NEMA Contactors & Starters

Contents

NEMA, Size 0 Full Voltage Non-reversing Starter

Product Description

Eaton's Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical line of Contactors and Starters is the result of a substantial engineering, manufacturing and marketing effort involving extensive customer input, combined with new advances in solid-state technology. ***IT.*** Electro-Mechanical products have greatly increased functionality, significantly reduced size and utilize the benefits of 24V DC control. The exclusive Pulse Width Modulation (PWM) control and digital microprocessor generate a minimized DC value which reduces energy to the contact block and provides the most compact system available.

Standards and Certifications

- Standard: Designed to meet or exceed UL, NEMA and CSA
- UL Listed: UL File #E1491, Guide #NLDX — Open, UL 508
- CSA Certified: CSA File #156828, Class #3211 04 Open, C22.2 No. 14-95
- CE
- NEMA ICS1, ICS2, ICS5
- NEMA, Certificate No. 2074289

ISO 9002 Certification

When you turn to Eaton's Cutler-Hammer Products, you turn to quality. The International Standards Organization (ISO) has established a series of standards acknowledged by 91 industrialized nations to bring harmony to the international quest for quality. The ISO Certification process covers 20 quality system elements in design, production and installation that must conform to achieve registration. This commitment to quality will result in increased product reliability and total customer satisfaction.

Publications

Pub. MN03305002E ***IT.*** NEMA Overload Relay Setup and Troubleshooting Manual
Pub. MN03305001E ***IT.*** NEMA Contactor and Starter User Manual
Pub. 50102 ***IT.*** NEMA Overload Relay Quick Setup Guide
Pub. 49416 ***IT.*** NEMA Contact Blocks (Size 00 – 4)
Pub. 50140 ***IT.*** NEMA Non-reversing Contactor Size 00 and 0 Installation Guide
Pub. 50150 ***IT.*** NEMA Non-reversing Contactor Size 1 Installation Guide
Pub. 50160 ***IT.*** NEMA Non-reversing Contactor Size 2 Installation Guide
Pub. 50170 ***IT.*** NEMA Non-reversing Contactor Size 3 and 4 Installation Guide
Pub. 50180 ***IT.*** NEMA Non-reversing Contactor Size 5 Installation Guide
Pub. 50141 ***IT.*** NEMA Reversing Contactor Size 00 and 0 Installation Guide
Pub. 50151 ***IT.*** NEMA Reversing Contactor Size 1 Installation Guide
Pub. 50161 ***IT.*** NEMA Reversing Contactor Size 2 Installation Guide
Pub. 50171 ***IT.*** NEMA Reversing Contactor Size 3 and 4 Installation Guide
Pub. 50181 ***IT.*** NEMA Reversing Contactor Size 5 Installation Guide
Pub. 50142 ***IT.*** NEMA Non-reversing Starter Size 00 and 0 Installation Guide
Pub. 50152 ***IT.*** NEMA Non-reversing Starter Size 1 Installation Guide
Pub. 50162 ***IT.*** NEMA Non-reversing Starter Size 2 Installation Guide
Pub. 50172 ***IT.*** NEMA Non-reversing Starter Size 3 and 4 Installation Guide
Pub. 50182 ***IT.*** NEMA Non-reversing Starter Size 5 Installation Guide
Pub. 50143 ***IT.*** NEMA Reversing Starter Size 00 and 0 Installation Guide
Pub. 50153 ***IT.*** NEMA Reversing Starter Size 1 Installation Guide
Pub. 50163 ***IT.*** NEMA Reversing Starter Size 2 Installation Guide
Pub. 50173 ***IT.*** NEMA Reversing Starter Size 3 and 4 Installation Guide
Pub. 50183 ***IT.*** NEMA Reversing Starter Size 5 Installation Guide

For copies of these and other publications, contact the Literature Fulfillment Center at 800-957-7050, Fax: 877-840-2371 or find on-line at: www.eaton.com.

For International, call: (630) 377-9798 (English only), Fax: (630) 377-1753.

Catalog Number Selection (Open Components)

Table 33-1. *IT.* Electro-Mechanical Catalog Numbering System

N 101 B S0 J 3 A - RTX

Standard
N = NEMA

Configuration (Open Type)
02N = FVNR Coil Controller
03N = FVR Coil Controller
04N = Contact Block
05N = Solid-State Non-reversing Overload Relay
06N = Solid-State Reversing Overload Relay
101 = FVNR Starter
111 = FVNR Contactor
501 = FVR Starter
511 = FVR Contactor

Frame Width
B = 45 mm
C = 54 mm
D = 76 mm
E = 105 mm
F = 140 mm

Designator (NEMA)
SA = Size 00
S0 = Size 0
S1 = Size 1
S2 = Size 2
S3 = Size 3
S4 = Size 4
S5 = Size 5

XC = Coil Controller
XR = Overload

Overload Full Amperes Adjustment

(45 mm)	(76 mm)
A = .25 – .8 **B** = .59 – 1.9 **C** = 1.4 – 4.4 **D** = 2.8 – 9.0 **G** = 6.3 – 20 **J** = 10 – 32	**F** = 5.0 – 16 **H** = 8.4 – 27 **K** = 14 – 45 **N** = 31 – 100
(54 mm)	(105 mm)
A = .25 – .8 **B** = .59 – 1.9 **C** = 1.4 – 4.4 **D** = 2.8 – 9.0 **F** = 5.0 – 16 **H** = 8.4 – 27 **L** = 16 – 50	**K** = 14 – 45 **M** = 28 – 90 **P** = 42 – 135 **R** = 63 – 200
	(140 mm) **P** = 42 – 135 **S** = 84 – 270 **T** = 131 – 420

X = Contact Block, Coil Controller, Contactor or Not Applicable

Pole Selection
3 = 3-Pole

Overload Type
A = Standard
N = Contactor or Not Applicable

Factory Installed Option
RTX = Ring Lug Ready (E, F Frames Only)

Note: When using the Catalog Numbering System for Eaton's Cutler-Hammer ***IT.*** Electro-Mechanical products, care should be exercised to assure that the Catalog Number for the Overload Relay aligns with the ***IT.*** Contact Block selected for type, frame size and ampacity, if purchased as separate components.

Examples:
N101BS0J3A — Full Voltage Non-reversing, Size 0 Starter with a 10 – 32 amp overload range
N111FS5X3N — Full Voltage Non-reversing, Size 5 Contactor
N501DS2K3A — Full Voltage Reversing Starter with a 14 – 45 amp overload range
N02NCXCXNN — Coil Controller 54 mm
N04NBSAX3N — Contact Block Size 00

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NEMA Full Voltage Non-reversing Contactor, Size 0, Cat. No. N111BS0X3N

NEMA Full Voltage Reversing Contactor, Size 0, Cat. No. N511BS0X3N

Product Description

The Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical Contactor from Eaton's electrical business consists of an ***IT.*** Electro-Mechanical Contact Block and ***IT.*** Electro-Mechanical Coil Controller as a Full Voltage Non-reversing (FVNR) or Full Voltage Reversing (FVR) device. Size 00 to Size 4 Contact Blocks combined with Coil Controllers (factory or field assembled) are stand-alone Contactors. Only the Size 5 Contactors have internal factory assembled coil controllers.

Features

- Size 00 – 5, 9 – 270A, 2 – 200 hp, 600V
- 24V DC Coil Control — safe, reliable global standard
- Frame width (mm): 45, 54, 76, 105, 140
- No laminations, shading coils or magnet noise
- -40 to 149°F (-40 to 65°C) operating temperature
- No seal in auxiliary contacts required — control wiring is not needed between the contactor and overload relay
- Conformal coated printed circuit boards for resistance to harsh environments
- Unique Pulse Width Modulated coil controller minimizes coil power consumption
- Microprocessor-based control
- Easily accessible mounting feet for panel mounting
- Meets or exceeds global standards for EMC (Electromagnetic compatibility) immunity and emissions
- Front and side mounted Auxiliary Contacts: 1NO, 1 NC, 2NO, 2NC, 1NO/1NC and logic level
- 2- or 3-wire control
- Built-in logic to provide either 2- or 3-wire control, eliminating the need to provide and wire auxiliary contacts to seal in and interlock the contactor coils
- Easy field assembly of control wiring — plug and unplug lockable control connector
- DIN rail mounting for Sizes 00 – 2
- Optional mounting plates for Size 00 – 4
- Common accessories
- Long-life silver nickel and silver tin oxide contacts provide excellent conductivity and superior resistance to welding and arc erosion
- Environmentally friendly materials
- Low wattage coils and minimal heat dissipation

Reversing Contactors

- Includes Reversing Power Wiring and bus bars
- Mounting plates for Size 00 – 4
- Exclusive internal electronic interlock for reversing
- Field installed Reversing Kits
- Unique coil controller energizes both forward and reverse contactors — one control point for wiring

Product Selection

Non-reversing Contactors

When Ordering Specify

NEMA Size, Continuous Ampere Rating, Voltage, kW/hp and Non-reversing or Reversing

Note:

- An **N111** (Size 00 – 4) consists of an **N04N** (Contact Block) and an **N02N** (Coil Controller), factory assembled.
- An **N111F** (Size 5) has an internal coil controller, factory assembled.

Cat. No. N111BS0X3N

Table 33-2. Full Voltage 3-Pole DC-Operated Non-reversing Contactors ①

NEMA Size	Continuous Ampere Rating	Max. UL Horsepower (hp) 60 Hz						Max. UL Horsepower (hp) 50 Hz	3-Pole Non-reversing	
		1-Phase		3-Phase				3-Phase	Catalog Number	Price U.S. $
		115V	230V	200V/ 208V	230V/ 240V	460V/ 480V	575V/ 600V	380V		
00	9	1/3	1	1-1/2	1-1/2	2	2	1-1/2	**N111BSAX3N**	
0	18	1	2	3	3	5	5	5	**N111BS0X3N**	
1	27	2	3	7-1/2	7-1/2	10	10	10	**N111CS1X3N**	
2	45	3	7-1/2	10	15	25	25	25	**N111DS2X3N**	
3	90	7-1/2	15	25	30	50	50	50	**N111ES3X3N**	
4	135	—	—	40	50	100	100	75	**N111ES4X3N**	
5	270	—	—	75	100	200	200	150	**N111FS5X3N**	

① 24V DC coil voltage.

Note:

- If required, accessories are available on **Page 33-13**.
- Integral solid-state auxiliary hold-in circuit.
- See **Table 33-7** for 24V DC power supply requirements.
- Control inputs are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages 33-13 – 33-16**
Technical Data ..... **Pages 33-10 – 33-12**
Dimensions ..... **Pages 33-18 – 33-21**
Discount Symbol **1CD1**

Reversing Contactors

When Ordering Specify

NEMA Size, Continuous Ampere Rating, Voltage, kW/hp, and Non-reversing or Reversing

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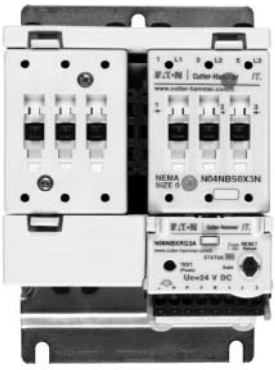
Note:

- An **N511** (Size 00 – 4) consists of two **N04N** (Contact Blocks), an **N03N** (FVR Coil Controller), Mechanical Interlock, Fanning Strips and Mounting Plate, factory assembled.
- An **N511F** (Size 5) consists of two **N111F** (Contactors), an Internal Reversing Coil Controller, Mechanical Interlock, Crossover Bus Bars and Wiring Harness, factory assembled.



Cat. No. N511BS0X3N

Table 33-3. Full Voltage 3-Pole DC-Operated Reversing Contactors ①

NEMA Size	Continuous Ampere Rating	Max. UL Horsepower (hp) 60 Hz						Max. UL Horsepower (hp) 50 Hz	3-Pole Reversing	
		1-Phase		3-Phase				3-Phase	Catalog Number	Price U.S. $
		115V	230V	200V/ 208V	230V/ 240V	460V/ 480V	575V/ 600V	380V		
00	9	1/3	1	1-1/2	1-1/2	2	2	1-1/2	**N511BSAX3N**	
0	18	1	2	3	3	5	5	5	**N511BS0X3N**	
1	27	2	3	7-1/2	7-1/2	10	10	10	**N511CS1X3N**	
2	45	3	7-1/2	10	15	25	25	25	**N511DS2X3N**	
3	90	7-1/2	15	25	30	50	50	50	**N511ES3X3N**	
4	135	—	—	40	50	100	100	75	**N511ES4X3N**	
5	270	—	—	75	100	200	200	150	**N511FS5X3N**	

① 24V DC coil voltage.

Note:

- If required, accessories are available on **Page 33-13**.
- Integral solid-state auxiliary hold-in circuit.
- See **Table 33-7** for 24V DC power supply requirements.
- Control inputs are rated 24V DC (3 – 5 mA).

Accessories . . . . . **Pages 33-13 – 33-16**
Technical Data . . . . . **Pages 33-10 – 33-12**
Dimensions . . . . . **Pages 33-18 – 33-21**
Discount Symbol **1CD1**

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NEMA Full Voltage Non-reversing Starter, Size 0

NEMA Full Voltage Reversing Starter, Size 0

Product Description

The Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical Starter from Eaton's electrical business consists of an ***IT.*** Electro-Mechanical Contact Block or Contactor and ***IT.*** Electro-Mechanical Solid-State Overload Relay as a Full Voltage Non-reversing (FVNR) or Full Voltage Reversing (FVR) device. Size 00 to Size 5 Starters are factory or field assembled.

Features

- 24V DC control power — safe, reliable global standard
- Unique Pulse Width Modulated (PWM) coil controller minimizes coil power consumption
- Microprocessor based control
- Phase loss and current unbalance protection, user selectable
- Standard selectable Trip Class 10, 20 (factory default) or 30 — no individual part numbers — no programming software
- Ambient compensated overload
- Motor temperature and power-up protection with thermal memory
- Front and side mounted Auxiliary Contacts: 1NO, 1NC, 2NO, 2NC, 1NO/1NC and logic level (1NO/1NC)
- Easily accessible mounting feet for panel mounting
- LED status indication — trip, trip class, motor thermal state, reset, overload state
- Unique "Alarm without Trip" option for critical must run applications
- Lockable overload cover protects against unauthorized adjustment and reset functions
- No control wiring needed between contactor and overload relay — eliminates seal in auxiliary contacts
- Minimal heat — no full voltage coils
- -40° to 149°F (-40° – 65°C) operating temperature
- Wide 3.2:1 current adjustment range
- Exclusive internal 24-bit floating point math calculations with RMS calibrated current measurement
- Meets or exceeds global standards for EMC (Electromagnetic compatibility) immunity and emissions
- IP20 Finger Protection
- Motor running thermal utilization indication
- Manual, Automatic or Remote Reset
- Easy field assembly of control wiring — plug and unplug lockable control connector
- DIN rail mountable, Size 00 – 2
- Communication Interface with Starter Network Adapter Product (SNAP)
- 2- or 3-wire control
- Solid-state alarm output indication
- Optional mounting plates with "Ease of Installation" slotted hole design
- Type 2 Coordination
- Conformal coated printed circuit boards for resistance to harsh environments

Reversing Starters

- Includes Reversing Power Wiring and bus bars
- Mounting plates for Size 00 – 4
- Built-in electronic interlock for FVR units
- Unique overload board energizes both forward and reverse starters — one control point for wiring

Product Selection

Non-reversing Starters

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When Ordering Specify

NEMA Size, Continuous Ampere Rating, Voltage, kW/hp, Non-reversing or Reversing and Overload Adjustment Range (Amperes)

Note:

- An **N101** (00 – 4) consists of an **N04N** (Contact Block) and an **N05N** (Non-reversing Overload Relay), factory assembled.
- An **N101** (Size 5) consists of an **N111F** (Contactor) and an **N05N** (Non-reversing Overload Relay), factory assembled.

Cat. No. N101BS0G3A

Table 33-4. Full Voltage Non-reversing DC-Operated, Open Type Starters (Size 00 – 5),① with 3-Pole Solid-State Overload Protection

NEMA Size	Continuous Ampere Rating	Overload Adjustment Range (Amperes)	Max. UL Horsepower (hp) 60 Hz						Max. UL Horsepower (hp) 50 Hz	3-Pole Non-reversing	
			1-Phase		3-Phase				3-Phase	Catalog Number	Price U.S. $
			115V	230V	200V/ 208V	230V/ 240V	460V/ 480V	575V/ 600V	380V		
00	9	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20	—	—	1-1/2	1-1/2	2	2	1-1/2	**N101BSAA3A** **N101BSAB3A** **N101BSAC3A** **N101BSAD3A** **N101BSAG3A**	
0	18	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	—	—	3	3	5	5	5	**N101BS0A3A** **N101BS0B3A** **N101BS0C3A** **N101BS0D3A** **N101BS0G3A** **N101BS0J3A**	
1	27	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	—	—	7-1/2	7-1/2	10	10	10	**N101CS1A3A** **N101CS1B3A** **N101CS1C3A** **N101CS1D3A** **N101CS1F3A** **N101CS1H3A** **N101CS1L3A**	
2	45	5.0 – 16 8.4 – 27 14 – 45 31 – 100	—	—	10	15	25	25	25	**N101DS2F3A** **N101DS2H3A** **N101DS2K3A** **N101DS2N3A**	
3	90	14 – 45 28 – 90 42 – 135	—	—	25	30	50	50	50	**N101ES3K3A** **N101ES3M3A** **N101ES3P3A**	
4	135	14 – 45 28 – 90 42 – 135 63 – 200	—	—	40	50	100	100	75	**N101ES4K3A** **N101ES4M3A** **N101ES4P3A** **N101ES4R3A**	
5	270	42 – 135 84 – 270 131 – 420	—	—	75	100	200	200	150	**N101FS5P3A** **N101FS5S3A** **N101FS5T3A**	

① 24V DC coil voltage.

Note:

- If required, accessories are available on **Page 33-13**.
- The standard *IT.* starter is for 3-phase applications only.
- See **Table 33-7** for 24V DC power supply requirements.
- Control inputs are rated 24V DC (3 – 5 mA).

Accessories . . . . . **Pages 33-13 – 33-16**
Technical Data . . . . . **Pages 33-10 – 33-12**
Dimensions . . . . . **Pages 33-22 – 33-24**
Discount Symbol **1CD1**

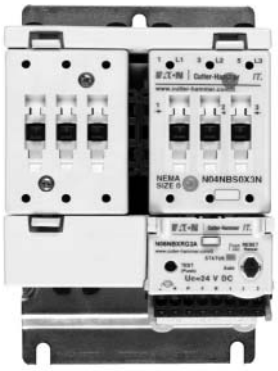
Reversing Starters

When Ordering Specify

NEMA Size, Continuous Ampere Rating, Voltage, kW/hp, Non-reversing or Reversing and Overload Adjustment Range (Amperes)

Note:

- An **N501** (Size 00 – 4) consists of two **N04N** (Contact Blocks), **N06N** (Reversing Overload Relay), Fanning Strips, Mechanical Interlock and Mounting Plate, factory assembled.
- An **N501F** (Size 5) consists of two **N111F** (Contactors), **N06N** (Reversing Overload Relay), Fanning Strips, Mechanical Interlock, Crossover Bus Bars and Reversing Wiring Harness, factory assembled.



Cat. No. N501BS0G3A

Table 33-5. Full Voltage Reversing DC-Operated, Open Type Starters (Size 00 – 5), ① with 3-Pole Solid-State Overload Protection

NEMA Size	Continuous Ampere Rating	Overload Adjustment Range (Amperes)	Max. UL Horsepower (hp) 60 Hz						Max. UL Horsepower (hp) 50 Hz	3-Pole Reversing	
			1-Phase		3-Phase				3-Phase	Catalog Number	Price U.S. $
			115V	230V	200V/ 208V	230V/ 240V	460V/ 480V	575V/ 600V	380V		
00	9	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20	—	—	1-1/2	1-1/2	2	2	1-1/2	**N501BSAA3A** **N501BSAB3A** **N501BSAC3A** **N501BSAD3A** **N501BSAG3A**	
0	18	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32	—	—	3	3	5	5	5	**N501BS0A3A** **N501BS0B3A** **N501BS0C3A** **N501BS0D3A** **N501BS0G3A** **N501BS0J3A**	
1	27	.25 – .8 .59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50	—	—	7-1/2	7-1/2	10	10	10	**N501CS1A3A** **N501CS1B3A** **N501CS1C3A** **N501CS1D3A** **N501CS1F3A** **N501CS1H3A** **N501CS1L3A**	
2	45	5.0 – 16 8.4 – 27 14 – 45 31 – 100	—	—	10	15	25	25	25	**N501DS2F3A** **N501DS2H3A** **N501DS2K3A** **N501DS2N3A**	
3	90	14 – 45 28 – 90 42 – 135	—	—	25	30	50	50	50	**N501ES3K3A** **N501ES3M3A** **N501ES3P3A**	
4	135	14 – 45 28 – 90 42 – 135 63 – 200	—	—	40	50	100	100	75	**N501ES4K3A** **N501ES4M3A** **N501ES4P3A** **N501ES4R3A**	
5	270	42 – 135 84 – 270 131 – 420	—	—	75	100	200	200	150	**N501FS5P3A** **N501FS5S3A** **N501FS5T3A**	

① 24V DC coil voltage.

Note:

- If required, accessories are available on **Page 33-13**.
- The standard ***IT.*** starter is for 3-phase applications only.
- See **Table 33-7** for 24V DC power supply requirements.
- Control inputs are rated 24V DC (3 – 5 mA).

Accessories ..... **Pages 33-13 – 33-16**
Technical Data ..... **Pages 33-10 – 33-12**
Dimensions ..... **Pages 33-22 – 33-24**
Discount Symbol **1CD1**

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Table 33-6. Specifications

Description	Size 00, 0	Size 1	Size 2	Size 3, 4	Size 5
Overall Dimensions in Inches (mm) ① — *w* x *h* x *d*					
Non-reversing Contactor	1.8 x 4.4 x 2.4 (45 x 111 x 60)	2.1 x 4.4 x 2.4 (54 x 113 x 60)	3.0 x 5.9 x 3.1 (76 x 150 x 79)	4.1 x 8.0 x 3.5 (105 x 203 x 90)	5.6 x 14.0 x 7.0 (142 x 355 x 178)
Reversing Contactor	3.8 x 5.9 x 2.7 (96 x 149 x 69)	4.5 x 5.9 x 2.6 (114 x 149 x 67)	6.2 x 7.4 x 3.3 (158 x 188 x 84)	8.5 x 9.5 x 3.8 (216 x 242 x 97)	11.7 x 17.2 x 7.0 (296 x 436 x 178)
Non-reversing Starter	1.8 x 5.0 x 2.5 (45 x 127 x 63)	2.1 x 5.4 x 2.5 (54 x 138 x 63)	3.0 x 5.9 x 3.1 (76 x 150 x 79)	4.1 x 8.0 x 3.5 (105 x 203 x 90)	5.7 x 19.4 x 7.0 (145 x 492 x 178)
Reversing Starter	3.8 x 5.9 x 2.7 (96 x 149 x 69)	4.5 x 5.9 x 2.6 (114 x 149 x 67)	6.2 x 7.4 x 3.3 (158 x 188 x 84)	8.5 x 9.5 x 3.8 (216 x 242 x 97)	11.8 x 21.0 x 7.0 (300 x 533 x 178)
Mounting Hole Spacing in Inches (mm) — *w* x *h*					
Non-reversing Contactor	1.33 x 4.0 (33.8 x 101)	1.46 x 4.10 (37 x 104)	.94 x 2.87 (24 x 73)	1.33 x 4.13 (33.8 x 105)	1.75 x 13.0 (44.5 x 330)
Reversing Contactor	3.15 x 5.35 (80 x 136)	3.15 x 5.35 (80 x 136)	5.51 x 6.89 (140 x 175)	7.87 x 9.06 (200 x 230)	7.82 x 13.0 (198.5 x 330)
Non-reversing Starter	1.33 x 4.62 (33.8 x 117.3)	1.46 x 5.04 (37 x 128)	.94 x 2.87 (24 x 73)	1.33 x 4.13 (33.8 x 105)	1.75 x 18.3 (44.5 x 465)
Reversing Starter	3.15 x 5.35 (80 x 136)	3.15 x 5.35 (80 x 136)	5.51 x 6.89 (140 x 175)	7.87 x 9.06 (200 x 230)	7.82 x 18.3 (198.5 x 465)
Mounting Positions					
Panel-Vertical	Yes	Yes	Yes	Yes	Yes
Panel-Horizontal	Yes	Yes	Yes	Yes	Yes
DIN Rail Mountable	Yes ②	Yes ②	Yes ②	No	No
Weights in Lb. (kg)					
Non-reversing Contactor	.7 (.31)	.9 (.42)	2.8 (1.27)	6.7 (3.05)	20.0 (9.1)
Reversing Contactor	1.9 (.86)	2.6 (1.17)	6.9 (3.13)	16.9 (7.67)	48.0 (21.8)
Non-reversing Starter	.9 (.40)	1.2 (.53)	2.9 (1.32)	7.1 (3.20)	27.0 (12.3)
Reversing Starter	2.0 (.90)	2.6 (1.20)	7.1 (3.20)	16.8 (7.60)	55.0 (25.0)
Mechanical Operating Rate ③					
Maximum	3/sec	3/sec	2/sec	2/sec	1/sec
Mechanical Life					
	10,000,000	10,000,000	8,000,000	8,000,000	5,000,000
Humidity ④					
	95% Non-condensing	95% Non-condensing	95% Non-condensing	95% Non-condensing	95% Non-condensing
Insulation Voltage (Ui)					
	690V	690V	690V	690V	690V
Impulse Withstand Voltage (Uimp)					
	6 kV	6 kV	6 kV	6 kV	6 kV

① Auxiliaries add approximately 1.0" (25 mm) to depth for single, 1.2" (30 mm) for dual.
② Non-reversing contactors and starters only.
③ No load condition.
④ Up to 99% humidity depending on application. Consult factory.

Table 33-6. Specifications (Continued)

Description	Size 00, 0	Size 1	Size 2	Size 3, 4	Size 5
Finger Protection					
Front	IP20	IP20	IP20	IP20	IP20
At Terminals	IP10	IP10	IP00	IP00	IP00
At Terminals with max. size wire installed	IP20	IP10	IP10	IP00	IP00
Terminals L1, L2, L3/T1, T2, T3 ①					
1 Wire per Terminal (stranded or solid)	14 – 8 AWG (1.5 – 10 mm^2)	14 – 4 AWG (1.5 – 16 mm^2)	14 – 1 AWG (1.5 – 35 mm^2)	6 – 250 MCM (16 – 120 mm^2)	4 – 750 MCM (25 – 420 mm^2)
2 Wires per Terminal (stranded or solid)	14 – 10 AWG (1.5 – 4 mm^2)	14 – 6 AWG (1.5 – 16 mm^2)	14 – 2 AWG (1.5 – 25 mm^2)	6 – 3/0 AWG (16 – 70 mm^2)	1/0 — 300 MCM (50 — 150 mm^2)
Strip Length	.45" (11 mm)	.5" (12 mm)	.7" (18 mm)	.8" (21 mm)	1.5" (40 mm)
Torque (max.)	20 lb-in (2.2 Nm) for 14 – 10 AWG (1.5 – 6 mm^2); 25 lb-in (2.8 Nm) for 8 AWG (10 mm^2)	35 lb-in (4.0 Nm) for 14 – 10 AWG (1.5 – 6 mm^2); 40 lb-in (4.5 Nm) for 8 AWG (10 mm^2); 45 lb-in (5.0 Nm) for 6 – 4 AWG (16 mm^2)	45 lb-in (5.0 Nm) for Single 14 – 8 AWG (1.5 – 10 mm^2); 100 lb-in (11 Nm) for Single 6 – 1 AWG (16 – 35 mm^2) and Dual Wire Combinations	250 lb-in (28 Nm)	550 lb-in (62 Nm)
Driver	2.5 mm Hex Key	3 mm Hex Key	5/32" (4 mm) Hex Key	5/16" (8 mm) Hex Key	5/16" (8 mm) Hex Key
Operation Performance					
Coil Voltage (nominal)	24V DC	24V DC	24V DC	24V DC	24V DC
Coil Operating Voltage Range (V DC)	20 – 28	20 – 28	20 – 28	20 – 28	20 – 28
Control Terminals					
(- and +) 1 Wire per Terminal	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)	14 – 12 AWG (1.5 – 2.5 mm^2)
(- and +) 2 Wires per Terminal	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)	14 AWG (1.5 mm^2)
(P, F, R, 1, 2, 3) 1 Wire per Terminal	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)	22 – 12 AWG (0.5 – 2.5 mm^2)
(P, F, R, 1, 2, 3) 2 Wires per Terminal	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)	18 – 14 AWG (0.75 – 1.5 mm^2)
Torque (max.)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)	4.5 lb-in (.5 Nm)
Strip Length	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)	.25 (7 mm)
Driver	.13 (3.5 mm) Flat	.13 (3.5 mm) Flat	.13 (3.5 mm) Flat	.13 (3.5 mm) Flat	.13 (3.5 mm) Flat
Temperature ②					
Operating	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)	-40° to +149°F (-40° to +65°C)
Storage	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)	-58° to +176°F (-50° to +80°C)
Environmental					
Shock/Vibration	15G/5G	15G/5G	15G/5G	15G/5G	15G/5G ③
Altitude ②	6600 FT (2000M)	6600 FT (2000M)	6600 FT (2000M)	6600 FT (2000M)	6600 FT (2000M)
Pull-In Time (mS) @ 24V					
Excl. Debounce Time	15	15	25	30	70 – 200
Incl. Debounce Time	75	80	88	95	120 – 300
Dropout Time (mS) @ 24V					
Excl. Debounce Time	5	5	12	15	50 – 150
Incl. Debounce Time	65	70	75	80	70 – 250

① Use Class B 75°C copper wire only (or 90°C copper wire sized for 75°C operation per NEC).

② Consult factory for higher ratings.

③ The Non-reversing Starter requires the use of all six mounting screws for the maximum rating.

Note: At other temperatures expressed in °C, for either inrush or sealed, use the 20°C value from the table in the following

$$Watts = W_{20} [1.1 - .005(T)]$$
$$Amps = A_{20} [1.1 - .005(T)]$$

For example, inrush requirements for a NEMA Size 2 Starter at -25°C would be:

Watts = 130 [1.1 – .005 (-25)] = 160

Amps = 5.4 [1.1 – .005 (-25)] = 6.6

Notes:

- Response time for Control Inputs = Debounce Time
- The time between operating forward and reverse must be greater than the Debounce Time.

Table 33-7. 24V DC Power Supply Requirements @ 68°F (20°C) (see Note at left)

Contactor/Starter Size		Sealed In		Inrush		
Catalog Number ④	NEMA Size	Wattage	Amps	Wattage	Amps	Duration (mS)
N_11B_ _X3N	00, 0	3.7	.15	80	3.3	50
N_01B_ _ _3A	00, 0	3.2	.13	80	3.3	50
N_11C_ _X3N	1	4.2	.18	90	3.8	50
N_01C_ _ _3A	1	3.6	.15	90	3.8	50
N_ _1D_ _ _3_	2	5.0	.21	130	5.4	65
N_ _1E_ _ _3_	3, 4	5.6	.23	140	5.8	85
N_ _1F_ _ _3_	5	12.0	.50	200	8.3	250
N_01F_ _ _3_	5	13.0	.54	200	8.3	250

④ _ indicates missing digit/character of the Catalog Number; may have multiple values.

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Electrical Life — AC-1, AC-2, AC-3 and AC-4 Utilization Categories

Table 33-8. Utilization Categories

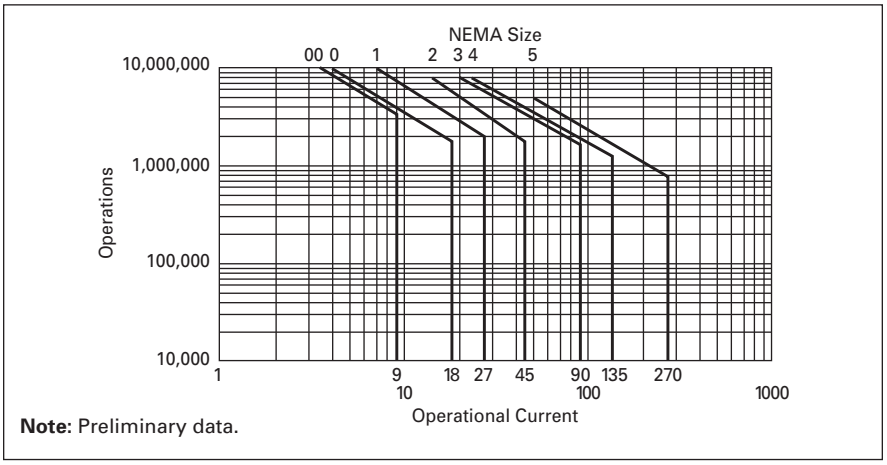
The International Electrotechnical Commission (IEC) has developed utilization categories for contactors and auxiliary contacts. The IEC utilization categories are used to define the type of electrical load for estimating electrical life, and do not imply the devices are IEC rated.	
Category	**Typical Application**
AC-1	Non-inductive or slightly inductive loads: Resistance furnaces, heating.
AC-2	Slip-ring motors: Starting and stopping of running motors
AC-3	Squirrel cage motors: Starting, switching off motors during running (motors in most industrial applications typically fall into this category).
AC-4	Squirrel cage motors: Starting, plugging ①, inching ② (very few applications in industry are totally AC-4).

① Plugging is stopping or reversing the motor rapidly by reversing the connections while the motor is running.
② Inching or jogging is energizing the motor once or repeatedly for short durations to obtain small movements of the motor driven load.

Life Load Curves — Eaton's Cutler-Hammer *IT.* Electro-Mechanical Series NEMA contactors have been designed and manufactured for superior life performance. All testing has been based on requirements as found in IEC 60947-4-1 and conducted by us. When selecting a contactor, the specifier must give attention to the specific load, utilization category and the required electrical life. For a definition of Utilization Categories, see **Table 33-8** above.

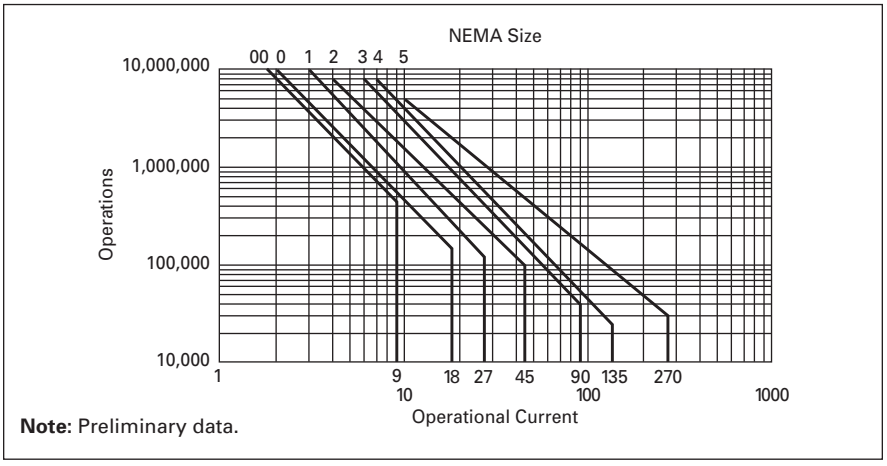
Note: AC-3 tests are conducted at rated device currents and AC-4 tests are conducted at six-times rated device currents. All tests have been run at 460V, 60 Hz.

Actual application life may vary, depending on environmental conditions and application duty cycle.



Note: Preliminary data.

Figure 33-1. Electrical Life — AC-3 Utilization Category



Note: Preliminary data.

Figure 33-2. Electrical Life — AC-4 Utilization Category

Contactor Choice —

- Decide what utilization category the application is and choose the appropriate curve from **Figure 33-1** or **Figure 33-2**.
- Locate the intersection of the life-load curve with the operational current (Ie) of the application, as found on the horizontal axis.
- Read the estimated contact life along the vertical axis in number of operations.

Trip Times

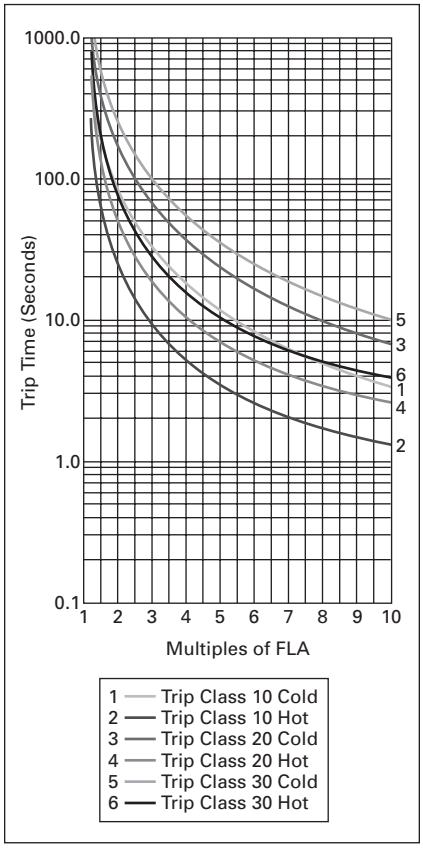


Figure 33-3. Class 10, 20 and 30 Trip Curves

Modular Components — Contactor Field Assembly

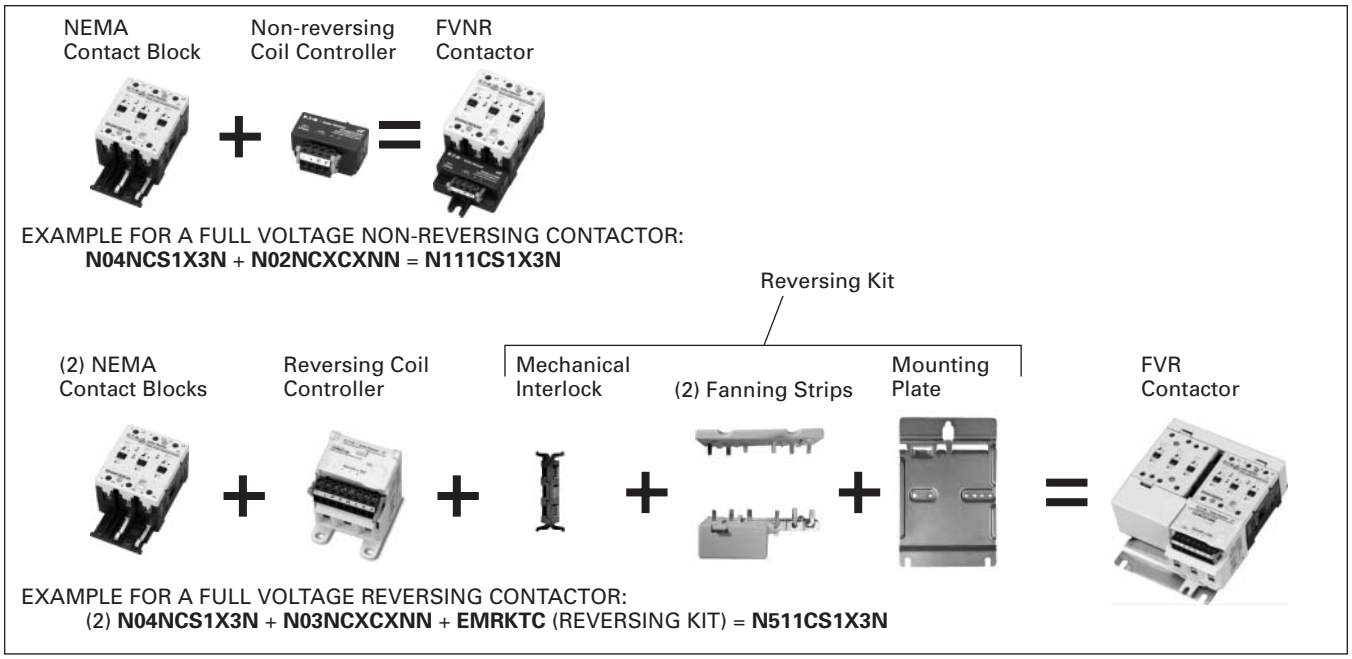


Figure 33-4. Modular Contactor Assembly

Modular Components — Starter Field Assembly

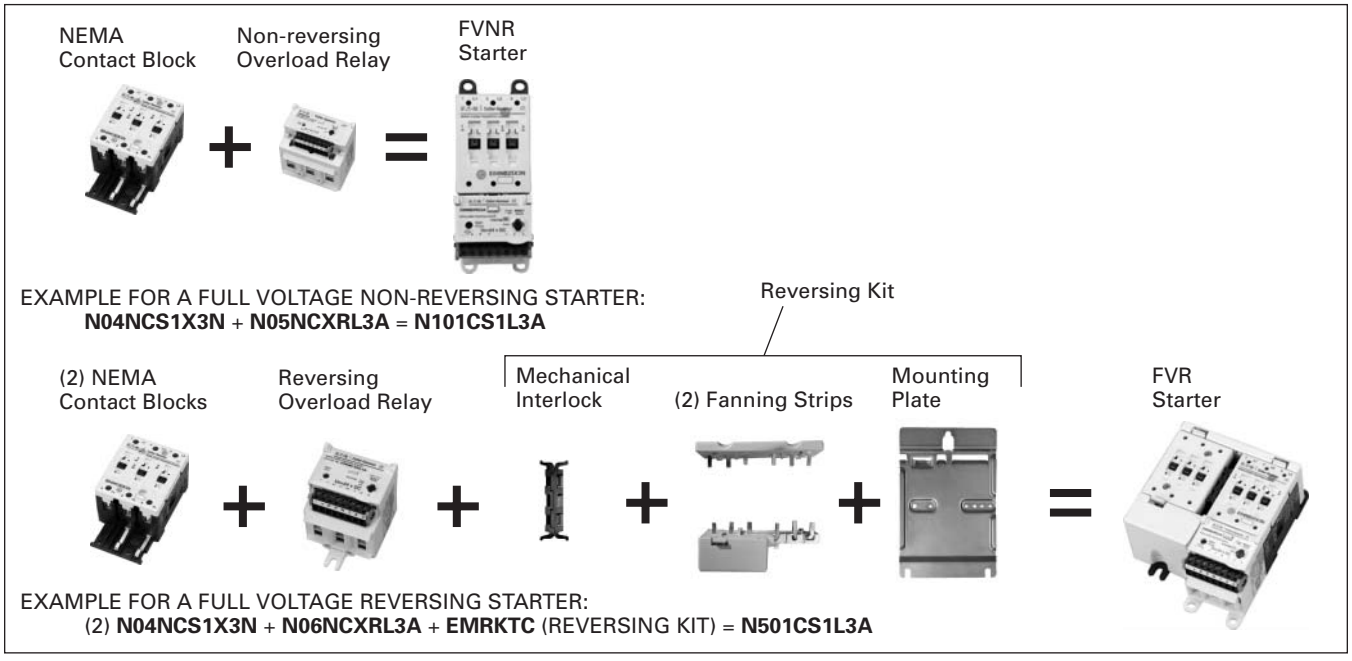


Figure 33-5. Modular Starter Assembly

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NEMA Contact Block

Table 33-9. NEMA Contact Block

Size	Amperes	Catalog Number	Price U.S. $
00	9	**N04NBSAX3N**	
0	18	**N04NBS0X3N**	
1	27	**N04NCS1X3N**	
2	45	**N04NDS2X3N**	
3	90	**N04NES3X3N**	
4	135	**N04NES4X3N**	

Note:

- N04N + N05N = N101; N04N + N02N = N111 (45 – 140 mm)
- N04N + N06N = N501; N04N + N03N = N511 (45 – 140 mm)

NEMA Coil Controller

Size 00-1 Non-reversing (pictured)

Table 33-10. NEMA Coil Controller

Size	Catalog Number	Price U.S. $
Non-reversing		
00, 0	**N02NBXCXNN**	
1	**N02NCXCXNN**	
2	**N02NDXCXNN**	
3, 4	**N02NEXCXNN**	
5	**EMUCCF**	

NEMA Solid-State Overload Relay

Table 33-11. NEMA Solid-State Overload Relay

Size	Overload Adjustment Range (Amperes)	Catalog Number	Price U.S. $
Non-reversing			
00, 0	.25 – .8	**N05NBXRA3A**	
	.59 – 1.9	**N05NBXRB3A**	
	1.4 – 4.4	**N05NBXRC3A**	
	2.8 – 9.0	**N05NBXRD3A**	
	6.3 – 20	**N05NBXRG3A**	
0	10 – 32	**N05NBXRJ3A**	
1	.25 – .8	**N05NCXRA3A**	
	.59 – 1.9	**N05NCXRB3A**	
	1.4 – 4.4	**N05NCXRC3A**	
	2.8 – 9.0	**N05NCXRD3A**	
	5.0 – 16	**N05NCXRF3A**	
	8.4 – 27	**N05NCXRH3A**	
	16 – 50	**N05NCXRL3A**	
2	5.0 – 16	**N05NDXRF3A**	
	8.4 – 27	**N05NDXRH3A**	
	14 – 45	**N05NDXRK3A**	
	31 – 100	**N05NDXRN3A**	
3, 4	14 – 45	**N05NEXRK3A**	
	28 – 90	**N05NEXRM3A**	
	42 – 135	**N05NEXRP3A**	
4	63 – 200	**N05NEXRR3A**	
5	42 – 135	**N05NFXRP3A**	
	84 – 270	**N05NFXRS3A**	
	131 – 420	**N05NFXRT3A**	
Reversing			
00, 0	.25 – .8	**N06NBXRA3A**	
	.59 – 1.9	**N06NBXRB3A**	
	1.4 – 4.4	**N06NBXRC3A**	
	2.8 – 9.0	**N06NBXRD3A**	
	6.3 – 20	**N06NBXRG3A**	
0	10 – 32	**N06NBXRJ3A**	
1	.25 – .8	**N06NCXRA3A**	
	.59 – 1.9	**N06NCXRB3A**	
	1.4 – 4.4	**N06NCXRC3A**	
	2.8 – 9.0	**N06NCXRD3A**	
	5.0 – 16	**N06NCXRF3A**	
	8.4 – 27	**N06NCXRH3A**	
	16 – 50	**N06NCXRL3A**	
2	5.0 – 16	**N06NDXRF3A**	
	8.4 – 27	**N06NDXRH3A**	
	14 – 45	**N06NDXRK3A**	
	31 – 100	**N06NDXRN3A**	
3, 4	14 – 45	**N06NEXRK3A**	
	28 – 90	**N06NEXRM3A**	
	42 – 135	**N06NEXRP3A**	
4	63 – 200	**N06NEXRR3A**	
5	42 – 135	**N06NFXRP3A**	
	84 – 270	**N06NFXRS3A**	
	125 – 400	**N06NFXRT3A**	

Discount Symbol **1CD1**

Auxiliary Contacts



Auxiliary Contacts are available for mounting on Eaton's Cutler-Hammer Intelligent Technologies (***IT.***) Electro-Mechanical Contactors and Starters. The various choices available for non-reversing models are shown in **Tables 33-12** and **33-13,** and their ratings in **Tables 33-14** – **33-16**. For reversing models, the number of auxiliaries indicated is for each of the contactors/starters in the assembly.

Table 33-12. Auxiliary Contact Availability — Sizes 00 – 5

Top Mounted (Maximum Auxiliaries per Contactor/Starter) ②							
Contactor/Starter Size					Contact Type	Catalog Number	Price U.S. $
Size 00, 0	Size 1	Size 2	Size 3, 4	Size 5			
3	3	3	3	—	1NO	**EMA13**	
3	3	3	3	—	1NC	**EMA14**	
2	2 ①	3	3	—	1NO-1NC	**EMA15**	
2	2 ①	3	3	—	2NO	**EMA16**	
2	2 ①	3	3	—	2NC	**EMA17**	
2	3	3	3	3	Logic Level 1NO-1NC	**EMA70**	

① Other combinations: Single, Dual, Single; Dual, Single, Dual; and Dual, Logic Level, Dual.
② For reversers, multiply quantities by two.

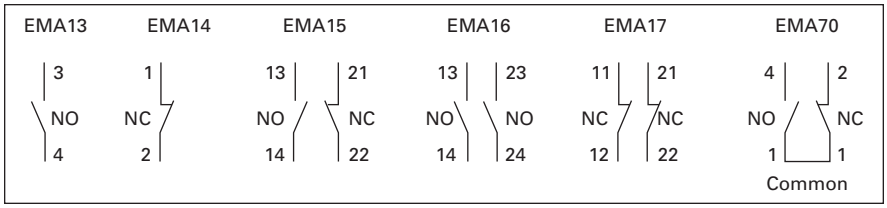

Figure 33-6. Connecting Diagram — Sizes 00 – 5

Table 33-13. Auxiliary Contact — Size 5

Auxiliary Contacts per Non-reversing and Reversing Contactor or Starter				
Max	Contact Type	Description	Catalog Number	Price U.S. $
2	1NO	Base auxiliary (max. 1 per side)	**C320KGS41**	
2	1NO-1NC	Base auxiliary (max. 1 per side)	**C320KGS42**	
6	1NO	C320KGS41 or C320KGS42 required (max. 3 Add-on auxiliaries per side)	**C320KGS20**	
2	1NO Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS20L**	
6	1NC	C320KGS41 or C320KGS42 required (max. 2 Add-on auxiliaries per side)	**C320KGS21**	
2	1NC Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS21L**	
2	1NO-1NC	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS22**	
2	1NO-1NC Logic Level	C320KGS41 or C320KGS42 required (max. 1 Add-on auxiliary per side)	**C320KGS22L** ③	
3	1NO-1NC Logic Level	Front mounted only	**EMA70** ④	

③ Form C contacts.
④ For reversers, multiply quantities by two.

Notes:

- Side Mounted — Maximum (10) Total Circuits
- Front Mounted — Maximum (6) Total Circuits ④
- Maximum 4 auxiliaries per side (base + 3 side mounted)
- EMASA/B _ _ have been superseded by the above Catalog Numbers.

Table 33-14. IEC Ratings

DC-13		AC-15	
U_e Voltage	I_e Amps.	U_e Voltage	I_e Amps.
24	5	48	8
48	2.5	120	6
125	1.1	240	4
250	.55	440	2

Table 33-15. NEMA A600 Ratings

Current	AC Voltage			
	120	240	480	600
Make and Interrupting	60	30	15	12
Break	6	3	1.5	1.2
Continuous	10	10	10	10
Thermal	10	10	10	10

Table 33-16. NEMA P300 Ratings

Current	DC Voltage	
	125	250
Make and Interrupting	1.1	.55
Break	1.1	.55
Continuous	5	5
Thermal	5	5

Table 33-17. EMA70 Auxiliary Contact

DC-12		AC-12	
Ue	Ie	Ue	Ie
30	.1	250	.1

Table 33-18. C320KGS20L, C320KGS21L, C320KGS22L, Auxiliary Contact Ratings

DC-12		AC-12	
Ue	Ie	Ue	Ie
80	0.1	250	0.1

Discount Symbol **1CD1**

Mounting Plates

Table 33-19. Mounting Plates

NEMA Size	Metal Reversing Contactor/Starter Plates	
	Catalog Number	Price U.S. $
00, 0, 1	**EMA9B**	
2	**EMA9D**	
3, 4	**EMA9E**	
5	**EMA9F**	

Reversing Fanning Strips

Table 33-20. Reversing Fanning Strips

NEMA Size	Line Side		Load Side	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
00, 0	**EMFRLB**		**EMFRTB**	
1	**EMFRLC**		**EMFRTC**	
2	**EMFRLD**		**EMFRTD**	
3, 4	**EMFRLE**		**EMFRTE**	
5	**EMFRLF**		**EMFRTF**	

Reversing Kits

Includes Fanning Strips, Mechanical Interlock, Mounting Plate and hardware.

Table 33-21. Reversing Kits ①

NEMA Size	Catalog Number	Price U.S. $
00, 0	**EMRKTB**	
1	**EMRKTC**	
2	**EMRKTD**	
3, 4	**EMRKTE**	
5	**EMRKTF**	

① For Contactor and Starter.

Note: Also order separately the appropriate contact blocks and overload relay.

Lug Kits

Table 33-22. Lug Kits

NEMA Size	Description	Catalog Number	Price U.S. $
1	Contactor or Starter Line or Load (3 Lugs)	**EMLUGKTC**	
2	Contactor or Starter Line or Load	**EMLUGKTD**	
3, 4	Contactor Line or Load, Starter Line Starter Load	**EMLUGKTLE** **EMLUGKTTE**	
5	Contactor or Starter Line or Load, Horizontal Contactor or Starter Line or Load, Vertical	**EMLUGKTFA** **EMLUGKTFB**	

Table 33-23. Ring Lug Retrofit Kits

Product	NEMA Sizes 3, 4			NEMA Size 5		
	Catalog Number			Catalog Number		
	Factory Installed	Retrofit Kits ②	Lug Kits ③	Factory Installed	Retrofit Kits ②	Lug Kits ③
N111 **N511**	Add "**-RTX**" Add "**-RTX**"	**EMRTXKTEN** **EMRTXKTER**	**EMLUGREN** **EMLUGRER**	Add "**-RTX**" Add "**-RTX**"	**EMRTXKTF** **EMRTXKTF**	**EMLUGRFC** **EMLUGRFC**
N101 **N501**	Add "**-RTX**" Add "**-RTX**"	**EMRTXKTEN** **EMRTXKTER**	**EMLUGREN** **EMLUGRER**	Add "**-RTX**" Add "**-RTX**"	**EMRTXKTF** **EMRTXKTF**	**EMLUGRFS** **EMLUGRFS**
N05N **N06N**	Add "**-RTX**" Add "**-RTX**"			Add "**-RTX**" Add "**-RTX**"		
N02N **N03N**	Add "**-RTX**" Add "**-RTX**"					
N04N	Add "**-RTX**"					

② Retrofit Kits used to field install ring lugs on standard lug units.

③ Lug Kits used to field install standard lugs into factory assembled ring lug units.

Discount Symbol **1CD1**

Coils

Table 33-24. Coils

Description ①	Catalog Number	Price U.S. $
Size 1 Coil	**EMCC**	
Size 2 Coil	**EMCD**	
Size 3, 4 Coil	**EMCE**	
Size 5 Coil	**EMCF**	

① For reversing contactors and starters, order two.

DIN Rail Catch

Table 33-25. DIN Rail Catch

NEMA Size	Description	Catalog Number	Price U.S. $
00 – 1	Catch with Leaf Spring and Pad	**EMDRCB**	
2	Catch with Leaf Spring and Pad	**EMDRCD**	

Contact Kits

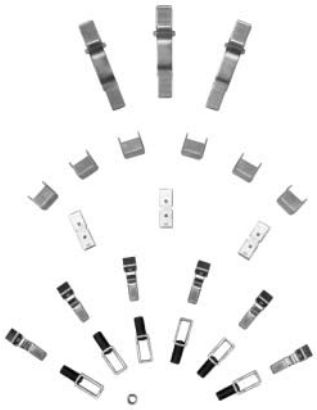

Table 33-26. Contact Kits

NEMA Size	Description	Catalog Number	Price U.S. $
1	Hold Open	**EMCKTS1**	
	Non-hold Open	**EMCKTS1NH**	
2	Hold Open	**EMCKTS2**	
	Non-hold Open	**EMCKTS2NH**	
3	Hold Open	**EMCKTS3**	
4	Hold Open	**EMCKTS4**	
5	Hold Open	**EMCKTS5**	

Control Terminal Blocks

Table 33-27. Control Terminal Blocks

No. of Pins	Terminal Markings	NEMA Size	Coil Controller		Contactor		Overload		Starter		Catalog Number	Price U.S. $
			Non-reversing	Reversing	Non-reversing	Reversing	Non-reversing	Reversing	Non-reversing	Reversing		
8	-+PFR123	00, 0		X		X	X	X	X	X	**EMA76L**	
		1		X		X	X	X	X	X		
		2	X	X	X	X	X	X	X	X		
		3,4	X	X	X	X	X	X	X	X		
		5					X	X	X	X		
5	-+PFR	5	X	X	X	X					**EMA77L**	
5	RFP+-	5		X		X		X		X	**EMA77LR**	
4	-+PF	00,0	X		X						**EMA78L**	
		1	X		X							
5 x 2	-+PFR and RFP+-	5				X				X	**EMA80L** ②	

② Consists of (1) EMA77L and (1) EMA77LR inter-wired.

Discount Symbol **1CD1**

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Non-reversing Contactors (Sizes 00 – 1)

Table 33-28. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes				Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/ DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	P	Q	R
00, 0	1.8 (45)	4.4 (111)	2.4 (60)	3.6 (91)	.1 (3)	1.33 (33.8)	4.0 (101)	.2 (5)	.9 (23)	(3) #8 M4	.7 (19)	1.2 (30)	1.2 (30)
1	2.1 (54)	4.45 (113)	2.4 (60)	3.6 (91)	.1 (3)	1.46 (37)	4.1 (104)	.2 (5)	.8 (20)	(3) #8 M4	.7 (19)	1.2 (30)	1.2 (30)

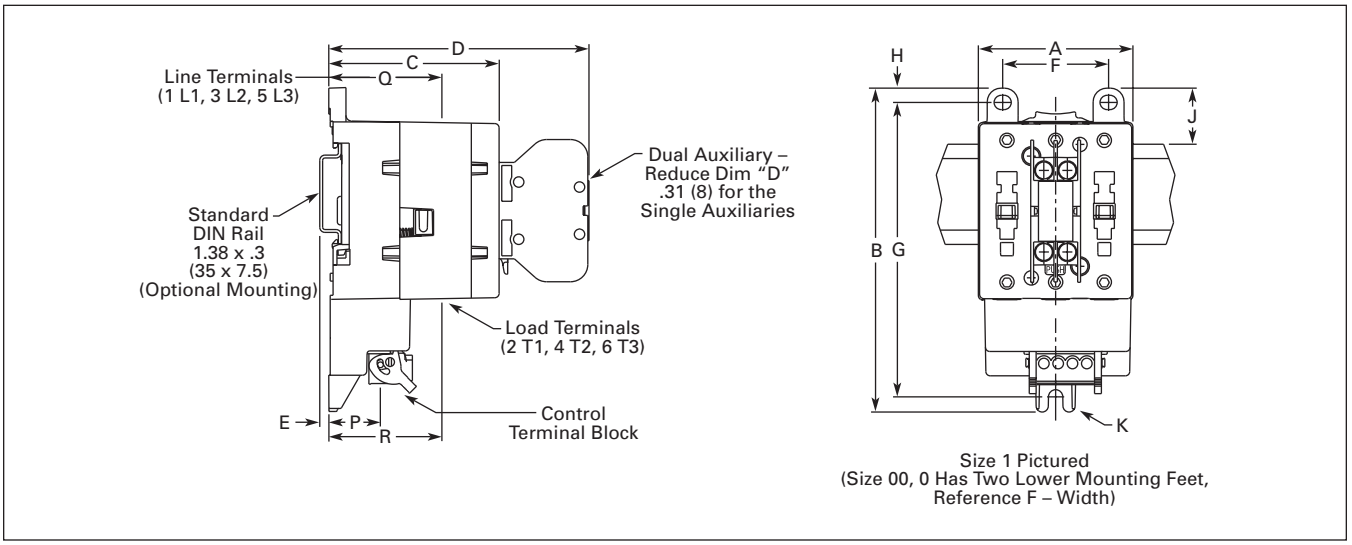

Figure 33-7. Approximate Dimensions — Inches (mm)

Non-reversing Contactors (Sizes 2 – 4)

Table 33-29. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes				Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/ DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	P	Q	R
2	3.0 (76)	5.9 (150)	3.1 (79)	4.2 (107)	.2 (4)	.94 (24)	2.87 (73)	.5 (13)	.9 (23)	(4) #6 x 2 M3.5 x 50	2.4 (60)	1.5 (37)	.6 (14)
3, 4	4.1 (105)	8.0 (203)	3.5 (90)	4.7 (119)	—	1.33 (33.8)	4.13 (105)	.6 (15)	—	(4) #8 x 1.5 M4 x 40	2.8 (72)	1.7 (42)	.3 (8)

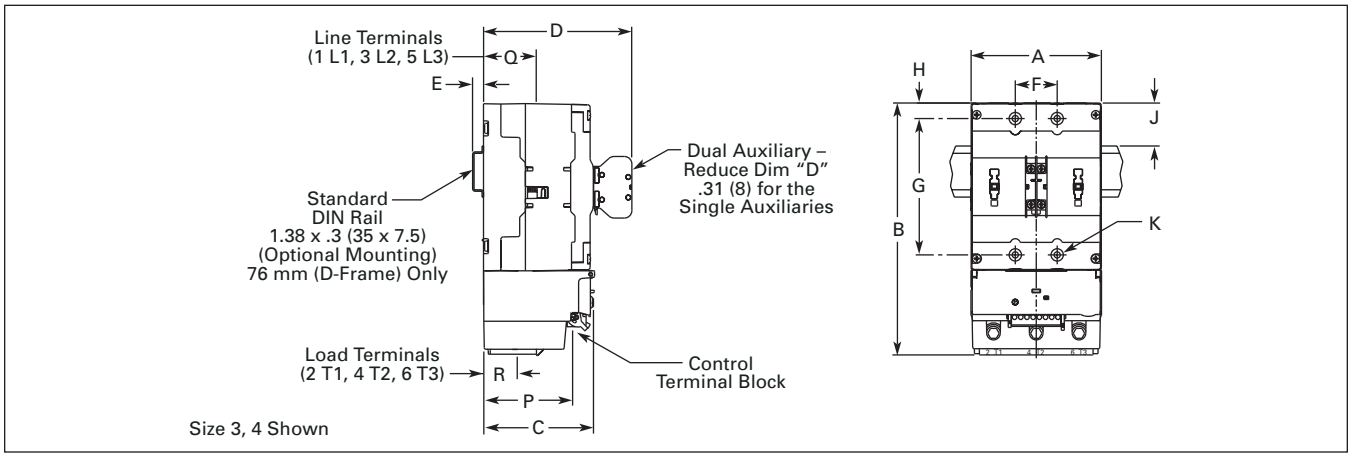

Figure 33-8. Approximate Dimensions — Inches (mm)

Non-reversing Contactors (Size 5)

Table 33-30. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mounting Hole to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	K	P	Q	R
5	5.6 (142)	14.0 (355)	7.0 (178)	8.2 (208)	6.70 (170)	1.75 (44.5)	13.0 (330)	.58 (14.7)	(4) 5/16 M8	.8 (20)	4.4 (112)	4.4 (112)

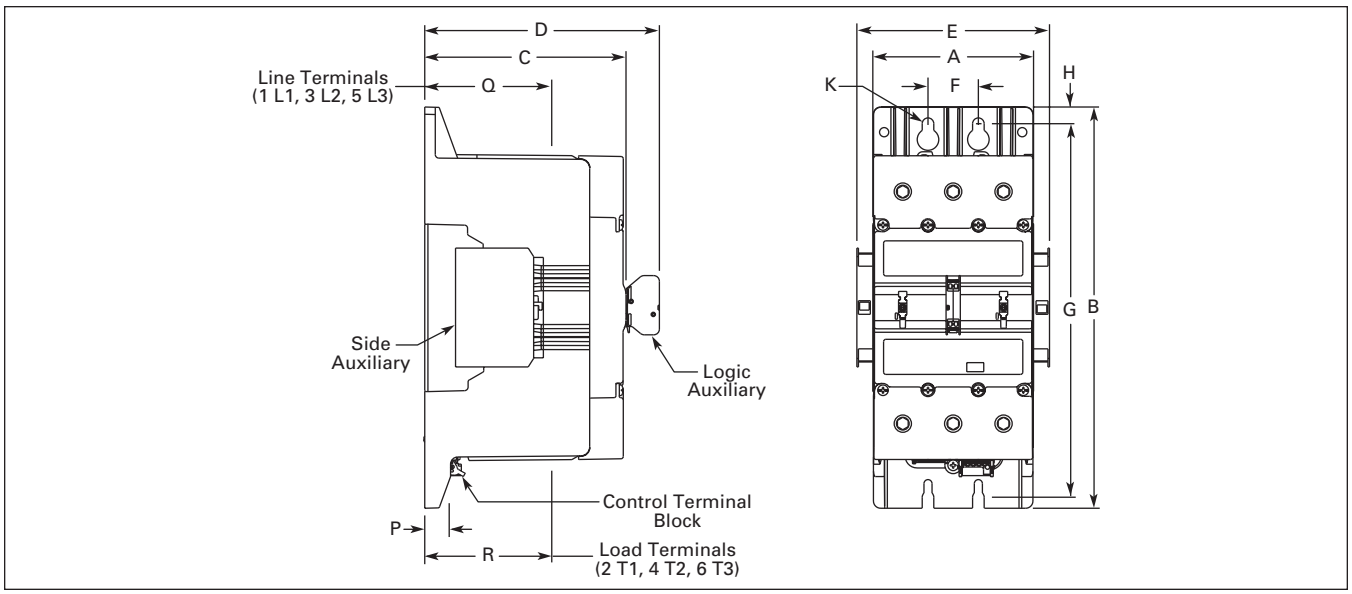

Figure 33-9. Approximate Dimensions in Inches (mm)

Reversing Contactors (Sizes 00 – 4)

Table 33-31. Approximate Dimensions in Inches (mm)

NEMA Size	Overall				Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Width	Height	Mtg. Hole to Top		Control	Line	Load
	A	B	C	D	F	G	H	K	P	Q	R
00, 0	3.8 (96)	5.9 (149)	2.7 (69)	3.8 (96)	3.15 (80)	5.35 (136)	.3 (7)	(3) #10 M5	2.0 (50)	1.5 (38)	.9 (22)
1	4.5 (114)	5.9 (149)	2.6 (67)	3.8 (96)	3.15 (80)	5.35 (136)	.3 (7)	(3) #10 M5	2.0 (50)	1.5 (38)	.6 (16)
2	6.2 (158)	7.4 (188)	3.3 (84)	4.4 (112)	5.51 (140)	6.89 (175)	.2 (6)	(3) #10 M5	2.6 (67)	1.9 (48)	.9 (22)
3, 4	8.5 (216)	9.5 (242)	3.8 (97)	4.9 (125)	7.87 (200)	9.06 (230)	.2 (6)	(3) #10 M5	3.1 (80)	2.1 (54)	.7 (17)

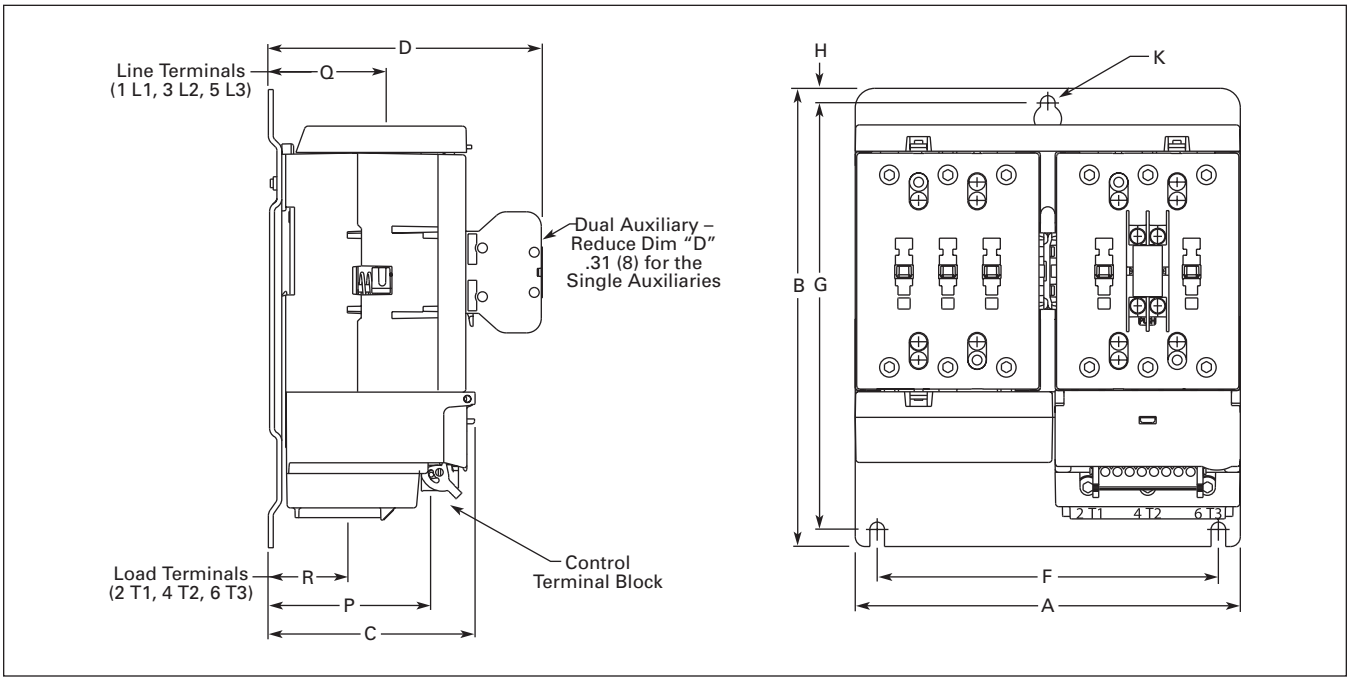

Figure 33-10. Approximate Dimensions — Inches (mm)

Reversing Contactors (Size 5)

Table 33-32. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes			Req. Mtg. Screws	Terminals		
	Width	Height	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mounting Hole to Top		Control	Line	Load
	A	B	C	D	E	F	G	H	K	P	Q	R
5	11.7 (297)	17.2 (436)	7.0 (178)	8.2 (208)	12.8 (325)	7.8 (198.5)	13.0 (330)	2.19 (55.5)	(4) 5/16 M8	.8 (20)	4.4 (112)	4.4 (112)

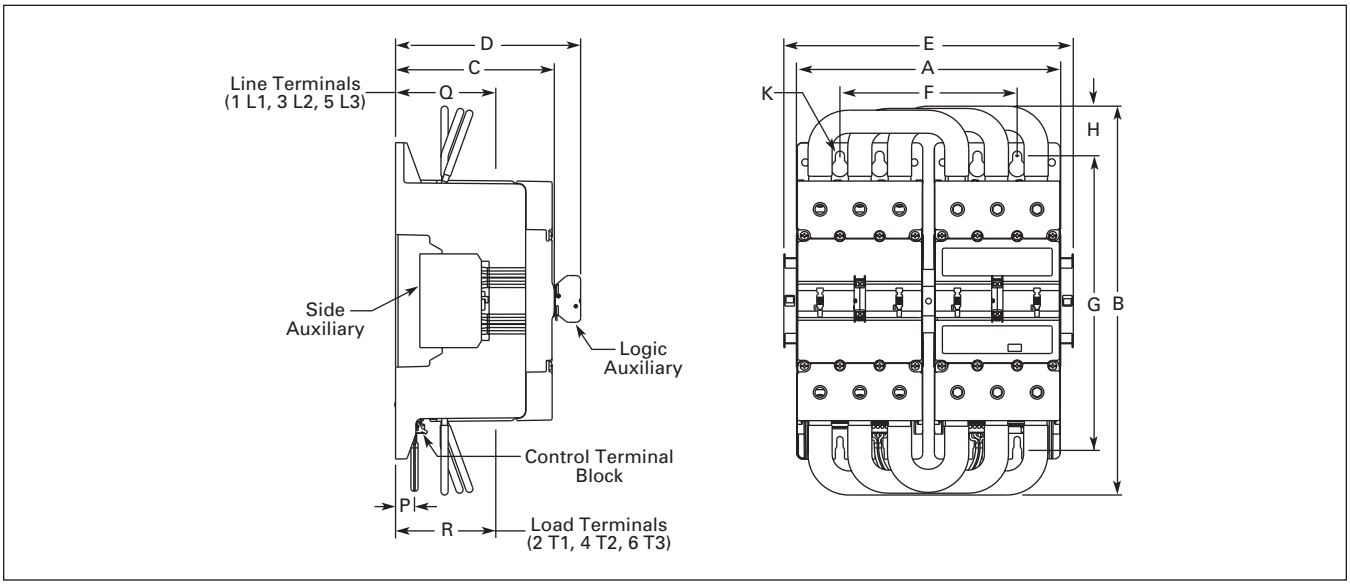

Figure 33-11. Approximate Dimensions in Inches (mm)

Non-reversing Starters (Sizes 00 – 4)

Table 33-33. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes				Req. Mtg. Screws	Reset Button			Terminals		
	Width	Height	Depth	Depth w/ Auxiliary	Depth added w/ DIN Rail	Width	Height	Mtg. Hole to Top	DIN Rail to Top		Width	Height	Depth	Control	Line	Load
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
00, 0	1.8 (45)	5.0 (127)	2.5 (63)	3.6 (91)	.1 (3)	1.33 (33.8)	4.62 (117.3)	.2 (5)	.9 (23)	(3) #8 M4	.6 (14)	3.6 (91)	2.5 (63)	1.7 (44)	1.2 (30)	.6 (16)
1	2.1 (54)	5.4 (138)	2.5 (63)	3.6 (91)	.1 (3)	1.46 (37)	5.04 (128)	.2 (5)	.8 (20)	(3) #8 M4	.7 (17)	3.7 (93)	2.4 (62)	1.8 (45)	1.2 (30)	.3 (8)
2	3.0 (76)	5.9 (150)	3.1 (79)	4.2 (107)	.2 (4)	.94 (24)	2.87 (73)	.5 (13)	.9 (23)	(4) #6 x 2 M3.5 x 50	.7 (17)	4.2 (106)	3.1 (78)	2.4 (60)	1.5 (37)	.6 (14)
3, 4	4.1 (105)	8.0 (203)	3.5 (90)	4.7 (119)	—	1.33 (33.8)	4.13 (105)	.6 (15)	—	(4) #8 x 1.5 M4 x 40	.7 (17)	5.7 (146)	3.5 (88)	2.8 (72)	1.7 (42)	.3 (8)

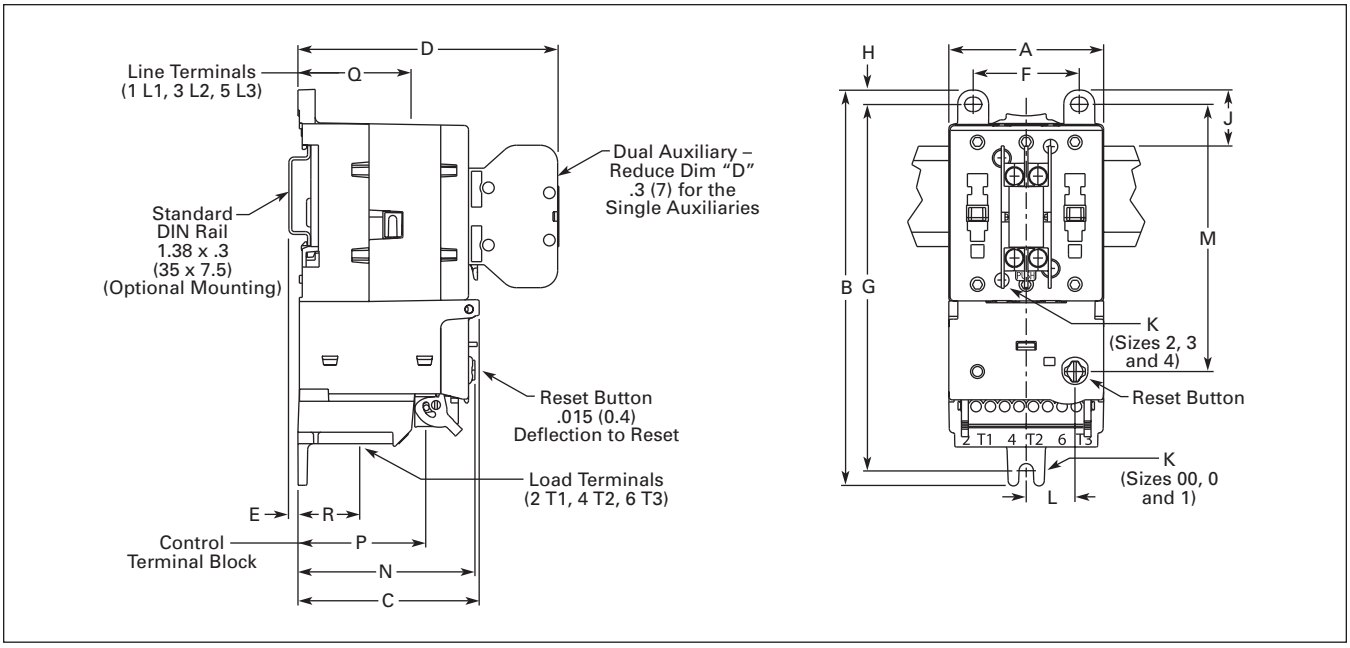

Figure 33-12. Approximate Dimensions — Inches (mm)

Non-reversing Starter (Size 5)

Table 33-34. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes			Req. Mtg. Screws	Reset Button			Terminals			
	Width	Length	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	Height	Mntg. Hole to Top		Width	Height	Depth	Control	Line	Load	Load
	A	B	C	D	E	F	G	I	K	L	M	N	P	Q	R	S
5	5.7 (145)	19.4 (492)	7.0 (178)	8.2 (208)	6.7 (170)	1.75 (44.5)	18.3 (465)	.58 (14.7)	(4) 5/16 M8	2.4 (61)	12.4 (315)	5.3 (135)	5.0 (126)	4.4 (112)	3.0 (75)	4.0 (101)

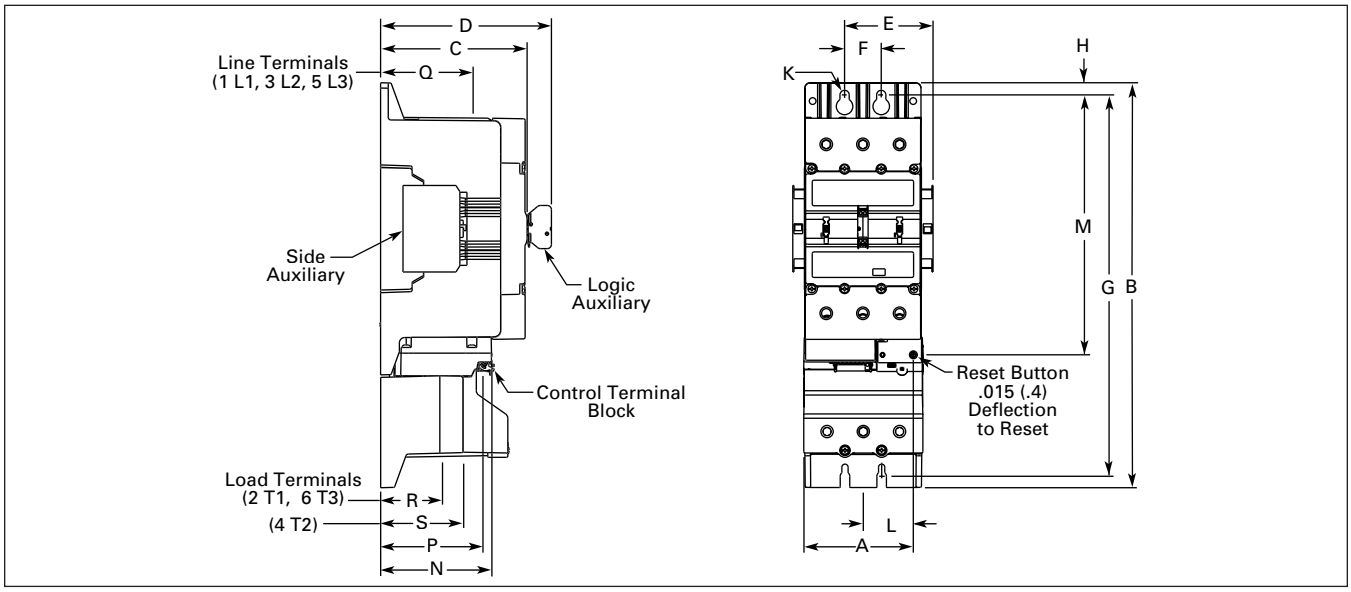

Figure 33-13. Approximate Dimensions in Inches (mm)

Reversing Starters (Sizes 00 – 4)

Table 33-35. Approximate Dimensions in Inches (mm)

NEMA Size	Overall				Mounting Holes			Req. Mtg. Screws	Reset Button			Terminals		
	Width	Length	Depth	Depth w/ Auxiliary	Width	Height	Mtg. Hole to Top		Width	Height	Depth	Control	Line	Load
	A	B	C	D	F	G	H	K	L	M	N	P	Q	R
00, 0	3.8 (96)	5.9 (149)	2.7 (69)	3.8 (96)	3.15 (80)	5.35 (136)	.28 (7)	(3) #10 M5	1.6 (40)	3.8 (97)	2.7 (68)	2.0 (50)	1.5 (38)	.9 (22)
1	4.5 (114)	5.9 (149)	2.6 (67)	3.8 (96)	3.15 (80)	5.35 (136)	.28 (7)	(3) #10 M5	1.7 (43)	4.1 (104)	2.6 (65)	2.0 (50)	1.5 (38)	.6 (16)
2	6.2 (158)	7.4 (188)	3.3 (84)	4.4 (112)	5.51 (140)	6.89 (175)	.24 (6)	(3) #10 M5	2.3 (58)	5.5 (139)	3.3 (83)	2.6 (67)	1.9 (48)	.9 (22)
3, 4	8.5 (216)	9.5 (242)	3.8 (97)	4.9 (125)	7.87 (200)	9.06 (230)	.24 (6)	(3) #10 M5	2.9 (73)	7.2 (182)	3.7 (94)	3.1 (80)	2.1 (54)	.7 (17)

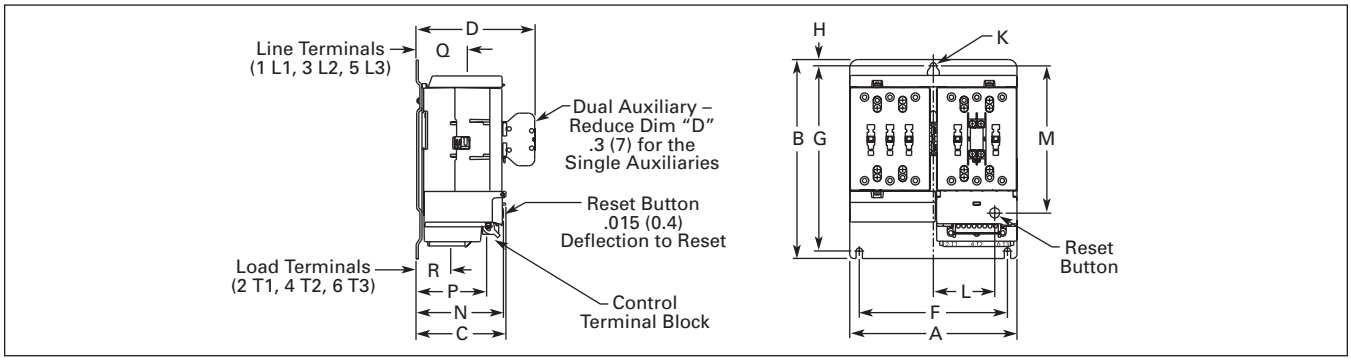

Figure 33-14. Approximate Dimensions — Inches (mm)

Reversing Starter (Size 5)

Table 33-36. Approximate Dimensions in Inches (mm)

NEMA Size	Overall					Mounting Holes				Req. Mtg. Screws	Reset Button			Terminals			
	Width	Length	Depth	Depth w/Logic Level Auxiliary	Width w/Side Auxiliaries	Width	H1	Mntg. Hole to Top	H2		Width	Height	Depth	Control	Line	Load	Load
	A	B	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S
5	11.8 (300)	21.0 (533)	7.0 (178)	8.2 (208)	12.8 (325)	7.82 (199)	18.3 (465)	2.19 (55.5)	13 (330)	(5) 5/16 M8	5.4 (138)	12.4 (315)	5.3 (135)	5.0 (126)	4.4 (112)	3.0 (75)	4.0 (101)

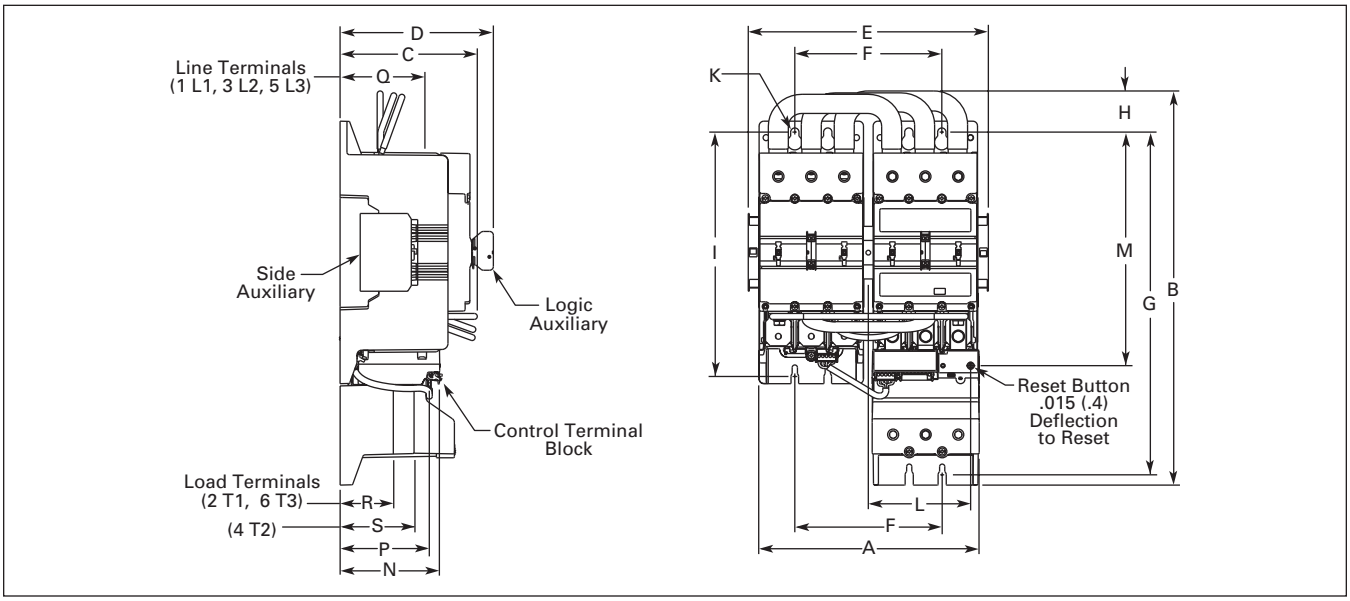

Figure 33-15. Approximate Dimensions in Inches (mm)

Contents

NEMA IT. Control

Product Description

Eaton's Cutler-Hammer® Intelligent Technologies (***IT.***) Electro-Mechanical line of Contactors and Starters is the result of a substantial engineering, manufacturing and marketing effort involving extensive customer input, combined with new advances in solid-state technology. ***IT.*** Electro-Mechanical products have greatly increased functionality, significantly reduced size and utilize the benefits of 24V DC control. The exclusive Pulse Width Modulation (PWM) control and digital microprocessor generate a minimized DC value which reduces energy to the contact block and provides the most compact system available.

Standards and Certifications

Note: See Enclosed Control Product Guide PG03300001E for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved

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Catalog Number Selection

Table 33-37. NEMA Intelligent Technologies (*IT.*) Line Enclosed Control Catalog Numbering System

E C T 2 2 1 1 A A B - A _

Design
T = *IT.* — NEMA

Class		Table
01 =	Non-reversing Contactor — 3-Pole	**33-42**
02 =	Reversing Contactor — 3-Pole	**33-43**
05 =	Non-combination Non-reversing Starter	**33-44**
06 =	Non-combination Reversing Starter	**33-45**
16 =	Combination Non-reversing Starter — Fusible Disconnect	**33-46**
	Combination Non-reversing Starter — Non-fusible Disconnect	**33-47**
17 =	Combination Reversing Starter — Fusible Disconnect	**33-48**
	Combination Reversing Starter — Non-fusible Disconnect	**33-49**
22 =	Combination Non-reversing Starter — Circuit Breaker	**33-50**
23 =	Combination Reversing Starter — Circuit Breaker	**33-51**

NEMA Size

A = Size 00	**3** = Size 3
0 = Size 0	**4** = Size 4
1 = Size 1	**5** = Size 5
2 = Size 2	

Enclosure Type
1 = Type 1 — General Purpose
2 = Type 3R — Rainproof
3 = Type 4 — Painted Steel
4 = Type 4X — Watertight
8 = Type 12 — Dust-Tight
9 = Type 4X — 316-Grade Stainless Steel

Motor Voltage/Power Supply ①

B = 230V	**E** = 200V
C = 460V	**Q** = 24V DC ②
D = 575V	**L** = 380V/50 Hz

Cover Control — Starters
Type 1 Non-comb., **Table 33-39**
All Others, **Table 33-40**
E22 Style Comb., **Table 33-42**

Contactors
3 = 3 Poles

Solid-State ③ **Overload Range**

Disconnect Fuse Clip

A = None	**G** = 100A/600V
B = 30A/250V	**H** = 200A/250V
C = 30A/600V	**J** = 200A/600V
D = 60A/250V	**K** = 400A/250V
E = 60A/600V	**L** = 400A/600V
F = 100A/250V	

HMCP/E or Breaker Ratings

A = None	**W** = 70A
B = 3A	**G** = 100A/RC3
C = 7A	**X** = 100A/TC3
D = 15A	**H** = 150A
E = 30A	**J** = 250A
F = 50A	**K** = 400A

Modification Codes
See **Page 33-42**

① If CPT is selected, Power Supply to be 120V AC – 24V DC.
② Power supply omitted.
③ See **Table 33-38**, Solid-State Overload Range Codes.

Table 33-38. *IT.* Solid-State Overload Range Codes

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—

FLA Range	Size						
	00	0	1	2	3	4	5
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

Cover Control

Non-combination Starters

Control Power Transformer (CPT) may be required.

Combination Starters

- Cover control for Combination Starters uses 10250T style devices as standard.
- E22 style cover control options are available (**Table 33-41**).
- Selector switches are maintained with lever operators.
- Pushbuttons are momentary type with extended pushbutton.
- The kit includes hardware and connecting wires (where possible).
- For factory installed control devices other than shown below, refer to Modification Codes, **Page 33-42**.

Type 1 Cover Control

Table 33-39. Type 1 Non-combination Cover Control

Description	Factory Installed Flange Control ①	Field Installation Kits
	Position 9 Code	Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	**C400GK0**
START/STOP Pushbuttons	**B**	**C400GK1**
with Red RUN Pilot Light	**C**	**C400GK12** ②
with Red RUN/Green OFF Lights	**D**	**C400GK16** ②
HAND/OFF/AUTO Selector Switch	**H**	**C400GK3**
with Red RUN Pilot Light	**J**	**C400GK32** ②
with Red RUN/Green OFF Lights	**K**	**C400GK36** ②
Red RUN Pilot Light	**P**	**C400GK42** ②
Green OFF	**Q**	**C400GK41** ②
Red RUN/Green OFF Pilot Lights	**R**	**C400GK46** ②
Reversing		
No Cover Mounted Pilot Devices	**A**	**C400GK0**
FOR/REV/STOP Pushbuttons	**B**	**C400GR1**
with 2 Red Pilot Lights	**C**	**C400GR14** ②
UP/STOP/DOWN Pushbuttons	**E**	**C400GR2**
with 2 Red Pilot Lights	**F**	**C400GR24** ②
Two Red Pilot Lights	**P**	**C400GK44** ②
One Green Pilot Light	**Q**	**C400GK41** ②

① For more available factory installed flange control, see **Table 33-40**.

② Add Code Letter from the table below to Catalog Number for voltage — Kits only. Example: C400T9**B**.

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

10250T Selector Switch

Table 33-40. Type 1 Combination and All Type 3R, 4X and 12 Cover Control ③

Description	Factory Installed Flange Control	Field Installation Kits
	Position 9 Code	Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	—
START/STOP Pushbuttons	**B**	**C400T1**
with Red RUN Pilot Light	**C**	—
with Red RUN/Green OFF Lights	**D**	—
ON/OFF Pushbuttons	**E**	**C400T2**
with Red RUN Pilot Light	**F**	—
with Red RUN/Green OFF Lights	**G**	—
HAND/OFF/AUTO Selector Switch	**H**	**C400T12**
with Red RUN Pilot Light	**J**	—
with Red RUN/Green OFF Lights	**K**	—
START Pushbutton	**L**	**C400T3**
ON Pushbutton	**M**	**C400T4**
OFF Pushbutton	**N**	**C400T5**
Red RUN Pilot Light	**P**	**C400T9** ④
Green OFF	**Q**	**C400T10** ④
Red RUN/Green OFF Pilot Lights	**R**	**C400T11** ④
START/STOP Selector Switch	**S**	**C400T13**
with Red RUN Pilot Light	**T**	—
with Red RUN/Green OFF Lights	**U**	—
ON/OFF Selector Switch	**V**	**C400T14**
with Red RUN Pilot Light	**W**	—
with Red RUN/Green OFF Lights	**X**	—
Reversing		
No Cover Mounted Pilot Devices	**A**	—
FOR/REV/STOP Pushbuttons	**B**	**C400T6**
with 2 Red Pilot Lights	**C**	—
with 2 Red/1 Green Pilot Lights	**D**	—
UP/STOP/DOWN Pushbuttons	**E**	—
with 2 Red Pilot Lights	**F**	—
FOR/OFF/REV Selector Switch	**H**	**C400T15**
with 2 Red Pilot Lights	**J**	—
with 2 Red/1 Green Pilot Lights	**K**	—
Two Red Pilot Lights	**P**	⑤
One Green Pilot Light	**Q**	**C400T10** ④
Two Red/One Green Pilot Lights	**R**	—
OPEN/OFF/CLOSE Selector Switch	**V**	**C400T16**
with 2 Red Pilot Lights	**W**	—
with 2 Red/1 Green Pilot Lights	**X**	—

③ For Type 1 Non-combination field installation kits, see **Table 33-39**.

④ Add Code Letter from the table below to Catalog Number for voltage — Kits only. Example: C400T9**B**.

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

⑤ Order Quantity (2) of **C400T10**.

E22 Selector Switch

Table 33-41. Type 1, 3R, 4X and 12 E22 Style Combination Starter Cover Control

Description	Factory Installed ① Position 9 Cover Control Code	Field Installation Kits Combination Only Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	**—**
START/STOP Pushbuttons (PB)	**B**	**CE400T01**
START/STOP PB & Red RUN Light	**C**	**CE400T02** ②
START/STOP PB, Red RUN, & Green STOPPED Light	**D**	**CE400T03** ②
HAND/OFF/AUTO Selector Switch (SS)	**H**	**CE400T04**
H-O-A SS & Red RUN Light	**J**	**CE400T05** ②
H-O-A SS, Red RUN, & Green STOPPED Light	**K**	**CE400T06** ②
Red RUN Pilot Light	**P**	**CE400T10** ②
Green Off Pilot Light	**Q**	**CE400T11** ②
Red RUN/Green OFF Pilot Light	**R**	**CE400T12** ②
ON/OFF Selector Switch (SS)	**S**	**CE400T07**
ON/OFF SS, Red RUN Light	**T**	**CE400T08** ②
ON/OFF SS, Red RUN, & Green STOPPED Light	**U**	**CE400T09** ②
Reversing		
No Cover Mounted Pilot Devices	**A**	**—**
FWD/REV/STOP Pushbuttons (PB)	**B**	**CE400T50**
FWD/REV/STOP PB + Red FWD & REV Lights	**C**	**CE400T51** ②
FWD/REV/STOP PB, Red FWD/REV, & Green STOPPED	**D**	**CE400T52** ②
FOR/OFF/REV Selector Switch (SS)	**H**	**CE400T53**
FOR/OFF/REV SS + Red FWD & REV Lights	**J**	**CE400T54** ②
FOR/OFF/REV SS, Red FWD/REV, & Green STOPPED	**K**	**CE400T55** ②
OPEN/OFF/CLOSE Selector Switch (SS)	**V**	**CE400T56**
OPEN/OFF/CLOSE SS + Red FWD & REV Lights	**W**	**CE400T57** ②
OPEN/OFF/CLOSE SS, Red FWD/REV, & Green STOPPED	**X**	**CE400T58** ②

① To include any of the above cover controls, place the control code character in position 9 of your Catalog Number and add Mod Code **C29**.
Example: ECT1604E**D**B-_**C29**.
Full voltage non-reversing fusible starter with START/STOP pushbutton with red RUN and green OFF pilot lights.

② Suffix for lights (required for field installed kits only) in the table below:

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

Features

- Full Voltage
- 3-Phase Electromechanical

Type 1 IT. NEMA Contactor

Product Selection

Table 33-42. Class ECT01 — Non-reversing Contactor — 3-Pole

NEMA Size	Motor Voltage	Max. hp	Coil ① Voltage	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Contactor (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	24V DC	**ECT01A1QAA**	**ECT01A2QAA**	**ECT01A4QAA**	**ECT01A8QAA**	**N111BSAX3N**
	200/208	1-1/2		**ECT01A1EAA**	**ECT01A2EAA**	**ECT01A4EAA**	**ECT01A8EAA**	
	230/240	1-1/2		**ECT01A1BAA**	**ECT01A2BAA**	**ECT01A4BAA**	**ECT01A8BAA**	
	460/480	2		**ECT01A1CAA**	**ECT01A2CAA**	**ECT01A4CAA**	**ECT01A8CAA**	
	575/600	2		**ECT01A1DAA**	**ECT01A2DAA**	**ECT01A4DAA**	**ECT01A8DAA**	
	380/50 Hz	1-1/2		**ECT01A1LAA**	**ECT01A2LAA**	**ECT01A4LAA**	**ECT01A8LAA**	
0	—	—	24V DC	**ECT0101QAA**	**ECT0102QAA**	**ECT0104QAA**	**ECT0108QAA**	**N111BS0X3N**
	200/208	3		**ECT0101EAA**	**ECT0102EAA**	**ECT0104EAA**	**ECT0108EAA**	
	230/240	3		**ECT0101BAA**	**ECT0102BAA**	**ECT0104BAA**	**ECT0108BAA**	
	460/480	5		**ECT0101CAA**	**ECT0102CAA**	**ECT0104CAA**	**ECT0108CAA**	
	575/600	5		**ECT0101DAA**	**ECT0102DAA**	**ECT0104DAA**	**ECT0108DAA**	
	380/50 Hz	5		**ECT0101LAA**	**ECT0102LAA**	**ECT0104LAA**	**ECT0108LAA**	
1	—	—	24V DC	**ECT0111QAA**	**ECT0112QAA**	**ECT0114QAA**	**ECT0118QAA**	**N111CS1X3N**
	200/208	7-1/2		**ECT0111EAA**	**ECT0112EAA**	**ECT0114EAA**	**ECT0118EAA**	
	230/240	7-1/2		**ECT0111BAA**	**ECT0112BAA**	**ECT0114BAA**	**ECT0118BAA**	
	460/480	10		**ECT0111CAA**	**ECT0112CAA**	**ECT0114CAA**	**ECT0118CAA**	
	575/600	10		**ECT0111DAA**	**ECT0112DAA**	**ECT0114DAA**	**ECT0118DAA**	
	380/50 Hz	10		**ECT0111LAA**	**ECT0112LAA**	**ECT0114LAA**	**ECT0118LAA**	
2	—	—	24V DC	**ECT0121QAA**	**ECT0122QAA**	**ECT0124QAA**	**ECT0128QAA**	**N111DS2X3N**
	200/208	10		**ECT0121EAA**	**ECT0122EAA**	**ECT0124EAA**	**ECT0128EAA**	
	230/240	15		**ECT0121BAA**	**ECT0122BAA**	**ECT0124BAA**	**ECT0128BAA**	
	460/480	25		**ECT0121CAA**	**ECT0122CAA**	**ECT0124CAA**	**ECT0128CAA**	
	575/600	25		**ECT0121DAA**	**ECT0122DAA**	**ECT0124DAA**	**ECT0128DAA**	
	380/50 Hz	25		**ECT0121LAA**	**ECT0122LAA**	**ECT0124LAA**	**ECT0128LAA**	
3	—	—	24V DC	**ECT0131QAA**	**ECT0132QAA**	**ECT0134QAA**	**ECT0138QAA**	**N111ES3X3N**
	200/208	25		**ECT0131EAA**	**ECT0132EAA**	**ECT0134EAA**	**ECT0138EAA**	
	230/240	30		**ECT0131BAA**	**ECT0132BAA**	**ECT0134BAA**	**ECT0138BAA**	
	460/480	50		**ECT0131CAA**	**ECT0132CAA**	**ECT0134CAA**	**ECT0138CAA**	
	575/600	50		**ECT0131DAA**	**ECT0132DAA**	**ECT0134DAA**	**ECT0138DAA**	
	380/50 Hz	50		**ECT0131LAA**	**ECT0132LAA**	**ECT0134LAA**	**ECT0138LAA**	
4	—	—	24V DC	**ECT0141QAA**	**ECT0142QAA**	**ECT0144QAA**	**ECT0148QAA**	**N111ES4X3N**
	200/208	40		**ECT0141EAA**	**ECT0142EAA**	**ECT0144EAA**	**ECT0148EAA**	
	230/240	50		**ECT0141BAA**	**ECT0142BAA**	**ECT0144BAA**	**ECT0148BAA**	
	460/480	100		**ECT0141CAA**	**ECT0142CAA**	**ECT0144CAA**	**ECT0148CAA**	
	575/600	100		**ECT0141DAA**	**ECT0142DAA**	**ECT0144DAA**	**ECT0148DAA**	
	380/50 Hz	75		**ECT0141LAA**	**ECT0142LAA**	**ECT0144LAA**	**ECT0148LAA**	
5	—	—	24V DC	**ECT0151QAA**	**ECT0152QAA**	**ECT0154QAA**	**ECT0158QAA**	**N111FS5X3N**
	200/208	75		**ECT0151EAA**	**ECT0152EAA**	**ECT0154EAA**	**ECT0158EAA**	
	230/240	100		**ECT0151BAA**	**ECT0152BAA**	**ECT0154BAA**	**ECT0158BAA**	
	460/480	200		**ECT0151CAA**	**ECT0152CAA**	**ECT0154CAA**	**ECT0158CAA**	
	575/600	200		**ECT0151DAA**	**ECT0152DAA**	**ECT0154DAA**	**ECT0158DAA**	
	380/50 Hz	150		**ECT0151LAA**	**ECT0152LAA**	**ECT0154LAA**	**ECT0158LAA**	

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT01A**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Table 33-43. Class ECT02 — Reversing Contactor — 3-Pole

NEMA Size	Motor Voltage	Max. hp	Coil ① Voltage	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Contactor (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	24V DC	**ECT02A1QAA**	**ECT02A2QAA**	**ECT02A4QAA**	**ECT02A8QAA**	**N511BSAX3N**
	200/208	1-1/2		**ECT02A1EAA**	**ECT02A2EAA**	**ECT02A4EAA**	**ECT02A8EAA**	
	230/240	1-1/2		**ECT02A1BAA**	**ECT02A2BAA**	**ECT02A4BAA**	**ECT02A8BAA**	
	460/480	2		**ECT02A1CAA**	**ECT02A2CAA**	**ECT02A4CAA**	**ECT02A8CAA**	
	575/600	2		**ECT02A1DAA**	**ECT02A2DAA**	**ECT02A4DAA**	**ECT02A8DAA**	
	380/50 Hz	1-1/2		**ECT02A1LAA**	**ECT02A2LAA**	**ECT02A4LAA**	**ECT02A8LAA**	
0	—	—	24V DC	**ECT0201QAA**	**ECT0202QAA**	**ECT0204QAA**	**ECT0208QAA**	**N511BS0X3N**
	200/208	3		**ECT0201EAA**	**ECT0202EAA**	**ECT0204EAA**	**ECT0208EAA**	
	230/240	3		**ECT0201BAA**	**ECT0202BAA**	**ECT0204BAA**	**ECT0208BAA**	
	460/480	5		**ECT0201CAA**	**ECT0202CAA**	**ECT0204CAA**	**ECT0208CAA**	
	575/600	5		**ECT0201DAA**	**ECT0202DAA**	**ECT0204DAA**	**ECT0208DAA**	
	380/50 Hz	5		**ECT0201LAA**	**ECT0202LAA**	**ECT0204LAA**	**ECT0208LAA**	
1	—	—	24V DC	**ECT0211QAA**	**ECT0212QAA**	**ECT0214QAA**	**ECT0218QAA**	**N511CS1X3N**
	200/208	7-1/2		**ECT0211EAA**	**ECT0212EAA**	**ECT0214EAA**	**ECT0218EAA**	
	230/240	7-1/2		**ECT0211BAA**	**ECT0212BAA**	**ECT0214BAA**	**ECT0218BAA**	
	460/480	10		**ECT0211CAA**	**ECT0212CAA**	**ECT0214CAA**	**ECT0218CAA**	
	575/600	10		**ECT0211DAA**	**ECT0212DAA**	**ECT0214DAA**	**ECT0218DAA**	
	380/50 Hz	10		**ECT0211LAA**	**ECT0212LAA**	**ECT0214LAA**	**ECT0218LAA**	
2	—	—	24V DC	**ECT0221QAA**	**ECT0222QAA**	**ECT0224QAA**	**ECT0228QAA**	**N511DS2X3N**
	200/208	10		**ECT0221EAA**	**ECT0222EAA**	**ECT0224EAA**	**ECT0228EAA**	
	230/240	15		**ECT0221BAA**	**ECT0222BAA**	**ECT0224BAA**	**ECT0228BAA**	
	460/480	25		**ECT0221CAA**	**ECT0222CAA**	**ECT0224CAA**	**ECT0228CAA**	
	575/600	25		**ECT0221DAA**	**ECT0222DAA**	**ECT0224DAA**	**ECT0228DAA**	
	380/50 Hz	25		**ECT0221LAA**	**ECT0222LAA**	**ECT0224LAA**	**ECT0228LAA**	
3	—	—	24V DC	**ECT0231QAA**	**ECT0232QAA**	**ECT0234QAA**	**ECT0238QAA**	**N511ES3X3N**
	200/208	25		**ECT0231EAA**	**ECT0232EAA**	**ECT0234EAA**	**ECT0238EAA**	
	230/240	30		**ECT0231BAA**	**ECT0232BAA**	**ECT0234BAA**	**ECT0238BAA**	
	460/480	50		**ECT0231CAA**	**ECT0232CAA**	**ECT0234CAA**	**ECT0238CAA**	
	575/600	50		**ECT0231DAA**	**ECT0232DAA**	**ECT0234DAA**	**ECT0238DAA**	
	380/50 Hz	50		**ECT0231LAA**	**ECT0232LAA**	**ECT0234LAA**	**ECT0238LAA**	
4	—	—	24V DC	**ECT0241QAA**	**ECT0242QAA**	**ECT0244QAA**	**ECT0248QAA**	**N511ES4X3N**
	200/208	40		**ECT0241EAA**	**ECT0242EAA**	**ECT0244EAA**	**ECT0248EAA**	
	230/240	50		**ECT0241BAA**	**ECT0242BAA**	**ECT0244BAA**	**ECT0248BAA**	
	460/480	100		**ECT0241CAA**	**ECT0242CAA**	**ECT0244CAA**	**ECT0248CAA**	
	575/600	100		**ECT0241DAA**	**ECT0242DAA**	**ECT0244DAA**	**ECT0248DAA**	
	380/50 Hz	75		**ECT0241LAA**	**ECT0242LAA**	**ECT0244LAA**	**ECT0248LAA**	
5	—	—	24V DC	**ECT0251QAA**	**ECT0252QAA**	**ECT0254QAA**	**ECT0258QAA**	**N511FS5X3N**
	200/208	75		**ECT0251EAA**	**ECT0252EAA**	**ECT0254EAA**	**ECT0258EAA**	
	230/240	100		**ECT0251BAA**	**ECT0252BAA**	**ECT0254BAA**	**ECT0258BAA**	
	460/480	200		**ECT0251CAA**	**ECT0252CAA**	**ECT0254CAA**	**ECT0258CAA**	
	575/600	200		**ECT0251DAA**	**ECT0252DAA**	**ECT0254DAA**	**ECT0258DAA**	
	380/50 Hz	150		**ECT0251LAA**	**ECT0252LAA**	**ECT0254LAA**	**ECT0258LAA**	

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT02A**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Features

- Full Voltage
- 3-Phase Electromechanical
- Solid-State Overload Relay

Type 12 Non-combination IT. Starter

Product Selection

Table 33-44. Class ECT05 — Non-combination Non-reversing Starter

NEMA Size	Motor Voltage	Max. hp	Coil ① Voltage	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Starter (Open)
				Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
00	—	—	24V DC	ECT05A1QAA-_	ECT05A2QAA-_	ECT05A4QAA-_	ECT05A8QAA-_	N101BSA_3A
	200/208	1-1/2		ECT05A1EAA-_	ECT05A2EAA-_	ECT05A4EAA-_	ECT05A8EAA-_	
	230/240	1-1/2		ECT05A1BAA-_	ECT05A2BAA-_	ECT05A4BAA-_	ECT05A8BAA-_	
	460/480	2		ECT05A1CAA-_	ECT05A2CAA-_	ECT05A4CAA-_	ECT05A8CAA-_	
	575/600	2		ECT05A1DAA-_	ECT05A2DAA-_	ECT05A4DAA-_	ECT05A8DAA-_	
	380/50 Hz	1-1/2		ECT05A1LAA-_	ECT05A2LAA-_	ECT05A4LAA-_	ECT05A8LAA-_	
0	—	—	24V DC	ECT0501QAA-_	ECT0502QAA-_	ECT0504QAA-_	ECT0508QAA-_	N101BS0_3A
	200/208	3		ECT0501EAA-_	ECT0502EAA-_	ECT0504EAA-_	ECT0508EAA-_	
	230/240	3		ECT0501BAA-_	ECT0502BAA-_	ECT0504BAA-_	ECT0508BAA-_	
	460/480	5		ECT0501CAA-_	ECT0502CAA-_	ECT0504CAA-_	ECT0508CAA-_	
	575/600	5		ECT0501DAA-_	ECT0502DAA-_	ECT0504DAA-_	ECT0508DAA-_	
	380/50 Hz	5		ECT0501LAA-_	ECT0502LAA-_	ECT0504LAA-_	ECT0508LAA-_	
1	—	—	24V DC	ECT0511QAA-_	ECT0512QAA-_	ECT0514QAA-_	ECT0518QAA-_	N101CS1_3A
	200/208	7-1/2		ECT0511EAA-_	ECT0512EAA-_	ECT0514EAA-_	ECT0518EAA-_	
	230/240	7-1/2		ECT0511BAA-_	ECT0512BAA-_	ECT0514BAA-_	ECT0518BAA-_	
	460/480	10		ECT0511CAA-_	ECT0512CAA-_	ECT0514CAA-_	ECT0518CAA-_	
	575/600	10		ECT0511DAA-_	ECT0512DAA-_	ECT0514DAA-_	ECT0518DAA-_	
	380/50 Hz	10		ECT0511LAA-_	ECT0512LAA-_	ECT0514LAA-_	ECT0518LAA-_	
2	—	—	24V DC	ECT0521QAA-K	ECT0522QAA-K	ECT0524QAA-K	ECT0528QAA-K	N101DS2_3A
	200/208	10		ECT0521EAA-K	ECT0522EAA-K	ECT0524EAA-K	ECT0528EAA-K	
	230/240	15		ECT0521BAA-K	ECT0522BAA-K	ECT0524BAA-K	ECT0528BAA-K	
	460/480	25		ECT0521CAA-K	ECT0522CAA-K	ECT0524CAA-K	ECT0528CAA-K	
	575/600	25		ECT0521DAA-K	ECT0522DAA-K	ECT0524DAA-K	ECT0528DAA-K	
	380/50 Hz	25		ECT0521LAA-K	ECT0522LAA-K	ECT0524LAA-K	ECT0528LAA-K	
3	—	—	24V DC	ECT0531QAA-M	ECT0532QAA-M	ECT0534QAA-M	ECT0538QAA-M	N101ES3_3A
	200/208	25		ECT0531EAA-M	ECT0532EAA-M	ECT0534EAA-M	ECT0538EAA-M	
	230/240	30		ECT0531BAA-M	ECT0532BAA-M	ECT0534BAA-M	ECT0538BAA-M	
	460/480	50		ECT0531CAA-M	ECT0532CAA-M	ECT0534CAA-M	ECT0538CAA-M	
	575/600	50		ECT0531DAA-M	ECT0532DAA-M	ECT0534DAA-M	ECT0538DAA-M	
	380/50 Hz	50		ECT0531LAA-M	ECT0532LAA-M	ECT0534LAA-M	ECT0538LAA-M	
4	—	—	24V DC	ECT0541QAA-P	ECT0542QAA-P	ECT0544QAA-P	ECT0548QAA-P	N101ES4_3A
	200/208	40		ECT0541EAA-P	ECT0542EAA-P	ECT0544EAA-P	ECT0548EAA-P	
	230/240	50		ECT0541BAA-P	ECT0542BAA-P	ECT0544BAA-P	ECT0548BAA-P	
	460/480	100		ECT0541CAA-P	ECT0542CAA-P	ECT0544CAA-P	ECT0548CAA-P	
	575/600	100		ECT0541DAA-P	ECT0542DAA-P	ECT0544DAA-P	ECT0548DAA-P	
	380/50 Hz	75		ECT0541LAA-P	ECT0542LAA-P	ECT0544LAA-P	ECT0548LAA-P	
5	—	—	24V DC	ECT0551QAA-S	ECT0552QAA-S	ECT0554QAA-S	ECT0558QAA-S	N101FS5_3A
	200/208	75		ECT0551EAA-S	ECT0552EAA-S	ECT0554EAA-S	ECT0558EAA-S	
	230/240	100		ECT0551BAA-S	ECT0552BAA-S	ECT0554BAA-S	ECT0558BAA-S	
	460/480	200		ECT0551CAA-S	ECT0552CAA-S	ECT0554CAA-S	ECT0558CAA-S	
	575/600	200		ECT0551DAA-S	ECT0552DAA-S	ECT0554DAA-S	ECT0558DAA-S	
	380/50 Hz	150		ECT0551LAA-S	ECT0552LAA-S	ECT0554LAA-S	ECT0558LAA-S	

① All *IT.* Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT05A**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from **Table 33-38** on **Page 33-26.**

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Table 33-45. Class ECT06 — Non-combination Reversing Starter

NEMA Size	Motor Voltage	Max. hp	Coil ① Voltage	3-Pole Type 1 Catalog Number ③	3-Pole Type 3R Catalog Number ③	3-Pole Type 4X ② Catalog Number ③	3-Pole Type 12 Catalog Number ③	3-Pole Component Starter (Open) Catalog Number ③
00	—	—	24V DC	ECT06A1QAA-_	ECT06A2QAA-_	ECT06A4QAA-_	ECT06A8QAA-_	N501BSA_3A
	200/208	1-1/2		ECT06A1EAA-_	ECT06A2EAA-_	ECT06A4EAA-_	ECT06A8EAA-_	
	230/240	1-1/2		ECT06A1BAA-_	ECT06A2BAA-_	ECT06A4BAA-_	ECT06A8BAA-_	
	460/480	2		ECT06A1CAA-_	ECT06A2CAA-_	ECT06A4CAA-_	ECT06A8CAA-_	
	575/600	2		ECT06A1DAA-_	ECT06A2DAA-_	ECT06A4DAA-_	ECT06A8DAA-_	
	380/50 Hz	1-1/2		ECT06A1LAA-_	ECT06A2LAA-_	ECT06A4LAA-_	ECT06A8LAA-_	
0	—	—	24V DC	ECT0601QAA-_	ECT0602QAA-_	ECT0604QAA-_	ECT0608QAA-_	N501BS0_3A
	200/208	3		ECT0601EAA-_	ECT0602EAA-_	ECT0604EAA-_	ECT0608EAA-_	
	230/240	3		ECT0601BAA-_	ECT0602BAA-_	ECT0604BAA-_	ECT0608BAA-_	
	460/480	5		ECT0601CAA-_	ECT0602CAA-_	ECT0604CAA-_	ECT0608CAA-_	
	575/600	5		ECT0601DAA-_	ECT0602DAA-_	ECT0604DAA-_	ECT0608DAA-_	
	380/50 Hz	5		ECT0601LAA-_	ECT0602LAA-_	ECT0604LAA-_	ECT0608LAA-_	
1	—	—	24V DC	ECT0611QAA-_	ECT0612QAA-_	ECT0614QAA-_	ECT0618QAA-_	N501CS1_3A
	200/208	7-1/2		ECT0611EAA-_	ECT0612EAA-_	ECT0614EAA-_	ECT0618EAA-_	
	230/240	7-1/2		ECT0611BAA-_	ECT0612BAA-_	ECT0614BAA-_	ECT0618BAA-_	
	460/480	10		ECT0611CAA-_	ECT0612CAA-_	ECT0614CAA-_	ECT0618CAA-_	
	575/600	10		ECT0611DAA-_	ECT0612DAA-_	ECT0614DAA-_	ECT0618DAA-_	
	380/50 Hz	10		ECT0611LAA-_	ECT0612LAA-_	ECT0614LAA-_	ECT0618LAA-_	
2	—	—	24V DC	ECT0621QAA-K	ECT0622QAA-K	ECT0624QAA-K	ECT0628QAA-K	N501DS2_3A
	200/208	10		ECT0621EAA-K	ECT0622EAA-K	ECT0624EAA-K	ECT0628EAA-K	
	230/240	15		ECT0621BAA-K	ECT0622BAA-K	ECT0624BAA-K	ECT0628BAA-K	
	460/480	25		ECT0621CAA-K	ECT0622CAA-K	ECT0624CAA-K	ECT0628CAA-K	
	575/600	25		ECT0621DAA-K	ECT0622DAA-K	ECT0624DAA-K	ECT0628DAA-K	
	380/50 Hz	25		ECT0621LAA-K	ECT0622LAA-K	ECT0624LAA-K	ECT0628LAA-K	
3	—	—	24V DC	ECT0631QAA-M	ECT0632QAA-M	ECT0634QAA-M	ECT0638QAA-M	N501ES3_3A
	200/208	25		ECT0631EAA-M	ECT0632EAA-M	ECT0634EAA-M	ECT0638EAA-M	
	230/240	30		ECT0631BAA-M	ECT0632BAA-M	ECT0634BAA-M	ECT0638BAA-M	
	460/480	50		ECT0631CAA-M	ECT0632CAA-M	ECT0634CAA-M	ECT0638CAA-M	
	575/600	50		ECT0631DAA-M	ECT0632DAA-M	ECT0634DAA-M	ECT0638DAA-M	
	380/50 Hz	50		ECT0631LAA-M	ECT0632LAA-M	ECT0634LAA-M	ECT0638LAA-M	
4	—	—	24V DC	ECT0641QAA-P	ECT0642QAA-P	ECT0644QAA-P	ECT0648QAA-P	N501ES4_3A
	200/208	40		ECT0641EAA-P	ECT0642EAA-P	ECT0644EAA-P	ECT0648EAA-P	
	230/240	50		ECT0641BAA-P	ECT0642BAA-P	ECT0644BAA-P	ECT0648BAA-P	
	460/480	100		ECT0641CAA-P	ECT0642CAA-P	ECT0644CAA-P	ECT0648CAA-P	
	575/600	100		ECT0641DAA-P	ECT0642DAA-P	ECT0644DAA-P	ECT0648DAA-P	
	380/50 Hz	75		ECT0641LAA-P	ECT0642LAA-P	ECT0644LAA-P	ECT0648LAA-P	
5	—	—	24V DC	ECT0651QAA-S	ECT0652QAA-S	ECT0654QAA-S	ECT0658QAA-S	N501FS5_3A
	200/208	75		ECT0651EAA-S	ECT0652EAA-S	ECT0654EAA-S	ECT0658EAA-S	
	230/240	100		ECT0651BAA-S	ECT0652BAA-S	ECT0654BAA-S	ECT0658BAA-S	
	460/480	200		ECT0651CAA-S	ECT0652CAA-S	ECT0654CAA-S	ECT0658CAA-S	
	575/600	200		ECT0651DAA-S	ECT0652DAA-S	ECT0654DAA-S	ECT0658DAA-S	
	380/50 Hz	150		ECT0651LAA-S	ECT0652LAA-S	ECT0654LAA-S	ECT0658LAA-S	

① All *IT.* Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT06A**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Features

- Full Voltage
- 3-Phase Electromechanical
- Solid-State Overload Relay

Product Selection

Table 33-46. Class ECT16 — Combination Non-reversing Starter — Fusible Disconnect

Motor Voltage	Max. hp	Coil ① Voltage	Disconnect	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Starter (Open)
				Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
NEMA Size 0								
—	—	24V DC	30A	ECT1601QAB-_	ECT1602QAB-_	ECT1604QAB-_	ECT1608QAB-_	N101BS0_3A
—	—			ECT1601QAC-_	ECT1602QAC-_	ECT1604QAC-_	ECT1608QAC-_	
200/208	3			ECT1601EAB-_	ECT1602EAB-_	ECT1604EAB-_	ECT1608EAB-_	
230/240	3			ECT1601BAB-_	ECT1602BAB-_	ECT1604BAB-_	ECT1608BAB-_	
460/480	5			ECT1601CAC-_	ECT1602CAC-_	ECT1604CAC-_	ECT1608CAC-_	
575/600	5			ECT1601DAC-_	ECT1602DAC-_	ECT1604DAC-_	ECT1608DAC-_	
380/50 Hz	5			ECT1601LAC-_	ECT1602LAC-_	ECT1604LAC-_	ECT1608LAC-_	
NEMA Size 1								
—	—	24V DC	30A	ECT1611QAB-_	ECT1612QAB-_	ECT1614QAB-_	ECT1618QAB-_	N101CS1_3A
—	—			ECT1611QAC-_	ECT1612QAC-_	ECT1614QAC-_	ECT1618QAC-_	
200/208	7-1/2			ECT1611EAB-_	ECT1612EAB-_	ECT1614EAB-_	ECT1618EAB-_	
230/240	7-1/2			ECT1611BAB-_	ECT1612BAB-_	ECT1614BAB-_	ECT1618BAB-_	
460/480	10			ECT1611CAC-_	ECT1612CAC-_	ECT1614CAC-_	ECT1618CAC-_	
575/600	10			ECT1611DAC-_	ECT1612DAC-_	ECT1614DAC-_	ECT1618DAC-_	
380/50 Hz	10			ECT1611LAC-_	ECT1612LAC-_	ECT1614LAC-_	ECT1618LAC-_	
NEMA Size 2								
—	—	24V DC	60A	ECT1621QAD-K	ECT1622QAD-K	ECT1624QAD-K	ECT1628QAD-K	N101DS2_3A
—	—			ECT1621QAE-K	ECT1622QAE-K	ECT1624QAE-K	ECT1628QAE-K	
200/208	10			ECT1621EAD-K	ECT1622EAD-K	ECT1624EAD-K	ECT1628EAD-K	
230/240	15			ECT1621BAD-K	ECT1622BAD-K	ECT1624BAD-K	ECT1628BAD-K	
460/480	25			ECT1621CAE-K	ECT1622CAE-K	ECT1624CAE-K	ECT1628CAE-K	
575/600	25			ECT1621DAE-K	ECT1622DAE-K	ECT1624DAE-K	ECT1628DAE-K	
380/50 Hz	25			ECT1621LAE-K	ECT1622LAE-K	ECT1624LAE-K	ECT1628LAE-K	
NEMA Size 3								
—	—	24V DC	100A	ECT1631QAF-M	ECT1632QAF-M	ECT1634QAF-M	ECT1638QAF-M	N101ES3_3A
—	—			ECT1631QAG-M	ECT1632QAG-M	ECT1634QAG-M	ECT1638QAG-M	
200/208	25			ECT1631EAF-M	ECT1632EAF-M	ECT1634EAF-M	ECT1638EAF-M	
230/240	30			ECT1631BAF-M	ECT1632BAF-M	ECT1634BAF-M	ECT1638BAF-M	
460/480	50			ECT1631CAG-M	ECT1632CAG-M	ECT1634CAG-M	ECT1638CAG-M	
575/600	50			ECT1631DAG-M	ECT1632DAG-M	ECT1634DAG-M	ECT1638DAG-M	
380/50 Hz	50			ECT1631LAG-M	ECT1632LAG-M	ECT1634LAG-M	ECT1638LAG-M	
NEMA Size 4								
—	—	24V DC	200A	ECT1641QAH-P	ECT1642QAH-P	ECT1644QAH-P	ECT1648QAH-P	N101ES4_3A
—	—			ECT1641QAJ-P	ECT1642QAJ-P	ECT1644QAJ-P	ECT1648QAJ-P	
200/208	40			ECT1641EAH-P	ECT1642EAH-P	ECT1644EAH-P	ECT1648EAH-P	
230/240	50			ECT1641BAH-P	ECT1642BAH-P	ECT1644BAH-P	ECT1648BAH-P	
460/480	100			ECT1641CAJ-P	ECT1642CAJ-P	ECT1644CAJ-P	ECT1648CAJ-P	
575/600	100			ECT1641DAJ-P	ECT1642DAJ-P	ECT1644DAJ-P	ECT1648DAJ-P	
380/50 Hz	75			ECT1641LAJ-P	ECT1642LAJ-P	ECT1644LAJ-P	ECT1648LAJ-P	
NEMA Size 5								
—	—	24V DC	400A	ECT1651QAK-S	ECT1652QAK-S	ECT1654QAK-S	ECT1658QAK-S	N101FS5_3A
—	—			ECT1651QAL-S	ECT1652QAL-S	ECT1654QAL-S	ECT1658QAL-S	
200/208	75			ECT1651EAK-S	ECT1652EAK-S	ECT1654EAK-S	ECT1658EAK-S	
230/240	100			ECT1651BAK-S	ECT1652BAK-S	ECT1654BAK-S	ECT1658BAK-S	
460/480	200			ECT1651CAL-S	ECT1652CAL-S	ECT1654CAL-S	ECT1658CAL-S	
575/600	200			ECT1651DAL-S	ECT1652DAL-S	ECT1654DAL-S	ECT1658DAL-S	
380/50 Hz	150			ECT1651LAL-S	ECT1652LAL-S	ECT1654LAL-S	ECT1658LAL-S	

① All *IT.* Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT160**4**QAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from **Table 33-38** on **Page 33-26.**

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Table 33-47. Class ECT16 — Combination Non-reversing Starter — Non-fusible Disconnect

Motor Voltage	Max. hp	Coil ① Voltage	Disconnect	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Starter (Open)
				Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
NEMA Size 0								
—	—	24V DC	30A	ECT1601QAA-_	ECT1602QAA-_	ECT1604QAA-_	ECT1608QAA-_	N101BS0_3A
200/208	3			ECT1601EAA-_	ECT1602EAA-_	ECT1604EAA-_	ECT1608EAA-_	
230/240	3			ECT1601BAA-_	ECT1602BAA-_	ECT1604BAA-_	ECT1608BAA-_	
460/480	5			ECT1601CAA-_	ECT1602CAA-_	ECT1604CAA-_	ECT1608CAA-_	
575/600	5			ECT1601DAA-_	ECT1602DAA-_	ECT1604DAA-_	ECT1608DAA-_	
380/50 Hz	5			ECT1601LAA-_	ECT1602LAA-_	ECT1604LAA-_	ECT1608LAA-_	
NEMA Size 1								
—	—	24V DC	30A	ECT1611QAA-_	ECT1612QAA-_	ECT1614QAA-_	ECT1618QAA-_	N101CS1_3A
200/208	7-1/2			ECT1611EAA-_	ECT1612EAA-_	ECT1614EAA-_	ECT1618EAA-_	
230/240	7-1/2			ECT1611BAA-_	ECT1612BAA-_	ECT1614BAA-_	ECT1618BAA-_	
460/480	10			ECT1611CAA-_	ECT1612CAA-_	ECT1614CAA-_	ECT1618CAA-_	
575/600	10			ECT1611DAA-_	ECT1612DAA-_	ECT1614DAA-_	ECT1618DAA-_	
380/50 Hz	10			ECT1611LAA-_	ECT1612LAA-_	ECT1614LAA-_	ECT1618LAA-_	
NEMA Size 2								
—	—	24V DC	60A	ECT1621QAA-K	ECT1622QAA-K	ECT1624QAA-K	ECT1628QAA-K	N101DS2_3A
200/208	10			ECT1621EAA-K	ECT1622EAA-K	ECT1624EAA-K	ECT1628EAA-K	
230/240	15			ECT1621BAA-K	ECT1622BAA-K	ECT1624BAA-K	ECT1628BAA-K	
460/480	25			ECT1621CAA-K	ECT1622CAA-K	ECT1624CAA-K	ECT1628CAA-K	
575/600	25			ECT1621DAA-K	ECT1622DAA-K	ECT1624DAA-K	ECT1628DAA-K	
380/50 Hz	25			ECT1621LAA-K	ECT1622LAA-K	ECT1624LAA-K	ECT1628LAA-K	
NEMA Size 3								
—	—	24V DC	100A	ECT1631QAA-M	ECT1632QAA-M	ECT1634QAA-M	ECT1638QAA-M	N101ES3_3A
200/208	25			ECT1631EAA-M	ECT1632EAA-M	ECT1634EAA-M	ECT1638EAA-M	
230/240	30			ECT1631BAA-M	ECT1632BAA-M	ECT1634BAA-M	ECT1638BAA-M	
460/480	50			ECT1631CAA-M	ECT1632CAA-M	ECT1634CAA-M	ECT1638CAA-M	
575/600	50			ECT1631DAA-M	ECT1632DAA-M	ECT1634DAA-M	ECT1638DAA-M	
380/50 Hz	50			ECT1631LAA-M	ECT1632LAA-M	ECT1634LAA-M	ECT1638LAA-M	
NEMA Size 4								
—	—	24V DC	200A	ECT1641QAA-P	ECT1642QAA-P	ECT1644QAA-P	ECT1648QAA-P	N101ES4_3A
200/208	40			ECT1641EAA-P	ECT1642EAA-P	ECT1644EAA-P	ECT1648EAA-P	
230/240	50			ECT1641BAA-P	ECT1642BAA-P	ECT1644BAA-P	ECT1648BAA-P	
460/480	100			ECT1641CAA-P	ECT1642CAA-P	ECT1644CAA-P	ECT1648CAA-P	
575/600	100			ECT1641DAA-P	ECT1642DAA-P	ECT1644DAA-P	ECT1648DAA-P	
380/50 Hz	75			ECT1641LAA-P	ECT1642LAA-P	ECT1644LAA-P	ECT1648LAA-P	
NEMA Size 5								
—	—	24V DC	400A	ECT1651QAA-S	ECT1652QAA-S	ECT1654QAA-S	ECT1658QAA-S	N101FS5_3A
200/208	75			ECT1651EAA-S	ECT1652EAA-S	ECT1654EAA-S	ECT1658EAA-S	
230/240	100			ECT1651BAA-S	ECT1652BAA-S	ECT1654BAA-S	ECT1658BAA-S	
460/480	200			ECT1651CAA-S	ECT1652CAA-S	ECT1654CAA-S	ECT1658CAA-S	
575/600	200			ECT1651DAA-S	ECT1652DAA-S	ECT1654DAA-S	ECT1658DAA-S	
380/50 Hz	150			ECT1651LAA-S	ECT1652LAA-S	ECT1654LAA-S	ECT1658LAA-S	

① All *IT.* Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT160**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Table 33-48. Class ECT17 — Combination Reversing Starter — Fusible Disconnect

Motor Voltage	Max. hp	Coil ① Voltage	Disconnect	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Starter (Open)
				Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
NEMA Size 0								
—	—	24V DC	30A	**ECT1701QAB-_**	**ECT1702QAB-_**	**ECT1704QAB-_**	**ECT1708QAB-_**	**N501BS0_3A**
—	—			**ECT1701QAC-_**	**ECT1702QAC-_**	**ECT1704QAC-_**	**ECT1708QAC-_**	
200/208	3			**ECT1701EAB-_**	**ECT1702EAB-_**	**ECT1704EAB-_**	**ECT1708EAB-_**	
230/240	3			**ECT1701BAB-_**	**ECT1702BAB-_**	**ECT1704BAB-_**	**ECT1708BAB-_**	
460/480	5			**ECT1701CAC-_**	**ECT1702CAC-_**	**ECT1704CAC-_**	**ECT1708CAC-_**	
575/600	5			**ECT1701DAC-_**	**ECT1702DAC-_**	**ECT1704DAC-_**	**ECT1708DAC-_**	
380/50 Hz	5			**ECT1701LAC-_**	**ECT1702LAC-_**	**ECT1704LAC-_**	**ECT1708LAC-_**	
NEMA Size 1								
—	—	24V DC	30A	**ECT1711QAB-_**	**ECT1712QAB-_**	**ECT1714QAB-_**	**ECT1718QAB-_**	**N501CS1_3A**
—	—			**ECT1711QAC-_**	**ECT1712QAC-_**	**ECT1714QAC-_**	**ECT1718QAC-_**	
200/208	7-1/2			**ECT1711EAB-_**	**ECT1712EAB-_**	**ECT1714EAB-_**	**ECT1718EAB-_**	
230/240	7-1/2			**ECT1711BAB-_**	**ECT1712BAB-_**	**ECT1714BAB-_**	**ECT1718BAB-_**	
460/480	10			**ECT1711CAC-_**	**ECT1712CAC-_**	**ECT1714CAC-_**	**ECT1718CAC-_**	
575/600	10			**ECT1711DAC-_**	**ECT1712DAC-_**	**ECT1714DAC-_**	**ECT1718DAC-_**	
380/50 Hz	10			**ECT1711LAC-_**	**ECT1712LAC-_**	**ECT1714LAC-_**	**ECT1718LAC-_**	
NEMA Size 2								
—	—	24V DC	60A	**ECT1721QAD-K**	**ECT1722QAD-K**	**ECT1724QAD-K**	**ECT1728QAD-K**	**N501DS2_3A**
—	—			**ECT1721QAE-K**	**ECT1722QAE-K**	**ECT1724QAE-K**	**ECT1728QAE-K**	
200/208	10			**ECT1721EAD-K**	**ECT1722EAD-K**	**ECT1724EAD-K**	**ECT1728EAD-K**	
230/240	15			**ECT1721BAD-K**	**ECT1722BAD-K**	**ECT1724BAD-K**	**ECT1728BAD-K**	
460/480	25			**ECT1721CAE-K**	**ECT1722CAE-K**	**ECT1724CAE-K**	**ECT1728CAE-K**	
575/600	25			**ECT1721DAE-K**	**ECT1722DAE-K**	**ECT1724DAE-K**	**ECT1728DAE-K**	
380/50 Hz	25			**ECT1721LAE-K**	**ECT1722LAEK**	**ECT1724LAE-K**	**ECT1728LAE-K**	
NEMA Size 3								
—	—	24V DC	100A	**ECT1731QAF-M**	**ECT1732QAF-M**	**ECT1734QAF-M**	**ECT1738QAF-M**	**N501ES3_3A**
—	—			**ECT1731QAG-M**	**ECT1732QAG-M**	**ECT1734QAG-M**	**ECT1738QAG-M**	
200/208	25			**ECT1731EAF-M**	**ECT1732EAF-M**	**ECT1734EAF-M**	**ECT1738EAF-M**	
230/240	30			**ECT1731BAF-M**	**ECT1732BAF-M**	**ECT1734BAF-M**	**ECT1738BAF-M**	
460/480	50			**ECT1731CAG-M**	**ECT1732CAG-M**	**ECT1734CAG-M**	**ECT1738CAG-M**	
575/600	50			**ECT1731DAG-M**	**ECT1732DAG-M**	**ECT1734DAG-M**	**ECT1738DAG-M**	
380/50 Hz	50			**ECT1731LAG-M**	**ECT1732LAG-M**	**ECT1734LAG-M**	**ECT1738LAG-M**	
NEMA Size 4								
—	—	24V DC	200A	**ECT1741QAH-P**	**ECT1742QAH-P**	**ECT1744QAH-P**	**ECT1748QAH-P**	**N501ES4_3A**
—	—			**ECT1741QAJ-P**	**ECT1742QAJ-P**	**ECT1744QAJ-P**	**ECT1748QAJ-P**	
200/208	40			**ECT1741EAH-P**	**ECT1742EAH-P**	**ECT1744EAH-P**	**ECT1748EAH-P**	
230/240	50			**ECT1741BAH-P**	**ECT1742BAH-P**	**ECT1744BAH-P**	**ECT1748BAH-P**	
460/480	100			**ECT1741CAJ-P**	**ECT1742CAJ-P**	**ECT1744CAJ-P**	**ECT1748CAJ-P**	
575/600	100			**ECT1741DAJ-P**	**ECT1742DAJ-P**	**ECT1744DAJ-P**	**ECT1748DAJ-P**	
380/50 Hz	75			**ECT1741LAJ-P**	**ECT1742LAJ-P**	**ECT1744LAJ-P**	**ECT1748LAJ-P**	
NEMA Size 5								
—	—	24V DC	400A	**ECT1751QAK-S**	**ECT1752QAK-S**	**ECT1754QAK-S**	**ECT1758QAK-S**	**N501FS5_3A**
—	—			**ECT1751QAL-S**	**ECT1752QAL-S**	**ECT1754QAL-S**	**ECT1758QAL-S**	
200/208	75			**ECT1751EAK-S**	**ECT1752EAK-S**	**ECT1754EAK-S**	**ECT1758EAK-S**	
230/240	100			**ECT1751BAK-S**	**ECT1752BAK-S**	**ECT1754BAK-S**	**ECT1758BAK-S**	
460/480	200			**ECT1751CAL-S**	**ECT1752CAL-S**	**ECT1754CAL-S**	**ECT1758CAL-S**	
575/600	200			**ECT1751DAL-S**	**ECT1752DAL-S**	**ECT1754DAL-S**	**ECT1758DAL-S**	
380/50 Hz	150			**ECT1751LAL-S**	**ECT1752LAL-S**	**ECT1754LAL-S**	**ECT1758LAL-S**	

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT170**4**QAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from **Table 33-38** on **Page 33-26**.

