respond and the disconnect can open. Additional interlocking wiring and circuitry for sending and receiving the restraining signals are required.

The zone selective or zone interlock scheme is for those few special applications where exceptionally fast tripping is necessary for all feeders throughout the entire system to reduce damage. Note that although the relay time can be reduced appreciably, the circuit breaker mechanism and arcing time (plus safety margin) will still be present.

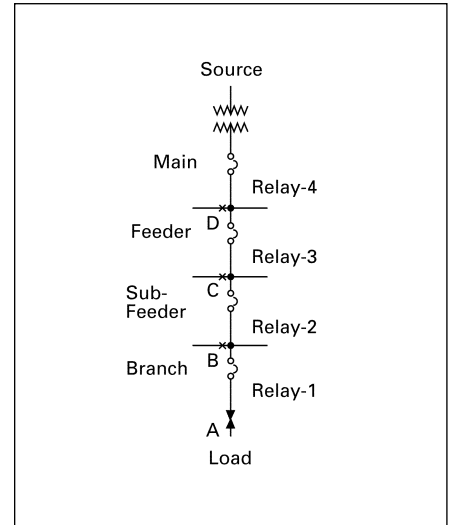


Figure 17. Zone Interlocking Scheme

#### Zone Selective Operation (Figure 17):

- Relay-1** will sense a ground fault at **A** when it exceeds 10 amperes. It will instantly initiate tripping of the **Branch** breaker and send restraining signals (transfer from instantaneous operation to time-delayed operation) to **Relay-2** and **Relay-3** (Relay-2 and Relay-3 will then back up Relay-1 on a time coordinated basis). **Relay-4** will be restrained by **Relay-2** if ground fault exceeds 100 amperes.
- Relay-2** will sense a ground fault at **B** when it exceeds 100 amperes. It will instantly initiate tripping of the **Sub-Feeder** breaker and send restraining signals to **Relay-3** and **Relay-4**.
- Relay-3** will sense a ground fault at **C** when it exceeds 400 amperes. It will instantly initiate tripping of the **Feeder** breaker and send a restraining signal to **Relay-4**.
- Relay-4** will sense a ground fault at **D** when it exceeds 800 amperes. It will instantly initiate tripping of the **Main** breaker.

Table 17.1

Typical Ampere Setting	Restrained Time Delay
800	0.4 SEC.
400	0.3 SEC.
100	0.2 SEC.
10	0.1 SEC.

# Technical

## Ground Fault Protection

## Selection

### Typical Application Diagrams

Figures 18 through 23 on this and the facing page show the basic methods of applying ground fault protection (GFP). Other types of distribution systems will require variations of these methods to satisfy other system conditions.

These diagrams show circuit breakers as the disconnects. Any disconnecting

means can be utilized, providing it is suitable for use with a ground fault protection system as indicated in the scope of this application guide. The examples do not show protection against a ground fault on the supply side of the main disconnect.

Sensing device and disconnect locations define zones of protection. Source side

and ground return sensors provide protection only on the load side of associated disconnects. If a vector summation method is used and its sensors are located on load side of a disconnect, the zone between a source and actual sensor location becomes the responsibility of the next upstream protective device.

**Table 17.2 Recommendations for Figures 18-23**

Ground Fault Protection	Figure	Sensing Method	Additional Ground Points	Recommended Use	Selectivity
On Main Disconnect Only	18	Vector Summation	Must not be downstream. May be upstream	Minimum protection only per Section 230-95 for the National Electric Code	Limited selectivity depends on location of fault and rating of overcurrent devices on the upstream side of fault.
	19	Ground Return	None		
On Main and Feeder Disconnects	20	Main and Feeders – Vector Summation	Must not be downstream of main ground fault sensor. May be upstream.	Improved service continuity is required	Main will allow feeder to trip for faults downstream of feeder sensors, but main will trip if feeder fails to operate.
	21	Main – Ground Return Feeders – Vector Summation	None		
On Main, Feeder, and Selected Branch Disconnects with Zone Selective Interlocking	22	Main and feeders 1-3 – Vector Summation MCC branch feeder A – Zero Sequence	Must not be downstream of main ground fault sensor. May be upstream.	Improved service continuity and minimum arcing fault damage are required and protection is needed on branch circuits.	Main and feeder 1-3 will provide delayed backup protection if fault is downstream of MCC branch feeder A. Main will provide delayed backup protection if fault is downstream of sensors for feeders 1-3. Main will trip on fastest curve if fault is upstream of sensors for feeders 1-3.
Double-Ended System with Protection on Main and On Tie and Feeder Disconnects	23	Main and Tie – Ground Return Feeders – Vector Summation	None	Double-ended systems with ground fault protection on tie disconnect where maximum continuity of service is essential.	When operating with tie disconnect open, main will provide delayed backup protection if fault is downstream from feeder sensors. When operating with the tie disconnect closed, the tie will trip before the main, thus sectionalizing the bus.

### Ground Fault Protection on Main Disconnects Only

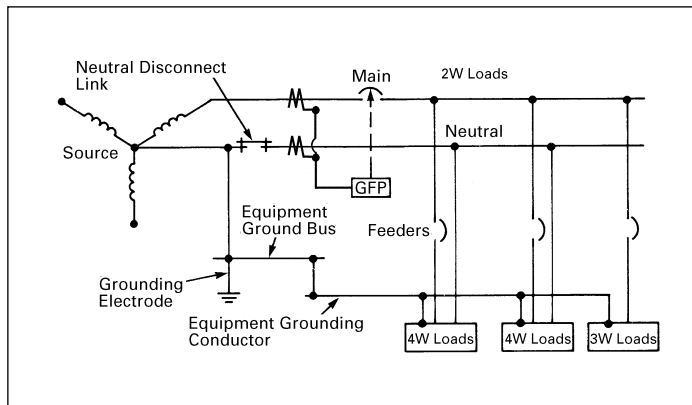


Figure 18

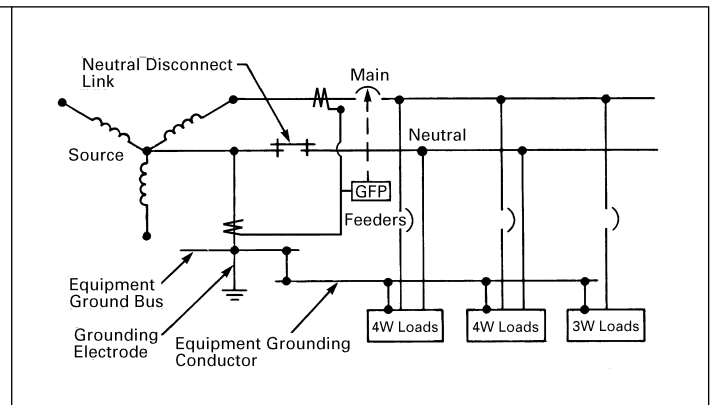


Figure 19

### Ground Fault Protection on Main and Feeder Disconnects

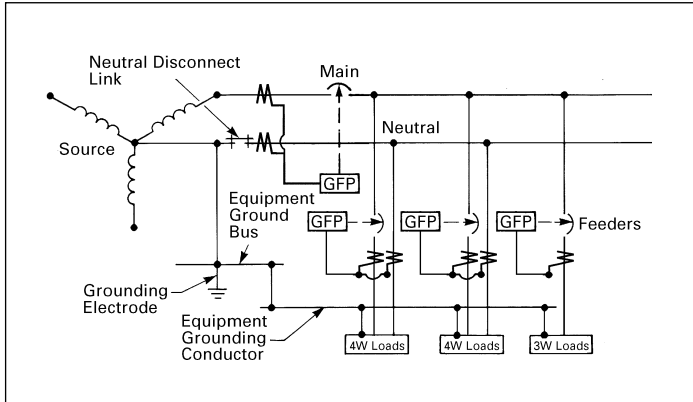


Figure 20

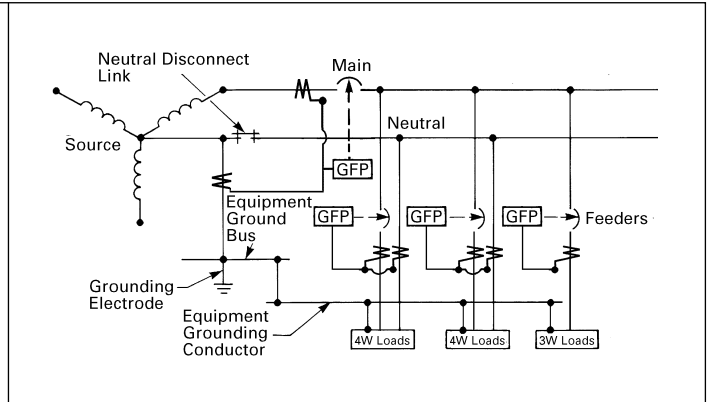


Figure 21

### Ground Fault Protection on Main, Feeder and Selected Branch Disconnects with Zone Selective Interlocking

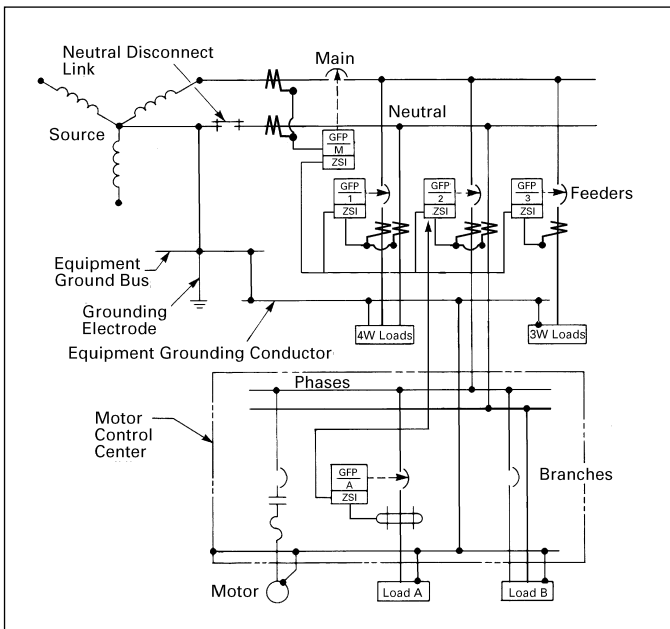


Figure 22

### Double-Ended System with Ground Fault Protection on Main and on Tie and Feeder Disconnects

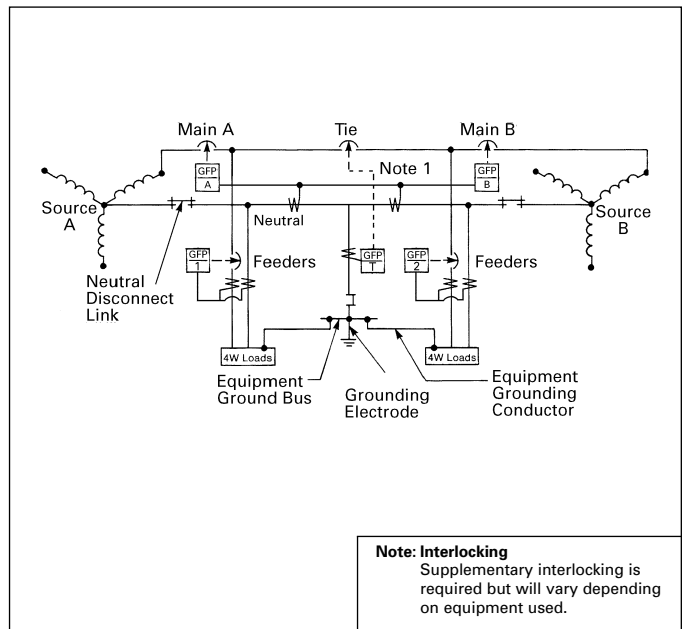


Figure 23

### NEC Requirements for Ground Fault Protection

**230.95 Ground-Fault Protection of Equipment.** Ground-fault protection of equipment shall be provided for solidly grounded wye electrical services of more than 150 volts to ground but not exceeding 600 volts phase-to-phase for each service disconnect rated 1000 amperes or more. The grounded conductor for the solidly grounded wye system shall be connected directly to ground without inserting any resistor or impedance device.

The rating of the service disconnect shall be considered to be the rating of the largest fuse that can be installed or the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted.

Exception No. 1: The ground-fault protection provisions of this section shall not apply to a service disconnect for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

Exception No. 2: The ground-fault protection provisions of this section shall not apply to fire pumps.

**(A) Setting.** The ground-fault protection system shall operate to cause the service disconnect to open all ungrounded conductors of the faulted circuit. The maximum setting of the ground-fault protection shall be 1200 amperes, and the maximum time delay shall be one second for ground-fault currents equal to or greater than 3000 amperes.

**(B) Fuses.** If a switch and fuse combination is used, the fuses employed shall be capable of interrupting any current higher than the interrupting capacity of the switch during a time that the ground-fault protective system will not cause the switch to open.

**(C) Performance Testing.** The ground-fault protection system shall be performance tested when first installed

on site. The test shall be conducted in accordance with instructions that shall be provided with the equipment. A written record of this test shall be made and shall be available to the authority having jurisdiction.

