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Product Family Overview

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
Catalogue Number Selection (Open Components)

Table A-1. IT. Electro-Mechanical Catalogue Numbering System

<table>
<thead>
<tr>
<th>Standard</th>
<th>N  =  NEMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Width</td>
<td></td>
</tr>
<tr>
<td>B  =  45 mm</td>
<td></td>
</tr>
<tr>
<td>C  =  54 mm</td>
<td></td>
</tr>
<tr>
<td>D  =  76 mm</td>
<td></td>
</tr>
<tr>
<td>E  =  105 mm</td>
<td></td>
</tr>
<tr>
<td>F  =  140 mm</td>
<td></td>
</tr>
<tr>
<td>Designator (NEMA)</td>
<td></td>
</tr>
<tr>
<td>S0  =  Size 0</td>
<td></td>
</tr>
<tr>
<td>S1  =  Size 1</td>
<td></td>
</tr>
<tr>
<td>S2  =  Size 2</td>
<td></td>
</tr>
<tr>
<td>S3  =  Size 3</td>
<td></td>
</tr>
<tr>
<td>S4  =  Size 4</td>
<td></td>
</tr>
<tr>
<td>S5  =  Size 5</td>
<td></td>
</tr>
<tr>
<td>XC  =  Coil Controller</td>
<td></td>
</tr>
<tr>
<td>XR  =  Overload</td>
<td></td>
</tr>
<tr>
<td>Overload Type</td>
<td></td>
</tr>
<tr>
<td>A  =  Standard</td>
<td></td>
</tr>
<tr>
<td>N  =  Contact Block</td>
<td></td>
</tr>
<tr>
<td>Pole Selection</td>
<td></td>
</tr>
<tr>
<td>3  =  3-Pole</td>
<td></td>
</tr>
<tr>
<td>Overload Full Amperes Adjustment</td>
<td></td>
</tr>
<tr>
<td>(45 mm)</td>
<td></td>
</tr>
<tr>
<td>A  =  .25 – .8</td>
<td></td>
</tr>
<tr>
<td>B  =  .59 – 1.9</td>
<td></td>
</tr>
<tr>
<td>C  =  1.4 – 4.4</td>
<td></td>
</tr>
<tr>
<td>D  =  2.8 – 9.0</td>
<td></td>
</tr>
<tr>
<td>G  =  6.3 – 20</td>
<td></td>
</tr>
<tr>
<td>J  =  10 – 32</td>
<td></td>
</tr>
<tr>
<td>(54 mm)</td>
<td></td>
</tr>
<tr>
<td>A  =  .25 – .8</td>
<td></td>
</tr>
<tr>
<td>B  =  .59 – 1.9</td>
<td></td>
</tr>
<tr>
<td>C  =  1.4 – 4.4</td>
<td></td>
</tr>
<tr>
<td>D  =  2.8 – 9.0</td>
<td></td>
</tr>
<tr>
<td>F  =  5.0 – 16</td>
<td></td>
</tr>
<tr>
<td>H  =  8.4 – 27</td>
<td></td>
</tr>
<tr>
<td>L  =  16 – 50</td>
<td></td>
</tr>
<tr>
<td>(76 mm)</td>
<td></td>
</tr>
<tr>
<td>A  =  .25 – .8</td>
<td></td>
</tr>
<tr>
<td>B  =  5.0 – 16</td>
<td></td>
</tr>
<tr>
<td>C  =  6.3 – 20</td>
<td></td>
</tr>
<tr>
<td>G  =  10 – 32</td>
<td></td>
</tr>
<tr>
<td>J  =  30 – 100</td>
<td></td>
</tr>
<tr>
<td>(105 mm)</td>
<td></td>
</tr>
<tr>
<td>K  =  14 – 45</td>
<td></td>
</tr>
<tr>
<td>M  =  28 – 90</td>
<td></td>
</tr>
<tr>
<td>P  =  42 – 135</td>
<td></td>
</tr>
<tr>
<td>R  =  63 – 200</td>
<td></td>
</tr>
<tr>
<td>(140 mm)</td>
<td></td>
</tr>
<tr>
<td>K  =  14 – 45</td>
<td></td>
</tr>
<tr>
<td>M  =  28 – 90</td>
<td></td>
</tr>
<tr>
<td>P  =  42 – 135</td>
<td></td>
</tr>
<tr>
<td>S  =  84 – 270</td>
<td></td>
</tr>
<tr>
<td>T  =  131 – 420</td>
<td></td>
</tr>
<tr>
<td>X  =  Contact Block, Coil Controller, Contact Block or Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>

Note: When using the Catalogue Numbering System for Eaton's Cutler-Hammer IT. Electro-Mechanical products, care should be exercised to assure that the Catalogue 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
- N111FSSX3N — Full Voltage Non-reversing, Size 5 Starter
- NS01DSXK3A — Full Voltage Reversing Starter with a 14 – 45 amp overload range
- N02NCXCNXN — Coil Controller 54 mm
- N04NBSAX3N — Contact Block Size 00
NEMA Contactors & Starters

IT. Electro-Mechanical

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 inter-lock 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 A-2. Full Voltage 3-Pole DC-Operated Non-reversing Contactors

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Max. UL Horsepower (hp) 60 Hz</th>
<th>Max. UL Horsepower (hp) 50 Hz</th>
<th>3-Pole Non-reversing</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9</td>
<td>1/3</td>
<td>1</td>
<td>1-1/2</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3</td>
<td>7-1/2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>7-1/2</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>—</td>
<td>—</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>—</td>
<td>—</td>
<td>75</td>
</tr>
</tbody>
</table>

1 24V DC coil voltage.

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

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

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.

Table A-3. Full Voltage 3-Pole DC-Operated Reversing Contactors

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Max. UL Horsepower (hp) 60 Hz</th>
<th>Max. UL Horsepower (hp) 50 Hz</th>
<th>3-Pole Reversing</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9</td>
<td>1/3</td>
<td>1</td>
<td>1-1/2</td>
<td>N511BSAX3N</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>N511BS0X3N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>N511CS1X3N</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3</td>
<td>7-1/2</td>
<td>10</td>
<td>N511DS2X3N</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>7-1/2</td>
<td>15</td>
<td>25</td>
<td>N511FS3X3N</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>136</td>
<td>—</td>
<td>40</td>
<td>75</td>
<td>N511FS4X3N</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>—</td>
<td>75</td>
<td>200</td>
<td>N511FS5X3N</td>
<td></td>
</tr>
</tbody>
</table>

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

IT. Electro-Mechanical

Starters — Full Voltage, Non-reversing and Reversing

Contents
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  Catalogue Number Selection . . . . . A-3
Starters — Non-reversing and Reversing
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  Features . . . . . . . . . . . . . . A-7
  Product Selection . . . . . A-8
Technical Data and Specifications . . . . . A-10
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Auxiliary Contacts . . . . . A-15
Renewal Parts . . . . . . . . . . . . . . A-17
Dimensions . . . . . . . . . . . . . . A-22

Product Description
The Cutler-Hammer® Intelligent Technologies (IT) Electro-Mechanical Starter from Eaton’s electrical business consists of an IT Electrical-Mechanical Contact Block or Contactor and IT Electrical-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

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.

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Overload Adjustment Range (Ampères)</th>
<th>Max. UL Horsepower (hp) 60 Hz</th>
<th>Max. UL Horsepower (hp) 50 Hz</th>
<th>3-Pole Non-reversing</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9</td>
<td>25 – 8 59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20</td>
<td>— — 1-1/2 1-1/2 2 2 1-1/2</td>
<td>— — 3 3 5 5 5</td>
<td>N101BSAA3A N101BSAB3A N101BSAC3A N101BSAD3A N101BSAG3A</td>
</tr>
<tr>
<td>01</td>
<td>18</td>
<td>25 – 8 59 – 1.9 1.4 – 4.4 2.8 – 9.0 6.3 – 20 10 – 32</td>
<td>— — 3 3 5 5 5</td>
<td>— — 7-1/2 7-1/2 10 10 10</td>
<td>N101CS1A3A N101CS1B3A N101CS1C3A N101CS1D3A N101CS1F3A N101CS1H3A N101CS1L3A</td>
</tr>
<tr>
<td>02</td>
<td>27</td>
<td>25 – 8 59 – 1.9 1.4 – 4.4 2.8 – 9.0 5.0 – 16 8.4 – 27 16 – 50</td>
<td>— — 7-1/2 7-1/2 10 10 10</td>
<td>— — 7-1/2 7-1/2 10 10 10</td>
<td>N101DS2F3A N101DS2H3A N101DS2K3A N101DS2N3A</td>
</tr>
<tr>
<td>05</td>
<td>135</td>
<td>42 – 135 84 – 270 131 – 420</td>
<td>— — 25 30 50 50 50</td>
<td>— — 25 30 50 50 50</td>
<td>N101FS4K3A N101FS4M3A N101FS4P3A</td>
</tr>
</tbody>
</table>

Note:
- 24V DC coil voltage.
- If required, accessories are available on Page A-13.
- The standard IT starter is for 3-phase applications only.
- See Table A-6 for 24V DC power supply requirements.
- Control inputs are rated 24V DC (3 – 5 mA).
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.

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Overload Adjustment Range (Amperes)</th>
<th>Max. UL Horsepower (hp) 60 Hz</th>
<th>Max. UL Horsepower (hp) 50 Hz</th>
<th>3-Pole Reversing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-Phase</td>
<td>3-Phase</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td>00</td>
<td>9</td>
<td>.25 – .8</td>
<td>.59 – 1.9</td>
<td>1.4 – 4.4</td>
<td>2.8 – 9.0</td>
</tr>
<tr>
<td></td>
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<tr>
<td>0</td>
<td>18</td>
<td>.25 – .8</td>
<td>.59 – 1.9</td>
<td>1.4 – 4.4</td>
<td>2.8 – 9.0</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>.25 – .8</td>
<td>.59 – 1.9</td>
<td>1.4 – 4.4</td>
<td>2.8 – 9.0</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>16 – 45</td>
<td>28 – 90</td>
<td>42 – 135</td>
<td>63 – 200</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>270</td>
<td>42 – 135</td>
<td>84 – 270</td>
<td>131 – 420</td>
<td>200</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

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

For more information visit: www.EatonCanada.ca
# NEMA Contactors & Starters
## IT. Electro-Mechanical

### Technical Data and Specifications

#### Table A-6. Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 00, 0</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3, 4</th>
<th>Size 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Dimensions in Inches (mm)</td>
<td>w x h x d</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-reversing Contactor</td>
<td>1.8 x 4.4 x 2.4 (45 x 111 x 60)</td>
<td>2.1 x 4.4 x 2.4 (54 x 113 x 60)</td>
<td>3.0 x 5.9 x 3.1 (76 x 150 x 79)</td>
<td>4.1 x 8.0 x 3.5 (105 x 203 x 90)</td>
<td>5.6 x 14.0 x 7.0 (142 x 355 x 178)</td>
</tr>
<tr>
<td>Reversing Contactor</td>
<td>3.8 x 5.9 x 2.7 (96 x 149 x 69)</td>
<td>4.5 x 5.9 x 2.6 (114 x 149 x 67)</td>
<td>6.2 x 7.4 x 3.3 (158 x 188 x 84)</td>
<td>8.5 x 9.5 x 3.8 (216 x 242 x 97)</td>
<td>11.7 x 17.2 x 7.0 (296 x 423 x 178)</td>
</tr>
<tr>
<td>Non-reversing Starter</td>
<td>1.8 x 5.0 x 2.5 (45 x 127 x 63)</td>
<td>2.1 x 5.4 x 2.5 (54 x 138 x 63)</td>
<td>3.0 x 5.9 x 3.1 (76 x 150 x 79)</td>
<td>4.1 x 8.0 x 3.5 (105 x 203 x 90)</td>
<td>5.7 x 19.4 x 7.0 (145 x 492 x 178)</td>
</tr>
<tr>
<td>Reversing Starter</td>
<td>3.8 x 5.9 x 2.7 (96 x 149 x 69)</td>
<td>4.5 x 5.9 x 2.6 (114 x 149 x 67)</td>
<td>6.2 x 7.4 x 3.3 (158 x 188 x 84)</td>
<td>8.5 x 9.5 x 3.8 (216 x 242 x 97)</td>
<td>11.8 x 21.0 x 7.0 (300 x 533 x 178)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Hole Spacing in Inches (mm) — w x h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reversing Contactor</td>
</tr>
<tr>
<td>Reversing Contactor</td>
</tr>
<tr>
<td>Non-reversing Starter</td>
</tr>
<tr>
<td>Reversing Starter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel-Vertical Yes</td>
</tr>
<tr>
<td>Panel-Horizontal Yes</td>
</tr>
<tr>
<td>DIN Rail Mountable Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weights in Lb. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reversing Contactor</td>
</tr>
<tr>
<td>Reversing Contactor</td>
</tr>
<tr>
<td>Non-reversing Starter</td>
</tr>
<tr>
<td>Reversing Starter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical Operating Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Mechanical Life</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>10,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>95% Non-condensing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insulation Voltage (Ui)</th>
</tr>
</thead>
<tbody>
<tr>
<td>690V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impulse Withstand Voltage (Uimp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 kV</td>
</tr>
</tbody>
</table>

---

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 Eaton.
Table A-6. Specifications (Continued)

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 00, 0</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3, 4</th>
<th>Size 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger Protection</td>
<td>IP20</td>
<td>IP20</td>
<td>IP20</td>
<td>IP20</td>
<td>IP20</td>
</tr>
<tr>
<td>At Terminals</td>
<td>IP10</td>
<td>IP10</td>
<td>IP00</td>
<td>IP00</td>
<td>IP00</td>
</tr>
<tr>
<td>At Terminals with max. size wire installed</td>
<td>IP20</td>
<td>IP20</td>
<td>IP10</td>
<td>IP00</td>
<td>IP00</td>
</tr>
</tbody>
</table>

Terminals L1, L2, L3/11, 12, 13:

1 Wire per Terminal (stranded or solid):
- 14 – 8 AWG (1.5 – 10 mm²)
- 14 – 4 AWG (1.5 – 16 mm²)
- 6 – 250 MCM (16 – 120 mm²)
- 6 – 300 AWG (16 – 70 mm²)
- 4 – 750 MCM (26 – 420 mm²)

2 Wires per Terminal (stranded or solid):
- 14 – 10 AWG (1.5 – 4 mm²)
- 14 – 6 AWG (1.5 – 16 mm²)
- 6 – 2 AWG (1.5 – 25 mm²)
- 6 – 30 AWG (16 – 70 mm²)
- 1/0 – 300 MCM (16 – 50 mm²)

Strip Length:
- 48” (12 mm)
- 78” (18 mm)
- 8” (21 mm)

Torque (max.):
- 20 lb-in (2 Nm) for 14 – 10 AWG (1.5 – 6 mm²)
- 25 lb-in (2.8 mm) for 8 AWG (10 mm²)
- 45 lb-in (5.9 Nm) for Single 14 – 4 AWG (1.5 – 10 mm²)
- 100 lb-in (11 Nm) for Single 6 – 1 AWG (16 – 35 mm²)

Response time for Control Inputs = Debounce Time.

Notes:
- Use Class B 75°C copper wire only (or 90°C copper wire sized for 75°C operation per NEC).
- Consult Eaton for higher ratings.
- 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 = W20[1.1 – .005(T)] and Amps = A20[1.1 – .005(T)]

For example, inrush requirements for a NEMA Size 2 Starter at -25°C would be:
- Watts = 120[1.1 – .005(-25)] = 160
- Amps = 5.4[1.1 – .005(-25)] = 6.6

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

<table>
<thead>
<tr>
<th>Contactor/Starter Size</th>
<th>NEMA Size</th>
<th>Sealed In</th>
<th>Inrush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalogue Number</td>
<td></td>
<td>Wattage</td>
<td>Amps</td>
</tr>
<tr>
<td>N_11B__X3N</td>
<td>0, 0</td>
<td>3.7</td>
<td>15</td>
</tr>
<tr>
<td>N_01B__3A</td>
<td>0, 0</td>
<td>3.2</td>
<td>13</td>
</tr>
<tr>
<td>N_11C__X3N</td>
<td>1</td>
<td>4.2</td>
<td>18</td>
</tr>
<tr>
<td>N_01C__3A</td>
<td>1</td>
<td>3.6</td>
<td>15</td>
</tr>
<tr>
<td>N_1D__3</td>
<td>2</td>
<td>5.0</td>
<td>21</td>
</tr>
<tr>
<td>N_1E__3</td>
<td>3, 4</td>
<td>5.6</td>
<td>23</td>
</tr>
<tr>
<td>N_1F__3</td>
<td>5</td>
<td>12.0</td>
<td>50</td>
</tr>
<tr>
<td>N_01F__3</td>
<td>5</td>
<td>13.0</td>
<td>50</td>
</tr>
</tbody>
</table>

* _ indicates missing digit/character of the Catalogue Number; may have multiple values.

For more information visit: www.EatonCanada.ca
NEMA Contactors & Starters
IT. Electro-Mechanical

Technical Data and Specifications

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

Table A-8. Utilization Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Typical Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-1</td>
<td>Non-inductive or slightly inductive loads: Resistance furnaces, heating.</td>
</tr>
<tr>
<td>AC-2</td>
<td>Slip-ring motors: Starting and stopping of running motors</td>
</tr>
<tr>
<td>AC-3</td>
<td>Squirrel cage motors: Starting, switching off motors during running (motors in most industrial applications typically fall into this category).</td>
</tr>
<tr>
<td>AC-4</td>
<td>Squirrel cage motors: Starting, plugging/6, inching (very few applications in industry are totally AC-4).</td>
</tr>
</tbody>
</table>

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.

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 A-8 above.

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

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

Contactor Choice

■ Decide what utilization category the application is and choose the appropriate curve from Figure A-1 or Figure A-2.

■ Locate the intersection of the life-load curve with the operational current (le) of the application, as found on the horizontal axis.

■ Read the estimated contact life along the vertical axis in number of operations.

Trip Times

For more information visit: www.EatonCanada.ca
Modular Components — Contactor Field Assembly

EXAMPLE FOR A FULL VOLTAGE NON-REVERSING CONTACTOR:
N04NCS1X3N + N02NCXCN3N = N111CS1X3N

EXAMPLE FOR A FULL VOLTAGE REVERSING CONTACTOR:
(2) N04NCS1X3N + N03NCXCN3N + EMRKTC (REVERSING KIT) = N511CS1X3N

Modular Components — Starter Field Assembly

EXAMPLE FOR A FULL VOLTAGE NON-REVERSING STARTER:
N04NCS1X3N + N05NCXRL3A = N101CS1L3A

EXAMPLE FOR A FULL VOLTAGE REVERSING STARTER:
(2) N04NCS1X3N + N06NCXRL3A + EMRKTC (REVERSING KIT) = N501CS1L3A
### NEMA Contact Block

**Table A-9. NEMA Contact Block**

<table>
<thead>
<tr>
<th>Size</th>
<th>Amperes</th>
<th>Catalogue Number</th>
<th>Price</th>
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<tbody>
<tr>
<td>0</td>
<td>9</td>
<td>N04NSAXX3N</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>N04NS0X3N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>N04NS1X3N</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>N04NS2X3N</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>N04NE3X3N</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>N04NE4X3N</td>
<td></td>
</tr>
</tbody>
</table>

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

### NEMA Coil Controller

**Table A-10. NEMA Coil Controller**

<table>
<thead>
<tr>
<th>Size</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>N02N0CXXNN</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>N02N0CXXNN</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>N02N0CXXNN</td>
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</tr>
<tr>
<td>3,4</td>
<td>N02N0CXXNN</td>
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<tr>
<td>5</td>
<td>EMUCF</td>
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</table>

**Size 00-1 Non-reversing (pictured)**

### NEMA Solid-State Overload Relay

**Table A-11. NEMA Solid-State Overload Relay**

**Non-reversing**

<table>
<thead>
<tr>
<th>Size</th>
<th>Overload Adjustment Range (Amperes)</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>.25 – 8</td>
<td>N06NBXRA3A</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>10 – 32</td>
<td>N06NBXRA3A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.25 – 8</td>
<td>N06NCXRA3A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.0 – 10</td>
<td>N06NNDXRA3A</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>14 – 45</td>
<td>N06NEXRA3A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>42 – 135</td>
<td>N06NFXRA3A</td>
<td></td>
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</tbody>
</table>

**Reversing**

<table>
<thead>
<tr>
<th>Size</th>
<th>Overload Adjustment Range (Amperes)</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>.25 – 8</td>
<td>N06NBXRA3A</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>10 – 32</td>
<td>N06NBXRA3A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.25 – 8</td>
<td>N06NCXRA3A</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.0 – 10</td>
<td>N06NNDXRA3A</td>
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<tr>
<td>3, 4</td>
<td>14 – 45</td>
<td>N06NEXRA3A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>42 – 135</td>
<td>N06NFXRA3A</td>
<td></td>
</tr>
</tbody>
</table>
## 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 A-12 and A-13, and their ratings in Tables A-14 – A-16. For reversing models, the number of auxiliaries indicated is for each of the contactors/starters in the assembly.

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

<table>
<thead>
<tr>
<th>Top Mounted (Maximum Auxiliaries per Contactor/Starter)</th>
<th>Contact Type</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 00, 0</td>
<td>Size 1</td>
<td>Size 2</td>
<td>Size 3, 4</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>3</td>
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<td>3</td>
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</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

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

### Table A-13. Auxiliary Contact — Size 5

<table>
<thead>
<tr>
<th>Auxiliary Contacts per Non-reversing and Reversing Contactor or Starter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>2</td>
</tr>
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<td>2</td>
</tr>
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<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
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</tbody>
</table>

1 For form C contacts.
2 For reversers, multiply quantities by two.

### Table A-14. IEC Ratings

<table>
<thead>
<tr>
<th>Current</th>
<th>DC-13</th>
<th>AC-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uₑ Voltage</td>
<td>Iₑ Amps.</td>
</tr>
<tr>
<td>24</td>
<td>5</td>
<td>48</td>
</tr>
<tr>
<td>48</td>
<td>2.5</td>
<td>120</td>
</tr>
<tr>
<td>125</td>
<td>1.1</td>
<td>240</td>
</tr>
<tr>
<td>250</td>
<td>.35</td>
<td>440</td>
</tr>
</tbody>
</table>

### Table A-15. NEMA A600 Ratings

<table>
<thead>
<tr>
<th>Current</th>
<th>DC Voltage</th>
<th>AC Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>120</td>
<td>240</td>
</tr>
<tr>
<td>Make and Interrupting</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Break</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Continuous</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Thermal</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

### Table A-16. NEMA P300 Ratings

<table>
<thead>
<tr>
<th>Current</th>
<th>DC-12</th>
<th>AC-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uₑ</td>
<td>Iₑ</td>
</tr>
<tr>
<td>125</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Make and Interrupting</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Break</td>
<td>48</td>
<td>30</td>
</tr>
<tr>
<td>Continuous</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Thermal</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

### Table A-17. EMA70 Auxiliary Contact

<table>
<thead>
<tr>
<th>DC-12</th>
<th>AC-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uₑ</td>
<td>Iₑ</td>
</tr>
<tr>
<td>30</td>
<td>.1</td>
</tr>
</tbody>
</table>

### Table A-18. C320KGS20L, C320KGS21L, C320KGS22L, Auxiliary Contact Ratings

<table>
<thead>
<tr>
<th>DC-12</th>
<th>AC-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uₑ</td>
<td>Iₑ</td>
</tr>
<tr>
<td>80</td>
<td>0.1</td>
</tr>
</tbody>
</table>

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
NEMA Contactors & Starters
IT. Electro-Mechanical

Mounting Plates

Table A-19. Mounting Plates

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Metal Reversing Contactor/Starter Plates</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0, 1</td>
<td>EMA9B</td>
</tr>
<tr>
<td>2</td>
<td>EMA9D</td>
</tr>
<tr>
<td>3, 4</td>
<td>EMA9E</td>
</tr>
<tr>
<td>5</td>
<td>EMA9F</td>
</tr>
</tbody>
</table>

Reversing Fanning Strips

Table A-20. Reversing Fanning Strips

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Line Side</th>
<th>Load Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>EMFRLB</td>
<td>EMFRTB</td>
</tr>
<tr>
<td>1</td>
<td>EMFRLC</td>
<td>EMFRTC</td>
</tr>
<tr>
<td>2</td>
<td>EMFRLD</td>
<td>EMFRTE</td>
</tr>
<tr>
<td>3, 4</td>
<td>EMFREL</td>
<td>EMFRTE</td>
</tr>
<tr>
<td>5</td>
<td>EMFRFL</td>
<td>EMFRTF</td>
</tr>
</tbody>
</table>

Reversing Kits

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

Table A-21. Reversing Kits

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>EMRTKTB</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EMRTKTC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EMRTKTD</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>EMRTKTE</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>EMRTKTF</td>
<td></td>
</tr>
</tbody>
</table>

Lug Kits

Table A-22. Lug Kits

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contactor or Starter Line or Load (3 Lugs)</td>
<td>EMMLUGKTC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contactor or Starter Line or Load</td>
<td>EMMLUGKTD</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>Contactor Line or Load, Starter Line</td>
<td>EMMLUGKTL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starter Load</td>
<td>EMMLUGKTE</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Contactor or Starter Line or Load, Horizontal</td>
<td>EMMLUGKTF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contactor or Starter Line or Load, Vertical</td>
<td>EMMLUGKTFB</td>
<td></td>
</tr>
</tbody>
</table>

Table A-23. Ring Lug Retrofit Kits

<table>
<thead>
<tr>
<th>Product</th>
<th>NEMA Sizes 3, 4</th>
<th>NEMA Size 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td></td>
<td>Factory Installed</td>
<td>Retrofit Kits</td>
</tr>
<tr>
<td>N111</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N511</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N101</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N01N</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N06N</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N02N</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N03N</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
<tr>
<td>N04N</td>
<td>Add &quot;-RTX&quot;</td>
<td>EMRTKXREN</td>
</tr>
</tbody>
</table>

- Retrofit Kits used to field install ring lugs on standard lug units.
- Lug Kits used to field install standard lugs into factory assembled ring lug units.

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

Table A-24. Coils

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1 Coil</td>
<td>EMCC</td>
<td></td>
</tr>
<tr>
<td>Size 2 Coil</td>
<td>EMCD</td>
<td></td>
</tr>
<tr>
<td>Size 3, 4 Coil</td>
<td>EMCE</td>
<td></td>
</tr>
<tr>
<td>Size 5 Coil</td>
<td>EMCF</td>
<td></td>
</tr>
</tbody>
</table>

For reversing contactors and starters, order two.

DIN Rail Catch

Table A-25. DIN Rail Catch

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 – 1</td>
<td>Catch with Leaf Spring and Pad</td>
<td>EMDRCB</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Catch with Leaf Spring and Pad</td>
<td>EMDRCD</td>
<td></td>
</tr>
</tbody>
</table>

Contact Kits

Table A-26. Contact Kits

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hold Open</td>
<td>EMCKTS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-hold Open</td>
<td>EMCKTS1NH</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hold Open</td>
<td>EMCKTS2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-hold Open</td>
<td>EMCKTS2NH</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hold Open</td>
<td>EMCKTS3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hold Open</td>
<td>EMCKTS4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hold Open</td>
<td>EMCKTS5</td>
<td></td>
</tr>
</tbody>
</table>

Control Terminal Blocks

Table A-27. Control Terminal Blocks

<table>
<thead>
<tr>
<th>No. of Pins</th>
<th>Terminal Markings</th>
<th>NEMA Size</th>
<th>Coil Controller</th>
<th>Contactor</th>
<th>Overload</th>
<th>Starter</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>00, 0</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3, 4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Consists of (1) EMA77L and (1) EMA77LR inter-wired.
### Non-reversing Contactors (Sizes 00 – 1)

#### Table A-28. Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall</th>
<th>Mounting Holes</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Depth w/ Auxiliary</td>
<td>Depth added w/ DIN Rail</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>00, 0</td>
<td>1.8</td>
<td>4.4</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>(45)</td>
<td>(111)</td>
<td>(60)</td>
</tr>
<tr>
<td>1</td>
<td>2.1</td>
<td>4.45</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>(54)</td>
<td>(113)</td>
<td>(60)</td>
</tr>
</tbody>
</table>

**Figure A-7. Approximate Dimensions — Inches (mm)**

- Line Terminals (1 L1, 3 L2, 5 L3)
- Standard DIN Rail 1.38 x 3 (35 x 7.5) (Optional Mounting)
- Control Terminal Block
- Load Terminals (2 T1, 4 T2, 6 T3)
- Dual Auxiliary — Reduce Dim "D" .31 (8) for the Single Auxiliaries
- Size 1 Pictured
  - (Size 00, 0 Has Two Lower Mounting Feet, Reference F – Width)
### Non-reversing Contactors (Sizes 2 – 4)

#### Table A-29. Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Overall Height</th>
<th>Overall Depth</th>
<th>Depth w/ Auxiliary</th>
<th>Depth added w/ DIN Rail</th>
<th>Mounting Holes Width</th>
<th>Mounting Holes Height</th>
<th>Mounting Hole to Top</th>
<th>DIN Rail to Top</th>
<th>Req. Mtg. Screws</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>J</td>
<td>K</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>3.0 (76)</td>
<td>5.9 (150)</td>
<td>3.1 (79)</td>
<td>4.2 (107)</td>
<td>.2 (4)</td>
<td>.34 (24)</td>
<td>2.87 (73)</td>
<td>.5 (13)</td>
<td>.9 (23)</td>
<td>(4) #6 x 2</td>
<td>2.4 (60)</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M3.5 x 50</td>
<td>1.5 (37)</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.6 (14)</td>
</tr>
<tr>
<td>E</td>
<td>4.1 (105)</td>
<td>8.0 (203)</td>
<td>3.5 (90)</td>
<td>4.7 (119)</td>
<td>—</td>
<td>1.33 (33.8)</td>
<td>4.13 (105)</td>
<td>.6 (15)</td>
<td>—</td>
<td>(4) #8 x 1.5</td>
<td>2.8 (72)</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M4 x 40</td>
<td>1.7 (42)</td>
</tr>
<tr>
<td>G</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.3 (8)</td>
</tr>
</tbody>
</table>

#### Figure A-8. Approximate Dimensions — Inches (mm)

### Non-reversing Contactors (Size 5)

#### Table A-30. Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Overall Height</th>
<th>Overall Depth</th>
<th>Depth w/Logic Level Auxiliary</th>
<th>Depth w/ Side Auxiliaries</th>
<th>Mounting Holes Width</th>
<th>Mounting Holes Height</th>
<th>Mounting Hole to Top</th>
<th>DIN Rail to Top</th>
<th>Req. Mtg. Screws</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>J</td>
<td>K</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>5.6 (142)</td>
<td>14.0 (355)</td>
<td>7.0 (178)</td>
<td>8.2 (208)</td>
<td>6.70 (170)</td>
<td>1.75 (44.5)</td>
<td>13.0 (330)</td>
<td>.58 (14.7)</td>
<td>—</td>
<td>(4) 5/16</td>
<td>8.8 (20)</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M8</td>
<td>4.4 (112)</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.4 (112)</td>
</tr>
</tbody>
</table>

#### Figure A-9. Approximate Dimensions in Inches (mm)
Reversing Contactors (Sizes 00 – 4)

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall</th>
<th>Mounting Holes</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Height</td>
<td>Depth</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>00, 0</td>
<td>3.8 (96)</td>
<td>5.9 (149)</td>
<td>2.7 (69)</td>
</tr>
<tr>
<td>1</td>
<td>4.5 (114)</td>
<td>5.9 (149)</td>
<td>2.6 (67)</td>
</tr>
<tr>
<td>2</td>
<td>6.2 (158)</td>
<td>7.4 (188)</td>
<td>3.3 (84)</td>
</tr>
<tr>
<td>3, 4</td>
<td>8.5 (216)</td>
<td>9.5 (242)</td>
<td>3.8 (97)</td>
</tr>
</tbody>
</table>

Figure A-10. Approximate Dimensions — Inches (mm)
Reversing Contactors (Size 5)

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Overall Height</th>
<th>Overall Depth</th>
<th>Depth w/Logic Level Auxiliary</th>
<th>Width w/Side Auxiliaries</th>
<th>Mounting Holes Width</th>
<th>Mounting Hole to Top Height</th>
<th>Req. Mtg. Screws</th>
<th>Terminals Control Line Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>11.7</td>
<td>12.2</td>
<td>7.0</td>
<td>8.2</td>
<td>12.8</td>
<td>7.8</td>
<td>13.0</td>
<td>2.19</td>
<td>(4) 5/16 8 M8</td>
</tr>
<tr>
<td></td>
<td>(297)</td>
<td>(336)</td>
<td>(178)</td>
<td>(208)</td>
<td>(325)</td>
<td>(198.5)</td>
<td>(330)</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.4</td>
</tr>
</tbody>
</table>

Figure A-11. Approximate Dimensions in Inches (mm)
**Non-reversing Starters (Sizes 00 – 4)**

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Height</th>
<th>Depth</th>
<th>Depth w/ Auxiliary</th>
<th>Depth added w/ DIN Rail</th>
<th>Mounting Holes Width</th>
<th>Height</th>
<th>Mtg. Hole to Top DIN Rail to Top</th>
<th>Req. Mtg. Screws</th>
<th>Reset Button Width</th>
<th>Height</th>
<th>Depth</th>
<th>Control Line Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>1.8 (45)</td>
<td>5.0 (127)</td>
<td>2.5 (63)</td>
<td>3.6 (91)</td>
<td>.1 (3)</td>
<td>1.33 (33.8)</td>
<td>4.62 (117)</td>
<td>.2 (5)</td>
<td>0 (23)</td>
<td>(3) #8 M4</td>
<td>6 (14)</td>
<td>3.6 (91)</td>
<td>2.5 (63)</td>
</tr>
<tr>
<td>1</td>
<td>2.1 (54)</td>
<td>5.4 (138)</td>
<td>2.5 (63)</td>
<td>3.6 (91)</td>
<td>.1 (3)</td>
<td>1.46 (37)</td>
<td>5.04 (128)</td>
<td>.2 (5)</td>
<td>.8 (20)</td>
<td>(3) #8 M4</td>
<td>7 (17)</td>
<td>3.7 (93)</td>
<td>2.4 (62)</td>
</tr>
<tr>
<td>2</td>
<td>3.0 (76)</td>
<td>5.9 (150)</td>
<td>3.1 (79)</td>
<td>4.2 (107)</td>
<td>.2 (4)</td>
<td>1.94 (49)</td>
<td>2.87 (73)</td>
<td>.5 (13)</td>
<td>.9 (23)</td>
<td>(4) #6 x 2 M3.5 x 50</td>
<td>7 (17)</td>
<td>4.2 (106)</td>
<td>3.1 (78)</td>
</tr>
<tr>
<td>3, 4</td>
<td>4.1 (105)</td>
<td>8.0 (203)</td>
<td>3.5 (90)</td>
<td>4.7 (119)</td>
<td>—</td>
<td>1.33 (33.8)</td>
<td>4.13 (105)</td>
<td>.6 (15)</td>
<td>—</td>
<td>(4) #8 x 1.5 M4 x 40</td>
<td>7 (17)</td>
<td>5.7 (146)</td>
<td>3.5 (88)</td>
</tr>
</tbody>
</table>

![Figure A-12. Approximate Dimensions — Inches (mm)](image-url)
Non-reversing Starter (Size 5)

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Overall Length</th>
<th>Overall Depth</th>
<th>Overall Depth w/Logic Level Auxiliary</th>
<th>Overall Width w/ Side Auxiliaries</th>
<th>Mounting Holes Width</th>
<th>Mounting Holes Height</th>
<th>Mounting Holes Mtg. Hole to Top</th>
<th>Reset Button Width</th>
<th>Reset Button Height</th>
<th>Reset Button Depth</th>
<th>Terminals Control Line</th>
<th>Terminals Line</th>
<th>Terminals Load</th>
<th>Terminals Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.7 (145)</td>
<td>19.4 (492)</td>
<td>7.0 (178)</td>
<td>6.2 (208)</td>
<td>6.7 (170)</td>
<td>1.75 (44.5)</td>
<td>18.3 (465)</td>
<td>58 (14.7)</td>
<td>2.4 (61)</td>
<td>12.4 (315)</td>
<td>5.3 (135)</td>
<td>5.0 (126)</td>
<td>4.4 (112)</td>
<td>3.0 (75)</td>
<td>4.0 (101)</td>
</tr>
</tbody>
</table>

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

Reversing Starters (Sizes 00 – 4)

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width</th>
<th>Overall Length</th>
<th>Overall Depth</th>
<th>Overall Depth w/ Auxiliary</th>
<th>Overall Width w/ Side Auxiliaries</th>
<th>Mounting Holes Width</th>
<th>Mounting Holes Height</th>
<th>Mounting Holes Mtg. Hole to Top</th>
<th>Reset Button Width</th>
<th>Reset Button Height</th>
<th>Reset Button Depth</th>
<th>Terminals Control Line</th>
<th>Terminals Line</th>
<th>Terminals Load</th>
<th>Terminals Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>3.8 (96)</td>
<td>5.9 (149)</td>
<td>2.7 (69)</td>
<td>3.8 (96)</td>
<td>3.15 (80)</td>
<td>5.35 (136)</td>
<td>28 (7)</td>
<td>(3) #10 M5</td>
<td>1.6 (40)</td>
<td>3.8 (97)</td>
<td>2.7 (68)</td>
<td>2.0 (50)</td>
<td>1.5 (38)</td>
<td>.9 (22)</td>
<td>.9 (22)</td>
</tr>
<tr>
<td>1</td>
<td>4.5 (114)</td>
<td>5.3 (149)</td>
<td>2.6 (67)</td>
<td>3.3 (96)</td>
<td>3.15 (80)</td>
<td>5.35 (136)</td>
<td>28 (7)</td>
<td>(3) #10 M5</td>
<td>1.7 (43)</td>
<td>4.1 (104)</td>
<td>2.6 (63)</td>
<td>2.0 (50)</td>
<td>1.5 (38)</td>
<td>.8 (16)</td>
<td>.8 (16)</td>
</tr>
<tr>
<td>2</td>
<td>6.2 (158)</td>
<td>7.4 (188)</td>
<td>3.3 (84)</td>
<td>4.4 (112)</td>
<td>5.51 (140)</td>
<td>6.89 (175)</td>
<td>24 (6)</td>
<td>(3) #10 M5</td>
<td>2.3 (58)</td>
<td>5.5 (139)</td>
<td>3.3 (83)</td>
<td>2.6 (67)</td>
<td>1.9 (48)</td>
<td>.9 (22)</td>
<td>.9 (22)</td>
</tr>
<tr>
<td>3, 4</td>
<td>8.5 (216)</td>
<td>9.5 (242)</td>
<td>3.8 (97)</td>
<td>4.9 (125)</td>
<td>7.87 (200)</td>
<td>9.06 (230)</td>
<td>24 (6)</td>
<td>(3) #10 M5</td>
<td>2.9 (73)</td>
<td>7.2 (182)</td>
<td>3.7 (94)</td>
<td>3.1 (80)</td>
<td>2.1 (54)</td>
<td>.7 (17)</td>
<td>.7 (17)</td>
</tr>
</tbody>
</table>

Figure A-14. Approximate Dimensions — Inches (mm)
Reversing Starter (Size 5)

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Overall Width A</th>
<th>Length B</th>
<th>Depth C</th>
<th>Depth w/Logic Level Auxiliary D</th>
<th>Width E</th>
<th>Mtg. Hole F</th>
<th>Holes G</th>
<th>H1 Height H</th>
<th>H2 Depth I</th>
<th>Req. Mtg. Screws K</th>
<th>Reset Button L</th>
<th>Terminal Width M</th>
<th>Height N</th>
<th>Depth O</th>
<th>Control Line P</th>
<th>Line Load Q</th>
<th>Load R</th>
<th>Load S</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>11.8 (300)</td>
<td>21.0 (533)</td>
<td>7.0 (178)</td>
<td>8.2 (208)</td>
<td>12.8 (325)</td>
<td>7.62 (199)</td>
<td>18.3 (465)</td>
<td>2.19 (55.5)</td>
<td>13 (330)</td>
<td>(5) 5/16 M8</td>
<td>5.4 (138)</td>
<td>12.4 (315)</td>
<td>5.3 (135)</td>
<td>5.0 (126)</td>
<td>4.4 (112)</td>
<td>3.0 (75)</td>
<td>4.0 (101)</td>
<td></td>
</tr>
</tbody>
</table>

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

- 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, back-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.