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Table 33-49. Class ECT17 — Combination Reversing Starter — Non-fusible Disconnect

Motor Voltage	Max. hp	Coil ① Voltage	Disconnect	3-Pole Type 1	3-Pole Type 3R	3-Pole Type 4X ②	3-Pole Type 12	3-Pole Component Starter (Open)
				Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
NEMA Size 0								
—	—	24V DC	30A	ECT1701QAA-_	ECT1702QAA-_	ECT1704QAA-_	ECT1708QAA-_	N501BS0_3A
200/208	3			ECT1701EAA-_	ECT1702EAA-_	ECT1704EAA-_	ECT1708EAA-_	
230/240	3			ECT1701BAA-_	ECT1702BAA-_	ECT1704BAA-_	ECT1708BAA-_	
460/480	5			ECT1701CAA-_	ECT1702CAA-_	ECT1704CAA-_	ECT1708CAA-_	
575/600	5			ECT1701DAA-_	ECT1702DAA-_	ECT1704DAA-_	ECT1708DAA-_	
380/50 Hz	5			ECT1701LAA-_	ECT1702LAA-_	ECT1704LAA-_	ECT1708LAA-_	
NEMA Size 1								
—	—	24V DC	30A	ECT1711QAA-_	ECT1712QAA-_	ECT1714QAA-_	ECT1718QAA-_	N501CS1_3A
200/208	7-1/2			ECT1711EAA-_	ECT1712EAA-_	ECT1714EAA-_	ECT1718EAA-_	
230/240	7-1/2			ECT1711BAA-_	ECT1712BAA-_	ECT1714BAA-_	ECT1718BAA-_	
460/480	10			ECT1711CAA-_	ECT1712CAA-_	ECT1714CAA-_	ECT1718CAA-_	
575/600	10			ECT1711DAA-_	ECT1712DAA-_	ECT1714DAA-_	ECT1718DAA-_	
380/50 Hz	10			ECT1711LAA-_	ECT1712LAA-_	ECT1714LAA-_	ECT1718LAA-_	
NEMA Size 2								
—	—	24V DC	60A	ECT1721QAA-K	ECT1722QAA-K	ECT1724QAA-K	ECT1728QAA-K	N501DS2_3A
200/208	10			ECT1721EAA-K	ECT1722EAA-K	ECT1724EAA-K	ECT1728EAA-K	
230/240	15			ECT1721BAA-K	ECT1722BAA-K	ECT1724BAA-K	ECT1728BAA-K	
460/480	25			ECT1721CAA-K	ECT1722CAA-K	ECT1724CAA-K	ECT1728CAA-K	
575/600	25			ECT1721DAA-K	ECT1722DAA-K	ECT1724DAA-K	ECT1728DAA-K	
380/50 Hz	25			ECT1721LAA-K	ECT1722LAA-K	ECT1724LAA-K	ECT1728LAA-K	
NEMA Size 3								
—	—	24V DC	100A	ECT1731QAA-M	ECT1732QAA-M	ECT1734QAA-M	ECT1738QAA-M	N501ES3_3A
200/208	25			ECT1731EAA-M	ECT1732EAA-M	ECT1734EAA-M	ECT1738EAA-M	
230/240	30			ECT1731BAA-M	ECT1732BAA-M	ECT1734BAA-M	ECT1738BAA-M	
460/480	50			ECT1731CAA-M	ECT1732CAA-M	ECT1734CAA-M	ECT1738CAA-M	
575/600	50			ECT1731DAA-M	ECT1732DAA-M	ECT1734DAA-M	ECT1738DAA-M	
380/50 Hz	50			ECT1731LAA-M	ECT1732LAA-M	ECT1734LAA-M	ECT1738LAA-M	
NEMA Size 4								
—	—	24V DC	200A	ECT1741QAA-P	ECT1742QAA-P	ECT1744QAA-P	ECT1748QAA-P	N501ES4_3A
200/208	40			ECT1741EAA-P	ECT1742EAA-P	ECT1744EAA-P	ECT1748EAA-P	
230/240	50			ECT1741BAA-P	ECT1742BAA-P	ECT1744BAA-P	ECT1748BAA-P	
460/480	100			ECT1741CAA-P	ECT1742CAA-P	ECT1744CAA-P	ECT1748CAA-P	
575/600	100			ECT1741DAA-P	ECT1742DAA-P	ECT1744DAA-P	ECT1748DAA-P	
380/50 Hz	75			ECT1741LAA-P	ECT1742LAA-P	ECT1744LAA-P	ECT1748LAA-P	
NEMA Size 5								
—	—	24V DC	400A	ECT1751QAA-S	ECT1752QAA-S	ECT1754QAA-S	ECT1758QAA-S	N501FS5_3A
200/208	75			ECT1751EAA-S	ECT1752EAA-S	ECT1754EAA-S	ECT1758EAA-S	
230/240	100			ECT1751BAA-S	ECT1752BAA-S	ECT1754BAA-S	ECT1758BAA-S	
460/480	200			ECT1751CAA-S	ECT1752CAA-S	ECT1754CAA-S	ECT1758CAA-S	
575/600	200			ECT1751DAA-S	ECT1752DAA-S	ECT1754DAA-S	ECT1758DAA-S	
380/50 Hz	150			ECT1751LAA-S	ECT1752LAA-S	ECT1754LAA-S	ECT1758LAA-S	

① All *IT.* Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT170**4**QAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Features

- Full Voltage
- 3-Phase Electromechanical
- Solid-State Overload Relay
- Integrated Cover Control (Type 1/12)

Type 12 Combination IT. Starter with HMCPE

Product Selection

Table 33-50. Class ECT22 — Combination Non-reversing Starter — Circuit Breaker

Motor Voltage	Max. hp	Magnet Coil Voltage ①	Circuit Breaker Type	3-Pole Type 1 General Purpose Catalog Number ③	3-Pole Type 3R Rainproof Catalog Number ③	3-Pole Type 4X ② Watertight Catalog Number ③	3-Pole Type 12 Dust-Tight Catalog Number ③	3-Pole Component Starter (Open) Catalog Number ③
NEMA Size 0								
200	1 3	24V DC	HMCPE 7A HMCPE 15A	**ECT2201EAC-_** **ECT2201EAD-_**	**ECT2202EAC-_** **ECT2202EAD-_**	**ECT2204EAC-_** **ECT2204EAD-_**	**ECT2208EAC-_** **ECT2208EAD-_**	**N101BS0_3A**
230	1 3	24V DC	HMCPE 7A HMCPE 15A	**ECT2201BAC-_** **ECT2201BAD-_**	**ECT2202BAC-_** **ECT2202BAD-_**	**ECT2204BAC-_** **ECT2204BAD-_**	**ECT2208BAC-_** **ECT2208BAD-_**	**N101BS0_3A**
460	1 3 5	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A	**ECT2201CAB-_** **ECT2201CAC-_** **ECT2201CAD-_**	**ECT2202CAB-_** **ECT2202CAC-_** **ECT2202CAD-_**	**ECT2204CAB-_** **ECT2204CAC-_** **ECT2204CAD-_**	**ECT2208CAB-_** **ECT2208CAC-_** **ECT2208CAD-_**	**N101BS0_3A**
575	1 3 5	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A	**ECT2201DAB-_** **ECT2201DAC-_** **ECT2201DAD-_**	**ECT2202DAB-_** **ECT2202DAC-_** **ECT2202DAD-_**	**ECT2204DAB-_** **ECT2204DAC-_** **ECT2204DAD-_**	**ECT2208DAB-_** **ECT2208DAC-_** **ECT2208DAD-_**	**N101BS0_3A**
NEMA Size 1								
200	1 3 5 7-1/2	24V DC	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECT2211EAC-_** **ECT2211EAD-_** **ECT2211EAE-_** **ECT2211EAF-_**	**ECT2212EAC-_** **ECT2212EAD-_** **ECT2212EAE-_** **ECT2212EAF-_**	**ECT2214EAC-_** **ECT2214EAD-_** **ECT2214EAE-_** **ECT2214EAF-_**	**ECT2218EAC-_** **ECT2218EAD-_** **ECT2218EAE-_** **ECT2218EAF-_**	**N101CS1_3A**
230	1 3 5 7-1/2	24V DC	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECT2211BAC-_** **ECT2211BAD-_** **ECT2211BAE-_** **ECT2211BAF-_**	**ECT2212BAC-_** **ECT2212BAD-_** **ECT2212BAE-_** **ECT2212BAF-_**	**ECT2214BAC-_** **ECT2214BAD-_** **ECT2214BAE-_** **ECT2214BAF-_**	**ECT2218BAC-_** **ECT2218BAD-_** **ECT2218BAE-_** **ECT2218BAF-_**	**N101CS1_3A**
460	1 3 5 10	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECT2211CAB-_** **ECT2211CAC-_** **ECT2211CAD-_** **ECT2211CAE-_**	**ECT2212CAB-_** **ECT2212CAC-_** **ECT2212CAD-_** **ECT2212CAE-_**	**ECT2214CAB-_** **ECT2214CAC-_** **ECT2214CAD-_** **ECT2214CAE-_**	**ECT2218CAB-_** **ECT2218CAC-_** **ECT2218CAD-_** **ECT2218CAE-_**	**N101CS1_3A**
575	1 3 5 10	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECT2211DAB-_** **ECT2211DAC-_** **ECT2211DAD-_** **ECT2211DAE-_**	**ECT2212DAB-_** **ECT2212DAC-_** **ECT2212DAD-_** **ECT2212DAE-_**	**ECT2214DAB-_** **ECT2214DAC-_** **ECT2214DAD-_** **ECT2214DAE-_**	**ECT2218DAB-_** **ECT2218DAC-_** **ECT2218DAD-_** **ECT2218DAE-_**	**N101CS1_3A**

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Ω** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT220**4**QAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Tables 33-50 Class ECT22 — Combination Non-reversing Starter — Circuit Breaker (Continued)

Motor Voltage	Max. hp	Magnet Coil Voltage ①	Circuit Breaker Type	3-Pole Type 1 General Purpose Catalog Number ③	3-Pole Type 3R Rainproof Catalog Number ③	3-Pole Type 4X ② Watertight Catalog Number ③	3-Pole Type 12 Dust-Tight Catalog Number ③	3-Pole Component Starter (Open) Catalog Number ③
NEMA Size 2								
200	10	24V DC	HMCPE 50A	**ECT2221EAF-K**	**ECT2222EAF-K**	**ECT2224EAF-K**	**ECT2228EAF-K**	**N101DS2_3A**
230	10 15	24V DC	HMCPE 50A HMCPE 70A	**ECT2221BAF-K** **ECT2221BAW-K**	**ECT2222BAF-K** **ECT2222BAW-K**	**ECT2224BAF-K** **ECT2224BAW-K**	**ECT2228BAF-K** **ECT2228BAW-K**	**N101DS2_3A**
460	25	24V DC	HMCPE 50A	**ECT2221CAF-K**	**ECT2222CAF-K**	**ECT2224CAF-K**	**ECT2228CAF-K**	**N101DS2_3A**
575	15 25	24V DC	HMCPE 30A HMCPE 50A	**ECT2221DAE-K** **ECT2221DAF-K**	**ECT2222DAE-K** **ECT2222DAF-K**	**ECT2224DAE-K** **ECT2224DAF-K**	**ECT2228DAE-K** **ECT2228DAF-K**	**N101DS2_3A**
NEMA Size 3								
200	20 25	24V DC	HMCPE 100A HMCPE 100A	**ECT2231EAG-M** **ECT2231EAX-M**	**ECT2232EAG-M** **ECT2232EAX-M**	**ECT2234EAG-M** **ECT2234EAX-M**	**ECT2238EAG-M** **ECT2238EAX-M**	**N101ES3_3A**
230	25 30	24V DC	HMCPE 100A HMCPE 100A	**ECT2231BAG-M** **ECT2231BAX-M**	**ECT2232BAG-M** **ECT2232BAX-M**	**ECT2234BAG-M** **ECT2234BAX-M**	**ECT2238BAG-M** **ECT2238BAX-M**	**N101ES3_3A**
460	50	24V DC	HMCPE 100A	**ECT2231CAG-M**	**ECT2232CAG-M**	**ECT2234CAG-M**	**ECT2238CAG-M**	**N101ES3_3A**
575	30 50	24V DC	HMCPE 50A HMCPE 100A	**ECT2231DAF-M** **ECT2231DAG-M**	**ECT2232DAF-M** **ECT2232DAG-M**	**ECT2234DAF-M** **ECT2234DAG-M**	**ECT2238DAF-M** **ECT2238DAG-M**	**N101ES3_3A**
NEMA Size 4								
200	40	24V DC	HMCP 150A	**ECT2241EAH-P**	**ECT2242EAH-P**	**ECT2244EAH-P**	**ECT2248EAH-P**	**N101ES4_3A**
230	50	24V DC	HMCP 150A	**ECT2241BAH-P**	**ECT2242BAH-P**	**ECT2244BAH-P**	**ECT2248BAH-P**	**N101ES4_3A**
460	100	24V DC	HMCP 150A	**ECT2241CAH-P**	**ECT2242CAH-P**	**ECT2244CAH-P**	**ECT2248CAH-P**	**N101ES4_3A**
575	100	24V DC	HMCP 150A	**ECT2241DAH-P**	**ECT2242DAH-P**	**ECT2244DAH-P**	**ECT2248DAH-P**	**N101ES4_3A**
NEMA Size 5								
200	50 75	24V DC	HMCP 250A HMCP 400A	**ECT2251EAJ-S** **ECT2251EAK-S**	**ECT2252EAJ-S** **ECT2252EAK-S**	**ECT2254EAJ-S** **ECT2254EAK-S**	**ECT2258EAJ-S** **ECT2258EAK-S**	**N101FS5_3A**
230	60 100	24V DC	HMCP 250A HMCP 400A	**ECT2251BAJ-S** **ECT2251BAK-S**	**ECT2252BAJ-S** **ECT2252BAK-S**	**ECT2254BAJ-S** **ECT2254BAK-S**	**ECT2258BAJ-S** **ECT2258BAK-S**	**N101FS5_3A**
460	125 200	24V DC	HMCP 250A HMCP 400A	**ECT2251CAJ-S** **ECT2251CAK-S**	**ECT2252CAJ-S** **ECT2252CAK-S**	**ECT2254CAJ-S** **ECT2254CAK-S**	**ECT2258CAJ-S** **ECT2258CAK-S**	**N101FS5_3A**
575	150 200	24V DC	HMCP 250A HMCP 400A	**ECT2251DAJ-S** **ECT2251DAK-S**	**ECT2252DAJ-S** **ECT2252DAK-S**	**ECT2254DAJ-S** **ECT2254DAK-S**	**ECT2258DAJ-S** **ECT2258DAK-S**	**N101FS5_3A**

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT222**4**QAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Table 33-51. Class ECT23 — Combination Reversing Starter — Circuit Breaker

Motor Voltage	Max. hp	Magnet Coil Voltage ①	Circuit Breaker Type	3-Pole Type 1 General Purpose Catalog Number ③	3-Pole Type 3R Rainproof Catalog Number ③	3-Pole Type 4X ② Watertight Catalog Number ③	3-Pole Type 12 Dust-Tight Catalog Number ③	3-Pole Component Starter (Open) Catalog Number ③
NEMA Size 0								
200	1 3	24V DC	HMCPE 7A HMCPE 15A	**ECT2301EAC-_** **ECT2301EAD-_**	**ECT2302EAC-_** **ECT2302EAD-_**	**ECT2304EAC-_** **ECT2304EAD-_**	**ECT2308EAC-_** **ECT2308EAD-_**	**N501BS0_3A**
230	1 3	24V DC	HMCPE 7A HMCPE 15A	**ECT2301BAC-_** **ECT2301BAD-_**	**ECT2302BAC-_** **ECT2302BAD-_**	**ECT2304BAC-_** **ECT2304BAD-_**	**ECT2308BAC-_** **ECT2308BAD-_**	**N501BS0_3A**
460	1 3 5	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A	**ECT2301CAB-_** **ECT2301CAC-_** **ECT2301CAD-_**	**ECT2302CAB-_** **ECT2302CAC-_** **ECT2302CAD-_**	**ECT2304CAB-_** **ECT2304CAC-_** **ECT2304CAD-_**	**ECT2308CAB-_** **ECT2308CAC-_** **ECT2308CAD-_**	**N501BS0_3A**
575	1 3 5	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A	**ECT2301DAB-_** **ECT2301DAC-_** **ECT2301DAD-_**	**ECT2302DAB-_** **ECT2302DAC-_** **ECT2302DAD-_**	**ECT2304DAB-_** **ECT2304DAC-_** **ECT2304DAD-_**	**ECT2308DAB-_** **ECT2308DAC-_** **ECT2308DAD-_**	**N501BS0_3A**
NEMA Size 1								
200	1 3 5 7-1/2	24V DC	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECT2311EAC-_** **ECT2311EAD-_** **ECT2311EAE-_** **ECT2311EAF-_**	**ECT2312EAC-_** **ECT2312EAD-_** **ECT2312EAE-_** **ECT2312EAF-_**	**ECT2314EAC-_** **ECT2314EAD-_** **ECT2314EAE-_** **ECT2314EAF-_**	**ECT2318EAC-_** **ECT2318EAD-_** **ECT2318EAE-_** **ECT2318EAF-_**	**N501CS1_3A**
230	1 3 5 7-1/2	24V DC	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECT2311BAC-_** **ECT2311BAD-_** **ECT2311BAE-_** **ECT2311BAF-_**	**ECT2312BAC-_** **ECT2312BAD-_** **ECT2312BAE-_** **ECT2312BAF-_**	**ECT2314BAC-_** **ECT2314BAD-_** **ECT2314BAE-_** **ECT2314BAF-_**	**ECT2318BAC-_** **ECT2318BAD-_** **ECT2318BAE-_** **ECT2318BAF-_**	**N501CS1_3A**
460	1 3 5 10	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECT2311CAB-_** **ECT2311CAC-_** **ECT2311CAD-_** **ECT2311CAE-_**	**ECT2312CAB-_** **ECT2312CAC-_** **ECT2312CAD-_** **ECT2312CAE-_**	**ECT2314CAB-_** **ECT2314CAC-_** **ECT2314CAD-_** **ECT2314CAE-_**	**ECT2318CAB-_** **ECT2318CAC-_** **ECT2318CAD-_** **ECT2318CAE-_**	**N501CS1_3A**
575	1 3 5 10	24V DC	HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECT2311DAB-_** **ECT2311DAC-_** **ECT2311DAD-_** **ECT2311DAE-_**	**ECT2312DAB-_** **ECT2312DAC-_** **ECT2312DAD-_** **ECT2312DAE-_**	**ECT2314DAB-_** **ECT2314DAC-_** **ECT2314DAD-_** **ECT2314DAE-_**	**ECT2318DAB-_** **ECT2318DAC-_** **ECT2318DAD-_** **ECT2318DAE-_**	**N501CS1_3A**
NEMA Size 2								
200	10	24V DC	HMCPE 50A	**ECT2321EAF-K**	**ECT2322EAF-K**	**ECT2324EAF-K**	**ECT2328EAF-K**	**N501DS2_3A**
230	10 15	24V DC	HMCPE 50A HMCPE 70A	**ECT2321BAF-K** **ECT2321BAW-K**	**ECT2322BAF-K** **ECT2322BAW-K**	**ECT2324BAF-K** **ECT2324BAW-K**	**ECT2328BAF-K** **ECT2328BAW-K**	**N501DS2_3A**
460	25	24V DC	HMCPE 50A	**ECT2321CAF-K**	**ECT2322CAF-K**	**ECT2324CAF-K**	**ECT2328CAF-K**	**N501DS2_3A**
575	15 25	24V DC	HMCPE 30A HMCPE 50A	**ECT2321DAE-K** **ECT2321DAF-K**	**ECT2322DAE-K** **ECT2322DAF-K**	**ECT2324DAE-K** **ECT2324DAF-K**	**ECT2328DAE-K** **ECT2328DAF-K**	**N501DS2_3A**

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT2304EAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Table 33-51. Class ECT23 — Combination Reversing Starter — Circuit Breaker (Continued)

Motor Voltage	Max. hp	Magnet Coil Voltage ①	Circuit Breaker Type	3-Pole Type 1 General Purpose Catalog Number ③	3-Pole Type 3R Rainproof Catalog Number ③	3-Pole Type 4X ② Watertight Catalog Number ③	3-Pole Type 12 Dust-Tight Catalog Number ③	3-Pole Component Starter (Open) Catalog Number ③
NEMA Size 3								
200	20 25	24V DC	HMCPE 100A HMCPE 100A	**ECT2331EAG-M** **ECT2331EAX-M**	**ECT2332EAG-M** **ECT2332EAX-M**	**ECT2334EAG-M** **ECT2334EAX-M**	**ECT2338EAG-M** **ECT2338EAX-M**	**N501ES3_3A**
230	25 30	24V DC	HMCPE 100A HMCPE 100A	**ECT2331BAG-M** **ECT2331BAX-M**	**ECT2332BAG-M** **ECT2332BAX-M**	**ECT2334BAG-M** **ECT2334BAX-M**	**ECT2338BAG-M** **ECT2338BAX-M**	**N501ES3_3A**
460	50	24V DC	HMCPE 100A	**ECT2331CAG-M**	**ECT2332CAG-M**	**ECT2334CAG-M**	**ECT2338CAG-M**	**N501ES3_3A**
575	30 50	24V DC	HMCPE 50A HMCPE 100A	**ECT2331DAF-M** **ECT2331DAG-M**	**ECT2332DAF-M** **ECT2332DAG-M**	**ECT2334DAF-M** **ECT2334DAG-M**	**ECT2338DAF-M** **ECT2338DAG-M**	**N501ES3_3A**
NEMA Size 4								
200	40	24V DC	HMCP 150A	**ECT2341EAH-P**	**ECT2342EAH-P**	**ECT2344EAH-P**	**ECT2348EAH-P**	**N501ES4_3A**
230	50	24V DC	HMCP 150A	**ECT2341BAH-P**	**ECT2342BAH-P**	**ECT2344BAH-P**	**ECT2348BAH-P**	**N501ES4_3A**
460	100	24V DC	HMCP 150A	**ECT2341CAH-P**	**ECT2342CAH-P**	**ECT2344CAH-P**	**ECT2348CAH-P**	**N501ES4_3A**
575	100	24V DC	HMCP 150A	**ECT2341DAH-P**	**ECT2342DAH-P**	**ECT2344DAH-P**	**ECT2348DAH-P**	**N501ES4_3A**
NEMA Size 5								
200	50 75	24V DC	HMCP 250A HMCP 400A	**ECT2351EAJ-S** **ECT2351EAK-S**	**ECT2352EAJ-S** **ECT2352EAK-S**	**ECT2354EAJ-S** **ECT2354EAK-S**	**ECT2358EAJ-S** **ECT2358EAK-S**	**N501FS5_3A**
230	60 100	24V DC	HMCP 250A HMCP 400A	**ECT2351BAJ-S** **ECT2351BAK-S**	**ECT2352BAJ-S** **ECT2352BAK-S**	**ECT2354BAJ-S** **ECT2354BAK-S**	**ECT2358BAJ-S** **ECT2358BAK-S**	**N501FS5_3A**
460	125 200	24V DC	HMCP 250A HMCP 400A	**ECT2351CAJ-S** **ECT2351CAK-S**	**ECT2352CAJ-S** **ECT2352CAK-S**	**ECT2354CAJ-S** **ECT2354CAK-S**	**ECT2358CAJ-S** **ECT2358CAK-S**	**N501FS5_3A**
575	150 200	24V DC	HMCP 250A HMCP 400A	**ECT2351DAJ-S** **ECT2351DAK-S**	**ECT2352DAJ-S** **ECT2352DAK-S**	**ECT2354DAJ-S** **ECT2354DAK-S**	**ECT2358DAJ-S** **ECT2358DAK-S**	**N501FS5_3A**

① All ***IT.*** Contactors and Starters are furnished with 24V DC coil and control power supply. The eighth digit **Q** denotes separate 24V DC control source.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECT230**4**EAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ A "_" denotes Catalog Numbers are incomplete without the Solid-State Overload Range Code. To complete the Catalog Number, select the appropriate Code from the following table:

FLA Range	Size						
	00	0	1	2	3	4	5
.25 – .80	**A**	**A**	**A**	—	—	—	—
.59 – 1.9	**B**	**B**	**B**	—	—	—	—
1.4 – 4.4	**C**	**C**	**C**	—	—	—	—
2.8 – 9.0	**D**	**D**	**D**	—	—	—	—
5.0 – 16	—	—	**F**	—	—	—	—
6.3 – 20	—	**G**	—	—	—	—	—
8.4 – 27	—	—	**H**	—	—	—	—
10 – 32	—	**J**	—	—	—	—	—
14 – 45	—	—	—	**K**	—	—	—
16 – 50	—	—	**L**	—	—	—	—
28 – 90	—	—	—	—	**M**	—	—
31 – 100	—	—	—	**N**	—	—	—
42 – 135	—	—	—	—	—	**P**	—
63 – 200	—	—	—	—	—	**R**	—
84 – 270	—	—	—	—	—	—	**S**
131 – 420	—	—	—	—	—	—	**T**

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Wiring Diagrams

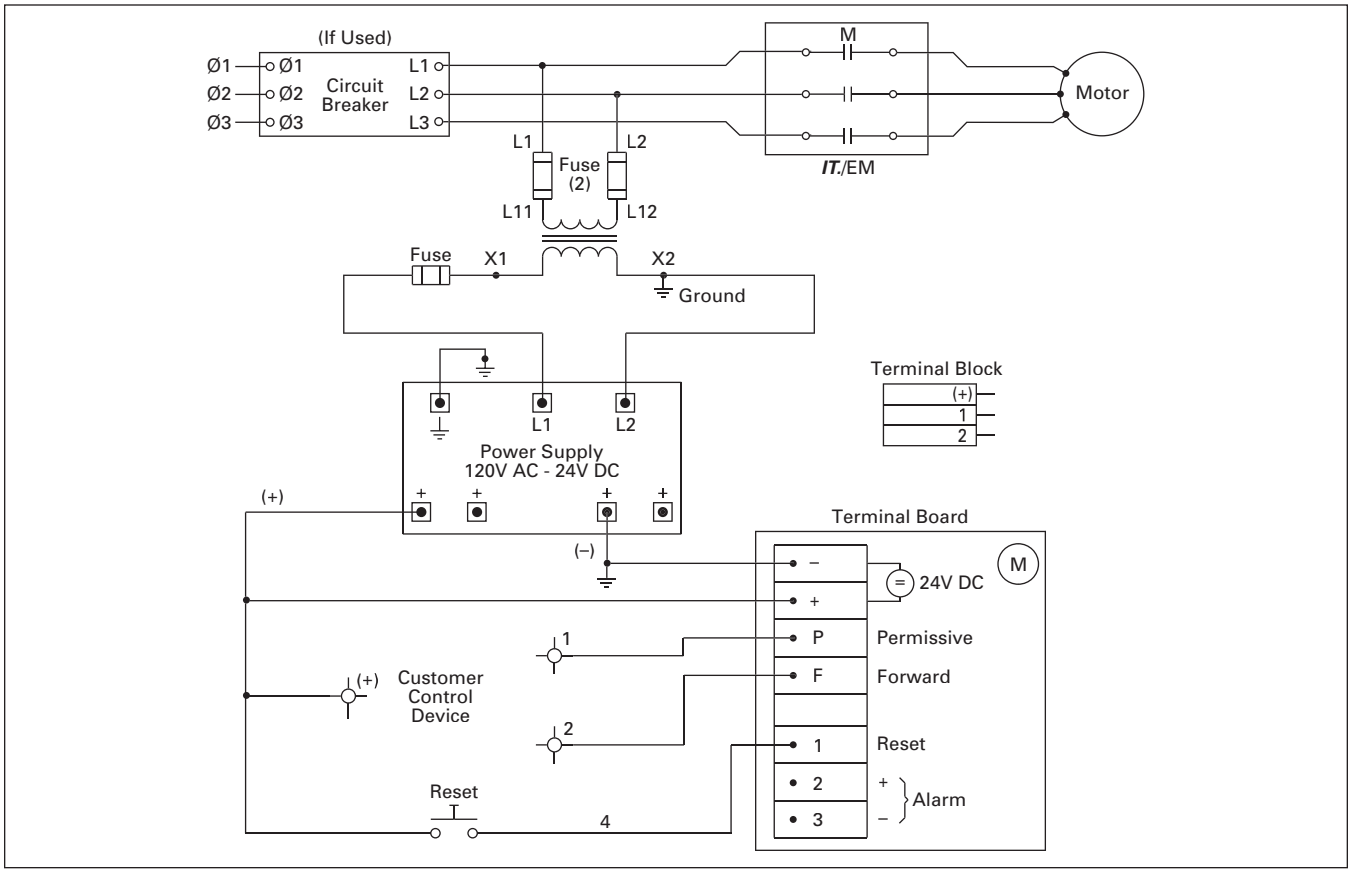

Figure 33-16. *IT.* Combination Starter with CPT and Power Supply

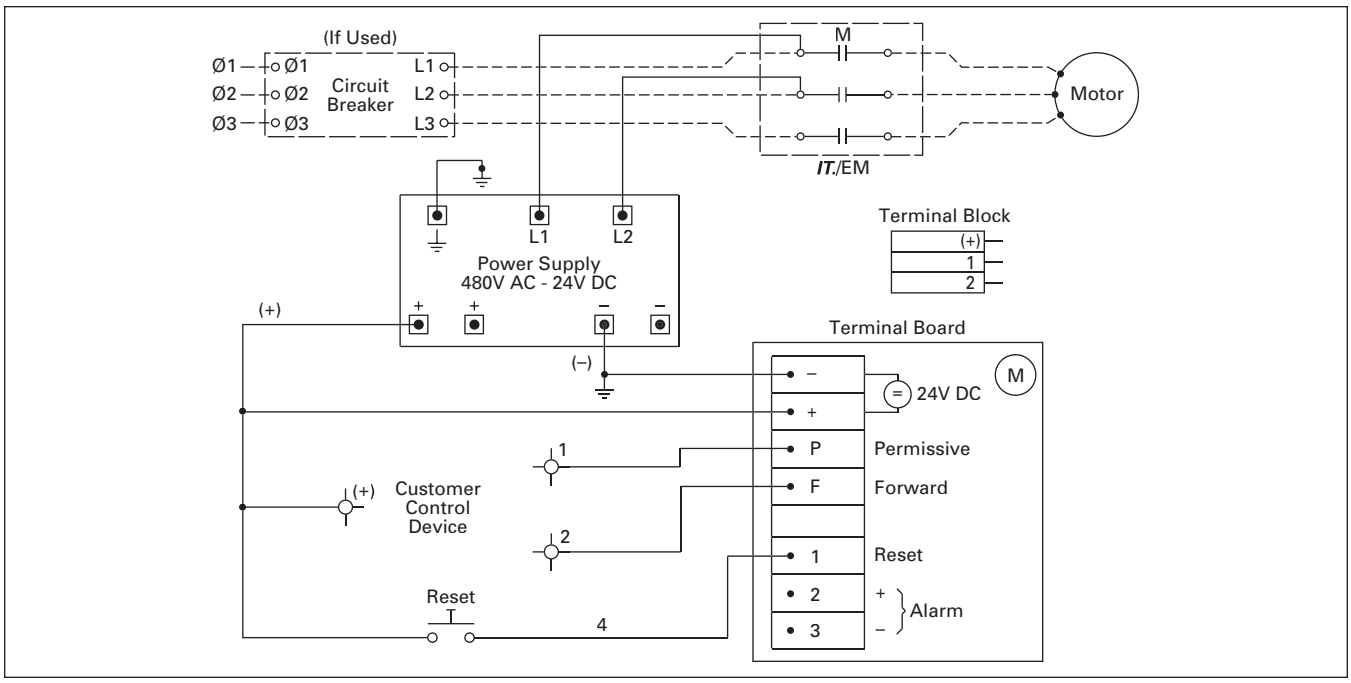

Figure 33-17. *IT.* Combination Starter with Power Supply

Modification Codes

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Table 33-52. A — Ammeters, Auxiliary Contacts, Accelerating Relays, Autotransformers

Modification	Catalog Number Suffix	Description
Ammeter ①	**A1**	Panel Type Wired to Current Transformer in Line 1, Type 1, 12
		Panel Type Wired to Current Transformer in Line 1, Type 3R, 4X
	A2	Panel Type, Selector Switch and 3 Current Transformers Wired to Ammeter via Switch, Type 1, 12
		Panel Type, Selector Switch and 3 Current Transformers Wired to Ammeter via Switch, Type 3R, 4X
	A3	Miniature (Single-Phase), Type 1, 12
	A4	Miniature with Selector Switch, Type 1, 12
	A5	Switchboard (Single-Phase), Type 1, 12
		Switchboard (Single-Phase), Type 3R, 4X
	A6	Switchboard with Selector Switch, Type 1, 12
		Switchboard with Selector Switch, Type 3R, 4X
	A7	3-Panel Type (Single-Phase), Type 1, 12
		3-Panel Type (Single-Phase), Type 3R, 4X
	A10	3 Miniature (Single-Phase), Type 1, 3R, 4X, 12
	A11	3 Switchboard Type (Single-Phase), Type 1, 12
		3 Switchboard Type (Single-Phase), Type 3R, 4X
	A12	Ammeter Order by Description, Type 1, 3R, 4X, 12
Auto-transformers	**A8**	hp Rating selection, see **P03300001E**
	A9	Order by Description
Top Mounted Auxiliary Contacts ②③ (Unwired)	**A13**	1NO
	A14	1NC
	A15	1NO-1NC
	A16	2NO
NEMA Sizes 00 – 2 only (Unwired)	**A17**	2NC
	A18	2NO-1NC
	A19	1NO-2NC
	A20	3NO
IEC Sizes B – L Only (Unwired) ***XT*** Series	**A21**	3NC
	A22	3NO-1NC
	A23	2NO-2NC
	A24	1NO-3NC
	A25	4NO
	A26	4NC
Side Mounted Auxiliary Contacts ③④	**A27**	1NO
	A28	1NC
	A29	1NO-1NC
	A30	2NO
	A31	2NC
	A32	2NO-1NC
	A33	1NO-2NC
	A34	3NO

Table 33-52. A — Ammeters, Auxiliary Contacts, Accelerating Relays, Autotransformers (Continued)

Modification	Catalog Number Suffix	Description
Side Mounted Auxiliary Contacts, continued ③④	**A35**	3NC
	A36	3NO-1NC
	A37	2NO-2NC
	A38	1NO-3NC
	A39	4NO
	A40	4NC
Auxiliary Contacts ③	**A42**	Contacts Mounted on Operating Mechanism of Disconnect Switch, 1NO-1NC
	A43	Contacts Mounted on Operating Mechanism of Disconnect Switch, 2NO-2NC
	A44	With Auxiliary Contact Omitted
Accelerating Relay	**A46**	For 2-Speed
	A47	2NO/2NC 24V DC Auxiliary Relay — ***IT.*** Only

① Oversize enclosure will be provided for ***IT.*** Starters.
② Top mounted auxiliary contacts cannot be added to contactors in Box 1 (Type 1).
③ Not available for ***IT.*** Starters.
④ Available on ***XT*** Starters for 40A and greater only.

Table 33-53. B — Breaker Modifications, Backspin Timer, Undervoltage Release, Bell Alarm, Bus Choke

Modification	Catalog Number Suffix	Description
Breaker	**B1**	1NO-1NC Auxiliary Contact on Breaker
	B2	2NO-2NC Auxiliary Contacts on Breaker
	B3	Shunt Trip on Circuit Breaker — 48 – 127V AC or DC
	B4	Shunt Trip on Circuit Breaker — 9 – 24V AC or DC
	B5	Shunt Trip on Circuit Breaker — 208 – 380V AC
	B6	Shunt Trip on Circuit Breaker — 415 – 600V AC or 220 – 250V DC
	B8	Undervoltage Release for Breaker
	B9	Current Limiter Mounted to Breaker
	B10	Breaker — Order by Description
	B11	Thermal Magnetic Breaker
Backspin Timer	**B12**	180 Seconds
Undervoltage Release	**B13**	Undervoltage Release for Circuit Breaker — 208 – 240V AC
	B14	Undervoltage Release for Circuit Breaker — 380 – 480V AC
	B15	Undervoltage Release for Circuit Breaker — 525 – 600V AC
Bell Alarm	**B16**	Bell Alarm for Circuit Breaker
Bus Choke (MVX)	**B20**	DC Bus Choke, Open Core and Coil ⑤

⑤ A DC bus choke may be used in place of an AC line reactor for line harmonic current reduction and for power source exceeding 500 kVA. The DC bus choke will not provide any protection for line voltage unbalance or transients.

Table 33-54. C — Control Power Transformer, *IT.* Power Supplies, Control Relays, Cover Control (not elsewhere defined), Current Transformers, Compelling Relay, Control Wiring, Control Circuit Breaker, Separate Control, Customer-Supplied Components, Custom for Advantage, Contactors, Counter, E-Stop Relay, DC/AC Interface, Separate Source Disconnect, Bypass Contactors

Modification	Catalog Number Suffix	Description
Control Power Transformers Make sure 8th character specifies primary/ secondary voltage.	**C1**	Standard Size Control Transformer, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C2	Standard Size Control Transformer, 24V/60 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C42	50 VA Extra Capacity CPT 120V/60 Hz, 110V/50 Hz with 2 Primary and 1 Secondary
	C3	100 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C4	100 VA Extra Capacity CPT, 24V/60 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C5	200 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C6	200 VA Extra Capacity CPT, 24V/60 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C7	300 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C8	400 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C9	1 kVA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C10	2 kVA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse
	C11	Control Transformer — Order by Description
	C34	CPT with Power Supply for ***IT.*** or ***XT***
Power Supplies (***IT.*** and ***XT*** Only)	**C27**	Separate Control 120V AC to 24V DC
	C28	Power Supply with Extra Capacity — Order by Description
Control Relays	**C12**	4-Pole Interposing Relay, 600V (2NO/2NC)
	C13	Run Relay, 24V DC (MVX)
	C14 ①	4-Pole, Unwired, A600 Rtg. — 2NO-2NC
	C15 ①	8-Pole, Unwired, A600 Rtg. — 4NO-4NC
	C16	Control Relay — Order by Description
	C18 ①②	3-Wire Control Module (C30 Lighting)
	C20 ①②	2-Wire Control Relay for Mechanical/ Magnetic Lighting Contactors
Cover Control	**C17** ①	Convert Position 7 to E30 Type Cover Control
	C19 ①	Lock-Off Attachment Added on Cover Control
	C29	Change to E22 (22 mm) Cover Controls

① Not available for ***IT.*** Starters.
② Not available for ***XT*** Starters.

Table 33-54. C — Control Power Transformer, *IT.* Power Supplies, Control Relays, Cover Control (not elsewhere defined), Current Transformers, Compelling Relay, Control Wiring, Control Circuit Breaker, Separate Control, Customer-Supplied Components, Custom for Advantage, Contactors, Counter, E-Stop Relay, DC/AC Interface, Separate Source Disconnect, Bypass Contactors (Continued)

Modification	Catalog Number Suffix	Description
Current Transformer(s)	**C21**	In Phase 1
	C22	In Phases 1 and 2
	C23	In 3 Phases
Compelling Relay	**C25** ③	—
Control Wiring	**C26**	Omit Control Wiring
	C30 ③	With Separate Control Wiring and Two 250V Fuses in Holder
	C31 ③	With Common Control Wiring and Two 600V (Class C) Fuses in Holder
	C33	Control Wiring Type — Order by Description
Control Circuit Breaker	**C32** ③	Order by Description
Separate Control	**C35**	Wired for Separate Control (Reduced Voltage)
Customer Supplied Components	**C36**	Customer Supplied Components to Be Installed
	C37	Customer Supplied Wiring Diagram to Use
Custom for Advantage	**C39**	Advantage+ Starter Supplied
Contactor/ Starter	**C40** ③	Contactor/Starter — Order by Description
Counter	**C41** ③	Operations Counter
E-Stop Relay	**C43** ③	E-Stop Relay (DeviceNet)
DC/AC Interface	**C44** ③⑤	DC/AC Interface Module
Separate Source Disconnect	**C45** ③	IEC Separate Source Disconnect for Control Circuitry
Bypass Contactors for ***IT.***/MVX Starters (MVX: 1/2 to 5 hp Only)	**C46/J1**	Isolation Contactor
	C46/J2	Output Contactor
	C46/J3	Bypass Contactor
	C46/J4	Isolation/Output/Bypass Contactor
	C46/J5	3-Contactor Bypass Pkg. for MVX ④

③ Not available for ***IT.*** Starters.
④ Includes CPT, Pilot Lights, Selector Switch, Auxiliary Contacts and Control Relay.
⑤ Not available for ***XT*** Starters.

Table 33-55. D — Device Labels, Deceleration Relay, Drain and Breather, Duplex Modifications

Modification	Catalog Number Suffix	Description
Device Labels	**D1**	(Each Label)
Decel. Relay ①	**D2**	2-Speed
Drain and Breather (Type 7/9 Enclosure) ①	**D5**	Drain and Breather
	D6	Drain Only
	D7	Breather Only
Duplex Modifications	**D12**	Alternator Omitted (Deduct Price)
	D14	START/STOP Pushbuttons — Supplied for Each Motor
	D15	HAND/OFF/AUTO Selector Switch — Supplied for Each Motor
	D16	No. 1 Lead - No. 2 Lead Selector Switch for Manual Selection of Lead Pump (Alternator is Omitted)
	D17	Red RUN Pilot Light — Supplied for Each Motor
	D18	Push-to-Test Red RUN Pilot Light — Supplied for Each Motor
	D19	TEST Pushbutton for Each Motor
	D20	CPT, 120V Secondary, 2 Pri. Fuses & 1 Sec. Fuse — Supplied for Ea. Motor
	D21	CPT w/100VA Extra Capacity, 120V Sec., 2 Pri. Fuses & 1 Sec. Fuse — Supplied for Each Motor
	D22	CPT w/200VA Extra Capacity, 120V Sec., 2 Pri. Fuses & 1 Sec. Fuse — Supplied for Each Motor
	D23	CPT for Duplex — Order by Description
	D24	Add 2 Relays to Modify Controller to Operate w/Single-Pole Pilot Devices
	D25	Add 3 Relays to Modify Controller to Operate w/Single-Pole Pilot Devices
	D26	Green — OFF for each starter
	D27	Green — Push-to-Test OFF for ea. starter

① Not available for ***IT.*** or ***XT*** Starters.

Table 33-56. E — Enclosure Modifications, Elapsed Time Meter, Duplex Outlet, Enclosure for Starter, Enclosure Clear Cover, Enclosure Material

Modification	Catalog Number Suffix	Description
Enclosure Modifications	**E3**	Oversize Enclosure
	E4	Enclosure — Order by Description
	E8	Service Entrance Rating w/Ground Bar
	E11	Safety Door Interlock
Elapsed Time Meter	**E9**	Wired Across Coil, Type 1, 12
		Wired Across Coil, Type 3R, 4X
	E10	Elapsed Time Meter — Order by Description
Duplex Outlet	**E12**	Convenience Duplex Outlet Mounted in Side of Enclosure
Enclosure for Starter ②	**E13**	Horizontal Combination Starter, Size 0 – 2
	E14	Narrow Combination Starter, Size 0 – 2
Enclosure Clear Cover for ***XT***	**E19**	Clear Cover for Halyester Enclosure Nonmetallic
Enclosure Material	**E20**	Convert to 316 Stainless Steel
	E21	Convert from Type 3R to Stainless Steel

② Not available for ***IT.*** or ***XT*** Starters.

Table 33-57. F — Fuse Clips, Fuse Blocks, Fungus Protection, Fingerproof Covers, EMI Filter

Modification	Catalog Number Suffix	Description
Fuse Clips ④	**F1**	Change Fuse Clips in Position 8 to Class J
	F2	Change Fuse Clips in Position 8 to Class H & K (30 & 60 Ampere Only)
Fuse Blocks	**F4**	Power Fuses Included — Order by Description
	F5	30 Ampere Control Circuit Fuseholder (KTK) Mounted on Panel (Unwired), Fuse Not Supplied
	F6	30 Ampere Control Circuit Fuseholder Mounted on Panel (Unwired), FNQR Fuse Supplied
	F7	3-Pole Power Fuseholder Mounted on Front Contactor
	F8	Separate Fusing of Control Power Supply — ***IT.***
	F10	Blown Fuse Indicator (Not for PFC)
	F21	Class CC Fuses
EMI Filter (MVX)	**F22**	3-Phase ③
	F23	1-Phase ③

③ The EMI filter is not necessary to meet the CE mark requirements for EMC when installing the MVX in an EC country.

④ Not available for ***XT*** Starters.

Table 33-58. G — Ground Fault Relay, Grounding

Modification	Catalog Number Suffix	Description
Ground Fault Relay	**G1**	Ground Fault Relay (Wired)
	G3	Ground Fault Relay (Unwired)
Grounding	**G5**	Special Grounding — Order by Description
	G6	Ground Fault Protection Omitted (Advantage)
	G7	Ground Fault Protection and Monitoring Panel

Table 33-59. H — Heater (Space), Heater Packs Installed

Modification	Catalog Number Suffix	Description	
Space Heater	**H1**	Space Heater and Thermostat	
	H2	Space Heater and NC Interlock	
Install Heater Packs (Freedom Series)	**H5**	**Class 20**	**Class 10**
		/D1 H2001B-3 /D2 H2002B-3 /D3 H2003B-3 /D4 H2004B-3 /D5 H2005B-3	/D25 H2101B-3 /D26 H2102B-3 /D27 H2103B-3 /D28 H2104B-3 /D29 H2105B-3
		/D6 H2006B-3 /D7 H2007B-3 /D8 H2008B-3 /D9 H2009B-3 /D10 H2010B-3	/D30 H2106B-3 /D31 H2107B-3 /D32 H2108B-3 /D33 H2109B-3 /D34 H2110B-3
		/D11 H2011B-3 /D12 H2012B-3 /D13 H2013B-3 /D14 H2014B-3 /D15 H2015B-3	/D35 H2111B-3 /D36 H2112B-3 /D37 H2113B-3 /D38 H2114B-3 /D39 H2115-3
		/D16 H2016B-3 /D17 H2017B-3 /D18 H2018-3 /D19 H2019-3 /D20 H2020-3	/D40 H2116-3 /D41 H2117-3
		/D21 H2021-3 /D22 H2022-3 /D23 H2023-3 /D24 H2024-3	

Table 33-60. K — MVX Keypad ①

Modification	Catalog Number Suffix	Description
Keypad (MVX)	**K1**	Door-Mounted AFD Keypad (Type 1 and 12)
	K2	Door-Mounted AFD Keypad (Type 3R)
	K3	AFD Copy Keypad (mounted on drive)
	K4	Door-Mounted AFD Copy Keypad (Type 1 and 12)
	K5	Door-Mounted AFD Copy Keypad (Type 3R)

① See **PG0300001E** for more MVX Modifications.

Table 33-61. L — Labels, Line and Load Reactors, Lighting Contactors

Modification	Catalog Number Suffix	Description
Carton Label	**L10**	Customer Marking — Specify
Line Reactors (MVX)	**L12**	3% Input Line Reactor, 3-Phase, Open Core and Coil ②
	L13	3% Input Line Reactor, 1-Phase, Open Core and Coil ②
	L14	5% Input Line Reactor, 3-Phase, Open Core and Coil ②
	L15	5% Input Line Reactor, 1-Phase, Open Core and Coil ②
	L16	Line Reactor — Order by Description
Load Reactors (MVX)	**L17**	Output Line DV/DT Filter, Open Core and Coil ③
	L18	Load Reactor — Order by Description
Lighting Contactors	**L21**	1 NC Pole
	L22	2 NC Pole
	L23	3 NC Pole
	L24	4 NC Pole
	L25	5 NC Pole
	L26	6 NC Pole
	L27	7 NC Pole
	L28	8 NC Pole
	L29A	3-Wire 120V AC
	L29B	3-Wire 240V AC
	L29C	3-Wire 24V AC
	L29D	3-Wire 24V DC
	L29E	2-Wire 120V AC
	L29F	2-Wire 240V AC
	L29G	2-Wire 24V AC

② If the power source exceeds 500 kVA, 3% line unbalance, or if transient voltages from power factor capacitor switching events are present, an input line reactor must be used. The input line reactor will also reduce line current harmonics.

③ The output line DV/DT filter is required when the distance from the drive to the motor exceeds 33 feet (10m). The total cable run should not exceed 165 feet (50m).

Table 33-62. N — Nameplates

Modification	Catalog Number Suffix	Description
Nameplates	**N1**	Enclosure Nameplates

Table 33-63. P — Pilot Lights, Pushbuttons, Phase Relays, Potential Transformers, Power Factor Correction Capacitors, Program Timer, Percentage Timer, Photocell

Modification	Catalog Number Suffix	Description
Push-to-Test Pilot Lights	**P1**	Push-to-Test Pilot Light (Red RUN) Wired to Coil
	P2	Push-to-Test Pilot Light (Green OFF) Wired in Series with Auxiliary Contact
	P3	Combination of **P1** and **P2** Above
	P4	Push-to-Test Pilot Light (Amber RUN) Wired to Coil
	P49	Push-to-Test Pilot Light (Green RUN)
	P54 ①	Push-to-Test Pilot Light — Red BYPASS (MVX)
	P56 ①	Push-to-Test Pilot Light — Amber INVERTER ENABLE (MVX)
	P57	Push-to-Test Pilot Light — Green STOP
Pushbuttons	**P5**	EMERGENCY STOP — Mushroom Head
	P6 ①	Pushbutton Omitted
	P7	START/STOP
	P8	ON/OFF
	P9	START
	P10	ON
	P11	OFF
	P12 ①	FORWARD/REVERSE/STOP
	P13 ①	FAST/SLOW/STOP
	P14 ①	FAST/OFF/SLOW
	P15 ①	HIGH/LOW/STOP
	P16 ①	HIGH/LOW
	P17 ①	SLOW/FAST
	P18 ①	Pushbutton with Legend Plate
	P52	UP/STOP/DOWN
	P53	OPEN/STOP/CLOSE
Pilot Lights	**P19**	With 1 Amber Pilot Light Marked POWER AVAILABLE Wired to Load Side of 2 Fuses or Circuit Breaker
	P20	Pilot Light (Amber RUN) Wired to Coil
	P21 ①	With 1 Red Pilot Light Marked RUN Wired thru NO Auxiliary Contact
	P22 ①	With 1 Push-to-Test Red Light Marked RUN Wired thru NO Auxiliary Contact
	P23	Pilot Light — Red RUN
	P24	Pilot Light — Red ON
	P25	Pilot Light — Green OFF
	P26	Pilot Light — Order by Description
	P29	Pilot Light — Red STOP

① Not available for ***IT.*** Starters.

Table 33-63. P — Pilot Lights, Pushbuttons, Phase Relays, Potential Transformers, Power Factor Correction Capacitors, Program Timer, Percentage Timer, Photocell (Continued)

Modification	Catalog Number Suffix	Description
Pilot Lights (Continued)	**P58**	Pilot Light — Red BYPASS (MVX)
	P59 ②	Pilot Light — Amber INVERTER ENABLE (MVX)
	P60 ②	Pilot Light — Red INVERTER RUNNING (MVX)
	P61	Pilot Light — Green STOP
	P62 ②	FORWARD/REVERSE Red Pilot Lights
	P63 ②	UP/DOWN Red Pilot Lights
	P64 ②	OPEN/CLOSE Red Pilot Lights
	P65 ②	HIGH/LOW Red Pilot Lights
	P66 ②	FAST/SLOW Red Pilot Lights
	P67	Green RUN Light
	P68	LED Bulbs
	P69	Blue OVERLOAD Light
Illuminated Pushbutton	**P27**	Illuminated Pushbutton — Order by Description
Phase Loss Relay	**P28**	Phase Loss Relay
	P36	Phase Loss Protection Omitted (Advantage)
	P37	Extended Phase Loss Trip Time (Advantage)
Phase Reversal Relay	**P30**	Phase Reversal Relay
Phase Unbalance Relay	**P32**	Phase Unbalance Relay
Phase Monitoring Relay	**P34**	Phase Monitoring Relay
Power Factor Correction Capacitors	**P38**	/F1 20 kVar /F2 25 kVar /F3 30 kVar /F4 35 kVar /F5 40 kVar /F6 45 kVar /F7 50 kVar /F8 60 kVar /F9 70 kVar /F10 75 kVar /F11 80 kVar /F12 90 kVar /F13 100 kVar /F14 125 kVar /F15 150 kVar /F16 175 kVar /F17 200 kVar /F18 225 kVar /F19 250 kVar /F20 300 kVar /F21 350 kVar /F22 400 kVar
Potential Transformers	**P39** ②	Potential Transformer — Wired L1 – L2
	P40 ②	Potential Transformer — Wired L1– L2 and L2 – L3
	P41 ②	Potential Transformer — 3 Phases
Pump Controller	**P42**	Pump Controller for ***IT.***
Program Timers	**P43**	15-Minute Program Timer
	P44	24-Hour Program Timer
	P45	7-Day Program Timer with Day Omission Feature
Percentage Timers	**P47**	15-Minute Percentage Timer
	P48	60-Minute Percentage Timer
Photocell	**P70** ②	Photoelectric Receptacle with Photocell

② Not available for ***IT.*** Starters.

Table 33-64. Q — IQ Products, DN50

Modification	Catalog Number Suffix	Description
IQ Products	**Q1**	IQ 500
	Q3	IQ 1000
	Q5	IQ 4000
	Q8	With Wponi (Advantage)
	Q9	With WCTLponi (Advantage)
IQ Data Metering Module	**Q12** ①	IQ Data Metering Module
	Q14	IQ 220 with Cable
DN50	**Q13** ①	DeviceNet Input/Output Module

① Not available for ***IT.*** Starters.

Table 33-65. R — Ramp, Relays, Solid-State Electronic Overload Relays, Resets, Overload Relay Modifications, Reversing, DeviceNet Interface

Modification	Catalog Number Suffix	Description	
Ramp	**R1**	Extended Ramp of ***IT.***	
Relay ②	**R2**	Overvoltage Relay	
Fixed Heater Overload Relay ③	**R8**	C316FNA3C	.25 – .40A
	R9	C316FNA3D	.40 – .63A
	R10	C316FNA3E	.63 – 1.00A
	R11	C316FNA3F	1.00 – 1.40A
	R12	C316FNA3G	1.30 – 1.80A
	R13	C316FNA3H	1.70 – 2.40A
	R14	C316FNA3J	2.20 – 3.10A
	R15	C316FNA3K	2.80 – 4.00A
	R16	C316FNA3L	3.50 – 5.00A
	R17	C316FNA3M	4.50 – 6.50A
	R18	C316FNA3N	6.00 – 8.50A
	R19	C316FNA3P	7.50 – 11.00A
	R20	C316FNA3Q	10.00 – 14.00A
	R21	C316FNA3R	13.00 – 19.00A
	R22	C316FNA3S	18.00 – 24.00A
	R23	C316FNA3T	24.00 – 32.00A
	R24	C316KNA3A	18.00 – 25.00A
	R25	C316KNA3B	22.00 – 32.00A
	R26	C316KNA3C	29.00 – 42.00A
	R27	C316KNA3D	36.00 – 52.00A
	R28	C316KNA3E	45.00 – 63.00A
	R29	C316KNA3F	60.00 – 80.00A
	R30	C316PNA3A	65.00 – 90.00A
	R31	C316PNA3B	80.00 – 100.00A
	R32	C316PNA3C	100.00 – 135.00A
	R33	C316PNA3D	110.00 – 150.00A
	R34	C316PNA3E	130.00 – 175.00A
	R35	C316PNA3F	150.00 – 200.00A
	R36	C316SNA3A	130.00 – 185.00A
	R37	C316SNA3B	165.00 – 235.00A
	R38	C316SNA3C	220.00 – 310.00A
	R39	C316SNA3D	285.00 – 400.00A
	R40	C316UNA3A	355.00 – 500.00A
	R41	C316UNA3B	465.00 – 650.00A
	R42	C316UNA3C	610.00 – 850.00A

② Not available for ***IT.*** Starters.
③ Not available for ***XT*** Starters.

Table 33-65. R — Ramp, Relays, Solid-State Electronic Overload Relays, Resets, Overload Relay Modifications, Reversing, DeviceNet Interface (Continued)

Modification	Catalog Number Suffix	Description		
Fixed Heater Overload Relay, continued ③	**R43**	Fixed Heater Overload Relay — Order by Description		
	R55	C316FNA3F w/Current Transformer		60.00 – 84.00 FLA
	R56	C316FNA3G w/Current Transformer		78.00 – 108.00 FLA
	R57	C316FNA3H w/Current Transformer		102.00 – 144.00 FLA
	R58	C316FNA3J w/Current Transformer		132.00 – 186.00 FLA
	R59	C316FNA3K w/Current Transformer		168.00 – 240.00 FLA
	R60	C316FNA3L w/Current Transformer		210.00 – 310.00 FLA
Solid-State Electronic Overload Relay ⑤	IEC Frame	NEMA Size	Full Load Current Adjustment Range (A)	3-Phase Automatic/ Manual Reset
				Class 5/10/20/30
	Catalog Number Suffix ➡ ⑥			**R61_**
	B & C	00	0.1 – 0.5 0.4 – 2.0 1.0 – 5.0 1.6 – 8.0	**A** **B** **C** **D**
	C & D	0 & 1	0.1 – 0.5 0.4 – 2.0 1.0 – 5.0 1.6 – 8.0 6.4 – 32	**A** **B** **C** **D** **E**
	D	2	9 – 45	**F**
		3	15 – 75	**G**
	F & G		22 – 110	**H**
	G	4	30 – 150	**J**
	N/A	5	96 – 300	**C**
	N/A	6	192 – 600	**C**
Resets ④	**R5**	Change External Reset to Internal Reset — Hole Covered with Plug		
	R6	Internal Reset — No Hole Plug		
	R44	Manual Reset Only on Overload Relay		
	R45	Auto Reset Only on Overload Relay		
	R47	Internal Trip Indicator — No External Reset		
	R48	External Reset with External Trip Indicator		
	R49	External Reset with Bell Alarm		
	R71	N3R Reset Boot Added (Type 1/12 Only)		
Reversing ④	**R54**	Reversing Contactor/Starter		
Overload Relay Mods	**R53**	Anti Plug-In		
	R61	C395 DNA DeviceNet Module		
	R62	C395 Bell Alarm		
	R63	C395 Load Module		
	R64	C395 Program Key		
DeviceNet Interface	**R69**	DeviceNet Interface		
	R65	Standard Reset for DeviceNet		
	R66	Lighted Reset for DeviceNet		
	R67	Trip Indicator for DeviceNet		
	R68	DeviceNet Communication Interface (MVX)		

④ Not available for ***IT.*** or ***XT*** Starters.
⑤ Features:
- Self-Powered
- Phase Loss Protection
- Current Adjustment Knob
- ± 1% Repeat Accuracy
- 1NO and 1NC Isolated Contacts

⑥ Complete Modification Code includes overload range. Example **R61/C**.

Table 33-66. S — System Voltage, Selector Switches, Suppressor, Incomplete Sequence Protection, Single-Phase Jumper, Surge Capacitor, Speed Potentiometer

Modification	Catalog Number Suffix	Description
System Voltage Selection	**S1**	System Voltage Selection for Internal Components
		/H1 208V 60 Hz /H2 240V 60 Hz /H3 277V 60 Hz, 1-Ph /H4 480V 60 Hz /H5 600V 60 Hz /H6 796V 60 Hz /H7 220V 50 Hz /H8 380V 50 Hz /H9 415V 50 Hz /H10 550V 50 Hz /H11 660V 50 Hz /H12 380V 60 Hz /H13 1500V 60 Hz
	S2	System Voltage Selection — Specify on Order
Selector Switches ①	**S3**	HAND/OFF/AUTO
	S4	HAND/AUTO
	S5	HAND/OFF/AUTO Selector Switch with 1 Red RUN Pilot Light
	S6	RUN/OFF/AUTO
	S7	AUTO/OFF/TEST
	S8	AUTO/OFF/TEST Selector Switch with 1 Red RUN Pilot Light
	S9	AUTO/OFF/TEST Selector Switch with 1 Red RUN Pilot Light and 1 Green Pilot Light
	S10	OFF/AUTO
	S11	START/STOP
	S12	OFF/ON
	S13 ②	HIGH/LOW
	S14 ②	FAST/OFF/SLOW
	S15 ②	SLOW/FAST
	S16 ②	FORWARD/REVERSE
	S17 ②	HIGH/OFF/LOW
	S18 ②	HIGH/LOW/OFF/AUTO
	S21	HAND/OFF/AUTO Spring Return from Left
	S38 ②	INVERTER/OFF/BYPASS (MVX)
	S41 ②	OPEN/OFF/CLOSE
	S42 ②	FORWARD/OFF/REVERSE
	S43 ②	FAST/OFF/SLOW/AUTO
	S19 ②	Selector Switch Omitted (Pump Panels Only)
	S40	Selector Switch — Order by Description
Suppressor	**S24** ②	Transient Suppressor Mounted on Magnet Coil
Surge Suppression	**S20**	MOV (***IT.***)
Sequence Timer	**S26** ②	Sequence Timer (Pump Panels)
Sequence Protection	**S27** ②	Incomplete Sequence Protection
Pump	**S28**	480V BP9000 Pump
Single Phase ②	**S29**	Convert Contactor or Starter from Three-Phase to Single-Phase — Install Jumper
	S30	Single-Phase Rev. 120V
	S31	Single-Phase Rev. 240V
Surge Capacitor	**S37** ②	Surge Capacitor Wired to Disconnect Line Side
Speed Potentiometer	**S39** ②	Speed Potentiometer (MVX)

① When using 3-position selector switch with magnetic lighting contactor, mod **C20** must also be used (ECL04, ECL13, ECL15).
② Not available for ***IT.*** Starters.

Table 33-67. T — Timers, Time Delay Relays, Terminal Blocks, Terminal Points, Ring Lug Connections

Modification	Catalog Number Suffix	Description
Timers	**T1** ③	Pneumatic Timer Installed on Contactor, Unwired, 30 Sec. Max.
	T2 ③	Pneumatic Timer Installed on Contactor, Unwired, 180 Sec. Max.
	T3	Pneumatic Timer Mounted in Enclosure, Unwired, 180 Sec. Max.
	T4	Solid-State ON Delay Timer (1 – 30 sec)
	T5	Solid-State ON Delay Timer (30 – 300 sec)
	T25	Timer — Order by Description
Time Delay Relays	**T6**	Time Delay Relay, 3 Minutes Maximum, Unwired, ON DELAY
	T7	Time Delay Relay, 3 Minutes Maximum, Unwired, OFF DELAY
	T8	Time Delay Low Voltage Release Relay
Terminal Blocks	**T9**	With 1 Single Circuit Terminal Block, Unwired
	T10	With 2 Single Circuit Terminal Block, Unwired
	T24 ③	Power Terminal Block for DeviceNet Overload
Terminal Points	**T11**	With 6 Terminal Points, Unwired
	T12	With 12 Terminal Points, Unwired
	T13	With 18 Terminal Points, Unwired
	T14	Terminal Point per Customer Specification, Unwired (Price Each)
	T15	Terminal Point per Customer Specification, Wired (Price Each)
	T21 ③	3 Terminals Mounted Between Contactor and Overload for Power Factor Capacitors — Sizes 0 – 2
	T22 ③	3 Terminals Mounted Between Contactor and Overload for Power Factor Capacitors — Sizes 3 – 4
	T23 ③	Quick-Connect Terminals Added to DP Contactor/Starter
Ring Lug Connections	**T16** ④	Ring Lug Connections on Power Wires
	T17 ③	Ring Lug Connections on Control Wires
IT./EM	**T30**	Reset Only
	T31	STOP with Reset
	T32	START/STOP with Reset
	T33A	HAND/OFF/AUTO with Reset 120V AC
	T33D	HAND/OFF/AUTO with Reset 24V DC
	T34	ON/OFF
	T40	Reset Only (DeviceNet)
	T41	STOP with Reset (DeviceNet)
	T42	START/STOP with Reset (DeviceNet)
	T43A	HAND/OFF/AUTO with Reset 120V AC (DeviceNet)
	T43D	HAND/OFF/AUTO with Reset 24V DC (DeviceNet)
	T44	ON/OFF
	T50	Reset Only
	T51	STOP with Reset
	T52	FORWARD/REVERSE/STOP with Reset
	T53A	FORWARD/REVERSE/STOP with Reset 120V AC
	T53D	FORWARD/REVERSE/STOP with Reset 24V DC
	T54	ON/OFF

③ Not available for ***IT.*** Starters.
④ Not available for ***XT*** Starters.

Table 33-67. T — Timers, Time Delay Relays, Terminal Blocks, Terminal Points, Ring Lug Connections (Continued)

Modification	Catalog Number Suffix	Description
IT./EM, continued	**T60**	Reset Only (DeviceNet)
	T61	STOP with Reset (DeviceNet)
	T62	FORWARD/REVERSE/STOP with Reset (DeviceNet)
	T63A	FORWARD/REVERSE/STOP with Reset 120V AC (DeviceNet)
	T63D	FORWARD/REVERSE/STOP with Reset 24V DC (DeviceNet)
	T64	ON/OFF
	T70	Reset Only
	T71	START/STOP with Reset
	T72	HAND/OFF/AUTO – START with Reset
	T73	FORWARD/REVERSE/STOP with Reset
	T74	HAND/OFF/AUTO – FORWARD/REVERSE with Reset
	T75	ON/OFF with Reset
	T76	FAST/SLOW/STOP with Reset
	T77	HAND/OFF/AUTO – FAST/SLOW with Reset

Table 33-68. U — Undervoltage Relay, Time Delay Undervoltage Relay

Modification	Catalog Number Suffix	Description
Undervoltage Relays	**U1**	Undervoltage Relay, Non-adjustable
	U2	Undervoltage Relay, Adjustable
Time Delay Undervoltage Relays	**U4** ①	Time Delay Undervoltage Relay, Non-adjustable
	U5	Time Delay Undervoltage Relay, Adjustable
Under- and Overvoltage Relay	**U7**	Under- and Overvoltage Relay

① Not available for ***IT.*** Starters.

Table 33-69. V — Voltmeter, Varmeter, Vacuum Starter

Modification	Catalog Number Suffix	Description
Voltmeters	**V1**	1 Panel Type Voltmeter Wired L1 – L2
	V2	Panel Type Voltmeter and Selector Switch Wired to Read Three Line Voltages
	V3 ②	Miniature Voltmeter Wired L1 – L2
	V4 ②	Miniature Voltmeter and Selector Switch Wired to Read Three Line Voltages
	V5	Switchboard Type Voltmeter Wired L1 – L2
	V6 ②	Switchboard Type Voltmeter and Selector Switch Wired to Read Three Line Voltage
	V7	3 Panel Type Voltmeters Wired in Each Phase
	V8 ②	3 Miniature Voltmeters Wired in Each Phase
	V9	3 Switchboard Type Voltmeters Wired in Each Phase
	V10	Voltmeter — Order by Description
Varmeter ③	**V11**	Varmeter
	V12	Varmeter — Order by Description
Vacuum Starter ③	**V13**	Vacuum Starter — 1500V Rating

② Type 1/12 only.
③ Not available for ***XT*** Starters.

Table 33-70. W — Wattmeter, Watt-Hour Meter, Wiremarkers, Wiring Diagram

Modification	Catalog Number Suffix	Description
Wattmeter ④	**W1**	Wattmeter
Watt-Hour Meter ④	**W3**	Watt-Hour Meter
	W5	Watt-Hour Meter with Demand Attachment
Wiremarkers	**W7**	Wiremarkers
	W8	Wiremarkers — Order per Customer Diagram or Specifications
	W9	Wiremarkers — Order by Description
WYE-Delta hp	**W10** ⑤	See **P03300001E**
Windows in Enclosure	**W11**	Enclosure Windows (MVX)
Wiring Diagram	**W12**	Reduced Copy of Custom Wiring Diagram Laminated on Inside of Door

④ Type 1/12 only.
⑤ Not available for ***XT*** Starters.

Contents

MN307 Open Non-reversing Manual Motor Controller

Product Description

The new Cutler-Hammer® Intelligent Technologies (***IT.***) Open Non-reversing and Reversing Manual Motor Controllers with NEMA Contactors from Eaton's electrical business combine a Manual Motor Protector with a NEMA Contactor(s) to provide a complete motor protection solution by combining motor disconnect function, thermal overload protection, magnetic short circuit protection and remote control operation in one compact, assembled unit. These assembled Manual Motor Controllers cover motors with FLA ratings from 0.22A to 25A.

The UL 508 Type F labeled Combination Motor Controller (CMC) includes a Line Side Adapter (LSA) for NEMA Size 00, Size 0 and Size 2. The Size 1 does not require an LSA. These assembled Combination Motor Controllers cover motors with FLA ratings from 0.22A to 40A.

Application Description

The ***IT.*** NEMA Non-reversing and Reversing Manual and Combination Motor Controllers can be used in the following applications:

- Manual Motor Controller for Single and Multi Motor Panels. The preassembled ***IT.*** Manual Motor Controllers (MMC) combine a Manual Motor Protector, Wiring Connector Link (NEMA Size 00 – 1 Non-reversing) and NEMA Contactor. The A307, A308 and A309 Manual Motor Protectors are UL listed as UL 508, Type E Self-Protected Manual Combination Starters. MMCs can also be field installed with separate MMPs, WCL and Contactor(s). A NEMA magnetic contactor has been added to allow for remote operation of the motor circuit.
- Combination Motor Controller (UL 508, Type F), for Single and Multi Motor Panels — The preassembled Combination Motor Controllers combine a Line Side Adapter, Manual Motor Protector, Wiring Connector Link (NEMA Size 00 – 1 Non-reversing) and NEMA Contactor. The A307, A308 and A309 Manual Motor Protectors are UL listed as UL 508, Type E Self-Protected Manual Combination Starters. This UL listing allows these devices to be used in motor circuits without having to add separate branch short circuit protection. A NEMA magnetic contactor has been added to allow for remote operation of the motor circuit.
- Group Motor Installations — Since the Manual Motor Protectors (Manual Combination Starters) are UL listed for Group Motor Installations, the Manual Motor Controllers provide a compact, assembled package for Group Motor Installations up to 600V.

For Group Installations (in-panel SCPD) applying the traditional 1/3 tap rule, the Manual Motor Protectors and Manual Motor Controllers may be used on 480V Delta systems along with 480Y/277V and 600Y/347V slash rated Wye systems. For Group Installations, applying the more recent 1/10 tap conductor rule, a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

For actual UL 508 Type E/F applications (out-of-panel upstream feeder SCPD only), a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

For Manual "At Motor" Disconnect applications, a maximum 240V Delta is permitted or 480Y/277V and 600Y/347V slash rated Wye systems.

Features

- ON/OFF rotary handle with lockout provision
- Visible trip indication
- Test trip function
- Motor applications from 0.22A to 40A
- Class 10 overload protection
- Built-in heater and magnetic trip elements to protect the motor
- Phase loss sensitivity
- Type 2 coordination
- Ambient compensated up to 140°F (60°C)

Table 33-71. Short Circuit Ratings — UL 508 Type E Manual Combination Starter/Motor Controller

Description	Specification
A307 ①	65 kA @ 240V, 480Y/277V 30 kA @ 600Y/347V up to 12.5A
A308 ①	65 kA @ 240V, 480Y/277V 25 kA @ 600Y/347V
A309 ①	65 kA @ 240V, 480Y/277V 30 kA @ 600Y/347V up to 75A

① See **Pages 34-295** and **34-296** for individual ratings.

- Control inputs located at bottom of starter for easy access and wiring
- 24V DC coils
- DIN Rail or panel mount — (M)N307, (M)N308 motor controllers
- Mounting plates — (M)N357, N358, N309 and N359 motor controllers
- Adjustment dial for setting motor FLA
- Short circuit trip at 13 times the maximum setting of the FLA adjustment dial
- UL 508 Type F CMC High Fault Short Circuit Ratings: Refer to **Table 33-73** on **Page 33-53**.
- Communications with the addition of an ***IT.*** Overload Relay and SNAP (Starter Network Adapter Product). See **Tab 50**.

Standards and Certifications

UL508 Type F Combination Motor Controller

- IEC Type 2 Approved per IEC 60947-4-1
- UL Listed File No. E218618
- CE Mark

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Instructional Leaflets

IL49490	A307 Manual Motor Protector
IL49491	A308 Manual Motor Protector
IL49492	A309 Manual Motor Protector
Pub51012	*IT.* Non-reversing and Reversing Manual Motor Controller B-Frame 45 mm ME307, ME357, MN307 and MN357 Installation and Assembly
Pub51013	*IT.* Non-reversing Manual Motor Controller C-Frame 54 mm ME308 and MN308 Installation and Assembly
Pub50761	*IT.* Non-reversing and Reversing Combination Motor Controller B-Frame 45 mm E307, E357, N307 and N357 Installation and Assembly
Pub50762	*IT.* Non-reversing and Reversing Combination Motor Controller C-Frame 54 mm E308, E358, N308 and N358 Installation and Assembly
Pub50763	*IT.* Non-reversing and Reversing Combination Motor Controller D-Frame 76 mm E309, E359, N309 and N359 Installation and Assembly
AP03402001E (Supersedes TP08A01TE)	Application Note
MN03305001E	*IT.* NEMA Contactor and Starter User Manual
Pub49416	*IT.* NEMA Contact Blocks (Size 00 – 4)
Pub50140	*IT.* NEMA Non-reversing Contactor Size 00 and 0 Installation Guide
Pub50150	*IT.* NEMA Non-reversing Contactor Size 1 Installation Guide
Pub50160	*IT.* NEMA Non-reversing Contactor Size 2 Installation Guide
Pub50141	*IT.* NEMA Reversing Contactor Size 00 and 0 Installation Guide
Pub50151	*IT.* NEMA Reversing Contactor Size 1 Installation Guide
Pub50161	*IT.* NEMA Reversing Contactor Size 2 Installation Guide

Catalog Number Selection

Table 33-72. *IT.* Manual and Combination Motor Controller – NEMA Contactors Numbering System

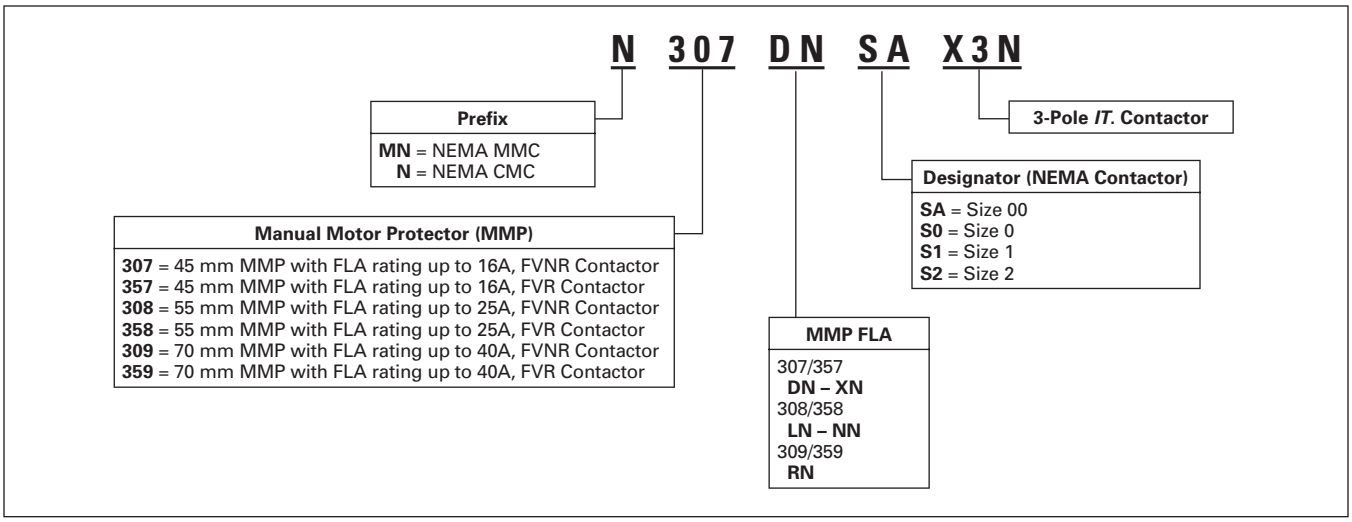


Table 33-73. High Fault Short Circuit Ratings

UL 508 Type F Combination Motor Controller Short Circuit Ratings – Type 2					
Catalog Number	**UL Ratings**		**IEC Ratings**		
	480 Volts	**600 Volts**	**(q) 480 Volts**	**(q) 600 Volts**	**(r) 480/600 Volts**
E307BN Through E307VN, E357BN Through E357VN	65 kA	30 kA	65 kA	30 kA	1 kA
E307XN Through E307Z2, E357XN Through E357Z2	65 kA	30 kA	65 kA	30 kA	3 kA
N307, N357	65 kA	30 kA	65 kA	30 kA	3 kA
E308, E358	65 kA	50 kA	65 kA	50 kA	3 kA
N308, N358	65 kA	50 kA	65 kA	50 kA	3 kA
E309, E359	50 kA	30 kA	50 kA	30 kA	5 kA
N309, N359	50 kA	50 kA	50 kA	50 kA	5 kA
Exceptions to Above					
E307AN	65 kA	50 kA	65 kA	50 kA	1 kA
E307WN, E357WN	65 kA	50 kA	65 kA	30 kA	3 kA
E309RN, E359RN	50 kA	50 kA	50 kA	50 kA	5 kA
E309WN, E359WN	65 kA	30 kA	65 kA	30 kA	5 kA

Product Selection

MN307 — IT. Open Non-reversing Manual Motor Controller with NEMA Size 00 FVNR Contactor

MMC with NEMA Size 00 Contactor for Group Motor Applications

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.0 (6.4A x .92 = 5.88A) select Catalog Number MN307TNSAX3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.15, select Catalog Number MN307UNSAX3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-74. *IT.* Open Non-reversing Manual Motor Controllers (A307 Manual Motor Protector + C320WC45IT Wiring Connector Link + N111B Size 00 *IT.* NEMA Contactor) — For Group Motor Applications

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
0.22 – 0.32	—	—	—	—	—	—	A307DN	N111BSAX3N	**MN307DNSAX3N**	
0.28 – 0.40	—	—	—	—	—	—	A307EN	N111BSAX3N	**MN307ENSAX3N**	
0.35 – 0.50	—	—	—	—	—	—	A307FN	N111BSAX3N	**MN307FNSAX3N**	
0.45 – 0.63	—	—	—	—	—	1/4	A307GN	N111BSAX3N	**MN307GNSAX3N**	
0.55 – 0.80	—	—	—	—	1/4	1/2	A307HN	N111BSAX3N	**MN307HNSAX3N**	
0.7 – 1.0	—	—	—	—	1/2	1/2	A307JN	N111BSAX3N	**MN307JNSAX3N**	
0.9 – 1.25	—	—	—	1/4	3/4	3/4	A307KN	N111BSAX3N	**MN307KNSAX3N**	
1.1 – 1.6	—	1/10	1/4	1/3	3/4	1	A307LN	N111BSAX3N	**MN307LNSAX3N**	
1.4 – 2.0	—	1/8	1/3	1/2	1	1-1/2	A307MN	N111BSAX3N	**MN307MNSAX3N**	
1.8 – 2.5	—	1/6	1/2	1/2	1-1/2	1-1/2	A307NN	N111BSAX3N	**MN307NNSAX3N**	
2.2 – 3.2	1/10	1/4	3/4	3/4	1-1/2	2	A307PN	N111BSAX3N	**MN307PNSAX3N**	
2.8 – 4.0	1/8	1/3	3/4	1	2	3	A307RN	N111BSAX3N	**MN307RNSAX3N**	
3.5 – 5.0	1/6	1/2	1	1	3	3	A307SN	N111BSAX3N	**MN307SNSAX3N**	
4.5 – 6.3	1/4	3/4	1-1/2	1-1/2	5	5	A307TN	N111BSAX3N	**MN307TNSAX3N**	
5.5 – 8.0	1/3	1	2	2	5	5	A307UN	N111BSAX3N	**MN307UNSAX3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Catalog Number is a composite of the factory assembled Manual Motor Protector, Wiring Connector Link and the ***IT.*** Contactor. *E.g.* Catalog No. MN307DNSAX3N is the combination of A307DN, C320WC45IT and N111BSAX3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Page 33-64**
Discount Symbol **1CD1**

MN357 — IT. Open Reversing Manual Motor Controller with NEMA Size 00 FVR Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.0 (6.4A x .92 = 5.88A) select Catalog Number MN357TNSAX3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.15, select Catalog Number MN357UNSAX3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-75. *IT.* Open Reversing Manual Motor Controllers (A307 Manual Motor Protector + N511B Size 00 *IT.* NEMA Reversing Contactor) — For Group Motor Applications

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
0.22 – 0.32	—	—	—	—	—	—	A307DN	N511BSAX3N	**MN357DNSAX3N**	
0.28 – 0.40	—	—	—	—	—	—	A307EN	N511BSAX3N	**MN357ENSAX3N**	
0.35 – 0.50	—	—	—	—	—	—	A307FN	N511BSAX3N	**MN357FNSAX3N**	
0.45 – 0.63	—	—	—	—	—	1/4	A307GN	N511BSAX3N	**MN357GNSAX3N**	
0.55 – 0.80	—	—	—	—	1/4	1/2	A307HN	N511BSAX3N	**MN357HNSAX3N**	
0.7 – 1.0	—	—	—	—	1/2	1/2	A307JN	N511BSAX3N	**MN357JNSAX3N**	
0.9 – 1.25	—	—	—	1/4	3/4	3/4	A307KN	N511BSAX3N	**MN357KNSAX3N**	
1.1 – 1.6	—	1/10	1/4	1/3	3/4	1	A307LN	N511BSAX3N	**MN357LNSAX3N**	
1.4 – 2.0	—	1/8	1/3	1/2	1	1-1/2	A307MN	N511BSAX3N	**MN357MNSAX3N**	
1.8 – 2.5	—	1/6	1/2	1/2	1-1/2	1-1/2	A307NN	N511BSAX3N	**MN357NNSAX3N**	
2.2 – 3.2	1/10	1/4	3/4	3/4	1-1/2	2	A307PN	N511BSAX3N	**MN357PNSAX3N**	
2.8 – 4.0	1/8	1/3	3/4	1	2	3	A307RN	N511BSAX3N	**MN357RNSAX3N**	
3.5 – 5.0	1/6	1/2	1	1	3	3	A307SN	N511BSAX3N	**MN357SNSAX3N**	
4.5 – 6.3	1/4	3/4	1-1/2	1-1/2	5	5	A307TN	N511BSAX3N	**MN357TNSAX3N**	
5.5 – 8.0	1/3	1	2	2	5	5	A307UN	N511BSAX3N	**MN357UNSAX3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② Mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Catalog Number is a composite of the factory assembled Manual Motor Protector, the ***IT.*** Contactor and the mounting plate. *E.g.* Catalog No. MN357DNSAX3N is the combination of A307DN and N511BSAX3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Page 33-67**
Discount Symbol **1CD1**

MN307 — IT. Open Non-reversing Manual Motor Controller with NEMA Size 0 FVNR Contactor

MMC with NEMA Size 0 Contactor for Group Motor Applications

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 12.5A and a service factor of 1.0 (12.5A x .92 = 11.5A) select Catalog Number MN307WNS0X3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 12.5A and a service factor of 1.15, select Catalog Number MN307XNS0X3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-76. *IT.* Open Non-reversing Manual Motor Controllers (A307 Manual Motor Protector + C320WC45IT Wiring Connector Link + N111B Size 0 *IT.* NEMA Contactor) — For Group Motor Applications

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
7.0 – 10	1/2	1-1/2	3	3	7-1/2	10	A307VN	N111BS0X3N	**MN307VNS0X3N**	
9.0 – 12.5	1/2	2	3	3	7-1/2	10	A307WN	N111BS0X3N	**MN307WNS0X3N**	
11 – 16	1	3	5	5	10	15	A307XN	N111BS0X3N	**MN307XNS0X3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Table 33-77. *IT.* Open Reversing Manual Motor Controllers (A307 Manual Motor Protector + N511B Size 0 *IT.* NEMA Reversing Contactor) — For Group Motor Applications

FLA Adjustment Range	Single-Phase hp Ratings ③		Three-Phase hp Ratings ③				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ④	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
7.0 – 10	1/2	1-1/2	3	3	7-1/2	10	A307VN	N511BS0X3N	**MN357VNS0X3N**	
9.0 – 12.5	1/2	2	3	3	7-1/2	10	A307WN	N511BS0X3N	**MN357WNS0X3N**	
11 – 16	1	3	5	5	10	15	A307XN	N511BS0X3N	**MN357XNS0X3N**	

③ Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
④ Mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Non-reversing Catalog Number is a composite of the factory assembled Manual Motor Protector, Wiring Connector Link and the ***IT.*** Contactor. *E.g.* Catalog No. MN307VNS0X3N is the combination of A307VN, C320WC45IT and N111BS0X3N.
- The Reversing Catalog Number is a composite of the factory assembled Manual Motor Protector, Mounting Plate and the ***IT.*** Contactor. *E.g.* Catalog No. MN357VNS0X3N is the combination of A307VN and N511BS0X3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Pages 33-64, 33-66**
Discount Symbol **1CD1**

MN308 IT. Open Non-reversing Manual Motor Controllers with NEMA Size 1 FVNR Contactor

MMC with NEMA Size 1 Contactor for Group Motor Applications

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 20A and a service factor of 1.0 (20A x .92 = 18.4A) select Catalog Number MN308MNS1X3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 20A and a service factor of 1.15, select Catalog Number MN308NNS1X3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-78. *IT.* Open Non-reversing Manual Motor Controllers (A308 Manual Motor Protector + C320WC54 Wiring Connector Link + N111C Size 1 *IT.* NEMA Contactor) — For Group Motor Applications

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
11 – 16	1	3	5	5	10	15	A308LN	N111CS1X3N	**MN308LNS1X3N**	
14 – 20	1-1/2	3	5	7-1/2	15	20	A308MN	N111CS1X3N	**MN308MNS1X3N**	
18 – 25	2	5	7-1/2	10	20	25	A308NN	N111CS1X3N	**MN308NNS1X3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Notes —

- The A308 MMP does not require a Line Side Adapter, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Non-reversing Catalog Number is a composite of the factory assembled Manual Motor Protector, Wiring Connector Link and the ***IT.*** Contactor. *E.g.* Catalog No. MN308LNS1X3N is the combination of A308LN, C320WC54 and N111CS1X3N.

Accessories . . . . . **Page 33-63**
Dimensions. . . . . **Pages 33-65, 33-67**
Discount Symbol **1CD1**

Product Selection

N307 — IT. Open Non-reversing Combination Motor Controller with NEMA Size 00 FVNR Contactor

UL 508 Type F CMC with NEMA Size 00 Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.0 (6.4A x .92 = 5.88A) select Catalog Number N307TNSAX3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.15, select Catalog Number N307UNSAX3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-79. *IT.* UL 508 Type F Open Non-reversing Combination Motor Controllers (C320LSA1 Line Side Adapter + A307 Manual Motor Protector + C320WC45IT Wiring Connector Link + N111B Size 00 *IT.* NEMA Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
0.22 – 0.32	—	—	—	—	—	—	A307DN	N111BSAX3N	**N307DNSAX3N**	
0.28 – 0.40	—	—	—	—	—	—	A307EN	N111BSAX3N	**N307ENSAX3N**	
0.35 – 0.50	—	—	—	—	—	—	A307FN	N111BSAX3N	**N307FNSAX3N**	
0.45 – 0.63	—	—	—	—	—	1/4	A307GN	N111BSAX3N	**N307GNSAX3N**	
0.55 – 0.80	—	—	—	—	1/4	1/2	A307HN	N111BSAX3N	**N307HNSAX3N**	
0.7 – 1.0	—	—	—	—	1/2	1/2	A307JN	N111BSAX3N	**N307JNSAX3N**	
0.9 – 1.25	—	—	—	1/4	3/4	3/4	A307KN	N111BSAX3N	**N307KNSAX3N**	
1.1 – 1.6	—	1/10	1/4	1/3	3/4	1	A307LN	N111BSAX3N	**N307LNSAX3N**	
1.4 – 2.0	—	1/8	1/3	1/2	1	1-1/2	A307MN	N111BSAX3N	**N307MNSAX3N**	
1.8 – 2.5	—	1/6	1/2	1/2	1-1/2	1-1/2	A307NN	N111BSAX3N	**N307NNSAX3N**	
2.2 – 3.2	1/10	1/4	3/4	3/4	1-1/2	2	A307PN	N111BSAX3N	**N307PNSAX3N**	
2.8 – 4.0	1/8	1/3	3/4	1	2	3	A307RN	N111BSAX3N	**N307RNSAX3N**	
3.5 – 5.0	1/6	1/2	1	1	3	3	A307SN	N111BSAX3N	**N307SNSAX3N**	
4.5 – 6.3	1/4	3/4	1-1/2	1-1/2	5	5	A307TN	N111BSAX3N	**N307TNSAX3N**	
5.5 – 8.0	1/3	1	2	2	5	5	A307UN	N111BSAX3N	**N307UNSAX3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For *IT.* NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Catalog Number is a composite of the factory assembled Line Side Adapter, Manual Motor Protector, Wiring Connector Link and the *IT.* Contactor. *E.g.* Catalog No. N307DNSAX3N is the combination of C320LSA1, A307DN, C320WC45IT and N111BSAX3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Page 33-64**
Discount Symbol **1CD1**

N357 — IT. Open Reversing Combination Motor Controller with NEMA Size 00 FVR Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.0 (6.4A x .92 = 5.88A) select Catalog Number N357TNSAX3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 6.4A and a service factor of 1.15, select Catalog Number N357UNSAX3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-80. *IT.* UL 508 Type F Open Reversing Combination Motor Controllers (C320LSA1 Line Side Adapter + A307 Manual Motor Protector + N511B Size 00 *IT.* NEMA Reversing Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
0.22 – 0.32	—	—	—	—	—	—	A307DN	N511BSAX3N	**N357DNSAX3N**	
0.28 – 0.40	—	—	—	—	—	—	A307EN	N511BSAX3N	**N357ENSAX3N**	
0.35 – 0.50	—	—	—	—	—	—	A307FN	N511BSAX3N	**N357FNSAX3N**	
0.45 – 0.63	—	—	—	—	—	1/4	A307GN	N511BSAX3N	**N357GNSAX3N**	
0.55 – 0.80	—	—	—	—	1/4	1/2	A307HN	N511BSAX3N	**N357HNSAX3N**	
0.7 – 1.0	—	—	—	—	1/2	1/2	A307JN	N511BSAX3N	**N357JNSAX3N**	
0.9 – 1.25	—	—	—	1/4	3/4	3/4	A307KN	N511BSAX3N	**N357KNSAX3N**	
1.1 – 1.6	—	1/10	1/4	1/3	3/4	1	A307LN	N511BSAX3N	**N357LNSAX3N**	
1.4 – 2.0	—	1/8	1/3	1/2	1	1-1/2	A307MN	N511BSAX3N	**N357MNSAX3N**	
1.8 – 2.5	—	1/6	1/2	1/2	1-1/2	1-1/2	A307NN	N511BSAX3N	**N357NNSAX3N**	
2.2 – 3.2	1/10	1/4	3/4	3/4	1-1/2	2	A307PN	N511BSAX3N	**N357PNSAX3N**	
2.8 – 4.0	1/8	1/3	3/4	1	2	3	A307RN	N511BSAX3N	**N357RNSAX3N**	
3.5 – 5.0	1/6	1/2	1	1	3	3	A307SN	N511BSAX3N	**N357SNSAX3N**	
4.5 – 6.3	1/4	3/4	1-1/2	1-1/2	5	5	A307TN	N511BSAX3N	**N357TNSAX3N**	
5.5 – 8.0	1/3	1	2	2	5	5	A307UN	N511BSAX3N	**N357UNSAX3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② Mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Catalog Number is a composite of the factory assembled Line Side Adapter, Manual Motor Protector, the ***IT.*** Contactor and the mounting plate. *E.g.* Catalog No. N357DNSAX3N is the combination of C320LSA1, A307DN and N511BSAX3N.

Accessories . . . . . **Page 33-63**
Dimensions. . . . . **Page 33-67**
Discount Symbol **1CD1**

N307 & N357 — IT. Open Non-reversing and IT. Reversing Combination Motor Controllers with NEMA Size 0 Contactor(s)

UL 508 Type F CMC with NEMA Size 0 Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 12.5A and a service factor of 1.0 (12.5A x .92 = 11.5A) select Catalog Number N307WNS0X3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 12.5A and a service factor of 1.15, select Catalog Number N307XNS0X3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-81. *IT.* UL 508 Type F Open Non-reversing Combination Motor Controllers (C320LSA1 Line Side Adapter + A307 Manual Motor Protector + C320WC45IT Wiring Connector Link + N111B Size 0 *IT.* NEMA Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
7.0 – 10	1/2	1-1/2	3	3	7-1/2	10	A307VN	N111BS0X3N	**N307VNS0X3N**	
9.0 – 12.5	1/2	2	3	3	7-1/2	10	A307WN	N111BS0X3N	**N307WNS0X3N**	
11 – 16	1	3	5	5	10	15	A307XN	N111BS0X3N	**N307XNS0X3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Table 33-82. *IT.* UL 508 Type F Open Reversing Combination Motor Controllers (C320LSA1 Line Side Adapter + A307 Manual Motor Protector + N511B Size 0 *IT.* NEMA Reversing Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ③		Three-Phase hp Ratings ③				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ④	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
7.0 – 10	1/2	1-1/2	3	3	7-1/2	10	A307VN	N511BS0X3N	**N357VNS0X3N**	
9.0 – 12.5	1/2	2	3	3	7-1/2	10	A307WN	N511BS0X3N	**N357WNS0X3N**	
11 – 16	1	3	5	5	10	15	A307XN	N511BS0X3N	**N357XNS0X3N**	

③ Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
④ Mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Non-reversing Catalog Number is a composite of the factory assembled Line Side Adapter, Manual Motor Protector, Wiring Connector Link and the ***IT.*** Contactor. *E.g.* Catalog No. N307VNS0X3N is the combination of C320LSA1, A307VN, C320WC45IT and N111BS0X3N.
- The Reversing Catalog Number is a composite of the factory assembled Line Side Adapter, Manual Motor Protector, Mounting Plate and the ***IT.*** Contactor. *E.g.* Catalog No. N357VNS0X3N is the combination of C320LSA1, A307VN and N511BS0X3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Pages 33-64, 33-66**
Discount Symbol **1CD1**

N308 & N358 — IT. Open Non-reversing and IT. Reversing Combination Motor Controllers with NEMA Size 1 Contactor(s)

UL 508 Type F CMC with NEMA Size 1 Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 20A and a service factor of 1.0 (20A x .92 = 18.4A) select Catalog Number N308MNS1X3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 20A and a service factor of 1.15, select Catalog Number N308NNS1X3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-83. *IT.* UL 508 Type F Open Non-reversing Combination Motor Controllers (A308 Manual Motor Protector + C320WC54 Wiring Connector Link + N111C Size 1 *IT.* NEMA Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
11 – 16	1	3	5	5	10	15	A308LN	N111CS1X3N	**N308LNS1X3N**	
14 – 20	1-1/2	3	5	7-1/2	15	20	A308MN	N111CS1X3N	**N308MNS1X3N**	
18 – 25	2	5	7-1/2	10	20	25	A308NN	N111CS1X3N	**N308NNS1X3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② DIN rail mounting. No mounting plate included.

Table 33-84. *IT.* UL 508 Type F Open Reversing Combination Motor Controllers (A308 Manual Motor Protector + N511C Size 1 *IT.* NEMA Reversing Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ③		Three-Phase hp Ratings ③				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ④	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
11 – 16	1	3	5	5	10	15	A308LN	N511CS1X3N	**N358LNS1X3N**	
14 – 20	1-1/2	3	5	7-1/2	15	20	A308MN	N511CS1X3N	**N358MNS1X3N**	
18 – 25	2	5	7-1/2	10	20	25	A308NN	N511CS1X3N	**N358NNS1X3N**	

③ Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
④ Mounting plate included.

Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- The A308_MMPs do not require Line Side Adapters.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Non-reversing Catalog Number is a composite of the factory assembled Manual Motor Protector, Wiring Connector Link and the ***IT.*** Contactor. *E.g.* Catalog No. N308LNS1X3N is the combination of A308LN, C320WC54 and N111CS1X3N.
- The Reversing Catalog Number is a composite of the factory assembled Manual Motor Protector, Mounting Plate and the ***IT.*** Contactor. *E.g.* Catalog No. N358LNS1X3N is the combination of A308LN and N511CS1X3N.

Accessories . . . . . **Page 33-63**
Dimensions. . . . . **Pages 33-65, 33-67**
Discount Symbol **1CD1**

N309 — IT. Open Non-reversing Combination Motor Controller with NEMA Size 2 Contactor

UL 508 Type F CMC with NEMA Size 2 Contactor

When Ordering Specify —

- All Non-reversing and Reversing motor controllers are selected based on the overload current range required for a given motor. This current range is determined from the motor Full Load Ampere rating and Motor Service Factor usually found on the motor nameplate.
- **For motors with service factors less than 1.15**, multiply the motor FLA by .92 to select the appropriate motor controller. Example: For a motor having FLA of 34A and a service factor of 1.0 (34A x .92 = 31.3A) select Catalog Number N309RNDX3N.
- **For motors with service factor of 1.15 or greater**, use motor nameplate Full Load Amperes to select the appropriate motor controller. Example: For a motor having FLA of 34A and a service factor of 1.15, select Catalog Number N309RNDX3N.

Instructional Leaflets

See **Page 33-52** for Listing.

Table 33-85. *IT.* UL 508 Type F Open Non-reversing Combination Motor Controllers (C320LSA2 Line Side Adapter + A309 Manual Motor Protector + N111D Size 2 *IT.* NEMA Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ①		Three-Phase hp Ratings ①				Manual Motor Protector	*IT.* NEMA Non-reversing Contactor	Catalog Number ②	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
28 – 40	3	7-1/2	15	15	30	40	A309RN	N111DS2X3N	**N309RNS2X3N**	

① Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
② Mounting plate included.

Table 33-86. *IT.* UL 508 Type F Open Reversing Combination Motor Controllers (C320LSA2 Line Side Adapter + A309 Manual Motor Protector + N511D Size 2 *IT.* NEMA Reversing Contactor)

FLA Adjustment Range	Single-Phase hp Ratings ③		Three-Phase hp Ratings ③				Manual Motor Protector	*IT.* NEMA Reversing Contactor	Catalog Number ④	Price U.S. $
	115V	230V	200V	230V	460V	575V				24V DC Coil
28 – 40	3	7-1/2	15	15	30	40	A309RN	N511DS2X3N	**N359RNS2X3N**	

③ Select motor controller by motor Full Load Amperes. Horsepower ratings are for reference only.
④ Mounting plate included.

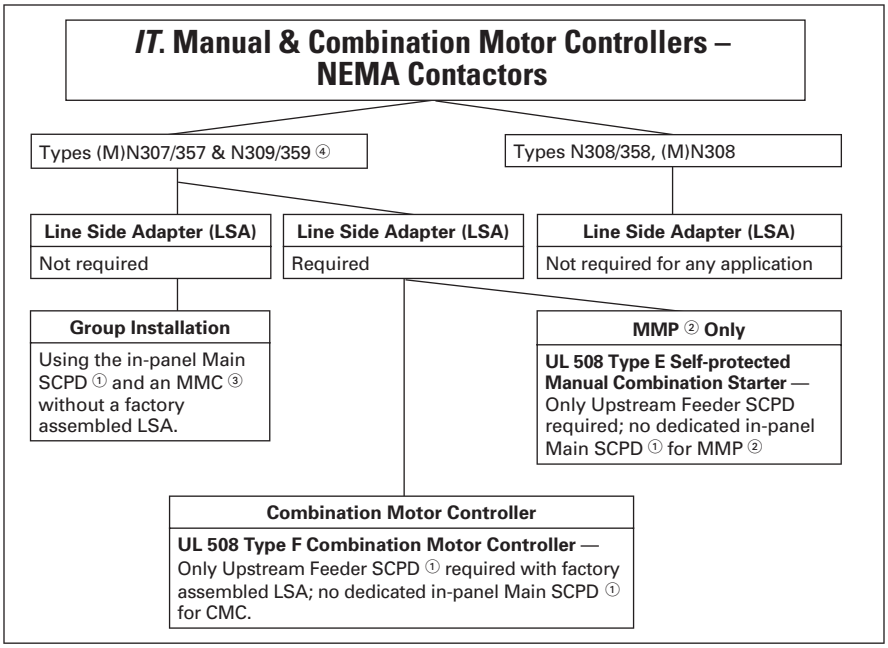
Notes —

- For more information on the use of Line Side Adapters, see **Table 33-87**, **Page 33-63**.
- For information on Manual Motor Protectors and Wiring Connector Links refer to **Pages 34-294 – 34-299**. For ***IT.*** NEMA Contactors, refer to **Pages 33-29** and **33-30**.
- The Catalog Number is a composite of the factory assembled Line Side Adapter, Manual Motor Protector, Mounting Plate and the ***IT.*** Contactor. *E.g.* Catalog No. N309RNS2X3N is the combination of C320LSA2, A309RN and N111DS2X3N.

Accessories ..... **Page 33-63**
Dimensions ..... **Pages 33-65, 33-67**
Discount Symbol **1CD1**

Accessories

Table 33-87. Line Side Adapters, C320LSA1 and C320LSA2 — When to Use Them for U.S. Applications



① SCPD = Short Circuit Protective Device (Circuit Breaker, Fuses).
② MMP = Manual Motor Protector.
③ MMC = Manual Motor Controller.
④ The C320LSA2 Line Side Adapter is factory assembled on the N309/359.

Reference: Technical Paper AP03402001E.

Note: Line Side Adapters are not required for non-U.S. applications. Most countries outside of the U.S. classify the MMP as a thermal magnetic circuit breaker.

Table 33-88. Accessories

	Description	Catalog Number	Price U.S. $
	**Line Side Adapter for A307 MMPs** (Required for use with A307 MMPs only when used as Type E Self-Protected Manual Combination Starters. Not required for Group Installation.)	**C320LSA1**	
	**Line Side Adapter for A309 MMPs** ⑤ (Required for use with A309 MMPs only when used as Type E Self-Protected Manual Combination Starters. Not required for Group Installation.)	**C320LSA2**	
	**Wiring Connector Link** (Electrical and mechanical interconnection between A307 MMP + ***IT.*** 27 mm FVNR/FVR Contactor)	**C320WC27**	
	**Wiring Connector Link** (Electrical and mechanical interconnection between A307 MMP + ***IT.*** 45 mm FVNR Contactor)	**C320WC45IT**	
	**Wiring Connector Link** (Electrical and mechanical interconnection between A308 MMP + ***IT.*** 54 mm FVNR Contactor)	**C320WC54**	

⑤ A308 MMP does not require a Line Side Adapter.

Protection in Different Controller Types

A UL 508 Type E Self-protected Manual Combination Starter/Motor Controller consists of a single device having integral short circuit protection, a main set of contacts, motor overload protection, and may also include a UL listed Line Side Adapter (See **Table 33-87**). This type of controller is a legitimate short circuit protective device and disconnect means for the downstream motor. It does require an upstream feeder short circuit protective device, but does not require a dedicated branch circuit protection or a disconnect means if used with a Line Side Adapter. A UL 508 Type E rating means that the unit clears a fault and does not experience any welding of the power poles. A UL 508 Type E self-protected manual motor controller will remain fully functional should a short circuit within its ratings occur. *E.g.* A307, A308 and A309.

*An **IT.** UL 508 Type F Self-protected Combination Motor Controller* consists of a UL Listed Type E Self-protected Manual Combination Starter/Motor Controller, a UL Listed Contactor, and a UL Listed Line Side Adapter (See **Table 33-87**). While the Type E self-protected manual motor controller of this combination motor controller device is a legitimate short circuit protective device and disconnect means for the down-stream motor, the contactor is *not* "self-protected." *E.g.* ***IT.*** N307 – N309, N357 – N359.

In addition, as a complete assembly or modular components, the device should have Type 2 Coordination certification. Type 2 Coordination means the Starter or the Controller must exhibit little or no damage following a major short circuit fault and should be able to be returned to proper service without replacing any parts. *E.g.* ***IT.*** MMCs, CMCs and MMPs.

Discount Symbol **1CD1**

Dimensions

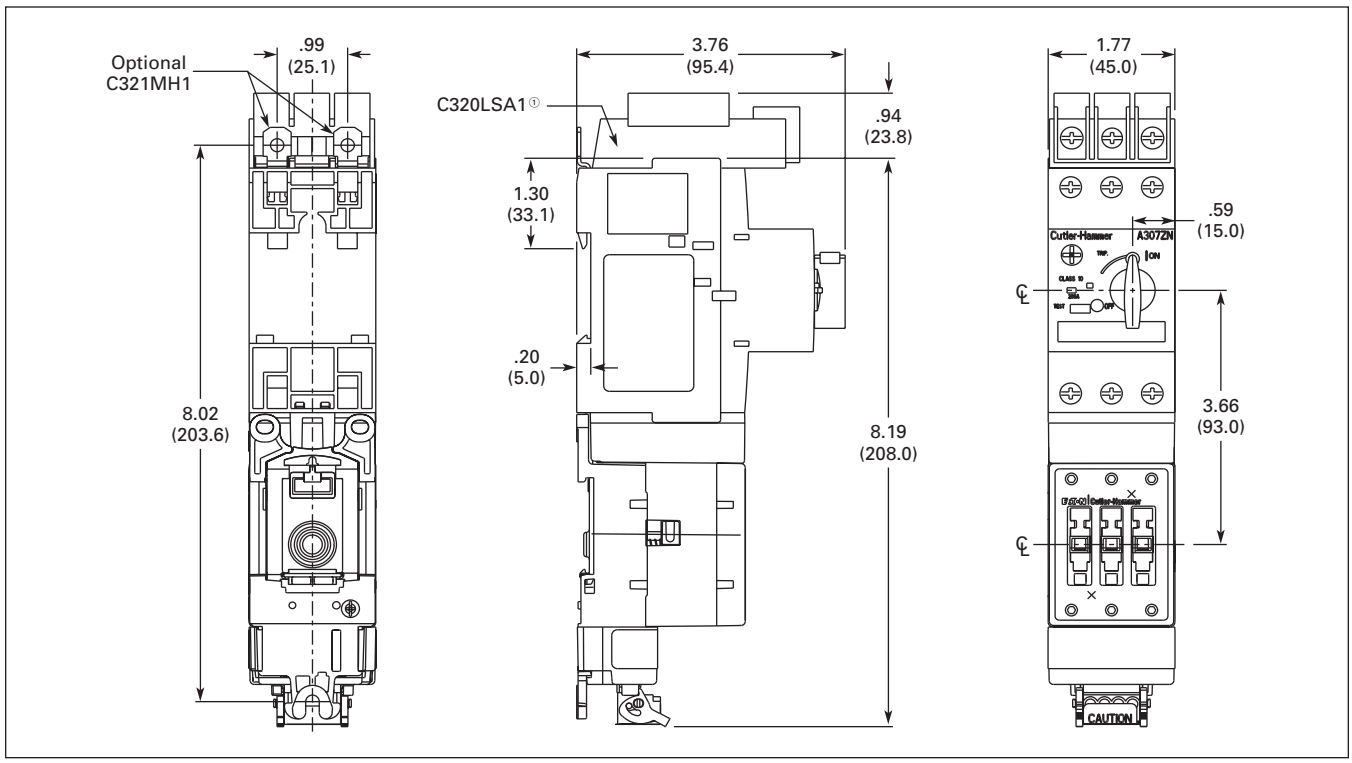


Figure 33-18. Non-reversing Manual and Combination Motor Controller (M)N307 (A307 MMP + C320WC45IT WCL + N111B [Size 00/0] Contactor) — Approximate Dimensions in Inches (mm)

① C320LSA1 is factory assembled with CMC and a field installed option with MMCs.

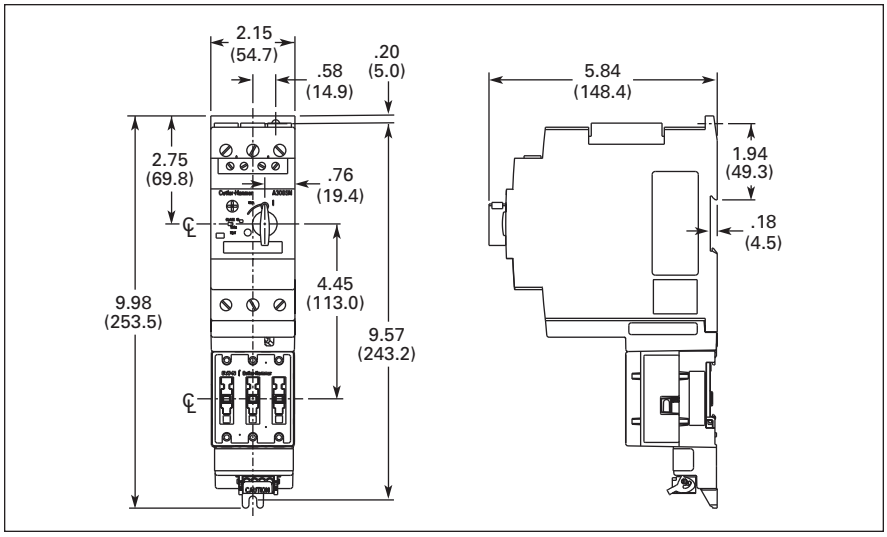


Figure 33-19. Non-reversing Manual and Combination Motor Controller (M)N308 (A308 MMP + C320WC54 WCL + N111C [Size 1] Contactor) — Approximate Dimensions in Inches (mm)

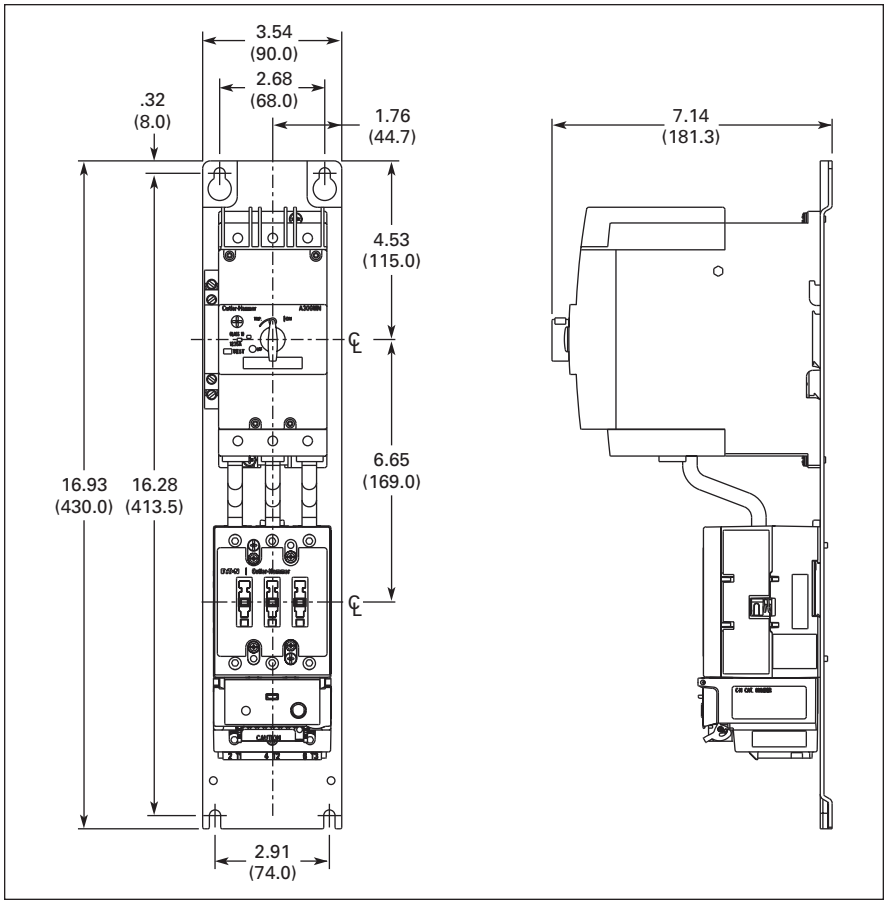


Figure 33-20. Non-reversing Combination Motor Controller N309 (LSA, A309 MMP + N111D [Size 2] Contactor) — Approximate Dimensions in Inches (mm)

Note: C320LSA2 is factory assembled.

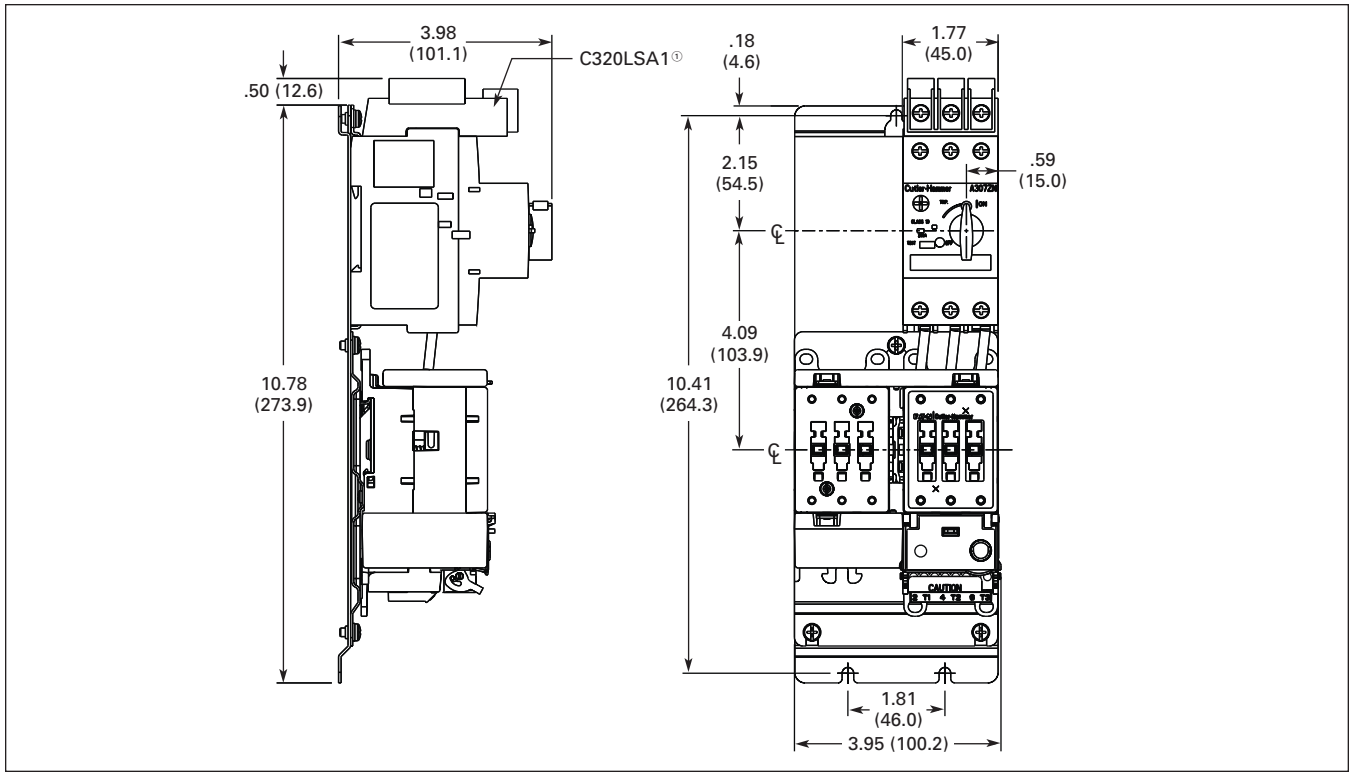


Figure 33-21. Reversing Manual and Combination Motor Controller (M)N357 (A307 MMP + N511B [Size 00/0] Contactor) — Approximate Dimensions in Inches (mm)

① C320LSA1 is factory assembled with CMC and a field installed option with MMCs.

