

**Type 3R Industrial Pump Panel—C440 SSOL**



**Narrow Enclosure Pump Panel**



**Irrigation Pump Panel—C440 SSOL**



**A200 Pump Panel**



## 6.1 Industrial Pump Panels

|                                  |           |
|----------------------------------|-----------|
| Product Overview .....           | V10-T6-2  |
| Freedom—Fusible Disconnect ..... | V10-T6-7  |
| Freedom—Circuit Breaker .....    | V10-T6-9  |
| A200—Fusible Disconnect .....    | V10-T6-11 |
| A200—Circuit Breaker .....       | V10-T6-13 |

## 6.2 Vacuum Starter Pump Panels

|  |           |
|--|-----------|
| Freedom—Fusible Disconnect and Circuit Breaker |           |
| Product Description .....                      | V10-T6-15 |
| Standards and Certifications .....             | V10-T6-15 |
| Additional Reference .....                     | V10-T6-15 |
| Product Selection .....                        | V10-T6-16 |
| Wiring Diagram .....                           | V10-T6-16 |

## 6.3 Irrigation Pump Panels

|   |           |
|---|-----------|
| Product Description .....                         | V10-T6-17 |
| Features .....                                    | V10-T6-17 |
| Standards and Certifications .....                | V10-T6-17 |
| Additional Reference .....                        | V10-T6-17 |
| Catalog Number Selection .....                    | V10-T6-18 |
| Pump Panels—Interchangeable Heater Overload ..... | V10-T6-19 |
| Pump Panels—Solid-State Overload .....            | V10-T6-20 |

## 6.4 Duplex Pump Panels

|                                    |           |
|------------------------------------|-----------|
| Product Description .....          | V10-T6-23 |
| Standards and Certifications ..... | V10-T6-23 |
| Additional Reference .....         | V10-T6-23 |
| Catalog Number Selection .....     | V10-T6-24 |
| Cover Control .....                | V10-T6-25 |
| Non-Combination .....              | V10-T6-26 |
| Combination .....                  | V10-T6-27 |

## Industrial Pump Panels



6

## Product Overview

### Product Description

Eaton's pump controllers are combination starters with accessories and modifications designed to meet the particular requirements of the irrigation, oil well, gas and other pump application industries. The enclosure is Type 3R to provide weather-tight protection and is available in several sizes, depending on the customer's control option requirements. The disconnect, contactor and overload relay are the same as used in Freedom lines of combination starters. These controllers are available in standard full voltage as well as reduced voltage configurations, with vacuum contactors as well as the standard electromechanical contactors.

Eaton's revolutionary design for soft starters is shown in the S801+ and S811+ soft starter products which are members of the Intelligent Technologies (*IT.*) family of products. These reduced voltage soft starters are the most compact, multi-functional, easy-to-install products on the market. Their superiority begins with the control package, which features 24 Vdc control, onboard Digital Signal Processor (DSP), and use of a low impedance run contactor, all of which contribute to the *IT.* soft starter's safety, advanced functionality and compact size.

## Contents

### Description

|                                    | <i>Page</i>      |
|------------------------------------|------------------|
| Industrial Pump Panels             |                  |
| Standards and Certifications ..... | <b>V10-T6-3</b>  |
| Additional Reference .....         | <b>V10-T6-3</b>  |
| Catalog Number Selection .....     | <b>V10-T6-4</b>  |
| Accessories .....                  | <b>V10-T6-5</b>  |
| Freedom—Fusible Disconnect .....   | <b>V10-T6-7</b>  |
| Freedom—Circuit Breaker .....      | <b>V10-T6-9</b>  |
| A200—Fusible Disconnect .....      | <b>V10-T6-11</b> |
| A200—Circuit Breaker .....         | <b>V10-T6-13</b> |

### Features

The Freedom series starters are available in either fusible or circuit breaker types utilizing Type 3R rainproof and sleet resistant enclosures. Convenient straight-through wiring with top line connections and bottom load connections features easily accessible pressure connections for line, load and control. Starter and disconnect are factory wired.

- Motor Circuit Switch—** Long life, heavy-duty, quick acting, double break action. Positive ON and positive OFF available in either fusible or non-fusible versions. Fuse clip kits are available for field installation and can be converted in the field for maximum job flexibility
- Motor Circuit Protector—** Similar to a magnetic trip only circuit breaker. Features an adjustable magnetic trip characteristic for accurate, dependable fault protection and simultaneous trip of all poles to prevent single phasing
- Overload Relay—**Freedom overload relays with trip indication feature bimetallic type operation with ambient compensation and a choice of either manual or automatic reset  
C440 electronic overload relays are available up to 100A as a self-powered, self-contained unit. With external CTs, C440 can protect motor up to 1500 FLA. Available add-on accessories include remote reset capability and communication modules with I/O for DeviceNet, PROFIBUS, and Modbus.
- HAND/OFF/AUTO Selector Switch and START Pushbutton—** 10250T heavy-duty units mounted on the flange of the enclosure for outside accessibility
- RESET Button—** Accessible from front of enclosure (booted for environmental protection) for operation of overload relay reset function

- **Enclosure**—Type 3R rainproof and sleet resistant construction with stainless steel door latches and special corrosion resistant paint. Enclosure features include grounding lugs, padlocking feature on door latch, drip hood over door and provisions for top mounting conduit hubs. Most enclosures include generous panel space for mounting optional control and accessories
- **Mounting**—Pole mounting feet with keyhole slots for easy mounting are standard on enclosures for Sizes 1–5 (removable for Sizes 1–5 standard width flange type enclosures). Brackets can be formed to the contour of the pole after mounting
- **Padlocking**—Provision on door latch for locking door closed, as well as provision for padlocking disconnect switch in OFF position. With a simple modification, disconnect can also be padlocked in ON position
- **UL Listed**—Underwriters Laboratories Inc. includes the “Suitable for Use as Service Equipment” label

**Interrupting Ratings**

- **Fusible**—Sizes 1–5 suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes. 600V maximum where a Class R fuse clip kit is properly installed and Class R fuses are used. If Class R fuses are not used, the switch should not be installed on circuits capable of delivering more than 10,000 rms symmetrical amperes. Size 6 is limited to 18,000 and Size 7 is limited to 30,000 rms symmetrical amperes
- **Circuit Breaker**—Sizes 1–3 controllers are suitable for use on circuits capable of delivering not more than 100,000 rms symmetrical amperes at 480V maximum; for 600V applications not more than 65,000 rms symmetrical amperes
- **ECP Irrigation Pump Panel**—Suitable for use on circuits capable of delivering not more than 10,000 rms symmetrical amperes at 480V maximum

**Optional Features**

- **Backspin Timer**—0.2 seconds to 3 minutes. Prevents restart until motor and pump have stopped
- **Program Timer**—24 hour, 7 day with day omission
- **Control Transformer**—Available as standard, either as a field kit or factory installed. Includes two primary and one secondary fuses
- **Electrical Interlocks**—Side mounted in NO, NC and NO-NC. Maximum of two contacts on either side of starter through Size 2, maximum of three per side Sizes 3–5
- **Control Circuit Fuse Kit**—30A, 600V rating
- **Lightning Arrestor**—Offers protection to control from lightning induced surges
- **“R” Fuse Clip Kits**—30–200A, 250V and 600V ratings
- **Disconnect Control Circuit Interlock**—To disconnect separate control circuits