(FPN No. 1): Ground-fault protection that functions to open the service disconnect affords no protection from faults on the line side of the protective element. It serves only to limit damage to conductors and equipment on the load side in the event of an arcing ground fault on the load side of the protective element.

(FPN No. 2): This added protective equipment at the service equipment may make it necessary to review the overall wiring system for proper selective overcurrent protection coordination. Additional installations of ground-fault protective equipment may be needed on feeders and branch circuits where maximum continuity of electrical service is necessary.

(FPN No. 3): Where ground-fault protection is provided for the service disconnect and interconnection is made with another supply system by a transfer device, means or devices may be needed to ensure proper ground-fault sensing by the ground-fault protection equipment.

(FPN No. 4): See 517.17(A) for information on where an additional step of ground fault protection is required for hospitals and other buildings with critical areas or life support equipment.

### 517.17 Ground-Fault Protection.

**(A) Applicability.** The requirements of 517.17 shall apply to hospitals and other buildings (including multiple occupancy buildings) with critical care areas or utilizing electrical life support equipment, and buildings that provide the required essential utilities or services for the operation of critical care areas or electrical life support equipment.

**(B) Feeders.** Where ground-fault protection is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent devices and current transformers or other equivalent protective equipment that shall cause the feeder disconnecting means to open.

The additional levels of ground-fault protection shall not be installed as follows:

- (1) On the load side of an essential electrical system transfer switch
- (2) Between the on-site generating unit(s) described in 517.35(B) and the essential electrical system transfer switch(es)
- (3) On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground but not exceeding 600 volts phase-to-phase.

**(C) Selectivity.** Ground-fault protection for operation of the service and feeder disconnecting means shall be fully selective such that the feeder device, but not the service device, shall open on ground faults on the load side of the feeder device. A six-cycle minimum separation between the service and feeder ground-fault tripping bands shall be provided. Operating time of the disconnecting devices shall be considered in selecting the time spread between these two bands to achieve 100 percent selectivity.

(FPN): See 230.95, fine print note, for transfer of alternate source where ground-fault protection is applied.

**(D) Testing.** When equipment ground-fault protection is first installed, each level shall be performance tested to ensure compliance with 517.17(C).



Coordination of a power distribution system requires that circuit protective devices be selected and set so that electrical disturbances, such as over-loads or short circuits, will be cleared promptly by isolating the faulted equipment with minimum service disruption of the distribution system. Time / Current Characteristic Curves are available for circuit protective devices, such as circuit breakers and fuses, which show how quickly they will operate at various values of overload and short circuit current. Coordination can be obtained by comparing these curves for each device in series in the system.

In developing the system, it will be noted that many compromises must be made between the various objectives:

1. System reliability.
2. Continuity of service.
3. Equipment and system protection.
4. Coordination of protective devices.
5. System cost.

Preliminary steps in Coordination study:

A) One-line diagram: used as a base on which to record pertinent data and information regarding relays, circuit breakers, fuses, current transformers, and operating equipment while at the same time, providing a convenient representation of the relationship of circuit protective devices with one another.

B) Short-circuit study: record all applicable impedances and ratings; using these values, a short-circuit study is made to determine currents available at any particular point in the system.

C) Determine maximum load currents which will exist under normal operating conditions in each of the power-system circuits, the transformer magnetizing inrush currents, and times, and the starting currents, and accelerating times of large motors. These values will determine the maximum currents which circuit protective devices must carry without operating. The upper boundary of current sensitivity will be determined by the smallest values resulting from the following considerations:

- 1) Maximum available short-circuit current obtained by calculation.
- 2) Requirements of applicable codes and standards for the protection of equipment such as cable, motors, and transformers.
- 3) Thermal and mechanical limitations of equipment.

D) Time / current characteristic curves of all the protective devices to be coordinated must be obtained. These should be

plotted on standard log-log coordination paper to facilitate the coordination study.

### Mechanics Of Achieving Coordination:

The process of achieving coordination among protective devices in series is essentially one of selecting individual units to match particular circuit or equipment protection requirements, and of plotting the time/current characteristic curves of these devices on a single overlay sheet of log-log coordination paper.

The achievement of coordination is a trial-and-error routine in which the various time / current characteristic curves of the series array of devices are matched one against another on the graph plot.

When selecting protective devices one must recognize ANSI and NEC requirements and adhere to the limiting factors of coordination such as load current, short-circuit current, and motor starting. The protective devices selected must operate within these boundaries while providing selective coordination

where possible. Selective coordination is usually obtained in low voltage systems when the log-log plot of time / current characteristics displays a clear space between the characteristics of the protective devices operating in series, that is, no overlap should exist between any two time/current characteristics if full selective coordination is to be obtained. Allowance must be made for relay overtravel and for the relay and fuse curve accuracy. Quite often the coordination study will stop at a point short of complete selective coordination because a compromise must be made between the competing objectives of maximum protection and maximum service continuity.

### Computer Aided Coordination:

The philosophy discussed above applies to the "classical" practice of performing coordination studies manually. Today, however, there are numerous personal computer software programs available for performing coordination studies.

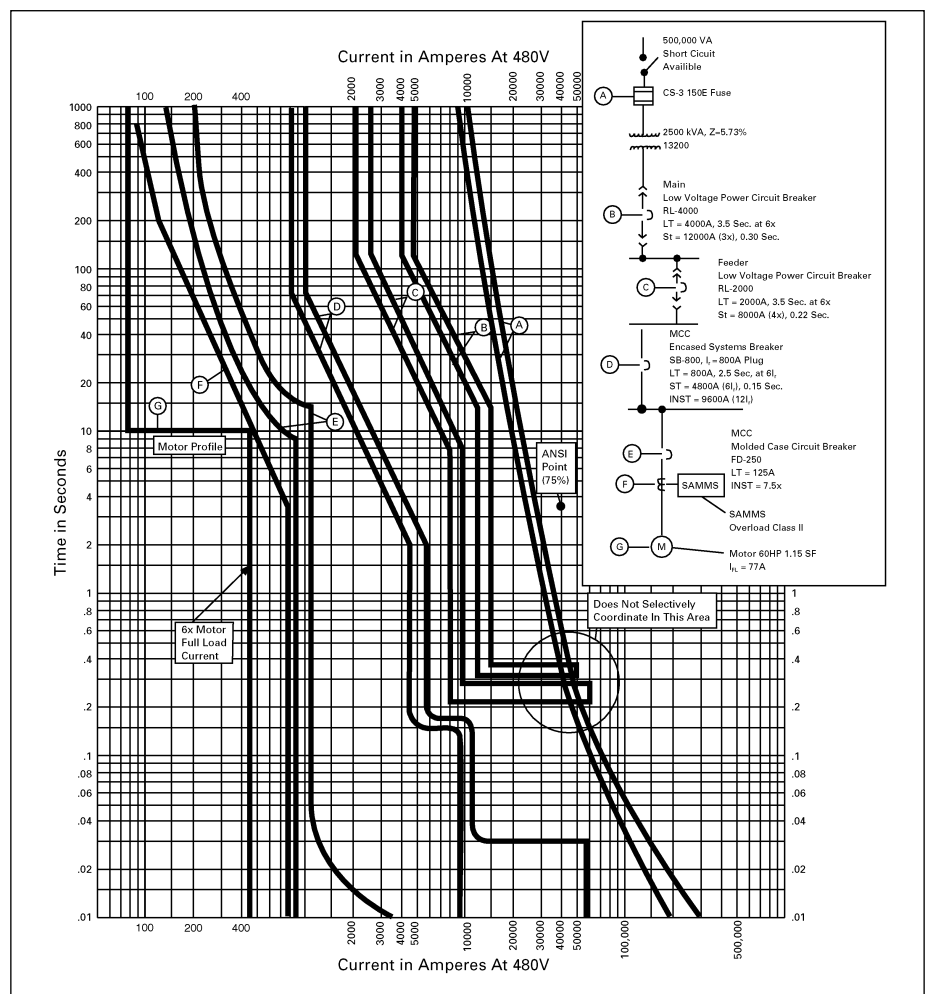


Figure 24. Coordination of Example System

### General

Proper system design requires that the system be coordinated so the interrupting capacity and / or short circuit withstand capabilities of the various components in the system are not exceeded for any operating situation. Good practice also requires that the system be selective, that is, that the minimum portion of the system be interrupted on occurrence of a fault. The need for selectivity must always be balanced against the requirements of economics and coordination with the overall process needs.

At the conceptual phase of a project, several distribution system alternatives should be considered, and examined both technically and economically. This study should include sufficient detail for a thorough understanding of the system alternatives. The conceptual study should determine the optimal distribution system configuration for the project, on which definitive design can proceed.

At all stages of design, the principal objectives of personnel safety, equipment protection, process continuity, fault clearing, and service continuity should be considered.

In designing a new or modified distribution system, the following types of system studies may be needed:

- 1. Short Circuit Studies:** three phase, line-to-line, and line-to-ground faults can be calculated for both close-and-latch and interrupting conditions, necessary for checking interrupting device and related equipment ratings, and setting protective devices.
- 2. Circuit Breaker Application Studies:** consider the AC and DC decrements in the fault current, and the speed of the various medium voltage circuit breakers, to determine close-and-latch and interrupting duties.
- 3. Protective Device Coordination Studies:** determine characteristics and settings of protective devices, e.g., relays, trip devices, fuses, etc. The coordination study should provide a balance between protection of system equipment and continuity of service.

**4. Load Flow Studies:** calculate voltages, phase angles, real and reactive power, line and transformer loadings under simulated conditions to aid in determining the performance of a new or revamped system during the planning stage.

**5. Motor Starting Studies:** determine severity of voltage dips and adequacy of load accelerating torque when starting large motors on a weak system.

Today, most studies are performed using computers. Some specialized studies require large computing resources, but many studies can now be performed on personal computers. A wide variety of software packages are available. In addition, many specialty firms exist which provide engineering service to perform such studies.

### Short Circuit Calculations

The single-line diagram serves as the starting point for the system study and selection of equipment ratings. The single-line must be modified to show all power sources and capacities, and system impedances. Sources of short circuit current include utility connections, local generation, and all rotating machines connected to the system at the instant the fault occurs. The system study should consider various fault types (line-to-line and line-to-ground) and fault locations.

The value of normal load current in a circuit depends on the load connected, and is essentially independent of the capacity of the power system. On the other hand, the short circuit current depends almost entirely on the capacity of the power system, not the size of the load.

The total fault current consists of a symmetrical AC component, superimposed on a DC (offset)

component. Hence, the total fault current is asymmetric with respect to the current axis. The value of the DC component depends on the point of the voltage wave at which the fault was initiated. For system studies, it is assumed that the fault is initiated at the worst point, to produce a "fully offset" fault current. This is illustrated in Figure 25.

Short circuit currents are determined by the system impedance, including both reactance and resistance. The effect of the reactance is to cause the initial fault current to be high, with the fault current declining as time proceeds. This is represented as the summation of a DC component which decays relatively rapidly over time, and an AC component, which decays at a slower rate. The rate of decay of the components depends on the system X / R ratio.

Since the reactance of rotating machines varies with the time from fault initiation, the short circuit calculations must use the appropriate machine reactance values. Subtransient reactance ( $X''_d$ ) governs current flow for approximately the first 6 cycles of a fault. Then, transient reactance ( $X'_d$ ) determines current flow up to around 30-120 cycles, depending on the machine. After this, synchronous reactance ( $X_d$ ) applies, but studies seldom use this value as faults are not usually allowed to persist for this length of time.

For transformers, the actual tested value of the transformer impedance is used. If this is not available, use design impedance adjusted to the minimum value allowed by manufacturing tolerance of  $\pm 7.5\%$ . For example, a 5.75% design unit has a tolerance range of 5.32-6.18%, and 5.32% would be used in a system study prior to manufacture.

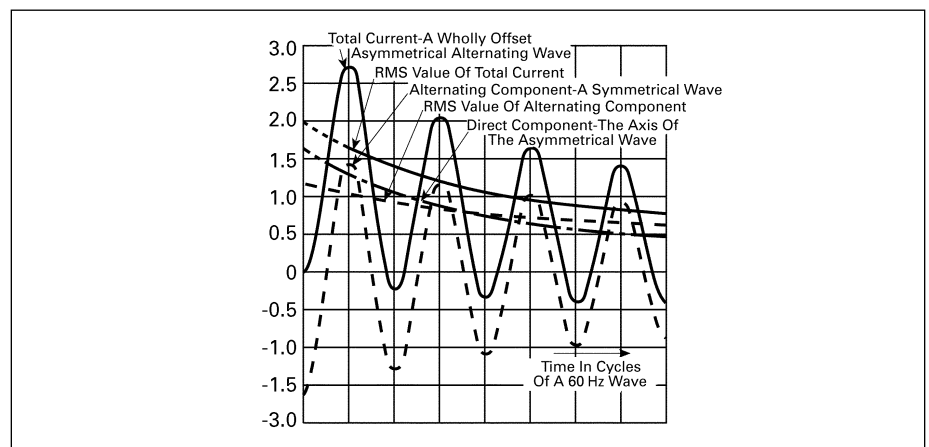


Figure 25. Structure of Asymmetrical Current Wave (Fully Offset)

### Fuseless Current Limiting Circuit Breakers

The technology of Siemens Sentron® fuseless current limiting circuit breakers was developed to meet the demands of modern distribution systems. It is not uncommon for today's systems to have prospective short circuit currents approaching 200,000 amperes. Users demanded the protection and flexibility afforded by circuit breakers, without the nuisance and expense of fuse replacement.