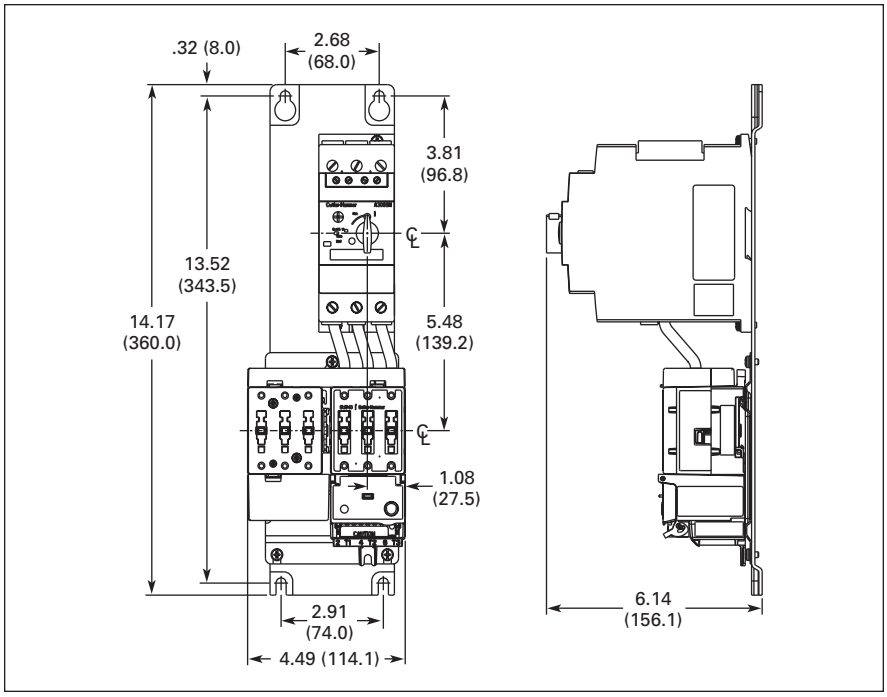


Figure 33-22. Reversing Combination Motor Controller N358 (A308 MMP + N511C [Size 1] Contactor) — Approximate Dimensions in Inches (mm)

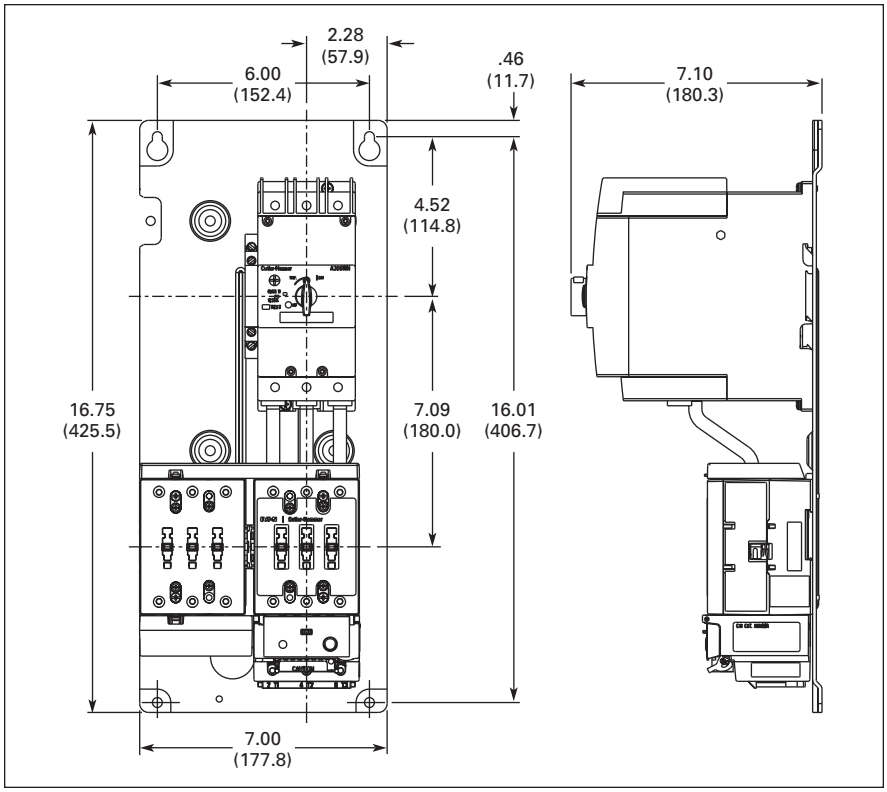
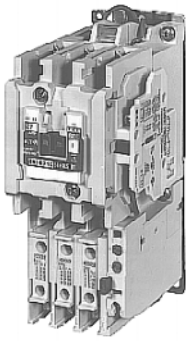
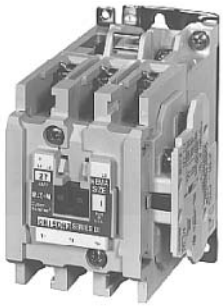


Figure 33-23. Reversing Combination Motor Controller N359 (LSA, A309 MMP + N511D [Size 2] Contactor) — Approximate Dimensions in Inches (mm)

Note: C320LSA2 is factory assembled.



NEMA AN16DN0AB
NEMA Size 1 Starter



NEMA Size 1 Contactor

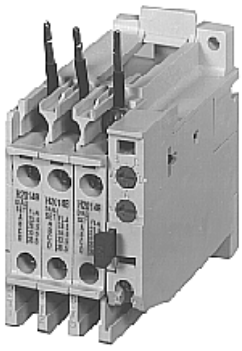
Product Description

Freedom Series starters and contactors feature a compact, space-saving design, using state-of-the-art technology and the latest in high strength, impact and temperature resistant insulating materials.

Features

Freedom NEMA

- Adjustable Bimetallic Ambient Compensated Overload relays with interchangeable heater packs — available in three basic sizes, covering applications up to 900 hp — reducing the number of different contactor/overload relay combinations that have to be stocked. Fixed heater overloads are optional.
- Electronic Solid-State Overload Relay (C396) available as a stand-alone unit and assembled with Freedom Contactor.
- A full line of snap-on accessories common to both IEC and NEMA devices — top and side mounted auxiliary contacts, solid-state and pneumatic timers, etc.
- Straight-through wiring — line lugs at top, load lugs at bottom.
- Horizontal or vertical mounting on upright panel for application freedom.
- Screw type power terminals have captive, backed-out self-lifting pressure plates with ± screws — reduced wiring time.
- Accessible terminals for easy wiring. Optional fingerproof shields available to prevent electrical shock.
- Top located coil terminals convenient and readily accessible. 45 mm contactor magnet coils have three terminals, permitting either top or diagonal wiring — easy to replace European or U.S. style starters or contactors without changing wiring layout.
- Encapsulated dual voltage/frequency magnet coils — permanently marked with voltage, frequency and part number. NEMA Sizes 00 – 0 have non-encapsulated coils as standard.
- Designed to meet or exceed NEMA, UL, CSA, VDE, BS and other international standards and listings.
- American engineering — built by Eaton, using the latest in statistical process control methods to produce high quality, reliable products.
- Sized based on standard NEMA classifications.
- Easy coil change and inspectable/replaceable contacts.
- Available in Open and NEMA Type 1, 3R, 4/4X and 12 enclosures.



Series B1 32A Overload

Standards and Certifications

- Standard: Designed to meet or exceed UL, NEMA, IEC, CSA, VDE and BS.
- UL listed: UL File #E1491, Guide #NLDX — Open and NEMA 1, 4, 12 Enclosed
- CSA Certified: CSA File #LR353, Class #321104 Open and NEMA 1 Enclosed

ISO 9000 Certification

When you turn to Eaton's Cutler-Hammer Products, you turn to quality. The International Standards Organization (ISO) has established a series of standards acknowledged by 91 industrialized nations to bring harmony to the international quest for quality. The ISO certification process covers 20 quality system elements in design, production and installation that must conform to achieve registration. This commitment to quality will result in increased product reliability and total customer satisfaction.

Short Circuit Protection

Fuses and **Inverse-Time Circuit Breakers** may be selected per Article 430, Part D of the National Electrical Code to protect motor branch circuits from fault conditions. If higher ratings or settings are required to start the motor, do **not** exceed the maximum as listed in Exception No. 2, Article 430-52.

C396 Electronic Overload

Catalog Number Selection

Table 33-89. Freedom Catalog Numbering System

A N 1 4 A N 0 A 3E 005

Device Type
A = Starter
C = Contactor

Standard
E = IEC
N = NEMA

Device Assembly Configuration
70 = Multi-Speed
1 = Non-reversing
5 = Reversing

OLR Type
4 = Starter w/C396 Electronic Overload
5 = Contactor only — no overload relay
6 = Starter w/C306 Bi-Metal OLR
7 = Starter w/C316 Bi-Metal OLR
8 = Starter w/***IT.*** SSOLR

Contactor Frame Size ①

NEMA Size	Continuous Amp Rating
A = 00	9
B = 0	18
D = 1	27
G = 2	45
K = 3	90
N = 4	135
S = 5	270
T = 6	540
U = 7	810
V = 8	1215

NEMA Enclosure
N = Open

For Starters

Starter Mounting Option
0 = Horizontal
V = Vertical

For Contactors Only
2 = 2-pole
3 = 3-pole
4 = 4-pole
5 = 5-pole

C396 Electronic Overload FLA Range (FNVR & FVR Only)

Frame A — NEMA Size 00 **P05** = 0.1 – 0.5A **002** = 0.4 – 2.0A **005** = 1.0 – 5.0A **008** = 1.6 – 8.0A	*Frame G — NEMA Size 2* **008** = 1.6 – 8.0A **045** = 9.0 – 45A
Frame B — NEMA Size 0 **P05** = 0.1 – 0.5A **002** = 0.4 – 2.0A **005** = 1.0 – 5.0A **008** = 1.6 – 8.0A **032** = 6.4 – 32A	*Frame K — NEMA Size 3* **110** = 22 – 110A
	Frame N — NEMA Size 4 **150** = 30 – 150A
	Frame S — NEMA Size 5 ② **300** = 60 – 300A
Frame D — NEMA Size 1 **P05** = 0.1 – 0.5A **002** = 0.4 – 2.0A **005** = 1.0 – 5.0A **008** = 1.6 – 8.0A **032** = 6.4 – 32A	*Frame T — NEMA Size 6* ② **600** = 120 – 600A
	Frame U — NEMA Size 7 ② **10C** = 200 – 1000A
	Frame V — NEMA Size 8 ② **15C** = 300 – 1500A

C396 Electronic OLR Designation (FVNR & FVR Only)
3E = Standard C396 OLR, SEL Reset, SEL Class

C306 Bi-Metallic OLR Designation

C =	NEMA Size 00, 0
B =	NEMA Size 1, 2
N/R =	NEMA Size 3, 4 ③
B =	NEMA Size 5
C =	NEMA Size 6
B =	NEMA Size 7, 8

AC Coil Suffix

Suffix	Coil Volts and Hertz
A =	120/60 or 110/50
B =	240/60 or 220/50
C =	480/60 or 440/50
D =	600/60 or 550/50
E =	208/60
H =	277/60
J =	208 – 240/60 ④
K =	240/50
L =	380 – 415/50
N =	550/50
T =	24/60, 24/50 ⑤
U =	24/50
V =	32/50
W =	48/60
Y =	48/50

① For Contactor Only orders, add **B** to end of Catalog Number if NEMA Size 00 – 2, 6.
② Uses panel-mount CT with C396A2A005SELAX Overload.
③ Not required.
④ NEMA Sizes 00 and 0 only.
⑤ NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

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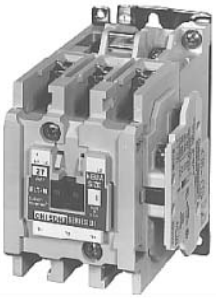
Contents

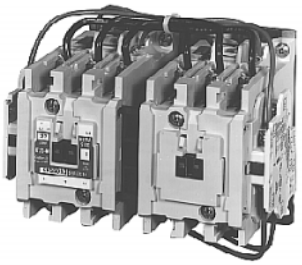


NEMA Size 1 — Cat. No. CN15DN3AB

Product Description

Non-reversing

Contactors are most commonly used to switch motor loads in applications where running overcurrent protection is either not required or is provided separately. Contactors consist of a magnetically actuated switch which can be remotely operated by a push-button station or pilot device such as a proximity switch, limit switch, float switch, auxiliary contacts, etc.



NEMA Size 1
Cat. No. CN55DN3AB

Reversing

Reversing contactors are used primarily for reversing single- or three-phase motors in applications where running overcurrent protection is either not required or is provided separately. They consist of two contactors mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Features

- Designed specifically for use in applications requiring NEMA ratings. Contactors meet or exceed NEMA standards ICS 2-1993.
- Long life twin break, silver cadmium oxide contacts — provide excellent conductivity and superior resistance to welding and arc erosion.
- Designed to 3,000,000 electrical operations at maximum hp ratings up through 25 hp at 600V.
- Steel mounting plate standard on all open type contactors.

Non-reversing

- Holding circuit contact(s) supplied as standard:
  - Sizes 00 – 3 have NO auxiliary contact block mounted on right hand side (on Size 00, contact occupies 4th power pole position — no increase in width).
  - Sizes 4 – 5 have a NO contact block mounted on left side.
  - Sizes 6 – 7 have a 2NO/2NC contact block on top left.
  - Size 8 has a NO/NC contact block on top left back and a NO contact block on top right back.

Reversing

- One NO-NC side mounted interlock supplied as standard on each contactor for Sizes 00 – 8.

Technical Data

Table 33-90. Wire (75°C) Sizes — AWG or kcmil — Open and Enclosed

NEMA Size	Power Terminals Line or Load	Control Terminals Cu Only
00	12 – 16 stranded; 12 – 14 solid Cu	12 – 16 stranded 12 – 14 solid
0	8 – 16 stranded; 10 – 14 solid Cu	
1	8 – 14 stranded or solid Cu	
2	3 – 14 (upper) and/or 6 – 14 (lower) stranded or solid ① Cu	
3	1/0 – 14 Cu/Al	
4	250 mcm – 6	
5	750 kcmil – 2, or (2) 250 kcmil – 3/0 Cu/Al	
6	(2) 750 kcmil – 3/0 Cu/Al	
7	(3) 750 kcmil – 3/0 Cu/Al	
8	(4) 750 kcmil – 4/0 Cu/Al	

① Two compartment box lug.

Table 33-91. Plugging and Jogging Service Horsepower Ratings ②

NEMA Size	200V	230V	460V	575V
00	—	1/2	1/2	1/2
0	1-1/2	1-1/2	2	2
1	3	3	5	5
2	7-1/2	10	15	15
3	15	20	30	30
4	25	30	60	60
5	60	75	150	150
6	125	150	300	300

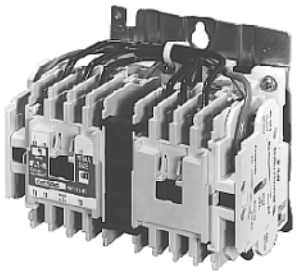
② Maximum horsepower where operation is interrupted more than 5 times per minute or more than 10 times in a 10 minute period. NEMA standard ICS 2-1993 table 2-4-3.

Kits and Accessories

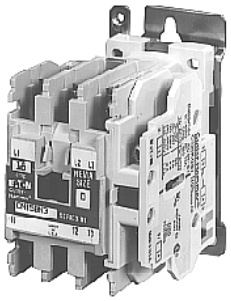
- Auxiliary Contacts, contactor mounted — **Pages 33-86** and **33-87**.
- Transient Suppressor, for magnet coil — **Pages 33-84.**
- Timers — Solid-State and Pneumatic, mount on contactor — **Page 33-83**.

Renewal Parts Publication Numbers

- See **Page 33-91.**



NEMA Size 00
3-Pole Contactor
Cat. No. CN55AN3AB



NEMA Size 0
3-Pole Contactor
Cat. No. CN15BN3AB

NEMA Size 3
3-Pole Contactor
Cat. No. CN15KN3A

Product Selection — 3-Pole Contactors

Table 33-92. Type CN15/CN55 NEMA Contactors — 3-Pole Non-reversing and Reversing

NEMA Size	Continuous Ampere Rating	Maximum UL Horsepower ①						3-Pole Non-reversing		3-Pole Reversing	
		1-Phase		3-Phase							
		115V	230V	208V	240V	480V	600V	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
00	9	1/3	1	1-1/2	1-1/2	2	2	**CN15AN3_B**		**CN55AN3_B**	
0	18	1	2	3	3	5	5	**CN15BN3_B**		**CN55BN3_B**	
1	27	2	3	7-1/2	7-1/2	10	10	**CN15DN3_B**		**CN55DN3_B**	
2	45	3	7-1/2	10	15	25	25	**CN15GN3_B**		**CN55GN3_B**	
3	90			25	30	50	50	**CN15KN3_**		**CN55KN3_**	
4	135			40	50	100	100	**CN15NN3_**		**CN55NN3_**	
5	270			75	100	200	200	**CN15SN3_**		**CN55SN3_**	
6	540			150	200	400	400	**CN15TN3_B**		**CN55TN3_B**	
7	810			200	300	600	600	**CN15UN3_**		**CN55UN3_**	
8 ②	1215			400	450	900	900	**CN15VN3_**		**CN55VN3_**	

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6	7	8
Horsepower	1-1/2	5	10	25	50	75	150	300	600	900

② Common control. For separate 120V control, insert letter **D** in 7th position of listed Catalog Number. EXAMPLE: CN15VN**D**3C.

Magnet Coils — AC and DC

Contactor coils listed in this section also have a 50 Hz rating as shown in the adjacent table. Select required contactor by Catalog Number and replace the magnet coil alpha designation in the Catalog Number (_) with the proper Code Suffix from the adjacent table.

For Sizes 00 – 2, the magnet coil alpha designation will be the next to the last digit of the listed Catalog Number. EXAMPLE: For a 380V, 50 Hz coil, change CN15AN3_B to CN15AN3**L**B. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalog Number.

For **DC Magnet Coils**, see Accessories, **Pages 33-88** – **33-89**.

Table 33-93. AC Suffix Code

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208 – 240/60 ③	**J**
240/50	**K**
380 – 415/50	**L**
550/50	**N**
24/60, 24/50 ④	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

③ NEMA Sizes 00 and 0 only.
④ NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

Technical Data..... **Pages 33-79 – 33-81**
Dimensions ..... **Pages 33-94 – 33-95**
Special Modifications ... **Page 33-90**
Accessories..... **Pages 33-82 – 33-90**
Discount Symbol..... **1CD1**

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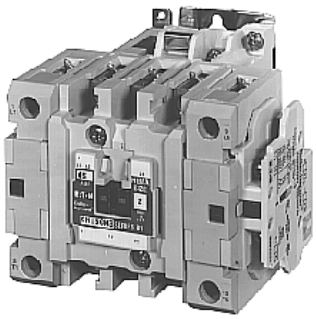
Product Selection — 2-, 4- and 5-Pole Contactors

Table 33-94. Type CN15 NEMA Contactors — 2-, 4- and 5-Pole Non-reversing

NEMA Size	Continuous Ampere Rating	Maximum UL Horsepower						2-Pole Non-reversing		4-Pole Non-reversing		5-Pole Non-reversing	
		1-Phase (2-Pole)		3-Phase				Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
		115V	230V	208V	240V	480V	600V						
00	9	1/3	1	1-1/2	1-1/2	2	2	**CN15AN2_B**		**CN15AN4_B**		—	
0	18	1	2	2	3	5	5	**CN15BN2_B**		—		—	
1	27	2	3	7-1/2	7-1/2	10	10	**CN15DN2_B**		**CN15DN4_B**		**CN15DN5_B**	
2	45	3	7-1/2	10	15	25	25	**CN15GN2_B**		**CN15GN4_B**		**CN15GN5_B**	
3	90			25	30	50	50	**CN15KN2_**		—		—	
4	135			40	50	100	100	**CN15NN2_**		—		—	
5	270			75	100	200	200	**CN15SN2_**		—		—	
6	540			150	200	400	400	**CN15TN2_B**		—		—	



NEMA Size 2
5-Pole Contactor
Cat. No. CN15GN5AB

Magnet Coils — AC or DC

Select required starter by Catalog Number and replace the magnet coil alpha designation in the Catalog Number (_) with the proper Code Suffix from the adjacent table.

For Sizes 00 – 2, the magnet coil alpha designation will be the next to the last digit of the listed Catalog Number. EXAMPLE: For a 380V, 50 Hz coil, change CN15BN3_B to CN15BN3**L**B. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalog Number.

For **DC Magnet Coils**, see Accessories, **Pages 33-88** – **33-89**.

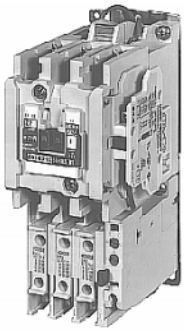
Table 33-95. AC Suffix Code

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208 – 240/60 ①	**J**
240/50	**K**
380 – 415/50	**L**
550/50	**N**
24/60, 24/50 ②	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

① NEMA Sizes 00 and 0 only.
② NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

Technical Data ..... **Pages 33-79** – **33-81**
Dimensions ..... **Pages 33-94** – **33-95**
Special Modifications... **Page 33-90**
Accessories ..... **Pages 33-82** – **33-90**
Discount Symbol **1CD1**

Contents

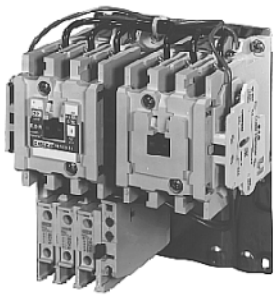


NEMA Size 1 — Cat. No. AN16DN0AB

Product Description

Non-reversing

Three-phase, full voltage magnetic starters are most commonly used to switch AC motor loads. Starters consist of a magnetically actuated switch (contactor) and an overload relay assembled together.



NEMA Size 1 — Cat. No. AN56DN0AB

Reversing

Three-phase, full voltage magnetic starters are used primarily for reversing of 3-phase squirrel cage motors. They consist of two contactors and a single overload relay assembled together. The contactors are mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Features

- Bimetallic Ambient Compensated Overload relays — available in three basic sizes covering applications up to 900 hp — reducing number of different contactor/overload relay combinations that have to be stocked.

  These overload relays feature:
  - Selectable Manual or Automatic Reset operation.
  - Interchangeable heater packs adjustable ±24% to match motor FLA and calibrated for 1.0 and 1.15 service factors. Heater packs for smaller overload relay will mount in larger overload relay — useful in derating applications such as jogging.
  - Load lugs built into relay base.
  - Single-phase protection, Class 20 or Class 10 trip time.
  - Overload trip indication.
  - Electrically isolated NO-NC contacts (pull RESET button to test).
- The C396 is a self-powered, robust electronic overload designed for integrate use with Freedom NEMA contactors.
  - Tiered feature set to provide coverage specific to your application.
  - Broad 5:1 FLA range for maximum flexibility.
  - Coverage from 0.05 – 1500 Amps to meet all your needs.
- Long life twin break, silver cadmium oxide contacts — provide excellent conductivity and superior resistance to welding and arc erosion. Generously sized for low resistance and cool operation.
- Designed to 3,000,000 electrical operations at maximum hp ratings up through 25 hp at 600V.
- Steel mounting plate standard on all open type starters.
- Wired for separate or common control.

Non-reversing

- Holding circuit contact(s) supplied as standard:
  - Sizes 00 – 3 have a NO auxiliary contact block mounted on right-hand side (on Size 00, contact occupies 4th power pole position — no increase in width).
  - Sizes 4 – 5 have a NO contact block mounted on left side.
  - Sizes 6 – 7 have a 2NO/2NC contact block on top left.
  - Size 8 has a NO/NC contact block on top left back and a NO on top right back.

Reversing

- Each contactor (Size 00 – 8) supplied with one NO-NC side mounted contact block as standard. NC contacts are wired as electrical interlocks.

Technical Data

Table 33-96. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 00 – 2 — Open and Enclosed

NEMA Size	Wire Size ② Cu Only
Power Terminals — Line	
00 0 1 2	12 – 16 AWG stranded, 12 – 14 AWG solid 8 – 16 AWG stranded, 10 – 14 AWG solid 8 – 14 AWG stranded or solid 3 – 14 AWG (upper) and/or 6 – 14 AWG (lower) stranded or solid ①
Power Terminals — Load — Cu Only (stranded or solid)	
00 – 0 1 – 2	14 – 6 AWG stranded or solid 14 – 2 AWG stranded or solid
Control Terminals — Cu Only	
12 – 16 AWG stranded, 12 – 14 AWG solid	

① Two compartment box lug.

② Minimum per NEC. Maximum wire size: Sizes 00 and 0 to 8 AWG and Sizes 1 – 2 to 2 AWG.

Table 33-97. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 3 – 8 — Open and Enclosed

NEMA Size	Wire Size ③
Power Terminals — Line and Load	
3	1/0 – 14 AWG Cu/Al
4	Open — 3/0 – 8 AWG Cu; Enclosed — 250 kcmil — 6 AWG Cu/Al
5 6 7 8	750 kcmil — 2 AWG; or (2) 250 kcmil — 3/0 AWG Cu/Al (2) 750 kcmil — 3/0 AWG Cu/Al (3) 750 kcmil — 3/0 AWG Cu/Al (4) 750 kcmil — 1/0 AWG Cu/Al
Control Terminals — Cu Only	
12 – 16 AWG stranded, 12 – 14 AWG solid	

③ Minimum per NEC. Maximum wire size: Sizes 00 and 0 to 8 AWG and Sizes 1 – 2 to 2 AWG.

Wiring Diagrams

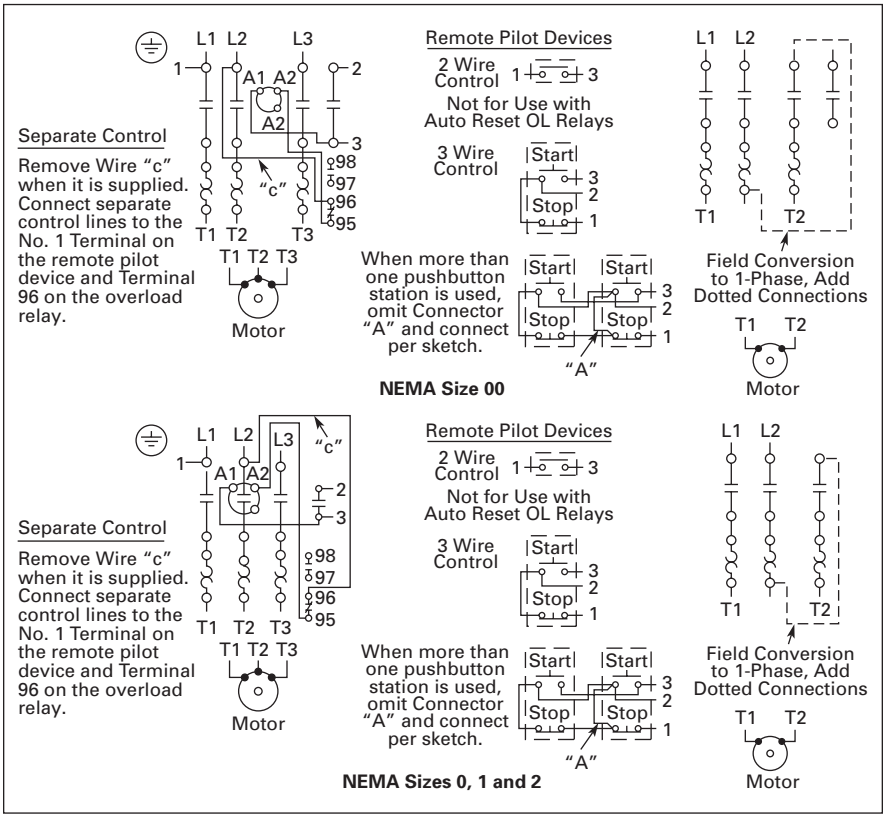


Figure 33-24. Typical Wiring Diagrams — Three-Phase and Single-Phase Applications

Table 33-98. Plugging and Jogging Service Horsepower Ratings ④

NEMA Size	200V	230V	460V	575V
00	—	1/2	1/2	1/2
0	1-1/2	1-1/2	2	2
1	3	3	5	5
2	7-1/2	10	15	15
3	15	20	30	30
4	25	30	60	60
5	60	75	150	150
6	125	150	300	300

④ Maximum horsepower where operation is interrupted more than 5 times per minute, or more than 10 times in a 10 minute period. NEMA Standard ICS2-1993 table 2-4-3.

Kits and Accessories

- Auxiliary Contacts, contactor mounted — **Pages 33-86** – **33-87**.
- Transient Suppressor, for magnet coil — **Pages 33-84.**
- Timers — Solid-State and Pneumatic, mount on contactor — **Page 33-83**.

Renewal Parts Publication Numbers

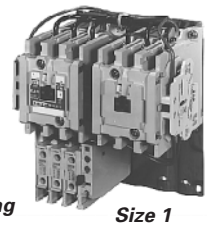
- See **Page 33-91.**

Product Selection

When Ordering Supply

- Catalog Number
- Heater pack number (see selection table, **Pages 33-107 – 33-108**) or full load current.

Size 0 Non-reversing Starter



Size 1 Reversing Starter

Size 3 Vertical Reversing Starter

Table 33-99. Type AN16/AN56 NEMA — Manual or Automatic Reset Overload Relay — Non-reversing and Reversing

NEMA Size	Continuous Ampere Rating	Service-Limit Current Rating ③ (Amperes)	Maximum UL Horsepower ②						3-Pole Non-reversing ①		3-Pole Reversing ①	Vertical Reversing ①	Price U.S. $
			1-Phase		3-Phase								
			115V	230V	208V	240V	480V	600V	Catalog Number	Price U.S. $	Catalog Number	Catalog Number	
00	9	11	1/3	1	1-1/2	1-1/2	2	2	**AN16AN0_C**		**AN56AN0_C**	**—**	
0	18	21	1	2	3	3	5	5	**AN16BN0_C**		**AN56BN0_C**	**AN56BNV0_**	
1	27	32	2	3	7-1/2	7-1/2	10	10	**AN16DN0_B**		**AN56DN0_B**	**AN56DNV0_**	
2	45	52	3	7-1/2	10	15	25	25	**AN16GN0_B**		**AN56GN0_B**	**AN56GNV0_**	
3	90	104	—	—	25	30	50	50	**AN16KN0_**		**AN56KN0_**	**AN56KNV0_**	
4	135	156	—	—	40	50	100	100	**AN16NN0_**		**AN56NN0_**	**AN56NNV0_**	
5	270	311	—	—	75	100	200	200	**AN16SN0_B**		**AN56SN0_B**	**—**	
6	540	621	—	—	150	200	400	400	**AN16TN0_C**		**AN56TN0_C**	**—**	
7	810	932	—	—	200	300	600	600	**AN16UN0_B**		**AN56UN0_B**	**—**	
8 ④	1215	1400	—	—	400	450	900	900	**AN16VN0_B**		**AN56VN0_B**	**—**	

Note: Starter Catalog Numbers do not include heater packs. Select one carton of three heater packs. Heater pack selection, **Pages 33-107 – 33-108.**

① Underscore (_) indicates coil suffix required, see **Table 33-100**.

② Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6	7	8
Horsepower	1-1/2	5	10	25	50	75	150	300	600	900

③ The service-limit current ratings represent the maximum rms current, in amperes, which the controller shall be permitted to carry for protracted periods in normal service. At service-limit current ratings, temperature rises shall be permitted to exceed those obtained by testing the controller at its continuous current rating. The current rating of overload relays or trip current of other motor protective devices used shall not exceed the service-limit current rating of the controller.

④ Common control. For separate 120V control, insert letter **D** in 7th position of listed Catalog Number. EXAMPLE: AN56VN**D**0CB.

NEMA Size 0
Cat. No. AN56BN0AC

Magnet Coils — AC or DC

Starter coils listed in this section also have a 50 Hz rating as shown in the adjacent table. Select required starter by Catalog Number and replace the magnet coil alpha designation in the Catalog Number (_) with the proper Code Suffix from the adjacent table.

For Sizes 00 – 2 and 5 – 8, the magnet coil alpha designation will be the next to last digit of the listed Catalog Number. EXAMPLE: For a 380V, 50 Hz coil, change AN16BN0_C to AN16BN0**L**C. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalog Number.

For **DC Magnet Coils**, see Accessories, **Pages 33-88 – 33-89**.

Table 33-100. AC Suffix Code

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208 – 240/60 ⑤	**J**
240/50	**K**
380 – 415/50	**L**
550/50	**N**
24/60, 24/50 ⑥	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

⑤ NEMA Sizes 00 and 0 only.

⑥ NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

Technical Data..... **Pages 33-79 – 33-81**
Overload Relay ..... **Page 33-103**
Dimensions ..... **Pages 33-96 – 33-98**
Special Modifications ... **Page 33-90**
Accessories..... **Pages 33-82 – 33-90**
Heater Packs..... **Pages 33-107 – 33-108**
Discount Symbol..... **1CD1**

Catalog Number AN700BN0218
NEMA Size 0, Open Type
Two-Speed, Reconnectable
(One-Winding)

Catalog Number AN700DN0218
NEMA Size 1, Open Type
Two-Speed, Reconnectable Winding
(One-Winding)

Catalog Number AN700DN022
NEMA Size 1, Open Type
Two-Speed, Two-Winding
Separate Winding) Wye-Wye Motor

Product Selection

When Ordering Specify

For 2-Speed Selective Control:

- Catalog Number plus magnet coil Code Suffix. Example: Size 0 — AN700BN022**B.**
- Heater pack number or full load current for each speed.

For 2-Speed other than Selective Control:

- Catalog Number plus magnet coil Code Suffix and option required. Example: AN700BN022B except Compelling.
- Heater pack number or full load current for each speed.

Note: 2-speed starters are designed for starting and controlling both separate (2-winding) and reconnectable (1-winding) motors. Separate winding, WYE-WYE motors have a separate winding for each speed. Reconnectable, consequent pole motors use the same winding for both speeds. All standard starters are wired for selective control.

Table 33-101. Product Selection — 2-Speed — Selective Control — Separate Winding ①

Maximum Horsepower — 60/50 Hertz								NEMA Size	Open Type	
Constant or Variable Torque				Constant Horsepower					Catalog Number	Price U.S. $
115V	200V	230V	460V/575V	115V	200V	230V	460/575V			
1-1/2	3	3	5	1	2	2	3	0	**AN700BN022_**	
3	7-1/2	7-1/2	10	2	5	5	7-1/2	1	**AN700DN022_**	
—	10	15	25	—	7-1/2	10	20	2	**AN700GN022_**	
—	25	30	50	—	20	25	40	3	**AN700KN022_**	
—	40	50	100	—	30	40	75	4	**AN700NN022_**	
—	75	100	200	—	60	75	150	5	**AN700SN022_**	

Prices of starters do not include heater packs. Select 2 packs (2 overload relays, one for each speed). Heater pack selection, **Pages 33-107 – 33-108.**

① If branch circuit protective device is 45A or greater, C320FBR1 fuse kit(s) may be required for circuit protection per NEC 530-072.

Table 33-102. Product Selection — 2-Speed — Selective Control — Reconnectable Winding ②

Maximum Horsepower — 60/50 Hertz								NEMA Size	Open Type		
Constant or Variable Torque				Constant Horsepower					Constant or Variable Torque	Constant Horsepower	Price U.S. $
115V	200V	230V	460V/575V	115V	200V	230V	460/575V		Catalog Number	Catalog Number	
1-1/2	3	3	5	1	2	2	3	0	**AN700BN0218_**	**AN700BN0219_**	
3	7-1/2	7-1/2	10	2	5	5	7-1/2	1	**AN700DN0218_**	**AN700DN0219_**	
—	10	15	25	—	7-1/2	10	20	2	**AN700GN0218_**	**AN700GN0219_**	
—	25	30	50	—	20	25	40	3	**AN700KN0218_**	**AN700KN0219_**	
—	40	50	100	—	30	40	75	4	**AN700NN0218_**	**AN700NN0219_**	

Prices of starters do not include heater packs. Select 2 packs (2 overload relays, one for each speed). Heater pack selection, **Pages 33-107 – 33-108.**

② If branch circuit protective device is 45A or greater, C320FBR1 fuse kit(s) may be required for circuit protection per NEC 530-072.

Table 33-103. Magnetic Coils — AC or DC

Coil Voltage and Hz	Code Suffix	Coil Voltage and Hz	Code Suffix	Coil Voltage and Hz	Code Suffix
120/60 or 110/50	**A**	277/60	**H**	24/60, 24/50 ③	**T**
240/60 or 220/50	**B**	208 – 240/60	**J**	24/50	**U**
480/60 or 440/50	**C**	240/50	**K**	32/50	**V**
600/60 or 550/50	**D**	380 – 415/50	**L**	48/60	**W**
208/60	**E**	550/50	**N**	48/50	**Y**

③ NEMA Sizes 00 and 0 only. Sizes 1 – 5 are 24/60 only.

Dimensions . . . . . **Page 33-99**
Discount Symbol **1CD1**

NEMA Size 1 — Cat. No. BN16DN0AB

Product Description

Single-phase, full voltage magnetic starters connect the motor directly across the line, allowing it to draw full inrush current during start-up. These starters are most commonly used for control of self-starting single-phase motors up to 15 horsepower at 230V. They consist of a 2-pole electromagnetic contactor to make and break the motor power circuit and an overload relay to provide running overload protection. Starters listed in the table include:

- Two-pole Freedom Series contactor with long life twin break, silver cadmium oxide contacts. Generously sized for low resistance and cool operation. Designed to 3 million electrical operations at maximum hp and 30 million mechanical operations to Size 0, 10 million operations to Size 2 and 6 million operations to Size 3.
- Three-pole Freedom Series overload with poles 2 and 3 wired in series for motor overload protection. This overload is ambient compensated, selectable Manual or Automatic reset, interchangeable Class 10 or 20 heater packs, 1.0 or 1.15 service factor selectability, overload trip indication and electrically isolated NO-NC contacts (pull RESET button to test).
- Holding circuit NO auxiliary contact supplied as standard. On Size 00, the contact occupies the 4th power pole position. Sizes 0 – 3 have the NO auxiliary mounted on the right side of the contactor.
- Steel mounting plate as standard on all open type starters. Wired for separate or common control.

Wiring Diagrams

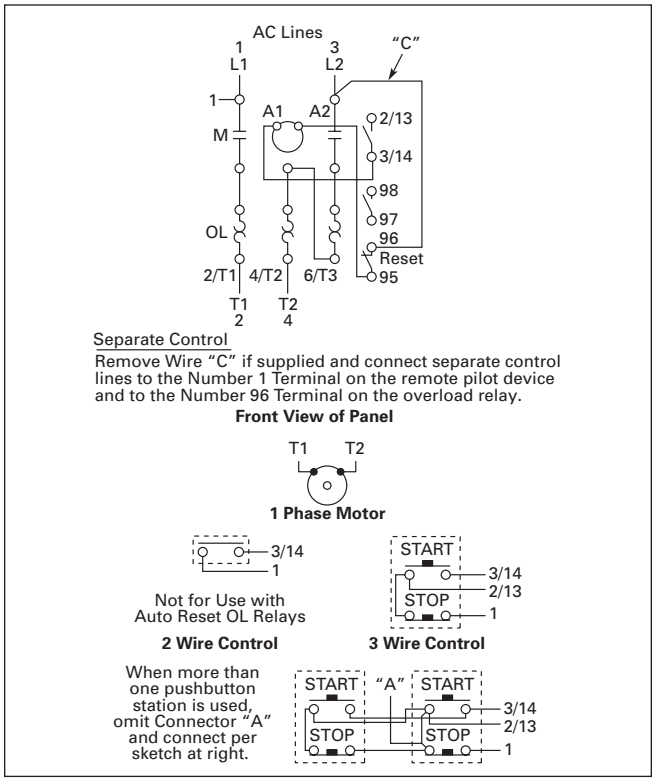


Figure 33-25. Typical Wiring Diagrams — Single-Phase Applications (Factory Wired)

Product Selection

When Ordering Specify

- Catalog Number
- Heater Pack Number (see selection table, **Pages 33-107 – 33-108**) or full load current.

Table 33-104. Type BN16 NEMA — Manual or Automatic Reset Overload Relay

NEMA Size	Maximum Horsepower		Magnet Coil Voltage (60 Hz)	Open Type 2-Pole	
	Motor Voltage	1-Phase		Catalog Number	Price U.S. $
00	115 230	1/3 1	120 ① 240	**BN16AN0AC** **BN16AN0BC**	
0	115 230	1 2	120 ① 240	**BN16BN0AC** **BN16BN0BC**	
1	115 230	2 3	120 ① 240	**BN16DN0AB** **BN16DN0BB**	
1P	115 230	3 5	120 ① 240	**BN16PN0AB** **BN16PN0BB**	
2	115 230	3 7-1/2	120 ① 240	**BN16GN0AB** **BN16GN0BB**	
3	115 230	7-1/2 15	120 ① 240	**BN16KN0A** **BN16KN0B**	

Note: Starter Catalog Numbers do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Pages 33-107 – 33-108**.

① For separate 120V control circuit. For maximum hp at listed motor voltages, use the rating of other starters of same size.

Accessories ..... **Pages 33-82 – 33-90**
Discount Symbol **1CD1**

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Product Selection

Catalog Number AN14GN0_ _ _

Table 33-105. Type AN14/AN54 NEMA — C396 Selectable Reset Electronic Overload Relay — Non-reversing and Reversing

NEMA Size	Cont. Amp Rating	Service-Limit Current Rating ⑥ (Amps)	Maximum UL Horsepower ⑤						3-Pole Non-reversing ①②③		3-Pole Reversing ①②③	Vertical Reversing ①②③	
			1-Phase		3-Phase								
			115V	230V	208V	240V	480V	600V	Catalog Number	Price U.S. $	Catalog Number	Catalog Number	Price U.S. $
00	9	11	1/3	1	1-1/2	1-1/2	2	2	**AN14AN0_ _ _**		**AN54AN0_ _ _**	**—**	
0	18	21	1	2	3	3	5	5	**AN14BN0_ _ _**		**AN54BN0_ _ _**	**AN54BNV_ _ _**	
1	27	32	2	3	7-1/2	7-1/2	10	10	**AN14DN0_ _ _**		**AN54DN0_ _ _**	**AN54DNV_ _ _**	
2	45	52	3	7-1/2	10	15	25	25	**AN14GN0_ _ _**		**AN54GN0_ _ _**	**AN54GNV_ _ _**	
3	90	104	—	—	25	30	50	50	**AN14KN0_ _ _**		**AN54KN0_ _ _**	**AN54KNV_ _ _**	
4 ④	135	156	—	—	40	50	100	100	**AN14NN0_ _ _**		**AN54NN0_ _ _**	**AN54NNV_ _ _**	
5	270	311	—	—	75	100	200	200	**AN14SN0_ _ _**		**AN54SN0_ _ _**	**—**	
6	540	621	—	—	150	200	400	400	**AN14TN0_ _ _**		**AN54TN0_ _ _**	**—**	
7	810	932	—	—	200	300	600	600	**AN14UN0_ _ _**		**AN54UN0_ _ _**	**—**	
8 ⑦	1215	1400	—	—	400	450	900	900	**AN14VN0_ _ _**		**AN54VN0_ _ _**	**—**	

① Underscore (_) indicates coil suffix required, see **Table 33-106**.

② Underscore (_) indicates OLR designation required, see **Table 33-107**.

③ Underscore (_) indicates FLA range, see **Table 33-108**.

④ Starter is shipped unassembled. Catalog Number includes overload relay and contactor. Not a direct dimensional replacement for Size 4 Starter with C306 bi-metallic overload.

⑤ Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6	7	8
Horsepower	1-1/2	5	10	25	50	75	150	300	600	900

⑥ The service-limit current ratings represent the maximum rms current, in amperes, which the controller shall be permitted to carry for protracted periods in normal service. At service-limit current ratings, temperature rises shall be permitted to exceed those obtained by testing the controller at its continuous current rating. The current rating of overload relays or trip current of other motor protective devices used shall not exceed the service-limit current rating of the controller.

⑦ Common control. For separate 120V control, insert letter **D** in 7th position of listed Catalog Number. EXAMPLE: AN54VN**D**_ _ _.

Table 33-106. AC Suffix Code

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	**A**
240/60 or 220/50	**B**
480/60 or 440/50	**C**
600/60 or 550/50	**D**
208/60	**E**
277/60	**H**
208 – 240/60 ⑧	**J**
240/50	**K**
380 – 415/50	**L**
550/50	**N**
24/60, 24/50 ⑨	**T**
24/50	**U**
32/50	**V**
48/60	**W**
48/50	**Y**

⑧ NEMA Sizes 00 and 0 only.

⑨ NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

Table 33-107. OLR Designation

OLR
3E = Standard C396 OLR, SEL Reset, SEL Class

Table 33-108. C396 FLA Range (FNVR & FVR Only)

NEMA Size	FLA Range
00	**P05** = 0.1 – 0.5A **005** = 1.0 – 5.0A **002** = 0.4 – 2.0A **008** = 1.6 – 8.0A
0	**P05** = 0.1 – 0.5A **008** = 1.6 – 8.0A **002** = 0.4 – 2.0A **032** = 6.4 – 32A **005** = 1.0 – 5.0A
1	**P05** = 0.1 – 0.5A **008** = 1.6 – 8.0A **002** = 0.4 – 2.0A **032** = 6.4 – 32A **005** = 1.0 – 5.0A
2	**008** = 1.6 – 8.0A **045** = 9.0 – 45A
3	**110** = 22 – 110A
4	**150** = 30 – 150A
5 ⑩	**300** = 60 – 300A
6 ⑩	**600** = 120 – 600A
7 ⑩	**10C** = 200 – 1000A
8 ⑩	**15C** = 300 – 1500A

⑩ Uses panel-mount CT with C396A2A005SELAX Overload.

Technical Data – Contactors . . . . . **Pages 33-79 – 33-81**
Technical Data – Overload . . . . . **Page 33-113**
Overload Relay . . . . . **Page 33-108**
Dimensions . . . . . **Pages 33-96 – 33-98**
Special Modifications . . . . **Page 33-90**
Accessories . . . . . **Pages 33-82 – 33-90**
Discount Symbol **1CD1**

Table 33-109. Coil Data Notes

P.U.	Pick-up time is the average time taken from closing of the coil circuit to main contact touch.
D.O.	Drop-out time is the average time taken from opening of the coil circuit to main contact separation.
Cold	Coil data with a cold coil.
Hot	Coil data with a hot coil.

All data is based on a standard contactor with no auxiliary devices and a 120V AC or 24V DC magnet coil. Coil data has a ±5% range depending on the application, therefore specific data may vary.

Table 33-110. Specifications — Sizes 00 – 3

Description	Contactor Catalog Number/Size				
	CN15A NEMA Size 00	**CN15B NEMA Size 0**	**CN15D NEMA Size 1**	**CN15G NEMA Size 2**	**CN15K NEMA Size 3**
Configuration					
Number of Poles	2, 3, 4	2, 3	2, 3, 4, 5	2, 3, 4, 5	2, 3
Auxiliary Contacts, Standard	4th Pole NO (1)	Side NO (1)	Side NO (1)	Side NO (1)	Side NO (1)
Add-On Auxiliary Contacts	Top (4) or Side (4)	Top (4) or Side (3)	Top (4) or Side (3)	Top (4) or Side (3)	Left Side (4) or Right Side (3)
Frame Size	45 mm	45 mm	65 mm	65 mm	90 mm
Maximum Voltage Rating	600V AC	600V AC	600V AC	600V AC	600V AC
Continuous Ampere Ratings (I)	9A	18A	27A	45A	90A
Maximum Horsepower (hp)					
1-Phase 115V	1/3	1	2	3	7-1/2
230V	1	2	3	7-1/2	15
3-Phase 200V	1-1/2	3	7-1/2	10	25
230V	1-1/2	3	7-1/2	15	30
460V	2	5	10	25	50
575V	2	5	10	25	50
AC Magnet Coil Data					
Pick-Up Volts — Cold	74%	74%	74%	74%	72%
Pick-Up Volts — Hot	78%	78%	78%	78%	76%
Pick-Up Voltamperes	80	100	230	230	390
Pick-Up Watts	49	65	95	95	112
Sealed Voltamperes	7.5	10	28	28	49.8
Sealed Watts	2.4	3.1	7.8	7.8	13
Drop-Out Volts — Cold	45%	45%	49%	49%	50%
Drop-Out Volts — Hot	46%	46%	50%	50%	52%
Maximum Operation Rate — Ops/Hour	12,000	12,000	12,000	12,000	7,200
Pick-Up Time (mS)	12	12	20	20	14
Drop-Out Time (mS)	12	12	14	14	11
Coil Operating Range % of Rated Voltage	-15% to +10%	-15% to +10%	-15% to +10%	-15% to +10%	-15% to +10%
DC Magnet Coil Data	For DC Magnet Coils (and coil data), see Accessories, **Pages 33-88 – 33-89.**				
Operating Temperature	-20° to 65°C	-20° to 65°C	-20° to 65°C	-20° to 65°C	-20° to 65°C
Maximum Operating Altitude (ft.)	6,000	6,000	6,000	6,000	6,000
Mechanical Life	20,000,000	20,000,000	10,000,000	10,000,000	6,000,000
Electrical Life (480V/60 Hz)					
AC-3	4,000,000	3,000,000	5,000,000	3,500,000	1,700,000
AC-4	90,000	85,000	200,000	62,000	80,000
Wire Range					
Power Terminals	12 – 16 stranded, 12 – 14 solid Cu	8 – 16 stranded, 10 – 14 solid Cu	8 – 14 stranded or solid Cu	2 – 14 (upper) and/or 6 – 14 (lower) stranded or solid Cu	1/0 – 14 Cu
Control Terminals	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded 12 – 14 solid Cu
Power Terminal Torque Line and Load — lb-in	7	15	20	40 (14 – 8 AWG) 45 (6 – 4 AWG) 50 (3 AWG)	35 (14 – 10 AWG) 40 (8 AWG) 45 (6 – 4 AWG) 50 (3 – 1/0 AWG)
Auxiliary Contact Rating	A600, P300				

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Table 33-111. Specifications — Sizes 4 – 8

Description	Contactor Catalog Number/Size				
	CN15N NEMA Size 4	**CN15S NEMA Size 5**	**CN15T NEMA Size 6**	**CN15U NEMA Size 7**	**CN15V NEMA Size 8**
Configuration					
Number of Poles	2, 3	2, 3	3	3	3
Auxiliary Contacts, Standard	Side NO (1)	Side NO (1)	Top left 2NO/2NC (1)	Top left 2NO/2NC (1)	Side 2NO/NC (1)
Add-On Auxiliary Contacts	Left side (3) or Right side (4)	Left side (3) or Right side (4)	Top right 2NO/2NC (1)	Top right 2NO/2NC (1)	NO/NC (2)
Frame Size	180 mm	180 mm	280 mm	280 mm	334 mm
Maximum Voltage Rating	600V AC	600V AC	600V AC	600V AC	600V AC
Continuous Ampere Ratings (I)	135A	270A	540A	810A	1215A
Maximum Horsepower (hp)					
1-Phase 115V	—	—	—	—	—
230V	—	—	—	—	—
3-Phase 200V	40	75	150	200	400
230V	50	100	200	300	450
460V	100	200	400	600	900
575V	100	200	400	600	900
AC Magnet Coil Data					
Pick-Up Volts — Cold	72.5%	75%	75%	75%	75%
Pick-Up Volts — Hot	76%	77%	75%	75%	75%
Pick-Up Voltamperes	1158	1158	1600	1600	2450
Pick-Up Watts	240	240	1345	1345	2060
Sealed Voltamperes	100	100	25	25	75
Sealed Watts	27.2	27.2	22	22	60
Drop-Out Volts — Cold	54%	63%	①	①	①
Drop-Out Volts — Hot	56%	64%	①	①	①
Maximum Operation Rate — Ops/Hour	2,400	2,400	N/A	N/A	N/A
Pick-Up Time (mS)	28	25	105	105	70
Drop-Out Time (mS)	14	13	200	200	50
Coil Operating Range % of Rated Voltage	-15% to +10%	-15% to +10%	-15% to +10%	-15% to +10%	-15% to +10%
DC Magnet Coil Data	For DC Magnet Coils (and coil data), see Accessories, **Pages 33-88** – **33-89**.				
Operating Temperature	-20° to 65°C	-20° to 65°C	-20° to 65°C	-20° to 65°C	-20° to 65°C
Maximum Operating Altitude (ft.)	6,000	6,000	6,000	6,000	6,000
Mechanical Life	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
Electrical Life (480V/60 Hz)					
AC-3	800,000	500,000	590,000	450,000	420,000
AC-4	70,000	34,000	7,400	5,000	4,200
Wire Range					
Power Terminals	Open — 3/0 – 8 Cu; Enclosed — 250 kcmil – 6 Cu/Al	750 kcmil — 2 or (2) 250 kcmil – 3/0 Cu/Al	(2) 750 kcmil – 3/0 Cu/Al	(3) 750 kcmil – 3/0 Cu/Al	(4) 750 kcmil – 1/0 Cu/Al
Control Terminals	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu	12 – 16 stranded, 12 – 14 solid Cu
Power Terminal Torque Line and Load — lb-in	200	550	550	550	500
Auxiliary Contact Rating	A600, P300				

① 20 – 30% of rated coil voltage.

Electrical Life — AC-3 and AC-4 Utilization Categories

Life Load Curves

Eaton's Cutler-Hammer Freedom Series NEMA contactors have been designed and manufactured for superior life performance in any worldwide application. All testing has been based on requirements as found in NEMA and UL standards and conducted by Eaton. Actual application life may vary depending on environmental conditions and application duty cycle.

Utilization Categories

The International Electrotechnical Commission (IEC) has developed utilization categories for contactors and auxiliary contacts. The IEC utilization categories are used to define the type of electrical load for estimating electrical life, and do not imply the devices are IEC rated.

AC-1 — Non-inductive or slightly inductive loads, such as resistance furnaces and heating.

AC-2 — Starting of slip-ring motors.

AC-3 — Squirrel cage motors; starting, switching off motors during running.

AC-4 — Squirrel cage motors; starting, plugging, inching or jogging.

Note: AC-3 tests are conducted at rated device currents and AC-4 tests are conducted at six times rated device currents. All tests have been run at 460V, 60 Hz.

Contactor Choice

- Decide what utilization category your application is and choose the appropriate curve.
- Locate the intersection of the life-load curve of the appropriate contactor with the applications operational current (Ie), as found on the horizontal axis.
- Read the estimated contact life along the vertical axis in number of operational cycles.

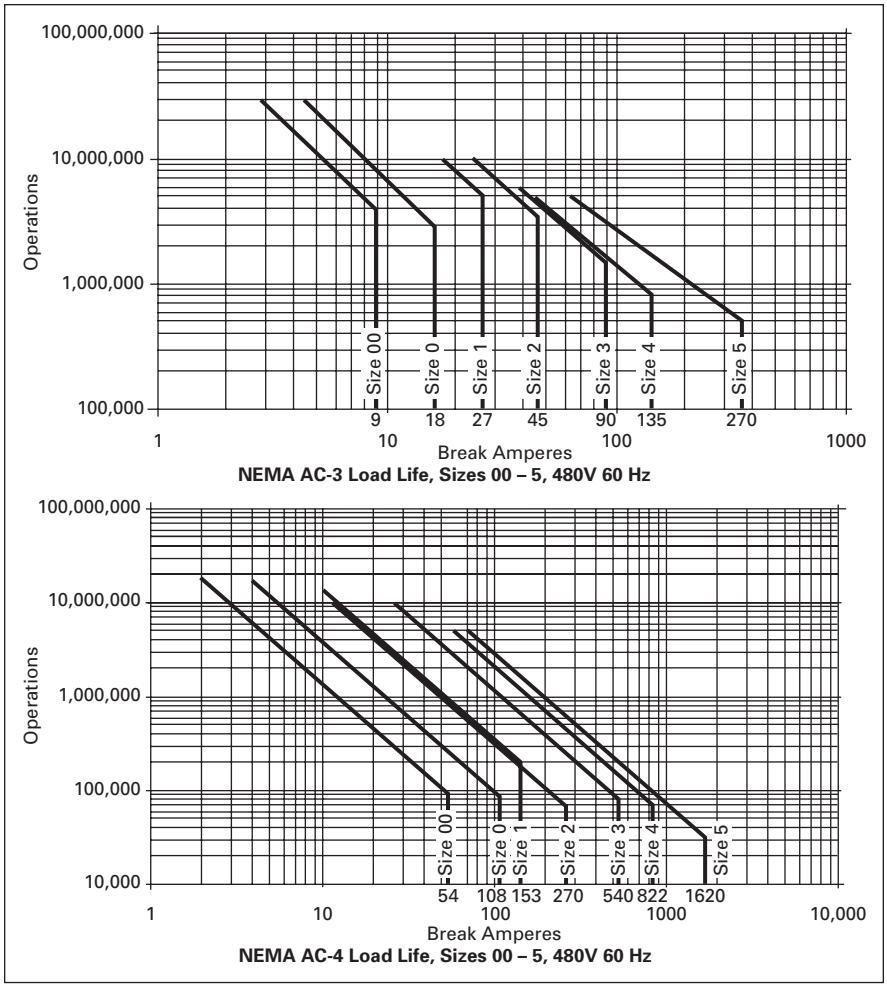

Figure 33-26. AC-3 and AC-4 Utilization Categories

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3-Pole Top Mounted Fuse Block Kit

IEC Sizes A – K, NEMA Sizes 00 – 2

Mounted Fuse Block Kit

Field mount to Freedom Series starters and contactors. Designed to save space and reduce installation costs. They provide short circuit protection for branch circuits.

Table 33-112. Fuse Block Kits

Fuse Type	Catalog Number	Price U.S. $
Class H — 30A 250V Class R — 30A 250V	**C350KH21** **C350KR21**	
Class G — 15A 300V Class G — 20A 300V Class G — 30A 300V Class G — 60A 300V	**C350KG37** **C350KG38** **C350KG31** **C350KG32**	
Class T — 30A 300V Class T — 60A 300V	**C350KT31** **C350KT32**	
Class J — 30A 600V Class J — 60A 600V Type M — 30A 600V ① Class CC — 30A 600V	**C350KJ61** **C350KJ62** **C350KM61** **C350KC63**	
Class T — 30A 600V Class T — 60A 600V	**C350KT61** **C350KT62**	

① Type M fuse block not approved for branch circuit protection.

Table 33-113. Approximate Dimensions

Fuse Block			Dimensions in Inches (mm)			
Class	Amperes	Volts	Wide A	High B	Deep C	D
G	15, 20, 30 60	300 300	2.40 (61.0) 2.62 (66.5)	3.00 (76.2) 4.25 (108.0)	2.04 (51.8) 2.08 (52.8)	— —
H	30	250	3.00 (76.2)	3.10 (78.7)	2.23 (56.6)	3.62 (91.9)
J	30, 60	600	4.81 (122.2)	4.12 (104.6)	2.82 (71.6)	—
M, CC	30	600	2.40 (61.0)	3.00 (76.2)	2.04 (51.8)	—
R	30	250	3.00 (76.2)	3.10 (78.7)	2.23 (56.6)	3.62 (91.9)
T	30, 60 30 60	300 600 600	3.44 (87.4) 3.75 (95.3) 4.87 (123.7)	3.00 (76.2) 3.31 (84.1) 3.00 (76.2)	2.33 (59.2) 2.26 (57.4) 2.58 (65.5)	— — —

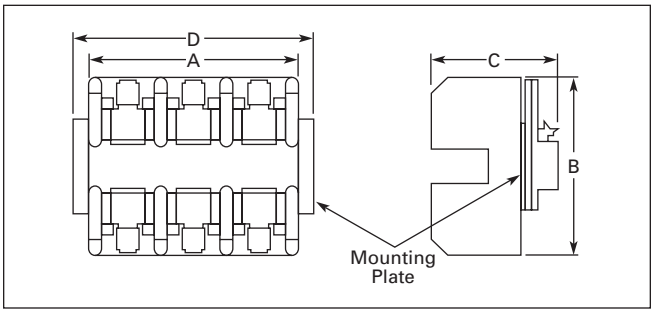


Figure 33-27. Approximate Dimensions in Inches (mm)

Mechanical Interlock and Reversing Kits

Mechanical interlocks and reversing kits are designed for field assembly of reversing contactors or starters from Freedom Series components. The Reversing Kits include a Mechanical Interlock, stabilizer bar and a pre-cut, trimmed and formed wire set. Auxiliary contacts, if required, must be ordered separately. See **Page 33-86**.

Cat. No. C321KM60B

Part No. 23-7165

Wire Set

Table 33-114. Mechanical Interlock Only ②③

Application			Catalog Number	Price U.S. $
NEMA Size	IEC Size	Contactor Mounting		
00 – 2	A – K	Horizontal	**C321KM60B**	
3	L – N	Horizontal	**C321KM30**	
3 to 4	N to P	Horizontal	**C321KM43**	
4	P – S	Horizontal	**C321KM40**	
4 to 5	—	Horizontal	**C321KM45**	
4 to 6	S to T/U	Horizontal	**C321KM80**	
5	—	Horizontal	**C321KM50**	
5 to 6	—	Horizontal	**C321KM56**	
6	T and U	Horizontal	**C321KM70**	
6 to 7	T/U to V – X	Horizontal	**C321KM90**	
7	V, W and X	Horizontal	**C321KM34**	
4 or 5 to 5	P – S to 5	Vertical	**C321KM55**	
5 to 6	—	Vertical	**C321KM65**	
6	T and U	Vertical	**C321KM66**	
6 to 7	T/U to V – X	Vertical	**C321KM67**	

② Without cross-wiring.
③ For use with latest series product.

Table 33-115. Reversing Kits (Horizontal Contactor Mounting Only)

Application		Catalog Number	Price U.S. $
NEMA Size	IEC Size		
00 0 1 2 3	A – C D – F — G – K —	**C321KM60K14B** **C321KM60K13B** **C321KM60K15B** **C321KM60K16B** **C321KM60K17** ④	
— — 4 5 —	L and M N — — P – S	**C321KM60K21** ④ **C321KM60K18** ④ **C321KM60K19** ④ **C321KM60K20** ④ **C321KM60K44** ④	

④ Kit includes (2) NC auxiliary contacts.

Discount Symbol **1CD1C**

Solid-State Timers

Solid-State Timer

Solid-State ON DELAY Timer — Side Mounted on Freedom Series NEMA 00 – 2, IEC A – K and C25D, C25E and C25F Frame

This timer is designed to be **wired in series with the load** (typically a coil). When the START button is pushed (power applied to timer), the ON DELAY timing function starts. At the completion of the set timing period, timer and series wired load will both be energized.

Table 33-116. Mounted Timer Product Selection

Timing Range	Catalog Number ①②③	Price U.S. $
.1 – 1.0 Seconds 1 – 30 Seconds 30 – 300 Seconds 5 – 30 Minutes	**C320TDN1_** **C320TDN30_** **C320TDN300_** **C320TDN3000_**	

① Add operating voltage Suffix to Catalog Number. **A** = 120V, **B** = 240V, **E** = 208V

② Rated .5 ampere pilot duty — not to be used on larger contactors.

③ Terminal connections are quick connects only. Two per side.

Shorting Bar Kits

These kits provide phase-to-phase power connections of contactors for field assembly. The kits include bus connections and mounting hardware. The shorting bars connect all three phases of a single contactor.

Table 33-117. Product Selection

Description	Catalog Number	Price U.S. $
NEMA Size 3, IEC Sizes L – N NEMA Size 4, IEC Sizes A – S NEMA Size 6, IEC Sizes T and U	**C321SB18** **C321SB19** **C321SB22**	

Pneumatic Timers — Top Mounted

Attachment mounts on top of any NEMA Size 00 – 2 or IEC Size A – K Freedom Series starter or contactor (top mounted auxiliary contacts can not be installed on device when timer is used). Timer unit has 1NO-1NC isolated timed contacts — circuits in each pole must be the same polarity. Units are convertible from OFF to ON DELAY or vice-versa.

Table 33-118. Product Selection

Timing Range	Catalog Number	Price U.S. $
.1 to 30 Seconds 10 to 180 Seconds	**C320TP1** **C320TP2**	

Table 33-119. Maximum Ampere Ratings

Description	Volts AC			
	120	240	480	600
Make Break	30 3	15 1.5	7.5 .75	6 .6

Locking Cover for Overload Relay — C306 Only

Snap-on transparent or opaque plastic panel for covering access port to the overload relay trip setting dial — helps prevent accidental or unauthorized changes to trip and reset setting.

Table 33-120. Product Selection

Description	Min. Ordering Quantity (Std. Pkg.)	Catalog Number	Price U.S. $
Clear cover, no accessibility	50	**C320PC3**	
Gray cover, no accessibility, with Auto only nib	50	**C320PC4**	
Gray cover, no accessibility, with Manual only nib	50	**C320PC5**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Auto only nib	50	**C320PC6**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Manual only nib	50	**C320PC7**	

Identification Markers

IEC Sizes A – K, NEMA Sizes 00 – 2

Designed to snap on the face of contactor for easy, personalized identification of individual devices. Includes holder and labels.

Table 33-121. Product Selection

Description	Catalog Number	Price U.S. $
Identification Marker	**C320DL2**	

Control Circuit Fuse Block

These panel mounted fuse holders, designed for control circuit protection or other similar low current requirements, have extractor type fuse caps. The Class CC rejection type fuses (KTK-R) used in these holders are intended for use with equipment designated as being suitable for use on systems having high available fault currents. If branch circuit protective device is 45A or greater, C320FBR fuse kit may be required for control circuit protection per NEC 430-72.

Table 33-122. Product Selection

Type	Max. Amperes	Catalog Number	Price U.S. $
Fuse Holder Only	15 30	**C320FB** ④ **C320FBR** ⑤	

④ A fuse is not supplied, but holder will accept a Bussman Type KTK or KTK-R (13/32" x 1-1/2") fuse, 600V maximum.

⑤ Includes a 5A, 600V KTK-R fuse.

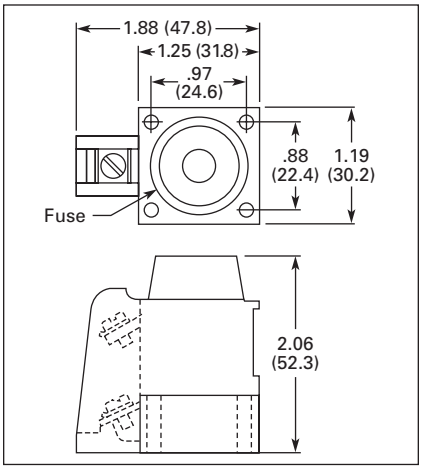


Figure 33-28. Approximate Dimensions in Inches (mm)

Discount Symbol **1CD1C**

33

DIN Rail Mounting Channel — 35 mm

Designed for DIN rail mounting of IEC style contactors and starters.

DIN Rail

Table 33-123. Product Selection

Description	Catalog Number	Price U.S. $
1 Meter Length	**MC382MA1**	

Finger Protection Shields

Snap-on shields for both contactors and starters provide IEC Type IP20 Finger Protection. Prevents accidental contact with line/load terminals.

Table 33-124. Product Selection

Application	Catalog Number	Price U.S. $
NEMA Size 00, IEC Sizes A – C NEMA Size 0, IEC Sizes D – F	**C320LS1** **C320LS2**	
NEMA Sizes 1 – 2, IEC Sizes G – K Contactors Reversing Contactors	 **C320LS3** **C320LS4**	
NEMA Size 1 Starters Reversing Starters	 **C320LS5** **C320LS6**	
NEMA Size 2, IEC Sizes G – K Starters Reversing Starters	 **C320LS7** **C320LS8**	

Adapter to DIN Rail Mount

NEMA 1 – 2 and IEC G – K Contactors

Designed to allow DIN rail mounting of NEMA 1 – 2 and IEC G – K contactors. Includes all hardware required to convert contactors from panel mounting to 35 mm DIN rail mounting.

Table 33-125. Product Selection

Catalog Number	Price U.S. $
C320DN65	

Transient Suppressor Kits

NEMA Sizes 00 – 2, IEC Sizes A – K

Cat. No. C320TS2

These kits limit high voltage transients produced in the control circuit when power is removed from the contactor or starter coil. There are three separate suppressors for use on 24 – 120V, 208 – 240V or 277 – 480V coils respectively. These devices mount directly to the coil terminals of Freedom Series contactors or starters NEMA Sizes 00 – 2, IEC Sizes A – K and lighting contactors 10 – 60A. Reversing devices will require two.

Table 33-126. Product Selection

Description	Coil ① Voltage	Catalog Number	Price U.S. $
Transient Suppressor	24/120V 208/240V 277/480V	**C320TS1** **C320TS2** **C320TS3**	

① Suppressor is compatible with coil voltages/ranges as shown, both 50 and 60 Hz.

NEMA Sizes 3 – 5, IEC Sizes L – S

This device mounts on top of any side mounted auxiliary contact on Freedom Series NEMA Sizes 3 – 5, IEC Sizes L – S and lighting contactors 100 – 300A. It connects across coil terminals on any 120V contactor or starter magnet coil (reversing starters or contactors require 2).

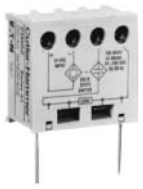
Limits high voltage transients produced in the circuit when power is removed from the coil.

Table 33-127. Product Selection

Description	Coil Voltage	Catalog Number	Price U.S. $
Transient Suppressor	120V	**C320AS1**	

Discount Symbol **1CD1C**

DC/AC Interface Module



Cat. No. C320DC

The Catalog Number C320DC Interface Module is an optically isolated solid-state switch which provides a means of operating AC coils with 5 – 48V DC control signal. It acts as a space saving interposing relay which can switch a specified 50/60 Hz AC source to the contactor or starter coil.

The module may be directly attached to the coil terminals of any Freedom Series contactor or starter — NEMA Sizes 00 – 3, IEC Sizes A – N and lighting contactors 10 – 100A. It also has provisions for DIN rail mounting.

The module will operate coils within the voltage ranges shown in **Table 33-128**.

Design Characteristics

- DC Input: 5 – 48V DC at mA nominal
- AC Operating Voltage: 240V AC (360 VA) ±10% 50/60 Hz;
- DC Operating Voltage: 30V DC max. (.5A)
- AC Current Rating
  - 10A make (inrush)
  - 1A break (sealed)

Table 33-128. Controller Coil Voltage Ranges

Controller Catalog Number Prefix	Controller Size or Rating	Coil Range Volts AC
AE16, AE17, AE56, AE57, CE15, CE55	A – F G – K L – N	24 – 240 48 – 240 110 – 240
AN16, AN56, CN15, CN55	00 – 0 1 – 2 3	24 _ 240 48 – 240 110 – 240
CN35	10 – 30A 60A 100A	24 – 240 48 – 240 110 – 240

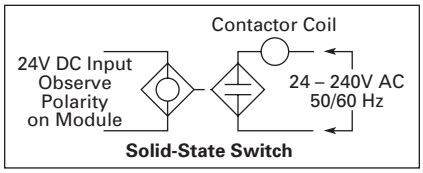


Figure 33-29. Typical Application

Table 33-129. Product Selection

Coil Voltage	Catalog Number	Price U.S. $
5V DC 6V DC 9V DC	**C320DC2V5** **C320DC2V6** **C320DC2V9**	
12V DC 48V DC	**C320DC2V12** **C320DC2V48**	

Adhesive Dust Cover

NEMA Sizes 00 – 2, IEC Sizes A – K

These adhesive stickers come 25 to a package and provide extra protection from contaminants when applied to the sides of Freedom NEMA Sizes 00 – 2 and IEC Sizes A – K. Adhesive covers are easily applied to side opening where auxiliaries are not installed and provide extra protection from metal filings and other debris.

Table 33-130. Product Selection

Description	Catalog Number	Price U.S. $
25 to a package	**C320DSTCVR**	

Add-On Power Pole Kit

NEMA Sizes 00 – 2, IEC A – K

This device mounts on the side of Freedom NEMA Size 00 – 2 and IEC Size A – K contactors. One unit can be mounted on each side and carries UL, cUL and IEC ratings. The device is rated for resistive, inductive and lighting applications.

Table 33-131. Product Selection

UL Ampere Rating						IEC 947 Ampere Rating			1NO Power Pole	
Inductive 600V	Resistive 600V	Horsepower 1-Phase		Locked Rotor 240V	Lighting Ballast Tungsten 480V	AC-1 600V	AC-3 600V	AC-5a AC-5b 480V	Catalog Number	Price U.S. $
		115V	230V							
15	20	1/2	2	96	20	20	12	18	**C320PPD10**	

Discount Symbol **1CD1C**

33

Auxiliary Contacts

Contact Configuration Code

This two-digit code is found on the auxiliary contact to assist in identifying the specific contact configuration. The first digit indicates the quantity of NO contacts and the second indicates the quantity of NC contacts.

NEMA Sizes 00 – 2 — IEC Sizes A – K

The auxiliary contacts listed below are designed for installation on Freedom Series starters and contactors. Snap-on design facilitates quick, easy installation.

These bifurcated design contact blocks, featuring silver cadmium alloy contacts, are well suited for use in very low energy (logic level) circuits.

Side Mounted

Top Mounted

Table 33-132. Product Selection

Description	Contact Configuration Code ①	Catalog Number	Price U.S. $
Side Mounted			
1NO	10	**C320KGS1**	
1NC	01	**C320KGS2**	
1NO-1NC	11	**C320KGS3**	
2NO	20	**C320KGS4**	
2NC	02	**C320KGS5**	
1NO-1NCI	N/A	**C320KGS6**	
1NO (EC)-1NC (LO)	N/A	**C320KGS7**	
1NCI	N/A	**C320KGS8**	
Top Mounted			
1NO	10	**C320KGT1**	
1NC	01	**C320KGT2**	
1NO-1NC	11	**C320KGT3**	
2NO	20	**C320KGT4**	
2NC	02	**C320KGT5**	
1NO-1NCI	N/A	**C320KGT6**	
1NO (EC)-1NC (LO)	N/A	**C320KGT7**	
1NCI	N/A	**C320KGT8**	
3NO	30	**C320KGT9**	
2NO-1NC	21	**C320KGT10**	
1NO-2NC	12	**C320KGT11**	
3NC	03	**C320KGT12**	
4NO	40	**C320KGT13**	
3NO-1NC	31	**C320KGT14**	
2NO-2NC	22	**C320KGT15**	
1NO-3NC	13	**C320KGT16**	
4NC	04	**C320KGT17**	
3NO-1NCI	N/A	**C320KGT18**	
2NO-1NCI-1NC	N/A	**C320KGT19**	
2NO-1NO (EC)-1NC (LO)	N/A	**C320KGT20**	
1NO-1NC-1NO (EC)-1NC (LO)	N/A	**C320KGT21**	

Note: NCI = Normally Closed early opening designed for use in reversing applications. EC = Early Closing. LO = Late Opening.

① For reference only — not part of Catalog Number. See above.

NEMA Sizes 3 – 8 — IEC Sizes L – Z

Base Auxiliary Contact Cat. No. C320KGS42

Auxiliary Contact Cat. No. C320KGS22

Table 33-133. Product Selection

Circuit	Contact Configuration Code ②	Catalog Number		Price U.S. $
Base Auxiliary Contacts — NEMA Sizes 3 – 5, IEC Sizes L – S				
		NEMA Size 3 IEC Sizes L – N	**NEMA Sizes 4 – 5 IEC Sizes P – S**	
NO	10	**C320KGS31**	**C320KGS41**	
NO-NC	11	**C320KGS32**	**C320KGS42**	
Auxiliary Contacts — NEMA Sizes 3 – 5, IEC Sizes L – S				
		Catalog Number		
NO	10	**C320KGS20**		
NC	01	**C320KGS21**		
NO-NC ③	11	**C320KGS22**		
Auxiliary Contacts, Sealed Logic Level – NEMA Sizes 3 – 5, IEC Sizes L – S				
		Catalog Number		
NO	10	**C320KGS20L**		
NC	01	**C320KGS21L**		
NO-NC ④	11	**C320KGS22L**		
Auxiliary Contacts — NEMA Sizes 6 – 8, IEC Sizes T – Z				
		Size	**Catalog Number**	
NO-NC	11	NEMA 8, IEC Z	**C320KA5**	
2NO-2NC	22	NEMA 6 – 7	**C320KA6**	
2NO-2NC	22	IEC T – X	**C320KA8**	

② For reference only — not part of Catalog Number. See above left.

③ NO-NC occupies two positions — L2 and L3, or R2 and R3. See **Figure 33-30** on **Page 33-87**.

④ Form C contacts.

Auxiliary Contact Ratings (Amperes)

Table 33-134. Ratings — NEMA A600

Current	AC Volts			
	120V	**240V**	**480V**	**600V**
Make and Interrupting	60	30	15	12
Break	6	3	1.5	1
Continuous	10	10	10	10

Table 33-135. Ratings — NEMA P300

Continuous Thermal Rating: 5A	
DC Volts	**Make/Break Amperes**
125	1.10
250	.55

Table 33-136. Ratings — Logic Level

Minimum Ratings for Logic Level and Hostile Atmosphere Application	
Minimum Amperes	20 mA
Minimum Volts	24V AC/DC

Table 33-137. Ratings C320KGS20L, C320KGS21L, C320KGS22L

DC-12		AC-12	
Ue	**Ie**	**Ue**	**Ie**
80	0.1	250	0.1

Discount Symbol **1CD1C**

Auxiliary Contact Location

NEMA Sizes 00 – 2, IEC Sizes A – K

The sketches below illustrate the maximum number of auxiliary contacts that can be assembled to a contactor or starter and their locations.

Table 33-138. Auxiliary Contacts

Catalog Number	Size	Poles	Available Mounting Positions ①②	
			Open Type	Enclosed
AE16	A – K	3	T1, L1	L1
AN16	00 0 – 2	3 3	T1, L1, R1 T1, L1	L1 L1
AE56	A – K	3	L1, R1	L1, R1
AN56	00 – 2	3	T1, T2	—
CE15	A – C D – K G – J G – J	2 – 4 3 4 5	T1, L1, R1 T1, L1 T1, R1 T1	L1, R1 L1 — —
CN15	00 0 – 2 1, 2 1, 2	2 – 4 2 – 3 4 5	T1, L1, R1 T1, L1 T1, L1 T1, L1	L1 L1 — —
CN35	10A 20 – 60A 60A 60A	2 – 4 2 – 3 4 5	T1, L1, R1 T1, L1 T1, L1 T1, L1	L1 L1 — —
CE55	A – K	3	L1, R1	L1, R1
CN55	00 – 2	3	T1, T2	—

① Available positions on contactors or starters other than what is factory installed.

② When a pneumatic timer is mounted on contactor, only side mounted auxiliary contact positions are available. The solid-state timer, when added, takes up side mounted auxiliary contact position.

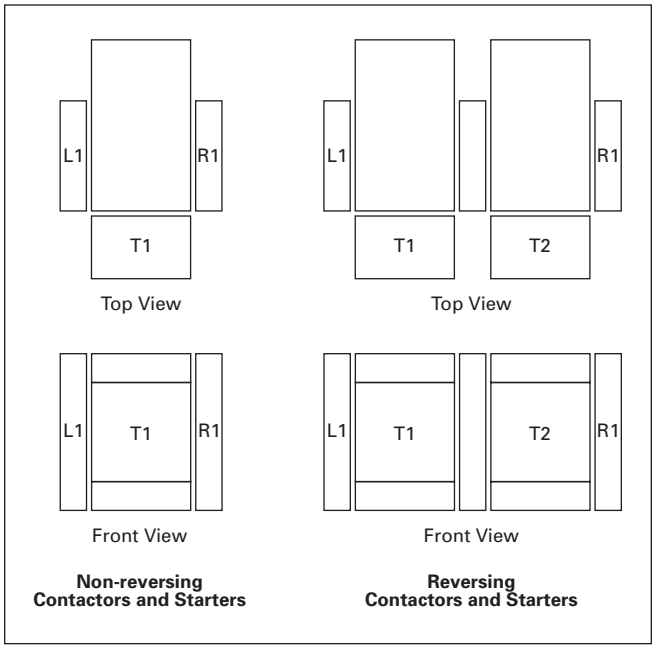


Figure 33-30. Auxiliary Contact Location

NEMA Sizes 3 – 8, IEC Sizes L – Z

The sketches below illustrate the maximum number of auxiliary contacts that can be assembled to a contactor and their locations.

Note: A Base Auxiliary Contact must be added in position R1 before additional auxiliary contacts can be mounted on NEMA Size 3 and IEC Sizes L – N, or in L1 on NEMA Sizes 4 – 5 and IEC Sizes P – S.

Table 33-139. Mounting Positions

Size	Available Mounting Positions ③
NEMA Size 3, IEC Sizes L – N	R2, R3, L1, L2, L3
NEMA Sizes 4 – 5, IEC Sizes P – S	L2, L3, R1, R2, R3
NEMA Sizes 6 – 7, IEC Sizes T – X	R1
NEMA Size 8, IEC Size Z	L2, R2

③ Available positions on contactors or starters other than what is factory installed.

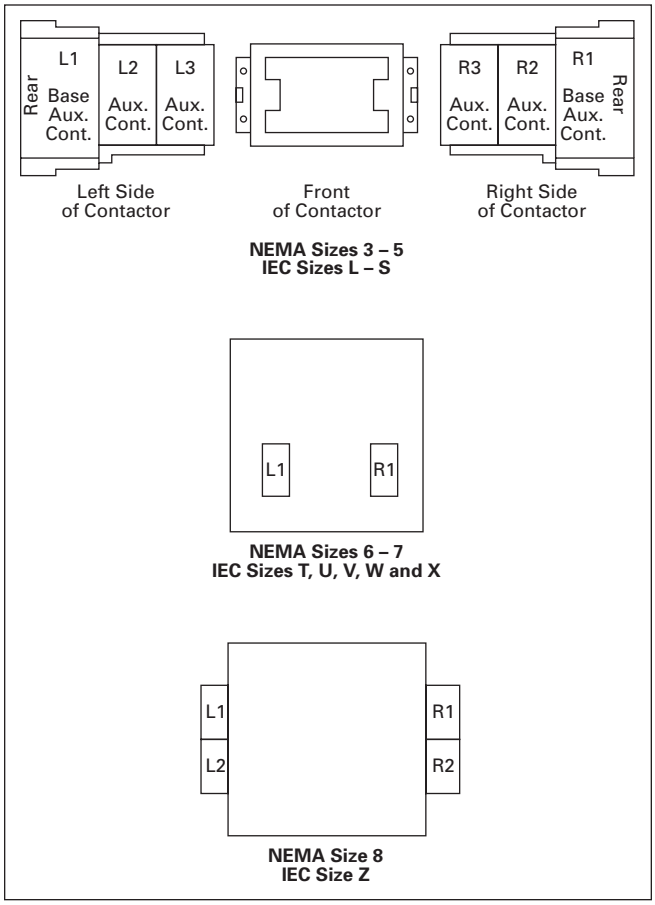


Figure 33-31. Auxiliary Contact Location

DC Magnet Coils

When Ordering Specify

Conversion Kit for Field Assembly

33

- Catalog Number

Factory Installed DC Coil

- For factory installed DC magnet coil on AC contactors or non-combination starters (open type only), substitute the Code Suffix from table below for the magnet coil identifier in the device Catalog Number.

EXAMPLE: For Size 0 AC contactor with a 24V DC coil, change AN16BN0**A**C to AN16BN0**T1**C.

Application

- Connect for separate control
- Not for use with cover control switch operators
- Use twin break, heavy-duty pilot devices.
- Designed for +10%, -20% rated voltage, continuous duty operation.

Non-reversing Kit Consists of:

- 1 Encapsulated DC magnet coil
- 1 NCI or NO/NCI side mounted auxiliary contact

  Note: These kits are supplied with a NO/NCI side mounted auxiliary contact in place of the NCI contact.
- 2 Blue colored connection wires
- 1 Instruction publication

Operation

See next page for operation details.

Table 33-140. Product Selection

Contactor or Starter Size		Conversion Data					Complete Conversion Kit			Factory Installed	
		Volts	Magnet Coil			NCI Interlock					
NEMA	IEC		Coil Number	Amps P.U./Seal	Watts P.U./Seal		Catalog Number	Price U.S. $	Ship Wt. Lbs. (kg)	Code Suffix	Adder U.S. $
Non-reversing — Kit includes NCI Side Mounted Auxiliary contact											
00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	**9-2988-11** **9-2988-12** **9-2988-13** **9-2988-14**	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	**C320KGD1** **C320KGD1** **C320KGD1** **C320KGD1**	**C335KD3R1** **C335KD3T1** **C335KD3W1** **C335KD3A1**		1.0 (.5)	**R1** **T1** **W1** **A1**	
① 00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	**9-2988-11** **9-2988-12** **9-2988-13** **9-2988-14**	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	**C320KGD2** ① **C320KGD2** ① **C320KGD2** ① **C320KGD2** ①	**C335KD3R4** **C335KD3T4** **C335KD3W4** **C335KD3A4**		1.0 (.5)	**R4** **T4** **W4** **A4**	
1 and 2 CN35 – G	G – K	12 24 48 120	**9-2990-1** **9-2990-2** **9-2990-3** **9-2990-4**	15.4/.42 7.7/.21 3.9/.11 1.5/.041	185/4.98 185/4.96 185/5.04 185/4.87	**C320KGD5** **C320KGD5** **C320KGD5** **C320KGD5**	**C335KD4R4** **C335KD4T4** **C335KD4W4** **C335KD4A4**		1.0 (.5)	**R4** **T4** **W4** **A4**	
3 CN35 – K	L – N	12 24 48 120	**9-3002-1** **9-3002-2** **9-3002-3** **9-3002-4**	24/.40 12/.20 6.1/.097 2.5/.038	293/4.84 288/4.75 295/4.67 298/4.57	**C320KGD3** **C320KGD3** **C320KGD3** **C320KGD3**	**C335KD5R1** **C335KD5T1** **C335KD5W1** **C335KD5A1**		2.0 (.9)	**R1** **T1** **W1** **A1**	
4 and 5 CN35 – N, S	P – S	24 48 120 240	**9-2026-4** **9-2026-3** **9-2026-2** **9-2026-1**	18/.22 9/.11 3.3/.05 1.7/.02	400/5.3 400/5.2 450/5.4 440/4.9	**C320KGD3** **C320KGD3** **C320KGD3** **C320KGD3**	**C335KA3T1** **C335KA3W1** **C335KA3A1** **C335KA3B1**		2.5 (1.1)	**T1B** **W1B** **A1B** **B1B**	
Reversing											
00 and 0 CN35 – A, B, D D15 Relays	A – F	12 24 48 120	**(2) 9-2988-1** **(2) 9-2988-2** **(2) 9-2988-3** **(2) 9-2988-4**	6.4/.28 3.2/.14 1.6/.07 .64/.028	76.8/3.36 76.8/3.36 76.8/3.36 76.8/3.36	**(2) C320KGD1** **(2) C320KGD1** **(2) C320KGD1** **(2) C320KGD1**	**C335RD3R1** ② **C335RD3T1** ② **C335RD3W1** ② **C335RD3A1** ②		1.0 (.5)	**R1** ③ **T1** ③ **W1** ③ **A1** ③	
1 and 2 CN35 – G	G – K	12 24 48 120	**(2) 9-2990-1** **(2) 9-2990-2** **(2) 9-2990-3** **(2) 9-2990-4**	15.4/.42 7.7/.21 3.9/.11 1.5/.041	185/4.98 185/4.96 185/5.04 185/4.87	**(2) C320KGD3** **(2) C320KGD3** **(2) C320KGD3** **(2) C320KGD3**	④ ④ ④ ④		—	**R1** ③ **T1** ③ **W1** ③ **A1** ③	

① These kits are supplied with a NO/NCI side mounted auxiliary contact in place of the NCI contact.

② Kit does not include mechanical interlock or crossover wiring. Two NO/NCI top mounted auxiliary contacts are supplied for electrical interlocking.

③ Factory installed DC coils on NEMA contactors and starters include a NO/NC top mounted auxiliary contact on each contactor for electrical interlocking. On IEC contactors and starters, a NC top mounted auxiliary contact is supplied on each contactor for electrical interlocking.

④ Available factory assembled only.

Discount Symbol **1CD1C**

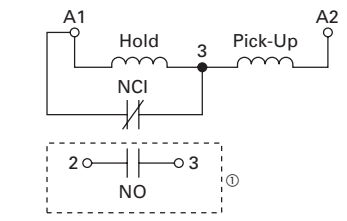
Operation

These DC coil kits have separate pick-up and seal windings. A **special** (side mounted) early-break NCI auxiliary contact is used to either disconnect the pick-up winding or insert the seal winding in series with the pick-up winding, depending on the frame size of the contactor. DC coil kits come in two styles, a suffix **1** and a suffix **4**. The 1 suffix contains only the **special** (side mounted) early break NCI auxiliary contact. The 4 suffix contains a NO contact in the same package as the **special** (side mounted) early-break NCI auxiliary contact.

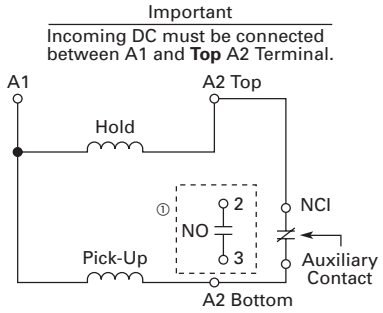
Note: For NEMA Sizes 00 and 0 and IEC Sizes A – F, contactors may utilize either suffix 1 or 4 DC coil kits; starters may utilize suffix 4 DC coil kits only. For NEMA Sizes 1 and 2 and IEC Sizes G – K, both contactors and starters may utilize a suffix 4 DC coil kit only.

On the above sizes only, when the **special** auxiliary package is mounted on the side of a contactor or starter, **no** standard auxiliary contact may be mounted on the same side.

Note: For NEMA Sizes 3 – 5 and IEC Sizes L – S, special coil NCI clearing contact is an add-on auxiliary (**must** mount on a base mount auxiliary contact; normally a 1NO). This arrangement will normally account for two of the three contact positions on the side of each contactor or starter.



DC Coil Elementary Diagram for NEMA Sizes 1 – 3 and IEC Sizes G – N Contactors and Starters



DC Coil Elementary Diagram for NEMA Sizes 00, 0, 4 & 5 and IEC Sizes A – F & P – S Contactors and Starters

Figure 33-32. Elementary Diagrams

① 1NO available in Suffix 4 kits only.

Competitive Mounting Plates

C321CMP1

The C321 adapter plates permit direct replacement of competitive starters with Freedom Series starters without drilling and tapping new mounting holes. Allen-Bradley 509, Eaton's Cutler-Hammer A10 (adapter plate not required for replacing A10 Starter Sizes 1, 4 and 5), Furnas 14, ESP100, General Electric CR206, CR306, Siemens SXL, Square D 8536, Westinghouse A200, B200.

Table 33-141. Product Selection

Freedom NEMA Size	Index Number ②	
	Catalog Number	Price U.S. $
00, 0	**C321CMP0**	
1	**C321CMP1**	
2	**C321CMP2**	
3	**C321CMP3**	
4	**C321CMP4**	
5	**C321CMP5**	

② Handling Number Only — Does not appear on product. The handling number is stamped on the carton label only.

Discount Symbol **1CD1C**

Table 33-142. Competitive Mounting Plates — Approximate Dimensions and Shipping Weights

NEMA Size	Catalog Number	Dimensions in Inches (mm)		Ship Wt. Lbs. (kg)
		Wide A	Deep B	
0 – 00	**C321CMP0**	3.25 (82.6)	8.50 (215.9)	.63 (.29)
1	**C321CMP1**	3.75 (95.3)	9.50 (241.3)	.90 (.41)
2	**C321CMP2**	3.75 (95.3)	10.25 (260.4)	1.20 (.54)
3	**C321CMP3**	6.00 (152.4)	12.75 (323.9)	2.40 (1.09)
4	**C321CMP4**	7.50 (190.5)	13.50 (342.9)	3.00 (1.36)
5	**C321CMP5**	11.00 (279.4)	19.00 (482.6)	6.63 (3.01)

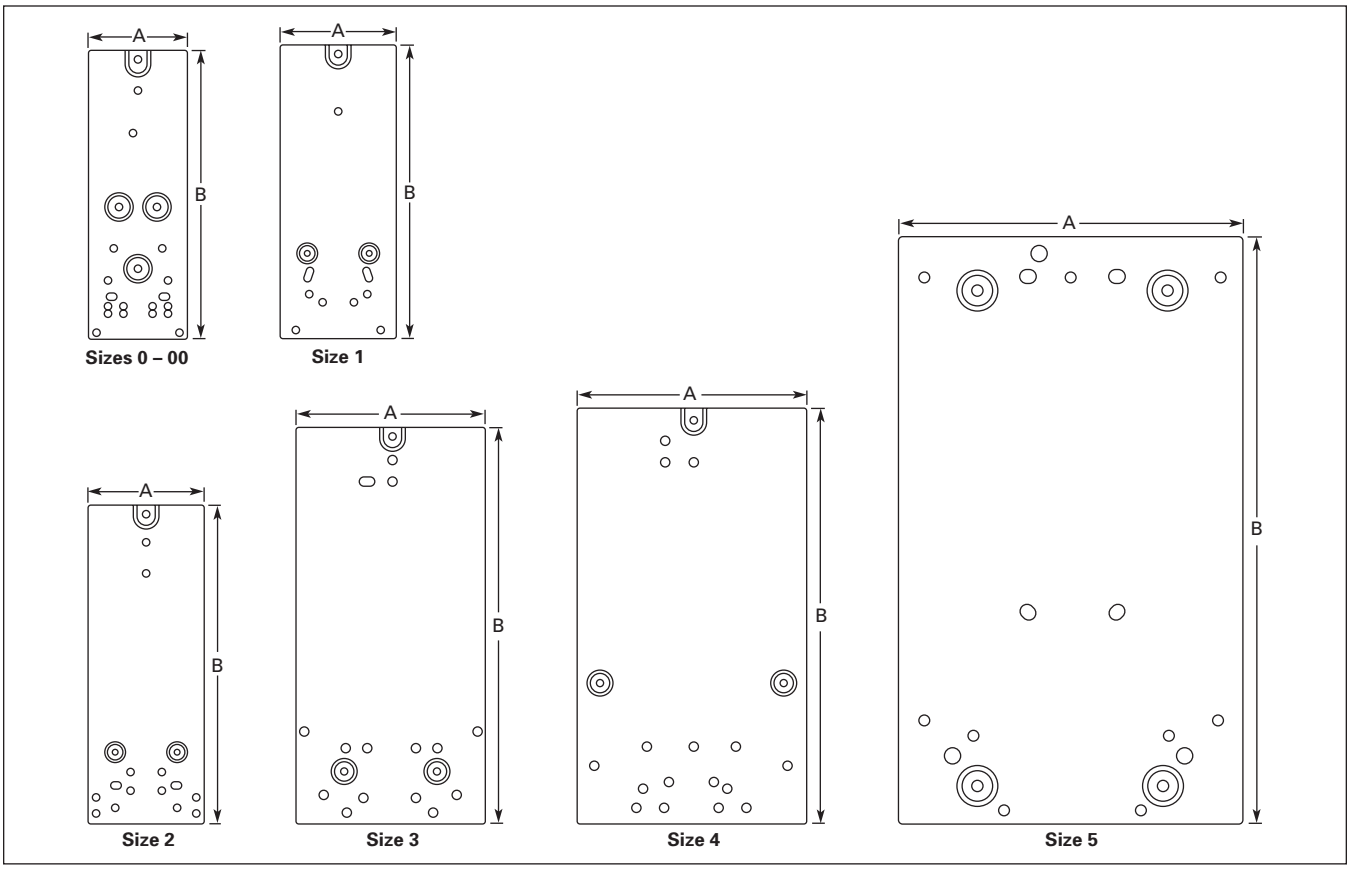


Figure 33-33. Approximate Dimensions

Special Modifications

Table 33-143. For Catalog Numbers AE16, AE17, AN16, AE56, AE57, AN56, CE15, CN15, CN35, CE55, CN55

Addition or Special Feature	Starter Size and Price Adder (U.S. $) — NEMA/IEC									
	00/ A – C	0/ D – F	1 —	2/ G – K	3/ L – N	4/ P – S	5/ T – U	6/ V	7/ W – X	8/ Z
Control Circuit										
Extra Auxiliary Circuit, Factory Installed NO or NC — each contact ①										
Transient Suppressor ①										
Power Circuit										
Contactor/Starter for Ring Lug Capability — Add Mod Code **T16** to Catalog Number (Power Terminals Only, Control Terminals as Standard) Standalone Overload Relays Can Not Accept Ring Lugs on Line Side										
Factory Installed Dust Covers										
Factory Installed C320DSTCVR — Add Mod Code **-53** to Catalog Number ①					NA	NA	NA	NA	NA	NA

① These modifications are generally available in Kit form at lower cost. See specific product sections for Kit listings.

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table 33-144. For Catalog Numbers AN16, AN30, AN40, AN56, AN70, AN80, AN800, CN15, CN35 ② and CN55 Contactors and Starters

Description		NEMA Size 00-0	Price U.S. $	NEMA Size 00		Price U.S. $	NEMA Size 0		Price U.S. $
		Series A1		Series B1	Series C1		Series B1	Series C1	
		Part No.		Part No.	Part No.		Part No.	Part No.	
Renewal Parts Publication Number		None		None	None		None	None	
Contact Kits									
2-Pole		①		①	①		①	①	
3-Pole		①		①	①		①	①	
4-Pole		①		①	①		①	①	
5-Pole		①		①	①		①	①	
Magnet Coils	**Coil Suffix**								
120V 60 Hz or 110V 50 Hz	A	9-2650-1		9-2875-1	9-2875-1		9-2876-1	9-2876-1	
240V 60 Hz or 220V 50 Hz	B	9-2650-2		9-2875-2	9-2875-2		9-2876-2	9-2876-2	
480V 60 Hz or 440V 50 Hz	C	9-2650-3		9-2875-3	9-2875-3		9-2876-3	9-2876-3	
600V 60 Hz or 550V 50 Hz	D	—		9-2875-4	9-2875-4		9-2876-4	9-2876-4	
208V 60 Hz	E	9-2650-5		9-2875-5	9-2875-5		9-2876-5	9-2876-5	
277V 60 Hz	H	9-2650-13		9-2875-12	9-2875-12		9-2876-12	9-2876-12	
208/240V 60Hz	J	—		9-2875-37	9-2875-37		9-2876-17	9-2876-17	
240V 50Hz.	K	—		9-2875-11	9-2875-11		9-2876-11	9-2876-11	
380 – 415V 50 Hz	L	9-2650-6		9-2875-6	9-2875-6		9-2876-6	9-2876-6	
380V 50 Hz	L	—		—	—		—	—	
415V 50 Hz	M	—		—	—		—	—	
550V 50 Hz	N	—		—	—		—	—	
24V 60 Hz – 24V 50 Hz	T	—		9-2875-36	9-2875-36		9-2876-36	9-2876-36	
24V 60 Hz	T	9-2650-7		—	—		—	—	
24V 50 Hz	U	9-2650-14		9-2875-36	9-2875-36		9-2876-36	9-2876-36	
32V 50 Hz	V	—		9-2875-16	9-2875-16		9-2876-16	9-2876-16	
48V 60 Hz	W	—		9-2875-8	9-2875-8		9-2876-8	9-2876-8	
48V 50 Hz	Y	—		9-2875-9	9-2875-9		9-2876-9	9-2876-9	
Magnet Frame Armature									
Lower Magnet Frame		①		①	①		①	①	
Upper Magnet Frame		①		①	①		①	①	

Description		NEMA Size 1		Price U.S. $	NEMA Size 2		Price U.S. $	NEMA Size 3	Price U.S. $
		Series A1	Series B1		Series A1	Series B1			
		Part No.	Part No.		Part No.	Part No.		Part No.	
Renewal Parts Publication Number		20861	22177		20861	22177		20426	
Contact Kits									
2-Pole		6-65	6-65		6-65-7	6-65-7		6-43-5	
3-Pole		6-65-2	6-65-2		6-65-8	6-65-8		6-43-6	
4-Pole		6-65-9	6-65-9		6-65-15	6-65-15		—	
5-Pole		6-65-10	6-65-10		6-65-16	6-65-16		—	
Magnet Coils	**Coil Suffix**								
120V 60 Hz or 110V 50 Hz	A	9-2703-1	9-2703-1		9-2703-1	9-2703-1		9-2756-1	
240V 60 Hz or 220V 50 Hz	B	9-2703-2	9-2703-2		9-2703-2	9-2703-2		9-2756-2	
480V 60 Hz or 440V 50 Hz	C	9-2703-3	9-2703-3		9-2703-3	9-2703-3		9-2756-3	
600V 60 Hz or 550V 50 Hz	D	9-2703-4	9-2703-4		9-2703-4	9-2703-4		9-2756-4	
208V 60 Hz	E	9-2703-9	9-2703-9		9-2703-9	9-2703-9		9-2756-5	
277V 60 Hz	H	9-2703-7	9-2703-7		9-2703-7	9-2703-7		9-2756-9	
208/240V 60Hz	J	—	—		—	—		—	
240V 50Hz.	K	9-2703-14	9-2703-14		9-2703-14	9-2703-14		9-2756-13	
380 – 415V 50 Hz	L	9-2703-8	9-2703-8		9-2703-8	9-2703-8		—	
380V 50 Hz	L	—	—		—	—		9-2756-12	
415V 50 Hz	M	—	—		—	—		9-2756-8	
550V 50 Hz	N	—	—		—	—		9-2756-14	
24V 60 Hz – 24V 50 Hz	T	—	—		—	—		—	
24V 60 Hz	T	9-2703-6	9-2703-6		9-2703-6	9-2703-6		9-2756-6	
24V 50 Hz	U	9-2703-12	9-2703-12		9-2703-12	9-2703-12		9-2756-11	
32V 50 Hz	V	9-2703-10	9-2703-10		9-2703-10	9-2703-10		9-2756-10	
48V 60 Hz	W	9-2703-11	9-2703-11		9-2703-11	9-2703-11		9-2756-15	
48V 50 Hz	Y	9-2703-13	9-2703-13		9-2703-13	9-2703-13		9-2756-7	
Magnet Frame Armature									
Lower Magnet Frame		17-18200	17-18200		17-18200	17-18200		17-8955-2	
Upper Magnet Frame		48-1936	48-1936		48-1936	48-1936		48-1902	

① Replace with complete contactor.

② CN35A = Size 00, CN35B and CN35D = Size 0, CN35G = Size 2, CN35K = Size 3, CN35N = Size 4, and CN35S = Size 5.

Discount Symbol **1CD1C**

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Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table 33-144. For Catalog Numbers AN16, AN30, AN40, AN56, AN70, AN80, AN800, CN15, CN35 ① and CN55 Contactors and Starters (Continued)

Description		NEMA Size 4			NEMA Size 5			NEMA Size 6			
		Series A1	Series B1	Price U.S. $	Series A1	Series B1	Price U.S. $	Contactor & Starter Series A1, Starter Series B1	Price U.S. $	Contactor & Starter Series B1, Starter Series C1	Price U.S. $
		Part No.	Part No.		Part No.	Part No.		Part No.		Part No.	
Renewal Parts Publication Number		20428	20428		20429	20429		20146		23349	
Contact Kits											
2-Pole		6-44	6-26		6-45	6-45		6-601-2		—	
3-Pole		6-44-2	6-26-2		6-45-2	6-45-2		6-601		6-648	
Magnet Coils	**Coil Suffix**										
120V 60 Hz or 110V 50 Hz	A	9-1891-1	9-1891-1		9-1891-1	9-1891-1		9-2698		9-3006	
240V 60 Hz or 220V 50 Hz	B	9-1891-2	9-1891-2		9-1891-2	9-1891-2		9-2698-2		9-3006-2	
480V 60 Hz or 440V 50 Hz	C	9-1891-3	9-1891-3		9-1891-3	9-1891-3		9-2698-3		9-3006-3	
600V 60 Hz or 550V 50 Hz	D	9-1891-4	9-1891-4		9-1891-4	9-1891-4		9-2698-4		9-3006-4	
208V 60 Hz	E	9-1891-13	9-1891-13		9-1891-13	9-1891-13		9-2698-5		—	
277V 60 Hz	H	9-1891-26	9-1891-26		9-1891-26	9-1891-26		—		—	
208/240V 60Hz	J	—	—		—	—		—		—	
240V 50Hz	K	9-1891-20	9-1891-20		9-1891-20	9-1891-20		—		—	
380 – 415V 50 Hz	L	—	—		—	—		9-2698-6		9-3006-7	
380V 50 Hz	L	9-1891-14	9-1891-14		9-1891-14	9-1891-14		—		—	
415V 50 Hz	M	9-1891-21	9-1891-21		9-1891-21	9-1891-21		—		—	
550V 50 Hz	N	9-1891-8	9-1891-8		9-1891-8	9-1891-8		—		—	
24V 60 Hz – 24V 50 Hz	T	—	—		—	—		—		9-3006-8	
24V 60 Hz	T	9-1891-15	9-1891-15		9-1891-15	9-1891-15		—		—	
24V 50 Hz	U	9-1891-16	9-1891-16		9-1891-16	9-1891-16		—		—	
48V 60 Hz	W	—	—		—	—		9-2698-8		9-3006-9	
48V 50 Hz	Y	9-1891-18	9-1891-18		9-1891-18	9-1891-18		—		—	
Overload Relays											
For replacement on existing starters 3-Pole — Ambient Compensated Bimetallic		10-6530-4	10-6530-4		C306DN3B	C306DN3B		C306DN3B		C306DN3B	
Current Transformer											
		—	—		42-3564	42-3564		42-3598		42-3598	
Magnet Frame Armature ②											
Lower Magnet Frame		48-1030-2	48-1030-2		48-1030-2	48-1030-2		—		—	
Upper Magnet Frame		48-1029-4	48-1029-4		48-1029-4	48-1029-4		—		—	

Feeder Group Renewal ③

Volts	Hertz	NEMA Size 4			NEMA Size 5			NEMA Size 6			
		Series A1	Series B1	Price U.S. $	Series A1	Series B1	Price U.S. $	Contactor & Starter Series A1, Starter Series B1	Price U.S. $	Contactor & Starter Series B1, Starter Series C1	Price U.S. $
110 – 120	50/60	—	—		—	—		9-2705		9-3007	
220 – 240	50/60	—	—		—	—		9-2705-2		9-3007-2	
440 – 480	50/60	—	—		—	—		9-2705-3		9-3007-3	
550 – 600	50/60	—	—		—	—		9-2705-4		9-3007-4	
208	50/60	—	—		—	—		9-2705-5		9-3007-5	
380 – 415	50/60	—	—		—	—		9-2705-6		9-3007-8	
48 – 52	50/60	—	—		—	—		9-2705-8		9-3007-6	

① CN35A = Size 00, CN35B and CN35D = Size 0, CN35G = Size 2, CN35K = Size 3, CN35N = Size 4, and CN35S = Size 5.

② Consult factory.

③ Voltage ratings of the main coils must match those of the feeder group for proper operation of the starter/contactor.

Discount Symbol **1CD1C**

Note: For a complete listing of parts, refer to the Renewal Parts Publication Number referenced below.

Table 33-144. For Catalog Numbers AN16, AN30, AN40, AN56, AN70, AN80, AN800, CN15, CN35 ① and CN55 Contactors and Starters (Continued)

Description		NEMA Size 7 Series A1 Part No.	NEMA Size 7 Series B1 Part No.	Price U.S. $	NEMA Size 8 Series A1 Part No.	NEMA Size 8 Series B1 Part No.	Price U.S. $
Renewal Parts Publication Number		**20848**	**20848**		**20849**	**20849**	
Contact Kits							
2-Pole		—	—		—	—	
3-Pole		**6-613**	**6-613**		**6-571**	**6-571**	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	**A**	**9-2698**	**9-2698**		**9-2654**	**9-2654**	
240V 60 Hz or 220V 50 Hz	**B**	**9-2698-2**	**9-2698-2**		**9-2654-2**	**9-2654-2**	
480V 60 Hz or 440V 50 Hz	**C**	**9-2698-3**	**9-2698-3**		**9-2654-3**	**9-2654-3**	
600V 60 Hz or 550V 50 Hz	**D**	**9-2698-4**	**9-2698-4**		**9-2654-4**	**9-2654-4**	
208V 60 Hz	**E**	**9-2698-5**	**9-2698-5**		**9-2654-6**	**9-2654-6**	
277V 60 Hz	**H**	—	—		—	—	
208/240V 60Hz	**J**	—	—		—	—	
240V 50Hz	**K**	—	—		—	—	
380 – 415V 50 Hz	**L**	—	—		—	—	
380V 50 Hz	**L**	**9-2698-6**	**9-2698-6**		**9-2654-5**	**9-2654-5**	
415V 50 Hz	**M**	—	—		—	—	
550V 50 Hz	**N**	—	—		—	—	
24V 60 Hz – 24V 50 Hz	**T**	—	—		—	—	
24V 60 Hz	**T**	—	—		—	—	
24V 50 Hz	**U**	—	—		—	—	
32V 50 Hz	**V**	—	—		—	—	
48V 60 Hz	**W**	—	—		—	—	
48V 50 Hz	**Y**	—	—		—	—	
Overload Relays							
For replacement on existing starters 3-Pole — Ambient Compensated Bimetallic		**C306DN3B**	**C306DN3B**		**C306DN3B**	**C306DN3B**	
Current Transformer							
		42-3598-2	**42-3598-2**		**42-3598-3**	**42-3598-3**	
Magnet Frame Armature ②							
Lower Magnet Frame		—	—		—	—	
Upper Magnet Frame		—	—		—	—	

Feeder Group Renewal ③

Volts	Hertz	NEMA Size 7 Series A1	NEMA Size 7 Series B1	Price U.S. $	NEMA Size 8 Series A1	NEMA Size 8 Series B1	Price U.S. $
110 – 120	50/60	**9-2705**	**9-2705**		—	—	
220 – 240	50/60	**9-2705-2**	**9-2705-2**		—	—	
440 – 480	50/60	**9-2705-3**	**9-2705-3**		—	—	
550 – 600	50/60	**9-2705-4**	**9-2705-4**		—	—	
208	50/60	**9-2705-5**	**9-2705-5**		—	—	
380 – 415	50/60	**9-2705-6**	**9-2705-6**		—	—	
48 – 52	50/60	**9-2705-8**	**9-2705-8**		—	—	
120	50/60	—	—		**9-2664**	**9-2664**	
240	50/60	—	—		**9-2664-2**	**9-2664-2**	
480	50/60	—	—		**9-2664-3**	**9-2664-3**	
600	50/60	—	—		**9-2664-4**	**9-2664-4**	
380	50/60	—	—		**9-2664-5**	**9-2664-5**	
208	50/60	—	—		**9-2664-6**	**9-2664-6**	
415	50/60	—	—		**9-2664-7**	**9-2664-7**	
110	50/60	—	—		**9-2664-8**	**9-2664-8**	
220	50/60	—	—		**9-2664-9**	**9-2664-9**	
550	50/60	—	—		**9-2664-10**	**9-2664-10**	
440	50/60	—	—		**9-2664-11**	**9-2664-11**	

① CN35A = Size 00, CN35B and CN35D = Size 0, CN35G = Size 2, CN35K = Size 3, CN35N = Size 4, and CN35S = Size 5.
② Consult factory.
③ Voltage ratings of the main coils must match those of the feeder group for proper operation of the starter/contactor.

Discount Symbol **1CD1C**

Non-reversing Contactors

Table 33-145. Approximate Dimensions and Shipping Weights — Open Type

NEMA Size	Number of Poles	Dimensions in Inches (mm)							Ship Wt. Lbs. (kg)
		Wide A	High B	Deep C	Mounting D	Mounting E	F	G	
00	2 – 4	1.75 (44.5)	3.88 (98.6)	3.49 (88.6)	1.50 (38.1) ①	3.38 (85.9)	4.62 (117.3)	.54 (13.7)	1.7 (.8)
0	2 – 3	1.75 (44.5)	3.88 (98.6)	3.49 (88.6)	1.50 (38.1) ①	3.38 (85.9)	4.62 (117.3)	.54 (13.7)	1.8 (.8)
1 – 2	2 – 3	2.56 (65.0)	5.05 (128.3)	4.44 (112.8)	2.00 (50.8) ①	4.50 (114.3)	5.80 (147.3)	.54 (13.7)	3.1 (1.4)
1 – 2	4	3.44 (87.4)	5.05 (128.3)	4.44 (112.8)	2.00 (50.8) ①	4.50 (114.3)	5.80 (147.3)	.54 (13.7)	3.6 (1.6)
1 – 2	5	4.32 (109.7)	5.05 (128.3)	4.44 (112.8)	2.00 (50.8) ①	4.50 (114.3)	5.80 (147.3)	.54 (13.7)	4.0 (1.8)
3	2 – 3	4.08 (103.6)	7.17 (182.1)	5.94 (150.9)	3.00 (76.2)	6.63 (168.4)	—	—	8.5 (3.9)
4	2 – 3	7.05 (179.1)	9.11 (231.4)	7.25 (184.2)	6.00 (152.4)	8.50 (215.9)	—	—	20.0 (9.1)
5	2 – 3	7.05 (179.1)	13.12 (333.2)	7.78 (197.6)	6.00 (152.4)	12.50 (317.5)	—	—	23.0 (10.4)
6	3	8.63 (219.2)	13.54 (343.9)	8.88 (225.6)	4.33 (110.0)	8.63 (219.2)	—	—	35.0 (15.9)
7	3	11.02 (279.9)	19.30 (490.2)	11.46 (291.1)	6.89 (175.0)	11.02 (279.9)	—	—	100.0 (45.4)
8	3	13.00 (330.2)	24.50 (622.3)	13.63 (346.2)	4.22 (107.2)	14.86 (377.4)	—	—	160.0 (72.6)

① Center mounting slot at bottom supplied only on Size 00 and 0 contactors.

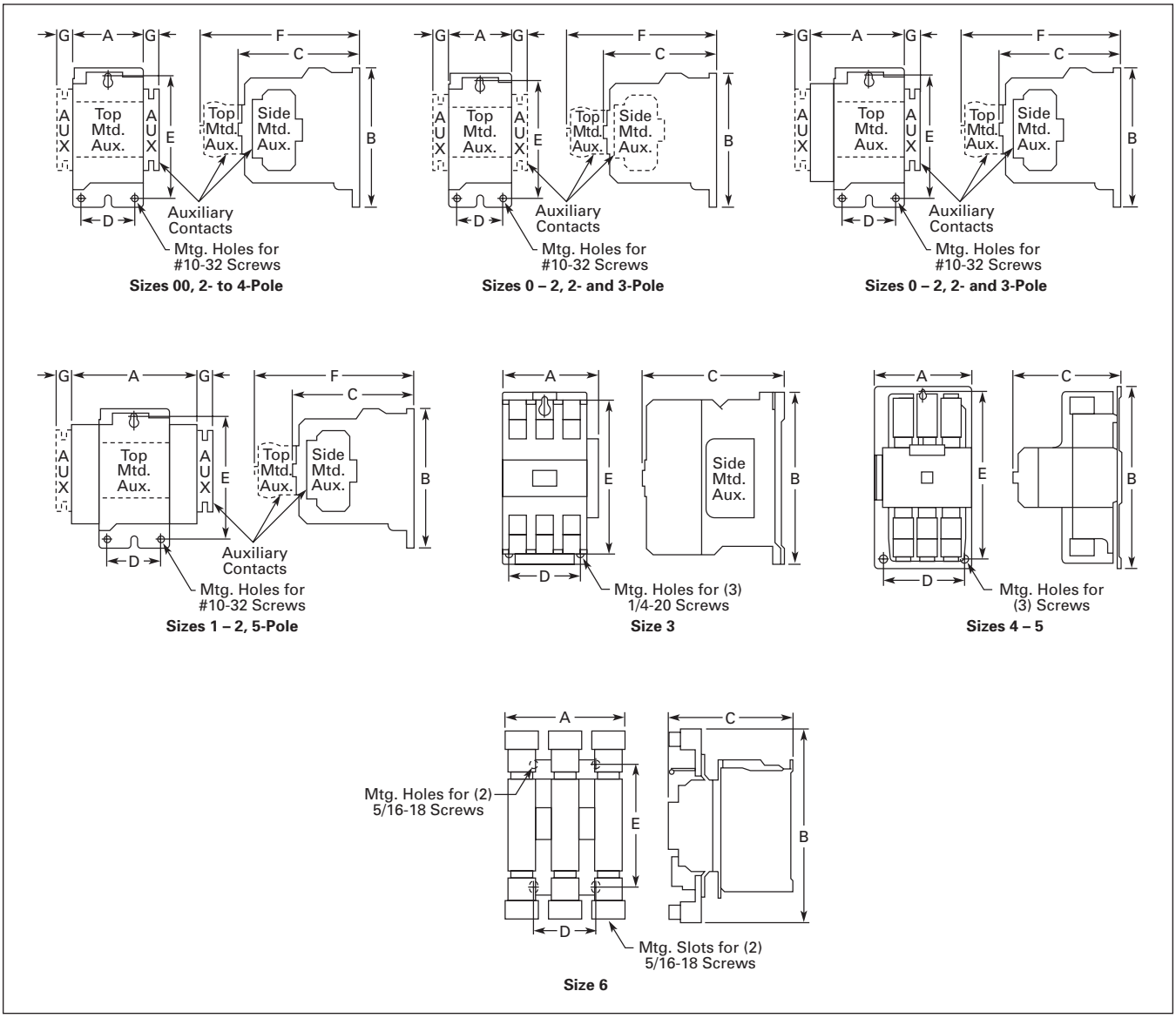


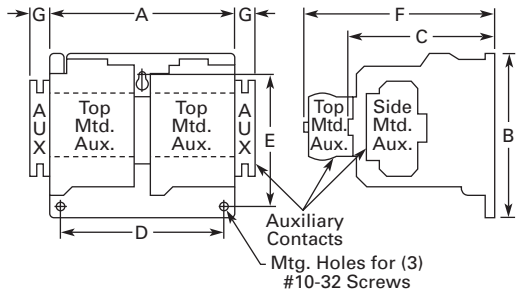
Figure 33-34. Approximate Dimensions

Reversing Contactors

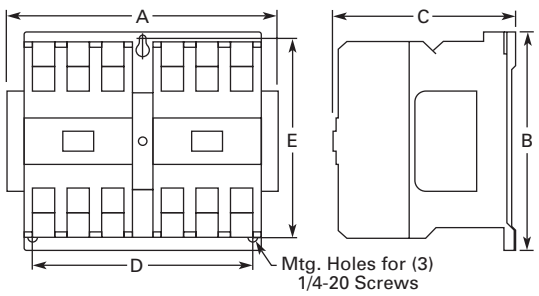
Table 33-146. Approximate Dimensions and Shipping Weights — Open Type

NEMA Size	Dimensions in Inches (mm)							Ship Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting D	Mounting E	F	G	
00 – 0	4.20 (106.7)	4.35 (110.5)	3.52 (89.4)	3.50 (88.9)	3.86 (98.0)	4.90 (124.5)	.54 (13.7)	3.3 (1.5)
1 – 2	5.71 (145.0)	5.05 (128.3)	4.44 (112.8)	5.25 (133.4)	3.63 (92.2)	5.80 (147.3)	.54 (13.7)	7.8 (3.5)
3	8.70 (221.0)	7.17 (182.1)	5.94 (150.9)	7.00 (177.8)	6.63 (168.4)	—	—	17.0 (7.7)
4	14.68 (372.9)	9.11 (231.4)	7.25 (184.2)	13.50 (342.9)	8.50 (215.9)	—	—	47.0 (21.3)
5	14.50 (368.3)	12.25 (311.2)	7.78 (197.6)	13.50 (342.9)	11.50 (292.1)	—	—	63.0 (28.6)
6	19.77 (502.2)	16.61 (421.9)	9.90 (251.5)	18.00 (457.2)	12.00 (304.8)	—	—	80.0 (36.3)
7	28.00 (711.2)	26.75 (679.5) ①	12.75 (323.9)	12.75 (323.9)	11.00 (279.4)	—	—	260.0 (118.0)
8	30.13 (765.3)	39.00 (990.6) ①	14.69 (373.1)	14.13 (358.9)	15.00 (381.0)	—	—	350.0 (158.9)

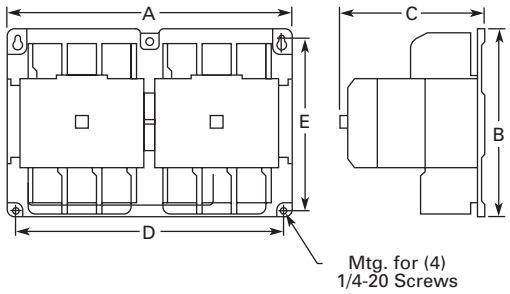
① Includes cross wiring.



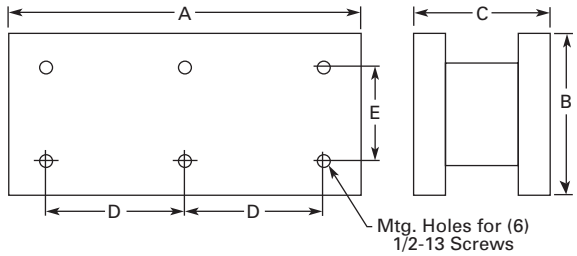
Sizes 00 – 2



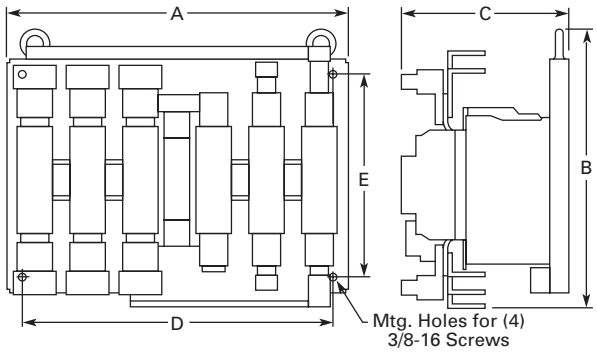
Size 3



Sizes 4 – 5



Open Type — Sizes 7 – 8 Horizontal



Size 6

Figure 33-35. Approximate Dimensions

Non-reversing Starters, Bi-Metallic Overload

Table 33-147. Approximate Dimensions and Shipping Weights — Open Type

NEMA Size	Dimensions in Inches (mm)							Ship. Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting D	Mounting E	F	G	
00 – 0	1.80 (45.7)	6.60 (167.6)	3.52 (89.4)	—	6.07 (154.2)	4.90 (124.5)	.54 (13.7)	2.2 (1.0)
1 – 1P	2.56 (65.0)	7.08 (179.8)	4.44 (112.8)	2.00 (50.8)	6.63 (168.4)	5.80 (147.3)	.54 (13.7)	4.5 (2.0)
2	2.56 (65.0)	8.08 (205.2)	4.44 (112.8)	2.00 (50.8)	7.63 (193.8)	5.80 (147.3)	.54 (13.7)	4.7 (2.1)
3	4.08 (103.6)	11.35 (288.3)	5.94 (150.9)	3.00 (76.2)	10.81 (274.6)	—	—	11.0 (5.0)
4	7.05 (179.1)	12.06 (306.3)	7.25 (184.2)	6.00 (152.4)	8.50 (215.9)	—	—	23.0 (10.4)
5	7.00 (177.8)	17.77 (451.4)	7.76 (197.1)	6.00 (152.4)	16.00 (406.4)	—	—	36.0 (16.3)
6	9.47 (240.5)	21.69 (550.9)	9.90 (251.5)	3.10 (78.7)	18.00 (457.2)	—	—	75.0 (34.1)
7	15.13 (384.3)	29.13 (739.9)	12.64 (321.1)	13.25 (336.6)	21.25 (539.8)	—	—	120.0 (54.5)
8	15.13 (384.3)	34.50 (876.3)	15.00 (381.0)	13.25 (336.6)	16.75 (425.5)	—	—	210.0 (95.3)

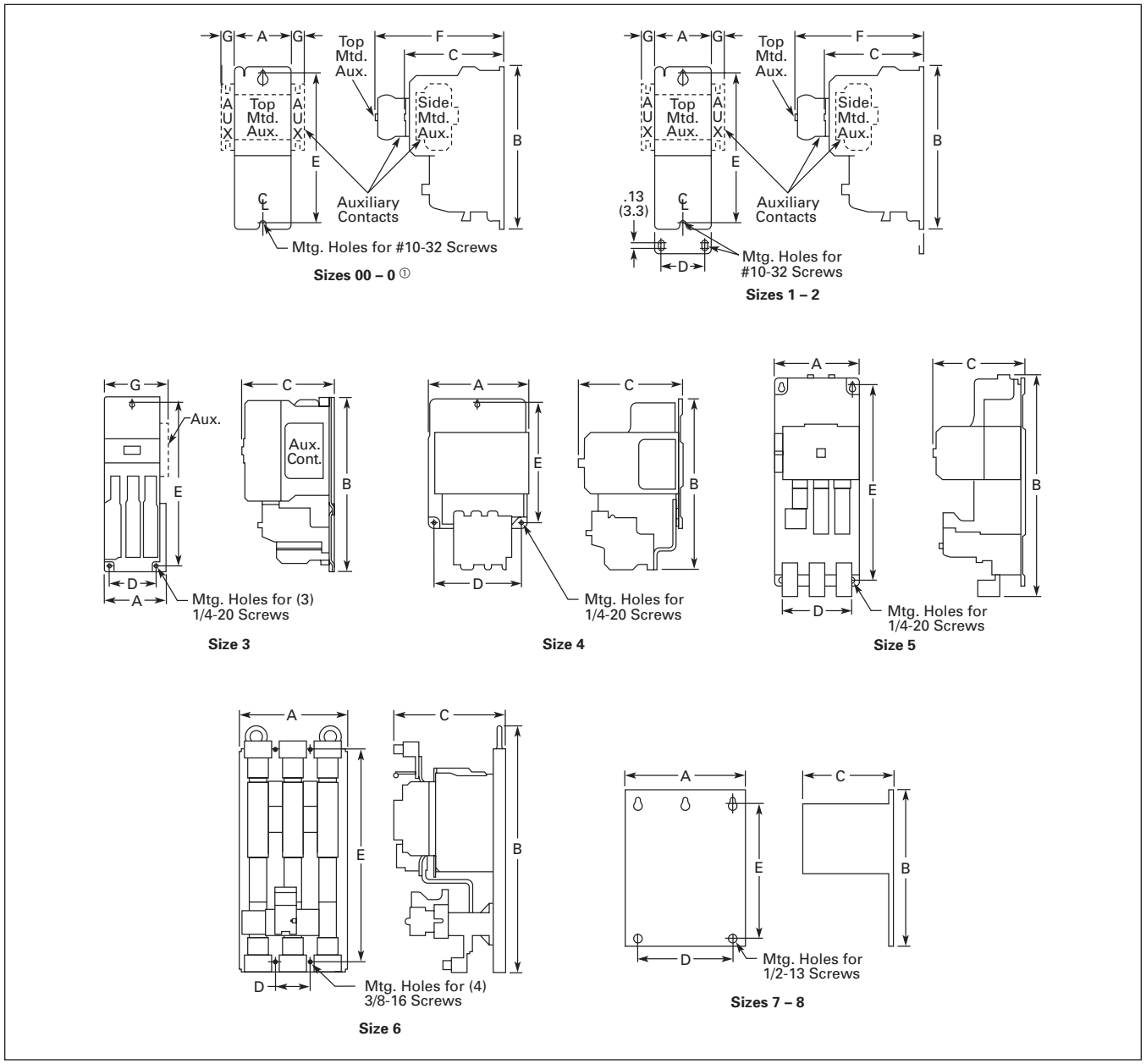


Figure 33-36. Approximate Dimensions

① Holding circuit contact for Size 00 occupies 4th power pole position — no increase in width.