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 #LR363, 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.
### Catalogue Number Selection

#### Table A-37. Freedom Catalogue Numbering System

<table>
<thead>
<tr>
<th>Device Type</th>
<th>A = Starter</th>
<th>C = Contactor</th>
</tr>
</thead>
</table>

#### 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

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

#### NEMA Enclosure

- N = Open

For Starters

- 2 = 2-pole
- 3 = 3-pole
- 4 = 4-pole
- 5 = 5-pole

For Contactors Only

#### C396 Electronic Overload FLA Range (FNVR & FVR Only)

<table>
<thead>
<tr>
<th>Frame</th>
<th>NEMA Size</th>
<th>FLA Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>00</td>
<td>P05 = 0.1 – 0.5A</td>
</tr>
<tr>
<td></td>
<td>02</td>
<td>002 = 0.4 – 2.0A</td>
</tr>
<tr>
<td></td>
<td>05</td>
<td>005 = 1.0 – 5.0A</td>
</tr>
<tr>
<td></td>
<td>08</td>
<td>008 = 1.6 – 8.0A</td>
</tr>
<tr>
<td>G</td>
<td>00</td>
<td>008 = 1.6 – 8.0A</td>
</tr>
<tr>
<td></td>
<td>02</td>
<td>002 = 0.4 – 2.0A</td>
</tr>
<tr>
<td></td>
<td>05</td>
<td>005 = 1.0 – 5.0A</td>
</tr>
<tr>
<td></td>
<td>08</td>
<td>008 = 1.6 – 8.0A</td>
</tr>
</tbody>
</table>

#### C396 Electronic OLR Designation (FNVR & FVR Only)

- 1E = Economy C396 OLR, Manual Reset, Class 10
- 2E = Economy C396 OLR, Manual Reset, Class 20
- 3E = Standard C396 OLR, SEL Reset, SEL Class
- 4E = Advanced C396 OLR, SEL Reset, SEL Class, GF Sensing, Jam

#### C306 Bi-Metallic OLR Designation

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

#### AC Coil Suffix

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Coil Volts and Hertz</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>120/60 or 110/50</td>
</tr>
<tr>
<td>B</td>
<td>240/60 or 220/60</td>
</tr>
<tr>
<td>C</td>
<td>480/60 or 440/60</td>
</tr>
<tr>
<td>D</td>
<td>600/60 or 550/60</td>
</tr>
<tr>
<td>E</td>
<td>208/60</td>
</tr>
<tr>
<td>H</td>
<td>277/60</td>
</tr>
<tr>
<td>J</td>
<td>208 – 240/60</td>
</tr>
<tr>
<td>K</td>
<td>240/50</td>
</tr>
<tr>
<td>L</td>
<td>380 – 415/50</td>
</tr>
<tr>
<td>N</td>
<td>550/50</td>
</tr>
<tr>
<td>T</td>
<td>24/60, 24/50</td>
</tr>
<tr>
<td>U</td>
<td>24/50</td>
</tr>
<tr>
<td>V</td>
<td>32/50</td>
</tr>
<tr>
<td>W</td>
<td>48/60</td>
</tr>
<tr>
<td>Y</td>
<td>48/50</td>
</tr>
</tbody>
</table>

---

1. For Contactor Only orders, add B to end of Catalogue Number if NEMA Size 00 – 2, 6.
2. 3E, 4E feature set only.
3. Uses CT with C396 45 mm OLR, 3E, 4E feature set only.
4. Not required.
5. NEMA Sizes 00 and 0 only.
6. NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.
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Features A-25
Standards and Certifications A-25
Catalogue Number Selection A-26
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Features A-27
Technical Data A-27
Accessories A-28
Auxiliary Contacts A-29
DC Magnet Coils A-45
Mounting Plates A-46
Special Modifications A-47
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Contactors — Non-reversing

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.

Reversing

Reversing contactors are used primarily for reversing single- or three-phase motors in applications where running overcurrent protection is neither 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 A-38. Wire (75°C) Sizes — AWG or kcmil — Open and Enclosed

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

Table A-39. Plugging and Jogging Service Horsepower Ratings

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>200V</th>
<th>230V</th>
<th>460V</th>
<th>575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>—</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>0</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7-1/2</td>
<td>10</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>20</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>30</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>75</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>6</td>
<td>125</td>
<td>150</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

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 A-43 and A-44.
- Transient Suppressor, for magnet coil — Pages A-41.

Renewal Parts Publication Numbers


For more information visit: www.EatonCanada.ca
A-28  NEMA Contactors & Starters

Freedom

NEMA Contactors & Starters

Non-reversing and Reversing

Product Selection — 3-Pole Contactors

Table A-40. Type CN15/CN55 NEMA Contactors — 3-Pole Non-reversing and Reversing

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Maximum UL Horsepower 1</th>
<th>3-Pole Non-reversing</th>
<th>3-Pole Reversing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-Phase</td>
<td>3-Phase</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>115V</td>
<td>230V</td>
<td>208V</td>
</tr>
<tr>
<td>00</td>
<td>9</td>
<td>1/3</td>
<td>1</td>
<td>1-1/2</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>7-1/2</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3</td>
<td>7-1/2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>25</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>40</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>75</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>150</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>7</td>
<td>810</td>
<td>200</td>
<td>300</td>
<td>600</td>
</tr>
<tr>
<td>8 2</td>
<td>1215</td>
<td>400</td>
<td>450</td>
<td>900</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>00</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horsepower</td>
<td>1-1/2</td>
<td>5</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>150</td>
<td>300</td>
<td>600</td>
<td>900</td>
</tr>
</tbody>
</table>

2 Common control. For separate 120V control, insert letter D in 7th position of listed Catalogue Number.

EXAMPLE: CN15VN3_D

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 Catalogue Number and replace the magnet coil alpha designation in the Catalogue 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 Catalogue Number. EXAMPLE: For a 380V, 50 Hz coil, change CN15AN3_B to CN15AN3LB. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalogue Number.

For DC Magnet Coils, see Accessories, Pages A-45 – A-46.

Table A-41. AC Suffix Code

<table>
<thead>
<tr>
<th>Coil Volts and Hertz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>240/60 or 220/60</td>
<td>B</td>
</tr>
<tr>
<td>480/60 or 440/50</td>
<td>C</td>
</tr>
<tr>
<td>600/60 or 550/50</td>
<td>D</td>
</tr>
<tr>
<td>208/60</td>
<td>E</td>
</tr>
<tr>
<td>277/60</td>
<td>F</td>
</tr>
<tr>
<td>208 – 240/60</td>
<td>G</td>
</tr>
<tr>
<td>240/50</td>
<td>H</td>
</tr>
<tr>
<td>380 – 415/50</td>
<td>I</td>
</tr>
<tr>
<td>550/50</td>
<td>J</td>
</tr>
<tr>
<td>24/60, 24/50</td>
<td>K</td>
</tr>
<tr>
<td>24/50</td>
<td>L</td>
</tr>
<tr>
<td>32/50</td>
<td>M</td>
</tr>
<tr>
<td>48/60</td>
<td>N</td>
</tr>
<tr>
<td>48/50</td>
<td>O</td>
</tr>
</tbody>
</table>

1 NEMA Sizes 00 and 0 only.

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

For more information visit: www.EatonCanada.ca

July 2008
### Product Selection — 2-, 4- and 5-Pole Contactors

**Table A-42. Type CN15 NEMA Contactors — 2-, 4- and 5-Pole Non-reversing**

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Maximum UL Horsepower</th>
<th>2-Pole Non-reversing</th>
<th>4-Pole Non-reversing</th>
<th>5-Pole Non-reversing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-Phase (2-Pole)</td>
<td>3-Phase</td>
<td>Catalogue Number</td>
<td>Price</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td></td>
<td>115V</td>
<td>230V</td>
<td>208V</td>
<td>240V</td>
<td>480V</td>
</tr>
<tr>
<td>00</td>
<td>9</td>
<td>1/3</td>
<td>1</td>
<td>1-1/2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>7-1/2</td>
<td>7-1/2</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3</td>
<td>7-1/2</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td></td>
<td>25</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td></td>
<td>40</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td></td>
<td>75</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td></td>
<td>150</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

**Magnet Coils — AC or DC**

Select required starter by Catalogue Number and replace the magnet coil alpha designation in the Catalogue 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 Catalogue Number. EXAMPLE: For a 380V, 50 Hz coil, change CN15BN3_B to CN15BN3L.

For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalogue Number.

For DC Magnet Coils, see Accessories, Pages A-45 – A-46.

**Table A-43. AC Suffix Code**

<table>
<thead>
<tr>
<th>Coil Volts and Hertz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>240/60 or 220/50</td>
<td>B</td>
</tr>
<tr>
<td>480/60 or 440/50</td>
<td>C</td>
</tr>
<tr>
<td>600/60 or 550/50</td>
<td>D</td>
</tr>
<tr>
<td>208/80</td>
<td>E</td>
</tr>
<tr>
<td>277/60</td>
<td>H</td>
</tr>
<tr>
<td>208 – 240/60①</td>
<td>J</td>
</tr>
<tr>
<td>240/50</td>
<td>K</td>
</tr>
<tr>
<td>380 – 415/50</td>
<td>L</td>
</tr>
<tr>
<td>550/50</td>
<td>N</td>
</tr>
<tr>
<td>24/60, 24/50②</td>
<td>T</td>
</tr>
<tr>
<td>24/50</td>
<td>U</td>
</tr>
<tr>
<td>22/50</td>
<td>V</td>
</tr>
<tr>
<td>48/80</td>
<td>W</td>
</tr>
<tr>
<td>48/50</td>
<td>Y</td>
</tr>
</tbody>
</table>

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

---

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
NEMA Contactors & Starters

Freedom

Starters — 3-Phase Non-reversing and Reversing, Full Voltage

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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.

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 integration 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.

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

■ 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 A-44. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 00 – 2 — Open and Enclosed

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

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

Table A-45. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 3 – 8 — Open and Enclosed

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

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

Wiring Diagrams

Figure A-15. Typical Wiring Diagrams — Three-Phase and Single-Phase Applications

Table A-46. Plugging and Jogging Service Horsepower Ratings

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>200V</th>
<th>230V</th>
<th>460V</th>
<th>575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>—</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>0</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2-1/2</td>
<td>10</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>20</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>30</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>75</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>6</td>
<td>125</td>
<td>150</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

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 A-43 – A-44.
- Transient Suppressor, for magnet coil — Pages A-41.

Renewal Parts Publication Numbers

NEMA Contactors & Starters

Freedom

July 2008

Product Selection

When Ordering Supply

■ Catalogue Number
■ Heater pack number (see selection table, Pages A-64 – A-64) or full load current.

Table A-47. Type AN16/AN56 NEMA — Manual or Automatic Reset Overload Relay — Non-reversing and Reversing

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Service-Limit Current Rating (Ampere)</th>
<th>Maximum UL Horsepower (A)</th>
<th>3-Pole Non-reversing Catalogue Number</th>
<th>3-Pole Reversing Catalogue Number</th>
<th>Vertical Reversing Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9</td>
<td>11</td>
<td>1/3 1</td>
<td>AN16AN0_C</td>
<td>AN56AN0_C</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>21</td>
<td>1 2</td>
<td>AN16BN0_C</td>
<td>AN56BN0_C</td>
<td>AN56BNV0_</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>32</td>
<td>2 3</td>
<td>AN16DN0_B</td>
<td>AN56DN0_B</td>
<td>AN56DNV0_</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>52</td>
<td>3 7-1/2</td>
<td>AN16GN0_B</td>
<td>AN56GN0_B</td>
<td>AN56GNV0_</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>104</td>
<td>— 25</td>
<td>AN16KN0_</td>
<td>AN56KN0_</td>
<td>AN56KNV0_</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>156</td>
<td>— 40</td>
<td>AN16NN0_</td>
<td>AN56NN0_</td>
<td>AN56NNV0_</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>311</td>
<td>— 75</td>
<td>AN16SN0_B</td>
<td>AN56SN0_B</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>621</td>
<td>— 150</td>
<td>AN16TN0_C</td>
<td>AN56TN0_C</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>810</td>
<td>932</td>
<td>— 200</td>
<td>AN16UN0_B</td>
<td>AN56UN0_B</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1215</td>
<td>1400</td>
<td>— 400</td>
<td>AN16VN0_B</td>
<td>AN56VN0_B</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Note: Starter Catalogue Numbers do not include heater packs. Select one carton of three heater packs. Heater pack selection, Pages A-64 – A-64.

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 Catalogue Number and replace the magnet coil alpha designation in the Catalogue 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 Catalogue Number. EXAMPLE: For a 380V, 50 Hz coil, change AN16BN0_C to AN16BN0LC. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalogue Number.

For DC Magnet Coils, see Accessories, Pages A-45 – A-46.

Table A-48. AC Suffix Code

<table>
<thead>
<tr>
<th>Coil Volts and Hertz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>240/60 or 220/50</td>
<td>B</td>
</tr>
<tr>
<td>480/60 or 440/50</td>
<td>C</td>
</tr>
<tr>
<td>600/60 or 550/50</td>
<td>D</td>
</tr>
<tr>
<td>208/60</td>
<td>E</td>
</tr>
<tr>
<td>277/60</td>
<td>F</td>
</tr>
<tr>
<td>208 – 240/60</td>
<td>G</td>
</tr>
<tr>
<td>240/50</td>
<td>H</td>
</tr>
<tr>
<td>380 – 415/50</td>
<td>L</td>
</tr>
<tr>
<td>550/50</td>
<td>M</td>
</tr>
<tr>
<td>240/60, 245/50</td>
<td>N</td>
</tr>
<tr>
<td>24/50</td>
<td>T</td>
</tr>
<tr>
<td>32/50</td>
<td>V</td>
</tr>
<tr>
<td>48/60</td>
<td>W</td>
</tr>
<tr>
<td>48/50</td>
<td>Y</td>
</tr>
</tbody>
</table>

Discount Symbol .......... MC7

For more information visit: www.EatonCanada.ca
Product Selection

When Ordering Specify

For 2-Speed Selective Control:

- Catalogue Number plus magnet coil Code Suffix. Example: Size 0 — AN700BN022B.
- Heater pack number or full load current for each speed.

For 2-Speed other than Selective Control:

- Catalogue 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 A-49. Product Selection — 2-Speed — Selective Control — Separate Winding

<table>
<thead>
<tr>
<th>Maximum Horsepower — 60/50 Hertz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant or Variable Torque</td>
</tr>
<tr>
<td>1-1/2</td>
</tr>
<tr>
<td>-</td>
</tr>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

Prices of starters do not include heater packs. Select 2 packs (2 overload relays, one for each speed). Heater pack selection, Pages A-64 – A-64.

Table A-50. Product Selection — 2-Speed — Selective Control — Reconnectable Winding

<table>
<thead>
<tr>
<th>Maximum Horsepower — 60/50 Hertz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant or Variable Torque</td>
</tr>
<tr>
<td>1-1/2</td>
</tr>
<tr>
<td>-</td>
</tr>
</tbody>
</table>

Prices of starters do not include heater packs. Select 2 packs (2 overload relays, one for each speed). Heater pack selection, Pages A-64 – A-64.

Table A-51. Magnetic Coils — AC or DC

<table>
<thead>
<tr>
<th>Coil Voltage and Hz</th>
<th>Code Suffix</th>
<th>Coil Voltage and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
<td>277/60</td>
<td>H</td>
</tr>
<tr>
<td>240/60 or 220/50</td>
<td>B</td>
<td>208 – 240/60</td>
<td>J</td>
</tr>
<tr>
<td>480/60 or 440/50</td>
<td>C</td>
<td>240/50</td>
<td>K</td>
</tr>
<tr>
<td>600/60 or 550/50</td>
<td>D</td>
<td>380 – 415/50</td>
<td>L</td>
</tr>
<tr>
<td>208/60</td>
<td>E</td>
<td>550/50</td>
<td>N</td>
</tr>
</tbody>
</table>

NEMA Sizes 00 and 0 only. Sizes 1 – 5 are 24/60/50 only.
NEMA Contactors & Starters

Freedom

Starter — Single-Phase Non-reversing, Full Voltage, Bi-Metallic Overload

Wiring Diagrams

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.

When Ordering Specify

- Catalogue Number
- Heater Pack Number (see selection table, Pages A-64 – A-64) or full load current.

Table A-52. Type BN16 NEMA — Manual or Automatic Reset Overload Relay

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Maximum Horsepower (1-Phase)</th>
<th>Magnet Coil Voltage (60 Hz)</th>
<th>Open Type 2-Pole Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>115 230</td>
<td>1/3 120 240</td>
<td>BN16AN0AC BN16AN0BC</td>
</tr>
<tr>
<td>1</td>
<td>115 230</td>
<td>2 120 240</td>
<td>BN16DN0AB BN16DN0BC</td>
</tr>
<tr>
<td>1P</td>
<td>115 230</td>
<td>3 120 240</td>
<td>BN16PN0AB BN16PN0BB</td>
</tr>
<tr>
<td>2</td>
<td>115 230</td>
<td>7-1/2 120 240</td>
<td>BN16GN0AB BN16GN0BB</td>
</tr>
<tr>
<td>3</td>
<td>115 230</td>
<td>7-1/2 120 240</td>
<td>BN16KN0A BN16KN0B</td>
</tr>
</tbody>
</table>

Note: Starter Catalogue Numbers do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, Pages A-64 – A-64.

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

Accessories Pages A-39 – A-47
Discount Symbol MC7

For more information visit: www.EatonCanada.ca

CA08102002K
Product Selection

Catalogue Number AN14GN0.

Table A-53. Type AN14/AN54 NEMA — C396 Manual or Selectable Reset Electronic Overload Relay — Non-reversing and Reversing

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Continuous Ampere Rating</th>
<th>Service Limit Current Rating (Ampere)</th>
<th>Maximum UL Horsepower</th>
<th>3-Pole Non-reversing</th>
<th>3-Pole Reversing</th>
<th>Vertical Reversing</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
<td></td>
</tr>
<tr>
<td>00</td>
<td>9</td>
<td>1/3 1</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1 2</td>
<td>3</td>
<td>3 5</td>
<td>5 5</td>
<td>AN14B00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2 3</td>
<td>3 7-1/2</td>
<td>7-1/2 10</td>
<td>15 25</td>
<td>AN14G00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>48</td>
<td>52</td>
<td>5</td>
<td>15 25 25</td>
<td>AN14G00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>104</td>
<td>—</td>
<td>25 30 50 50</td>
<td>AN14K00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>156</td>
<td>—</td>
<td>40 50 100 100</td>
<td>AN14M00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>311</td>
<td>—</td>
<td>75 100 200 200</td>
<td>AN14S00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>810</td>
<td>932</td>
<td>—</td>
<td>200 300 600 600</td>
<td>AN14U00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1215</td>
<td>1400</td>
<td>—</td>
<td>400 450 900 900</td>
<td>AN14V00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Underscore (_) indicates coil suffix required, see Table A-54.
2 Underscore (_) indicates OLR designation required, see Table A-55.
3 Starter is shipped unassembled. Catalogue Number includes overload relay and contactor. Not a direct dimensional replacement for Size 4 Starter with C306 bi-metallic overload.
4 Maximum horsepower rating of starters for 380V 50 Hz applications:

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Horsepower</th>
<th>1-1/2</th>
<th>5</th>
<th>10</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>150</th>
<th>300</th>
<th>600</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>1-1/2</td>
<td>5</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>150</td>
<td>300</td>
<td>600</td>
<td>900</td>
<td></td>
</tr>
</tbody>
</table>

5 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.

6 Common control. For separate 120V control, insert letter D in 7th position of listed Catalogue Number. EXAMPLE: AN54VND.___.

7 Uses CT with C396 46 mm OLR, see Table A-125

Table A-54. AC Suffix Code

<table>
<thead>
<tr>
<th>Coil Volts and Hertz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>240/60 or 220/50</td>
<td>B</td>
</tr>
<tr>
<td>480/60 or 440/50</td>
<td>C</td>
</tr>
<tr>
<td>600/60 or 550/50</td>
<td>D</td>
</tr>
<tr>
<td>238/60</td>
<td>E</td>
</tr>
<tr>
<td>277/60</td>
<td>F</td>
</tr>
<tr>
<td>208 - 240/60</td>
<td>G</td>
</tr>
<tr>
<td>240/60</td>
<td>H</td>
</tr>
<tr>
<td>380 – 415/50</td>
<td>J</td>
</tr>
<tr>
<td>550/50</td>
<td>K</td>
</tr>
<tr>
<td>240/50</td>
<td>N</td>
</tr>
<tr>
<td>240/50</td>
<td>U</td>
</tr>
<tr>
<td>337/60</td>
<td>V</td>
</tr>
<tr>
<td>48/60</td>
<td>W</td>
</tr>
<tr>
<td>48/60</td>
<td>Y</td>
</tr>
</tbody>
</table>

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

Table A-55. OLR Designation

<table>
<thead>
<tr>
<th>OLR</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E</td>
<td>Standard C396 OLR, SEL Reset, SEL Class</td>
</tr>
</tbody>
</table>

For more information visit: www.EatonCanada.ca
### Table A-57. Coil Data Notes

<table>
<thead>
<tr>
<th>P.U.</th>
<th>Pick-up time is the average time taken from closing of the coil circuit to main contact touch.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.O.</td>
<td>Drop-out time is the average time taken from opening of the coil circuit to main contact separation.</td>
</tr>
<tr>
<td>Cold</td>
<td>Cold coil data with a cold coil.</td>
</tr>
<tr>
<td>Hot</td>
<td>Hot coil data with a hot coil.</td>
</tr>
</tbody>
</table>

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 A-58. Specifications — Sizes 00 – 3

<table>
<thead>
<tr>
<th>Description</th>
<th>Contactor Catalogue Number/Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>CN15A NEMA Size 00</td>
</tr>
<tr>
<td>Configuration</td>
<td></td>
</tr>
<tr>
<td>Number of Poles</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>4th Pole NO (1)</td>
<td>Top (4) or Side (4)</td>
</tr>
<tr>
<td>Add-On Auxiliary Contacts</td>
<td></td>
</tr>
<tr>
<td>Frame Size</td>
<td>45 mm</td>
</tr>
<tr>
<td>Maximum Voltage Rating</td>
<td>600V AC</td>
</tr>
<tr>
<td>Continuous Ampere Ratings II</td>
<td>9A</td>
</tr>
<tr>
<td>Maximum Horsepower (hp)</td>
<td></td>
</tr>
<tr>
<td>1-Phase 115V</td>
<td>1/3</td>
</tr>
<tr>
<td>230V</td>
<td>2</td>
</tr>
<tr>
<td>3-Phase 260V</td>
<td>2-1/2</td>
</tr>
<tr>
<td>460V</td>
<td>2</td>
</tr>
<tr>
<td>575V</td>
<td>2</td>
</tr>
<tr>
<td>AC Magnet Coil Data</td>
<td></td>
</tr>
<tr>
<td>Pick-Up Volts — Cold</td>
<td>74%</td>
</tr>
<tr>
<td>Pick-Up Volts — Hot</td>
<td>78%</td>
</tr>
<tr>
<td>Pick-Up Volts — Cold</td>
<td>80</td>
</tr>
<tr>
<td>Pick-Up Volts — Cold</td>
<td>49</td>
</tr>
<tr>
<td>Pick-Up Volts — Cold</td>
<td>75</td>
</tr>
<tr>
<td>Sealed Voltamperes</td>
<td>49</td>
</tr>
<tr>
<td>Sealed Watts</td>
<td>2.4</td>
</tr>
<tr>
<td>Drop-Out Volts — Cold</td>
<td>45%</td>
</tr>
<tr>
<td>Drop-Out Volts — Hot</td>
<td>46%</td>
</tr>
<tr>
<td>Maximum Operation Rate — Ops/Hour</td>
<td>12,000</td>
</tr>
<tr>
<td>Pick-Up Time (mS)</td>
<td>12</td>
</tr>
<tr>
<td>Drop-Out Time (mS)</td>
<td>12</td>
</tr>
<tr>
<td>Coil Operating Range</td>
<td></td>
</tr>
<tr>
<td>% of Rated Voltage</td>
<td>-15% to +10%</td>
</tr>
<tr>
<td>DC Magnet Coil Data</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20° to 65°C</td>
</tr>
<tr>
<td>Maximum Operating Altitude (ft.)</td>
<td>6,000</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>20,000,000</td>
</tr>
<tr>
<td>Electrical Life (480V/60 Hz)</td>
<td>AC-3</td>
</tr>
<tr>
<td></td>
<td>AC-4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Wire Range</td>
<td></td>
</tr>
<tr>
<td>Power Terminals</td>
<td>12 – 16 stranded, 12 – 14 solid Cu</td>
</tr>
<tr>
<td>Control Terminals</td>
<td>12 – 16 stranded, 12 – 14 solid Cu</td>
</tr>
<tr>
<td>Power Terminal Torque</td>
<td>7</td>
</tr>
<tr>
<td>Line and Load — lb-in</td>
<td>18</td>
</tr>
<tr>
<td>Auxiliary Contact Rating</td>
<td>A600</td>
</tr>
</tbody>
</table>

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## Table A-59. Specifications — Sizes 4 – 8

<table>
<thead>
<tr>
<th>Description</th>
<th>CN15N NEMA Size 4</th>
<th>CN15S NEMA Size 5</th>
<th>CN15T NEMA Size 6</th>
<th>CN15U NEMA Size 7</th>
<th>CN15V NEMA Size 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configuration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Poles</td>
<td>2, 3</td>
<td>2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Auxiliary Contacts, Standard</td>
<td>Side NO (1)</td>
<td>Side NO (1)</td>
<td>Top left 2NO/2NC (1)</td>
<td>Top left 2NO/2NC (1)</td>
<td>Side 2NO/NC (1)</td>
</tr>
<tr>
<td>Add-On Auxiliary Contacts</td>
<td>Left side (3) or Right side (4)</td>
<td>Left side (3) or Right side (4)</td>
<td>Top right 2NO/2NC (1)</td>
<td>Top right 2NO/2NC (1)</td>
<td>NO/NC (2)</td>
</tr>
<tr>
<td>Frame Size</td>
<td>180 mm</td>
<td>180 mm</td>
<td>280 mm</td>
<td>280 mm</td>
<td>334 mm</td>
</tr>
<tr>
<td>Maximum Voltage Rating</td>
<td>600V AC</td>
<td>600V AC</td>
<td>600V AC</td>
<td>600V AC</td>
<td>600V AC</td>
</tr>
<tr>
<td>Continuous Ampere Ratings (I)</td>
<td>135A</td>
<td>270A</td>
<td>540A</td>
<td>810A</td>
<td>1215A</td>
</tr>
<tr>
<td>Maximum Horsepower (hp)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Phase</td>
<td>115V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Phase</td>
<td>200V</td>
<td>230V</td>
<td>460V</td>
<td>575V</td>
<td></td>
</tr>
<tr>
<td>AC Magnet Coil Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pick-Up Volts — Cold</td>
<td>72.5%</td>
<td>75%</td>
<td>75%</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Pick-Up Volts — Hot</td>
<td>76%</td>
<td>77%</td>
<td>75%</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Pick-Up Watts</td>
<td>240</td>
<td>240</td>
<td>1345</td>
<td>1345</td>
<td>2060</td>
</tr>
<tr>
<td>Sealed Voltamperes</td>
<td>100</td>
<td>100</td>
<td>25</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>Sealed Watts</td>
<td>272</td>
<td>272</td>
<td>22</td>
<td>22</td>
<td>60</td>
</tr>
<tr>
<td>Drop-Out Volts — Cold</td>
<td>54%</td>
<td>63%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drop-Out Volts — Hot</td>
<td>56%</td>
<td>64%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Operation Rate — Ops/Hour</td>
<td>2,400</td>
<td>2,400</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Pick-Up Time (mS)</td>
<td>28</td>
<td>25</td>
<td>105</td>
<td>105</td>
<td>70</td>
</tr>
<tr>
<td>Drop-Out Time (mS)</td>
<td>14</td>
<td>13</td>
<td>200</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>Coil Operating Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Rated Voltage</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
<td>-15% to +10%</td>
</tr>
<tr>
<td>DC Magnet Coil Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Operating Altitude (ft.)</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Electrical Life (480V/60 Hz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC-3</td>
<td>800,000</td>
<td>500,000</td>
<td>590,000</td>
<td>450,000</td>
<td>420,000</td>
</tr>
<tr>
<td>AC-4</td>
<td>70,000</td>
<td>34,000</td>
<td>7,400</td>
<td>5,000</td>
<td>4,200</td>
</tr>
<tr>
<td><strong>Wire Range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open — 3/0 – 8 Cu; Enclosed —</td>
<td>750 kcml — 2 or (2) 590,000</td>
<td>450,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 kcml — 6 Cu/Al</td>
<td>12 – 16 stranded, 12 – 16 stranded</td>
<td>12 – 16 stranded, 12 – 16 stranded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 – 14 solid Cu</td>
<td></td>
<td>12 – 14 solid Cu</td>
<td>12 – 14 solid Cu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Terminal Torque</td>
<td>200</td>
<td>550</td>
<td>550</td>
<td>550</td>
<td>500</td>
</tr>
<tr>
<td>Line and Load — lb-in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary Contact Rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For DC Magnet Coils (and coil data), see Accessories, Pages A-45 – A-46.

- 20 – 30% of rated coil voltage.
Technical Data and Specifications

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 application operational current (Ie), as found on the horizontal axis.
■ Read the estimated contact life along the vertical axis in number of operational cycles.

Figure A-17. AC-3 and AC-4 Utilization Categories
3-Pole Top Mounted Fuse Block Kit

IEC Sizes A – K, NEMA Sizes 00 – 2

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

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 A-43.

<table>
<thead>
<tr>
<th>Fuse Type</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class H – 30A 250V</td>
<td>C350KH21</td>
<td></td>
</tr>
<tr>
<td>Class R – 30A 250V</td>
<td>C350KR21</td>
<td></td>
</tr>
<tr>
<td>Class G – 15A 300V</td>
<td>C350KG37</td>
<td></td>
</tr>
<tr>
<td>Class G – 20A 300V</td>
<td>C350KG38</td>
<td></td>
</tr>
<tr>
<td>Class G – 30A 300V</td>
<td>C350KG31</td>
<td></td>
</tr>
<tr>
<td>Class G – 60A 300V</td>
<td>C350KG32</td>
<td></td>
</tr>
<tr>
<td>Class T – 30A 300V</td>
<td>C350KT31</td>
<td></td>
</tr>
<tr>
<td>Class T – 60A 300V</td>
<td>C350KT32</td>
<td></td>
</tr>
<tr>
<td>Class J – 30A 600V</td>
<td>C350JK61</td>
<td></td>
</tr>
<tr>
<td>Class J – 60A 600V</td>
<td>C350JK62</td>
<td></td>
</tr>
<tr>
<td>Type M – 30A 600V</td>
<td>C350KMD1</td>
<td></td>
</tr>
<tr>
<td>Type M – 60A 600V</td>
<td>C350KMD2</td>
<td></td>
</tr>
<tr>
<td>Class CC – 30A 600V</td>
<td>C350KCD1</td>
<td></td>
</tr>
<tr>
<td>Class CC – 60A 600V</td>
<td>C350KCD2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuse Block</th>
<th>Dimensions in Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Ampere</td>
</tr>
<tr>
<td>G</td>
<td>15, 20, 30</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>30</td>
</tr>
<tr>
<td>J</td>
<td>30, 60</td>
</tr>
<tr>
<td>M, CC</td>
<td>30, 60</td>
</tr>
<tr>
<td>R</td>
<td>30, 60</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Application</th>
<th>NEMA Size</th>
<th>IEC Size</th>
<th>Contactor Mounting</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 – 2</td>
<td>A – K</td>
<td>Horizontal</td>
<td>C321KM60B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>L – N</td>
<td>Horizontal</td>
<td>C321KM30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 to 4</td>
<td>N to P</td>
<td>Horizontal</td>
<td>C321KM43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>P – S</td>
<td>Horizontal</td>
<td>C321KM40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 to 5</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 to 6</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 to 6</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 to 7</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>—</td>
<td>Horizontal</td>
<td>C321KM34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or 5 to 5</td>
<td>P – S to 5</td>
<td>Vertical</td>
<td>C321KM55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 to 6</td>
<td>—</td>
<td>Vertical</td>
<td>C321KM65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>—</td>
<td>Vertical</td>
<td>C321KM66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 to 7</td>
<td>—</td>
<td>Vertical</td>
<td>C321KM67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Without cross-wiring.

For use with latest series product.

<table>
<thead>
<tr>
<th>Application</th>
<th>NEMA Size</th>
<th>IEC Size</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>A – C</td>
<td>—</td>
<td>C321KM60K14B</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>D – F</td>
<td>—</td>
<td>C321KM60K15B</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>—</td>
<td>—</td>
<td>C321KM60K16B</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>G – K</td>
<td>—</td>
<td>C321KM60K17</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>L and M</td>
<td>—</td>
<td>C321KM60K21</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>N</td>
<td>—</td>
<td>C321KM60K18</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>P – S</td>
<td>—</td>
<td>C321KM60K19</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>—</td>
<td>—</td>
<td>C321KM60K20</td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>—</td>
<td>—</td>
<td>C321KM60K44</td>
<td></td>
</tr>
</tbody>
</table>

Kit includes (2) NC auxiliary contacts.

For more information visit: www.EatonCanada.ca
Solid-State Timers

Solid-State Timer


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 A-64. Mounted Timer Product Selection

<table>
<thead>
<tr>
<th>Timing Range</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>.1 to 1.0 Seconds</td>
<td>C320TDN1</td>
<td></td>
</tr>
<tr>
<td>1 – 30 Seconds</td>
<td>C320TDN2</td>
<td></td>
</tr>
<tr>
<td>30 – 300 Seconds</td>
<td>C320TDN30</td>
<td></td>
</tr>
<tr>
<td>5 – 30 Minutes</td>
<td>C320TDN300</td>
<td></td>
</tr>
</tbody>
</table>

* Add operating voltage Suffix to Catalogue Number. A = 120V, B = 240V, E = 208V
* Rated 5 amperes pilot duty — not to be used on larger contactors.
* 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 A-65. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA Size 3, IEC Sizes L – N</td>
<td>C321SB18</td>
<td></td>
</tr>
<tr>
<td>NEMA Size 4, IEC Sizes A – S</td>
<td>C321SB19</td>
<td></td>
</tr>
<tr>
<td>NEMA Size 6</td>
<td>C321SB22</td>
<td></td>
</tr>
</tbody>
</table>

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 do not have to be installed 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 A-66. Product Selection

<table>
<thead>
<tr>
<th>Timing Range</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>.1 to 30 Seconds</td>
<td>C320TP1</td>
<td></td>
</tr>
<tr>
<td>10 to 180 Seconds</td>
<td>C320TP2</td>
<td></td>
</tr>
</tbody>
</table>

Table A-67. Maximum Ampere Ratings

<table>
<thead>
<tr>
<th>Description</th>
<th>Volts AC</th>
<th>120</th>
<th>240</th>
<th>480</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make Break</td>
<td>30</td>
<td>9</td>
<td>15</td>
<td>.75</td>
<td>6</td>
</tr>
</tbody>
</table>

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 A-68. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Min. Ordering Quantity (Std. Pkg.)</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear cover, no accessibility</td>
<td>50</td>
<td>C320PC3</td>
<td></td>
</tr>
<tr>
<td>Gray cover, no accessibility, with Auto only nib</td>
<td>50</td>
<td>C320PC4</td>
<td></td>
</tr>
<tr>
<td>Gray cover, no accessibility, with Manual only nib</td>
<td>50</td>
<td>C320PC5</td>
<td></td>
</tr>
<tr>
<td>Gray cover with FLA dial accessibility, A, B, C, D positions and Auto only nib</td>
<td>50</td>
<td>C320PC6</td>
<td></td>
</tr>
<tr>
<td>Gray cover with FLA dial accessibility, A, B, C, D positions and Manual only nib</td>
<td>50</td>
<td>C320PC7</td>
<td></td>
</tr>
</tbody>
</table>

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 A-69. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification Marker</td>
<td>C320DL2</td>
<td></td>
</tr>
</tbody>
</table>

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, C320FR fuse kit may be required for control circuit protection per NEC 430-72.

Table A-70. Product Selection

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. Amperes</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse Holder Only</td>
<td>15</td>
<td>C320FB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>C320FBR</td>
<td></td>
</tr>
</tbody>
</table>

Discount Symbol .......... MC7
DIN Rail Mounting Channel — 35 mm

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

Table A-71. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Meter Length</td>
<td>MC382MA1</td>
<td></td>
</tr>
</tbody>
</table>

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 A-72. Product Selection

<table>
<thead>
<tr>
<th>Application</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
</table>
| 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 A-73. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN Rail Mounting Channel</td>
<td>C320DN65</td>
<td></td>
</tr>
</tbody>
</table>

Transient Suppressor Kits

NEMA Sizes 00 – 2, IEC Sizes A – K

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.

Table A-74. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Coil Voltage</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient Suppressor</td>
<td>24/120V</td>
<td>C320TS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>208/240V</td>
<td>C320TS2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>277/480V</td>
<td>C320TS3</td>
<td></td>
</tr>
</tbody>
</table>

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 A-75. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Coil Voltage</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient Suppressor</td>
<td>120V</td>
<td>C320AS1</td>
<td></td>
</tr>
</tbody>
</table>
DC/AC Interface Module

The Catalogue 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 A-76.

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 A-76. Controller Coil Voltage Ranges

<table>
<thead>
<tr>
<th>Controller Catalogue Number Prefix</th>
<th>Controller Size or Rating</th>
<th>Coil Voltage Range</th>
<th>Volts AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE16, AE17, AE56, AE57, CE15, CE55</td>
<td>A – F</td>
<td>24 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G – K</td>
<td>48 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L – N</td>
<td>110 – 240</td>
<td></td>
</tr>
<tr>
<td>AN16, AN56, CN15, CN55</td>
<td>00 – 0</td>
<td>24 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 – 2</td>
<td>48 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>110 – 240</td>
<td></td>
</tr>
<tr>
<td>CN35</td>
<td>10 – 30A</td>
<td>24 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60A</td>
<td>48 – 240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100A</td>
<td>110 – 240</td>
<td></td>
</tr>
</tbody>
</table>

### Table A-77. Product Selection

<table>
<thead>
<tr>
<th>Coil Voltage</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V DC</td>
<td>C320DC2V5</td>
<td></td>
</tr>
<tr>
<td>6V DC</td>
<td>C320DC2V6</td>
<td></td>
</tr>
<tr>
<td>9V DC</td>
<td>C320DC2V9</td>
<td></td>
</tr>
<tr>
<td>12V DC</td>
<td>C320DC2V12</td>
<td></td>
</tr>
<tr>
<td>48V DC</td>
<td>C320DC2V48</td>
<td></td>
</tr>
</tbody>
</table>

Adhesive Dust Cover

NEMA Sizes 00 – 2, IEC Sizes A – K

Those 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.

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 A-78. Product Selection

<table>
<thead>
<tr>
<th>UL Ampere Rating</th>
<th>IEC 947 Ampere Rating</th>
<th>1NO Power Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductive 600V</td>
<td>Resistive 600V</td>
<td></td>
</tr>
<tr>
<td>115V 230V</td>
<td>Horsepower 1-Phase</td>
<td></td>
</tr>
<tr>
<td>480V</td>
<td>Locked Rotor 240V</td>
<td></td>
</tr>
<tr>
<td>Lighting Ballast Tungsten 600V</td>
<td>AC-1 600V</td>
<td></td>
</tr>
<tr>
<td>AC-3 600V</td>
<td>AC-5a AC-5b 480V</td>
<td></td>
</tr>
<tr>
<td>15 20 1/2 2 96</td>
<td>20 20 12 18</td>
<td>C320PPD10</td>
</tr>
</tbody>
</table>

Discount Symbol: MC7
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.

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

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

For reference only — not part of Catalogue Number. See above.

Discount Symbol :................MC7
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 A-86. Auxiliary Contacts

<table>
<thead>
<tr>
<th>Catalogue Number</th>
<th>Size</th>
<th>Poles</th>
<th>Available Mounting Positions</th>
<th>Open Type</th>
<th>Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE16</td>
<td>A – K</td>
<td>3</td>
<td>T1, L1</td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>AN16</td>
<td>00</td>
<td>3</td>
<td>T1, L1, R1</td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td></td>
<td>0 – 2</td>
<td>3</td>
<td>T1, L1</td>
<td></td>
<td>L1</td>
</tr>
<tr>
<td>AE56</td>
<td>A – K</td>
<td>3</td>
<td>L1, R1</td>
<td></td>
<td>L1, R1</td>
</tr>
<tr>
<td>AN56</td>
<td>00 – 2</td>
<td>3</td>
<td>T1, T2</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>CE15</td>
<td>A – C</td>
<td>2 – 4</td>
<td>T1, L1, R1</td>
<td>L1, R1</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>D – K</td>
<td>3</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>G – J</td>
<td>4</td>
<td>T1, R1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>G – J</td>
<td>5</td>
<td>T1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>CN15</td>
<td>00</td>
<td>2 – 4</td>
<td>T1, L1, R1</td>
<td>L1</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>0 – 2</td>
<td>2 – 3</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1, 2</td>
<td>4</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>CN35</td>
<td>10A</td>
<td>2 – 4</td>
<td>T1, L1, R1</td>
<td>L1</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>20 – 60A</td>
<td>2 – 3</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>60A</td>
<td>4</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>60A</td>
<td>5</td>
<td>T1, L1</td>
<td></td>
<td>—</td>
</tr>
<tr>
<td>CE55</td>
<td>A – K</td>
<td>3</td>
<td>L1, R1</td>
<td></td>
<td>L1, R1</td>
</tr>
<tr>
<td>CN55</td>
<td>00 – 2</td>
<td>3</td>
<td>T1, T2</td>
<td></td>
<td>—</td>
</tr>
</tbody>
</table>

1. Available positions on contactors or starters other than what is factory installed.
2. When two pneumatic contactor or starters are mounted on the same contactor, the auxiliary contact positions are available.

NEMA Sizes 3 – 8, IEC Sizes L – S
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 A-87. Mounting Positions

<table>
<thead>
<tr>
<th>Size</th>
<th>Available Mounting Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA Size 3, IEC Sizes L – N</td>
<td>R2, R3, L1, L2, L3</td>
</tr>
<tr>
<td>NEMA Sizes 4 – 5, IEC Sizes P – S</td>
<td>L2, L3, R1, R2, R3</td>
</tr>
<tr>
<td>NEMA Sizes 6 – 7</td>
<td>R1</td>
</tr>
<tr>
<td>NEMA Size 8</td>
<td>L2, R2</td>
</tr>
</tbody>
</table>

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

Figure A-21. Auxiliary Contact Location

Figure A-22. Auxiliary Contact Location
DC Magnet Coils

When Ordering Specify

Conversion Kit for Field Assembly

- Catalogue Number
- Factory Installed DC Coil

For factory installed DC magnet coils 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 Catalogue Number.

Non-reversing Kit Consists of:
- 1 Encapsulated DC magnet coil
- 1 NCI or NO/NCI side mounted auxiliary contact

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.

Example: For Size 0 AC contactor with a 24V DC coil, change AN16BN0AC to AN16BN0T1C.