Underwriters Laboratories, in UL489-2.4A, defines a fuseless current limiting circuit breaker as one that "does not employ a fusible element, and that when operating within its current-limiting range, limits the let-through  $I^2t$  to a value less than the  $I^2t$  of a half-cycle wave of the symmetrical prospective current."

$I^2t$  is an expression which allows comparison of the energy available as a result of fault current flow. As used in current limiting discussions,  $I^2t$  refers to the energy released between the initiation of the fault current and the clearing of the circuit.

Figure 26 relates the "prospective  $I^2t$ " to the energy allowed by a Sentron current limiting circuit breaker, or "let-through  $I^2t$ ". The upper curve represents the maximum  $I^2$  the circuit can produce, unaltered by the presence of any protective device. The lower curve illustrates the reduction in energy allowed when Sentron current limiting circuit breakers are used.

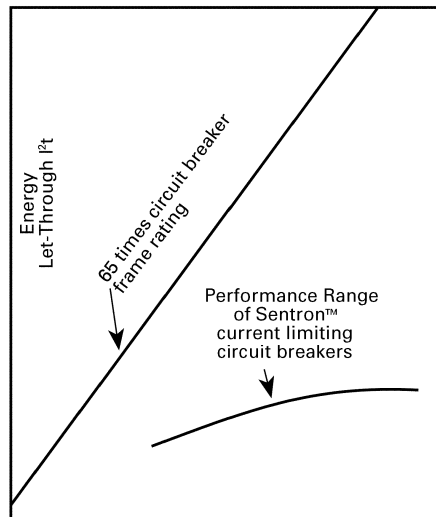


Figure 26. Reduction of  $I^2t$  Let-Through with Current-Limiting Technology

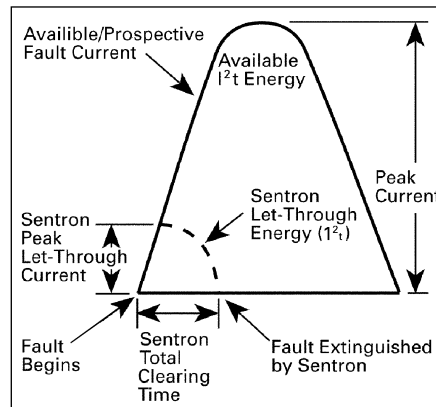


Figure 27. Current Limitation

Figure 27 illustrates how the Sentron circuit breaker limits the energy under fault conditions. The upper curve illustrates the first half-cycle wave of prospective fault current. To qualify as truly current limiting, the circuit breaker must prevent the current value from reaching the maximum value that it would reach if the circuit breaker were not connected in the circuit.

The Sentron circuit breakers use the "blow-apart" contact principle to accomplish current limitation. This principle is based on the electro-magnetic repulsion of adjacent conductors which carry current in opposite directions.

The contact arms are arranged to create opposing magnetic fields. As fault current rises, magnetic repulsion forces the contacts to separate completely. The higher the fault current, the faster this "blow-apart" action occurs.

As figure 27 illustrates, the energy let-through with the current limiting Sentron circuit breaker is decreased significantly. This provides better protection for downstream equipment, and reduces damage.

### Applications and Ratings

Sentron current limiting circuit breakers are designed for use in load centers, power panelboards, distribution switchboards, secondary unit substations, and all types of individual enclosures where the available fault currents exceed the interrupting ratings of heavy duty and extra-heavy duty molded case circuit breakers.

Sentron circuit breakers have ratings of 15 through 1600 amperes, 240 through 600 volts AC, with up to 200,000 symmetrical amperes interrupting rating.

### Series-Connected Rating

A series-connected rating can be assigned to a combination of components — typically circuit breakers — which has been tested in combination to a higher interrupting rating than that of the lowest rated protective device of the combination. These ratings must be substantiated by extensive UL testing.

### General

Article 110.9 of the 2005 *National Electric Code* states the following: "Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment. Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that must be interrupted."

The difference between the phrases "at fault levels" and "at other than fault levels" is the part of the Code which makes series-connected systems possible. For example, the traditional method of satisfying the Code was to select each breaker in the series with an interrupting rating equal to or greater than the prospective fault current. The interrupting rating of a circuit breaker — stated in RMS symmetrical amperes — is the amount of short circuit current the device can safely interrupt and continue to function as a circuit breaker.

Thus, if the prospective fault current at the line terminals of a panelboard is 100,000A RMS symmetrical, this traditional method would require that all the circuit breakers within the panelboard be rated at 100,000A RMS symmetrical or greater interrupting capacity. This is illustrated in Figure 28. In the traditional system, both the main and the feeder breaker are subjected to several short circuit peaks.

In a series-connected system, however, the individual components (or circuit breakers) *have already been tested in series and the combination has been given an interrupting rating equal to or greater than various prospective fault currents which are available.* The combination, therefore, acts as a *single entity*, and performs the same protective function as individual circuit breakers in the traditional method. The difference is that combinations in series-connected systems contain devices with lower interrupting ratings.

Siemens circuit breakers used in series combinations which have passed extensive tests required by Underwriters Laboratories are listed in the *UL Recognized Component Directory* according to manufacturer's name and type. The listing means that such circuit breakers are UL Recognized for the series interrupting ratings as noted in the Directory, and that they can be used as an entity to meet Article 110.9 of the NEC.

Using the previous example, if the prospective fault current at the line terminals of the panelboard is 100,000 amperes RMS symmetrical, the series-connected method would involve selecting a specific *combination* from the *UL Recognized Component Directory* with a rating of 100,000 amperes RMS symmetrical or greater interrupting capacity. That combination might include individual components which have lower individual interrupting ratings than 100,000 amperes RMS symmetrical.

However, all the components in the combination have been tested together and form an *entity* that will safely interrupt the prospective fault current of the particular situation being examined as long as the interrupting rating listed matches the prospective fault current.

With the advent of fuseless current limiting circuit breakers such as Sentron, another important development in series-connected combinations has emerged. Because of the fuseless current limiting circuit breaker's extremely fast interrupting capability, this device provides more control over high prospective fault currents than traditional series-connected systems.

The concept behind using fuseless current limiting circuit breakers as a component in a series-connected system is twofold: (1) higher interrupting ratings, and (2) increased control over peak current ( $i_p$ ) and energy let-through ( $I^2t$ ).

For example, a current limiting circuit breaker is placed at the side closest to the source of power and rated according to the prospective fault current available at the line-side terminals. In effect, doing this places a "shroud of protection" over the downstream components. Because of the inherent high interrupting capability of the current limiting circuit breaker, the breaker itself meets or exceeds the prospective short circuit current. Because of its current limiting action the prospective  $I^2t$  never reaches downstream components. This is illustrated in Figure 29.

It is important to recognize that the current limiting circuit breaker be an individual component in a UL tested combination, and that it is the combination itself — current limiting circuit breaker *plus* other circuit breakers — that forms entity specified in day-to-day applications.

For specific series-connected combinations that have met UL requirements and are listed in the *UL Recognized Component Directory*, check with your local Siemens sales office listed on the back cover. Since the Directory is updated every six months, please check for additional combinations which may have been tested and approved.

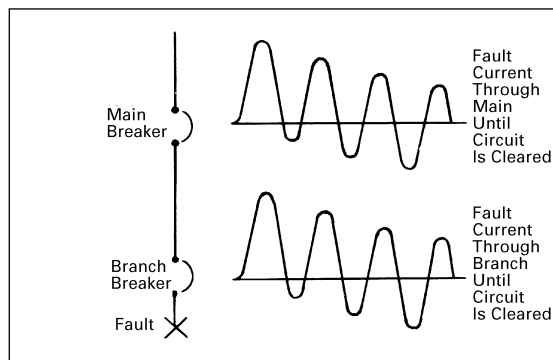


Figure 28 — Without Current Limiting

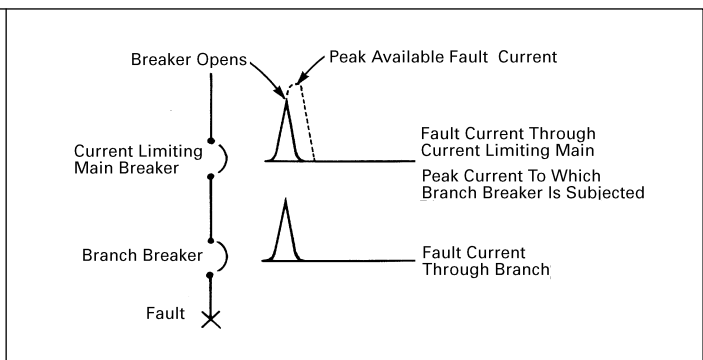


Figure 29 — Series-Connected Protective Scheme With Current Limiting Main Circuit Breaker

### Non-Linear Loads

When a sinusoidal voltage is applied to a linear load, the resultant current waveform takes on the shape of a sine wave as well. Typical linear loads are resistive heating and induction motors.

In contrast, a non-linear load either:

- Draws current during only part of the cycle and acts as an open circuit for the balance of the cycle,
- or
- Changes the impedance during the cycle, hence the resultant waveform is distorted and no longer conforms to a pure sine wave shape

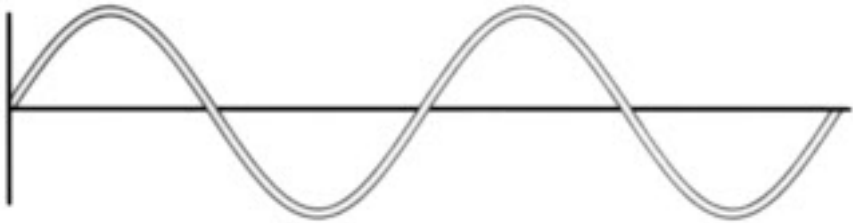
In recent years, the use of electronic equipment has mushroomed in both offices and industrial plants. These electronic devices are powered by switching power supplies or some type of rectifier circuit. Examples of these devices used in offices are: computers, fax machines, copiers, printers, cash registers, UPS systems, and solid-state ballasts. In industrial plants, one will find other electronic devices such as variable speed drives, HID lighting, solid-state starters and solid-state instruments. They all contribute to the distortion of the current waveform and the generation of harmonics. As the use of electronic equipment increases and it makes up a larger portion of the electrical load, many concerns are raised about its impact on the electrical power supply system.

### Harmonics

As defined by ANSI / IEEE Std. 519-1992, harmonic components are represented by a periodic wave or quantity having a frequency that is an integral multiple of the fundamental frequency. Harmonics are voltages or currents at frequencies that are integer multiples of the fundamental (60 Hz) frequency: 120 Hz, 180 Hz, 240 Hz, 300 Hz, etc. Harmonics are designated by their harmonic number, or multiple of the fundamental frequency. Thus, a harmonic with a frequency of 180 Hz (three times the 60 Hz fundamental frequency) is called the 3rd harmonic.

Harmonics superimpose themselves on the fundamental waveform, distorting it and changing its magnitude. For instance, when a sine wave voltage source is applied to a non-linear load connected from a phase-leg to neutral on a 3-phase, 4-wire branch circuit, the load itself will draw a current wave made up of the 60 Hz fundamental frequency of the voltage source, plus 3rd and higher order odd harmonic (multiples of the 60 Hz fundamental frequency), which are all

Voltage of Current Waveform for Linear Loads (Sine Wave)



Typical Current Waveform of Switching Power Supply



A Non-Linear Current and Its Fundamental, Plus 3rd and 5th Harmonic Components

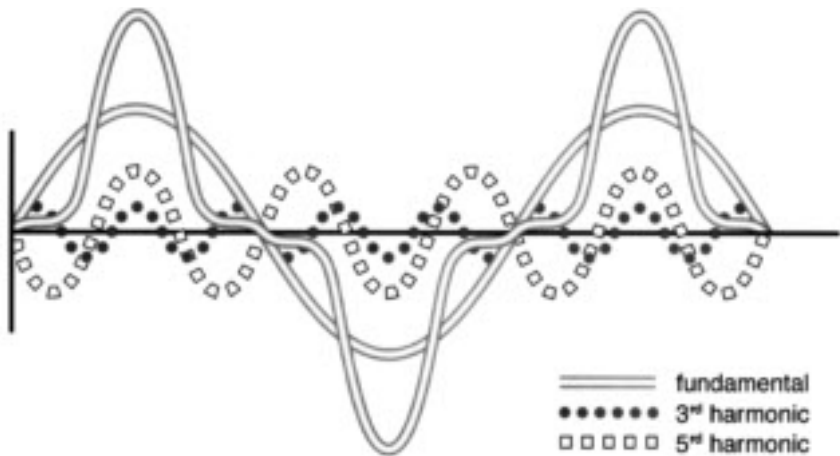


Figure 30 — Effect of Harmonics on Current Waveform

generated by the non-linear load. Total Harmonic Distortion (THD) is calculated as the square root of the sum of the squares of all harmonics divided by the normal 60 Hz value.

$$THD = \sqrt{\frac{\left(\frac{I_{RMS}}{60 \text{ Hz}}\right)^2 + \left(\frac{I_{RMS}}{180 \text{ Hz}}\right)^2 + \left(\frac{I_{RMS}}{N}\right)^2}{\left(\frac{I_{RMS}}{60 \text{ Hz}}\right)^2}}$$

This yields an RMS value of distortion as a percentage of the fundamental 60 Hz waveform.