Reversing Starters, Bi-Metallic Overload

Table 33-148. Approximate Dimensions and Shipping Weights — Open Type

NEMA Size	Dimensions in Inches (mm)									Ship. Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting D	Mounting E	D1	E1	F	G	
00 – 0	4.20 (106.7)	7.38 (187.5)	3.52 (89.4)	3.50 (88.9)	6.87 (174.5)	—	—	4.90 (124.5)	.54 (13.7)	3.6 (1.6)
1	5.71 (145.0)	7.08 (179.8)	4.44 (112.8)	5.25 (133.4)	5.75 (146.1)	—	—	5.80 (147.3)	.54 (13.7)	8.3 (3.8)
2	5.71 (145.0)	8.08 (205.2)	4.44 (112.8)	5.25 (133.4)	6.75 (171.5)	—	—	5.80 (147.3)	.54 (13.7)	8.5 (3.9)
3	8.70 (221.0)	11.35 (288.3)	5.94 (150.9)	7.00 (177.8)	10.81 (274.6)	—	—	—	—	20.0 (9.1)
4	14.68 (372.9)	12.06 (306.3)	7.25 (184.2)	13.50 (342.9)	8.50 (215.9)	—	—	—	—	49.0 (22.2)
5	14.50 (368.3)	17.77 (451.4)	7.76 (197.1)	13.50 (342.9)	16.00 (406.4)	—	—	—	—	68.0 (30.9)
6	19.77 (502.2)	22.63 (574.8)	9.90 (251.5)	18.00 (457.2)	12.00 (304.8)	3.10 (78.7)	18.00 (457.2)	—	—	90.0 (40.9)
7	28.06 (712.7)	32.13 (816.1) ①	12.70 (322.6)	12.75 (323.9)	21.25 (539.8)	—	—	—	—	175.0 (79.5)
8	30.38 (771.7)	41.50 (1054.1) ①	14.70 (373.4)	14.13 (358.9)	16.75 (425.5)	—	—	—	—	430.0 (195.2)

① Includes cross wiring overhang.

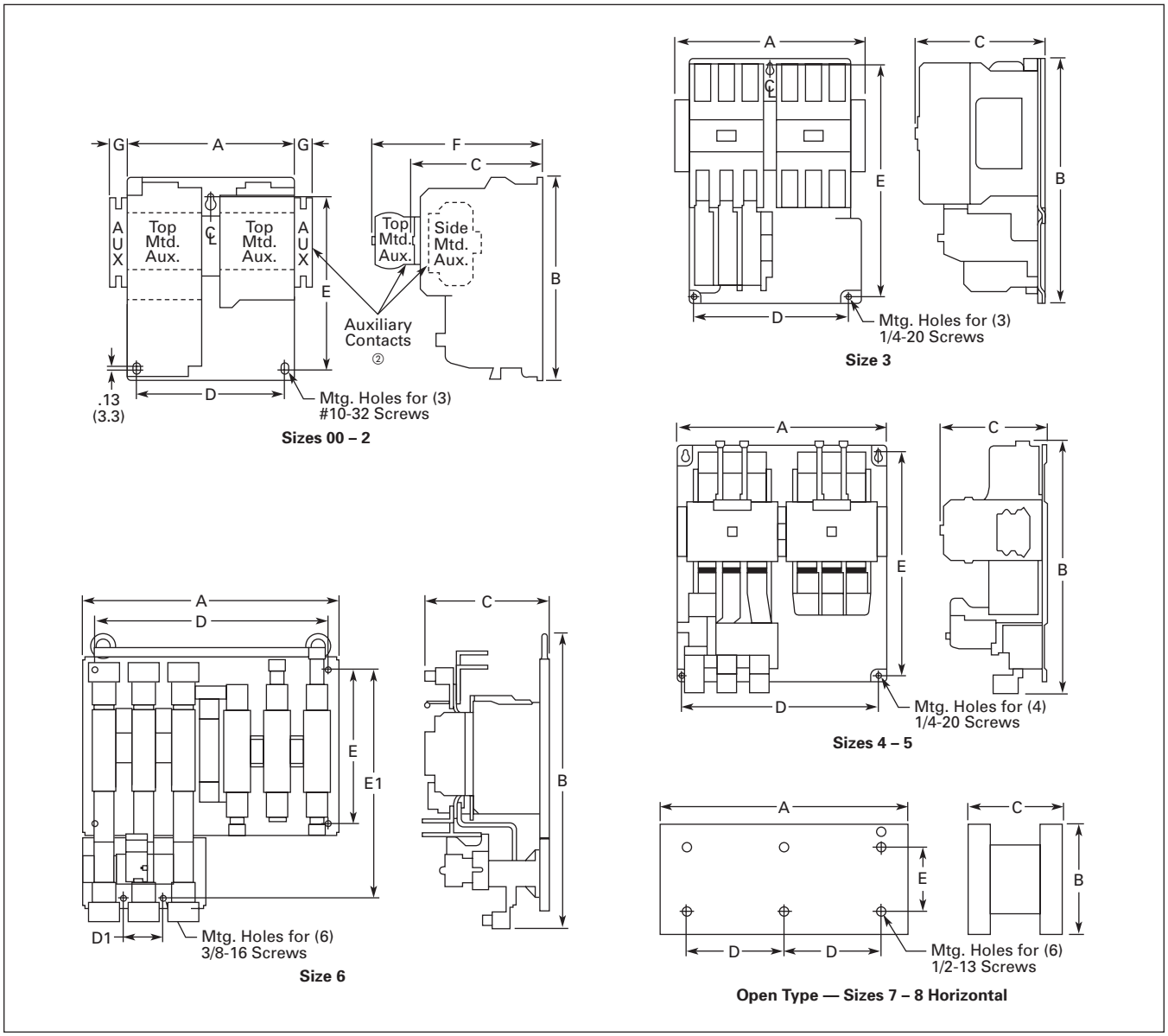


Figure 33-37. Approximate Dimensions

② See catalog listings for type and location of auxiliary contacts supplied with a particular starter.

33

Reversing Starters — Vertical Construction, Bi-Metallic Overload

Table 33-149. Approximate Dimensions and Shipping Weights — AN56V Open Vertical Starter

NEMA Size	Dimensions in Inches (mm)						Ship. Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting		Wire Zone	
				Wide D	High E		
0	4.25 (108.0)	12.05 (306.1)	3.84 (97.5)	2.00 (50.8)	11.50 (292.1)	—	4.0 (1.8)
1	4.25 (108.0)	12.05 (306.1)	3.86 (98.0)	2.00 (50.8)	11.50 (292.1)	1.00 (25.4)	9.0 (4.1)
2	4.25 (108.0)	12.05 (306.1)	3.86 (98.0)	2.00 (50.8)	11.50 (292.1)	1.00 (25.4)	9.5 (4.3)
3	9.25 (235.0)	16.75 (425.5)	5.18 (131.6)	7.15 (181.6)	16.07 (408.2)	①	21.0 (9.5)
4	9.08 (230.6)	19.84 (503.9)	5.18 (131.6)	8.00 (203.2)	18.51 (470.2)	1.50 (38.1)	50.0 (22.7)

① Wire overhang 1.00 mm left, 50 mm right.

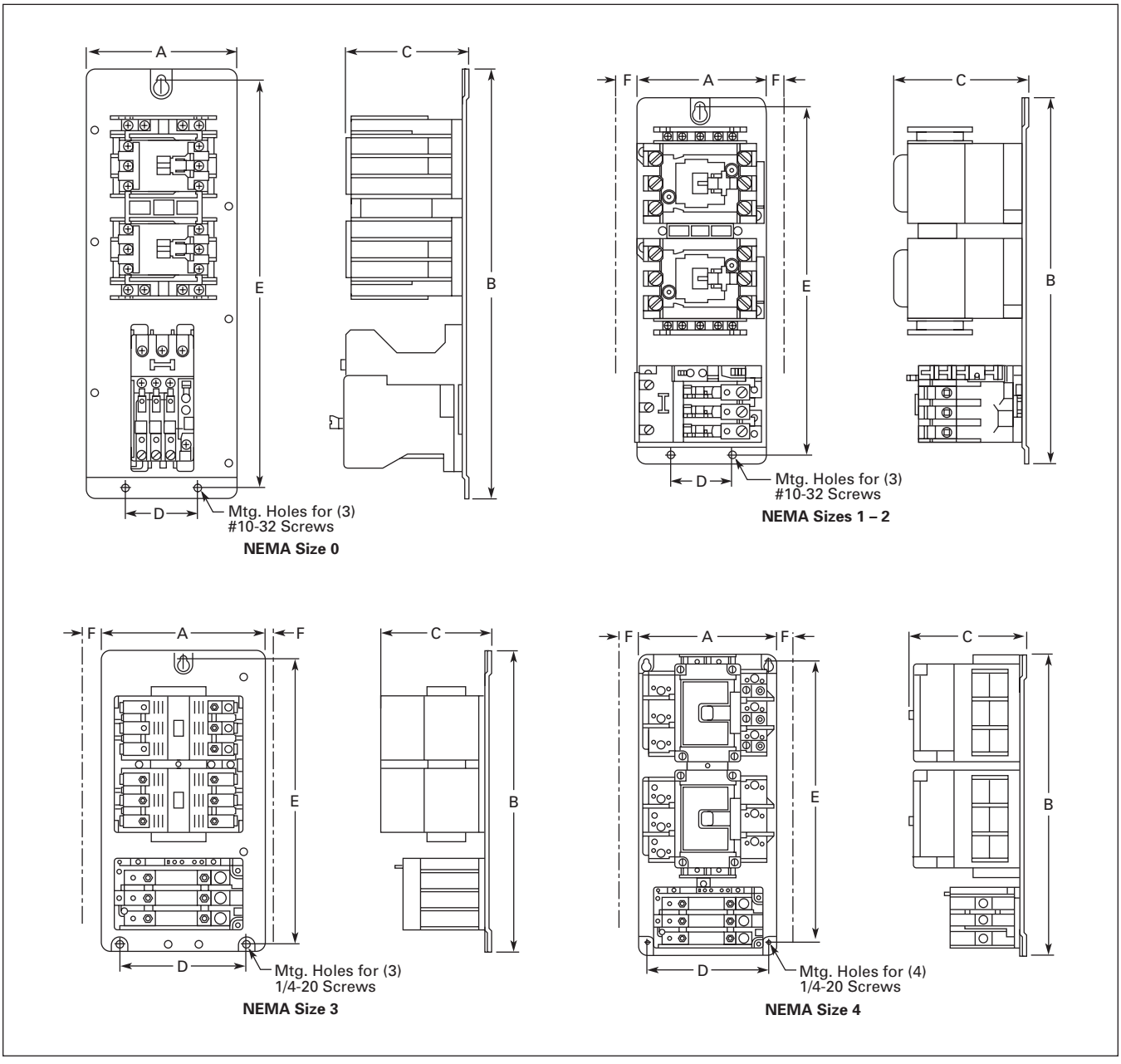


Figure 33-38. Approximate Dimensions

Multispeed Starters, Bi-Metallic Overload

Table 33-150. Approximate Dimensions and Shipping Weights — AN700 Open Vertical Starter

NEMA Size	Dimensions in Inches (mm)						Ship Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting		Wire Zone F	
				Wide D	High E		
2-Speed — Selective Control — Separate Winding							
0	5.19 (132)	7.38 (188)	3.52 (89)	3.50 (89)	6.87 (175)	.89 (23)	4.5 (2.0)
1	5.66 (144)	7.08 (180)	4.42 (112)	5.25 (133)	5.75 (146)	1.23 (31)	9.0 (4.1)
2	5.66 (144)	8.08 (205)	4.42 (112)	5.25 (133)	6.75 (165)	1.63 (41)	10.0 (4.5)
3	8.72 (221)	11.35 (288)	5.89 (150)	7.00 (178)	10.81 (275)	1.77 (45)	24.0 (10.9)
4	14.68 (373)	12.06 (306)	7.25 (184)	13.50 (343)	8.50 (216)	1.95 (50)	53.0 (24.1)
5	14.50 (368)	17.82 (453)	7.76 (197)	13.50 (343)	16.00 (406)	4.56 (116)	73.0 (33.1)
2-Speed — Selective Control — Reconnectable Winding							
0	8.62 (219)	7.06 (179)	3.82 (81)	6.62 (168)	6.50 (165)	.50 (13)	6.0 (2.7)
1	8.97 (228)	7.12 (181)	4.72 (120)	6.62 (168)	6.50 (165)	1.04 (26)	10.0 (4.5)
2	8.90 (226)	8.62 (219)	4.75 (121)	8.40 (213)	8.12 (206)	1.03 (26)	11.0 (5.0)
3	16.00 (406)	13.46 (342)	6.38 (162)	15.00 (381)	12.25 (311)	1.24 (31)	31.0 (14.1)
4	15.46 (393)	31.00 (787)	7.74 (197)	13.50 (343)	30.00 (762)	1.84 (47)	72.0 (32.7)

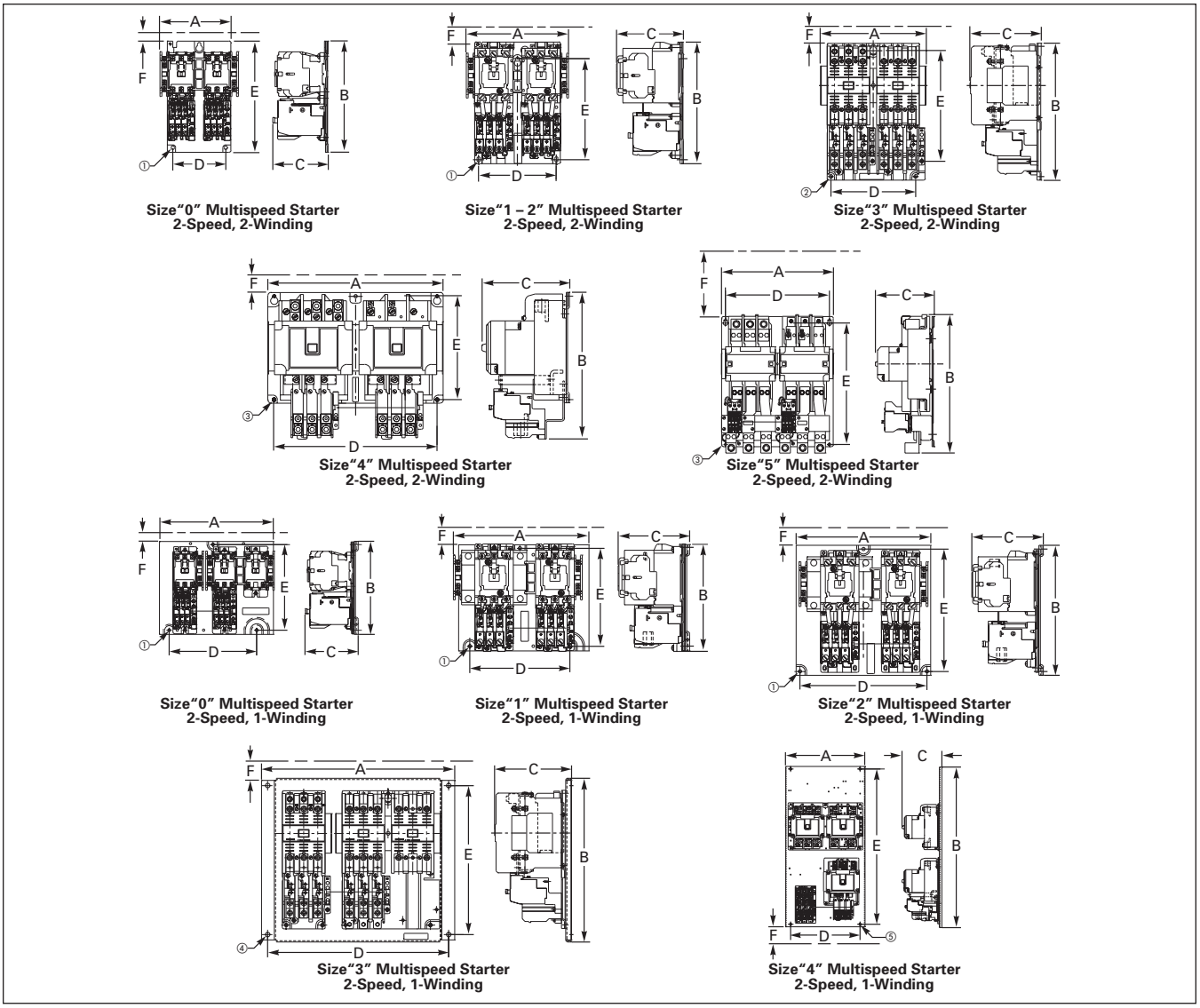


Figure 33-39. Approximate Dimensions

① Mounting holes for (3) #10 screws.
② Mounting holes for (3) 1/4-20 screws.
③ Mounting holes for (4) 1/4-20 screws.
④ Mounting holes for (4) 5/16 screws.
⑤ Mounting holes for (4) 3/8 screws.

Non-reversing Starters, C396 Electronic Overload

Table 33-151. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

NEMA Size	Dimensions in Inches (mm)						
	Wide A	High B	Deep C	Mounting			
				Wide D	High E	Wide D1	High E1
00 – 0	2.13 (54.0)	6.60 (167.6)	3.65 (92.8)	1.01 (25.7)	6.18 (157.0)	—	—
1	2.59 (65.9)	7.08 (179.7)	4.49 (114.0)	2.00 (50.8)	6.50 (165.1)	1.29 (32.8)	—
2	2.59 (65.9)	8.08 (205.1)	4.49 (114.0)	2.00 (50.8)	7.50 (190.5)	1.29 (32.8)	6.50 (165.1)
3	4.09 (103.9)	11.40 (289.6)	5.82 (147.9)	3.00 (76.2)	10.81 (274.6)	1.50 (38.1)	6.63 (168.3)

① Consult Eaton.

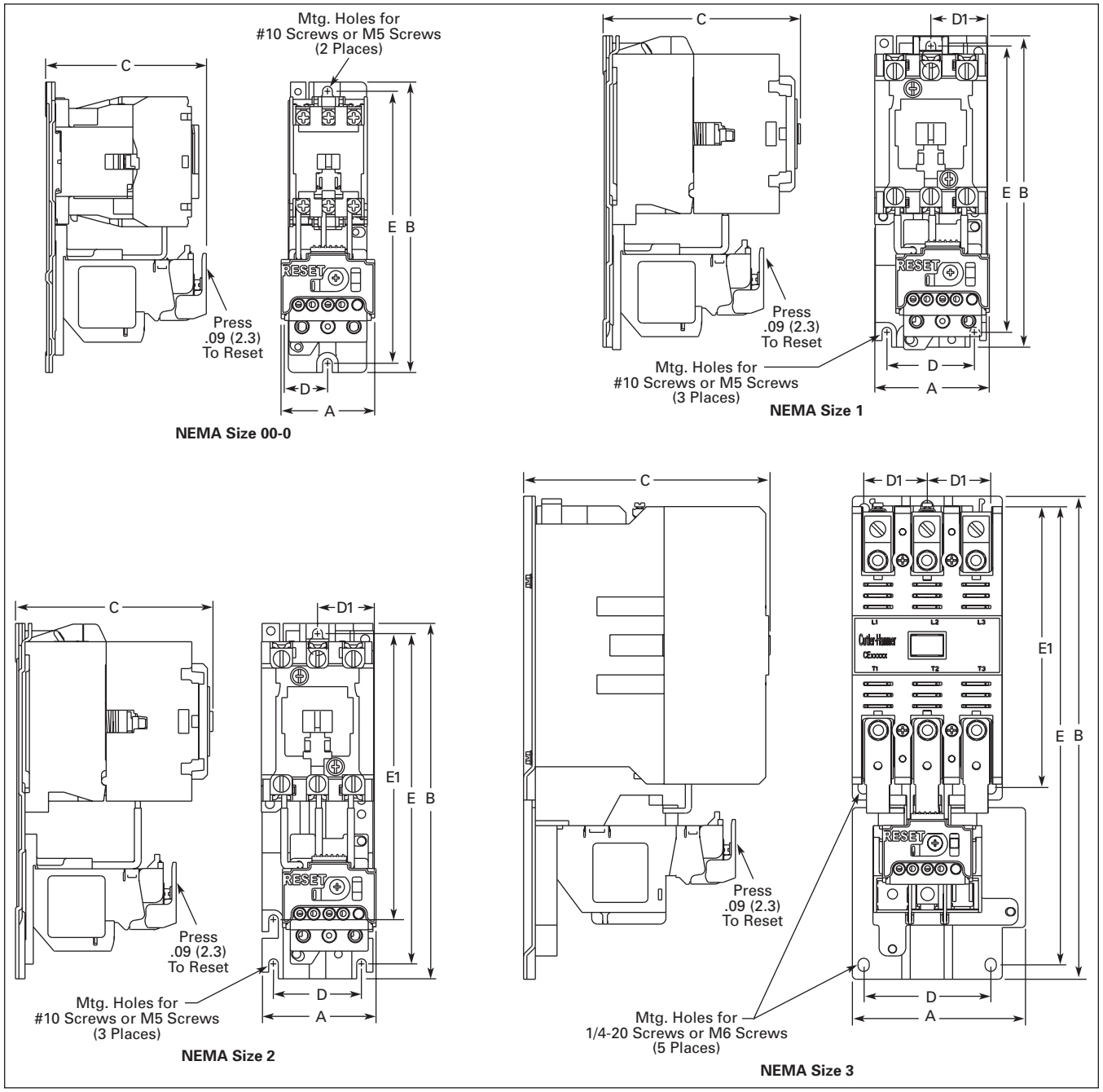
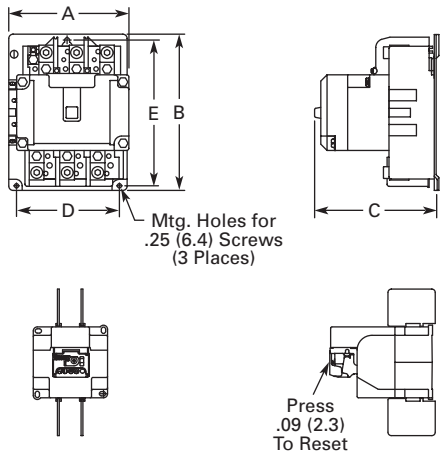


Figure 33-40. Approximate Dimensions

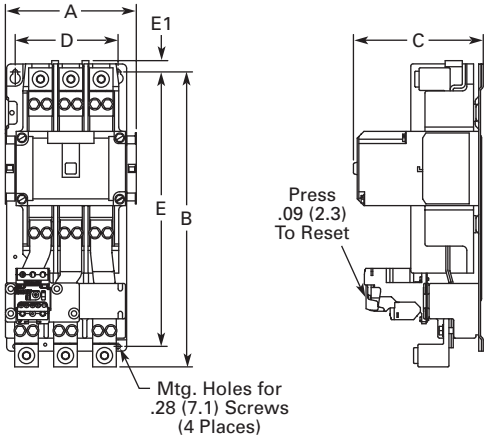
Table 33-152. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

NEMA Size	Dimensions in Inches (mm)						
	Wide A	High B	Deep C	Mounting			
				Wide D	High E	Wide D1	High E1
4	7.00 (177.8)	9.11 (231.4)	7.17 (182.2)	6.00 (152.4)	8.50 (215.8)	—	—
5	7.64 (194.0)	17.86 (453.7)	7.57 (192.4)	6.00 (152.4)	16.01 (406.6)	—	.66 (16.7)
6	9.47 (240.5)	21.69 (551.0)	9.89 (251.2)	3.10 (79.7)	18.00 (457.2)	3.18 (80.9)	.89 (22.5)

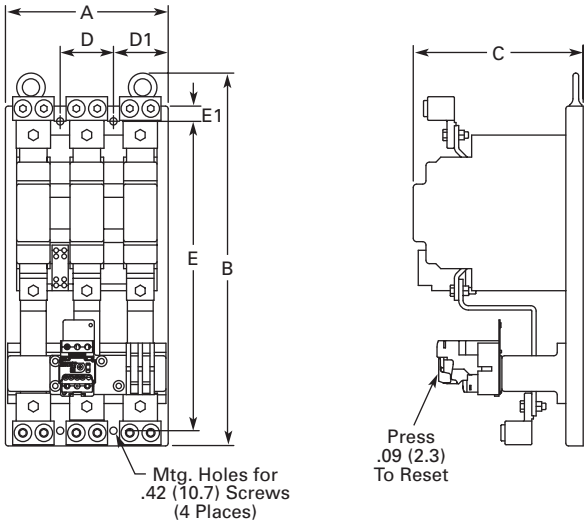


Note: Size 4 Starter comes unassembled. The starter is comprised of the Size 4 Freedom Series NEMA Contactor and the C396 Overload Relay.

Size 4



Size 5

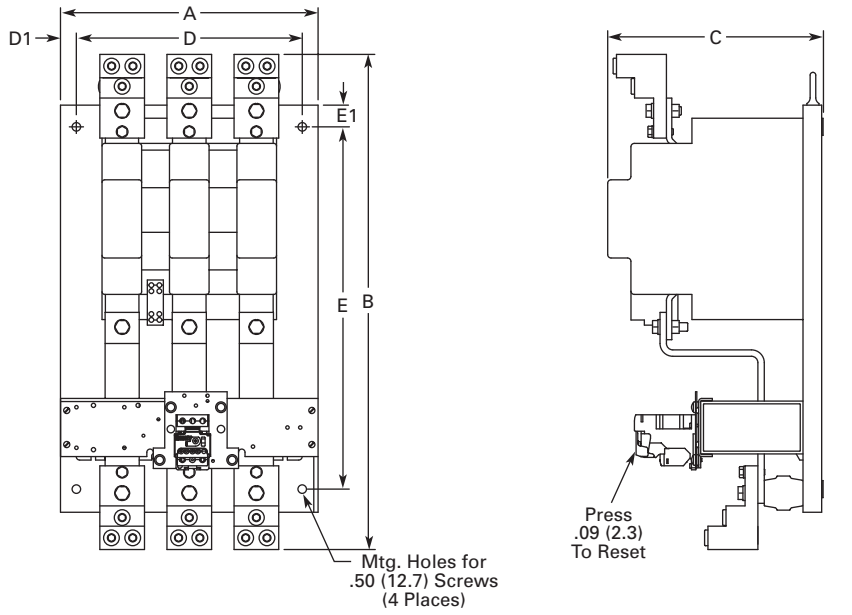


Size 6

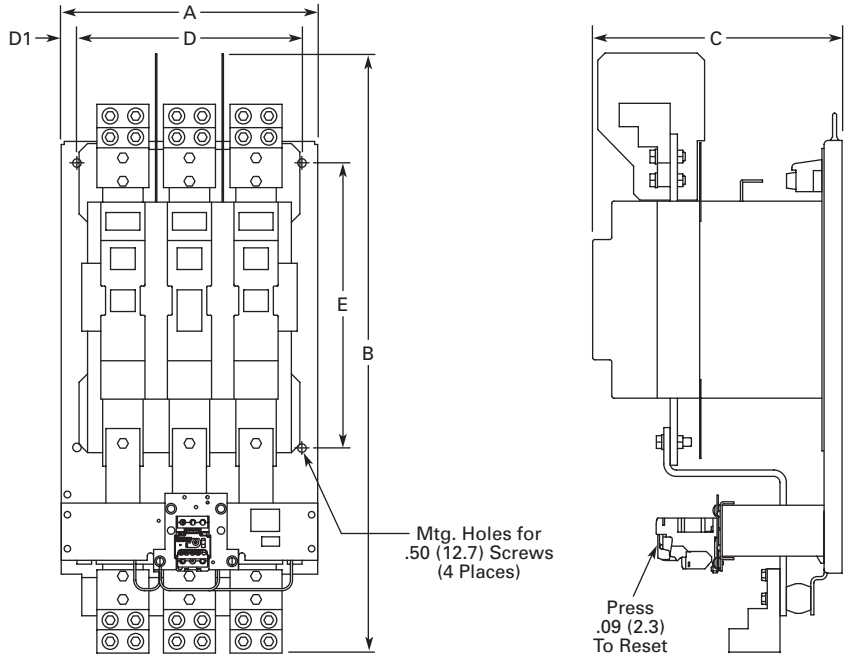
Figure 33-41. Approximate Dimensions

Table 33-153. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

NEMA Size	Dimensions in Inches (mm)						
	Wide A	High B	Deep C	Mounting			
				Wide D	High E	Wide D1	High E1
7	15.11 (383.8)	29.04 (737.7)	12.63 (320.9)	13.25 (336.6)	21.25 (539.8)	.93 (23.7)	1.27 (32.4)
8	15.11 (383.8)	35.28 (895.1)	14.69 (373.0)	13.25 (336.6)	16.75 (425.5)	.93 (23.7)	—



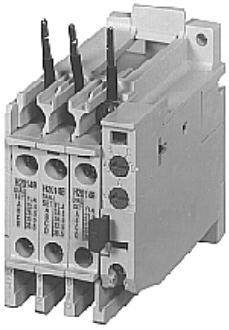
Size 7



Size 8

Figure 33-42. Approximate Dimensions

Contents



32A Overload
Cat. No. C306DN3B

Product Description

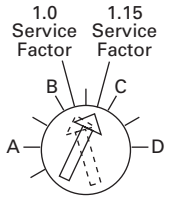
C306 Overload Relays are designed for use with CE or CN non-reversing and reversing contactors. Four sizes are available for overload protection up to 144A.

Features

- Selectable Manual or Automatic Reset operation.
- Interchangeable Heater Packs adjustable ±24% to match motor FLA and calibrated for use with 1.0 and 1.15 service factor motors. Heater packs for 32A overload relay will mount in 75A overload relay — useful in derating applications such as jogging.
- Class 10 or 20 heater packs.
- Load lugs built into relay base.
- Bimetallic, ambient compensated operated. Trip free mechanism.
- Electrically isolated NO-NC contacts (pull RESET button to test). (Electrical Ratings see **Table 33-158** on **Page 33-104**).
- Overload trip indication.
- Shrouded or fingerproof terminals to reduce possibility of electrical shock.
- Meets UL 508 single-phasing requirements.
- UL listed, CSA certified, NEMA compliance and CE mark.

Operation

C306 Overload Relay Setting



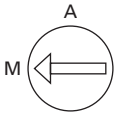
Example of 12.0 FLA setting for heater pack number H2011B showing position for 1.0 or 1.15 service factor motors.

Figure 33-43. FLA Dial Adjustment

For motors having a 1.15 service factor, rotate the FLA adjustment dial to correspond to the motor's FLA rating.

Estimate the dial position when the motor FLA falls between two letter values as shown in the example.

For motors having a 1.0 service factor, rotate the FLA dial one-half position counterclockwise (CCW).



Example of setting for manual reset.

Figure 33-44. Manual/Automatic Reset

The overload relay is factory set at M for manual reset operation. For automatic reset operation, turn the reset adjustment dial to the A position as shown in the illustration.

Automatic reset is not intended for two-wire control devices.

Test for Trip Indication

To test overload relay for trip indication when in manual reset, pull out the blue reset button. An orange flag will appear indicating that the device has tripped. Push reset button in to reset.

Warning — To provide continued protection against fire or shock hazard, the complete overload relay must be replaced if burnout of the heater element occurs.

Technical Information

General

"Overload relays are provided to protect motors, motor control apparatus and motor-branch circuit conductors against excessive heating due to motor overloads and failure to start. This definition does not include: 1) motor circuits over 600V, 2) short circuits, 3) ground faults and 4) fire pump control." (NEC Art. 430-31)

Time Current Characteristics

The time-current characteristics of an overload relay is an expression of performance which defines its operating time at various multiples of its current setting. Tests are run at Underwriters Laboratories (UL) in accordance with NEMA Standards and the NEC. UL requires:

- When tested at 100 percent of its current rating, the overload relay shall trip ultimately.
- When tested at 200 percent of its current rating, the overload relay shall trip in not more than 8 minutes.
- When tested at 600 percent of the current rating, the overload relay shall trip in not more than 10 or 20 seconds, depending on the Class of the relay.

"Current Rating" is defined as the minimum current at which the relay will trip. Per NEC, an overload must ultimately trip at 125% of FLA current (heater) setting for a 1.15 service factor motor and 115% FLA for a 1.0 service factor motor.

"Current Setting" is defined as the FLA (Full Load Amperes) of the motor and thus the overload heater pack setting.

Example: 600% of current rating is defined as 750% (600 x 1.25) of FLA current (heater) setting for a 1.15 service factor motor. A 10A heater setting must trip in 20 seconds or less at 75A motor current for a Class 20 relay.

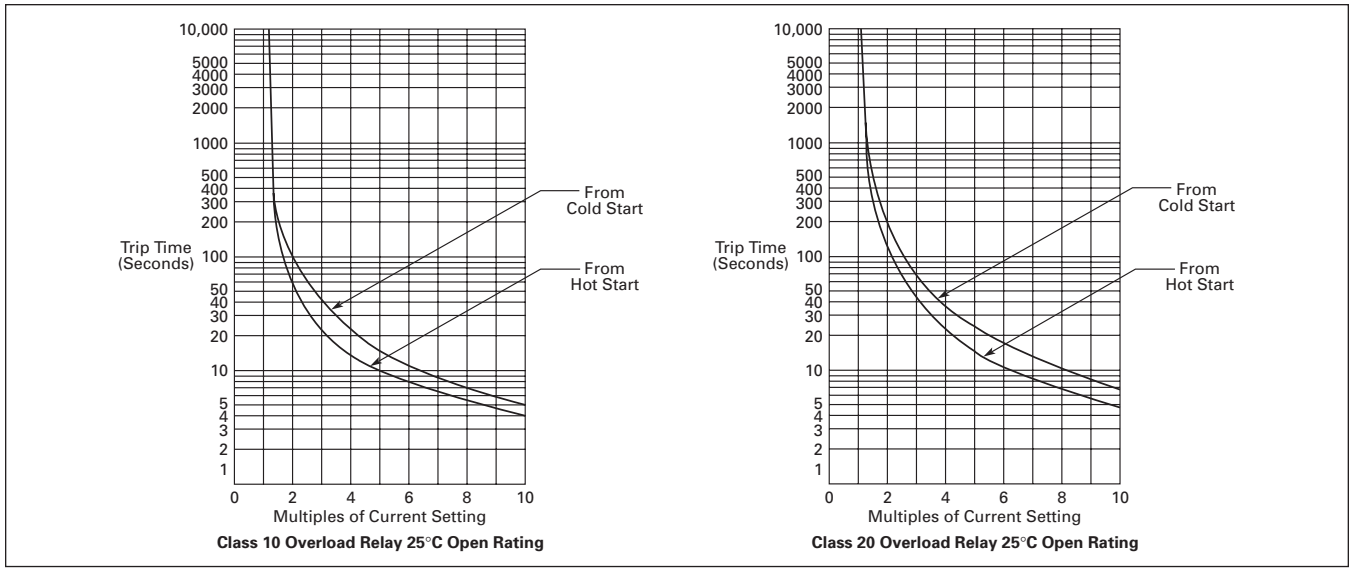


Figure 33-45. Class 10 and Class 20 Trip Curves

Technical Data

Table 33-154. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 00 – 2, IEC A – K — Open

IEC Size	NEMA Size	Cu Only
Power Terminals — Line		
A, B, C	00	12 – 16 Stranded, 12 – 14 Solid
D, E, F	0	8 – 16 Stranded, 10 – 14 Solid
	1	8 – 14 Stranded or Solid
G, H, J, K	2	3 – 14 (Upper) and/or 6 – 14 (Lower) Stranded or Solid ①
Power Terminals — Load — Cu Only (Stranded or Solid)		
Catalog Number	**Terminal**	**Wire Size**
C306DN3B	32A	14 – 6 AWG
C306GN3B	75A	14 – 2 AWG
Control Terminals — Cu Only		
12 – 16 AWG Stranded, 12 – 14 AWG Solid		

① Two compartment box lug.

Table 33-155. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 3 – 8, IEC L – N — Open

IEC Size	NEMA Size	Wire Size
Power Terminals — Line and Load		
L	3	1/0 – 14 Cu/Al
M	—	1/0 – 8 Cu/Al
N	—	3/0 – 8 Cu/Al
—	4	Open — 3/0 – 8 Cu Enclosed — 250 kcmil — 6 Cu/Al
—	5	750 kcmil — 2 or (2) 250 kcmil — 3/0 Cu/Al
	6 – 7	(2) 750 kcmil — 3/0 Cu/Al
	8	(2) 750 kcmil — 1/0 Cu/Al
Control Terminals — Cu Only		
12 – 16 AWG Stranded, 12 – 14 AWG Solid		

Table 33-156. Power Terminal Torque Line and Load Terminals

Terminal	Catalog Number	Torque in lb-in
32A	**C306DT3B**	20
75A	**C306GT3B**	35 (14 – 10 AWG) 40 (8 AWG) 45 (6 – 4 AWG) 50 (3 – 2 AWG)
105A	**C306KN3** (Socket Head Screw)	120 (3/16) 200 (1/4) 250 (5/16)
144A	**C306NN3** (Socket Head Screw)	120 (3/16) 200 (1/4) 250 (5/16)
	C306NN3 (Slotted Head Screw)	35 (14 – 10 AWG) 40 (8 AWG) 45 (6 – 4 AWG) 50 (3 – 1/0 AWG)

Table 33-157. Plugging and Jogging Service Horsepower Ratings ②

NEMA Size	200V	230V	460V	575V
00	—	1/2	1/2	1/2
0	1-1/2	1-1/2	2	2
1	3	3	5	5
2	7-1/2	10	15	15
3	15	20	30	30
4	25	30	60	60
5	60	75	150	150
6	125	150	300	300

② Maximum horsepower where operation is interrupted more than 5 times per minute or more than 10 times in a 10 minute period. NEMA standard ICS 2-1993 table 2-4-3.

Table 33-158. Overload Relay UL/CSA Contact Ratings Control Circuit ③

AC Volts	120V	240V	480V	600V
NC Contact B600				
Make and Break Amps	30	15	7.5	6
Break Amps	3	1.5	.75	.6
Continuous Amps	5	5	5	5
NO Contact C600				
Make and Break Amps	15	7.5	3.375	3
Break Amps	1.5	.75	.375	.3
Continuous Amps	2.5	2.5	2.5	2.5

③ DC ratings cover Freedom Series coils only.

Factory Modifications

C306 Thermal Overload Relays with Mounting Adapter

Consists of a thermal overload relay mounted to a terminal base adapter — permits fast and easy installation.

Table 33-159. Product Selection

Description	Catalog Number	Price U.S. $
C306DN3B + C306TB1 C306GN3B + C306TB2B	**C306DT3B** **C306GT3B**	

Accessories

DIN Rail and Panel Mounting Adapter

These adapters are required when component overload relays are to be separately mounted. The terminal base adapter includes line terminals and connects with the overload relays on **Page 33-107**.

Cat. No. C306TB1

Table 33-160. Product Selection

Description	Catalog Number	Price U.S. $
For 32A Overload Relay For 75A Overload Relay	**C306TB1** **C306TB2B** ①	

① This Series B adapter will accept Series A or B overload relays (C306GN3 or C306GN3B), C306TB2 can only be used with C306GN3.

Locking Cover for Overload Relay — C306 Only

Snap-on transparent or opaque plastic panel for covering access port to the overload relay trip setting dial — helps prevent accidental or unauthorized changes to trip and reset setting.

Overload Relay Cover

Table 33-161. Product Selection

Description	Min. Order Qty. (Std. Pkg.)	Catalog Number	Price U.S. $
Clear cover, no accessibility	50	**C320PC3**	
Gray cover, no accessibility w/Auto only nib	50	**C320PC4**	
Gray cover, no accessibility, w/Manual only nib	50	**C320PC5**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Auto only nib	50	**C320PC6**	
Gray cover with FLA dial accessibility, A, B, C, D positions and Manual only nib	50	**C320PC7**	

Replacement Parts

Heater Pack Replacement

The heater pack series is determined by the 6th character of the Catalog Number. Series A or prior heater packs (identified by either "A" or "-" as the 6th character) have built-in load lugs. Series B or later heater packs do not (load lugs are on overload relay). Replacement of Series A or earlier heater packs with Series B or later heater packs, requires the one time addition of Lug Adapter Kit C3606KAL1-3B to the Series A1 overload relay.

Superseded Series A Heater Pack

Series B Heater Pack

Table 33-162. Heater Pack Replacement Requirements

Existing Heater Pack Catalog Numbers	Replacement Product Required
H2001-3 – H2013-3 **H2001A-3 – H2013A-3**	Lug Adapter Kit C306KAL1-3B and Series B Heater Pack
H2001B-3 – H2013B-3	Series B Heater Pack
H2014-3 **H2014A-3**	When inventory is exhausted, replace with Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack
H2014B-3	Series B Heater Pack
H2015-3 – H2017-3	When inventory is exhausted, replace with heater pack chosen from **Table 33-163**
H2015A-3 – H2017A-3	When inventory is exhausted, replace with Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack
H2015B-3 – H2017B-3	Series B Heater Pack

Table 33-163. Heater Pack Ratings

Motor Full Load Ampere Rating				Order Heater Pack Catalog Number	Price U.S. $
Dial Position					
A	B	C	D		
29.0 39.6 53.9	32.5 44.3 60.4	36.0 49.1 66.8	39.5 53.8 74.9	**H2015B-3** **H2016B-3** **H2017B-3**	

Discount Symbol **1CD1C**

Overload Relay Lug Adapter Kit

Cat. No. C306KAL1-3
Overload Relay
Lug Adapter Kit

These kits are used in conjunction with Catalog Numbers H2001B – H2014B or H2101B – H2114B heater packs as a means of utilizing these Series B heater packs in Catalog Numbers C306DN3 and C306GN3 Series AI overload relays. The kit consists of 3 lug adapters and installation instructions. When installing Series B heater packs plus lug adapters in Series A overload relays, refer to heater pack FLA adjustment tables originally supplied with equipment (also supplied with kit).

Table 33-164. Product Selection — Overload Relay Lug

Description	Catalog Number	Price U.S. $
Series AI Overload Relay Lug Adapter Kit	**C306KAL1-3B**	

Superseded 32A Series A
Overload Relay
Cat. No. C306DN3

Superseded 75A Series A
Overload Relay
Cat. No. C306GN3

Overload Relay Replacement — Series A Only

When replacing a Catalog Number C306DN3 (Part No. 10-6044) or C306GN3 (10-6319) Series A overload relay on a starter, order a Series B overload relay and Series B heater packs.

Dimensions

Table 33-165. Stand-Alone Overload Relays — Approximate Dimensions and Shipping Weight

Ampere Size	Dimensions in Inches (mm)							Ship. Wt. Lbs. (kg)
	Wide A	High B	Deep C	Mounting				
				D	E	F (Slot)	G (Hole)	
32A	1.77 (45.0)	4.13 (104.9)	3.69 (93.7)	1.36 (34.5)	3.74 (95.0)	.18 x .30 (4.6 x 7.6)	.18 (4.6) Dia.	.8 (.4)
75A	2.54 (64.5)	4.69 (119.1)	3.74 (95.0)	2.00 (50.8)	3.45 (87.6)	.22 x .26 (5.6 x 6.6)	.21 (5.3) Dia.	1.4 (.6)
105 & 144A	4.00 (101.6)	7.17 (182.1)	4.91 (124.7)	3.00 (76.2)	6.62 (168.1)	—	—	4.0 (1.8)

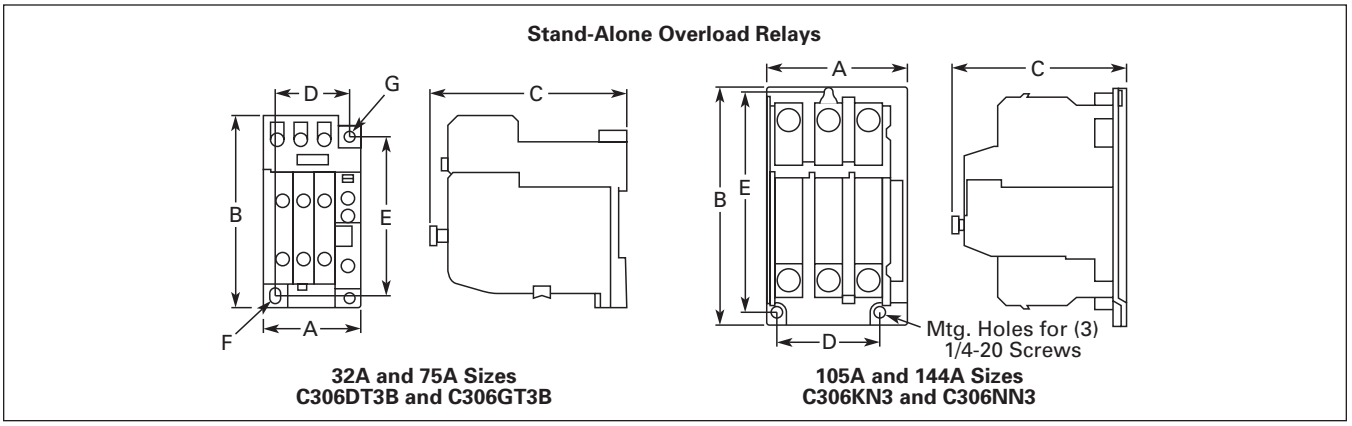


Figure 33-46. Approximate Dimensions — Stand-Alone Overload Relays

Discount Symbol **1CD1C**

Product Selection

75A Overload
Cat. No. C306GN3B

75A Overload
Cat. No. C306GT3B

32A Overload
Cat. No. C306DT3B

32A Overload
Cat. No. C306DN3B

Table 33-166. C306 Thermal Overload Relays

For Use with Freedom Series Contactors	Maximum Ampere Rating	Number of Poles	Open Type		NEMA 1 Enclosed	
NEMA Size			Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
00, 0	32 ②	3	**C306DN3B**		**C306DG3B**	
1, 2	75 ②	3	**C306GN3B**		**C306GG3B**	
3	105 ③	3	**C306KN3**		**—**	
4	144 ③	3	**C306NN3**			
5 – 8 ①	—	—	**—**			

① NEMA Sizes 5 – 8 use the 32A overload in conjunction with CTs.
② Series B overload relays have load lugs built into relay base and will only accept Series B heater packs. These relays can be directly attached to contactor or they can be DIN rail or panel mounted using adapter on **Page 33-105**.
③ These relays can be panel mounted only.

Table 33-167. C306 Thermal Overload Relays

For Stand-Alone Applications	Maximum Ampere Rating	Number of Poles	Open Type	
NEMA Size			Catalog Number	Price U.S. $
00, 0, 1 ④	32	3	**C306DT3B**	
1 ④	75	3	**C306GT3B**	
3 ⑤	105	3	**C306KN3**	
4 ⑤	144	3	**C306NN3**	
5 – 8 ⑥	—	—	**—**	

④ Overload relay assembled with mounting adapter for DIN rail or panel mount.
⑤ Panel mount only.
⑥ NEMA Sizes 5 – 8 use the 32A overload in conjunction with CTs.

Heater Pack
H2001B – H2017B

Heater Pack
H2101B – H2117B

Heater Pack
H2018 – H2024

Heater Pack Selection

Heater packs H2001B to H2017B and H2101B to H2117B are to be used only with Series B overload relays Catalog Numbers C306DN3B (Part No. 10-7016) and C306GN3B (Part No. 10-7020). The load lugs are built into the overload relay base to allow load wiring prior to heater pack installation. The previous heater design had integral load lugs. The Series B heater packs are electrically equivalent to the previous heater design. Heaters H2018-3 to H2024-3 have not changed.

Table 33-168. Starters with Series B Overload Relays

NEMA — AN Type		IEC — AE Type	
Size	Series	Size	Series
00 – 0	**C**	A – F	**C**
1 – 2	**B**	G – K	**B**
5	**B**		
6	**C**		
7 – 8	**B**		

Note: The series of a starter is the last digit of the listed Catalog Number. EXAMPLE: AN16DN0A**B**.

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Dimensions ..... **Page 33-106**
Replacement Parts ..... **Pages 33-105 – 33-106**
Discount Symbol **1CD1C**

Table 33-169. Standard Trip — Class 20 Heater Selection

Overload Relay Size	Motor Full Load Ampere Rating — Dial Position A	B	C	D	Catalog Number (Includes 3 Heater Packs) ①	Price U.S. $
For Use with NEMA Sizes 00 – 0 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B						
32A or 75A	.254	.306	.359	.411	**H2001B-3**	
	.375	.452	.530	.607	**H2002B-3**	
	.560	.676	.791	.907	**H2003B-3**	
	.814	.983	1.15	1.32	**H2004B-3**	
	1.20	1.45	1.71	1.96	**H2005B-3**	
	1.79	2.16	2.53	2.90	**H2006B-3**	
	2.15	2.60	3.04	3.49	**H2007B-3**	
	3.23	3.90	4.56	5.23	**H2008B-3**	
	4.55	5.50	6.45	7.40	**H2009B-3**	
	6.75	8.17	9.58	11.0	**H2010B-3**	
	9.14	10.8	12.4	14.0	**H2011B-3**	
	14.0	16.9	19.9	22.8	**H2012B-3**	
	18.7	22.7	26.7	30.7	**H2013B-3**	
	23.5	28.5	33.5	38.5	**H2014B-3**	
For Use with NEMA Size 2, IEC Sizes G – K Only — Series B						
75A	29.0	34.0	39.1	44.1	**H2015B-3**	
	39.6	45.5	51.5	57.4	**H2016B-3**	
	53.9	60.9	67.9	74.9	**H2017B-3**	
For Use with NEMA Sizes 3 – 4, IEC Sizes L – N Only — Series A						
105A or 144A	8.0	9.2	10.3	11.5	**H2025-3**	
	11.4	12.8	14.3	15.7	**H2026-3**	
	14.3	15.7	17.4	19.0	**H2027-3**	
	18.0	20.2	22.3	24.5	**H2018-3**	
	24.6	27.6	30.5	33.4	**H2019-3**	
	33.5	37.5	41.5	45.6	**H2020-3**	
	45.7	51.2	56.7	62.1	**H2021-3**	
	62.2	69.7	77.1	84.6	**H2022-3**	
	84.7	95.0	105.0	115.0	**H2023-3**	
	106.0	118.0	131.0	144.0	**H2024-3**	
For Use with Size 5 Starters — Series B and IEC P, R and S with 300/5 CT						
32A ②	49	59	69	79	**H2004B-3**	
	72	87	103	118	**H2005B-3**	
	107	130	152	174	**H2006B-3**	
	129	156	182	209	**H2007B-3**	
	194	234	274	—	**H2008B-3**	
For Use with Size 6 Starters Only — Series B and IEC T – V with 600/5 CT						
32A ②	144	174	205	235	**H2005B-3**	
	215	259	304	348	**H2006B-3**	
	258	312	365	419	**H2007B-3**	
	388	468	547	627	**H2008B-3**	
For Use with Size 7 Starters Only — Series B and IEC W – X with 1000/5 CT						
32A ②	163	197	230	264	**H2004B-3**	
	240	290	342	392	**H2005B-3**	
	358	432	506	580	**H2006B-3**	
	430	520	608	698	**H2007B-3**	
	646	780	912	—	**H2008B-3**	
For Use with Size 8 Starters Only — Series B and IEC Z with 1500/5 CT						
32A ②	244	295	345	396	**H2004B-3**	
	360	435	513	588	**H2005B-3**	
	537	648	759	870	**H2006B-3**	
	645	780	912	1047	**H2007B-3**	
	969	1170	1368	—	**H2008B-3**	

① Heater packs are shipped 3 to a carton. Catalog Numbers are for 3 heater packs.

② Sizes 5 – 8 and IEC P – Z use the 32A overload relay with current transformers.

Table 33-170. Fast Trip — Class 10 Heater Selection

Overload Relay Size	Motor Full Load Ampere Rating — Dial Position A	B	C	D	Catalog Number (Includes 3 Heater Packs) ③	Price U.S. $
For Use with NEMA Sizes 00 – 0 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B						
32A or 75A	.260	.313	.367	.420	**H2101B-3**	
	.384	.464	.543	.623	**H2102B-3**	
	.570	.688	.806	.924	**H2103B-3**	
	.846	1.02	1.20	1.37	**H2104B-3**	
	1.28	1.55	1.83	2.10	**H2105B-3**	
	1.92	2.33	2.74	3.15	**H2106B-3**	
	2.30	2.79	3.28	3.77	**H2107B-3**	
	3.38	4.10	4.82	5.54	**H2108B-3**	
	4.96	6.03	7.09	8.16	**H2109B-3**	
	7.07	8.58	10.1	11.6	**H2110B-3**	
	9.60	11.2	12.8	14.4	**H2111B-3**	
	14.4	17.5	20.7	23.8	**H2112B-3**	
	18.7	21.8	25.0	28.1	**H2113B-3**	
	23.5	27.3	31.0	34.8	**H2114B-3**	
For Use with NEMA Size 2, IEC Sizes G – K Only — Series B						
75A	28.3	32.6	37.0	41.3	**H2115B-3**	
	36.6	42.3	48.1	53.8	**H2116B-3**	
	53.8	60.8	67.9	74.9	**H2117B-3**	
For Use with Size 5 Starters Only — Series B and IEC P, R and S with 300/5 CT						
32A ④	51	61	72	82	**H2104B-3**	
	77	93	110	126	**H2105B-3**	
	115	140	164	189	**H2106B-3**	
	138	167	197	226	**H2107B-3**	
	203	246	289	—	**H2108B-3**	
For Use with Size 6 Starters Only — Series B and IEC T – V with 600/5 CT						
32A ④	154	186	220	252	**H2105B-3**	
	230	280	329	378	**H2106B-3**	
	276	335	394	452	**H2107B-3**	
	406	492	578	—	**H2108B-3**	
For Use with Size 7 Starters Only — Series B and IEC W – X with 1000/5 CT						
32A ④	169	204	240	274	**H2104B-3**	
	256	310	366	420	**H2105B-3**	
	384	466	543	630	**H2106B-3**	
	460	558	656	754	**H2107B-3**	
	676	820	—	—	**H2108B-3**	
For Use with Size 8 Starters Only — Series B and IEC Z with 1500/5 CT						
32A ④	254	306	360	411	**H2104B-3**	
	384	465	549	630	**H2105B-3**	
	576	699	822	945	**H2106B-3**	
	690	837	984	1131	**H2107B-3**	
	1014	1230	—	—	**H2108B-3**	

③ Heater packs are shipped 3 to a carton. Catalog Numbers are for 3 heater packs.

④ Sizes 5 – 8 and IEC P – Z use the 32A overload relay with current transformers.

Discount Symbol **1CD1C**

Contents

C396 Electronic Overload Relay

Product Description

The C396 is a self-powered, robust electronic overload designed for integrated use with Freedom NEMA, ***XT*** IEC, and DP contactors. The overload can also be ordered as a stand-alone device that is designed for Panel-Mounting and for use on 35 mm DIN rail. The C396 has an FLA range of 0.1 – 150 Amps with internal CTs, and up to 1500 Amps using external CTs.

Features

- Standard Version: Selectable trip class (5, 10, 20, 30) with Selectable Manual or Auto Reset
- Broad 5:1 FLA range
- Self-Powered Design, will accept AC voltages from 12 – 690V 50/60 Hz
- Ambient Temperature Compensation
- Low Heat Generation
- Phase Loss Protection
- Phase Unbalance Protection
- Electrically isolated 1NO-1NC Contacts (Push-to-Test)
- Trip Status Indicator
- FLA range of 0.1 – 1500 Amps

Standards and Certifications

- UL Listed Components: Stand-alone, starter-mounted devices and remote reset kit.
- CSA Certified Components: Stand-alone, starter-mounted devices and remote reset kit.
- IEC EN 60947-4-1, EN 60947-5-1
- CE
- RoHS

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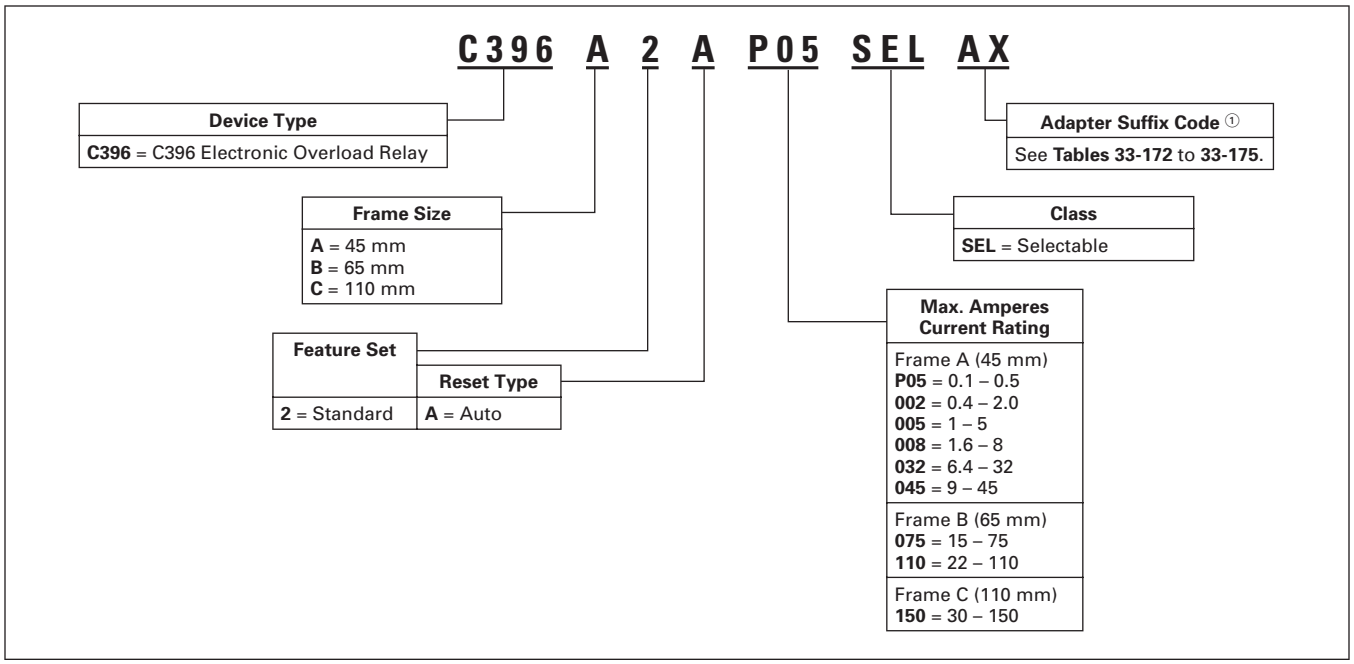
Catalog Number Selection

Table 33-171. C396 Electronic Overload Catalog Numbering System



① Choose appropriate adapter based on application FLA range and contactor's frame size.

Table 33-172. Stand-Alone Overload Relay Suffix Code

FLA Range	Frame Size	Suffix
All	N/A	**AX**

Table 33-173. *XT* IEC Adapter Suffix Code

Contactor Frame Size	FLA Range (Amps)	Suffix
IEC Frame B	0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32	**XB**
IEC Frame C	0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32	**XC**
IEC Frame D	6.4 – 32 9 – 45 15 – 75	**XD**
IEC Frame F – G	22 – 110	**XF**

Table 33-174. Freedom NEMA Adapter Suffix Code

FLA Range (Amps)	Contactor Frame Size	Suffix
0.1 – 0.5	NEMA Size 00 NEMA Size 0 NEMA Size 1	**FD**
0.4 – 2.0	NEMA Size 00 NEMA Size 0 NEMA Size 1	**FD**
1 – 5	NEMA Size 00 NEMA Size 0 NEMA Size 1	**F00** **F0** **F01**
1.6 – 8	NEMA Size 00 NEMA Size 0 NEMA Size 1 NEMA Size 2	**F00** **F0** **F1** **F2**
6.4 – 32	NEMA Size 0 NEMA Size 1	**FB** **FD**
9 – 45	NEMA Size 2	**FG**
22 – 110	NEMA Size 3	**FK**

Table 33-175. DP Contactor Adapter Suffix Code

FLA Range (Amps)	Contactor Frame Size	Suffix
0.1 – 0.5 0.4 – 2.0 1 – 5	15, 25, 30A	**DC**
1.6 – 8	15, 25, 30, 40A	**DE**
6.4 – 32	15, 25, 30, 40, 50A	**DF**
9 – 45	40, 50A	**DF**
15 – 75	60, 75A	**DG**

Product Selection

Cat. No.
C396A2A045SELAX

Cat. No.
C396B2A110SELFK

Cat. No.
C396C2A150SELAX

Cat. No.
C396C2A150SELAX +
C396CBAR

Cat. No.
C396C2A150SELAX +
C396CBAR + C396CLUG

Table 33-176. C396 Stand-Alone Overload Relay

FLA Range (Amps)	Description	Catalog Number	Price U.S. $
45 mm Overload Frame Size ①			
0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32 9 – 45	—	**C396A2AP05SELAX** **C396A2A002SELAX** **C396A2A005SELAX** **C396A2A008SELAX** **C396A2A032SELAX** **C396A2A045SELAX**	
65 mm Overload Frame Size ①			
15 – 75 22 – 110	—	**C396B2A075SELAX** **C396B2A110SELAX**	
110 mm Overload Frame Size ②			
30 – 150	—	**C396C2A150SELAX**	

① Overload comes with a panel/DIN rail mounting adapter assembled. No separate mounting adapter accessory offered.

② Panel mount only! Overload comes with integrated pass-through holes for power wires. Bus Bar Kit (C396CBAR or C396CBARXT, see Table 33-181) and Lug Kit (C396CLUG) must be purchased separately if customer prefers not to use pass-through capability.

Table 33-177. Current Transformer Kits for Use with Stand-Alone Overload Relay C396A2A005SELAX ③

FLA Range (Amps)	Description	Catalog Number	Price U.S. $
60 – 300	300: 5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (*not* included).	**C396CTK300**	
120 – 600	600: 5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (*not* included).	**C396CTK600**	
200 – 1000	1000: 5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (*not* included).	**C396CTK1000**	
300 – 1500	1500: 5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (*not* included).	**C396CTK1500**	

③ C396A2A005SELAX is *not* included in the current transformer kits. This item must be ordered separately.

Table 33-178. C396 Overload for Integrated Use with *XT* IEC Contactors

FLA Range (Amps)	*XT* IEC Contactor Frame Size / Width	Catalog Number	Price U.S. $
45 mm Overload Frame Size			
0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32	B / 45 mm B / 45 mm B / 45 mm B / 45 mm B / 45 mm	**C396A2AP05SELXB** **C396A2A002SELXB** **C396A2A005SELXB** **C396A2A008SELXB** **C396A2A032SELXB**	
0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32	C / 45 mm C / 45 mm C / 45 mm C / 45 mm C / 45 mm	**C396A2AP05SELXC** **C396A2A002SELXC** **C396A2A005SELXC** **C396A2A008SELXC** **C396A2A032SELXC**	
6.4 – 32 9 – 45	D / 55 mm D / 55 mm	**C396A2A032SELXD** **C396A2A045SELXD**	
65 mm Overload Frame Size			
15 – 75	D / 55 mm	**C396B2A075SELXD**	
22 – 110	F – G / 90 mm	**C396B2A110SELXF**	
110 mm Overload Frame Size — Stand-Alone or Direct to *XT* Contactor with Indicated Kit			
30 – 150	G / 90 mm	**C396C2A150SELAX** ④	
110 mm ***XT*** Bus Bar Kit		**C396CBARXT**	

④ Catalog Number shown is for Stand-Alone C396 Overload Relay. For direct connection to ***XT*** Frame G contactor, order additional ***XT*** Bus Bar Kit, C396CBARXT, shown in **Tables 33-178** and **33-181**. If load side lugs are required, order C396CLUG (set of 3).

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Dimensions . . . . . **Page 33-114 – 33-114**
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Discount Symbol **1CD7**

Table 33-179. C396 Overload for Integrated Use with Freedom NEMA Contactors ①

FLA Range (Amps)	NEMA Contactor Frame Size	Description	Catalog Number	Price U.S. $
45 mm Overload Frame Size				
0.1 – 0.5 0.4 – 2.0	00, 0, 1 00, 0, 1	—	**C396A2AP05SELFD** **C396A2A002SELFD**	
1 – 5	00 0 1	—	**C396A2A005SELF00** **C396A2A005SELF0** **C396A2A005SELF1**	
1.6 – 8	00 0 1 2	—	**C396A2A008SELF00** **C396A2A008SELF0** **C396A2A008SELF1** **C396A2A008SELF2**	
6.4 – 32	0 1	—	**C396A2A032SELFB** **C396A2A032SELFD**	
9 – 45	2	—	**C396A2A045SELFG**	
65 mm Overload Frame Size				
22 – 110	3	—	**C396B2A110SELFK**	
110 mm Overload Frame Size — Stand-Alone ③				
30 – 150	4	—	**C396C2A150SELAX** ②	

Note: For NEMA Sizes 5 – 8, refer to **Table 33-177**, Current Transformer Kits.

① Discount Symbol **1CD1**.

② Discount Symbol **1CD7**.

③ Panel mount only! Overload comes with integrated pass-through holes for power wires. Bus Bar Kit (C396CBAR or C396CBARXT, see **Table 33-181**) and Lug Kit (C396CLUG) must be purchased separately if customer prefers not to use pass-through capability.

Cat. No.
C396A2A008SELDC

Table 33-180. C396 Overload for Integrated Use with DP Contactors by Feature Set ④

FLA Range (Amps)	DP Contactor Rating	Catalog Number	Price U.S. $
45 mm Overload Frame Size			
0.1 – 0.5 0.4 – 2.0 1 – 5 1.6 – 8 6.4 – 32 9 – 45	15, 25, 30 15, 25, 30 15, 25, 30 15, 25, 30, 40 15, 25, 30, 40, 50 40, 50	**C396A2AP05SELDC** **C396A2A002SELDC** **C396A2A005SELDC** **C396A2A008SELDE** **C396A2A032SELDF** **C396A2A045SELDF**	
65 mm Overload Frame Size			
15 – 75	60, 75	**C396B2A075SELDG**	

④ Discount Symbol **1CD-5C**.

Accessories

Table 33-181. C396 Electronic Overload Accessories

	Description	Catalog Number	Price U.S. $
	Reset Bar Kit ⑤ assembles to the top of the overload to increase reset area.	**C396ARST**	
	110 mm Lug Kit ⑤⑦	**C396CLUG**	
	110 mm Bus Bar Kit ⑤⑧	**C396CBAR**	
	110 mm ***XT*** Bus Bar Kit ⑤⑧	**C396CBARXT**	
 ***C396ARST + C396RR_ _ _ _ _ Assembled to a C396 Overload Relay***	Remote Reset 24V DC ⑤⑩⑪	**C396RR024DC**	
	Remote Reset 24V AC ⑤⑩⑪	**C396RR024AC**	
	Remote Reset 120V AC ⑤⑩⑪	**C396RR120AC**	
	Remote Reset 240V AC ⑤⑩⑪	**C396RR240AC**	
	Mechanical Reset with E22 Flush Push-button and Mechanical Push Rod ⑥⑨ Plastic Black Bezel Chrome Bezel	 **E22PB6N29L** **E22P6N29L**	
	Mechanical Push Rod — for external mechanical reset ⑥⑫	**E22MRL**	
	Mounting Hole Adapter Kit ⑥⑬	**E22ARK**	

⑤ Discount Symbol **1CD7**.

⑥ Discount Symbol **1CD1**.

⑦ Set of 3 lugs and hardware, 2 sets are required to wire line and load sides. Bus Bar Kit (C396CBAR or C396CBARXT) is needed to use the Lug Kit.

⑧ Bus bar kits do not include lugs. Order C396CLUG if lugs are needed (3 lugs per kit).

⑨ The operator button is blue with the letters "RESET" printed in white. The push rod is 4.72" long and can be cut to the desired length. This kit can be used alone or in conjunction with the C396 Reset Bar Kit, C396ARST, to increase the size of the reset area on the overload.

⑩ Reset Bar Kit (C396ARST) required to use the Remote Reset modules. Note that all Freedom Starters come with Reset Bars.

⑪ When used in conjunction with a Stand-Alone C396 Overload Relay (overloads with an "AX" suffix), style number of the overload must end in a "B" or later.

⑫ Must be cut to proper length — uncut 4.72 inches (119.9 mm) long.

⑬ Enables a 22.5 mm operator to be mounted in a 30.5 mm holes — 1/16 to 7/32 inch (1.6 to 5.6 mm) panel thickness.

Dimensions . . . . . **Page 33-114**, **Page 33-115**

Technical Data and Specifications

Table 33-182. Overload Relay Specifications

General Description	C396_2_
	Standard
Protection	
Thermal	1.05 x FLA: Does not trip 1.25 x FLA: Overload trip
Phase Loss	1 Phase = 0, Trip time = 3s (Hot Status)
Phase Imbalance	Max - Min / Max > 40%, Trip time = 3s (Hot Status)
Inrush Current	> 8 x Max FLA, Trip time is 0.3s (Cold Status)
Trip Class	
Class 5, 10, 20, 30	Selectable
Reset	
M / M-O A / A-O	Manual / Manual + Stop Auto / Auto + Stop Auto Reset Time = up to 165s
Indications	
Test Indicator	Yellow
Trip Indicator	Yellow
PCBA	
Power Sensing	3 phase
Instant Reset by Power ON	CPU reset by Power ON after 2 – 3s
Thermal memory	< 3 min.
Cold and Hot Trip Curves	Power ON > 20 min. is Hot Status
Power Consumption	< 300 mW
Options	
Safety Cover	Covers FLA dial, DIP switches
Remote Reset	24V DC, 24V AC, 120V AC, 240V AC

Table 33-182. Overload Relay Specifications (Continued)

General Description	C396_2_
	Standard
Climate Considerations	
Ambient Temperature (Operating)	-25° to 65°C (-13° to 149°F) inside enclosure
Ambient Temperature (Storage / Transportation)	-40° to 80°C (-40° to 176°F)
Humidity	UL991 (H3): 20 – 95% non-condensing
Altitude (Operating)	NEMA ICS1: 2000 meters max above sea level
Pollution (Operating — External)	Pollution degree 3
Mechanical Shock Resistance (IEC/EN 68-2-17)	15g
Vibration (Lloyd's Register of Shipping, Vibration Test 2)	6g
Temperature Compensation	Continuous
Voltages	
Control Voltage	12 – 690V AC, 50/60 Hz
Insulation Voltage (Ui) — Main Circuit	1000V AC
Insulation Voltage (Ui) — Control Circuit	690V AC
Impulse Withstand Voltage (Uimp) VAC	6000
FLA Range	
45 mm Frame: C396A_	0.1 – 45A
65 mm Frame: C396B_	15 – 110A
110 mm Frame: C396C_	30 – 150A
Safety	
Degree of Protection	IP20 (Stand-Alone Version Only)
Capacity	
Control Terminal Capacity	18 – 14 AWG
Control Terminal Tightening Torque in Nm (lb-in)	0.79 (7)
Load Terminal Capacity	
45 mm Frame: C396A_	14 – 6 AWG
65 mm Frame: C396B_	10 – 1 AWG
110 mm Frame: C396C_	6 AWG – 250 mcm
Load Terminal Tightening Torque in Nm (lb-in)	
45 mm Frame: C396A_	3.2 (28)
65 mm Frame: C396B_	9.0 (80)
110 mm Frame: C396C_	22.6 (200)

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Dimensions ..... **Page 33-114, 33-115**

Dimensions

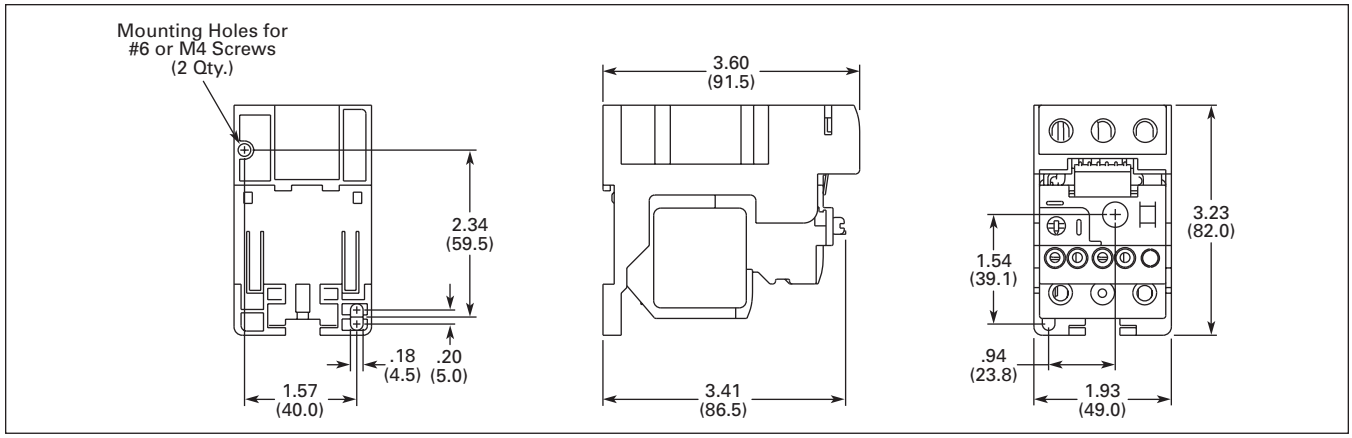

Figure 33-47. 45 mm Stand-Alone C396 Electronic Overload Relay — Approximate Dimensions in Inches (mm)

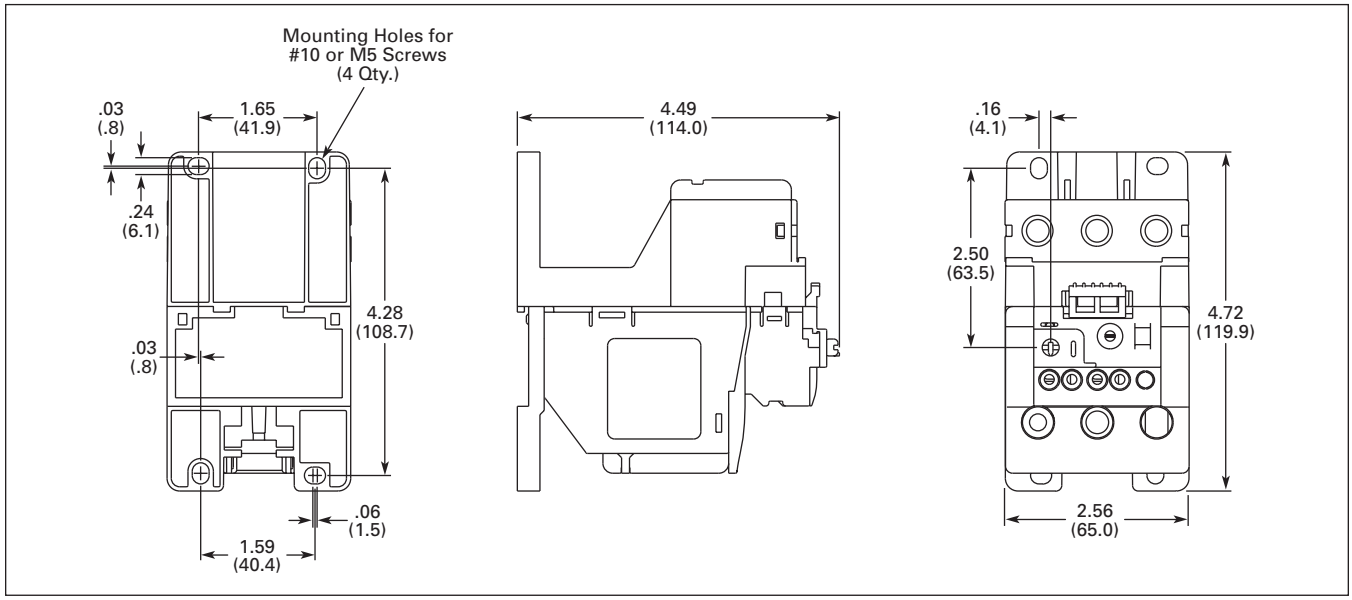

Figure 33-48. 65 mm Stand-Alone C396 Electronic Overload Relay — Approximate Dimensions in Inches (mm)

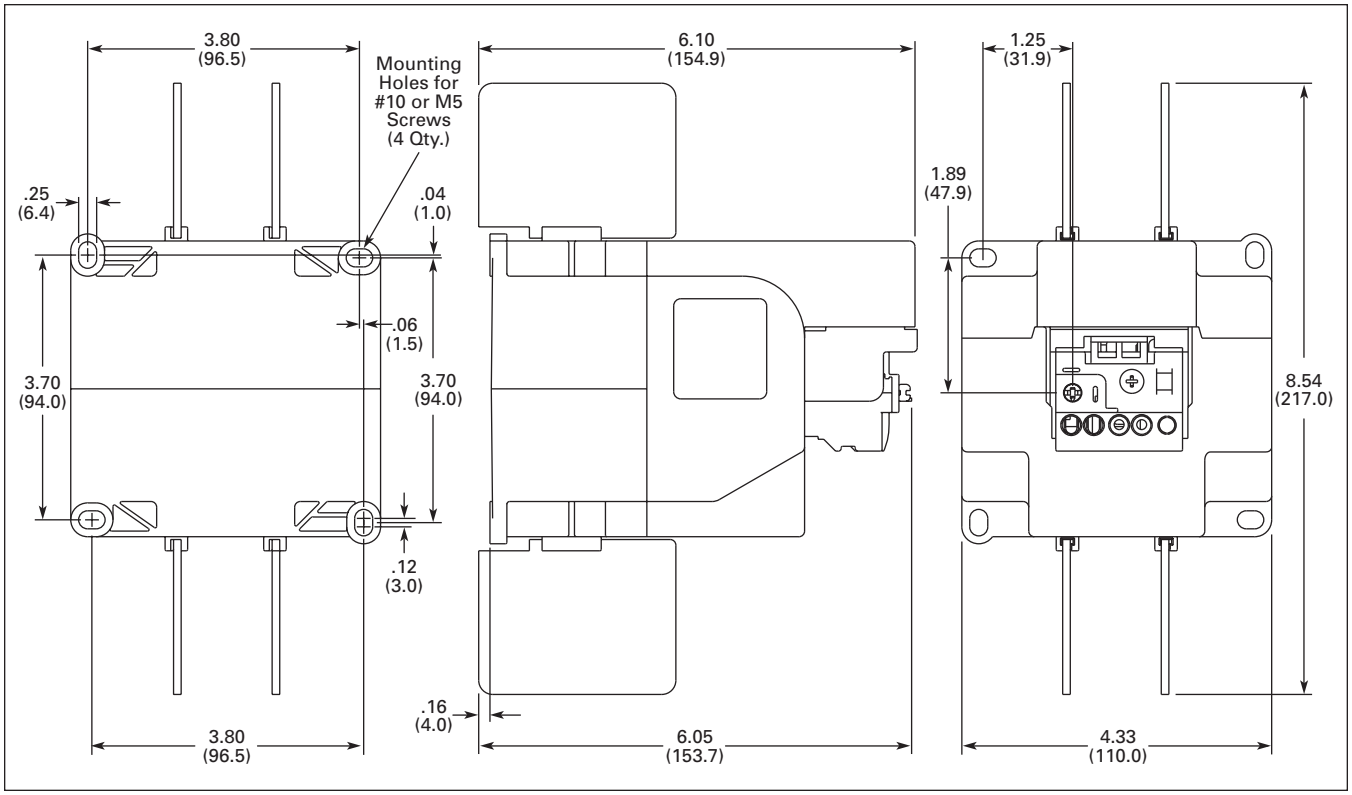

Figure 33-49. 110 mm Stand-Alone C396 Electronic Overload Relay

Catalog Number ECN2208AAC

Product Description

Eaton's Cutler-Hammer® "Freedom Series" Starters and Contactors feature a compact, space-saving design, high strength, impact and temperature resistant insulating materials.

Features

- Adjustable Bimetallic Ambient Compensated Overload Relays with interchangeable heater packs — available in three basic sizes, covering applications up to 900 hp — reducing the number of different contactor/overload relay combinations that have to be stocked.
- Fixed heater overloads optional.
- Electronic/Solid-State Overload optional.
- A full line of snap-on accessories — top and side mounted auxiliary contacts, solid-state and pneumatic timers, etc.
- Straight-through wiring — line lugs at top, load lugs at bottom.
- Horizontal or vertical mounting on upright panel for application freedom.
- Screw type power terminals have captive, backed-out self-lifting pressure plates with ± screws — reduced wiring time.
- Accessible terminals for easy wiring. Optional fingerproof shields available to prevent electrical shock.
- Top located coil terminals convenient and readily accessible. 45 mm contactor magnet coils have three terminals, permitting either top or diagonal wiring — easy to replace European or U.S. style starters or contactors without changing wiring layout.
- Encapsulated dual voltage/frequency magnet coils — permanently marked with voltage, frequency and part number.
- Designed to meet or exceed UL, CSA, IEC, VDE, BS and other international standards and listings.

Standards and Certifications

Note: See Enclosed Control Product Guide PG0300001E for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved

Certified Type 2 Coordination

Eaton's Cutler-Hammer Freedom Series IEC starters and NEMA starters are UL Certified to achieve IEC 947 Type 2 coordination against 100,000A short circuit fault currents. Any brand of properly selected fuse can be used. Type 2 coordination means that the starter will be suitable for further use following a short circuit fault.

ISO 9001 Certification

When you turn to Eaton's Cutler-Hammer Products, you turn to quality. The International Standards Organization (ISO) has established a series of standards acknowledged by 91 industrialized nations to bring harmony to the international quest for quality. The ISO certification process covers 20 quality system elements in design, production and installation that must conform to achieve registration. The Enclosed Control is manufactured in our Fayetteville, NC plant, and this facility is registered ISO 9001. This commitment to quality results in increased product reliability and total customer satisfaction.

Freedom NEMA contactors and starters are extremely rugged products built for any application. Their long electrical/mechanical life is extended through easy maintainability.

- Meets and exceeds all UL and CSA standards.
- Sized based on standard NEMA size classifications.
- Designed and built for a variety of demanding applications.
- Easy coil change and inspectable/replaceable contacts.
- Available Open and in Type 1, 3R, 4, 4X, 7/9 and 12 enclosures.

Short Circuit Protection

Fuses and **Inverse-Time Circuit Breakers** may be selected per Article 430, Part D of the National Electrical Code to protect motor branch circuits from fault conditions. If higher ratings or settings are required to start the motor, do **not** exceed the maximum as listed in Exception No. 2, Article 430-52.

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Catalog Number Selection

Table 33-183. NEMA Freedom Line Enclosed Control Catalog Numbering System

E C N 22 2 1 A A F - __

Design
N = Freedom NEMA
2 = A200

Modification Codes
See **Page 33-42 – 33-49**

Class		Table
01 =	Non-reversing Contactor — 3-Pole	**33-189**
	Non-reversing Contactor — 2-Pole	**33-190**
	Non-reversing Contactor — 4-Pole	**33-191**
	Non-reversing Contactor — 5-Pole	**33-192**
02 =	Reversing Contactor — 3-Pole	**33-193**
05 =	Non-combination Non-reversing Starter	**33-194**
06 =	Non-combination Reversing Starter	**33-195**
07 =	Non-combination Non-reversing Starter with CPT	**33-196**
08 =	Non-combination Single-Phase Non-reversing Starter	**33-197**
16 =	Combination Non-reversing Starter — Fusible Disconnect	**33-198, 33-287**
	Combination Non-reversing Starter — Non-fusible Disconnect	**33-199**
	Special Enclosure Combination Non-reversing Starter — Fusible/Non-fusible Disconnect	**33-200**
17 =	Combination Reversing Starter — Fusible Disconnect	**33-201**
	Combination Reversing Starter — Non-fusible Disconnect	**33-202**
18 =	Combination Reversing Starter — Fusible Disconnect with CPT	**33-203, 33-288**
	Combination Reversing Starter — Non-fusible Disconnect with CPT	**33-204**
22 =	Combination Non-reversing Starter — Circuit Breaker	**33-205,**
	Special Enclosure Combination Non-reversing Starter — Circuit Breaker	**33-206**

Cover Control
Type 1 Non-comb., **Table 33-186**
All Others, **Table 33-187**
E22 Style Comb., **Table 33-189**

Contactors
3 = 3 Poles

Coil Voltage and/or Control Transformers
See **Tables 33-184** and **33-185**

Disconnect Fuse Clip Ratings

A = None	**G** = 100A/600V R	**N** = 600A/600V R
B = 30A/250V R	**H** = 200A/250V R	**P** = 800A/600V L
C = 30A/600V R	**J** = 200A/600V R	**Q** = 1200A/600V L
D = 60A/250V R	**K** = 400A/250V R	**R** = 1600A/600V L
E = 60A/600V R	**L** = 400A/600V R	**S** = 2000A/600V L
F = 100A/250V R	**M** = 600A/250V R	**T** = by Description

HMCP/E or Breaker Ratings

A = None	**H** = 150A	**R** = 3000A
B = 3A	**J** = 250A	**T** = by Description
C = 7A	**K** = 400A	**5** = 3A ①
D = 15A	**L** = 600A	**6** = 7A ①
E = 30A	**M** = 800A	**7** = 15A ①
F = 50A	**N** = 1000A	**8** = 30A ①
W = 70A	**P** = 1200A	**9** = 50A ①
G = 100A	**Q** = 2000A	**I** = 100A ①

NEMA Size

A = Size 00	**3** = Size 3	**7** = Size 7
0 = Size 0	**4** = Size 4	**8** = Size 8
1 = Size 1	**5** = Size 5	**9** = Size 9
2 = Size 2	**6** = Size 6	

Enclosure Type
1 = Type 1 — General Purpose
2 = Type 3R — Rainproof
3 = Type 4 — Watertight (Painted Steel)
4 = Type 4X — Watertight (304-Grade Stainless Steel)
5 = Type 4X — Corrosion (Nonmetallic)
6 = Type 7/9 — Bolted Hazardous Location
7 = Type 7/9 — Threaded Hazardous Location
8 = Type 12 — Dust-Tight
9 = Type 4X — 316-Grade Stainless Steel

① Use for Sizes 0 – 3, HMCP 600V applications only.

Table 33-184. Magnetic Coil Codes (System Voltage) ②

Code	Magnet Coil	Code	Magnet Coil	Code	Magnet Coil
A	120/60 110/50	**K**	240/50	**U**	24/50
B	240/60 220/50	**L**	380/50	**V**	32/50
C	460/60 440/50	**M**	415/50	**W**	48/60
D	575/60 550/50	**P**	12V DC	**X**	104 – 120/60
E	208/60	**Q**	24V DC	**Y**	48/50
G	550/50	**R**	48V DC	**Z**	By Description
H	277/60	**S**	125V DC		
J	208 – 240/60	**T**	24/60		

② When control power transformer modification codes (**C1** – **C11**) are used or when starter class includes CPT (i.e. ECN07, 18) see **Table 33-185** for system voltage code.

Table 33-185. Control Power Transformer Codes (System Voltage)

Code	Primary	Secondary
B	240/480 – 220/440 Wired for 240V	120/60 – 110/50
C	240/480 – 220/440 Wired for 480V	120/60 – 110/50
D	600/60 – 550/50	120/60 – 110/50
E	208/60	120/60
H	277/60	120/60
L	380/50	110/50
M	415/50	110/50
Q	208/60	24
R	240/480 – 220/440 Wired for 240V	24
S	240/480 – 220/440 Wired for 480V	24
T	600/60	24
U	277/60	24
V	380/50	24
W	415/50	24
X	240/480/600 Wired for 480V	120
Y	240/480/600 Wired for 480V	24
Z	By Description	

Cover Control

Non-combination Starters

Control Power Transformer (CPT) may be required.

Combination Starters

- Cover control for Combination Starters uses 10250T style devices as standard.
- E22 style cover control options are available (**Table 33-188**).
- Selector switches are maintained with lever operators.
- Pushbuttons are momentary type with extended pushbutton.
- The kit includes hardware and connecting wires (where possible).
- For factory installed control devices other than shown below, refer to Modification Codes, **Page 33-42**.

Type 1 Cover Control

Table 33-186. Type 1 Non-combination Cover Control

Description	Factory Installed Flange Control ①	Field Installation Kits
	Position 9 Code	Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	**C400GK0**
START/STOP Pushbuttons	**B**	**C400GK1**
with Red RUN Pilot Light	**C**	**C400GK12** ②
with Red RUN/Green OFF Lights	**D**	**C400GK16** ②
HAND/OFF/AUTO Selector Switch	**H**	**C400GK3**
with Red RUN Pilot Light	**J**	**C400GK32** ②
with Red RUN/Green OFF Lights	**K**	**C400GK36** ②
Red RUN Pilot Light	**P**	**C400GK42** ②
Green OFF	**Q**	**C400GK41** ②
Red RUN/Green OFF Pilot Lights	**R**	**C400GK46** ②
Reversing		
No Cover Mounted Pilot Devices	**A**	**C400GK0**
FOR/REV/STOP Pushbuttons	**B**	**C400GR1**
with 2 Red Pilot Lights	**C**	**C400GR14** ②
UP/STOP/DOWN Pushbuttons	**E**	**C400GR2**
with 2 Red Pilot Lights	**F**	**C400GR24** ②
Two Red Pilot Lights	**P**	**C400GK44** ②
One Green Pilot Light	**Q**	**C400GK41** ②

① For more available factory installed flange control, see **Table 33-187**.

② Add Code Letter from the table below to Catalog Number for voltage — Kits only. Example: C400T9**B**.

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

10250T Selector Switch

Table 33-187. Type 1 Combination and All Type 3R, 4X and 12 Cover Control ③

Description	Factory Installed Flange Control	Field Installation Kits
	Position 9 Code	Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	—
START/STOP Pushbuttons	**B**	**C400T1**
with Red RUN Pilot Light	**C**	—
with Red RUN/Green OFF Lights	**D**	—
ON/OFF Pushbuttons	**E**	**C400T2**
with Red RUN Pilot Light	**F**	—
with Red RUN/Green OFF Lights	**G**	—
HAND/OFF/AUTO Selector Switch	**H**	**C400T12**
with Red RUN Pilot Light	**J**	—
with Red RUN/Green OFF Lights	**K**	—
START Pushbutton	**L**	**C400T3**
ON Pushbutton	**M**	**C400T4**
OFF Pushbutton	**N**	**C400T5**
Red RUN Pilot Light	**P**	**C400T9** ④
Green OFF	**Q**	**C400T10** ④
Red RUN/Green OFF Pilot Lights	**R**	**C400T11** ④
START/STOP Selector Switch	**S**	**C400T13**
with Red RUN Pilot Light	**T**	—
with Red RUN/Green OFF Lights	**U**	—
ON/OFF Selector Switch	**V**	**C400T14**
with Red RUN Pilot Light	**W**	—
with Red RUN/Green OFF Lights	**X**	—
Reversing		
No Cover Mounted Pilot Devices	**A**	—
FOR/REV/STOP Pushbuttons	**B**	**C400T6**
with 2 Red Pilot Lights	**C**	—
with 2 Red/1 Green Pilot Lights	**D**	—
UP/STOP/DOWN Pushbuttons	**E**	—
with 2 Red Pilot Lights	**F**	—
FOR/OFF/REV Selector Switch	**H**	**C400T15**
with 2 Red Pilot Lights	**J**	—
with 2 Red/1 Green Pilot Lights	**K**	—
Two Red Pilot Lights	**P**	⑤
One Green Pilot Light	**Q**	**C400T10** ④
Two Red/One Green Pilot Lights	**R**	—
OPEN/OFF/CLOSE Selector Switch	**V**	**C400T16**
with 2 Red Pilot Lights	**W**	—
with 2 Red/1 Green Pilot Lights	**X**	—

③ For Type 1 Non-combination field installation kits, see **Table 33-186**.

④ Add Code Letter from the table below to Catalog Number for voltage — Kits only. Example: C400T9**B**.

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

⑤ Order Quantity (2) of **C400T10**.

E22 Selector Switch

Table 33-188. Type 1, 3R, 4X and 12 E22 Style Combination Starter Cover Control

Description	Factory Installed ① Position 9 Cover Control Code	Field Installation Kits Combination Only Catalog Number
Non-reversing		
No Cover Mounted Pilot Devices	**A**	**—**
START/STOP Pushbuttons (PB)	**B**	**CE400T01**
START/STOP PB & Red RUN Light	**C**	**CE400T02** ②
START/STOP PB, Red RUN, & Green STOPPED Light	**D**	**CE400T03** ②
HAND/OFF/AUTO Selector Switch (SS)	**H**	**CE400T04**
H-O-A SS & Red RUN Light	**J**	**CE400T05** ②
H-O-A SS, Red RUN, & Green STOPPED Light	**K**	**CE400T06** ②
Red RUN Pilot Light	**P**	**CE400T10** ②
Green Off Pilot Light	**Q**	**CE400T11** ②
Red RUN/Green OFF Pilot Light	**R**	**CE400T12** ②
ON/OFF Selector Switch (SS)	**S**	**CE400T07**
ON/OFF SS, Red RUN Light	**T**	**CE400T08** ②
ON/OFF SS, Red RUN, & Green STOPPED Light	**U**	**CE400T09** ②
Reversing		
No Cover Mounted Pilot Devices	**A**	**—**
FWD/REV/STOP Pushbuttons (PB)	**B**	**CE400T50**
FWD/REV/STOP PB + Red FWD & REV Lights	**C**	**CE400T51** ②
FWD/REV/STOP PB, Red FWD/REV, & Green STOPPED	**D**	**CE400T52** ②
FOR/OFF/REV Selector Switch (SS)	**H**	**CE400T53**
FOR/OFF/REV SS + Red FWD & REV Lights	**J**	**CE400T54** ②
FOR/OFF/REV SS, Red FWD/REV, & Green STOPPED	**K**	**CE400T55** ②
OPEN/OFF/CLOSE Selector Switch (SS)	**V**	**CE400T56**
OPEN/OFF/CLOSE SS + Red FWD & REV Lights	**W**	**CE400T57** ②
OPEN/OFF/CLOSE SS, Red FWD/REV, & Green STOPPED	**X**	**CE400T58** ②

① To include any of the above cover controls, place the control code character in position 9 of your Catalog Number and add Mod Code **C29**.
Example: ECN16A4A**D**A-**C29**.
Full voltage non-reversing fusible starter with START/STOP pushbutton with red RUN and green OFF pilot lights.

② Suffix for lights (required for field installed kits only) in the table below:

Rating	Code Letter	Rating	Code Letter	Rating	Code Letter
120V 60 Hz	**A**	277V 60 Hz	**H**	480V 60 Hz	**C**
208V 60 Hz	**E**	380V 50 Hz	**L**	600V 60 Hz	**D**
240V 60 Hz	**B**				

Features

- 1-Phase or 3-Phase Magnetic
- 2-, 3-, 4- or 5-Pole Non-reversing or 3-Pole Reversing
- 600V Maximum

Product Selection

Table 33-189. Class ECN01 — Non-reversing Contactor — 3-Pole

NEMA Size	Continuous Ampere Rating	Motor Voltage	Maximum hp Rating ①	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ③	Type 12 Dust-Tight Industrial	Component Contactor (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	9	—	—	120	ECN01A1A3A	ECN01A2A3A	(Select Contactor from Size 0 Listing)		CN15AN3AB
		200	1-1/2	208	ECN01A1E3A	ECN01A2E3A			CN15AN3EB
		230	1-1/2	240	ECN01A1B3A	ECN01A2B3A			CN15AN3BB
		460	2	480	ECN01A1C3A	ECN01A2C3A			CN15AN3CB
		575	2	600	ECN01A1D3A	ECN01A2D3A			CN15AN3DB
0	18	—	—	120	ECN0101A3A	ECN0102A3A	ECN0104A3A	ECN0108A3A	CN15BN3AB
		200	3	208	ECN0101E3A	ECN0102E3A	ECN0104E3A	ECN0108E3A	CN15BN3EB
		230	3	240	ECN0101B3A	ECN0102B3A	ECN0104B3A	ECN0108B3A	CN15BN3BB
		460	5	480	ECN0101C3A	ECN0102C3A	ECN0104C3A	ECN0108C3A	CN15BN3CB
		575	5	600	ECN0101D3A	ECN0102D3A	ECN0104D3A	ECN0108D3A	CN15BN3DB
1	27	—	—	120	ECN0111A3A	ECN0112A3A	ECN0114A3A	ECN0118A3A	CN15DN3AB
		200	7-1/2	208	ECN0111E3A	ECN0112E3A	ECN0114E3A	ECN0118E3A	CN15DN3EB
		230	7-1/2	240	ECN0111B3A	ECN0112B3A	ECN0114B3A	ECN0118B3A	CN15DN3BB
		460	10	480	ECN0111C3A	ECN0112C3A	ECN0114C3A	ECN0118C3A	CN15DN3CB
		575	10	600	ECN0111D3A	ECN0112D3A	ECN0114D3A	ECN0118D3A	CN15DN3DB
2	45	—	—	120	ECN0121A3A	ECN0122A3A	ECN0124A3A	ECN0128A3A	CN15GN3AB
		200	10	208	ECN0121E3A	ECN0122E3A	ECN0124E3A	ECN0128E3A	CN15GN3EB
		230	15	240	ECN0121B3A	ECN0122B3A	ECN0124B3A	ECN0128B3A	CN15GN3BB
		460	25	480	ECN0121C3A	ECN0122C3A	ECN0124C3A	ECN0128C3A	CN15GN3CB
		575	25	600	ECN0121D3A	ECN0122D3A	ECN0124D3A	ECN0128D3A	CN15GN3DB
3	90	—	—	120	ECN0131A3A	ECN0132A3A	ECN0134A3A	ECN0138A3A	CN15KN3A
		200	25	208	ECN0131E3A	ECN0132E3A	ECN0134E3A	ECN0138E3A	CN15KN3E
		230	30	240	ECN0131B3A	ECN0132B3A	ECN0134B3A	ECN0138B3A	CN15KN3B
		460	50	480	ECN0131C3A	ECN0132C3A	ECN0134C3A	ECN0138C3A	CN15KN3C
		575	50	600	ECN0131D3A	ECN0132D3A	ECN0134D3A	ECN0138D3A	CN15KN3D
4	135	—	—	120	ECN0141A3A	ECN0142A3A	ECN0144A3A	ECN0148A3A	CN15NN3A
		200	40	208	ECN0141E3A	ECN0142E3A	ECN0144E3A	ECN0148E3A	CN15NN3E
		230	50	240	ECN0141B3A	ECN0142B3A	ECN0144B3A	ECN0148B3A	CN15NN3B
		460	100	480	ECN0141C3A	ECN0142C3A	ECN0144C3A	ECN0148C3A	CN15NN3C
		575	100	600	ECN0141D3A	ECN0142D3A	ECN0144D3A	ECN0148D3A	CN15NN3D
5	270	—	—	120	ECN0151A3A	ECN0152A3A	ECN0154A3A	ECN0158A3A	CN15SN3A
		200	75	208	ECN0151E3A	ECN0152E3A	ECN0154E3A	ECN0158E3A	CN15SN3E
		230	100	240	ECN0151B3A	ECN0152B3A	ECN0154B3A	ECN0158B3A	CN15SN3B
		460	200	480	ECN0151C3A	ECN0152C3A	ECN0154C3A	ECN0158C3A	CN15SN3C
		575	200	600	ECN0151D3A	ECN0152D3A	ECN0154D3A	ECN0158D3A	CN15SN3D
6	540	—	—	120	ECN0161A3A	ECN0162A3A	ECN0164A3A	ECN0168A3A	CN15TN3A
		200	150	208	ECN0161E3A	ECN0162E3A	ECN0164E3A	ECN0168E3A	CN15TN3E
		230	200	240	ECN0161B3A	ECN0162B3A	ECN0164B3A	ECN0168B3A	CN15TN3B
		460	400	480	ECN0161C3A	ECN0162C3A	ECN0164C3A	ECN0168C3A	CN15TN3C
		575	400	600	ECN0161D3A	ECN0162D3A	ECN0164D3A	ECN0168D3A	CN15TN3D
7	810	—	—	120	ECN0171A3A	ECN0172A3A	ECN0173A3A ②	ECN0178A3A	CN15UN3A
		230	300	240	ECN0171B3A	ECN0172B3A	ECN0173B3A ②	ECN0178B3A	CN15UN3B
		460	600	480	ECN0171C3A	ECN0172C3A	ECN0173C3A ②	ECN0178C3A	CN15UN3C
		575	600	600	ECN0171D3A	ECN0172D3A	ECN0173D3A ②	ECN0178D3A	CN15UN3D
8	1215	—	—	120	ECN0181A3A	ECN0182A3A	ECN0183A3A ②	ECN0188A3A	CN15VN3A
		230	450	240	ECN0181B3A	ECN0182B3A	ECN0183B3A ②	ECN0188B3A	CN15VN3B
		460	900	480	ECN0181C3A	ECN0182C3A	ECN0183C3A ②	ECN0188C3A	CN15VN3C
		575	900	600	ECN0181D3A	ECN0182D3A	ECN0183D3A ②	ECN0188D3A	CN15VN3D
9	2250	—	—	120	ECN0191A3A	ECN0192A3A	ECN0193A3A ②	ECN0198A3A	CN15WN3A
		230	800	240	ECN0191B3A	ECN0192B3A	ECN0193B3A ②	ECN0198B3A	CN15WN3B
		460	1600	480	ECN0191C3A	ECN0192C3A	ECN0193C3A ②	ECN0198C3A	CN15WN3C
		575	1600	600	ECN0191D3A	ECN0192D3A	ECN0193D3A ②	ECN0198D3A	CN15WN3D

① Maximum horsepower rating of contactors for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② Type 4 (Painted steel) Sizes 7 – 9.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN010**4**A3A. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

Note: NEMA Sizes 00, 0 and 1 of 3-Pole/3-Phase Non-reversing Contactors are available with auxiliary contact omitted. Add Modification Code **A44**. Example: ECN0101A3A-**A44**.

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Table 33-190. Class ECN01 — Non-reversing Contactor — 2-Pole

NEMA Size	Continuous Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial	Component Contactor (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	9	115	1/3	120	**ECN01A1A2A**	(Select Contactor from Size 0 Listing)			**CN15AN2AB**
		—	—	208	**ECN01A1E2A**				**CN15AN2EB**
		230	1	240	**ECN01A1B2A**				**CN15AN2BB**
		—	—	480	**ECN01A1C2A**				**CN15AN2CB**
		—	—	600	**ECN01A1D2A**				**CN15AN2DB**
0	18	115	1	120	**ECN0101A2A**	**ECN0102A2A**	**ECN0104A2A**	**ECN0108A2A**	**CN15BN2AB**
		—	—	208	**ECN0101E2A**	**ECN0102E2A**	**ECN0104E2A**	**ECN0108E2A**	**CN15BN2EB**
		230	2	240	**ECN0101B2A**	**ECN0102B2A**	**ECN0104B2A**	**ECN0108B2A**	**CN15BN2BB**
		—	—	480	**ECN0101C2A**	**ECN0102C2A**	**ECN0104C2A**	**ECN0108C2A**	**CN15BN2CB**
		—	—	600	**ECN0101D2A**	**ECN0102D2A**	**ECN0104D2A**	**ECN0108D2A**	**CN15BN2DB**
1	27	115	2	120	**ECN0111A2A**	**ECN0112A2A**	**ECN0114A2A**	**ECN0118A2A**	**CN15DN2AB**
		—	—	208	**ECN0111E2A**	**ECN0112E2A**	**ECN0114E2A**	**ECN0118E2A**	**CN15DN2EB**
		230	3	240	**ECN0111B2A**	**ECN0112B2A**	**ECN0114B2A**	**ECN0118B2A**	**CN15DN2BB**
		—	—	480	**ECN0111C2A**	**ECN0112C2A**	**ECN0114C2A**	**ECN0118C2A**	**CN15DN2CB**
		—	—	600	**ECN0111D2A**	**ECN0112D2A**	**ECN0114D2A**	**ECN0118D2A**	**CN15DN2DB**
2	45	115	3	120	**ECN0121A2A**	**ECN0122A2A**	**ECN0124A2A**	**ECN0128A2A**	**CN15GN2AB**
		—	—	208	**ECN0121E2A**	**ECN0122E2A**	**ECN0124E2A**	**ECN0128E2A**	**CN15GN2EB**
		230	7-1/2	240	**ECN0121B2A**	**ECN0122B2A**	**ECN0124B2A**	**ECN0128B2A**	**CN15GN2BB**
		—	—	480	**ECN0121C2A**	**ECN0122C2A**	**ECN0124C2A**	**ECN0128C2A**	**CN15GN2CB**
		—	—	600	**ECN0121D2A**	**ECN0122D2A**	**ECN0124D2A**	**ECN0128D2A**	**CN15GN2DB**
3	90	115	7-1/2	120	**ECN0131A2A**	**ECN0132A2A**	**ECN0134A2A**	**ECN0138A2A**	**CN15KN2A**
		—	—	208	**ECN0131E2A**	**ECN0132E2A**	**ECN0134E2A**	**ECN0138E2A**	**CN15KN2E**
		230	15	240	**ECN0131B2A**	**ECN0132B2A**	**ECN0134B2A**	**ECN0138B2A**	**CN15KN2B**
		—	—	480	**ECN0131C2A**	**ECN0132C2A**	**ECN0134C2A**	**ECN0138C2A**	**CN15KN2C**
		—	—	600	**ECN0131D2A**	**ECN0132D2A**	**ECN0134D2A**	**ECN0138D2A**	**CN15KN2D**
4	135	—	—	120	**ECN0141A2A**	**ECN0142A2A**	**ECN0144A2A**	**ECN0148A2A**	**CN15NN2A**
		—	—	208	**ECN0141E2A**	**ECN0142E2A**	**ECN0144E2A**	**ECN0148E2A**	**CN15NN2E**
		—	—	240	**ECN0141B2A**	**ECN0142B2A**	**ECN0144B2A**	**ECN0148B2A**	**CN15NN2B**
		—	—	480	**ECN0141C2A**	**ECN0142C2A**	**ECN0144C2A**	**ECN0148C2A**	**CN15NN2C**
		—	—	600	**ECN0141D2A**	**ECN0142D2A**	**ECN0144D2A**	**ECN0148D2A**	**CN15NN2D**
5	270	—	—	120	**ECN0151A2A**	**ECN0152A2A**	**ECN0154A2A**	**ECN0158A2A**	**CN15SN2A**
		—	—	208	**ECN0151E2A**	**ECN0152E2A**	**ECN0154E2A**	**ECN0158E2A**	**CN15SN2E**
		—	—	240	**ECN0151B2A**	**ECN0152B2A**	**ECN0154B2A**	**ECN0158B2A**	**CN15SN2B**
		—	—	480	**ECN0151C2A**	**ECN0152C2A**	**ECN0154C2A**	**ECN0158C2A**	**CN15SN2C**
		—	—	600	**ECN0151D2A**	**ECN0152D2A**	**ECN0154D2A**	**ECN0158D2A**	**CN15SN2D**
6	540	—	—	120	**ECN0161A2A**	**ECN0162A2A**	**ECN0164A2A**	**ECN0168A2A**	**CN15TN2A**
		—	—	208	**ECN0161E2A**	**ECN0162E2A**	**ECN0164E2A**	**ECN0168E2A**	**CN15TN2E**
		—	—	240	**ECN0161B2A**	**ECN0162B2A**	**ECN0164B2A**	**ECN0168B2A**	**CN15TN2B**
		—	—	480	**ECN0161C2A**	**ECN0162C2A**	**ECN0164C2A**	**ECN0168C2A**	**CN15TN2C**
		—	—	600	**ECN0161D2A**	**ECN0162D2A**	**ECN0164D2A**	**ECN0168D2A**	**CN15TN2D**
7	810	—	—	120	**ECN0171A2A**	**ECN0172A2A**	**ECN0173A2A** ①	**ECN0178A2A**	**CN15UN2A**
		—	—	208	**ECN0171E2A**	**ECN0172E2A**	**ECN0173E2A** ①	**ECN0178E2A**	**CN15UN2E**
		—	—	240	**ECN0171B2A**	**ECN0172B2A**	**ECN0173B2A** ①	**ECN0178B2A**	**CN15UN2B**
		—	—	480	**ECN0171C2A**	**ECN0172C2A**	**ECN0173C2A** ①	**ECN0178C2A**	**CN15UN2C**
		—	—	600	**ECN0171D2A**	**ECN0172D2A**	**ECN0173D2A** ①	**ECN0178D2A**	**CN15UN2D**
8	1215	—	—	120	**ECN0181A2A**	**ECN0182A2A**	**ECN0183A2A** ①	**ECN0188A2A**	**CN15VN2A**
		—	—	208	**ECN0181E2A**	**ECN0182E2A**	**ECN0183E2A** ①	**ECN0188E2A**	**CN15VN2E**
		—	—	240	**ECN0181B2A**	**ECN0182B2A**	**ECN0183B2A** ①	**ECN0188B2A**	**CN15VN2B**
		—	—	480	**ECN0181C2A**	**ECN0182C2A**	**ECN0183C2A** ①	**ECN0188C2A**	**CN15VN2C**
		—	—	600	**ECN0181D2A**	**ECN0182D2A**	**ECN0183D2A** ①	**ECN0188D2A**	**CN15VN2D**
9	2250	—	—	120	**ECN0181A2A**	**ECN0192A2A**	**ECN0193A2A** ①	**ECN0198A2A**	**CN15WN2A**
		—	—	208	**ECN0181E2A**	**ECN0192E2A**	**ECN0193E2A** ①	**ECN0198E2A**	**CN15WN2E**
		—	—	240	**ECN0191B2A**	**ECN0192B2A**	**ECN0193B2A** ①	**ECN0198B2A**	**CN15WN2B**
		—	—	480	**ECN0191C2A**	**ECN0192C2A**	**ECN0193C2A** ①	**ECN0198C2A**	**CN15WN2C**
		—	—	600	**ECN0191D2A**	**ECN0192D2A**	**ECN0193D2A** ①	**ECN0198D2A**	**CN15WN2D**

① Type 4 (Painted steel) Sizes 7 – 9.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0104A2A. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

Note: NEMA Sizes 00, 0 and 1 of 2-Pole/2-Phase Non-reversing Contactors are available with auxiliary contact omitted. Add Modification Code **A44**. Example: ECN0101A2A-**A44**.

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Table 33-191. Class ECN01 — Non-reversing Contactor — 4-Pole

NEMA Size	Continuous Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial	Component Contactor (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	9	—	—	120	**ECN01A1A4A**	(Select Contactor from Size 0 Listing)			**CN15AN4AB**
		200	1-1/2	208	**ECN01A1E4A**				**CN15AN4EB**
		230	1-1/2	240	**ECN01A1B4A**				**CN15AN4BB**
		460	2	480	**ECN01A1C4A**				**CN15AN4CB**
		575	2	600	**ECN01A1D4A**				**CN15AN4DB**
0	18	—	—	120	**ECN0101A4A**	**ECN0102A4A**	**ECN0104A4A**	**ECN0108A4A**	(Select Contactor from Size 1 Listing)
		200	3	208	**ECN0101E4A**	**ECN0102E4A**	**ECN0104E4A**	**ECN0108E4A**	
		230	3	240	**ECN0101B4A**	**ECN0102B4A**	**ECN0104B4A**	**ECN0108B4A**	
		460	5	480	**ECN0101C4A**	**ECN0102C4A**	**ECN0104C4A**	**ECN0108C4A**	
		575	5	600	**ECN0101D4A**	**ECN0102D4A**	**ECN0104D4A**	**ECN0108D4A**	
1	27	—	—	120	**ECN0111A4A**	**ECN0112A4A**	**ECN0114A4A**	**ECN0118A4A**	**CN15DN4AB**
		200	7-1/2	208	**ECN0111E4A**	**ECN0112E4A**	**ECN0114E4A**	**ECN0118E4A**	**CN15DN4EB**
		230	7-1/2	240	**ECN0111B4A**	**ECN0112B4A**	**ECN0114B4A**	**ECN0118B4A**	**CN15DN4BB**
		460	10	480	**ECN0111C4A**	**ECN0112C4A**	**ECN0114C4A**	**ECN0118C4A**	**CN15DN4CB**
		575	10	600	**ECN0111D4A**	**ECN0112D4A**	**ECN0114D4A**	**ECN0118D4A**	**CN15DN4DB**
2	45	—	—	120	**ECN0121A4A**	**ECN0122A4A**	**ECN0124A4A**	**ECN0128A4A**	**CN15GN4AB**
		200	10	208	**ECN0121E4A**	**ECN0122E4A**	**ECN0124E4A**	**ECN0128E4A**	**CN15GN4EB**
		230	15	240	**ECN0121B4A**	**ECN0122B4A**	**ECN0124B4A**	**ECN0128B4A**	**CN15GN4BB**
		460	25	480	**ECN0121C4A**	**ECN0122C4A**	**ECN0124C4A**	**ECN0128C4A**	**CN15GN4CB**
		575	25	600	**ECN0121D4A**	**ECN0122D4A**	**ECN0124D4A**	**ECN0128D4A**	**CN15GN4DB**

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0104A4A. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

Table 33-192. Class ECN01 — Non-reversing Contactor — 5-Pole

NEMA Size	Continuous Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial	Component Contactor (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	9	—	—	120	**ECN01A1A5A**	(Select Contactor from Size 1 Listing)			
		200	1-1/2	208	**ECN01A1E5A**				
		230	1-1/2	240	**ECN01A1B5A**				
		460	2	480	**ECN01A1C5A**				
		575	2	600	**ECN01A1D5A**				
0	18	—	—	120	**ECN0101A5A**	(Select Contactor from Size 1 Listing)			
		200	3	208	**ECN0101E5A**				
		230	3	240	**ECN0101B5A**				
		460	5	480	**ECN0101C5A**				
		575	5	600	**ECN0101D5A**				
1	27	—	—	120	**ECN0111A5A**	**ECN0112A5A**	**ECN0114A5A**	**ECN0118A5A**	**CN15DN5AB**
		200	7-1/2	208	**ECN0111E5A**	**ECN0112E5A**	**ECN0114E5A**	**ECN0118E5A**	**CN15DN5EB**
		230	7-1/2	240	**ECN0111B5A**	**ECN0112B5A**	**ECN0114B5A**	**ECN0118B5A**	**CN15DN5BB**
		460	10	480	**ECN0111C5A**	**ECN0112C5A**	**ECN0114C5A**	**ECN0118C5A**	**CN15DN5CB**
		575	10	600	**ECN0111D5A**	**ECN0112D5A**	**ECN0114D5A**	**ECN0118D5A**	**CN15DN5DB**
2	45	—	—	120	**ECN0121A5A**	**ECN0122A5A**	**ECN0124A5A**	**ECN0128A5A**	**CN15GN5AB**
		200	10	208	**ECN0121E5A**	**ECN0122E5A**	**ECN0124E5A**	**ECN0128E5A**	**CN15GN5EB**
		230	15	240	**ECN0121B5A**	**ECN0122B5A**	**ECN0124B5A**	**ECN0128B5A**	**CN15GN5BB**
		460	25	480	**ECN0121C5A**	**ECN0122C5A**	**ECN0124C5A**	**ECN0128C5A**	**CN15GN5CB**
		575	25	600	**ECN0121D5A**	**ECN0122D5A**	**ECN0124D5A**	**ECN0128D5A**	**CN15GN5DB**

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0114A5A. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Table 33-193. Class ECN02 — Reversing Contactor — 3-Pole

NEMA Size	Continuous Ampere Rating	Motor Voltage	Maximum hp Rating ①	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial	Component Contactor (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	9	—	—	120	**ECN02A1A3A**	(Select Contactor from Size 0 Listing)			**CN55AN3AB**
		200	1-1/2	208	**ECN02A1E3A**				**CN55AN3EB**
		230	1-1/2	240	**ECN02A1B3A**				**CN55AN3BB**
		460	2	480	**ECN02A1C3A**				**CN55AN3CB**
		575	2	600	**ECN02A1D3A**				**CN55AN3DB**
0	18	—	—	120	**ECN0201A3A**	**ECN0202A3A**	**ECN0204A3A**	**ECN0208A3A**	**CN55BN3AB**
		200	3	208	**ECN0201E3A**	**ECN0202E3A**	**ECN0204E3A**	**ECN0208E3A**	**CN55BN3EB**
		230	3	240	**ECN0201B3A**	**ECN0202B3A**	**ECN0204B3A**	**ECN0208B3A**	**CN55BN3BB**
		460	5	480	**ECN0201C3A**	**ECN0202C3A**	**ECN0204C3A**	**ECN0208C3A**	**CN55BN3CB**
		575	5	600	**ECN0201D3A**	**ECN0202D3A**	**ECN0204D3A**	**ECN0208D3A**	**CN55BN3DB**
1	27	—	—	120	**ECN0211A3A**	**ECN0212A3A**	**ECN0214A3A**	**ECN0218A3A**	**CN55DN3AB**
		200	7-1/2	208	**ECN0211E3A**	**ECN0212E3A**	**ECN0214E3A**	**ECN0218E3A**	**CN55DN3EB**
		230	7-1/2	240	**ECN0211B3A**	**ECN0212B3A**	**ECN0214B3A**	**ECN0218B3A**	**CN55DN3BB**
		460	10	480	**ECN0211C3A**	**ECN0212C3A**	**ECN0214C3A**	**ECN0218C3A**	**CN55DN3CB**
		575	10	600	**ECN0211D3A**	**ECN0212D3A**	**ECN0214D3A**	**ECN0218D3A**	**CN55DN3DB**
2	45	—	—	120	**ECN0221A3A**	**ECN0222A3A**	**ECN0224A3A**	**ECN0228A3A**	**CN15GN3AB**
		200	10	208	**ECN0221E3A**	**ECN0222E3A**	**ECN0224E3A**	**ECN0228E3A**	**CN55GN3EB**
		230	15	240	**ECN0221B3A**	**ECN0222B3A**	**ECN0224B3A**	**ECN0228B3A**	**CN55GN3BB**
		460	25	480	**ECN0221C3A**	**ECN0222C3A**	**ECN0224C3A**	**ECN0228C3A**	**CN55GN3CB**
		575	25	600	**ECN0221D3A**	**ECN0222D3A**	**ECN0224D3A**	**ECN0228D3A**	**CN55GN3DB**
3	90	—	—	120	**ECN0231A3A**	**ECN0232A3A**	**ECN0234A3A**	**ECN0238A3A**	**CN55KN3A**
		200	25	208	**ECN0231E3A**	**ECN0232E3A**	**ECN0234E3A**	**ECN0238E3A**	**CN55KN3E**
		230	30	240	**ECN0231B3A**	**ECN0232B3A**	**ECN0234B3A**	**ECN0238B3A**	**CN55KN3B**
		460	50	480	**ECN0231C3A**	**ECN0232C3A**	**ECN0234C3A**	**ECN0238C3A**	**CN55KN3C**
		575	50	600	**ECN0231D3A**	**ECN0232D3A**	**ECN0234D3A**	**ECN0238D3A**	**CN55KN3D**
4	135	—	—	120	**ECN0241A3A**	**ECN0242A3A**	**ECN0244A3A**	**ECN0248A3A**	**CN55NN3A**
		200	40	208	**ECN0241E3A**	**ECN0242E3A**	**ECN0244E3A**	**ECN0248E3A**	**CN55NN3E**
		230	50	240	**ECN0241B3A**	**ECN0242B3A**	**ECN0244B3A**	**ECN0248B3A**	**CN55NN3B**
		460	100	480	**ECN0241C3A**	**ECN0242C3A**	**ECN0244C3A**	**ECN0248C3A**	**CN55NN3C**
		575	100	600	**ECN0241D3A**	**ECN0242D3A**	**ECN0244D3A**	**ECN0248D3A**	**CN55NN3D**
5	270	—	—	120	**ECN0251A3A**	**ECN0252A3A**	**ECN0254A3A**	**ECN0258A3A**	**CN55SN3A**
		200	75	208	**ECN0251E3A**	**ECN0252E3A**	**ECN0254E3A**	**ECN0258E3A**	**CN55SN3E**
		230	100	240	**ECN0251B3A**	**ECN0252B3A**	**ECN0254B3A**	**ECN0258B3A**	**CN55SN3B**
		460	200	480	**ECN0251C3A**	**ECN0252C3A**	**ECN0254C3A**	**ECN0258C3A**	**CN55SN3C**
		575	200	600	**ECN0251D3A**	**ECN0252D3A**	**ECN0254D3A**	**ECN0258D3A**	**CN55SN3D**
6	540	—	—	120	**ECN0261A3A**	**ECN0262A3A**	**ECN0263A3A** ②	**ECN0268A3A**	**CN55TN3A**
		200	150	208	**ECN0261E3A**	**ECN0262E3A**	**ECN0263E3A** ②	**ECN0268E3A**	**CN55TN3E**
		230	200	240	**ECN0261B3A**	**ECN0262B3A**	**ECN0263B3A** ②	**ECN0268B3A**	**CN55TN3B**
		460	400	480	**ECN0261C3A**	**ECN0262C3A**	**ECN0263C3A** ②	**ECN0268C3A**	**CN55TN3C**
		575	400	600	**ECN0261D3A**	**ECN0262D3A**	**ECN0263D3A** ②	**ECN0268D3A**	**CN55TN3D**
7	810	—	—	120	**ECN0271A3A**	**ECN0272A3A**	**ECN0273A3A** ②	**ECN0278A3A**	**CN55UN3A**
		230	300	240	**ECN0271B3A**	**ECN0272B3A**	**ECN0273B3A** ②	**ECN0278B3A**	**CN55UN3B**
		460	600	480	**ECN0271C3A**	**ECN0272C3A**	**ECN0273C3A** ②	**ECN0278C3A**	**CN55UN3C**
		575	600	600	**ECN0271D3A**	**ECN0272D3A**	**ECN0273D3A** ②	**ECN0278D3A**	**CN55UN3D**
8	1215	—	—	120	**ECN0281A3A**	**ECN0282A3A**	**ECN0283A3A** ②	**ECN0288A3A**	**CN55VN3A**
		230	450	240	**ECN0281B3A**	**ECN0282B3A**	**ECN0283B3A** ②	**ECN0288B3A**	**CN55VN3B**
		460	900	480	**ECN0281C3A**	**ECN0282C3A**	**ECN0283C3A** ②	**ECN0288C3A**	**CN55VN3C**
		575	900	600	**ECN0281D3A**	**ECN0282D3A**	**ECN0283D3A** ②	**ECN0288D3A**	**CN55VN3D**
9	2250	—	—	120	**ECN0291A3A**	**ECN0292A3A**	**ECN0293A3A** ②	**ECN0298A3A**	**CN55WN3A**
		230	800	240	**ECN0291B3A**	**ECN0292B3A**	**ECN0293B3A** ②	**ECN0298B3A**	**CN55WN3B**
		460	1600	480	**ECN0291C3A**	**ECN0292C3A**	**ECN0293C3A** ②	**ECN0298C3A**	**CN55WN3C**
		575	1600	600	**ECN0291D3A**	**ECN0292D3A**	**ECN0293D3A** ②	**ECN0298D3A**	**CN55WN3D**

① Maximum horsepower rating of contactors for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② Type 4 (Painted steel) Sizes 6 – 9.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0204A3A. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Features

- 1-Phase or 3-Phase Magnetic
- 2- or 3-Pole Non-reversing or 3-Pole Reversing
- Standard Interchangeable Heater OLR
- Optional Electronic Overload
- 600V Maximum

Product Selection

Table 33-194. Class ECN05 — Non-combination Non-reversing Starter

NEMA Size	Motor Voltage	Maximum hp Rating ①	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset	Component Starter (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	**ECN05A1AAA**	**ECN05A2AAA**	**ECN05A4AAA**	**ECN05A8AAA**	**AN16AN0AC**
	200	1-1/2	208	**ECN05A1EAA**	**ECN05A2EAA**	**ECN05A4EAA**	**ECN05A8EAA**	**AN16AN0EC**
	230	1-1/2	240	**ECN05A1BAA**	**ECN05A2BAA**	**ECN05A4BAA**	**ECN05A8BAA**	**AN16AN0BC**
	460	2	480	**ECN05A1CAA**	**ECN05A2CAA**	**ECN05A4CAA**	**ECN05A8CAA**	**AN16AN0CC**
	575	2	600	**ECN05A1DAA**	**ECN05A2DAA**	**ECN05A4DAA**	**ECN05A8DAA**	**AN16AN0DC**
0	—	—	120	**ECN0501AAA**	**ECN0502AAA**	**ECN0504AAA**	**ECN0508AAA**	**AN16BN0AC**
	200	3	208	**ECN0501EAA**	**ECN0502EAA**	**ECN0504EAA**	**ECN0508EAA**	**AN16BN0EC**
	230	3	240	**ECN0501BAA**	**ECN0502BAA**	**ECN0504BAA**	**ECN0508BAA**	**AN16BN0BC**
	460	5	480	**ECN0501CAA**	**ECN0502CAA**	**ECN0504CAA**	**ECN0508CAA**	**AN16BN0CC**
	575	5	600	**ECN0501DAA**	**ECN0502DAA**	**ECN0504DAA**	**ECN0508DAA**	**AN16BN0DC**
1	—	—	120	**ECN0511AAA**	**ECN0512AAA**	**ECN0514AAA**	**ECN0518AAA**	**AN16DN0AB**
	200	7-1/2	208	**ECN0511EAA**	**ECN0512EAA**	**ECN0514EAA**	**ECN0518EAA**	**AN16DN0EB**
	230	7-1/2	240	**ECN0511BAA**	**ECN0512BAA**	**ECN0514BAA**	**ECN0518BAA**	**AN16DN0BB**
	460	10	480	**ECN0511CAA**	**ECN0512CAA**	**ECN0514CAA**	**ECN0518CAA**	**AN16DN0CB**
	575	10	600	**ECN0511DAA**	**ECN0512DAA**	**ECN0514DAA**	**ECN0518DAA**	**AN16DN0DB**
2	—	—	120	**ECN0521AAA**	**ECN0522AAA**	**ECN0524AAA**	**ECN0528AAA**	**AN16GN0AB**
	200	10	208	**ECN0521EAA**	**ECN0522EAA**	**ECN0524EAA**	**ECN0528EAA**	**AN16GN0EB**
	230	15	240	**ECN0521BAA**	**ECN0522BAA**	**ECN0524BAA**	**ECN0528BAA**	**AN16GN0BB**
	460	25	480	**ECN0521CAA**	**ECN0522CAA**	**ECN0524CAA**	**ECN0528CAA**	**AN16GN0CB**
	575	25	600	**ECN0521DAA**	**ECN0522DAA**	**ECN0524DAA**	**ECN0528DAA**	**AN16GN0DB**
3	—	—	120	**ECN0531AAA**	**ECN0532AAA**	**ECN0534AAA**	**ECN0538AAA**	**AN16KN0A**
	200	25	208	**ECN0531EAA**	**ECN0532EAA**	**ECN0534EAA**	**ECN0538EAA**	**AN16KN0E**
	230	30	240	**ECN0531BAA**	**ECN0532BAA**	**ECN0534BAA**	**ECN0538BAA**	**AN16KN0B**
	460	50	480	**ECN0531CAA**	**ECN0532CAA**	**ECN0534CAA**	**ECN0538CAA**	**AN16KN0C**
	575	50	600	**ECN0531DAA**	**ECN0532DAA**	**ECN0534DAA**	**ECN0538DAA**	**AN16KN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0504AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Table 33-194. Class ECN05 — Non-combination Non-reversing Starter (Continued)

NEMA Size	Motor Voltage	Maximum hp Rating ①	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset	Component Starter (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	—	—	120	**ECN0541AAA**	**ECN0542AAA**	**ECN0544AAA**	**ECN0548AAA**	**AN16NN0A**
	200	40	208	**ECN0541EAA**	**ECN0542EAA**	**ECN0544EAA**	**ECN0548EAA**	**AN16NN0E**
	230	50	240	**ECN0541BAA**	**ECN0542BAA**	**ECN0544BAA**	**ECN0548BAA**	**AN16NN0B**
	460	100	480	**ECN0541CAA**	**ECN0542CAA**	**ECN0544CAA**	**ECN0548CAA**	**AN16NN0C**
	575	100	600	**ECN0541DAA**	**ECN0542DAA**	**ECN0544DAA**	**ECN0548DAA**	**AN16NN0D**
5	—	—	120	**ECN0551AAA**	**ECN0552AAA**	**ECN0554AAA**	**ECN0558AAA**	**AN16SN0AB**
	200	75	208	**ECN0551EAA**	**ECN0552EAA**	**ECN0554EAA**	**ECN0558EAA**	**AN16SN0EB**
	230	100	240	**ECN0551BAA**	**ECN0552BAA**	**ECN0554BAA**	**ECN0558BAA**	**AN16SN0BB**
	460	200	480	**ECN0551CAA**	**ECN0552CAA**	**ECN0554CAA**	**ECN0558CAA**	**AN16SN0CB**
	575	200	600	**ECN0551DAA**	**ECN0552DAA**	**ECN0554DAA**	**ECN0558DAA**	**AN16SN0DB**
6	—	—	120	**ECN0561AAA**	**ECN0562AAA**	**ECN0564AAA**	**ECN0568AAA**	**AN16TN0AB**
	200	150	208	**ECN0561EAA**	**ECN0562EAA**	**ECN0564EAA**	**ECN0568EAA**	**AN16TN0EB**
	230	200	240	**ECN0561BAA**	**ECN0562BAA**	**ECN0564BAA**	**ECN0568BAA**	**AN16TN0BB**
	460	400	480	**ECN0561CAA**	**ECN0562CAA**	**ECN0564CAA**	**ECN0568CAA**	**AN16TN0CB**
	575	400	600	**ECN0561DAA**	**ECN0562DAA**	**ECN0564DAA**	**ECN0568DAA**	**AN16TN0DB**
7	—	—	120	**ECN0571AAA**	**ECN0572AAA**	**ECN0573AAA** ②	**ECN0578AAA**	**AN16UN0AB**
	230	300	240	**ECN0571BAA**	**ECN0572BAA**	**ECN0573BAA** ②	**ECN0578BAA**	**AN16UN0BB**
	460	600	480	**ECN0571CAA**	**ECN0572CAA**	**ECN0573CAA** ②	**ECN0578CAA**	**AN16UN0CB**
	575	600	600	**ECN0571DAA**	**ECN0572DAA**	**ECN0573DAA** ②	**ECN0578DAA**	**AN16UN0DB**
8	—	—	120	**ECN0581AAA**	**ECN0582AAA**	**ECN0583AAA** ②	**ECN0588AAA**	**AN16VN0AB**
	230	450	240	**ECN0581BAA**	**ECN0582BAA**	**ECN0583BAA** ②	**ECN0588BAA**	**AN16VN0BB**
	460	900	480	**ECN0581CAA**	**ECN0582CAA**	**ECN0583CAA** ②	**ECN0588CAA**	**AN16VN0CB**
	575	900	600	**ECN0581DAA**	**ECN0582DAA**	**ECN0583DAA** ②	**ECN0588DAA**	**AN16VN0DB**
9	—	—	120	**ECN0591AAA**	**ECN0592AAA**	**ECN0593AAA** ②	**ECN0598AAA**	**AN16WN0A**
	230	800	240	**ECN0591BAA**	**ECN0592BAA**	**ECN0593BAA** ②	**ECN0598BAA**	**AN16WN0B**
	460	1600	480	**ECN0591CAA**	**ECN0592CAA**	**ECN0593CAA** ②	**ECN0598CAA**	**AN16WN0C**
	575	1600	600	**ECN0591DAA**	**ECN0592DAA**	**ECN0593DAA** ②	**ECN0598DAA**	**AN16WN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② Type 4 (Painted steel) Sizes 7 – 9.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0504AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Table 33-195. Class ECN06 — Non-combination Reversing Starter

NEMA Size	Motor Voltage	Maximum hp Rating ①	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset	Component Starter (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	ECN06A1AAA	ECN06A2AAA	ECN06A4AAA	ECN06A8AAA	AN56AN0AC
	200	1-1/2	208	ECN06A1EAA	ECN06A2EAA	ECN06A4EAA	ECN06A8EAA	AN56AN0EC
	230	1-1/2	240	ECN06A1BAA	ECN06A2BAA	ECN06A4BAA	ECN06A8BAA	AN56AN0BC
	460	2	480	ECN06A1CAA	ECN06A2CAA	ECN06A4CAA	ECN06A8CAA	AN56AN0CC
	575	2	600	ECN06A1DAA	ECN06A2DAA	ECN06A4DAA	ECN06A8DAA	AN56AN0DC
0	—	—	120	ECN0601AAA	ECN0602AAA	ECN0604AAA	ECN0608AAA	AN56BN0AC
	200	3	208	ECN0601EAA	ECN0602EAA	ECN0604EAA	ECN0608EAA	AN56BN0EC
	230	3	240	ECN0601BAA	ECN0602BAA	ECN0604BAA	ECN0608BAA	AN56BN0BC
	460	5	480	ECN0601CAA	ECN0602CAA	ECN0604CAA	ECN0608CAA	AN56BN0CC
	575	5	600	ECN0601DAA	ECN0602DAA	ECN0604DAA	ECN0608DAA	AN56BN0DC
1	—	—	120	ECN0611AAA	ECN0612AAA	ECN0614AAA	ECN0618AAA	AN56DN0AB
	200	7-1/2	208	ECN0611EAA	ECN0612EAA	ECN0614EAA	ECN0618EAA	AN56DN0EB
	230	7-1/2	240	ECN0611BAA	ECN0612BAA	ECN0614BAA	ECN0618BAA	AN56DN0BB
	460	10	480	ECN0611CAA	ECN0612CAA	ECN0614CAA	ECN0618CAA	AN56DN0CB
	575	10	600	ECN0611DAA	ECN0612DAA	ECN0614DAA	ECN0618DAA	AN56DN0DB
2	—	—	120	ECN0621AAA	ECN0622AAA	ECN0624AAA	ECN0628AAA	AN56GN0AB
	200	10	208	ECN0621EAA	ECN0622EAA	ECN0624EAA	ECN0628EAA	AN56GN0EB
	230	15	240	ECN0621BAA	ECN0622BAA	ECN0624BAA	ECN0628BAA	AN56GN0BB
	460	25	480	ECN0621CAA	ECN0622CAA	ECN0624CAA	ECN0628CAA	AN56GN0CB
	575	25	600	ECN0621DAA	ECN0622DAA	ECN0624DAA	ECN0628DAA	AN56GN0DB
3	—	—	120	ECN0631AAA	ECN0632AAA	ECN0634AAA	ECN0638AAA	AN56KN0A
	200	25	208	ECN0631EAA	ECN0632EAA	ECN0634EAA	ECN0638EAA	AN56KN0E
	230	30	240	ECN0631BAA	ECN0632BAA	ECN0634BAA	ECN0638BAA	AN56KN0B
	460	50	480	ECN0631CAA	ECN0632CAA	ECN0634CAA	ECN0638CAA	AN56KN0C
	575	50	600	ECN0631DAA	ECN0632DAA	ECN0634DAA	ECN0638DAA	AN56KN0D
4	—	—	120	ECN0641AAA	ECN0642AAA	ECN0644AAA	ECN0648AAA	AN56NN0A
	200	40	208	ECN0641EAA	ECN0642EAA	ECN0644EAA	ECN0648EAA	AN56NN0E
	230	50	240	ECN0641BAA	ECN0642BAA	ECN0644BAA	ECN0648BAA	AN56NN0B
	460	100	480	ECN0641CAA	ECN0642CAA	ECN0644CAA	ECN0648CAA	AN56NN0C
	575	100	600	ECN0641DAA	ECN0642DAA	ECN0644DAA	ECN0648DAA	AN56NN0D
5	—	—	120	ECN0651AAA	ECN0652AAA	ECN0654AAA	ECN0658AAA	AN56SN0AB
	200	75	208	ECN0651EAA	ECN0652EAA	ECN0654EAA	ECN0658EAA	AN56SN0EB
	230	100	240	ECN0651BAA	ECN0652BAA	ECN0654BAA	ECN0658BAA	AN56SN0BB
	460	200	480	ECN0651CAA	ECN0652CAA	ECN0654CAA	ECN0658CAA	AN56SN0CB
	575	200	600	ECN0651DAA	ECN0652DAA	ECN0654DAA	ECN0658DAA	AN56SN0DB
6	—	—	120	ECN0661AAA	ECN0662AAA	ECN0663AAA ②	ECN0668AAA	AN56TN0AB
	200	150	208	ECN0661EAA	ECN0662EAA	ECN0663EAA ②	ECN0668EAA	AN56TN0EB
	230	200	240	ECN0661BAA	ECN0662BAA	ECN0663BAA ②	ECN0668BAA	AN56TN0BB
	460	400	480	ECN0661CAA	ECN0662CAA	ECN0663CAA ②	ECN0668CAA	AN56TN0CB
	575	400	600	ECN0661DAA	ECN0662DAA	ECN0663DAA ②	ECN0668DAA	AN56TN0DB
7	—	—	120	ECN0671AAA	ECN0672AAA	ECN0673AAA ②	ECN0678AAA	AN56UN0AB
	230	300	240	ECN0671BAA	ECN0672BAA	ECN0673BAA ②	ECN0678BAA	AN56UN0BB
	460	600	480	ECN0671CAA	ECN0672CAA	ECN0673CAA ②	ECN0678CAA	AN56UN0CB
	575	600	600	ECN0671DAA	ECN0672DAA	ECN0673DAA ②	ECN0678DAA	AN56UN0DB
8	—	—	120	ECN0681AAA	ECN0682AAA	ECN0683AAA ②	ECN0688AAA	AN56VN0AB
	230	450	240	ECN0681BAA	ECN0682BAA	ECN0683BAA ②	ECN0688BAA	AN56VN0BB
	460	900	480	ECN0681CAA	ECN0682CAA	ECN0683CAA ②	ECN0688CAA	AN56VN0CB
	575	900	600	ECN0681DAA	ECN0682DAA	ECN0683DAA ②	ECN0688DAA	AN56VN0DB
9	—	—	120	ECN0691AAA	ECN0692AAA	ECN0693AAA ②	ECN0698AAA	AN56WN0A
	230	800	240	ECN0691BAA	ECN0692BAA	ECN0693BAA ②	ECN0698BAA	AN56WN0B
	460	1600	480	ECN0691CAA	ECN0692CAA	ECN0693CAA ②	ECN0698CAA	AN56WN0C
	575	1600	600	ECN0691DAA	ECN0692DAA	ECN0693DAA ②	ECN0698DAA	AN56WN0D

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② Type 4 (Painted steel) Sizes 6 – 9.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0604AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Table 33-196. Class ECN07 — Non-combination Non-reversing Starter with CPT

NEMA Size	Primary Voltage ②	Max. hp Rating ①	Secondary Voltage / Magnet Coil Voltage	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X Watertight & Dust-Tight Stainless Steel ④ Catalog Number	Type 12 Dust-Tight Industrial External Reset Catalog Number	Component Starter (Open) Catalog Number
00	208	1-1/2	120	ECN07A1EAA	ECN07A2EAA	ECN07A4EAA	ECN07A8EAA	AN16AN0EC
	240	1-1/2		ECN07A1BAA	ECN07A2BAA	ECN07A4BAA	ECN07A8BAA	AN16AN0BC
	480	2		ECN07A1CAA	ECN07A2CAA	ECN07A4CAA	ECN07A8CAA	AN16AN0CC
	600	3		ECN07A1DAA	ECN07A2DAA	ECN07A4DAA	ECN07A8DAA	AN16AN0DC
0	208	3	120	ECN0701EAA	ECN0702EAA	ECN0704EAA	ECN0708EAA	AN16BN0EC
	240	3		ECN0701BAA	ECN0702BAA	ECN0704BAA	ECN0708BAA	AN16BN0BC
	480	5		ECN0701CAA	ECN0702CAA	ECN0704CAA	ECN0708CAA	AN16BN0CC
	600	5		ECN0701DAA	ECN0702DAA	ECN0704DAA	ECN0708DAA	AN16BN0DC
1	208	7-1/2	120	ECN0711EAA	ECN0712EAA	ECN0714EAA	ECN0718EAA	AN16DN0EB
	240	7-1/2		ECN0711BAA	ECN0712BAA	ECN0714BAA	ECN0718BAA	AN16DN0BB
	480	10		ECN0711CAA	ECN0712CAA	ECN0714CAA	ECN0718CAA	AN16DN0CB
	600	10		ECN0711DAA	ECN0712DAA	ECN0714DAA	ECN0718DAA	AN16DN0DB
2	208	10	120	ECN0721EAA	ECN0722EAA	ECN0724EAA	ECN0728EAA	AN16GN0EB
	240	15		ECN0721BAA	ECN0722BAA	ECN0724BAA	ECN0728BAA	AN16GN0BB
	480	25		ECN0721CAA	ECN0722CAA	ECN0724CAA	ECN0728CAA	AN16GN0CB
	600	25		ECN0721DAA	ECN0722DAA	ECN0724DAA	ECN0728DAA	AN16GN0DB
3	208	25	120	ECN0731EAA	ECN0732EAA	ECN0734EAA	ECN0738EAA	AN16KN0E
	240	30		ECN0731BAA	ECN0732BAA	ECN0734BAA	ECN0738BAA	AN16KN0B
	480	50		ECN0731CAA	ECN0732CAA	ECN0734CAA	ECN0738CAA	AN16KN0C
	600	50		ECN0731DAA	ECN0732DAA	ECN0734DAA	ECN0738DAA	AN16KN0D
4	208	40	120	ECN0741EAA	ECN0742EAA	ECN0744EAA	ECN0748EAA	AN16NN0E
	240	50		ECN0741BAA	ECN0742BAA	ECN0744BAA	ECN0748BAA	AN16NN0B
	480	100		ECN0741CAA	ECN0742CAA	ECN0744CAA	ECN0748CAA	AN16NN0C
	600	100		ECN0741DAA	ECN0742DAA	ECN0744DAA	ECN0748DAA	AN16NN0D
5	208	75	120	ECN0751EAA	ECN0752EAA	ECN0754EAA	ECN0758EAA	AN16SN0EB
	240	100		ECN0751BAA	ECN0752BAA	ECN0754BAA	ECN0758BAA	AN16SN0BB
	480	200		ECN0751CAA	ECN0752CAA	ECN0754CAA	ECN0758CAA	AN16SN0CB
	600	200		ECN0751DAA	ECN0752DAA	ECN0754DAA	ECN0758DAA	AN16SN0DB
6	208	150	120	ECN0761EAA	ECN0762EAA	ECN0763EAA ③	ECN0768EAA	AN56TN0EB
	240	200		ECN0761BAA	ECN0762BAA	ECN0763BAA ③	ECN0768BAA	AN56TN0BB
	480	400		ECN0761CAA	ECN0762CAA	ECN0763CAA ③	ECN0768CAA	AN56TN0CB
	600	400		ECN0761DAA	ECN0762DAA	ECN0763DAA ③	ECN0768DAA	AN56TN0DB
7	240	300	120	ECN0771BAA	ECN0772BAA	ECN0773BAA ③	ECN0778BAA	AN16UN0BB
	480	600		ECN0771CAA	ECN0772CAA	ECN0773CAA ③	ECN0778CAA	AN16UN0CB
	600	600		ECN0771DAA	ECN0772DAA	ECN0773DAA ③	ECN0778DAA	AN16UN0DB
8	240	450	120	ECN0781BAA	ECN0782BAA	ECN0783BAA ③	ECN0788BAA	AN16VN0BB
	480	900		ECN0781CAA	ECN0782CAA	ECN0783CAA ③	ECN0788CAA	AN16VN0CB
	600	900		ECN0781DAA	ECN0782DAA	ECN0783DAA ③	ECN0788DAA	AN16VN0DB
9	240	800	120	ECN0791BAA	ECN0792BAA	ECN0793BAA ③	ECN0798BAA	AN16WN0B
	480	1600		ECN0791CAA	ECN0792CAA	ECN0793CAA ③	ECN0798CAA	AN16WN0C
	600	1600		ECN0791DAA	ECN0792DAA	ECN0793DAA ③	ECN0798DAA	AN16WN0D

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

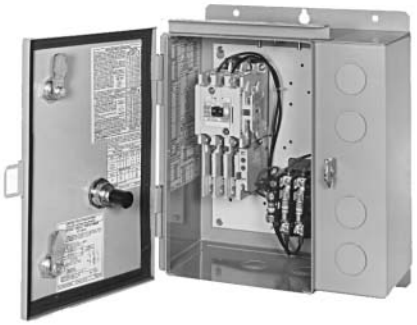
① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6
Horsepower	1-1/2	5	10	25	50	75	150	300

② Other control power transformer primary and/or secondary voltages, see **Page 33-118**.