Table A-88. Product Selection

<table>
<thead>
<tr>
<th>Contactor or Starter Size</th>
<th>Conversion Data</th>
<th>Complete Conversion Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA</td>
<td>Magnet Coil</td>
<td>NCI Interlock</td>
</tr>
<tr>
<td>00 and 0 CN35 - A, B, D D15 Relays</td>
<td>12 9-2988-11 6.4/28 76.8/3.36 C320KD1</td>
<td>C335KD3R1 1.0 (.5) R1</td>
</tr>
<tr>
<td>24 9-2988-12 3.2/14 76.8/3.36 C320KD1</td>
<td>C335KD3T1 T1</td>
<td></td>
</tr>
<tr>
<td>48 9-2988-13 1.6/07 76.8/3.36 C320KD1</td>
<td>C335KD3W1 W1</td>
<td></td>
</tr>
<tr>
<td>120 9-2988-14 0.6/028 76.8/3.36 C320KD1</td>
<td>C335KD3A1 A1</td>
<td></td>
</tr>
<tr>
<td>00 and 0 CN35 - A, B, D D15 Relays</td>
<td>24 9-2988-11 6.4/28 76.8/3.36 C320KD2 1.0 (.5) R4</td>
<td></td>
</tr>
<tr>
<td>24 9-2988-12 3.2/14 76.8/3.36 C320KD2 1.0 (.5) R4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 9-2988-13 1.6/07 76.8/3.36 C320KD2 1.0 (.5) R4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 9-2988-14 0.6/028 76.8/3.36 C320KD2 1.0 (.5) R4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 and 2 CN35 - G</td>
<td>12 9-2990-1 15.4/42 185/4.98 C320KD5</td>
<td>C335KD4R1 2.0 (.9) R1</td>
</tr>
<tr>
<td>24 9-2990-2 7.7/21 185/4.96 C320KD5</td>
<td>C335KD4T1 T1</td>
<td></td>
</tr>
<tr>
<td>48 9-2990-3 3.9/11 185/5.04 C320KD5</td>
<td>C335KD4W1 W1</td>
<td></td>
</tr>
<tr>
<td>120 9-2990-4 1.5/041 185/5.87 C320KD5</td>
<td>C335KD4A1 A1</td>
<td></td>
</tr>
<tr>
<td>3 CN35 - K</td>
<td>24 9-3002-1 24.40 234/8.44 C320KD6</td>
<td>C335KD5R1 2.0 (.9) R1</td>
</tr>
<tr>
<td>48 9-3002-2 12/20 288/4.75 C320KD6</td>
<td>C335KD5T1 T1</td>
<td></td>
</tr>
<tr>
<td>120 9-3002-3 6.1/097 295/4.67 C320KD6</td>
<td>C335KD5W1 W1</td>
<td></td>
</tr>
<tr>
<td>2 and 5 CN35 - N, S</td>
<td>24 9-2026-4 18/22 400/5.3 C320KD7</td>
<td>C335KD5A1 A1</td>
</tr>
<tr>
<td>48 9-2026-5 9/11 400/5.2 C320KD7</td>
<td>C335KD5W1 W1</td>
<td></td>
</tr>
<tr>
<td>120 9-2026-2 3.3/05 450/5.4 C320KD7</td>
<td>C335KD5A1 A1</td>
<td></td>
</tr>
<tr>
<td>240 9-2026-3 1.7/02 440/4.9 C320KD7</td>
<td>C335KD5B1 B1</td>
<td></td>
</tr>
<tr>
<td>Reversing 00 and 0 CN35 - A, B, D D15 Relays</td>
<td>12 2(9-2988-1) 6.4/28 76.8/3.36 C320KD1</td>
<td>C335RD3R1 1.0 (.5) R1</td>
</tr>
<tr>
<td>24 2(9-2988-2) 3.2/14 76.8/3.36 C320KD1</td>
<td>C335RD3T1 T1</td>
<td></td>
</tr>
<tr>
<td>48 2(9-2988-3) 1.6/07 76.8/3.36 C320KD1</td>
<td>C335RD3W1 W1</td>
<td></td>
</tr>
<tr>
<td>120 2(9-2988-4) 0.6/028 76.8/3.36 C320KD1</td>
<td>C335RD3A1 A1</td>
<td></td>
</tr>
<tr>
<td>1 and 2 CN35 - G</td>
<td>12 2(9-2990-1) 15.4/42 185/4.98 C320KD3</td>
<td>C335RD3R1 1.0 (.5) R1</td>
</tr>
<tr>
<td>24 2(9-2990-2) 7.7/21 185/4.96 C320KD3</td>
<td>C335RD3T1 T1</td>
<td></td>
</tr>
<tr>
<td>48 2(9-2990-3) 3.9/11 185/5.04 C320KD3</td>
<td>C335RD3G1 G1</td>
<td></td>
</tr>
<tr>
<td>120 2(9-2990-4) 1.5/041 185/5.87 C320KD3</td>
<td>C335RD3A1 A1</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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.

Available factory assembled only.

Discount Symbol: MC7

For more information visit: www.EatonCanada.ca
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.

Competitive Mounting Plates


Table A-88. Product Selection

<table>
<thead>
<tr>
<th>Freedom NEMA Size</th>
<th>Index Number</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>C321CMP0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>C321CMP1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C321CMP2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C321CMP3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>C321CMP4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>C321CMP5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Handling Number Only — Does not appear on product. The handling number is stamped on the carton label only.
### Table A-90. Competitive Mounting Plates — Approximate Dimensions and Shipping Weights

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Catalogue Number</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 00</td>
<td>C321CMP0</td>
<td>3.25 (82.6) 8.50 (215.9)</td>
<td>.63 (.29)</td>
</tr>
<tr>
<td>1</td>
<td>C321CMP1</td>
<td>3.75 (95.3) 9.50 (241.3)</td>
<td>.90 (.41)</td>
</tr>
<tr>
<td>2</td>
<td>C321CMP2</td>
<td>3.75 (95.3) 10.25 (260.4)</td>
<td>1.20 (.54)</td>
</tr>
<tr>
<td>3</td>
<td>C321CMP3</td>
<td>6.00 (152.4) 12.75 (323.9)</td>
<td>2.40 (1.09)</td>
</tr>
<tr>
<td>4</td>
<td>C321CMP4</td>
<td>7.50 (190.5) 13.50 (342.9)</td>
<td>3.00 (1.36)</td>
</tr>
<tr>
<td>5</td>
<td>C321CMP5</td>
<td>11.00 (279.4) 19.00 (482.6)</td>
<td>6.03 (3.01)</td>
</tr>
</tbody>
</table>

### Figure A-24. Approximate Dimensions

#### Special Modifications

### Table A-91. For Catalogue Numbers AE16, AE17, AN16, AE56, AE57, AN56, CE15, CN15, CN35, CE55, CN55

<table>
<thead>
<tr>
<th>Addition or Special Feature</th>
<th>Starter Size and Price Adder — NEMA/IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Circuit</td>
<td></td>
</tr>
<tr>
<td>Extra Auxiliary Circuit, Factory Installed NO or NC — each contact</td>
<td></td>
</tr>
<tr>
<td>Transient Suppressor</td>
<td></td>
</tr>
<tr>
<td>Power Circuit</td>
<td></td>
</tr>
<tr>
<td>Contactor/Starter for Ring Lug Capability — Add Mod Code T16 to Catalogue Number</td>
<td></td>
</tr>
<tr>
<td>(Power Terminals Only, Control Terminals as Standard)</td>
<td></td>
</tr>
<tr>
<td>Standalone Overload Relays Can Not Accept Ring Lugs on Line Side</td>
<td></td>
</tr>
<tr>
<td>Factory Installed Dust Covers</td>
<td></td>
</tr>
<tr>
<td>Factory Installed C320DSTCVR — Add Mod Code -53 to Catalogue Number</td>
<td></td>
</tr>
</tbody>
</table>

*These modifications are generally available in Kit form at lower cost. See specific product sections for Kit listings.*
### Magnet Coils

<table>
<thead>
<tr>
<th>Description</th>
<th>NEMA Size 00-0</th>
<th>Price</th>
<th>NEMA Size 00</th>
<th>Price</th>
<th>NEMA Size 0</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Pole</td>
<td>9-2875-1</td>
<td>9-2875-1</td>
<td>9-2875-1</td>
<td>9-2875-1</td>
<td>9-2875-1</td>
<td>9-2875-1</td>
</tr>
<tr>
<td>3-Pole</td>
<td>9-2875-3</td>
<td>9-2875-3</td>
<td>9-2875-3</td>
<td>9-2875-3</td>
<td>9-2875-3</td>
<td>9-2875-3</td>
</tr>
<tr>
<td>4-Pole</td>
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</table>

### Magnet Frame Armature

#### Lower Magnet Frame

<table>
<thead>
<tr>
<th>Description</th>
<th>NEMA Size 1</th>
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<th>NEMA Size 2</th>
<th>Price</th>
<th>NEMA Size 3</th>
<th>Price</th>
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</thead>
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<td>4-Pole</td>
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<td>5-Pole</td>
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#### Upper Magnet Frame

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<th>NEMA Size 0</th>
<th>Price</th>
<th>NEMA Size 0</th>
<th>Price</th>
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<tbody>
<tr>
<td>2-Pole</td>
<td>9-2703-1</td>
<td>9-2703-1</td>
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<td>9-2703-1</td>
<td>9-2703-1</td>
<td>9-2703-1</td>
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<tr>
<td>4-Pole</td>
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<td>9-2703-3</td>
<td>9-2703-3</td>
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<td>9-2703-3</td>
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</tr>
<tr>
<td>5-Pole</td>
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#### Magnets Coils

<table>
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<th>NEMA Size 0</th>
<th>Price</th>
<th>NEMA Size 0</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>2-Pole</td>
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<td>9-2703-1</td>
<td>9-2703-1</td>
<td>9-2703-1</td>
<td>9-2703-1</td>
<td>9-2703-1</td>
</tr>
<tr>
<td>4-Pole</td>
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<td>9-2703-3</td>
<td>9-2703-3</td>
<td>9-2703-3</td>
<td>9-2703-3</td>
<td>9-2703-3</td>
</tr>
<tr>
<td>5-Pole</td>
<td>9-2703-4</td>
<td>9-2703-4</td>
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<td>9-2703-4</td>
<td>9-2703-4</td>
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</table>

#### Magnet Frame Armature

- Lower Magnet Frame
- Upper Magnet Frame

#### Contact Kits

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

Table A-22. For Catalogue Numbers AN16, AN30, AN40, AN56, AN70, AN80, AN800, CN15, CN35, and CN55 Contactors and Starters

[For more information visit: www.EatonCanada.ca]

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**Discount Symbol:** MC17

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**CA08102002K**
### Table A-2. For Catalogue Numbers AN16, AN30, AN40, AN56, AN70, AN80, AN800, CN15, CN35 and CN55 Contactors and Starters (Continued)

<table>
<thead>
<tr>
<th>Description</th>
<th>NEMA Size 4</th>
<th>NEMA Size 5</th>
<th>NEMA Size 6</th>
</tr>
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<td></td>
<td>Part No.</td>
<td>Part No.</td>
<td></td>
</tr>
<tr>
<td>Renewal Parts Publication Number</td>
<td>20428</td>
<td>20428</td>
<td>20429</td>
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#### Contact Kits

<table>
<thead>
<tr>
<th>2-Pole</th>
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<th>6-26</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Pole</td>
<td>6-44-2</td>
<td>6-26-2</td>
</tr>
<tr>
<td></td>
<td>6-45</td>
<td>6-45-2</td>
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<td>6-601</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-648</td>
</tr>
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#### Magnet Coils

<table>
<thead>
<tr>
<th>Cells</th>
<th>Coils</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V 60 Hz or 110V 50 Hz</td>
<td>A</td>
<td>9-1891-1</td>
</tr>
<tr>
<td>240V 60 Hz or 220V 50 Hz</td>
<td>B</td>
<td>9-1891-2</td>
</tr>
<tr>
<td>480V 60 Hz or 440V 50 Hz</td>
<td>C</td>
<td>9-1891-3</td>
</tr>
<tr>
<td>600V 60 Hz or 550V 50 Hz</td>
<td>D</td>
<td>9-1891-4</td>
</tr>
<tr>
<td>208V 60 Hz</td>
<td>E</td>
<td>9-1891-13</td>
</tr>
<tr>
<td>277V 60 Hz</td>
<td>H</td>
<td>9-1891-26</td>
</tr>
<tr>
<td>208/240V 60Hz</td>
<td>J</td>
<td>9-1891-20</td>
</tr>
<tr>
<td>240V 50Hz</td>
<td>K</td>
<td>9-1891-20</td>
</tr>
<tr>
<td>380V 50Hz</td>
<td>L</td>
<td>9-1891-20</td>
</tr>
<tr>
<td>415V 50Hz</td>
<td>M</td>
<td>9-1891-20</td>
</tr>
<tr>
<td>550V 50Hz</td>
<td>N</td>
<td>9-1891-20</td>
</tr>
<tr>
<td>24V 60 Hz</td>
<td>T</td>
<td>9-1891-15</td>
</tr>
<tr>
<td>24V 50 Hz</td>
<td>U</td>
<td>9-1891-16</td>
</tr>
<tr>
<td>48V 60 Hz</td>
<td>W</td>
<td>9-1891-18</td>
</tr>
<tr>
<td>48V 50 Hz</td>
<td>Y</td>
<td>9-1891-18</td>
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#### Overload Relays

For replacement on existing starters
3-Pole — Ambient Compensated Bimetallic

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Price Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-6530-4</td>
<td>42-3564</td>
</tr>
<tr>
<td>10-6530-4</td>
<td>42-3598</td>
</tr>
</tbody>
</table>

#### Current Transformer

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Price Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-601</td>
<td>42-3564</td>
</tr>
<tr>
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<td>42-3598</td>
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</table>

#### Magnet Frame Armature

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Price Contactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-2705-8</td>
<td>9-3006-8</td>
</tr>
<tr>
<td>9-2705-6</td>
<td>9-3006-6</td>
</tr>
<tr>
<td>9-2705-4</td>
<td>9-3006-4</td>
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<tr>
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<tr>
<td>9-3006-9</td>
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</tbody>
</table>

#### Feeder Group Renewal

<table>
<thead>
<tr>
<th>Volts</th>
<th>Hertz</th>
<th>NEMA Size 4</th>
<th>NEMA Size 5</th>
<th>NEMA Size 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Part No.</td>
<td>Part No.</td>
<td></td>
</tr>
<tr>
<td>110 – 120</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>220 – 240</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>440 – 480</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>550 – 600</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>238</td>
<td>5060</td>
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<td>—</td>
<td>—</td>
</tr>
<tr>
<td>380 – 415</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>48 – 52</td>
<td>5060</td>
<td>—</td>
<td>—</td>
<td>—</td>
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</tbody>
</table>

---

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

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

Discount Symbol ......................... MC17

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
### Feeder Group Renewal

#### Current Transformer

<table>
<thead>
<tr>
<th>Volts</th>
<th>Hertz</th>
<th>NEMA Size 7</th>
<th>NEMA Size 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 – 120</td>
<td>50/60</td>
<td>9-2705</td>
<td>9-2705</td>
</tr>
<tr>
<td>220 – 240</td>
<td>50/60</td>
<td>9-2705-2</td>
<td>9-2705-2</td>
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<tr>
<td>440 – 480</td>
<td>50/60</td>
<td>9-2705-3</td>
<td>9-2705-3</td>
</tr>
<tr>
<td>550 – 600</td>
<td>50/60</td>
<td>9-2705-4</td>
<td>9-2705-4</td>
</tr>
<tr>
<td>208</td>
<td>50/60</td>
<td>9-2705-5</td>
<td>9-2705-5</td>
</tr>
<tr>
<td>380 – 415</td>
<td>50/60</td>
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</tr>
<tr>
<td>46 – 52</td>
<td>50/60</td>
<td>9-2705-8</td>
<td>9-2705-8</td>
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</table>

### Overload Relays

#### Lower Magnet Frame

#### Upper Magnet Frame

#### Ambient Compensated Bimetallic

### Contact Kits

<table>
<thead>
<tr>
<th>2-Pole</th>
<th>3-Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-613</td>
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### Table A-92 Price

<table>
<thead>
<tr>
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### Magnet Frame Armature

For replacement on existing starters, use:

- 3-Pole  — Ambient Compensated Bimetallic
- C306DN3B

### Current Transformer

<table>
<thead>
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<td>42-3598-3</td>
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</table>

### Volt / Hertz

<table>
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<th>Volts</th>
<th>Hertz</th>
<th>Part No.</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
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<td></td>
<td></td>
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<tr>
<td>9-2698-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-2698-3</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
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<td>9-2698-11</td>
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</table>

### Note

- Consult Eaton.
- Voltage ratings of the main coils must match those of the feeder group for proper operation of the starter/contactor.
- Discount Symbol: MC17
Non-reversing Contactors

Table A-93. Approximate Dimensions and Shipping Weights — Open Type

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Dimensions in Inches (mm)</th>
<th>Mounting</th>
<th>F</th>
<th>G</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wide A</td>
<td>High B</td>
<td>Deep C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>00</td>
<td>2 – 4</td>
<td>1.75 (44.5)</td>
<td>3.88 (98.6)</td>
<td>3.49 (88.6)</td>
<td>1.50 (38.1)</td>
<td>3.38 (85.9)</td>
</tr>
<tr>
<td>0</td>
<td>2 – 3</td>
<td>1.75 (44.5)</td>
<td>3.88 (98.6)</td>
<td>3.49 (88.6)</td>
<td>1.50 (38.1)</td>
<td>3.38 (85.9)</td>
</tr>
<tr>
<td>1 – 2</td>
<td>2 – 3</td>
<td>2.56 (65.0)</td>
<td>5.05 (128.3)</td>
<td>4.44 (112.8)</td>
<td>2.00 (50.8)</td>
<td>4.50 (114.3)</td>
</tr>
<tr>
<td>1 – 2</td>
<td>4</td>
<td>3.44 (87.4)</td>
<td>5.05 (128.3)</td>
<td>4.44 (112.8)</td>
<td>2.00 (50.8)</td>
<td>4.50 (114.3)</td>
</tr>
<tr>
<td>1 – 2</td>
<td>5</td>
<td>4.32 (109.7)</td>
<td>5.05 (128.3)</td>
<td>4.44 (112.8)</td>
<td>2.00 (50.8)</td>
<td>4.50 (114.3)</td>
</tr>
<tr>
<td>3</td>
<td>2 – 3</td>
<td>4.08 (103.6)</td>
<td>7.17 (182.1)</td>
<td>5.94 (150.9)</td>
<td>3.00 (76.2)</td>
<td>6.63 (168.4)</td>
</tr>
<tr>
<td>4</td>
<td>2 – 3</td>
<td>7.05 (179.1)</td>
<td>9.11 (231.4)</td>
<td>7.25 (184.2)</td>
<td>6.00 (152.4)</td>
<td>8.50 (215.9)</td>
</tr>
<tr>
<td>5</td>
<td>2 – 3</td>
<td>7.05 (179.1)</td>
<td>13.12 (333.2)</td>
<td>7.78 (197.6)</td>
<td>6.00 (152.4)</td>
<td>12.50 (317.5)</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>8.63 (219.2)</td>
<td>13.54 (343.9)</td>
<td>8.88 (225.6)</td>
<td>4.33 (110.0)</td>
<td>8.63 (219.2)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>11.02 (279.9)</td>
<td>19.30 (490.2)</td>
<td>11.46 (291.1)</td>
<td>6.89 (175.0)</td>
<td>11.02 (279.9)</td>
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<tr>
<td>8</td>
<td>3</td>
<td>13.00 (330.2)</td>
<td>24.50 (622.3)</td>
<td>13.63 (346.2)</td>
<td>4.22 (1072)</td>
<td>14.86 (377.4)</td>
</tr>
</tbody>
</table>

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

Figure A-25. Approximate Dimensions
NEMA Contactors & Starters
Freedom

July 2008

Reversing Contactors

Table A-94. Approximate Dimensions and Shipping Weights — Open Type

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide A</td>
<td>High B</td>
</tr>
<tr>
<td>00 – 0</td>
<td>4.20 (106.7)</td>
<td>4.35 (110.5)</td>
</tr>
<tr>
<td>1 – 2</td>
<td>5.71 (145.0)</td>
<td>5.05 (128.3)</td>
</tr>
<tr>
<td>3</td>
<td>8.70 (221.0)</td>
<td>7.17 (182.1)</td>
</tr>
<tr>
<td>4</td>
<td>14.68 (372.9)</td>
<td>9.11 (231.4)</td>
</tr>
<tr>
<td>5</td>
<td>14.50 (368.3)</td>
<td>12.25 (311.2)</td>
</tr>
<tr>
<td>6</td>
<td>19.77 (502.2)</td>
<td>16.61 (421.9)</td>
</tr>
<tr>
<td>7</td>
<td>20.00 (711.2)</td>
<td>26.75 (679.5)</td>
</tr>
<tr>
<td>8</td>
<td>30.13 (765.3)</td>
<td>39.00 (990.6)</td>
</tr>
</tbody>
</table>

Includes cross wiring.

Figure A-26. Approximate Dimensions

For more information visit: www.EatonCanada.ca
Non-reversing Starters, Bi-Metallic Overload

Table A-95. Approximate Dimensions and Shipping Weights — Open Type

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide A</td>
<td>High B</td>
</tr>
<tr>
<td>00 – 0</td>
<td>1.80 (45.7)</td>
<td>6.60 (167.6)</td>
</tr>
<tr>
<td>1 – 1P</td>
<td>2.56 (65.0)</td>
<td>7.08 (179.8)</td>
</tr>
<tr>
<td>2</td>
<td>2.56 (65.0)</td>
<td>8.98 (225.2)</td>
</tr>
<tr>
<td>3</td>
<td>4.08 (103.6)</td>
<td>11.35 (288.3)</td>
</tr>
<tr>
<td>4</td>
<td>7.06 (179.1)</td>
<td>12.06 (306.3)</td>
</tr>
<tr>
<td>5</td>
<td>7.00 (177.8)</td>
<td>17.77 (451.4)</td>
</tr>
<tr>
<td>6</td>
<td>9.47 (240.5)</td>
<td>21.69 (550.9)</td>
</tr>
<tr>
<td>7</td>
<td>15.13 (384.3)</td>
<td>29.13 (739.9)</td>
</tr>
<tr>
<td>8</td>
<td>15.13 (384.3)</td>
<td>34.50 (876.3)</td>
</tr>
</tbody>
</table>

Figure A-27. Approximate Dimensions

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

For more information visit: www.EatonCanada.ca
Reversing Starters, Bi-Metallic Overload

Table A-96. Approximate Dimensions and Shipping Weights — Open Type

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Mounting D1</th>
<th>E1</th>
<th>F</th>
<th>G</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 – 0</td>
<td>Wide (A) 4.20 (106.7) B 7.38 (187.5) C 3.52 (89.4) D 5.50 (88.9) E 6.87 (174.5)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4.90 (124.5)</td>
</tr>
<tr>
<td>00 – 0</td>
<td>1 5.71 (145.0) B 7.08 (179.8) C 4.44 (112.8) D 5.25 (133.4) E 5.75 (146.1)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>5.80 (142.3)</td>
</tr>
<tr>
<td>00 – 0</td>
<td>2 5.71 (145.0) B 8.08 (205.2) C 4.44 (112.8) D 5.25 (133.4) E 6.75 (171.5)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>5.80 (142.3)</td>
</tr>
<tr>
<td>00 – 0</td>
<td>3 8.70 (221.0) B 11.35 (288.3) C 5.94 (150.9) D 7.00 (177.8) E 10.81 (274.6)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>20.0 (91.1)</td>
</tr>
<tr>
<td>00 – 0</td>
<td>4 14.68 (372.9) B 12.06 (306.3) C 7.25 (184.2) D 15.50 (392.9) E 8.50 (215.9)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>49.0 (22.2)</td>
</tr>
<tr>
<td>5</td>
<td>14.50 (368.3) B 12.77 (324.4) C 7.76 (197.1) D 15.50 (392.9) E 16.00 (406.4)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>68.0 (30.9)</td>
</tr>
<tr>
<td>6</td>
<td>19.77 (502.2) B 22.63 (574.8) C 9.90 (251.5) D 18.00 (457.2) E 18.00 (457.2)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>90.0 (40.9)</td>
</tr>
<tr>
<td>6</td>
<td>28.06 (712.7) B 32.13 (816.1) C 12.70 (322.6) D 12.75 (323.9) E 21.25 (539.8)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>175.0 (79.5)</td>
</tr>
<tr>
<td>6</td>
<td>30.38 (771.7) B 41.50 (1054.1) C 14.70 (373.4) D 14.13 (358.9) E 16.75 (425.6)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>430.0 (195.2)</td>
</tr>
</tbody>
</table>

Includes cross wiring overhang.

Figure A-28. Approximate Dimensions

See Catalogue listings for type and location of auxiliary contacts supplied with a particular starter.
Reversing Starters — Vertical Construction, Bi-Metallic Overload

Table A-97. Approximate Dimensions and Shipping Weights — AN56V Open Vertical Starter

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>4.0 (1.8)</td>
</tr>
<tr>
<td>1</td>
<td>4.25 (108.0) 12.05 (306.1) 3.84 (97.5) 2.00 (50.8) 11.50 (292.1)</td>
<td>1.00 (25.4) 9.0 (4.1)</td>
</tr>
<tr>
<td>2</td>
<td>4.25 (108.0) 12.05 (306.1) 3.86 (98.0) 2.00 (50.8) 11.50 (292.1)</td>
<td>1.00 (25.4) 9.5 (4.3)</td>
</tr>
<tr>
<td>3</td>
<td>9.25 (235.0) 16.75 (425.5) 5.18 (131.6) 715 (181.6) 16.07 (408.2)</td>
<td>1.50 (38.1) 21.0 (9.5)</td>
</tr>
<tr>
<td>4</td>
<td>9.08 (230.0) 19.84 (503.9) 5.18 (131.6) 8.00 (203.2) 18.51 (470.2)</td>
<td>1.50 (38.1) 50.0 (22.7)</td>
</tr>
</tbody>
</table>

Wire overhang 1.00 mm left, 50 mm right.

Figure A-29. Approximate Dimensions
## Multispeed Starters, Bi-Metallic Overload

### Table A-98. Approximate Dimensions and Shipping Weights — AN700 Open Vertical Starter

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Mounting Zone F</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide A</td>
<td>High B</td>
<td>Deep C</td>
</tr>
<tr>
<td>2-Speed — Selective Control — Separate Winding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>5.19 (132)</td>
<td>7.38 (188)</td>
<td>3.52 (89)</td>
</tr>
<tr>
<td>1</td>
<td>5.66 (144)</td>
<td>7.08 (180)</td>
<td>4.42 (112)</td>
</tr>
<tr>
<td>2</td>
<td>5.66 (144)</td>
<td>8.09 (205)</td>
<td>4.42 (112)</td>
</tr>
<tr>
<td>3</td>
<td>8.72 (221)</td>
<td>11.35 (288)</td>
<td>5.89 (150)</td>
</tr>
<tr>
<td>4</td>
<td>14.68 (373)</td>
<td>12.06 (306)</td>
<td>7.25 (184)</td>
</tr>
<tr>
<td>5</td>
<td>14.50 (368)</td>
<td>17.82 (453)</td>
<td>7.76 (197)</td>
</tr>
<tr>
<td>2-Speed — Selective Control — Reconnectable Winding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8.62 (219)</td>
<td>7.06 (179)</td>
<td>3.82 (91)</td>
</tr>
<tr>
<td>1</td>
<td>8.97 (228)</td>
<td>7.12 (181)</td>
<td>4.72 (120)</td>
</tr>
<tr>
<td>2</td>
<td>8.90 (226)</td>
<td>6.62 (162)</td>
<td>4.75 (121)</td>
</tr>
<tr>
<td>3</td>
<td>16.00 (406)</td>
<td>15.46 (393)</td>
<td>6.38 (162)</td>
</tr>
<tr>
<td>4</td>
<td>15.46 (393)</td>
<td>31.00 (787)</td>
<td>7.74 (197)</td>
</tr>
</tbody>
</table>

---

**Figure A-30. Approximate Dimensions**

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

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
Non-reversing Starters, C396 Electronic Overload

Table A-99. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Mounting Wide</th>
<th>High D</th>
<th>High E</th>
<th>Wide D1</th>
<th>High E1</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-0</td>
<td>2.13 (54.0) 6.60 (167.6) 3.65 (92.8) 1.01 (25.7) 6.18 (157.6)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>2.59 (65.9) 7.08 (179.7) 4.49 (114.0) 2.00 (50.8) 6.50 (165.1) 1.29 (32.8)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>2.59 (65.9) 8.09 (205.1) 4.49 (114.0) 2.00 (50.8) 7.50 (190.5) 1.29 (32.8) 6.50 (165.1)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>4.09 (103.9) 11.40 (290.6) 5.92 (147.9) 3.00 (76.2) 10.81 (274.6) 1.50 (38.1) 6.63 (168.3)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Consult Eaton.
Table A-100. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide</td>
<td>High</td>
<td>Deep</td>
<td>Mounting</td>
<td>Wide</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>D1</td>
</tr>
<tr>
<td>4</td>
<td>7.00 (177.8)</td>
<td>9.11 (231.4)</td>
<td>21.7 (551.2)</td>
<td>6.00 (152.4)</td>
<td>8.50 (215.8)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7.64 (194.0)</td>
<td>17.86 (453.7)</td>
<td>25.7 (652.4)</td>
<td>6.00 (152.4)</td>
<td>16.01 (406.6)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>9.47 (240.5)</td>
<td>21.69 (551.0)</td>
<td>9.89 (251.2)</td>
<td>3.10 (79.7)</td>
<td>18.00 (457.2)</td>
<td>3.18 (80.9)</td>
</tr>
</tbody>
</table>

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 A-32. Approximate Dimensions
### Table A-101. Approximate Dimensions and Shipping Weights — C396 Electronic Overload

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Dimensions in Inches (mm)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide A</td>
<td>High B</td>
<td>Deep C</td>
<td>Wide D</td>
<td>High E</td>
</tr>
<tr>
<td>7</td>
<td>16.11 (383.8)</td>
<td>29.04 (737.7)</td>
<td>12.63 (320.9)</td>
<td>13.25 (336.6)</td>
<td>21.26 (539.8)</td>
</tr>
<tr>
<td>8</td>
<td>15.11 (383.8)</td>
<td>35.28 (895.1)</td>
<td>14.69 (373.0)</td>
<td>13.25 (336.6)</td>
<td>16.75 (425.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Wide D1</th>
<th>High E1</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>13.25 (336.6)</td>
<td>.93 (23.7)</td>
</tr>
<tr>
<td>8</td>
<td>21.25 (539.8)</td>
<td>1.27 (32.4)</td>
</tr>
</tbody>
</table>

### Figure A-33. Approximate Dimensions

- **Size 7**
  - Mfg. Holes for .50 (12.7) Screws (4 Places)
  - Press .09 (2.3) To Reset

- **Size 8**
  - Mfg. Holes for .50 (12.7) Screws (4 Places)
  - Press .09 (2.3) To Reset
Thermal Overload Relays

Overload trip indication.

- Electrically isolated NO-NC contacts
- Bimetallic, ambient compensated
- Load lugs built into relay base.
- Class 10 or 20 heater packs.

Features

- Shrouded or fingerprint 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.

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.

For more information visit: www.EatonCanada.ca
Figure A-36. Class 10 and Class 20 Trip Curves

Technical Data

Table A-102. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 00 – 2, IEC A – K — Open

<table>
<thead>
<tr>
<th>IEC Size</th>
<th>NEMA Size</th>
<th>Cu Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C</td>
<td>00</td>
<td>12 – 16 Stranded, 12 – 14 Solid</td>
</tr>
<tr>
<td>D, E, F</td>
<td>0</td>
<td>8 – 16 Stranded, 10 – 14 Solid</td>
</tr>
<tr>
<td>G, H, J, K</td>
<td>2</td>
<td>8 – 14 Stranded or Solid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Upper) Stranded or 6 – 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Lower) Stranded or Solid</td>
</tr>
</tbody>
</table>

Power Terminals — Line

<table>
<thead>
<tr>
<th>Catalogue Number</th>
<th>Terminal Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>C306DN3B</td>
<td>32A 14 – 6 AWG</td>
</tr>
<tr>
<td>C306GN3B</td>
<td>75A 14 – 2 AWG</td>
</tr>
</tbody>
</table>

Power Terminals — Load — Cu Only (Stranded or Solid)

Power Terminals — Line and Load

Control Terminals — Cu Only

12 – 16 AWG Stranded, 12 – 14 AWG Solid

Two compartment box lug.

Table A-103. Wire (75°C) Sizes — AWG or kcmil — NEMA Sizes 3 – 8, IEC L – N — Open

<table>
<thead>
<tr>
<th>IEC Size</th>
<th>NEMA Size</th>
<th>Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>3</td>
<td>1/0 – 14 Cu/Al</td>
</tr>
<tr>
<td>M</td>
<td></td>
<td>1/0 – 8 Cu/Al</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>3/0 – 8 Cu/Al</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Open — 3/0 – 8 Cu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enclosed — 250 kcmil — 6 Cu/Al</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>750 kcmil — 2 or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) 250 kcmil — 3/0 Cu/Al</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) 750 kcmil — 1/0 Cu/Al</td>
</tr>
<tr>
<td></td>
<td>6 – 7</td>
<td>8</td>
</tr>
</tbody>
</table>
| Control Terminals — Cu Only

12 – 16 AWG Stranded, 12 – 14 AWG Solid

Table A-104. Power Terminal Torque Line and Load Terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Catalogue Number</th>
<th>Torque in lb-in</th>
</tr>
</thead>
<tbody>
<tr>
<td>32A</td>
<td>C306DT3B</td>
<td>20</td>
</tr>
<tr>
<td>75A</td>
<td>C306GT3B</td>
<td>35 (14 – 10 AWG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 (8 AWG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 (6 – 4 AWG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 (3 – 2 AWG)</td>
</tr>
<tr>
<td>105A</td>
<td>C306KN3</td>
<td>120 (3/16)</td>
</tr>
<tr>
<td></td>
<td>(Socket Head Screw)</td>
<td>200 (1/4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250 (5/16)</td>
</tr>
<tr>
<td>144A</td>
<td>C306NN3</td>
<td>120 (3/16)</td>
</tr>
<tr>
<td></td>
<td>(Socket Head Screw)</td>
<td>200 (1/4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250 (5/16)</td>
</tr>
<tr>
<td></td>
<td>C306NN3</td>
<td>35 (14 – 10 AWG)</td>
</tr>
<tr>
<td></td>
<td>(Slotted Head Screw)</td>
<td>40 (8 AWG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 (6 – 4 AWG)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 (3 – 1/0 AWG)</td>
</tr>
</tbody>
</table>

Table A-105. Plugging and Jogging Service Horsepower Ratings

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>200V</th>
<th>230V</th>
<th>460V</th>
<th>575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0</td>
<td>1</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>125</td>
<td>300</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AC Volts</th>
<th>120V</th>
<th>240V</th>
<th>480V</th>
<th>600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC Contact B500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make and Break Amps</td>
<td>30</td>
<td>15</td>
<td>75</td>
<td>6</td>
</tr>
<tr>
<td>Break Amps</td>
<td>3</td>
<td>1.5</td>
<td>.75</td>
<td>.6</td>
</tr>
<tr>
<td>Continuous Amps</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

| NO Contact C600 |
| Make and Break Amps | 15 | 25 | 3.375 | 3 |
| Break Amps | 1.5 | .75 | .375 | .3 |
| Continuous Amps | 2.5 | 2.5 | 2.5 | 2.5 |

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 A-106. Overload Relay UL/CSA Contact Ratings Control Circuit

For more information visit: www.EatonCanada.ca
## 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>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C306DN3B + C306TB1</td>
<td>C306DT3B</td>
</tr>
<tr>
<td>C306GN3B + C306TB2B</td>
<td>C306GT3B</td>
</tr>
</tbody>
</table>

## 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 A-64.

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 32A Overload Relay</td>
<td>C306TB1</td>
</tr>
<tr>
<td>For 75A Overload Relay</td>
<td>C306TB2B</td>
</tr>
</tbody>
</table>

\* 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear cover, no accessibility</td>
<td>C320PC3</td>
</tr>
<tr>
<td>Gray cover, no accessibility, w/Auto only nib</td>
<td>C320PC4</td>
</tr>
<tr>
<td>Gray cover, no accessibility, w/Manual only nib</td>
<td>C320PC5</td>
</tr>
<tr>
<td>Gray cover, FLA dial accessibility, A, B, C, D positions and Auto only nib</td>
<td>C320PC6</td>
</tr>
<tr>
<td>Gray cover, FLA dial accessibility, A, B, C, D positions and Manual only nib</td>
<td>C320PC7</td>
</tr>
</tbody>
</table>

## Replacement Parts

### Heater Pack Replacement

The heater pack series is determined by the 6th character of the Catalogue 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.

### Table A-107. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>For more information visit: <a href="http://www.EatonCanada.ca">www.EatonCanada.ca</a></td>
<td></td>
</tr>
<tr>
<td>CA08102002K</td>
<td></td>
</tr>
</tbody>
</table>

### Table A-108. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 32A Overload Relay</td>
<td>C306TB1</td>
</tr>
<tr>
<td>For 75A Overload Relay</td>
<td>C306TB2B</td>
</tr>
</tbody>
</table>

### Table A-109. Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Min. Order Qty. (Std. Pkg.)</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear cover, no accessibility</td>
<td>50</td>
<td>C320PC3</td>
</tr>
<tr>
<td>Gray cover, no accessibility, w/Auto only nib</td>
<td>50</td>
<td>C320PC4</td>
</tr>
<tr>
<td>Gray cover, no accessibility, w/Manual only nib</td>
<td>50</td>
<td>C320PC5</td>
</tr>
<tr>
<td>Gray cover, FLA dial accessibility, A, B, C, D positions and Auto only nib</td>
<td>50</td>
<td>C320PC6</td>
</tr>
<tr>
<td>Gray cover, FLA dial accessibility, A, B, C, D positions and Manual only nib</td>
<td>50</td>
<td>C320PC7</td>
</tr>
</tbody>
</table>

## Table A-110. Heater Pack Replacement Requirements

<table>
<thead>
<tr>
<th>Existing Heater Pack Catalogue Numbers</th>
<th>Replacement Product Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2001-3 – H2013-3</td>
<td>Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack</td>
</tr>
<tr>
<td>H2001A-3 – H2013A-3</td>
<td></td>
</tr>
<tr>
<td>H2001B-3 – H2013B-3</td>
<td>Series B Heater Pack</td>
</tr>
<tr>
<td>H2014-3 – H2014A-3</td>
<td>When inventory is exhausted, replace with Lug Adapter Kit C3606KAL1-3B and Series B Heater Pack</td>
</tr>
<tr>
<td>H2014B-3</td>
<td>Series B Heater Pack</td>
</tr>
<tr>
<td>H2015-3 – H2015A-3</td>
<td>When inventory is exhausted, replace with heater pack chosen from Table A-111</td>
</tr>
<tr>
<td>H2015B-3 – H2017-3</td>
<td>Series B Heater Pack</td>
</tr>
<tr>
<td>H2016B-3 – H2017A-3</td>
<td>When inventory is exhausted, replace with heater pack chosen from Table A-111</td>
</tr>
</tbody>
</table>

## Table A-111. Heater Pack Ratings

<table>
<thead>
<tr>
<th>Motor Full Load Ampere Rating</th>
<th>Order Heater Pack Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial Position</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>29.0</td>
<td>32.5</td>
<td>36.0</td>
</tr>
<tr>
<td>39.6</td>
<td>44.3</td>
<td>49.1</td>
</tr>
<tr>
<td>53.9</td>
<td>66.8</td>
<td>74.9</td>
</tr>
</tbody>
</table>

Discount Symbol ......................... MC7
Overload Relay Lug Adapter Kit

These kits are used in conjunction with Catalogue Numbers H2001B – H2014B or H2101B – H2114B heater packs as a means of utilizing these Series B heater packs in Catalogue Numbers C306DN3 and C306GN3 Series Al 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 A-112. Product Selection — Overload Relay Lug

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series A1 Overload Relay Lug Adapter Kit</td>
<td>C306KAL1-3B</td>
<td></td>
</tr>
</tbody>
</table>

Overload Relay Replacement — Series A Only

When replacing a Catalogue 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 A-113. Stand-Alone Overload Relays — Approximate Dimensions and Shipping Weight

<table>
<thead>
<tr>
<th>Ampere Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wide (A)</td>
<td>High (B)</td>
</tr>
<tr>
<td>32A &amp; 75A</td>
<td>1.77 (45.0)</td>
<td>4.13 (104.9)</td>
</tr>
<tr>
<td>105 &amp; 144A</td>
<td>2.54 (64.5)</td>
<td>4.69 (119.1)</td>
</tr>
</tbody>
</table>

Figure A-37. Approximate Dimensions — Stand-Alone Overload Relays
Product Selection

Table A-114. C306 Thermal Overload Relays

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>For Use with Freedom Series Contactors</th>
<th>Maximum Ampere Rating</th>
<th>Number of Poles</th>
<th>Open Type</th>
<th>Price</th>
<th>Catalogue Number</th>
<th>NEMA 1 Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>32</td>
<td>3</td>
<td>C306DN3B</td>
<td>C306DG3B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1, 2</td>
<td>75</td>
<td>3</td>
<td>C306GF3B</td>
<td>C306GG3B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>105</td>
<td>3</td>
<td>C306KN3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>144</td>
<td>3</td>
<td>C306NN3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 – 8</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- NEMA Sizes 5 – 8 use the 32A overload in conjunction with CTs.
- 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 A-62.
- These relays can be panel mounted only.