- **Enclosure Conduit Hubs**—Hole provided in enclosure top covered with hole closer. Will accept 3/4 in, 1-1/4 in, 1-1/2 in, 2 in, 2-1/2 in, and three inch conduit sizes
- **Pad Mounting Feet**—For standard width enclosures Sizes 1–5
- **Electronic Overload (SSOL)**
- **304-Grade Stainless Steel Enclosure**—For additional corrosion resistance, any of the pump panels can be ordered as 304-Grade stainless steel, still keeping the Type 3R rating
- **Soft Starter Pump Control Options**
  - Designed to reduce “water-hammer” during start-up and stopping sequences
  - Stop ramp extended to 60 seconds to help control larger motors and systems with long piping runs

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

|   |                 |
|---|-----------------|
| Kits . . . . .                              | <b>V10-T6-5</b> |
| Dimensions . . . . .                        | <b>Tab 14</b>   |
| Accessories and Modifications . . . . .     | <b>Tab 15</b>   |
| Technical Data and Specifications . . . . . | <b>Tab 17</b>   |

# 6.1

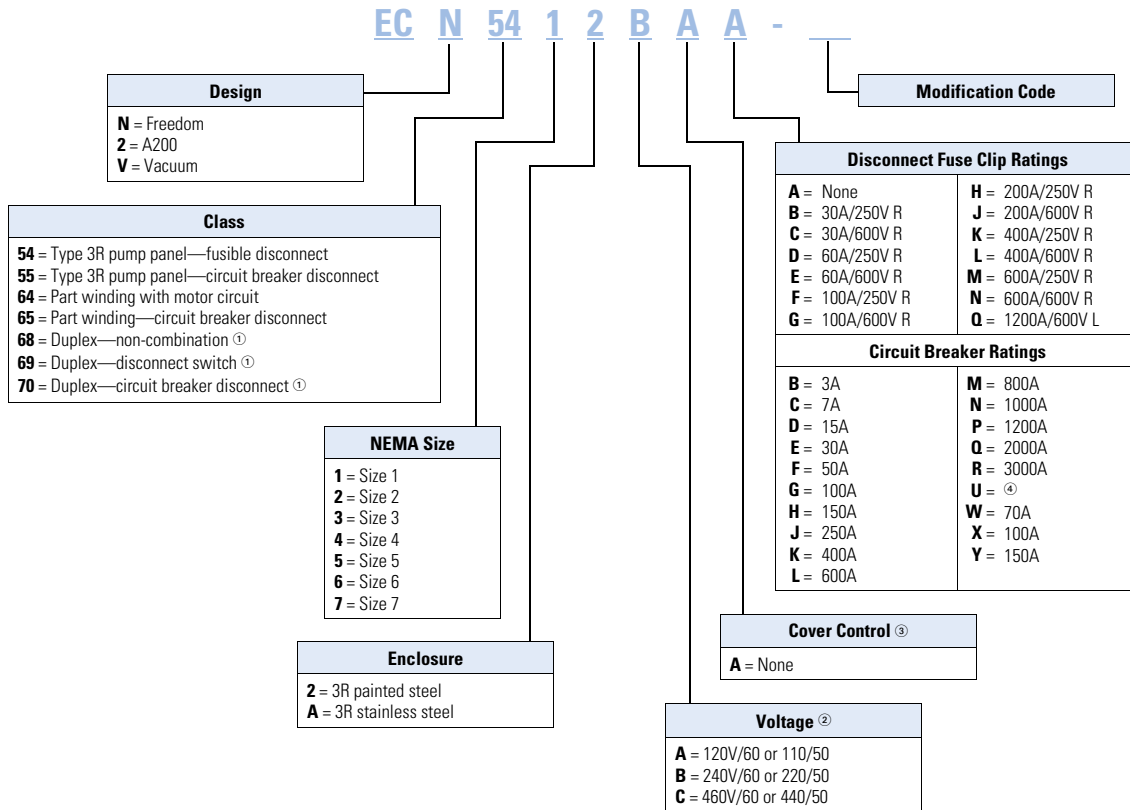
## Pump Panels

### Industrial Pump Panels

#### Catalog Number Selection

#### Pump Panel

6



#### Notes

- ① More information on Type 1, 3R, 4X and 12 duplex pump panels is on **Page V10-T6-23**. Product Selection is on **Page V10-T6-26**.
- ② For other voltages and single-phase applications, consult your Eaton representative.
- ③ HOA selector switch and START pushbutton provided as standard.
- ④ Engineering determination depending on size, horsepower FLA, NEC or other considerations.

**Accessories**

**Kits**

**Kits for Field Mounting**

| <b>Description</b>  | <b>Catalog Number<br/>Suffix</b> | <b>Catalog Number</b> |
|---|----------------------------------|-----------------------|
| Backspin timer—0.2 sec. to 3 min. (60 Hz)                             | <b>B12</b>                       | —                     |
| Control transformers 240/480V primary, 120V secondary                 |                                  |                       |
| Size 1  | <b>C1</b>                        | —                     |
| Size 2  | <b>C1</b>                        | —                     |
| Size 3  | <b>C1</b>                        | —                     |
| Size 4  | <b>C1</b>                        | —                     |
| Size 5  | <b>C1</b>                        | —                     |
| Lightning arrestor  | <b>L3</b>                        | —                     |
| Control circuit fuse kit (600V)                                       | <b>C31</b>                       | —                     |
| Electrical interlocks—Freedom line/vacuum                             |                                  |                       |
| NO  | <b>A27</b>                       | —                     |
| NC  | <b>A28</b>                       | <b>C320KGS2</b>       |
| NO and NC   | <b>A29</b>                       | <b>C320KGS3</b>       |
| Time delay relay—3 minutes  |                                  |                       |
| ON delay (unwired)  | <b>T6</b>                        | —                     |
| OFF delay (unwired)   | <b>T7</b>                        | —                     |
| 24-hour programming clock   | <b>P44</b>                       | —                     |
| Interchangeable hubs for enclosure. <sup>①</sup>                      |                                  |                       |
| Enclosure has removable top plate. If conduit hub is required, order: |                                  |                       |
| 3/4 in conduit size   | —                                | <b>DS075H1</b>        |
| 1-1/4 in conduit size   | —                                | <b>DS125H1</b>        |
| 1-1/2 in conduit size   | —                                | <b>DS150H1</b>        |
| 2 in conduit size   | —                                | <b>DS200H1</b>        |
| 2-1/2 in conduit size   | —                                | <b>DS250H2</b>        |
| 3 in conduit size   | —                                | <b>DS300H2</b>        |
| Power supply  | <b>C34</b>                       | —                     |

**Note**

<sup>①</sup> Does not apply to reduced voltage controllers.