③ Type 4 (Painted steel) Sizes 6 – 9.

④ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0704EAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.



ECN0712CAA

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Table 33-197. Class ECN08 — Non-combination Single Phase Non-reversing Starter

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ① Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset	Component Starter (Open)
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	115 230	1/3 1	120 240	**ECN08A1AAA** **ECN08A1BAA**	(Select Contactor from Size 0 Listing)			**AN16AN0AC** **AN16AN0BC**
0	115 230	1 2	120 240	**ECN0801AAA** **ECN0801BAA**	**ECN0802AAA** **ECN0802BAA**	**ECN0804AAA** **ECN0804BAA**	**ECN0808AAA** **ECN0808BAA**	**AN16BN0AC** **AN16BN0BC**
1	115 230	2 3	120 240	**ECN0811AAA** **ECN0811BAA**	**ECN0812AAA** **ECN0812BAA**	**ECN0814AAA** **ECN0814BAA**	**ECN0818AAA** **ECN0818BAA**	**AN16DN0AB** **AN16DN0BB**
1P	115 230	3 5	120 240	**ECN08C1AAA** **ECN08C1BAA**	**ECN08C2AAA** **ECN08C2BAA**	**ECN08C4AAA** **ECN08C4BAA**	**ECN08C8AAA** **ECN08C8BAA**	**AN16PN0A** **AN16PN0B**
2	115 230	3 7-1/2	120 240	**ECN0821AAA** **ECN0821BAA**	**ECN0822AAA** **ECN0822BAA**	**ECN0824AAA** **ECN0824BAA**	**ECN0828AAA** **ECN0828BAA**	**AN16GN0AB** **AN16GN0BB**
3	115 230	7-1/2 15	120 240	**ECN0831AAA** **ECN0831BAA**	**ECN0832AAA** **ECN0832BAA**	**ECN0834AAA** **ECN0834BAA**	**ECN0838AAA** **ECN0838BAA**	**AN16KN0A** **AN16KN0B**
Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.								

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN0804AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

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Features

- 3-Phase Magnetic
- 3-Pole Non-reversing or Reversing
- Standard Interchangeable Heater OLR
- Optional Electronic Overload
- 600V Maximum
- 100,000 RMS Short Circuit Rating with Fuses

Product Selection

Table 33-198. Class ECN16 — Combination Non-reversing Starter — Fusible Disconnect

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ① Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ②③	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	30A	**ECN16A1AAB**	**ECN16A2AAB**	**ECN16A4AAB**	**ECN16A8AAB**	**AN16AN0AC**
	200	1-1/2	208		**ECN16A1EAB**	**ECN16A2EAB**	**ECN16A4EAB**	**ECN16A8EAB**	**AN16AN0EC**
	230	1-1/2	240		**ECN16A1BAB**	**ECN16A2BAB**	**ECN16A4BAB**	**ECN16A8BAB**	**AN16AN0BC**
	460	2	480		**ECN16A1CAC**	**ECN16A2CAC**	**ECN16A4CAC**	**ECN16A8CAC**	**AN16AN0CC**
	575	2	600		**ECN16A1DAC**	**ECN16A2DAC**	**ECN16A4DAC**	**ECN16A8DAC**	**AN16AN0DC**
0	—	—	120	30A	**ECN1601AAB**	**ECN1602AAB**	**ECN1604AAB**	**ECN1608AAB**	**AN16BN0AC**
	200	3	208		**ECN1601EAB**	**ECN1602EAB**	**ECN1604EAB**	**ECN1608EAB**	**AN16BN0EC**
	230	3	240		**ECN1601BAB**	**ECN1602BAB**	**ECN1604BAB**	**ECN1608BAB**	**AN16BN0BC**
	460	5	480		**ECN1601CAC**	**ECN1602CAC**	**ECN1604CAC**	**ECN1608CAC**	**AN16BN0CC**
	575	5	600		**ECN1601DAC**	**ECN1602DAC**	**ECN1604DAC**	**ECN1608DAC**	**AN16BN0DC**
1	—	—	120	30A	**ECN1611AAB**	**ECN1612AAB**	**ECN1614AAB**	**ECN1618AAB**	**AN16DN0AB**
	200	7-1/2	208		**ECN1611EAB**	**ECN1612EAB**	**ECN1614EAB**	**ECN1618EAB**	**AN16DN0EB**
	230	7-1/2	240		**ECN1611BAB**	**ECN1612BAB**	**ECN1614BAB**	**ECN1618BAB**	**AN16DN0BB**
	460	10	480		**ECN1611CAC**	**ECN1612CAC**	**ECN1614CAC**	**ECN1618CAC**	**AN16DN0CB**
	575	10	600		**ECN1611DAC**	**ECN1612DAC**	**ECN1614DAC**	**ECN1618DAC**	**AN16DN0DB**
2	—	—	120	60A	**ECN1621AAD**	**ECN1622AAD**	**ECN1624AAD**	**ECN1628AAD**	**AN16GN0AB**
	200	10	208		**ECN1621EAD**	**ECN1622EAD**	**ECN1624EAD**	**ECN1628EAD**	**AN16GN0EB**
	230	15	240		**ECN1621BAD**	**ECN1622BAD**	**ECN1624BAD**	**ECN1628BAD**	**AN16GN0BB**
	460	25	480		**ECN1621CAE**	**ECN1622CAE**	**ECN1624CAE**	**ECN1628CAE**	**AN16GN0CB**
	575	25	600		**ECN1621DAE**	**ECN1622DAE**	**ECN1624DAE**	**ECN1628DAE**	**AN16GN0DB**
3	—	—	120	100A	**ECN1631AAF**	**ECN1632AAF**	**ECN1634AAF**	**ECN1638AAF**	**AN16KN0A**
	200	25	208		**ECN1631EAF**	**ECN1632EAF**	**ECN1634EAF**	**ECN1638EAF**	**AN16KN0E**
	230	30	240		**ECN1631BAF**	**ECN1632BAF**	**ECN1634BAF**	**ECN1638BAF**	**AN16KN0B**
	460	50	480		**ECN1631CAG**	**ECN1632CAG**	**ECN1634CAG**	**ECN1638CAG**	**AN16KN0C**
	575	50	600		**ECN1631DAG**	**ECN1632DAG**	**ECN1634DAG**	**ECN1638DAG**	**AN16KN0D**
4	—	—	120	200A	**ECN1641AAH**	**ECN1642AAH**	**ECN1644AAH**	**ECN1648AAH**	**AN16NN0A**
	200	40	208		**ECN1641EAH**	**ECN1642EAH**	**ECN1644EAH**	**ECN1648EAH**	**AN16NN0E**
	230	50	240		**ECN1641BAH**	**ECN1642BAH**	**ECN1644BAH**	**ECN1648BAH**	**AN16NN0B**
	460	100	480		**ECN1641CAJ**	**ECN1642CAJ**	**ECN1644CAJ**	**ECN1648CAJ**	**AN16NN0C**
	575	100	600		**ECN1641DAJ**	**ECN1642DAJ**	**ECN1644DAJ**	**ECN1648DAJ**	**AN16NN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1604EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Non-metallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

② All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

③ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-198. Class ECN16 — Combination Non-reversing Starter — Fusible Disconnect (Continued)

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ① Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ②③	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
5	—	—	120	400A	**ECN1651AAK**	**ECN1652AAK**	**ECN1654AAK**	**ECN1658AAK**	**AN16SN0AB**
	200	75	208		**ECN1651EAK**	**ECN1652EAK**	**ECN1654EAK**	**ECN1658EAK**	**AN16SN0EB**
	230	100	240		**ECN1651BAK**	**ECN1652BAK**	**ECN1654BAK**	**ECN1658BAK**	**AN16SN0BB**
	460	200	480		**ECN1651CAL**	**ECN1652CAL**	**ECN1654CAL**	**ECN1658CAL**	**AN16SN0CB**
	575	200	600		**ECN1651DAL**	**ECN1652DAL**	**ECN1654DAL**	**ECN1658DAL**	**AN16SN0DB**
6	—	—	120	600A	**ECN1661AAM**	**ECN1662AAM**	**ECN1663AAM** ⑥	**ECN1668AAM**	**AN16TN0AB**
	200	150	208		**ECN1661EAM**	**ECN1662EAM**	**ECN1663EAM** ⑥	**ECN1668EAM**	**AN16TN0EB**
	230	200	240		**ECN1661BAM**	**ECN1662BAM**	**ECN1663BAM** ⑥	**ECN1668BAM**	**AN16TN0BB**
	460	400	480		**ECN1661CAN**	**ECN1662CAN**	**ECN1663CAN** ⑥	**ECN1668CAN**	**AN16TN0CB**
	575	400	600		**ECN1661DAN**	**ECN1662DAN**	**ECN1663DAN** ⑥	**ECN1668DAN**	**AN16TN0DB**
7	—	—	120	⑤	**ECN1671AAU**	**ECN1672AAU**	**ECN1673AAU** ⑥	**ECN1678AAU**	**AN16UN0AB**
	230	300	240		**ECN1671BAU**	**ECN1672BAU**	**ECN1673BAU** ⑥	**ECN1678BAU**	**AN16UN0BB**
	460	600	480		**ECN1671CAU**	**ECN1672CAU**	**ECN1673CAU** ⑥	**ECN1678CAU**	**AN16UN0CB**
	575	600	600		**ECN1671DAU**	**ECN1672DAU**	**ECN1673DAU** ⑥	**ECN1678DAU**	**AN16UN0DB**
8	—	—	120	⑤	**ECN1681AAU**	**ECN1682AAU**	**ECN1683AAU** ⑥	**ECN1688AAU**	**AN16VN0AB**
	230	450	240		**ECN1681BAU**	**ECN1682BAU**	**ECN1683BAU** ⑥	**ECN1688BAU**	**AN16VN0BB**
	460	900	480		**ECN1681CAU**	**ECN1682CAU**	**ECN1683CAU** ⑥	**ECN1688CAU**	**AN16VN0CB**
	575	900	600		**ECN1681DAU**	**ECN1682DAU**	**ECN1683DAU** ⑥	**ECN1688DAU**	**AN16VN0DB**
9	—	—	120	⑤	**ECN1691AAU**	**ECN1692AAU**	**ECN1693AAU** ⑥	**ECN1698AAU**	**AN16WN0A**
	230	800	240		**ECN1691BAU**	**ECN1692BAU**	**ECN1693BAU** ⑥	**ECN1698BAU**	**AN16WN0B**
	460	1000 ④	480		**ECN1691CAU**	**ECN1692CAU**	**ECN1693CAU** ⑥	**ECN1698CAU**	**AN16WN0C**
	575	1000	600		**ECN1691DAU**	**ECN1692DAU**	**ECN1693DAU** ⑥	**ECN1698DAU**	**AN16WN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1604EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

② All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

③ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

④ For 1250 and 1600 hp ratings at 460V, consult Eaton.

⑤ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

⑥ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-199. Class ECN16 — Combination Non-reversing Starter — Non-fusible Disconnect ①

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage	Disconnect Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③ ④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	30A	ECN16A1AAA	ECN16A2AAA	ECN16A4AAA	ECN16A8AAA	AN16AN0AC
	200	1-1/2	208		ECN16A1EAA	ECN16A2EAA	ECN16A4EAA	ECN16A8EAA	AN16AN0EC
	230	1-1/2	240		ECN16A1BAA	ECN16A2BAA	ECN16A4BAA	ECN16A8BAA	AN16AN0BC
	460	2	480		ECN16A1CAA	ECN16A2CAA	ECN16A4CAA	ECN16A8CAA	AN16AN0CC
	575	2	600		ECN16A1DAA	ECN16A2DAA	ECN16A4DAA	ECN16A8DAA	AN16AN0DC
0	—	—	120	30A	ECN1601AAA	ECN1602AAA	ECN1604AAA	ECN1608AAA	AN16BN0AC
	200	3	208		ECN1601EAA	ECN1602EAA	ECN1604EAA	ECN1608EAA	AN16BN0EC
	230	3	240		ECN1601BAA	ECN1602BAA	ECN1604BAA	ECN1608BAA	AN16BN0BC
	460	5	480		ECN1601CAA	ECN1602CAA	ECN1604CAA	ECN1608CAA	AN16BN0CC
	575	5	600		ECN1601DAA	ECN1602DAA	ECN1604DAA	ECN1608DAA	AN16BN0DC
1	—	—	120	30A	ECN1611AAA	ECN1612AAA	ECN1614AAA	ECN1618AAA	AN16DN0AB
	200	7-1/2	208		ECN1611EAA	ECN1612EAA	ECN1614EAA	ECN1618EAA	AN16DN0EB
	230	7-1/2	240		ECN1611BAA	ECN1612BAA	ECN1614BAA	ECN1618BAA	AN16DN0BB
	460	10	480		ECN1611CAA	ECN1612CAA	ECN1614CAA	ECN1618CAA	AN16DN0CB
	575	10	600		ECN1611DAA	ECN1612DAA	ECN1614DAA	ECN1618DAA	AN16DN0DB
2	—	—	120	60A	ECN1621AAA	ECN1622AAA	ECN1624AAA	ECN1628AAA	AN16GN0AB
	200	10	208		ECN1621EAA	ECN1622EAA	ECN1624EAA	ECN1628EAA	AN16GN0EB
	230	15	240		ECN1621BAA	ECN1622BAA	ECN1624BAA	ECN1628BAA	AN16GN0BB
	460	25	480		ECN1621CAA	ECN1622CAA	ECN1624CAA	ECN1628CAA	AN16GN0CB
	575	25	600		ECN1621DAA	ECN1622DAA	ECN1624DAA	ECN1628DAA	AN16GN0DB
3	—	—	120	100A	ECN1631AAA	ECN1632AAA	ECN1634AAA	ECN1638AAA	AN16KN0A
	200	25	208		ECN1631EAA	ECN1632EAA	ECN1634EAA	ECN1638EAA	AN16KN0E
	230	30	240		ECN1631BAA	ECN1632BAA	ECN1634BAA	ECN1638BAA	AN16KN0B
	460	50	480		ECN1631CAA	ECN1632CAA	ECN1634CAA	ECN1638CAA	AN16KN0C
	575	50	600		ECN1631DAA	ECN1632DAA	ECN1634DAA	ECN1638DAA	AN16KN0D
4	—	—	120	200A	ECN1641AAA	ECN1642AAA	ECN1644AAA	ECN1648AAA	AN16NN0A
	200	40	208		ECN1641EAA	ECN1642EAA	ECN1644EAA	ECN1648EAA	AN16NN0E
	230	50	240		ECN1641BAA	ECN1642BAA	ECN1644BAA	ECN1648BAA	AN16NN0B
	460	100	480		ECN1641CAA	ECN1642CAA	ECN1644CAA	ECN1648CAA	AN16NN0C
	575	100	600		ECN1641DAA	ECN1642DAA	ECN1644DAA	ECN1648DAA	AN16NN0D
5	—	—	120	400A	ECN1651AAA	ECN1652AAA	ECN1654AAA	ECN1658AAA	AN16SN0AB
	200	75	208		ECN1651EAA	ECN1652EAA	ECN1654EAA	ECN1658EAA	AN16SN0EB
	230	100	240		ECN1651BAA	ECN1652BAA	ECN1654BAA	ECN1658BAA	AN16SN0BB
	460	200	480		ECN1651CAA	ECN1652CAA	ECN1654CAA	ECN1658CAA	AN16SN0CB
	575	200	600		ECN1651DAA	ECN1652DAA	ECN1654DAA	ECN1658DAA	AN16SN0DB
6	—	—	120	600A	ECN1661AAA	ECN1662AAA	ECN1663AAA ⑦	ECN1668AAA	AN16TN0AB
	200	150	208		ECN1661EAA	ECN1662EAA	ECN1663EAA ⑦	ECN1668EAA	AN16TN0EB
	230	200	240		ECN1661BAA	ECN1662BAA	ECN1663BAA ⑦	ECN1668BAA	AN16TN0BB
	460	400	480		ECN1661CAA	ECN1662CAA	ECN1663CAA ⑦	ECN1668CAA	AN16TN0CB
	575	400	600		ECN1661DAA	ECN1662DAA	ECN1663DAA ⑦	ECN1668DAA	AN16TN0DB
7	—	—	120	⑥	ECN1671AAA	ECN1672AAA	ECN1673AAA ⑦	ECN1678AAA	AN16UN0AB
	230	300	240		ECN1671BAA	ECN1672BAA	ECN1673BAA ⑦	ECN1678BAA	AN16UN0BB
	460	600	480		ECN1671CAA	ECN1672CAA	ECN1673CAA ⑦	ECN1678CAA	AN16UN0CB
	575	600	600		ECN1671DAA	ECN1672DAA	ECN1673DAA ⑦	ECN1678DAA	AN16UN0DB
8	—	—	120	⑥	ECN1681AAA	ECN1682AAA	ECN1683AAA ⑦	ECN1688AAA	AN16VN0AB
	230	450	240		ECN1681BAA	ECN1682BAA	ECN1683BAA ⑦	ECN1688BAA	AN16VN0BB
	460	900	480		ECN1681CAA	ECN1682CAA	ECN1683CAA ⑦	ECN1688CAA	AN16VN0CB
	575	900	600		ECN1681DAA	ECN1682DAA	ECN1683DAA ⑦	ECN1688DAA	AN16VN0DB
9	—	—	120	⑥	ECN1691AAA	ECN1692AAA	ECN1693AAA ⑦	ECN1698AAA	AN16WN0A
	230	800	240		ECN1691BAA	ECN1692BAA	ECN1693BAA ⑦	ECN1698BAA	AN16WN0B
	460	1000 ⑤	480		ECN1691CAA	ECN1692CAA	ECN1693CAA ⑦	ECN1698CAA	AN16WN0C
	575	1000	600		ECN1691DAA	ECN1692DAA	ECN1693DAA ⑦	ECN1698DAA	AN16WN0D

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Field installed Fuse Clips available, see **PG03300001E**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1604AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑤ For 1250 and 1600 hp ratings at 460V, consult Eaton.

⑥ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

⑦ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-200. Class ECN16 — Special Enclosure Combination Non-reversing Starter — Fusible/Non-fusible Disconnect

NEMA Size	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage	Fuse Clip Amperes ①	Type 1 General Purpose	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial ③		Component Starter (Open)
					External Reset	External Reset	External Reset	Internal Reset	
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
Horizontal Enclosure — Fusible									
1	—	—	120	30A	ECN1611AAB-E13	—	ECN1618AAB-E13	ECN1618AAB-E13R5	AN16DN0AB
	200	7-1/2	208		ECN1611EAB-E13	—	ECN1618EAB-E13	ECN1618EAB-E13R5	AN16DN0EB
	230	7-1/2	240		ECN1611BAB-E13	—	ECN1618BAB-E13	ECN1618BAB-E13R5	AN16DN0BB
	460	10	480		ECN1611CAC-E13	—	ECN1618CAC-E13	ECN1618CAC-E13R5	AN16DN0CB
	575	10	600		ECN1611DAC-E13	—	ECN1618DAC-E13	ECN1618DAC-E13R5	AN16DN0DB
2	—	—	120	60A	ECN1621AAD-E13	—	ECN1628AAD-E13	ECN1628AAD-E13R5	AN16GN0AB
	200	10	208		ECN1621EAD-E13	—	ECN1628EAD-E13	ECN1628EAD-E13R5	AN16GN0EB
	230	15	240		ECN1621BAD-E13	—	ECN1628BAD-E13	ECN1628BAD-E13R5	AN16GN0BB
	460	25	480		ECN1621CAE-E13	—	ECN1628CAE-E13	ECN1628CAE-E13R5	AN16GN0CB
	575	25	600		ECN1621DAE-E13	—	ECN1628DAE-E13	ECN1628DAE-E13R5	AN16GN0DB
Horizontal Enclosure — Non-fusible									
1	—	—	120	—	ECN1611AAA-E13	—	ECN1618AAA-E13	ECN1618AAA-E13R5	AN16DN0AB
	200	7-1/2	208		ECN1611EAA-E13	—	ECN1618EAA-E13	ECN1618EAA-E13R5	AN16DN0EB
	230	7-1/2	240		ECN1611BAA-E13	—	ECN1618BAA-E13	ECN1618BAA-E13R5	AN16DN0BB
	460	10	480		ECN1611CAA-E13	—	ECN1618CAA-E13	ECN1618CAA-E13R5	AN16DN0CB
	575	10	600		ECN1611DAA-E13	—	ECN1618DAA-E13	ECN1618DAA-E13R5	AN16DN0DB
2	—	—	120	—	ECN1621AAA-E13	—	ECN1628AAA-E13	ECN1628AAA-E13R5	AN16GN0AB
	200	10	208		ECN1621EAA-E13	—	ECN1628EAA-E13	ECN1628EAA-E13R5	AN16GN0EB
	230	15	240		ECN1621BAA-E13	—	ECN1628BAA-E13	ECN1628BAA-E13R5	AN16GN0BB
	460	25	480		ECN1621CAA-E13	—	ECN1628CAA-E13	ECN1628CAA-E13R5	AN16GN0CB
	575	25	600		ECN1621DAA-E13	—	ECN1628DAA-E13	ECN1628DAA-E13R5	AN16GN0DB
Oversize Enclosure — without Control Transformer — Fusible									
0	—	—	120	30A	ECN1601AAB-E3	ECN1604AAB-E3	ECN1608AAB-E3	ECN1608AAB-E3R5	AN16BN0AC
	200	3	208		ECN1601EAB-E3	ECN1604EAB-E3	ECN1608EAB-E3	ECN1608EAB-E3R5	AN16BN0EC
	230	3	240		ECN1601BAB-E3	ECN1604BAB-E3	ECN1608BAB-E3	ECN1608BAB-E3R5	AN16BN0BC
	460	5	480		ECN1601CAC-E3	ECN1604CAC-E3	ECN1608CAC-E3	ECN1608CAC-E3R5	AN16BN0CC
	575	5	600		ECN1601DAC-E3	ECN1604DAC-E3	ECN1608DAC-E3	ECN1608DAC-E3R5	AN16BN0DC
1	—	—	120	30A	ECN1611AAB-E3	ECN1614AAB-E3	ECN1618AAB-E3	ECN1618AAB-E3R5	AN16DN0AB
	200	7-1/2	208		ECN1611EAB-E3	ECN1614EAB-E3	ECN1618EAB-E3	ECN1618EAB-E3R5	AN16DN0EB
	230	7-1/2	240		ECN1611BAB-E3	ECN1614BAB-E3	ECN1618BAB-E3	ECN1618BAB-E3R5	AN16DN0BB
	460	10	480		ECN1611CAC-E3	ECN1614CAC-E3	ECN1618CAC-E3	ECN1618CAC-E3R5	AN16DN0CB
	575	10	600		ECN1611DAC-E3	ECN1614DAC-E3	ECN1618DAC-E3	ECN1618DAC-E3R5	AN16DN0DB
2	—	—	120	60A	ECN1621AAD-E3	ECN1624AAD-E3	ECN1628AAD-E3	ECN1628AAD-E3R5	AN16GN0AB
	200	10	208		ECN1621EAD-E3	ECN1624EAD-E3	ECN1628EAD-E3	ECN1628EAD-E3R5	AN16GN0EB
	230	15	240		ECN1621BAD-E3	ECN1624BAD-E3	ECN1628BAD-E3	ECN1628BAD-E3R5	AN16GN0BB
	460	25	480		ECN1621CAE-E3	ECN1624CAE-E3	ECN1628CAE-E3	ECN1628CAE-E3R5	AN16GN0CB
	575	25	600		ECN1621DAE-E3	ECN1624DAE-E3	ECN1628DAE-E3	ECN1628DAE-E3R5	AN16GN0DB
Oversize Enclosure — without Control Transformer — Non-fusible									
0	—	—	120	—	ECN1601AAA-E3	ECN1604AAA-E3	ECN1608AAA-E3	ECN1608AAA-E3R5	AN16BN0AC
	200	3	208		ECN1601EAA-E3	ECN1604EAA-E3	ECN1608EAA-E3	ECN1608EAA-E3R5	AN16BN0EC
	230	3	240		ECN1601BAA-E3	ECN1604BAA-E3	ECN1608BAA-E3	ECN1608BAA-E3R5	AN16BN0BC
	460	5	480		ECN1601CAA-E3	ECN1604CAA-E3	ECN1608CAA-E3	ECN1608CAA-E3R5	AN16BN0CC
	575	5	600		ECN1601DAA-E3	ECN1604DAA-E3	ECN1608DAA-E3	ECN1608DAA-E3R5	AN16BN0DC
1	—	—	120	—	ECN1611AAA-E3	ECN1614AAA-E3	ECN1618AAA-E3	ECN1618AAA-E3R5	AN16DN0AB
	200	7-1/2	208		ECN1611EAA-E3	ECN1614EAA-E3	ECN1618EAA-E3	ECN1618EAA-E3R5	AN16DN0EB
	230	7-1/2	240		ECN1611BAA-E3	ECN1614BAA-E3	ECN1618BAA-E3	ECN1618BAA-E3R5	AN16DN0BB
	460	10	480		ECN1611CAA-E3	ECN1614CAA-E3	ECN1618CAA-E3	ECN1618CAA-E3R5	AN16DN0CB
	575	10	600		ECN1611DAA-E3	ECN1614DAA-E3	ECN1618DAA-E3	ECN1618DAA-E3R5	AN16DN0DB
2	—	—	120	—	ECN1621AAA-E3	ECN1624AAA-E3	ECN1628AAA-E3	ECN1628AAA-E3R5	AN16GN0AB
	200	10	208		ECN1621EAA-E3	ECN1624EAA-E3	ECN1628EAA-E3	ECN1628EAA-E3R5	AN16GN0EB
	230	15	240		ECN1621BAA-E3	ECN1624BAA-E3	ECN1628BAA-E3	ECN1628BAA-E3R5	AN16GN0BB
	460	25	480		ECN1621CAA-E3	ECN1624CAA-E3	ECN1628CAA-E3	ECN1628CAA-E3R5	AN16GN0CB
	575	25	600		ECN1621DAA-E3	ECN1624DAA-E3	ECN1628DAA-E3	ECN1628DAA-E3R5	AN16GN0DB

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Fuse clips are for Class R fuses only. For H and J fuses see mods, **Page 33-44**.
② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1604EAB-E3. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.
③ To order Type 12 enclosures with safety door interlock add modification **E11**.

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Starters — Fusible and Non-fusible

Table 33-201. Class ECN17 — Combination Reversing Starter — Fusible Disconnect

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X ① Watertight & Dust-Tight Stainless Steel Catalog Number	Type 12 Dust-Tight Industrial External Reset ②③ Catalog Number	Component Starter (Open) Catalog Number
0	—	—	120	30A	ECN1701AAB	ECN1702AAB	ECN1704AAB	ECN1708AAB	AN56BN0AC
	200	3	208		ECN1701EAB	ECN1702EAB	ECN1704EAB	ECN1708EAB	AN56BN0EC
	230	3	240		ECN1701BAB	ECN1702BAB	ECN1704BAB	ECN1708BAB	AN56BN0BC
	460	5	480		ECN1701CAC	ECN1702CAC	ECN1704CAC	ECN1708CAC	AN56BN0CC
	575	5	600		ECN1701DAC	ECN1702DAC	ECN1704DAC	ECN1708DAC	AN56BN0DC
1	—	—	120	30A	ECN1711AAB	ECN1712AAB	ECN1714AAB	ECN1718AAB	AN56DN0AB
	200	7-1/2	208		ECN1711EAB	ECN1712EAB	ECN1714EAB	ECN1718EAB	AN56DN0EB
	230	7-1/2	240		ECN1711BAB	ECN1712BAB	ECN1714BAB	ECN1718BAB	AN56DN0BB
	460	10	480		ECN1711CAC	ECN1712CAC	ECN1714CAC	ECN1718CAC	AN56DN0CB
	575	10	600		ECN1711DAC	ECN1712DAC	ECN1714DAC	ECN1718DAC	AN56DN0DB
2	—	—	120	60A	ECN1721AAD	ECN1722AAD	ECN1724AAD	ECN1728AAD	AN56GN0AB
	200	10	208		ECN1721EAD	ECN1722EAD	ECN1724EAD	ECN1728EAD	AN56GN0EB
	230	15	240		ECN1721BAD	ECN1722BAD	ECN1724BAD	ECN1728BAD	AN56GN0BB
	460	25	480		ECN1721CAE	ECN1722CAE	ECN1724CAE	ECN1728CAE	AN56GN0CB
	575	25	600		ECN1721DAE	ECN1722DAE	ECN1724DAE	ECN1728DAE	AN56GN0DB
3	—	—	120	100A	ECN1731AAF	ECN1732AAF	ECN1734AAF	ECN1738AAF	AN56KN0A
	200	25	208		ECN1731EAF	ECN1732EAF	ECN1734EAF	ECN1738EAF	AN56KN0E
	230	30	240		ECN1731BAF	ECN1732BAF	ECN1734BAF	ECN1738BAF	AN56KN0B
	460	50	480		ECN1731CAG	ECN1732CAG	ECN1734CAG	ECN1738CAG	AN56KN0C
	575	50	600		ECN1731DAG	ECN1732DAG	ECN1734DAG	ECN1738DAG	AN56KN0D
4	—	—	120	200A	ECN1741AAH	ECN1742AAH	ECN1744AAH	ECN1748AAH	AN56NN0A
	200	40	208		ECN1741EAH	ECN1742EAH	ECN1744EAH	ECN1748EAH	AN56NN0E
	230	50	240		ECN1741BAH	ECN1742BAH	ECN1744BAH	ECN1748BAH	AN56NN0B
	460	100	480		ECN1741CAJ	ECN1742CAJ	ECN1744CAJ	ECN1748CAJ	AN56NN0C
	575	100	600		ECN1741DAJ	ECN1742DAJ	ECN1744DAJ	ECN1748DAJ	AN56NN0D
5	—	—	120	400A	ECN1751AAK	ECN1752AAK	ECN1754AAK	ECN1758AAK	AN56SN0AB
	200	75	208		ECN1751EAK	ECN1752EAK	ECN1754EAK	ECN1758EAK	AN56SN0EB
	230	100	240		ECN1751BAK	ECN1752BAK	ECN1754BAK	ECN1758BAK	AN56SN0BB
	460	200	480		ECN1751CAL	ECN1752CAL	ECN1754CAL	ECN1758CAL	AN56SN0CB
	575	200	600		ECN1751DAL	ECN1752DAL	ECN1754DAL	ECN1758DAL	AN56SN0DB
6	—	—	120	600A	ECN1761AAM	ECN1762AAM	ECN1763AAM ⑥	ECN1768AAM	AN56TN0AB
	200	150	208		ECN1761EAM	ECN1762EAM	ECN1763EAM ⑥	ECN1768EAM	AN56TN0EB
	230	200	240		ECN1761BAM	ECN1762BAM	ECN1763BAM ⑥	ECN1768BAM	AN56TN0BB
	460	400	480		ECN1761CAN	ECN1762CAN	ECN1763CAN ⑥	ECN1768CAN	AN56TN0CB
	575	400	600		ECN1761DAN	ECN1762DAN	ECN1763DAN ⑥	ECN1768DAN	AN56TN0DB
7	—	—	120	⑤	ECN1771AAU	ECN1772AAU	ECN1773AAU ⑥	ECN1778AAU	AN56UN0AB
	230	300	240		ECN1771BAU	ECN1772BAU	ECN1773BAU ⑥	ECN1778BAU	AN56UN0BB
	460	600	480		ECN1771CAU	ECN1772CAU	ECN1773CAU ⑥	ECN1778CAU	AN56UN0CB
	575	600	600		ECN1771DAU	ECN1772DAU	ECN1773DAU ⑥	ECN1778DAU	AN56UN0DB
8	—	—	120	⑤	ECN1781AAU	ECN1782AAU	ECN1783AAU ⑥	ECN1788AAU	AN56VN0AB
	230	450	240		ECN1781BAU	ECN1782BAU	ECN1783BAU ⑥	ECN1788BAU	AN56VN0BB
	460	900	480		ECN1781CAU	ECN1782CAU	ECN1783CAU ⑥	ECN1788CAU	AN56VN0CB
	575	900	600		ECN1781DAU	ECN1782DAU	ECN1783DAU ⑥	ECN1788DAU	AN56VN0DB
9	—	—	120	⑤	ECN1791AAU	ECN1792AAU	ECN1793AAU ⑥	ECN1798AAU	AN56WN0A
	230	800	240		ECN1791BAU	ECN1792BAU	ECN1793BAU ⑥	ECN1798BAU	AN56WN0B
	460	1000 ④	480		ECN1791CAU	ECN1792CAU	ECN1793CAU ⑥	ECN1798CAU	AN56WN0C
	575	1000	600		ECN1791DAU	ECN1792DAU	ECN1793DAU ⑥	ECN1798DAU	AN56WN0D

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1704EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

② All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

③ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

④ For 1250 and 1600 hp ratings at 460V, consult Eaton.

⑤ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

⑥ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-202. Class ECN17 — Combination Reversing Starter — Non-fusible Disconnect

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage	Disconnect Amps	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X ① Watertight & Dust-Tight Stainless Steel Catalog Number	Type 12 Dust-Tight Industrial External Reset ②③ Catalog Number	Component Starter (Open) Catalog Number
0	—	—	120	30A	ECN1701AAA	ECN1702AAA	ECN1704AAA	ECN1708AAA	AN56BN0AC
	200	3	208		ECN1701EAA	ECN1702EAA	ECN1704EAA	ECN1708EAA	AN56BN0EC
	230	3	240		ECN1701BAA	ECN1702BAA	ECN1704BAA	ECN1708BAA	AN56BN0BC
	460	5	480		ECN1701CAA	ECN1702CAA	ECN1704CAA	ECN1708CAA	AN56BN0CC
	575	5	600		ECN1701DAA	ECN1702DAA	ECN1704DAA	ECN1708DAA	AN56BN0DC
1	—	—	120	30A	ECN1711AAA	ECN1712AAA	ECN1714AAA	ECN1718AAA	AN56DN0AB
	200	7-1/2	208		ECN1711EAA	ECN1712EAA	ECN1714EAA	ECN1718EAA	AN56DN0EB
	230	7-1/2	240		ECN1711BAA	ECN1712BAA	ECN1714BAA	ECN1718BAA	AN56DN0BB
	460	10	480		ECN1711CAA	ECN1712CAA	ECN1714CAA	ECN1718CAA	AN56DN0CB
	575	10	600		ECN1711DAA	ECN1712DAA	ECN1714DAA	ECN1718DAA	AN56DN0DB
2	—	—	120	60A	ECN1721AAA	ECN1722AAA	ECN1724AAA	ECN1728AAA	AN56GN0AB
	200	10	208		ECN1721EAA	ECN1722EAA	ECN1724EAA	ECN1728EAA	AN56GN0EB
	230	15	240		ECN1721BAA	ECN1722BAA	ECN1724BAA	ECN1728BAA	AN56GN0BB
	460	25	480		ECN1721CAA	ECN1722CAA	ECN1724CAA	ECN1728CAA	AN56GN0CB
	575	25	600		ECN1721DAA	ECN1722DAA	ECN1724DAA	ECN1728DAA	AN56GN0DB
3	—	—	120	100A	ECN1731AAA	ECN1732AAA	ECN1734AAA	ECN1738AAA	AN56KN0A
	200	25	208		ECN1731EAA	ECN1732EAA	ECN1734EAA	ECN1738EAA	AN56KN0E
	230	30	240		ECN1731BAA	ECN1732BAA	ECN1734BAA	ECN1738BAA	AN56KN0B
	460	50	480		ECN1731CAA	ECN1732CAA	ECN1734CAA	ECN1738CAA	AN56KN0C
	575	50	600		ECN1731DAA	ECN1732DAA	ECN1734DAA	ECN1738DAA	AN56KN0D
4	—	—	120	200A	ECN1741AAA	ECN1742AAA	ECN1744AAA	ECN1748AAA	AN56NN0A
	200	40	208		ECN1741EAA	ECN1742EAA	ECN1744EAA	ECN1748EAA	AN56NN0E
	230	50	240		ECN1741BAA	ECN1742BAA	ECN1744BAA	ECN1748BAA	AN56NN0B
	460	100	480		ECN1741CAA	ECN1742CAA	ECN1744CAA	ECN1748CAA	AN56NN0C
	575	100	600		ECN1741DAA	ECN1742DAA	ECN1744DAA	ECN1748DAA	AN56NN0D
5	—	—	120	400A	ECN1751AAA	ECN1752AAA	ECN1754AAA	ECN1758AAA	AN56SN0AB
	200	75	208		ECN1751EAA	ECN1752EAA	ECN1754EAA	ECN1758EAA	AN56SN0EB
	230	100	240		ECN1751BAA	ECN1752BAA	ECN1754BAA	ECN1758BAA	AN56SN0BB
	460	200	480		ECN1751CAA	ECN1752CAA	ECN1754CAA	ECN1758CAA	AN56SN0CB
	575	200	600		ECN1751DAA	ECN1752DAA	ECN1754DAA	ECN1758DAA	AN56SN0DB
6	—	—	120	600A	ECN1761AAA	ECN1762AAA	ECN1763AAA ⑥	ECN1768AAA	AN56TN0AB
	200	150	208		ECN1761EAA	ECN1762EAA	ECN1763EAA ⑥	ECN1768EAA	AN56TN0EB
	230	200	240		ECN1761BAA	ECN1762BAA	ECN1763BAA ⑥	ECN1768BAA	AN56TN0BB
	460	400	480		ECN1761CAA	ECN1762CAA	ECN1763CAA ⑥	ECN1768CAA	AN56TN0CB
	575	400	600		ECN1761DAA	ECN1762DAA	ECN1763DAA ⑥	ECN1768DAA	AN56TN0DB
7	—	—	120	⑤	ECN1771AAA	ECN1772AAA	ECN1773AAA ⑥	ECN1778AAA	AN56UN0AB
	230	300	240		ECN1771BAA	ECN1772BAA	ECN1773BAA ⑥	ECN1778BAA	AN56UN0BB
	460	600	480		ECN1771CAA	ECN1772CAA	ECN1773CAA ⑥	ECN1778CAA	AN56UN0CB
	575	600	600		ECN1771DAA	ECN1772DAA	ECN1773DAA ⑥	ECN1778DAA	AN56UN0DB
8	—	—	120	⑤	ECN1781AAA	ECN1782AAA	ECN1783AAA ⑥	ECN1788AAA	AN56VN0AB
	230	450	240		ECN1781BAA	ECN1782BAA	ECN1783BAA ⑥	ECN1788BAA	AN56VN0BB
	460	900	480		ECN1781CAA	ECN1782CAA	ECN1783CAA ⑥	ECN1788CAA	AN56VN0CB
	575	900	600		ECN1781DAA	ECN1782DAA	ECN1783DAA ⑥	ECN1788DAA	AN56VN0DB
9	—	—	120	⑤	ECN1791AAA	ECN1792AAA	ECN1793AAA ⑥	ECN1798AAA	AN56WN0A
	230	800	240		ECN1791BAA	ECN1792BAA	ECN1793BAA ⑥	ECN1798BAA	AN56WN0B
	460	1000 ④	480		ECN1791CAA	ECN1792CAA	ECN1793CAA ⑥	ECN1798CAA	AN56WN0C
	575	1000	600		ECN1791DAA	ECN1792DAA	ECN1793DAA ⑥	ECN1798DAA	AN56WN0D

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN170**4**AAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.
② All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.
③ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.
④ For 1250 and 1600 hp ratings at 460V, consult Eaton.
⑤ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.
⑥ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-203. Class ECN18 — Combination Reversing Starter — Fusible Disconnect with CPT ①

NEMA Size	Primary Voltage ②	Max. hp Rating	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ③	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	208 240 480 600	1-1/2 1-1/2 2 2	120	30A ⑦	**ECN18A1EAB** **ECN18A1BAB** **ECN18A1CAC** **ECN18A1DAC**	**ECN18A2EAB** **ECN18A2BAB** **ECN18A2CAC** **ECN18A2DAC**	**ECN18A4EAB** **ECN18A4BAB** **ECN18A4CAC** **ECN18A4DAC**	**ECN18A8EAB** **ECN18A8BAB** **ECN18A8CAC** **ECN18A8DAC**	**AN16AN0EC** **AN16AN0BC** **AN16AN0CC** **AN16AN0DC**
0	208 240 480 600	3 3 5 5	120	30A ⑦	**ECN1801EAB** **ECN1801BAB** **ECN1801CAC** **ECN1801DAC**	**ECN1802EAB** **ECN1802BAB** **ECN1802CAC** **ECN1802DAC**	**ECN1804EAB** **ECN1804BAB** **ECN1804CAC** **ECN1804DAC**	**ECN1808EAB** **ECN1808BAB** **ECN1808CAC** **ECN1808DAC**	**AN16BN0EC** **AN16BN0BC** **AN16BN0CC** **AN16BN0DC**
1	208 240 480 600	7-1/2 7-1/2 10 10	120	30A ⑦	**ECN1811EAB** **ECN1811BAB** **ECN1811CAC** **ECN1811DAC**	**ECN1812EAB** **ECN1812BAB** **ECN1812CAC** **ECN1812DAC**	**ECN1814EAB** **ECN1814BAB** **ECN1814CAC** **ECN1814DAC**	**ECN1818EAB** **ECN1818BAB** **ECN1818CAC** **ECN1818DAC**	**AN16DN0EB** **AN16DN0BB** **AN16DN0CB** **AN16DN0DB**
2	208 240 480 600	10 15 25 25	120	60A ⑦	**ECN1821EAD** **ECN1821BAD** **ECN1821CAE** **ECN1821DAE**	**ECN1822EAD** **ECN1822BAD** **ECN1822CAE** **ECN1822DAE**	**ECN1824EAD** **ECN1824BAD** **ECN1824CAE** **ECN1824DAE**	**ECN1828EAD** **ECN1828BAD** **ECN1828CAE** **ECN1828DAE**	**AN16GN0EB** **AN16GN0BB** **AN16GN0CB** **AN16GN0DB**
3	208 240 480 600	25 30 50 50	120	100A	**ECN1831EAF** **ECN1831BAF** **ECN1831CAG** **ECN1831DAG**	**ECN1832EAF** **ECN1832BAF** **ECN1832CAG** **ECN1832DAG**	**ECN1834EAF** **ECN1834BAF** **ECN1834CAG** **ECN1834DAG**	**ECN1838EAF** **ECN1838BAF** **ECN1838CAG** **ECN1838DAG**	**AN16KN0E** **AN16KN0B** **AN16KN0C** **AN16KN0D**
4	208 240 480 600	40 50 100 100	120	200A	**ECN1841EAH** **ECN1841BAH** **ECN1841CAJ** **ECN1841DAJ**	**ECN1842EAH** **ECN1842BAH** **ECN1842CAJ** **ECN1842DAJ**	**ECN1844EAH** **ECN1844BAH** **ECN1844CAJ** **ECN1844DAJ**	**ECN1848EAH** **ECN1848BAH** **ECN1848CAJ** **ECN1848DAJ**	**AN16NN0E** **AN16NN0B** **AN16NN0C** **AN16NN0D**
5	208 240 480 600	75 100 200 200	120	400A	**ECN1851EAK** **ECN1851BAK** **ECN1851CAL** **ECN1851DAL**	**ECN1852EAK** **ECN1852BAK** **ECN1852CAL** **ECN1852DAL**	**ECN1854EAK** **ECN1854BAK** **ECN1854CAL** **ECN1854DAL**	**ECN1858EAK** **ECN1858BAK** **ECN1858CAL** **ECN1858DAL**	**AN16SN0EB** **AN16SN0BB** **AN16SN0CB** **AN16SN0DB**
6	208 240 480 600	150 200 400 400	120	600A	**ECN1861EAM** **ECN1861BAM** **ECN1861CAN** **ECN1861DAN**	**ECN1862EAM** **ECN1862BAM** **ECN1862CAN** **ECN1862DAN**	**ECN1863EAM** ⑨ **ECN1863BAM** ⑨ **ECN1863CAN** ⑨ **ECN1863DAN** ⑨	**ECN1868EAM** **ECN1868BAM** **ECN1868CAN** **ECN1868DAN**	**AN16TN0EB** **AN16TN0BB** **AN16TN0CB** **AN16TN0DB**
7	240 480 600	300 600 600	120	⑧	**ECN1871BAU** **ECN1871CAU** **ECN1871DAU**	**ECN1872BAU** **ECN1872CAU** **ECN1872DAU**	**ECN1873BAU** ⑨ **ECN1873CAU** ⑨ **ECN1873DAU** ⑨	**ECN1878BAU** **ECN1878CAU** **ECN1878DAU**	**AN16UN0BB** **AN16UN0CB** **AN16UN0DB**
8	240 480 600	450 900 900	120	⑧	**ECN1881BAU** **ECN1881CAU** **ECN1881DAU**	**ECN1882BAU** **ECN1882CAU** **ECN1882DAU**	**ECN1883BAU** ⑨ **ECN1883CAU** ⑨ **ECN1883DAU** ⑨	**ECN1888BAU** **ECN1888CAU** **ECN1888DAU**	**AN16VN0BB** **AN16VN0CB** **AN16VN0DB**
9	240 480 600	800 1000 ⑥ 1000	120	⑧	**ECN1891BAU** **ECN1891CAU** **ECN1891DAU**	**ECN1892BAU** **ECN1892CAU** **ECN1892DAU**	**ECN1893BAU** ⑨ **ECN1893CAU** ⑨ **ECN1893DAU** ⑨	**ECN1898BAU** **ECN1898CAU** **ECN1898DAU**	**AN16WN0B** **AN16WN0C** **AN16WN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① 100,000 RMS short-circuit rating.
② Other control power transformer primary and/or secondary voltages, see **Page 33-118**.
③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1804EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.
④ All Type 12 enclosures are standardized with external reset. For internal reset, order mod code **R5**.
⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.
⑥ For 1250 and 1600 hp ratings at 460V, consult Eaton.
⑦ Fuse clips are for Class R fuses. For H and J fuses see mods, **Page 33-44.**
⑧ Supply hp, voltage, FLA and whether motor is design E or not when ordering the motor.
⑨ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-204. Class ECN18 — Combination Reversing Starter — Non-fusible Disconnect with CPT

NEMA Size	Primary Voltage ①	Max. hp Rating	Magnet Coil Voltage	Disconnect Switch Rating	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial External Reset ③ ④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	208 240 480 600	1-1/2 1-1/2 2 2	120	30A	**ECN18A1EAA** **ECN18A1BAA** **ECN18A1CAA** **ECN18A1DAA**	**ECN18A2EAA** **ECN18A2BAA** **ECN18A2CAA** **ECN18A2DAA**	**ECN18A4EAA** **ECN18A4BAA** **ECN18A4CAA** **ECN18A4DAA**	**ECN18A8EAA** **ECN18A8BAA** **ECN18A8CAA** **ECN18A8DAA**	**AN16AN0EC** **AN16AN0BC** **AN16AN0CC** **AN16AN0DC**
0	208 240 480 600	3 3 5 5	120	30A	**ECN1801EAA** **ECN1801BAA** **ECN1801CAA** **ECN1801DAA**	**ECN1802EAA** **ECN1802BAA** **ECN1802CAA** **ECN1802DAA**	**ECN1804EAA** **ECN1804BAA** **ECN1804CAA** **ECN1804DAA**	**ECN1808EAA** **ECN1808BAA** **ECN1808CAA** **ECN1808DAA**	**AN16BN0EC** **AN16BN0BC** **AN16BN0CC** **AN16BN0DC**
1	208 240 480 600	7-1/2 7-1/2 10 10	120	30A	**ECN1811EAA** **ECN1811BAA** **ECN1811CAA** **ECN1811DAA**	**ECN1812EAA** **ECN1812BAA** **ECN1812CAA** **ECN1812DAA**	**ECN1814EAA** **ECN1814BAA** **ECN1814CAA** **ECN1814DAA**	**ECN1818EAA** **ECN1818BAA** **ECN1818CAA** **ECN1818DAA**	**AN16DN0EB** **AN16DN0BB** **AN16DN0CB** **AN16DN0DB**
2	208 240 480 600	10 15 25 25	120	60A	**ECN1821EAA** **ECN1821BAA** **ECN1821CAA** **ECN1821DAA**	**ECN1822EAA** **ECN1822BAA** **ECN1822CAA** **ECN1822DAA**	**ECN1824EAA** **ECN1824BAA** **ECN1824CAA** **ECN1824DAA**	**ECN1828EAA** **ECN1828BAA** **ECN1828CAA** **ECN1828DAA**	**AN16GN0EB** **AN16GN0BB** **AN16GN0CB** **AN16GN0DB**
3	208 240 480 600	25 30 50 50	120	100A	**ECN1831EAA** **ECN1831BAA** **ECN1831CAA** **ECN1831DAA**	**ECN1832EAA** **ECN1832BAA** **ECN1832CAA** **ECN1832DAA**	**ECN1834EAA** **ECN1834BAA** **ECN1834CAA** **ECN1834DAA**	**ECN1838EAA** **ECN1838BAA** **ECN1838CAA** **ECN1838DAA**	**AN16KN0E** **AN16KN0B** **AN16KN0C** **AN16KN0D**
4	208 240 480 600	40 50 100 100	120	200A	**ECN1841EAA** **ECN1841BAA** **ECN1841CAA** **ECN1841DAA**	**ECN1842EAA** **ECN1842BAA** **ECN1842CAA** **ECN1842DAA**	**ECN1844EAA** **ECN1844BAA** **ECN1844CAA** **ECN1844DAA**	**ECN1848EAA** **ECN1848BAA** **ECN1848CAA** **ECN1848DAA**	**AN16NN0E** **AN16NN0B** **AN16NN0C** **AN16NN0D**
5	208 240 480 600	75 100 200 200	120	400A	**ECN1851EAA** **ECN1851BAA** **ECN1851CAA** **ECN1851DAA**	**ECN1852EAA** **ECN1852BAA** **ECN1852CAA** **ECN1852DAA**	**ECN1854EAA** **ECN1854BAA** **ECN1854CAA** **ECN1854DAA**	**ECN1858EAA** **ECN1858BAA** **ECN1858CAA** **ECN1858DAA**	**AN16SN0EB** **AN16SN0BB** **AN16SN0CB** **AN16SN0DB**
6	208 240 480 600	150 200 400 400	120	600A	**ECN1861EAA** **ECN1861BAA** **ECN1861CAA** **ECN1861DAA**	**ECN1862EAA** **ECN1862BAA** **ECN1862CAA** **ECN1862DAA**	**ECN1863EAA** ⑦ **ECN1863BAA** ⑦ **ECN1863CAA** ⑦ **ECN1863DAA** ⑦	**ECN1868EAA** **ECN1868BAA** **ECN1868CAA** **ECN1868DAA**	**AN16TN0EB** **AN16TN0BB** **AN16TN0CB** **AN16TN0DB**
7	240 480 600	300 600 600	120	⑥	**ECN1871BAA** **ECN1871CAA** **ECN1871DAA**	**ECN1872BAA** **ECN1872CAA** **ECN1872DAA**	**ECN1873BAA** ⑦ **ECN1873CAA** ⑦ **ECN1873DAA** ⑦	**ECN1878BAA** **ECN1878CAA** **ECN1878DAA**	**AN16UN0BB** **AN16UN0CB** **AN16UN0DB**
8	240 480 600	450 900 900	120	⑥	**ECN1881BAA** **ECN1881CAA** **ECN1881DAA**	**ECN1882BAA** **ECN1882CAA** **ECN1882DAA**	**ECN1883BAA** ⑦ **ECN1883CAA** ⑦ **ECN1883DAA** ⑦	**ECN1888BAA** **ECN1888CAA** **ECN1888DAA**	**AN16VN0BB** **AN16VN0CB** **AN16VN0DB**
9	240 480 600	800 1000 ⑤ 1000	120	⑥	**ECN1891BAA** **ECN1891CAA** **ECN1891DAA**	**ECN1892BAA** **ECN1892CAA** **ECN1892DAA**	**ECN1893BAA** ⑦ **ECN1893CAA** ⑦ **ECN1893DAA** ⑦	**ECN1898BAA** **ECN1898CAA** **ECN1898DAA**	**AN16WN0B** **AN16WN0C** **AN16WN0D**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① Other control power transformer primary and/or secondary voltages, see **Page 33-118**.
② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN1804EAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.
③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.
④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.
⑤ For 1250 and 1600 hp ratings at 460V, consult Eaton.
⑥ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.
⑦ Type 4 (Painted steel) Sizes 6 – 9.

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Features

- 3-Phase Magnetic
- 3-Pole Non-reversing or Reversing
- Standard Interchangeable Heater OLR
- Optional Electronic Overload
- 600V Maximum
- 100,000 RMS 480V, 25,000 RMS 600V

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Product Selection

Table 33-205. Class ECN22 — Combination Non-reversing Starter — Circuit Breaker

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	200	1 1-1/2	120	HMCPE 7A HMCPE 15A	**ECN22A1AAC** **ECN22A1AAD**	**ECN22A2AAC** **ECN22A2AAD**	**ECN22A4AAC** **ECN22A4AAD**	**ECN22A8AAC** **ECN22A8AAD**	**AN16AN0AC**
	230	1 1-1/2		HMCPE 7A HMCPE 15A	**ECN22A1AAC** **ECN22A1AAD**	**ECN22A2AAC** **ECN22A2AAD**	**ECN22A4AAC** **ECN22A4AAD**	**ECN22A8AAC** **ECN22A8AAD**	
	460	1 2		HMCPE 3A HMCPE 7A	**ECN22A1AAB** **ECN22A1AAC**	**ECN22A2AAB** **ECN22A2AAC**	**ECN22A4AAB** **ECN22A4AAC**	**ECN22A8AAB** **ECN22A8AAC**	
	575	1 2		HMCP 3A HMCP 7A	**ECN22A1AAB** **ECN22A1AAC**	**ECN22A2AAB** **ECN22A2AAC**	**ECN22A4AAB** **ECN22A4AAC**	**ECN22A8AAB** **ECN22A8AAC**	
0	200	1 3	120	HMCPE 7A HMCPE 15A	**ECN2201AAC** **ECN2201AAD**	**ECN2202AAC** **ECN2202AAD**	**ECN2204AAC** **ECN2204AAD**	**ECN2208AAC** **ECN2208AAD**	**AN16BN0AC**
	230	1 3		HMCPE 7A HMCPE 15A	**ECN2201AAC** **ECN2201AAD**	**ECN2202AAC** **ECN2202AAD**	**ECN2204AAC** **ECN2204AAD**	**ECN2208AAC** **ECN2208AAD**	
	460	1 3 5		HMCPE 3A HMCPE 7A HMCPE 15A	**ECN2201AAB** **ECN2201AAC** **ECN2201AAD**	**ECN2202AAB** **ECN2202AAC** **ECN2202AAD**	**ECN2204AAB** **ECN2204AAC** **ECN2204AAD**	**ECN2208AAB** **ECN2208AAC** **ECN2208AAD**	
	575	1 3 5		HMCP 3A HMCP 15A HMCP 7A	**ECN2201AAB** **ECN2201AAD** **ECN2201AAC**	**ECN2202AAB** **ECN2202AAD** **ECN2202AAC**	**ECN2204AAB** **ECN2204AAD** **ECN2204AAC**	**ECN2208AAB** **ECN2208AAD** **ECN2208AAC**	
1	200	1 3 5 7-1/2	120	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2211AAC** **ECN2211AAD** **ECN2211AAE** **ECN2211AAF**	**ECN2212AAC** **ECN2212AAD** **ECN2212AAE** **ECN2212AAF**	**ECN2214AAC** **ECN2214AAD** **ECN2214AAE** **ECN2214AAF**	**ECN2218AAC** **ECN2218AAD** **ECN2218AAE** **ECN2218AAF**	**AN16DN0AB**
	230	1 3 5 7-1/2		HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2211AAC** **ECN2211AAD** **ECN2211AAE** **ECN2211AAF**	**ECN2212AAC** **ECN2212AAD** **ECN2212AAE** **ECN2212AAF**	**ECN2214AAC** **ECN2214AAD** **ECN2214AAE** **ECN2214AAF**	**ECN2218AAC** **ECN2218AAD** **ECN2218AAE** **ECN2218AAF**	
	460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECN2211AAB** **ECN2211AAC** **ECN2211AAD** **ECN2211AAE**	**ECN2212AAB** **ECN2212AAC** **ECN2212AAD** **ECN2212AAE**	**ECN2214AAB** **ECN2214AAC** **ECN2214AAD** **ECN2214AAE**	**ECN2218AAB** **ECN2218AAC** **ECN2218AAD** **ECN2218AAE**	
	575	1 3 5 10		HMCP 3A HMCP 7A HMCP 15A HMCP 30A	**ECN2211AAB** **ECN2211AAC** **ECN2211AAD** **ECN2211AAE**	**ECN2212AAB** **ECN2212AAC** **ECN2212AAD** **ECN2212AAE**	**ECN2214AAB** **ECN2214AAC** **ECN2214AAD** **ECN2214AAE**	**ECN2218AAB** **ECN2218AAC** **ECN2218AAD** **ECN2218AAE**	

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN2204AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-205. Class ECN22 — Combination Non-reversing Starter — Circuit Breaker (Continued)

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
2	200	10	120	HMCPE 50A	**ECN2221AAF**	**ECN2222AAF**	**ECN2224AAF**	**ECN2228AAF**	**AN16GN0AB**
	230	10 15		HMCPE 50A HMCPE 70A	**ECN2221AAF** **ECN2221AAW**	**ECN2222AAF** **ECN2222AAW**	**ECN2224AAF** **ECN2224AAW**	**ECN2228AAF** **ECN2228AAW**	
	460	25		HMCPE 50A	**ECN2221AAF**	**ECN2222AAF**	**ECN2224AAF**	**ECN2228AAF**	
	575	15 25		HMCP 30A HMCP 50A	**ECN2221AAE** **ECN2221AAF**	**ECN2222AAE** **ECN2222AAF**	**ECN2224AAE** **ECN2224AAF**	**ECN2228AAE** **ECN2228AAF**	
3	200	20 25	120	HMCPE 100A HMCPE 100A	**ECN2231AAG** **ECN2231AAX**	**ECN2232AAG** **ECN2232AAX**	**ECN2234AAG** **ECN2234AAX**	**ECN2238AAG** **ECN2238AAX**	**AN16KN0A**
	230	25 30		HMCPE 100A HMCPE 100A	**ECN2231AAG** **ECN2231AAX**	**ECN2232AAG** **ECN2232AAX**	**ECN2234AAG** **ECN2234AAX**	**ECN2238AAG** **ECN2238AAX**	
	460	50		HMCPE 100A	**ECN2231AAG**	**ECN2232AAG**	**ECN2234AAG**	**ECN2238AAG**	
	575	30 50		HMCP 50A HMCP 100A	**ECN2231AAF** **ECN2231AAG**	**ECN2232AAF** **ECN2232AAG**	**ECN2234AAF** **ECN2234AAG**	**ECN2238AAF** **ECN2238AAG**	
4	200 230 460 575	40 50 100 100	120	HMCP 150A HMCP 150A HMCP 150A HMCP 150A	**ECN2241AAH** **ECN2241AAH** **ECN2241AAH** **ECN2241AAH**	**ECN2242AAH** **ECN2242AAH** **ECN2242AAH** **ECN2242AAH**	**ECN2244AAH** **ECN2244AAH** **ECN2244AAH** **ECN2244AAH**	**ECN2248AAH** **ECN2248AAH** **ECN2248AAH** **ECN2248AAH**	**AN16NN0A**
5	200	50 75	120	HMCP 250A HMCP 400A	**ECN2251AAJ** **ECN2251AAK**	**ECN2252AAJ** **ECN2252AAK**	**ECN2254AAJ** **ECN2254AAK**	**ECN2258AAJ** **ECN2258AAK**	**AN16SN0AB**
	230	60 100		HMCP 250A HMCP 400A	**ECN2251AAJ** **ECN2251AAK**	**ECN2252AAJ** **ECN2252AAK**	**ECN2254AAJ** **ECN2254AAK**	**ECN2258AAJ** **ECN2258AAK**	
	460	125 200		HMCP 250A HMCP 400A	**ECN2251AAJ** **ECN2251AAK**	**ECN2252AAJ** **ECN2252AAK**	**ECN2254AAJ** **ECN2254AAK**	**ECN2258AAJ** **ECN2258AAK**	
	575	150 200		HMCP 250A HMCP 400A	**ECN2251AAJ** **ECN2251AAK**	**ECN2252AAJ** **ECN2252AAK**	**ECN2254AAJ** **ECN2254AAK**	**ECN2258AAJ** **ECN2258AAK**	
6	200	150	120	HMCP 600A	**ECN2261AAL**	**ECN2262AAL**	**ECN2263AAL** ⑤	**ECN2268AAL**	**AN16TN0AB**
	230	200		HMCP 600A	**ECN2261AAL**	**ECN2262AAL**	**ECN2263AAL** ⑤	**ECN2268AAL**	
	460	350 400		HMCP 600A HMCP 1200A	**ECN2261AAL** **ECN2261AAP**	**ECN2262AAL** **ECN2262AAP**	**ECN2263AAL** ⑤ **ECN2263AAP** ⑤	**ECN2268AAL** **ECN2268AAP**	
	575	400		HMCP 600A	**ECN2261AAL**	**ECN2262AAL**	**ECN2263AAL** ⑤	**ECN2268AAL**	
7	230 460 575	300 600 600	120	— — —	**ECN2271AAU** **ECN2271AAU** **ECN2271AAU**	**ECN2272AAU** **ECN2272AAU** **ECN2272AAU**	**ECN2273AAU** ⑤ **ECN2273AAU** ⑤ **ECN2273AAU** ⑤	**ECN2278AAU** **ECN2278AAU** **ECN2278AAU**	**AN16UN0AB**
8	230 460 575	450 900 900	120	— — —	**ECN2281AAU** **ECN2281AAU** **ECN2281AAU**	**ECN2282AAU** **ECN2282AAU** **ECN2282AAU**	**ECN2283AAU** ⑤ **ECN2283AAU** ⑤ **ECN2283AAU** ⑤	**ECN2288AAU** **ECN2288AAU** **ECN2288AAU**	**AN16VN0AB**
9	230 460 575	800 1600 1600	120	— — —	**ECN2291AAU** **ECN2291AAU** **ECN2291AAU**	**ECN2292AAU** **ECN2292AAU** **ECN2292AAU**	**ECN2293AAU** ⑤ **ECN2293AAU** ⑤ **ECN2293AAU** ⑤	**ECN2298AAU** **ECN2298AAU** **ECN2298AAU**	**AN16WN0A**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN2204AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑤ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-206. Class ECN22 — Special Enclosure Combination Non-reversing Starter — Circuit Breaker

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①	Circuit Breaker Type	Type 1 General Purpose	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial ③		Component Starter (Open)
							External Reset	Internal Rest	
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
Horizontal Enclosure									
1	200	1	120	HMCPE 7A	**ECN2211AAC-E13**	**ECN2212AAC-E13**	**ECN2214AAC-E13**	**ECN2218AAC-E13**	**AN16DN0AB**
		3		HMCPE 15A	**ECN2211AAD-E13**	**ECN2212AAD-E13**	**ECN2214AAD-E13**	**ECN2218AAD-E13**	
		5		HMCPE 30A	**ECN2211AAE-E13**	**ECN2212AAE-E13**	**ECN2214AAE-E13**	**ECN2218AAE-E13**	
		7-1/2		HMCPE 50A	**ECN2211AAF-E13**	**ECN2212AAF-E13**	**ECN2214AAF-E13**	**ECN2218AAF-E13**	
	230	1		HMCPE 7A	**ECN2211AAC-E13**	**ECN2212AAC-E13**	**ECN2214AAC-E13**	**ECN2218AAC-E13**	
		3		HMCPE 15A	**ECN2211AAD-E13**	**ECN2212AAD-E13**	**ECN2214AAD-E13**	**ECN2218AAD-E13**	
		5		HMCPE 30A	**ECN2211AAE-E13**	**ECN2212AAE-E13**	**ECN2214AAE-E13**	**ECN2218AAE-E13**	
		7-1/2		HMCPE 50A	**ECN2211AAF-E13**	**ECN2212AAF-E13**	**ECN2214AAF-E13**	**ECN2218AAF-E13**	
	460	1		HMCPE 3A	**ECN2211AAB-E13**	**ECN2212AAB-E13**	**ECN2214AAB-E13**	**ECN2218AAB-E13**	
		3		HMCPE 7A	**ECN2211AAC-E13**	**ECN2212AAC-E13**	**ECN2214AAC-E13**	**ECN2218AAC-E13**	
		5		HMCPE 15A	**ECN2211AAD-E13**	**ECN2212AAD-E13**	**ECN2214AAD-E13**	**ECN2218AAD-E13**	
		10		HMCPE 30A	**ECN2211AAE-E13**	**ECN2212AAE-E13**	**ECN2214AAE-E13**	**ECN2218AAE-E13**	
	575	1		HMCP 3A	**ECN2211AAB-E13**	**ECN2212AAB-E13**	**ECN2214AAB-E13**	**ECN2218AAB-E13**	
		3		HMCP 7A	**ECN2211AAC-E13**	**ECN2212AAC-E13**	**ECN2214AAC-E13**	**ECN2218AAC-E13**	
		5		HMCP 15A	**ECN2211AAD-E13**	**ECN2212AAD-E13**	**ECN2214AAD-E13**	**ECN2218AAD-E13**	
		10		HMCP 30A	**ECN2211AAE-E13**	**ECN2212AAE-E13**	**ECN2214AAE-E13**	**ECN2218AAE-E13**	
2	200	10	120	HMCPE 50A	**ECN2221AAF-E13**	**ECN2222AAF-E13**	**ECN2224AAF-E13**	**ECN2228AAF-E13**	**AN16GN0AB**
	230	10		HMCPE 50A	**ECN2221AAF-E13**	**ECN2222AAF-E13**	**ECN2224AAF-E13**	**ECN2228AAF-E13**	
		15		HMCPE 70A	**ECN2221AAW-E13**	**ECN2222AAW-E13**	**ECN2224AAW-E13**	**ECN2228AAW-E13**	
	460	25		HMCPE 50A	**ECN2221AAF-E13**	**ECN2222AAF-E13**	**ECN2224AAF-E13**	**ECN2228AAF-E13**	
	575	15		HMCP 30A	**ECN2221AAE-E13**	**ECN2222AAE-E13**	**ECN2224AAE-E13**	**ECN2228AAE-E13**	
		25		HMCP 50A	**ECN2221AAF-E13**	**ECN2222AAF-E13**	**ECN2224AAF-E13**	**ECN2228AAF-E13**	
Oversize Enclosure — without Control Transformer									
0	200	1	120	HMCPE 7A	**ECN2201AAC-E3**	**ECN2202AAC-E3**	**ECN2204AAC-E3**	**ECN2208AAC-E3**	**AN16BN0AC**
		3		HMCPE 15A	**ECN2201AAD-E3**	**ECN2202AAD-E3**	**ECN2204AAD-E3**	**ECN2208AAD-E3**	
	230	1		HMCPE 7A	**ECN2201AAC-E3**	**ECN2202AAC-E3**	**ECN2204AAC-E3**	**ECN2208AAC-E3**	
		3		HMCPE 15A	**ECN2201AAD-E3**	**ECN2202AAD-E3**	**ECN2204AAD-E3**	**ECN2208AAD-E3**	
	460	1		HMCPE 3A	**ECN2201AAB-E3**	**ECN2202AAB-E3**	**ECN2204AAB-E3**	**ECN2208AAB-E3**	
		3		HMCPE 7A	**ECN2201AAC-E3**	**ECN2202AAC-E3**	**ECN2204AAC-E3**	**ECN2208AAC-E3**	
		5		HMCPE 15A	**ECN2201AAD-E3**	**ECN2202AAD-E3**	**ECN2204AAD-E3**	**ECN2208AAD-E3**	
	575	1		HMCP 3A	**ECN2201AAB-E3**	**ECN2202AAB-E3**	**ECN2204AAB-E3**	**ECN2208AAB-E3**	
		3		HMCP 15A	**ECN2201AAD-E3**	**ECN2202AAD-E3**	**ECN2204AAD-E3**	**ECN2208AAD-E3**	
		5		HMCP 7A	**ECN2201AAC-E3**	**ECN2202AAC-E3**	**ECN2204AAC-E3**	**ECN2208AAC-E3**	
1	200	1	120	HMCPE 7A	**ECN2211AAC-E3**	**ECN2212AAC-E3**	**ECN2214AAC-E3**	**ECN2218AAC-E3**	**AN16DN0AB**
		3		HMCPE 15A	**ECN2211AAD-E3**	**ECN2212AAD-E3**	**ECN2214AAD-E3**	**ECN2218AAD-E3**	
		5		HMCPE 30A	**ECN2211AAE-E3**	**ECN2212AAE-E3**	**ECN2214AAE-E3**	**ECN2218AAE-E3**	
		7-1/2		HMCPE 50A	**ECN2211AAF-E3**	**ECN2212AAF-E3**	**ECN2214AAF-E3**	**ECN2218AAF-E3**	
	230	1		HMCPE 7A	**ECN2211AAC-E3**	**ECN2212AAC-E3**	**ECN2214AAC-E3**	**ECN2218AAC-E3**	
		3		HMCPE 15A	**ECN2211AAD-E3**	**ECN2212AAD-E3**	**ECN2214AAD-E3**	**ECN2218AAD-E3**	
		5		HMCPE 30A	**ECN2211AAE-E3**	**ECN2212AAE-E3**	**ECN2214AAE-E3**	**ECN2218AAE-E3**	
		7-1/2		HMCPE 50A	**ECN2211AAF-E3**	**ECN2212AAF-E3**	**ECN2214AAF-E3**	**ECN2218AAF-E3**	
	460	1		HMCPE 3A	**ECN2211AAB-E3**	**ECN2212AAB-E3**	**ECN2214AAB-E3**	**ECN2218AAB-E3**	
		3		HMCPE 7A	**ECN2211AAC-E3**	**ECN2212AAC-E3**	**ECN2214AAC-E3**	**ECN2218AAC-E3**	
		5		HMCPE 15A	**ECN2211AAD-E3**	**ECN2212AAD-E3**	**ECN2214AAD-E3**	**ECN2218AAD-E3**	
		10		HMCPE 30A	**ECN2211AAE-E3**	**ECN2212AAE-E3**	**ECN2214AAE-E3**	**ECN2218AAE-E3**	
	575	1		HMCP 3A	**ECN2211AAB-E3**	**ECN2212AAB-E3**	**ECN2214AAB-E3**	**ECN2218AAB-E3**	
		3		HMCP 7A	**ECN2211AAC-E3**	**ECN2212AAC-E3**	**ECN2214AAC-E3**	**ECN2218AAC-E3**	
		5		HMCP 15A	**ECN2211AAD-E3**	**ECN2212AAD-E3**	**ECN2214AAD-E3**	**ECN2218AAD-E3**	
		10		HMCP 30A	**ECN2211AAE-E3**	**ECN2212AAE-E3**	**ECN2214AAE-E3**	**ECN2218AAE-E3**	
2	200	10	120	HMCPE 50A	**ECN2221AAF-E3**	**ECN2222AAF-E3**	**ECN2224AAF-E3**	**ECN2228AAF-E3**	**AN16GN0AB**
	230	10		HMCPE 50A	**ECN2221AAF-E3**	**ECN2222AAF-E3**	**ECN2224AAF-E3**	**ECN2228AAF-E3**	
		15		HMCPE 70A	**ECN2221AAW-E3**	**ECN2222AAW-E3**	**ECN2224AAW-E3**	**ECN2228AAW-E3**	
	460	25		HMCPE 50A	**ECN2221AAF-E3**	**ECN2222AAF-E3**	**ECN2224AAF-E3**	**ECN2228AAF-E3**	
	575	15		HMCP 30A	**ECN2221AAE-E3**	**ECN2222AAE-E3**	**ECN2224AAE-E3**	**ECN2228AAE-E3**	
		25		HMCP 50A	**ECN2221AAF-E3**	**ECN2222AAF-E3**	**ECN2224AAF-E3**	**ECN2228AAF-E3**	

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECN2204AAC-E3. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ To order Type 12 enclosures with safety door interlock add modification **E11**.

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Table 33-207. Class ECN23 — Combination Reversing Starter — Circuit Breaker ①

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	200	1 1-1/2	120	HMCPE 7A HMCPE 15A	**ECN23A1AAC** **ECN23A1AAD**	**ECN23A2AAC** **ECN23A2AAD**	**ECN23A4AAC** **ECN23A4AAD**	**ECN23A8AAC** **ECN23A8AAD**	**AN56AN0AC**
	230	1 1-1/2		HMCPE 7A HMCPE 15A	**ECN23A1AAC** **ECN23A1AAD**	**ECN23A2AAC** **ECN23A2AAD**	**ECN23A4AAC** **ECN23A4AAD**	**ECN23A8AAC** **ECN23A8AAD**	
	460	1 2		HMCPE 3A HMCPE 7A	**ECN23A1AAB** **ECN23A1AAC**	**ECN23A2AAB** **ECN23A2AAC**	**ECN23A4AAB** **ECN23A4AAC**	**ECN23A8AAB** **ECN23A8AAC**	
	575	1 2		HMCP 3A HMCP 7A	**ECN23A1AAB** **ECN23A1AAC**	**ECN23A2AAB** **ECN23A2AAC**	**ECN23A4AAB** **ECN23A4AAC**	**ECN23A8AAB** **ECN23A8AAC**	
0	200	1 3	120	HMCPE 7A HMCPE 15A	**ECN2301AAC** **ECN2301AAD**	**ECN2302AAC** **ECN2302AAD**	**ECN2304AAC** **ECN2304AAD**	**ECN2308AAC** **ECN2308AAD**	**AN56BN0AC**
	230	1 3		HMCPE 7A HMCPE 15A	**ECN2301AAC** **ECN2301AAD**	**ECN2302AAC** **ECN2302AAD**	**ECN2304AAC** **ECN2304AAD**	**ECN2308AAC** **ECN2308AAD**	
	460	1 3 5		HMCPE 3A HMCPE 7A HMCPE 15A	**ECN2301AAB** **ECN2301AAC** **ECN2301AAD**	**ECN2302AAB** **ECN2302AAC** **ECN2302AAD**	**ECN2304AAB** **ECN2304AAC** **ECN2304AAD**	**ECN2308AAB** **ECN2308AAC** **ECN2308AAD**	
	575	1 3 5		HMCP 3A HMCP 15A HMCP 7A	**ECN2301AAB** **ECN2301AAD** **ECN2301AAC**	**ECN2302AAB** **ECN2302AAD** **ECN2302AAC**	**ECN2304AAB** **ECN2304AAD** **ECN2304AAC**	**ECN2308AAB** **ECN2308AAD** **ECN2308AAC**	
1	200	1 3 5 7-1/2	120	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2311AAC** **ECN2311AAD** **ECN2311AAE** **ECN2311AAF**	**ECN2312AAC** **ECN2312AAD** **ECN2312AAE** **ECN2312AAF**	**ECN2314AAC** **ECN2314AAD** **ECN2314AAE** **ECN2314AAF**	**ECN2318AAC** **ECN2318AAD** **ECN2318AAE** **ECN2318AAF**	**AN56DN0AB**
	230	1 3 5 7-1/2		HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2311AAC** **ECN2311AAD** **ECN2311AAE** **ECN2311AAF**	**ECN2312AAC** **ECN2312AAD** **ECN2312AAE** **ECN2312AAF**	**ECN2314AAC** **ECN2314AAD** **ECN2314AAE** **ECN2314AAF**	**ECN2318AAC** **ECN2318AAD** **ECN2318AAE** **ECN2318AAF**	
	460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECN2311AAB** **ECN2311AAC** **ECN2311AAD** **ECN2311AAE**	**ECN2312AAB** **ECN2312AAC** **ECN2312AAD** **ECN2312AAE**	**ECN2314AAB** **ECN2314AAC** **ECN2314AAD** **ECN2314AAE**	**ECN2318AAB** **ECN2318AAC** **ECN2318AAD** **ECN2318AAE**	
	575	1 3 5 10		HMCP 3A HMCP 7A HMCP 15A HMCP 30A	**ECN2311AAB** **ECN2311AAC** **ECN2311AAD** **ECN2311AAE**	**ECN2312AAB** **ECN2312AAC** **ECN2312AAD** **ECN2312AAE**	**ECN2314AAB** **ECN2314AAC** **ECN2314AAD** **ECN2314AAE**	**ECN2318AAB** **ECN2318AAC** **ECN2318AAD** **ECN2318AAE**	
2	200	10	120	HMCPE 50A	**ECN2321AAF**	**ECN2322AAF**	**ECN2324AAF**	**ECN2328AAF**	**AN56GN0AB**
	230	10 15		HMCPE 50A HMCPE 70A	**ECN2321AAF** **ECN2321AAW**	**ECN2322AAF** **ECN2322AAW**	**ECN2324AAF** **ECN2324AAW**	**ECN2328AAF** **ECN2328AAW**	
	460	25		HMCPE 50A	**ECN2321AAF**	**ECN2322AAF**	**ECN2324AAF**	**ECN2328AAF**	
	575	15 25		HMCP 30A HMCP 50A	**ECN2321AAE** **ECN2321AAF**	**ECN2322AAE** **ECN2322AAF**	**ECN2324AAE** **ECN2324AAF**	**ECN2328AAE** **ECN2328AAF**	

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① 100,000 RMS short-circuit – 480V
25,000 RMS short-circuit – 600V

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**.
Example: ECN2304AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**.
To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-207. Class ECN23 — Combination Reversing Starter — Circuit Breaker ① (Continued)

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
3	200	20 25	120	HMCPE 100A HMCPE 100A	**ECN2331AAG** **ECN2331AAX**	**ECN2332AAG** **ECN2332AAX**	**ECN2334AAG** **ECN2334AAX**	**ECN2338AAG** **ECN2338AAX**	**AN56KN0A**
	230	25 30		HMCPE 100A HMCPE 100A	**ECN2331AAG** **ECN2331AAX**	**ECN2332AAG** **ECN2332AAX**	**ECN2334AAG** **ECN2334AAX**	**ECN2338AAG** **ECN2338AAX**	
	460	50		HMCPE 100A	**ECN2331AAG**	**ECN2332AAG**	**ECN2334AAG**	**ECN2338AAG**	
	575	30 50		HMCP 50A HMCP 100A	**ECN2331AAF** **ECN2331AAG**	**ECN2332AAF** **ECN2332AAG**	**ECN2334AAF** **ECN2334AAG**	**ECN2338AAF** **ECN2338AAG**	
4	200 230 460 575	40 50 100 100	120	HMCP 150A HMCP 150A HMCP 150A HMCP 150A	**ECN2341AAH** **ECN2341AAH** **ECN2341AAH** **ECN2341AAH**	**ECN2342AAH** **ECN2342AAH** **ECN2342AAH** **ECN2342AAH**	**ECN2344AAH** **ECN2344AAH** **ECN2344AAH** **ECN2344AAH**	**ECN2348AAH** **ECN2348AAH** **ECN2348AAH** **ECN2348AAH**	**AN56NN0A**
5	200	50 75	230	HMCP 250A HMCP 400A	**ECN2351AAJ** **ECN2351AAK**	**ECN2352AAJ** **ECN2352AAK**	**ECN2354AAJ** **ECN2354AAK**	**ECN2358AAJ** **ECN2358AAK**	**AN56SN0AB**
	230	60 100		HMCP 250A HMCP 400A	**ECN2351AAJ** **ECN2351AAK**	**ECN2352AAJ** **ECN2352AAK**	**ECN2354AAJ** **ECN2354AAK**	**ECN2358AAJ** **ECN2358AAK**	
	460	125 200		HMCP 250A HMCP 400A	**ECN2351AAJ** **ECN2351AAK**	**ECN2352AAJ** **ECN2352AAK**	**ECN2354AAJ** **ECN2354AAK**	**ECN2358AAJ** **ECN2358AAK**	
	575	150 200		HMCP 250A HMCP 400A	**ECN2351AAJ** **ECN2351AAK**	**ECN2352AAJ** **ECN2352AAK**	**ECN2354AAJ** **ECN2354AAK**	**ECN2358AAJ** **ECN2358AAK**	
6	200	150	120	HMCP 600A	**ECN2361AAL**	**ECN2362AAL**	**ECN2363AAL** ⑦	**ECN2368AAL**	**AN56TN0AB**
	230	200		HMCP 600A	**ECN2361AAL**	**ECN2362AAL**	**ECN2363AAL** ⑦	**ECN2368AAL**	
	460	350 400		HMCP 600A HMCP 1200A	**ECN2361AAL** **ECN2361AAP**	**ECN2362AAL** **ECN2362AAP**	**ECN2363AAL** ⑦ **ECN2363AAP** ⑦	**ECN2368AAL** **ECN2368AAP**	
	575	400		HMCP 600A	**ECN2361AAL**	**ECN2362AAL**	**ECN2363AAL** ⑦	**ECN2368AAL**	
7	230 460 575	300 600 600	120	— — —	**ECN2371AAU** ⑥ **ECN2371AAU** ⑥ **ECN2371AAU** ⑥	**ECN2372AAU** ⑥ **ECN2372AAU** ⑥ **ECN2372AAU** ⑥	**ECN2373AAU** ⑥⑦ **ECN2373AAU** ⑥⑦ **ECN2373AAU** ⑥⑦	**ECN2378AAU** ⑥ **ECN2378AAU** ⑥ **ECN2378AAU** ⑥	**AN56UN0AB**
8	230 460 575	450 900 900	120	— — —	**ECN2381AAU** ⑥ **ECN2381AAU** ⑥ **ECN2381AAU** ⑥	**ECN2382AAU** ⑥ **ECN2382AAU** ⑥ **ECN2382AAU** ⑥	**ECN2383AAU** ⑥ **ECN2383AAU** ⑥ **ECN2383AAU** ⑥	**ECN2388AAU** ⑥ **ECN2388AAU** ⑥ **ECN2388AAU** ⑥	**AN56VN0AB**
9	230 460 575	800 1600 1600	120	— — —	**ECN2391AAU** ⑥ **ECN2391AAU** ⑥ **ECN2391AAU** ⑥	**ECN2392AAU** ⑥ **ECN2392AAU** ⑥ **ECN2392AAU** ⑥	**ECN2393AAU** ⑥ **ECN2393AAU** ⑥ **ECN2393AAU** ⑥	**ECN2398AAU** ⑥ **ECN2398AAU** ⑥ **ECN2398AAU** ⑥	**AN56WN0A**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① 100,000 RMS Short-circuit – 480V
25,000 RMS Short-circuit – 600V

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**.
Example: ECN2304AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**.
To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑥ Provide FLA to size disconnect properly.

⑦ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-208. Class ECN24 — Combination Non-reversing Starter — Circuit Breaker with CPT ①

NEMA Size	Motor Voltage ②	Max. hp Rating	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	200	1 1-1/2	120	HMCPE 7A HMCPE 15A	**ECN24A1EAC** **ECN24A1EAD**	**ECN24A2EAC** **ECN24A2EAD**	**ECN24A4EAC** **ECN24A4EAD**	**ECN24A8EAC** **ECN24A8EAD**	**AN16AN0AC**
	230	1 1-1/2		HMCPE 7A HMCPE 15A	**ECN24A1BAC** **ECN24A1BAD**	**ECN24A2BAC** **ECN24A2BAD**	**ECN24A4BAC** **ECN24A4BAD**	**ECN24A8BAC** **ECN24A8BAD**	
	460	1 2		HMCPE 3A HMCPE 7A	**ECN24A1CAB** **ECN24A1CAC**	**ECN24A2CAB** **ECN24A2CAC**	**ECN24A4CAB** **ECN24A4CAC**	**ECN24A8CAB** **ECN24A8CAC**	
	575	1 2		HMCP 3A HMCP 7A	**ECN24A1DAB** **ECN24A1DAC**	**ECN24A2DAB** **ECN24A2DAC**	**ECN24A4DAB** **ECN24A4DAC**	**ECN24A8DAB** **ECN24A8DAC**	
0	200	1 3	120	HMCPE 7A HMCPE 15A	**ECN2401EAC** **ECN2401EAD**	**ECN2402EAC** **ECN2402EAD**	**ECN2404EAC** **ECN2404EAD**	**ECN2408EAC** **ECN2408EAD**	**AN16BN0AC**
	230	1 3		HMCPE 7A HMCPE 15A	**ECN2401BAC** **ECN2401BAD**	**ECN2402BAC** **ECN2402BAD**	**ECN2404BAC** **ECN2404BAD**	**ECN2408BAC** **ECN2408BAD**	
	460	1 3 5		HMCPE 3A HMCPE 7A HMCPE 15A	**ECN2401CAB** **ECN2401CAC** **ECN2401CAD**	**ECN2402CAB** **ECN2402CAC** **ECN2402CAD**	**ECN2404CAB** **ECN2404CAC** **ECN2404CAD**	**ECN2408CAB** **ECN2408CAC** **ECN2408CAD**	
	575	1 3 5		HMCP 3A HMCP 15A HMCP 7A	**ECN2401DAB** **ECN2401DAD** **ECN2401DAC**	**ECN2402DAB** **ECN2402DAD** **ECN2402DAC**	**ECN2404DAB** **ECN2404DAD** **ECN2404DAC**	**ECN2408DAB** **ECN2408DAD** **ECN2408DAC**	
1	200	1 3 5 7-1/2	120	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2411EAC** **ECN2411EAD** **ECN2411EAE** **ECN2411EAF**	**ECN2412EAC** **ECN2412EAD** **ECN2412EAE** **ECN2412EAF**	**ECN2414EAC** **ECN2414EAD** **ECN2414EAE** **ECN2414EAF**	**ECN2418EAC** **ECN2418EAD** **ECN2418EAE** **ECN2418EAF**	**AN16DN0AB**
	230	1 3 5 7-1/2		HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**ECN2411BAC** **ECN2411BAD** **ECN2411BAE** **ECN2411BAF**	**ECN2412BAC** **ECN2412BAD** **ECN2412BAE** **ECN2412BAF**	**ECN2414BAC** **ECN2414BAD** **ECN2414BAE** **ECN2414BAF**	**ECN2418BAC** **ECN2418BAD** **ECN2418BAE** **ECN2418BAF**	
	460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**ECN2411CAB** **ECN2411CAC** **ECN2411CAD** **ECN2411CAE**	**ECN2412CAB** **ECN2412CAC** **ECN2412CAD** **ECN2412CAE**	**ECN2414CAB** **ECN2414CAC** **ECN2414CAD** **ECN2414CAE**	**ECN2418CAB** **ECN2418CAC** **ECN2418CAD** **ECN2418CAE**	
	575	1 3 5 10		HMCP 3A HMCP 7A HMCP 15A HMCP 30A	**ECN2411DAB** **ECN2411DAC** **ECN2411DAD** **ECN2411DAE**	**ECN2412DAB** **ECN2412DAC** **ECN2412DAD** **ECN2412DAE**	**ECN2414DAB** **ECN2414DAC** **ECN2414DAD** **ECN2414DAE**	**ECN2418DAB** **ECN2418DAC** **ECN2418DAD** **ECN2418DAE**	
2	200	10	120	HMCPE 50A	**ECN2421EAF**	**ECN2422EAF**	**ECN2424EAF**	**ECN2428EAF**	**AN16GN0AB**
	230	10 15		HMCPE 50A HMCPE 70A	**ECN2421BAF** **ECN2421BAW**	**ECN2422BAF** **ECN2422BAW**	**ECN2424BAF** **ECN2424BAW**	**ECN2428BAF** **ECN2428BAW**	
	460	25		HMCPE 50A	**ECN2421CAF**	**ECN2422CAF**	**ECN2424CAF**	**ECN2428CAF**	
	575	15 25		HMCP 30A HMCP 50A	**ECN2421CAE** **ECN2421DAF**	**ECN2422CAE** **ECN2422DAF**	**ECN2424CAE** **ECN2424DAF**	**ECN2428CAE** **ECN2428DAF**	

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① 100,000 RMS short-circuit – 480V
25,000 RMS short-circuit – 600V

② For other control power transformer primary and/or secondary voltages, substitute the eighth digit with appropriate digit based on **Table 33-185**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**.
Example: ECN240**4**AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**.
To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-208. Class ECN24 — Combination Non-reversing Starter — Circuit Breaker with CPT ① (Continued)

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X ③ Watertight & Dust-Tight Stainless Steel Catalog Number	Type 12 Dust-Tight Industrial External Reset ④⑤ Catalog Number	Component Starter (Open) Catalog Number
3	200	20 25	120	HMCPE 100A HMCPE 100A	**ECN2431EAG** **ECN2431EAX**	**ECN2432EAG** **ECN2432EAX**	**ECN2434EAG** **ECN2434EAX**	**ECN2438EAG** **ECN2438EAX**	**AN16KN0A**
	230	25 30		HMCPE 100A HMCPE 100A	**ECN2431BAG** **ECN2431BAX**	**ECN2432BAG** **ECN2432BAX**	**ECN2434BAG** **ECN2434BAX**	**ECN2438BAG** **ECN2438BAX**	
	460	50		HMCPE 100A	**ECN2431CAG**	**ECN2432CAG**	**ECN2434CAG**	**ECN2438CAG**	
	575	30 50		HMCP 50A HMCP 100A	**ECN2431DAF** **ECN2431DAG**	**ECN2432DAF** **ECN2432DAG**	**ECN2434DAF** **ECN2434DAG**	**ECN2438DAF** **ECN2438DAG**	
4	200 230 460 575	40 50 100 100	120	HMCP 150A HMCP 150A HMCP 150A HMCP 150A	**ECN2441EAH** **ECN2441BAH** **ECN2441CAH** **ECN2441DAH**	**ECN2442EAH** **ECN2442BAH** **ECN2442CAH** **ECN2442DAH**	**ECN2444EAH** **ECN2444BAH** **ECN2444CAH** **ECN2444DAH**	**ECN2448EAH** **ECN2448BAH** **ECN2448CAH** **ECN2448DAH**	**AN16NN0A**
5	200	50 75	120	HMCP 250A HMCP 400A	**ECN2451EAJ** **ECN2451EAK**	**ECN2452EAJ** **ECN2452EAK**	**ECN2454EAJ** **ECN2454EAK**	**ECN2458EAJ** **ECN2458EAK**	**AN16SN0AB**
	230	60 100		HMCP 250A HMCP 400A	**ECN2451BAJ** **ECN2451BAK**	**ECN2452BAJ** **ECN2452BAK**	**ECN2454BAJ** **ECN2454BAK**	**ECN2458BAJ** **ECN2458BAK**	
	460	125 200		HMCP 250A HMCP 400A	**ECN2451CAJ** **ECN2451CAK**	**ECN2452CAJ** **ECN2452CAK**	**ECN2454CAJ** **ECN2454CAK**	**ECN2458CAJ** **ECN2458CAK**	
	575	150 200		HMCP 250A HMCP 400A	**ECN2451DAJ** **ECN2451DAK**	**ECN2452DAJ** **ECN2452DAK**	**ECN2454DAJ** **ECN2454DAK**	**ECN2458DAJ** **ECN2458DAK**	
6	200	150	120	HMCP 600A	**ECN2461EAL**	**ECN2462EAL**	**ECN2463EAL** ⑦	**ECN2468EAL**	**AN16TN0AB**
	230	200		HMCP 600A	**ECN2461BAL**	**ECN2462BAL**	**ECN2463BAL** ⑦	**ECN2468BAL**	
	460	350 400		HMCP 600A HMCP 1200A	**ECN2461CAL** **ECN2461CAP**	**ECN2462CAL** **ECN2462CAP**	**ECN2463CAL** ⑦ **ECN2463CAP** ⑦	**ECN2468CAL** **ECN2468CAP**	
	575	400		HMCP 600A	**ECN2461DAL**	**ECN2462DAL**	**ECN2463DAL** ⑦	**ECN2468DAL**	
7	230 460 575	300 600 600	120	— — —	**ECN2471BAU** ⑥ **ECN2471CAU** ⑥ **ECN2471DAU** ⑥	**ECN2472BAU** ⑥ **ECN2472CAU** ⑥ **ECN2472DAU** ⑥	**ECN2473BAU** ⑦⑥ **ECN2473CAU** ⑦⑥ **ECN2473DAU** ⑦⑥	**ECN2478BAU** ⑥ **ECN2478CAU** ⑥ **ECN2478DAU** ⑥	**AN16UN0AB**
8	230 460 575	450 900 900	120	— — —	**ECN2481BAU** ⑥ **ECN2481CAU** ⑥ **ECN2481DAU** ⑥	**ECN2482BAU** ⑥ **ECN2482CAU** ⑥ **ECN2482DAU** ⑥	**ECN2483BAU** ⑦⑥ **ECN2483CAU** ⑦⑥ **ECN2483DAU** ⑦⑥	**ECN2488BAU** ⑥ **ECN2488CAU** ⑥ **ECN2488DAU** ⑥	**AN16VN0AB**
9	230 460 575	800 1600 1600	120	— — —	**ECN2491BAU** ⑥ **ECN2491CAU** ⑥ **ECN2491DAU** ⑥	**ECN2492BAU** ⑥ **ECN2492CAU** ⑥ **ECN2492DAU** ⑥	**ECN2493BAU** ⑦⑥ **ECN2493CAU** ⑦⑥ **ECN2493DAU** ⑦⑥	**ECN2498BAU** ⑥ **ECN2498CAU** ⑥ **ECN2498DAU** ⑥	**AN16WN0A**

Starters do not include heater packs. Select 1 carton of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.
Starters with Electronic Overload, see **Page 33-47** of Modification Codes.

① 100,000 RMS short-circuit – 480V
25,000 RMS short-circuit – 600V

② For other control power transformer primary and/or secondary voltages, substitute the eighth digit with appropriate digit based on **Table 33-185**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**.
Example: ECN240**4**AAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**.
To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑥ Provide FLA to size disconnect properly.

⑦ Type 4 (Painted steel) Sizes 6 – 9.

Cover Control ..... **Page 33-119**
Other Magnet Coils ..... **Page 33-118**
Dimensions **PG03300001E**
Accessories **PG03300001E**
Modifications ..... **Page 33-42**
Technical Data **PG03300001E**

Wiring Diagrams

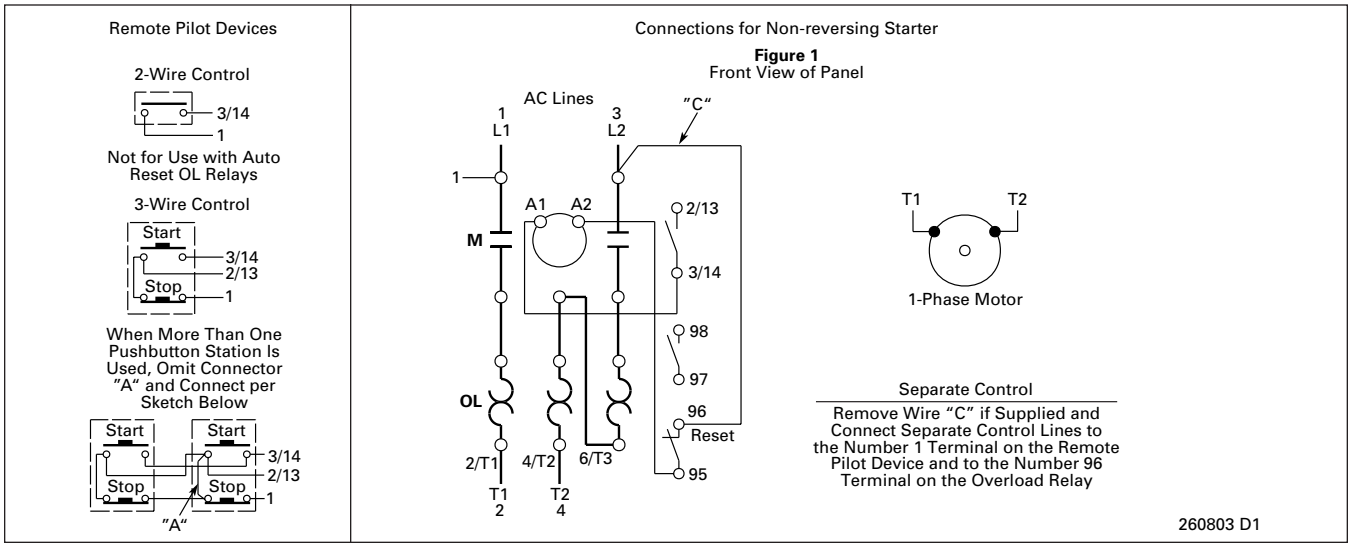

Figure 33-50. Non-reversing Starter — Single-Phase Non-combination

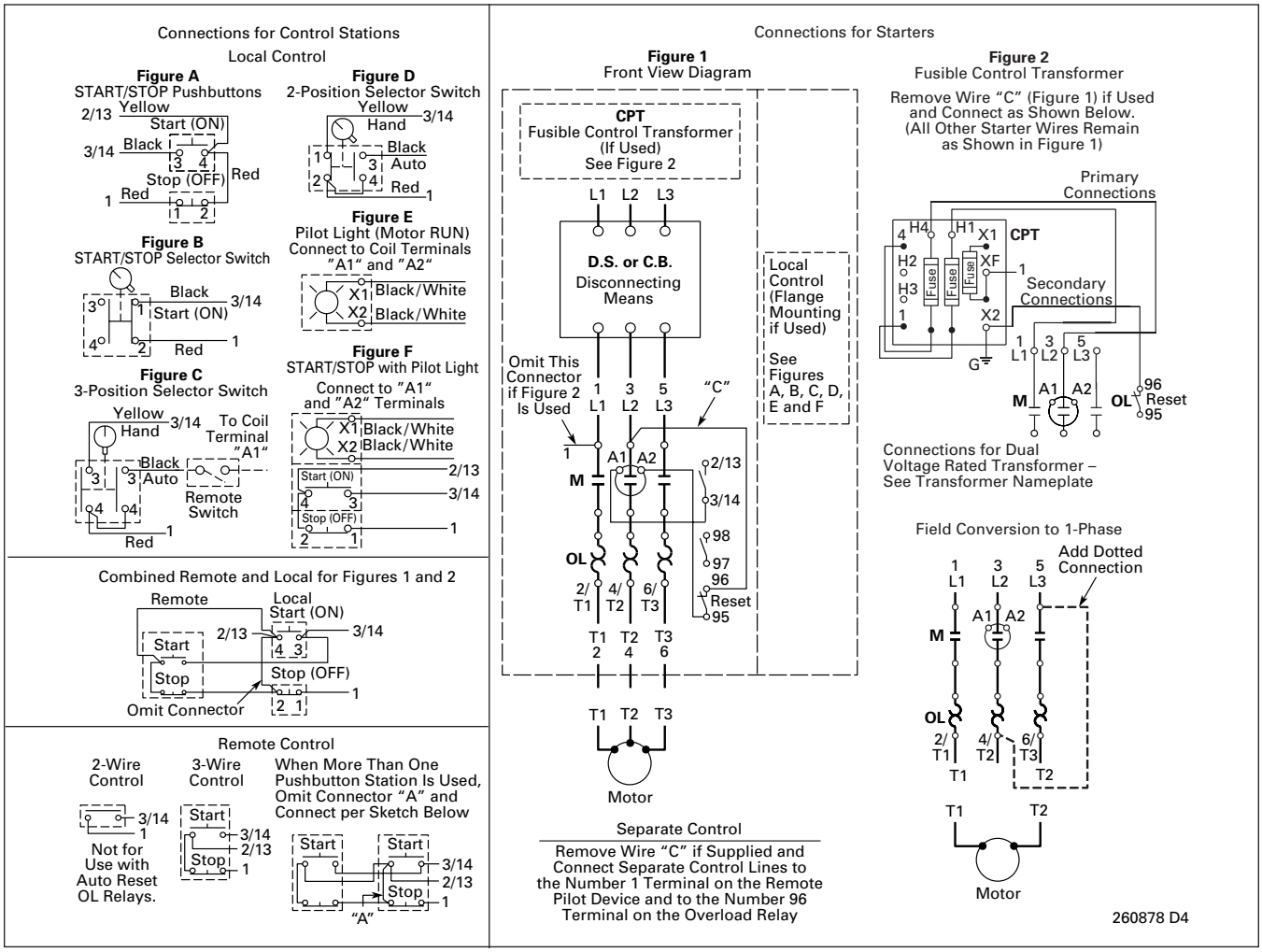

Figure 33-51. Non-reversing Starter — Combination

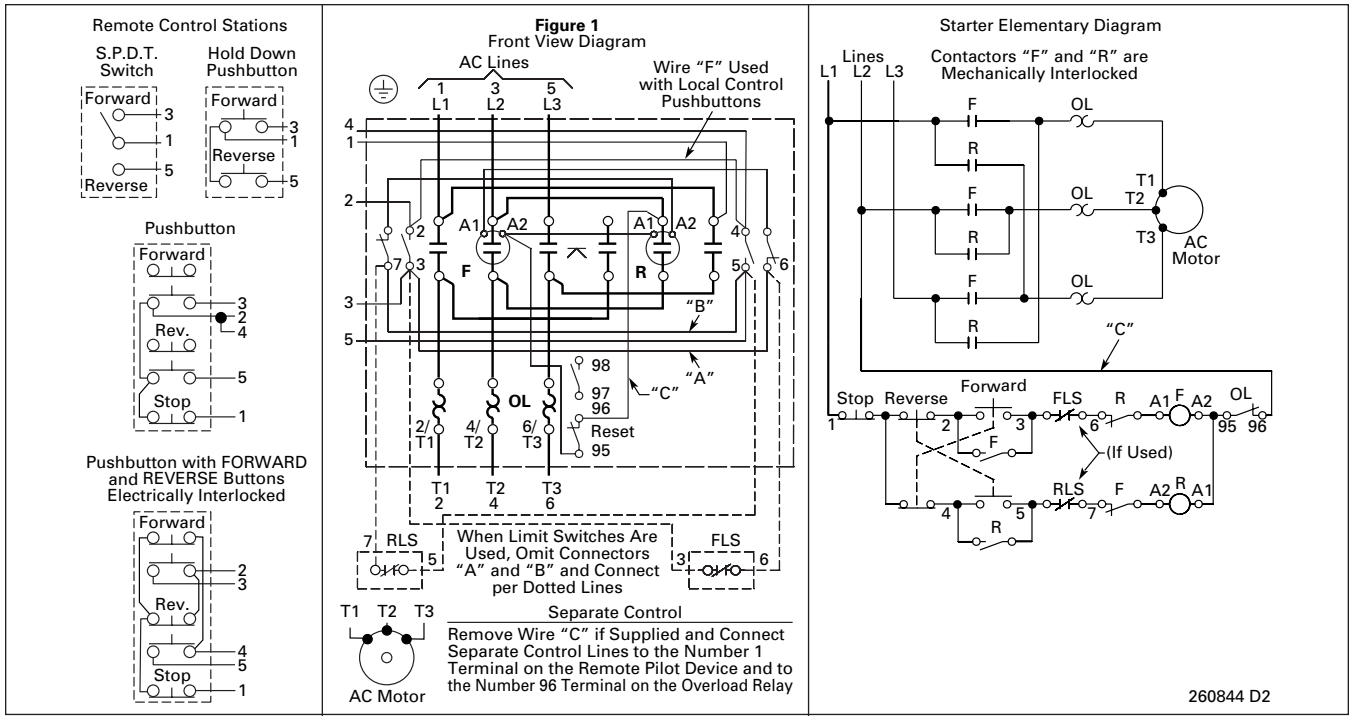

Figure 33-52. Reversing Starter — Non-combination

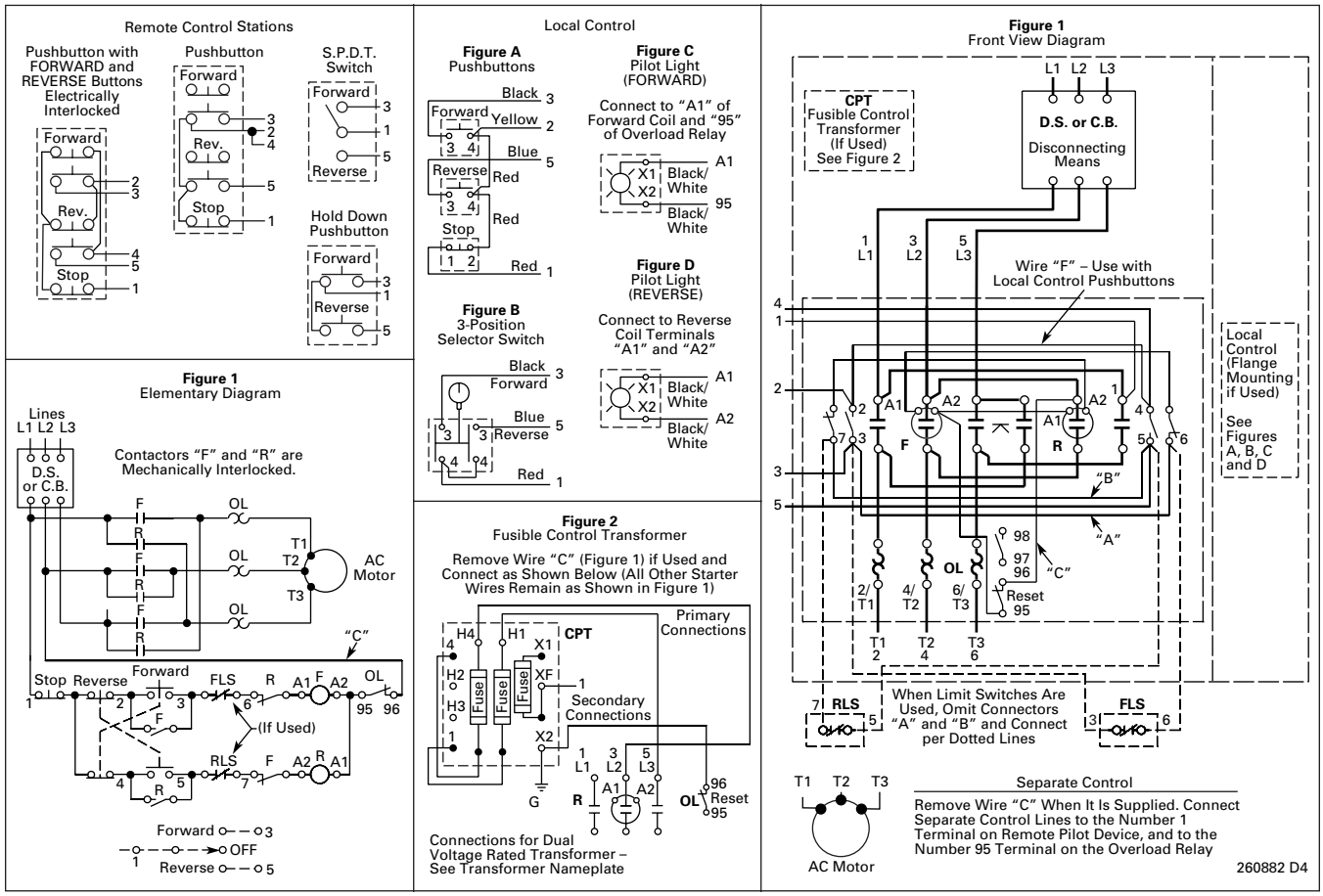

Figure 33-53. Reversing Starter — Combination

Non-reversing Cover Control

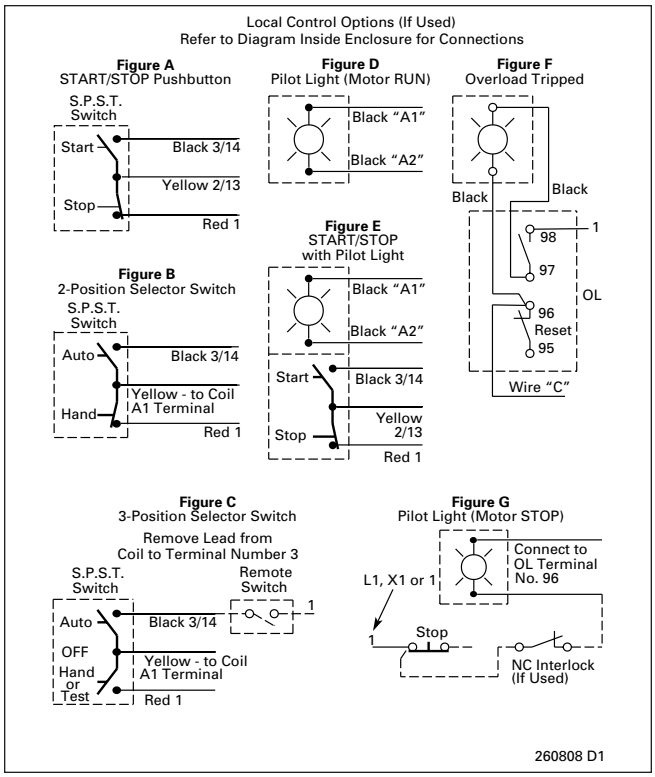

Figure 33-54. Type 1 C400GK Control Options

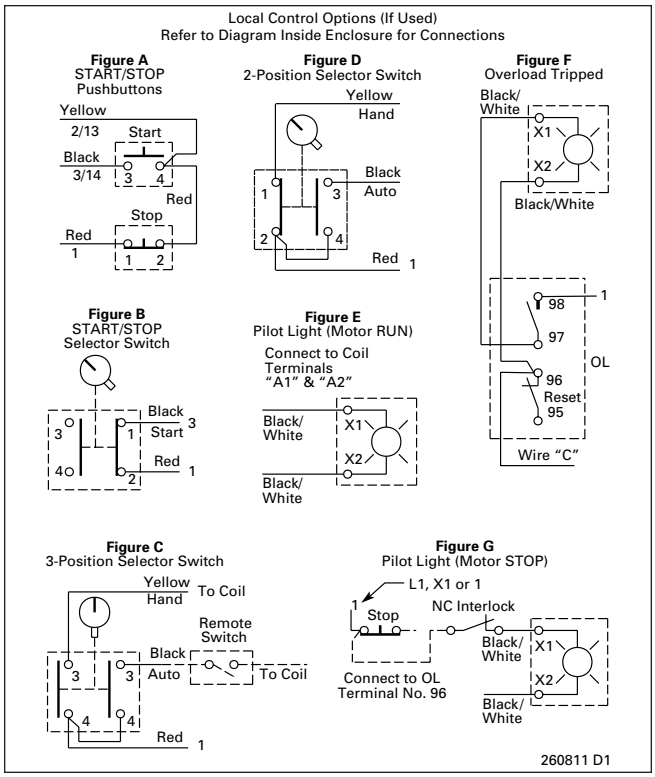

Figure 33-55. C400T Control Options

Reversing Cover Control

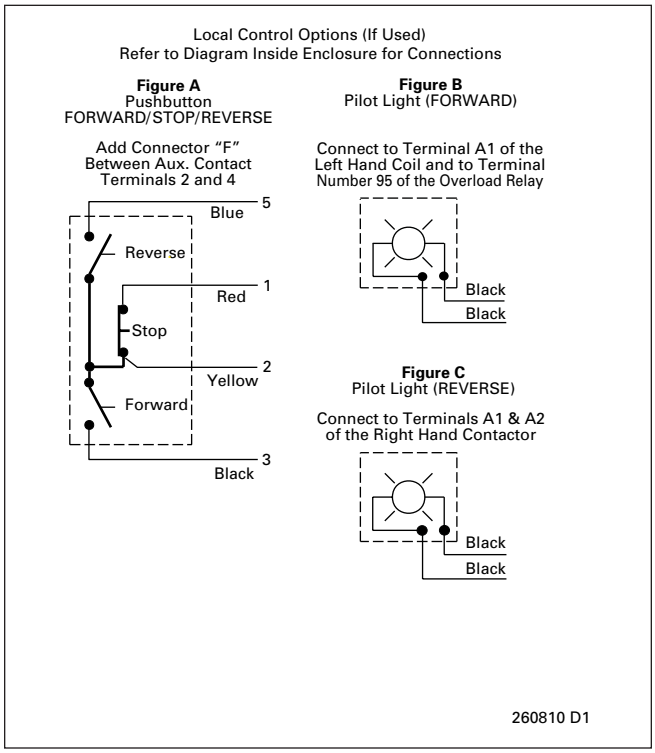

Figure 33-56. Type 1 C400GR Control Options

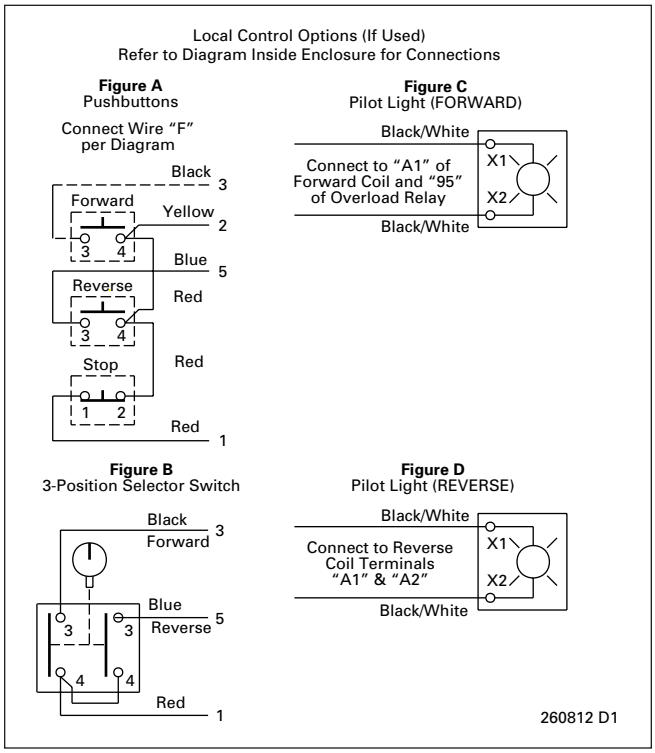

Figure 33-57. C400T Control Options

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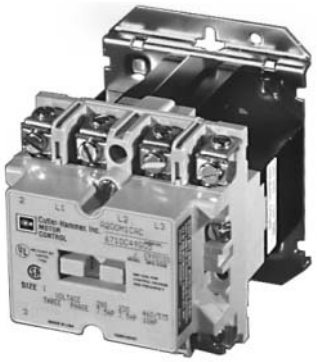
Contents



Size 1 Contactor

Product Description — Sizes 00 – 4

Application

Magnetic contactors are used to switch transformers and capacitors and to control electrical power circuits such as heating, lighting and motors that require no overload protection, or where overload protection is separately provided. They can be operated remotely by manual or automatic pilot devices.