Table A-115. C306 Thermal Overload Relays

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>For Stand-Alone Applications</th>
<th>Maximum Ampere Rating</th>
<th>Number of Poles</th>
<th>Open Type</th>
<th>Price</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0</td>
<td>32</td>
<td>3</td>
<td>C306DT3B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>75</td>
<td>3</td>
<td>C306GT3B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>105</td>
<td>3</td>
<td>C306KN3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>144</td>
<td>3</td>
<td>C306NN3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 – 8</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Heater Pack Selection

Heater packs H2001B to H2017B and H2101B to H2117B are to be used only with Series B overload relays Catalogue 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 A-116. Starters with Series B Overload Relays

<table>
<thead>
<tr>
<th>NEMA — AN Type</th>
<th>IEC — AE Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Series</td>
</tr>
<tr>
<td>00 – 0</td>
<td>C</td>
</tr>
<tr>
<td>1 – 2</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
</tr>
<tr>
<td>5 – 8</td>
<td>A – F</td>
</tr>
<tr>
<td>6</td>
<td>G – K</td>
</tr>
<tr>
<td>7 – 8</td>
<td>B</td>
</tr>
</tbody>
</table>

Note: The series of a starter is the last digit of the listed Catalogue Number, EXAMPLE: AN16DN0AB.FreedomRelays — Thermal Overload

Technical Data Page A-61
Dimensions Page A-63
Replacement Parts Pages A-62 – A-63
Discount Symbol MC7

For more information visit: www.EatonCanada.ca

CA08102002K
### Table A-117. Standard Trip — Class 20 Heater Selection

<table>
<thead>
<tr>
<th>Overload Relay Size</th>
<th>Dial Position</th>
<th>Motor Full Load Ampere Rating</th>
<th>Catalogue Number (Includes 3 Heater Packs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32A or 75A</td>
<td>A</td>
<td>.254</td>
<td>H2001B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>.306</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>.359</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>.411</td>
<td></td>
</tr>
<tr>
<td>32A or 144A</td>
<td>A</td>
<td>1.79</td>
<td>H2006B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>2.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>3.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>4.55</td>
<td></td>
</tr>
<tr>
<td>32A or 500A</td>
<td>A</td>
<td>9.14</td>
<td>H2011B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>23.5</td>
<td></td>
</tr>
</tbody>
</table>

For Use with NEMA Sizes 00 – 6 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B

### Table A-118. Fast Trip — Class 10 Heater Selection

<table>
<thead>
<tr>
<th>Overload Relay Size</th>
<th>Dial Position</th>
<th>Motor Full Load Ampere Rating</th>
<th>Catalogue Number (Includes 3 Heater Packs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32A or 75A</td>
<td>A</td>
<td>.260</td>
<td>H2101B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>.313</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>.367</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>.420</td>
<td></td>
</tr>
<tr>
<td>32A or 144A</td>
<td>A</td>
<td>1.82</td>
<td>H2106B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>2.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>3.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>4.96</td>
<td></td>
</tr>
<tr>
<td>32A or 500A</td>
<td>A</td>
<td>9.60</td>
<td>H2111B-3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>23.5</td>
<td></td>
</tr>
</tbody>
</table>

For Use with NEMA Sizes 00 – 6 Series C, NEMA Sizes 1 – 2 Series B; IEC Sizes A – F Series C, IEC Sizes G – K Series B

### Notes
- Heater packs are shipped 3 to a carton. Catalogue Numbers are for 3 heater packs.
- Sizes 5 – 8 and IEC P – S use the 32A overload relay with current transformers.

---

Discount Symbol: MC7
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
Catalogue Number Selection

Table A-119. C396 Electronic Overload Catalogue Numbering System

```
<table>
<thead>
<tr>
<th>Device Type</th>
<th>C396 = C396 Electronic Overload Relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Size</td>
<td>A = 45 mm</td>
</tr>
<tr>
<td></td>
<td>B = 65 mm</td>
</tr>
<tr>
<td></td>
<td>C = 110 mm</td>
</tr>
<tr>
<td>Feature Set</td>
<td>2 = Standard</td>
</tr>
<tr>
<td></td>
<td>A = Auto</td>
</tr>
<tr>
<td>Reset Type</td>
<td></td>
</tr>
<tr>
<td>Max. Amperes</td>
<td></td>
</tr>
<tr>
<td>Current Rating</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>SEL = Selectable</td>
<td></td>
</tr>
</tbody>
</table>

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

Table A-120. Stand-Alone Overload Relay Suffix Code

<table>
<thead>
<tr>
<th>FLA Range</th>
<th>Frame Size</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>N/A</td>
<td>AX</td>
</tr>
</tbody>
</table>

Table A-121. X7/IEC Adapter Suffix Code

<table>
<thead>
<tr>
<th>Contactor Frame Size</th>
<th>FLA Range (Amps)</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC Frame B</td>
<td>0.1 – 0.5</td>
<td>XB</td>
</tr>
<tr>
<td>IEC Frame C</td>
<td>0.1 – 0.5</td>
<td>XC</td>
</tr>
<tr>
<td>IEC Frame D</td>
<td>6.4 – 32</td>
<td>XD</td>
</tr>
<tr>
<td>IEC Frame F – G</td>
<td>22 – 110</td>
<td>XF</td>
</tr>
</tbody>
</table>

Table A-122. Freedom NEMA Adapter Suffix Code

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>Contactor Frame Size</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5</td>
<td>NEMA Size 00</td>
<td>FD</td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>NEMA Size 00 0</td>
<td>FD</td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>NEMA Size 00 0</td>
<td>F00</td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>NEMA Size 00 1</td>
<td>F0</td>
</tr>
<tr>
<td>1 – 5</td>
<td>NEMA Size 00 0</td>
<td>F00</td>
</tr>
<tr>
<td>1 – 5</td>
<td>NEMA Size 00 1</td>
<td>F0</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>NEMA Size 00 0</td>
<td>F00</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>NEMA Size 00 1</td>
<td>F0</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>NEMA Size 1</td>
<td>F00</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>NEMA Size 2</td>
<td>F0</td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>NEMA Size 00 0</td>
<td>FB</td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>NEMA Size 00 1</td>
<td>FD</td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>NEMA Size 2</td>
<td>FG</td>
</tr>
<tr>
<td>9 – 45</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>9 – 45</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
<tr>
<td>15 – 75</td>
<td>NEMA Size 3</td>
<td>FK</td>
</tr>
</tbody>
</table>
```

Table A-123. DP Contactor Adapter Suffix Code

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>Contactor Frame Size</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5</td>
<td>15, 25, 30A</td>
<td>DC</td>
</tr>
<tr>
<td>0.1 – 0.5</td>
<td>15, 25, 30A</td>
<td>DC</td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>15, 25, 30, 40A</td>
<td>DE</td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>15, 25, 30, 40A</td>
<td>DE</td>
</tr>
<tr>
<td>1 – 5</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>1 – 5</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>15, 25, 30, 40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>9 – 45</td>
<td>40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>9 – 45</td>
<td>40, 50A</td>
<td>DF</td>
</tr>
<tr>
<td>15 – 75</td>
<td>60, 75A</td>
<td>DG</td>
</tr>
<tr>
<td>15 – 75</td>
<td>60, 75A</td>
<td>DG</td>
</tr>
</tbody>
</table>

For more information visit: www.EatonCanada.ca
Product Selection

Table A-124. C396 Stand-Alone Overload Relay

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 mm Overload Frame Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 0.5</td>
<td>—</td>
<td>C396A2AP05SELAX</td>
<td></td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>—</td>
<td>C396A2A002SELAX</td>
<td></td>
</tr>
<tr>
<td>1 – 5</td>
<td>—</td>
<td>C396A2A005SELAX</td>
<td></td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>—</td>
<td>C396A2A008SELAX</td>
<td></td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>—</td>
<td>C396A2A032SELAX</td>
<td></td>
</tr>
<tr>
<td>9 – 45</td>
<td>—</td>
<td>C396A2A045SELAX</td>
<td></td>
</tr>
<tr>
<td>65 mm Overload Frame Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 75</td>
<td>—</td>
<td>C396B2A075SELAX</td>
<td></td>
</tr>
<tr>
<td>22 – 110</td>
<td>—</td>
<td>C396B2A110SELAX</td>
<td></td>
</tr>
<tr>
<td>110 mm Overload Frame Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 – 150</td>
<td>—</td>
<td>C396C2A150SELAX</td>
<td></td>
</tr>
</tbody>
</table>

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

Panel mount only! Overload comes with integrated pass-through holes for power wires. Bus Bar Kit (C396CBAR or C396CBARXT, see Table A-129) and Lug Kit (C396CLUG) must be purchased separately if customer prefers not to use pass-through capability.

Table A-125. Current Transformer Kits for Use with Stand-Alone Overload Relay C396A2A005SELAX

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 – 300</td>
<td>5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (not included).</td>
<td>C396CTK300</td>
<td></td>
</tr>
<tr>
<td>120 – 600</td>
<td>5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (not included).</td>
<td>C396CTK600</td>
<td></td>
</tr>
<tr>
<td>200 – 1000</td>
<td>5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (not included).</td>
<td>C396CTK1000</td>
<td></td>
</tr>
<tr>
<td>300 – 1500</td>
<td>5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (not included).</td>
<td>C396CTK1500</td>
<td></td>
</tr>
</tbody>
</table>

60 – 300: 5 Panel-mount CT Kit with integrated, pass-through holes. Kit includes CT, bus bars, lugs and hardware to mount C396A2A005SELAX (not included).

Table A-126. C396 Overload for Integrated Use with XT IEC Contactors

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>XT IEC Contactor Frame Size / Width</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 mm Overload Frame Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 0.5</td>
<td>B / 45 mm</td>
<td>C396A2AP05SELXB</td>
<td></td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>B / 45 mm</td>
<td>C396A2A002SELXB</td>
<td></td>
</tr>
<tr>
<td>1 – 5</td>
<td>B / 45 mm</td>
<td>C396A2A005SELXB</td>
<td></td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>C / 45 mm</td>
<td>C396A2A008SELXB</td>
<td></td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>C / 45 mm</td>
<td>C396A2A032SELXC</td>
<td></td>
</tr>
<tr>
<td>9 – 45</td>
<td>D / 55 mm</td>
<td>C396A2A045SELXD</td>
<td></td>
</tr>
<tr>
<td>65 mm Overload Frame Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 75</td>
<td>G / 95 mm</td>
<td>C396B2A075SELXD</td>
<td></td>
</tr>
<tr>
<td>22 – 110</td>
<td>G / 95 mm</td>
<td>C396B2A110SELXD</td>
<td></td>
</tr>
<tr>
<td>110 mm Overload Frame Size — Stand-Alone or Direct to XT Contactor with Indicated Kit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 – 150</td>
<td>G / 95 mm</td>
<td>C396C2A150SELAX</td>
<td></td>
</tr>
<tr>
<td>110 mm XT Bus Bar Kit</td>
<td></td>
<td>C396CBARXT</td>
<td></td>
</tr>
</tbody>
</table>

Catalogue 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 A-126 and A-129. If load side lugs are required, order C396CLUG (set of 3).

For more information visit: www.EatonCanada.ca
## C396 Overload for Integrated Use with Freedom NEMA Contactors

### FLA Range (Amps) | NEMA Contactor Frame Size | Description | Catalogue Number | Price
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5</td>
<td>00, 0, 1</td>
<td></td>
<td>C396A2AP05SELFD</td>
<td></td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>00, 0, 1</td>
<td></td>
<td>C396A2A002SELFD</td>
<td></td>
</tr>
<tr>
<td>1 – 5</td>
<td>00</td>
<td></td>
<td>C396A2A005SELF0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td>C396A2A005SELF1</td>
<td></td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>00</td>
<td></td>
<td>C396A2A008SELF0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td>C396A2A008SELF1</td>
<td></td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>00</td>
<td></td>
<td>C396A2A032SELF1</td>
<td></td>
</tr>
<tr>
<td>9 – 45</td>
<td>2</td>
<td></td>
<td>C396A2A045SELFG</td>
<td></td>
</tr>
</tbody>
</table>

### 65 mm Overload Frame Size

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>DP Contactor Rating</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 – 110</td>
<td></td>
<td>C396B2A110SELFK</td>
<td></td>
</tr>
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</table>

### 110 mm Overload Frame Size — Stand-Alone

<table>
<thead>
<tr>
<th>FLA Range (Amps)</th>
<th>DP Contactor Rating</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 – 150</td>
<td></td>
<td>C396C2A150SELAX</td>
<td></td>
</tr>
</tbody>
</table>

### Note:
- For NEMA Sizes 5 – 8, refer to Table A-125, Current Transformer Kits.
- Panel mount only! Overload comes with integrated pass-through holes for power wires. Bus Bar Kit (C396CBAR or C396CBARXT, see Table A-129) and Lug Kit (C396CLUG) must be purchased separately if customer prefers not to use pass-through capability.

## C396 Overload for Integrated Use with DP Contactors by Feature Set

### FLA Range (Amps) | DP Contactor Rating | Catalogue Number | Price |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5</td>
<td>15, 25, 30</td>
<td>C396A2AP05SELDC</td>
<td></td>
</tr>
<tr>
<td>0.4 – 2.0</td>
<td>15, 25, 30</td>
<td>C396A2A002SELDC</td>
<td></td>
</tr>
<tr>
<td>1 – 5</td>
<td>15, 25, 30</td>
<td>C396A2A005SELDC</td>
<td></td>
</tr>
<tr>
<td>1.6 – 8</td>
<td>15, 25, 30, 40</td>
<td>C396A2A032SELDE</td>
<td></td>
</tr>
<tr>
<td>6.4 – 32</td>
<td>15, 25, 30, 40, 50</td>
<td>C396A2A032SELDF</td>
<td></td>
</tr>
<tr>
<td>9 – 45</td>
<td>40, 50</td>
<td>C396A2A045SELFH</td>
<td></td>
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</table>

## Accessories

### C396 Electronic Overload Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset Bar Kit assembles to the top of the overload to increase reset area.</td>
<td>C396ARST</td>
<td></td>
</tr>
<tr>
<td>Remote Reset 24V DC</td>
<td>C396RR024DC</td>
<td></td>
</tr>
<tr>
<td>Remote Reset 24V AC</td>
<td>C396RR024AC</td>
<td></td>
</tr>
<tr>
<td>Remote Reset 120V AC</td>
<td>C396RR120AC</td>
<td></td>
</tr>
<tr>
<td>Remote Reset 240V AC</td>
<td>C396RR240AC</td>
<td></td>
</tr>
<tr>
<td>Mechanical Reset with E22 Flush Pushbutton and Mechanical Push Rod</td>
<td>E22PB6N29L, E22P6N29L</td>
<td></td>
</tr>
<tr>
<td>Plastic Black Bezel</td>
<td>E22BRL</td>
<td></td>
</tr>
<tr>
<td>Chrome Bezel</td>
<td>E22BRL</td>
<td></td>
</tr>
<tr>
<td>Mounting Hole Adapter Kit</td>
<td>E22ARK</td>
<td></td>
</tr>
</tbody>
</table>

---

**Dimensions**

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## Technical Data and Specifications

### Table A-130. Overload Relay Specifications (Continued)

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

### Table A-130. Overload Relay Specifications (Continued)

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

Figure A-38. 45 mm Stand-Alone C396 Electronic Overload Relay

Figure A-39. 65 mm Stand-Alone C396 Electronic Overload Relay
Figure A-40. 110 mm Stand-Alone C396 Electronic Overload Relay
Contactors — Non-reversing and Reversing

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 a 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 A-91.

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.
NEMA Contactors & Starters
A200

Contactors — Non-reversing and Reversing

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 L63 auxiliary contacts which are easily converted from normally-open to normally-closed, providing auxiliary circuit flexibility. Size 9 uses L64 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 A-87 – A-90
A201 Size 1 Contactor

Product Selection —
Non-reversing, Sizes 00 – 9

When Ordering Specify
Order by Catalogue Number from Table A-131, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Table A-131. Front Connected Contactors Selection

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>2 Poles — Open</th>
<th>3 Poles — Open</th>
<th>4 Poles — Open</th>
<th>5 Poles — Open</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-Phase</td>
<td>3-Phase</td>
<td>Catalogue Number</td>
<td>Price</td>
</tr>
<tr>
<td>00</td>
<td>9</td>
<td>1/3</td>
<td>1</td>
<td>1-1/2</td>
<td>A201KAB_</td>
<td>A201KAC_</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>A201K0B_</td>
<td>A201K0C_</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2</td>
<td>3</td>
<td>7-1/2</td>
<td>A201K1B_</td>
<td>A201K1C_</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3</td>
<td>7-1/2</td>
<td>10</td>
<td>A201K2B_</td>
<td>A201K2C_</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>—</td>
<td>—</td>
<td>25</td>
<td>A201K3B_</td>
<td>A201K3C_</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>—</td>
<td>—</td>
<td>50</td>
<td>A201K4B_</td>
<td>A201K4C_</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>A201K5B_</td>
<td>A201K5C_</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>—</td>
<td>—</td>
<td>200</td>
<td>A201K6B_</td>
<td>A201K6C_</td>
</tr>
</tbody>
</table>

Sizes 00 – 6

| 7    | 810  | —                  | —       | 200   | A201K7B_ | A201K7C_ | —       | —       |
| 8    | 1215 | —                  | —       | 400   | A201K8B_ | A201K8C_ | —       | —       |
| 9    | 2250 | —                  | —       | 800   | A201K9B_ | A201K9C_ | —       | —       |

Sizes 7 – 9

| 7    | —    | —                  | —       | 600   | A201K7C_Z1 | —       | —       |
| 8    | —    | —                  | —       | 900   | A201K8C_Z1 | —       | —       |
| 9    | —    | —                  | —       | 1600  | A201K9C_Z1 | —       | —       |

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 A-132. Rear Connected Contactors Selection

<table>
<thead>
<tr>
<th>Size</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>A201K7C_J2124</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>A201K8C_J2124</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>A201K9C_J2124</td>
<td></td>
</tr>
</tbody>
</table>

Table A-133. Coils for Sizes 00 – 6

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>220 – 208/60</td>
<td>B</td>
</tr>
<tr>
<td>240/60</td>
<td>W</td>
</tr>
<tr>
<td>480/60</td>
<td>X</td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
</tr>
</tbody>
</table>

Table A-134. Coils for Sizes 7, 8 and 9

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>110/ – 120/50 or 60</td>
<td>J</td>
</tr>
<tr>
<td>220 – 240/60 or 60</td>
<td>K</td>
</tr>
<tr>
<td>440 – 480/50 or 60</td>
<td>U</td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
</tr>
</tbody>
</table>

Modification Kits,
Accessories ............... Pages A-91 – A-93
Factory Modifications .... Page A-91
Other Coil Voltages ........ Page A-90
Technical Data, ............ Pages A-87 – A-90
Dimensions ................. Page A-77
Discount Symbol ............ MC29

For more information visit: www.EatonCanada.ca
NEMA Contactors & Starters
A200

Contactors — Non-reversing and Reversing

Class A211 Reversing Contactors — Horizontally Mounted
Class A251 Reversing Contactors — Vertically Mounted

Table A-135. Reversing Contactors Selection

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>Horizontal Design</th>
<th>Vertical Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-Phase 230V</td>
<td>208V 480V 600V</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>1 2 3 3 5 5</td>
<td>A211K0C_</td>
<td>A251K0C_</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>2 3 7-1/2 7-1/2 10 10</td>
<td>A211K1C_</td>
<td>A251K1C_</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>3 7-1/2 10 15 25 25</td>
<td>A211K2C_</td>
<td>A251K2C_</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>— 25 30 50 50</td>
<td>A211K3C_</td>
<td>A251K3C_</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>— 40 50 100 100</td>
<td>A211K4C_</td>
<td>A251K4C_</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>— 75 100 200 200</td>
<td>A211K5C_</td>
<td>A251K5C_</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>— 150 200 400 400</td>
<td>A211K6C_</td>
<td>A251K6C_</td>
</tr>
</tbody>
</table>

Sizes 7 – 9

For Size 9, only available coil voltage is 120V.

Table A-136. Coils for Sizes 00 – 6

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>A</td>
</tr>
<tr>
<td>200 – 208/60</td>
<td>B</td>
</tr>
<tr>
<td>240/60</td>
<td>W</td>
</tr>
<tr>
<td>480/60</td>
<td>K</td>
</tr>
<tr>
<td>600/90</td>
<td>E</td>
</tr>
</tbody>
</table>

Table A-137. Coils for Sizes 7, 8 and 9

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 – 120/60 or 60</td>
<td>J</td>
</tr>
<tr>
<td>220 – 240/50 or 60</td>
<td>K</td>
</tr>
<tr>
<td>440 – 480/50 or 60</td>
<td>U</td>
</tr>
<tr>
<td>600/90</td>
<td>E</td>
</tr>
</tbody>
</table>

For Size 9, only available coil voltage is 120V.

Modification Kits, Accessories Pages A-91 – A-93
Factory Modifications Page A-91
Othr Coil Voltages Page A-90
Technical Data Pages A-87 – A-90
Dimensions Page A-78
Discount Symbol MC29

For more information visit: www.EatonCanada.ca

July 2008
## Dimensions and Shipping Weights

*Not to be used for construction purposes unless approved.*

### Table A-138. Non-reversing Open Contactors Dimensions

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>No. of Poles</th>
<th>Fig.</th>
<th>Mounting Screws</th>
<th>Approximate Dimensions in Inches (mm)</th>
<th>Weight, Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0, 1</td>
<td>2 – 4</td>
<td>A</td>
<td>#10</td>
<td>3.31 (84.1) 4.38 (111.3) 4.61 (117.1) 3.95 (100.3) 1.50 (38.1) 1.66 (42.2) .23 (5.8)</td>
<td>2.6 (1.2)</td>
</tr>
<tr>
<td></td>
<td>3 – 5</td>
<td>A, 3</td>
<td>#10</td>
<td>4.19 (106.4) 4.38 (111.3) 4.61 (117.1) 3.95 (100.3) 1.50 (38.1) 2.09 (53.1) .23 (5.8)</td>
<td>3.2 (1.5)</td>
</tr>
<tr>
<td>2</td>
<td>2, 3</td>
<td>A, 3</td>
<td>#10</td>
<td>3.31 (84.1) 4.38 (111.3) 4.94 (125.5) 3.95 (100.3) 1.50 (38.1) 1.66 (42.2) .23 (5.8)</td>
<td>3.3 (1.5)</td>
</tr>
<tr>
<td></td>
<td>4, 5</td>
<td>A, 3</td>
<td>#10</td>
<td>5.06 (128.5) 4.38 (111.3) 4.94 (125.5) 3.95 (100.3) 1.50 (38.1) 2.53 (64.3) .23 (5.8)</td>
<td>4.5 (2.0)</td>
</tr>
<tr>
<td>3, 4</td>
<td>2, 3</td>
<td>A, 3</td>
<td>1/4 in.</td>
<td>4.63 (117.6) 6.63 (168.4) 6.75 (171.5) 6.00 (152.4) 1.88 (47.8) 2.31 (58.7) .38 (9.7)</td>
<td>9.3 (4.2)</td>
</tr>
<tr>
<td></td>
<td>4, 5</td>
<td>A, 3</td>
<td>1/4 in.</td>
<td>7.25 (184.2) 6.63 (168.4) 6.75 (171.5) 6.00 (152.4) 1.88 (47.8) 3.63 (92.2) .38 (9.7)</td>
<td>13.0 (5.9)</td>
</tr>
<tr>
<td>5</td>
<td>2, 3</td>
<td>B, 4</td>
<td>3/8 in.</td>
<td>7.22 (183.4) 12.00 (304.8) 7.75 (196.9) 11.00 (279.4) 2.76 (69.9) — .59 (15.0) 2.22 (56.4) 25.0 (11.4)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2, 3</td>
<td>C, 4</td>
<td>3/8 in.</td>
<td>7.22 (183.4) 13.50 (342.9) 9.50 (241.3) 11.00 (279.4) 2.76 (69.9) — .59 (15.0) 2.22 (56.4) 42.0 (19.1)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>D, 4</td>
<td>3/8 in.</td>
<td>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)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>D, 4</td>
<td>3/8 in.</td>
<td>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)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>D, 4</td>
<td>1/2 in.</td>
<td>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)</td>
<td></td>
</tr>
</tbody>
</table>

### Figures

- Figure A: Sizes 00 – 4 A201 Contactors
- Figure B: Size 5
- Figure C: Size 6
- Figure D: Sizes 7 – 9

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
### NEMA Contactors & Starters

**A200**

**Contactors — Non-reversing and Reversing**

**Not to be used for construction purposes unless approved.**

#### Table A-139. Reversing Open Contactors Dimensions

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>No. of Poles</th>
<th>Fig. A</th>
<th>Mounting Screws</th>
<th>Approximate Dimensions in Inches (mm)</th>
<th>No. A</th>
<th>No. B</th>
<th>No. C</th>
<th>No. D</th>
<th>No. E</th>
<th>No. F</th>
<th>No. G</th>
<th>No. H</th>
<th>Weight, Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0, 1</td>
<td>3 x 3 H. A</td>
<td>3</td>
<td>#10</td>
<td>7.13 (181.1)</td>
<td>4.45</td>
<td>5.05</td>
<td>9.08</td>
<td>3.95</td>
<td>5.31</td>
<td>3.56</td>
<td>.25</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>00, 0, 1</td>
<td>3 x 3 H. B</td>
<td>3</td>
<td>#10</td>
<td>3.33 (84.6)</td>
<td>9.61</td>
<td>5.05</td>
<td>230.6</td>
<td>5.95</td>
<td>2.16</td>
<td>.75</td>
<td>.25</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3 x 3 H. A</td>
<td>3</td>
<td>#10</td>
<td>7.13 (181.1)</td>
<td>4.45</td>
<td>5.38</td>
<td>9.08</td>
<td>3.95</td>
<td>5.31</td>
<td>3.56</td>
<td>.25</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3 x 3 H. B</td>
<td>3</td>
<td>#10</td>
<td>3.33 (84.6)</td>
<td>9.61</td>
<td>5.38</td>
<td>230.6</td>
<td>5.95</td>
<td>2.16</td>
<td>.75</td>
<td>.25</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3 H. A</td>
<td>3</td>
<td>1/4 in.</td>
<td>9.75 (247.7)</td>
<td>6.88</td>
<td>7.25</td>
<td>152.4</td>
<td>7.00</td>
<td>25.0</td>
<td>4.88</td>
<td>.24</td>
<td>7.78</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3 H. B</td>
<td>3</td>
<td>1/4 in.</td>
<td>4.63 (117.6)</td>
<td>16.56</td>
<td>7.25</td>
<td>152.4</td>
<td>7.00</td>
<td>25.0</td>
<td>4.88</td>
<td>.24</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 x 3 H. C</td>
<td>8</td>
<td>3/8 in.</td>
<td>17.22 (437.4)</td>
<td>12.00</td>
<td>7.75</td>
<td>196.9</td>
<td>11.00</td>
<td>7.75</td>
<td>196.9</td>
<td>2.75</td>
<td>.59</td>
<td>55.0</td>
</tr>
<tr>
<td>5</td>
<td>3 x 3 H. D</td>
<td>8</td>
<td>3/8 in.</td>
<td>8.25 (209.6)</td>
<td>30.00</td>
<td>7.75</td>
<td>196.9</td>
<td>18.00</td>
<td>7.75</td>
<td>196.9</td>
<td>2.75</td>
<td>.59</td>
<td>55.0</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3 H. C</td>
<td>8</td>
<td>3/8 in.</td>
<td>17.22 (437.4)</td>
<td>13.50</td>
<td>8.75</td>
<td>222.3</td>
<td>11.00</td>
<td>7.75</td>
<td>222.3</td>
<td>2.75</td>
<td>.59</td>
<td>90.0</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3 H. D</td>
<td>8</td>
<td>3/8 in.</td>
<td>8.25 (209.6)</td>
<td>41.50</td>
<td>8.75</td>
<td>222.3</td>
<td>28.00</td>
<td>7.75</td>
<td>222.3</td>
<td>2.75</td>
<td>.59</td>
<td>90.0</td>
</tr>
<tr>
<td>7</td>
<td>3 x 3 V. E</td>
<td>8</td>
<td>3/8 in.</td>
<td>22.50 (596.9)</td>
<td>38.63</td>
<td>11.00</td>
<td>279.4</td>
<td>20.00</td>
<td>22.00</td>
<td>2088</td>
<td>2.75</td>
<td>.56</td>
<td>450.0</td>
</tr>
<tr>
<td>8</td>
<td>3 x 3 V. E</td>
<td>8</td>
<td>3/8 in.</td>
<td>22.50 (596.9)</td>
<td>208.0</td>
<td>11.00</td>
<td>279.4</td>
<td>20.00</td>
<td>22.00</td>
<td>2088</td>
<td>2.75</td>
<td>.56</td>
<td>550.0</td>
</tr>
<tr>
<td>9</td>
<td>3 x 3 V. E</td>
<td>8</td>
<td>1/2 in.</td>
<td>33.00 (838.2)</td>
<td>62.75</td>
<td>12.94</td>
<td>328.7</td>
<td>33.00</td>
<td>30.75</td>
<td>791.1</td>
<td>1.45</td>
<td>1.63</td>
<td>650.0</td>
</tr>
</tbody>
</table>

**Figure A**

Sizes 00 – 4 Horizontal

**Figure B**

Sizes 00 – 4 Vertical

**Figure C**

Sizes 5, 6 Horizontal

**Figure D**

Sizes 5, 6 Vertical

**Figure E**

Sizes 7 – 9 Vertical

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
Starters — Non-reversing and Reversing

Type B Overload Relay, Manual Reset Only
Supplied as standard on Class A200 and A900 starters (two-speed). The bimetallic 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 induction motors. They are used with reversal 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 July 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.
NEMA Contactors & Starters
A200

For more information visit: www.EatonCanada.ca

July 2008

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

Tab33.book  Page 80  Sunday, September 21, 2008  10:27 PM
Product Selection — Non-reversing, Sizes 00 – 9

When Ordering Specify
Order by Catalogue Number from Table A-140 or Table A-141, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Heaters
Enter heaters as separate item by listing Catalogue Number from tables, Pages A-106 – A-107, as required per starter.

Table A-140. Non-reversing Starters Selection — 2 Poles

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>Open</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9 1/3</td>
<td>1 1/2 – 2 2</td>
<td>A200MABR</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>3 – 5 5</td>
<td>A200M0BR</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>7 1/2 – 10 10</td>
<td>A200M1BR</td>
<td></td>
</tr>
<tr>
<td>1 1/2</td>
<td>36</td>
<td>3 – 10 15 25 25</td>
<td>A200M2BR</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>7 1/2 – 10 15 25 25</td>
<td>A200M2BR</td>
<td></td>
</tr>
</tbody>
</table>

1 For ambient compensated overload relay with auto-reset, add Suffix D.
2 Single-phase with one single-pole overload relay.

Table A-141. Non-reversing Starters Selection — 3 Poles

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>Open</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>9 1/3</td>
<td>1 1/2 – 2 2</td>
<td>A200MAC_</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>3 – 5 5</td>
<td>A200M0C_</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>7 1/2 – 10 10</td>
<td>A200M1C_</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>7 1/2 – 10 15 25 25</td>
<td>A200M2C_</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>25 30 50 50</td>
<td>A200M3C_</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>40 50 100 100</td>
<td>A200M4C_</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>75 100 200 200</td>
<td>A200M5C_</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>150 200 400 400</td>
<td>A200M6C_</td>
<td></td>
</tr>
</tbody>
</table>

Sizes 7 – 9

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>Open</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>810</td>
<td>200 300 600 600</td>
<td>A200M7C_</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1215</td>
<td>400 450 900 900</td>
<td>A200M8C_</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2250</td>
<td>800 1600 – 800 1600</td>
<td>A200M9C_</td>
<td></td>
</tr>
</tbody>
</table>

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 A-142. Coils for Sizes 00 – 6

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>AC</td>
<td></td>
</tr>
<tr>
<td>220 – 208/60</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>240/80</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>480/60</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

Table A-143. Coils for Sizes 7, 8 and 9

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 – 120/50 or 60</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>220 – 240/50 or 60</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>440 – 480/50 or 60</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

1 For Size 9, only available coil voltage is 120V.
NEMA Contactors & Starters

A200

Starters — Non-reversing and Reversing

Table A-144. Reversing Starters Selection

<table>
<thead>
<tr>
<th>Size</th>
<th>Amps</th>
<th>Max. UL Horsepower</th>
<th>Horizontal Design</th>
<th>Vertical Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catalogue Number</td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catalogue Number</td>
<td>Price</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sizes 00 – 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sizes 7 – 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

For ambient compensated overload relay with auto-reset, add Suffix D.

Sizes 7 – 9 use rectifier with DC coil.

For Size 9, only available coil voltage is 120V.

Table A-145. Coils for Sizes 00 – 6

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>AC</td>
</tr>
<tr>
<td>200 – 208/60</td>
<td>B</td>
</tr>
<tr>
<td>240/60</td>
<td>W</td>
</tr>
<tr>
<td>480/60</td>
<td>X</td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
</tr>
</tbody>
</table>

Table A-146. Coils for Sizes 7, 8 and 9

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Code Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 – 120/50 or 60</td>
<td>J</td>
</tr>
<tr>
<td>220 – 240/50 or 60</td>
<td>W</td>
</tr>
<tr>
<td>440 – 480/50 or 60</td>
<td>X</td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
</tr>
</tbody>
</table>

For Size 9, only available coil voltage is 120V.

Product Selection — Reversing, Sizes 00 – 9

When Ordering Specify

Order by Catalogue Number from Table A-144, plus Suffix for coil voltages, verifying usage of appropriate sizes.

Heaters

Enter heaters as separate item by listing Catalogue Number from tables, Pages A-106 – A-107, as required per starter.

Technical Data …………… Pages A-87 – A-90

Heaters ………………… Pages A-106 – A-107

Other Coil Voltages …… Page A-90

Factory Modifications …… Page A-91

Modification Kits, Accessories ……… Pages A-91 – A-103

Dimensions …………… Page A-85

Discount Symbol ……… MC29

For more information visit: www.EatonCanada.ca
# Product Selection

## For Separate Two-Winding Motors

**Heaters**

Enter heaters as separate item by listing Catalogue Number from table, Pages A-106 – A-107, as required per starter.

**Table A-147. Three-Phase, Non-reversing, Reversing 60 Hz Starters — Heater Selection**

<table>
<thead>
<tr>
<th>NEMA</th>
<th>Amps</th>
<th>Constant Horsepower</th>
<th>Constant or Variable Torque</th>
<th>3 Poles — Open</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>208V</td>
<td>240V</td>
<td>480V</td>
<td>600V</td>
<td>208V</td>
</tr>
<tr>
<td>Sizes 0 – 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>7-1/2</td>
<td>7-1/2</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>25</td>
<td>30</td>
<td>50</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>40</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>75</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>150</td>
<td>200</td>
<td>400</td>
<td>400</td>
<td>100</td>
</tr>
</tbody>
</table>

For ambient compensated overload relay with auto-reset, add Suffix D.

**Table A-149. Coils for Sizes 0 – 6**

<table>
<thead>
<tr>
<th>Coil Volts and Hz</th>
<th>Coil Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/60 or 110/50</td>
<td>AC</td>
</tr>
<tr>
<td>200 – 208/60</td>
<td>B</td>
</tr>
<tr>
<td>240/60</td>
<td>W</td>
</tr>
<tr>
<td>480/60</td>
<td>X</td>
</tr>
<tr>
<td>600/60</td>
<td>E</td>
</tr>
</tbody>
</table>

## For Single-Winding Motors

**Table A-148. Product Selection — Sizes 0 – 6**

<table>
<thead>
<tr>
<th>NEMA</th>
<th>Amps</th>
<th>Constant Horsepower</th>
<th>Constant or Variable Torque</th>
<th>3 Poles — Open</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>208V</td>
<td>240V</td>
<td>480V</td>
<td>600V</td>
<td>208V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>18</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>7-1/2</td>
<td>7-1/2</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>25</td>
<td>30</td>
<td>50</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>135</td>
<td>40</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
<td>75</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>150</td>
<td>200</td>
<td>400</td>
<td>400</td>
<td>100</td>
</tr>
</tbody>
</table>

|      |      |      |      |      |      |      |      |      |      |         |        |
|      |      |      |      |      |      |      |      |      |      |         |        |
| 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 |        |

For ambient compensated overload relay with auto-reset, add Suffix D.

---

For more information visit: www.EatonCanada.ca
### Dimensions and Shipping Weights

*Not to be used for construction purposes unless approved.*

#### Table A-151. Open Non-reversing Starters Dimensions

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>No. of Poles</th>
<th>Fig. No.</th>
<th>Mounting Screws No.</th>
<th>Dimensions in Inches (mm)</th>
<th>Weight, Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 0, 1</td>
<td>2, 3</td>
<td>A 3</td>
<td>#10</td>
<td>A: 3.31 (84.1) B: 6.42 (163.1) C: 4.61 (117.1) D: 6.00 (152.4) E: 1.88 (47.8) F: 1.66 (42.2) G: 23 (5.8)</td>
<td>.39 (9.9) .59 (15.0) 4.48 (113.8) .27 (6.9) 35.0 (15.9)</td>
</tr>
<tr>
<td>2</td>
<td>2, 3</td>
<td>A 3</td>
<td>#10</td>
<td>A: 3.31 (84.1) B: 7.17 (182.1) C: 4.94 (125.5) D: 6.75 (171.5) E: 1.88 (47.8) F: 1.66 (42.2) G: 23 (5.8)</td>
<td>.41 (10.4) .77 (19.6) 4.53 (115.1) .27 (6.9) 43.0 (19.5)</td>
</tr>
<tr>
<td>3, 4</td>
<td>2, 3</td>
<td>A 3</td>
<td>1/4 in.</td>
<td>A: 4.63 (117.6) B: 9.94 (252.5) C: 6.75 (171.5) D: 9.25 (235.0) E: 2.88 (73.2) F: .94 (23.9) G: .38 (9.7)</td>
<td>.55 (14.0) .20 (9.0) 6.36 (161.5) .27 (6.9) 115.0 (52.2)</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>B 4</td>
<td>3/8 in.</td>
<td>A: 7.59 (192.8) B: 16.22 (412.0) C: 7.75 (196.9) D: 11.00 (279.4) E: 2.75 (69.9) F: 3.81 (96.8) G: 2.69 (68.3)</td>
<td>.33 (8.4) .33 (8.4) 7.00 (172.8) .27 (6.9) 29.0 (13.2)</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>C 4</td>
<td>3/8 in.</td>
<td>A: 8.25 (213.0) B: 23.50 (596.9) C: 9.50 (241.3) D: 11.00 (279.4) E: 2.75 (69.9) F: 4.81 (122.2) G: 2.75 (69.9)</td>
<td>3.06 (77.7) 2.75 (69.9) .55 (12.9) .27 (6.9) 55.0 (25.0)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>1/2</td>
<td>3788 (962.2) B: 21.50 (546.1) C: 11.75 (298.5)</td>
<td>- - - - - - -</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>1/2</td>
<td>3788 (962.2) B: 21.50 (546.1) C: 11.75 (298.5)</td>
<td>- - - - - - -</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>- - - - - - -</td>
<td>-</td>
</tr>
</tbody>
</table>

*Refer to factory.*

---

**Figure A, Sizes 00 – 4**

**Figure B, Size 5**

**Figure C, Size 6**

---

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
Not to be used for construction purposes unless approved.

### Table A-152. Open Reversing Starters Dimensions

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Fig.</th>
<th>Mounting Screws</th>
<th>Dimensions in Inches (mm)</th>
<th>Weight, Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>00, 0, 1</td>
<td>3 x 3 Horiz.</td>
<td>A 3</td>
<td>#10</td>
<td>7.13 (181.1)</td>
<td>6.50 (165.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 3</td>
<td>#10</td>
<td>3.33 (84.6)</td>
<td>11.63 (295.4)</td>
</tr>
<tr>
<td>2</td>
<td>3 x 3 Horiz.</td>
<td>A 3</td>
<td>#10</td>
<td>7.13 (181.1)</td>
<td>7.25 (184.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 3</td>
<td>#10</td>
<td>3.33 (84.6)</td>
<td>12.38 (314.5)</td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3 Horiz.</td>
<td>A 3</td>
<td>1/4 in.</td>
<td>9.75 (247.7)</td>
<td>10.13 (257.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B 3</td>
<td>1/4 in.</td>
<td>4.63 (117.6)</td>
<td>19.81 (503.2)</td>
</tr>
<tr>
<td>5</td>
<td>3 x 3 Horiz.</td>
<td>A 4</td>
<td>3/8 in.</td>
<td>35.25 (895.4)</td>
<td>25.50 (647.7)</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3 Horiz.</td>
<td>A 4</td>
<td>3/8 in.</td>
<td>35.25 (895.4)</td>
<td>25.50 (647.7)</td>
</tr>
</tbody>
</table>

*Refer to factory.*

---

**Figure A**
Sizes 00 – 4 Horizontal

**Figure B**
Sizes 00 – 4 Vertical

---
Not to be used for construction purposes unless approved.