Therefore, it is the percentage amount of odd harmonics (3rd, 5th, 7th, ..., 25th, ...) present in the load which can affect the transformer, and this condition is called a "Non-Linear Load" or "Non-Sinusoidal Load". To determine what amount of harmonic content is present, a K-Factor calculation is made instead of using the THD formula. The total amount of harmonics will determine the percentage of non-linear load, which can be specified with the appropriate K-Factor rating.

### Typical Symptoms of Harmonic Problems

- Distribution / lighting transformers overheating even when measured load current is within transformer rating
- Neutral cable / bus overheating even with balanced load
- Fuses blowing and circuit breakers tripping at currents within rating

### Effect Of Harmonics On Transformers

Non-sinusoidal current generates extra losses and heating of transformer coils thus reducing efficiency and shortening the life expectancy of the transformer. Coil losses increase with the higher harmonic frequencies due to higher eddy current loss in the conductors.

Furthermore, on a balanced linear power system, the phase currents are 120 degrees out of phase and offset one another in the neutral conductor. But with the "Triplen" harmonics (multiple of 3) the phase currents are in phase and they are additive in this neutral conductor. This may cause installations with non-linear loads to double either the size or number of neutral conductors.

**Table 17.5 K-Factor Ratings**

Type	Linear Load	Non-Linear Load	Total K-Factor Load Value
K4	100%	50%	4.0
K13	100%	100%	13.0
K20	100%	125%	20.0
K30	100%	150%	30.0

### Measurement of Harmonics

For existing installations, the extent of the harmonics can be measured with appropriate instruments commonly referred to as "Power Harmonic Analyzers". This service is offered by many consulting service organizations. For new construction, such information may not be obtainable. For such situations, it is best to assume the worse case condition based on experience with the type and mix of loads.

### Sizing Transformers for Non-Linear Loads

ANSI / IEEE C57.110-1986 has a procedure for de-rating standard distribution transformers for non-linear loading. However this is not the only approach. A transformer with the appropriate K-Factor specifically designed for non-linear loads can be specified.

### K-Factors

K-Factor is a ratio between the additional losses due to harmonics and the eddy losses at 60 Hz. It is used to specify transformers for non-linear loads. Note that K-Factor transformers do not eliminate harmonic distortion; they withstand the non-linear load condition without overheating.

### Calculating K-Factor Loads

1. List the kVA value for each load category to be supplied. Next, assign a K-factor designation that corresponds to the relative level of harmonics drawn by each type of load. Refer to Table 21.5.
2. Multiply the kVA of each load or load category times the Index of Load K-rating ( $I_{LK}$ ) that corresponds to the assigned K-factor rating. This result is an indexed  $kVA \cdot I_{LK}$  value.  

$$KVA \times I_{LK} = kVA \cdot I_{LK}$$

**Table 17.6 Index of Load K-Ratings**

K-Factor	$I_{LK}$
K1	0.0
K4	25.82
K9	44.72
K13	57.74
K20	80.94
K30	123.54
K40	208.17

3. Tabulate the total connected load kVA for all load categories to be supplied.
4. Next, add-up the  $kVA \cdot I_{LK}$  values for all loads or load categories to be supplied by the transformer.
5. Divide the grand total  $kVA \cdot I_{LK}$  value by the total kVA load to be supplied. This will give an average  $I_{LK}$  for that combination of loads. Total  $kVA \cdot I_{LK}$  / Total kVA = average  $I_{LK}$ .
6. From Table 21.6 find the K-factor rating whose  $I_{LK}$  is equal to or greater than the calculated  $I_{LK}$ .

**Table 17.7 Estimating K-Factor Loads<sup>①</sup>**

Description	K-Factor	$I_{LK}$
Incandescent Lighting Electric Resistance Heating Motors (without solid state drives) Control Transformers / Electromagnetic Control Devices Motor-Generators (without solid state drives) Standard Distribution Transformers	K1	0.00
Electric Discharge Lighting (HID) UPS with Optional Input Filter Welders Induction Heating Equipment PLCs and Solid State Controls	K4	25.82
Telecommunications Equipment (PBX) UPS without Input Filtering Multiwire Receptacle Circuits in General Care Areas of Health Care Facilities, Schools, etc. Multiwire Receptacle Circuits Supplying Testing Equipment on an Assembly Line	K13	57.74
Main-Frame Computer Loads Solid State Motor Drives (variable speed drives) Multiwire Receptacle Circuits in Critical Care Areas in Hospitals	K20	80.94
Multiwire Receptacle Circuits in Industrial, Medical and Educational Laboratories Multiwire Receptacle Circuits in Commercial Office Spaces Small Main-Frames (mini and micro)	K30	123.54

① Typical loads and K-Factor values for estimating purposes only.

Table 1

**Ampacities of Insulated Conductors (From NEC Table 310-16)  
Not More Than Three Conductors in Raceway or Cable or Earth (Directly Buried).  
(Based on Ambient Temperature of 30°C, 86°F)**

Size	Copper Conductors			Aluminum Conductors Copper-Clad Aluminum Conductors			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)	
<b>AWG Kcmil</b>	<b>Types</b>	<b>Types</b>	<b>Types</b> TBS SA SIS FEP FEPB RHH THHN THHW XHHW	<b>Types</b>	<b>Types</b> RHW THHW THW THWN XHHW USE	<b>Types</b> TBS, SA, SIS, THHN THHW THW-2, THWN-2, RHH, RHW-2 USE-2 XHH, XHHW XHHW-2, ZW-2	<b>AWG Kcmil</b>
18	—	—	14	—	—	—	—
16	—	—	18	—	—	—	—
14 <sup>Ⓣ</sup>	20	20	25	—	—	—	—
12 <sup>Ⓣ</sup>	25	25	30	20 <sup>Ⓣ</sup>	20 <sup>Ⓣ</sup>	25 <sup>Ⓣ</sup>	12
10 <sup>Ⓣ</sup>	30	35	40	25	30 <sup>Ⓣ</sup>	35 <sup>Ⓣ</sup>	10
8	40	50	55	30	40	45	8
6	55	65	75	40	50	60	6
4	70	85	95	55	65	75	4
3	85	100	110	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	150	85	100	115	1
¾	125	150	170	100	120	135	¾
½	145	175	195	115	135	150	½
¼	165	200	225	130	155	175	¼
⅛	195	230	260	150	180	205	⅛
250	215	255	290	170	205	230	250
300	240	285	320	190	230	255	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	355	420	475	285	340	385	600
700	385	460	520	310	375	420	700
750	400	475	535	320	385	435	750
800	410	490	555	330	395	450	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	520	625	705	435	520	585	1500
1750	545	650	735	455	545	615	1750
2000	560	665	750	470	560	630	2000

Table 2

**Correction Factors for Ambient Temperature Over 30°C, 86°F**

Ambient Temperature°C	For ambient temperature over 30°C, (86°F) multiply the ampacities shown above by the appropriate factor shown below.						Ambient Temperature°F
21–25	1.08	1.05	1.04	1.08	1.05	1.04	70–77
26–30	1.00	1.00	1.00	1.00	1.00	1.00	78–86
31–35	.91	.94	.96	.91	.94	.96	87–95
36–40	.82	.88	.91	.82	.88	.91	96–104
41–45	.71	.82	.87	.71	.82	.87	105–113
46–50	.58	.75	.82	.58	.75	.82	114–122
51–55	.41	.67	.76	.41	.67	.76	123–131
56–60	—	.58	.71	—	.58	.71	132–140
61–70	—	.33	.58	—	.33	.58	141–158
71–80	—	—	.41	—	—	.41	159–176

ⓉThe load current rating and the overcurrent protection for conductor types shall not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper; or 15 amperes for 12 AWG and 25 amperes for 10 AWG aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

Table 4A

**Motor Full-Load Currents of Three Phase AC Induction Type Motors<sup>①</sup>**

Motor Rating Horsepower	Current in Amperes			
	208V	230V	460V	575V
1/8	1.11	.96	.48	.38
1/4	1.34	1.18	.59	.47
1/2	2.4	2.2	1.1	.9
3/4	3.5	3.2	1.6	1.3
1	4.6	4.2	2.1	1.7
1 1/2	6.6	6	3	2.4
2	7.5	6.8	3.4	2.7
3	10.6	9.6	4.8	3.9
5	16.7	15.2	7.6	6.1
7 1/2	24.2	22.0	11.0	9.0
10	30.8	28.0	14.0	11.0
15	46.2	42.0	21.0	17.0
20	59.4	54	27	22
25	74.8	68	34	27
30	88	80	40	32
40	114	104	52	41
50	143	130	65	52
60	169	154	77	62
75	211	192	96	77
100	273	248	124	99
125	343	312	156	125
150	396	360	180	144
200	528	480	240	192
250	—	—	302	242
300	—	—	361	289
350	—	—	414	336
400	—	—	477	382
450	—	—	515	412
500	—	—	590	472

Table 4B

**Motor Full-Load Currents In Amperes, Single Phase, AC**

Horsepower	115V	230V
1/8	4.4	2.2
1/4	5.8	2.9
1/2	7.2	3.6
3/4	9.8	4.9
1	13.8	6.9
1 1/2	16	8
2	20	10
3	24	12
5	34	17
7 1/2	56	28
10	80	40
10	100	50

Table 4C

**Motor Full-Load Currents In Amperes, DC**

Horsepower	120V	240V
1/8	3.1	1.6
1/4	4.1	2.0
1/2	5.4	2.7
3/4	7.6	3.8
1	9.5	4.7
1 1/2	13.2	6.6
2	17	8.5
3	25	12.2
5	40	20
7 1/2	58	29
10	76	38

Table 4D

**Conversion Table of Polyphase Design B, C, D, and E Maximum Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating and Design Letter For use only with Sections 430-110, 440-12, 440-41, and 455-8(c) of the National Electric Code.**

Rated HP	Maximum Motor Locked-Rotor Current Amperes Two and Three Phase Design B, C, D, and E											
	115 Volts B, C, D E		200 Volts B, C, D E		208 Volts B, C, D E		230 Volts B, C, D E		460 Volts B, C, D E		575 Volts B, C, D E	
	1/8	40	40	23	23	22.1	22.1	20	20	10	10	8
1/4	50	50	28.8	28.8	27.6	27.6	25	25	12.5	12.5	10	10
1	60	60	34.5	34.5	33	33	30	30	15	15	12	12
1 1/2	80	80	46	46	44	44	40	40	20	20	16	16
2	100	100	57.5	57.5	55	55	50	50	25	25	20	20
3	—	—	73.6	84	71	81	64	73	32	36.5	25.6	29.2
5	—	—	105.8	140	102	135	92	122	46	61	36.8	48.8
7 1/2	—	—	146	210	140	202	127	183	63.5	91.5	50.8	73.2
10	—	—	186.3	259	179	249	162	225	81	113	64.8	90
15	—	—	267	388	257	373	232	337	116	169	93	135
20	—	—	334	516	321	497	290	449	145	225	116	180
25	—	—	420	646	404	621	365	562	183	281	146	225
30	—	—	500	775	481	745	435	674	218	337	174	270
40	—	—	667	948	641	911	580	824	290	412	232	330
50	—	—	834	1185	802	1139	725	1030	363	515	290	412
60	—	—	1001	1421	962	1367	870	1236	435	618	348	494
75	—	—	1248	1777	1200	1708	1085	1545	543	773	434	618
100	—	—	1668	2154	1603	2071	1450	1873	725	937	580	749
125	—	—	2087	2692	2007	2589	1815	2341	908	1171	726	936
150	—	—	2496	3230	2400	3106	2170	2809	1085	1405	868	1124
200	—	—	3335	4307	3207	4141	2900	3745	1450	1873	1160	1498
250	—	—	—	—	—	—	—	—	1825	2344	1460	1875
300	—	—	—	—	—	—	—	—	2200	2809	1760	2247
350	—	—	—	—	—	—	—	—	2550	3277	2040	2622
400	—	—	—	—	—	—	—	—	2900	3745	2320	2996
450	—	—	—	—	—	—	—	—	3250	4214	2600	3371
500	—	—	—	—	—	—	—	—	3625	4682	2900	3746

Table 5

**Normal-Load and Fault Currents of Three Phase Transformers**

Transformer Characteristics 3-Phase		AC Voltage 3-Phase					
		280V		240V		480V	
kVA Rating	% Impedance	Normal Load Continuous Amperes	Short Circuit Current	Normal Load Continuous Amperes	Short Circuit Current	Normal Load Continuous Amperes	Short Circuit Current
112.5	2.25	312	14,491	271	13,128	135	6,540
150	3.00	416	14,699	361	13,477	180	6,720
225	4.50	625	15,139	541	14,186	271	7,106
300	5.00	834	18,326	722	17,328	361	8,664
500	5.00	1388	30,536	1203	28,872	601	14,424
750	5.75	2080	40,373	1804	38,590	902	19,295
1000	5.75	2780	53,830	2406	51,467	1203	25,734
1500	5.75	4162	80,745	3610	77,201	1805	38,590
2000	5.75	—	—	4812	102,914	2406	51,467
2500	5.75	—	—	6010	128,647	3008	64,324
1000	8.00	—	—	—	—	1203	19,850
1500	8.00	—	—	—	—	1805	29,766

① Values may vary depending on manufacturer, type of motor and NEMA design. For full load currents of 200 volt motors, increase the corresponding 230 volt motor full-load current by 15 percent.