**Overload Relays****Freedom Solid-State Overload Relays**

| <b>NEMA Size</b> | <b>Full Load Current Adjustment Range (A)</b> | <b>Three-Phase without Ground Fault Auto/Manual Reset Overload Selectable Class 10/20/30</b> | <b>Three-Phase with Ground Fault Auto/Manual Reset Overload Selectable Class 10/20/30</b> |
|------------------|---|--|---|
| 00               | 0.33–1.65 <sup>①</sup>                        | R63/A  | R64/A   |
|                  | 1–5   | R63/B  | R64/B   |
|                  | 4–20  | R63/C  | R64/C   |
| 0 and 1          | 0.33–1.65 <sup>①</sup>                        | R63/A  | R64/A   |
|                  | 1–5   | R63/B  | R64/B   |
|                  | 4–20  | R63/C  | R64/C   |
|                  | 9–45  | R63/D  | R64/D   |
| 2                | 9–45  | R63/D  | R64/D   |
| 3                | 20–100  | R63/E  | R64/E   |
| 4                | 28–140  | R63/F  | R64/F   |
| 5                | 60–300 <sup>②</sup>                           | R63/G  | R64/G   |
| 6                | 120–600 <sup>③</sup>                          | R63/H  | R64/H   |

**Notes**

- ① Not UL Listed.
- ② NEMA Size 5 starter available with 60–300A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).
- ③ NEMA Size 6 starter available with 120–600A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

## Freedom—Fusible Disconnect

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECN54 controllers have a HAND/OFF/AUTO selector switch and START and RESET pushbuttons mounted on the enclosure and are wired as illustrated on **Page V10-T6-8**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class ECN54—Combination Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Narrow Width ③ | Standard Width ③ |
|-----------|-----------------|------------------|--------------------|---------------|----------------|------------------|
|           |                 |                  | Amperes            | Volts         | Catalog Number | Catalog Number   |
| 1 ④       | 230             | 7-1/2            | 30                 | 250           | ECN5412BAB-E14 | ECN5412BAB       |
|           | 460             | 10               |                    | 600           | ECN5412CAC-E14 | ECN5412CAC       |
|           | —               | —                | Not installed      | Not installed | ECN5412AAA-E14 | ECN5412AAA       |
| 2         | 230             | 15               | 60                 | 250           | ECN5422BAD-E14 | ECN5422BAD       |
|           | 460             | 25               |                    | 600           | ECN5422CAE-E14 | ECN5422CAE       |
|           | —               | —                | Not installed      | Not installed | ECN5422AAA-E14 | ECN5422AAA       |
| 3         | 230             | 30               | 100                | 250           | —              | ECN5432BAF       |
|           | 460             | 50               |                    | 600           | —              | ECN5432CAG       |
|           | —               | —                | Not installed      | Not installed | —              | ECN5432AAA       |
| 4 ④       | 230             | 50               | 200                | 250           | —              | ECN5442BAH       |
|           | 460             | 100              |                    | 600           | —              | ECN5442CAJ       |
|           | —               | —                | Not installed      | Not installed | —              | ECN5442AAA       |
| 5         | 230             | 100              | 400                | 250           | —              | ECN5452BAK       |
|           | 460             | 200              |                    | 600           | —              | ECN5452CAL       |
| 6         | 230             | 200              | 600                | 250           | —              | ECN5462BAM       |
|           | 460             | 400              |                    | 600           | —              | ECN5462CAN       |
| 7         | 460             | 600              | 1200               | 600           | —              | ECN5472CAQ       |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

**Starters with electronic overload,** see Modification Codes in **Tab 15**.

① Dual element fuse ratings.

② Class R fuse clips, except for Size 7 which uses Class L fuse clips. For starters with clips “Not Installed,” select fuse clip kit on **Page V10-T6-8**.

③ To order without the START pushbutton, add modification code **P6**.

④ For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECN5412**B**AC to ECN5412**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

# 6.1

## Pump Panels

### Industrial Pump Panels

6

#### Accessories

##### C351—Fuse Clip Selection—Three-Pole (Three Fuses)

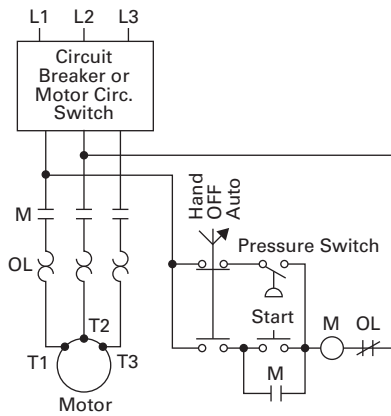
| NEMA Size | Motor Voltage | Fuse Clip Rating Amperes | Volts | Fuse Clip Kit for Field Installation in Non-Fusible Starter |  |
|-----------|---------------|--------------------------|-------|---|--|
|           |               |                          |       | For Non-Rejection Type Fuses Catalog Number                 | For Use with "R" Rejection Type Fuses Catalog Number |
| 1         | 200/230       | 30                       | 250   | C351KC21  | C351KC21R  |
|           | 460-575       |                          | 600   | C351KD22-61   | C351KD22-61R   |
| 2         | 200           | 60                       | 250   | C351KD22-61   | C351KD22-61R   |
|           | 230           |                          | 250   | C351KD22-61   | C351KD22-61R   |
|           | 460-575       |                          | 600   | C351KD62  | C351KD62R  |
| 3         | 200           | 100                      | 250   | C351KE23-63   | C351KE23-63 ①  |
|           | 230           |                          | 250   | C351KE23-63   | C351KE23-63 ①  |
|           | 460-575       |                          | 600   | C351KE23-63   | C351KE23-63 ①  |
| 4         | 200           | 200                      | 250   | C351KF24-64   | C351KF24-64 ①  |
|           | 230           |                          | 250   | C351KF24-64   | C351KF24-64 ①  |
|           | 460-575       |                          | 600   | C351KF24-64   | C351KF24-64 ①  |

**Note**

① Fuse clip "R" rejection members for use with Class R fuses are supplied loose both in fuse clip kits and when fuse clips are factory installed.

#### Wiring Diagram

##### Typical Wiring Diagram





## Freedom—Circuit Breaker

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

These ECN55 pump controllers feature the Freedom line starters. They have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the

enclosure and a RESET button on the front—wiring is as illustrated in the wiring diagram on **Page V10-T6-8**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see table on **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class ECN55—Combination Pump Panel—Circuit Breaker