Table A-153. Open Multi-Speed Starters Dimensions

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Fig. Mounting Screws</th>
<th>Dimensions in Inches (mm)</th>
<th>Weight, Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No. Size A B C D E F G J K L M N P R</td>
<td></td>
</tr>
<tr>
<td>00, 0, 1</td>
<td></td>
<td></td>
<td>3 x 3 Horiz. A 3 #10 7.1 (181.1) 6.50 (165.1) 5.05 (128.3) 3.68 (93.5) 3.56 (90.4) 3.25 (82.5) 2.35 (59.7) 3.33 (84.5) 4.92 (125.0) 27.3 (60.3) 3.81 (96.8) 2.91 (69.3)</td>
<td>10.0 (4.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 x 3 Horiz. B 3 #10 7.0 (178.0) 6.50 (165.1) 5.05 (128.3) 3.68 (93.5) 3.56 (90.4) 3.25 (82.5) 2.35 (59.7) 3.33 (84.5) 4.92 (125.0) 27.3 (60.3) 3.81 (96.8) 2.91 (69.3)</td>
<td>11.0 (5.0)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>3 x 3 Horiz. A 3 #10 7.1 (181.1) 7.25 (184.2) 5.25 (133.5) 6.75 (171.5) 3.56 (90.4) 3.56 (90.4) 2.5 (63.5) 2.69 (68.3) 6.9 (175) 4.97 (126.2) 27.3 (60.3) 3.81 (96.8) 2.91 (69.3)</td>
<td>11.0 (5.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 x 3 Horiz. B 3 #10 7.25 (184.2) 5.25 (133.5) 6.75 (171.5) 3.56 (90.4) 3.56 (90.4) 2.5 (63.5) 2.69 (68.3) 6.9 (175) 4.97 (126.2) 27.3 (60.3) 3.81 (96.8) 2.91 (69.3)</td>
<td>13.0 (5.9)</td>
</tr>
<tr>
<td>3, 4</td>
<td></td>
<td></td>
<td>3 x 3 Horiz. A 3 1/4 in. 9.75 (248.0) 10.13 (257.3) 7.25 (184.2) 9.25 (235.3) 4.88 (124.0) 4.88 (124.0) 3.11 (79.0) 3.11 (79.0) 8.75 (223.0) 33.5 (85.1) 10.1 (257.0) 6.86 (174.0) 5.13 (130.3)</td>
<td>4.00 (1.81)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 x 3 Horiz. B 3 1/4 in. 12.38 (314.5) 10.13 (257.3) 7.25 (184.2) 9.25 (235.3) 4.88 (124.0) 4.88 (124.0) 3.11 (79.0) 3.11 (79.0) 8.75 (223.0) 33.5 (85.1) 10.1 (257.0) 6.86 (174.0) 5.13 (130.3)</td>
<td>4.00 (1.81)</td>
</tr>
</tbody>
</table>

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 A-45. Open Multi-Speed Starters Dimensions
### Electrical Characteristics

**Table A-154. Electrical Characteristics — Sizes 00 – 4**

<table>
<thead>
<tr>
<th>Size 0</th>
<th>Size 0</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Voltage Rating</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
</tr>
<tr>
<td>Ampere Rating (Open)</td>
<td>10A</td>
<td>20A</td>
<td>30A</td>
<td>50A</td>
<td>100A</td>
</tr>
<tr>
<td>(Enclosed)</td>
<td>5A</td>
<td>10A</td>
<td>15A</td>
<td>25A</td>
<td>50A</td>
</tr>
<tr>
<td>Transformer Switching kVA</td>
<td>460V – 575V/60 Hz</td>
<td>230V/60 Hz</td>
<td>200V/60 Hz</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Capacitor Switching kVAR, Three-Phase</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Table A-155. Electrical Characteristics — Sizes 5 – 9**

<table>
<thead>
<tr>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 7</th>
<th>Size 8</th>
<th>Size 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Voltage Rating</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
</tr>
<tr>
<td>Ampere Rating (Open)</td>
<td>300A</td>
<td>600A</td>
<td>900A</td>
<td>1350A</td>
</tr>
<tr>
<td>(Enclosed)</td>
<td>270A</td>
<td>540A</td>
<td>810A</td>
<td>1215A</td>
</tr>
<tr>
<td>Transformer Switching kVA</td>
<td>460V – 575V/60 Hz</td>
<td>230V/60 Hz</td>
<td>200V/60 Hz</td>
<td>—</td>
</tr>
<tr>
<td>Capacitor Switching kVAR, Three-Phase</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Squirrel Cage Motor**

<table>
<thead>
<tr>
<th>Maximum Horsepower At:</th>
<th>200V/60 Hz</th>
<th>230V/60 Hz</th>
<th>380V/50 Hz</th>
<th>460V – 575V/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Pole</td>
<td>1-1/2 hp</td>
<td>3 hp</td>
<td>7-1/2 hp</td>
<td>10 hp</td>
</tr>
<tr>
<td>2-Pole</td>
<td>1-1/2 hp</td>
<td>3 hp</td>
<td>7-1/2 hp</td>
<td>10 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>1-1/2 hp</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>3-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
<tr>
<td>3-Pole</td>
<td>2-Pole</td>
<td>5 hp</td>
<td>10 hp</td>
<td>25 hp</td>
</tr>
</tbody>
</table>

**Resistive Heating kW**

<table>
<thead>
<tr>
<th>Single-Phase, 2-Pole</th>
<th>120V</th>
<th>240V</th>
<th>480V</th>
<th>600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>3 kW</td>
<td>6 kW</td>
<td>12 kW</td>
<td>15 kW</td>
</tr>
<tr>
<td></td>
<td>5 kW</td>
<td>10 kW</td>
<td>20 kW</td>
<td>50 kW</td>
</tr>
<tr>
<td></td>
<td>10 kW</td>
<td>20 kW</td>
<td>40 kW</td>
<td>75 kW</td>
</tr>
<tr>
<td></td>
<td>12 kW</td>
<td>20 kW</td>
<td>30 kW</td>
<td>75 kW</td>
</tr>
<tr>
<td></td>
<td>15 kW</td>
<td>25 kW</td>
<td>50 kW</td>
<td>75 kW</td>
</tr>
</tbody>
</table>

**Transformer Switching kVA**

<table>
<thead>
<tr>
<th>Single-Phase, 2-Pole</th>
<th>120V</th>
<th>240V</th>
<th>480V</th>
<th>600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer Switching kVA</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>6 kW</td>
<td>1.2 kVA</td>
<td>2.1 kVA</td>
<td>4.1 kVA</td>
</tr>
<tr>
<td></td>
<td>1.2 kVA</td>
<td>2.4 kVA</td>
<td>4.1 kVA</td>
<td>8.1 kVA</td>
</tr>
<tr>
<td></td>
<td>2.4 kVA</td>
<td>4.9 kVA</td>
<td>8.3 kVA</td>
<td>16 kVA</td>
</tr>
<tr>
<td></td>
<td>3 kVA</td>
<td>6.2 kVA</td>
<td>10 kVA</td>
<td>20 kVA</td>
</tr>
<tr>
<td></td>
<td>1.8 kW</td>
<td>3.6 kW</td>
<td>6.3 kW</td>
<td>12 kW</td>
</tr>
<tr>
<td></td>
<td>2.1 kVA</td>
<td>4.3 kVA</td>
<td>7.2 kVA</td>
<td>14 kVA</td>
</tr>
<tr>
<td></td>
<td>4.2 kVA</td>
<td>8.5 kVA</td>
<td>14 kVA</td>
<td>28 kVA</td>
</tr>
<tr>
<td></td>
<td>5.2 kVA</td>
<td>11 kVA</td>
<td>18 kVA</td>
<td>35 kVA</td>
</tr>
</tbody>
</table>

### Notes:

1. Resitive 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 Eaton.
3. For ratings refer to Eaton.
DC Power Pole Ratings

The following represent typical production test values and should not be interpreted as a guarantee of actual performance.

Table A-156. DC Operated 120 and 240V Coils

<table>
<thead>
<tr>
<th>Contactor Size</th>
<th>DC Contact Amp Rating 2 Poles in Series</th>
<th>120V</th>
<th>240V</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>30</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>40</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>90</td>
<td>70</td>
<td>—</td>
</tr>
</tbody>
</table>

(1) Non-inductive load.

380V, 50 Hz Starter Maximum Horsepower Ratings

Table A-157. 380V, 50 Hz Starters — Maximum Horsepower Ratings

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>00</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Horsepower</td>
<td>1-1/2</td>
<td>5</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>150</td>
<td>300</td>
<td>450</td>
<td>700</td>
</tr>
</tbody>
</table>

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 A-158. Operating Coil Characteristics

<table>
<thead>
<tr>
<th>AC Coil Burden (Open VA)</th>
<th>Size 00</th>
<th>Size 0</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 7</th>
<th>Size 8</th>
<th>Size 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>160 VA</td>
<td>160 VA</td>
<td>160 VA</td>
<td>625 VA</td>
<td>700 VA</td>
<td>1700 VA</td>
<td>2900 VA</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>25 VA</td>
<td>25 VA</td>
<td>25 VA</td>
<td>50 VA</td>
<td>64 VA</td>
<td>180 VA</td>
<td>220 VA</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>78 W</td>
<td>78 W</td>
<td>78 W</td>
<td>18 W</td>
<td>21 W</td>
<td>32 W</td>
<td>42 W</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>85%</td>
<td>85%</td>
<td>85%</td>
<td>85%</td>
<td>85%</td>
<td>78%</td>
<td>70%</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>40 – 60%</td>
<td>40 – 60%</td>
<td>40 – 60%</td>
<td>40 – 60%</td>
<td>65 to 75%</td>
<td>60 to 70%</td>
<td>60 to 70%</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pick-Up Time Hz (Hz)</td>
<td>1 – 1-1/2</td>
<td>1-1/2 – 2</td>
<td>2 – 2-1/2</td>
<td>1 – 1-1/2</td>
<td>1.5</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Drop-Out Time Hz (mS)</td>
<td>3/4 – 1</td>
<td>3/4 – 1</td>
<td>3/4 – 1</td>
<td>3/4 – 1</td>
<td>.75</td>
<td>.75</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DC Coil Burden (Open VA)</th>
<th>Size 00</th>
<th>Size 0</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 7</th>
<th>Size 8</th>
<th>Size 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 VA</td>
<td>17 VA</td>
<td>17 VA</td>
<td>35 VA</td>
<td>35 VA</td>
<td>600 VA</td>
<td>2120 VA</td>
<td>400 VA</td>
<td>400 VA</td>
<td>2100 VA</td>
<td>2100 VA</td>
<td>2100 VA</td>
</tr>
<tr>
<td>17 VA</td>
<td>17 VA</td>
<td>17 VA</td>
<td>35 VA</td>
<td>35 VA</td>
<td>22 VA</td>
<td>21 VA</td>
<td>400 VA</td>
<td>400 VA</td>
<td>350 VA</td>
<td>350 VA</td>
<td>350 VA</td>
</tr>
<tr>
<td>18 W</td>
<td>18 W</td>
<td>18 W</td>
<td>35 W</td>
<td>35 W</td>
<td>20 W</td>
<td>20 W</td>
<td>400 W</td>
<td>400 W</td>
<td>350 W</td>
<td>350 W</td>
<td>350 W</td>
</tr>
<tr>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>64%</td>
<td>73%</td>
<td>45% – 65%</td>
<td>45% – 65%</td>
<td>50% – 65%</td>
<td>50% – 65%</td>
<td>50% – 65%</td>
</tr>
<tr>
<td>5 – 10%</td>
<td>5 – 10%</td>
<td>5 – 10%</td>
<td>5 – 10%</td>
<td>5 – 10%</td>
<td>18%</td>
<td>13%</td>
<td>30% – 45%</td>
<td>30% – 45%</td>
<td>40% – 50%</td>
<td>40% – 50%</td>
<td>40% – 50%</td>
</tr>
<tr>
<td>Pick-Up Time Hz (Hz)</td>
<td>25 – 75 mS</td>
<td>25 – 75 mS</td>
<td>25 – 75 mS</td>
<td>25 – 75 mS</td>
<td>2.7 Hz</td>
<td>3 Hz</td>
<td>21 – 41 Hz</td>
<td>17 – 29 Hz</td>
<td>16 – 18 Hz</td>
<td>16 – 18 Hz</td>
<td>16 – 18 Hz</td>
</tr>
<tr>
<td>Drop-Out Time Hz (mS)</td>
<td>16 – 25 mS</td>
<td>16 – 25 mS</td>
<td>16 – 25 mS</td>
<td>16 – 25 mS</td>
<td>3.9 Hz</td>
<td>17.5 Hz</td>
<td>7 – 12 Hz</td>
<td>7 – 12 Hz</td>
<td>18 – 20 Hz</td>
<td>18 – 20 Hz</td>
<td>18 – 20 Hz</td>
</tr>
</tbody>
</table>

(1) AC coil data pertains to Model K, DC coil data pertains to Model J.
(2) DC Operated only.
(3) Percent of rated coil voltage.
(4) Lower figure when coil is cold. Higher figure when coil is hot.
(5) Drop-out time to clear arc. Time varies with type of load and contact wear.
(6) At 60 Hz base.
(7) To contact touch.
# Mechanical Characteristics

NEMA Standard ICS 2-110

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 A-159. Mechanical Characteristics, Sizes 00 – 9

<table>
<thead>
<tr>
<th>Dimensions in Inches (mm)</th>
<th>Sizes 00, 0, 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 7</th>
<th>Size 8</th>
<th>Size 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height</strong></td>
<td>6.45 (163.8)</td>
<td>7.16</td>
<td>9.93</td>
<td>9.93</td>
<td>12.00</td>
<td>13.50</td>
<td>18.62</td>
<td>19.25</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>(181.9)</td>
<td>(252.2)</td>
<td>(252.2)</td>
<td>(304.8)</td>
<td>(342.9)</td>
<td>(472.9)</td>
<td>(489.9)</td>
<td>(605.9)</td>
<td>(812.8)</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>3.31 (84.1)</td>
<td>3.31</td>
<td>4.62</td>
<td>4.62</td>
<td>7.00</td>
<td>7.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>(84.1)</td>
<td>(117.3)</td>
<td>(117.3)</td>
<td>(177.8)</td>
<td>(177.8)</td>
<td>(235.0)</td>
<td>(235.0)</td>
<td>(235.0)</td>
<td>(235.0)</td>
</tr>
<tr>
<td><strong>Depth</strong></td>
<td>4.61 (117.1)</td>
<td>4.96</td>
<td>6.75</td>
<td>6.75</td>
<td>7.75</td>
<td>8.75</td>
<td>11.00</td>
<td>11.00</td>
<td>13.00</td>
</tr>
<tr>
<td></td>
<td>(120.6)</td>
<td>(171.5)</td>
<td>(171.5)</td>
<td>(196.9)</td>
<td>(222.3)</td>
<td>(279.4)</td>
<td>(279.4)</td>
<td>(330.2)</td>
<td>(330.2)</td>
</tr>
<tr>
<td><strong>Panel Area —</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Square Inches</strong></td>
<td>21.35</td>
<td>23.7</td>
<td>46.0</td>
<td>46.0</td>
<td>84.0</td>
<td>94.5</td>
<td>4325</td>
<td>452.4</td>
<td>800</td>
</tr>
<tr>
<td><strong>Weight — Pounds</strong></td>
<td>3.5 Lbs.</td>
<td>3.5 Lbs.</td>
<td>11.5 Lbs.</td>
<td>11.5 Lbs.</td>
<td>25 Lbs.</td>
<td>42 Lbs.</td>
<td>215 Lbs.</td>
<td>265 Lbs.</td>
<td>315 Lbs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Front</td>
<td>Front</td>
<td>Front/Rear</td>
<td>Front/Rear</td>
<td>Front/Rear</td>
</tr>
<tr>
<td><strong>Maximum Cable Size/Phase Copper (AWG/MCM)</strong></td>
<td>6 AWG</td>
<td>3 AWG</td>
<td>1.0</td>
<td>4.0</td>
<td>1-500 MCM</td>
<td>2-500 MCM</td>
<td>3-500 MCM</td>
<td>4-500 MCM</td>
<td>8-500 MCM</td>
</tr>
<tr>
<td><strong>Auxiliary Electrical Circuits Available</strong></td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Latched Version Available</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

For Sizes 6 – 9 contactors only; for starter Sizes 5 – 9, refer to factory.

## Table A-160. Data from Tables 430 — 147 Through 150 of 1996 NEC: Motor Amperes at Full Load ½, Three-Phase AC

<table>
<thead>
<tr>
<th>Hp</th>
<th>Single-Phase AC</th>
<th>Induction Type Squirrel-Cage and Wound-Rotor Amperes</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>115V</td>
<td>230V</td>
<td>200V</td>
</tr>
<tr>
<td>1/6</td>
<td>4.4</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>5.8</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td>7.2</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9.8</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>13.8</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>8</td>
<td>4.8</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>7.8</td>
<td>11.0</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>28</td>
<td>175</td>
</tr>
<tr>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>10</td>
<td>26.3</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>48.3</td>
<td>42</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>50</td>
<td>32.2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>28</td>
<td>96</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>78.2</td>
<td>68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hp</th>
<th>Single-Phase AC</th>
<th>Induction Type Squirrel-Cage and Wound-Rotor Amperes</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>115V</td>
<td>230V</td>
<td>200V</td>
</tr>
<tr>
<td>1/6</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>40</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>60</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>75</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>250</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>289</td>
<td>289</td>
<td></td>
</tr>
</tbody>
</table>

For Sizes 5 – 9 contactors only; for starter Sizes 5 – 9, refer to factory.

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## Combination Ratings

### Table A-161. Combination Ratings — Sizes 00 – 2

<table>
<thead>
<tr>
<th>Sizes 00, 1</th>
<th>Short-Circuit Protective Device (SCPD)</th>
<th>Max. Rating SCPD</th>
<th>Circuit Breaker Intermuting Rating</th>
<th>Short-Circuit Withstand Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class H Fuse</td>
<td>60A</td>
<td>5,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class J Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class R Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class T Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Magnetic Only</td>
<td>30A</td>
<td>Marked HMCP</td>
<td>100,000A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CB</td>
<td>60A</td>
<td>65,000A</td>
<td>6500A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CLB</td>
<td>60A</td>
<td>150,000A</td>
<td>100,000A 480V</td>
<td></td>
</tr>
<tr>
<td>Size 2</td>
<td>100A</td>
<td>5,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class H Fuse</td>
<td>100A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class J Fuse</td>
<td>100A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class R Fuse</td>
<td>100A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class T Fuse</td>
<td>100A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Magnetic Only</td>
<td>50A</td>
<td>Marked HMCP</td>
<td>100,000A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CB</td>
<td>100A</td>
<td>65,000A</td>
<td>6500A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CLB</td>
<td>100A</td>
<td>150,000A</td>
<td>100,000A 480V</td>
<td></td>
</tr>
</tbody>
</table>

### Table A-162. Combination Ratings — Sizes 3 and 4

<table>
<thead>
<tr>
<th>Size 3</th>
<th>Short-Circuit Protective Device (SCPD)</th>
<th>Max. Rating SCPD</th>
<th>Circuit Breaker Intermuting Rating</th>
<th>Short-Circuit Withstand Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class H Fuse</td>
<td>60A</td>
<td>5,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class J Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class R Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Class T Fuse</td>
<td>60A</td>
<td>100,000A</td>
<td>600V</td>
<td></td>
</tr>
<tr>
<td>Magnetic Only</td>
<td>100A</td>
<td>Marked HMCP</td>
<td>100,000A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CB</td>
<td>150A</td>
<td>65,000A</td>
<td>6500A 480V</td>
<td></td>
</tr>
<tr>
<td>Type CLB</td>
<td>150A</td>
<td>50,000A</td>
<td>480V</td>
<td></td>
</tr>
</tbody>
</table>

### Table A-163. Other Available Coil Voltages — AC and DC Coils

<table>
<thead>
<tr>
<th>Coils</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>120-80, 110/50</td>
<td>200-208/60</td>
<td>240/80 and 480/60</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>440/50</td>
<td>600/60 Hz</td>
<td>380/50</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>240/60</td>
<td>24/60</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>K</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>110-120/50 or X</td>
<td>220-240/50 or Y</td>
<td>24V DC</td>
</tr>
<tr>
<td></td>
<td>60 Rect. to DC</td>
<td>60 Rect. to DC</td>
<td>48V DC</td>
</tr>
<tr>
<td>DC</td>
<td>M</td>
<td>N</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>48V DC</td>
<td>110/50</td>
<td>48/60</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>S</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>120/60 and 240/60</td>
<td>240/60</td>
<td>129V DC</td>
</tr>
<tr>
<td></td>
<td>U</td>
<td>V</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>U</td>
<td>V</td>
<td>110/90</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
<td>Z</td>
</tr>
<tr>
<td></td>
<td>480/80</td>
<td>415/50</td>
<td>277/60</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>Y</td>
<td>250V DC</td>
</tr>
</tbody>
</table>

## Coil Suffix

### Table A-164. Other DC Coils Available (For Q Suffix)

<table>
<thead>
<tr>
<th>Coils</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>120-80, 110/50</td>
<td>200-208/60</td>
<td>240/80 and 480/60</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>440/50</td>
<td>600/60 Hz</td>
<td>380/50</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>240/60</td>
<td>24/60</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>K</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>110-120/50 or X</td>
<td>220-240/50 or Y</td>
<td>24V DC</td>
</tr>
<tr>
<td></td>
<td>60 Rect. to DC</td>
<td>60 Rect. to DC</td>
<td>48V DC</td>
</tr>
</tbody>
</table>

### Table A-165. Other Available Coil Voltages — DC Coils

<table>
<thead>
<tr>
<th>Coils</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>120-80, 110/50</td>
<td>200-208/60</td>
<td>240/80 and 480/60</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>440/50</td>
<td>600/60 Hz</td>
<td>380/50</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>220/50</td>
<td>240/60</td>
<td>24/60</td>
</tr>
<tr>
<td></td>
<td>J</td>
<td>K</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>110-120/50 or X</td>
<td>220-240/50 or Y</td>
<td>24V DC</td>
</tr>
<tr>
<td></td>
<td>60 Rect. to DC</td>
<td>60 Rect. to DC</td>
<td>48V DC</td>
</tr>
</tbody>
</table>

## Specifications

- Instantaneous Adjustable Trip.
- Circuit Breaker.
- Inverse Time Circuit Breaker.
- Instantaneous Adjustable Trip with Current Limiting Attachment.
- Inverse Time with Built-In Current Limiting Attachment.

- List Price Addition for dual voltage coils.
- List Price Addition for DC coils.
- DC coils for Size 5 and 6 contactors and starters are intermittent duty rated only. A mechanical latch is required.
- DC coils use only on contactors originally supplied with a DC coil.
- For Q suffixes “order by description” consult Customer Support Centre, 1-800-268-3578. Availability may be limited.

---

Discount Symbol ............... MC17

For more information visit: www.EatonCanada.ca

CA08102002K
Factory Modifications

Table A-165. A200 Factory Modifications

<table>
<thead>
<tr>
<th>Modifications Description</th>
<th>Catalogue Number Suffix</th>
<th>NEMA Size 00 – 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Circuit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Extra Auxiliary Contact (1NO-1NC) Non-reversing, Reversing, 2-Speed Unwired</td>
<td>J1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Extra Auxiliary Contact Non-reversing, Reversing, 2-Speed Unwired</td>
<td>J2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Extra Auxiliary Contact Non-reversing, Unwired</td>
<td>J3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Extra Auxiliary Contact Non-reversing, Unwired</td>
<td>J4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wired for Separate Control (NC)</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omit Control Wiring (NC)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overload Relays (Substitutions)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Compensated with Auto Reset (NC)</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast Trip — Ambient Compensated (Specify Motor FLA)</td>
<td>D7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload Relay Alarm Contact (NO) per overload</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accessories and Field Modification Kits

- 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 L56 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.

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).

Table A-166. Auxiliary Contact Ratings

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Make</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA A600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 – 600V AC</td>
<td>7200VA</td>
<td>720VA</td>
</tr>
<tr>
<td>72 – 120V AC</td>
<td>60A</td>
<td>720VA</td>
</tr>
<tr>
<td>28 – 72V AC</td>
<td>60 VA</td>
<td>720VA</td>
</tr>
<tr>
<td>NEMA R300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 – 300V DC</td>
<td>28 VA</td>
<td>28 VA</td>
</tr>
</tbody>
</table>

Table A-167. Auxiliary Contact Types

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Max.</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1NO and 1NC</td>
<td></td>
<td>J11</td>
<td></td>
</tr>
<tr>
<td>2NC</td>
<td></td>
<td>J02</td>
<td></td>
</tr>
<tr>
<td>2NO</td>
<td></td>
<td>J20</td>
<td></td>
</tr>
<tr>
<td>1 Coil Clearing NC and 1NO</td>
<td></td>
<td>J1C</td>
<td></td>
</tr>
</tbody>
</table>
SS-56 Surge Suppressor

■ Designed to be used with magnetic motor controllers through Size 4 in 120V, 60 Hz control circuits 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 A-168. Surge Suppressor

<table>
<thead>
<tr>
<th>Type</th>
<th>Mounting</th>
<th>Kit Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>SS-56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS-56 Surge Suppressor

For Size 3 and 4.

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 A-169. Fuse Block

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Kit Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>FS6</td>
<td></td>
</tr>
<tr>
<td>Panel</td>
<td>FS6-P</td>
<td></td>
</tr>
</tbody>
</table>

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 A-170. Interposing Relay

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Kit Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter or Panel</td>
<td>RS6-AA</td>
<td></td>
</tr>
</tbody>
</table>

B3NO Bell Alarm Contact

■ Isolated Normally Open Bell Alarm Contact.
■ Mounts in Type B block-type overload relay.

Table A-172. Bell Alarm Contact

<table>
<thead>
<tr>
<th>Kit Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3NO-2</td>
<td></td>
</tr>
<tr>
<td>B3NO-4</td>
<td></td>
</tr>
</tbody>
</table>

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 A-171. Mechanical Interlock

<table>
<thead>
<tr>
<th>Contactor Arrangement (Number of Poles, Horizontal or Vertical)</th>
<th>Continuous Size</th>
<th>Interlock Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 3 Horizontal</td>
<td>0, 1</td>
<td>M-33-1B</td>
<td></td>
</tr>
<tr>
<td>4 x 4 Horizontal</td>
<td>0, 1</td>
<td>M-33-1B</td>
<td></td>
</tr>
<tr>
<td>5 x 3 Horizontal</td>
<td>0, 1</td>
<td>M-33-1B</td>
<td></td>
</tr>
<tr>
<td>All Pole Combination, Vertical</td>
<td>0, 1</td>
<td>M-33-2B</td>
<td></td>
</tr>
<tr>
<td>5 x 3 Horizontal Reversing</td>
<td>2</td>
<td>M-33-2A</td>
<td></td>
</tr>
<tr>
<td>3 x 3 Vertical Reversing</td>
<td>2</td>
<td>M-33-2A</td>
<td></td>
</tr>
<tr>
<td>5 x 3 Horizontal</td>
<td>2</td>
<td>M-33-3B</td>
<td></td>
</tr>
<tr>
<td>4 x 4 Horizontal</td>
<td>2</td>
<td>M-33-3B</td>
<td></td>
</tr>
<tr>
<td>All Pole Combination Horizontal</td>
<td>3, 4</td>
<td>M-33-3B</td>
<td></td>
</tr>
<tr>
<td>All Pole Combination Vertical</td>
<td>3, 4</td>
<td>M-34-3</td>
<td></td>
</tr>
</tbody>
</table>

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., BA13B.
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.

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 A-174. Power Pole Kit

<table>
<thead>
<tr>
<th>Continuous Current Rating</th>
<th>Kit Size</th>
<th>Kit Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normally Open</td>
<td>18</td>
<td>PN0-0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>PN0-1</td>
<td></td>
</tr>
<tr>
<td>Normally Closed</td>
<td>18</td>
<td>PNC-0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>PNC-1</td>
<td></td>
</tr>
</tbody>
</table>

Discount Symbol .................. MC29
### Replacement Auxiliary Contacts

**Table A-175. Replacement Auxiliary Contacts**

<table>
<thead>
<tr>
<th>Contactor Size</th>
<th>Contact Arrangement</th>
<th>Aux. Elect. Contact</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 6</td>
<td>1NO + 1NC</td>
<td>J11</td>
<td>9084A17G01</td>
</tr>
<tr>
<td></td>
<td>2NO</td>
<td>J20</td>
<td>9084A17G02</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>J02</td>
<td>9084A17G03</td>
</tr>
<tr>
<td>7, 8</td>
<td>1NO</td>
<td>—</td>
<td>578D461G01</td>
</tr>
<tr>
<td></td>
<td>1NC</td>
<td>—</td>
<td>578D461G03</td>
</tr>
<tr>
<td>9</td>
<td>1NO + 1NC</td>
<td>—</td>
<td>843D943G04</td>
</tr>
<tr>
<td></td>
<td>2NO</td>
<td>—</td>
<td>843D943G05</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>—</td>
<td>843D943G06</td>
</tr>
</tbody>
</table>

### 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 A-176. Extra Auxiliary Contact Kits**

<table>
<thead>
<tr>
<th>Contactor Size</th>
<th>Contact Arrangement</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 6</td>
<td>1NO + 1NC</td>
<td>3463D94G18</td>
<td>9084A17G01</td>
</tr>
<tr>
<td></td>
<td>2NO</td>
<td>3463D94G04</td>
<td>9084A17G02</td>
</tr>
<tr>
<td></td>
<td>2NC</td>
<td>3463D94G19</td>
<td>9084A17G03</td>
</tr>
<tr>
<td>7, 8</td>
<td>2NO</td>
<td>818D498G06</td>
<td>9084A17G01</td>
</tr>
<tr>
<td></td>
<td>1NO</td>
<td>818D498G04</td>
<td>9084A17G02</td>
</tr>
</tbody>
</table>

- 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 A-177. DC Coil Conversion Kits**

<table>
<thead>
<tr>
<th>Size</th>
<th>Voltage</th>
<th>Kit Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>110-120</td>
<td>7864A28G01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>220-240</td>
<td>7864A28G02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>440-480</td>
<td>7864A28G03</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>110-120</td>
<td>7864A29G01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>220-240</td>
<td>7864A29G02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>440-480</td>
<td>7864A29G03</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical Interlocks

**Table A-178. Mechanical Interlocks**

<table>
<thead>
<tr>
<th>Contactor Size</th>
<th>Style Numbers</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 4 and 5</td>
<td>2050A11G75</td>
<td>2050A11G65</td>
</tr>
<tr>
<td>5 and 5</td>
<td>2050A11G25</td>
<td>2050A11G15</td>
</tr>
<tr>
<td>5 and 6</td>
<td>2050A11G27</td>
<td>2050A11G17</td>
</tr>
<tr>
<td>6 and 6</td>
<td>2050A11G26</td>
<td>2050A11G16</td>
</tr>
<tr>
<td>6 and 7, 8</td>
<td>—</td>
<td>2050A11G55</td>
</tr>
<tr>
<td>7, 8 and 7, 8</td>
<td>No (Rear Conn.)</td>
<td>567D624G01</td>
</tr>
<tr>
<td>7, 8 and 9</td>
<td>No (Rear Conn.)</td>
<td>9944D56G06</td>
</tr>
<tr>
<td>9 and 9</td>
<td>No (Rear Conn.)</td>
<td>9944D56G01</td>
</tr>
</tbody>
</table>

### 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 A-179. Overload Relay Kits**

<table>
<thead>
<tr>
<th>Kit Size</th>
<th>Kit Part Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2057A34G01</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6379D80G10</td>
<td></td>
</tr>
</tbody>
</table>

### Replacement Terminal Lugs

**Table A-180. Replacement Terminal Lugs**

<table>
<thead>
<tr>
<th>Contactor Size</th>
<th>Cable Size</th>
<th>Terminals Qty. in Kit</th>
<th>Terminals Qty. Req'd per Pole</th>
<th>Kit Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1-500 MCM</td>
<td>2</td>
<td>2</td>
<td>2119A76G01</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2-500 MCM</td>
<td>6</td>
<td>2</td>
<td>2119A76G02</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>4-500 MCM</td>
<td>12</td>
<td>4</td>
<td>7858A96G01</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>4-500 MCM</td>
<td>12</td>
<td>4</td>
<td>7858A96G02</td>
<td></td>
</tr>
</tbody>
</table>
NEMA Contactors & Starters

A200

Renewal Parts

When Ordering Specify
Use this renewal parts data to identify device by style number, catalogue 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 Centre.

General Information
This renewal parts data will provide the proper identification of standard parts which July be required for maintenance of Eaton’s Cutler-Hammer components.
It is the intent of this catalogue 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 A-181. JF Autostarter Kits

<table>
<thead>
<tr>
<th>Frame Size</th>
<th>Start Contacts</th>
<th></th>
<th></th>
<th>Run Contacts</th>
<th></th>
<th></th>
<th>Grid Stack Kit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required</td>
<td>Style Number</td>
<td>Price</td>
<td>Required</td>
<td>Style Number</td>
<td>Price</td>
<td>Required</td>
<td>Style Number</td>
</tr>
<tr>
<td>2 – 3</td>
<td>1</td>
<td>38A7018G12</td>
<td></td>
<td>1</td>
<td>38A7018G13</td>
<td></td>
<td>1</td>
<td>3354D90G10</td>
</tr>
<tr>
<td>4 – 5 SL</td>
<td>1</td>
<td>550D409G18</td>
<td></td>
<td>1</td>
<td>550D409G19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5M – 5MM</td>
<td>1</td>
<td>3354D90G08</td>
<td></td>
<td>1</td>
<td>3354D90G09</td>
<td></td>
<td>2</td>
<td>3354D90G10</td>
</tr>
</tbody>
</table>

Note: Kits contain a complete set of moving contacts, stationary contacts and springs.

Table A-182. Solenoid Assembly with Coil (All Sizes)

<table>
<thead>
<tr>
<th>Volt</th>
<th>Hz</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>60</td>
<td>5264C05H01</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>60</td>
<td>5264C05H02</td>
<td></td>
</tr>
<tr>
<td>460</td>
<td>60</td>
<td>5264C05H03</td>
<td></td>
</tr>
<tr>
<td>575</td>
<td>60</td>
<td>5264C05H04</td>
<td></td>
</tr>
</tbody>
</table>

1. When replacing solenoid assembly series 416C160 use adapter plate style 9917D02H01 — 1 required.
2. These styles replace coil style 296BB920.
   When ordering new style as replacement, customer must order adapter plate 9917D02H01, Quantity 1 required.
AC Starters, Contactors A200, A201

Table A-183. AC Contactors Model J Sizes 00, 0, 1, 2 Kits

<table>
<thead>
<tr>
<th>Part</th>
<th>Poles</th>
<th>Size 00</th>
<th></th>
<th></th>
<th>Size 0</th>
<th></th>
<th></th>
<th>Size 1</th>
<th></th>
<th></th>
<th>Size 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Style</td>
<td>Number</td>
<td>Style</td>
<td>Number</td>
<td>Style</td>
<td>Number</td>
<td>Style</td>
<td>Number</td>
<td>Style</td>
<td>Number</td>
</tr>
<tr>
<td>Contact Kit</td>
<td>2</td>
<td>373B331G17</td>
<td>373B331G02</td>
<td>373B331G07</td>
<td>373B331G11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>373B331G18</td>
<td>373B331G04</td>
<td>373B331G09</td>
<td>373B331G12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>373B331G18</td>
<td>373B331G04</td>
<td>373B331G09</td>
<td>373B331G13</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>5</td>
<td>373B331G19</td>
<td>373B331G05</td>
<td>373B331G10</td>
<td>373B331G14</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Arc Box</td>
<td>2, 3, 4</td>
<td>6714C74G01</td>
<td>6714C74G02</td>
<td>6714C74G03</td>
<td>6714C74G07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>5</td>
<td>6714C74G04</td>
<td>6714C74G05</td>
<td>6714C74G06</td>
<td>6714C74G08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross Bar</td>
<td>2, 3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4, 6</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper Base (for single rated coils only)</td>
<td>2, 3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Base</td>
<td>2, 3</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4, 5</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KO Spring (Pk of 10)</td>
<td>All</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal Line/Load (Pk of 3)</td>
<td>All</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 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.

Mounting hardware included.

Use one each of 373B331G1 and 373B331G12.

Table A-184. AC Coils

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Hz</th>
<th>Size 00, 0, 1</th>
<th>2-, 3-, 4-Pole</th>
<th>5-Pole</th>
<th>Size 0</th>
<th>2-, 3-Pole</th>
<th>4-, 5-Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Style Number</td>
<td>Price</td>
<td>Style</td>
<td>Number</td>
<td>Price</td>
<td>Style Number</td>
</tr>
<tr>
<td>120/110</td>
<td>60/50</td>
<td>505C806G01</td>
<td>505C806G02</td>
<td>505C806G01</td>
<td>505C806G02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>208</td>
<td>60</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>50</td>
<td>505C806G05</td>
<td>505C806G05</td>
<td>505C806G05</td>
<td>505C806G05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>60/50</td>
<td>505C806G07</td>
<td>505C806G07</td>
<td>505C806G07</td>
<td>505C806G07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>60</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td>505C806G02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>277</td>
<td>60</td>
<td>505C806G01</td>
<td>505C806G01</td>
<td>505C806G01</td>
<td>505C806G01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>60/50</td>
<td>505C806G03</td>
<td>505C806G03</td>
<td>505C806G03</td>
<td>505C806G03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120/240</td>
<td>60/60</td>
<td>505C806G10</td>
<td>505C806G10</td>
<td>505C806G10</td>
<td>505C806G10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Dual Voltage Coils. Use only on contactors or starters originally supplied with a dual voltage coil.

Table A-185. DC Coil

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Size 0, 1</th>
<th>Size 2</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Style</td>
<td>Number</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>128C36G07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>128C36G04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>128C36G05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>128C36G02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>128C36G01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125/250</td>
<td>128C36G03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Dual Voltage Coils. Use only on contactors or starters originally supplied with a dual voltage coil.

Table A-186. AC-DC Coil Conversion Kits

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Style Number</td>
<td></td>
</tr>
<tr>
<td>120V AC</td>
<td>7864A28G01</td>
<td></td>
</tr>
<tr>
<td>240V AC</td>
<td>7864A28G02</td>
<td></td>
</tr>
<tr>
<td>480V AC</td>
<td>7864A28G03</td>
<td></td>
</tr>
</tbody>
</table>

Table A-187. Replacement Coils for Above

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Style Number</td>
<td></td>
</tr>
<tr>
<td>120V AC</td>
<td>7856A15G05</td>
<td></td>
</tr>
<tr>
<td>240V AC</td>
<td>7856A15G10</td>
<td></td>
</tr>
<tr>
<td>480V AC</td>
<td>7856A15G15</td>
<td></td>
</tr>
</tbody>
</table>

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.
# Renewal Parts

## NEMA Contactors & Starters

### A-200

### AC Starters, Contactors A200, A201 (Continued)

#### Accessories for Size 5 – 9 AC Contactors

Table A-188. Auxiliary Electrical Interlocks Size 7 – 9 AC and All DC Units

<table>
<thead>
<tr>
<th>Type</th>
<th>Circuits</th>
<th>Application</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>L63</td>
<td>NO</td>
<td>Size 7 – 8</td>
<td>578D461G01</td>
<td></td>
</tr>
<tr>
<td>L63</td>
<td>NC</td>
<td>Size 7 – 8</td>
<td>578D461G03</td>
<td></td>
</tr>
<tr>
<td>L64</td>
<td>NO-NC</td>
<td>Size 9</td>
<td>843D943G04</td>
<td></td>
</tr>
<tr>
<td>L64</td>
<td>2NO</td>
<td>Size 9</td>
<td>843D943G05</td>
<td></td>
</tr>
<tr>
<td>L64</td>
<td>2NC</td>
<td>Size 9</td>
<td>843D943G06</td>
<td></td>
</tr>
</tbody>
</table>

#### Accessories for Size 00 – 6 AC Contactors

Table A-189. Auxiliary Electrical Interlocks Model J – K, Sizes 3 and 4

<table>
<thead>
<tr>
<th>Catalogue Number (Obsolete)</th>
<th>Style Number (Obsolete)</th>
<th>Circuits</th>
<th>Catalogue Number</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>(L56) (2609D01G01)</td>
<td>J11</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56D) (2609D01G02)</td>
<td>J20</td>
<td>2NO</td>
<td>9084A17G02</td>
<td>9084A17G01</td>
<td></td>
</tr>
<tr>
<td>(L56E) (2609D01G03)</td>
<td>J11</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56B) (2609D01G04)</td>
<td>J20</td>
<td>2NO</td>
<td>9084A17G02</td>
<td>9084A17G02</td>
<td></td>
</tr>
<tr>
<td>(L56H) (2609D01G05)</td>
<td>J20</td>
<td>2NO</td>
<td>9084A17G02</td>
<td>9084A17G02</td>
<td></td>
</tr>
<tr>
<td>(L56J) (2609D01G06)</td>
<td>J1C</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56A) (2609D01G07)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56B) (2609D01G08)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56F) (2609D01G09)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56G) (2609D01G10)</td>
<td>J1C</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56C) (2609D01G11)</td>
<td>J20</td>
<td>2NC</td>
<td>9084A17G03</td>
<td>9084A17G01</td>
<td></td>
</tr>
<tr>
<td>(L56M) (2609D01G12)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56P) (2609D01G17)</td>
<td>J11</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(L56R) (2609D01G18)</td>
<td>J20</td>
<td>2NC</td>
<td>9084A17G03</td>
<td>9084A17G01</td>
<td></td>
</tr>
<tr>
<td>(L56S) (2609D01G19)</td>
<td>J11</td>
<td>1NO &amp; 1NC</td>
<td>9084A17G01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Model J – K, Sizes 3 and 4

Table A-190. Model J – K Series 3, 4 Kits

<table>
<thead>
<tr>
<th>Part</th>
<th>Poles</th>
<th>Size 3 – Model J</th>
<th>Size 4 – Model J</th>
<th>Size 4 – Model K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Kit</td>
<td>2</td>
<td>626B187G12</td>
<td>626B187G16</td>
<td>5250C81G16</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>626B187G13</td>
<td>626B187G17</td>
<td>5250C81G17</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>626B187G14</td>
<td>626B187G18</td>
<td>5250C81G18</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>626B187G15</td>
<td>626B187G19</td>
<td>5250C81G19</td>
</tr>
</tbody>
</table>

| Arc Box       | 2, 3  | 6714C74G09       | 6714C74G11       | 6714C74G12       |
|               | 4, 5  | 6714C74G10       | 6714C74G12       | 6714C74G12       |

| Cross Bar     | 2, 3  | 672B788G36       | 672B788G36       | 672B788G52       |
|               | 4, 5  | 672B788G38       | 672B788G39       |

| Upper Base    | 2, 3  | 672B788G37       | 672B788G37       | 672B788G52       |
|               | 4, 5  | 672B788G38       | 672B788G39       |

| Lower Base    | 2, 3  | 1250C33G03       | 1250C33G03       | 1250C33G10       |
|               | 4, 5  | 1250C33G06       | 1250C33G06       |

| KO Spring (Pk of 10) | All     | 503C796G02       | 672B788G50       |
| Terminal Line/Load (Pk of 3) | All     | 372B357G12       | 372B357G18       |

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AC Starters, Contactors A200, A201 (Continued)

Accessories for Model J – K, Series 3, 4

Table A-191. DC Coils

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Model J Size 3, 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-, 3-Pole</td>
</tr>
<tr>
<td>24</td>
<td>125SC68G04</td>
</tr>
<tr>
<td>48</td>
<td>125SC68G05</td>
</tr>
<tr>
<td>125</td>
<td>125SC68G01</td>
</tr>
<tr>
<td>250</td>
<td>125SC68G02</td>
</tr>
<tr>
<td>125/250</td>
<td>125SC68G03</td>
</tr>
</tbody>
</table>

- Use only on units originally supplied with DC coil.
- Dual Voltage Coils. Use only on contactors or starters originally supplied with dual voltage coil.