**Table 5 Notes:**

1. Primary source available is assumed as 500 MVA at the primary of the transformer with a source circuit X/R ratio of 12.
2. Motor contribution is included in the table at twice the full-load current for 208 volt transformers and at 4 times the full-load current for 240 volt and 480 volt transformers. These values are derived from the assumption that 208 volt systems are 50% motor load and 240 and 480 volt systems are 100% motor load.
3. All short circuit current values are in symmetrical RMS amperes.



Table 6

**Electrical Formulas for Finding Amperes, Horsepower, Kilowatts and kVA**

To Find	Single Phase	Alternating Current Two Phase <sup>ⓐ</sup> , Four Wire	Three Phase	Direct Current
Kilowatts	$\frac{I \times E \times pf}{1000}$	$\frac{I \times E \times 2 \times pf}{1000}$	$\frac{I \times E \times 1.73 \times pf}{1000}$	$\frac{I \times E}{1000}$
kVA	$\frac{I \times E}{1000}$	$\frac{I \times E \times 2}{1000}$	$\frac{I \times E \times 1.73}{1000}$	—
Horsepower (Output)	$\frac{I \times E \times \% \text{ EFF} \times pf}{746}$	$\frac{I \times E \times 2 \times \% \text{ EFF} \times pf}{746}$	$\frac{I \times E \times 1.73 \times \% \text{ EFF} \times pf}{746}$	$\frac{I \times E \times \% \text{ EFF}}{746}$
Amperes when Horsepower is Known	$\frac{HP \times 746}{E \times \% \text{ EFF} \times pf}$	$\frac{HP \times 746}{2 \times E \times \% \text{ EFF} \times pf}$	$\frac{HP \times 746}{1.73 \times E \times \% \text{ EFF} \times pf}$	$\frac{HP \times 746}{E \times \% \text{ EFF}}$
Amperes when Kilowatts is Known	$\frac{KW \times 1000}{E \times pf}$	$\frac{KW \times 1000}{2 \times E \times pf}$	$\frac{KW \times 1000}{1.73 \times E \times pf}$	$\frac{KW \times 1000}{E}$
Amperes when kVA is Known	$\frac{kVA \times 1000}{E}$	$\frac{kVA \times 1000}{2 \times E}$	$\frac{kVA \times 1000}{1.73 \times E}$	—

**Average Efficiency and Power Factor Values of Motors**

When the actual efficiencies and power factors of the motors to be controlled are not known, the following approximations may be used.

Efficiencies:

- DC motors, 35 horsepower and less 80% to 85%
- DC motors, above 35 horsepower 85% to 90%
- Synchronous motors (at 100% power factor) 92% to 95%
- "Apparent" Efficiencies (= Efficiency x Power Factor);
- Three phase induction motors, 25 horsepower and less 70%
- Three phase induction motors above 25 horsepower 80%
- These figures may be decreased slightly for single phase and two phase induction motors.

**Fault-Current Calculation on Low-Voltage AC Systems**

In order to determine the maximum interrupting rate of the circuit breakers in a distribution system it is necessary to calculate the current which could flow under a three phase bolted short circuit condition. For a three phase system the maximum available fault current at the secondary side of the transformer can be obtained by use of the formula:

$$I_{sc} = \frac{kVA \times 100}{KV \times \sqrt{3} \times \% Z}$$

where:

- $I_{sc}$  = Symmetrical RMS amperes of fault current.
- kVA = Kilovolt-ampere rating of transformers.
- KV = Secondary voltage in kilovolts.
- % Z = Percent impedance of primary line and transformer.

Table 5 on page 18-20 has been prepared to list the symmetrical RMS fault current which is available at the secondary terminals of the transformer.

Table 8<sup>ⓐ</sup>

**Minimum Size Grounding Conductors for Grounding Raceways and Equipment (From NEC Table 250-122)**

Rating or Setting of Automatic Overcurrent Device in Circuit Ahead of Equipment, Conduit etc., Not Exceeding (Amperes)	Size	
	Copper Wire Number	Aluminum or Copper Clad Aluminum Wire Number
15	14	12
20	12	10
30	10	8
40	10	8
60	10	8
100	8	6
200	6	4
300	4	2
400	3	1
500	2	1/0
600	1	2/0
800	1/0	3/0
1000	2/0	4/0
1200	3/0	250 kcmil
1600	4/0	350 kcmil
2000	250 kcmil	400 kcmil
2500	350 kcmil	600 kcmil
3000	400 kcmil	600 kcmil
4000	500 kcmil	800 kcmil
5000	700 kcmil	1200 kcmil
6000	800 kcmil	1200 kcmil

Note: Where necessary to comply with 250.4(A)(5) or (B)(4), the equipment grounding conductor shall be sized larger than given in this table.

Table 7<sup>ⓐ</sup>

**Grounding Electrode Conductor for AC Systems (From NEC Table 250-66)**

Size of Largest Service Entrance Conductor or Equivalent Area for Parallel Conductors		Size of Grounding Electrode Conductor	
Copper	Aluminum or Copper Clad Aluminum	Copper	Aluminum or Copper Clad Aluminum
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0 or 3/0	6	4
2/0 or 3/0	4/0 or 250 kcmil	4	2
Over 3/0 to 350 kcmil	Over 250 kcmil to 500 kcmil	2	1/0
Over 350 kcmil to 600 kcmil	Over 500 kcmil to 900 kcmil	1/0	3/0
Over 600 kcmil to 1100 kcmil	Over 900 kcmil to 1750 kcmil	2/0	4/0
Over 1100 kcmil	Over 1750 kcmil	3/0	250 kcmil

<sup>ⓐ</sup>In three wire, two phase circuits the current in the common conductor is 1.41 times that in either other conductor.

<sup>ⓐ</sup>Additional information and exceptions are stated in Article 250 — Grounding, National Electric Code.

E = Volts I = Amperes  
% EFF = Per Cent Efficiency pf = Power Factor

# Molded Case Circuit Breakers

## Unusual Operating Conditions

## Application

**Note:** The information provided on this and the next page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data below is based less on controlled testing, than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.

### High Ambient Temperatures

Because standard thermal-magnetic breakers are temperature sensitive and calibrated for a specific ambient of 40°C (104°F) (average enclosure temperature), the presence of an ambient higher will cause the breaker to carry less current than its name-plate rating — in other words, causing the breaker to “derate” (see Table 17.33). Similarly, the safe current carrying capacity of a circuit conductor is based upon an ambient temperature of 30°C (86°F) (average air temperature) and the presence of a higher ambient will reduce its safe current carrying capacity, causing it to “derate.” Thus, it can be seen from Table 17.33 that in the presence of a fluctuating temperature, a thermal-magnetic breaker will derate nearly parallel with its connected circuit conductors and maintain close circuit protection. If the application temperature exceeds 40°C (104°F) and is known, either a breaker especially calibrated for the higher ambients or one oversized according to Table 17.33 may be selected. It should be noted that in a case such as this, the circuit conductors should be oversized as well.

Siemens Sensitrip® III and Type SB Encased System Breakers are insensitive to temperature changes. However, they do include circuitry to protect the components from abnormally high temperatures.

### Moisture — Corrosion

For atmospheres having high moisture content and I or where fungus growth is prevalent, a special preventive treatment may be required. Where the air is heavily laden with corrosive elements, breakers made with special corrosion-resistant finishes are recommended.

### Altitude

Reduced air density at altitudes greater than 6600 ft. (2000 meters) affects the ability for a molded case circuit breaker to transfer heat and interrupt faults. Therefore, circuit breakers applied at these altitudes should have interrupting insulation and continuous currents derated as indicated in Table 17.34.

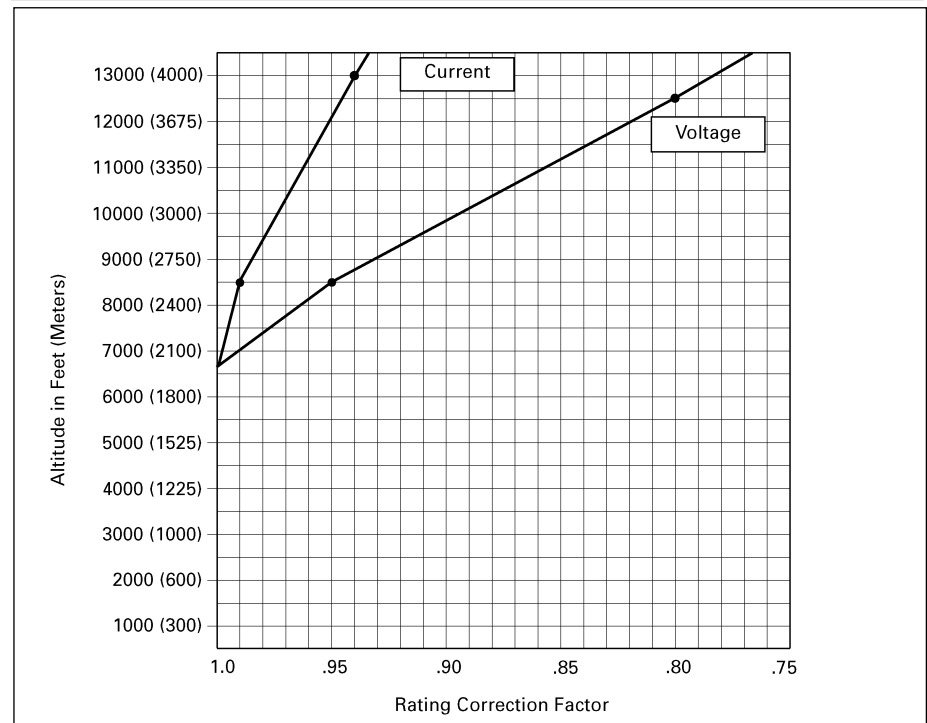
**Table 17.34 Altitude Correction**

Altitude in feet (meters)	Rating Correction Factor	
	Continuous Current	Voltage
6600 (and below) (2000)	1	1
8500 (2600)	0.99	0.95
13000 (4000)	0.96	0.8

© Values for intermediate altitudes may be derived from linear interpolation. See Figure 1.

**Table 17.35 Temperature Derating Data for Thermal-Magnetic Breakers**

Reference Ampere Rating at 40°C (104°F)	Relative Amperage Rating at:			Siemens Breaker Types
	25°C (77°F)	50°C (122°F)	60°C (140°F)	
15	17	13	11	ED2 ED4 ED6 HED4 HED6 CED6
20	22	18	16	
25	28	23	21	
30	33	28	26	
35	39	30	25	
40	44	37	34	
50	55	46	42	
60	66	56	52	
70	77	65	60	
90	99	84	78	
100	110	94	87	QJ2 QJH2 QJ2-H
125	137	144	100	
150	165	136	120	
175	192	159	140	
200	220	182	160	
225	247	205	180	JXD2 JXD6 JD6 HJD6 HHJD6 CJD6
250	275	235	220	
300	330	276	252	
350	385	325	301	
400	440	372	340	
500	550	468	435	MXD6, MD6 HMXD6 HMD6 CMD6  NXD6, ND6 HNXD6 HND6 CND6
600	660	564	525	
700	770	658	613	
800	880	754	704	
900	990	828	749	
1000	1100	900	825	
1200	1320	1090	1000	
1400	1540	1304	1148	
1600	1760	1500	1320	
1800	1980	1690	1485	
2000	2200	1880	1650	
				FXD6 FD6 HFD6 CFD6
				PXD6, PD6 HPXD6, HPD6 CPD6



**Figure 1 — Altitude Adjustment Chart**

# Molded Case Circuit Breakers

## Unusual Operating Conditions (400 Hz Systems<sup>①</sup>)

## Application

### Circuit Breaker Derating Required

Table 17.35 lists the maximum continuous current carrying capacity for Siemens breakers at 400 Hz. Due to the increased resistance of the copper sections resulting from the skin effect produced by eddy currents at these frequencies, circuit breakers in many cases require derating. The thermal derating on these devices is based upon 100%, three phase application in open air in a maximum of 40°C (104°F) with 48 in. (1219 mm) of the specified cable (75°C) of bus at the line and load side. Additional derating of not less than 20% will be required if the circuit breaker is to be utilized in an enclosure. Further derating may be required if the enclosure contains other heat generating devices or if the ambient temperatures exceed 40°C (104°F).