Class A201 Contactors, Sizes 00 – 4; Three-Phase, 1-1/2 – 100 hp

A201 Magnetic Contactors from Eaton's electrical business are 600V rated devices available in NEMA Sizes 00 – 4, 10A through 150A (open rating). Product features include:

- Straight-through wiring to line and load terminals located up front for ease of installation.
- Moving and stationary contacts are front accessible, simplifying inspection and maintenance.
- Reliable U-shaped magnet for reduced power consumption.
- Coil design reduces inventory/maintenance expenses. For a given voltage, one size coil fits all contactors Sizes 00 – 2, and a second coil fits three-pole Model J Sizes 3 and 4. Model K coils are different design.

A201 contactors have normally open holding circuit interlocks which are supplied as standard.

Panel layout and drilling are simplified through the use of common backplates, one for Sizes 00 – 2 and one for Sizes 3 – 4. In addition, panel space is reduced dramatically through the use of unique corner cavities for mounting the wide variety of modifications shown on **Page 33-166.**

For reversing applications, two contactors are supplied on a common base with electrical and mechanical interlocks which prevent both contactors from being closed at the same time.

A201 contactors are UL listed components and also have CSA certification.

Technical Data . . . . . **Pages 33-162 – 33-165**

Size 5 Contactor

Product Description — Sizes 5 – 9

Class A201, Contactors, Sizes 5 – 9; Three-Phase, Over 100 hp

These Cutler-Hammer® AC magnetic contactors utilize clapper design and feature straight-through wiring.

Contacts are silver alloy for longer life. The contacts close with optimum wiping action which serves to keep the contacting surfaces clean. De-ion® arc quenchers draw the arc away from the contacts at opening, which reduces burning and pitting and increases contact life.

All of the contactors are complete with one unwired, normally-open (NO) auxiliary contact mounted and have accommodations for additional auxiliary contacts. No control circuit wiring or terminal markings are included.

Size 5, 300A, 600V, Open
Size 6, 600A, 600V, Open

Cutler-Hammer Class A201 Size 5 and 6 contactors are front clapper design, AC operated with the armature pivoting on dual needle bearings which assure accurate contact alignment.

The contactor base is molded of a high impact, non-tracking, non-hygroscopic glass polyester material permitting front mounting and wiring on a steel panel.

Floating magnet assures quiet operation.

Size 5 and 6 contactors must be mounted with the line terminals directly above the load terminals.

Multi-voltage coil ratings allow selection of the voltage which closely matches the actual system voltage to assure optimum contactor operation.

Each contactor accommodates two Type J11 auxiliary contacts, providing up to four auxiliary circuits, normally-open or normally-closed (NO and NC).

A201 Size 5 and 6 contactors and starters are UL recognized when supplied without terminals. When supplied with terminals, the devices are UL listed.

Two special configurations of the Class A201 Size 5 and 6 contactors are available:

- **Latched Design** — This is a mechanically held, electrically released device. It is applied where the contactor must remain closed during extreme voltage fluctuations or power failure. It is also suitable for applications requiring quiet operation since the operating coil is de-energized when the contactor is closed. The latch assembly consists of a mechanical latch mechanism, electrically operated AC trip solenoid and a clearing contact.
- **DC Operated** — This device is DC operated. It is used where low drop-out voltage or exceptionally quiet operation is desired. The DC assembly consists of a DC operating coil, integrally mounted rectifier and shorting contact.

Size 7, 900A, 600V, Open
Size 8, 1350A, 600V, Open
Size 9, 2500A, 600V, Open

Cutler-Hammer Class A201 Size 7 and 8 contactors are DC operated side clapper design with the shaft mounted on dual needle bearings to ensure positive contact alignment and long contact life.

A steel panel base permits mounting on angle or channel without additional support, for versatile low cost installation.

Each stationary contact assembly is mounted on an individual molded insulator. Each pair of contacts is surrounded by a De-ion grid type arc quencher for rapid and confined arc interruption and long contact life.

The shunt for each pole is made of flexible, braided copper cable for freedom of movement and long life.

The rugged DC operating coils are designed to operate at high temperature and insulated to meet Class H service.

An integrally mounted avalanche type silicon rectifier supplies DC coil voltage from the AC control circuit.

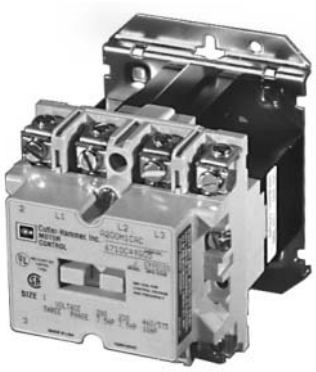
Sizes 7 and 8 accommodate three Type L-63 auxiliary contacts which are easily converted from normally-open to normally-closed, providing auxiliary circuit flexibility. Size 9 uses L-64 auxiliary contacts with a total of four circuits.

A201 Size 7, 8 and 9 contactors and starters are UL recognized when supplied without terminals. When supplied with terminals, the devices are UL listed.

Instructional Leaflets

16960B	Sizes 00 – 1 Magnetic Contactor, Non-reversing or Reversing
16961E	Size 2 Magnetic Contactor, Non-reversing or Reversing
13238G	Size 3 Magnetic Contactor, Non-reversing or Reversing
17001C	Size 4 Magnetic Contactor, Non-reversing or Reversing
17049D	Size 5 Magnetic Contactor, Non-reversing or Reversing
17053B	Size 6 Magnetic Contactor, Non-reversing or Reversing
17048	Sizes 7 – 8 Magnetic Contactor, Non-reversing or Reversing
16978	Size 9 Magnetic Contactor, Non-reversing or Reversing

Technical Data. . . . . **Pages 33-162 – 33-165**



A201 Size 1 Contactor

Product Selection — Non-reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalog Number from **Table 33-209**, plus Suffix for coil voltages,
verifying usage of appropriate sizes.

Table 33-209. Front Connected Contactors Selection

Size	Amps	Max. UL Horsepower						2 Poles — Open		3 Poles — Open		4 Poles — Open		5 Poles — Open	
		1-Phase		3-Phase				Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
		115V	230V	208V	240V	480V	600V								
Sizes 00 – 6															
00	9	1/3	1	1-1/2	1-1/2	2	2	**A201KAB_**		**A201KAC_**		**A201KAD_**		**A201KAE_**	
0	18	1	2	3	3	5	5	**A201K0B_**		**A201K0C_**		**A201K0D_**		**A201K0E_**	
1	27	2	3	7-1/2	7-1/2	10	10	**A201K1B_**		**A201K1C_**		**A201K1D_**		**A201K1E_**	
2	45	3	7-1/2	10	15	25	25	**A201K2B_**		**A201K2C_**		**A201K2D_**		**A201K2E_**	
3	90	—	—	25	30	50	50	**A201K3B_**		**A201K3C_**		**A201K3D_**		**A201K3E_**	
4	135	—	—	40	50	100	100	**A201K4B_**		**A201K4C_**		**A201K4D_**		**A201K4E_**	
5	270	—	—	75	100	200	200	**A201K5B_**		**A201K5C_**		**—**		**—**	
6	540	—	—	150	200	400	400	**A201K6B_**		**A201K6C_**		**—**		**—**	
Sizes 7 – 9															
7 ①	810	—	—	200	300	600	600	**A201K7B_**		**A201K7C_**		**—**		**—**	
8 ①	1215	—	—	400	450	900	900	**A201K8B_**		**A201K8C_**		**—**		**—**	
9 ①	2250	—	—	—	800	1600	—	**A201K9B_**		**A201K9C_Z1** ②③		**—**		**—**	

① Sizes 7 – 9 use rectifier with DC coil.
② For Size 9, only available coil voltage is 120V.
③ Supplied without terminal lugs.

Table 33-210. Rear Connected Contactors Selection

120 Volt Rectified Coil/Open Only		
Size	**Catalog Number**	**Price U.S.**
7	**A201K7CJZ1Z4**	
8	**A201K8CJZ1Z4**	
9	**A201K9CJZ1Z4**	

Table 33-211. Coils for Sizes 00 – 6

Coil Volts and Hz	Code Suffix
120/60 or 110/50	**A**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

Table 33-212. Coils for Sizes 7, 8 and 9 ④

Coil Volts and Hz	Code Suffix
110 – 120/50 or 60	**J**
220 – 240/50 or 60	**K**
440 – 480/50 or 60	**U**
600/60	**E**

④ For Size 9, only available coil voltage is 120V.

Modification Kits, Accessories . . . . . **Pages 33-166 – 33-168**
Factory Modifications. . . . . **Page 33-166**
Other Coil Voltages . . . . . **Page 33-165**
Technical Data . . . . . **Pages 33-162 – 33-165**
Dimensions . . . . . **Page 33-152**
Discount Symbol **1CD1**

Size 1 Horizontal Reversing Contactor

Product Selection — Reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalog Number from **Table 33-213**, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Class A211 Reversing Contactors — Horizontally Mounted
Class A251 Reversing Contactors — Vertically Mounted

Table 33-213. Reversing Contactors Selection

Size	Amps	Max. UL Horsepower						Horizontal Design		Vertical Design	
		1-Phase		3-Phase				Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
		115V	230V	208V	240V	480V	600V				
Sizes 0 – 6											
0	18	1	2	3	3	5	5	**A211K0C_**		**A251K0C_**	
1	27	2	3	7-1/2	7-1/2	10	10	**A211K1C_**		**A251K1C_**	
2	45	3	7-1/2	10	15	25	25	**A211K2C_**		**A251K2C_**	
3	90	—	—	25	30	50	50	**A211K3C_**		**A251K3C_**	
4	135	—	—	40	50	100	100	**A211K4C_**		**A251K4C_**	
5	270	—	—	75	100	200	200	**A211K5C_**		**A251K5C_**	
6	540	—	—	150	200	400	400	**A211K6C_**		**A251K6C_**	
Sizes 7 – 9											
7 ①	810	—	—	200	300	600	600	**—**		**A251K7C_**	
8 ①	1215	—	—	400	450	900	900	**—**		**A251K8C_**	
9 ①	2250	—	—	—	800	1600	—	**—**		**A251K9C_** ②	

① Sizes 7 – 9 use rectifier with DC coil.
② For Size 9, only available coil voltage is 120V.

Table 33-214. Coils for Sizes 00 – 6

Coil Volts and Hz	Code Suffix
120/60 or 110/50	**A**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

Table 33-215. Coils for Sizes 7, 8 and 9 ③

Coil Volts and Hz	Code Suffix
110 – 120/50 or 60	**J**
220 – 240/50 or 60	**K**
440 – 480/50 or 60	**U**
600/60	**E**

③ For Size 9, only available coil voltage is 120V.

Modification Kits, Accessories . . . . . **Pages 33-166 – 33-168**
Factory Modifications . . . . . **Page 33-166**
Other Coil Voltages . . . . . **Page 33-165**
Technical Data . . . . . **Pages 33-162 – 33-165**
Dimensions . . . . . **Page 33-153**
Discount Symbol **1CD1**

Dimensions and Shipping Weights

Not to be used for construction purposes unless approved.

Table 33-216. Non-reversing Open Contactors Dimensions

33

NEMA Size	No. of Poles	Fig.	Mounting Screws		Approximate Dimensions in Inches (mm)								Weight, Lbs. (kg)
			No.	Size	A	B	C	D	E	F	G	H	
00, 0, 1	2 – 4 5	A A	3 3	#10 #10	3.31 (84.1) 4.19 (106.4)	4.38 (111.3) 4.38 (111.3)	4.61 (117.1) 4.61 (117.1)	3.95 (100.3) 3.95 (100.3)	1.50 (38.1) 1.50 (38.1)	1.66 (42.2) 2.09 (53.1)	.23 (5.8) .23 (5.8)	— —	2.6 (1.2) 3.2 (1.5)
2	2, 3 4, 5	A A	3 3	#10 #10	3.31 (84.1) 5.06 (128.5)	4.38 (111.3) 4.38 (111.3)	4.94 (125.5) 4.94 (125.5)	3.95 (100.3) 3.95 (100.3)	1.50 (38.1) 1.50 (38.1)	1.66 (42.2) 2.53 (64.3)	.23 (5.8) .23 (5.8)	— —	3.3 (1.5) 4.5 (2.0)
3, 4	2, 3 4, 5	A A	3 3	1/4 in. 1/4 in.	4.63 (117.6) 7.25 (184.2)	6.63 (168.4) 6.63 (168.4)	6.75 (171.5) 6.75 (171.5)	6.00 (152.4) 6.00 (152.4)	1.88 (47.8) 1.88 (47.8)	2.31 (58.7) 3.63 (92.2)	.38 (9.7) .38 (9.7)	— —	9.3 (4.2) 13.0 (5.9)
5	2, 3	B	4	3/8 in.	7.22 (183.4)	12.00 (304.8)	7.75 (196.9)	11.00 (279.4)	2.75 (69.9)	—	.59 (15.0)	2.22 (56.4)	25.0 (11.4)
6	2, 3	C	4	3/8 in.	7.22 (183.4)	13.50 (342.9)	9.50 (251.3)	11.00 (279.4)	2.75 (69.9)	—	.59 (15.0)	2.22 (56.4)	42.0 (19.1)
7	3	D	4	3/8 in.	23.50 (596.9)	18.63 (473.2)	11.00 (279.4)	12.00 (304.8)	22.00 (558.8)	—	5.63 (143.0)	.75 (19.1)	215.0 (97.6)
8	3	D	4	3/8 in.	23.50 (596.9)	19.25 (489.0)	11.00 (279.4)	12.00 (304.8)	22.00 (558.8)	—	5.63 (143.0)	.75 (19.1)	265.0 (120.3)
9	3	D	4	1/2 in.	33.00 (838.2)	29.75 (755.7)	12.94 (328.7)	8.00 (203.2)	30.75 (781.1)	—	14.50 (368.3)	1.63 (41.4)	315.0 (143.0)

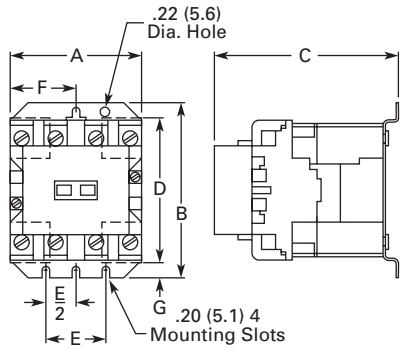


Figure A
Sizes 00 – 4 A201 Contactors

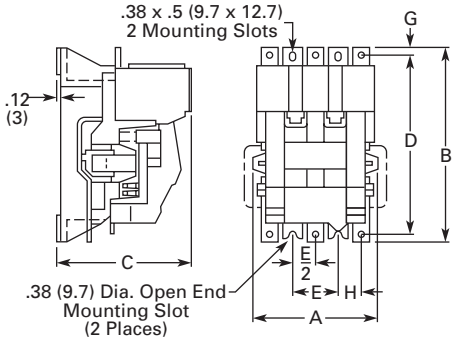


Figure B
Size 5

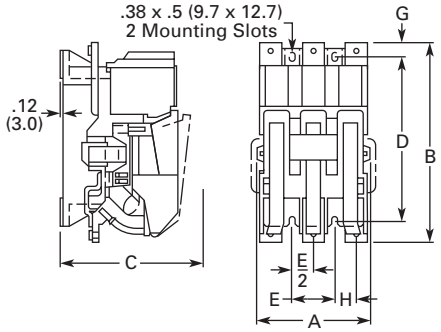


Figure C
Size 6

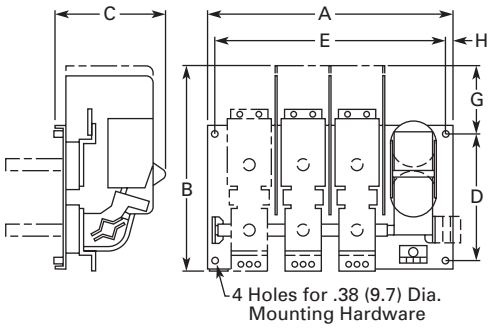


Figure D
Sizes 7 – 9

Figure 33-58. Non-reversing Open Contactors Dimensions

Not to be used for construction purposes unless approved.

Table 33-217. Reversing Open Contactors Dimensions

NEMA Size	No. of Poles	Fig.	Mounting Screws		Approximate Dimensions in Inches (mm)								Weight, Lbs. (kg)
			No.	Size	A	B	C	D	E	F	G	H	
00, 0, 1	3 x 3 H. 3 x 3 V.	A B	3 3	#10 #10	7.13 (181.1) 3.33 (84.6)	4.45 (113.0) 9.61 (244.1)	5.05 (128.3) 5.05 (128.3)	3.95 (100.3) 9.08 (230.6)	5.31 (134.9) 2.16 (54.9)	3.56 (90.4) .75 (19.1)	.25 (6.4) .25 (6.4)	— 4.52 (114.8)	7.8 (3.5) 8.9 (4.0)
2	3 x 3 H. 3 x 3 V.	A B	3 3	#10 #10	7.13 (181.1) 3.33 (84.6)	4.45 (113.0) 9.61 (244.1)	5.38 (136.7) 5.38 (136.7)	3.95 (100.3) 9.08 (230.6)	5.31 (134.9) 2.16 (54.9)	3.56 (90.4) .75 (19.1)	.25 (6.4) .25 (6.4)	— 4.52 (114.8)	9.1 (4.1) 10.0 (4.5)
3, 4	3 x 3 H. 3 x 3 V.	A B	3 3	1/4 in. 1/4 in.	9.75 (247.7) 4.63 (117.6)	6.88 (174.8) 16.56 (420.6)	7.25 (184.2) 7.25 (184.2)	6.00 (152.4) 15.69 (398.5)	7.00 (177.8) 2.75 (69.9)	4.88 (124.0) .94 (23.9)	.44 (11.2) .44 (11.2)	— 7.78 (197.6)	24.0 (10.9) 25.0 (11.4)
5	3 x 3 H. 3 x 3 V.	C D	8 8	3/8 in. 3/8 in.	17.22 (437.4) 8.25 (209.6)	12.00 (304.8) 30.00 (762.0)	7.75 (196.9) 7.75 (196.9)	11.00 (279.4) 18.00 (457.8)	2.75 (69.9) 2.75 (69.9)	10.00 (254.0) —	.59 (15.0) —	1.38 (35.1) 1.38 (35.1)	55.0 (25.0) 55.0 (26.0)
6	3 x 3 H. 3 x 3 V.	C D	8 8	3/8 in. 3/8 in.	17.22 (437.4) 8.25 (209.6)	13.50 (342.9) 41.50 (1054.1)	8.75 (222.3) 8.75 (222.3)	11.00 (279.4) 28.00 (711.2)	2.75 (69.9) 2.75 (69.9)	10.00 (254.0) —	.59 (15.0) —	1.38 (35.1) 1.38 (35.1)	90.0 (40.9) 90.0 (40.9)
7	3 x 3 V.	E	8	3/8 in.	23.50 (596.9)	38.63 (981.2)	11.00 (279.4)	20.00 (508.0)	22.00 (558.8)	—	5.63 (143.0)	.75 (19.1)	450.0 (204.3)
8	3 x 3 V.	E	8	3/8 in.	23.50 (596.9)	39.25 (997.0)	11.00 (279.4)	20.00 (508.0)	22.00 (558.8)	—	5.63 (143.0)	.75 (19.1)	550.0 (249.7)
9	3 x 3 V.	E	8	1/2 in.	33.00 (838.2)	62.75 (1593.9)	12.94 (328.7)	33.00 (838.2)	30.75 (781.1)	—	14.50 (368.3)	1.63 (41.4)	650.0 (295.1)

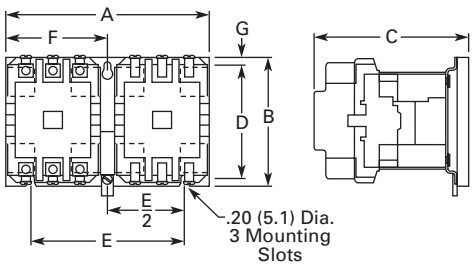


Figure A
Sizes 00 – 4 Horizontal

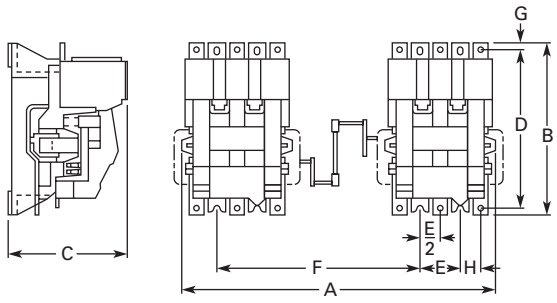


Figure C
Sizes 5, 6 Horizontal

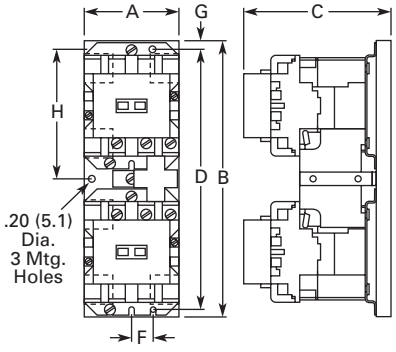


Figure B
Sizes 00 – 4 Vertical

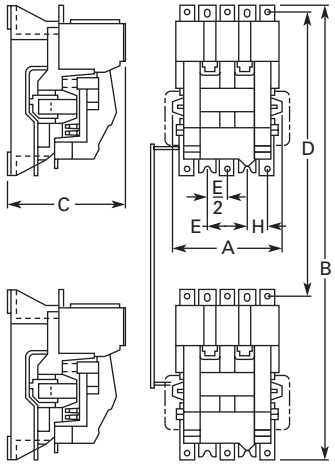


Figure D
Sizes 5, 6 Vertical

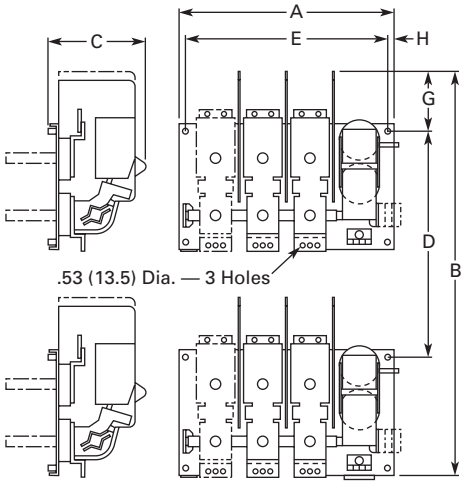


Figure E
Sizes 7 – 9 Vertical

Figure 33-59. Reversing Open Contactors Dimensions

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Contents

Size 1 Starter

Product Description — Sizes 00 – 4

Application

Magnetic starters are used for full-voltage, across-the-line starting and stopping of squirrel cage motors. They can be operated locally or remotely by manual or automatic pilot devices.

NEMA Sizes 00 – 4; Three-Phase, 1-1/2 – 100 hp

These Cutler-Hammer® Starters from Eaton's electrical business use Class A201 contactors as described on **Page 33-148**. Contactor features are enhanced through the ability to provide positive motor protection in the form of several types of overload relays. See **Pages 33-174** – **33-182**.

Type B Overload Relay, Manual Reset Only

Supplied as standard on Class A200 and A900 starters (two-speed). The bi-metallic overload relay offers ambient compensation and trip-to-test feature (relay contact status check) as standard. In addition, an isolated normally-open contact is available in kit form for customer mounting. Type B overload relays are manual reset only.

Type A Overload Relay, Manual or Automatic Reset

This is an optional overload relay, offering the capability of field conversion to automatic reset. It is available as an ambient compensated or non-compensated type.

Non-reversing Starters

Non-reversing starters are supplied as open devices. All starters are supplied with a normally-open holding circuit interlock.

Class A200 starters are available as UL listed or recognized components, as well as with CSA certification.

Reversing Starters

For reversing applications (Class A210), a starter and a contactor electrically and mechanically interlocked are supplied on a common baseplate. Reversing starters are used to start, stop and reverse AC squirrel cage motors and for primary control of reversing wound-rotor motors.

For plugging or inching, when operations exceed five times per minute, decreased horsepower ratings in accordance with NEMA Standard ICS 2-321 are recommended.

Two-Speed Starters, A900s

For across-the-line starting of two-speed constant hp, constant torque and variable torque squirrel cage motors, two-speed starters (Class A900) are available. These Cutler-Hammer starters consist of two starters, one for each motor speed, mechanically and electrically interlocked and wired for manual speed selection by means of pushbuttons. Auxiliary relays may be added to provide automatic acceleration or deceleration.

Starters for two-speed, two independent winding motors consist of two-, three- or four-pole starters electrically and mechanically interlocked. Starters for two-speed, single reconnectable winding motors consist of one three-pole and one five-pole starter mechanically and electrically interlocked.

Size 5 Starter

Product Description — Sizes 5 – 9

NEMA Sizes 5 – 9; Three-Phase 75 to 1600 hp

Non-reversing (Class A200), and reversing (Classes A210, A250) full voltage starters are used for across-the-line starting of squirrel cage induction motors. They are used with motors rated above 50 hp at 230V, and above 100 hp at 460 through 600V.

Sizes 5 and 6 Cutler-Hammer starters use Class A201 contactors as described on **Page 33-149**. In addition to standard motor starters, special application devices are available: Sizes 5 and 6 starters with integrally rectified AC to DC coils for applications where low voltage problems are prevalent are available.

Class A200 starters are UL listed and recognized and also carry CSA certification.

Front Removable Parts — All operating parts can be removed quickly and easily from the front. Straight-through wiring and conveniently located connection points for external wires and cables minimize installation time.

Type B Block Type Thermal Overload Relay — Dependable overload protection is assured by these snap-action, manual reset relays. Automatic reset Type A relays are available as an option.

Technical Data . . . . . **Pages 33-162** – **33-165**

Types of Starters

Class A200, Sizes 5 and 6 — Non-reversing starters contain an AC magnetically-operated Size 5 or Size 6 line contactor and block Type B three-pole overload relay, along with three current transformers. A control relay whose contacts handle the coil current of the starter is provided with Size 6 starters.

Class A200, Sizes 7, 8 and 9 — Non-reversing starters contain a DC operated line contactor, DC power supply, block Type B three-pole overload relay with three current transformers and a control relay.

Class A960/A970/A980 Multi-Speed Starters: Refer to **Page 33-158**.

Features and Benefits

Sizes 00 – 4

- **Straight-Through Wiring, Up-Front, Out-Front Terminals** for ease in installation.
- **Unique Accessory Mounting Cavities** reduce panel space requirements.
- **Snap-in Accessories** for application flexibility.
- **Vertical and Horizontal Interlocking** capability increases application flexibility.
- **Ambient Compensated Overload Relays** available as standard, offering superior motor protection in variable motor/controller environments.
- **Isolated Normally Open Relay Contact** available in kit mounting form on Type B Overload Relay.

Sizes 5 – 9

- **Rectified AC/DC Coils** available to reduce premature drop-out or "kiss" problems due to inherent low voltage conditions.
- **Clapper Design** armature assembly pivots on needle bearings resulting in quick, smooth opening and closing of the magnet.
- **Stainless Steel Kick-Out Spring** assures quick, positive drop-out time.
- **Front Removable Parts** all current carrying parts front removable for easy inspection and maintenance.

Instructional Leaflets

16958	Sizes 00 – 1, 3-Pole Motor Controller
16956	Sizes 00 – 1, 2-Pole, Single-Phase Motor Controller
16959	Size 2, 3-Pole Motor Controller
16957	Size 2, 2-Pole, Single-Phase Motor Controller
15465C	Sizes 3 and 4J Motor Controller
17000C	Size 4, Model K Motor Controller
17054C	Size 5 Motor Controller
17055C	Size 6 Motor Controller

Technical Data. . . . . **Pages 33-162 – 33-165**

Size 3 Starter

Product Selection — Non-reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalog Number from **Table 33-218** or **Table 33-219**, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-181 – 33-182**, as required per starter.

Table 33-218. Non-reversing Starters Selection — 2 Poles ②

Size	Amps	Max. UL Horsepower						Open	
		1-Phase		3-Phase				Catalog Number ①	Price U.S $
		115V	230V	208V	240V	480V	600V		
Sizes 00 – 2									
00	9	1/3	—	1-1/2	1-1/2	2	2	**A200MABR**	
0	18	1	—	3	3	5	5	**A200M0BR**	
1	27	2	—	7-1/2	7-1/2	10	10	**A200M1BR**	
1-1/2	36	3	—	—	—	—	—	**A200MDBR**	
2	45	7-12	—	10	15	25	25	**A200M2BR**	

① For ambient compensated overload relay with auto-reset, add Suffix **D**.
② Single-phase with one single-pole overload relay.

Table 33-219. Non-reversing Starters Selection — 3 Poles

Size	Amps	Max. UL Horsepower						Open	
		1-Phase		3-Phase				Catalog Number ③	Price U.S. $
		115V	230V	208V	240V	480V	600V		
Sizes 00 – 6									
00	9	1/3	—	1-1/2	1-1/2	2	2	**A200MAC_**	
0	18	1	—	3	3	5	5	**A200M0C_**	
1	27	2	—	7-1/2	7-1/2	10	10	**A200M1C_**	
2	45	7-12	—	10	15	25	25	**A200M2C_**	
3	90	—	—	25	30	50	50	**A200M3C_**	
4	135	—	—	40	50	100	100	**A200M4C_**	
5	270	—	—	75	100	200	200	**A200M5C_**	
6	540	—	—	150	200	400	400	**A200M6C_**	
Sizes 7 – 9									
7 ④	810	—	—	200	300	600	600	**A200M7C_**	
8 ④	1215	—	—	400	450	900	900	**A200M8C_**	
9 ④	2250	—	—	—	800	1600	—	**A200M9C_** ⑤	

③ For ambient compensated overload relay with auto-reset, add Suffix **D**.
④ Sizes 7 – 9 use rectifier with DC coil.
⑤ For Size 9, only available coil voltage is 120V.

Table 33-220. Coils for Sizes 00 – 6

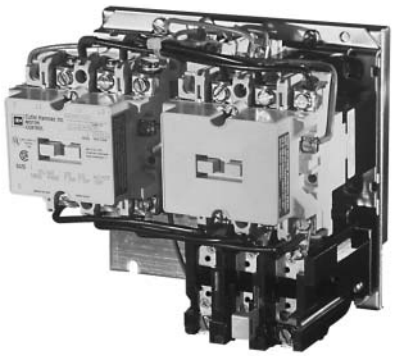
Coil Volts and Hz	Code Suffix
120/60 or 110/50	**AC**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

Table 33-221. Coils for Sizes 7, 8 and 9 ⑥

Coil Volts and Hz	Code Suffix
110 – 120/50 or 60	**J**
220 – 240/50 or 60	**W**
440 – 480/50 or 60	**X**
600/60	**E**

⑥ For Size 9, only available coil voltage is 120V.

Technical Data . . . . . **Pages 33-162 – 33-165**
Heaters . . . . . **Pages 33-181 – 33-182**
Other Coil Voltages . . . . . **Page 33-165**
Factory Modifications . . . . . **Page 33-166**
Modification Kits, Accessories . . . . . **Pages 33-166 – 33-168**
Dimensions . . . . . **Page 33-159**
Discount Symbol **1CD1**



Size 1 Horizontal Reversing Starter

Product Selection — Reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalog Number from **Table 33-222**, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-181 – 33-182**, as required per starter.

Table 33-222. Reversing Starters Selection

Size	Amps	Max. UL Horsepower						Horizontal Design		Vertical Design	
		1-Phase		3-Phase				Catalog Number ①	Price U.S $	Catalog Number ①	Price U.S. $
		115V	230V	208V	240V	480V	600V				
Sizes 00 – 6											
00	9	1/3	1	1-1/2	1-1/2	2	2	**A210MAC_**		**A250MAC_**	
0	18	1	2	3	3	5	5	**A210M0C_**		**A250M0C_**	
1	27	2	3	7-1/2	7-1/2	10	10	**A210M1C_**		**A250M1C_**	
2	45	3	7-1/2	10	15	25	25	**A210M2C_**		**A250M2C_**	
3	90	—	—	25	30	50	50	**A210M3C_**		**A250M3C_**	
4	135	—	—	40	50	100	100	**A210M4C_**		**A250M4C_**	
5	270	—	—	75	100	200	200	**A210M5C_**		**A250M5C_**	
6	540	—	—	150	200	400	400	**A210M6C_**		**A250M6C_**	
Sizes 7 – 9											
7 ②	810	—	—	200	300	600	600	**—**		**A250M7C_**	
8 ②	1215	—	—	400	450	900	900	**—**		**A250M8C_**	
9 ②	2250	—	—	—	800	1600	—	**—**		**A250M9C_** ③	

① For ambient compensated overload relay with auto-reset, add Suffix **D**.
② Sizes 7 – 9 use rectifier with DC coil.
③ For Size 9, only available coil voltage is 120V.

Table 33-223. Coils for Sizes 00 – 6

Coil Volts and Hz	Code Suffix
120/60 or 110/50	**AC**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

Table 33-224. Coils for Sizes 7, 8 and 9 ④

Coil Volts and Hz	Code Suffix
110 – 120/50 or 60	**J**
220 – 240/50 or 60	**W**
440 – 480/50 or 60	**X**
600/60	**E**

④ For Size 9, only available coil voltage is 120V.

Technical Data. . . . . **Pages 33-162 – 33-165**
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Modification Kits, Accessories . . . . . **Pages 33-166 – 33-168**
Dimensions. . . . . **Page 33-160**
Discount Symbol **1CD1**

Product Selection

For Separate Two-Winding Motors

Heaters

33

Enter heaters as separate item by listing Catalog Number from table, **Pages 33-181 – 33-182**, as required per starter.

Table 33-225. Three-Phase, Non-reversing, Reversing 60 Hz Starters — Heater Selection

NEMA	Amps	Constant Horsepower				Constant or Variable Torque				3 Poles — Open	
		208V	240V	480V	600V	208V	240V	480V	600V	Catalog Number ①	Price U.S. $
Sizes 0 – 6											
0	18	3	3	5	5	2	2	3	3	**A960M0C_**	
1	27	7-1/2	7-1/2	10	10	5	5	7-1/2	7-1/2	**A960M1C_**	
2	45	10	15	25	25	7-1/2	10	20	20	**A960M2C_**	
3	90	25	30	50	50	20	25	40	40	**A960M3C_**	
4	135	40	50	100	100	30	40	75	75	**A960M4C_**	
5	270	75	100	200	200	60	75	150	150	**A960M5C_**	
6	540	150	200	400	400	100	150	300	300	**A960M6C_**	

① For ambient compensated overload relay with auto-reset, add Suffix **D**.

Table 33-227. Coils for Sizes 0 – 6

Coil Volts and Hz	Coil Suffix
120/60 or 110/50	**AC**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

For Single-Winding Motors

Table 33-226. Product Selection — Sizes 0 – 6

NEMA	Amps	208V	240V	480V	600V	3 Poles — Open	
						Catalog Number ②	Price U.S. $
Constant Horsepower							
0	18	3	3	5	5	**A970M0C_**	
1	27	7-1/2	7-1/2	10	10	**A970M1C_**	
2	45	10	15	25	25	**A970M2C_**	
3	90	25	30	50	50	**A970M3C_**	
4	135	40	50	100	100	**A970M4C_**	
5	270	75	100	200	200	**A970M5C_**	
6	540	150	200	400	400	**A970M6C_**	
Constant or Variable Torque							
0	18	2	2	3	3	**A980M0C_**	
1	27	5	5	7-1/2	7-1/2	**A980M1C_**	
2	45	7-1/2	10	20	20	**A980M2C_**	
3	90	20	25	40	40	**A980M3C_**	
4	135	30	40	75	75	**A980M4C_**	
5	270	60	75	150	150	**A980M5C_**	
6	540	100	150	300	300	**A980M6C_**	

② For ambient compensated overload relay with auto-reset, add Suffix **D**.

Table 33-228. Coils for Sizes 0 – 6

Coil Volts and Hz	Coil Suffix
120/60 or 110/50	**AC**
200 – 208/60	**B**
240/60	**W**
480/60	**X**
600/60	**E**

Technical Data . . . . . **Pages 33-162 – 33-165**
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Dimensions . . . . . **Page 33-161**
Discount Symbol **1CD1**

Dimensions and Shipping Weights

Not to be used for construction purposes unless approved.

Table 33-229. Open Non-reversing Starters Dimensions

NEMA Size	No. of Poles	Fig.	Mounting Screws		Dimensions in Inches (mm)												Weight, Lbs. (kg)
			No.	Size	A	B	C	D	E	F	G	H	J	K	L	M	
00, 0, 1	2, 3	A	3	#10	3.31 (84.1)	6.42 (163.1)	4.61 (117.1)	6.00 (152.4)	1.88 (47.8)	1.66 (42.2)	.23 (5.8)	—	.39 (9.9)	.59 (15.0)	4.48 (113.8)	.27 (6.9)	35.0 (15.9)
2	2, 3	A	3	#10	3.31 (84.1)	7.17 (182.1)	4.94 (125.5)	6.75 (171.5)	1.88 (47.8)	1.66 (42.2)	.23 (5.8)	—	.41 (10.4)	.77 (19.6)	4.53 (115.1)	.27 (6.9)	43.0 (19.5)
3, 4	2, 3	A	3	1/4 in.	4.63 (117.6)	9.94 (252.5)	6.75 (171.5)	9.25 (235.0)	2.88 (73.2)	.94 (23.9)	.38 (9.7)	—	.55 (14.0)	.80 (20.3)	6.36 (161.5)	.27 (6.9)	115.0 (52.2)
5	3	B	4	3/8 in.	7.59 (192.8)	16.22 (412.0)	7.75 (196.9)	11.00 (279.4)	2.75 (69.9)	3.81 (96.8)	2.69 (68.3)	2.42 (61.5)	.33 (8.4)	.33 (8.4)	7.00 (177.8)	.27 (6.9)	29.0 (13.2)
6	3	C	4	3/8 in.	9.25 (235.0)	23.50 (596.9)	9.50 (241.3)	11.00 (279.4)	2.75 (69.9)	4.81 (122.2)	2.75 (69.9)	3.06 (77.7)	—	6.50 (165.1)	8.44 (214.4)	.27 (6.9)	55.0 (25.0)
7	3	①	①	①	37.88 (962.2)	21.50 (546.1)	11.75 (298.5)	—	—	—	—	—	—	—	—	—	—
8	3	①	①	①	37.88 (962.2)	21.50 (546.1)	11.75 (298.5)	—	—	—	—	—	—	—	—	—	—
9	3	①															

① Refer to factory.

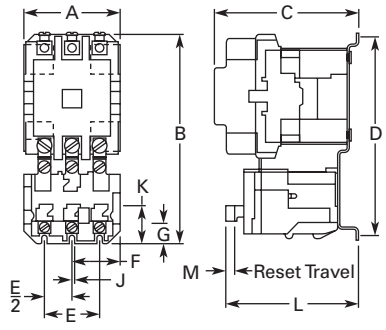

Figure A, Sizes 00 – 4

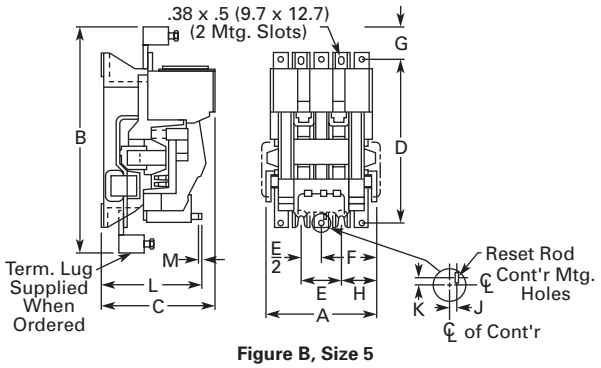

Figure B, Size 5

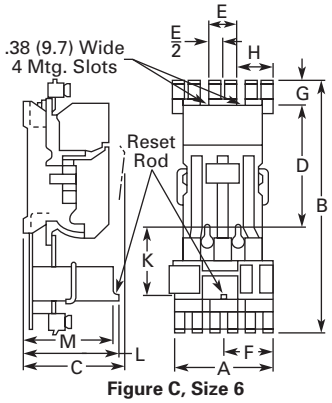

Figure C, Size 6

Figure 33-60. Open Non-reversing Starters Dimensions

Not to be used for construction purposes unless approved.

Table 33-230. Open Reversing Starters Dimensions

NEMA Size	Number of Poles	Fig.	Mounting Screws		Dimensions in Inches (mm)												Weight, Lbs. (kg)
			No.	Size	A	B	C	D	E	F	G	J	K	L	M	N	
00, 0, 1	3 x 3 Horiz.	A	3	#10	7.13 (181.1)	6.50 (165.1)	5.05 (128.3)	6.00 (152.4)	5.69 (144.5)	3.56 (90.4)	.25 (6.4)	2.3 (58.4)	.59 (15.0)	4.92 (125.0)	.27 (6.9)	—	9.0 (4.0)
	3 x 3 Vert.	B	3	#10	3.33 (84.6)	11.63 (295.4)	5.05 (128.3)	11.13 (282.7)	1.88 (47.8)	1.66 (42.2)	.25 (6.4)	.39 (9.9)	.59 (15.0)	4.92 (125.0)	.27 (6.9)	4.52 (114.8)	9.8 (4.4)
2	3 x 3 Horiz.	A	3	#10	7.13 (181.1)	7.25 (184.2)	5.38 (136.7)	6.75 (171.5)	5.69 (144.5)	3.56 (90.4)	.25 (6.4)	2.31 (58.7)	.77 (19.6)	4.97 (126.2)	.27 (6.9)	—	10.8 (4.9)
	3 x 3 Vert.	B	3	#10	3.33 (84.6)	12.38 (314.5)	5.38 (136.7)	11.88 (301.8)	1.88 (47.8)	1.66 (42.2)	.25 (6.4)	.39 (9.9)	.77 (19.6)	4.97 (126.2)	.27 (6.9)	4.52 (114.8)	12.2 (5.5)
3, 4	3 x 3 Horiz.	A	3	1/4 in.	9.75 (247.7)	10.13 (257.3)	7.25 (184.2)	9.25 (235.0)	8.00 (203.2)	4.88 (124.0)	.44 (11.2)	3.11 (79.0)	.80 (20.3)	6.86 (174.2)	.27 (6.9)	—	26.0 (11.8)
	3 x 3 Vert.	B	3	1/4 in.	4.63 (117.6)	19.81 (503.2)	7.25 (184.2)	18.94 (481.1)	2.88 (73.2)	2.94 (74.7)	.44 (11.2)	.55 (14.0)	.80 (20.3)	6.86 (174.2)	.27 (6.9)	7.91 (200.9)	28.0 (12.7)
5	3 x 3 Horiz.	—	4	3/8 in.	35.25 (895.4)	25.50 (647.7)	8.75 (222.3)	—	—	—	—	—	—	—	—	—	73.0 (33.1)
6	3 x 3 Horiz.	—	4	3/8 in.	35.25 (895.4)	25.50 (647.7)	10.50 (266.7)	—	—	—	—	—	—	—	—	—	127.0 (57.7)
7	①																
8	①																
9	①																

① Refer to factory.

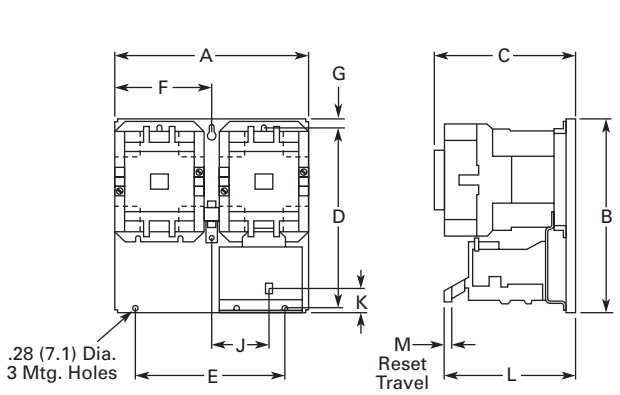

Figure A
Sizes 00 – 4 Horizontal

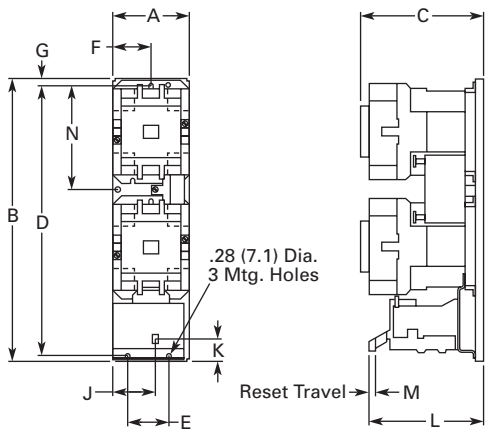

Figure B
Sizes 00 – 4 Vertical

Figure 33-61. Open Reversing Starters Dimensions

Not to be used for construction purposes unless approved.

Table 33-231. Open Multi-Speed Starters Dimensions

NEMA Size	Number of Poles	Fig.	Mounting Screws		Dimensions in Inches (mm)														Weight, Lbs. (kg)
			No.	Size	A	B	C	D	E	F	G	J	K	L	M	N	P	R	
00, 0, 1	3 x 3 Horiz.	A	3	#10	7.13 (181.1)	6.50 (165.1)	5.05 (128.3)	6.00 (152.4)	5.69 (144.5)	3.56 (90.4)	.25 (6.4)	2.30 (58.4)	.33 (8.4)	4.92 (125.0)	.27 (6.9)	3.81 (96.8)	—	2.91 (73.9)	10.0 (4.5)
	5 x 3 Horiz.	B	3	#10	8.00 (203.2)	6.50 (165.1)	5.05 (128.3)	6.00 (152.4)	6.53 (165.9)	3.56 (90.4)	.25 (6.4)	2.30 (58.4)	.48 (12.2)	4.92 (125.0)	.27 (6.9)	4.66 (118.4)	—	2.91 (73.9)	11.0 (5.0)
2	3 x 3 Horiz.	A	3	#10	7.13 (181.1)	7.25 (184.2)	5.38 (136.7)	6.75 (171.5)	5.69 (144.5)	3.56 (90.4)	.25 (6.4)	2.69 (68.3)	.69 (17.5)	4.97 (126.2)	.27 (6.9)	3.81 (96.8)	—	2.91 (73.9)	11.0 (5.0)
	5 x 3 Horiz.	B	3	#10	8.88 (225.6)	7.25 (184.2)	5.38 (136.7)	6.75 (171.5)	6.56 (166.6)	3.56 (90.4)	.25 (6.4)	2.69 (68.3)	.69 (17.5)	4.97 (126.2)	.27 (6.9)	4.66 (118.4)	—	2.84 (72.1)	13.0 (5.9)
3, 4	3 x 3 Horiz.	A	3	1/4 in.	9.75 (247.7)	10.13 (257.3)	7.25 (184.2)	9.25 (235.0)	8.00 (203.2)	4.88 (124.0)	.44 (11.2)	3.11 (79.0)	.80 (20.3)	6.86 (174.2)	.27 (6.9)	5.13 (130.3)	—	4.00 (101.6)	28.0 (12.7)
	5 x 3 Horiz.	B	3	1/4 in.	12.38 (314.5)	10.13 (257.3)	7.25 (184.2)	9.25 (235.0)	9.31 (236.5)	4.88 (124.0)	.44 (11.2)	3.11 (79.0)	.80 (20.3)	6.86 (174.2)	.27 (6.9)	6.44 (163.6)	—	4.00 (101.6)	33.5 (15.2)
5	①																		
6	①																		

① Refer to factory.

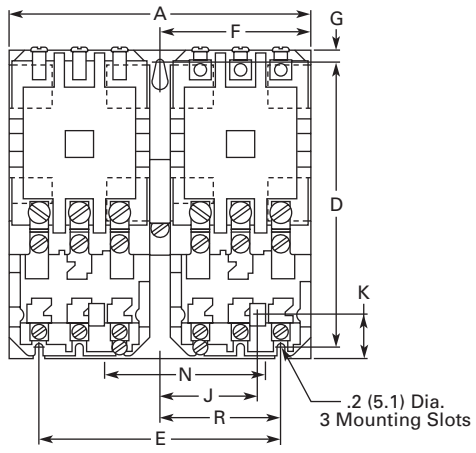

Figure A, Sizes 00 – 4

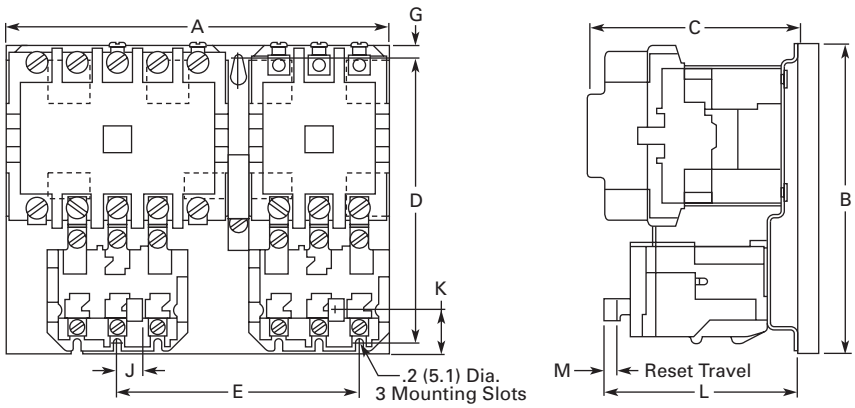

Figure B, Size 2

Note: 3-Pole x 3-Pole Devices Are for Wye-Wye Two-Winding Motors Only

Figure 33-62. Open Multi-Speed Starters Dimensions

Electrical Characteristics

Table 33-232. Electrical Characteristics — Sizes 00 – 4

	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4
Max. Voltage Rating	600V	600V	600V	600V	600V	600V
Ampere Rating						
(Open)	10A	20A	30A	50A	100A	150A
(Enclosed)	9A	18A	27A	45A	90A	135A
Squirrel Cage Motor						
Maximum Horsepower At:						
200V/60 Hz	1-1/2 hp	3 hp	7-1/2 hp	10 hp	25 hp	40 hp
230V/ 60 Hz	1-1/2 hp	3 hp	7-1/2 hp	15 hp	30 hp	50 hp
380V/50 Hz	1-1/2 hp	5 hp	10 hp	25 hp	50 hp	75 hp
460V – 575V/ 60 Hz	2 hp	5 hp	10 hp	25 hp	50 hp	100 hp
Resistive Heating kW ①						
Single-Phase, 2-Pole						
120V	—	—	3 kW	5 kW	10 kW	15 kW
240V	—	—	6 kW	10 kW	20 kW	30 kW
480V	—	—	12 kW	20 kW	40 kW	60 kW
600V	—	—	15 kW	25 kW	50 kW	75 kW
Three-Phase, 3-Pole						
120V	—	—	5 kW	8.5 kW	17 kW	26 kW
240V	—	—	10 kW	17 kW	34 kW	68 kW
480V	—	—	20 kW	34 kW	68 kW	105 kW
600V	—	—	25 kW	43 kW	86 kW	130 kW
Capacitor Switching kVAR, Three-Phase						
240V	—	—	—	12 kVAR	27 kVAR	40 kVAR
480V	—	—	—	25 kVAR	53 kVAR	80 kVAR
600V	—	—	—	31 kVAR	67 kVAR	100 kVAR
Transformer Switching kVA ②						
Single-Phase, 2-Pole						
120V	—	.6 kVA	1.2 kVA	2.1 kVA	4.1 kVA	6.8 kVA
240V	—	1.2 kVA	2.4 kVA	4.1 kVA	8.1 kVA	14 kVA
480V	—	2.4 kVA	4.9 kVA	8.3 kVA	16 kVA	27 kVA
600V	—	3 kVA	6.2 kVA	10 kVA	20 kVA	34 kVA
Three-Phase, 3-Pole						
120V	—	1.8 kVA	3.6 kVA	6.3 kVA	12 kVA	20 kVA
240V	—	2.1 kVA	4.3 kVA	7.2 kVA	14 kVA	23 kVA
480V	—	4.2 kVA	8.5 kVA	14 kVA	28 kVA	47 kVA
600V	—	5.2 kVA	11 kVA	18 kVA	35 kVA	59 kVA

① Resistive loads having inrush currents not exceeding 1.5 times continuous rating.

② These ratings are for transformers having inrush currents not more than 20 times peak of continuous current ratings. For inrush currents greater than 20 times, refer to factory.

Table 33-233. Electrical Characteristics — Sizes 5 – 9

	Size 5	Size 6	Size 7	Size 8	Size 9
Max. Voltage Rating	600V	600V	600V	600V	600V
Ampere Rating					
(Open)	300A	600A	900A	1350A	2500A
(Enclosed)	270A	540A	810A	1215A	2250A
Squirrel Cage Motor					
Maximum Horsepower At:					
200V/60 Hz	75 hp	150 hp	—	—	—
230V/60 Hz	100 hp	200 hp	300 hp	450 hp	800 hp
380V/50 Hz	150 hp	300 hp	—	—	—
460V – 575V/ 60 Hz	200 hp	400 hp	600 hp	900 hp	1600 hp
Resistive Heating kW ③					
Single-Phase, 2-Pole					
120V	30 kW	60 kW	90 kW	④	④
240V	60 kW	120 kW	180 kW	④	④
480V	120 kW	240 kW	360 kW	④	④
600V	150 kW	300 kW	450 kW	④	④
Three-Phase, 3-Pole					
120V	52 kW	105 kW	155 kW	④	④
240V	105 kW	210 kW	315 kW	④	④
480V	210 kW	415 kW	625 kW	④	④
600V	260 kW	515 kW	775 kW	④	④
Capacitor Switching kVAR, Three-Phase					
240V	80 kVAR	160 kVAR	240 kVAR	360 kVAR	665 kVAR
480V	160 kVAR	320 kVAR	480 kVAR	720 kVAR	1325 kVAR
600V	200 kVAR	400 kVAR	600 kVAR	900 kVAR	1670 kVAR
Transformer Switching kVA ⑤					
Single-Phase, 2-Pole					
120V	14 kVA	27 kVA	41 kVA	61 kVA	112 kVA
240V	27 kVA	54 kVA	81 kVA	122 kVA	225 kVA
480V	54 kVA	108 kVA	162 kVA	244 kVA	450 kVA
600V	68 kVA	135 kVA	203 kVA	304 kVA	562 kVA
Three-Phase, 3-Pole					
120V	41 kVA	81 kVA	122 kVA	182 kVA	337 kVA
240V	47 kVA	94 kVA	140 kVA	210 kVA	342 kVA
480V	94 kVA	188 kVA	280 kVA	420 kVA	783 kVA
600V	117 kVA	234 kVA	351 kVA	526 kVA	975 kVA

③ Resistive loads having inrush currents not exceeding 1.5 times continuous rating.

④ For ratings refer to factory.

⑤ These ratings are for transformers having inrush currents not more than 20 times peak of continuous current ratings. For inrush currents greater than 20 times, refer to factory.

DC Power Pole Ratings

The following represent typical production test values and should not be interpreted as a guarantee of actual performance.

Table 33-234. DC Operated 120 and 240V Coils

Contactor Size	DC Contact Amp Rating 2 Poles in Series ①	
	120V	240V
0	—	—
1	20	10
2	45	30
3	75	40
4	90	70

① Non-inductive load.

380V, 50 Hz Starter Maximum Horsepower Ratings

Table 33-235. 380V, 50 Hz Starters — Maximum Horsepower Ratings

NEMA Size	00	0	1	2	3	4	5	6	7	8
Maximum Horsepower	1-1/2	5	10	25	50	75	150	300	450	700

Operating Coil Characteristics at Rated Coil Volts, Sizes 00 – 9

The following represent typical production test values and should not be interpreted as a guarantee of actual performance.

Table 33-236. Operating Coil Characteristics

	Sizes 00, 0, 1	Size 2	Size 3	Size 4 ②	Size 5	Size 6	Size 7	Size 8	Size 9
AC Coil									
Burden (Open VA)	160 VA	160 VA	625 VA	700 VA	1700 VA	2900 VA	③	③	③
(Closed VA)	25 VA	25 VA	50 VA	64 VA	180 VA	220 VA	③	③	③
(Closed Watts)	7.8 W	7.8 W	18 W	21 W	32 W	42 W	—	—	—
Pick-Up Volts ④	85%	85%	85%	85%	78%	70%	—	—	—
Drop-Out Volts ④	40 – 60%	40 – 60%	40 – 60%	40 – 60%	65 to 75%	60 to 70%	—	—	—
Pick-Up Time Hz ⑤⑥	1 – 1-1/2	1-1/2 – 2	2 – 2-1/2	1 – 1-1/2	1.5	4.0	—	—	—
Drop-Out Time Hz ⑤	3/4 – 1	3/4 – 1	3/4 – 1	3/4 – 1	.75	.75	—	—	—
DC Coil									
Burden (Open VA)	17 VA	17 VA	35 VA	35 VA	600 VA	2120 VA	400 VA	400 VA	2100 VA
(Closed VA)	17 VA	17 VA	35 VA	35 VA	22 VA	21 VA	400 VA	400 VA	350 VA
(Closed Watts)	18 W	18 W	35 W	35 W	20 W	20 W	400 W	400 W	350 W
Pick-Up Volts ④	80%	80%	80%	80%	64%	73%	45% – 65% ⑦	45% – 65% ⑦	50% – 65% ⑦
Drop-Out Volts ④	5 – 10%	5 – 10%	5 – 10%	5 – 10%	18%	13%	30% – 45% ⑦	30% – 45% ⑦	40% – 50% ⑦
Pick-Up Time Hz ⑥	—	25 – 75 mS	25 – 75 mS	25 – 75 mS	2.7 Hz ⑤	3 Hz ⑤	21 – 41 Hz ⑦⑤	17 – 29 Hz ⑦⑤	16 – 18 ⑦⑤
Drop-Out Time Hz ⑤	—	16 – 25 mS	16 – 25 mS	16 – 25 mS	9.3 Hz ⑤	17.5 Hz ⑤	7 – 12 Hz ⑧⑤	7 – 12 Hz ⑧⑤	18 – 20 Hz ⑦⑤

② AC coil data pertains to Model K, DC coil data pertains to Model J.
③ DC Operated only.
④ Percent of rated coil voltage.
⑤ At 60 Hz base.
⑥ To contact touch.
⑦ Lower figure when coil is cold. Higher figure when coil is hot.
⑧ Drop-out time to clear arc. Time varies with type of load and contact wear.

Mechanical Characteristics

NEMA Standard ICS 2-110

33

Direct-current operated contactors shall withstand 110% of their rated voltage continuously without injury to the operating coils and shall close successfully at 80% of their rated voltage.

Alternating-current operated contactors shall withstand 110% of their rated voltage continuously without injury to the operating coils and shall close successfully at 85% of their rated voltage.

Table 33-237. Mechanical Characteristics, Sizes 00 – 9

	Sizes 00, 0, 1	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7	Size 8	Size 9
Dimensions in Inches (mm)									
Height	6.45 (163.8)	7.16 (181.9)	9.93 (252.2)	9.93 (252.2)	12.00 (304.8) ①	13.50 (342.9) ①	18.62 (472.9) ①	19.25 (489) ①	25.00 (635) ①
Width	3.31 (84.1)	3.31 (84.1)	4.62 (117.3)	4.62 (117.3)	7.00 (177.8) ①	7.00 (177.8) ①	23.50 (596.9) ①	23.50 (596.9) ①	32.00 (812.8) ①
Depth	4.61 (117.1)	4.96 (126)	6.75 (171.5)	6.75 (171.5)	7.75 (196.9) ①	8.75 (222.3) ①	11.00 (279.4) ①	11.00 (279.4) ①	13.00 (330.2) ①
Panel Area — Square Inches	21.35	23.7	46.0	46.0	84.0	94.5	437.5	452.4	800
Weight — Pounds	3.5 Lbs.	3.5 Lbs.	11.5 Lbs.	11.5 Lbs.	25 Lbs.	42 Lbs.	215 Lbs.	265 Lbs.	315 Lbs.
Cable Connection	—	—	—	—	Front	Front	Front/Rear	Front/Rear	Front/Rear
Maximum Cable Size/Phase Copper (AWG/MCM)	6 AWG	3 AWG	1/0	4/0	1-500 MCM	2-500 MCM	3-500 MCM	4-500 MCM	8-500 MCM
Auxiliary Electrical Circuits Available	8	6	6	6	4	4	3	3	4
Latched Version Available	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Mechanical Interlock Combinations Available									
Sizes 00, 0, 1, 2, 3, 4	Vert., Horiz.	Vert., Horiz.	Vert., Horiz.	Vert., Horiz.	Vert., Horiz.	—	—	—	—
5	—	—	—	—	Vert., Horiz.	Vert., Horiz.	—	—	—
6	—	—	—	—	Vert., Horiz.	Vert., Horiz.	Vertical	Vertical	—
7, 8	—	—	—	—	—	Vertical	Vertical	Vertical	Vertical
9	—	—	—	—	—	—	Vertical	Vertical	Vertical

① For Sizes 5 – 9 contactors only; for starter Sizes 5 – 9, refer to factory.

Table 33-238. Data from Tables 430 — 147 Through 150 of 1996 NEC: Motor Amperes at Full Load ②, Three-Phase AC

hp	Single-Phase AC		Induction Type Squirrel-Cage and Wound-Rotor Amperes				DC	
	115V	230V	200V	230V	460V	575V	120V	240V
1/6	4.4	2.2	—	—	—	—	—	—
1/4	5.8	2.9	—	—	—	—	3.1	1.6
1/3	7.2	3.6	—	—	—	—	4.1	2.0
1/2	9.8	4.9	2.5	2.2	1.1	.9	5.4	2.7
3/4	13.8	6.9	3.7	3.2	1.6	1.3	7.6	3.8
1	16	8	4.8	4.2	2.1	1.7	9.5	4.7
1-1/2	20	10	6.9	6.0	3.0	2.4	13.2	6.6
2	24	12	7.8	6.8	3.4	2.7	17	8.5
3	34	17	11.0	9.6	4.8	3.9	25	12.2
5	56	28	17.5	15.2	7.6	6.1	40	20
7-1/2	80	40	25.3	22	11	9	58	29
10	100	50	32.2	28	14	11	76	38
15	—	—	48.3	42	21	17	—	55
20	—	—	62.1	54	27	22	—	72
25	—	—	78.2	68	34	27	—	89

hp	Single-Phase AC		Induction Type Squirrel-Cage and Wound-Rotor Amperes				DC	
	115V	230V	200V	230V	460V	575V	120V	240V
30	—	—	92	80	40	32	—	106
40	—	—	120	104	52	41	—	140
50	—	—	150	130	65	52	—	173
60	—	—	177	154	77	62	—	206
75	—	—	221	192	96	77	—	255
100	—	—	285	248	124	99	—	341
125	—	—	359	312	156	125	—	425
150	—	—	414	360	180	144	—	506
200	—	—	552	480	240	192	—	675
250	—	—	—	—	302	242	—	—
300	—	—	—	—	361	289	—	—
350	—	—	—	—	414	336	—	—
400	—	—	—	—	477	382	—	—
450	—	—	—	—	515	412	—	—
500	—	—	—	—	590	472	—	—

② These current values are for motors running at usual speeds and with normal torque characteristics. Motors for special low speed or high torque may require higher current. In all cases, heaters should be selected on basis of information on motor nameplate or motor card data.

Combination Ratings

Table 33-239. Combination Ratings — Sizes 00 – 2

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Capability	
			Current	Voltage
Sizes 00, 0, 1				
Class H Fuse	60A	—	5,000A	600V
Class J Fuse	60A	—	100,000A	600V
Class R Fuse	60A	—	100,000A	600V
Class T Fuse	60A	—	100,000A	600V
Magnetic Only ① Type CB ②	30A	Marked HMCP	100,000A	480V
			50,000A	600V
Thermal/Mag. Type CB ③	50A	65,000A	65,000A	480V
		25,000A	25,000A	600V
		100,000A	100,000A	480V
		35,000A	35,000A	600V
Magnetic Only Type CB + CL ④	30A	HMCP + Current Limiter	100,000A	600V
Thermal/Mag. Type CLB ⑤	50A	150,000A	100,000A	480V
Size 2				
Class H Fuse	100A	—	5,000A	600V
Class J Fuse	100A	—	100,000A	600V
Class R Fuse	100A	—	100,000A	600V
Class T Fuse	100A	—	100,000A	600V
Magnetic Only ① Type CB ②	50A	Marked HMCP	100,000A	480V
			50,000A	600V
Thermal/Mag. Type CB ③	90A	65,000A	65,000A	480V
		25,000A	25,000A	600V
		100,000A	100,000A	480V
		35,000A	35,000A	600V
Magnetic Only Type CB + CL ④	50A	HMCP + Current Limiter	100,000A	600V
Thermal/Mag. Type CLB ⑤	50A	150,000A	100,000A	480V

① Instantaneous Adjustable Trip.
② Circuit Breaker.
③ Inverse Time Circuit Breaker.
④ Instantaneous Adjustable Trip with Current Limiting Attachment.
⑤ Inverse Time with Built-In Current Limiting Attachment.

Table 33-240. Combination Ratings — Sizes 3 and 4

Short-Circuit Protective Device (SCPD)	Max. Rating SCPD	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Capability	
			Current	Voltage
Size 3				
Class H Fuse	60A	—	5,000A	600V
Class J Fuse	60A	—	100,000A	600V
Class R Fuse	60A	—	100,000A	600V
Class T Fuse	60A	—	100,000A	600V
Magnetic Only ⑥ Type CB ⑦	100A	Marked HMCP	100,000A	480V
			50,000A	600V
Thermal/Mag. Type CB ⑧	150A	65,000A	65,000A	480V
		25,000A	25,000A	600V
		100,000A	100,000A	480V
		35,000A	35,000A	600V
Magnetic Only Type CB + CL ⑨	100A	HMCP + Current Limiter	100,000A	600V
Thermal/Mag. Type CLB ⑩	150A	50,000A	100,000A	480V
Size 4				
Class H Fuse	400A	—	10,000A	600V
Class J Fuse	400A	—	100,000A	600V
Class R Fuse	400A	—	100,000A	600V
Class T Fuse	400A	—	100,000A	600V
Magnetic Only ⑥ Type CB ⑦	150A	Marked HMCP	100,000A	480V
			50,000A	600V
Thermal/Mag. Type CB ⑧	250A	65,000A	65,000A	480V
		25,000A	25,000A	600V
		100,000A	100,000A	480V
		35,000A	35,000A	600V
Magnetic Only Type CB + CL ⑨	150A	HMCP + Current Limiter	100,000A	600V
Thermal/Mag. Type CB + CL ⑩	250A	200,000A	100,000A	600V
Thermal/Mag. Type CLB ⑪	250A	150,000A	100,000A	480V

⑥ Instantaneous Adjustable Trip.
⑦ Circuit Breaker.
⑧ Inverse Time Circuit Breaker.
⑨ Instantaneous Adjustable Trip with Current Limiting Attachment.
⑩ Inverse Time with Built-In Current Limiting Attachment.
⑪ Inverse Time Current Limiting Breaker.

Coil Suffix

Table 33-241. Other Available Coil Voltages — AC and DC Coils ⑫

Coils	Catalog Number Suffix	Coil Rating (Volts/Hertz)	Catalog Number Suffix	Coil Rating (Volts/Hertz)
AC	**A**	120/60, 110/50	**N**	110/50
	B	200-208/60	**P**	48/60
	C ⑯	240/60 and 480/60	**R** ⑯	120/60 and 240/60
	D	440/50	**U**	440-480/50 or 60 Rect. to DC
	E	600/60 Hz		
	G	220/50	**V**	110/60
	H	380/50	**W**	240/60
	I	24/60	**X**	480/60
	J	110-120/50 or 60 Rect. to DC	**Y**	415/50
	K	220-240/50 or 60 Rect. to DC	**Z**	277/60
DC ⑬⑭⑮	**L**	24V DC	**S**	125V DC
	M	48V DC	**T**	250V DC

⑫ Availability may be limited.
⑬ List Price Addition for DC coils.
⑭ DC coils for Size 5 and 6 contactors and starters are intermittent duty rated only. A mechanical latch is required.
⑮ DC coils. Use only on contactors originally supplied with a DC coil.
⑯ List Price Addition for dual voltage coils.

Discount Symbol **1CD1C**

Factory Modifications

Table 33-242. A200 Factory Modifications

Modifications	Description	Catalog Number Suffix	NEMA Size								
			00 – 1	2	3	4	5	6	7	8	9
			Adder U.S. $								
Control Circuit	1 Extra Auxiliary Contact (1NO-1NC) Non-reversing, Reversing, 2-Speed Unwired	**J1**									
	2 Extra Auxiliary Contact Non-reversing, Reversing, 2-Speed Unwired	**J2**									
	3 Extra Auxiliary Contact Non-reversing, Unwired	**J3**									
	4 Extra Auxiliary Contact Non-reversing, Unwired	**J4**									
	Wired for Separate Control (NC)	**C**									
	Omit Control Wiring (NC)	**X**									
Overload Relays (Substitutions)	Ambient Compensated with Auto Reset (NC)	**D**									
	Fast Trip — Ambient Compensated (Specify Motor FLA)	**D7**									
	Overload Relay Alarm Contact (NO) per overload	**E**									

Accessories and Field Modification Kits

Type J Auxiliary Contact

Type J Auxiliary Contact

- Capable of being field mounted in a contactor or starter (Classes A200, A900 Sizes 00 – 6, V200, V201 vacuum and definite purpose controllers).
- Provides two separate electrical contact sets which wire vertically and are color coded; black designates NC and silver designates NO. Please note that the vertical wiring is contrary to the horizontal wiring of the L-56 auxiliary contacts.
- Designed to fit within dimensions of starter; no additional panel space is required.
- Provides circuit isolation (no polarity restrictions) and single break bifurcated contacts.

Table 33-243. Auxiliary Contact Ratings

Voltage	Make	Break
NEMA A600		
120 – 600V AC	7200 VA	720 VA
72 – 120V AC	60A	720 VA
28 – 72V AC	60 VA	10A
NEMA R300		
28 – 300V DC	28 VA	28 VA

Table 33-244. Auxiliary Contact Types

Contact Type	Max.	Catalog Number	Price U.S. $
1NO and 1NC	4	**J11**	
2NC	4	**J02**	
2NO	4	**J20**	
1 Coil Clearing NC and 1NO	4	**J1C**	

Discount Symbol **1CD1C**

SS-56 Surge Suppressor

SS-56 Surge Suppressor

- Designed to be used with magnetic motor controllers through Size 4 in 120V, 60 Hz control circuit applications where electronic equipment is used.
- Steady State Coil Volts: 120, 60 Hz, RMS
- Peak Input Volts: 169.6, 60 Hz, Max. Amplitude
- Max. Ambient Temperature: 65°C
- Nominal Limiting Volts: 270 Peak
- Nominal Rate of Volt Rise: .5 per mS

Table 33-245. Surge Suppressor ①

Type Mounting	Kit Catalog Number	Price U.S. $ ②
Starter	**SS-56**	

① Can be used on Sizes 5 and 6 with 120V coil. Mounting bracket required — order separately. Mounting Bracket 177C043G04.
② Discount Symbol **1CD1**.

F-56 Fuse Block

- Facilitates installation of fuses (15A, 600V max.) in control circuits.
- Utilizes Bussman type KTK fuses, or equivalent.
- Mounts in same cavity as Type J auxiliary contact.
- No tools or mounting hardware needed.
- Fuse not included.

Table 33-246. Fuse Block

Mounting	Kit Catalog Number	Price U.S. $
Starter Panel	**F56 F56-P**	

R-56 Interposing Relay

The R-56AA interposing relay is a low energy solid-state device with a single NO solid-state contact. It can be used as a 120V AC control relay, and will operate on as little as 40V AC input. Is useful in applications requiring long control wiring runs where excessive voltage drop would prevent the contactor or relay from energizing. Will operate a Size 4 contactor from 10,000 feet using 18 AWG wire.

Table 33-247. Interposing Relay

Type Mounting	Kit Catalog Number	Price U.S. $ ③
Starter or Panel	**R56-AA**	

③ Discount Symbol **1CD1**.

B3NO Bell Alarm Contact

- Isolated Normally Open Bell Alarm Contact.
- Mounts in Type B block-type overload relay.

Table 33-249. Bell Alarm Contact

Kit Catalog Number	Price U.S. $
B3NO-2 **B3NO-4** ④	

④ For Size 3 and 4.

Table 33-250. Control Contact Ratings (B600)

AC Volts	Maximum Amperes	
	Make	Break
24 – 120	30	3.00
121 – 600	3600 VA	360 VA
Continuous Current Rating: 5A		

Overload Relay Reset Extension

- Used to adjust overload reset rod depth of Class A200 Model J starters and current design overload relays to same dimensions as obsolete B200 starters and overloads identified by suffix **B**, i.e., BA13**B**.

When replacing obsolete B200 device with Class A200 starter and Type B overload, order Style 6710C11H03. No charge.

When replacing obsolete B200 device with Class A200 starter and Type A overload, order Style 1490C15H10. No charge.

Mechanical Interlock

- Prevents closing of one member of a reversing or multi-speed contactor until the opposite member is completely open.
- Lever type mechanism assures positive action.
- Can be factory assembled or field mounted on A200 and A900 starters and contactors.

Table 33-248. Mechanical Interlock

Contactor Arrangement (Number of Poles, Horizontal or Vertical)	Continuous Size	Interlock Catalog Number	Price U.S. $
3 x 3 Horizontal 4 x 4 Horizontal 5 x 3 Horizontal	0, 1 0, 1 0, 1	**M-33-1B** **M-33-1B** **M-33-1B**	
All Pole Combination, Vertical 3 x 3 Horizontal Reversing 3 x 3 Vertical Reversing	0, 1 2 2	**M-34-1A** **M-33-2B** **M-34-2A**	
5 x 3 Horizontal 4 x 4 Horizontal	2 2	**M-35-2A** **M-36-2A**	
All Pole Combination Horizontal All Pole Combination Vertical	3, 4 3, 4	**M-33-3B** **M-34-3**	

Power Pole Kit

- Adds 1NO or 1NC power pole to Size 00 – 1 A201 Class contactors.
- Factory installed or field mountable in load side auxiliary cavities.
- 600V AC.
- Continuous current rating of 18A for Size 0, 27A for Size 1.

Table 33-251. Power Pole Kit ⑤

Continuous Current Rating	Kit Size	Kit Catalog Number	Price U.S. $
Normally Open			
18 27	0 1	**PN0-0** **PN0-1**	
Normally Closed			
18 27	0 1	**PNC-0** **PNC-1**	

⑤ Do not use with DC operated contactors.

Discount Symbol **1CD1C**

Replacement Auxiliary Contacts

Table 33-252. Replacement Auxiliary Contacts

Contactor Size	Contact Arrangement	Aux. Elect. Contact		Price U.S. $
		Catalog Number	Style Number	
5, 6	1NO + 1NC 2NO 2NC	**J11** **J20** **J02**	**9084A17G01** **9084A17G02** **9084A17G03**	
7, 8	1NO 1NC	— —	**578D461G01** **578D461G03**	
9	1NO + 1NC 2NO 2NC	— — —	**843D943G04** **843D943G05** **843D943G06**	

Extra Auxiliary Contact Kits

All starters include an auxiliary contact with 1NO and 1NC contact. These kits include an auxiliary contact with contacts as shown, plus operating arm and mounting bracket when required.

Table 33-253. Extra Auxiliary Contact Kits

Contactor Size	Contact Arrangement	Style Number	Price U.S. $
5, 6	1NO + 1NC 2NO 2NC	**3463D94G18** **3463D94G04** **3463D94G19**	
7, 8 ①	2NO 1NO	**818D498G06** **818D498G04**	

① Size 7 and larger use DC coils as standard.

DC Coil Conversion Kits

Kits listed below include all necessary parts to convert from AC to DC control including the DC coil with built-in diode, rectifier, auxiliary interlock and all mounting hardware.

Table 33-254. DC Coil Conversion Kits

Size	Voltage	Kit Style Number	Price U.S. $
5	110-120 220-240 440-480	**7864A28G01** **7864A28G02** **7864A28G03**	
6	110-120 220-240 440-480	**7864A29G01** **7864A29G02** **7864A29G03**	

Mechanical Interlocks

Table 33-255. Mechanical Interlocks

Contactor Sizes	Style Numbers		Price U.S. $
	Horizontal	Vertical	
3, 4 and 5 5 and 5 5 and 6 6 and 6 6 and 7, 8	**2050A11G75** **2050A11G25** **2050A11G27** **2050A11G26** —	**2050A11G65** **2050A11G15** **2050A11G17** **2050A11G16** **2050A11G55**	
7, 8 and 7, 8 7, 8 and 9 9 and 9	No (Rear Conn.) No (Rear Conn.) No (Rear Conn.)	**567D624G01** **9944D56G06** **9944D56G01**	

Overload Protection

Overload Protection Size 5 Starters

Type B overload relay is a three-pole, block type, thermal ambient compensated device with manual reset mounted integrally. Current transformers are enclosed in a protective case and integrally mounted to save panel space. Standard ratio is 300:5.

Overload Protection Size 6 Starters

Overload protection assembly consists of three current transformers, Type B three-pole block overload relay and an optional interposing relay. These parts are mounted on a panel which connects directly to the load terminal of the contactor. Current transformers are 600:5 ratio as standard.

If automatic reset is required, the Type A, three-pole block, ambient compensated relay is available upon request.

Overload Relay Kits

Each kit includes three current transformers (standard ratio) and one Type B, three-pole block overload relay, ambient compensated with manual reset.

Table 33-256. Overload Relay Kits

Kit Size	Kit Part Number	Price U.S. $
5 6	**2057A34G01** **6379D80G10**	

Table 33-257. Replacement Terminal Lugs ②

Contactor Size	Cable Size	Terminals		Kit Style Number	Price U.S. $
		Qty. in Kit	Qty. Req'd. per Pole		
5	1-500 MCM	6	2	**2119A76G01**	
6	2-500 MCM	6	2	**7858A96G01**	
7	4-500 MCM	12	4	**7858A96G02**	
8	4-500 MCM	12	4	**7858A96G03**	

② All mounting hardware is included in kit.

Discount Symbol **1CD1C**

When Ordering Specify

Use this renewal parts data to identify device by style number, catalog number and/or description.

Select style number of replacement part from the following pages.

For clarification of ordering procedure, pricing and discounts, contact the Customer Support Center.

General Information

This renewal parts data will provide the proper identification of standard parts which may be required for maintenance of Eaton's Cutler-Hammer components.

It is the intent of this catalog section to make it possible to quickly select the parts needed.

An investment in renewal parts and regular maintenance program will protect against downtime and ensure a proper duty cycle for your equipment.

To maintain maximum operating efficiency and dependability of your equipment, only genuine Cutler-Hammer replacement parts should be used.

This section identifies the replacements parts which are available. Order by style number.

JF Autostarters

Table 33-258. JF Autostarter Kits

Frame Size	Start Contacts			Run Contacts			Grid Stack Kit		
	Required	Style Number	Price U.S. $	Required	Style Number	Price U.S. $	Required	Style Number	Price U.S. $
2 – 3	1	**38A7018G12**		1	**38A7018G13**		1	**3354D90G10**	
4 – 5 5L	1	**550D409G18**		1	**550D409G19**		1	**3354D90G10**	
5M – 5MM	1	**3354D90G08**		1	**3354D90G09**		2	**3354D90G10**	

Note: Kits contain a complete set of moving contacts, stationary contacts and springs.

Table 33-259. Solenoid Assembly with Coil (All Sizes) ①

Volt	Hz	Style Number ②	Price U.S. $
115	60	**5264C05H01**	
230	60	**5264C05H02**	
460	60	**5264C05H03**	
575	60	**5264C05H04**	

① When replacing solenoid assembly series 416C160 use adapter plate style 9917D02H01 — 1 required.

② These styles replace coil style 296B892G__. When ordering new style as replacement, customer must order adapter plate 9917D02H01, Quantity 1 required.

Discount Symbol **1CD1C**

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AC Starters, Contactors A200, A201

Table 33-260. AC Contactors Model J Sizes 00, 0, 1, 2 Kits ①

Part	Poles	Size 00		Size 0		Size 1		Size 2	
		Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $
Contact Kit	2 3 4 5	373B331G17 373B331G18 373B331G18 373B331G19		373B331G02 373B331G04 373B331G04 373B331G05		373B331G07 373B331G09 373B331G09 373B331G10		373B331G11 373B331G12 373B331G13 ③	
Arc Box ②	2, 3, 4 5	6714C74G01 6714C74G04		6714C74G02 6714C74G05		6714C74G03 6714C74G06		6714C74G07 ④ 6714C74G08 ⑤	
Cross Bar	2, 3 4, 5	N/A N/A		N/A N/A		N/A N/A		672B788G32 672B788G34	
Upper Base (for single rated coils only)	2, 3 4, 5	N/A N/A		N/A N/A		N/A N/A		672B788G33 672B788G35	
Lower Base	2, 3 4, 5	N/A N/A		N/A N/A		N/A N/A		1250C33G09 1250C33G05	
KO Spring (Pk of 10)	All	N/A		N/A		N/A		503C796G01	
Terminal Line/Load (Pk of 3)	All	N/A		N/A		N/A		371B870G03	

① Model C contact tips and coils 00-4, 2-, 3-, 4- and 5-pole contactors are same as Model J. All other parts are unavailable.
② Mounting hardware included.
③ Use one each of 373B331G11 and 373B331G12.
④ 2-, 3-pole.
⑤ 4-, 5-pole.

Table 33-261. AC Coils

Voltage	Hz	Size 00, 0, 1				Size 2			
		2-, 3-, 4-Pole		5-Pole		2-, 3-Pole		4-, 5-Pole	
		Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $
120/110	60/50	505C806G01		505C808G01		505C806G01		505C818G01	
208	60	505C806G02		505C808G02		505C806G02		505C818G02	
600/550	60/50	505C806G05		505C808G05		505C806G05		505C818G05	
380	50	505C806G07		505C808G07		505C806G07		505C818G07	
240/220	60/50	505C806G12		505C808G12		505C806G12		505C818G12	
480/440	60/50	505C806G13		505C808G13		505C806G13		505C818G13	
24	60	505C806G16		N/A		505C806G16		505C818G15	
277	60	505C806G18		505C808G16		505C806G18		505C818G16	
240/480 ⑥	60/60	505C806G03		505C808G03		505C806G03		505C818G03	
120/240 ⑦	60/60	505C806G10		505C808G10		505C806G10		505C818G10	

⑥ Dual Voltage Coils. Use only on contactors or starters originally supplied with a dual voltage coil.
⑦ Use only on contactors originally supplied with a DC coil.

Table 33-262. DC Coil ⑨

Voltage	Size 0, 1	Size 2	Price U.S. $
	1, 2, 3, 4 Pole	1, 2, 3 Pole	
	Style Number		
12	1268C86G07		
24	1268C86G04		
48	1268C86G05		
125	1268C86G02		
250	1268C86G01		
125/250 ⑧	1268C86G03		

⑧ Dual Voltage Coils. Use only on contactors or starters originally supplied with a dual voltage coil.
⑨ Use only on contactors originally supplied with a DC coil.

Accessories for Size 5 – 9 AC Contactors

Note: A rectifier circuit converts the AC supply to DC supply. This conversion provides pick up and drop out characteristics. All necessary parts are included in the kit.

Table 33-263. AC-DC Coil Conversion Kits

Voltage	Size 5		Size 6	
	Style Number	Price U.S. $	Style Number	Price U.S. $
120V AC	7864A28G01		7864A29G01	
240V AC	7864A28G02		7864A29G02	
480V AC	7864A28G03		7864A29G03	

Table 33-264. Replacement Coils for Above

Voltage	Size 5		Size 6	
	Style Number	Price U.S. $	Style Number	Price U.S. $
120V AC	7856A15G05		7856A16G05	
240V AC	7856A15G10		7856A16G10	
480V AC	7856A15G15		7856A16G15	

Discount Symbol **1CD1C**

AC Starters, Contactors A200, A201 (Continued)

Accessories for Size 5 – 9 AC Contactors

Table 33-265. Auxiliary Electrical Interlocks Size 7 – 9 AC and All DC Units

Type	Circuits	Application	Style Number	Price U.S. $
L63	NO	Size 7 – 8	**578D461G01**	
L63	NC	Size 7 – 8	**578D461G03**	
L64	NO-NC	Size 9	**843D943G04**	
L64	2NO	Size 9	**843D943G05**	
L64	2NC	Size 9	**843D943G06**	

Accessories for Size 00 – 6 AC Contactors

Table 33-266. Auxiliary Electrical Interlocks

Catalog Number (Obsolete)	Style Number (Obsolete)	Circuits	Catalog Number Current	Style Number Current	Price U.S. $
(L-56)	(2609D01G01)	1NO & 1NC 2NO	**J11**	**9084A17G01**	
(L-56D)	(2609D01G02)	1NO & 1NC	**J20**	**9084A17G02**	
(L-56E)	(2609D01G03)	2NO 2NO	**J11**	**9084A17G01**	
(L-56B)	(2609D01G04)		**J20**	**9084A17G02**	
(L-56H)	(2609D01G05)		**J20**	**9084A17G02**	
(L-56J)	(2609D01G06)	1NO & 1NC DB	**J1C**	**9084A17G04**	
(L-56A)	(2609D01G07)	N/A	**N/A**	**N/A**	
(L-56B)	(2609D01G08)	N/A	**N/A**	**N/A**	
(L-56F)	(2609D01G09)	N/A	**N/A**	**N/A**	
(L-56G)	(2609D01G10)	1NO & 1NC DB	**J1C**	**9084A17G04**	
(L-56C)	(2609D01G11)	2NC	**J02**	**9084A17G03**	
(L-56M)	(2609D01G12)	N/A	**N/A**	**N/A**	
(L-56P)	(2609D01G17)	1NO & 1NC 2NC	**J11**	**9084A17G01**	
(L-56R)	(2609D01G18)	1NO & 1NC	**J02**	**9084A17G03**	
(L-56S)	(2609D01G19)		**J11**	**9084A17G01**	

Model J – K, Sizes 3 and 4

Table 33-267. Model J – K Series 3, 4 Kits ①

Part	Poles	Size 3 – Model J		Size 4 – Model J ②		Size 4 – Model K ③	
		Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $
Contact Kit	2 3 4 5	**626B187G12** **626B187G13** ④ ⑤		**626B187G16** **626B187G17** ⑥ ⑦		**5250C81G16** **5250C81G17** **5250C81G18** **5250C81G19**	
Arc Box	2, 3 4, 5	**6714C74G09** **6714C74G10**		**6714C74G11** **6714C74G12**		**6714C74G11** **6714C74G12**	
Cross Bar	2, 3 4, 5	**672B788G36** **672B788G38**		**672B788G36** **672B788G38**		**672B788G40**	
Upper Base	2, 3 4, 5	**672B788G37** **672B788G39**		**672B788G37** **672B788G39**		**672B788G52**	
Lower Base	2, 3 4, 5	**1250C33G03** **1250C33G06**		**1250C33G03** **1250C33G06**		**1250C33G10**	
KO Spring (Pk of 10)	All	**503C796G02**		**503C796G02**		**672B788G50**	
Terminal Line/Load (Pk of 3)	All	**372B357G12**		**372B357G18**		**372B357G18**	

① Model C contact tips and coils 00-4, 2-, 3-, 4- and 5-pole contactors are same as model J. All other parts are unavailable.
② For 200 Amp A202 Magnetically Latched Lighting Contactors order 3-pole contact kit style 672B788G07.
③ Model K replaces Model J, offering superior design life characteristics. Renewal parts are different. Use parts for proper model only.
④ Use Qty. 2 of 626B187G12.
⑤ Use Qty. 1 each of 626B187G12 and 626B187G13.
⑥ Use Qty. 2 of 626B187G16.
⑦ Use Qty. 1 each of 626B187G16 and 626B187G17.

Discount Symbol **1CD1C**

AC Starters, Contactors A200, A201 (Continued)

Accessories for Model J – K, Series 3, 4

Table 33-268. DC Coils ①

Voltage	Model J Size 3, 4	
	2-, 3-Pole	
	Style Number	Price U.S. $
24	1255C68G04	
48	1255C68G05	
125	1255C68G01	
250	1255C68G02	
125/250 ②	1255C68G03	

① Use only on units originally supplied with DC coil.

② Dual Voltage Coils. Use only on contactors or starters originally supplied with dual voltage coil.

Table 33-269. AC Coils

Voltage	Hz	Model J Size 3, 4				Model K Size 4 ③			
		2-, 3-Pole		4-, 5-Pole		2-, 3-Pole		4-, 5-Pole	
		Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $
120/110	60/50	505C633G01		505C635G01		5250C79G01		5250C80G01	
208	60	505C633G02		505C635G02		5250C79G02		5250C80G02	
600/550	60/50	505C633G05		505C635G05		5250C79G05		5250C80G05	
380	50	505C633G07		505C635G07		5250C79G07		5250C80G07	
240/220	60/50	505C633G12		505C635G12		5250C79G12		5250C80G12	
480/440	60/50	505C633G13		505C635G13		5250C79G13		5250C80G13	
24	60	505C633G34		N/A		5250C79G34		N/A	
277	60	505C633G14		N/A		5250C79G14		N/A	
240/480 ④	60/60	505C633G03		505C635G03		5250C79G03		5250C80G03	
120/244 ④	60/60	505C633G10		505C635G10		5250C79G10		5250C80G10	

③ Model K replaces Model J, offering superior design life characteristics. Renewal parts are different. Use parts for proper model only.

④ Dual Voltage Coils. Use only on contactors or starters originally supplied with dual voltage coil.

A201 Contactors — Size 5 – 9

Table 33-270. GCA 530/630 — GPD 7, 8, 9 Kits ⑤

Part	Size 5		Size 6		Size 7		Size 8		Size 9	
	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $	Style Number	Price U.S. $
Contact Kit (1 per pole)	477B477G05 ⑥		2066A10G11		461A757G17		646C829G05		5264C42G01 ⑨ 5264C42G02 ⑩	
Arc Box	2050A15G45		2066A10G45		831D580G01		831D580G01		9917D69G02	
Magnet Assy.	2050A15G46		2050A15G46		N/A		N/A		N/A	
Mag. Spg. Kit	2050A15G47		2050A15G47		N/A		N/A		N/A	
Acr Cup Kit	2050A15G48		N/A		N/A		N/A		N/A	
Load Conn. Kit	2050A15G49		2066A10G49		N/A		N/A		N/A	
Line Conn. Kit	2050A15G50		2066A10G50		N/A		N/A		N/A	
K.O. Spring – 6	2050A15G51		2066A10G46		N/A		N/A		N/A	
C.T. 300/5	655C285H03		N/A		N/A		N/A		N/A	
C.T. 400/5	655C285H04		N/A		N/A		N/A		N/A	
C.T. 600/5 ⑦	N/A		2066A10G18		N/A		N/A		N/A	
C.T. 800/5 ⑦	N/A		2066A10G19		N/A		N/A		N/A	
Phase Barrier	N/A		N/A		640C441G01		640C441G01		5264C35G03 ⑨	
Cross Bar	2050A15G12		2066A10G15		N/A		N/A		N/A	
Shunt	N/A		2066A10G48		650C129G01		646C831G02 ⑧		5264C39G02 ⑪	

⑤ Catalog Number A201/A200 Series replaces GCA/GPD series. Renewal parts are the same.

⑥ Use 477B477G06 for Silver Tungsten applications.

⑦ C.T. kit which replaces the single molded 1 CT assembly used on the old size 6 airbreak. The kit includes a single molded 3 C.T. assembly, 2 bus bar and hardware. This C.T. kit also replaces the single molded 3 C.T. assembly used on the present size 6 airbreak and size vacuum.

⑧ Set of 3.

⑨ R.C.

⑩ F.C.

⑪ Set of 4.

Discount Symbol **1CD1C**

Accessories for A201 Contactors — Size 5 – 9

Table 33-271. Coils

Voltage	Hz	Size 5		Size 6	
		Style Number	Price U.S. $	Style Number	Price U.S. $
Sizes 5 and 6					
110/120	60	**2050A14G05**		**2050A12G05**	
110/120	50	**2050A14G06**		**2050A12G06**	
200/208	50	**2050A14G07**		**2050A12G07**	
220/240	50	**2050A14G08**		**2050A12G08**	
200/208	60	**2050A14G09**		**2050A12G09**	
220/240	60	**2050A14G10**		**2050A12G10**	
277/303	60	**2050A14G12**		**2050A12G12**	
380/415	50	**2050A14G14**		**2050A12G14**	
440/480	60	**2050A14G15**		**2050A12G15**	
440/480	50	**2050A14G16**		**2050A12G16**	
550/600	60	**2050A14G17**		**2050A12G17**	
550/600	50	**2050A14G18**		**2050A12G18**	
380/415	60	**2050A14G19**		**2050A12G19**	
120/240	60	**2050A14G20**		**2050A12G20**	
24 DC		**2050A14G21**		**2050A12G21**	
48 DC		**2050A14G22**		**2050A12G22**	
125 DC		**2050A14G25**		**2050A12G25**	
250 DC		**2050A14G27**		**2050A12G27**	

Line Voltage	Size 7, 8		Required
	Style Number	Price U.S. $	
Sizes 7 and 8			
125V DC	**438C805G04**		2
230V DC	**438C805G02**		2
250V DC	**438C805G03**		2
110/120V AC ① ④	**438C805G12**		2
220/240V AC ② ④	**438C805G11**		2
380V AC ③ ④	**438C805G15**		2
440/480V AC ③ ④	**438C805G10**		2
550/575V AC ③ ④	**438C805G13**		2

Line Voltage	Size 9	
	Style Number	Price U.S. $
Size 9		
110V DC	**5264C34G01** ⑤	

① Rectifier 125V 2018A40G01 (1 required).
② Rectifier 250V 2018A40G02 (1 required).
③ Rectifier 600V 2018A40G03 (1 required).
④ These coils require an external rectifier. If the rectifier needs replacement, order by the appropriate style number.
⑤ Contains coil and resistor.

Discount Symbol **1CD1C**

Contents

Type A Overload Relay 3-Pole Panel Mount

Product Family Overview

Type B and Type A, Class 20 Cutler-Hammer® Thermal Overload Relays from Eaton's electrical business will protect the motor against abnormal overload conditions. Bimetallic actuated, they are available as either ambient compensated or non-compensated in either single-pole or block type three-pole design. The Type B use one pole of the three-pole block for single-phase.

Single-pole relays are also available as Fast Trip Class 10 ambient compensated type, which provides approximately 125% motor protection with a tripping time of less than 10 seconds, at 600% of heater current rating.

Fast trip relays can be identified by the green reset rods. They are available for panel or starter mounting. The three-pole fast trip design is composed of three single-pole relays on a common baseplate, with a common reset bar.

The bimetal element is actuated by precisely calibrated heater elements which are connected directly in the circuit to be protected. Thermal actuation of this device opens the contacts in the coil circuit of a contactor or relay which results in the disconnection of power to the overloaded circuit.

Interchangeable thermal heater elements for single-pole standard trip and block type overload relays are available to cover motor full load currents from .29 to 133A in approximately 10% steps (see Heater Application Table). Fast trip overload relays do not have interchangeable heater elements but are available in a series of ratings to cover motor full load currents from 1.6 to 150A in approximately 50% steps.

Design Features

Manual or Automatic Reset

The Type B is furnished with a manual reset. The Type A is normally furnished set for manual reset operation and may be quickly adjusted for automatic reset when required. Automatic reset should not be used with 2-wire control or where automatic restarting would endanger either personnel or equipment.

Trip Indication

An immediate visible indication of trip is provided on the overload relay. When an overload occurs, which causes the relay to operate, a trip indicator projects out and thus shows positive visual indication of trip. The Type B has a mechanical trip bar to manually check the NC contact operation on the overload relay.

Adjustable Trip

On the Type A, the trip rating of a specific heater element can be adjusted over a range of approximately 85% to 115% of its respective rating to permit the desired close protection.

This is accomplished by turning the adjusting knob on the relay to the respective stop position.

Positive Contact Break

A follow-through contact, provided on the stationary terminal of the snap action control switch, provides reliable electrical continuity during toggling, thus eliminating false trip sometimes prevalent with thermally operated switches. This contact also allows contact wipe for further reliability.

Ambient Compensation

Motor overload protection can be provided with the same trip characteristics in ambient temperature from -40° to 77°C (-40° to 167°F). A compensating bimetal maintains a constant "travel to trip" distance independent of ambient conditions. The compensating feature is fully automatic and no adjustments are required over wide fluctuations in ambient temperatures. Compensated relays are identified by black reset rods on the Type A and light gray reset rods on the Type B, while non-compensated relays use red reset rods. AA three-pole units have gray reset rods. AA one-pole units have black reset rods.

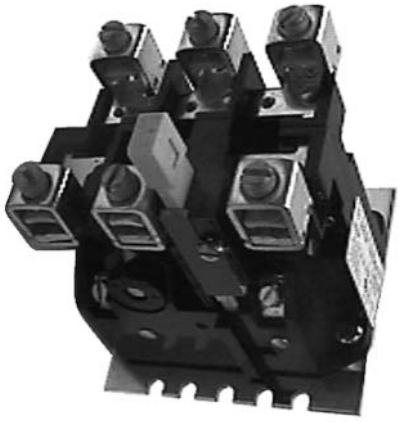
Control Contact

Single-pole and block type relays are supplied as standard with a SPST NC control contact. A SPDT NO-NC with common is available as a factory modification on the Type A. An isolated NO contact can be supplied on the Type B as either a factory modification or as a field kit.

Instruction Leaflets

14885B	Fast Trip A Sizes 0 – 4, 3-Pole OL Relay
14567E	Type A Sizes 1 – 2, 1-Pole OL Relay Mod A
14568	Type A Sizes 1 – 2, 3-Pole OL Relay Mod J
14570D	Type A Sizes 3 – 4, 3-Pole OL Relay Mod J
14569C	Type A Sizes 3 – 4, 1-Pole OL Relay Mod A
17093A	Type B OLR for Sizes 7, 8 and 9 Contactors
16955A	Type B Sizes 1 – 2, 1-Pole OL Relay
16954A	Type B Sizes 1 – 2, 3-Pole OL Relay
15392B	Type B Sizes 3 – 4, 3-Pole OL Relay
13676F	Fast Trip Sizes 0 – 4, 1-Pole OL Relay

Thermal Type B, Class 20, Manual Reset



Type B Overload Relay Panel Mounting

Application Description

The Type B overload relay is designed to protect industrial motors against overload conditions. Using modern block type, bimetallic design, this relay will provide Class 20 operation in either single-phase or 3-phase applications.

Features

- Ambient compensation standard
- Alarm contact field mountable
- Class 20 — 600V design
- Inverse time delay trip
- Test trip device for weld check
- Hi-visibility up-front trip indication
- Trip-free reset mechanism

Operation

The Type B overload relay is a bimetallic actuated device. The bimetal elements are operated by precisely calibrated heaters. The heater elements are connected either directly in the circuit to be measured, or through current transformers on applications NEMA Size 5 and larger.

As the bimetals are heated by motor current flow, a deflection force is produced. Upon a sustained level of abnormal current flow, the deflection becomes great enough to open the snap-action output contact.

Ambient Compensation

The Type B ambient compensated design is supplied as standard on all A200 starters. This design uses a second compensating bimetal responsive to ambient air temperature in the surrounding enclosure. This feature reduces nuisance tripping in applications using compact control panels and motor control centers where internal temperature rise is significant compared to motor ambient temperature. The compensating characteristic is maintained in ambient temperatures from 40° to 77°C.

Standards and Certifications

- UL508
- CSA
- ANSI/NEMA ICS 2-222

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Technical Data

Table 33-272. Control Contact Ratings — NEMA B600 NO and NC Control Contact Rating

AC Volts	Make	Break
24 – 120 120 – 600	30A 3600 VA	3A 360 VA

Accessories

Table 33-273. Alarm Contact Kit Selection ①

Type B Overload Relay Size	Catalog Number	Price U.S. $
1, 2 3, 4	B3NO-2 B3NO-4	

① Alarm contact available as factory modification of field mountable. For factory modification, add suffix B.

Product Selection

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-181 – 33-182**, as required per starter.

Relays

Table 33-274. Product Selection — Thermal Type B Overload Relay Selection

Motor Full Load Amps	Panel Mounted Catalog Numbers		Starter Mounted Catalog Numbers				Price U.S. $
			Replacement for Type B Overload Relays		Replacement for Type A Overload Relays in Manual Reset Mode (3-Pole Only) ②		
	Ambient Comp.	Non comp.	Ambient Comp.	Non-comp.	Ambient Comp.	Non-comp.	
Single-Pole (One NC Contact)							
.25 – 26.2 26.3 – 45	BA11JP BA21JP	BN11JP BN21JP	BA11A BA21A	BN11A BN21A	— —	— —	
19 – 90 19 – 135	Use 3-Pole Design, Wire 3 Poles in Series						
Three-Pole (One NC Contact)							
.25 – 26.2 26.3 – 45 19 – 90 19 – 135	BA13JP BA23JP BA33P BA43P	BN13JP BN23JP BN33P BN43P	BA13A ③ BA23A BA33A BA43A	BN13A ③ BN23A BN33A BN43A	BA13J BA23J BA33A BA43A	BN13J BN23J BN33A BN43A	

② Includes contactor mounting bracket, overload relay and connection straps to contactor.

③ For replacement on B200 size 00, 0, 1 use BA23A instead of BA13A and use BN23A instead of BN13A.

Discount Symbol **1CD1C**

Dimensions

Not to be used for construction purposes unless approved.

Table 33-275. Thermal Type B Overload Relays Dimensions

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Relay Size	Approximate Dimensions in Inches (mm)			
	A	B	C	D
3	3.13 (79.5)	4.06 (103.1)	.44 (11.2)	.31 (7.9)
4	3.38 (85.9)	4.38 (111.3)	.31 (7.9)	.19 (4.8)

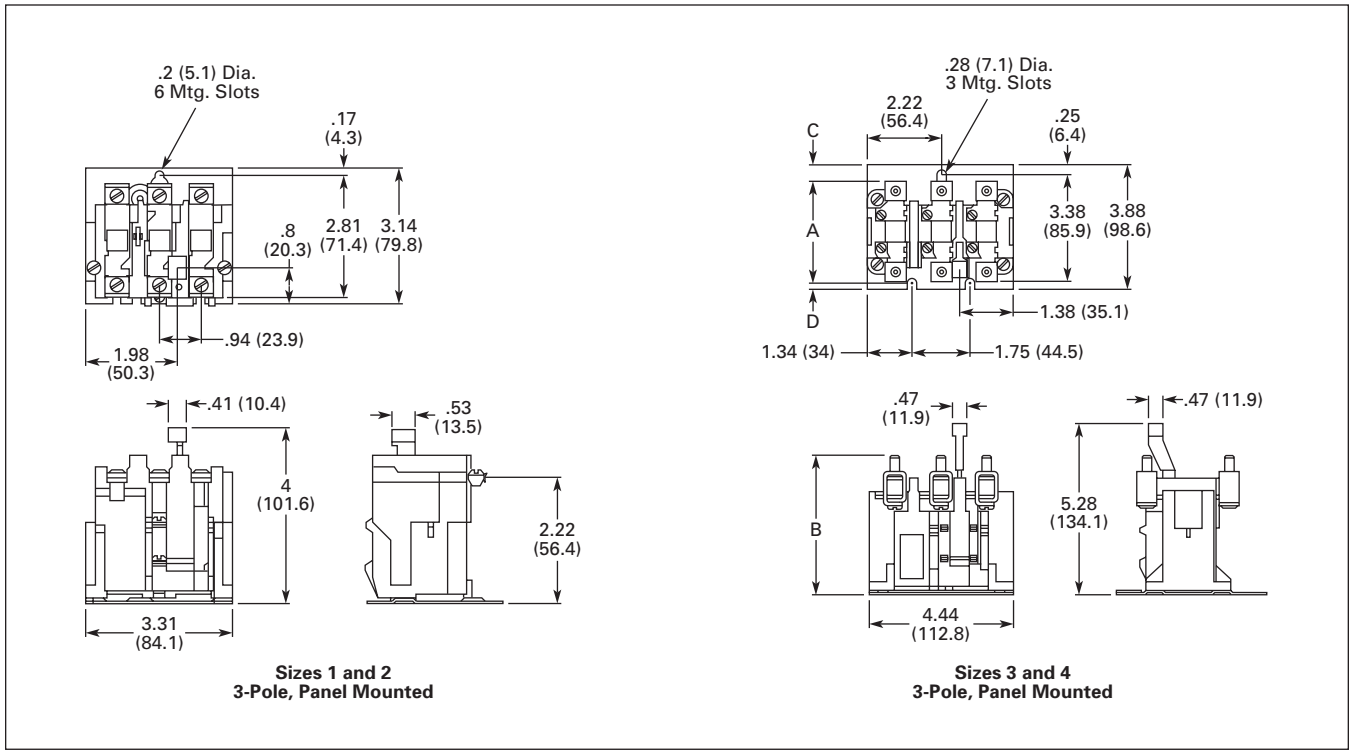

Figure 33-63. Thermal Type B Overload Relays Dimensions in Inches (mm)

Thermal Type A, Class 20, Auto/Manual Reset

Type A Overload Relay
1-Pole Panel Mounting

Application Description

The Type A overload relay is designed to protect industrial motors against overload conditions. Using modern block type, bimetallic design, this relay will provide Class 20 operation in either single- or 3-phase applications.

Features

- Field selectable manual/auto reset
- Alarm contract factory available
- Class 20 — 600V design
- Inverse time delay trip
- Adjustable trip rating ± 15%
- Color coded reset rod:
  - Compensated (Gray)
  - Non-compensated (Red)

Operation

The Type A overload relay is a bimetallic actuated device. The bimetal elements are operated by precisely calibrated heaters. The heater elements are connected either directly in the circuit to be measured, or through current transformers on applications NEMA Size 5 and larger.

As the bimetals are heated by motor current flow, a deflection force is produced. Upon a sustained level of abnormal current flow, the deflection becomes great enough to open the snap-action output contact.

Automatic Reset

The Type A overload relay can be supplied as an option on all A200 starters to provide automatic reset operation. The overload relay is always shipped in the non-automatic mode. To set up auto operation, reposition the reset rod by loosening and re-tightening a hold-down clamp at the base of overload relay.

Standards and Certifications

- UL508
- CSA
- ANSI/NEMA ICS 2-222

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Technical Data

Table 33-276. Control Contact Ratings

AC Volts	Normally Closed		Normally Open	
	Make	Break	Make	Break
Three-Pole Control Contact Ratings				
24 – 120 120 – 600	20A 2400 VA	2A 240 VA	.5A 600 VA	.5A 60 VA
One-Pole Control Contact Ratings				
24 – 120 120 – 600	30A 3600 VA	3A 360 VA	10A 1200 VA	1A 120 VA

Product Selection

Heaters

Enter heaters as separate item by listing Catalog Number from tables, **Pages 33-181 – 33-182**, as required per starter.

Relays

Table 33-277. Product Selection — Thermal Type A Overload Relay Selection

Motor Full Load Amps	Panel Mounted		Starter Replacement		Price U.S. $
	Ambient Comp.	Non-comp.	Ambient Comp.	Non-comp.	
	Catalog Number	Catalog Number	Catalog Number	Catalog Number	
Single-Pole (One NC Contact)					
.25 – 26.2 26.3 – 45 19 – 90 19 – 135	**AA11P** **AA21P** **AA31P** **AA41P**	**AN11P** **AN21P** **AN31P** **AN41P**	**AA11A** **AA21A** **AA31A** **AA41A**	**AN11A** **AN21A** **AN31A** **AN41A**	
Three-Pole (One NC Contact)					
.25 – 26.2 26.3 – 45 19 – 90 19 – 135	**AA13P** ① **AA23P** ① **AA33P** ① **AA43P** ①	**AN13P** ① **AN23P** ① **AN33P** ① **AN43P** ①	**AA13A** ① **AA23A** ① **AA33A** ① **AA43A** ①	**AN13A** ① **AN23A** ① **AN33A** ① **AN43A** ①	

Note: For Alarm Contact (Form C), add Suffix **B**. Available only as factory modification on Type A relay.

① 3-Pole Type B Overload Relay is a suitable alternative to a 3-Pole Type A Overload Relay in Manual Reset Mode. For example, BA13JP for AA13P, BN23J for AN23A, etc. (See **Page 33-175**.)

Discount Symbol **1CD1C**

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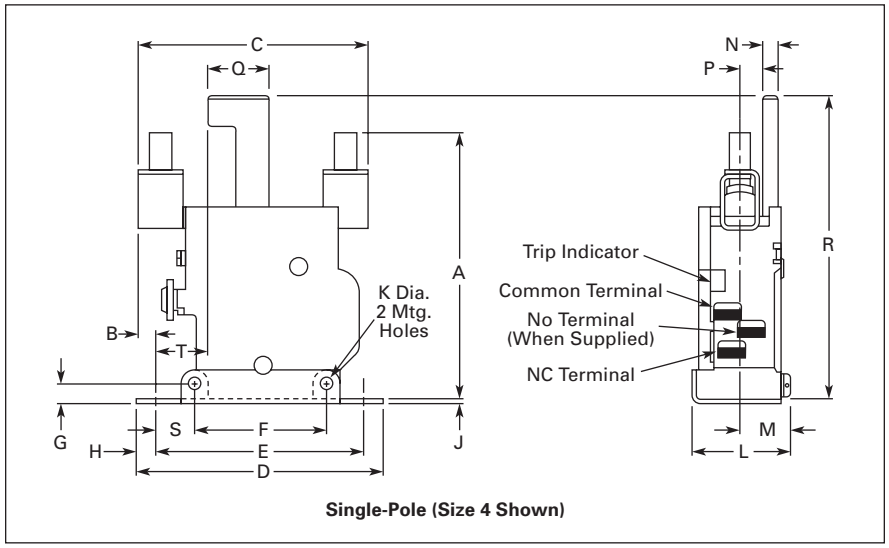
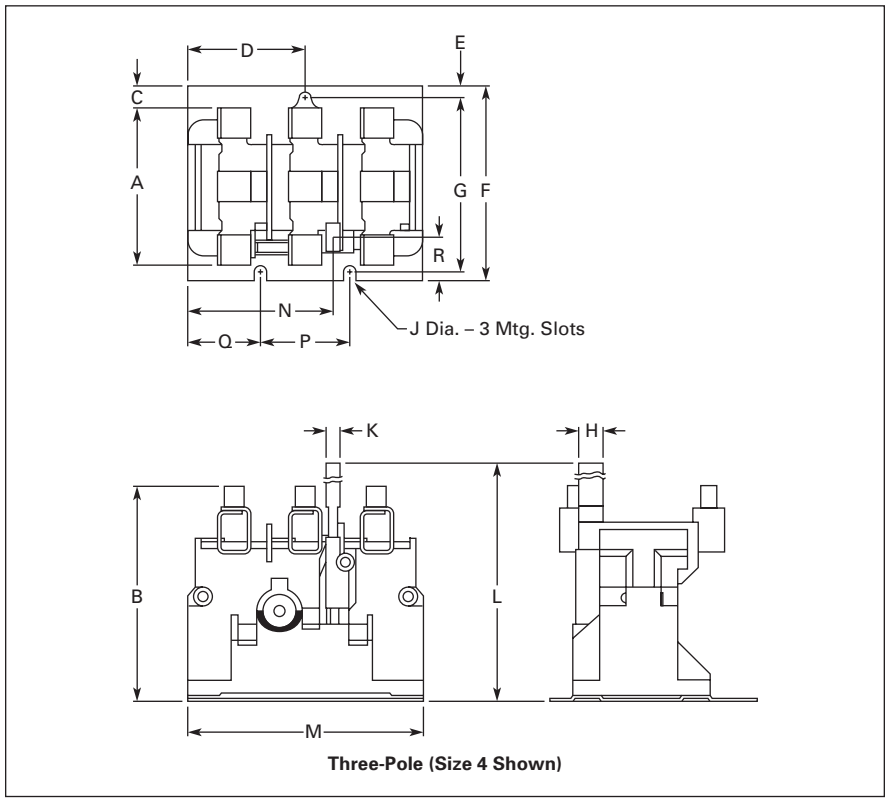
Dimensions

Not to be used for construction purposes unless approved.



Single-Pole (Size 4 Shown)

Figure 33-64. Type A Single-Pole Approximate Dimensions



Three-Pole (Size 4 Shown)

Figure 33-65. Type A Three-Pole Approximate Dimensions

Table 33-278. Type A Single-Pole — Approximate Dimensions in Inches (mm)

Dim.	Relay Size			
	1	2	3	4
A	2.72 (69.1)	3.48 (88.4)	4.19 (106.4)	4.5 (114.3)
B	.94 (23.9)	.67 (17.0)	.25 (6.4)	.38 (9.7)
C	2.75 (69.9)	3.5 (88.9)	3.53 (89.7)	3.78 (96.0)

Dim.	1, 2	3, 4
D	3.25 (82.6)	4.13 (104.9)
E	2.63 (66.8)	3.38 (85.9)
F	1.34 (34.0)	2.19 (55.6)
G	.25 (6.4)	.28 (7.1)
H	.31 (7.9)	.38 (9.7)
J	.06 (1.5)	.06 (1.5)
K	.22 (5.6)	.27 (6.8)
L	1.34 (34.0)	1.69 (42.9)
M	.66 (16.8)	.88 (22.4)
N	.16 (4.1)	.27 (6.8)
P	.22 (5.6)	.34 (8.6)
Q	.06 (1.5)	.69 (17.5)
R	4.00 (101.6)	5.19 (131.8)
S	.47 (11.9)	.59 (15.0)
T	1.11 (28.2)	.69 (17.5)

Table 33-279. Type A Three-Pole — Approximate Dimensions in Inches (mm)

Dim.	Relay Size			
	1	2	3	4
A	2.38 (60.5)	2.44 (62.0)	3.13 (79.5)	3.38 (85.9)
B	3.13 (79.5)	3.17 (80.5)	4.06 (103.1)	4.38 (111.3)
C	.36 (9.1)	.33 (8.4)	.44 (11.2)	.31 (7.9)

Dim.	1, 2	3, 4
D	1.66 (42.2)	2.22 (56.4)
E	.17 (4.3)	.25 (6.4)
F	2.81 (71.4)	3.38 (85.9)
G	3.08 (78.2)	3.88 (98.6)
H	.47 (11.9)	.47 (11.9)
J	.20 (5.1)	.28 (7.1)
K	.28 (7.1)	.47 (11.9)
L	4.00 (101.6)	5.28 (134.1)
M	3.31 (84.1)	4.44 (112.8)
N	1.80 (45.7)	2.77 (70.4)
P	1.89 (48.0)	1.75 (44.5)
Q	1.00 (25.4)	1.34 (34.0)
R		1.03 (26.2)

Type FT Fast Trip, Class 10

Application Description

The Type FT overload relay is designed to protect special purpose motors having restricted thermal and locked rotor capabilities. Using modern block type, bimetallic design, this relay will provide Class 10 operation in single- or three-phase applications.

Operation

The Type FT overload relay is a bimetallic actuated device. The bimetal elements are operated directly from line current, thus separate calibrating heater elements are not utilized. The overload relay may be wired directly in the motor circuit, or through-current transformers on applications larger than 150A.

As the bimetals are heated by motor current flow, a deflection force is produced. Upon a sustained level of abnormal current flow, the deflection becomes great enough to open the snap action output contact.

Features

- Class 10 — 600V design
- Inverse time delay trip
- Color coded reset rod — green
- Alarm contact factory available
- Field selectable manual/auto reset
- Adjustable trip rating ±20%
- Ambient compensation included

Technical Data

Table 33-281. Control Contact Ratings

AC Volts	Normally Closed		Normally Open	
	Make	Break	Make	Break
24 – 120	30A	3A	10A	1A
120 – 600	3600 VA	360 VA	1200 VA	120 VA

Product Selection

Table 33-280. Type FT Single-Pole (One NC Contact); Three-Phase (Three NC Contacts in Series)

Motor Full Load Amperes	Panel Mounted				Starter Replacement		
	Single-Pole		Three-Pole		NEMA Size	Single-Pole	
	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $		Catalog Number	Price U.S. $
.76 – 1.1	**FT11P-1.1**		**FT13P-1.1**		—	**FT11A-1.1**	
1.1 – 1.6	**FT11P-1.6**		**FT13P-1.6**		—	**FT11A-1.6**	
1.6 – 2.4	**FT11P-2.4**		**FT13P-2.4**		0, 1	**FT11A-2.4**	
2.4 – 3.6	**FT11P-3.6**		**FT13P-3.6**		0, 1	**FT11A-3.6**	
3.6 – 5.4	**FT11P-5.4**		**FT13P-5.4**		0, 1	**FT11A-5.4**	
5.4 – 8.0	**FT11P-8.0**		**FT13P-8**		0, 1	**FT11A-8**	
8.0 – 12	**FT11P-12**		**FT13P-12**		0, 1	**FT11A-12**	
12 – 18	**FT11P-18**		**FT13P-18**		1	**FT11A-18**	
16 – 24	**—**		**FT13P-24**			**—**	
22 – 32	**FT11P-32**		**FT13P-32**		0, 1	**FT11A-32**	
24 – 36	**FT21P-36**		**FT23P-36**		2	**FT21A-36**	
36 – 54	**FT21P-54**		**FT23P-54**		2	**FT21A-54**	
22 – 32	**FT31P-32**		**FT33P-32**		3	**FT31A-32**	
32 – 48	**FT31P-48**		**FT33P-48**		3	**FT31A-48**	
48 – 72	**FT31P-72**		**FT33P-72**		3	**FT31A-72**	
72 – 110	**FT41P-110**		**FT43P-110**		4	**FT41A-110**	
100 – 150	**FT41P-150**		**FT43P-150**		4	**FT41A-150**	

Note: Single-Pole (1NO-NC Contact): Add Suffix **B**.
Three-Pole (3NO-NC Contacts): Add Suffix **B**. Example: FT13P**B**-12.

Discount Symbol **1CD1C**

Dimensions

Not to be used for construction purposes unless approved.

Table 33-282. Type FT Overload Relays Dimensions

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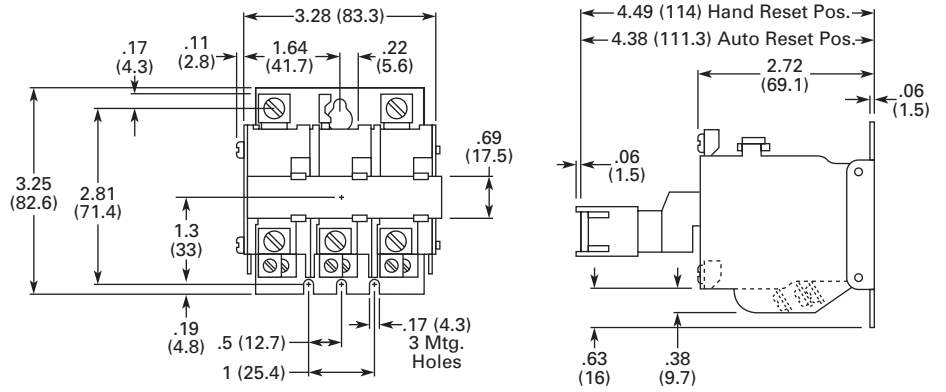
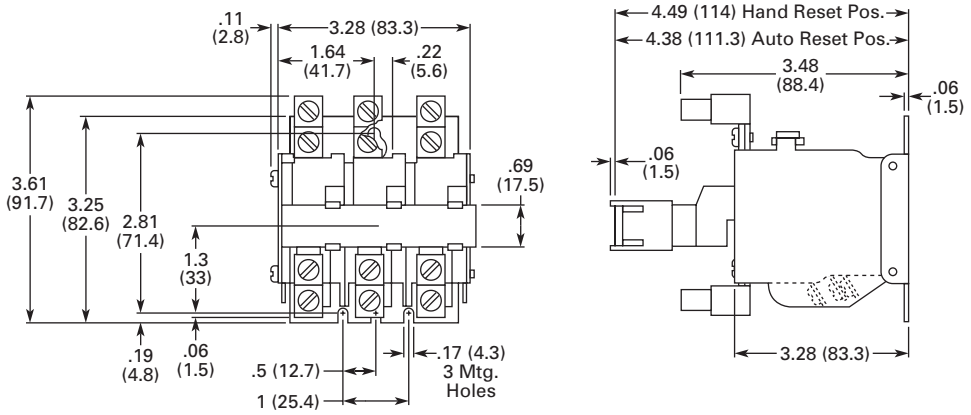
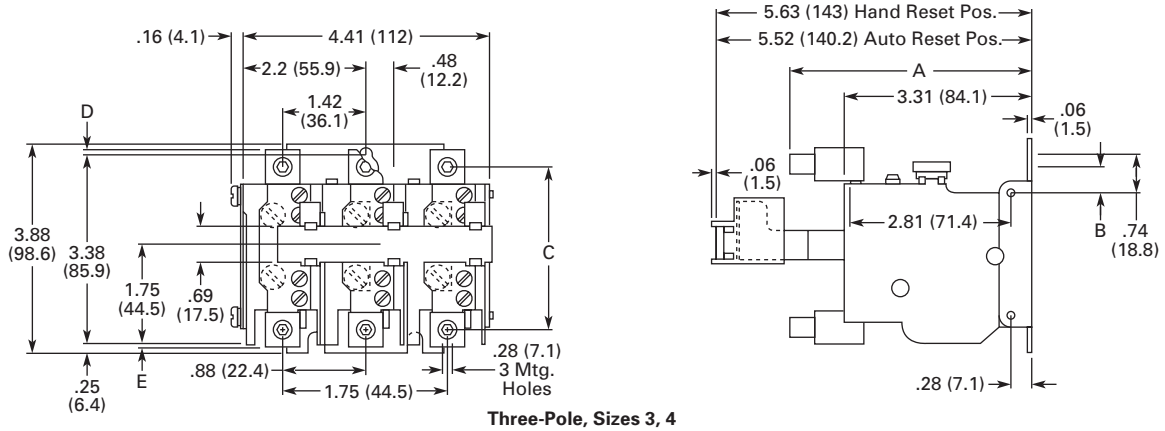
Relay Size	Approximate Dimensions in Inches (mm)				
	A	B	C	D	E
3	4.25 (108.0)	.53 (13.5)	2.91 (73.9)	.09 (2.3)	.06 (1.5)
4	4.50 (114.3)	.59 (15.0)	3.03 (77.0)	.22 (5.6)	.19 (4.8)



Three-Pole, Size 1



Three-Pole, Size 2



Three-Pole, Sizes 3, 4

Figure 33-66. Type FT Overload Relays Dimensions in Inches (mm)

Heater Selection

General Information on Heater Coil Selection

For maximum motor protection and compliance with Article 430-32 of the National Electrical Code, select heater coils from the tables in this section on the basis of motor nameplate full load current.

When the full load current is unknown, selection may be made on the basis of average full load currents as shown on **Pages 33-241** and **33-242**.
Caution — The average ratings could be high or low for a specific motor and therefore selection on this basis always involves risk. For fully reliable motor protection, select heater coils on the basis of full load current rating as shown on the motor nameplate.

Heater coils are rated to protect 40°C rise motors, and open and drip-proof motors having a **service factor of 1.15** where the motor and the controller are at the same ambient temperature.

For other conditions:

1. For 50°C, 55°C, 75°C rise motors and **enclosed motors having a service factor of 1.0, select one size smaller coil.**
2. Ambient temperature of controller lower than motor by 26°C (47°F), use one size smaller coil.
3. Ambient temperature of controller higher than motor by 26°C (47°F), use one size larger coil.

Ultimate tripping current of heater coils is approximately 1.25 times the minimum current rating listed in the tables.