Table A-192. AC Coils

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Hz</th>
<th>Model J Size 3, 4</th>
<th>Model K Size 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2-, 3-Pole</td>
<td>2-, 3-Pole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Style Number</td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Style Number</td>
<td>Price</td>
</tr>
<tr>
<td>120/110</td>
<td>60/50</td>
<td>505C63G01</td>
<td>505C63G01</td>
</tr>
<tr>
<td>208</td>
<td>60</td>
<td>505C63G02</td>
<td>505C63G02</td>
</tr>
<tr>
<td>600/550</td>
<td>60/50</td>
<td>505C63G05</td>
<td>505C63G05</td>
</tr>
<tr>
<td>380</td>
<td>60</td>
<td>505C63G07</td>
<td>505C63G07</td>
</tr>
<tr>
<td>240/220</td>
<td>60/50</td>
<td>505C63G12</td>
<td>505C63G12</td>
</tr>
<tr>
<td>480/440</td>
<td>60/50</td>
<td>505C63G13</td>
<td>505C63G13</td>
</tr>
<tr>
<td>24</td>
<td>60</td>
<td>505C63G34</td>
<td>N/A</td>
</tr>
<tr>
<td>277</td>
<td>60</td>
<td>505C63G14</td>
<td>N/A</td>
</tr>
<tr>
<td>240/480</td>
<td>60/60</td>
<td>505C63G10</td>
<td>505C63G10</td>
</tr>
<tr>
<td>120/244</td>
<td>60/80</td>
<td>505C63G30</td>
<td>505C63G30</td>
</tr>
</tbody>
</table>

- Use 477B477G06 for Silver Tungsten applications.
- C.T. kit which replaces the single moulded 1 CT assembly used on the old size 6 airbreak. The kit includes a single moulded 3 C.T. assembly, 2 bus bar and hardware. This C.T. kit also replaces the single moulded 3 C.T. assembly used on the present size 6 airbreak and size vacuum.

Table A-193. GCA 530/630 — GPD 7, 8, 9 Kits

<table>
<thead>
<tr>
<th>Part</th>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 7</th>
<th>Size 8</th>
<th>Size 9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Style Number</td>
<td>Price</td>
<td>Style Number</td>
<td>Price</td>
<td>Style Number</td>
</tr>
<tr>
<td>Contact Kit (1 per pole)</td>
<td>477B477G06</td>
<td>2066A10G11</td>
<td>461A175G17</td>
<td>646C829G05</td>
<td>5264C42G01 (R.C.)</td>
</tr>
<tr>
<td>Arc Box</td>
<td>2050A15G46</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Magnet Assy.</td>
<td>2050A15G46</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Mag. Spg. Kit</td>
<td>2050A15G47</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Acr Cup Kit</td>
<td>2050A15G48</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Load Conn. Kit</td>
<td>2050A15G49</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Line Conn. Kit</td>
<td>2050A15G50</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>K.O. Spring – 6</td>
<td>655C285H02</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C.T. 300/5</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C.T. 600/5</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C.T. 800/5</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C.T. 800/5</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C.T. 800/5</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Cross Bar</td>
<td>2050A15G12</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Shunt</td>
<td>N/A</td>
<td>2066A10G19</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- Catalogue Number A201/A200 Series replaces GCA/GPD series. Renewal parts are the same.
- Use 477B477G06 for Silver Tungsten applications.
- C.T. kit which replaces the single moulded 1 CT assembly used on the old size 6 airbreak. The kit includes a single moulded 3 C.T. assembly, 2 bus bar and hardware. This C.T. kit also replaces the single moulded 3 C.T. assembly used on the present size 6 airbreak and size vacuum.
## Accessories for A201 Contactors — Size 5 – 9

### Table A-194. Coils

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Hz</th>
<th>Size 5 Style Number</th>
<th>Price</th>
<th>Size 6 Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>110/120 V AC</td>
<td>60</td>
<td>2050A14G05</td>
<td></td>
<td>2050A12G05</td>
<td></td>
</tr>
<tr>
<td>110/120 V AC</td>
<td>50</td>
<td>2050A14G06</td>
<td></td>
<td>2050A12G06</td>
<td></td>
</tr>
<tr>
<td>200/208 V AC</td>
<td>50</td>
<td>2050A14G07</td>
<td></td>
<td>2050A12G07</td>
<td></td>
</tr>
<tr>
<td>220/240 V AC</td>
<td>50</td>
<td>2050A14G08</td>
<td></td>
<td>2050A12G08</td>
<td></td>
</tr>
<tr>
<td>200/208 V AC</td>
<td>60</td>
<td>2050A14G09</td>
<td></td>
<td>2050A12G09</td>
<td></td>
</tr>
<tr>
<td>220/240 V AC</td>
<td>60</td>
<td>2050A14G10</td>
<td></td>
<td>2050A12G10</td>
<td></td>
</tr>
<tr>
<td>277/303 V AC</td>
<td>60</td>
<td>2050A14G12</td>
<td></td>
<td>2050A12G12</td>
<td></td>
</tr>
<tr>
<td>380/415 V AC</td>
<td>50</td>
<td>2050A14G14</td>
<td></td>
<td>2050A12G14</td>
<td></td>
</tr>
<tr>
<td>440/480 V AC</td>
<td>50</td>
<td>2050A14G16</td>
<td></td>
<td>2050A12G16</td>
<td></td>
</tr>
<tr>
<td>550/600 V AC</td>
<td>60</td>
<td>2050A14G17</td>
<td></td>
<td>2050A12G17</td>
<td></td>
</tr>
<tr>
<td>550/600 V AC</td>
<td>50</td>
<td>2050A14G18</td>
<td></td>
<td>2050A12G18</td>
<td></td>
</tr>
<tr>
<td>380/415 V AC</td>
<td>60</td>
<td>2050A14G19</td>
<td></td>
<td>2050A12G19</td>
<td></td>
</tr>
<tr>
<td>120/240 V DC</td>
<td>60</td>
<td>2050A14G20</td>
<td></td>
<td>2050A12G20</td>
<td></td>
</tr>
<tr>
<td>24 DC</td>
<td></td>
<td>2050A14G21</td>
<td></td>
<td>2050A12G21</td>
<td></td>
</tr>
<tr>
<td>48 DC</td>
<td></td>
<td>2050A14G22</td>
<td></td>
<td>2050A12G22</td>
<td></td>
</tr>
<tr>
<td>125 DC</td>
<td></td>
<td>2050A14G25</td>
<td></td>
<td>2050A12G25</td>
<td></td>
</tr>
<tr>
<td>250 DC</td>
<td></td>
<td>2050A14G27</td>
<td></td>
<td>2050A12G27</td>
<td></td>
</tr>
</tbody>
</table>

### Line Voltage — Size 7, 8

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>125V DC</td>
<td>438C805G04</td>
<td>2</td>
</tr>
<tr>
<td>230V DC</td>
<td>438C805G02</td>
<td>2</td>
</tr>
<tr>
<td>250V DC</td>
<td>438C805G03</td>
<td>2</td>
</tr>
<tr>
<td>110/120V AC</td>
<td>438C805G12</td>
<td>2</td>
</tr>
<tr>
<td>220/240V AC</td>
<td>438C805G11</td>
<td>2</td>
</tr>
<tr>
<td>380V AC</td>
<td>438C805G15</td>
<td>2</td>
</tr>
<tr>
<td>440/480V AC</td>
<td>438C805G10</td>
<td>2</td>
</tr>
<tr>
<td>550/675V AC</td>
<td>438C805G13</td>
<td>2</td>
</tr>
</tbody>
</table>

### Line Voltage — Size 9

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Style Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>110V DC</td>
<td>5264C34G01</td>
<td>2</td>
</tr>
</tbody>
</table>

---

* Rectifier 125V 2018A40G01 (1 required).
* Rectifier 250V 2018A40G02 (1 required).
* Rectifier 600V 2018A40G03 (1 required).
* These coils require an external rectifier. If the rectifier needs replacement, order by the appropriate style number.
* Contains coil and resistor.

Discount Symbol ………………….. MC17
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 July 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
NEMA Contactors & Starters

A200

Relays — Thermal and Fast Trip, Thermal Type B

Thermal Type B, Class 20, Manual Reset

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 centres 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

Technical Data

Table A-195. Control Contact Ratings — NEMA B680 NO and NC Control Contact Rating

<table>
<thead>
<tr>
<th>AC Volts</th>
<th>Make</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 – 120</td>
<td>30A</td>
<td>3A</td>
</tr>
<tr>
<td>120 – 600</td>
<td>3600 VA</td>
<td>360 VA</td>
</tr>
</tbody>
</table>

Accessories

Table A-196. Alarm Contact Kit Selection

<table>
<thead>
<tr>
<th>Type B Overload Relay Size</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>B3NO-2</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>B3NO-4</td>
<td></td>
</tr>
</tbody>
</table>

Product Selection

Heaters

Enter heaters as separate item by listing Catalogue Number from tables, Pages A-106 – A-107, as required per starter.

Relays

Table A-197. Product Selection — Thermal Type B Overload Relay Selection

<table>
<thead>
<tr>
<th>Motor Full Load Amps</th>
<th>Panel Mounted</th>
<th>Starter Mounted Catalogue Numbers</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Catalogue Numbers</td>
<td>Replacement for Type B Overload Relays</td>
<td>Replacement for Type A Overload Relays in Manual Reset Mode (3-Pole Only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Pole (One NC Contact)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.3 – 45</td>
<td>BA21JP</td>
<td>BN21JP</td>
<td></td>
</tr>
<tr>
<td>19 – 90</td>
<td>BA11A</td>
<td>BN11A</td>
<td></td>
</tr>
<tr>
<td>19 – 136</td>
<td>BA21A</td>
<td>BN21A</td>
<td></td>
</tr>
<tr>
<td>Use 3-Pole Design, Wire 3 Poles in Series</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Three-Pole (One NC Contact)

| .25 – 26.2           | BA13JP        | BN13JP                             | BA13A |
| 26.3 – 45            | BA23JP        | BN23JP                             | BA23A |
| 19 – 90              | BA33P         | BN33P                             | BA33A |
| 19 – 135             | BA43P         | BN43P                             | BA43A |

- Includes contactor mounting bracket, overload relay and connection straps to contactor.
- For replacement on B200 size 00, 0, 1 use BA23A instead of BA13A and use BN23A instead of BN13A.

Discount Symbol ................................... MC29
Dimensions

Not to be used for construction purposes unless approved.

Table A-198. Thermal Type B Overload Relays Dimensions

<table>
<thead>
<tr>
<th>Relay Size</th>
<th>Approximate Dimensions in Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>3.13 (79.5)</td>
</tr>
<tr>
<td>4</td>
<td>3.38 (85.9)</td>
</tr>
</tbody>
</table>

Figure A-46. Thermal Type B Overload Relays Dimensions in Inches (mm)
Thermal Type A, Class 20, Auto/Manual Reset

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.

Product Selection
Heaters
Enter heaters as separate item by listing Catalogue Number from tables, Pages A-106 – A-107, as required per starter.

Relays
Table A-200. Product Selection — Thermal Type A Overload Relay Selection

<table>
<thead>
<tr>
<th>Motor Full Load Amps</th>
<th>Panel Mounted</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td>Single-Pole (One NC Contact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 – 26.2</td>
<td>AA11P</td>
<td>AN11P</td>
<td>AA11A</td>
<td>AN11A</td>
</tr>
<tr>
<td>26.3 – 45</td>
<td>AA21P</td>
<td>AN21P</td>
<td>AA21A</td>
<td>AN21A</td>
</tr>
<tr>
<td>19 – 90</td>
<td>AA31P</td>
<td>AN31P</td>
<td>AA31A</td>
<td>AN31A</td>
</tr>
<tr>
<td>19 – 135</td>
<td>AA41P</td>
<td>AN41P</td>
<td>AA41A</td>
<td>AN41A</td>
</tr>
<tr>
<td>Three-Pole (One NC Contact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 – 26.2</td>
<td>AA33P</td>
<td>AN33P</td>
<td>AA33A</td>
<td>AN33A</td>
</tr>
<tr>
<td>26.3 – 45</td>
<td>AA43P</td>
<td>AN43P</td>
<td>AA43A</td>
<td>AN43A</td>
</tr>
<tr>
<td>19 – 90</td>
<td>AA31P</td>
<td>AN31P</td>
<td>AA31A</td>
<td>AN31A</td>
</tr>
<tr>
<td>19 – 135</td>
<td>AA41P</td>
<td>AN41P</td>
<td>AA41A</td>
<td>AN41A</td>
</tr>
</tbody>
</table>

Note: For Alarm Contact (Form C), add Suffix B. Available only as factory modification on Type A relay.

© 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 A-100.)
Dimensions

Not to be used for construction purposes unless approved.

Figure A-47. Type A Single-Pole Approximate Dimensions

Figure A-48. Type A Three-Pole Approximate Dimensions

Table A-201. Type A Single-Pole — Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>Dim.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.72</td>
<td>3.48</td>
<td>4.19</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>(69.1)</td>
<td>(88.4)</td>
<td>(106.4)</td>
<td>(114.3)</td>
</tr>
<tr>
<td>B</td>
<td>.94</td>
<td>.67</td>
<td>.25</td>
<td>.38</td>
</tr>
<tr>
<td></td>
<td>(23.9)</td>
<td>(17.0)</td>
<td>(6.4)</td>
<td>(9.7)</td>
</tr>
<tr>
<td>C</td>
<td>2.75</td>
<td>3.5</td>
<td>3.53</td>
<td>3.78</td>
</tr>
<tr>
<td></td>
<td>(69.9)</td>
<td>(88.9)</td>
<td>(89.7)</td>
<td>(96.0)</td>
</tr>
</tbody>
</table>

Table A-202. Type A Three-Pole — Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>Dim.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.38</td>
<td>2.44</td>
<td>3.13</td>
<td>3.38</td>
</tr>
<tr>
<td></td>
<td>(60.5)</td>
<td>(62.0)</td>
<td>(79.5)</td>
<td>(85.9)</td>
</tr>
<tr>
<td>B</td>
<td>3.13</td>
<td>3.17</td>
<td>4.06</td>
<td>4.38</td>
</tr>
<tr>
<td></td>
<td>(79.5)</td>
<td>(80.5)</td>
<td>(103.1)</td>
<td>(111.3)</td>
</tr>
<tr>
<td>C</td>
<td>.36</td>
<td>.33</td>
<td>.44</td>
<td>.31</td>
</tr>
<tr>
<td></td>
<td>(9.1)</td>
<td>(9.4)</td>
<td>(11.2)</td>
<td>(7.9)</td>
</tr>
</tbody>
</table>

Table A-203. Type A Single-Pole — Approximate Dimensions in Inches (mm)

<table>
<thead>
<tr>
<th>Dim.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.72</td>
<td>3.48</td>
<td>4.19</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>(69.1)</td>
<td>(88.4)</td>
<td>(106.4)</td>
<td>(114.3)</td>
</tr>
<tr>
<td>B</td>
<td>.94</td>
<td>.67</td>
<td>.25</td>
<td>.38</td>
</tr>
<tr>
<td></td>
<td>(23.9)</td>
<td>(17.0)</td>
<td>(6.4)</td>
<td>(9.7)</td>
</tr>
<tr>
<td>C</td>
<td>2.75</td>
<td>3.5</td>
<td>3.53</td>
<td>3.78</td>
</tr>
<tr>
<td></td>
<td>(69.9)</td>
<td>(88.9)</td>
<td>(89.7)</td>
<td>(96.0)</td>
</tr>
</tbody>
</table>
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.

Product Selection

Table A-203. Type FT Single-Pole (One NC Contact); Three-Phase (Three NC Contacts in Series)

<table>
<thead>
<tr>
<th>Motor Full Load Amperes</th>
<th>Panel Mounted</th>
<th>Three-Pole</th>
<th>NEMA Size</th>
<th>Starter Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Mounted</td>
<td></td>
<td>Single-Pole</td>
<td></td>
<td>Three-Pole</td>
</tr>
<tr>
<td>Catalogue Number</td>
<td>Price</td>
<td>Catalogue Number</td>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>FT11P-1.1</td>
<td>—</td>
<td>FT13P-1.1</td>
<td>—</td>
<td>FT11A-1.1</td>
</tr>
<tr>
<td>1.1 – 1.6</td>
<td>FT11P-1.6</td>
<td>FT13P-1.6</td>
<td>0, 1</td>
<td>FT11A-1.6</td>
</tr>
<tr>
<td>1.6 – 2.4</td>
<td>FT11P-2.4</td>
<td>FT13P-2.4</td>
<td>0, 1</td>
<td>FT11A-2.4</td>
</tr>
<tr>
<td>2.4 – 3.6</td>
<td>FT11P-3.6</td>
<td>FT13P-3.6</td>
<td>0, 1</td>
<td>FT11A-3.6</td>
</tr>
<tr>
<td>3.6 – 5.4</td>
<td>FT11P-5.4</td>
<td>FT13P-5.4</td>
<td>0, 1</td>
<td>FT11A-5.4</td>
</tr>
<tr>
<td>5.4 – 8.0</td>
<td>FT11P-8.0</td>
<td>FT13P-8</td>
<td>0, 1</td>
<td>FT11A-8</td>
</tr>
<tr>
<td>8.0 – 12</td>
<td>FT11P-12</td>
<td>FT13P-12</td>
<td>0, 1</td>
<td>FT11A-12</td>
</tr>
<tr>
<td>12 – 18</td>
<td>FT11P-18</td>
<td>FT13P-18</td>
<td>1</td>
<td>FT11A-18</td>
</tr>
<tr>
<td>16 – 24</td>
<td>—</td>
<td>FT13P-24</td>
<td>—</td>
<td>FT11A-32</td>
</tr>
<tr>
<td>22 – 32</td>
<td>FT11P-32</td>
<td>FT13P-32</td>
<td>2</td>
<td>FT21A-36</td>
</tr>
<tr>
<td>24 – 36</td>
<td>FT21P-36</td>
<td>FT23P-36</td>
<td>2</td>
<td>FT21A-54</td>
</tr>
<tr>
<td>36 – 54</td>
<td>FT21P-54</td>
<td>FT23P-54</td>
<td>2</td>
<td>FT21A-54</td>
</tr>
<tr>
<td>56 – 80</td>
<td>FT31P-32</td>
<td>FT33P-32</td>
<td>3</td>
<td>FT31A-32</td>
</tr>
<tr>
<td>80 – 120</td>
<td>FT31P-48</td>
<td>FT33P-48</td>
<td>3</td>
<td>FT31A-48</td>
</tr>
<tr>
<td>100 – 150</td>
<td>FT41P-110</td>
<td>FT43P-110</td>
<td>4</td>
<td>FT41A-110</td>
</tr>
<tr>
<td>150 – 200</td>
<td>FT41P-150</td>
<td>FT43P-150</td>
<td>4</td>
<td>FT41A-150</td>
</tr>
</tbody>
</table>

Note: Single-Pole (1NO-NC Contact): Add Suffix B.
Three-Pole (3NO-NC Contacts): Add Suffix B. Example: FT13PB-12.

Features

- Class 10 — 600V design
- Inverse time delay trip
- Colour coded reset rod — green
- Alarm contact factory available
- Field selectable manual/auto reset
- Adjustable trip rating ±20%
- Ambient compensation included

Technical Data

Table A-204. Control Contact Ratings

<table>
<thead>
<tr>
<th>AC Volts</th>
<th>Normally Closed</th>
<th>Normally Open</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Make</td>
<td>Break</td>
</tr>
<tr>
<td>24 – 120</td>
<td>360 VA</td>
<td>3A</td>
</tr>
<tr>
<td>120 – 600</td>
<td>3600 VA</td>
<td>3A</td>
</tr>
</tbody>
</table>

Discount Symbol .................. MC29

For more information visit: www.EatonCanada.ca
### Dimensions

Not to be used for construction purposes unless approved.

Table A-205. Type FT Overload Relays Dimensions

<table>
<thead>
<tr>
<th>Relay Size</th>
<th>Approximate Dimensions in Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>4.25 (108.0)</td>
</tr>
<tr>
<td>4</td>
<td>4.50 (114.3)</td>
</tr>
</tbody>
</table>

Figure A-49. Type FT Overload Relays Dimensions in Inches (mm)
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 A-206. Heater Selection — Type A and B Overload Relays, Sizes 3 and 4

<table>
<thead>
<tr>
<th>Full Load Current of Motor (Amps)</th>
<th>Compensated Enclosed Starters</th>
<th>Non-compensating Enclosed Starters</th>
<th>Heater (One Heater per Catalogue Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Applications</td>
<td>Catalogue Number</td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td>51 – 55</td>
<td>FH52</td>
<td>47 – 51</td>
</tr>
<tr>
<td></td>
<td>56 – 61</td>
<td>FH61</td>
<td>52 – 56</td>
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<tr>
<td></td>
<td>62 – 66</td>
<td>FH62</td>
<td>57 – 61</td>
</tr>
<tr>
<td></td>
<td>67 – 73</td>
<td>FH63</td>
<td>62 – 67</td>
</tr>
<tr>
<td></td>
<td>74 – 78</td>
<td>FH64</td>
<td>66 – 72</td>
</tr>
<tr>
<td></td>
<td>79 – 84</td>
<td>FH65</td>
<td>73 – 77</td>
</tr>
<tr>
<td></td>
<td>85 – 92</td>
<td>FH66</td>
<td>78 – 84</td>
</tr>
<tr>
<td></td>
<td>93 – 101</td>
<td>FH67</td>
<td>85 – 91</td>
</tr>
<tr>
<td>12.8 – 14.1</td>
<td>11.9 – 13.0</td>
<td>FH68</td>
<td>FH90</td>
</tr>
<tr>
<td>14.2 – 15.5</td>
<td>13.1 – 14.3</td>
<td>FH69</td>
<td>FH91</td>
</tr>
<tr>
<td>15.6 – 17.1</td>
<td>14.4 – 15.9</td>
<td>FH70</td>
<td>FH92</td>
</tr>
<tr>
<td>17.2 – 18.9</td>
<td>16.0 – 17.4</td>
<td>FH71</td>
<td>FH93</td>
</tr>
<tr>
<td>19.0 – 20.8</td>
<td>17.5 – 19.1</td>
<td>FH72</td>
<td>FH94</td>
</tr>
</tbody>
</table>

Table A-207. Heater Selection — Type A and B Overload Relays, Sizes 5 and 6

<table>
<thead>
<tr>
<th>Full Load Current of Motor (Amps)</th>
<th>Compensated Overload Relay</th>
<th>Heater (One Heater per Catalogue Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Open Starter</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td></td>
<td>Enclosed Starter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FH23</td>
<td>FH92</td>
</tr>
<tr>
<td></td>
<td>118 – 129</td>
<td>118 – 129</td>
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<tr>
<td></td>
<td>120 – 141</td>
<td>120 – 141</td>
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<tr>
<td></td>
<td>142 – 159</td>
<td>142 – 159</td>
</tr>
<tr>
<td></td>
<td>156 – 170</td>
<td>156 – 170</td>
</tr>
<tr>
<td></td>
<td>171 – 187</td>
<td>171 – 187</td>
</tr>
<tr>
<td></td>
<td>184 – 205</td>
<td>184 – 205</td>
</tr>
<tr>
<td></td>
<td>206 – 224</td>
<td>206 – 224</td>
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<tr>
<td></td>
<td>225 – 244</td>
<td>225 – 244</td>
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<tr>
<td></td>
<td>245 – 263</td>
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<tr>
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<td>264 – 292</td>
<td>264 – 292</td>
</tr>
<tr>
<td></td>
<td>293 – 300</td>
<td>293 – 300</td>
</tr>
</tbody>
</table>

Note: Size 7 and Larger — Advise Full Load Current.
Table A-208. Heater Selection — Type A and B Overload Relays, Sizes 0, 1 and 2

<table>
<thead>
<tr>
<th>Size Starter</th>
<th>Non-compensated Open Starters and Ambient Comp. Open and Enclosed Starters</th>
<th>Heater (One Heater per Catalogue Number)</th>
<th>Non-compensating Enclosed Starters</th>
<th>Heater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Type Overload Using 3 Heaters</td>
<td>Single-Pole Type Overload</td>
<td>Catalogue Number</td>
<td>Price</td>
<td>Block Type Overload Using 3 Heaters</td>
</tr>
<tr>
<td>.25 – .27</td>
<td>.29 – .31</td>
<td>FH03</td>
<td>.24 – .25</td>
<td>.28 – .30</td>
</tr>
<tr>
<td>.28 – .31</td>
<td>.32 – .35</td>
<td>FH04</td>
<td>.26 – .28</td>
<td>.31 – .34</td>
</tr>
<tr>
<td>.32 – .34</td>
<td>.36 – .39</td>
<td>FH05</td>
<td>.29 – .31</td>
<td>.35 – .37</td>
</tr>
<tr>
<td>.35 – .38</td>
<td>.40 – .43</td>
<td>FH06</td>
<td>.32 – .35</td>
<td>.38 – .42</td>
</tr>
<tr>
<td>.39 – .42</td>
<td>.44 – .48</td>
<td>FH07</td>
<td>.36 – .39</td>
<td>.43 – .47</td>
</tr>
<tr>
<td>.43 – .46</td>
<td>.49 – .53</td>
<td>FH08</td>
<td>.40 – .43</td>
<td>.48 – .52</td>
</tr>
<tr>
<td>.47 – .50</td>
<td>.54 – .58</td>
<td>FH09</td>
<td>.44 – .47</td>
<td>.53 – .56</td>
</tr>
<tr>
<td>.51 – .55</td>
<td>.59 – .64</td>
<td>FH10</td>
<td>.48 – .51</td>
<td>.57 – .63</td>
</tr>
<tr>
<td>.56 – .62</td>
<td>.65 – .71</td>
<td>FH11</td>
<td>.52 – .57</td>
<td>.64 – .70</td>
</tr>
<tr>
<td>.63 – .68</td>
<td>.72 – .79</td>
<td>FH12</td>
<td>.58 – .63</td>
<td>.71 – .77</td>
</tr>
<tr>
<td>.69 – .75</td>
<td>.80 – .87</td>
<td>FH13</td>
<td>.64 – .70</td>
<td>.78 – .85</td>
</tr>
<tr>
<td>.76 – .83</td>
<td>.89 – .96</td>
<td>FH14</td>
<td>.71 – .77</td>
<td>.86 – .94</td>
</tr>
<tr>
<td>.84 – .91</td>
<td>.97 – 1.06</td>
<td>FH15</td>
<td>.78 – .85</td>
<td>.95 – 1.03</td>
</tr>
<tr>
<td>.92 – 1.00</td>
<td>1.07 – 1.16</td>
<td>FH16</td>
<td>.86 – .93</td>
<td>1.04 – 1.13</td>
</tr>
<tr>
<td>1.01 – 1.11</td>
<td>1.17 – 1.28</td>
<td>FH17</td>
<td>.94 – 1.03</td>
<td>1.14 – 1.25</td>
</tr>
<tr>
<td>1.12 – 1.22</td>
<td>1.29 – 1.41</td>
<td>FH18</td>
<td>1.04 – 1.15</td>
<td>1.26 – 1.38</td>
</tr>
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<td>1.23 – 1.34</td>
<td>1.42 – 1.55</td>
<td>FH19</td>
<td>1.14 – 1.25</td>
<td>1.39 – 1.52</td>
</tr>
<tr>
<td>1.35 – 1.47</td>
<td>1.56 – 1.71</td>
<td>FH20</td>
<td>1.26 – 1.37</td>
<td>1.53 – 1.67</td>
</tr>
<tr>
<td>1.48 – 1.62</td>
<td>1.72 – 1.87</td>
<td>FH21</td>
<td>1.38 – 1.51</td>
<td>1.68 – 1.83</td>
</tr>
<tr>
<td>1.63 – 1.78</td>
<td>1.88 – 2.06</td>
<td>FH22</td>
<td>1.52 – 1.65</td>
<td>1.84 – 2.01</td>
</tr>
<tr>
<td>1.79 – 1.95</td>
<td>2.07 – 2.26</td>
<td>FH23</td>
<td>1.66 – 1.81</td>
<td>2.02 – 2.21</td>
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<td>1.96 – 2.15</td>
<td>2.27 – 2.48</td>
<td>FH24</td>
<td>1.82 – 1.99</td>
<td>2.22 – 2.43</td>
</tr>
<tr>
<td>2.16 – 2.35</td>
<td>2.49 – 2.72</td>
<td>FH25</td>
<td>2.00 – 2.19</td>
<td>2.44 – 2.66</td>
</tr>
<tr>
<td>2.36 – 2.58</td>
<td>2.73 – 2.99</td>
<td>FH26</td>
<td>2.20 – 2.39</td>
<td>2.67 – 2.92</td>
</tr>
<tr>
<td>2.59 – 2.83</td>
<td>3.00 – 3.28</td>
<td>FH27</td>
<td>2.40 – 2.63</td>
<td>2.93 – 3.21</td>
</tr>
</tbody>
</table>

Discount Symbol: ....................... MC7

For more information visit: www.EatonCanada.ca
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 pre-start 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

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
Product Description

Catalogue Number W201 — Non-reversing Contactors

Catalogue Number W211 — Horizontal Reversing Contactors (shown above) — long axis horizontal

Catalogue 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 Catalogue Number as specified in table below.
- Reversing Catalogue Number as specified in table below.

Table A-209. Advantage Contactors — 3-Pole Non-reversing and Reversing — NEMA Sizes 1 – 6

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Motor Voltage</th>
<th>Max. hp</th>
<th>Continuous Amperes (Enclosed)</th>
<th>Coil Voltage/Hz</th>
<th>Non-reversing</th>
<th>Reversing (Horizontal)</th>
<th>Reversing (Vertical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200 230 460 575</td>
<td>7-1/2 7-1/2 10 10</td>
<td>27</td>
<td>120/60 110/50</td>
<td>W201K1CF W201K1CN</td>
<td>W211K1CF W211K1CN</td>
<td>W251K1CF W251K1CN</td>
</tr>
<tr>
<td>2</td>
<td>200 230 460 575</td>
<td>10 15 25 25</td>
<td>45</td>
<td>120/60 110/50</td>
<td>W201K2CF W201K2CN</td>
<td>W211K2CF W211K2CN</td>
<td>W251K2CF W251K2CN</td>
</tr>
<tr>
<td>3</td>
<td>200 230 460 575</td>
<td>25 30 50 50</td>
<td>90</td>
<td>120/60 110/50</td>
<td>W201K3CF W201K3CN</td>
<td>W211K3CF W211K3CN</td>
<td>W251K3CF W251K3CN</td>
</tr>
<tr>
<td>4</td>
<td>200 230 460 575</td>
<td>40 50 100 100</td>
<td>135</td>
<td>120/60 110/50</td>
<td>W201K4CF W201K4CN</td>
<td>W211K4CF W211K4CN</td>
<td>W251K4CF W251K4CN</td>
</tr>
<tr>
<td>5</td>
<td>200 230 460 575</td>
<td>75 100 200 200</td>
<td>270</td>
<td>120/60 110/50</td>
<td>W201K5CF W201K5CN</td>
<td>W211K5CF W211K5CN</td>
<td>W251K5CF W251K5CN</td>
</tr>
<tr>
<td>6</td>
<td>200 230 460 575</td>
<td>150 200 400 400</td>
<td>540</td>
<td>120/60 110/50</td>
<td>W201K6CF W201K6CN</td>
<td>W211K6CF W211K6CN</td>
<td>W251K6CF W251K6CN</td>
</tr>
</tbody>
</table>
Size 5 and 6 Starter

Product Description
Catalogue Number W200 — Non-reversing Starters (shown above)
Catalogue Number W210 — Horizontal Reversing Starters — long axis horizontal.
Catalogue 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 A-210. Motor FLA Ranges

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>1.15 to 1.25 Service Factor</th>
<th>1.0 Service Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 3/4 - 3.81</td>
<td>3.15 - 270</td>
<td>1.51 - 4.14</td>
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<tr>
<td>2 3.15 - 45.0</td>
<td>3.43 - 270</td>
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<tr>
<td>3 9.90 - 90.0</td>
<td>10.8 - 90.0</td>
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</tr>
<tr>
<td>4 9.90 - 135</td>
<td>10.8 - 135</td>
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<tr>
<td>5 38.3 - 270</td>
<td>41.7 - 270</td>
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<td>6 38.3 - 540</td>
<td>41.7 - 540</td>
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</table>

For motor full load current (FLA) range of 0.47A - 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 A-211. Optional Features

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omit Class II Ground-Current Protection</td>
<td>Y7</td>
</tr>
<tr>
<td>Omit Phase-Loss Protection</td>
<td>Y4</td>
</tr>
<tr>
<td>Omit both Class II Ground-Current Protection and Phase-Loss Protection</td>
<td>Y4Y7</td>
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</table>
Product Selection

When Ordering Specify

- Non-reversing Catalogue Number as specified in table below.
- Reversing Catalogue Number as specified in table below.

Table A-212. Advantage Starters — 3-Pole Non-reversing and Reversing — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1 – 6

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Motor Voltage</th>
<th>Max. hp</th>
<th>Continuous Amperes (Enclosed)</th>
<th>Coil Voltage/Hz</th>
<th>Non-reversing Catalogue Number</th>
<th>Reversing (Horizontal)</th>
<th>Reversing (Vertical)</th>
<th>Price</th>
<th>Price</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>1</td>
<td>1</td>
<td>120/60</td>
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<td>W210MLCFC W210MLCNC</td>
<td>W250MLCFC W250MLCNC</td>
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<td></td>
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<tr>
<td>1</td>
<td>200</td>
<td>7-1/2</td>
<td>7-1/2</td>
<td>120/60</td>
<td>W200M1CFC W200M1CNC</td>
<td>W210M1CFC W210M1CNC</td>
<td>W250M1CFC W250M1CNC</td>
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<tr>
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<td>230</td>
<td>7-1/2</td>
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<td>575</td>
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<td>200</td>
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<td>15</td>
<td>120/60</td>
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<td>120/60</td>
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<td>50</td>
<td>120/60</td>
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<td>W210M4CFC W210M4CNC</td>
<td>W250M4CFC W250M4CNC</td>
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<td>120/60</td>
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<td>W210M5CFC W210M5CNC</td>
<td>W250M5CFC W250M5CNC</td>
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<td>150</td>
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<td>120/60</td>
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</tr>
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</table>

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.
## Product Selection

**When Ordering Specify**
- Catalogue Number as shown in table below.

**Table A-213. Two-Speed Advantage Starters — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1 – 6**

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Motor Voltage</th>
<th>Max. Horsepower</th>
<th>Continuous Amperes (Enclosed)</th>
<th>Coil Voltage/Hz</th>
<th>Open Type (Horizontal)</th>
<th>Catalogue Number</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Constant Torque</td>
<td>Constant Torque</td>
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</table>

For Separate (2) Winding Type Motors — Wye Wye

For motor full load current (FLA) range of 0.47A – 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.
## Table A-213. Two-Speed Advantage Starters — Wired for Separate Control — Heaters Not Required — NEMA Sizes 1–6 (Continued)

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Motor Voltage</th>
<th>Max. Horsepower</th>
<th>Continuous Amperes (Enclosed)</th>
<th>Coil Voltage/Hz</th>
<th>Open Type [Horizontal]</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Constant or Variable Torque</td>
<td>Constant hp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>200 230 460 575</td>
<td>—</td>
<td>1 1 2 2</td>
<td>27</td>
<td>120/60</td>
<td>W970MLCFCM3 W970MLCNCM3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>200 230 460 575</td>
<td>—</td>
<td>6 6 10 10</td>
<td>27</td>
<td>120/60</td>
<td>W970M1CFCM3 W970M1CNCM3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>200 230 460 575</td>
<td>—</td>
<td>7 20 20</td>
<td>45</td>
<td>120/60</td>
<td>W970M2CFCM3 W970M2CNCM3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>200 230 460 575</td>
<td>—</td>
<td>20 25 40 40</td>
<td>90</td>
<td>120/60</td>
<td>W970M3CFCM3 W970M3CNCM3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>200 230 460 575</td>
<td>—</td>
<td>30 40 75 75</td>
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<td>120/60</td>
<td>W970M4CFCM3 W970M4CNCM3</td>
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</tr>
<tr>
<td>5</td>
<td>200 230 460 575</td>
<td>—</td>
<td>60 150 150</td>
<td>270</td>
<td>120/60</td>
<td>W970M5CFCM3 W970M5CNCM3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>200 230 460 575</td>
<td>—</td>
<td>100 150 300 300</td>
<td>540</td>
<td>120/60</td>
<td>W970M6CFCM3 W970M6CNCM3</td>
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</table>

**For Single Winding Type Motors (Constant or Variable Torque)**

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Motor Voltage</th>
<th>Max. Horsepower</th>
<th>Continuous Amperes (Enclosed)</th>
<th>Coil Voltage/Hz</th>
<th>Open Type [Horizontal]</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200 230 460 575</td>
<td>—</td>
<td>1 1 2 2</td>
<td>27</td>
<td>120/60</td>
<td>W980MLCFCM3 W980MLCNCM3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>200 230 460 575</td>
<td>—</td>
<td>7-1/2 10 10</td>
<td>27</td>
<td>120/60</td>
<td>W980M1CFCM3 W980M1CNCM3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>200 230 460 575</td>
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<td></td>
</tr>
<tr>
<td>3</td>
<td>200 230 460 575</td>
<td>—</td>
<td>25 30 50</td>
<td>90</td>
<td>120/60</td>
<td>W980M3CFCM3 W980M3CNCM3</td>
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</tr>
<tr>
<td>4</td>
<td>200 230 460 575</td>
<td>—</td>
<td>40 50 60 60</td>
<td>135</td>
<td>120/60</td>
<td>W980M4CFCM3 W980M4CNCM3</td>
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</tr>
<tr>
<td>5</td>
<td>200 230 460 575</td>
<td>—</td>
<td>75 150 150</td>
<td>270</td>
<td>120/60</td>
<td>W980M5CFCM3 W980M5CNCM3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>200 230 460 575</td>
<td>—</td>
<td>150 150 400 400</td>
<td>540</td>
<td>120/60</td>
<td>W980M6CFCM3 W980M6CNCM3</td>
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</tr>
</tbody>
</table>

1 For motor full load current (FLA) range of 0.7 A – 3.81 A with a 1.15 to 1.25 service factor and for motor hp range of 1/4 hp to 2 hp at 460V.
NEMA Contactors & Starters Advantage

Technical Data and Specifications

Table A-214. Electrical Characteristics, Sizes 1 – 6

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Voltage Rating</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
<td>600V</td>
</tr>
<tr>
<td>Ampere Rating</td>
<td>30A</td>
<td>50A</td>
<td>100A</td>
<td>150A</td>
<td>300A</td>
<td>650A</td>
</tr>
<tr>
<td>Enclosed</td>
<td>27A</td>
<td>45A</td>
<td>90A</td>
<td>135A</td>
<td>270A</td>
<td>540A</td>
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<tr>
<td>Maximum Horsepower — Squirrel Cage Motor</td>
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</tr>
<tr>
<td>200V, 60 Hz</td>
<td>7-1/2 hp</td>
<td>10 hp</td>
<td>25 hp</td>
<td>40 hp</td>
<td>75 hp</td>
<td>150 hp</td>
</tr>
<tr>
<td>230V, 60 Hz</td>
<td>7-1/2 hp</td>
<td>15 hp</td>
<td>30 hp</td>
<td>50 hp</td>
<td>100 hp</td>
<td>200 hp</td>
</tr>
<tr>
<td>380V, 50 Hz</td>
<td>10 hp</td>
<td>26 hp</td>
<td>50 hp</td>
<td>75 hp</td>
<td>150 hp</td>
<td>300 hp</td>
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<td>460 – 575V, 60 Hz</td>
<td>10 hp</td>
<td>25 hp</td>
<td>50 hp</td>
<td>100 hp</td>
<td>200 hp</td>
<td>400 hp</td>
</tr>
<tr>
<td>Resistive Heating, kW</td>
<td>120V</td>
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<td>8.5 kW</td>
<td>17 kW</td>
<td>26 kW</td>
<td>52 kW</td>
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<tr>
<td>— Three-Phase, 3-Pole</td>
<td>240V</td>
<td>10 kW</td>
<td>17 kW</td>
<td>34 kW</td>
<td>68 kW</td>
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<tr>
<td>480V</td>
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<td>34 kW</td>
<td>68 kW</td>
<td>105 kW</td>
<td>210 kW</td>
<td>415 kW</td>
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<td>43 kW</td>
<td>86 kW</td>
<td>130 kW</td>
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<td>515 kW</td>
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<td>Capacitor Switching kVAR</td>
<td>240V</td>
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<td>12 kVAR</td>
<td>27 kVAR</td>
<td>40 kVAR</td>
<td>80 kVAR</td>
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<tr>
<td>— Three-Phase</td>
<td>480V</td>
<td>—</td>
<td>25 kVAR</td>
<td>53 kVAR</td>
<td>80 kVAR</td>
<td>160 kVAR</td>
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<td>67 kVAR</td>
<td>100 kVAR</td>
<td>200 kVAR</td>
<td>400 kVAR</td>
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<td>208V</td>
<td>3.6 kVA</td>
<td>6.3 kVA</td>
<td>12 kVA</td>
<td>20 kVA</td>
<td>41 kVA</td>
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<tr>
<td>— Three-Phase, 3-Pole</td>
<td>240V</td>
<td>4.3 kVA</td>
<td>7.2 kVA</td>
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<td>480V</td>
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<td>14 kVA</td>
<td>28 kVA</td>
<td>47 kVA</td>
<td>94 kVA</td>
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<td>600V</td>
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<td>18 kVA</td>
<td>35 kVA</td>
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<td>234 kVA</td>
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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 A-216. Ground Current Sensing

<table>
<thead>
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<th>Size</th>
<th>Trip Current</th>
<th>Lockout Current</th>
<th>Trip Time</th>
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</thead>
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<td>IL</td>
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<td>24</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>48</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>86</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>171</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>256</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>5</td>
<td>240</td>
<td>1045</td>
<td>.4 sec.</td>
</tr>
<tr>
<td>6</td>
<td>240</td>
<td>1045</td>
<td>.4 sec.</td>
</tr>
</tbody>
</table>

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 A-217. Phase Trip Time

<table>
<thead>
<tr>
<th>Size</th>
<th>Phase Unbalance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1</td>
<td>30% Unbalance</td>
</tr>
</tbody>
</table>

Phase Unbalance Trip Delay

- 6 sec.  
- 9 sec.  
- 12 sec.