### Cable and Bus Sizing

The cable and bus sizes to be utilized at 400 Hz are not based on standard

National Electric Codes tables for 60 Hz application. Larger cross sections are necessary at 400 Hz to avoid exceeding component temperature limits. All bus bars specified are based upon mounting the bars in the vertical plane to allow maximum air flow. All bus bars are spaced at a minimum of 0.25 in. (6 mm) apart. Mounting of bus bars in the horizontal plane will necessitate additional drafting. Edgewise orientation of the bus may change the maximum ratings indicated. If additional information is required for other connections of cable or bus, contact Siemens for information.

### Application Recommendations

It is recommended that thermal indicating devices be placed on the line and load terminals or T-connectors of the center pole. These are usually the hottest terminals with a balanced load. A maximum temperature of 75°C (35°C over a maximum ambient of 40°C) would

verify the maximum rating for the particular application. Temperature profiles taken on these breakers can be correlated to ensure that the hottest points within the breaker are within the required temperature limits.

### Factory Configurations

When required, molded case circuit breakers may be factory calibrated for 400 Hz application. These breakers are specially labeled for 400 Hz usage and their nameplate current rating will include the necessary derating factor. The highest "Maximum Continuous Amperes" rating at 400 Hz, found in Table 17.35 approximately equals the highest specially calibrated 400 Hz nameplate ampere rating available for a given frame size. Contact Siemens for ordering information on other breakers applied in 400 Hz systems.

Table 17.36 400 Hz Breakers

Siemens Breaker Type	Maximum Continuous Ampere Rating At 40°C (104°F) <sup>②</sup>			75°C (167°F) Copper Cable per Pole		Siemens Breaker Type	Maximum Continuous Ampere Rating At 40°C (104°F) <sup>②</sup>			75°C (167°F) Copper Cable per Pole			
	60 Hz		400 Hz	No. of Pieces	Wire Size		60 Hz		400 Hz	No. of Pieces	Wire Size		
	Open Air	Open Air <sup>③</sup>	Enclosed After Derating				Open Air	Open Air <sup>③</sup>	Enclosed After Derating				
ED2, ED4, ED6, HED4, HED6, CED6	15	15	12	1 pc.	#14	LD2, LXD6, HLD6, HLXD6, HHLXD6, HHLXD6, CLD6	250	210	168	1 pc.	250 kcmil		
	20	20	16	1 pc.	#12		300	240	192	1 pc.	350 kcmil		
	25	25	20	1 pc.	#10		350	260	208	1 pc.	500 kcmil		
	30	30	24	1 pc.	#10		400	300	240	2 pcs.	#3/0		
	35	35	28	1 pc.	#10		450	340	272	2 pcs.	#4/0		
	40	40	32	1 pc.	#8		500	375	300	2 pcs.	250 kcmil		
	45	43	34	1 pc.	#8		600	420	336	2 pcs.	350 kcmil		
	50	48	38	1 pc.	#8		250	210	210	1 pc.	250 kcmil		
	60	57	46	1 pc.	#6		300	240	240	1 pc.	350 kcmil		
	60	67	54	1 pc.	#4		350	260	260	1 pc.	500 kcmil		
	80	76	61	1 pc.	#4		400	300	300	2 pcs.	#3/0		
	90	86	69	1 pc.	#3		450	340	340	2 pcs.	#4/0		
	100	95	76	1 pc.	#3		500	375	375	2 pcs.	250 kcmil		
	110	105	84	1 pc.	#2		600	420	420	2 pcs.	350 kcmil		
FD6, FXD4, HFD6, HFxD4, CFD6	70	63	50	1 pc.	#4	MD6, MXD6, HMD6, HMxD6, CMD6	500	400	320	2 pcs.	250 kcmil		
	80	72	58	1 pc.	#4		600	430	360	2 pcs.	350 kcmil		
	90	80	64	1 pc.	#3		700	500	400	3 pcs.	250 kcmil		
	100	90	72	1 pc.	#3		800	560	448	3 pcs.	300 kcmil		
	110	95	75	1 pc.	#2		500	400	400	2 pcs.	250 kcmil		
	125	105	84	1 pc.	#1		600	430	430	2 pcs.	350 kcmil		
	150	125	100	1 pc.	#1/0		700	500	500	3 pcs.	250 kcmil		
	175	140	112	1 pc.	#2/0		800	560	560	3 pcs.	300 kcmil		
	200	160	128	1 pc.	#3/0		800	560	448	3 pcs.	300 kcmil		
	225	180	144	1 pc.	#4/0		900	600	480	3 pcs.	350 kcmil		
	250	200	160	1 pc.	250 kcmil		1000	650	520	3 pcs.	400 kcmil		
	JXD2, JD6, JXD6, HJD6, HJXD6, HHJXD6, CJXD6	200	170	136	1 pc.		#3/0	ND6, NXD6, HND6, HNXD6, CND6	900	600	600	3 pcs.	350 kcmil
		225	190	152	1 pc.		#4/0		1000	650	650	3 pcs.	400 kcmil
		250	210	168	1 pc.		250 kcmil		1200	780	780	4 pcs.	350 kcmil
300		240	192	1 pc.	350 kcmil	1200	780		624	4 pcs.	400 kcmil		
350		260	208	1 pc.	500 kcmil	1400	850		680	4 pcs.	500 kcmil		
400		300	240	2 pcs.	#3/0	1600	960		768	5 pcs.	500 kcmil		
JD6, JXD6, HJD6, HJXD6, 100% Rated		200	170	170	2 pcs.	#3/0	PD6, PXD6, HPD6, HPD6, CPD6, CPD6		1200	780	780	4 pcs.	400 kcmil
		225	190	190	2 pcs.	#4/0			1400	850	850	4 pcs.	500 kcmil
		250	210	210	1 pc.	250 kcmil			1600	960	960	5 pcs.	500 kcmil
		300	240	240	1 pc.	350 kcmil			1600	960	768	5 pcs.	500 kcmil
	350	260	260	1 pc.	500 kcmil	1800		1080	864	5 pcs.	500 kcmil		
	400	300	300	2 pcs.	#3/0	2000		1200	960	6 pcs.	500 kcmil		

① The information provided on this page is intended for reference and recommendation only. Because several variables can act on a circuit breaker's performance at the same time, the data above is based less on controlled testing than on experience and engineering judgment. Contact Siemens for further information on special conditions and treatment.  
 ② Additional derating may be required if the ambient temperature is greater than 40°C (104°F).  
 ③ Calculated after derating to compensate for the heating of the copper conductor, caused by the skin effect generated by eddy currents produced at 400/415 Hz.

# Molded Case Circuit Breakers

## Capacitor Circuit Conductors

## Application

### Article 460-8 (N.E.C.)

The ampacity of capacitor circuit conductors shall not be less than 135% of the rated current of the capacitor. The ampacity of conductors that connect a capacitor to the terminals of a motor or to motor circuit conductors shall not be less than one-third the ampacity of the motor circuit conductors and in no case less than 135% of the rated current of the capacitor.

### Application

Circuit breakers and switches for use with capacitors must have a current rating in excess of rated capacitor current to provide for overcurrent from overvoltages at fundamental frequency and harmonic currents. Use the following percent of capacitor current rating to size circuit breaker or fused and non-fused switches.

- **Enclosed Circuit Breakers** 150%  
(Includes derating factor for enclosure)
- **Fused and non-fused switches** 165%

Due to switching surges, and possible overcurrent related to overvoltage and harmonics, Siemens recommends using 150% of the capacitor current rating to size a thermal-magnetic circuit breaker for overload protection.

If the circuit breaker is to be applied in an ambient greater than the marked rated ambient, it may be necessary to derate the continuous current rating. This is also true for applications where harmonic components are present. A basic formula to use for calculation of the capacitor current rating is as follows (assuming three phase application):

$$\frac{\text{Capacitor (Kvar)} \times 1000}{(\text{Voltage} / 1.732) \times 3}$$

The interrupting rating of the circuit breaker or fuse must be selected to match the system fault current available at the point of the capacitor application.

Table 17.37 Capacitor Application

Capacitor Rating		Amperage			Capacitor Rating		Amperage		
Voltage	K <sub>var</sub>	Capacitor Rating	Enclosed Switch Fuse Rating	MCCB Trip Rating	Voltage	K <sub>var</sub>	Capacitor Rating	Enclosed Switch Fuse Rating	MCCB Trip Rating
240	2.5	6	15	15	480 (cont'd)	125	150	250	225
	5	12	20	20		150	180	300	300
	7.5	18	30	30		160	192	350	300
	10	24.1	40	40		180	216	400	350
	15	36.1	60	60		200	241	400	400
	20	48.1	80	80		225	271	500	500
	25	60	100	90		240	289	500	500
	30	72.2	125	125		250	301	500	500
	45	108	200	175		300	361	600	600
	50	120	200	200		320	385	700	600
	60	144	250	225		360	433	800	700
	75	180	300	275		375	451	800	700
	90	217	400	350		400	481	800	800
	100	240	400	400		450	541	900	900
	120	289	500	450		600	5	4.8	15
	125	301	500	450	7.5		7.2	15	15
	135	325	600	500	10		9.6	20	15
	150	361	600	500	15		14.4	25	30
	180	433	800	700	20		19.2	35	30
	200	480	800	800	25		24.1	40	40
225	541	900	900	30	28.9		50	50	
240	578	1000	900	35	33.7		60	50	
250	602	1000	900	40	38.5		70	70	
270	650	1200	1000	45	43.3		80	70	
300	720	1200	1200	50	48.1	80	100		
360	866	1600	1400	60	57.7	100	100		
375	903	1600	1400	75	72.2	125	125		
480	2	2.41	15	15	80	77	150	125	
	5	6	15	15	100	96.2	175	150	
	7.5	9	15	15	120	115	200	175	
	10	12	20	20	125	120	200	200	
	15	18	30	30	150	144	250	225	
	20	24	40	40	160	154	300	250	
	25	30	50	50	180	173	300	300	
	30	36.1	60	50	200	192	300	300	
	35	42.1	70	60	225	217	400	350	
	40	48.1	80	70	240	231	400	350	
	45	54.1	90	80	250	241	400	400	
	50	60.1	100	100	300	289	500	450	
	60	72.2	125	110	320	308	600	500	
	75	90.2	150	150	360	346	600	600	
	80	96.2	175	150	375	361	600	600	
90	108.3	200	175	400	385	700	600		
100	120.3	200	200	450	433	800	700		
120	144	250	225						

# Technical

## Fraction, Decimal, and Millimeter Equivalents

## Conversion Tables

### Fractions to Decimals to Millimeters

Fractions	Decimals	Millimeters
1/64	0.015625	0.397
1/32	0.03125	0.794
3/64	0.046875	1.191
1/16	0.0625	1.588
5/64	0.078125	1.984
3/32	0.09375	2.381
7/64	0.109375	2.778
1/8	0.1250	3.175
9/64	0.140625	3.572
5/32	0.15625	3.969
11/64	0.171875	4.366
3/16	0.1875	4.763
13/64	0.203125	5.159
7/32	0.21875	5.556
15/64	0.234375	5.953
1/4	0.2500	6.350
17/64	0.265625	6.747
9/32	0.28125	7.144
19/64	0.296875	7.541
5/16	0.3125	7.938
21/64	0.328125	8.334
11/32	0.34375	8.731
23/64	0.359375	9.128
3/8	0.3750	9.525
25/64	0.390625	9.922
13/32	0.40625	10.319
27/64	0.421875	10.716
7/16	0.4375	11.113
29/64	0.453125	11.509
15/32	0.46875	11.906
31/64	0.484375	12.303
1/2	0.500	12.700
33/64	0.515625	13.097
17/32	0.53125	13.494
35/64	0.546875	13.891
9/16	0.5625	14.288
37/64	0.578125	14.684
19/32	0.59375	15.081
39/64	0.609375	15.478
5/8	0.6250	15.875
41/64	0.640625	16.272
21/32	0.65625	16.669
43/64	0.671875	17.066
11/16	0.6875	17.463
45/64	0.703125	17.859
23/32	0.71875	18.256
47/64	0.734375	18.653
3/4	0.7500	19.050
49/64	0.765625	19.447
25/32	0.78125	19.844
51/64	0.796875	20.241
13/16	0.8125	20.638
53/64	0.828125	21.034
27/32	0.84375	21.431
55/64	0.859375	21.828
7/8	0.8750	22.225
57/64	0.890625	22.622
29/32	0.90625	23.019
59/64	0.921875	23.416
15/16	0.9375	23.813
61/64	0.953125	24.209
31/32	0.96875	24.606
63/64	0.984375	25.003
1	1.000	25.400