| NEMA Size      | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | Narrow Width <sup>①</sup> Catalog Number | Standard Width <sup>①</sup> Catalog Number |
|----------------|---------------|------------------|----------------------|--|--|
| 1 <sup>②</sup> | 230           | 1                | 7A                   | ECN5512BAC-E14                           | ECN5512BAC                                 |
|                |               | 3                | 15A                  | ECN5512BAD-E14                           | ECN5512BAD                                 |
|                |               | 7-1/2            | 30A                  | ECN5512BAE-E14                           | ECN5512BAE                                 |
|                | 460           | 1                | 3A                   | ECN5512CAB-E14                           | ECN5512CAB                                 |
|                |               | 3                | 7A                   | ECN5512CAC-E14                           | ECN5512CAC                                 |
|                |               | 5                | 15A                  | ECN5512CAD-E14                           | ECN5512CAD                                 |
| 2              | 230           | 10               | 50A                  | ECN5522BAF-E14                           | ECN5522BAF                                 |
|                | 460           | 25               |                      | ECN5522CAF-E14                           | ECN5522CAF                                 |
| 3              | 230           | 30               | 100A                 | —  | ECN5532BAG                                 |
|                | 460           | 50               |                      | —  | ECN5532CAG                                 |
| 4 <sup>②</sup> | 230           | 50               | 150A                 | —  | ECN5542BAH                                 |
|                | 460           | 100              |                      | —  | ECN5542CAH                                 |
| 5              | 230           | 60               | 250A                 | —  | ECN5552BAJ                                 |
|                | 230           | 100              | 400A                 | —  | ECN5552BAK                                 |
|                | 460           | 150              | 250A                 | —  | ECN5552CAJ                                 |
|                | 460           | 200              | 400A                 | —  | ECN5552CAK                                 |
| 6              | 230           | 125              | 600A                 | —  | ECN5562BAL                                 |
|                | 230           | 200              | 800A                 | —  | ECN5562BAM                                 |
|                | 460           | 300              | 600A                 | —  | ECN5562CAL                                 |
|                | 460           | 400              | 800A                 | —  | ECN5562CAM                                 |
| 7              | 230           | 250              | <sup>③</sup>         | —  | ECN5572BAU                                 |
|                | 230           | 300              |                      | —  | ECN5572BAU                                 |
|                | 460           | 500              |                      | —  | ECN5572CAU                                 |
|                | 460           | 600              |                      | —  | ECN5572CAU                                 |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

<sup>①</sup> To order without the START pushbutton, add modification code **P6**.

<sup>②</sup> For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

<sup>③</sup> Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECN5512**C**AC to ECN5512**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

# 6.1

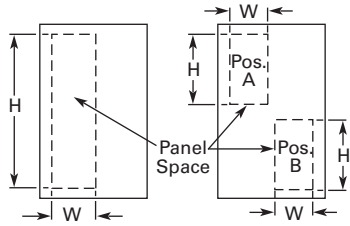
## Pump Panels

### Industrial Pump Panels

#### Dimensions

Approximate Dimensions in Inches (mm)

#### Panel Space



NEMA Sizes 1-4

NEMA Size 5

| Panel Size          | NEMA Size | Position (see figure above) | Width W    | Height H   |
|---------------------|-----------|-----------------------------|------------|------------|
| Narrow <sup>①</sup> | 1-2       | —                           | 5.5 (140)  | 6.0 (152)  |
| Standard            | 1-3       | —                           | 8.5 (216)  | 26.0 (660) |
|                     | 4         | —                           | 8.5 (216)  | 39.0 (991) |
|                     | 5         | A                           | 10.0 (254) | 22.0 (559) |
|                     |           | B                           | 15.0 (381) | 12.0 (305) |
| Oversize            | 1-2       | —                           | 12.0 (318) | 39.0 (991) |
|                     | 3         | —                           | 11.0 (279) | 39.0 (991) |

#### Note

<sup>①</sup> Space is between disconnect switch or circuit breaker and starter.

## A200—Fusible Disconnect

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECN54 controllers have a HAND/OFF/AUTO selector switch and START and RESET pushbuttons mounted on the enclosure and are wired as illustrated on **Page V10-T6-12**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see table on **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class EC254—Combination A200 Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Narrow Width ③        | Standard Width ③  |
|-----------|-----------------|------------------|--------------------|---------------|-----------------------|-------------------|
|           |                 |                  | Amperes            | Volts         | Catalog Number        | Catalog Number    |
| 1         | 230             | 7-1/2            | 30                 | 250           | <b>EC25412BAB-E14</b> | <b>EC25412BAB</b> |
|           | 460             | 10               |                    | 600           | <b>EC25412CAC-E14</b> | <b>EC25412CAC</b> |
|           | —               | —                | Not installed      | Not installed | <b>EC25412AAA-E14</b> | <b>EC25412AAA</b> |
| 2         | 230             | 15               | 60                 | 250           | <b>EC25422BAD-E14</b> | <b>EC25422BAD</b> |
|           | 460             | 25               |                    | 600           | <b>EC25422CAE-E14</b> | <b>EC25422CAE</b> |
|           | —               | —                | Not installed      | Not installed | <b>EC25422AAA-E14</b> | <b>EC25422AAA</b> |
| 3         | 230             | 30               | 100                | 250           | —                     | <b>EC25432BAF</b> |
|           | 460             | 50               |                    | 600           | —                     | <b>EC25432CAG</b> |
|           | —               | —                | Not installed      | Not installed | —                     | <b>EC25432AAA</b> |
| 4         | 230             | 50               | 200                | 250           | —                     | <b>EC25442BAH</b> |
|           | 460             | 100              |                    | 600           | —                     | <b>EC25442CAJ</b> |
|           | —               | —                | Not installed      | Not installed | —                     | <b>EC25442AAA</b> |
| 5         | 230             | 100              | 400                | 250           | —                     | <b>EC25452BAK</b> |
|           | 460             | 200              |                    | 600           | —                     | <b>EC25452CAL</b> |
| 6         | 230             | 200              | 600                | 250           | —                     | <b>EC25462BAM</b> |
|           | 460             | 400              |                    | 600           | —                     | <b>EC25462CAN</b> |
| 7         | 460             | 600              | 1200               | 600           | —                     | <b>EC25472CAQ</b> |

#### Notes

**Starters do not include heater packs.** Select 1 carton of 3 heater packs. For heater pack selection, see **Tab 15**.

① Dual element fuse ratings.

② Class R fuse clips, except for Size 7 which uses Class L fuse clips. For starters with clips “Not Installed”, select fuse clip kit on **Page V10-T6-8**.

③ To order without the START pushbutton, add modification code **P6**.

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change EC25412**B**AC to EC25412**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

# 6.1

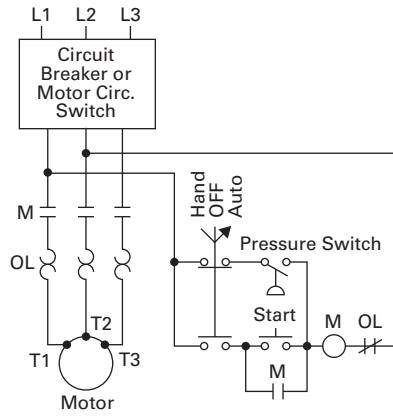
## Pump Panels

### Industrial Pump Panels

#### Wiring Diagram

#### Typical Wiring Diagram

6



## A200—Circuit Breaker

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

These ECN55 pump controllers feature the A200 starters. They have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the enclosure and a RESET button on the front—wiring is as illustrated in the wiring diagram on **Page V10-T6-12**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class EC255—Combination A200 Pump Panel—Circuit Breaker

| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | Narrow Width <sup>①</sup> | Standard Width <sup>②</sup> |
|-----------|---------------|------------------|----------------------|---------------------------|-----------------------------|
|           |               |                  |                      | Catalog Number            | Catalog Number              |
| 1         | 230           | 1                | 7A                   | EC25512BAC-E14            | EC25512BAC                  |
|           |               | 3                | 15A                  | EC25512BAD-E14            | EC25512BAD                  |
|           |               | 7-1/2            | 30A                  | EC25512BAE-E14            | EC25512BAE                  |
|           | 460           | 1                | 3A                   | EC25512CAB-E14            | EC25512CAB                  |
|           |               | 3                | 7A                   | EC25512CAC-E14            | EC25512CAC                  |
|           |               | 5                | 15A                  | EC25512CAD-E14            | EC25512CAD                  |
| 2         | 230           | 10               | 50A                  | EC25522BAF-E14            | EC25522BAF                  |
|           |               | 25               |                      | EC25522CAF-E14            | EC25522CAF                  |
|           |               | 30               | 100A                 | —                         | EC25532BAG                  |
|           | 460           | 50               |                      | —                         | EC25532CAG                  |
|           |               | 50               | 150A                 | —                         | EC25542BAH                  |
|           |               | 100              |                      | —                         | EC25542CAH                  |
| 3         | 230           | 60               | 250A                 | —                         | EC25552BAJ                  |
|           |               | 100              | 400A                 | —                         | EC25552BAK                  |
|           |               | 150              | 250A                 | —                         | EC25552CAJ                  |
|           | 460           | 200              | 400A                 | —                         | EC25552CAK                  |
|           |               | 125              | 600A                 | —                         | EC25562BAL                  |
|           |               | 200              | 800A                 | —                         | EC25562BAM                  |
| 4         | 230           | 300              | 600A                 | —                         | EC25562CAL                  |
|           |               | 400              | 800A                 | —                         | EC25562CAM                  |
|           | 460           | 250              | ③                    | —                         | EC25572BAU                  |
|           |               | 300              |                      | —                         | EC25572BAU                  |
| 5         | 230           | 500              |                      | —                         | EC25572CAU                  |
|           |               | 600              |                      | —                         | EC25572CAU                  |

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change EC25512**C**AC to EC25512**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

- ① To order without the START pushbutton, add modification code **P6**.
- ② Consult factory in the event ground fault protection is required.
- ③ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

# 6.1

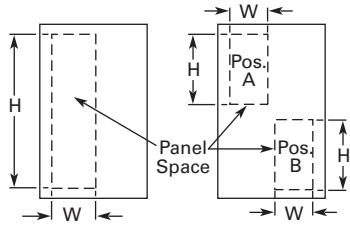
## Pump Panels

### Industrial Pump Panels

#### Dimensions

Approximate Dimensions in Inches (mm)

#### Panel Space



NEMA Sizes 1-4

NEMA Size 5

| Panel Size          | NEMA Size | Position (see figure above) | Width W    | Height H   |
|---------------------|-----------|-----------------------------|------------|------------|
| Narrow <sup>①</sup> | 1-2       | —                           | 5.5 (140)  | 6.0 (152)  |
| Standard            | 1-3       | —                           | 8.5 (216)  | 26.0 (660) |
|                     | 4         | —                           | 8.5 (216)  | 39.0 (991) |
|                     | 5         | A                           | 10.0 (254) | 22.0 (559) |
|                     |           | B                           | 15.0 (381) | 12.0 (305) |
| Oversize            | 1-2       | —                           | 12.0 (318) | 39.0 (991) |
|                     | 3         | —                           | 11.0 (279) | 39.0 (991) |

#### Note

<sup>①</sup> Space is between disconnect switch or circuit breaker and starter.

**Vacuum Starter Pump Panels**



**Contents**

| <i><b>Description</b></i>  | <i><b>Page</b></i> |
|----------------------------|--------------------|
| Vacuum Starter Pump Panels |                    |
| Product Selection .....    | <b>V10-T6-16</b>   |
| Wiring Diagram .....       | <b>V10-T6-16</b>   |

**Freedom—Fusible Disconnect and Circuit Breaker**

**Product Description**

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECV54, 55 controllers have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the enclosure and are wired as illustrated on **Page V10-T6-16**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

| <i><b>Description</b></i>           | <i><b>Page</b></i> |
|-------------------------------------|--------------------|
| Kits .....                          | <b>V10-T6-5</b>    |
| Dimensions .....                    | <b>Tab 14</b>      |
| Accessories and Modifications ..... | <b>Tab 15</b>      |

#### Product Selection

##### Class ECV54—Combination Vacuum Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Fuse Clip Rating Amperes | Volts | With START Pushbutton Catalog Number |
|-----------|---------------|------------------|--------------------------|-------|--------------------------------------|
| 4         | 230           | 50               | 200                      | 250   | ECV5442BAH                           |
|           | 460           | 100              |                          | 600   | ECV5442CAJ                           |
| 5         | 230           | 100              | 400                      | 250   | ECV5452BAK                           |
|           | 460           | 200              |                          | 600   | ECV5452CAL                           |
| 6         | 230           | 200              | 600                      | 250   | ECV5462BAM                           |
|           | 460           | 400              |                          | 600   | ECV5462CAN                           |

##### Class ECV55—Combination Vacuum Pump Panel—Circuit Breaker

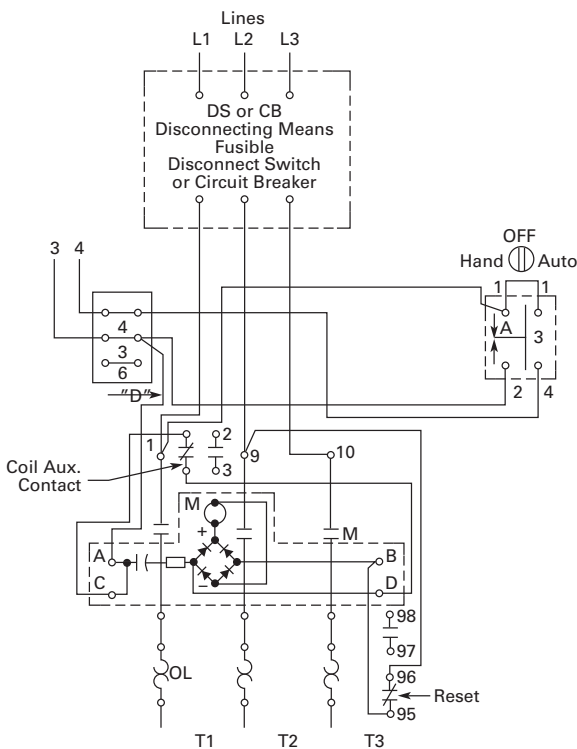
| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | With START Pushbutton Catalog Number |
|-----------|---------------|------------------|----------------------|--------------------------------------|
| 4         | 230           | 50               | 150A                 | ECV5542BAH                           |
|           | 460           | 100              |                      | ECV5542CAH                           |
| 5         | 230           | 75               | 250A                 | ECV5552BAJ                           |
|           |               | 100              | 400A                 | ECV5552BAK                           |
|           | 460           | 150              | 250A                 | ECV5552CAJ                           |
|           |               | 200              | 400A                 | ECV5552CAK                           |
| 6         | 230           | 200              | 600A                 | ECV5562BAL                           |
|           | 460           | 400              |                      | ECV5562CAL                           |

**Note**

Starters do not include heater packs. Select one carton of three heater packs. For heater pack selection, see Tab 15.