Phase Loss Trip after 2 sec. if Phase Current is below:

- .15A  
- 1.15A  
- 2.5A  
- 2.5A  
- 11A  
- 11A

5. Size 1 Lower Current Range for motor hp range of 1/4 hp to 2 hp at 460V.
Table A-218. Operating Coil Characteristics at Rated Coil Volts, Sizes 1 – 6

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Coil Burden — Inrush VA</td>
<td>250 VA</td>
<td>250 VA</td>
<td>500 VA</td>
<td>500 VA</td>
<td>2000 VA</td>
<td>2600 VA</td>
</tr>
<tr>
<td>Closed VA</td>
<td>25 VA</td>
<td>25 VA</td>
<td>50 VA</td>
<td>50 VA</td>
<td>50 VA</td>
<td>50 VA</td>
</tr>
<tr>
<td>Closed Watts</td>
<td>5 W</td>
<td>5 W</td>
<td>10 W</td>
<td>10 W</td>
<td>10 W</td>
<td>10 W</td>
</tr>
<tr>
<td>Pick-Up Volts (1)</td>
<td>78 V</td>
<td>78 V</td>
<td>78 V</td>
<td>78 V</td>
<td>78 V</td>
<td>78 V</td>
</tr>
<tr>
<td>Drop-Out Volts (1)</td>
<td>60 V</td>
<td>60 V</td>
<td>60 V</td>
<td>60 V</td>
<td>60 V</td>
<td>60 V</td>
</tr>
</tbody>
</table>

Note: The above represent typical production test values and should not be interpreted as a guarantee of actual performance.

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 A-219. Mechanical Characteristics — Sizes 1 – 6

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions in Inches (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>6.50</td>
<td>6.50</td>
<td>8.00</td>
<td>8.00</td>
<td>10.08</td>
<td>10.08</td>
</tr>
<tr>
<td>Width</td>
<td>2.50</td>
<td>2.50</td>
<td>4.96</td>
<td>4.96</td>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Depth</td>
<td>4.96</td>
<td>4.96</td>
<td>6.54</td>
<td>6.54</td>
<td>10.08</td>
<td>10.08</td>
</tr>
<tr>
<td>Panel area, square inches</td>
<td>16.25</td>
<td>16.25</td>
<td>29.44</td>
<td>29.44</td>
<td>50.08</td>
<td>50.08</td>
</tr>
<tr>
<td>Shipping weight, lbs.</td>
<td>2.00</td>
<td>2.00</td>
<td>6.00</td>
<td>6.00</td>
<td>12.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Maximum cable size/phase copper — AWG/MCM (2)</td>
<td>8 AWG</td>
<td>4 AWG</td>
<td>250 MCM (2)</td>
<td>250 MCM (2)</td>
<td>(1) 500 MCM (2)</td>
<td>(2) 500 MCM (2)</td>
</tr>
<tr>
<td>Auxiliary Electrical Circuits Available</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Maximum wire size for auxiliary electrical circuit — AWG</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Maximum wire size for control circuit — AWG</td>
<td>(2) 14</td>
<td>(2) 14</td>
<td>(2) 14</td>
<td>(2) 14</td>
<td>(2) 14</td>
<td>(2) 14</td>
</tr>
</tbody>
</table>

(2) Also referenced as “kcmil” (1990 NEC).

Motor FLA, Three-Phase AC

Table A-220. Data from Table 430-150 of 1990 NEC

<table>
<thead>
<tr>
<th>Horsepower</th>
<th>200V</th>
<th>230V</th>
<th>460V</th>
<th>575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>1.15</td>
<td>1.0</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>1/2</td>
<td>2.3</td>
<td>2.0</td>
<td>1.0</td>
<td>0.8</td>
</tr>
<tr>
<td>3/4</td>
<td>3.2</td>
<td>2.8</td>
<td>1.4</td>
<td>1.1</td>
</tr>
<tr>
<td>1</td>
<td>4.1</td>
<td>3.6</td>
<td>1.8</td>
<td>1.4</td>
</tr>
<tr>
<td>1-1/2</td>
<td>6.0</td>
<td>5.2</td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td>2</td>
<td>7.8</td>
<td>6.8</td>
<td>3.4</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>11.0</td>
<td>9.6</td>
<td>4.8</td>
<td>3.9</td>
</tr>
<tr>
<td>5</td>
<td>17.5</td>
<td>15.2</td>
<td>7.6</td>
<td>6.1</td>
</tr>
<tr>
<td>7-1/2</td>
<td>25.3</td>
<td>22.2</td>
<td>11.1</td>
<td>9.0</td>
</tr>
<tr>
<td>10</td>
<td>32.2</td>
<td>28.8</td>
<td>14.1</td>
<td>11.3</td>
</tr>
<tr>
<td>15</td>
<td>48.3</td>
<td>42.3</td>
<td>21.7</td>
<td>17.1</td>
</tr>
<tr>
<td>20</td>
<td>62.1</td>
<td>54.0</td>
<td>27.0</td>
<td>22.0</td>
</tr>
<tr>
<td>25</td>
<td>78.2</td>
<td>68.0</td>
<td>34.0</td>
<td>27.0</td>
</tr>
<tr>
<td>30</td>
<td>92</td>
<td>80</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>40</td>
<td>120</td>
<td>104</td>
<td>52</td>
<td>41</td>
</tr>
<tr>
<td>50</td>
<td>150</td>
<td>130</td>
<td>65</td>
<td>52</td>
</tr>
<tr>
<td>60</td>
<td>177</td>
<td>154</td>
<td>72</td>
<td>62</td>
</tr>
<tr>
<td>75</td>
<td>221</td>
<td>192</td>
<td>96</td>
<td>77</td>
</tr>
<tr>
<td>100</td>
<td>286</td>
<td>248</td>
<td>124</td>
<td>99</td>
</tr>
<tr>
<td>125</td>
<td>359</td>
<td>312</td>
<td>156</td>
<td>125</td>
</tr>
<tr>
<td>150</td>
<td>414</td>
<td>360</td>
<td>180</td>
<td>144</td>
</tr>
<tr>
<td>200</td>
<td>552</td>
<td>480</td>
<td>240</td>
<td>192</td>
</tr>
</tbody>
</table>

Note: These current values are for motors running at usual speeds and with normal torque characteristics. Motors for special low speed or high torque July 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 A-221. Temperature Specifications, Sizes 1 – 6

<table>
<thead>
<tr>
<th>Ambient Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>-40° to 100°C (-40° to 212°F)</td>
</tr>
<tr>
<td>Operating</td>
<td>-40° to 40°C (-40° to 104°F)</td>
</tr>
<tr>
<td>External (NEMA Enclosed)</td>
<td>-40° to 40°C (-40° to 104°F)</td>
</tr>
</tbody>
</table>

Table A-222. DIP Switch Overload Protection Settings

<table>
<thead>
<tr>
<th>Reset Method</th>
<th>Position 8</th>
<th>Position 7</th>
<th>Position 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANUAL (Non-automatic — wait 5 minutes)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC (Reset time is based on protection Class)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overload Class</th>
<th>Position 7</th>
<th>Position 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
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 A-223. Factor

<table>
<thead>
<tr>
<th>Catalogue Number</th>
<th>Multiplier Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>W800 Autotransformer</td>
<td>1.00</td>
</tr>
<tr>
<td>W700 Part Winding</td>
<td>0.50</td>
</tr>
<tr>
<td>W800, W800 Wye-Delta</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Table A-224. Size 1 — Lower Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25 Min. Max.</th>
<th>Column B Service Factor 1.0 Min. Max.</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.47 – 0.51</td>
<td>0.51 – 0.56</td>
<td>0.59</td>
<td>00000</td>
</tr>
<tr>
<td>0.52 – 0.56</td>
<td>0.57 – 0.61</td>
<td>0.65</td>
<td>00001</td>
</tr>
<tr>
<td>0.57 – 0.61</td>
<td>0.62 – 0.67</td>
<td>0.71</td>
<td>00010</td>
</tr>
<tr>
<td>0.62 – 0.68</td>
<td>0.68 – 0.74</td>
<td>0.78</td>
<td>00011</td>
</tr>
<tr>
<td>0.69 – 0.75</td>
<td>0.75 – 0.82</td>
<td>0.86</td>
<td>00100</td>
</tr>
<tr>
<td>0.76 – 0.82</td>
<td>0.83 – 0.89</td>
<td>0.95</td>
<td>00101</td>
</tr>
<tr>
<td>0.83 – 0.90</td>
<td>0.90 – 0.95</td>
<td>1.04</td>
<td>00110</td>
</tr>
<tr>
<td>0.91 – 1.00</td>
<td>0.99 – 1.09</td>
<td>1.14</td>
<td>00111</td>
</tr>
<tr>
<td>1.01 – 1.09</td>
<td>1.10 – 1.19</td>
<td>1.26</td>
<td>01000</td>
</tr>
<tr>
<td>1.10 – 1.21</td>
<td>1.20 – 1.31</td>
<td>1.38</td>
<td>01001</td>
</tr>
<tr>
<td>1.22 – 1.33</td>
<td>1.32 – 1.44</td>
<td>1.52</td>
<td>01010</td>
</tr>
<tr>
<td>1.34 – 1.46</td>
<td>1.45 – 1.59</td>
<td>1.67</td>
<td>01011</td>
</tr>
<tr>
<td>1.47 – 1.61</td>
<td>1.60 – 1.75</td>
<td>1.84</td>
<td>01100</td>
</tr>
<tr>
<td>1.62 – 1.77</td>
<td>1.76 – 1.93</td>
<td>2.02</td>
<td>01101</td>
</tr>
<tr>
<td>1.78 – 1.95</td>
<td>1.94 – 2.12</td>
<td>2.23</td>
<td>01110</td>
</tr>
<tr>
<td>1.96 – 2.14</td>
<td>2.13 – 2.33</td>
<td>2.45</td>
<td>01111</td>
</tr>
<tr>
<td>2.15 – 2.36</td>
<td>2.34 – 2.56</td>
<td>2.69</td>
<td>10000</td>
</tr>
<tr>
<td>2.37 – 2.60</td>
<td>2.57 – 2.82</td>
<td>2.96</td>
<td>10001</td>
</tr>
<tr>
<td>2.61 – 2.85</td>
<td>2.83 – 3.10</td>
<td>3.26</td>
<td>10010</td>
</tr>
<tr>
<td>2.86 – 3.14</td>
<td>3.11 – 3.42</td>
<td>3.58</td>
<td>10011</td>
</tr>
<tr>
<td>3.15 – 3.46</td>
<td>3.43 – 3.76</td>
<td>3.94</td>
<td>10100</td>
</tr>
<tr>
<td>3.47 – 3.81</td>
<td>3.77 – 4.14</td>
<td>4.34</td>
<td>10101</td>
</tr>
</tbody>
</table>

Table A-225. Size 1 — Upper Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25 Min. Max.</th>
<th>Column B Service Factor 1.0 Min. Max.</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.15 – 3.46</td>
<td>3.43 – 3.75</td>
<td>3.93</td>
<td>00000</td>
</tr>
<tr>
<td>3.47 – 3.81</td>
<td>3.76 – 4.13</td>
<td>4.33</td>
<td>00001</td>
</tr>
<tr>
<td>3.82 – 4.19</td>
<td>4.14 – 4.55</td>
<td>4.77</td>
<td>00010</td>
</tr>
<tr>
<td>4.20 – 4.61</td>
<td>4.56 – 4.99</td>
<td>5.25</td>
<td>00011</td>
</tr>
<tr>
<td>4.62 – 5.00</td>
<td>5.00 – 5.45</td>
<td>5.77</td>
<td>00011</td>
</tr>
<tr>
<td>5.2 – 5.55</td>
<td>5.55 – 6.00</td>
<td>6.35</td>
<td>00101</td>
</tr>
<tr>
<td>5.6 – 6.00</td>
<td>6.00 – 6.50</td>
<td>6.90</td>
<td>00110</td>
</tr>
<tr>
<td>6.1 – 6.6</td>
<td>6.60 – 7.12</td>
<td>7.27</td>
<td>00111</td>
</tr>
<tr>
<td>6.7 – 7.3</td>
<td>7.30 – 8.00</td>
<td>8.50</td>
<td>01000</td>
</tr>
<tr>
<td>7.4 – 8.1</td>
<td>8.10 – 8.80</td>
<td>9.30</td>
<td>01001</td>
</tr>
<tr>
<td>8.2 – 8.9</td>
<td>8.90 – 9.60</td>
<td>10.20</td>
<td>01010</td>
</tr>
<tr>
<td>9.0 – 9.8</td>
<td>9.70 – 10.60</td>
<td>11.20</td>
<td>01011</td>
</tr>
<tr>
<td>9.9 – 10.8</td>
<td>10.70 – 11.70</td>
<td>12.40</td>
<td>01011</td>
</tr>
<tr>
<td>10.9 – 11.9</td>
<td>11.80 – 12.90</td>
<td>13.60</td>
<td>01011</td>
</tr>
<tr>
<td>12.0 – 13.1</td>
<td>13.00 – 14.20</td>
<td>15.00</td>
<td>01011</td>
</tr>
</tbody>
</table>

All settings not shown are equivalent to 00000.

Table A-226. Size 2 — Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25 Min. Max.</th>
<th>Column B Service Factor 1.0 Min. Max.</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.15 – 3.46</td>
<td>3.43 – 3.75</td>
<td>3.93</td>
<td>00000</td>
</tr>
<tr>
<td>3.47 – 3.81</td>
<td>3.76 – 4.13</td>
<td>4.33</td>
<td>00001</td>
</tr>
<tr>
<td>3.82 – 4.19</td>
<td>4.14 – 4.55</td>
<td>4.77</td>
<td>00010</td>
</tr>
<tr>
<td>4.20 – 4.61</td>
<td>4.56 – 4.99</td>
<td>5.25</td>
<td>00011</td>
</tr>
<tr>
<td>4.62 – 5.00</td>
<td>5.00 – 5.45</td>
<td>5.77</td>
<td>00011</td>
</tr>
<tr>
<td>5.1 – 5.55</td>
<td>5.55 – 6.00</td>
<td>6.35</td>
<td>00101</td>
</tr>
<tr>
<td>5.6 – 6.00</td>
<td>6.00 – 6.50</td>
<td>6.90</td>
<td>00110</td>
</tr>
<tr>
<td>6.1 – 6.6</td>
<td>6.60 – 7.12</td>
<td>7.27</td>
<td>00111</td>
</tr>
<tr>
<td>6.7 – 7.3</td>
<td>7.30 – 8.00</td>
<td>8.50</td>
<td>01000</td>
</tr>
<tr>
<td>7.4 – 8.1</td>
<td>8.10 – 8.80</td>
<td>9.30</td>
<td>01001</td>
</tr>
<tr>
<td>8.2 – 8.9</td>
<td>8.90 – 9.60</td>
<td>10.20</td>
<td>01010</td>
</tr>
<tr>
<td>9.0 – 9.8</td>
<td>9.70 – 10.60</td>
<td>11.20</td>
<td>01011</td>
</tr>
<tr>
<td>9.9 – 10.8</td>
<td>10.70 – 11.70</td>
<td>12.40</td>
<td>01011</td>
</tr>
<tr>
<td>10.9 – 11.9</td>
<td>11.80 – 12.90</td>
<td>13.60</td>
<td>01011</td>
</tr>
<tr>
<td>12.0 – 13.1</td>
<td>13.00 – 14.20</td>
<td>15.00</td>
<td>01011</td>
</tr>
</tbody>
</table>

All settings not shown are equivalent to 00000.

For more information visit: www.EatonCanada.ca

CA08102002K
### Table A-228. Size 4 Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25</th>
<th>Column B Service Factor 1.0</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.9 - 10.8</td>
<td>10.8 - 11.7</td>
<td>12.4</td>
<td>00000</td>
</tr>
<tr>
<td>10.9 - 11.9</td>
<td>11.8 - 12.9</td>
<td>13.6</td>
<td>00001</td>
</tr>
<tr>
<td>12.0 - 13.1</td>
<td>13.0 - 14.2</td>
<td>15.0</td>
<td>00010</td>
</tr>
<tr>
<td>13.2 - 14.4</td>
<td>14.3 - 15.6</td>
<td>16.5</td>
<td>00011</td>
</tr>
<tr>
<td>14.5 - 15.8</td>
<td>15.7 - 17.2</td>
<td>18.1</td>
<td>00012</td>
</tr>
<tr>
<td>15.9 - 17.3</td>
<td>17.3 - 18.9</td>
<td>19.9</td>
<td>00101</td>
</tr>
<tr>
<td>17.5 - 19.2</td>
<td>19.0 - 20.9</td>
<td>21.9</td>
<td>00102</td>
</tr>
<tr>
<td>19.3 - 21.1</td>
<td>21.0 - 22.9</td>
<td>24.1</td>
<td>00111</td>
</tr>
<tr>
<td>21.2 - 23.2</td>
<td>23.0 - 25.2</td>
<td>26.5</td>
<td>01000</td>
</tr>
<tr>
<td>23.3 - 25.6</td>
<td>25.3 - 27.8</td>
<td>29.1</td>
<td>01001</td>
</tr>
<tr>
<td>25.7 - 28.1</td>
<td>27.9 - 30.6</td>
<td>32.1</td>
<td>01010</td>
</tr>
<tr>
<td>28.2 - 30.9</td>
<td>30.7 - 33.6</td>
<td>35.3</td>
<td>01011</td>
</tr>
<tr>
<td>31.0 - 34.1</td>
<td>33.7 - 37.0</td>
<td>38.8</td>
<td>01101</td>
</tr>
<tr>
<td>34.2 - 37.6</td>
<td>37.1 - 40.8</td>
<td>42.7</td>
<td>01102</td>
</tr>
<tr>
<td>37.6 - 41.3</td>
<td>40.9 - 44.9</td>
<td>47.0</td>
<td>01111</td>
</tr>
<tr>
<td>41.4 - 45.4</td>
<td>45.0 - 49.4</td>
<td>51.7</td>
<td>11111</td>
</tr>
<tr>
<td>45.5 - 50.0</td>
<td>49.5 - 54.3</td>
<td>56.9</td>
<td>10000</td>
</tr>
<tr>
<td>50.1 - 54.9</td>
<td>54.4 - 59.7</td>
<td>62.6</td>
<td>10001</td>
</tr>
<tr>
<td>55.0 - 60.5</td>
<td>59.8 - 65.7</td>
<td>68.8</td>
<td>10010</td>
</tr>
<tr>
<td>60.6 - 66.5</td>
<td>65.8 - 72.3</td>
<td>75.7</td>
<td>10011</td>
</tr>
<tr>
<td>66.6 - 73.2</td>
<td>72.4 - 79.6</td>
<td>83.3</td>
<td>10100</td>
</tr>
<tr>
<td>73.3 - 80.7</td>
<td>79.7 - 87.7</td>
<td>91.6</td>
<td>10101</td>
</tr>
<tr>
<td>80.8 - 88.7</td>
<td>87.8 - 96.0</td>
<td>101.0</td>
<td>10110</td>
</tr>
<tr>
<td>88.8 - 90.0</td>
<td>—</td>
<td>111.0</td>
<td>10111</td>
</tr>
</tbody>
</table>

Note: All settings not shown are equivalent to 00000.

### Table A-229. Size 5 Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25</th>
<th>Column B Service Factor 1.0</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.3 - 41.9</td>
<td>41.7 - 45.6</td>
<td>47.9</td>
<td>00000</td>
</tr>
<tr>
<td>42.0 - 46.1</td>
<td>45.7 - 50.1</td>
<td>52.5</td>
<td>00001</td>
</tr>
<tr>
<td>46.2 - 51.0</td>
<td>50.2 - 55.5</td>
<td>57.7</td>
<td>00010</td>
</tr>
<tr>
<td>51.1 - 55.9</td>
<td>55.6 - 60.8</td>
<td>63.9</td>
<td>00011</td>
</tr>
<tr>
<td>56.0 - 61.7</td>
<td>60.9 - 67.1</td>
<td>70.0</td>
<td>00100</td>
</tr>
<tr>
<td>61.8 - 67.5</td>
<td>67.2 - 73.4</td>
<td>77.3</td>
<td>00101</td>
</tr>
<tr>
<td>67.6 - 74.9</td>
<td>73.5 - 81.4</td>
<td>84.5</td>
<td>00110</td>
</tr>
<tr>
<td>75.0 - 82.3</td>
<td>81.5 - 89.5</td>
<td>93.7</td>
<td>00111</td>
</tr>
<tr>
<td>82.4 - 90.3</td>
<td>89.6 - 98.2</td>
<td>103</td>
<td>01000</td>
</tr>
<tr>
<td>90.4 - 99.9</td>
<td>98.3 - 108</td>
<td>113</td>
<td>01001</td>
</tr>
<tr>
<td>100 - 109</td>
<td>109 - 118</td>
<td>125</td>
<td>01010</td>
</tr>
<tr>
<td>110 - 120</td>
<td>119 - 130</td>
<td>137</td>
<td>01011</td>
</tr>
<tr>
<td>121 - 132</td>
<td>131 - 143</td>
<td>151</td>
<td>01012</td>
</tr>
<tr>
<td>132 - 145</td>
<td>144 - 157</td>
<td>166</td>
<td>01013</td>
</tr>
<tr>
<td>146 - 159</td>
<td>158 - 173</td>
<td>182</td>
<td>01014</td>
</tr>
<tr>
<td>160 - 175</td>
<td>174 - 190</td>
<td>200</td>
<td>01100</td>
</tr>
<tr>
<td>176 - 193</td>
<td>191 - 209</td>
<td>220</td>
<td>01101</td>
</tr>
<tr>
<td>194 - 213</td>
<td>210 - 231</td>
<td>242</td>
<td>01102</td>
</tr>
<tr>
<td>214 - 233</td>
<td>222 - 254</td>
<td>267</td>
<td>01103</td>
</tr>
<tr>
<td>234 - 257</td>
<td>255 - 279</td>
<td>293</td>
<td>01104</td>
</tr>
</tbody>
</table>

Note: All settings not shown are equivalent to 00000.

### Table A-230. Size 6 Current Range

<table>
<thead>
<tr>
<th>Column A Service Factor 1.15 to 1.25</th>
<th>Column B Service Factor 1.0</th>
<th>Trip Rating Amperes</th>
<th>DIP Switch Setting (Positions) (54321)</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.3 - 41.9</td>
<td>41.7 - 45.6</td>
<td>47.9</td>
<td>00000</td>
</tr>
<tr>
<td>42.0 - 46.1</td>
<td>45.7 - 50.1</td>
<td>52.5</td>
<td>00001</td>
</tr>
<tr>
<td>46.2 - 51.0</td>
<td>50.2 - 55.5</td>
<td>57.7</td>
<td>00010</td>
</tr>
<tr>
<td>51.1 - 55.9</td>
<td>55.6 - 60.8</td>
<td>63.9</td>
<td>00011</td>
</tr>
<tr>
<td>56.0 - 61.7</td>
<td>60.9 - 67.1</td>
<td>70.0</td>
<td>00100</td>
</tr>
<tr>
<td>61.8 - 67.5</td>
<td>67.2 - 73.4</td>
<td>77.3</td>
<td>00101</td>
</tr>
<tr>
<td>67.6 - 74.9</td>
<td>73.5 - 81.4</td>
<td>84.5</td>
<td>00110</td>
</tr>
<tr>
<td>75.0 - 82.3</td>
<td>81.5 - 89.5</td>
<td>93.7</td>
<td>00111</td>
</tr>
<tr>
<td>82.4 - 90.3</td>
<td>89.6 - 98.2</td>
<td>103</td>
<td>01000</td>
</tr>
<tr>
<td>90.4 - 99.9</td>
<td>98.3 - 108</td>
<td>113</td>
<td>01001</td>
</tr>
<tr>
<td>100 - 109</td>
<td>109 - 118</td>
<td>125</td>
<td>01010</td>
</tr>
<tr>
<td>110 - 120</td>
<td>119 - 130</td>
<td>137</td>
<td>01011</td>
</tr>
<tr>
<td>121 - 132</td>
<td>131 - 143</td>
<td>151</td>
<td>01012</td>
</tr>
<tr>
<td>132 - 145</td>
<td>144 - 157</td>
<td>166</td>
<td>01013</td>
</tr>
<tr>
<td>146 - 159</td>
<td>158 - 173</td>
<td>182</td>
<td>01014</td>
</tr>
<tr>
<td>160 - 175</td>
<td>174 - 190</td>
<td>200</td>
<td>01100</td>
</tr>
<tr>
<td>176 - 193</td>
<td>191 - 209</td>
<td>220</td>
<td>01101</td>
</tr>
<tr>
<td>194 - 213</td>
<td>210 - 231</td>
<td>242</td>
<td>01102</td>
</tr>
<tr>
<td>214 - 233</td>
<td>222 - 254</td>
<td>267</td>
<td>01103</td>
</tr>
<tr>
<td>234 - 257</td>
<td>255 - 279</td>
<td>293</td>
<td>01104</td>
</tr>
</tbody>
</table>

Note: All settings not shown are equivalent to 00000.

---

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## Short Circuit Ratings

### Table A-231. Short-Circuit Ratings

<table>
<thead>
<tr>
<th>Short-Circuit Protective Device (SCPD)</th>
<th>Max. Rating (SCPD)</th>
<th>Circuit Breaker Interrupting Rating</th>
<th>Short-Circuit Withstand Rating</th>
<th>Typical Disconnect Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class H Fuse</td>
<td>60A</td>
<td>5,000A 600V 30A DS Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class J, R or T Fuse</td>
<td>60A</td>
<td>100,000A 480V 600V 100A FD-K Molded Case Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB</td>
<td>3A</td>
<td>100,000A 25,000A 480V HMCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB plus CL</td>
<td>7A</td>
<td>100,000A 25,000A 480V HMCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Magnetic Type CB</td>
<td>50A</td>
<td>65,000A 25,000A 480V HFD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Magnetic Type CB plus CL</td>
<td>30A</td>
<td>100,000A 25,000A 480V HMCP plus CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal/Mag. Type CB plus CL</td>
<td>50A</td>
<td>150,000A 100,000A 600V HFD plus CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class H Fuse</td>
<td>100A</td>
<td>5,000A 600V 60A DS Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class J, R or T Fuse</td>
<td>100A</td>
<td>100,000A 480V 600V 100A FD-K Molded Case Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB</td>
<td>50A</td>
<td>100,000A 25,000A 480V HMCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Magnetic Type CB</td>
<td>90A</td>
<td>65,000A 25,000A 480V HFD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB plus CL</td>
<td>50A</td>
<td>100,000A 25,000A 480V HMCP plus CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal/Mag. Type CB plus CL</td>
<td>90A</td>
<td>150,000A 100,000A 600V HFD plus CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class H Fuse</td>
<td>350A</td>
<td>5,000A 600V 100A DS Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class R or T Fuse</td>
<td>200A</td>
<td>100,000A 480V 600V 100A FD-K Molded Case Sw.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB</td>
<td>200A</td>
<td>100,000A 25,000A 480V HMCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Magnetic</td>
<td>150A</td>
<td>65,000A 25,000A 480V HFD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic Only Type CB plus CL</td>
<td>100A</td>
<td>100,000A 25,000A 480V HMCP plus CL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
DeviceNet™ Communications Module

The DeviceNet Communications module (Catalogue 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 (Catalogue 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 July 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 July 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 A-232. DeviceNet Interface

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeviceNet Interface Module</td>
<td>WPONIDNA</td>
<td></td>
</tr>
<tr>
<td>Mounting Plate Assembly</td>
<td>WPONIBASE</td>
<td></td>
</tr>
</tbody>
</table>

Note: See Page A-134 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 A-233. Ratings

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Make</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA A600 – 120 – 600V AC</td>
<td>7200 VA</td>
<td>720 VA</td>
</tr>
<tr>
<td>NEMA G300 – 125 – 300V DC</td>
<td>69 VA</td>
<td>69 VA</td>
</tr>
</tbody>
</table>

Table A-234. Auxiliary Contact Modules

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2NO, 2NC</td>
<td>W22</td>
<td></td>
</tr>
<tr>
<td>3NO, 1NC</td>
<td>W31</td>
<td></td>
</tr>
<tr>
<td>4NO</td>
<td>W40</td>
<td></td>
</tr>
<tr>
<td>4NC</td>
<td>W04</td>
<td></td>
</tr>
<tr>
<td>1NO, 3NC</td>
<td>W13</td>
<td></td>
</tr>
<tr>
<td>1NO, 1NC and 2 Tie Points</td>
<td>W11T</td>
<td></td>
</tr>
</tbody>
</table>

Bell Alarm Module

- Simple snap-on mounting — see mounting examples in Figure A-51.
- Isolated NO and NC contacts (1 each)
- Plugs into Reset port
- Remote electrical Reset wired to Catalogue Number WBELL module

Transformer Pilot Light Kits

Table A-236. Transformer Pilot Light Kits

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Colour</th>
<th>Legend Plate</th>
<th>Catalogue Number</th>
<th>Price</th>
<th>Replacement Part</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Red</td>
<td>RUN</td>
<td>PLK1R</td>
<td>99-3590-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>Red</td>
<td>RUN</td>
<td>PLK2R</td>
<td>99-3590-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>480</td>
<td>Red</td>
<td>RUN</td>
<td>PLK4R</td>
<td>99-3590-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>Green</td>
<td>OFF</td>
<td>PLK1G</td>
<td>99-3590-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discount Symbol: MC7
Mechanical Interlock Kits

- 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 A-237. Mechanical Interlock Kits
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>NEMA Size</td>
<td>Catalogue Number</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Horizontal</td>
<td>1 – 6</td>
<td>WM16H</td>
</tr>
<tr>
<td>Vertical</td>
<td>1, 2</td>
<td>WM12V</td>
</tr>
<tr>
<td></td>
<td>3, 4</td>
<td>WM34V</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>WM55V</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>WM66V</td>
</tr>
<tr>
<td>Vertical</td>
<td>1 or 2 to 3 or 4</td>
<td>WM23VR</td>
</tr>
<tr>
<td></td>
<td>3 or 4 to 5 or 6</td>
<td>WM45VR</td>
</tr>
<tr>
<td></td>
<td>5, 6</td>
<td>WMBBV</td>
</tr>
</tbody>
</table>

- Used to interlock a Size 1 or 2 to a Size 3 or 4 — mounts on right only.
- Used to interlock a Size 3 or 4 to a Size 5 or 6 — mounts on right only.
- Interconnecting bus bars are furnished with the interlock.

**Control Wire Ring/Spade Terminal Block**

- 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 A-238. Control Wire Terminal Block**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Wire Terminal Block</td>
<td>WTBF16</td>
<td></td>
</tr>
</tbody>
</table>
OL Selection 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 A-239. DIP Switch Window

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
<th>Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIP Switch Window, (Must order in packages of 10)</td>
<td>WDIPSW10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 A-240. DIN Rail Adapter Kit

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN Rail Adapter Kit</td>
<td>WDIN</td>
<td></td>
</tr>
</tbody>
</table>

Internal Trip Indicator

- Overload condition indication — indicated by blinking light
- Trip condition — indicated by solid light

Table A-241. Trip Indicator

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Trip Indicator</td>
<td>WLED</td>
<td></td>
</tr>
</tbody>
</table>

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 A-242. Baseplate Kit

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sizes 1 and 2</td>
<td>WBASE12</td>
<td></td>
</tr>
<tr>
<td>Sizes 3 and 4</td>
<td>WBASE34</td>
<td></td>
</tr>
</tbody>
</table>

Remote Reset and Trip Indicator Pushbutton

- OL condition indication
- Trip indication — OL phase-loss/ unbalance and ground fault
- OL reset capability
- 10250T — for 30 mm mounting
- NEMA 4 oiltight rated

Table A-243. Remote Pushbuttons

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset with Trip Indication</td>
<td>WRSTL24</td>
<td></td>
</tr>
<tr>
<td>2 ft. Cable</td>
<td>WRSTL72</td>
<td></td>
</tr>
<tr>
<td>6 ft. Cable</td>
<td>WRSTL180</td>
<td></td>
</tr>
<tr>
<td>Reset Only</td>
<td>WRST24</td>
<td></td>
</tr>
<tr>
<td>2 ft. Cable</td>
<td>WRST72</td>
<td></td>
</tr>
<tr>
<td>6 ft. Cable</td>
<td>WRST180</td>
<td></td>
</tr>
<tr>
<td>Conversion Kit</td>
<td>WRLT2</td>
<td></td>
</tr>
<tr>
<td>Reset Only to Reset with Trip Indication</td>
<td>WRLT83</td>
<td></td>
</tr>
<tr>
<td>6 ft. Cable Only</td>
<td>WRC72</td>
<td></td>
</tr>
<tr>
<td>15 ft. Cable Only</td>
<td>WRC180</td>
<td></td>
</tr>
<tr>
<td>LED Replacement Bulb</td>
<td>WRC72</td>
<td></td>
</tr>
</tbody>
</table>

Renewal Parts

Table A-244. Replacement Contact Kits

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>WCK13</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>WCK23</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>WCK33</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>WCK43</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>WCK53</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>WCK63</td>
<td></td>
</tr>
</tbody>
</table>

Table A-245. Replacement Coils

<table>
<thead>
<tr>
<th>Coil Size</th>
<th>Voltage and Hz</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>110/120V 60 Hz</td>
<td>WCOIL12F</td>
<td></td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>110/120V 60 Hz</td>
<td>WCOIL34F</td>
<td></td>
</tr>
<tr>
<td>5 &amp; 6</td>
<td>110/120V 60 Hz</td>
<td>WCOIL56F</td>
<td></td>
</tr>
</tbody>
</table>
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

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 A-54. Full Voltage and Reduced Voltage Control Modules
**Reversing and 2-Speed Pushbutton Modules**

**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.
- 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

**Metering Module**

The Advantage Metering Module monitors status of a motor along with any of the pushbutton modules. It July 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 July 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 A-26. Control Modules/Accessories**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Voltage</td>
<td>WPBFV1</td>
<td></td>
</tr>
<tr>
<td>Status Only with Reset</td>
<td>WPBFV2</td>
<td></td>
</tr>
<tr>
<td>START/STOP</td>
<td>WPBFV3</td>
<td></td>
</tr>
<tr>
<td>START/STOP/HOA</td>
<td>WPBFV4</td>
<td></td>
</tr>
<tr>
<td>ON/OFF/AUTO</td>
<td>WPBFV5</td>
<td></td>
</tr>
<tr>
<td>LOCAL/OFF/REMOTE with Lockable ACM</td>
<td>WPBFV6</td>
<td></td>
</tr>
<tr>
<td>LOCAL/OFF/REMOTE with Network Health</td>
<td>WPBFV7</td>
<td></td>
</tr>
</tbody>
</table>

**Reversing**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Only with Reset</td>
<td>WPBR1</td>
<td></td>
</tr>
<tr>
<td>FWD/REV/STOP</td>
<td>WPBR2</td>
<td></td>
</tr>
<tr>
<td>FWD/REV/STOP/HOA</td>
<td>WPBR3</td>
<td></td>
</tr>
</tbody>
</table>

**2-Speed**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Only with Reset</td>
<td>WPB2S1</td>
<td></td>
</tr>
<tr>
<td>FAST/SLOW/STOP</td>
<td>WPB2S2</td>
<td></td>
</tr>
<tr>
<td>FAST/SLOW/STOP/HOA</td>
<td>WPB2S3</td>
<td></td>
</tr>
</tbody>
</table>

**Reduced Voltage**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Only with Reset</td>
<td>WPBKV1</td>
<td></td>
</tr>
<tr>
<td>START/STOP</td>
<td>WPBKV2</td>
<td></td>
</tr>
<tr>
<td>START/STOP/HOA</td>
<td>WPBKV3</td>
<td></td>
</tr>
<tr>
<td>ON/OFF/AUTO</td>
<td>WPBKV4</td>
<td></td>
</tr>
</tbody>
</table>

**Metering Module**

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ft. Interconnect Cable (3m)</td>
<td>WMETER</td>
<td></td>
</tr>
<tr>
<td>6 ft. Interconnect Cable (1.8m)</td>
<td>WACM10</td>
<td></td>
</tr>
<tr>
<td>3 ft. Interconnect Cable (1.8m)</td>
<td>WACM6</td>
<td></td>
</tr>
<tr>
<td>1 ft. Interconnect Jumper (3m)</td>
<td>WACM3</td>
<td></td>
</tr>
</tbody>
</table>

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.
Non-reversing Contactors, NEMA Sizes 1 – 6

Figure A-56. Approximate Dimensions in Inches and Shipping Weights

Table A-247. Catalogue Number W201 Non-reversing Contactors

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Figure Number</th>
<th>Mounting Screws</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>#10</td>
<td>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 (162.4) .52 (13.2) 2 (.9)</td>
</tr>
<tr>
<td>3, 4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1/4-20</td>
<td>3.69 (93.5) 8.00 (203.2) 6.49 (164.8) 6.45 (163.8) 2.90 (71.1) 1.84 (46.7) .93 (23.6) 7.50 (190.5) .52 (13.2) 6 (2.7)</td>
</tr>
<tr>
<td>5, 6</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>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)</td>
</tr>
</tbody>
</table>

For more information visit: www.EatonCanada.ca
**Horizontal Reversing, Open Contactors, NEMA Sizes 1 – 6**

**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 A-248. Catalogue Number W211 Horizontal Reversing Contactors**

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Figure Number</th>
<th>Mounting Screws Number</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wide A</td>
<td>High B</td>
<td>Deep C</td>
</tr>
<tr>
<td>1, 2</td>
<td>3 x 3</td>
<td>1</td>
<td>#10</td>
<td>7.13 (181.1)</td>
<td>8.05 (204.5)</td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3</td>
<td>2</td>
<td>1/4-20</td>
<td>9.76 (247.9)</td>
<td>11.37 (288.8)</td>
</tr>
<tr>
<td>5</td>
<td>3 x 3</td>
<td>3</td>
<td>5/16</td>
<td>22.24 (564.9)</td>
<td>18.24 (463.3)</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3</td>
<td>3</td>
<td>5/16</td>
<td>22.24 (564.9)</td>
<td>18.24 (463.3)</td>
</tr>
</tbody>
</table>
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 A-58. 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 A-249. Catalogue Number W251 Vertical Reversing Contactors

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Figure Number</th>
<th>Mounting Screws</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Height</td>
<td>Deep</td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>1, 2</td>
<td>3 x 3</td>
<td>1</td>
<td>3</td>
<td>#10</td>
<td>4.27</td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3</td>
<td>2</td>
<td>3</td>
<td>1/4-20</td>
<td>5.42</td>
</tr>
<tr>
<td>5</td>
<td>3 x 3</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>13.24</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>13.24</td>
</tr>
</tbody>
</table>

For more information visit: www.EatonCanada.ca
Non-reversing Starters, NEMA Sizes 1 – 6

Table A-250. Catalogue Number W200 Non-reversing Starters

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Figure Number</th>
<th>Mounting Screws Number</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>3</td>
<td>1</td>
<td>#10</td>
<td>2.50 (63.5) 6.50 (165.1) 4.96 (126.0) 5.12 (130.0) 1.88 (47.8) 1.25 (31.8) 0.75 (19.1) 6.00 (152.4) 0.52 (13.2) 0.29 (7.4) 2.10 (9.1)</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>3</td>
<td>2</td>
<td>1/4-20</td>
<td>3.88 (93.5) 8.00 (203.2) 6.54 (166.1) 6.45 (163.8) 2.80 (71.1) 1.84 (46.7) 0.93 (23.6) 7.60 (190.5) 0.52 (12.2) 0.32 (8.1) 6.20 (2.7)</td>
<td></td>
</tr>
<tr>
<td>5, 6</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>7.07 (179.6) 10.08 (256.0) 7.64 (194.1) – 6.00 (152.4) – – 9.20 (233.7) 50 (12.2) 0.46 (11.7) 30 (13.6)</td>
<td></td>
</tr>
</tbody>
</table>

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
Table A-251. Catalogue Number W210 Horizontal Reversing Starters

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Number of Circuit</th>
<th>Mounting Screws</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lbs. (kg)</td>
</tr>
<tr>
<td>1, 2</td>
<td>3 x 3</td>
<td>1</td>
<td>3</td>
<td>#10</td>
<td>7.13 (181.1)</td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3</td>
<td>2</td>
<td>3</td>
<td>1/4-20</td>
<td>9.76 (247.9)</td>
</tr>
<tr>
<td>5</td>
<td>3 x 3</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>22.24 (564.9)</td>
</tr>
<tr>
<td>6</td>
<td>3 x 3</td>
<td>3</td>
<td>4</td>
<td>5/16</td>
<td>22.24 (564.9)</td>
</tr>
</tbody>
</table>

Figure A-60. 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.
Vertical Reversing, Open Starters, NEMA Sizes 1 – 6

Figure A-61. 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 A-252. Catalogue Number W250 Vertical Reversing Starters

<table>
<thead>
<tr>
<th>NEMA Size</th>
<th>Number of Poles</th>
<th>Figure Number</th>
<th>Mounting Screws Number</th>
<th>Size</th>
<th>Dimensions in Inches (mm)</th>
<th>Ship. Wt. Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>3 x 3</td>
<td>1</td>
<td>30</td>
<td>#10</td>
<td>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)</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>3 x 3</td>
<td>2</td>
<td>30</td>
<td>1/4-20</td>
<td>5.42 (137.7) 25.13 (638.3) 6.81 (173.0) 2.49 (61.6) 2.88 (73.2) 2.31 (58.7) 4.82 (117.3) 20.28 (515.1) 52 (13.2) 19.0 (8.6)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3 x 3</td>
<td>3</td>
<td>30</td>
<td>5/16</td>
<td>13.24 (336.3) 34.94 (887.5) 6.64 (191.5) 32.00 (812.8) 10.00 (254.0) — 12.04 (305.8) 34.78 (883.4) — 85.0 (38.6)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3 x 3</td>
<td>3</td>
<td>30</td>
<td>5/16</td>
<td>13.24 (336.3) 34.94 (887.5) 6.64 (191.5) 32.00 (812.8) 10.00 (254.0) — 12.04 (305.8) 34.59 (878.6) — 85.0 (38.6)</td>
<td></td>
</tr>
</tbody>
</table>
Non-reversing and Reversing Contactors, NEMA Sizes 1 – 6

Figure A-62. 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
3-Wire Control with Internal Holding Circuit

Cat. No. W250 Vertical Reversing Starter
3-Wire Control with Internal Holding Circuit

Figure A-63. Typical Wiring Diagrams

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.
NEMA Contactors & Starters

Advantage

PowerNet Communication Devices

Central Monitoring Unit

Product Description

The Cutler-Hammer® Advantage Central Monitoring Unit from Eaton’s electrical business is a communications centre 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
  - $I_a$, $I_b$, $I_c$ 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 A-64. Chassis Cutout Dimensions in Inches (mm)
Figure A-65. Typical Wiring Diagram

Product Selection

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantage Central Monitoring Unit</td>
<td>WCMU</td>
<td></td>
</tr>
</tbody>
</table>
**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>
<thead>
<tr>
<th>Description</th>
<th>Catalogue Number</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantage WPONI</td>
<td>WPONIBASE</td>
<td></td>
</tr>
<tr>
<td>To panel mount an WPONI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: See Page A-119 for WPONIDNA DeviceNet Interface Module.*

**Mounting Dimensions**

Figure A-66. Mounting Procedures — WPONI — Approximate Dimensions in Inches (mm)

Note: For a complete listing of parts refer to the Renewal Parts Publication Number referenced on the device nameplate.