### Millimeters to Inches<sup>①</sup>

Millimeters	Inches	Millimeters	Inches
0.1	0.0039	46	1.8110
0.2	0.0079	47	1.8504
0.3	0.0118	48	1.8898
0.4	0.0157	49	1.9291
0.5	0.0197	50	1.9685
0.6	0.0236	51	2.0079
0.7	0.0276	52	2.0472
0.8	0.0315	53	2.0866
0.9	0.0354	54	2.1260
		55	2.1654
1	0.0394	56	2.2047
2	0.0787	57	2.2441
3	0.1181	58	2.2835
4	0.1575	59	2.3228
5	0.1969	60	2.3622
6	0.2362	61	2.4016
7	0.2756	62	2.4409
8	0.3150	63	2.4803
9	0.3543	64	2.5197
10	0.3937	65	2.5591
11	0.4331	66	2.5984
12	0.4724	67	2.6378
13	0.5118	68	2.6772
14	0.5512	69	2.7165
15	0.5906	70	2.7559
16	0.6299	71	2.7953
17	0.6693	72	2.8346
18	0.7087	73	2.8740
19	0.7480	74	2.9134
20	0.7874	75	2.9528
21	0.8268	76	2.9921
22	0.8661	77	3.0315
23	0.9055	78	3.0709
24	0.9449	79	3.1102
25	0.9843	80	3.1496
26	1.0236	81	3.1890
27	1.0630	82	3.2283
28	1.1024	83	3.2677
29	1.1417	84	3.3071
30	1.1811	85	3.3465
31	1.2205	86	3.3858
32	1.2598	87	3.4252
33	1.2992	88	3.4646
34	1.3386	89	3.5039
35	1.3780	90	3.5433
36	1.4173	91	3.5827
37	1.4567	92	3.6220
38	1.4961	93	3.6614
39	1.5354	94	3.7008
40	1.5748	95	3.7402
41	1.6142	96	3.7795
42	1.6535	97	3.8189
43	1.6929	98	3.8583
44	1.7323	99	3.8976
45	1.7717	100	3.9370

① 0.001" = 0.0254 mm  
1 mm = 0.03937"

# NOTES

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A01ED62B	MCCB	6-36	ASKL3	MCCB	6-103	B215HID	MCCB	6-20	B38	UNPB	10-10	BE250	MCCB	6-19
A01EDLV	MCCB	6-36	ASKL3	MCCB	6-107	B215R	MCCB	6-18	B38	UNPB	10-10	BE250H	MCCB	6-19
A01FD62	MCCB	6-39	ASKL3	MCCB	6-111	B220	MCCB	6-18	B38	UNPB	10-10	BE260	MCCB	6-19
A01FD64	MCCB	6-39	ASKL3	MCCB	6-99	B220AF	MCCB	6-19	B38	UNPB	10-10	BE260H	MCCB	6-19
A01FDLV	MCCB	6-39	ASKP3	MCCB	6-115	B220AFH	MCCB	6-19	B38	UNPB	10-10	BE4	RESG	2-81
A01HCP4	VBSS	4-22	ASKP3	MCCB	6-119	B220H	MCCB	6-18	B380	MCCB	6-18	BEC3100	BPLU	14-57
A01HCP4	VBSS	4-22	ASKP3	MCCB	6-122	B220HH	MCCB	6-18	B380H	MCCB	6-18	BEC4100	BPLU	14-57
A01JLD64	MCCB	6-43	ASKP4	MCCB	6-115	B220HID	MCCB	6-20	B380HH	MCCB	6-18	BF115	MCCB	6-19
A01JLD64	MCCB	6-47	ASKP4	MCCB	6-119	B220R	MCCB	6-18	B390	MCCB	6-18	BF115H	MCCB	6-19
A01JLD64	MCCB	6-50	ASKP4	MCCB	6-122	B225	MCCB	6-18	B390H	MCCB	6-18	BF120	MCCB	6-19
A01JLD64B	MCCB	6-43	ASWPA	MCCB	6-103	B225H	MCCB	6-18	B390HH	MCCB	6-18	BF120H	MCCB	6-19
A01JLD64B	MCCB	6-47	ASWPA	MCCB	6-107	B225HH	MCCB	6-18	B44	UNPB	10-10	BF125	MCCB	6-19
A01JLD64B	MCCB	6-50	ASWPA	MCCB	6-111	B230	MCCB	6-18	B44	UNPB	10-10	BF125H	MCCB	6-19
A01JLDLV	MCCB	6-43	ASWPA	MCCB	6-115	B230H	MCCB	6-18	B44	UNPB	10-10	BF130	MCCB	6-19
A01JLDLV	MCCB	6-47	ASWPA	MCCB	6-119	B230HH	MCCB	6-18	B44	UNPB	10-10	BF130H	MCCB	6-19
A01JLDLV	MCCB	6-50	ASWPA	MCCB	6-122	B230HID	MCCB	6-20	B44	UNPB	10-10	BF215	MCCB	6-19
A01MN64	MCCB	6-54	ASWPA	MCCB	6-99	B230R	MCCB	6-18	B44	UNPB	10-10	BF215H	MCCB	6-19
A01MN64	MCCB	6-58	ASWPA	MCCB	6-103	B230S	MCCB	6-20	B56	UNPB	10-10	BF220	MCCB	6-19
A01MN64	MCCB	6-61	ASWPA	MCCB	6-107	B235	MCCB	6-18	B56	UNPB	10-10	BF220H	MCCB	6-19
A01MN64	MCCB	6-63	ASWPA	MCCB	6-111	B235H	MCCB	6-18	B56	UNPB	10-10	BF230	MCCB	6-19
A01MN64B	MCCB	6-54	ASWPA	MCCB	6-115	B235HH	MCCB	6-18	B56	UNPB	10-10	BF230H	MCCB	6-19
A01MN64B	MCCB	6-58	ASWPA	MCCB	6-119	B240	MCCB	6-18	B56	UNPB	10-10	BF240	MCCB	6-19
A01MN64B	MCCB	6-61	ASWPA	MCCB	6-122	B240H	MCCB	6-18	B56	UNPB	10-10	BF240H	MCCB	6-19
A01MN64B	MCCB	6-63	ASWPA	MCCB	6-99	B240HH	MCCB	6-18	B62	UNPB	10-10	BF250	MCCB	6-19
A01MNDLV	MCCB	6-54	B00ED62	MCCB	6-36	B240R	MCCB	6-18	B62	UNPB	10-10	BF250H	MCCB	6-19
A01MNDLV	MCCB	6-58	B00ED64	MCCB	6-36	B245	MCCB	6-18	B62	UNPB	10-10	BF260	MCCB	6-19
A01MNDLV	MCCB	6-61	B00FD64	MCCB	6-39	B245H	MCCB	6-18	B62	UNPB	10-10	BF260H	MCCB	6-19
A01MNDLV	MCCB	6-63	B00MN64	MCCB	6-54	B245HH	MCCB	6-18	B62	UNPB	10-10	BFC3250	BPLU	14-57
A02ED62	MCCB	6-36	B00MN64	MCCB	6-58	B250	MCCB	6-18	B62	UNPB	10-10	BFC4250	BPLU	14-57
A02ED62B	MCCB	6-36	B00MN64	MCCB	6-61	B250H	MCCB	6-18	B68	UNPB	10-10	BG215	MCCB	6-20
A02FD62	MCCB	6-39	B00MN64	MCCB	6-63	B250HH	MCCB	6-18	B68	UNPB	10-10	BG220	MCCB	6-20
A02FD64	MCCB	6-39	B01JLD64	MCCB	6-43	B250R	MCCB	6-18	B68	UNPB	10-10	BG230	MCCB	6-20
A02JLD64	MCCB	6-43	B01JLD64	MCCB	6-47	B260	MCCB	6-18	B68	UNPB	10-10	BG315	MCCB	6-20
A02JLD64	MCCB	6-47	B01JLD64	MCCB	6-50	B260H	MCCB	6-18	B68	UNPB	10-10	BG320	MCCB	6-20
A02JLD64	MCCB	6-50	B110	MCCB	6-18	B260HH	MCCB	6-18	B68	UNPB	10-10	BG330	MCCB	6-20
A02JLD64B	MCCB	6-43	B115	MCCB	6-18	B260R	MCCB	6-18	BBKB32	PBSB	10-31	BHP	PILO	16-187
A02JLD64B	MCCB	6-47	B115AF	MCCB	6-19	B260S	MCCB	6-20	BBKB32	PBSB	10-42	BJC3400	BPLU	14-57
A02JLD64B	MCCB	6-50	B115AFH	MCCB	6-19	B270	MCCB	6-18	BBKEB32	PBSB	10-42	BJC4400	BPLU	14-57
A02JLDLV	MCCB	6-43	B115H	MCCB	6-18	B270H	MCCB	6-18	BBKED32	PBSB	10-31	BK1	UNPB	10-11
A02JLDLV	MCCB	6-47	B115HH	MCCB	6-18	B270HH	MCCB	6-18	BBKED32	PBSB	10-42	BK2	UNPB	10-11
A02JLDLV	MCCB	6-50	B115HID	MCCB	6-20	B270R	MCCB	6-18	BBKNB32	PBSB	10-31	BK3	UNPB	10-11
A02MN64	MCCB	6-54	B115T	MCCB	6-20	B280	MCCB	6-18	BBKNB32	PBSB	10-42	BLC3600	BPLU	14-57
A02MN64	MCCB	6-58	B120	MCCB	6-18	B280H	MCCB	6-18	BBKQ1	PBSB	10-31	BLC4600	BPLU	14-57
A02MN64	MCCB	6-61	B120AF	MCCB	6-19	B280HH	MCCB	6-18	BBKQ2	PBSB	10-42	BMC3800	BPLU	14-57
A02MN64	MCCB	6-63	B120AFH	MCCB	6-19	B280R	MCCB	6-18	BCT1036HND6	SWBD	12-24	BMC4800	BPLU	14-57
A02MN64B	MCCB	6-54	B120H	MCCB	6-18	B290	MCCB	6-18	BCT1036NXD6	SWBD	12-24	BNK2	PBSB	10-31
A02MN64B	MCCB	6-58	B120HH	MCCB	6-18	B290H	MCCB	6-18	BCT1236HND6	SWBD	12-24	BOS14321	BPLU	14-57
A02MN64B	MCCB	6-61	B120HID	MCCB	6-20	B290HH	MCCB	6-18	BCT1236NXD6	SWBD	12-24	BOS14322	BPLU	14-57
A02MN64B	MCCB	6-63	B120T	MCCB	6-20	B290R	MCCB	6-18	BCT331	BUSW	14-61	BOS14323	BPLU	14-57
A02MNDLV	MCCB	6-54	B125	MCCB	6-18	B310	MCCB	6-18	BCT436HJD6	SWBD	12-24	BOS14324	BPLU	14-57
A02MNDLV	MCCB	6-58	B125H	MCCB	6-18	B3100	MCCB	6-18	BCT436JXD6	SWBD	12-24	BOS14325	BPLU	14-57
A02MNDLV	MCCB	6-61	B125HH	MCCB	6-18	B3100H	MCCB	6-18	BCT636HLD6	SWBD	12-24	BOS14326	BPLU	14-57
A02MNDLV	MCCB	6-63	B130	MCCB	6-18	B3100HH	MCCB	6-18	BCT636LXD6	SWBD	12-24	BOS14327	BPLU	14-57
ACT331	BUSW	14-61	B130H	MCCB	6-18	B315	MCCB	6-18	BCT836HMD6	SWBD	12-24	BOS14328	BPLU	14-57
AMBL1	MCCB	6-103	B130HH	MCCB	6-18	B315H	MCCB	6-18	BCT836MXD6	SWBD	12-24	BOS14329	BPLU	14-57
AMBL1	MCCB	6-107	B130HID	MCCB	6-20	B315HH	MCCB	6-18	BDH10	BUSW	14-51	BOS14330	BPLU	14-57
AMBL1	MCCB	6-111	B135	MCCB	6-18	B32	UNPB	10-10	BDH10	BUSW	14-51	BOS14331	BPLU	14-57
AMBL1	MCCB	6-99	B135H	MCCB	6-18	B32	UNPB	10-10	BDH10	BUSW	14-51	BOS14332	BPLU	14-57
AMBL2	MCCB	6-103	B135HH	MCCB	6-18	B32	UNPB	10-10	BDH10	BUSW	14-51	BOS14333	BPLU	14-57
AMBL2	MCCB	6-107	B140	MCCB	6-18	B32	UNPB	10-10	BDH10	BUSW	14-51	BOS16422	BPLU	14-57
AMBL2	MCCB	6-111	B140H	MCCB	6-18	B32	UNPB	10-10	BDH12	BUSW	14-51	BOS16423	BPLU	14-57
AMBL2	MCCB	6-99	B140HH	MCCB	6-18	B32	UNPB	10-10	BDH12	BUSW	14-51	BOS16424	BPLU	14-57
AMBL3	MCCB	6-103	B145	MCCB	6-18	B320	MCCB	6-18	BDH12	BUSW	14-51	BOS16425	BPLU	14-57
AMBL3	MCCB	6-107	B145H	MCCB	6-18	B320H	MCCB	6-18	BDP302	BUSW	14-50	BOS16426	BPLU	14-57
AMBL3	MCCB	6-111	B145HH	MCCB	6-18	B320HH	MCCB	6-18	BDP304	BUSW	14-50	BOS16427	BPLU	14-57
AMBL3	MCCB	6-99	B150	MCCB	6-18	B325	MCCB	6-18	BDP306	BUSW	14-50	BOS16428	BPLU	14-57
AMB1P1	MCCB	6-115	B150H	MCCB	6-18	B325H	MCCB	6-18	BDP308	BUSW	14-50	BOS16429	BPLU	14-57
AMB1P1	MCCB	6-119	B150HH	MCCB	6-18	B325HH	MCCB	6-18	BDP310	BUSW	14-50	BOS16430	BPLU	14-57
AMB1P1	MCCB	6-122	B160	MCCB	6-18	B330	MCCB	6-18	BDP313	BUSW	14-50	BOS16431	BPLU	14-57
AMB2P2		6-115	B160H	MCCB	6-18	B330H	MCCB	6-18	BDP316	BUSW	14-50	BOS16432	BPLU	14-57
AMB2P2		6-119	B160HH	MCCB	6-18	B330HH	MCCB	6-18	BDP4024	BUSW	14-50	BOS16433	BPLU	14-57
AMB2P2		6-122	B170	MCCB	6-18	B335	MCCB	6-18	BDP4044	BUSW	14-50	BOS16434	BPLU	14-57
ASKE1	MCCB	6-25	B170H	MCCB	6-18	B335H	MCCB	6-18	BDP4064	BUSW	14-50	BOS16435	BPLU	14-57
ASKE1	MCCB	6-33	B170HH	MCCB	6-18	B335HH	MCCB	6-18	BDP4084	BUSW	14-50	BOS16436	BPLU	14-57
ASKE2	MCCB	6-25	B210	MCCB	6-18	B340	MCCB	6-18	BDP4104	BUSW	14-50	BOS16437	BPLU	14-57
ASKE2	MCCB	6-33	B2100	MCCB	6-18	B340H	MCCB	6-18	BE1	RESG	2-81	BOS16438	BPLU	14-57
ASKE3	MCCB	6-25	B2100H	MCCB	6-18	B340HH	MCCB	6-18	BE115	MCCB	6-19	BOS16439	BPLU	14-57
ASKE3	MCCB	6-33	B2100HH	MCCB	6-18	B345	MCCB	6-18	BE115H	MCCB	6-19	BOS16440	BPLU	14-57
ASKE5		6-25	B2100HH	MCCB	6-18	B345H	MCCB	6-18	BE120	MCCB	6-19	BOS16441	BPLU	14-57
ASKE5		6-33	B2100R	MCCB	6-18	B345HH	MCCB	6-18	BE120H	MCCB	6-19	BOS16442	BPLU	14-57
ASKE6	MCCB	6-33	B2110	MCCB	6-18	B350	MCCB	6-18	BE130	MCCB	6-19	BOS16443	BPLU	14-57
ASKE6	MCCB	6-33	B2110H	MCCB	6-18	B350H	MCCB	6-18	BE130H	MCCB	6-19	BOS16444	BPLU	14-57
ASKL1	MCCB	6-103	B2125	MCCB	6-18	B350HH	MCCB	6-18	BE215	MCCB	6-19	BOS16445	BPLU	14-57
ASKL1	MCCB	6-107	B2125H	MCCB	6-18	B360	MCCB	6-18	BE215H	MCCB	6-19	BOS16446	BPLU	14-57
ASKL1	MCCB	6-111	B2125HH	MCCB	6-18	B360H	MCCB	6-18	BE220	MCCB	6-19	BOS16447	BPLU	14-57
ASKL1	MCCB	6-99	B215	MCCB	6-18	B360HH	MCCB	6-18	BE220H	MCCB	6-19	BOS16448	BPLU	14-57
ASKL2	MCCB	6-103	B215AF	MCCB	6-19	B370	MCCB	6-18	BE230	MCCB	6-19	BOS16449	BPLU	14-57
ASKL2	MCCB	6-107	B215AFH	MCCB	6-19	B370H	MCCB	6-18	BE230H	MCCB	6-19	BOS16450	BPLU	14-57
ASKL2	MCCB	6-111	B215H	MCCB	6-18	B370HH	MCCB	6-18	BE240	MCCB	6-19	BOS16451	BPLU	14-57