Table 33-283. Heater Selection — Type A and B Overload Relays, Sizes 3 and 4

Size Starter		Ambient Compensated Enclosed Starters	Non-compensating Enclosed Starters	Heater (One Heater per Catalog Number)	
		All Applications		Catalog Number	Price U.S. $
		Full Load Current of Motor Amps			
For Size 4 Starters	For Size 3 Starters	12.8 – 14.1 14.2 – 15.5 15.6 – 17.1 17.2 – 18.9 19.0 – 20.8	11.9 – 13.0 13.1 – 14.3 14.4 – 15.9 16.0 – 17.4 17.5 – 19.1	**FH68** **FH69** **FH70** **FH71** **FH72**	
		20.9 – 22.9 23.0 – 25.2 25.3 – 27.8 27.9 – 30.6 30.7 – 33.5	19.2 – 21.1 21.2 – 23.2 23.3 – 25.6 25.7 – 28.1 28.2 – 30.8	**FH73** **FH74** **FH75** **FH76** **FH77**	
		33.6 – 37.5 37.6 – 41.5 41.6 – 56.3 46.4 – 50 51 – 55	30.9 – 34.5 34.6 – 38.2 38.3 – 42.6 42.7 – 46 47 – 51	**FH78** **FH79** **FH80** **FH81** **FH82**	
		56 – 61 62 – 66 67 – 73 74 – 78	52 – 56 57 – 61 62 – 67 68 – 72	**FH83** **FH84** **FH85** **FH86**	
		79 – 84 85 – 92	73 – 77 78 – 84	**FH87** **FH88**	
		93 – 101	85 – 91	**FH89**	
		102 – 110 111 – 122 123 – 129 130 – 133 —	92 – 99 100 – 110 111 – 122 123 – 128 129 – 133	**FH90** **FH91** **FH92** **FH93** **FH94**	

Table 33-284. Heater Selection — Type A and B Overload Relays, Sizes 5 and 6

Compensated Overload Relay		Heater (One Heater per Catalog Number)	
Open Starter	Enclosed Starter	Catalog Number	Price U.S. $
Full Load Current of Motor (Amps)			
Size 5 (with 300/5 Current Transformers)			
—	—	**FH23**	
118 – 129	118 – 129	**FH24**	
130 – 141	130 – 141	**FH25**	
142 – 155	142 – 155	**FH26**	
156 – 170	156 – 170	**FH27**	
171 – 187	171 – 187	**FH28**	
188 – 205	188 – 205	**FH29**	
206 – 224	206 – 224	**FH30**	
225 – 244	225 – 244	**FH31**	
245 – 263	245 – 263	**FH32**	
264 – 292	264 – 292	**FH33**	
293 – 300	—	**FH34**	
Size 6 (with 600/5 Current Transformers)			
—	—	**FH23**	
236 – 259	236 – 259	**FH24**	
260 – 283	260 – 283	**FH25**	
284 – 310	284 – 310	**FH26**	
311 – 340	311 – 340	**FH27**	
341 – 374	341 – 374	**FH28**	
375 – 411	375 – 411	**FH29**	
412 – 448	412 – 448	**FH30**	
449 – 489	449 – 489	**FH31**	
490 – 527	490 – 527	**FH32**	
528 – 585	528 – 540	**FH33**	
586 – 600	—	**FH34**	

Note: Size 7 and Larger — Advise Full Load Current.

Discount Symbol **1CD1C**

Table 33-285. Heater Selection — Type A and B Overload Relays, Sizes 0, 1 and 2

Size Starter	Non-compensated Open Starters and Ambient Comp. Open and Enclosed Starters		Heater (One Heater per Catalog Number)		Non-compensating Enclosed Starters		Heater	
	Block Type Overload Using 3 Heaters	Single-Pole Type Overload	Catalog Number	Price U.S. $	Block Type Overload Using 3 Heaters	Single-Pole Type Overload	Catalog Number	Price U.S. $
	Full Load Current of Motor (Amps)							
For Size 2 Starters / For Size 1 Starters / For Size 0 Starters	.25 – .27	.29 – .31	**FH03**		.24 – .25	.28 – .30	**FH03**	
	.28 – .31	.32 – .35	**FH04**		.26 – .28	.31 – .34	**FH04**	
	.32 – .34	.36 – .39	**FH05**		.29 – .31	.35 – .37	**FH05**	
	.35 – .38	.40 – .43	**FH06**		.32 – .35	.38 – .42	**FH06**	
	.39 – .42	.44 – .48	**FH07**		.36 – .39	.43 – .47	**FH07**	
	.43 – .46	.49 – .53	**FH08**		.40 – .43	.48 – .52	**FH08**	
	.47 – .50	.54 – .58	**FH09**		.44 – .47	.53 – .56	**FH09**	
	.51 – .55	.59 – .64	**FH10**		.48 – .51	.57 – .63	**FH10**	
	.56 – .62	.65 – .71	**FH11**		.52 – .57	.64 – .70	**FH11**	
	.63 – .68	.72 – .79	**FH12**		.58 – .63	.71 – .77	**FH12**	
	.69 – .75	.80 – .87	**FH13**		.64 – .70	.78 – .85	**FH13**	
	.76 – .83	.88 – .96	**FH14**		.71 – .77	.86 – .94	**FH14**	
	.84 – .91	.97 – 1.06	**FH15**		.78 – 85	.95 – 1.03	**FH15**	
	.92 – 1.00	1.07 – 1.16	**FH16**		.86 – .93	1.04 – 1.13	**FH16**	
	1.01 – 1.11	1.17 – 1.28	**FH17**		.94 – 1.03	1.14 – 1.25	**FH17**	
	1.12 – 1.22	1.29 – 1.41	**FH18**		1.04 – 1.13	1.26 – 1.38	**FH18**	
	1.23 – 1.34	1.42 – 1.55	**FH19**		1.14 – 1.25	1.39 – 1.52	**FH19**	
	1.35 – 1.47	1.56 – 1.71	**FH20**		1.26 – 1.37	1.53 – 1.67	**FH20**	
	1.48 – 1.62	1.72 – 1.87	**FH21**		1.38 – 1.51	1.68 – 1.83	**FH21**	
	1.63 – 1.78	1.88 – 2.06	**FH22**		1.52 – 1.65	1.84 – 2.01	**FH22**	
	1.79 – 1.95	2.07 – 2.26	**FH23**		1.66 – 1.81	2.02 – 2.21	**FH23**	
	1.96 – 2.15	2.27 – 2.48	**FH24**		1.82 – 1.99	2.22 – 2.43	**FH24**	
	2.16 – 2.35	2.49 – 2.72	**FH25**		2.00 – 2.19	2.44 – 2.66	**FH25**	
	2.36 – 2.58	2.73 – 2.99	**FH26**		2.20 – 2.39	2.67 – 2.92	**FH26**	
	2.59 – 2.83	3.00 – 3.28	**FH27**		2.40 – 2.63	2.93 – 3.21	**FH27**	
	2.84 – 3.11	3.29 – 3.60	**FH28**		2.64 – 2.89	3.22 – 3.53	**FH28**	
	3.12 – 3.42	3.61 – 3.95	**FH29**		2.90 – 3.17	3.54 – 3.87	**FH29**	
	3.43 – 3.73	3.96 – 4.31	**FH30**		3.18 – 3.47	3.88 – 4.22	**FH30**	
	3.74 – 4.07	4.32 – 4.71	**FH31**		3.48 – 3.79	4.23 – 4.61	**FH31**	
	4.08 – 4.39	4.72 – 5.14	**FH32**		3.80 – 4.11	4.62 – 4.9	**FH32**	
	4.40 – 4.87	5.15 – 5.6	**FH33**		4.12 – 4.55	5.0 – 5.5	**FH33**	
	4.88 – 5.3	5.7 – 6.2	**FH34**		4.56 – 5.0	5.6 – 6.0	**FH34**	
	5.4 – 5.9	6.3 – 6.8	**FH35**		5.1 – 5.5	6.1 – 6.6	**FH35**	
	6.0 – 6.4	6.9 – 7.5	**FH36**		5.6 – 5.9	6.7 – 7.3	**FH36**	
	6.5 – 7.1	7.6 – 8.2	**FH37**		6.0 – 6.6	7.4 – 8.0	**FH37**	
	7.2 – .78	8.3 – 9.0	**FH38**		6.7 – 7.2	8.1 – 8.7	**FH38**	
	7.9 – 8.5	9.1 – 9.9	**FH39**		7.3 – 7.9	8.8 – 9.7	**FH39**	
	8.6 – 9.4	10.0 – 10.8	**FH40**		8.0 – 8.7	9.8 – 10.5	**FH40**	
	9.5 – 10.3	10.9 – 11.9	**FH41**		8.8 – 9.5	10.6 – 11.7	**FH41**	
	10.4 – 11.3	12.0 – 13.1	**FH42**		9.6 – 10.5	11.8 – 12.7	**FH42**	
	11.4 – 12.4	13.2 – 14.3	**FH43**		10.6 – 11.5	12.8 – 14.0	**FH43**	
	12.5 – 13.5	14.4 – 15.7	**FH44**		11.6 – 12.6	14.1 – 15.3	**FH44**	
	13.6 – 14.9	15.8 – 17.2	**FH45**		12.7 – 13.8	15.4 – 16.6	**FH45**	
	15.0 – 16.3	17.3 – 18.9	**FH46**		13.9 – 15.1	16.7 – 18.3	**FH46**	
	16.4 – 18.0	19.0 – 20.8	**FH47**		15.2 – 16.7	18.4 – 20.0	**FH47**	
	18.1 – 19.8	20.9 – 22.9	**FH48**		16.8 – 18.3	20.1 – 21.9	**FH48**	
	19.9 – 21.7	23.0 – 25.2	**FH49**		18.4 – 20.2	22.0 – 23.9	**FH49**	
	21.8 – 23.9	25.3 – 27.6	**FH50**		20.3 – 22.2	24.0 – 26.2	**FH50**	
	24.0 – 26.2	27.7 – 30.3	**FH51**		22.3 – 24.3	26.3 – 28.8	**FH51**	
	26.3 – 28.7	30.4 – 33.3	**FH52**		24.4 – 26.6	28.9 – 31.4	**FH52**	
	28.8 – 31.4	33.4 – 36.4	**FH53**		26.7 – 29.1	31.5 – 34.5	**FH53**	
	31.5 – 34.5	36.5 – 39.9	**FH54**		29.2 – 32.0	34.6 – 37.9	**FH54**	
	34.6 – 37.9	40.0 – 43.9	**FH55**		32.1 – 35.2	3.80 – 41.9	**FH55**	
	38.0 – 41.5		**FH56**		35.3 – 38.5	42.0 – 45.0	**FH56**	
	41.6 – 45.0		**FH57**		38.6 – 42.3		**FH57**	

Discount Symbol **1CD1C**

Contents

Catalog Number IQ502A

Product Description

The IQ500 is a heaterless, current-sensing, solid-state motor protective relay with optional communications capabilities. Several functions are incorporated into the base relay (IQ502/IQ504) as standard:

- Overload (overcurrent) protection
- Phase unbalance and phase loss protection
- Ground current protection (Class II)

The base relay can serve as the initial building block for a motor protection system by adding the IQ500M Special Function Module. The module can address application related motor load functions with the additional features:

- Underload protection
- Long acceleration
- Jam protection
- Load control

The IQ500 can provide a cost-effective alternative to conventional protective relays such as current relays, ground fault relays and phase loss or phase unbalance relays. Used with the PowerNet system, a low-cost, local area communication network, information such as current values, status, setpoint values and cause of trip can be displayed remotely. The IQ500 relay is ideal for a variety of industrial applications such as mining, timber, material handling, air conditioning compressors, wastewater treatment plants and petrochemical industries.

Features

- Overload class is adjustable using DIP switches for 5, 10, 20 or 30 seconds, maximum trip times at six times rated current
- Designed for 1000V and less distribution systems
- Form C (NO/NC) contact on output relay
- Isolated alarm relay output contact
- Communications capability using IMPACC network
- Manual or automatic reset (either a true manual or remote electrical reset) — selectable
- Overload, Class II ground current, phase unbalance and single-phase protection are standard
- LED indication (bi-colored — red/green) for device status, including overload, phase unbalance or ground current trip
- Special Function Module adds protection for underload and jam conditions, also provides for long acceleration
- Optional load control feature available with special function module
- Feed-through current transformer windows for contactors, NEMA Sizes 1 – 4 (for Size 5 and larger, external current transformers can be used)
- Fits mounting footprint of Eaton's Cutler-Hammer MORA relay
- Panel or starter mountable
- Cause of trip is held in memory through a power loss
- Bell alarm contact available for remote status indication
- DIP switch provided for setting operating frequency — 50 or 60 Hz
- Plug-in terminal block for control power, trip relay and bell alarm relay connections
- Operating temperature: -20° to 60°C (-4° to 140°F)

Benefits

- No external current transformers are required since they are internal to the IQ500.
- DIP switches used to select functions and settings on base relay are clearly marked and covered with screw-on plastic covers.
- On the automatic reset, the reset times can be selected for long (90 second) or short (10 second) delay.
- Device can be set for different motor full load currents without additional parts or modules.

Optional Benefits

- With the addition of the IQ500M Special Function Module, the enhanced protection includes jam (overtorque) and underload and provides long acceleration time (high inertia load).
- The underload and jam protection functions each have independent Form C output relays as part of the module. In addition, the underload and jam functions each have their own LEDs for status indication.
- The underload and jam functions also have separate selectable trip levels and adjustable trip-delay and start-delay settings.
- The IQ500M can be used as a load control module that allows "shedding and restoring" a particular load that contributes to the load being monitored.
- The PONI (Product Operated Network Interface) card attaches directly to the base relay or special function module for interfacing with the Eaton's Cutler-Hammer PowerNet communications system.
- Localized display can be achieved with the Central Monitoring Unit.

Standards and Certifications

- UL File No. E19223

Product Selection

Table 33-286. Current Sensing Protective Relay

Maximum Horsepower			Ampere Rating	Catalog Number		Price U.S. $
				Control Voltage		
200V	230V	460 – 475V		110/120V 50/60 Hz	220/240V 50/60 Hz	
20	25	50	3.4 to 66A	IQ502A	IQ502B	
60	75	150	10.8 to 207A	IQ504A	IQ504B	
—	—	—	.32 to 5.4A	IQ500LA ①	IQ500LB ①	
Special Function Module				IQ500M		

① Can be used with external CTs having 5A secondary.

Dimensions

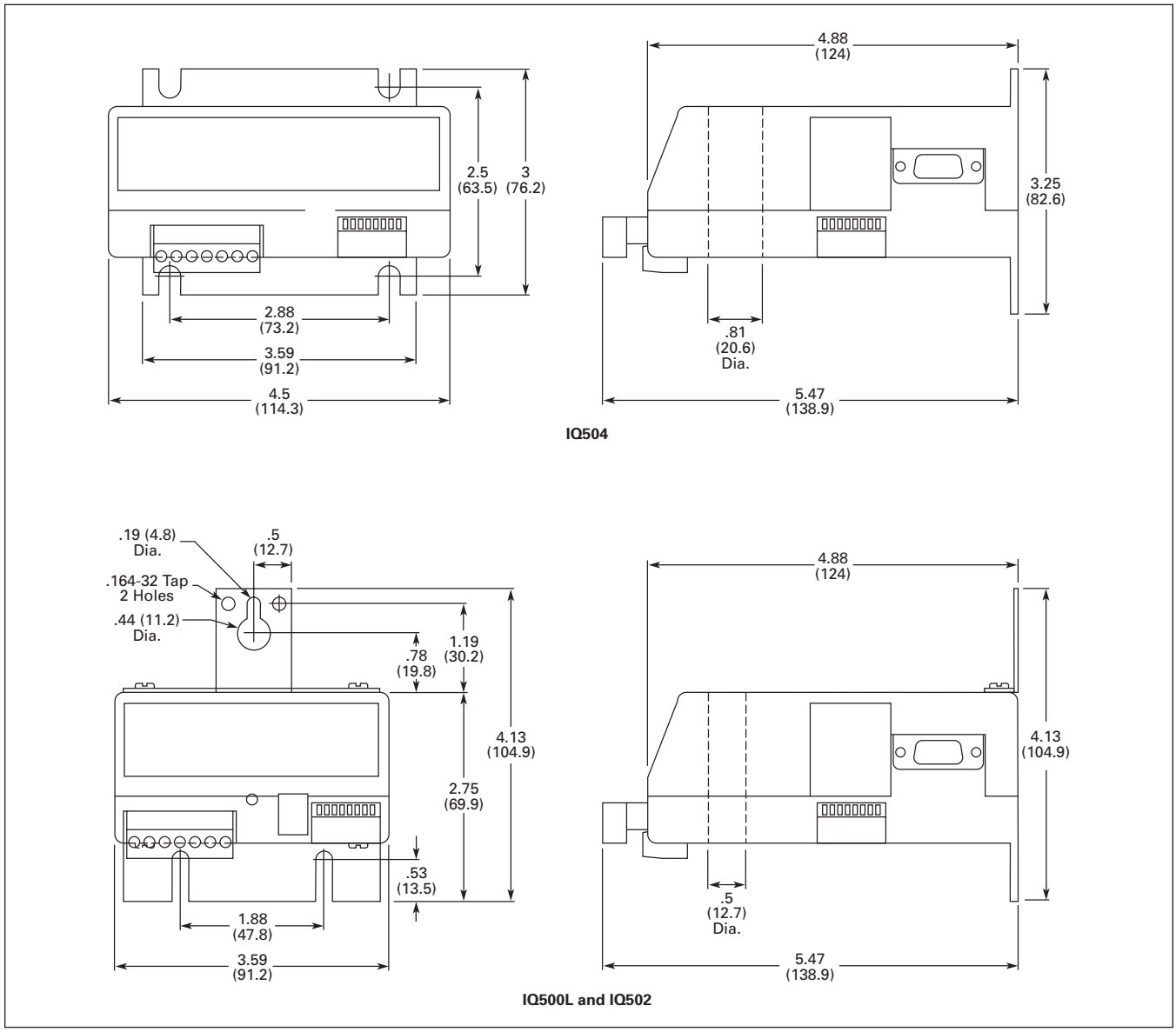


Figure 33-67. Approximate Dimensions in Inches (mm)

Discount Symbol **1CD1C**

Product Selection

Table 33-287. Class EC216 — Combination Non-reversing Starter — Fusible Disconnect ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	30A	**EC216A1AAB**	**EC216A2AAB**	**EC216A4AAB**	**EC216A8AAB**	**A200MACAC**
	200	1-1/2	208		**EC216A1EAB**	**EC216A2EAB**	**EC216A4EAB**	**EC216A8EAB**	**A200MACB**
	230	1-1/2	240		**EC216A1BAB**	**EC216A2BAB**	**EC216A4BAB**	**EC216A8BAB**	**A200MACW**
	460	2	480		**EC216A1CAC**	**EC216A2CAC**	**EC216A4CAC**	**EC216A8CAC**	**A200MACX**
	575	2	600		**EC216A1DAC**	**EC216A2DAC**	**EC216A4DAC**	**EC216A8DAC**	**A200MACE**
0	—	—	120	30A	**EC21601AAB**	**EC21602AAB**	**EC21604AAB**	**EC21608AAB**	**A200M0CAC**
	200	3	208		**EC21601EAB**	**EC21602EAB**	**EC21604EAB**	**EC21608EAB**	**A200M0CB**
	230	3	240		**EC21601BAB**	**EC21602BAB**	**EC21604BAB**	**EC21608BAB**	**A200M0CW**
	460	5	480		**EC21601CAC**	**EC21602CAC**	**EC21604CAC**	**EC21608CAC**	**A200M0CX**
	575	5	600		**EC21601DAC**	**EC21602DAC**	**EC21604DAC**	**EC21608DAC**	**A200M0CE**
1	—	—	120	30A	**EC21611AAB**	**EC21612AAB**	**EC21614AAB**	**EC21618AAB**	**A200M1CAC**
	200	7-1/2	208		**EC21611EAB**	**EC21612EAB**	**EC21614EAB**	**EC21618EAB**	**A200M1CB**
	230	7-1/2	240		**EC21611BAB**	**EC21612BAB**	**EC21614BAB**	**EC21618BAB**	**A200M1CW**
	460	10	480		**EC21611CAC**	**EC21612CAC**	**EC21614CAC**	**EC21618CAC**	**A200M1CX**
	575	10	600		**EC21611DAC**	**EC21612DAC**	**EC21614DAC**	**EC21618DAC**	**A200M1CE**
2	—	—	120	60A	**EC21621AAD**	**EC21622AAD**	**EC21624AAD**	**EC21628AAD**	**A200M2CAC**
	200	10	208		**EC21621EAD**	**EC21622EAD**	**EC21624EAD**	**EC21628EAD**	**A200M2CB**
	230	15	240		**EC21621BAD**	**EC21622BAD**	**EC21624BAD**	**EC21628BAD**	**A200M2CW**
	460	25	480		**EC21621CAE**	**EC21622CAE**	**EC21624CAE**	**EC21628CAE**	**A200M2CX**
	575	25	600		**EC21621DAE**	**EC21622DAE**	**EC21624DAE**	**EC21628DAE**	**A200M2CE**
3	—	—	120	100A	**EC21631AAF**	**EC21632AAF**	**EC21634AAF**	**EC21638AAF**	**A200M3CAC**
	200	25	208		**EC21631EAF**	**EC21632EAF**	**EC21634EAF**	**EC21638EAF**	**A200M3CB**
	230	30	240		**EC21631BAF**	**EC21632BAF**	**EC21634BAF**	**EC21638BAF**	**A200M3CW**
	460	50	480		**EC21631CAG**	**EC21632CAG**	**EC21634CAG**	**EC21638CAG**	**A200M3CX**
	575	50	600		**EC21631DAG**	**EC21632DAG**	**EC21634DAG**	**EC21638DAG**	**A200M3CE**
4	—	—	120	200A	**EC21641AAH**	**EC21642AAH**	**EC21644AAH**	**EC21648AAH**	**A200M4CAC**
	200	40	208		**EC21641EAH**	**EC21642EAH**	**EC21644EAH**	**EC21648EAH**	**A200M4CB**
	230	50	240		**EC21641BAH**	**EC21642BAH**	**EC21644BAH**	**EC21648BAH**	**A200M4CW**
	460	100	480		**EC21641CAJ**	**EC21642CAJ**	**EC21644CAJ**	**EC21648CAJ**	**A200M4CX**
	575	100	600		**EC21641DAJ**	**EC21642DAJ**	**EC21644DAJ**	**EC21648DAJ**	**A200M4CE**

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC21604EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

Cover Control ..... **Page 33-119**
Dimensions **PG03300001E**
Accessories **PG03300001E**
Modifications ..... **Page 33-42**
Renewal Parts **PG03300001E**
Technical Data **CA08102001E**

Table 33-287. Class EC216 — Combination Non-reversing Starter — Fusible Disconnect (Continued) ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
5	—	—	120	400A	**EC21651AAK**	**EC21652AAK**	**EC21654AAK**	**EC21658AAK**	**A200M5CAC**
	200	75	208		**EC21651EAK**	**EC21652EAK**	**EC21654EAK**	**EC21658EAK**	**A200M5CB**
	230	100	240		**EC21651BAK**	**EC21652BAK**	**EC21654BAK**	**EC21658BAK**	**A200M5CW**
	460	200	480		**EC21651CAL**	**EC21652CAL**	**EC21654CAL**	**EC21658CAL**	**A200M5CX**
	575	200	600		**EC21651DAL**	**EC21652DAL**	**EC21654DAL**	**EC21658DAL**	**A200M5CE**
6	—	—	120	600A	**EC21661AAM**	**EC21662AAM**	**EC21663AAM** ⑥	**EC21668AAM**	**A200M6CAC**
	200	150	208		**EC21661EAM**	**EC21662EAM**	**EC21663EAM** ⑥	**EC21668EAM**	**A200M6CB**
	230	200	240		**EC21661BAM**	**EC21662BAM**	**EC21663BAM** ⑥	**EC21668BAM**	**A200M6CW**
	460	400	480		**EC21661CAN**	**EC21662CAN**	**EC21663CAN** ⑥	**EC21668CAN**	**A200M6CX**
	575	400	600		**EC21661DAN**	**EC21662DAN**	**EC21663DAN** ⑥	**EC21668DAN**	**A200M6CE**
7	—	—	120	⑤	**EC21671AAU**	**EC21672AAU**	**EC21673AAU** ⑥	**EC21678AAU**	**A200M7CJ**
	230	300	240		**EC21671BAU**	**EC21672BAU**	**EC21673BAU** ⑥	**EC21678BAU**	**A200M7CW**
	460	600	480		**EC21671CAU**	**EC21672CAU**	**EC21673CAU** ⑥	**EC21678CAU**	**A200M7CX**
	575	600	600		**EC21671DAU**	**EC21672DAU**	**EC21673DAU** ⑥	**EC21678DAU**	**A200M7CE**
8	—	—	120	⑤	**EC21681AAU**	**EC21682AAU**	**EC21683AAU** ⑥	**EC21688AAU**	**A200M8CJ**
	230	450	240		**EC21681BAU**	**EC21682BAU**	**EC21683BAU** ⑥	**EC21688BAU**	**A200M8CW**
	460	900	480		**EC21681CAU**	**EC21682CAU**	**EC21683CAU** ⑥	**EC21688CAU**	**A200M8CX**
	575	900	600		**EC21681DAU**	**EC21682DAU**	**EC21683DAU** ⑥	**EC21688DAU**	**A200M8CE**
9	—	—	120	⑤	**EC21691AAU**	**EC21692AAU**	**EC21693AAU** ⑥	**EC21698AAU**	**A200M9CJ**
	230	800	240		**EC21691BAU**	**EC21692BAU**	**EC21693BAU** ⑥	**EC21698BAU**	**A200M9CW**
	460	1000 ⑤	480		**EC21691CAU**	**EC21692CAU**	**EC21693CAU** ⑥	**EC21698CAU**	**A200M9CX**
	575	1000	600		**EC21691DAU**	**EC21692DAU**	**EC21693DAU** ⑥	**EC21698DAU**	**A200M9CE**

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC2160**4**EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑤ Contact Eaton.

⑥ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-288. Class EC218 — Combination Reversing Starter — Fusible Disconnect with CPT ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	—	—	120	30A	**EC218A1AAB**	**EC218A2AAB**	**EC218A4AAB**	**EC218A8AAB**	**A200MACAC**
	200	1-1/2	208		**EC218A1EAB**	**EC218A2EAB**	**EC218A4EAB**	**EC218A8EAB**	**A200MACB**
	230	1-1/2	240		**EC218A1BAB**	**EC218A2BAB**	**EC218A4BAB**	**EC218A8BAB**	**A200MACW**
	460	2	480		**EC218A1CAC**	**EC218A2CAC**	**EC218A4CAC**	**EC218A8CAC**	**A200MACX**
	575	2	600		**EC218A1DAC**	**EC218A2DAC**	**EC218A4DAC**	**EC218A8DAC**	**A200MACE**
0	—	—	120	30A	**EC21801AAB**	**EC21802AAB**	**EC21804AAB**	**EC21808AAB**	**A200M0CAC**
	200	3	208		**EC21801EAB**	**EC21802EAB**	**EC21804EAB**	**EC21808EAB**	**A200M0CB**
	230	3	240		**EC21801BAB**	**EC21802BAB**	**EC21804BAB**	**EC21808BAB**	**A200M0CW**
	460	5	480		**EC21801CAC**	**EC21802CAC**	**EC21804CAC**	**EC21808CAC**	**A200M0CX**
	575	5	600		**EC21801DAC**	**EC21802DAC**	**EC21804DAC**	**EC21808DAC**	**A200M0CE**
1	—	—	120	30A	**EC21811AAB**	**EC21812AAB**	**EC21814AAB**	**EC21818AAB**	**A200M1CAC**
	200	7-1/2	208		**EC21811EAB**	**EC21812EAB**	**EC21814EAB**	**EC21818EAB**	**A200M1CB**
	230	7-1/2	240		**EC21811BAB**	**EC21812BAB**	**EC21814BAB**	**EC21818BAB**	**A200M1CW**
	460	10	480		**EC21811CAC**	**EC21812CAC**	**EC21814CAC**	**EC21818CAC**	**A200M1CX**
	575	10	600		**EC21811DAC**	**EC21812DAC**	**EC21814DAC**	**EC21818DAC**	**A200M1CE**
2	—	—	120	60A	**EC21821AAD**	**EC21822AAD**	**EC21824AAD**	**EC21828AAD**	**A200M2CAC**
	200	10	208		**EC21821EAD**	**EC21822EAD**	**EC21824EAD**	**EC21828EAD**	**A200M2CB**
	230	15	240		**EC21821BAD**	**EC21822BAD**	**EC21824BAD**	**EC21828BAD**	**A200M2CW**
	460	25	480		**EC21821CAE**	**EC21822CAE**	**EC21824CAE**	**EC21828CAE**	**A200M2CX**
	575	25	600		**EC21821DAE**	**EC21822DAE**	**EC21824DAE**	**EC21828DAE**	**A200M2CE**
3	—	—	120	100A	**EC21831AAF**	**EC21832AAF**	**EC21834AAF**	**EC21838AAF**	**A200M3CAC**
	200	25	208		**EC21831EAF**	**EC21832EAF**	**EC21834EAF**	**EC21838EAF**	**A200M3CB**
	230	30	240		**EC21831BAF**	**EC21832BAF**	**EC21834BAF**	**EC21838BAF**	**A200M3CW**
	460	50	480		**EC21831CAG**	**EC21832CAG**	**EC21834CAG**	**EC21838CAG**	**A200M3CX**
	575	50	600		**EC21831DAG**	**EC21832DAG**	**EC21834DAG**	**EC21838DAG**	**A200M3CE**
4	—	—	120	200A	**EC21841AAH**	**EC21842AAH**	**EC21844AAH**	**EC21848AAH**	**A200M4CAC**
	200	40	208		**EC21841EAH**	**EC21842EAH**	**EC21844EAH**	**EC21848EAH**	**A200M4CB**
	230	50	240		**EC21841BAH**	**EC21842BAH**	**EC21844BAH**	**EC21848BAH**	**A200M4CW**
	460	100	480		**EC21841CAJ**	**EC21842CAJ**	**EC21844CAJ**	**EC21848CAJ**	**A200M4CX**
	575	100	600		**EC21841DAJ**	**EC21842DAJ**	**EC21844DAJ**	**EC21848DAJ**	**A200M4CE**

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC21804EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-288. Class EC218 — Combination Reversing Starter — Fusible Disconnect with CPT (Continued) ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage 1	Fuse Clip Amps	Type 1 General Purpose	Type 3R Rainproof	Type 4X ② Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
5	—	—	120	400A	**EC21851AAK**	**EC21852AAK**	**EC21854AAK**	**EC21858AAK**	**A200M5CAC**
	200	75	208		**EC21851EAK**	**EC21852EAK**	**EC21854EAK**	**EC21858EAK**	**A200M5CB**
	230	100	240		**EC21851BAK**	**EC21852BAK**	**EC21854BAK**	**EC21858BAK**	**A200M5CW**
	460	200	480		**EC21851CAL**	**EC21852CAL**	**EC21854CAL**	**EC21858CAL**	**A200M5CX**
	575	200	600		**EC21851DAL**	**EC21852DAL**	**EC21854DAL**	**EC21858DAL**	**A200M5CE**
6	—	—	120	600A	**EC21861AAM**	**EC21862AAM**	**EC21863AAM** ⑥	**EC21868AAM**	**A200M6CAC**
	200	150	208		**EC21861EAM**	**EC21862EAM**	**EC21863EAM** ⑥	**EC21868EAM**	**A200M6CB**
	230	200	240		**EC21861BAM**	**EC21862BAM**	**EC21863BAM** ⑥	**EC21868BAM**	**A200M6CW**
	460	400	480		**EC21861CAN**	**EC21862CAN**	**EC21863CAN** ⑥	**EC21868CAN**	**A200M6CX**
	575	400	600		**EC21861DAN**	**EC21862DAN**	**EC21863DAN** ⑥	**EC21868DAN**	**A200M6CE**
7	—	—	120	⑤	**EC21871AAU**	**EC21872AAU**	**EC21873AAU** ⑥	**EC21878AAU**	**A200M7CJ**
	230	300	240		**EC21871BAU**	**EC21872BAU**	**EC21873BAU** ⑥	**EC21878BAU**	**A200M7CW**
	460	600	480		**EC21871CAU**	**EC21872CAU**	**EC21873CAU** ⑥	**EC21878CAU**	**A200M7CX**
	575	600	600		**EC21871DAU**	**EC21872DAU**	**EC21873DAU** ⑥	**EC21878DAU**	**A200M7CE**
8	—	—	120	⑤	**EC21881AAU**	**EC21882AAU**	**EC21883AAU** ⑥	**EC21888AAU**	**A200M8CJ**
	230	450	240		**EC21881BAU**	**EC21882BAU**	**EC21883BAU** ⑥	**EC21888BAU**	**A200M8CW**
	460	900	480		**EC21881CAU**	**EC21882CAU**	**EC21883CAU** ⑥	**EC21888CAU**	**A200M8CX**
	575	900	600		**EC21881DAU**	**EC21882DAU**	**EC21883DAU** ⑥	**EC21888DAU**	**A200M8CE**
9	—	—	120	⑤	**EC21891AAU**	**EC21892AAU**	**EC21893AAU** ⑥	**EC21898AAU**	**A200M9CJ**
	230	800	240		**EC21891BAU**	**EC21892BAU**	**EC21893BAU** ⑥	**EC21898BAU**	**A200M9CW**
	460	1000 ⑤	480		**EC21891CAU**	**EC21892CAU**	**EC21893CAU** ⑥	**EC21898CAU**	**A200M9CX**
	575	1000	600		**EC21891DAU**	**EC21892DAU**	**EC21893DAU** ⑥	**EC21898DAU**	**A200M9CE**

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC2180**4**EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

③ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑤ Contact Eaton.

⑥ Type 4 (Painted steel) Sizes 6 – 9.

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Table 33-289. Class EC222 — Combination Non-reversing Starter — Circuit Breaker ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
00	200	1 1-1/2	120	HMCPE 7A HMCPE 15A	**EC222A1AAC** **EC222A1AAD**	**EC222A2AAC** **EC222A2AAD**	**EC222A4AAC** **EC222A4AAD**	**EC222A8AAC** **EC222A8AAD**	**A200MACAC**
	230	1 1-1/2		HMCPE 7A HMCPE 15A	**EC222A1AAC** **EC222A1AAD**	**EC222A2AAC** **EC222A2AAD**	**EC222A4AAC** **EC222A4AAD**	**EC222A8AAC** **EC222A8AAD**	
	460	1 2		HMCPE 3A HMCPE 7A	**EC222A1AAB** **EC222A1AAC**	**EC222A2AAB** **EC222A2AAC**	**EC222A4AAB** **EC222A4AAC**	**EC222A8AAB** **EC222A8AAC**	
	575	1 2		HMCP 3A HMCP 7A	**EC222A1AAB** **EC222A1AAC**	**EC222A2AAB** **EC222A2AAC**	**EC222A4AAB** **EC222A4AAC**	**EC222A8AAB** **EC222A8AAC**	
0	200	1 3	120	HMCPE 7A HMCPE 15A	**EC22201AAC** **EC22201AAD**	**EC22202AAC** **EC22202AAD**	**EC22204AAC** **EC22204AAD**	**EC22208AAC** **EC22208AAD**	**A200M0CAC**
	230	1 3		HMCPE 7A HMCPE 15A	**EC22201AAC** **EC22201AAD**	**EC22202AAC** **EC22202AAD**	**EC22204AAC** **EC22204AAD**	**EC22208AAC** **EC22208AAD**	
	460	1 3 5		HMCPE 3A HMCPE 7A HMCPE 15A	**EC22201AAB** **EC22201AAC** **EC22201AAD**	**EC22202AAB** **EC22202AAC** **EC22202AAD**	**EC22204AAB** **EC22204AAC** **EC22204AAD**	**EC22208AAB** **EC22208AAC** **EC22208AAD**	
	575	1 3 5		HMCPE 3A HMCPE 15A HMCPE 7A	**EC22201AAB** **EC22201AAD** **EC22201AAC**	**EC22202AAB** **EC22202AAD** **EC22202AAC**	**EC22204AAB** **EC22204AAD** **EC22204AAC**	**EC22208AAB** **EC22208AAD** **EC22208AAC**	
1	200	1 3 5 7-1/2	120	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**EC22211AAC** **EC22211AAD** **EC22211AAE** **EC22211AAF**	**EC22212AAC** **EC22212AAD** **EC22212AAE** **EC22212AAF**	**EC22214AAC** **EC22214AAD** **EC22214AAE** **EC22214AAF**	**EC22218AAC** **EC22218AAD** **EC22218AAE** **EC22218AAF**	**A200M1CAC**
	230	1 3 5 7-1/2		HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**EC22211AAC** **EC22211AAD** **EC22211AAE** **EC22211AAF**	**EC22212AAC** **EC22212AAD** **EC22212AAE** **EC22212AAF**	**EC22214AAC** **EC22214AAD** **EC22214AAE** **EC22214AAF**	**EC22218AAC** **EC22218AAD** **EC22218AAE** **EC22218AAF**	
	460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**EC22211AAB** **EC22211AAC** **EC22211AAD** **EC22211AAE**	**EC22212AAB** **EC22212AAC** **EC22212AAD** **EC22212AAE**	**EC22214AAB** **EC22214AAC** **EC22214AAD** **EC22214AAE**	**EC22218AAB** **EC22218AAC** **EC22218AAD** **EC22218AAE**	
	575	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**EC22211AAB** **EC22211AAC** **EC22211AAD** **EC22211AAE**	**EC22212AAB** **EC22212AAC** **EC22212AAD** **EC22212AAE**	**EC22214AAB** **EC22214AAC** **EC22214AAD** **EC22214AAE**	**EC22218AAB** **EC22218AAC** **EC22218AAD** **EC22218AAE**	

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC22204AAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Table 33-289. Class EC222 — Combination Non-reversing Starter — Circuit Breaker (Continued) ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
2	200	10	120	HMCPE 50A	**EC22221AAF**	**EC22222AAF**	**EC22224AAF**	**EC22228AAF**	**A200M2CAC**
	230	10 15		HMCPE 50A HMCPE 70A	**EC22221AAF** **EC22221AAW**	**EC22222AAF** **EC22222AAW**	**EC22224AAF** **EC22224AAW**	**EC22228AAF** **EC22228AAW**	
	460	25		HMCPE 50A	**EC22221AAF**	**EC22222AAF**	**EC22224AAF**	**EC22228AAF**	
	575	15 25		HMCP 30A HMCP 50A	**EC22221AAE** **EC22221AAF**	**EC22222AAE** **EC22222AAF**	**EC22224AAE** **EC22224AAF**	**EC22228AAE** **EC22228AAF**	
3	200	20 25	120	HMCPE 100A HMCPE 100A	**EC22231AAG** **EC22231AAX**	**EC22232AAG** **EC22232AAX**	**EC22234AAG** **EC22234AAX**	**EC22238AAG** **EC22238AAX**	**A200M3CAC**
	230	25 30		HMCPE 100A HMCPE 100A	**EC22231AAG** **EC22231AAX**	**EC22232AAG** **EC22232AAX**	**EC22234AAG** **EC22234AAX**	**EC22238AAG** **EC22238AAX**	
	460	50		HMCPE 100A	**EC22231AAG**	**EC22232AAG**	**EC22234AAG**	**EC22238AAG**	
	575	30 50		HMCP 50A HMCP 100A	**EC22231AAF** **EC22231AAG**	**EC22232AAF** **EC22232AAG**	**EC22234AAF** **EC22234AAG**	**EC22238AAF** **EC22238AAG**	
4	200 230 460 575	40 50 100 100	120	HMCP 150A HMCP 150A HMCP 150A HMCP 150A	**EC22241AAH** **EC22241AAH** **EC22241AAH** **EC22241AAH**	**EC22242AAH** **EC22242AAH** **EC22242AAH** **EC22242AAH**	**EC22244AAH** **EC22244AAH** **EC22244AAH** **EC22244AAH**	**EC22248AAH** **EC22248AAH** **EC22248AAH** **EC22248AAH**	**A200M4CAC**
5	200	50 75	120	HMCP 250A HMCP 400A	**EC22251AAJ** **EC22251AAK**	**EC22252AAJ** **EC22252AAK**	**EC22254AAJ** **EC22254AAK**	**EC22258AAJ** **EC22258AAK**	**A200M5CAC**
	230	60 100		HMCP 250A HMCP 400A	**EC22251AAJ** **EC22251AAK**	**EC22252AAJ** **EC22252AAK**	**EC22254AAJ** **EC22254AAK**	**EC22258AAJ** **EC22258AAK**	
	460	125 200		HMCP 250A HMCP 400A	**EC22251AAJ** **EC22251AAK**	**EC22252AAJ** **EC22252AAK**	**EC22254AAJ** **EC22254AAK**	**EC22258AAJ** **EC22258AAK**	
	575	150 200		HMCP 250A HMCP 400A	**EC22251AAJ** **EC22251AAK**	**EC22252AAJ** **EC22252AAK**	**EC22254AAJ** **EC22254AAK**	**EC22258AAJ** **EC22258AAK**	
6	200	150	120	HMCP 600A	**EC22261AAL**	**EC22262AAL**	**EC22263AAL** ⑥	**EC22268AAL**	**A200M6CAC**
	230	200		HMCP 600A	**EC22261AAL**	**EC22262AAL**	**EC22263AAL** ⑥	**EC22268AAL**	
	460	350 400		HMCP 600A HMCP 1200A	**EC22261AAL** **EC22261AAP**	**EC22262AAL** **EC22262AAP**	**EC22263AAL** ⑥ **EC22263AAP** ⑥	**EC22268AAL** **EC22268AAP**	
	575	400		HMCP 600A	**EC22261AAL**	**EC22262AAL**	**EC22263AAL** ⑥	**EC22268AAL**	

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC22204AAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑥ Type 4 (Painted steel) Size 6.

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Table 33-290. Class EC224 — Combination Non-reversing Starter — Circuit Breaker with CPT ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X ③ Watertight & Dust-Tight Stainless Steel Catalog Number	Type 12 Dust-Tight Industrial External Reset ④⑤ Catalog Number	Component Starter (Open) Catalog Number
00	200	1 1-1/2	120	HMCPE 7A HMCPE 15A	**EC224A1EAC** **EC224A1EAD**	**EC224A2EAC** **EC224A2EAD**	**EC224A4EAC** **EC224A4EAD**	**EC224A8EAC** **EC224A8EAD**	**A200MACAC**
	230	1 1-1/2		HMCPE 7A HMCPE 15A	**EC224A1BAC** **EC224A1BAD**	**EC224A2BAC** **EC224A2BAD**	**EC224A4BAC** **EC224A4BAD**	**EC224A8BAC** **EC224A8BAD**	
	460	1 2		HMCPE 3A HMCPE 7A	**EC224A1CAB** **EC224A1CAC**	**EC224A2CAB** **EC224A2CAC**	**EC224A4CAB** **EC224A4CAC**	**EC224A8CAB** **EC224A8CAC**	
	575	1 2		HMCP 3A HMCP 7A	**EC224A1DAB** **EC224A1DAC**	**EC224A2DAB** **EC224A2DAC**	**EC224A4DAB** **EC224A4DAC**	**EC224A8DAB** **EC224A8DAC**	
0	200	1 3	120	HMCPE 7A HMCPE 15A	**EC22401EAC** **EC22401EAD**	**EC22402EAC** **EC22402EAD**	**EC22404EAC** **EC22404EAD**	**EC22408EAC** **EC22408EAD**	**A200M0CAC**
	230	1 3		HMCPE 7A HMCPE 15A	**EC22401BAC** **EC22401BAD**	**EC22402BAC** **EC22402BAD**	**EC22404BAC** **EC22404BAD**	**EC22408BAC** **EC22408BAD**	
	460	1 3 5		HMCPE 3A HMCPE 7A HMCPE 15A	**EC22401CAB** **EC22401CAC** **EC22401CAD**	**EC22402CAB** **EC22402CAC** **EC22402CAD**	**EC22404CAB** **EC22404CAC** **EC22404CAD**	**EC22408CAB** **EC22408CAC** **EC22408CAD**	
	575	1 3 5		HMCP 3A HMCP 15A HMCP 7A	**EC22401DAB** **EC22401DAD** **EC22401DAC**	**EC22402DAB** **EC22402DAD** **EC22402DAC**	**EC22404DAB** **EC22404DAD** **EC22404DAC**	**EC22408DAB** **EC22408DAD** **EC22408DAC**	
1	200	1 3 5 7-1/2	120	HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**EC22411EAC** **EC22411EAD** **EC22411EAE** **EC22411EAF**	**EC22412EAC** **EC22412EAD** **EC22412EAE** **EC22412EAF**	**EC22414EAC** **EC22414EAD** **EC22414EAE** **EC22414EAF**	**EC22418EAC** **EC22418EAD** **EC22418EAE** **EC22418EAF**	**A200M1CAC**
	230	1 3 5 7-1/2		HMCPE 7A HMCPE 15A HMCPE 30A HMCPE 50A	**EC22411BAC** **EC22411BAD** **EC22411BAE** **EC22411BAF**	**EC22412BAC** **EC22412BAD** **EC22412BAE** **EC22412BAF**	**EC22414BAC** **EC22414BAD** **EC22414BAE** **EC22414BAF**	**EC22418BAC** **EC22418BAD** **EC22418BAE** **EC22418BAF**	
	460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	**EC22411CAB** **EC22411CAC** **EC22411CAD** **EC22411CAE**	**EC22412CAB** **EC22412CAC** **EC22412CAD** **EC22412CAE**	**EC22414CAB** **EC22414CAC** **EC22414CAD** **EC22414CAE**	**EC22418CAB** **EC22418CAC** **EC22418CAD** **EC22418CAE**	
	575	1 3 5 10		HMCP 3A HMCP 7A HMCP 15A HMCP 30A	**EC22411DAB** **EC22411DAC** **EC22411DAD** **EC22411DAE**	**EC22412DAB** **EC22412DAC** **EC22412DAD** **EC22412DAE**	**EC22414DAB** **EC22414DAC** **EC22414DAD** **EC22414DAE**	**EC22418DAB** **EC22418DAC** **EC22418DAD** **EC22418DAE**	

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**.
Example: EC22404EAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**.
To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

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Technical Data **CA08102001E**

Table 33-290. Class EC224 — Combination Non-reversing Starter — Circuit Breaker with CPT (Continued) ①

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ③ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
2	200	10	120	HMCPE 50A	**EC22421EAF**	**EC22422EAF**	**EC22424EAF**	**EC22428EAF**	**A200M2CAC**
	230	10 15		HMCPE 50A HMCPE 70A	**EC22421BAF** **EC22421BAW**	**EC22422BAF** **EC22422BAW**	**EC22424BAF** **EC22424BAW**	**EC22428BAF** **EC22428BAW**	
	460	25		HMCPE 50A	**EC22421CAF**	**EC22422CAF**	**EC22424CAF**	**EC22428CAF**	
	575	15 25		HMCPE 30A HMCPE 50A	**EC22421CAE** **EC22421DAF**	**EC22422CAE** **EC22422DAF**	**EC22424CAE** **EC22424DAF**	**EC22428CAE** **EC22428DAF**	
3	200	20 25	120	HMCPE 100A HMCPE 100A	**EC22431EAG** **EC22431EAX**	**EC22432EAG** **EC22432EAX**	**EC22434EAG** **EC22434EAX**	**EC22438EAG** **EC22438EAX**	**A200M3CAC**
	230	25 30		HMCPE 100A HMCPE 100A	**EC22431BAG** **EC22431BAX**	**EC22432BAG** **EC22432BAX**	**EC22434BAG** **EC22434BAX**	**EC22438BAG** **EC22438BAX**	
	460	50		HMCPE 100A	**EC22431CAG**	**EC22432CAG**	**EC22434CAG**	**EC22438CAG**	
	575	30 50		HMCP 50A HMCP 100A	**EC22431DAF** **EC22431DAG**	**EC22432DAF** **EC22432DAG**	**EC22434DAF** **EC22434DAG**	**EC22438DAF** **EC22438DAG**	
4	200 230 460 575	40 50 100 100	120	HMCP 150A HMCP 150A HMCP 150A HMCP 150A	**EC22441EAH** **EC22441BAH** **EC22441CAH** **EC22441DAH**	**EC22442EAH** **EC22442BAH** **EC22442CAH** **EC22442DAH**	**EC22444EAH** **EC22444BAH** **EC22444CAH** **EC22444DAH**	**EC22448EAH** **EC22448BAH** **EC22448CAH** **EC22448DAH**	**A200M4CAC**
5	200	50 75	120	HMCP 250A HMCP 400A	**EC22451EAJ** **EC22451EAK**	**EC22452EAJ** **EC22452EAK**	**EC22454EAJ** **EC22454EAK**	**EC22458EAJ** **EC22458EAK**	**A200M5CAC**
	230	60 100		HMCP 250A HMCP 400A	**EC22451BAJ** **EC22451BAK**	**EC22452BAJ** **EC22452BAK**	**EC22454BAJ** **EC22454BAK**	**EC22458BAJ** **EC22458BAK**	
	460	125 200		HMCP 250A HMCP 400A	**EC22451CAJ** **EC22451CAK**	**EC22452CAJ** **EC22452CAK**	**EC22454CAJ** **EC22454CAK**	**EC22458CAJ** **EC22458CAK**	
	575	150 200		HMCP 250A HMCP 400A	**EC22451DAJ** **EC22451DAK**	**EC22452DAJ** **EC22452DAK**	**EC22454DAJ** **EC22454DAK**	**EC22458DAJ** **EC22458DAK**	
6	200	150	120	HMCP 600A	**EC22461EAL**	**EC22462EAL**	**EC22463EAL** ⑥	**EC22468EAL**	**A200M6CAC**
	230	200		HMCP 600A	**EC22461BAL**	**EC22462BAL**	**EC22463BAL** ⑥	**EC22468BAL**	
	460	350 400		HMCP 600A HMCP 1200A	**EC22461CAL** **EC22461CAP**	**EC22462CAL** **EC22462CAP**	**EC22463CAL** ⑥ **EC22463CAP** ⑥	**EC22468CAL** **EC22468CAP**	
	575	400		HMCP 600A	**EC22461DAL**	**EC22462DAL**	**EC22463DAL** ⑥	**EC22468DAL**	

Starters do not include heater packs. Order quantity of 3 heater packs. For Heater Pack Selection, see **PG03300001E**.

① For Ambient Compensated Overload Relay with Auto-Reset, add suffix **D**.

② For other magnet coil voltages substitute the eighth digit with appropriate digit based on **Table 33-184**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: EC22404EAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add modification **E11**.

⑥ Type 4 (Painted steel) Size 6.

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Technical Data **CA08102001E**

Size 1 and 2 Starter

Product Description

Setting the Standard in Motor Control

Cutler-Hammer® Advantage motor starters from Eaton's electrical business have extended operating life in a physical space requirement one half the size of conventional motor starters.

Offering motor overcurrent protection accurate to 2% at maximum FLC, Advantage also maintains constant coil power regardless of varying control circuit conditions, eliminating coil burnout, contact chatter and welding due to low voltage of fluttering control signals.

Advantage is designed with a full complement of features that make it the most versatile motor starter in the industry. Multifunction overload protection options provide application flexibility while reducing inventory. Communication capability extends benefits, allowing Advantage to be interactively linked to higher order control systems for monitoring, troubleshooting and control.

Technological advances incorporated in the Advantage design, such as prestart diagnostics, increased accuracy and the ability to communicate with other systems, are benefits not realized in traditional motor starters.

Benefits

Advantage Breakthroughs

To achieve the level of benefits envisioned for Advantage controls at a competitive price, it was discovered early in the development process that simply improving existing design concepts would fall short of the mark. A new approach involving a higher level of technology was required. The result was the incorporation of three technical breakthroughs — new current sensing monitoring, an energy-balanced contact closure system that increased life by decreasing electrical and mechanical wear and an intelligent coil controller optimizing the contact closing process based on varying control circuit conditions. Coordinating these breakthroughs to provide enhanced motor control performance is concentrated in the SURE chip.

Advantage uses the right combination of brains and brawn in effecting a motor start. The power circuit of the contactor employs heavy-duty silver alloy contacts scientifically designed for long life. The addition of a uniquely developed application-specific microprocessor chip regulates power supplied to the operating coil. The regulated closing profile is tailored to existing control circuit conditions. This results in an energy balanced system which reduces armature/magnet crash and contact bounce, extending mechanical and electrical life.

Improved Protection and Motor Utilization

The motor circuit monitoring and overload protection functions of Advantage starters are provided by three current sensors closely monitored by the microprocessor. This sensor/microprocessor combination yields a protection scheme closely paralleling that of the motor heating damage boundary expressed in terms of current and time. Accurate to 2% of full scale, Advantage allows full utilization of motor capability without motor damage or nuisance tripping.

No Heaters, Small Size

Advantage starters eliminate the need for costly heater elements and their associated installation expense. Standard overload protection functions include phase loss and unbalance protection, selectable trip class, automatic/manual reset and ground current protection.

Built-In Communications Capabilities Provide Two-Way Control

Advantage also offers low cost communication capability. ON/OFF commands, status and motor data can be linked to automated control systems without the addition of costly sensors, I/O modules and transducers, in a language compatible with many computer-based software systems in use today.

Protected by 22 patents and proven in many years of operating experience in harsh industrial applications, Advantage motor starters and contactors offer the user unprecedented value at a price competitive with traditional devices.

Instructional Leaflets

17401	Sizes 1, 2 Non-reversing Contactors and Starters
17403	Sizes 3, 4 Non-reversing Contactors and Starters
17405	Sizes 5, 6 Non-reversing Contactors and Starters
17482	Sizes 1, 2 Reversing Contactors and Starters
17484B	Sizes 3, 4 Reversing Contactors and Starters
17486	Sizes 5, 6 Reversing Contactors and Starters
17456	Sizes 1, 2 Contactor Overload Combo
17457	Sizes 3, 4 Contactor Overload Combo
17604	Sizes 5, 6 Contactor Overload Combo
17595	Sizes 1, 2 Reversing Contactors and Starters with status-only ACM
17596	Sizes 3, 4 Reversing Contactors and Starters with status-only ACM
17597	Sizes 5, 6 Reversing Contactors and Starters with status-only ACM
17598	Sizes 1, 2 Two-Speed Two-Winding Starters with status-only ACM
17599	Sizes 3, 4 Two-Speed Two-Winding Starters with status-only ACM
17600	Sizes 5, 6 Two-Speed Two-Winding Starters with status-only ACM
17601	Sizes 1, 2 Two-Speed One-Winding Starters with status-only ACM
17602	Sizes 3, 4 Two-Speed One-Winding Starters with status-only ACM
17603	Sizes 5, 6 Two-Speed One-Winding Starters with status-only ACM

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Contents

Size 3 and 4 Starter

Product Description

Catalog Number W201 — Non-reversing Contactors

Catalog Number W211 — Horizontal Reversing Contactors (shown above) — long axis horizontal

Catalog Number W251 — Vertical Reversing Contactors (not illustrated) — long axis vertical

Features

- Small physical size
- Brownout protection
- Communications capability
- Long electrical life
- Higher contact force

Product Selection

When Ordering Specify

- Non-reversing Catalog Number as specified in table below.
- Reversing Catalog Number as specified in table below.

Table 33-291. Advantage Contactors — 3-Pole Non-reversing and Reversing — NEMA Sizes 1 – 6

NEMA Size	Motor Voltage	Max. hp	Continuous Amperes (Enclosed)	Coil Voltage/Hz	Non-reversing		Reversing (Horizontal)		Reversing (Vertical)	
					Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1	200 230 460 575	7-1/2 7-1/2 10 10	27	120/60 110/50	**W201K1CF** **W201K1CN**		**W211K1CF** **W211K1CN**		**W251K1CF** **W251K1CN**	
2	200 230 460 575	10 15 25 25	45	120/60 110/50	**W201K2CF** **W201K2CN**		**W211K2CF** **W211K2CN**		**W251K2CF** **W251K2CN**	
3	200 230 460 575	25 30 50 50	90	120/60 110/50	**W201K3CF** **W201K3CN**		**W211K3CF** **W211K3CN**		**W251K3CF** **W251K3CN**	
4	200 230 460 575	40 50 100 100	135	120/60 110/50	**W201K4CF** **W201K4CN**		**W211K4CF** **W211K4CN**		**W251K4CF** **W251K4CN**	
5	200 230 460 575	75 100 200 200	270	120/60 110/50	**W201K5CF** **W201K5CN**		**W211K5CF** **W211K5CN**		**W251K5CF** **W251K5CN**	
6	200 230 460 575	150 200 400 400	540	120/60 110/50	**W201K6CF** **W201K6CN**		**W211K6CF** **W211K6CN**		**W251K6CF** **W251K6CN**	

Discount Symbol **1CD1**

Contents

Size 5 and 6 Starter

Product Description

Catalog Number W200 — Non-reversing Starters (shown above)

Catalog Number W210 — Horizontal Reversing Starters — long axis horizontal.

Catalog Number W250 — Vertical Reversing Starters (not illustrated) — long axis vertical.

Features

Starter

- Small physical size
- Brownout protection
- Communications capability
- Minimized bounce times
- Higher contact force
- Common auxiliary contacts

Motor Protection

- Heaters not required — selectable settings
- Overload protection — accuracy 2%
- Phase loss and phase unbalance protection
- Ground current protection

OL Protection Settings

- Selectable automatic/manual reset
- Selectable trip class — 10, 20, 30 or no protection (disables overload)
- Selectable trip current

Technical Data

Table 33-292. Motor FLA Ranges

NEMA Size	1.15 to 1.25 Service Factor	1.0 Service Factor
1 ①	.47 – 3.81	.51 – 4.14
1	3.15 – 27.0	3.43 – 27.0
2	3.15 – 45.0	3.43 – 45.0
3	9.90 – 90.0	10.8 – 90.0
4	9.90 – 135	10.8 – 135
5	38.3 – 270	41.7 – 270
6	38.3 – 540	41.7 – 540

① For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

Options

Table 33-293. Optional Features

Description	Catalog Number Suffix
Omit Class II Ground-Current Protection	**Y7**
Omit Phase-Loss Protection	**Y4**
Omit both Class II Ground-Current Protection and Phase-Loss Protection	**Y4Y7**

Product Selection

When Ordering Specify

- Non-reversing Catalog Number as specified in table below.
- Reversing Catalog Number as specified in table below.

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Table 33-294. Advantage Starters — 3-Pole Non-reversing and Reversing — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1 – 6

NEMA Size	Motor Voltage	Max. hp	Continuous Amperes (Enclosed)	Coil Voltage/Hz	Non-reversing		Reversing (Horizontal)		Reversing (Vertical)	
					Catalog Number	Price U.S. $	Catalog Number	Price U.S. $	Catalog Number	Price U.S. $
1 ①	200 230 460 575	1 1 2 2	27	120/60 110/50	**W200MLCFC** **W200MLCNC**		**W210MLCFC** **W210MLCNC**		**W250MLCFC** **W250MLCNC**	
1	200 230 460 575	7-1/2 7-1/2 10 10	27	120/60 110/50	**W200M1CFC** **W200M1CNC**		**W210M1CFC** **W210M1CNC**		**W250M1CFC** **W250M1CNC**	
2	200 230 460 575	10 15 25 25	45	120/60 110/50	**W200M2CFC** **W200M2CNC**		**W210M2CFC** **W210M2CNC**		**W250M2CFC** **W250M2CNC**	
3	200 230 460 575	25 30 50 50	90	120/60 110/50	**W200M3CFC** **W200M3CNC**		**W210M3CFC** **W210M3CNC**		**W250M3CFC** **W250M3CNC**	
4	200 230 460 575	40 50 100 100	135	120/60 110/50	**W200M4CFC** **W200M4CNC**		**W210M4CFC** **W210M4CNC**		**W250M4CFC** **W250M4CNC**	
5	200 230 460 575	75 100 200 200	270	120/60 110/50	**W200M5CFC** **W200M5CNC**		**W210M5CFC** **W210M5CNC**		**W250M5CFC** **W250M5CNC**	
6	200 230 460 575	150 200 400 400	540	120/60 110/50	**W200M6CFC** **W200M6CNC**		**W210M6CFC** **W210M6CNC**		**W250M6CFC** **W250M6CNC**	

① For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

Discount Symbol **1CD1**

Contents

Product Selection

When Ordering Specify

- Catalog Number as shown in table below.

Table 33-295. Two-Speed Advantage Starters — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1 – 6

NEMA Size	Motor Voltage	Max. Horsepower		Continuous Amperes (Enclosed)	Coil Voltage/ Hz	Open Type (Horizontal)	
		Constant or Variable Torque	Constant hp			Catalog Number	Price U.S. $
For Separate (2) Winding Type Motors — Wye Wye							
1 ①	200 230 460 575	1 1 2 2	1 1 2 2	27	120/60 110/50	**W960MLCFCM3** **W960MLCNCM3**	
1	200 230 460 575	7-1/2 7-1/2 10 10	5 5 7-1/2 7-1/2	27	120/60 110/50	**W960M1CFCM3** **W960M1CNCM3**	
2	200 230 460 575	10 15 25 25	7-1/2 10 20 20	45	120/60 110/50	**W960M2CFCM3** **W960M2CNCM3**	
3	200 230 460 575	25 30 50 50	20 25 40 40	90	120/60 110/50	**W960M3CFCM3** **W960M3CNCM3**	
4	200 230 460 575	40 50 100 100	30 40 75 75	135	120/60 110/50	**W960M4CFCM3** **W960M4CNCM3**	
5	200 230 460 575	75 100 200 200	60 75 150 150	270	120/60 110/50	**W960M5CFCM3** **W960M5CNCM3**	
6	200 230 460 575	150 200 400 400	100 150 300 300	540	120/60 110/50	**W960M6CFCM3** **W960M6CNCM3**	

① For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

Discount Symbol **1CD1**

Table 33-295. Two-Speed Advantage Starters — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1– 6 (Continued)

NEMA Size	Motor Voltage	Max. Horsepower		Continuous Amperes (Enclosed)	Coil Voltage/ Hz	Open Type (Horizontal)	
		Constant or Variable Torque	Constant hp			Catalog Number	Price U.S. $
For Single Winding Type Motors Constant Horsepower							
1 ①	200 230 460 575	—	1 1 2 2	27	120/60 110/50	**W970MLCFCM3** **W970MLCNCM3**	
1	200 230 460 575	—	5 5 7-1/2 7-1/2	27	120/60 110/50	**W970M1CFCM3** **W970M1CNCM3**	
2	200 230 460 575	—	7-1/2 10 20 20	45	120/60 110/50	**W970M2CFCM3** **W970M2CNCM3**	
3	200 230 460 575	—	20 25 40 40	90	120/60 110/50	**W970M3CFCM3** **W970M3CNCM3**	
4	200 230 460 575	—	30 40 75 75	135	120/60 110/50	**W970M4CFCM3** **W970M4CNCM3**	
5	200 230 460 575	—	60 75 150 150	270	120/60 110/50	**W970M5CFCM3** **W970M5CNCM3**	
6	200 230 460 575	—	100 150 300 300	540	120/60 110/50	**W970M6CFCM3** **W970M6CNCM3**	
For Single Winding Type Motors (Constant or Variable Torque)							
1 ①	200 230 460 575	1 1 2 2	—	27	120/60 110/50	**W980MLCFCM3** **W980MLCNCM3**	
1	200 230 460 575	7-1/2 7-1/2 10 10	—	27	120/60 110/50	**W980M1CFCM3** **W980M1CNCM3**	
2	200 230 460 575	10 15 25 25	—	45	120/60 110/50	**W980M2CFCM3** **W980M2CNCM3**	
3	200 230 460 575	25 30 50 50	—	90	120/60 110/50	**W980M3CFCM3** **W980M3CNCM3**	
4	200 230 460 575	40 50 100 100	—	135	120/60 110/50	**W980M4CFCM3** **W980M4CNCM3**	
5	200 230 460 575	75 100 200 200	—	270	120/60 110/50	**W980M5CFCM3** **W980M5CNCM3**	
6	200 230 460 575	150 150 400 400	—	540	120/60 110/50	**W980M6CFCM3** **W980M6CNCM3**	

① For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

Discount Symbol **1CD1**

Table 33-296. Electrical Characteristics, Sizes 1 – 6

Description	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
Maximum Voltage Rating	600V	600V	600V	600V	600V	600V
Ampere Rating — Open	30A	50A	100A	150A	300A	600A
— Enclosed	27A	45A	90A	135A	270A	540A
Maximum Horsepower — Squirrel Cage Motor						
200V, 60 Hz	7-1/2 hp	10 hp	25 hp	40 hp	75 hp	150 hp
230V, 60 Hz	7-1/2 hp	15 hp	30 hp	50 hp	100 hp	200 hp
380V, 50 Hz	10 hp	25 hp	50 hp	75 hp	150 hp	300 hp
460 – 575V, 60 Hz	10 hp	25 hp	50 hp	100 hp	200 hp	400 hp
Resistive Heating, kW ① — Three-Phase, 3-Pole						
120V	5 kW	8.5 kW	17 kW	26 kW	52 kW	105 kW
240V	10 kW	17 kW	34 kW	68 kW	105 kW	210 kW
480V	20 kW	34 kW	68 kW	105 kW	210 kW	415 kW
600V	25 kW	43 kW	86 kW	130 kW	260 kW	515 kW
Capacitor Switching kVAR — Three-Phase						
240V	—	12 kVAR	27 kVAR	40 kVAR	80 kVAR	160 kVAR
480V	—	25 kVAR	53 kVAR	80 kVAR	160 kVAR	320 kVAR
600V	—	32 kVAR	67 kVAR	100 kVAR	200 kVAR	400 kVAR
Transformer Switching, kVA ② — Three-Phase, 3-Pole						
208V	3.6 kVA	6.3 kVA	12 kVA	20 kVA	41 kVA	81 kVA
240V	4.3 kVA	7.2 kVA	14 kVA	23 kVA	47 kVA	94 kVA
480V	8.5 kVA	14 kVA	28 kVA	47 kVA	94 kVA	188 kVA
600V	11 kVA	18 kVA	35 kVA	59 kVA	117 kVA	234 kVA

① Resistive loads having inrush currents not exceeding 1.5 times continuous rating.
② Transformers having inrush currents not more than 20 times peak of continuous current ratings.

Table 33-297. 380V, 50 Hz Starters — Maximum Horsepower Ratings

NEMA Size	1	2	3	4	5	6
Maximum hp	10	25	50	75	150	300

Ground Current Sensing Protection

Eaton's Cutler-Hammer Advantage starters with ground current sensing protection feature provide equipment protection against ground currents between a factory-set low level and a lockout current. It is designed to open the circuit when it senses the low-level and arcing ground currents often occurring in motor branch circuits. This feature is standard with Cutler-Hammer Advantage starters. The ground current sensing protection feature can either be omitted from devices supplied by the factory, or omitted in the field by modifying the device with an Advantage Programming Module (WAPM).

Note: These devices are NOT Ground Fault Interrupters (GFIs) designed to protect people. Additionally, branch circuit short-circuit protective devices are to be used to clear faults that exceed the interrupting rating of the starter.

Table 33-298. Ground Current Sensing

Size	Trip Current	Lockout Current	Trip Time
IL	10	24	.4 sec.
1	10	48	.4 sec.
2	20	86	.4 sec.
3	40	171	.4 sec.
4	60	256	.4 sec.
5	240	1045	.4 sec.
6	240	1045	.4 sec.

The table above gives trip amperes and lockout amperes for each size of the starter. Lockout current is the sum of the phase current and ground current.

Phase Unbalance

If the unbalance of any two phases is greater than 30% of the DIP switch selected trip rating of the starter, a phase unbalance is declared and a trip occurs. No time delay is required for reset. This feature is standard in the Cutler-Hammer Advantage starter. To customize your protection, phase unbalance can be omitted by disabling the protection using an Advantage Programming Module (WAPM).

Phase Loss

The Advantage starter will trip on phase loss, after two seconds, if the current in any one phase is lower than the currents listed in the table below. No time delay is required for reset. Phase loss protection is standard on the Cutler-Hammer Advantage starter. The phase loss protection feature can either be omitted from devices supplied by the factory, or omitted in the field by modifying the device with an Advantage Programming Module (WAPM).

Table 33-299. Phase Trip Time

	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
Phase Unbalance Level	30% Unbalance					
Phase Unbalance Trip Delay	6 sec.		9 sec.		12 sec.	
Phase Loss Trip after 2 sec. if Phase Current is below:	.15A ③ 1.15A	1.15A	2.5A	2.5A	11A	11A

③ Size 1 Lower Current Range for motor hp range of 1/4 hp to 2 hp at 460V.

Table 33-300. Operating Coil Characteristics at Rated Coil Volts, Sizes 1 – 6

Description	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
AC Coil						
Burden — Inrush VA	250 VA	250 VA	500 VA	500 VA	2600 VA	2600 VA
Closed VA	25 VA	25 VA	50 VA	50 VA	50 VA	50 VA
Closed Watts	5W	5W	10W	10W	10W	10W
Pick-Up Volts ①	78V	78V	78V	78V	78V	78V
Drop-Out Volts ①	60V	60V	60V	60V	60V	60V
Recommended VA rating for machine tool control power transformers	100 VA	100 VA	150 VA	150 VA	300 VA	300 VA

Note: The above represent typical production test values and should not be interpreted as a guarantee of actual performance.
① Values may vary based upon control power transformer capacities.

Advantage contactors will withstand 110% of their rated voltage continuously without injury to the operating coils and will close successfully at 65% of their rated voltage.

Table 33-301. Mechanical Characteristics — Sizes 1 – 6

Description	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6
Dimensions in Inches (mm)						
Height	6.50 (165.1)	6.50 (165.1)	8.00 (203.2)	8.00 (203.2)	10.08 (256.0)	10.08 (256.0)
Width	2.50 (63.5)	2.50 (63.5)	3.68 (93.5)	3.68 (93.5)	7.07 (179.6)	7.07 (179.6)
Depth	4.96 (126.0)	4.96 (126.0)	6.54 (166.1)	6.54 (166.1)	7.64 (194.1)	7.64 (194.1)
Panel area, square inches	16.25	16.25	29.44	29.44	71.27	71.27
Shipping weight, lbs.	2.00	2.00	6.00	6.00	30.00	30.00
Maximum cable size/phase copper — AWG/MCM ②	8 AWG	4 AWG	250 MCM ②	250 MCM ②	(1) 500 MCM ②	(2) 500 MCM ②
Auxiliary Electrical Circuits Available	8	8	8	8	8	8
Maximum wire size for auxiliary electrical circuit — AWG	12	12	12	12	12	12
Maximum wire size for control circuit — AWG	(2) 14	(2) 14	(2) 14	(2) 14	(2) 14	(2) 14
Mechanical interlock combinations available	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.	Vert. Horiz.

② Also referenced as "kcmil" (1990 NEC).

Motor FLA, Three-Phase AC

Table 33-302. Data from Table 430-150 of 1990 NEC

Horsepower	Squirrel Cage AC			
	200V	230V	460V	575V
1/4	1.15	1	.6	.5
1/2	2.3	2.0	1.0	.8
3/4	3.2	2.8	1.4	1.1
1	4.1	3.6	1.8	1.4
1-1/2	6.0	5.2	2.6	2.1
2	7.8	6.8	3.4	2.7
3	11.0	9.6	4.8	3.9
5	17.5	15.2	7.6	6.1
7-1/2	25.3	22	11	9
10	32.2	28	14	11
15	48.3	42	21	17
20	62.1	54	27	22
25	78.2	68	34	27
30	92	80	40	32
40	120	104	52	41
50	150	130	65	52
60	177	154	77	62
75	221	192	96	77
100	286	248	124	99
125	359	312	156	125
150	414	360	180	144
200	552	480	240	192

Note: These current values are for motors running at usual speeds and with normal torque characteristics. Motors for special low speed or high torque may require higher current. In all cases, OL trip current setting should be selected on basis of information on motor nameplate or motor card data.

Table 33-303. Temperature Specifications, Sizes 1 – 6

Ambient Temperature	
Storage	-40° to 100°C (-40° to 212°F)
Operating	-40° to 40°C (-40° to 104°F)
External (NEMA Enclosed)	-40° to 40°C (-40° to 104°F)

Table 33-304. DIP Switch Overload Protection Settings

Reset Method	Position 8
MANUAL (Non-automatic — wait 5 minutes)	0
AUTOMATIC (Reset time is based on protection Class)	1

Overload Class	Position 7	Position 6
10	0	0
20	0	1
30	1	0
None	1	1

Overload Trip Current Settings

Full Voltage Starters

To select the overload current trip setting, find the starter size table. Locate the full load current from motor nameplate in column A or B. Change DIP switch positions 5 – 1 to correspond to the table.

Reduced Voltage Starters

Multiply the full load current from motor nameplate by factor below for your type of reduced voltage starter. Find this adjusted full load current in starter Size table in Column A or B. Change DIP switch positions 5 – 1 to correspond to the table.

Table 33-305. Factor

Catalog Number	Multiplier Factor
W600 Autotransformer	1.0
W700 Part Winding	.5
W800, W890 Wye-Delta	.575

Table 33-306. Size 1 — Lower Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ① (Positions) (54321)
Min.	Max.	Min.	Max.		
.47 –	.51	.51 –	.56	.59	00000
.52 –	.56	.57 –	.61	.65	00001
.57 –	.61	.62 –	.67	.71	00010
.62 –	.68	.68 –	.74	.78	00011
.69 –	.75	.75 –	.82	.86	00100
.76 –	.82	.83 –	.89	.95	00101
.83 –	.90	.90 –	.98	1.04	00110
.91 –	1.00	.99 –	1.09	1.14	00111
1.01 –	1.09	1.10 –	1.19	1.26	01000
1.10 –	1.21	1.20 –	1.31	1.38	01001
1.22 –	1.33	1.32 –	1.44	1.52	01010
1.34 –	1.46	1.45 –	1.59	1.67	01011
1.47 –	1.61	1.60 –	1.75	1.84	01100
1.62 –	1.77	1.76 –	1.93	2.02	01101
1.78 –	1.95	1.94 –	2.12	2.23	01110
1.96 –	2.14	2.13 –	2.33	2.45	01111
2.15 –	2.36	2.34 –	2.56	2.69	10000
2.37 –	2.60	2.57 –	2.82	2.96	10001
2.61 –	2.85	2.83 –	3.10	3.26	10010
2.86 –	3.14	3.11 –	3.42	3.58	10011
3.15 –	3.46	3.43 –	3.76	3.94	10100
3.47 –	3.81	3.77 –	4.14	4.34	10101

① All settings not shown are equivalent to 00000.

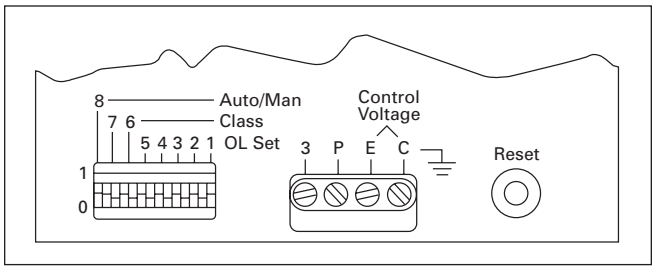


Figure 33-68. DIP Switch, Terminals and Reset

Table 33-307. Size 1 — Upper Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ② (Positions) (54321)
Min.	Max.	Min.	Max.		
3.15 –	3.46	3.43 –	3.75	3.93	00000
3.47 –	3.81	3.76 –	4.13	4.33	00001
3.82 –	4.19	4.14 –	4.55	4.77	00010
4.20 –	4.61	4.56 –	4.99	5.25	00011
4.62 –	5.0	5.00 –	5.4	5.77	00100
5.2 –	5.5	5.5 –	6.0	6.35	00101
5.6 –	6.0	6.1 –	6.5	6.9	00110
6.1 –	6.6	6.6 –	7.2	7.7	00111
6.7 –	7.3	7.3 –	8.0	8.5	01000
7.4 –	8.1	8.1 –	8.8	9.3	01001
8.2 –	8.9	8.9 –	9.6	10.2	01010
9.0 –	9.8	9.7 –	10.6	11.2	01011
9.9 –	0.8	10.7 –	11.7	12.4	01100
10.9 –	11.9	11.8 –	12.9	13.6	01101
12.0 –	13.1	13.0 –	14.2	15.0	01110
13.2 –	14.4	14.3 –	15.7	16.5	01111
14.5 –	15.8	15.8 –	17.2	18.1	10000
15.9 –	17.4	17.3 –	18.9	19.9	10001
17.5 –	19.2	19.0 –	20.9	21.9	10010
19.3 –	21.1	21.0 –	22.9	24.1	10011
21.2 –	23.3	23.0 –	25.2	26.5	10100
23.4 –	25.6	25.3 –	27.0	29.1	10101
25.7 –	27.0	—	—	32.1	10110

② All settings not shown are equivalent to 00000.

Table 33-308. Size 2 — Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ③ (Positions) (54321)
Min.	Max.	Min.	Max.		
3.15 –	3.46	3.43 –	3.75	3.93	00000
3.47 –	3.81	3.76 –	4.13	4.33	00001
3.82 –	4.19	4.14 –	4.55	4.77	00010
4.20 –	4.61	4.56 –	4.99	5.25	00011
4.62 –	5.0	5.00 –	5.4	5.77	00100
5.1 –	5.5	5.5 –	6.0	6.35	00101
5.6 –	6.0	6.1 –	6.5	6.9	00110
6.1 –	6.6	6.6 –	7.2	7.7	00111
6.7 –	7.3	7.3 –	8.0	8.5	01000
7.4 –	8.1	8.1 –	8.8	9.3	01001
8.2 –	8.9	8.9 –	9.6	10.2	01010
9.0 –	9.8	9.7 –	10.6	11.2	01011
9.9 –	10.8	10.7 –	11.7	12.4	01100
10.9 –	11.9	11.8 –	12.9	13.6	01101
12.0 –	13.1	13.0 –	14.2	15.0	01110
13.2 –	14.4	14.3 –	15.7	16.5	01111
14.5 –	15.8	15.8 –	17.2	18.1	10000
15.9 –	17.4	17.3 –	18.9	19.9	10001
17.5 –	19.2	19.0 –	20.9	21.9	10010
19.3 –	21.1	21.0 –	22.9	24.1	10011
21.2 –	23.2	23.0 –	25.2	26.5	10100
23.3 –	25.6	25.3 –	27.8	29.1	10101
25.7 –	28.1	27.9 –	30.5	32.1	10110
28.2 –	31.0	30.6 –	33.7	35.3	10111
31.1 –	34.1	33.8 –	37.0	38.9	11000
34.2 –	37.5	37.1 –	40.7	42.8	11001
37.6 –	41.2	40.8 –	44.8	47.0	11010
41.3 –	45.0	44.9 –	45.0	51.6	11011

③ All settings not shown are equivalent to 00000.

Overload Trip Current Settings (Continued)

Table 33-309. Size 3 Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ① (Positions) (54321)
Min.	Max.	Min.	Max.		
9.9 –	10.8	10.8 –	11.7	12.4	00000
10.9 –	11.9	11.8 –	12.9	13.6	00001
12.0 –	13.1	13.0 –	14.2	15.0	00010
13.2 –	14.4	14.3 –	15.6	16.5	00011
14.5 –	15.8	15.7 –	17.2	18.1	00100
15.9 –	17.3	17.3 –	18.9	19.9	00101
17.5 –	19.2	19.0 –	20.9	21.9	00110
19.3 –	21.1	21.0 –	22.9	24.1	00111
21.2 –	23.2	23.0 –	25.2	26.5	01000
23.3 –	25.6	25.3 –	27.8	29.1	01001
25.7 –	28.1	27.9 –	30.6	32.1	01010
28.2 –	30.9	30.7 –	33.6	35.3	01011
31.0 –	34.1	33.7 –	37.0	38.8	01100
34.2 –	37.5	37.1 –	40.8	42.7	01101
37.6 –	41.3	40.9 –	44.9	47.0	01110
41.4 –	45.4	45.0 –	49.4	51.7	01111
45.5 –	50.0	49.5 –	54.3	56.9	10000
50.1 –	54.9	54.4 –	59.7	62.6	10001
55.0 –	60.5	59.8 –	65.7	68.8	10010
60.6 –	66.5	65.8 –	72.3	75.7	10011
66.6 –	73.2	72.4 –	79.6	83.3	10100
73.3 –	80.7	79.7 –	87.7	91.6	10101
80.8 –	88.7	87.8 –	90.0	101.0	10110
88.8 –	90.0	—	—	111.0	10111

① All settings not shown are equivalent to 00000.

Table 33-310. Size 4 Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ② (Positions) (54321)
Min.	Max.	Min.	Max.		
9.9 –	10.8	10.8 –	11.7	12.4	00000
10.9 –	11.9	11.8 –	12.9	13.6	00001
12.0 –	13.1	13.0 –	14.2	15.0	00010
13.2 –	14.4	14.3 –	15.6	16.5	00011
14.5 –	15.8	15.7 –	17.2	18.1	00100
15.9 –	17.4	17.3 –	18.9	19.9	00101
17.5 –	19.2	19.0 –	20.9	21.9	00110
19.3 –	21.1	21.0 –	22.9	24.1	00111
21.2 –	23.2	23.0 –	25.2	26.5	01000
23.3 –	25.6	25.3 –	27.8	29.1	01001
25.7 –	28.1	27.9 –	30.6	32.1	01010
28.2 –	30.9	30.7 –	33.6	35.3	01011
31.0 –	34.1	33.7 –	37.0	38.8	01100
34.2 –	37.5	37.1 –	40.8	42.7	01101
37.6 –	41.3	40.9 –	44.9	47.0	01110
41.4 –	45.4	45.0 –	49.4	51.7	01111
45.5 –	50.0	49.5 –	54.3	56.9	10000
50.1 –	54.9	54.4 –	59.7	62.6	10001
55.0 –	60.5	59.8 –	65.7	68.8	10010
60.6 –	66.5	65.8 –	72.3	75.7	10011
66.6 –	73.2	72.4 –	79.6	83.3	10100
73.3 –	80.7	79.7 –	87.7	91.6	10101
80.8 –	88.7	87.8 –	96.4	101	10110
88.8 –	97.5	96.5 –	105	111	10111
97.6 –	106	106 –	116	122	11000
107 –	117	117 –	127	134	11001
118 –	129	128 –	133	147	11010
130 –	133	—	—	162	11011

② All settings not shown are equivalent to 00000.

Table 33-311. Size 5 Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ③ (Positions) (54321)
Min.	Max.	Min.	Max.		
38.3 –	41.9	41.7 –	45.6	47.9	00000
42.0 –	46.1	45.7 –	50.1	52.5	00001
46.2 –	51.0	50.2 –	55.5	57.7	00010
51.1 –	55.9	55.6 –	60.8	63.9	00011
56.0 –	61.7	60.9 –	67.1	70.0	00100
61.8 –	67.5	67.2 –	73.4	77.3	00101
67.6 –	74.9	73.5 –	81.4	84.5	00110
75.0 –	82.3	81.5 –	89.5	93.7	00111
82.4 –	90.3	89.6 –	98.2	103	01000
90.4 –	99.9	98.3 –	108	113	01001
100 –	109	109 –	118	125	01010
110 –	120	119 –	130	137	01011
121 –	132	131 –	143	151	01100
133 –	145	144 –	157	166	01101
146 –	159	158 –	173	182	01110
160 –	175	174 –	190	200	01111
176 –	193	191 –	209	220	10000
194 –	213	210 –	231	242	10001
214 –	233	232 –	254	267	10010
234 –	257	255 –	270	293	10011
258 –	270	—	—	322	10100

③ All settings not shown are equivalent to 00000.

Table 33-312. Size 6 Current Range

Column A Service Factor 1.15 to 1.25		Column B Service Factor 1.0		Trip Rating Amperes	DIP Switch Setting ④ (Positions) (54321)
Min.	Max.	Min.	Max.		
38.3 –	41.9	41.7 –	45.6	47.9	00000
42.0 –	46.1	45.7 –	50.1	52.5	00001
46.2 –	51.0	50.2 –	55.5	57.7	00010
51.1 –	55.9	55.6 –	60.8	63.9	00011
56.0 –	61.7	60.9 –	67.1	70.0	00100
61.8 –	67.5	67.2 –	73.4	77.3	00101
67.6 –	74.9	73.5 –	81.4	84.5	00110
75.0 –	82.3	81.5 –	89.5	93.7	00111
82.4 –	90.3	89.6 –	98.2	103	01000
90.4 –	99.9	98.3 –	108	113	01001
100 –	109	109 –	118	125	01010
110 –	120	119 –	130	137	01011
121 –	132	131 –	143	151	01100
133 –	145	144 –	157	166	01101
146 –	159	158 –	173	182	01110
160 –	175	174 –	190	200	01111
176 –	193	191 –	209	220	10000
194 –	213	210 –	231	242	10001
214 –	233	232 –	254	267	10010
234 –	257	255 –	279	293	10011
258 –	282	280 –	307	322	10100
283 –	311	308 –	338	354	10101
312 –	342	339 –	372	390	10110
343 –	376	373 –	409	429	10111
377 –	414	410 –	450	471	11000
415 –	456	451 –	496	519	11001
457 –	501	497 –	540	571	11010
502 –	540	—	—	628	11011

④ All settings not shown are equivalent to 00000.

Short Circuit Ratings

Table 33-313. Short-Circuit Ratings

Short-Circuit Protective Device (SCPD)	Max. Rating (SCPD)	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device
			Current	Voltage	
Size 1					
Class H Fuse	60A	—	5,000A	600V	30A DS Sw.
Class J, R or T Fuse	60A	—	100,000A 50,000A	480V 600V	30A DS Sw.
			65,000A	600V	100A FD-K Molded Case Sw.
Magnetic Only ① Type CB ②	3A	—	100,000A 25,000A	480V 600V	HMCP HMCPS
	7A	—	100,000A 25,000A	480V 600V	HMCPS
	15A	—	100,000A 25,000A	480V 600V	HMCP
	30A	—	100,000A 25,000A	480V 600V	HMCP
Thermal Magnetic Type CB ③	50A	65,000A 25,000A	65,000A 25,000A	480V 600V	HFD
		100,000A 35,000A	100,000A 35,000A	480V 600V	FDC
Magnetic Only Type CB plus CL ④	30A	—	100,000A	600V	HMCP plus CL
Thermal/Mag. Type CB plus CL ⑤	50A	150,000A	100,000A	600V	HFD plus CL
Size 2					
Class H Fuse	100A	—	5,000A	600V	60A DS Sw.
Class J, R or T Fuse	100A	—	100,000A 50,000A	480V 600V	60A DS Sw.
			65,000A	600V	100A FD-K Molded Case Sw.
Magnetic Only ① Type CB ②	50A	—	100,000A 25,000A	480V 600V	HMCP
Thermal Magnetic Type CB ③	90A	65,000A 25,000A	65,000A 25,000A	480V 600V	HFD
		100,000A 35,000A	100,000A 35,000A	480V 600V	FDC
Magnetic Only Type CB plus CL ④	50A	—	100,000A	600V	HMCP plus CL
Thermal/Mag. Type CB plus CL ⑤	90A	150,000A	100,000A	600V	HFD plus CL
Size 3					
Class H Fuse	350A	—	5,000A	600V	100A DS Sw.
Class R Fuse	200A	—	100,000A 65,000A	480V 600V	100A FD-K Molded Case Sw.
Class J or T Fuse	200A	—	100,000A 65,000A	480V 600V	100A FD-K Molded Case Sw.
Magnetic Only ① Type CB ②	200A	—	100,000A 25,000A	480V 600V	HMCP
Thermal Magnetic	150A	65,000A 25,000A	65,000A 25,000A	480V 600V	HFD
		100,000A 35,000A	100,000A 35,000A	480V 600V	FDC
Magnetic Only Type CB plus CL ④	100A	—	100,000A	600V	HMCP plus CL
Thermal/Mag. Type CB plus CL ⑤	150A	150,000A	100,000A	600V	HFD plus CL

Short-Circuit Protective Device (SCPD)	Max. Rating (SCPD)	Circuit Breaker Interrupting Rating	Short-Circuit Withstand Rating		Typical Disconnect Device
			Current	Voltage	
Size 4					
Class H Fuse	500A	—	10,000A	600V	200A DS Sw.
Class J Fuse	400A	—	100,000A 65,000A	480V 600V	250A JD-K Molded Case Sw.
Class R or Class T Fuse	400A	—	100,000A 65,000A	480V 600V	250A JD-K Molded Case Sw.
Magnetic Only ① Type CB ②	150A	—	100,000A 50,000A	480V 600V	HMCP
Thermal Magnetic Type CB ③	250A	100,000A 35,000A	100,000A 50,000A	480V 600V	JDC
		65,000A 25,000A	65,000A 25,000A	480V 600V	HJD
Magnetic Only Type CB plus CL ④	150A	—	100,000A	600V	HMCP plus CL
Size 5					
Class H Fuse	600A	—	10,000A	600V	400A KD-K Molded Case Sw.
Class J, R or T Fuse	600A	—	100,000A	600V	
Magnetic Only ① Type CB ②	250A	—	100,000A 25,000A	480V 600V	HMCP
	400A	—	100,000A 25,000A	480V 600V	
Thermal Magnetic Type CB ③	400A	65,000A 50,000A 35,000A	65,000A 100,000A 25,000A	480V 600V 600V	HFD KDC HKD
Size 6					
Class J, R or T Fuse	600A	—	100,000A 65,000A	480V 600V	600A LD-K Molded Case Sw.
Class L Fuse	800A	—	100,000A 65,000A	480V 600V	600A LD-K Molded Case Sw.
Magnetic Only ① Type CB ②	600A	—	100,000A 25,000A	480V 600V	HMCP
	800A	—	65,000A 25,000A	480V 600V	Magnetic Only HMCP
Thermal Magnetic Type CB ③	600A	65,000A 25,000A	65,000A 35,000A	480V 600V	HLD
	800A	50,000A 25,000A	65,000A 25,000A	480V 600V	Thermal Magnetic HMC
Thermal/Mag. with CL ⑤	800A	200,000A	100,000A	600V	NB Tri-Pac

① Instantaneous adjustable trip.
② Circuit breaker.
③ Inverse time circuit breaker.
④ Instantaneous adjustable trip with current limiting attachment.
⑤ Inverse time with built-in current limiting attachment.

DeviceNet™ Communications Module

DeviceNet Module

The DeviceNet Communications module (Catalog Number WPONIDNA) is designed to plug into the Advantage with the attached cable and plug. The module can be snapped onto the top or bottom of the Advantage unit. It can also be mounted separately using the mounting plate assembly (Catalog Number WPONIBASE). The module provides DeviceNet users with the ability to control and monitor the functions of the Advantage system at 125, 250 or 500 kbaud. A connector is provided so that a HAND/OFF/AUTO hard contact may be used to selectively enable or disable the output of the control functions from the module without affecting its ability to monitor. A "Feedback" input is provided so that the state of an auxiliary contact may be read over the DeviceNet network.

Three bicolor LEDs indicate:

- DeviceNet address
- Network status (including connected, not connected, not powered)
- Module status (including normal operation, minor fault, needs commissioning)

Table 33-314. DeviceNet Interface

Description	Catalog Number	Price U.S. $
DeviceNet Interface Module	**WPONIDNA**	
Mounting Plate Assembly	**WPONIBASE**	

Note: See **Page 33-219** for WPONI Network Interface.

Type W Auxiliary Contact Modules

- Provides four separate contact sets which wire vertically and are color coded; black designates NC and silver designated NO.
- Up to two auxiliary contact modules can be mounted for a total of up to eight contact sets.
- Provides circuit isolation (no polarity restrictions) and single break bifurcated contacts.
- Common design fits all Sizes 1 – 6.

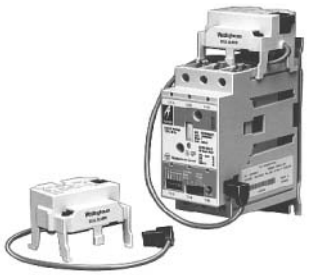
Table 33-315. Ratings

Voltage	Make	Break
NEMA A600 — 120 – 600V AC	7200 VA	720 VA
NEMA Q300 — 125 – 300V DC	69 VA	69 VA

Table 33-316. Auxiliary Contact Modules

Description	Catalog Number	Price U.S. $
2NO, 2NC	**W22**	
3NO, 1NC	**W31**	
4NO	**W40**	
4NC	**W04**	
1NO, 3NC	**W13**	
1NO, 1NC and 2 Tie Points	**W11T**	

Bell Alarm Module



Bell Alarm Module

- Simple snap-on mounting — see mounting examples in **Figure 33-69**.
- Isolated NO and NC contacts (1 each)
- Plugs into Reset port
- Remote electrical Reset wired to Catalog Number WBELL module

Table 33-317. Ratings

Form C Contact Ratings Maximum Amperes — 120V AC		Catalog Number	Price U.S. $
Make	Break		
2880 VA	480 VA	**WBELL**	
Continuous Current Rating: 5A			

Transformer Pilot Light Kits

Table 33-318. Transformer Pilot Light Kits

Voltage	Color	Legend Plate	Catalog Number	Price U.S. $	Replacement Part	Price U.S. $
120	Red	RUN	**PLK1R**		**99-3590-1**	
240	Red	RUN	**PLK2R**		**99-3590-3**	
480	Red	RUN	**PLK4R**		**99-3590-6**	
600	Green	OFF	**PLK1G**		**99-3590-8**	

Discount Symbol **1CD1C**

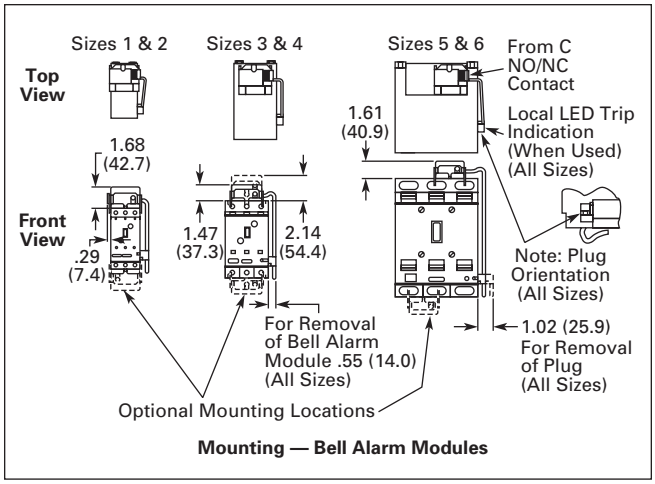
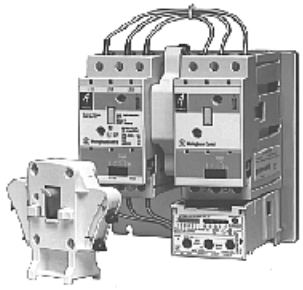


Figure 33-69. Approximate Dimensions in Inches (mm)

Mechanical Interlock Kits



Installed Mechanical Interlock Kit

- Prevents closing of one contactor of a reversing or multi-speed controller until the opposite contactor is completely open.
- Lever type mechanism assures positive action.
- Electrical interlocking contacts included — two NC contacts.

Note: These kits cannot be field installed on reversing starters.

Table 33-319. Mechanical Interlock Kits

Orientation	NEMA Size	Catalog Number	Price U.S. $
Horizontal	1 – 6	**WM16H**	
Vertical	1, 2 3, 4 5 6	**WM12V** **WM34V** **WM55V** **WM66V**	
Vertical	1 or 2 to 3 or 4 3 or 4 to 5 or 6 5, 6	**WM23VR** ① **WM45VR** ② **WMBBV** ③	

① Used to interlock a Size 1 or 2 to a Size 3 or 4 — mounts on right only.
② Used to interlock a Size 3 or 4 to a Size 5 or 6 — mounts on right only.
③ Interconnecting bus bars are furnished with the interlock.

Control Wire Ring/Spade Terminal Block

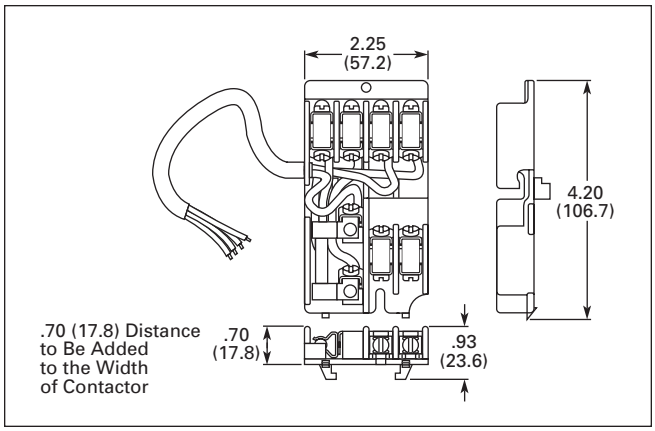


Figure 33-70. Approximate Dimensions in Inches (mm)

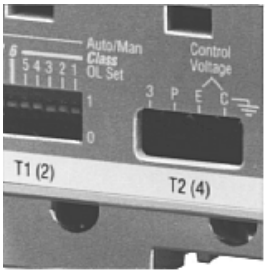
- For use with all Sizes 1 – 6.
- Provisions for ring or spade type lugs or stripped conductors.
- Bottom side pre-wired with color coded conductors.
- Side mounting on contactor identical to Type W auxiliary contact module mounting or can be mounted on Type W auxiliary contacts.
- Kit contains fuses for use with all size starters.

Table 33-320. Control Wire Terminal Block

Description	Catalog Number	Price U.S. $
Control Wire Terminal Block	**WTBF16**	

Discount Symbol **1CD1C**

OL Selection DIP Switch Window



DIP Switch Window

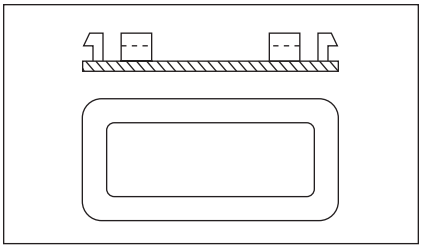


Figure 33-71. DIP Switch Window

- Simple snap-in installation
- Allows clear visibility of DIP switches
- Prevents unwanted tampering of DIP switch settings
- Once in must be pried out from rear
- One window supplied with each starter

Table 33-321. DIP Switch Window

Description	Catalog Number	Price Each U.S. $
DIP Switch Window, (Must order in packages of 10)	**WDIPSW10**	

DIN Rail Adapter Kit

- Provides snap-on mounting on 35 mm DIN rail
- For use with Sizes 1 and 2 non-reversing contactors and starters

Table 33-322. DIN Rail Adapter Kit

Description	Catalog Number	Price U.S. $
DIN Rail Adapter Kit	**WDIN**	

Internal Trip Indicator

Internal Trip Indicator

- Overload condition indication — indicated by blinking light
- Trip condition — indicated by solid light

Table 33-323. Trip Indicator

Description	Catalog Number	Price U.S. $
Internal Trip Indicator	**WLED**	

Competitive Baseplate Kit

- Allows for direct retrofit of competitive non-reversing starters
- Eliminates the need for re-drilling and tapping of mounting holes
- Simple selection of competitive footprints

Table 33-324. Baseplate Kit

Description	Catalog Number	Price U.S. $
Sizes 1 and 2 Sizes 3 and 4	**WBASE12** **WBASE34**	

Remote Reset and Trip Indicator Pushbutton

FWD/REV/OFF/AUTO Control

- OL condition indication
- Trip indication — OL phase-loss/unbalance and ground fault
- OL reset capability
- 10250T — for 30 mm mounting
- NEMA 4 oiltight rated
- Mount remotely up to 6 ft. away
- Unit completely assembled including legend plate
- Available also in reset-only form — no trip indication provided

Table 33-325. Remote Pushbuttons

Description	Catalog Number	Price U.S. $
Reset with Trip Indication 2 ft. Cable 6 ft. Cable 15 ft. Cable	 **WRSTL24** **WRSTL72** **WRSTL180**	
Reset Only 2 ft. Cable 6 ft. Cable 15 ft. Cable	 **WRST24** **WRST72** **WRST180**	
Conversion Kit Reset Only to Reset with Trip Indication	**WRLTT**	
6 ft. Cable Only 15 ft. Cable Only LED Replacement Bulb	**WRC72** **WRC180** **WRLT**	

Renewal Parts

Table 33-326. Replacement Contact Kits

NEMA Size	Number of Poles	Catalog Number	Price U.S. $
1	3	**WCK13**	
2	3	**WCK23**	
3	3	**WCK33**	
4	3	**WCK43**	
5	3	**WCK53**	
6	3	**WCK63**	

Table 33-327. Replacement Coils

Coil Size	Voltage and Hz	Catalog Number	Price U.S. $
1 & 2	110/120V 60 Hz	**WCOIL12F**	
3 & 4	110/120V 60 Hz	**WCOIL34F**	
5 & 6	110/120V 60 Hz	**WCOIL56F**	

Discount Symbol **1CD1C**

Full Voltage Pushbutton Control Module

Metering Module

Cutler-Hammer® Advantage Control Modules (ACMs) from Eaton's electrical business provide a cost-effective alternative to pushbuttons, selector switches, indicating lights, reset mechanisms, bell alarms and panel meters when used with the Advantage product line. Typical input/output control functions provided by panel mounted devices are conveniently packaged in a series of modules depending on application and complexity.

Sixteen styles cover applications ranging from:

- Full voltage non-reversing
- Full voltage reversing
- Full voltage multispeed
- Reduced voltage
- DeviceNet compatible

Modules exist for each application to provide the functions of:

- Status only
  - ❑ Indicating lights
  - ❑ Reset
- Status, START/STOP and RESET
- Status, HOA and RESET
- Status, START/STOP/HOA and RESET

An additional Metering Module replaces conventional ammeters (three-phase), replaces reset mechanisms and displays trip cause and data, control voltage and status.

This Metering Module can be used independently or in conjunction with any of the ACMs. An extra plug connection is available on the rear of each ACM to accept the Metering Module input.

The ACM family has been designed to save:

- Panel space (versus conventional pushbuttons, selector switches and indicating lights)
- Mounting and assembly labor
- Wiring and installation time

Regardless of the configuration, installation requires mounting only one 2.25 x 3.5 inch module, substantially reducing space requirements. Fitting a standard Greenlee punch and die set, Greenlee #60071, installation is accomplished with only two screws.

ACMs provide savings in wiring costs as well. Regardless of the complexity of the application, wiring is reduced to a single plug-in cable, see photo at left.

Communication is not restricted by use of the Advantage Control Modules. An extra plug connection is available on the rear of the ACM or Metering Module to allow a WPONIDNA or WPONI Communications module to be plugged in.

Full Voltage and Reduced Voltage Control Modules

Status Only

- 4 LEDs indicate that the motor is OFF, Running, Tripped or in Alarm mode (motor current is above the trip current setting)
- Includes RESET button

START/STOP

- Motor START/STOP controlled by START and STOP buttons
- Includes all features of Status Only module

HOA Selector Switch with START/STOP

- In HAND mode, motor will start and stop in response to START/STOP pushbuttons
- In AUTO mode, motor will run in response to remote signal
- Includes all features of Status Only module

ON/OFF/AUTO Selector Switch

- Motor will run in ON mode and not in the OFF mode
- In AUTO mode the motor will run in response to a remote signal
- Includes all features of Status Only module

Reduced Voltage Control Modules

The four reduced voltage pushbutton control modules provide control using two to four starters and/or contactors. The faceplates are identical to the full voltage modules, and the pushbuttons all perform the same functions. The module is programmed for the type of reduced voltage starter which sets the sequence of contact open and closing.

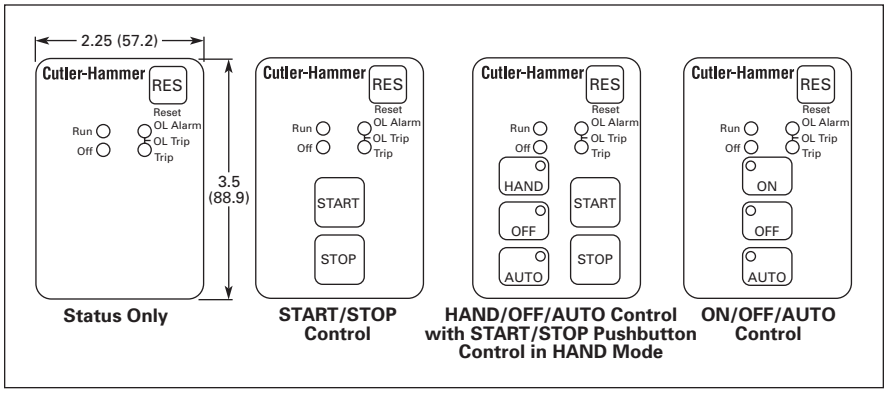


Figure 33-72. Full Voltage and Reduced Voltage Control Modules

33

Reversing and 2-Speed Pushbutton Modules

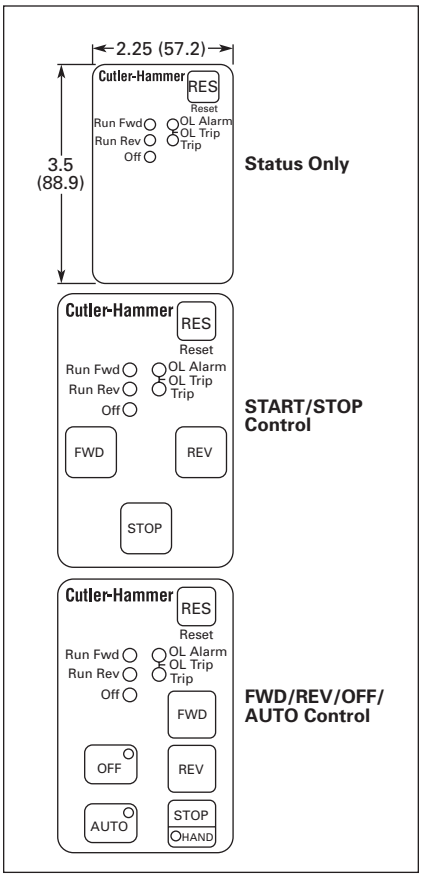


Figure 33-73. Reversing and 2-Speed Pushbutton Module

ACM Specifications

- Input supply requirements: 120V AC (supplied by the Advantage motor controller)
- Max. distance from Advantage motor controller: 6 ft. (1.83m)
- Operating frequency: 50 or 60 Hz
- Operating temperature: -20° to 70°C
- Storage temperature: -20° to 85°C
- Humidity: 0 to 95%, non-condensing
- Remote input wire size: 18 – 14 AWG
- Maximum distance between remote pushbuttons and ACM: 200 ft. (60.9m)
- Cutout dimensions: 2.25 x 3.5 inches (57.2 x 88.9 mm) (see above). The cutout can be made using a Greenlee rectangular punch #600710
- Enclosure type: NEMA 1 or 12, when properly installed

Status Only

- 5 LEDs which indicate that the motor is OFF, running forward (FAST), running reverse (SLOW), tripped or in alarm mode
- Includes RESET button

FORWARD (FAST)/REVERSE (SLOW)/STOP

- Pushbuttons control whether motor is running forward (FAST), running reverse (SLOW) or stopped
- Includes all features of Status Only module

FWD/REV/OFF/AUTO

- In AUTO mode, motor is running forward (FAST), running reverse (SLOW) or OFF in response to a remote signal
- All features of FORWARD/REVERSE/ STOP module

Note: For 2-speed modules, FAST replaces FWD and SLOW replaces REV.

Metering Module

The Advantage Metering Module monitors status of a motor along with any of the pushbutton modules. It may be plugged into the pushbutton control module, and communicates to the starter through it, or plugged directly into the starter when a pushbutton control module is not used.

The four digit display will show the current in each phase, control voltage or cause of trip. The STEP button may be pressed to step through these values, and the five LEDs will indicate which value is being displayed. It is also equipped with a reset button and Trip Lockout LED.

Table 33-328. Control Modules/Accessories

Description	Catalog Number	Price U.S. $
Full Voltage		
Status Only with Reset	**WPBFV1**	
START/STOP	**WPBFV2**	
START/STOP/HOA	**WPBFV3**	
ON/OFF/AUTO	**WPBFV4**	
LOCAL/OFF/REMOTE with Lockable ACM ①	**WPBFV5** ①	
LOCAL/OFF/REMOTE with Network Health ①	**WPBFV7** ①	
Reversing		
Status Only with Reset	**WPBR1**	
FWD/REV/STOP	**WPBR2**	
FWD/REV/STOP/HOA	**WPBR3**	
2-Speed		
Status Only with Reset	**WPB2S1**	
FAST/SLOW/STOP	**WPB2S2**	
FAST/SLOW/STOP/HOA	**WPB2S3**	
Reduced Voltage		
Status Only with Reset	**WPBRV1**	
START/STOP	**WPBRV2**	
START/STOP/HOA	**WPBRV3**	
ON/OFF/AUTO	**WPBRV4**	
Metering Module	**WMETER** ②③	
10 ft. Interconnect Cable (3m)	**WACM10**	
6 ft. Interconnect Cable (1.8m)	**WACM6**	
3 ft. Interconnect Cable (.9m)	**WACM3**	
1 ft. Interconnect Jumper (.3m)	**WACM1**	

① The WPBFV5 and WPBFV7 are DeviceNet only. They can only be used when an active network is connected.
② Harmonic distortion may cause the WMETER to display inaccurate current measurements.
③ This device is not compatible with Advantage Starters on DeviceNet via the WPONIDNA.

Discount Symbol **1CD1C**

Non-reversing Contactors, NEMA Sizes 1 – 6

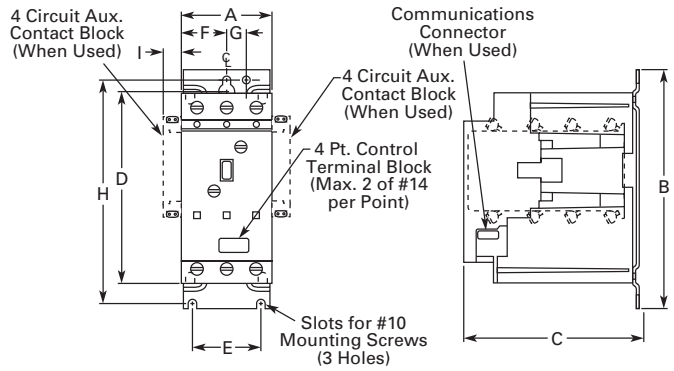


Figure 1
Sizes 1 and 2 Contactor

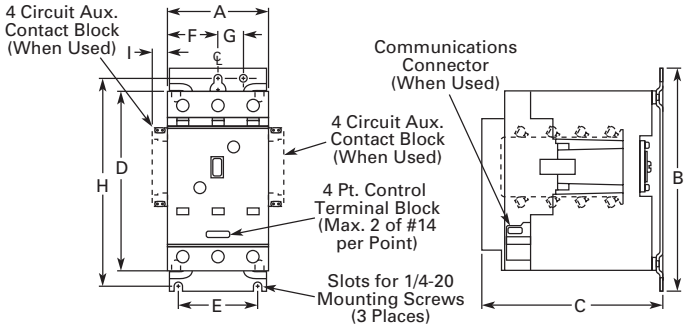


Figure 2
Sizes 3 and 4 Contactor

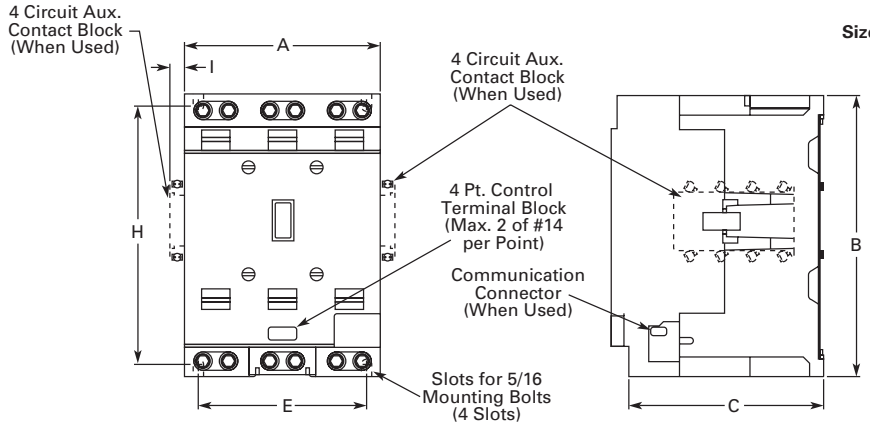


Figure 3
Sizes 5 and 6 Contactor

Figure 33-74. Approximate Dimensions in Inches and Shipping Weights

Table 33-329. Catalog Number W201 Non-reversing Contactors

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)									Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	
1, 2	3	1	3	#10	2.50 (63.5)	6.50 (165.1)	4.84 (122.9)	5.12 (130.0)	1.88 (47.8)	1.25 (31.8)	.75 (19.1)	6.00 (152.4)	.52 (13.2)	2 (.9)
3, 4	3	2	3	1/4-20	3.68 (93.5)	8.00 (203.2)	6.49 (164.8)	6.45 (163.8)	2.80 (71.1)	1.84 (46.7)	.93 (23.6)	7.50 (190.5)	.52 (13.2)	6 (2.7)
5, 6	3	3	4	5/16	7.07 (179.6)	10.08 (256.0)	7.64 (194.1)	—	6.00 (152.4)	—	—	9.20 (233.7)	.50 (12.7)	30 (13.6)

Horizontal Reversing, Open Contactors, NEMA Sizes 1 – 6

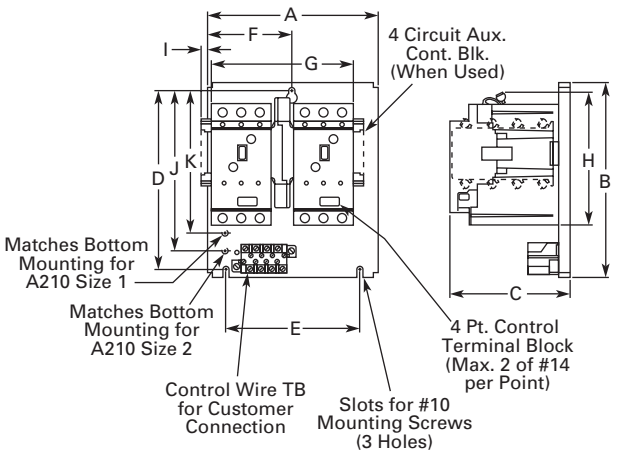


Figure 1
Sizes 1 and 2 Horizontal Reversing Contactor

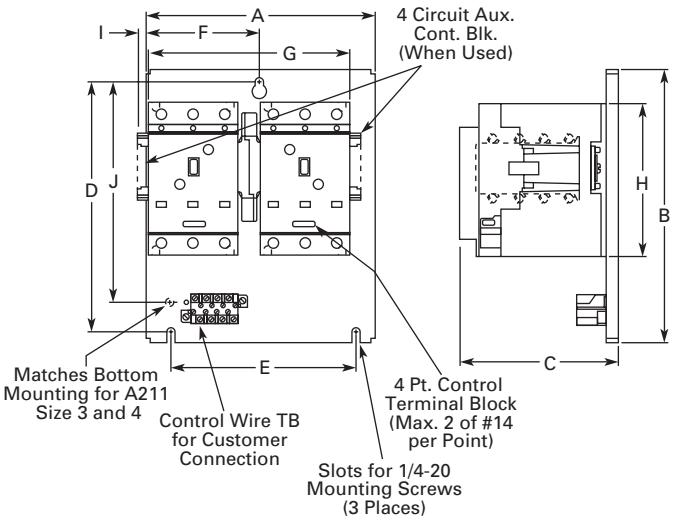


Figure 2
Sizes 3 and 4 Horizontal Reversing Contactor

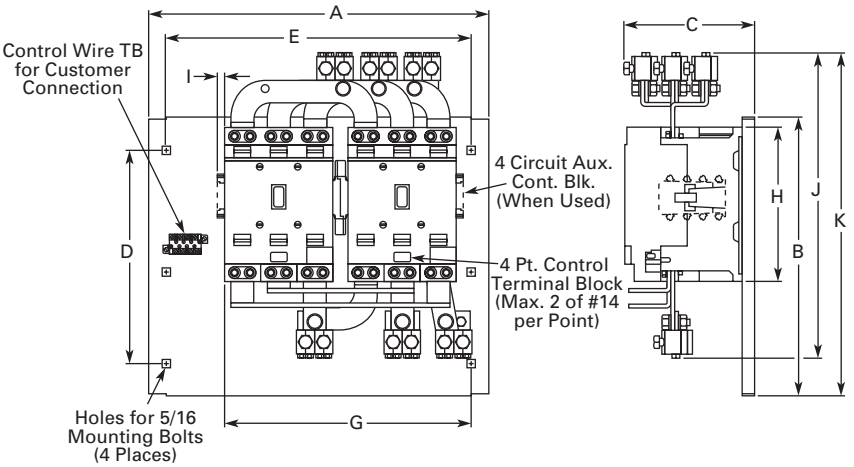


Figure 3
Sizes 5 and 6 Horizontal Reversing Contactor

Figure 33-75. Approximate Dimensions in Inches and Shipping Weights

Note: For all Sizes 1 – 6, factory furnishes the control wiring between the forward and reverse contactors, and the control wire terminal block for customer connection.

Table 33-330. Catalog Number W211 Horizontal Reversing Contactors

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)											Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	J	K	
1, 2	3 x 3	1	3	#10	7.13 (181.1)	8.05 (204.5)	5.09 (129.3)	7.50 (190.5)	5.69 (144.5)	3.56 (90.4)	6.00 (152.4)	5.53 (140.5)	.33 (8.4)	6.75 (171.5)	6.00 (152.4)	6 (2.7)
3, 4	3 x 3	2	3	1/4-20	9.76 (247.9)	11.37 (288.8)	6.76 (171.7)	10.50 (266.7)	8.00 (203.2)	4.88 (124.0)	8.36 (212.3)	6.45 (163.8)	.45 (11.4)	9.25 (235.0)	—	16 (7.3)
5	3 x 3	3	4	5/16	22.24 (564.9)	18.24 (463.3)	8.91 (226.3)	14.00 (355.6)	20.00 (508.0)	—	15.15 (384.8)	10.08 (256.0)	.50 (12.7)	19.95 (506.7)	22.47 (570.7)	80 (36.3)
6	3 x 3	3	4	5/16	22.24 (564.9)	18.24 (463.3)	8.65 (219.7)	14.00 (355.6)	20.00 (508.0)	—	16.18 (411.0)	10.08 (256.0)	.50 (12.7)	19.76 (501.9)	22.28 (565.9)	80 (36.3)

Vertical Reversing, Open Contactors, NEMA Sizes 1 – 6

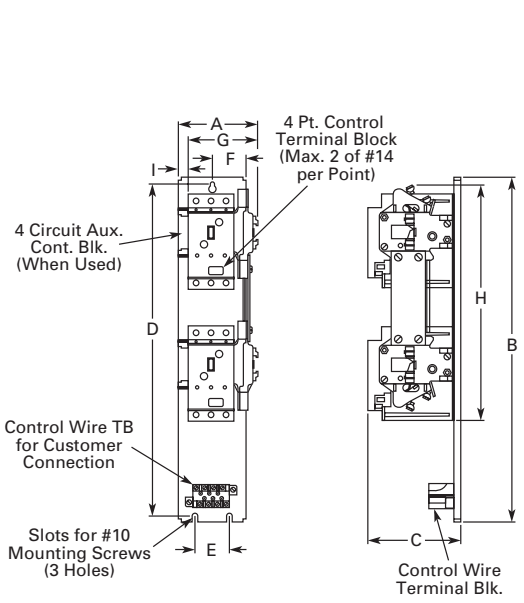


Figure 1
Sizes 1 and 2 Vertical Reversing Contactor

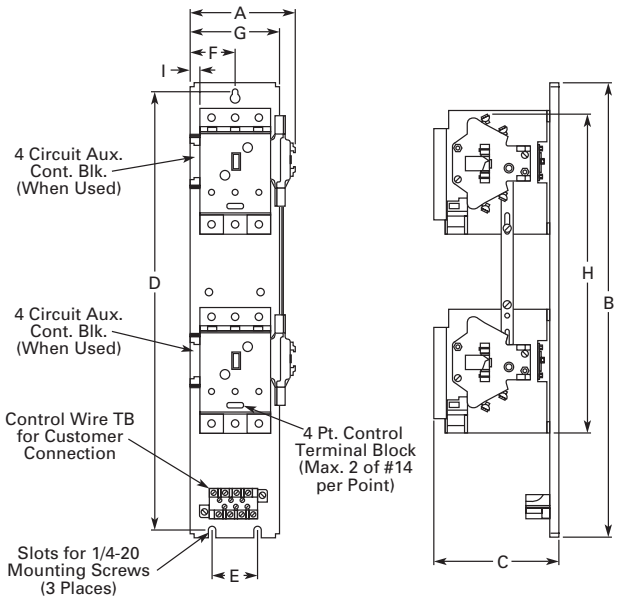


Figure 2
Sizes 3 and 4 Vertical Reversing Contactor

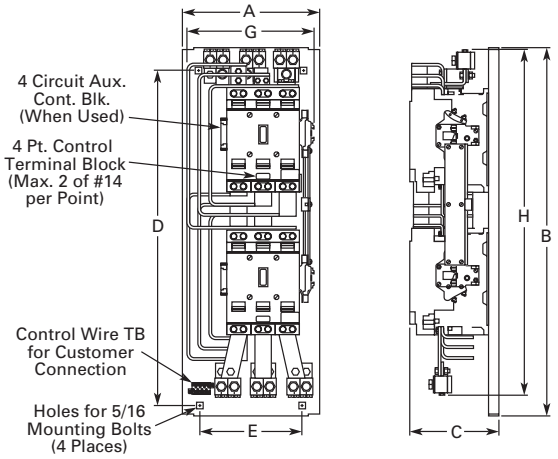


Figure 3
Sizes 5 and 6 Vertical Reversing Contactor

Figure 33-76. Approximate Dimensions in Inches and Shipping Weights

Note: For all Sizes 1 – 6, factory furnishes the control wiring between the forward and reverse contactors, and the control wire terminal block for customer connection.

Table 33-331. Catalog Number W251 Vertical Reversing Contactors

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)									Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	
1, 2	3 x 3	1	3	#10	4.27 (108.5)	18.50 (469.9)	5.09 (129.3)	18.00 (457.2)	1.88 (47.8)	1.80 (45.7)	3.73 (94.7)	12.65 (321.3)	.52 (13.2)	7 (3.2)
3, 4	3 x 3	2	3	1/4-20	5.42 (137.7)	25.13 (638.3)	6.76 (171.7)	24.25 (616.0)	2.88 (73.2)	2.31 (58.7)	4.62 (117.3)	16.94 (430.3)	.52 (13.2)	17 (7.7)
5	3 x 3	3	4	5/16	13.24 (336.3)	34.94 (887.5)	8.64 (219.5)	32.00 (812.8)	10.00 (254.0)	—	12.04 (305.8)	33.29 (845.6)	—	80 (36.3)
6	3 x 3	3	4	5/16	13.24 (336.3)	34.94 (887.5)	8.64 (219.5)	32.00 (812.8)	10.00 (254.0)	—	12.04 (305.8)	33.16 (842.3)	—	80 (36.3)

Non-reversing Starters, NEMA Sizes 1 – 6

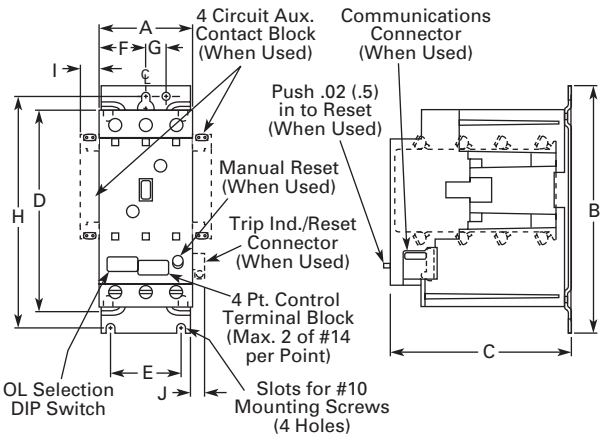


Figure 1
Sizes 1 and 2 Starter

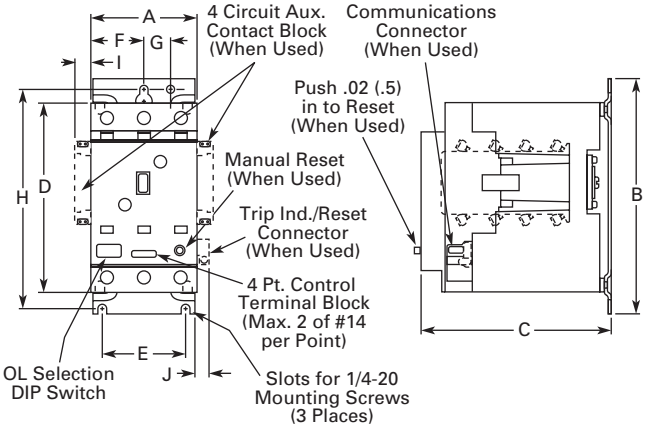


Figure 2
Sizes 3 and 4 Starter

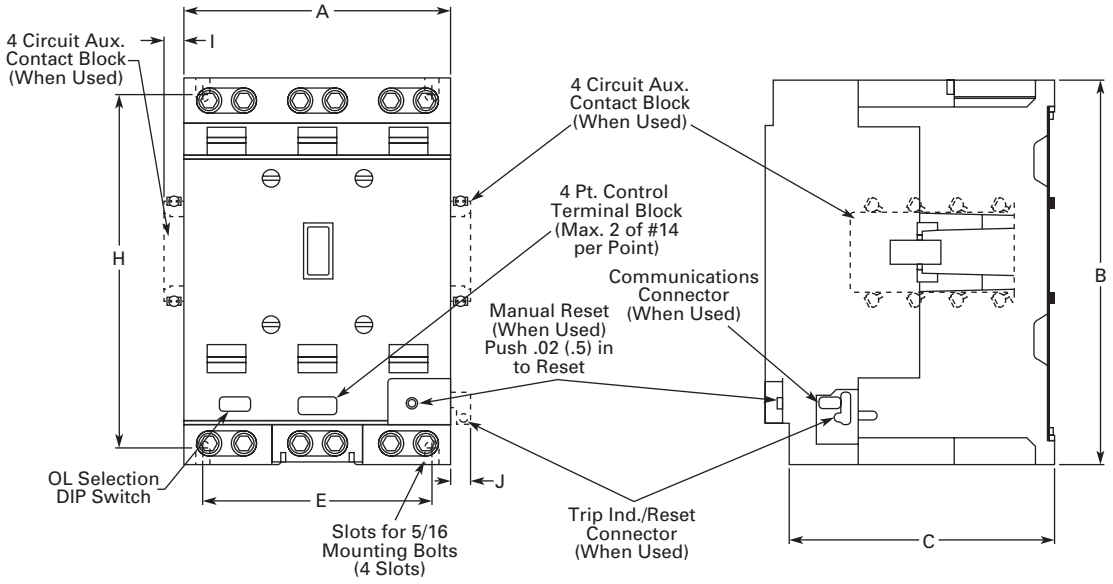


Figure 3
Sizes 5 and 6 Starter

Figure 33-77. Approximate Dimensions in Inches and Shipping Weights

Table 33-332. Catalog Number W200 Non-reversing Starters

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)										Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	J	
1, 2	3	1	3	#10	2.50 (63.5)	6.50 (165.1)	4.96 (126.0)	5.12 (130.0)	1.88 (47.8)	1.25 (31.8)	.75 (19.1)	6.00 (152.4)	.52 (13.2)	.29 (7.4)	2 (.9)
3, 4	3	2	3	1/4-20	3.68 (93.5)	8.00 (203.2)	6.54 (166.1)	6.45 (163.8)	2.80 (71.1)	1.84 (46.7)	.93 (23.6)	7.50 (190.5)	.52 (13.2)	.32 (8.1)	6 (2.7)
5, 6	3	3	4	5/16	7.07 (179.6)	10.08 (256.0)	7.64 (194.1)	—	6.00 (152.4)	—	—	9.20 (233.7)	.50 (12.7)	.46 (11.7)	30 (13.6)

Horizontal Reversing, Open Starters, NEMA Sizes 1 – 6

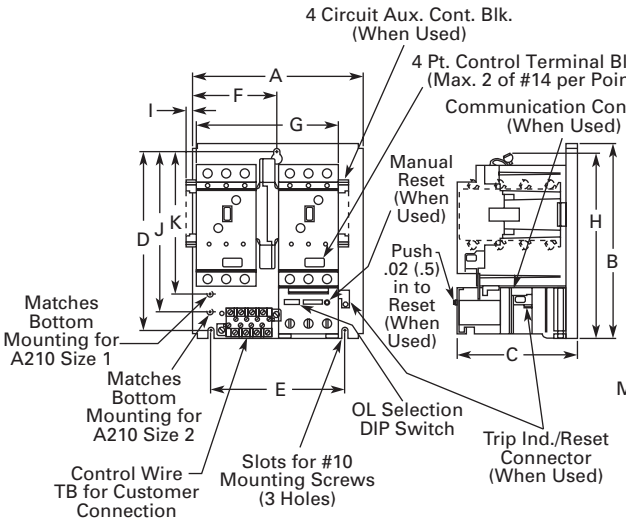


Figure 1
Sizes 1 and 2 Horizontal Reversing Contactor

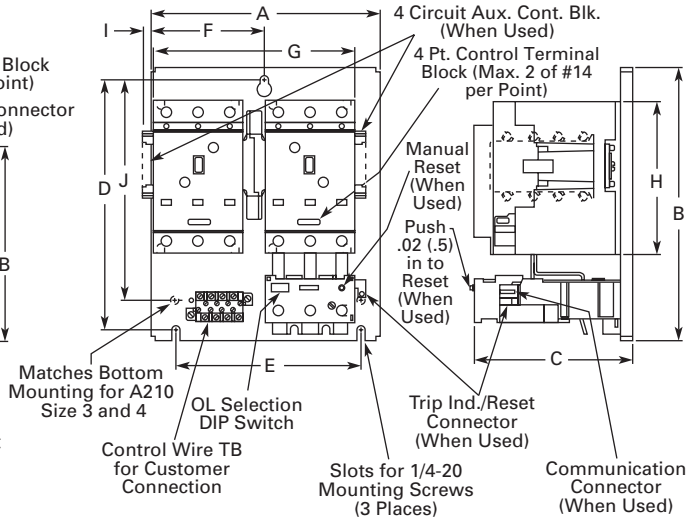


Figure 2
Sizes 3 and 4 Horizontal Reversing Contactor

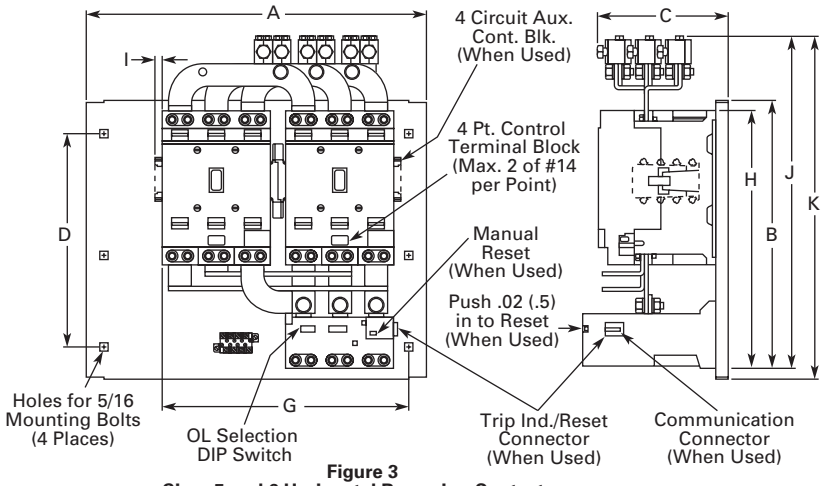


Figure 3
Sizes 5 and 6 Horizontal Reversing Contactor

Figure 33-78. Approximate Dimensions in Inches and Shipping Weights

Note: For all Sizes 1 – 6, factory furnishes the control wiring between the forward and reverse contactors, and the control wire terminal block for customer connection.