#### Wiring Diagram

##### Typical Wiring Diagram





Irrigation Pump Panel—C440 SSOL



**Contents**

| <b>Description</b>                          | <b>Page</b>      |
|---|------------------|
| Irrigation Pump Panels                      |                  |
| Catalog Number Selection .....              | <b>V10-T6-18</b> |
| Pump Panels—Interchangeable Heater Overload |                  |
| Product Selection .....                     | <b>V10-T6-19</b> |
| Pump Panels—Solid-State Overload            |                  |
| Product Selection .....                     | <b>V10-T6-20</b> |
| Wiring Diagram .....                        | <b>V10-T6-22</b> |

**Product Description**

Eaton’s irrigation pump controllers are combination starters designed to meet the requirements of the agricultural industry. The enclosure is UL Type 3R rated to provide weathertight protection and is available in two sizes. Irrigation application specific accessories and modifications are available to fit the customer’s requirements.

The irrigation pump panels use Freedom series motor starting technology to control motors up to 100 hp at 460V. These controllers have two styles of overload protection available, interchangeable heater and solid-state overload (SSOL).

**Features**

- The interchangeable heater overload (C306) uses individual heater packs to allow customers the ability to use various heater styles
- The solid-state overload relay (C440) provides enhanced protection and adjustment ranges as compared to bimetallic overload relays. Trip Class 10, 20, and 30 are available, along with a very wide trip current range to make setup very easy

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

|                                     |                 |
|-------------------------------------|-----------------|
| Kits .....                          | <b>V10-T6-5</b> |
| Dimensions .....                    | <b>Tab 14</b>   |
| Accessories and Modifications ..... | <b>Tab 15</b>   |

# 6.3

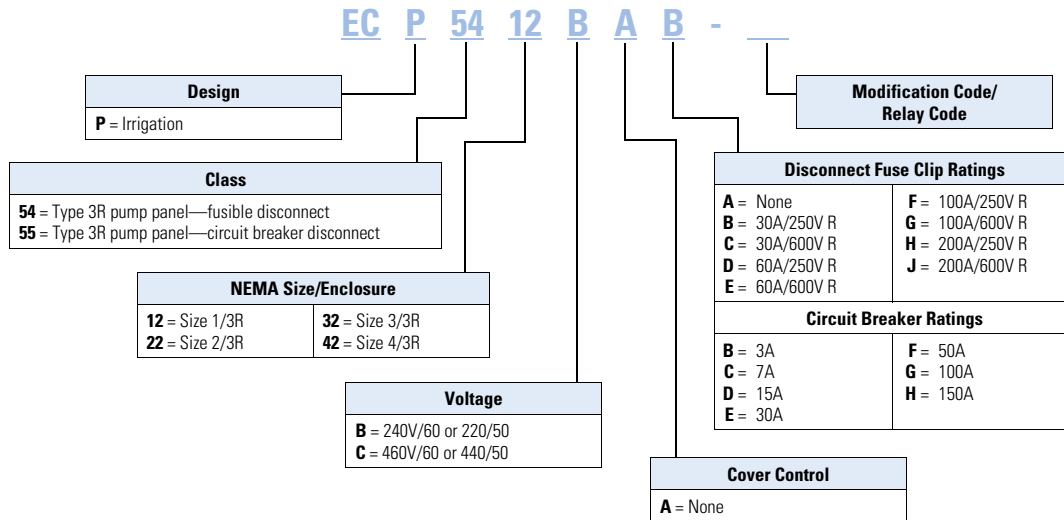
## Pump Panels

### Irrigation Pump Panels

#### Catalog Number Selection

##### Irrigation Pump Panel

6



## Pump Panels—Interchangeable Heater Overload

### Product Selection

Standard ECP54 controllers have a HAND/OFF/AUTO selector switch and START

pushbutton mounted on the enclosure and are wired as illustrated on **Page V10-T6-22**.

### Class ECP54—Combination Irrigation Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Standard Width Catalog Number |
|-----------|-----------------|------------------|--------------------|---------------|-------------------------------|
|           |                 |                  | Amperes            | Volts         |                               |
| 1 ③       | 230             | 7-1/2            | 30                 | 250           | ECP5412BAB                    |
|           | 460             | 10               |                    | 600           | ECP5412CAC                    |
|           | —               | —                | Not installed      | Not installed | ECP5412AAA                    |
| 2         | 230             | 15               | 60                 | 250           | ECP5422BAD                    |
|           | 460             | 25               |                    | 600           | ECP5422CAE                    |
|           | —               | —                | Not installed      | Not installed | ECP5422AAA                    |
| 3         | 230             | 30               | 100                | 250           | ECP5432BAF                    |
|           | 460             | 50               |                    | 600           | ECP5432CAG                    |
|           | —               | —                | Not installed      | Not installed | ECP5432AAA                    |

### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECP5412BAB to ECP5412DAB.

### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | A           |
| 240/60 or 220/50     | B           |
| 480/60 or 440/50     | C           |
| 600/60 or 550/50     | D           |
| 208/60               | E           |

### Fuse Clips

#### C351—Fuse Clip Selection—Three-Pole (Three Fuses)

| NEMA Size | Motor Voltage | Fuse Clip Rating Amperes | Volts | Fuse Clip Kit for Field Installation in Non-Fusible Starter |  |
|-----------|---------------|--------------------------|-------|---|--|
|           |               |                          |       | For Non-Rejection Type Fuses Catalog Number                 | For Use with "R" Rejection Type Fuses Catalog Number |
| 1         | 200/230       | 30                       | 250   | C351KC21  | C351KC21R  |
|           | 460-575       |                          | 600   | C351KD22-61   | C351KD22-61R   |
| 2         | 200           | 60                       | 250   | C351KD22-61   | C351KD22-61R   |
|           | 230           |                          |       | C351KD22-61   | C351KD22-61R   |
|           | 460-575       |                          |       | C351KD62  | C351KD62R  |
| 3         | 200           | 100                      | 250   | C351KE23-63   | C351KE23-63 ④  |
|           | 230           |                          |       | C351KE23-63   | C351KE23-63 ④  |
|           | 460-575       |                          | 600   | C351KE23-63   | C351KE23-63 ④  |

### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

- ① Dual element fuse ratings.
- ② Class R fuse clips.
- ③ For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) |                   |
|-----------|---------------------|-------------------|
|           | AC3/AC4             | Operations        |
| 1C        | 27/150              | 2,500,000/40,000  |
| 1         | 27/153              | 5,000,000/110,000 |

- ④ Fuse clip "R" rejection members for use with Class R fuses are supplied loose both in fuse clip kits and when fuse clips are factory installed.