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NEB2B080B	MCCB	6-24	NFG2B150L		6-101	NGB3B035B	MCCB	6-22	NJG3P250L		6-106	NNG3N100L		6-118
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NEB3B030B	MCCB	6-24	NFG3B125L		6-101	NGB3B100B	MCCB	6-22	NJG4B350L		6-105	NNG3U800L		6-118
NEB3B035B	MCCB	6-24	NFG3B150L		6-101	NGB3B110B	MCCB	6-22	NJG4B400L		6-105	NNG3X100L		6-118
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NEB3B060B	MCCB	6-24	NFG3B250L		6-101	NGG1B025L	MCCB	6-30	NJJ2B350L		6-105	NNG4N100L		6-118
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NEB3B090B	MCCB	6-24	NFG3D200L		6-102	NGG1B040L	MCCB	6-30	NJJ3B300L		6-105	NNG4P100L		6-118
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RS5785	MCCB	6-91	S03JLD6	MCCB	6-47	S15JLD6	MCCB	6-50	S62B	UNPB	10-10	SCMD69700ANGTH	MCCB	6-53
RS5785	MCCB	6-91	S03JLD6	MCCB	6-50	S15JLD64A	MCCB	6-43	S62B	UNPB	10-10	SCMD69700ANT	MCCB	6-53
RS5786	MCCB	6-91	S03JLD62A	MCCB	6-43	S15JLD64A	MCCB	6-47	S62B	UNPB	10-10	SCMD69700ANTH	MCCB	6-53
RS5786	MCCB	6-91	S03JLD62A	MCCB	6-47	S15JLD64A	MCCB	6-50	S62B	UNPB	10-10	SCMD69800A	MCCB	6-53
RS5787	MCCB	6-91	S03JLD62A	MCCB	6-50	S15MN6	MCCB	6-54	S62B	UNPB	10-10	SCMD69800AG	MCCB	6-53
RS5787	MCCB	6-91	S03MN6	MCCB	6-54	S15MN6	MCCB	6-58	S68B	UNPB	10-10	SCMD69800AGH	MCCB	6-53
RS5788	MCCB	6-91	S03MN6	MCCB	6-58	S15MN6	MCCB	6-61	S68B	UNPB	10-10	SCMD69800AH	MCCB	6-53
RS5788	MCCB	6-91	S03MN6	MCCB	6-61	S15MN6	MCCB	6-63	S68B	UNPB	10-10	SCMD69800ANGT	MCCB	6-53
RS5788	MCCB	6-91	S03MN6	MCCB	6-63	S15MN64A	MCCB	6-54	S68B	UNPB	10-10	SCMD69800ANGTH	MCCB	6-53
RT121413	RESG	2-9	S03MN64A	MCCB	6-54	S15MN64A	MCCB	6-58	S68B	UNPB	10-10	SCMD69800ANT	MCCB	6-53
RT6019A		2-9	S03MN64A	MCCB	6-58	S15MN64A	MCCB	6-61	S68B	UNPB	10-10	SCMD69800ANTH	MCCB	6-53
RT6019HA		2-9	S03MN64A	MCCB	6-61	S15MN64A	MCCB	6-63	S68B	UNPB	10-10	SCMD69800ANGT	MCCB	6-53
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RTLDSR		6-132	S04JLD6	MCCB	6-54	S16JLD62A	MCCB	6-47	S9804-9146	RESG	2-8	SCND69100ANGTH	MCCB	6-57
RTLFLR	MCCB	6-91	S04MN6	MCCB	6-54	S16JLD62A	MCCB	6-47	S9804-9147	RESG	2-8	SCND69100ANT	MCCB	6-57
RTLFLR	MCCB	6-91	S04MN6	MCCB	6-58	S16JLD62A	MCCB	6-50	S9817-8061	RESG	2-8	SCND69100ANTH	MCCB	6-57
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SHJD69400H	MCCB	6-42	SJD69200NGT	MCCB	6-42	SLEC52***0GED2		14-15	SLJC46***0IGJXD6		14-15	SLVB*3640IG		14-14
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SHLD69300G	MCCB	6-46	SJD69300GH	MCCB	6-42	SLEC54***0GED4		14-15	SLJCS56***0IGJXD6		14-15	SLVB*3660IG		14-14
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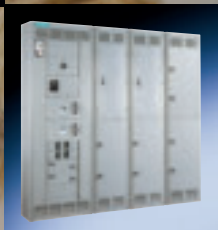
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Siemens switchboards give you room to breathe.



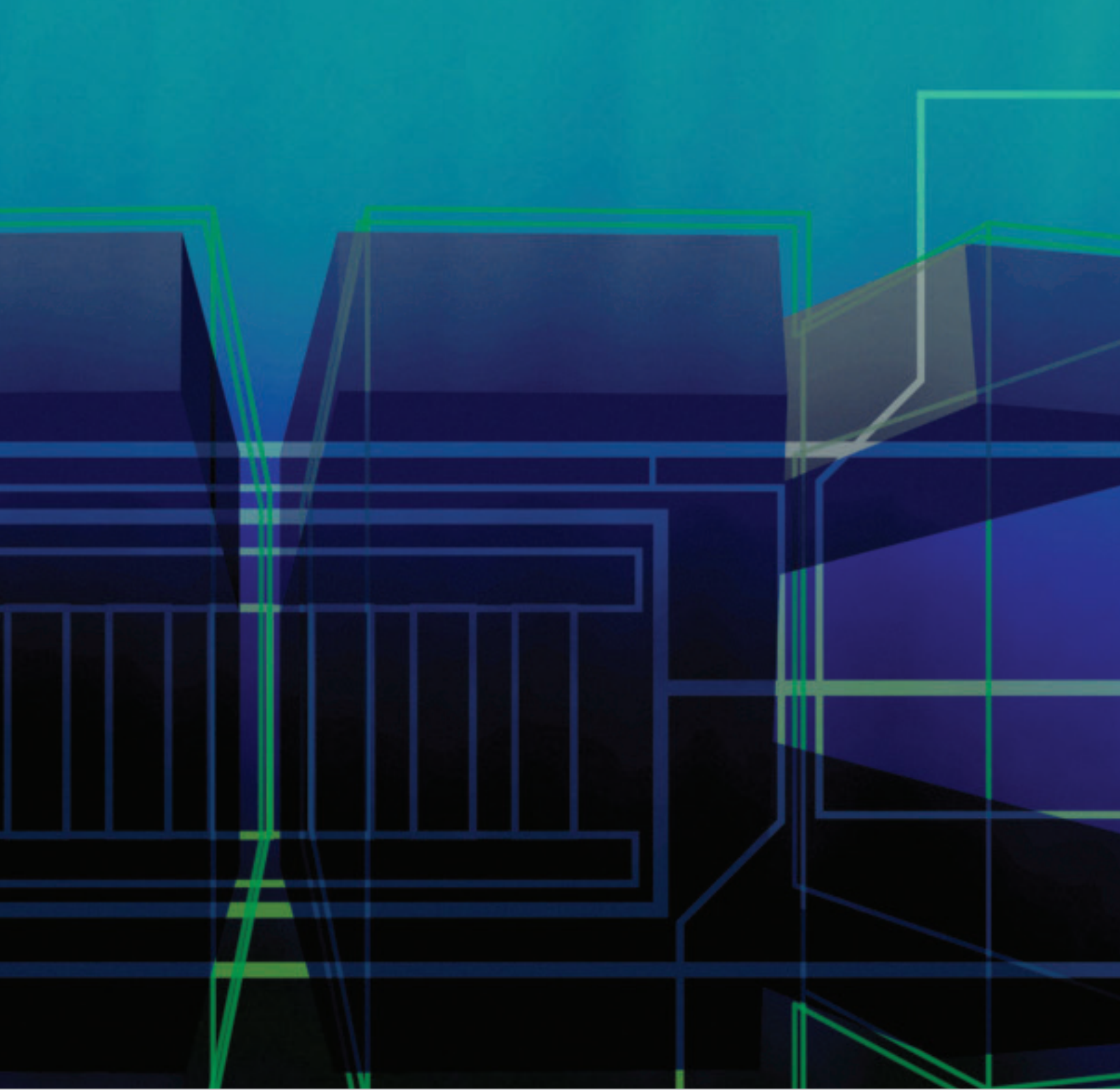
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Components such as power monitoring, lighting panels, transformers, and lighting control are all incorporated into one piece of equipment. One product, one supplier, and one invoice – it just makes sense. Ask your sales representative about using i-3 Control Technology™ in your IPS switchboard design.

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