Table 33-333. Catalog Number W210 Horizontal Reversing Starters

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)											Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	J	K	
1, 2	3 x 3	1	3	#10	7.13 (181.1)	8.05 (204.5)	5.25 (133.4)	7.50 (190.5)	5.69 (144.5)	3.56 (90.4)	6.00 (152.4)	7.62 (192.5)	.33 (8.4)	6.75 (171.5)	6.00 (152.4)	7 (3.2)
3, 4	3 x 3	2	3	1/4-20	9.76 (247.9)	11.37 (288.8)	6.81 (173.0)	10.50 (266.7)	8.00 (203.2)	4.88 (124.0)	8.47 (215.1)	9.79 (248.7)	.45 (11.4)	9.25 (235.0)	—	18 (8.2)
5	3 x 3	3	4	5/16	22.24 (564.9)	18.24 (463.3)	8.91 (226.3)	14.00 (355.6)	20.00 (508.0)	—	15.28 (388.1)	16.82 (427.2)	.50 (12.7)	21.76 (552.7)	22.47 (570.7)	85 (38.6)
6	3 x 3	3	4	516	22.24 (564.9)	18.24 (463.3)	8.65 (219.7)	14.00 (355.6)	20.00 (508.0)	—	15.28 (388.1)	16.82 (427.2)	.50 (12.7)	21.57 (547.9)	22.28 (565.9)	85 (38.6)

Vertical Reversing, Open Starters, NEMA Sizes 1 – 6

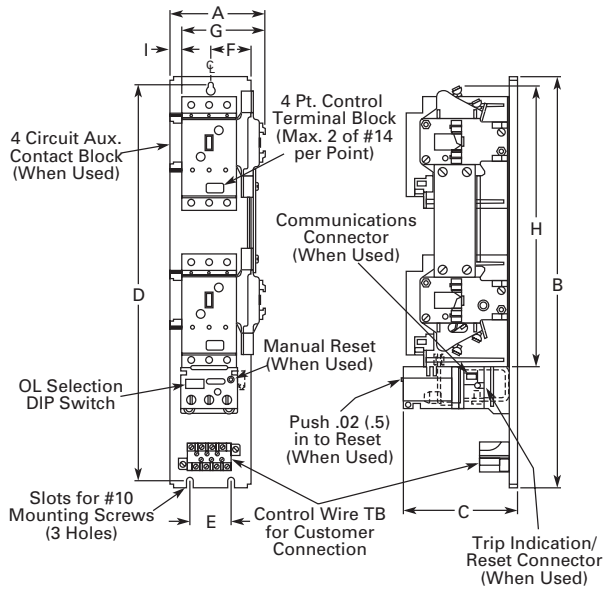


Figure 1
Sizes 1 and 2 Vertical Reversing Starter

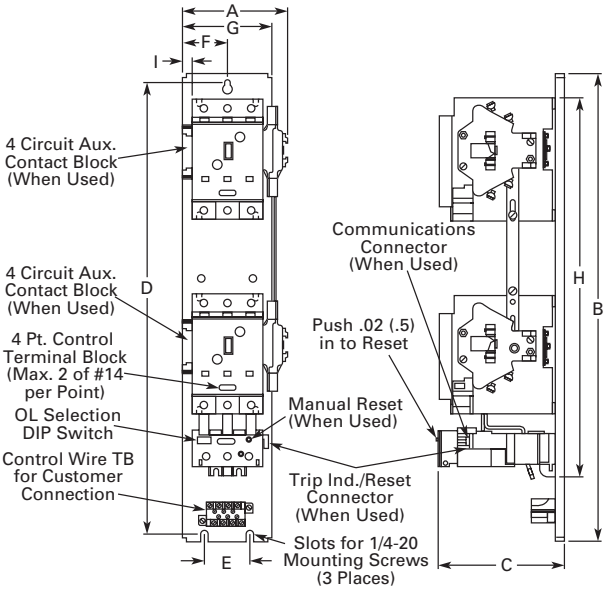


Figure 2
Sizes 3 and 4 Vertical Reversing Starter

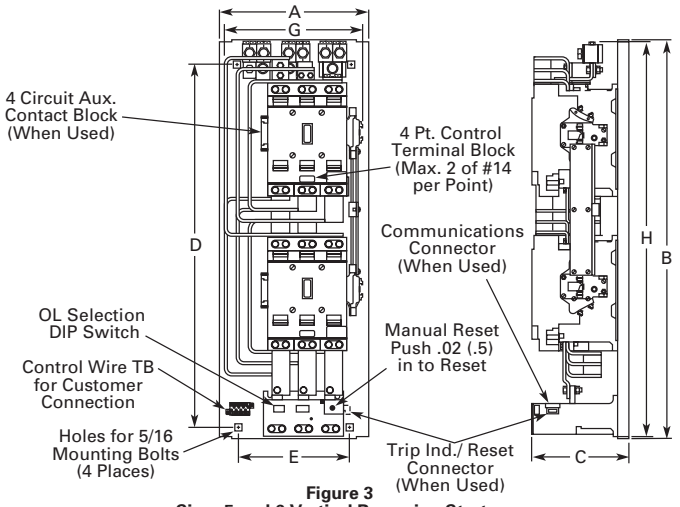


Figure 3
Sizes 5 and 6 Vertical Reversing Starter

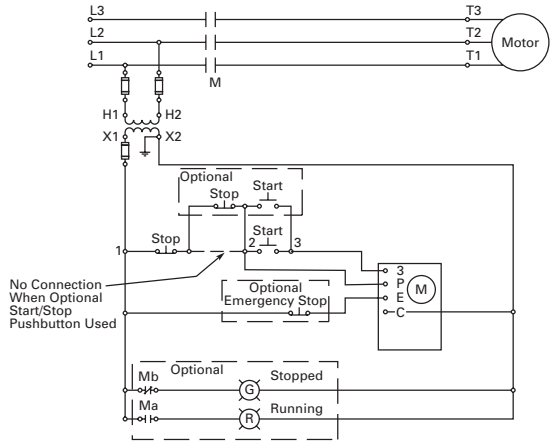
Figure 33-79. Approximate Dimensions in Inches and Shipping Weights

Note: For all Sizes 1 – 6, factory furnishes the control wiring between the forward and reverse contactors, and the control wire terminal block for customer connection.

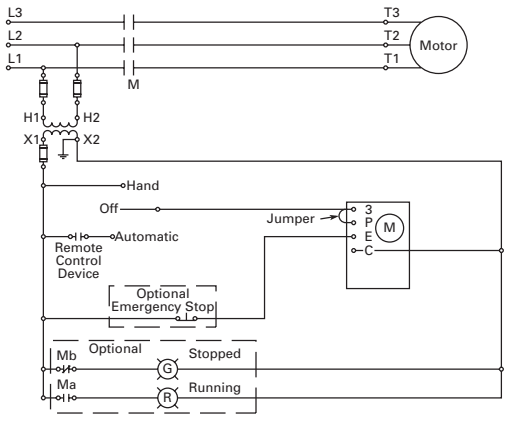
Table 33-334. Catalog Number W250 Vertical Reversing Starters

NEMA Size	Number of Poles	Figure Number	Mounting Screws		Dimensions in Inches (mm)									Ship. Wt. Lbs. (kg)
			Number	Size	Wide A	High B	Deep C	D	E	F	G	H	I	
1, 2	3 x 3	1	3	#10	4.27 (108.5)	18.50 (469.9)	5.25 (133.4)	18.00 (457.2)	1.88 (47.8)	1.80 (45.7)	3.73 (94.7)	14.72 (373.9)	.52 (13.2)	7.5 (3.4)
3, 4	3 x 3	2	3	1/4-20	5.42 (137.7)	25.13 (638.3)	6.81 (173.0)	24.25 (616.0)	2.88 (73.2)	2.31 (58.7)	4.62 (117.3)	20.28 (515.1)	.52 (13.2)	19.0 (8.6)
5	3 x 3	3	4	5/16	13.24 (336.3)	34.94 (887.5)	8.64 (219.5)	32.00 (812.8)	10.00 (254.0)	—	12.04 (305.8)	34.78 (883.4)	—	85.0 (38.6)
6	3 x 3	3	4	516	13.24 (336.3)	34.94 (887.5)	8.64 (219.5)	32.00 (812.8)	10.00 (254.0)	—	12.04 (305.8)	34.59 (878.6)	—	85.0 (38.6)

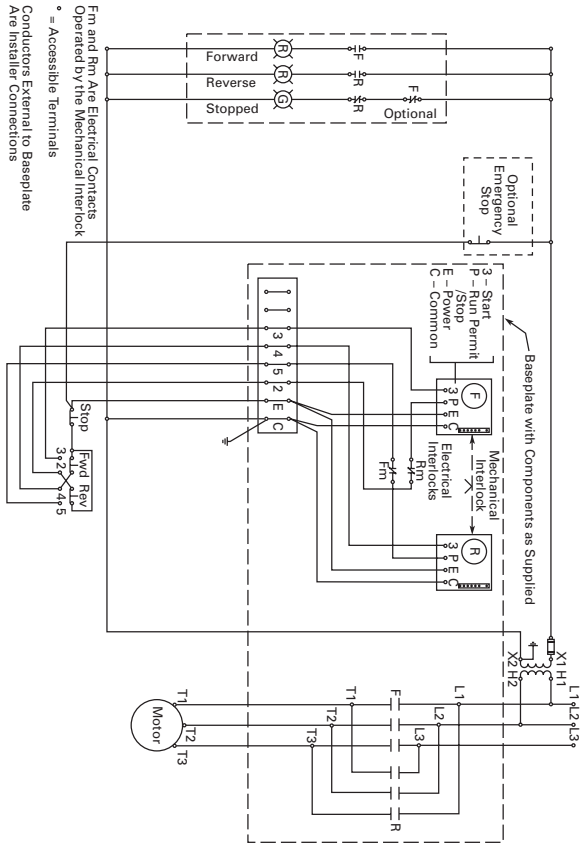
Non-reversing and Reversing Contactors, NEMA Sizes 1 – 6



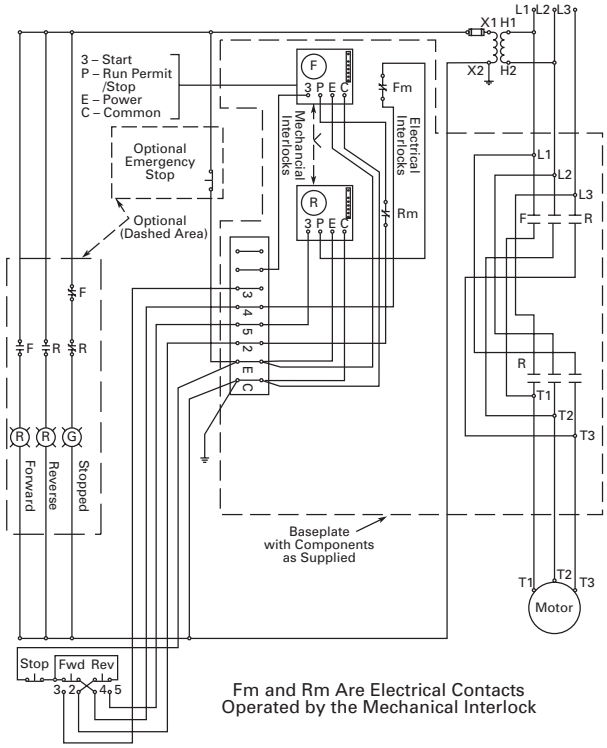
Cat. No. W201 Non-reversing Contactor
3-Wire Control with Internal Holding Circuit



Cat. No. W201 Non-reversing Contactor
2-Wire Control with Maintained HOA Switch



Cat. No. W211 Horizontal Reversing Contactor ①
3-Wire Control with Internal Holding Circuit

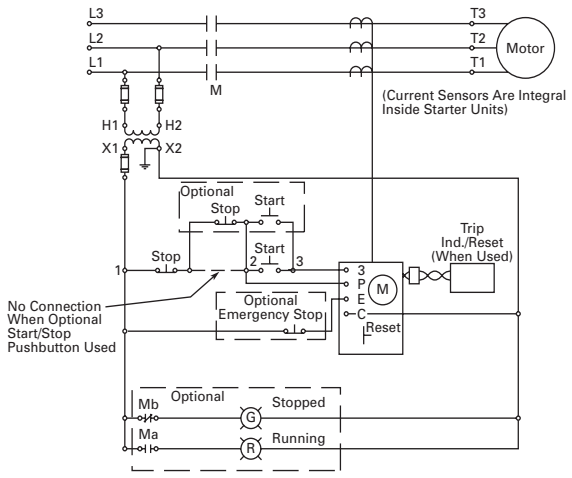


Cat. No. W251 Vertical Reversing Contactor
3-Wire Control with Internal Holding Circuit

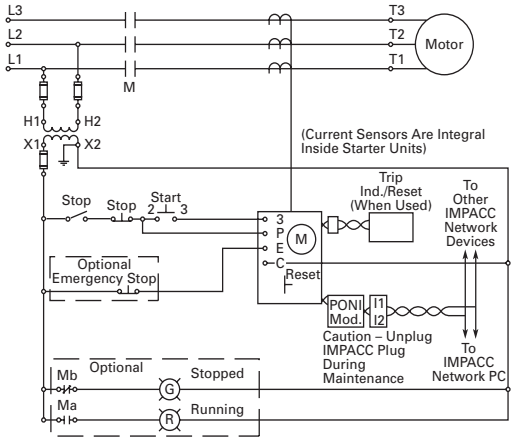
Figure 33-80. Typical Wiring Diagrams

① Sizes 5 and 6 horizontal reversing contactors have their Forward and Reverse contactor arrangement reversed. Reverse contactor is on left and Forward contactor is on right.

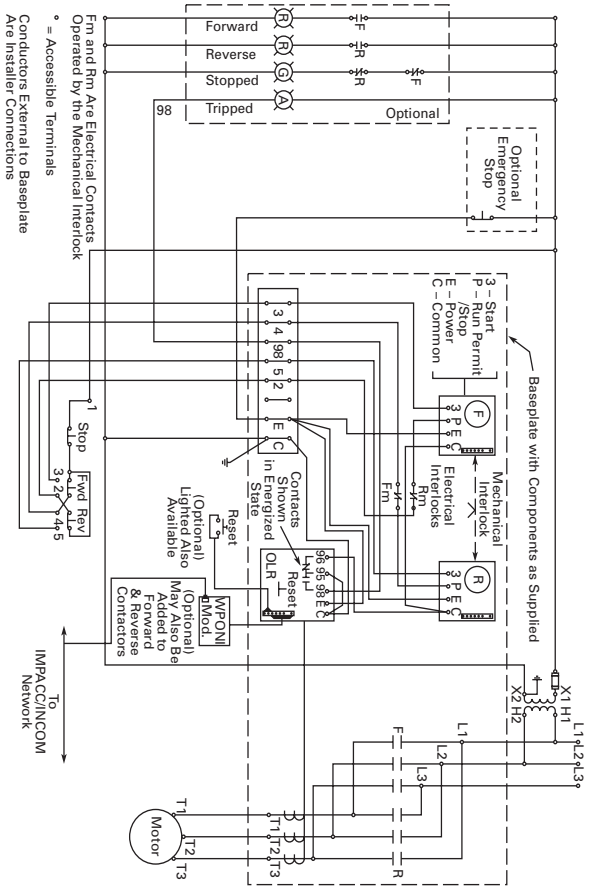
Non-reversing and Reversing Starters, NEMA Sizes 1 – 6



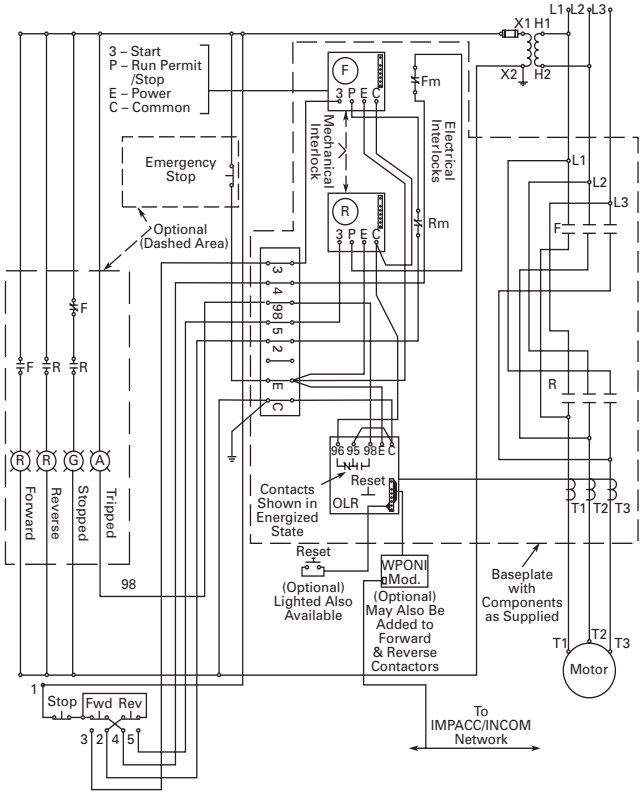
Cat. No. W200 Non-reversing Starter 3-Wire Control with Internal Holding Circuit



Cat. No. W200 Non-reversing Starter Internal Holding Circuit, 3-Wire with IMPACC



**Cat. No. W210 Horizontal Reversing Starter ①
3-Wire Control with Internal Holding Circuit**



**Cat. No. W250 Vertical Reversing Starter
3-Wire Control with Internal Holding Circuit**

Figure 33-81. Typical Wiring Diagrams

① Sizes 5 and 6 horizontal reversing contactors have their Forward and Reverse contactor arrangement reversed. Reverse contactor is on left and Forward contactor is on right.

Contents

Central Monitoring Unit

Central Monitoring Unit

Product Description

The Cutler-Hammer® Advantage Central Monitoring Unit from Eaton's electrical business is a communications center which transmits to and receives data from up to 99 Advantage starters or contactors or IQ500s equipped with PONI cards. The CMU can be mounted on the door of a motor control center or custom panel using the existing IQ cut-out dimensions.

The eight-digit alphanumeric display monitors active data, trip data or set points. The group of data being displayed is indicated by one of three LEDs and is selected by the user. The two-digit alphanumeric display indicates the address of the device about which the data is being displayed. This address is also selected by the user.

Five LEDs are provided which indicate the present status of the selected starter. Two additional LEDs are also provided at the top of the panel, one which indicates that the CMU is OPERATIONAL, and another which indicates ALARM status. An ACKNOWLEDGE/RESET button permits the user to reset the CMU following a device trip.

The CMU can be interfaced into a larger PowerNet network with the addition of a PowerNet PONI Communications Module.

Parameters Displayed

- Monitored values:
  - Device description
  - 1_A, 1_B, 1_C currents
  - Control voltage (excluding IQ500)
  - Present time, date
  - Resettable operation count
  - Run time, hours
- Trip data — same as current values with cause of trip
- Set points:
  - Device size
  - OL trip current setting (FLA setting)
  - OL trip class
  - Ground fault protection — ON/OFF
  - Phase loss/unbalance protection — ON/OFF
  - Reset mode — AUTO/MANUAL
  - Frequency
  - Ground fault trip level (IQ500 only)
  - Ground fault trip delay time (IQ500 only)
  - Phase unbalance % (IQ500 only)
- IQ500M — Special Functions Module set points — if LOAD CONTROL selected:
  - Load shed level
  - Load shed delay time
  - Load resume level
  - Load resume delay time
  - Long acceleration time

  If UNDERLOAD/JAM selected:
  - Jam trip level
  - Jam trip delay time
  - Jam start delay time
  - Underload trip level
  - Underload trip delay time
  - Underload start delay time
  - Long acceleration time
  - Relay control

Technical Data

- Device power requirement: 10 VA maximum
- Frequency: 50/60 Hz
- Line characteristics: 120 or 240V AC +20%, -20% (auto selected)
- Operating temperature: 0° to 70°C (32° to 158°F)
- Storage temperature: -20° to 85°C (-4° to 185°F)
- Humidity: 0 to 95%, R.H. non-condensing
- Alarm contact ratings —
  - 240V AC: 10A, resistive
  - 30V DC: 10A, resistive

Dimensions

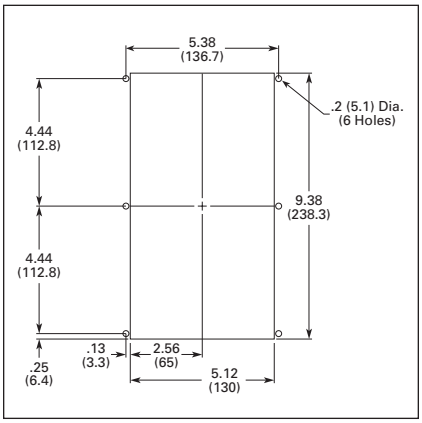


Figure 33-82. Chassis Cutout Dimensions in Inches (mm)

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Wiring Diagram

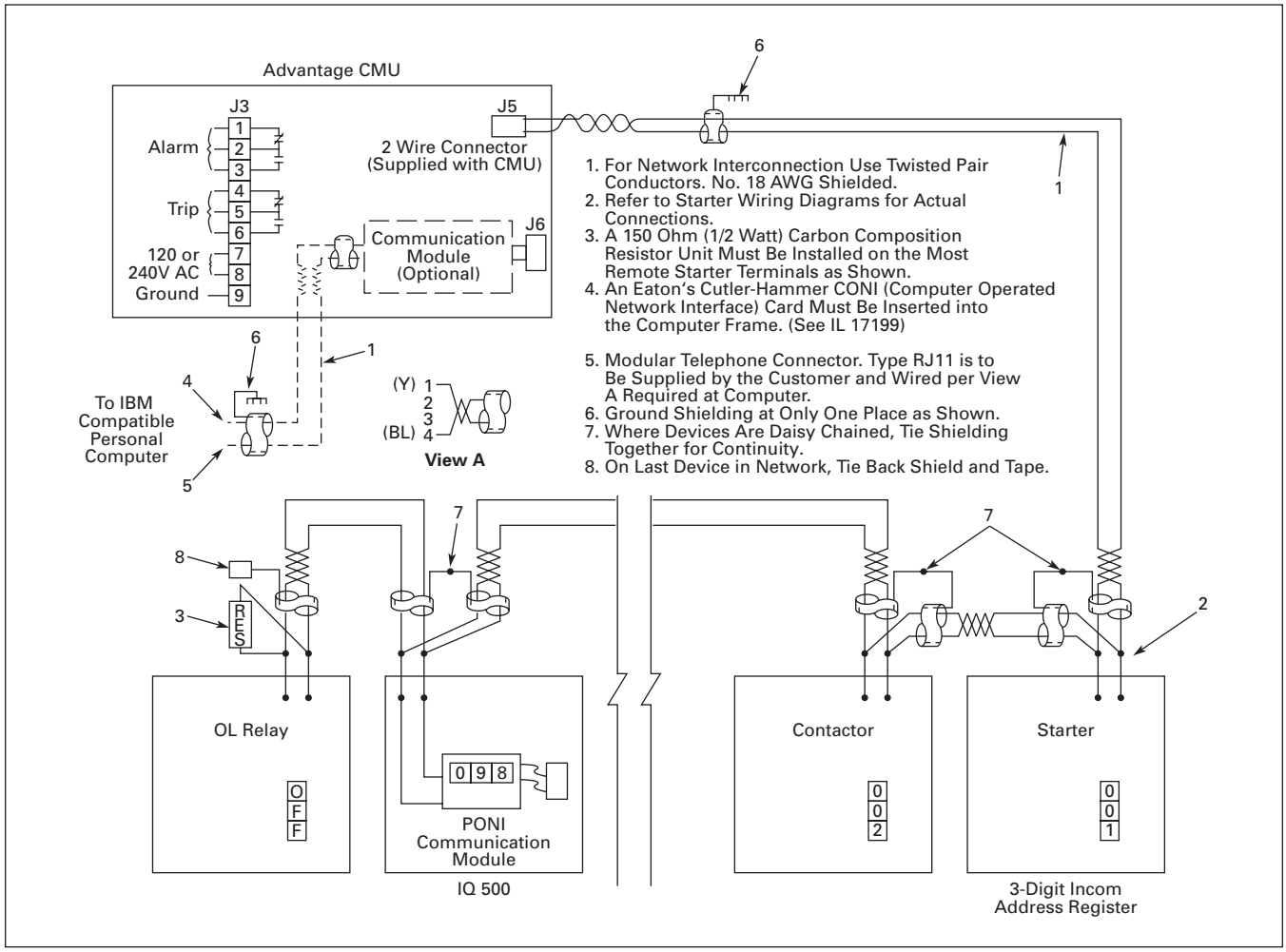

Figure 33-83. Typical Wiring Diagram

Product Selection

Table 33-335. Central Monitoring Unit

Description	Catalog Number	Price U.S. $
Advantage Central Monitoring Unit	**WCMU**	

Discount Symbol **1CD1**

Product Operated Network Interface (PONI)

Product Description

To use the PowerNet Communications network with Advantage motor control, a PONI is required for each device. The WPONI operates at 9600 baud.

Communications Data

- ON/OFF reset
- Status (ON, OFF, TRIPPED, NO RESPONSE)
- 3-phase unbalance
- % phase unbalance
- Control voltage
- Overload protection settings
- Cause of trip
- Trip data

Product Selection

Table 33-336. WPONI Network Interface

Description	Catalog Number	Price U.S. $
Advantage WPONI To panel mount a WPONI	**WPONI** **WPONIBASE**	

Note: See **Page 33-204** for WPONIDNA DeviceNet Interface Module.

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Mounting Dimensions

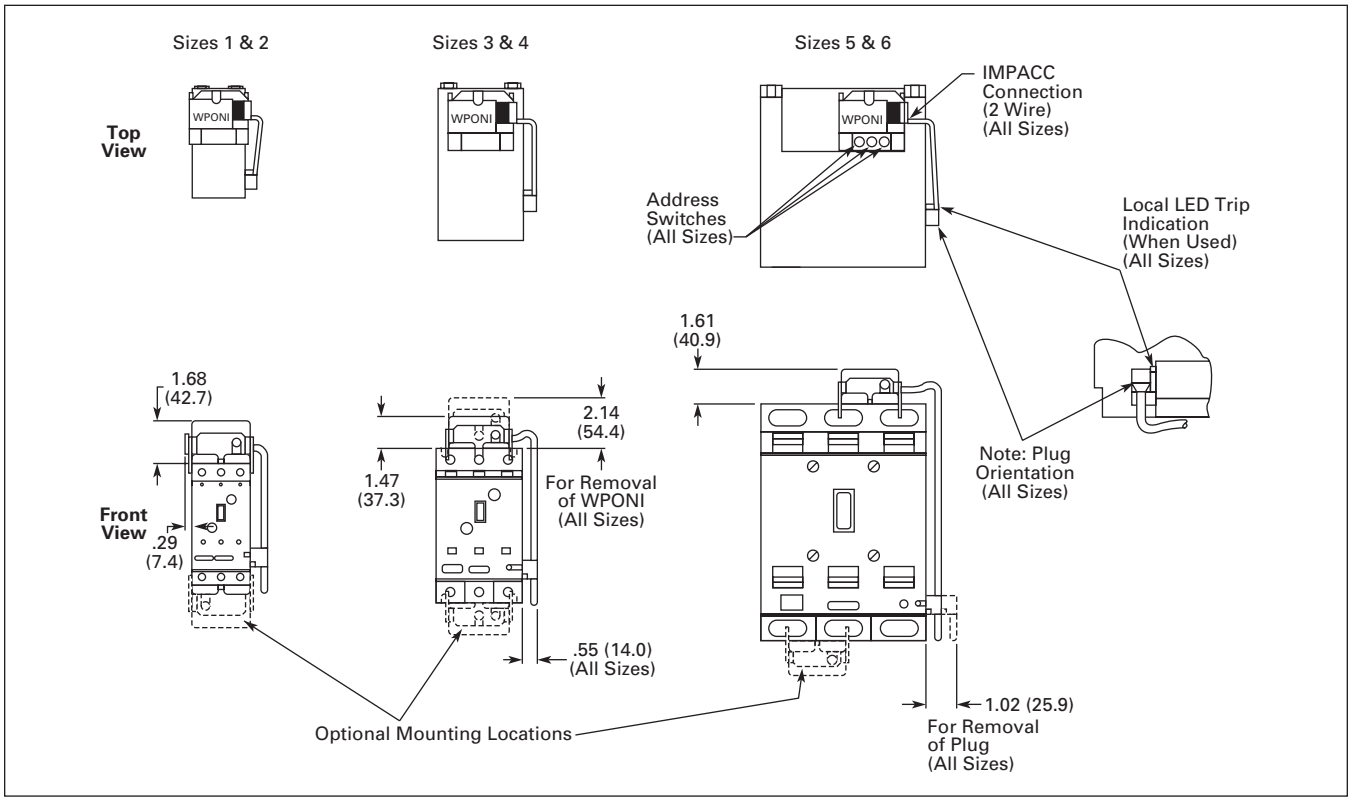

Figure 33-84. Mounting Procedures — WPONI — Approximate Dimensions in Inches (mm)

Discount Symbol **1CD1C**

Catalog Number ECH2211FAD

Product Description

Setting the Standard in Motor Control

Eaton's Cutler-Hammer® Advantage Motor Starters have extended operating life in a physical space requirement one half the size of conventional motor starters.

Offering motor overcurrent protection accurate to 2% at maximum FLC, Advantage also maintains constant coil power regardless of varying control circuit conditions, eliminating coil burnout, contact chatter and welding due to low voltage of fluttering control signals.

Advantage is designed with a full complement of features that make it the most versatile motor starter in the industry. Multifunction overload protection options provide application flexibility while reducing inventory. Communication capability extends benefits, allowing Advantage to be interactively linked to higher order control systems for monitoring, troubleshooting and control.

Technological advances incorporated in the Advantage design, such as prestart diagnostics, increased accuracy and the ability to communicate with other systems, are benefits not realized in traditional motor starters.

Features, Functions, Benefits

Advantage Breakthroughs

To achieve the level of benefits envisioned for Advantage controls at a competitive price, it was discovered early in the development process that simply improving existing design concepts would fall short of the mark. A new approach involving a higher level of technology was required. The result was the incorporation of three technical breakthroughs — new current sensing monitoring, an energy-balanced contact closure system that increased life by decreasing electrical and mechanical wear and an intelligent coil controller optimizing the contact closing process based on varying control circuit conditions. Coordinating these breakthroughs to provide enhanced motor control performance is concentrated in the SURE chip.

Advantage uses the right combination of brains and brawn in effecting a motor start. The power circuit of the contactor employs heavy-duty silver alloy contacts scientifically designed for long life. The addition of a uniquely developed application-specific microprocessor chip, regulates power supplied to the operating coil. The regulated closing profile is tailored to existing control circuit conditions. This results in an energy balanced system which reduces armature/magnet crash and contact bounce, extending mechanical and electrical life.

Improved Protection and Motor Utilization

The motor circuit monitoring and overload protection functions of Advantage starters are provided by three current sensors closely monitored by the microprocessor. This sensor/microprocessor combination yields a protection scheme closely paralleling that of the motor heating damage boundary expressed in terms of current and time. Accurate to 2%, Advantage allows full utilization of motor capability without motor damage or nuisance tripping.

No Heaters, Small Size

Advantage starters eliminate the need for costly heater elements and their associated installation expense. Standard overload protection functions include phase loss and unbalance protection, selectable trip class, automatic/manual reset and ground current protection.

Built-In Communications Capabilities Provide Two-Way Control

Advantage also offers low cost communication capability. ON-OFF commands, status and motor data can be linked to automated control systems without the addition of costly sensors, I/O modules and transducers, in a language compatible with many computer-based software systems in use today.

Protected by 22 patents and proven in many years of operating experience in harsh industrial applications, Advantage motor starters and contactors offer the user unprecedented value at a price competitive with traditional devices.

Standards and Certifications

Note: See Enclosed Control Product Guide PG0300001E for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved

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Catalog Number Selection

Table 33-337. Advantage Line Enclosed Control Catalog Numbering System

E C A 22 2 1 A A F - __

Design
A = Advantage NEMA

Modification Codes
See **Page 33-42**

Class	Table
01 = Contactors	①
02 = Reversing Contactors	①
05 = Non-combination Non-reversing Starter	**33-341**
06 = Non-combination Reversing Starter	①
07 = Non-combination Non-reversing Starter, with CPT	①
16 = Combination Non-reversing Starter — Fusible Disconnect	**33-342**
17 = Combination Reversing Starter with Disconnect Switch	①
18 = Combination Reversing Starter — Fusible/ Non-fusible Disconnect with CPT	**33-343**
22 = Combination Non-reversing Starter — Circuit Breaker	**33-344**
23 = Reversing, Combination with HMCP/E	①
24 = Combination with HMCP/E with CPT	①
33 = Multispeed 2S2W Non-combination	①
34 = Multispeed 2S1W CT or VT Non-combination	①
35 = Multispeed 2S1W CH Non-combination	①
36 = Multispeed with Disconnect Switch, 2S2W	①
37 = Multispeed with Disconnect Switch, 2S1W CT or VT	①
38 = Multispeed with Disconnect Switch, 2S1W CH	①
39 = Multispeed with HMCP/E, 2S2W	①
40 = Multispeed with HMCP/E, 2S1W CT or VT	①
41 = Multispeed with HMCP/E, 2S1W CH	①
42 = Autotransformer, Non-combination	①
43 = Autotransformer, with Disconnect Switch	①
44 = Autotransformer, with HMCP/E	①
45 = Part-Winding, Non-combination	①
46 = Part-Winding, with Disconnect Switch	①
47 = Part-Winding, with HMCP/E	①
48 = Y-D, Open Transition, Non-combination	①
49 = Y-D, Open Transition, with Disconnect Switch	①
50 = Y-D, Open Transition, with HMCP/E	①
51 = Y-D, Closed Transition, Non-combination	①
52 = Y-D, Closed Transition, with Disconnect Switch	①
53 = Y-D, Closed Transition, with HMCP/E	①
54 = Std Width Pump Panel, with Disconnect Switch	①
55 = Std Width Pump Panel, with HMCP/E	①
62 = Autotransformer Pump Panel, Disconnect Switch	①
63 = Autotransformer Pump Panel, HMCP/E	①
64 = Part-Winding Pump Panel, Disconnect	①
65 = Part-Winding Pump Panel, Circuit Breaker	①
68 = Duplex, Non-combination	①
69 = Duplex, with Disconnect Switch	①
70 = Duplex, with HMCP/E	①

Cover Control — Starters
10250T and E22 style, see **Tables 33-186 – 33-188**
Flange-Mounted ACM, see **Table 33-340**

Contactors
3 = 3 Poles

Coil Voltage and/or Control Transformers
See **Tables 33-338** and **33-339**

Disconnect Fuse Clip Ratings

A = None	**G** = 100A/600V R	**N** = 600A/600V R
B = 30A/250V R	**H** = 200A/250V R	**P** = 800A/600V R
C = 30A/600V R	**J** = 200A/600V R	**Q** = 1200A/600V R
D = 60A/250V R	**K** = 400A/250V R	**R** = 1600A/600V R
E = 60A/600V R	**L** = 400A/600V R	**S** = 2000A/600V R
F = 100A/250V R	**M** = 600A/250V R	**T** = by Description

HMCP/E or Breaker Ratings

A = None	**H** = 150A	**R** = 3000A
B = 3A	**J** = 250A	**T** = by Description
C = 7A	**K** = 400A	**5** = 3A ②
D = 15A	**L** = 600A	**6** = 7A ②
E = 30A	**M** = 800A	**7** = 15A ②
F = 50A	**N** = 1000A	**8** = 30A ②
W = 70A	**P** = 1200A	**9** = 50A ②
G = 100A	**Q** = 2000A	**I** = 100A ②

Enclosure Type
1 = Type 1 — General Purpose
2 = Type 3R — Rainproof
3 = Type 4 — Watertight (Painted Steel)
4 = Type 4X — Watertight (304-Grade Stainless Steel)
5 = Type 4X — Corrosion (Nonmetallic)
6 = Type 7/9 — Bolted Hazardous Location
7 = Type 7/9 — Threaded Hazardous Location
8 = Type 12 — Dust-Tight
9 = Type 4X — 316-Grade Stainless Steel

NEMA Size

L = Lower 1	**4** = Size 4
1 = Size 1	**5** = Size 5
2 = Size 2	**6** = Size 6
3 = Size 3	

① Contact Eaton for more information.
② Use with Sizes L – 3, HMCP 600V applications only.

Table 33-338. Magnet Coil Codes (System Voltage) ③

Code	Magnet Coil	Code	Magnet Coil
F	120/60	**Z**	By Description
N	110/50		

③ When control power transformer modification codes (**C1** – **C11**) are used or when starter class includes CPT (i.e. ECN07, 18), see **Table 33-339** for system voltage code.

Table 33-339. Control Power Transformer Codes (System Voltage)

Code	Primary	Secondary	Code	Primary	Secondary
B	240/480 – 220/440 Wired for 240V	120/60 – 110/50	**H**	277/60	120/60
			L	380/50	110/50
C	240/480 – 220/440 Wired for 480V	120/60 – 110/50	**M**	415/50	110/50
			X	240/480/600 Wired for 480V	120
D	600/60 – 550/50	120/60 – 110/50			
E	208/60	120/60	**Z**	By Description	

Cover Control

Flange Mounted Pilot ACM Devices — NEMA 1, 12 Only

For **Factory Installed** flange mounted pilot devices using **Advantage Control Modules** (ACMs), change the 9th character from **A** to **Y** and add one of the following (**A49** through **A62**) Mod Code Suffixes to the Catalog Number. In addition, one **A63** Mod may be added if desired.

Table 33-340. Flange Mounted Pilot ACM Devices

Flange Mounted Pilot Devices Description	Factory Installed	Field Installation Kits
	Mod Code Suffix	Catalog Number
Full Voltage		
Status Only with Reset	**A49**	**WPBFV1**
START/STOP	**A50**	**WPBFV2**
START/STOP/HOA	**A51**	**WPBFV3**
ON/OFF/AUTO	**A52**	**WPBFV4**
Reversing		
Status Only with Reset	**A53**	**WPBR1**
FWD/REV/STOP	**A54**	**WPBR2**
FWD/REV/STOP/HOA	**A55**	**WPBR3**
2-Speed		
Status Only with Reset	**A56**	**WPB2S1**
FAST/SLOW/STOP	**A57**	**WPB2S2**
FAST/SLOW/STOP/HOA	**A58**	**WPB2S3**
Reduced Voltage		
Status Only with Reset	**A59**	**WPBRV1**
START/STOP	**A60**	**WPBRV2**
START/STOP/HOA	**A61**	**WPBRV3**
ON/OFF/AUTO	**A62**	**WPBRV4**
Metering Module	**A63**	**WMETER** ①
10 ft. Interconnect Cable	—	**WACM10**
6 ft. Interconnect Cable	—	**WACM6**
3 ft. Interconnect Cable	—	**WACM3**
1 ft. Interconnect Jumper	—	**WACM1**

① This device is not compatible with Advantage Starters on DeviceNet via the WPONIDNA.

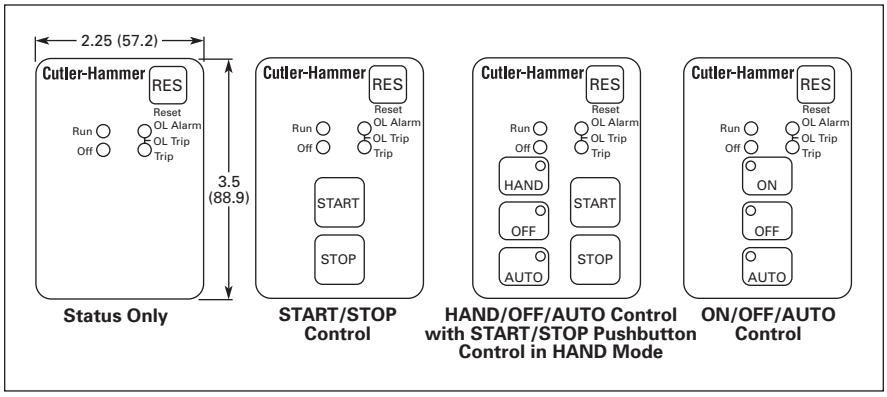

Figure 33-85. Flange Mounted Pilot ACM Devices

Other Cover Control Devices

See **Page 33-119** in NEMA Contactors & Starters, Freedom Line.

Features and Product Selection

- Full Voltage
- Solid-State Overload Relays
- 600V Maximum

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Table 33-341. Class ECA05 — Non-combination Non-reversing Starter

NEMA Size	Motor Voltage ①	Maximum hp Rating ①	Magnet Coil Voltage ②③	Type 3R Rainproof Catalog Number	Type 4X Watertight & Dust-Tight Stainless Steel ④ Catalog Number	Type 12 Dust-Tight Industrial ⑤ Catalog Number	Component Starter (Open) Catalog Number
1-L ⑥	200 230 460 575	1 1 2 2	120	**ECA05L2FAA**	**ECA05L4FAA**	**ECA05L8FAA**	**W200MLCFC**
1	200 230 460 575	7-1/2 7-1/2 10 10	120	**ECA0512FAA**	**ECA0514FAA**	**ECA0518FAA**	**W200M1CFC**
2	200 230 460 575	10 15 25 25	120	**ECA0522FAA**	**ECA0524FAA**	**ECA0528FAA**	**W200M2CFC**
3	200 230 460 575	25 30 50 50	120	**ECA0532FAA**	**ECA0534FAA**	**ECA0538FAA**	**W200M3CFC**
4	200 230 460 575	40 50 100 100	120	**ECA0542FAA**	**ECA0544FAA**	**ECA0548FAA**	**W200M4CFC**
5	200 230 460 575	75 100 200 200	120	**ECA0552FAA**	**ECA0554FAA**	**ECA0558FAA**	**W200M5CFC**
6	200 230 460 575	150 200 400 400	120 ⑦	**ECA0562EAA** **ECA0562BAA** **ECA0562CAA** **ECA0562DAA**	**ECA0564EAA** **ECA0564BAA** **ECA0564CAA** **ECA0564DAA**	**ECA0568EAA** **ECA0568BAA** **ECA0568CAA** **ECA0568DAA**	**W200M6CFC**

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	1-L ⑥	1	2	3	4	5	6
Horsepower	1-1/2	10	25	50	75	150	300

② All starters provided with coils for separate control.

③ Starters for 50 Hz operation use 110V 50 Hz magnet coil. Change 8th character from **F** to **N**.

④ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECA05L**4**FAA. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

⑤ Choose a Type 12 enclosure for Type 1 applications.

⑥ For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

⑦ Size 6 includes control power transformer.

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Features and Product Selection

- Full Voltage
- Solid-State Overload Relays
- 600V Maximum
- 100,000 AIC Short Circuit — 600V Maximum

Table 33-342. Class ECA16 — Combination Non-reversing Starter — Fusible Disconnect

NEMA Size	Motor Voltage	Maximum hp Rating Dual Element Fuses	Magnet Coil Voltage ①②	Fuse Clip Amps. ③	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ④	Type 12 Dust-Tight Industrial ⑤⑥	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
1-L ⑦	200 230	1	120	30A	**ECA16L1FAB**	**ECA16L2FAB**	**ECA16L4FAB**	**ECA16L8FAB**	**W200MLCFC**
	460 575	2	120	30A	**ECA16L1FAC**	**ECA16L2FAC**	**ECA16L4FAC**	**ECA16L8FAC**	**W200MLCFC**
1	200 230	7-1/2	120	30A	**ECA1611FAB**	**ECA1612FAB**	**ECA1614FAB**	**ECA1618FAB**	**W200M1CFC**
	460 575	10	120	30A	**ECA1611FAC**	**ECA1612FAC**	**ECA1614FAC**	**ECA1618FAC**	**W200M1CFC**
2	200 230	10 15	120	60A	**ECA1621FAD**	**ECA1622FAD**	**ECA1624FAD**	**ECA1628FAD**	**W200M2CFC**
	460 575	25	120	60A	**ECA1621FAE**	**ECA1622FAE**	**ECA1624FAE**	**ECA1628FAE**	**W200M2CFC**
3	200 230	25 30	120	100A	**ECA1631FAF**	**ECA1632FAF**	**ECA1634FAF**	**ECA1638FAF**	**W200M3CFC**
	460 575	50	120	100A	**ECA1631FAG**	**ECA1632FAG**	**ECA1634FAG**	**ECA1638FAG**	**W200M3CFC**
4	200 230	40 50	120	200A	**ECA1641FAH**	**ECA1642FAH**	**ECA1644FAH**	**ECA1648FAH**	**W200M4CFC**
	460 575	100	120	200A	**ECA1641FAJ**	**ECA1642FAJ**	**ECA1644FAJ**	**ECA1648FAJ**	**W200M4CFC**
5	200 230	75 100	120	400A	**ECA1651FAK**	**ECA1652FAK**	**ECA1654FAK**	**ECA1658FAK**	**W200M5CFC**
	460 575	200	120	400A	**ECA1651FAL**	**ECA1652FAL**	**ECA1654FAL**	**ECA1658FAL**	**W200M5CFC**
6	200 230	150 200	120 ⑧	600A	**ECA1661EAM** **ECA1661BAM**	**ECA1662EAM** **ECA1662BAM**	**ECA1663EAM** **ECA1663BAM**	**ECA1668EAM** **ECA1668BAM**	**W200M6CFC**
	460 575	400		600A	**ECA1661CAN** **ECA1661DAN**	**ECA1662CAN** **ECA1662DAN**	**ECA1663CAN** **ECA1663DAN**	**ECA1668CAN** **ECA1668DAN**	**W200M6CFC**

① All starters provided with coils for separate control.

② Starters for 50 Hz operation use 110V 50 Hz magnet coil. Change 8th character from **F** to **N**.

③ Fuse clips are for Class R fuses only. For H and J fuses see mods, **Page 33-44**.

④ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECA16L**4**FAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

⑤ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑥ Type 12 enclosure is without safety door interlock. When safety door interlock is required, change seventh character from **8** to **9**, i.e. ECA161**8**FAC would become ECA161**9**FAC.

⑦ For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

⑧ Size 6 includes control power transformer.

ECA1611FAA

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Starters — Fusible and Non-fusible

Table 33-343. Class ECA18 — Combination Reversing Starter — Fusible/Non-fusible Disconnect with CPT

NEMA Size	Primary Voltage ①	Max. hp Rating Dual Element Fuses	Secondary Voltage / Magnet Coil Voltage	Fuse Clip Amps. ②	Type 1 General Purpose Catalog Number	Type 3R Rainproof Catalog Number	Type 4X Watertight & Dust-Tight Stainless Steel ③ Catalog Number	Type 12 Dust-Tight Industrial ④⑤ Catalog Number	Component Starter (Open) Catalog Number
Fusible ⑥									
1-L ⑦	208 240	1	120	30A	**ECA18L1EAB** **ECA18L1BAB**	**ECA18L2EAB** **ECA18L2BAB**	**ECA18L4EAB** **ECA18L4BAB**	**ECA18L8EAB** **ECA18L8BAB**	**W200MLCFC**
	480 600	2	120	30A	**ECA18L1CAC** **ECA18L1DAC**	**ECA18L2CAC** **ECA18L2DAC**	**ECA18L4CAC** **ECA18L4DAC**	**ECA18L8CAC** **ECA18L8DAC**	**W200MLCFC**
1	208 240	7-1/2	120	30A	**ECA1811EAB** **ECA1811BAB**	**ECA1812EAB** **ECA1812BAB**	**ECA1814EAB** **ECA1814BAB**	**ECA1818EAB** **ECA1818BAB**	**W200M1CFC**
	480 600	10	120	30A	**ECA1811CAC** **ECA1811DAC**	**ECA1812CAC** **ECA1812DAC**	**ECA1814CAC** **ECA1814DAC**	**ECA1818CAC** **ECA1818DAC**	**W200M1CFC**
2	208 240	10 15	120	60A	**ECA1821EAD** **ECA1821BAD**	**ECA1822EAD** **ECA1822BAD**	**ECA1824EAD** **ECA1824BAD**	**ECA1828EAD** **ECA1828BAD**	**W200M2CFC**
	480 600	25	120	60A	**ECA1821CAE** **ECA1821DAE**	**ECA1822CAE** **ECA1822DAE**	**ECA1824CAE** **ECA1824DAE**	**ECA1828CAE** **ECA1828DAE**	**W200M2CFC**
3	208 240	25 30	120	100A	**ECA1831EAF** **ECA1831BAF**	**ECA1832EAF** **ECA1832BAF**	**ECA1834EAF** **ECA1834BAF**	**ECA1838EAF** **ECA1838BAF**	**W200M3CFC**
	480 600	50	120	100A	**ECA1831CAG** **ECA1831DAG**	**ECA1832CAG** **ECA1832DAG**	**ECA1834CAG** **ECA1834DAG**	**ECA1838CAG** **ECA1838DAG**	**W200M3CFC**
4	208 240	40 50	120	200A	**ECA1841EAH** **ECA1841BAH**	**ECA1842EAH** **ECA1842BAH**	**ECA1844EAH** **ECA1844BAH**	**ECA1848EAH** **ECA1848BAH**	**W200M4CFC**
	480 600	100	120	200A	**ECA1841CAJ** **ECA1841DAJ**	**ECA1842CAJ** **ECA1842DAJ**	**ECA1844CAJ** **ECA1844DAJ**	**ECA1848CAJ** **ECA1848DAJ**	**W200M4CFC**
Non-fusible									
1-L ⑦	208 240 480 600	1 1 2 2	120	30A	**ECA18L1EAA** **ECA18L1BAA** **ECA18L1CAA** **ECA18L1DAA**	**ECA18L2EAA** **ECA18L2BAA** **ECA18L2CAA** **ECA18L2DAA**	**ECA18L4EAA** **ECA18L4BAA** **ECA18L4CAA** **ECA18L4DAA**	**ECA18L8EAA** **ECA18L8BAA** **ECA18L8CAA** **ECA18L8DAA**	**W200MLCFC**
1	208 240 480 600	7-1/2 7-1/2 10 10	120	30A	**ECA1811EAA** **ECA1811BAA** **ECA1811CAA** **ECA1811DAA**	**ECA1812EAA** **ECA1812BAA** **ECA1812CAA** **ECA1812DAA**	**ECA1814EAA** **ECA1814BAA** **ECA1814CAA** **ECA1814DAA**	**ECA1818EAA** **ECA1818BAA** **ECA1818CAA** **ECA1818DAA**	**W200M1CFC**
2	208 240 480 600	10 15 25 25	120	60A	**ECA1821EAA** **ECA1821BAA** **ECA1821CAA** **ECA1821DAA**	**ECA1822EAA** **ECA1822BAA** **ECA1822CAA** **ECA1822DAA**	**ECA1824EAA** **ECA1824BAA** **ECA1824CAA** **ECA1824DAA**	**ECA1828EAA** **ECA1828BAA** **ECA1828CAA** **ECA1828DAA**	**W200M2CFC**
3	208 240 480 600	25 30 50 50	120	100A	**ECA1831EAA** **ECA1831BAA** **ECA1831CAA** **ECA1831DAA**	**ECA1832EAA** **ECA1832BAA** **ECA1832CAA** **ECA1832DAA**	**ECA1834EAA** **ECA1834BAA** **ECA1834CAA** **ECA1834DAA**	**ECA1838EAA** **ECA1838BAA** **ECA1838CAA** **ECA1838DAA**	**W200M3CFC**
4	208 240 480 600	40 50 100 100	120	200A	**ECA1841EAA** **ECA1841BAA** **ECA1841CAA** **ECA1841DAA**	**ECA1842EAA** **ECA1842BAA** **ECA1842CAA** **ECA1842DAA**	**ECA1844EAA** **ECA1844BAA** **ECA1844CAA** **ECA1844DAA**	**ECA1848EAA** **ECA1848BAA** **ECA1848CAA** **ECA1848DAA**	**W200M4CFC**

① Other control power transformer primary and/or secondary voltages, see **Page 33-222**.

② Fuse clips are for Class R fuses only. For H and J Fuses see mods, **Page 33-44**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECA16L**4**EAB. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ Type 12 enclosure is without safety door interlock. When safety door interlock is required, change seventh character from **8** to **9**, i.e. ECA1818EAA would become ECA1819EAA.

⑥ 100,000 AIC short circuit.

⑦ For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

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Features and Product Selection

- Full Voltage
- Solid-State Overload Relays
- 600V Maximum

Table 33-344. Class ECA22 — Combination Non-reversing Starter — Circuit Breaker

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①②	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ③	Type 12 Dust-Tight Industrial ④	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
1-L ⑤	200	1	120	HMCPE 7A	**ECA22L1FAC**	**ECA22L2FAC**	**ECA22L4FAC**	**ECA22L8FAC**	**W200MLCFC**
	230	1		HMCPE 7A	**ECA22L1FAC**	**ECA22L2FAC**	**ECA22L4FAC**	**ECA22L8FAC**	
	460	1		HMCPE 3A	**ECA22L1FAB**	**ECA22L2FAB**	**ECA22L4FAB**	**ECA22L8FAB**	
		3		HMCPE 7A	**ECA22L1FAC**	**ECA22L2FAC**	**ECA22L4FAC**	**ECA22L8FAC**	
	575	1		HMCP 3A	**ECA22L1FA5**	**ECA22L2FA5**	**ECA22L4FA5**	**ECA22L8FA5**	
		3		HMCP 7A	**ECA22L1FA6**	**ECA22L2FA6**	**ECA22L4FA6**	**ECA22L8FA6**	
1	200	1	120	HMCPE 7A	**ECA2211FAC**	**ECA2212FAC**	**ECA2214FAC**	**ECA2218FAC**	**W200M1CFC**
		3		HMCPE 15A	**ECA2211FAD**	**ECA2212FAD**	**ECA2214FAD**	**ECA2218FAD**	
		5		HMCPE 30A	**ECA2211FAE**	**ECA2212FAE**	**ECA2214FAE**	**ECA2218FAE**	
		7-1/2		HMCPE 50A	**ECA2211FAF**	**ECA2212FAF**	**ECA2214FAF**	**ECA2218FAF**	
	230	1	120	HMCPE 7A	**ECA2211FAC**	**ECA2212FAC**	**ECA2214FAC**	**ECA2218FAC**	**W200M1CFC**
		3		HMCPE 15A	**ECA2211FAD**	**ECA2212FAD**	**ECA2214FAD**	**ECA2218FAD**	
		5		HMCPE 30A	**ECA2211FAE**	**ECA2212FAE**	**ECA2214FAE**	**ECA2218FAE**	
		7-1/2		HMCPE 50A	**ECA2211FAF**	**ECA2212FAF**	**ECA2214FAF**	**ECA2218FAF**	
	460	1	120	HMCPE 3A	**ECA2211FAB**	**ECA2212FAB**	**ECA2214FAB**	**ECA2218FAB**	**W200M1CFC**
		3		HMCPE 7A	**ECA2211FAC**	**ECA2212FAC**	**ECA2214FAC**	**ECA2218FAC**	
		5		HMCPE 15A	**ECA2211FAD**	**ECA2212FAD**	**ECA2214FAD**	**ECA2218FAD**	
		10		HMCPE 30A	**ECA2211FAE**	**ECA2212FAE**	**ECA2214FAE**	**ECA2218FAE**	
	575	1	120	HMCP 3A	**ECA2211FA5**	**ECA2212FA5**	**ECA2214FA5**	**ECA2218FA5**	**W200M1CFC**
		3		HMCP 7A	**ECA2211FA6**	**ECA2212FA6**	**ECA2214FA6**	**ECA2218FA6**	
		5		HMCP 15A	**ECA2211FA7**	**ECA2212FA7**	**ECA2214FA7**	**ECA2218FA7**	
		10		HMCP 30A	**ECA2211FA8**	**ECA2212FA8**	**ECA2214FA8**	**ECA2218FA8**	
2	200	10	120	HMCPE 50A	**ECA2221FAF**	**ECA2222FAF**	**ECA2224FAF**	**ECA2228FAF**	**W200M2CFC**
	230	10		HMCPE 50A	**ECA2221FAF**	**ECA2222FAF**	**ECA2224FAF**	**ECA2228FAF**	
		15		HMCPE 70A	**ECA2221FAW**	**ECA2222FAW**	**ECA2224FAW**	**ECA2228FAW**	
	460	25		HMCPE 50A	**ECA2221FAF**	**ECA2222FAF**	**ECA2224FAF**	**ECA2228FAF**	
	575	15		HMCP 30A	**ECA2221FA8**	**ECA2222FA8**	**ECA2224FA8**	**ECA2228FA8**	
		25		HMCP 50A	**ECA2221FA9**	**ECA2222FA9**	**ECA2224FA9**	**ECA2228FA9**	
3	200	20	120	HMCPE 100A	**ECA2231FAG**	**ECA2232FAG**	**ECA2234FAG**	**ECA2238FAG**	**W200M3CFC**
		25		HMCPE 100A	**ECA2231FAX**	**ECA2232FAX**	**ECA2234FAX**	**ECA2238FAX**	
	230	25		HMCPE 100A	**ECA2231FAG**	**ECA2232FAG**	**ECA2234FAG**	**ECA2238FAG**	
		30		HMCPE 100A	**ECA2231FAX**	**ECA2232FAX**	**ECA2234FAX**	**ECA2238FAX**	
	460	50		HMCPE 100A	**ECA2231FAG**	**ECA2232FAG**	**ECA2234FAG**	**ECA2238FAG**	
	575	30		HMCP 50A	**ECA2231FA9**	**ECA2232FA9**	**ECA2234FA9**	**ECA2238FA9**	
		50		HMCP 100A	**ECA2231FAI**	**ECA2232FAI**	**ECA2234FAI**	**ECA2238FAI**	
4	200	40	120	HMCP 150A	**ECA2241FAH**	**ECA2242FAH**	**ECA2244FAH**	**ECA2248FAH**	**W200M4CFC**
	230	50		HMCP 150A					
	460	100		HMCP 150A					
	575	100		HMCP 150A					
5	200	50	120	HMCP 250A	**ECA2251FAJ**	**ECA2252FAJ**	**ECA2254FAJ**	**ECA2258FAJ**	**W200M5CFC**
		75		HMCP 400A	**ECA2251FAK**	**ECA2252FAK**	**ECA2254FAK**	**ECA2258FAK**	
	230	60		HMCP 250A	**ECA2251FAJ**	**ECA2252FAJ**	**ECA2254FAJ**	**ECA2258FAJ**	
		100		HMCP 400A	**ECA2251FAK**	**ECA2252FAK**	**ECA2254FAK**	**ECA2258FAK**	
	460	125		HMCP 250A	**ECA2251FAJ**	**ECA2252FAJ**	**ECA2254FAJ**	**ECA2258FAJ**	
		200		HMCP 400A	**ECA2251FAK**	**ECA2252FAK**	**ECA2254FAK**	**ECA2258FAK**	
	575	150		HMCP 250A	**ECA2251FAJ**	**ECA2252FAJ**	**ECA2254FAJ**	**ECA2258FAJ**	
		200		HMCP 400A	**ECA2251FAK**	**ECA2252FAK**	**ECA2254FAK**	**ECA2258FAK**	
6	200	150	120 ⑥	HMCP 600A	**ECA2261EAL**	**ECA2262EAL**	**ECA2264EAL**	**ECA2268EAL**	**W200M6CFC**
	230	200		HMCP 600A	**ECA2261BAL**	**ECA2262BAL**	**ECA2264BAL**	**ECA2268BAL**	
	460	350		HMCP 600A	**ECA2261CAL**	**ECA2262CAL**	**ECA2264CAL**	**ECA2268CAL**	
		400		HMCP 1200A	**ECA2261FAP**	**ECA2262FAP**	**ECA2264FAP**	**ECA2268FAP**	
	575	400		HMCP 600A	**ECA2261DAL**	**ECA2262DAL**	**ECA2264DAL**	**ECA2268DAL**	

① All starters provided with coils for separate control.

② Starters for 50 Hz operation use 110V 50 Hz magnet coil. Change 8th character from **F** to **N**.

③ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECA22L**4**FAC. To order Type 4X 316-Grade Stainless Steel, change that digit to **9**. To order Type 4 Painted Steel, change that digit to **3**. To order Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **PG03300001E**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order Mod Code **R5**.

⑤ For motor full load current (FLA) range of .47A – 3.81A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.

⑥ Size 6 includes control power transformer.

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Cover Mounted Control – ACM Series ..... **Page 33-223**
Accessories **PG03300001E**
Modifications ..... **Page 33-42**
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Wiring Diagrams

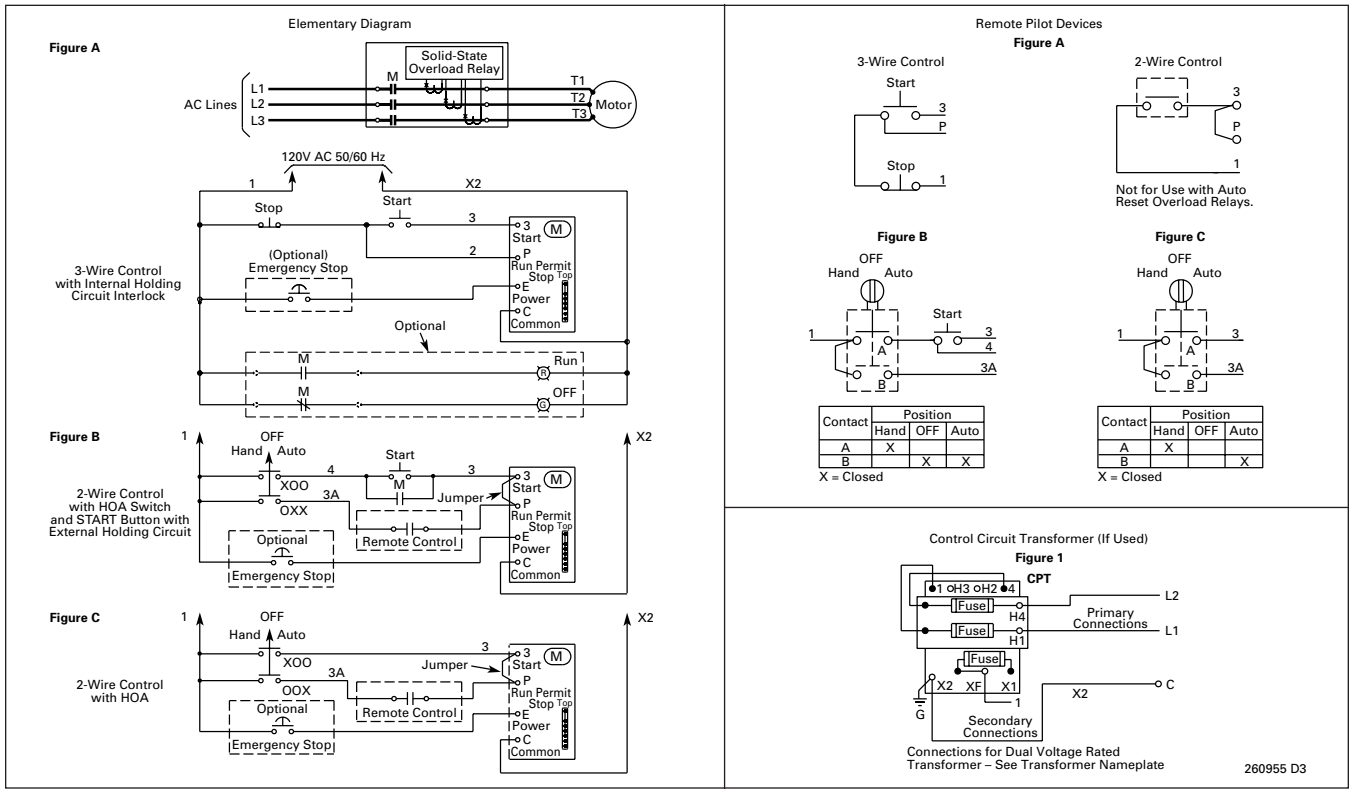


Figure 33-86. Advantage Non-reversing — Non-combination

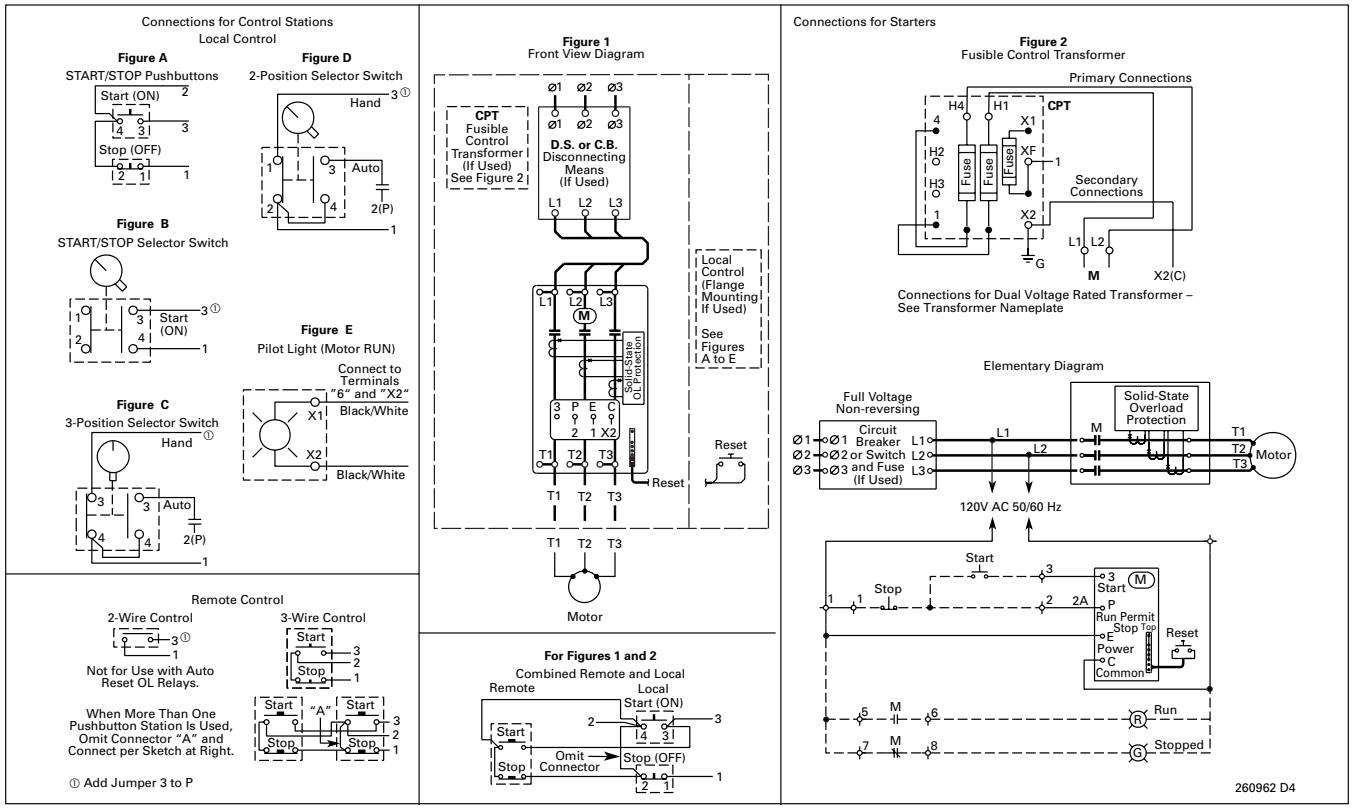


Figure 33-87. Advantage Non-reversing — Combination

For Catalog Numbers A10, A11, A13, A30, A31, A40, A41, A50, A51, A70, A71, A80, A81, B10, B11, B50, B51, B52, C10, C30 and C50 Contactors and Starters

Note: For a complete listing of parts refer to the Renewal Parts Publication Number referenced on the device nameplate.

Table 33-345. Citation Renewal Parts

Description		Size 00					Size 0	
		Series A1 ①	Series B1	Series C1	Series D1/C2	Price U.S. $		
		Part Number	Part Number	Part Number	Part Number		Part Number	Price U.S. $
Set of Contacts								
Part Number on Contactor or Starter Nameplate								
2-Pole without Interlock		6-21	②	②	②		6-22	
3-Pole without Interlock		6-21-2	②	②	②		6-22-2	
3-Pole with Interlock		6-21-3	②	②	②		—	
4-Pole without Interlock		—	—	—	—		6-22-3	
5-Pole without Interlock		—	—	—	—		6-22-4	
Magnet Coils	**Coil Suffix**							
120V 60 Hz or 110V 50 Hz	A	9-1945-1	③	9-2650-1	9-2823-1		9-1887-1	
240V 60 Hz or 220V 50 Hz	B	9-1945-2	③	9-2650-2	9-2823-2		9-1887-2	
480V 60 Hz or 440V 50 Hz	C	9-1945-3	③	9-2650-3	9-2823-3		9-1887-3	
600V 60 Hz or 550V 50 Hz	D	9-1945-4	③	9-2650-4	9-2823-4		9-1887-4	
208V 60 Hz	E	9-1945-5	③	9-2650-5	9-2823-5		9-1887-5	
24V 60 Hz	T	9-1945-8	③	9-2650-7	9-2823-7		9-1887-7	
380V 50 Hz	L	9-1945-6	③	9-2650-6	9-2421-18 ④		9-1887-8	
120/240V 60 Hz or 110/220V 50 Hz	F	—	—	—	—		9-1888-1	
240/480V 60 Hz or 220/440V 50 Hz	G	—	—	—	—		9-1888-2	
277V 60 Hz	H	9-1945-16	③	9-2650-13	9-2823-12		9-1887-16	
208/240V 60 Hz	J	—	—	—	9-2823-17		—	
120V DC	A1	—	—	—	—		9-2024-2	
240V DC	B1	—	—	—	—		9-2024-1	
24V DC	T1	—	—	—	—		9-2024-4	
48V DC	W1	—	—	—	—		9-2024-3	
Replacement Thermal Elements								
Standard Trip Eutectic (12 teeth)		10-4767	10-4767	10-4767	10-4767		10-4767	
Slow Trip Eutectic (24 teeth)		10-5018	10-5018	10-5018	10-5018		10-5018	
Current Transformer		—	—	—	—		—	

① For non-reversing contactors and starters only. For Size 00 reversing, select parts from adjoining size 0 column.
② Replace complete contactor.
③ Obsolete.
④ Non-encapsulated coil.

Discount Symbol **1CD1C**

Table 33-345. Citation Renewal Parts (Continued)

Description		Size 1		Size 2				Size 3			
				Series A1		Series B1		Series A1		Series B1	
		Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $
Set of Contacts											
Part Number on Contactor or Starter Nameplate											
2-Pole without Interlock		6-23		6-24		6-34		6-25		6-35	
3-Pole without Interlock		6-23-2		6-24-2		6-34-2		6-25-2		6-35-2	
3-Pole with Interlock		—		—		—		—		—	
4-Pole without Interlock		6-23-3		—		6-34-3		—		—	
5-Pole without Interlock		6-23-4		—		6-34-4		—		—	
Magnet Coils	**Coil Suffix**										
120V 60 Hz or 110V 50 Hz	A	9-1887-1		9-1889-1		9-2526-1		9-1891-1		9-1889-1	
240V 60 Hz or 220V 50 Hz	B	9-1887-2		9-1889-2		9-2526-2		9-1891-2		9-1889-2	
480V 60 Hz or 440V 50 Hz	C	9-1887-3		9-1889-3		9-2526-3		9-1891-3		9-1889-3	
600V 60 Hz or 550V 50 Hz	D	9-1887-4		9-1889-4		9-2526-4		9-1891-4		9-1889-4	
208V 60 Hz	E	9-1887-5		9-1889-13		9-2526-5		9-1891-13		9-1889-13	
24V 60 Hz	T	9-1887-7		9-1889-20		9-2526-6		9-1891-15		9-1889-20	
380V 50 Hz	L	9-1887-8		9-1889-14		9-2526-7		9-1891-14		9-1889-14	
120/240V 60 Hz or 110/220V 50 Hz	F	—		9-1890-1		—		—		—	
277V 60 Hz	H	9-1887-16		9-1889-31		9-2526-15		9-1891-26		9-1889-31	
120V DC	A1	9-2024-2		9-2025-2		9-2626-2		9-2026-2		9-2025-2	
240V DC	B1	9-2024-1		9-2025-1		9-2626-1		9-2026-1		9-2025-1	
24V DC	T1	9-2024-4		9-2025-4		9-2626-4		9-2026-4		9-2025-4	
48V DC	W1	9-2024-3		9-2025-3		9-2626-3		9-2026-3		9-2025-3	
Replacement Thermal Elements											
Standard Trip Eutectic (12 teeth)		10-4767		10-4767		10-4767		10-4767		10-4767	
Slow Trip Eutectic (24 teeth)		10-5018		10-5018		10-5018		10-5018		10-5018	
Current Transformer		—		—		—		—		—	

Description		Size 4		Size 5		Size 6					
						Series A1		Series B1		Series C1	
		Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $	Part Number	Price U.S. $
Set of Contacts											
Part Number on Contactor or Starter Nameplate											
2-Pole without Interlock		6-36-3 ①		6-27		6-28		—		6-601-2	
3-Pole without Interlock		6-36-4 ①		6-27-2		6-28-2		6-570		6-601	
3-Pole with Interlock		—		—		—		—		—	
4-Pole without Interlock		—		—		—		—		—	
5-Pole without Interlock		—		—		—		—		—	
Magnet Coils	**Coil Suffix**										
120V 60 Hz or 110V 50 Hz	A	9-1891-1		9-1891-1		9-1875-1		9-2651		9-2698	
240V 60 Hz or 220V 50 Hz	B	9-1891-2		9-1891-2		9-1875-2		9-2651-2		9-2698-2	
480V 60 Hz or 440V 50 Hz	C	9-1891-3		9-1891-3		9-1875-3		9-2651-3		9-2698-3	
600V 60 Hz or 550V 50 Hz	D	9-1891-4		9-1891-4		9-1875-4		9-2651-4		9-2698-4	
208V 60 Hz	E	9-1891-13		9-1891-13		9-1875-14		9-2651-6		9-2698-5	
24V 60 Hz	T	9-1891-15		9-1891-15		—		—		—	
380V 50 Hz	L	9-1891-14		9-1891-14		—		9-2651-5		9-2698-6	
120/240V 60 Hz or 110/220V 50 Hz	F	—		—		—		—		—	
240/480V 60 Hz or 220/440V 50 Hz	G	—		—		—		—		—	
277V 60Hz	H	9-1891-26		9-1891-26		—		—		—	
120V DC	A1	9-2026-2		9-2026-2		—		—		—	
240V DC	B1	9-2026-1		9-2026-1		—		—		—	
24V DC	T1	9-2026-4		9-2026-4		—		—		—	
48V DC	W1	9-2026-3		9-2026-3		—		—		—	
Replacement Thermal Elements											
Standard Trip Eutectic (12 teeth)		10-4767		10-4767		10-4767		10-4767		10-4767	
Slow Trip Eutectic (24 teeth)		10-5018		10-5018		—		—		—	
Current Transformer		—		—		—		—		—	

① #Series B1. For Series A1, order 6-26 or 6-26-2.

Discount Symbol **1CD1C**

Table 33-345. Citation Renewal Parts (Continued)

Description		Size 7				Size 8	
		Series A1	Price U.S. $	Series B1	Price U.S. $		
		Part Number		Part Number		Part Number	Price U.S. $
Set of Contacts							
Part Number on Contactor or Starter Nameplate							
2-Pole without Interlock		6-28		—		—	
3-Pole without Interlock		6-28-2		6-570		6-571	
3-Pole with Interlock		—		—		—	
4-Pole without Interlock		—		—		—	
5-Pole without Interlock		—		—		—	
Magnet Coils	**Coil Suffix**						
120V 60 Hz or 110V 50 Hz	A	9-1875-1		9-2651		9-2654	
240V 60 Hz or 220V 50 Hz	B	9-1875-2		9-2651-2		9-2654-2	
480V 60 Hz or 440V 50 Hz	C	9-1875-3		9-2651-3		9-2654-3	
600V 60 Hz or 550V 50 Hz	D	9-1875-4		9-2651-4		9-2654-4	
208V 60 Hz	E	9-1875-14		9-2651-6		9-2654-6	
24V 60 Hz	T	—		—		—	
380V 50 Hz	L	—		9-2651-5		9-2654-5	
120/240V 60 Hz or 110/220V 50 Hz	F	—		—		—	
240/480V 60 Hz or 220/440V 50 Hz	G	—		—		—	
277V 60 Hz	H	—		—		—	
120V DC	A1	—		—		—	
240V DC	B1	—		—		—	
24V DC	T1	—		—		—	
48V DC	W1	—		—		—	
Replacement Thermal Elements							
Standard Trip Eutectic (12 teeth)		10-4767		10-4767		10-4767	
Slow Trip Eutectic (24 teeth)		—		—		—	
Current Transformer		—		—		—	

Discount Symbol **1CD1C**

For Type N Control

Table 33-346. Contact Kits

Poles	NEMA Size	Part Number	Price U.S. $
3	0	**1605226**	
	1	**1605212**	
	2	**1605202**	
	3	**1625563**	
	4	**1625564**	

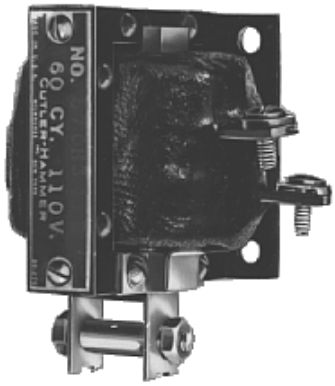
Table 33-347. AC Coils

Voltage	Hz	2-, 3-Pole			4-, 5-Pole		
		Obsolete Part Number	Current Part Number	Price U.S. $	Obsolete Part Number	Current Part Number	Price U.S. $
Size 0, 1 ①							
110	60	1470241	**9969D90G01**		1470261	**9969D90G16**	
110/208/220	25/60/60	1470242	**9969D90G02**		1470262	**9969D90G17**	
220/380/440	25/50/60	1470243	**9969D90G03**		1470263	**9969D90G18**	
550	60	1470244	**9969D90G04**		N/A	**N/A**	
220	50	1470247	**9969D90G06**		N/A	**N/A**	
440	50	1470248	**9969D90G07**		1470268	**9969D90G19**	
440	25	1470250	**9969D90G08**		1470270	**9969D90G21**	
120	60	1605268	**9969D90G09**		N/A	**N/A**	
115/208/230	60/60/60	1605513	**9969D90G15**		N/A	**N/A**	
600	60	1470245	**9969D90G20**		N/A	**N/A**	
550	25	1470251	**9969D90G22**		N/A	**N/A**	
Size 2 ①							
110	60	1470201	**9969D92G01**		1470221	**9969D93G01**	
110/208/220	25/60/60	1470202	**9969D92G02**		1470222	**9969D93G02**	
220/380/440/480	25/50/60/60	1470203	**9969D92G03**		N/A	**N/A**	
550	60	1470204	**9969D92G04**		1470224	**9969D93G10**	
110	50	1470206	**9969D92G05**		1470226	**9969D93G05**	
220	50	1470207	**9969D92G06**		1470227	**9969D93G06**	
440	50	1470208	**9969D92G07**		N/A	**N/A**	
600	60	1470205	**9969D92G08**		1470225	**9969D93G08**	
440	25	1470210	**9969D92G09**		N/A	**N/A**	
120/110	60/50	1605478	**9969D92G10**		N/A	**N/A**	
550	50	1470209	**9969D92G11**		N/A	**N/A**	
415	50	N/A	**N/A**		L1557647	**9969D93G09**	
220/380/440	25/60/60	N/A	**N/A**		1470223	**9969D93G03**	
Size 3 ①							
110	60	1490645	**9969D96G04**		1490645	**9969D96G04**	
110/208/220	25/60/60	1490646	**9969D96G05**		1490646	**9969D96G05**	
220/380/400/440	25/50/50/60	1490647	**9969D96G06**		1490647	**9969D96G06**	
110	50	1490652	**9969D96G08**		1490652	**9969D96G08**	
120/110	60/50	1600770	**9969D96G09**		1600770	**9969D96G09**	
600/500	60/50	1490649	**9969D96G21**		1490649	**9969D96G21**	
600/500/400	60/50/40	1659421	**9969D96G23**		1659421	**9969D96G23**	
220	50	1490653	**9969D93G24**		1490653	**9969D93G24**	
240	60	1490648	**9969D96G29**		1490648	**9969D96G29**	
Size 4							
110	60	1596633	**9969D96G10**		1597723	**9969D96G01**	
110/208/220	25/60/60	1490658	**9969D96G11**		1597724	**9969D96G02**	
110	50	1596636	**9969D96G13**		N/A	**N/A**	
220	50	1596637	**9969D96G14**		N/A	**N/A**	
240	50	1596639	**9969D96G15**		N/A	**N/A**	
600/500	60/50	1596635	**9969D96G16**		1490649	**9969D96G21**	
440	25	1596641	**9969D96G17**		N/A	**N/A**	
600	60	1596634	**9969D96G19**		N/A	**N/A**	
440	60	1490659	**9969D96G12**		N/A	**N/A**	
120/110	60/50	1600771	**9969D96G20**		N/A	**N/A**	
220/380/400/440	25/50/50/60	N/A	**N/A**		1597725	**9969D96G31**	

① Minimum order quantity of 3 required.

Discount Symbol **1CD1C**

Contents



Cat. No. 10370

Product Description

Cutler-Hammer® Solenoids from Eaton's electrical business are used for a wide variety of applications where straight line motion is to be obtained automatically or at a remote point.

Features

- Plunger and frame are machined to ensure quiet operation
- Push- and pull-type operation
- With and without terminal box
- Plunger provided with connecting pin
- Size C and D solenoids are provided with special bearing to minimize wear in clevis under severe service

Product Selection

When Ordering Specify

- Catalog Number

Table 33-348. AC Solenoids — 60 Hz, Continuous Duty

Size	Volt.	Operating Data ①												
		Magnetic Force in Lbs.						Max. Stroke in Inches (mm)	Current		Without Conduit Box			With Conduit Box	
		Horizontal Position		With Gravity		Against Gravity			Inrush	Sealed	Floor Mtg.	Wall Mtg.	Price U.S.$	Mtg. ②	Price U.S.$
		At 100% Voltage	At 85% Voltage	At 100% Voltage	At 85% Voltage	At 100% Voltage	At 85% Voltage				Catalog Number	Catalog Number		Catalog Number	
60 Hertz Pull Type															
A	110	.72	.50	.90	.68	.55	.33	1 (25.4)	1.83	.34	—	**10370H1**		**10370H610**	
	220	.72	.50	.90	.68	.55	.33	1 (25.4)	.92	.17	—	**10370H2**		**10370H611**	
	440	.72	.50	.90	.68	.55	.33	1 (25.4)	.45	.08	—	**10370H3**		**10370H612**	
B	110	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	5.4	.87	**10370H57**	**10370H694**		**10370H69**	
	220	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	2.6	.42	**10370H58**	**10370H696**		**10370H70**	
	440	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	1.29	.20	**10370H59**	**10370H697**		**10370H71**	
C	110	7	5.25	8	6.25	6	4.25	1.25 (31.8)	10.4	1.07	**10370H244**	—		**10370H256**	
	220	7	5.25	8	6.25	6	4.25	1.25 (31.8)	5.2	.52	**10370H245**	—		**10370H257**	
	440	7	5.25	8	6.25	6	4.25	1.25 (31.8)	2.5	.26	**10370H246**	—		**10370H258**	
D	110	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	18	1.58	**10370H356**	**10370H814**		**10370H368**	
	220	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	9.3	.81	**10370H357**	**10370H816**		**10370H369**	
	440	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	4.4	.40	**10370H358**	**10370H817**		**10370H370**	
60 Hertz Push Type															
A	110	.72	.50	.90	.68	.55	.33	1 (25.4)	1.83	.34	—	**10370H13**		**10370H25**	
	220	.72	.50	.90	.68	.55	.33	1 (25.4)	.92	.17	—	**10370H14** ③		**10370H26**	
	440	.72	.50	.90	.68	.55	.33	1 (25.4)	.45	.08	—	**10370H15**		**10370H27**	
B	110	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	5.4	.87	**10370H81**	**10370H708**		**10370H93**	
	220	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	2.6	.42	**10370H82**	**10370H710**		**10370H94**	
	440	4.2	3	4.5	3.3	3.9	2.7	1 (25.4)	1.29	.20	**10370H83**	**10370H711**		**10370H95**	
C	110	7	5.25	8	6.25	6	4.25	1.25 (31.8)	10.4	1.07	**10370H268**	—		**10370H280**	
	220	7	5.25	8	6.25	6	4.25	1.25 (31.8)	5.2	.52	—	**10370H774**		**10370H281**	
	440	7	5.25	8	6.25	6	4.25	1.25 (31.8)	2.5	.26	—	**10370H775**		**10370H282**	
D	110	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	18	1.58	**10370H380**	**10370H828** ③		**10370H392**	
	220	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	9.3	.81	**10370H381**	**10370H830** ③		**10370H393**	
	440	12.4	10	13.65	11.25	11.15	8.75	1.25 (31.8)	4.4	.40	**10370H382**	**10370H831** ③		**10370H394**	

① Mounting of solenoids "with conduit box" — Size A are for wall mounting — Size B, C and D are for floor mounting.
② Recommended selection of solenoids on basis of 85% voltage values.
③ Part numbers are now obsolete.

Discount Symbol **1CD1C**

Dimensions

Table 33-349. Approximate Dimensions in Inches (mm) and Shipping Weights

Size	Push Type						Pull Type					
	Dimensions in Inches (mm)					Ship. Wt. Lbs. (kg)	Dimensions in Inches (mm)					Ship. Wt. Lbs. (kg)
	Wide A	High B ①	Deep C	Mounting D	Mounting E		Wide A	High B ①	Deep C	Mounting D	Mounting E	
Wall Mounted												
A	2.38 (60.5)	3.63 (92.2)	2.25 (57.2)	1.13 (28.7)	1.63 (41.4)	2.0 (.9)	2.38 (60.5)	2.63 (66.8)	2.25 (57.2)	1.13 (28.7)	1.63 (41.4)	2.0 (.9)
B	2.63 (66.8)	4.88 (124.0)	3.00 (76.2)	2.00 (50.8)	2.13 (54.1)	2.5 (1.1)	2.63 (66.8)	3.63 (92.2)	3.00 (76.2)	2.00 (50.8)	2.13 (54.1)	2.5 (1.1)
C	3.00 (76.2)	6.13 (155.7)	4.13 (104.9)	2.38 (60.5)	3.13 (79.5)	5.0 (2.3)	3.00 (76.2)	4.88 (124.0)	4.13 (104.9)	2.38 (60.5)	3.13 (79.5)	5.0 (2.3)
D	4.00 (101.6)	6.13 (155.7)	4.13 (104.9)	2.75 (69.9)	3.13 (79.5)	7.0 (3.2)	4.00 (101.6)	4.88 (124.0)	4.13 (104.9)	2.75 (69.9)	3.13 (79.5)	7.0 (3.2)
Floor Mounted												
B	3.13 (79.5)	4.88 (124.0)	3.00 (76.2)	1.50 (38.1)	2.25 (57.2)	2.5 (1.1)	3.13 (79.5)	3.88 (98.6)	3.00 (76.2)	1.50 (38.1)	2.25 (57.2)	2.5 (1.1)
C	3.50 (88.9)	6.13 (155.7)	3.75 (95.3)	1.75 (44.5)	3.13 (79.5)	5.0 (2.3)	3.50 (88.9)	4.88 (124.0)	3.75 (95.3)	1.75 (44.5)	3.13 (79.5)	5.0 (2.3)
D	3.88 (98.6)	6.13 (155.7)	3.75 (95.3)	2.25 (57.2)	3.13 (79.5)	7.0 (3.2)	3.88 (98.6)	4.88 (124.0)	3.75 (95.3)	2.25 (57.2)	3.13 (79.5)	7.0 (3.2)

① In sealed state.

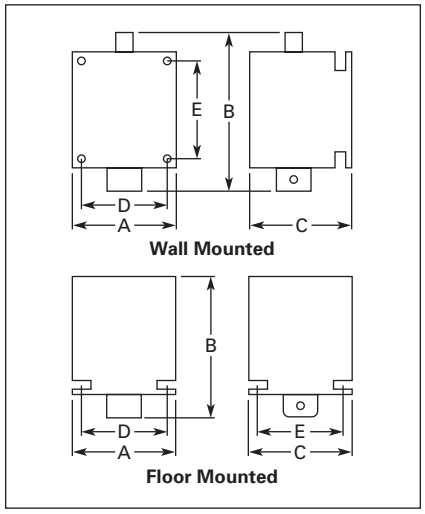
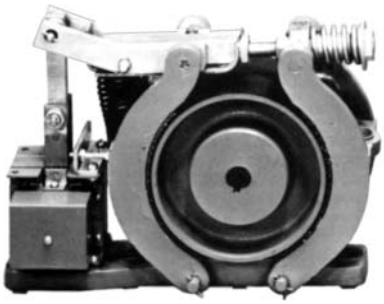


Figure 33-88. Approximate Dimensions

Contents



Size S-7 Brake and Wheel

Product Description

Cutler-Hammer® Type S Brakes from Eaton's electrical business are electrically released and spring applied providing "fail-safe" operation. The retarding torque developed is directly proportional to the spring pressure.

Application Description

- Conveyors
- Machine tools
- Printing presses
- Small cranes
- Overhead doors
- Dumb waiters
- Vacuum molding machines
- Carnival rides

Features

The brake wheel is of relatively large size in relation to the torque developed by the brake. This permits use of a larger brake shoe lining and lower shoe pressures. Low shoe pressure, equally distributed over a large lining area, results in even wear of the friction surfaces and even braking torque. The oversize wheel type construction also permits use of a smaller operating solenoid that requires less current for a given torque rating.

Brake Selection

The method most generally used to determine required braking torque is to calculate the full load motor torque by the following formula:

$$T = \frac{5252 \times hp}{rpm}$$

T = Full load motor torque in lb-ft

hp = Motor horsepower

rpm = Speed of shaft on which brake wheel is mounted

The torque rating of the brake selected should be at least equal to the full load motor torque for the duty considered.

DC Brakes

Standard DC brakes are equipped with shunt coils. The magnet coil circuit on DC brakes consists of two separate windings and a protective switch.

Mounting

Type S brakes are designed and recommended for use and mounting only in the horizontal position. Side or vertical mountings are not recommended because the solenoid loading is altered, resulting in accelerated wear and premature coil failure.

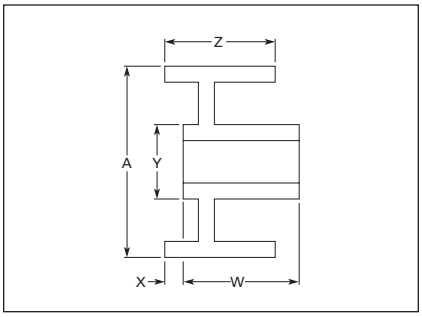


Figure 33-89. Standard Brake Wheels — Approximate Dimensions

Table 33-350. Standard Brake Wheel Dimensions

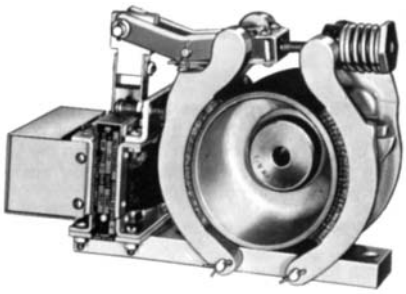
Approximate Dimensions in Inches (mm)					Bore	
A	Z	W ①	X	Y	Max.	Min.
4.00 (101.6)	2.75 (69.9)	1.63 (41.4)	1.38 (35.1)	2.50 (63.5)	1.38 (35.1)	.50 (12.7)
5.50 (139.7)	3.25 (82.6)	2.00 (50.8)	1.63 (41.4)	3.25 (82.6)	2.00 (50.8)	.75 (19.1)
7.00 (177.8)	4.25 (108.0)	3.00 (76.2)	1.25 (31.8)	4.00 (101.6)	2.25 (57.2)	1.00 (25.4)

① Hub lengths other than standard are not available.

Shipping Weights

Table 33-351. Approximate Shipping Weights

Brake Size	Torque Rating ft-lb	Weight in Lbs. (kg)		
		Net — Brake with Wheel	Net — Wheel Only	Boxed — Brake with Wheel
Type "S" AC Shoe Brakes				
S-4	3	15.8 (7.2)	3.4 (1.5)	17.0 (7.7)
S-4	10	15.8 (7.2)	3.4 (1.5)	17.0 (7.7)
S-4	15	15.8 (7.2)	3.4 (1.5)	17.0 (7.7)
S-5-1/2	25	33.2 (15.1)	7.5 (3.4)	36.0 (16.3)
S-5-1/2	35	33.2 (15.1)	7.5 (3.4)	36.0 (16.3)
S-7	50	52.1 (23.7)	18.8 (8.5)	55.0 (25.0)
S-7	75	52.1 (23.7)	18.8 (8.5)	55.0 (25.0)
Type "S" DC Shoe Brakes				
S-4	3	18.0 (8.2)	3.4 (1.5)	20.0 (9.1)
S-4	10	18.0 (8.2)	3.4 (1.5)	20.0 (9.1)
S-4	15	18.0 (8.2)	3.4 (1.5)	20.0 (9.1)
S-5-1/2	25	35.0 (15.9)	7.5 (3.4)	38.0 (17.3)
S-5-1/2	35	35.0 (15.9)	7.5 (3.4)	38.0 (17.3)
S-7	50	54.0 (24.5)	18.8 (8.5)	58.0 (26.3)
S-7	75	54.0 (24.5)	18.8 (8.5)	58.0 (26.3)
S-7	85	54.0 (24.5)	18.8 (8.5)	58.0 (26.3)
S-7	110	54.0 (24.5)	18.8 (8.5)	58.0 (26.3)



Size S-4 Brake and Wheel

Product Selection

When Ordering Specify

- Brake
  - Catalog Number plus Suffix Number for coil
  - Example: 511H1193-**41**
- Wheel
  - Catalog Number plus Suffix Number for bore size
  - Example: 511H1150-**3**

Table 33-352. Type S Brakes — Floor Mounting

Torque — lb-ft		Brake Size	AC				DC			
Continuous	Intermittent ①		Base Catalog Number ②③	Price U.S. $	For Type S4, S5-1/2, S7, S10		Base Catalog Number ②③	Price U.S. $	Coil Voltage	Coil Suffix ②
					Coil Volts and Hertz	Coil Suffix ②				
3	3	S-4	**511H1194**		120V 60 Hz	**-39**	**511H955**		120V DC	**-97**
10	10	S-4	**511H1193**		208V 60 Hz	**-45**	**511H956**		240V DC	**-98**
—	15	S-4	**511H1192**		240V 60 Hz	**-40**	**511H957**			
25	25	S-5-1/2	**511H992**		480V 60 Hz	**-41**	**511H994**			
—	35	S-5-1/2	**511H993**		600V 60 Hz	**-58**	**511H995**			
50	50	S-7	**511H970**		110V 50 Hz	**-5**	**511H975**			
—	75	S-7	**511H971**		220V 50 Hz	**-6**	**511H976**			
85	85	S-7	**511H1195**		380V 50 Hz	**-7**	**511H1197**			
—	110	S-7	**511H1196**		440V 50 Hz	**-8**	**511H1198**			
					550V 50 Hz	**-9**				

① Intermittent duty indicates that the coil can be placed across the line continuously for one hour maximum without excessive heating. It is equivalent to 1/2 time ON and 1/2 time OFF.
② Add Suffix Number for coil voltage to Base Catalog Number.
③ Does not include Wheel.

Discount Symbol **1CD1C**

Table 33-353. Brake Wheels

Wheel Size in Inches	Min. Bore in Inches (mm)	Max. Bore in Inches (mm)	Pilot Bore in Inches (mm)	WK^2	Straight Bore ①			Tapered Bore ②		
					Base ③ Catalog Number	Finished Bore Price U.S. $	Pilot Bore Only Price U.S. $	Base ③ Catalog Number	Finished Bore Price U.S. $	Pilot Bore Only Price U.S. $
4.0	.50 (12.7)	1.38 (35.1)	.50 (12.7)	.06	**511H1150**			**511H1151**		
5.5	.75 (19.1)	2.00 (50.8)	.75 (19.1)	.26	**511H1160**			**511H1161**		
7.0	1.00 (25.4)	2.25 (57.2)	.75 (19.1)	.77	**511H1170**			**511H1171**		

① Bore tolerance: +.000 -.001 inches.
② Taper is at rate of 1.25 inches per foot on diameter. In bore size selection, use diameter of tapered shaft. Bore tolerance: +.000 -.005 inches.
③ Add Suffix Number for bore size to Base Catalog Number.

Table 33-354. Brake Wheel Suffix Numbers

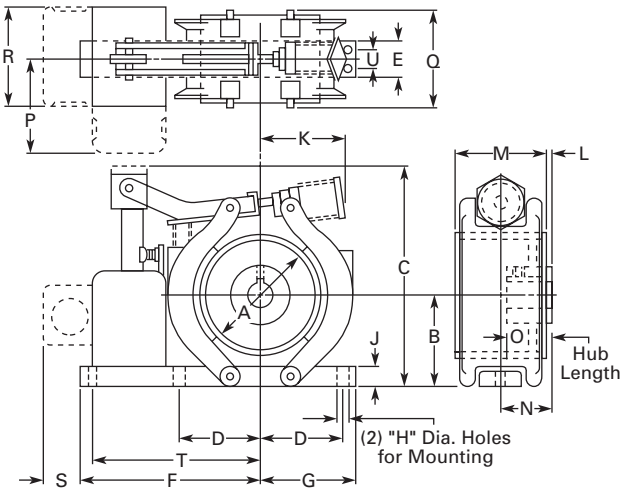
Bore Size Suffix Number — Add to Base Catalog Number					
Bore ④ in Inches (mm)	**Keyway in Inches**	**Suffix Number**	**Bore ④ in Inches (mm)**	**Keyway in Inches (mm)**	**Suffix Number**
Standard Bore Sizes — No Price Addition					
Pilot Bore	None	**-1**	1.625 (41.28)	3/38 x 3/16	**-9**
.625 (15.88)	3/16 x 3/32	**-2**	1.875 (47.63)	1/2 x 1/4	**-10**
.750 (19.05)	3/16 x 3/32	**-3**	2.125 (53.98)	1/2 x 1/4	**-11**
.875 (22.23)	3/16 x 3/32	**-4**	2.375 (60.33)	5/8 x 5/16	**-12**
1.000 (25.40)	1/4 x 1/8	**-5**	2.500 (63.50)	5/8 x 5/16	**-63**
1.125 (28.58)	1/4 x 1/8	**-6**	2.625 (66.68)	5/8 x 5/16	**-13**
1.250 (31.75)	1/4 x 1/8	**-7**	2.750 (69.85)	5/8 x 5/16	**-18**
1.375 (34.93)	5/16 x 5/32	**-8**	2.875 (73.03)	3/4 x 3/8	**-14**
Non-standard Bore Sizes — Make Necessary Price Addition ⑤					
.500 (12.70)	1/8 x 1/16	**-50**	1.687 (42.85)	3/8 x 3/16	**-58**
.750 (19.05)	1/4 x 1/8	**-51**	1.750 (44.45)	3/8 x 3/16	**-59**
.875 (22.23)	1/4 x 1/8	**-52**	1.937 (49.20)	1/2 x 1/4	**-60**
1.000 (25.40)	5/16 x 5/32	**-53**	2.000 (50.80)	1/2 x 1/4	**-61**
1.187 (30.15)	1/4 x 1/8	**-54**	2.250 (57.15)	1/2 x 1/4	**-62**
1.375 (34.93)	3/8 x 3/16	**-55**	—	—	**—**
1.437 (36.50)	3/8 x 3/16	**-56**	—	—	**—**
1.500 (38.10)	3/8 x 3/16	**-57**	—	—	**—**

④ Bore size selected must be between minimum and maximum dimensions listed in brake wheel selection table.
⑤ Price Additions

Description	Adder U.S. $
4.0 Inch (101.6 mm) 5.5 Inch (139.7 mm) 7.0 Inch (177.8 mm)	

Discount Symbol **1CD1C**

Dimensions



Types S4, S5-1/2, and S7
Solenoid Operated

Figure 33-90. Approximate Dimensions in Inches (mm)

Table 33-355. Approximate Dimensions

Brake Size	Torque Rating ft-lb	Dimensions in Inches (mm)																
		A	B ①	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R
Type "S" AC Shoe Brakes																		
S-4	3	4.00 (101.6)	2.88 (73.2)	7.50 (190.5)	2.63 (66.8)	1.25 (31.8)	7.50 (190.5)	3.13 (79.5)	.38 (9.7)	.63 (16.0)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.88 (73.2)	3.00 (76.2)	3.13 (79.5)
S-4	10	4.00 (101.6)	2.88 (73.2)	7.50 (190.5)	2.63 (66.8)	1.25 (31.8)	7.50 (190.5)	3.13 (79.5)	.38 (9.7)	.63 (16.0)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.88 (73.2)	3.00 (76.2)	3.13 (79.5)
S-4	15	4.00 (101.6)	2.88 (73.2)	7.50 (190.5)	2.63 (66.8)	1.25 (31.8)	7.50 (190.5)	3.13 (79.5)	.38 (9.7)	.63 (16.0)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.88 (73.2)	3.00 (76.2)	3.13 (79.5)
S-5-1/2	25	5.50 (139.7)	4.00 (101.6)	9.50 (241.3)	3.50 (88.9)	2.00 (50.8)	8.38 (212.9)	4.13 (104.9)	.44 (11.2)	1.00 (25.4)	4.88 (124.0)	.38 (9.7)	3.25 (82.6)	2.00 (50.8)	2.00 (50.8)	3.13 (79.5)	3.75 (95.3)	3.13 (79.5)
S-5-1/2	35	5.50 (139.7)	4.00 (101.6)	9.50 (241.3)	3.50 (88.9)	2.00 (50.8)	8.38 (212.9)	4.13 (104.9)	.44 (11.2)	1.00 (25.4)	7.88 (200.2)	.38 (9.7)	3.25 (82.6)	2.00 (50.8)	2.00 (50.8)	3.13 (79.5)	3.75 (95.3)	3.13 (79.5)
S-7	50	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	1.00 (25.4)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	3.13 (79.5)	4.75 (120.7)	3.13 (79.5)
S-7	75	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	1.00 (25.4)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	3.13 (79.5)	4.75 (120.7)	3.13 (79.5)
Type "S" DC Shoe Brakes																		
S-4	3	4.00 (101.6)	3.50 (88.9)	8.00 (203.2)	2.63 (66.8)	1.25 (31.8)	7.56 (192.0)	3.25 (82.6)	.38 (9.7)	.75 (19.1)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.63 (66.8)	3.00 (76.2)	4.06 (103.1)
S-4	10	4.00 (101.6)	3.50 (88.9)	8.00 (203.2)	2.63 (66.8)	1.25 (31.8)	7.56 (192.0)	3.25 (82.6)	.38 (9.7)	.75 (19.1)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.63 (66.8)	3.00 (76.2)	4.06 (103.1)
S-4	15	4.00 (101.6)	3.50 (88.9)	8.00 (203.2)	2.63 (66.8)	1.25 (31.8)	7.56 (192.0)	3.25 (82.6)	.38 (9.7)	.75 (19.1)	2.88 (73.2)	.25 (6.4)	2.75 (69.9)	1.63 (41.4)	1.63 (41.4)	2.63 (66.8)	3.00 (76.2)	4.06 (103.1)
S-5-1/2	25	5.50 (139.7)	4.00 (101.6)	9.50 (241.3)	3.50 (88.9)	2.00 (50.8)	8.38 (212.9)	4.13 (104.9)	.44 (11.2)	.75 (19.1)	4.88 (124.0)	.38 (9.7)	3.25 (82.6)	2.00 (50.8)	2.00 (50.8)	2.88 (73.2)	3.75 (95.3)	4.06 (103.1)
S-5-1/2	35	5.50 (139.7)	4.00 (101.6)	9.50 (241.3)	3.50 (88.9)	2.00 (50.8)	8.38 (212.9)	4.13 (104.9)	.44 (11.2)	.75 (19.1)	4.88 (124.0)	.38 (9.7)	3.25 (82.6)	2.00 (50.8)	2.00 (50.8)	2.88 (73.2)	3.75 (95.3)	4.06 (103.1)
S-7	50	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	.75 (19.1)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	2.88 (73.2)	4.88 (124.0)	4.06 (103.1)
S-7	75	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	.75 (19.1)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	2.88 (73.2)	4.88 (124.0)	4.06 (103.1)
S-7	85	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	.75 (19.1)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	2.88 (73.2)	4.88 (124.0)	4.06 (103.1)
S-7	110	7.00 (177.8)	5.00 (127.0)	11.50 (292.1)	4.38 (111.3)	2.50 (63.5)	9.50 (241.3)	5.00 (127.0)	.56 (14.2)	.75 (19.1)	6.00 (152.4)	—	4.25 (108.0)	2.13 (54.1)	3.00 (76.2)	2.88 (73.2)	4.88 (124.0)	4.06 (103.1)

① Open type brake only.

IEC Utilization Categories

(See also IEC/EN 60947-1; 2.1.18/IEV 441-17-19)

A combination of specified requirements relating to the condition in which the switching device or fuse fulfills its purpose and selected to represent a characteristic group of real-life applications. The specified requirements may, for example, relate to the values of making and breaking capacity and other characteristic values, data concerning associated circuits and the applicable conditions of use and operational behavior.

Table 33-356. Used in Technical Data & Formulas

Code	Descriptions
DF	Duty factory
$I_{\Delta n}$	Response value of earth-fault release
I_{cm}	Rated short-circuit making capacity
I_{cn}	Rated short-circuit breaking capacity
I_{cs}	Rated service short-circuit breaking capacity
I_{cu}	Rated ultimate short-circuit breaking capacity
I_{cw}	Rated short-time withstand current
I_e	Rated operational current
I_k	Transformer initial short-circuit AC current
I_L	Load monitoring response value
I_n	Rated current
I_{NT}	Transformer rated current
I_{PK}	Rated peak withstand current
I_q	Rated conditional short-circuit current
I_r	Overcurrent release set value
I_{rm}	Response value of non-delayed short-circuit release
I_i	Response value of non-delayed short-circuit release
I_{rmf}	Response value of fixed, non-delayed short-circuit release

Code	Descriptions
I_{rmv}	Response value of short-time delayed short-circuit release
I_{sd}	Response value of short-time delayed short-circuit release
I_T	Response value of earth-fault release
I_g	Response value of earth-fault release
I_{th}	Conventional free air thermal current
I_{the}	Conventional thermal current of enclosed devices
I_u	Rated uninterrupted current
S_{NT}	Transformer rating
t_r	Time delay of overload release response
t_T	Time delay of earth-fault release response
t_g	Time delay of earth-fault release response
t_v	Time delay of short-circuit release response
U_c	Rated actuating voltage
U_e	Rated operational voltage
U_i	Rated insulation voltage
U_{imp}	Rated impulse withstand voltage
U_k	Transformer short-circuit voltage
U_s	Rated control voltage

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Annex A (informative)

Table 33-357. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear ①

Category	Typical Applications	Relevant IEC Product Standard
Nature of Current — AC		
AC-1	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-1
AC-2	Slip-ring motors: starting, switching off	60947-4-1
AC-3	Squirrel-cage motors: starting, switching off motors during running	60947-4-1
AC-4	Squirrel-cage motors: starting, plugging ②, inching ③	60947-4-1
AC-5a	Switching of electric discharge lamp controls	60947-4-1
AC-5b	Switching of incandescent lamps	60947-4-1
AC-6a	Switching of transformers	60947-4-1
AC-6b	Switching of capacitor banks	60947-4-1
AC-7a	Slightly inductive loads for household appliances and similar applications	61095
AC-7b	Motor-loads for household applications	61095
AC-8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases	60947-4-1
AC-8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases	60947-4-1
AC-12	Control of resistive loads and solid-state loads with isolation by optocouplers	60947-5-1
AC-12	Control of resistive loads and solid-state loads with optical isolation	60947-5-2
AC-13	Control of solid-state loads with transformer isolation	60947-5-1
AC-14	Control of small electromagnetic loads	60947-5-1
AC-15	Control of AC electromagnetic loads	60947-5-1
AC-20	Connecting and disconnecting under no-load conditions	60947-3
AC-21	Switching of resistive loads, including moderate overloads	60947-3
AC-22	Switching of mixed resistive and inductive loads, including moderate overloads	60947-3
AC-23	Switching of motor loads or other highly inductive loads	60947-3

① 60947-1 © IEC: 2004.
② By plugging is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.
③ By inching (jogging) is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Annex A (informative)

Table 33-357. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear ① (Continued)

Category	Typical Applications	Relevant IEC Product Standard
Nature of Current — AC (Continued)		
AC-31	Non inductive or slightly inductive loads	60947-6-1
AC-33	Motor loads or mixed loads including motors, resistive loads and up to 30% incandescent lamp loads	60947-6-1
AC-35	Electric discharge lamp loads	60947-6-1
AC-36	Incandescent lamp loads	60947-6-1
AC-40	Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance	60947-6-2
AC-41	Non-inductive or slightly inductive loads, resistance furnaces	60947-6-2
AC-42	Slip-ring motors: starting, switching off	60947-6-2
AC-43	Squirrel-cage motors: starting, switching off motors during running	60947-6-2
AC-44	Squirrel-cage motors: starting, plugging ②, inching ③	60947-6-2
AC-45a	Switching of electric discharge lamp controls	60947-6-2
AC-45b	Switching of incandescent lamps	60947-6-2
AC-51	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-3
AC-52a	Control of slip ring motor stators: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-52b	Control of slip ring motor stators: intermittent duty	60947-4-2
AC-53a	Control of squirrel-cage motors: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-53b	Control of squirrel-cage motors: intermittent duty	60947-4-2
AC-55a	Switching of electric discharge lamp controls	60947-4-3
AC-55b	Switching of incandescent lamps	60947-4-3
AC-56a	Switching of transformers	60947-4-3
AC-56b	Switching of capacitor banks	60947-4-3
AC-58a	Control of hermetic refrigerant compressor motors with automatic resetting of overload releases: 8 h duty with on-load currents for start, acceleration, run	60947-4-2
AC-58b	Control of hermetic refrigerant compressor motors with automatic resetting of overload releases: intermittent duty	60947-4-2
AC-140	Control of small electromagnetic loads with holding (closed) current ≤ 0,2 A, e.g. contactor relays	60947-5-2
Nature of Current — AC and DC		
A	Protection of circuits, with no rated short-time withstand current	60947-2
B	Protection of circuits, with a rated short-time withstand current	60947-2
Nature of Current — DC		
DC-1	Non-inductive or slightly inductive loads, resistance furnaces	60947-4-1
DC-3	Shunt-motors: starting, plugging ②, inching ③, Dynamic breaking of motors	60947-4-1
DC-5	Series-motors: starting, plugging ②, inching ③, Dynamic breaking of motors	60947-4-1
DC-6	Switching of incandescent lamps	60947-4-1
DC-12	Control of resistive loads and solid-state loads with isolation by optocouplers	60947-5-1
DC-12	Control of resistive loads and solid-state loads with optical isolation	60947-5-2
DC-13	Control of electromagnets	60947-5-1
DC-13	Control of electromagnets	60947-5-2
DC-14	Control of electromagnetic loads having economy resistors in circuit	60947-5-1
DC-20	Connecting and disconnecting under no-load conditions	60947-3
DC-21	Switching of resistive loads, including moderate overloads	60947-3
DC-22	Switching of mixed resistive and inductive loads, including moderate overloads (e.g. shunt motors)	60947-3
DC-23	Switching of motor loads or other highly inductive loads (e.g. series motors)	60947-3
DC-31	Resistive loads	60947-6-1
DC-33	Motor loads or mixed loads including motors	60947-6-1
DC-36	Incandescent lamp loads	60947-6-1
DC-40	Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance	60947-6-2
DC-41	Non-inductive or slightly inductive loads, resistance furnaces	60947-6-2
DC-43	Shunt-motors: starting, plugging ②, inching ③, Dynamic breaking of DC	60947-6-2
DC-45	Series-motors: starting, plugging ②, inching ③, Dynamic breaking of DC	60947-6-2
DC-46	Switching of incandescent lamps	60947-6-2

① 60947-1 © IEC: 2004.
② By plugging is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.
③ By inching (jogging) is understood energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Motor Ratings Data

Ampere Rating of AC and DC Motors

Ampere ratings of motors vary somewhat, depending upon the type of motor. The values given below are for drip-proof, Class B insulated (T Frame) where available, 1.15 service factor, NEMA Design B motors. These values represent an average full load motor current which was calculated from the motor performance data published by several motor manufacturers. In the case of high torque squirrel cage motors, the ampere ratings will be at least 10% greater than the values given below.

Caution — These average ratings could be high or low for a specific motor and therefore heater coil selection on this basis always involves risk. For fully reliable motor protection, select heater coils on the basis of full load current rating as shown on the motor nameplate.

Table 33-358. Ampere Ratings of Three-Phase, 60 Hz, AC Induction Motor

hp	Syn. Speed RPM	Current in Amperes					
		200V	230V	380V ①	460V	575V	2200V
1/4	1800	1.09	.95	.55	.48	.38	—
	1200	1.61	1.40	.81	.70	.56	—
	900	1.84	1.60	.93	.80	.64	—
1/3	1800	1.37	1.19	.69	.60	.48	—
	1200	1.83	1.59	.92	.80	.64	—
	900	2.07	1.80	1.04	.90	.72	—
1/2	1800	1.98	1.72	.99	.86	.69	—
	1200	2.47	2.15	1.24	1.08	.86	—
	900	2.74	2.38	1.38	1.19	.95	—
3/4	1800	2.83	2.46	1.42	1.23	.98	—
	1200	3.36	2.92	1.69	1.46	1.17	—
	900	3.75	3.26	1.88	1.63	1.30	—
1	3600	3.22	2.80	1.70	1.40	1.12	—
	1800	4.09	3.56	2.06	1.78	1.42	—
	1200	4.32	3.76	2.28	1.88	1.50	—
	900	4.95	4.30	2.60	2.15	1.72	—
1-1/2	3600	5.01	4.36	2.64	2.18	1.74	—
	1800	5.59	4.86	2.94	2.43	1.94	—
	1200	6.07	5.28	3.20	2.64	2.11	—
	900	6.44	5.60	3.39	2.80	2.24	—
2	3600	6.44	5.60	3.39	2.80	2.24	—
	1800	7.36	6.40	3.87	3.20	2.56	—
	1200	7.87	6.84	4.14	3.42	2.74	—
	900	9.09	7.90	4.77	3.95	3.16	—
3	3600	9.59	8.34	5.02	4.17	3.34	—
	1800	10.8	9.40	5.70	4.70	3.76	—
	1200	11.7	10.2	6.20	5.12	4.10	—
	900	13.1	11.4	6.90	5.70	4.55	—
5	3600	15.5	13.5	8.20	6.76	5.41	—
	1800	16.6	14.4	8.74	7.21	5.78	—
	1200	18.2	15.8	9.59	7.91	6.32	—
	900	18.3	15.9	9.60	7.92	6.33	—
7-1/2	3600	22.4	19.5	11.8	9.79	7.81	—
	1800	24.7	21.5	13.0	10.7	8.55	—
	1200	25.1	21.8	13.2	10.9	8.70	—
	900	26.5	23.0	13.9	11.5	9.19	—
10	3600	29.2	25.4	15.4	12.7	10.1	—
	1800	30.8	26.8	16.3	13.4	10.7	—
	1200	32.2	28.0	16.9	14.0	11.2	—
	900	35.1	30.5	18.5	15.2	12.2	—
15	3600	41.9	36.4	22.0	18.2	14.5	—
	1800	45.1	39.2	23.7	19.6	15.7	—
	1200	47.6	41.4	25.0	20.7	16.5	—
	900	51.2	44.5	26.9	22.2	17.8	—
20	3600	58.0	50.4	30.5	25.2	20.1	—
	1800	58.9	51.2	31.0	25.6	20.5	—
	1200	60.7	52.8	31.9	26.4	21.1	—
	900	63.1	54.9	33.2	27.4	21.9	—
25	3600	69.9	60.8	36.8	30.4	24.3	—
	1800	74.5	64.8	39.2	32.4	25.9	—
	1200	75.4	65.6	39.6	32.8	26.2	—
	900	77.4	67.3	40.7	33.7	27.0	—
30	3600	84.8	73.7	44.4	36.8	29.4	—
	1800	86.9	75.6	45.7	37.8	30.2	—
	1200	90.6	78.8	47.6	39.4	31.5	—
	900	94.1	81.8	49.5	40.9	32.7	—
40	3600	111	96.4	58.2	48.2	38.5	—
	1800	116	101	61.0	50.4	40.3	—
	1200	117	102	61.2	50.6	40.4	—
	900	121	105	63.2	52.2	41.7	—
50	3600	138	120	72.9	60.1	48.2	—
	1800	143	124	75.2	62.2	49.7	—
	1200	145	126	76.2	63.0	50.4	—
	900	150	130	78.5	65.0	52.0	—
60	3600	164	143	86.8	71.7	57.3	—
	1800	171	140	90.0	74.5	59.4	—
	1200	173	150	91.0	75.0	60.0	—
	900	177	154	93.1	77.0	61.5	—
75	3600	206	179	108	89.6	71.7	—
	1800	210	183	111	91.6	73.2	—
	1200	212	184	112	92.0	73.5	—
	900	222	193	117	96.5	77.5	—
100	3600	266	231	140	115	92.2	—
	1800	271	236	144	118	94.8	23.6
	1200	275	239	145	120	95.6	24.2
	900	290	252	153	126	101	24.8
125	3600	—	292	176	146	116	—
	1800	—	293	177	147	117	29.2
	1200	—	298	180	149	119	29.9
	900	—	305	186	153	122	30.9
150	3600	—	343	208	171	137	—
	1800	—	348	210	174	139	34.8
	1200	—	350	210	174	139	35.5
	900	—	365	211	183	146	37.0
200	3600	—	452	257	226	181	—
	1800	—	458	265	229	184	46.7
	1200	—	460	266	230	184	47.0
	900	—	482	279	241	193	49.4
250	3600	—	559	338	279	223	—
	1800	—	568	343	284	227	57.5
	1200	—	573	345	287	229	58.5
	900	—	600	347	300	240	60.5
300	1800	—	678	392	339	271	69.0
	1200	—	684	395	342	274	70.0
400	1800	—	896	518	448	358	91.8
500	1800	—	1110	642	555	444	116

① 380V 50 Hz.

Single-Phase AC Motors

Table 430.248. **Full-Load Currents in Amperes, Single-Phase Alternating-Current Motors**

The following values of full-load currents are for motors running at usual speeds and motors with normal torque characteristics. Motors built for especially low speeds or high torques may have higher full-load currents and multispeed motors will have full-load current varying with speed, in which case the nameplate current ratings shall be used.

The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120 and 220 to 240V.

hp	115V	200V	208V	230V
1/6	4.4	2.5	2.4	2.2
1/4	5.8	3.3	3.2	2.9
1/3	7.2	4.1	4.0	3.6
1/2	9.8	5.6	5.4	4.9
3/4	13.8	7.9	7.6	6.9
1	16	9.2	8.8	8
1-1/2	20	11.5	11	10
2	24	13.8	13.2	12
3	34	19.6	18.7	17
5	56	32.2	30.8	28
7-1/2	80	46	44	40
10	100	57.5	55	50

Three-Phase AC Motors

The following values of full-load currents are typical for motors running at speeds usual for belted motors and motors with normal torque characteristics.

Motors built for low speeds (1,200 RPM or less) or high torques may require more running current and multispeed motors will have full-load current varying with speed. In these cases the nameplate current rating shall be used.

The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480 and 550 to 600V.

DC Motors

Table 430.247. **Full-Load Current in Amperes, Direct-Current Motors**

The following values of full-load currents are for motors running at base speed.

Note: These are average direct-current quantities.

hp	Armature Voltage Rating ①		Ampere Capacity of Fuses for Motors	
			Recommended Values	
	120V	240V	120V	240V
1/4	3.1	1.6	5	3
1/3	4.1	2.0	5	3
1/2	5.4	2.7	7	3
3/4	7.6	3.8	10	5
1	9.5	4.7	15	7
1-1/2	13.2	6.6	20	10
2	17	8.5	25	12
3	25	12.2	30	15
5	40	20	50	25
7-1/2	58	29	80	40
10	76	38	100	50
15	—	55	—	75
20	—	72	—	100
25	—	89	—	125
30	—	106	—	150
40	—	140	—	200
50	—	173	—	250
60	—	206	—	275
75	—	255	—	350
100	—	341	—	500
125	—	425	—	600
150	—	506	—	—
200	—	675	—	—

① These are average direct-current quantities.

Table 430.250. **Full-Load Current Three-Phase Alternating-Current Motors**

hp	Induction Type Squirrel-Cage and Wound-Rotor Amperes							Synchronous Type Unity Power Factor ② Amperes			
	115V	200V	208V	230V	460V	575V	2300V	230V	460V	575V	2300V
1/2	4.4	2.5	2.4	2.2	1.1	.9	—	—	—	—	—
3/4	6.4	3.7	3.5	3.2	1.6	1.3	—	—	—	—	—
1	8.4	4.8	4.6	4.2	2.1	1.7	—	—	—	—	—
1-1/2	12.0	6.9	6.6	6.0	3.0	2.4	—	—	—	—	—
2	13.6	7.8	7.5	6.8	3.4	2.7	—	—	—	—	—
3	—	11.0	10.6	9.6	4.8	3.9	—	—	—	—	—
5	—	17.5	16.7	15.2	7.6	6.1	—	—	—	—	—
7-1/2	—	25.3	24.2	22	11	9	—	—	—	—	—
10	—	32.2	30.8	28	14	11	—	—	—	—	—
15	—	48.3	46.2	42	21	17	—	—	—	—	—
20	—	62.1	59.4	54	27	22	—	—	—	—	—
25	—	78.2	74.8	68	34	27	—	53	26	21	—
30	—	92	88	80	40	32	—	63	32	26	—
40	—	120	114	104	52	41	—	83	41	33	—
50	—	150	143	130	65	52	—	104	52	42	—
60	—	177	169	154	77	62	16	123	61	49	12
75	—	221	211	192	96	77	20	155	78	62	15
100	—	285	273	248	124	99	26	202	101	81	20
125	—	359	343	312	156	125	31	253	126	101	25
150	—	414	396	360	180	144	37	302	151	121	30
200	—	552	528	480	240	192	49	400	201	161	40
250	—	—	—	—	302	242	60	—	—	—	—
300	—	—	—	—	361	289	72	—	—	—	—
350	—	—	—	—	414	336	83	—	—	—	—
400	—	—	—	—	477	382	95	—	—	—	—
450	—	—	—	—	515	412	103	—	—	—	—
500	—	—	—	—	590	472	118	—	—	—	—

② For 90 and 80 percent power factor, the above figures shall be multiplied by 1.1 and 1.25 respectively.