## Pump Panels—Solid-State Overload

### Product Selection

#### Class ECP54—Combination Irrigation Pump Panel with Solid-State Overload—Fusible Disconnect <sup>①</sup>

| Motor Voltage | NEMA Size      | Maximum hp | Fuse Clip Amperes | Trip Range       | Catalog Number   |
|---------------|----------------|------------|-------------------|------------------|------------------|
| 240V          | 1 <sup>②</sup> | 1          | 30                | 1.0–5.0          | ECP5412BAB-R63/B |
|               |                | 3          |                   | 4–20             | ECP5412BAB-R63/C |
|               |                | 7-1/2      |                   | 9–45             | ECP5412BAB-R63/D |
|               | 2              | 10         | 60                | 9–45             | ECP5422BAD-R63/D |
|               |                | 15         |                   |                  | ECP5422BAD-R63/D |
|               | 3              | 25         | 100               | 20–100           | ECP5432BAF-R63/E |
| 480V          | 1 <sup>②</sup> | 1          | 30                | 1.0–5.0          | ECP5412CAC-R63/B |
|               |                | 2          |                   | ECP5412CAC-R63/B |                  |
|               |                | 5          |                   | 4–20             | ECP5412CAC-R63/C |
|               |                | 10         |                   | ECP5412CAC-R63/C |                  |
|               | 2              | 20         | 60                | 9–45             | ECP5422CAE-R63/D |
|               |                | 25         |                   |                  | ECP5422CAE-R63/D |
|               | 3              | 50         | 100               | 20–100           | ECP5432CAG-R63/E |

#### Class ECP55—Combination Irrigation Pump Panel with Solid-State Overload—Circuit Breaker <sup>①</sup>

| Motor Voltage | NEMA Size      | Maximum hp | Breaker Rating | Trip Range       | Catalog Number   |
|---------------|----------------|------------|----------------|------------------|------------------|
| 240V          | 1 <sup>②</sup> | 1          | 7              | 1.0–5.0          | ECP5512BAC-R63/B |
|               |                | 3          | 15             | 4–20             | ECP5512BAD-R63/C |
|               |                | 7-1/2      | 30             | 9–45             | ECP5512BAE-R63/D |
|               | 2              | 10         | 50             | 9–45             | ECP5522BAF-R63/D |
|               |                | 15         | 20–100         | ECP5522BAF-R63/E |                  |
|               | 3              | 25         | 100            | 20–100           | ECP5532BAG-R63/E |
|               | 4 <sup>②</sup> | 50         | 28–140         | ECP5532BAH-R63/F |                  |
| 480V          | 1 <sup>②</sup> | 1          | 30             | 1.0–5.0          | ECP5512CAB-R63/B |
|               |                | 2          |                | ECP5512CAC-R63/B |                  |
|               |                | 5          |                | 4–20             | ECP5512CAD-R63/C |
|               |                | 10         |                | ECP5512CAE-R63/C |                  |
|               | 2              | 20         | 60             | 9–45             | ECP5522CAE-R63/D |
|               |                | 25         |                |                  | ECP5522CAF-R63/D |
|               | 3              | 50         | 100            | 20–100           | ECP5532CAG-R63/E |
|               | 4 <sup>②</sup> | 100        | 150            | 28–140           | ECP5532CAG-R63/F |

#### Note

<sup>①</sup> Motor FLA based on NEC Table.

<sup>②</sup> For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

**Class ECP55—Combination Irrigation Pump Panel—Circuit Breaker**

| Motor Voltage | NEMA Size | Maximum hp | Breaker Rating | Catalog Number | Motor Voltage | NEMA Size | Maximum hp | Breaker Rating | Catalog Number |
|---------------|-----------|------------|----------------|----------------|---------------|-----------|------------|----------------|----------------|
| 240V          | 1 ①       | 1          | 7              | ECP5512BAC     | 480V          | 1 ①       | 1          | 3              | ECP5512CAB     |
|               |           | 3          | 15             | ECP5512BAD     |               |           | 3          | 7              | ECP5512CAC     |
|               |           | 7-1/2      | 30             | ECP5512BAE     |               |           | 5          | 15             | ECP5512CAD     |
|               | 2         | 10         | 50             | ECP5522BAF     |               | 2         | 10         | 30             | ECP5512CAE     |
|               |           | 15         | 70             | ECP5522BAW     |               |           | 10         | 30             | ECP5522CAE     |
|               | 3         | 25         | 100            | ECP5532BAG     |               | 25        | 50         | ECP5522CAF     |                |
|               | 4 ①       | 50         | 150            | ECP5542BAH     |               | 3         | 50         | 100            | ECP5532CAG     |
|               |           |            |                | 4 ①            | 100           | 175       | ECP5542CAN |                |                |

**Overload Relays**

**Freedom Solid-State Overload Relays**

| NEMA Size | Full Load Current Adjustment Range (A) | Three-Phase without Ground Fault                        | Three-Phase with Ground Fault                           |
|-----------|--|---|---|
|           |  | Auto/Manual Reset Overload<br>Selectable Class 10/20/30 | Auto/Manual Reset Overload<br>Selectable Class 10/20/30 |
| 00        | 0.33–1.65 ②                            | R63/A   | R64/A   |
|           | 1–5                                    | R63/B   | R64/B   |
|           | 4–20                                   | R63/C   | R64/C   |
| 0 and 1   | 0.33–1.65 ②                            | R63/A   | R64/A   |
|           | 1–5                                    | R63/B   | R64/B   |
|           | 4–20                                   | R63/C   | R64/C   |
|           | 9–45                                   | R63/D   | R64/D   |
| 2         | 9–45                                   | R63/D   | R64/D   |
| 3         | 20–100                                 | R63/E   | R64/E   |
| 4         | 28–140                                 | R63/F   | R64/F   |
| 5         | 60–300 ③                               | R63/G   | R64/G   |
| 6         | 120–600 ④                              | R63/H   | R64/H   |

**Notes**

① Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-**C60**).

**Compact NEMA Size 1 and Size 4 Starters  
Electrical Life at Rated Continuous Current**

| NEMA Size | Rated Current (Amp) |                   |
|-----------|---------------------|-------------------|
|           | AC3/AC4             | Operations        |
| 1C        | 27/150              | 2,500,000/40,000  |
| 1         | 27/153              | 5,000,000/110,000 |
| 4C        | 135/516             | 500,000/40,000    |
| 4         | 135/822             | 800,000/70,000    |

② Not UL Listed.

③ NEMA Size 5 starter available with 60–300A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

④ NEMA Size 6 starter available with 120–600A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

**Features:**

- Self powered
- Phase loss protection
- Current adjustment knob
- ±1% repeat accuracy
- 1NO and 1NC isolated contacts
- Predictive indication
- Enhanced protection and monitoring
- Communication capabilities

# 6.3

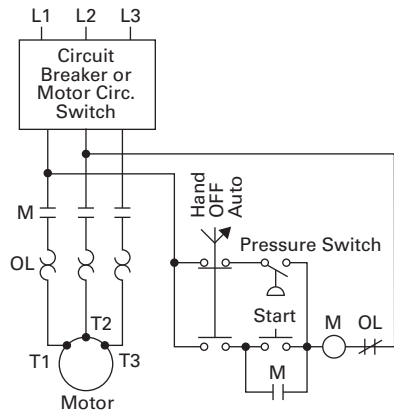
## Pump Panels

### Irrigation Pump Panels

#### Wiring Diagram

##### Typical Wiring Diagram

6



**Contents**

| <b>Description</b>             | <b>Page</b>      |
|--------------------------------|------------------|
| Duplex Pump Panels             |                  |
| Catalog Number Selection ..... | <b>V10-T6-24</b> |
| Cover Control .....            | <b>V10-T6-25</b> |
| Non-Combination                |                  |
| Features .....                 | <b>V10-T6-26</b> |
| Product Selection .....        | <b>V10-T6-26</b> |
| Combination                    |                  |
| Features .....                 | <b>V10-T6-27</b> |
| Product Selection .....        | <b>V10-T6-27</b> |

**Product Description**

Eaton’s duplex pump panels are controllers with or without disconnect, and designed to meet the requirement for two alternating pumps in critical installations. All duplex pump panels are provided standard with two three-phase magnetic starters and an automatic alternator to provide equal pump wear. During periods for heavy demand, both pumps will operate.