Table A-255. Citation Renewal Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 00</th>
<th>Size 0</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Series A1</td>
<td>Series B1</td>
</tr>
<tr>
<td><strong>Part Number</strong></td>
<td><strong>Part Number</strong></td>
<td><strong>Part Number</strong></td>
</tr>
<tr>
<td>Set of Contacts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Number on Contactor</td>
<td>6-21</td>
<td>6-21-2</td>
</tr>
<tr>
<td>or Starter Nameplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Pole without Interlock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Pole without Interlock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Pole with Interlock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-Pole without Interlock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-Pole without Interlock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnet Coils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil Suffix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120V 60 Hz or 110V 50 Hz</td>
<td>A</td>
<td>9-1945-1</td>
</tr>
<tr>
<td>240V 60 Hz or 220V 50 Hz</td>
<td>B</td>
<td>9-1945-2</td>
</tr>
<tr>
<td>480V 60 Hz or 440V 50 Hz</td>
<td>C</td>
<td>9-1945-3</td>
</tr>
<tr>
<td>600V 60 Hz or 550V 50 Hz</td>
<td>D</td>
<td>9-1945-4</td>
</tr>
<tr>
<td>208V 60 Hz</td>
<td>E</td>
<td>9-1945-5</td>
</tr>
<tr>
<td>24V 60 Hz</td>
<td>F</td>
<td>9-1945-6</td>
</tr>
<tr>
<td>380V 50 Hz</td>
<td>G</td>
<td>9-1945-7</td>
</tr>
<tr>
<td>480V or 440V 60 Hz or 220/440 V 50 Hz</td>
<td>H</td>
<td>9-1945-8</td>
</tr>
<tr>
<td>277V 60 Hz</td>
<td>I</td>
<td>9-1945-9</td>
</tr>
<tr>
<td>208/240 V 60 Hz or 110/220 V 50 Hz</td>
<td>J</td>
<td>9-1945-10</td>
</tr>
<tr>
<td>120V DC</td>
<td>A</td>
<td>9-1945-11</td>
</tr>
<tr>
<td>240V DC</td>
<td>B</td>
<td>9-1945-12</td>
</tr>
<tr>
<td>Replacement Thermal Elements</td>
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<td></td>
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<tr>
<td>Standard Trip Eutectic (12 teeth)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow Trip Eutectic (24 teeth)</td>
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<td></td>
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<tr>
<td>Current Transformer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discount Symbol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For non-reversing contactors and starters only. For Size 00 reversing, select parts from adjoining size 0 column.
2 Replace complete contactor.
3 Non-encapsulated coil.
4 Obsolete.
### Table A-255. Citation Renewal Parts (Continued)

<table>
<thead>
<tr>
<th>Description</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
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<tbody>
<tr>
<td></td>
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<td>Part Number</td>
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<td>Part Number</td>
</tr>
<tr>
<td><strong>Set of Contacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Number on Contactor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Starter Nameplate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Pole without Interlock</td>
<td>6-23</td>
<td>6-24</td>
<td>6-34</td>
</tr>
<tr>
<td>3-Pole with Interlock</td>
<td>6-23-3</td>
<td>6-24-3</td>
<td>6-34-3</td>
</tr>
<tr>
<td>4-Pole without Interlock</td>
<td>6-23-4</td>
<td>6-24-4</td>
<td>6-34-4</td>
</tr>
<tr>
<td><strong>Magnet Coils</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUFFIX</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120V 60 Hz or 105V 50 Hz</td>
<td>A</td>
<td>9-1887-1</td>
<td>9-1889-1</td>
</tr>
<tr>
<td>480V 60 Hz or 440V 50 Hz</td>
<td>C</td>
<td>9-1887-3</td>
<td>9-1889-3</td>
</tr>
<tr>
<td>600V 60 Hz or 550V 50 Hz</td>
<td>D</td>
<td>9-1887-4</td>
<td>9-1889-4</td>
</tr>
<tr>
<td>208V 60 Hz</td>
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<td>9-1889-5</td>
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<tr>
<td>24V 60 Hz</td>
<td>F</td>
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<tr>
<td>277V 60 Hz</td>
<td>I</td>
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**Replacement Thermal Elements**

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<th>Size 6</th>
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<td>Series A1</td>
<td>Series B1</td>
<td>Series A1</td>
</tr>
<tr>
<td></td>
<td>Part Number</td>
<td>Price</td>
<td>Part Number</td>
</tr>
<tr>
<td><strong>Set of Contacts</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Part Number on Contactor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Starter Nameplate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Pole without Interlock</td>
<td>6-26</td>
<td>6-27</td>
<td>—</td>
</tr>
<tr>
<td>3-Pole without Interlock</td>
<td>6-26-2</td>
<td>6-27-2</td>
<td>—</td>
</tr>
<tr>
<td>3-Pole with Interlock</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4-Pole without Interlock</td>
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<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5-Pole without Interlock</td>
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**Discount Symbol** ............... MC17

For more information visit: www.EatonCanada.ca
### Table A-255, Citation Renewal Parts (Continued)

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<tr>
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<td>Price</td>
<td>Part</td>
<td>Part</td>
<td>Price</td>
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<td>Number</td>
<td>Number</td>
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<td>Number</td>
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</tr>
<tr>
<td>Set of Contacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Number on Contactor or Starter Nameplate</td>
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</tr>
<tr>
<td>2-Pole without Interlock</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>3-Pole without Interlock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Pole with Interlock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-Pole without Interlock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-Pole without Interlock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Magnet Coils</td>
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<td></td>
</tr>
<tr>
<td>Suffix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120V 60 Hz or 110V 50 Hz</td>
<td>A</td>
<td>9-1875-1</td>
<td>9-2651</td>
<td>9-2654</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240V 60 Hz or 220V 50 Hz</td>
<td>B</td>
<td>9-1875-2</td>
<td>9-2651-2</td>
<td>9-2654-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>240V 60 Hz or 220V 50 Hz</td>
<td>C</td>
<td>9-1875-3</td>
<td>9-2651-3</td>
<td>9-2654-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600V 60 Hz or 550V 50 Hz</td>
<td>D</td>
<td>9-1875-4</td>
<td>9-2651-4</td>
<td>9-2654-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>208V 60 Hz</td>
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<td>9-1875-14</td>
<td>9-2651-6</td>
<td>9-2654-6</td>
<td></td>
<td></td>
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<tr>
<td>24V 60 Hz</td>
<td>T</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380V 50 Hz</td>
<td>L</td>
<td>—</td>
<td></td>
<td></td>
<td>9-2651-5</td>
<td>9-2654-5</td>
</tr>
<tr>
<td>120/240V 60 Hz or 110/220V 50 Hz</td>
<td>G</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>240/480V 60 Hz or 220/440V 50 Hz</td>
<td>H</td>
<td>—</td>
<td></td>
<td></td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>277V 60 Hz</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>120V DC</td>
<td>A1</td>
<td>—</td>
<td></td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>240V DC</td>
<td>B1</td>
<td>—</td>
<td></td>
<td>—</td>
<td>—</td>
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<td>Replacement Thermal Elements</td>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Standard Trip Eutectic (12 teeth)</td>
<td></td>
<td>10-4767</td>
<td>10-4767</td>
<td>10-4767</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow Trip Eutectic (24 teeth)</td>
<td></td>
<td>—</td>
<td></td>
<td>—</td>
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<td>Current Transformer</td>
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<td>—</td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
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</table>

Discount Symbol .................................. MC17
## Table A-256. Contact Kits

<table>
<thead>
<tr>
<th>Poles</th>
<th>NEMA Size</th>
<th>Part Number</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>3</td>
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<td>1605226</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1605212</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1605202</td>
<td></td>
</tr>
<tr>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>1625564</td>
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</tbody>
</table>

## Table A-257. AC Coils

<table>
<thead>
<tr>
<th>Voltage Hz</th>
<th>2-, 3-Pole</th>
<th>4-, 5-Pole</th>
<th>Voltage Hz</th>
<th>2-, 3-Pole</th>
<th>4-, 5-Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-, 3-Pole</td>
<td>Current Part Number</td>
<td>Current Part Number</td>
<td>4-, 5-Pole</td>
<td>Current Part Number</td>
<td>Current Part Number</td>
</tr>
<tr>
<td>2-, 3-Pole</td>
<td>Part Number</td>
<td>Part Number</td>
<td>4-, 5-Pole</td>
<td>Part Number</td>
<td>Part Number</td>
</tr>
<tr>
<td>2-, 3-Pole</td>
<td>Price</td>
<td>Price</td>
<td>4-, 5-Pole</td>
<td>Price</td>
<td>Price</td>
</tr>
</tbody>
</table>

**Size 0, 1**

<table>
<thead>
<tr>
<th>Size</th>
<th>2-, 3-Pole</th>
<th>4-, 5-Pole</th>
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</thead>
<tbody>
<tr>
<td>110</td>
<td>60</td>
<td>1470241</td>
</tr>
<tr>
<td>110/208/220</td>
<td>25/50/60</td>
<td>1470242</td>
</tr>
<tr>
<td>220/380/440</td>
<td>60/60/60</td>
<td>1470243</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1470244</td>
</tr>
<tr>
<td>115/208/230</td>
<td>60/60/60</td>
<td>1470247</td>
</tr>
<tr>
<td>600</td>
<td>60</td>
<td>1470251</td>
</tr>
<tr>
<td>600/500/440</td>
<td>25/50/60</td>
<td>1470251</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1470251</td>
</tr>
</tbody>
</table>

**Size 2**

<table>
<thead>
<tr>
<th>Size</th>
<th>2-, 3-Pole</th>
<th>4-, 5-Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>60</td>
<td>1470201</td>
</tr>
<tr>
<td>110/208/220</td>
<td>60/50/60</td>
<td>1470202</td>
</tr>
<tr>
<td>220/380/440</td>
<td>60/60/60</td>
<td>1470203</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1470204</td>
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<tr>
<td>110</td>
<td>50</td>
<td>1470205</td>
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<td>1470206</td>
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<td>50</td>
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<tr>
<td>115/208/230</td>
<td>60/60/60</td>
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</tr>
<tr>
<td>600</td>
<td>60</td>
<td>1470206</td>
</tr>
<tr>
<td>600/500/440</td>
<td>25/50/60</td>
<td>1470206</td>
</tr>
<tr>
<td>110</td>
<td>50</td>
<td>1470206</td>
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**Size 3**

<table>
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<tbody>
<tr>
<td>110</td>
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<td>1490646</td>
</tr>
<tr>
<td>110/208/220</td>
<td>60/50/60</td>
<td>1490647</td>
</tr>
<tr>
<td>220/380/440</td>
<td>60/60/60</td>
<td>1490652</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1490652</td>
</tr>
<tr>
<td>110</td>
<td>50</td>
<td>1490652</td>
</tr>
<tr>
<td>120/110</td>
<td>60/60/60</td>
<td>1490652</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1490652</td>
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<tr>
<td>110</td>
<td>50</td>
<td>1490652</td>
</tr>
<tr>
<td>115/208/230</td>
<td>60/60/60</td>
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<td>600</td>
<td>60</td>
<td>1490652</td>
</tr>
<tr>
<td>600/500/440</td>
<td>25/50/60</td>
<td>1490652</td>
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<td>50</td>
<td>1490652</td>
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</tbody>
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**Size 4**

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</thead>
<tbody>
<tr>
<td>110</td>
<td>60</td>
<td>1596633</td>
</tr>
<tr>
<td>110/208/220</td>
<td>60/50/60</td>
<td>1596633</td>
</tr>
<tr>
<td>220/380/440</td>
<td>60/60/60</td>
<td>1596633</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
<td>1596633</td>
</tr>
<tr>
<td>110</td>
<td>50</td>
<td>1596633</td>
</tr>
<tr>
<td>120/110</td>
<td>60/60/60</td>
<td>1596633</td>
</tr>
<tr>
<td>550</td>
<td>50</td>
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<td>50</td>
<td>1596633</td>
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<td>600</td>
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<td>1596633</td>
</tr>
<tr>
<td>110</td>
<td>50</td>
<td>1596633</td>
</tr>
</tbody>
</table>

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
# AC Solenoids

**Product Description**

Cutter-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

- Catalogue Number

<table>
<thead>
<tr>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
<th>Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>10370H1</td>
<td>10370H2</td>
<td>10370H3</td>
<td>10370H610</td>
<td>10370H611</td>
<td>10370H612</td>
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<td>10370H57</td>
<td>10370H694</td>
<td>10370H696</td>
<td>10370H697</td>
<td>10370H698</td>
<td>10370H699</td>
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<td>10370H59</td>
<td>10370H74</td>
<td>10370H75</td>
<td>10370H76</td>
<td>10370H77</td>
<td></td>
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<tr>
<td>10370H244</td>
<td>10370H256</td>
<td>10370H257</td>
<td>10370H258</td>
<td>10370H259</td>
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<td>10370H359</td>
<td>10370H360</td>
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<td></td>
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<td>10370H82</td>
<td>10370H81</td>
<td>10370H268</td>
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<td>10370H271</td>
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<td>10370H710</td>
<td>10370H711</td>
<td>10370H712</td>
<td>10370H713</td>
<td>10370H714</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10370H245</td>
<td>10370H246</td>
<td>10370H247</td>
<td>10370H248</td>
<td>10370H249</td>
<td></td>
<td></td>
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<tr>
<td>10370H370</td>
<td>10370H371</td>
<td>10370H372</td>
<td>10370H373</td>
<td>10370H374</td>
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</tbody>
</table>

**Table A-258. AC Solenoids — 60 Hz, Continuous Duty**

<table>
<thead>
<tr>
<th>Size</th>
<th>Voltage</th>
<th>Operating Data</th>
<th>Max. Stroke in Inches (mm)</th>
<th>Current</th>
<th>Without Conduit Box</th>
<th>With Conduit Box</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Horizontal Position</td>
<td>With Gravity</td>
<td>Against Gravity</td>
<td>Voltage</td>
<td>Voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>At 100% Voltage</td>
<td>At 85% Voltage</td>
<td>At 100% Voltage</td>
<td>At 85% Voltage</td>
<td>At 100% Voltage</td>
</tr>
<tr>
<td>60 Hz Pull Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>110</td>
<td>7.2</td>
<td>.50</td>
<td>.90</td>
<td>.68</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>7.2</td>
<td>.50</td>
<td>.90</td>
<td>.68</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>7.2</td>
<td>.50</td>
<td>.90</td>
<td>.68</td>
<td>.55</td>
</tr>
<tr>
<td>B</td>
<td>110</td>
<td>4.2</td>
<td>3</td>
<td>3.3</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>4.2</td>
<td>3</td>
<td>3.3</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>4.2</td>
<td>3</td>
<td>3.3</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>C</td>
<td>110</td>
<td>7</td>
<td>5.25</td>
<td>8</td>
<td>6.25</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>7</td>
<td>5.25</td>
<td>8</td>
<td>6.25</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>7</td>
<td>5.25</td>
<td>8</td>
<td>6.25</td>
<td>6</td>
</tr>
<tr>
<td>D</td>
<td>110</td>
<td>12.4</td>
<td>10</td>
<td>13.65</td>
<td>11.25</td>
<td>11.15</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>12.4</td>
<td>10</td>
<td>13.65</td>
<td>11.25</td>
<td>11.15</td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>12.4</td>
<td>10</td>
<td>13.65</td>
<td>11.25</td>
<td>11.15</td>
</tr>
</tbody>
</table>

**60 Hz Push Type**

| A    | 110     | 7.2 | .50 | .90 | .68 | .55 | .33 | 1 (25.4) | 1.83 | .34 | — | 10370H13 |
|      | 220     | 7.2 | .50 | .90 | .68 | .55 | .33 | 1 (25.4) | .92 | .17 | — | 10370H14 |
|      | 440     | 7.2 | .50 | .90 | .68 | .55 | .33 | 1 (25.4) | .45 | .08 | — | 10370H15 |
| B    | 110     | 4.2 | 3 | 3.3 | 3.9 | 3.9 | 2.7 | 1 (25.4) | 5.4 | .87 | 10370H81 |
|      | 220     | 4.2 | 3 | 3.3 | 3.9 | 3.9 | 2.7 | 1 (25.4) | 2.6 | .42 | 10370H82 |
|      | 440     | 4.2 | 3 | 3.3 | 3.9 | 3.9 | 2.7 | 1 (25.4) | 1.29 | .20 | 10370H83 |
| C    | 110     | 7   | 5.25 | 8 | 6.25 | 6 | 4.25 | 1.25 (31.8) | 10.4 | 1.07 | 10370H288 |
|      | 220     | 7   | 5.25 | 8 | 6.25 | 6 | 4.25 | 1.25 (31.8) | 5.2 | .52 | 10370H289 |
|      | 440     | 7   | 5.25 | 8 | 6.25 | 6 | 4.25 | 1.25 (31.8) | 2.5 | .26 | 10370H290 |
| D    | 110     | 12.4 | 10 | 13.65 | 11.25 | 11.15 | 8.75 | 1.25 (31.8) | 18 | 1.58 | 10370H380 |
|      | 220     | 12.4 | 10 | 13.65 | 11.25 | 11.15 | 8.75 | 1.25 (31.8) | 9.3 | .81 | 10370H381 |
|      | 440     | 12.4 | 10 | 13.65 | 11.25 | 11.15 | 8.75 | 1.25 (31.8) | 4.4 | .40 | 10370H382 |

1. Recommended selection of solenoids on basis of 85% voltage values.
2. Mounting of solenoids “with conduit box” — Size A are for wall mounting — Size B, C and D are for floor mounting.
3. Part numbers are now obsolete.

---

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## Dimensions

### Table A-259. Approximate Dimensions in Inches (mm) and Shipping Weights

<table>
<thead>
<tr>
<th>Size</th>
<th>Push Type</th>
<th>Pull Type</th>
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<tbody>
<tr>
<td></td>
<td>Dimensions in Inches (mm)</td>
<td>Dimensions in Inches (mm)</td>
</tr>
<tr>
<td></td>
<td>Wide A</td>
<td>High B</td>
</tr>
<tr>
<td><strong>Wall Mounted</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2.38 (60.5)</td>
<td>3.63 (92.2)</td>
</tr>
<tr>
<td>B</td>
<td>2.63 (66.8)</td>
<td>4.98 (124.0)</td>
</tr>
<tr>
<td>C</td>
<td>3.00 (76.2)</td>
<td>6.13 (156.71)</td>
</tr>
<tr>
<td>D</td>
<td>4.00 (101.6)</td>
<td>6.13 (156.71)</td>
</tr>
<tr>
<td><strong>Floor Mounted</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.13 (79.5)</td>
<td>4.88 (124.0)</td>
</tr>
<tr>
<td>C</td>
<td>3.50 (88.9)</td>
<td>6.13 (156.71)</td>
</tr>
<tr>
<td>D</td>
<td>3.88 (98.6)</td>
<td>6.13 (156.71)</td>
</tr>
</tbody>
</table>

\(^{(*)}\) In sealed state.

### Figure A-67. Approximate Dimensions

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
**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 moulding 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.

**Shipping Weights**

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<thead>
<tr>
<th>Brake Size</th>
<th>Torque Rating ft-lb</th>
<th>Weight in Lbs. (kg)</th>
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<td>Net — Brake with Wheel</td>
<td>Net — Wheel Only</td>
</tr>
<tr>
<td><strong>Type &quot;S&quot; AC Shoe Brakes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-4</td>
<td>3</td>
<td>15.8 (7.2)</td>
</tr>
<tr>
<td>S-4</td>
<td>10</td>
<td>18.0 (8.2)</td>
</tr>
<tr>
<td>S-5</td>
<td>15</td>
<td>18.0 (8.2)</td>
</tr>
<tr>
<td>S-5-1/2</td>
<td>25</td>
<td>33.2 (15.1)</td>
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<tr>
<td>S-5-1/2</td>
<td>35</td>
<td>33.2 (15.1)</td>
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<td>S-7</td>
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<td>52.1 (23.7)</td>
</tr>
<tr>
<td>S-7</td>
<td>75</td>
<td>52.1 (23.7)</td>
</tr>
<tr>
<td>S-10</td>
<td>125, 160</td>
<td>200.0 (90.8)</td>
</tr>
<tr>
<td><strong>Type &quot;S&quot; DC Shoe Brakes</strong></td>
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<tr>
<td>S-4</td>
<td>3</td>
<td>18.0 (8.2)</td>
</tr>
<tr>
<td>S-4</td>
<td>10</td>
<td>18.0 (8.2)</td>
</tr>
<tr>
<td>S-5</td>
<td>15</td>
<td>18.0 (8.2)</td>
</tr>
<tr>
<td>S-5-1/2</td>
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<td>S-5-1/2</td>
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<td>35.0 (15.9)</td>
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<tr>
<td>S-7</td>
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<td>54.0 (24.5)</td>
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<tr>
<td>S-7</td>
<td>75</td>
<td>54.0 (24.5)</td>
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<tr>
<td>S-7</td>
<td>85</td>
<td>54.0 (24.5)</td>
</tr>
<tr>
<td>S-7</td>
<td>110</td>
<td>54.0 (24.5)</td>
</tr>
</tbody>
</table>
# NEMA Contactors & Starters

## Shoe Brakes — AC and DC Magnetic

### 511 Series

### Product Selection

**When Ordering Specify**

- **Brake**
  - Catalogue Number plus Suffix Number for coil
  - Example: 511H1193-41

- **Wheel**
  - Catalogue Number plus Suffix Number for bore size
  - Example: 511H1150-3

### Table A-262. Type S Brakes — Floor Mounting

<table>
<thead>
<tr>
<th>Torque — lb-ft</th>
<th>Brake Size</th>
<th>AC</th>
<th>Price</th>
<th>DC</th>
<th>Price</th>
<th>Coil Voltage</th>
<th>Coil Suffix</th>
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</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>Intermittent</td>
<td>Base Catalogue Number</td>
<td>For Type S4, S5-1/2, S7, S10</td>
<td>Base Catalogue Number</td>
<td>Price</td>
<td>Coil Voltage</td>
<td>Coil Suffix</td>
</tr>
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<td>3</td>
<td>3</td>
<td>S-4</td>
<td>511H1194</td>
<td>120V 60 Hz</td>
<td>-39</td>
<td>511H955</td>
<td>120V DC</td>
</tr>
<tr>
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<td>10</td>
<td>S-4</td>
<td>511H1193</td>
<td>208V 60 Hz</td>
<td>-45</td>
<td>511H956</td>
<td>240V DC</td>
</tr>
<tr>
<td>—</td>
<td>15</td>
<td>S-4</td>
<td>511H1192</td>
<td>240V 60 Hz</td>
<td>-40</td>
<td>511H957</td>
<td>—</td>
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<td>25</td>
<td>S-5-1/2</td>
<td>511H992</td>
<td>480V 60 Hz</td>
<td>-41</td>
<td>511H958</td>
<td>—</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
<td>S-5-1/2</td>
<td>511H993</td>
<td>600V 60 Hz</td>
<td>-58</td>
<td>511H994</td>
<td>—</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>S-7</td>
<td>511H970</td>
<td>110V 50 Hz</td>
<td>-5</td>
<td>511H995</td>
<td>—</td>
</tr>
<tr>
<td>—</td>
<td>75</td>
<td>S-7</td>
<td>511H971</td>
<td>220V 50 Hz</td>
<td>-6</td>
<td>511H975</td>
<td>—</td>
</tr>
<tr>
<td>85</td>
<td>85</td>
<td>S-7</td>
<td>511H1195</td>
<td>220V 50 Hz</td>
<td>-7</td>
<td>511H976</td>
<td>380V 50 Hz</td>
</tr>
<tr>
<td>—</td>
<td>110</td>
<td>S-7</td>
<td>511H1196</td>
<td>380V 50 Hz</td>
<td>-8</td>
<td>511H977</td>
<td>440V 50 Hz</td>
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<td>125</td>
<td>S-10</td>
<td>511H996</td>
<td>440V 50 Hz</td>
<td>-9</td>
<td>511H1197</td>
<td>550V 50 Hz</td>
</tr>
<tr>
<td>—</td>
<td>160</td>
<td>S-10</td>
<td>511H997</td>
<td>550V 50 Hz</td>
<td>—</td>
<td>511H1198</td>
<td>—</td>
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</tbody>
</table>

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 Catalogue Number.
3. Does not include Wheel.

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
## A-143NEMA Contactors & Starters

### Shoe Brakes — AC and DC Magnetic

#### 511 Series

**Table A-263. Brake Wheels**

<table>
<thead>
<tr>
<th>Wheel Size in Inches</th>
<th>Min. Bore in Inches (mm)</th>
<th>Max. Bore in Inches (mm)</th>
<th>Pilot Bore in Inches (mm)</th>
<th>WK³</th>
<th>Straight Bore ¹</th>
<th>Tapered Bore ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>.50 (12.7)</td>
<td>1.38 (35.1)</td>
<td>.50 (12.7)</td>
<td>.06</td>
<td>511H1150</td>
<td>511H1151</td>
</tr>
<tr>
<td>5.5</td>
<td>.75 (19.1)</td>
<td>2.00 (50.8)</td>
<td>.75 (19.1)</td>
<td>.26</td>
<td>511H1160</td>
<td>511H1161</td>
</tr>
<tr>
<td>7.0</td>
<td>1.00 (25.4)</td>
<td>2.25 (57.2)</td>
<td>.75 (19.1)</td>
<td>.77</td>
<td>511H1170</td>
<td>511H1171</td>
</tr>
<tr>
<td>10.0</td>
<td>1.38 (35.1)</td>
<td>2.88 (73.2)</td>
<td>1.13 (28.7)</td>
<td>3.10</td>
<td>511H1190</td>
<td>511H1191</td>
</tr>
</tbody>
</table>

¹ 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.

² Add Suffix Number for bore size to Base catalogue Number.

³ Bore tolerance: +.00 .001 inches.

**Table A-264. Brake Wheel Suffix Numbers**

<table>
<thead>
<tr>
<th>Bore Size Suffix Number — Add to Base Catalogue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore ² in Inches (mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pilot Bore</th>
<th>None</th>
<th>1/8 x 1/16</th>
<th>-1</th>
<th>1.625 (41.28)</th>
<th>3/38 x 3/16</th>
<th>-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>.625 (.15.88)</td>
<td>3/16 x 3/32</td>
<td>-2</td>
<td>1.875 (47.63)</td>
<td>1/2 x 1/4</td>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>.750 (.19.05)</td>
<td>3/16 x 3/32</td>
<td>-3</td>
<td>2.125 (53.98)</td>
<td>1/2 x 1/4</td>
<td>-11</td>
<td></td>
</tr>
<tr>
<td>.875 (.22.23)</td>
<td>3/16 x 3/32</td>
<td>-4</td>
<td>2.375 (60.33)</td>
<td>5/8 x 5/16</td>
<td>-12</td>
<td></td>
</tr>
<tr>
<td>1.000 (.25.40)</td>
<td>1/4 x 1/8</td>
<td>-5</td>
<td>2.500 (63.50)</td>
<td>5/8 x 5/16</td>
<td>-63</td>
<td></td>
</tr>
<tr>
<td>1.125 (.28.56)</td>
<td>1/4 x 1/8</td>
<td>-6</td>
<td>2.625 (66.88)</td>
<td>5/8 x 5/16</td>
<td>-13</td>
<td></td>
</tr>
<tr>
<td>1.250 (.31.76)</td>
<td>1/4 x 1/8</td>
<td>-7</td>
<td>2.750 (69.85)</td>
<td>5/8 x 5/16</td>
<td>-18</td>
<td></td>
</tr>
<tr>
<td>1.375 (.34.93)</td>
<td>5/16 x 5/32</td>
<td>-8</td>
<td>2.875 (73.03)</td>
<td>1/4 x 3/8</td>
<td>-14</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-standard Bore Sizes — Make Necessary Price Addition ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>.500 (.12.70)</td>
</tr>
<tr>
<td>.750 (.19.05)</td>
</tr>
<tr>
<td>.875 (.22.23)</td>
</tr>
<tr>
<td>1.000 (.25.40)</td>
</tr>
<tr>
<td>1.187 (.30.15)</td>
</tr>
<tr>
<td>1.375 (.34.93)</td>
</tr>
<tr>
<td>1.437 (.36.50)</td>
</tr>
<tr>
<td>1.500 (.38.10)</td>
</tr>
</tbody>
</table>

³ Bore size selected must be between minimum and maximum dimensions listed in brake wheel selection table.

⁴ Price Additions

<table>
<thead>
<tr>
<th>Description</th>
<th>Adder</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 Inch (101.6 mm)</td>
<td>5.5 Inch (139.7 mm)</td>
</tr>
<tr>
<td>7.0 Inch (177.8 mm)</td>
<td>10.0 Inch (254.0 mm)</td>
</tr>
</tbody>
</table>

Discount Symbol: ......................... MC7

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
**A-144**

**NEMA Contactors & Starters**

**Shoe Brakes — AC and DC Magnetic**

**511 Series**

**July 2008**

---

**Dimensions**

Table A-265. Approximate Dimensions

<table>
<thead>
<tr>
<th>Brake Size</th>
<th>Torque Rating (ft-lb)</th>
<th>Dimensions in Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type “S” AC Shoe Brakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-4</td>
<td>3</td>
<td>4.00</td>
</tr>
<tr>
<td>S-4</td>
<td>10</td>
<td>4.00</td>
</tr>
<tr>
<td>S-4</td>
<td>15</td>
<td>4.00</td>
</tr>
<tr>
<td>S-5-1/2</td>
<td>25</td>
<td>5.50</td>
</tr>
<tr>
<td>S-5-1/2</td>
<td>35</td>
<td>5.50</td>
</tr>
<tr>
<td>S-7</td>
<td>50</td>
<td>7.00</td>
</tr>
<tr>
<td>S-7</td>
<td>75</td>
<td>7.00</td>
</tr>
<tr>
<td>S-10</td>
<td>125, 160</td>
<td>Refer to above drawing.</td>
</tr>
</tbody>
</table>

Type “S” DC Shoe Brakes

<table>
<thead>
<tr>
<th>Brake Size</th>
<th>Torque Rating (ft-lb)</th>
<th>Dimensions in Inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-4</td>
<td>3</td>
<td>4.00</td>
</tr>
<tr>
<td>S-4</td>
<td>10</td>
<td>4.00</td>
</tr>
<tr>
<td>S-5-1/2</td>
<td>25</td>
<td>5.50</td>
</tr>
<tr>
<td>S-5-1/2</td>
<td>35</td>
<td>5.50</td>
</tr>
<tr>
<td>S-7</td>
<td>50</td>
<td>7.00</td>
</tr>
<tr>
<td>S-7</td>
<td>75</td>
<td>7.00</td>
</tr>
<tr>
<td>S-7</td>
<td>85</td>
<td>7.00</td>
</tr>
<tr>
<td>S-7</td>
<td>110</td>
<td>7.00</td>
</tr>
</tbody>
</table>

(1) Open type brake only.

---

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
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 A-266. Used in Technical Data & Formulas

<table>
<thead>
<tr>
<th>Code</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF</td>
<td>Duty factory</td>
</tr>
<tr>
<td>I_on</td>
<td>Response value of earth-fault release</td>
</tr>
<tr>
<td>I_m</td>
<td>Rated short-circuit making capacity</td>
</tr>
<tr>
<td>I_m</td>
<td>Rated short-circuit breaking capacity</td>
</tr>
<tr>
<td>I_s</td>
<td>Rated service short-circuit breaking capacity</td>
</tr>
<tr>
<td>I_u</td>
<td>Rated ultimate short-circuit breaking capacity</td>
</tr>
<tr>
<td>I_w</td>
<td>Rated short-time withstand current</td>
</tr>
<tr>
<td>I_o</td>
<td>Rated operational current</td>
</tr>
<tr>
<td>I_k</td>
<td>Transformer initial short-circuit AC current</td>
</tr>
<tr>
<td>I_L</td>
<td>Load monitoring response value</td>
</tr>
<tr>
<td>I_n</td>
<td>Rated current</td>
</tr>
<tr>
<td>I_NT</td>
<td>Transformer rated current</td>
</tr>
<tr>
<td>I_PK</td>
<td>Rated peak withstand current</td>
</tr>
<tr>
<td>I_q</td>
<td>Rated conditional short-circuit current</td>
</tr>
<tr>
<td>I_r</td>
<td>Overcurrent release set value</td>
</tr>
<tr>
<td>I_m</td>
<td>Response value of non-delayed short-circuit release</td>
</tr>
<tr>
<td>I_i</td>
<td>Response value of non-delayed short-circuit release</td>
</tr>
<tr>
<td>I_mf</td>
<td>Response value of fixed, non-delayed short-circuit release</td>
</tr>
</tbody>
</table>

Annex A (informative)

Table A-267. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear

<table>
<thead>
<tr>
<th>Category</th>
<th>Typical Applications</th>
<th>Relevant IEC Product Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of Current — AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC-1</td>
<td>Non-inductive or slightly inductive loads, resistance furnaces</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-2</td>
<td>Slip-ring motors: starting, switching off</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-3</td>
<td>Squirrel-cage motors: starting, switching off motors during running</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-4</td>
<td>Squirrel-cage motors: starting, plugging, inching</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-5a</td>
<td>Switching of electric discharge lamp controls</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-5b</td>
<td>Switching of incandescent lamps</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-6a</td>
<td>Switching of transformers</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-6b</td>
<td>Switching of capacitor banks</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-7a</td>
<td>Slightly inductive loads for household appliances and similar applications</td>
<td>61095</td>
</tr>
<tr>
<td>AC-7b</td>
<td>Motor-loads for household applications</td>
<td>61095</td>
</tr>
<tr>
<td>AC-8a</td>
<td>Hermetic refrigerant compressor motor control with manual resetting of overload releases</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-8b</td>
<td>Hermetic refrigerant compressor motor control with automatic resetting of overload releases</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>AC-12</td>
<td>Control of resistive loads and solid-state loads with isolation by optocouplers</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>AC-12</td>
<td>Control of resistive loads and solid-state loads with optical isolation</td>
<td>60947-5-2</td>
</tr>
<tr>
<td>AC-13</td>
<td>Control of solid-state loads with transformer isolation</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>AC-14</td>
<td>Control of small electromagnetic loads</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>AC-15</td>
<td>Control of AC electromagnetic loads</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>AC-20</td>
<td>Connecting and disconnecting under no-load conditions</td>
<td>60947-3</td>
</tr>
<tr>
<td>AC-21</td>
<td>Switching of resistive loads, including moderate overloads</td>
<td>60947-3</td>
</tr>
<tr>
<td>AC-22</td>
<td>Switching of mixed resistive and inductive loads, including moderate overloads</td>
<td>60947-3</td>
</tr>
<tr>
<td>AC-23</td>
<td>Switching of motor loads or other highly inductive loads</td>
<td>60947-3</td>
</tr>
</tbody>
</table>

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 A-267. Examples of Utilization Categories for Low-Voltage Switchgear and Controlgear (Continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Typical Applications</th>
<th>Relevant IEC Product Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nature of Current — AC (Continued)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC-31</td>
<td>Non-inductive or slightly inductive loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>AC-33</td>
<td>Motor loads or mixed loads including motors, resistive loads and up to 30% incandescent lamp loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>AC-35</td>
<td>Electric discharge lamp loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>AC-36</td>
<td>Incandescent lamp loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>AC-40</td>
<td>Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-41</td>
<td>Non-inductive or slightly inductive loads, resistance furnaces</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-42</td>
<td>Slip-ring motors: starting, switching off</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-43</td>
<td>Squirrel-cage motors: starting, switching off motors during running</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-44</td>
<td>Squirrel-cage motors: starting, plugging, inching</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-45a</td>
<td>Switching of electric discharge lamp controls</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-45b</td>
<td>Switching of incandescent lamps</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-46</td>
<td>Switching of incandescent lamps</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>AC-47a</td>
<td>Control of small electromagnetic loads with holding (closed) current ≤ 0.2 A, e.g. contactor relays</td>
<td>60947-6-2</td>
</tr>
<tr>
<td><strong>Nature of Current — AC and DC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Protection of circuits, with no rated short-time withstand current</td>
<td>60947-2</td>
</tr>
<tr>
<td>B</td>
<td>Protection of circuits, with a rated short-time withstand current</td>
<td>60947-2</td>
</tr>
<tr>
<td><strong>Nature of Current — DC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC-1</td>
<td>Non-inductive or slightly inductive loads, resistance furnaces</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>DC-3</td>
<td>Shunt-motors: starting, plugging, inching, Dynamic breaking of motors</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>DC-5</td>
<td>Series-motors: starting, plugging, inching, Dynamic breaking of motors</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>DC-6</td>
<td>Switching of incandescent lamps</td>
<td>60947-4-1</td>
</tr>
<tr>
<td>DC-12</td>
<td>Control of resistive loads and solid-state loads with isolation by optocouplers</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>DC-12</td>
<td>Control of resistive loads and solid-state loads with optical isolation</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>DC-13</td>
<td>Control of electromagnets</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>DC-13</td>
<td>Control of electromagnets</td>
<td>60947-5-2</td>
</tr>
<tr>
<td>DC-14</td>
<td>Control of electromagnetic loads having economy resistors in circuit</td>
<td>60947-5-1</td>
</tr>
<tr>
<td>DC-20</td>
<td>Connecting and disconnecting under no-load conditions</td>
<td>60947-3</td>
</tr>
<tr>
<td>DC-21</td>
<td>Switching of resistive loads, including moderate overloads</td>
<td>60947-3</td>
</tr>
<tr>
<td>DC-22</td>
<td>Switching of mixed resistive and inductive loads, including moderate overloads (e.g. shunt motors)</td>
<td>60947-3</td>
</tr>
<tr>
<td>DC-23</td>
<td>Switching of motor loads or other highly inductive loads (e.g. series motors)</td>
<td>60947-3</td>
</tr>
<tr>
<td>DC-31</td>
<td>Resistive loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>DC-33</td>
<td>Motor loads or mixed loads including motors</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>DC-36</td>
<td>Incandescent lamp loads</td>
<td>60947-6-1</td>
</tr>
<tr>
<td>DC-40</td>
<td>Distribution circuits comprising mixed resistive and reactive loads having a resultant inductive reactance</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>DC-41</td>
<td>Non-inductive or slightly inductive loads, resistance furnaces</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>DC-43</td>
<td>Shunt-motors: starting, plugging, inching, Dynamic breaking of DC</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>DC-45</td>
<td>Series-motors: starting, plugging, inching, Dynamic breaking of DC</td>
<td>60947-6-2</td>
</tr>
<tr>
<td>DC-46</td>
<td>Switching of incandescent lamps</td>
<td>60947-6-2</td>
</tr>
</tbody>
</table>

---

60947-4-1 © IEC: 2004.
60947-4-3 © IEC: 2004.
60947-6-1 © IEC: 2004.

By plugging is understood stopping or reversing the motor rapidly by reversing motor primary connections while the motor is running.

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.

**Ampere Ratings of Three-Phase, 60 Hz, AC Induction Motor**

<table>
<thead>
<tr>
<th>hp</th>
<th>Syn. Speed RPM</th>
<th>Current in Amperes</th>
<th>200V</th>
<th>230V</th>
<th>380V</th>
<th>460V</th>
<th>575V</th>
<th>2200V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>1800</td>
<td>1.09</td>
<td>.95</td>
<td>.55</td>
<td>.48</td>
<td>.38</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>1.61</td>
<td>1.40</td>
<td>.81</td>
<td>.70</td>
<td>.56</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>1.84</td>
<td>1.60</td>
<td>.93</td>
<td>.80</td>
<td>.64</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1/3</td>
<td>1800</td>
<td>1.37</td>
<td>1.19</td>
<td>.69</td>
<td>.60</td>
<td>.48</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>1.83</td>
<td>1.59</td>
<td>.92</td>
<td>.80</td>
<td>.64</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>2.07</td>
<td>1.80</td>
<td>1.04</td>
<td>.90</td>
<td>.72</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1/2</td>
<td>1800</td>
<td>1.96</td>
<td>1.72</td>
<td>.99</td>
<td>.86</td>
<td>.69</td>
<td>—</td>
<td>—</td>
</tr>
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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.

For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)
**NEMA Contactors & Starters**

**Reference Data**

**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.

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<th>208V</th>
<th>230V</th>
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**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.

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<th>Ampere Capacity of Fuses for Motors</th>
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These are average direct-current quantities.

*For more information visit: [www.EatonCanada.ca](http://www.EatonCanada.ca)*