The enclosure options include UL Type 1, 12, 3R, or 4X.

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

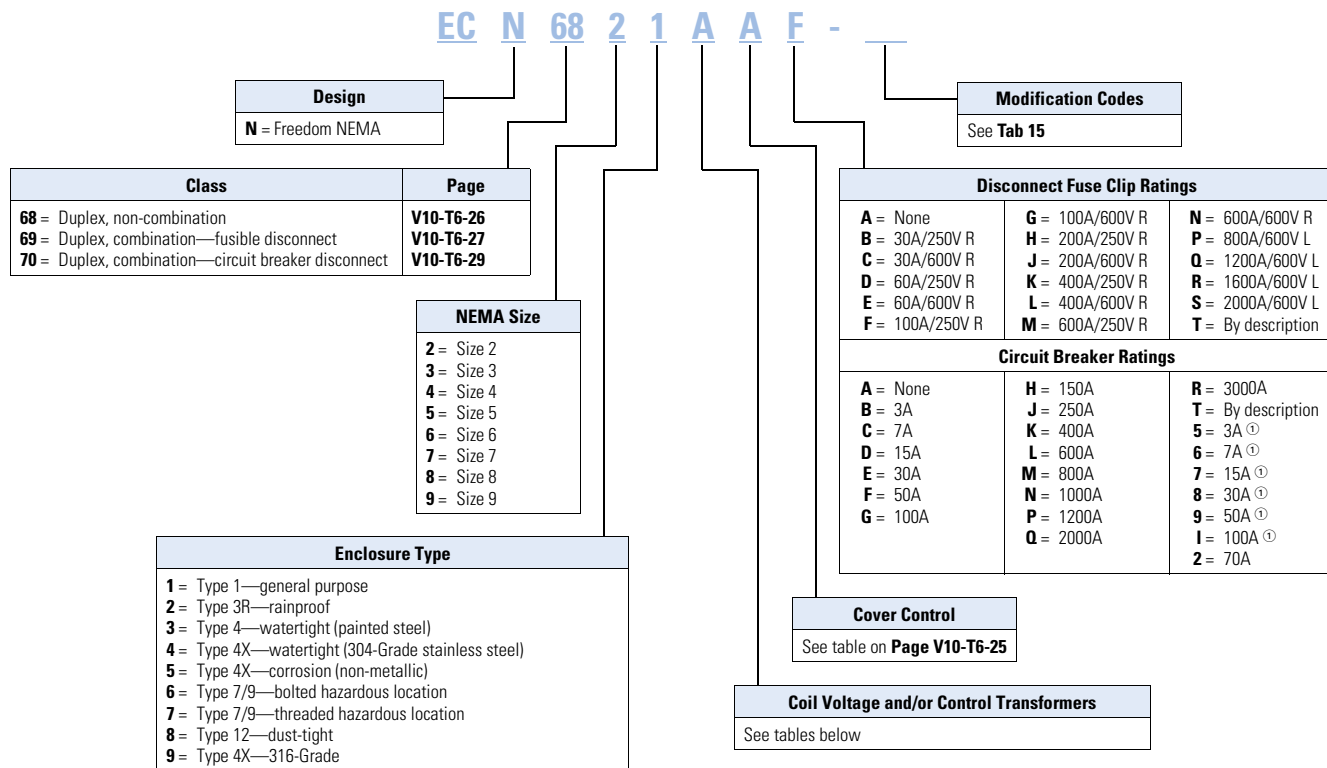
**Additional Reference**

|   |                  |
|---|------------------|
| Other Magnet Coils .....                | <b>V10-T6-24</b> |
| Cover Control .....                     | <b>V10-T6-25</b> |
| Dimensions .....                        | <b>Tab 14</b>    |
| Accessories and Modifications .....     | <b>Tab 15</b>    |
| Technical Data and Specifications ..... | <b>Tab 17</b>    |

### Catalog Number Selection

#### Freedom Duplex Pump Panels

6



#### Magnetic Coil Codes (System Voltage) ②

| Code | Magnet Coil  | Code | Magnet Coil | Code | Magnet Coil    |
|------|--------------|------|-------------|------|----------------|
| A    | 120/60110/50 | K    | 240/50      | U    | 24/50          |
| B    | 240/60220/50 | L    | 380/50      | V    | 32/50          |
| C    | 460/60440/50 | M    | 415/50      | W    | 48/60          |
| D    | 575/60550/50 | P    | 12 Vdc      | X    | 104–120/60     |
| E    | 208/60       | Q    | 24 Vdc      | Y    | 48/50          |
| G    | 550/50       | R    | 48 Vdc      | Z    | By description |
| H    | 277/60       | S    | 125 Vdc     |      |                |
| J    | 208–240/60   | T    | 24/60       |      |                |

#### Control Power Transformer Codes (System Voltage)

| Code | Primary                        | Secondary     |
|------|--------------------------------|---------------|
| B    | 240/480–220/440 wired for 240V | 120/60–110/50 |
| C    | 240/480–220/440 wired for 480V | 120/60–110/50 |
| D    | 600/60–550/50                  | 120/60–110/50 |
| E    | 208/60                         | 120/60        |
| H    | 277/60                         | 120/60        |
| L    | 380/50                         | 110/50        |
| M    | 415/50                         | 110/50        |
| Q    | 208/60                         | 24            |
| R    | 240/480–220/440 wired for 240V | 24            |
| S    | 240/480–220/440 wired for 480V | 24            |
| T    | 600/60                         | 24            |
| U    | 277/60                         | 24            |
| V    | 380/50                         | 24            |
| W    | 415/50                         | 24            |
| X    | 240/480/600 wired for 480V     | 120           |
| Y    | 240/480/600 wired for 480V     | 24            |
| Z    | By description                 | —             |

#### Notes

- ① Use for Sizes 0–3, HMCP 600V applications only.
- ② When control power transformer modification codes (C1–C11) are used or when starter class includes CPT (that is, ECN07, 18) see table to the right for system voltage code.



## Cover Control

### Non-Reversing

#### Flange Control Kits

For on-the-job conversion of Type 1, 3R, 4X and 12 enclosed starters. Knockouts are provided on the Type 1 flange. Type 3R, 4X and 12 have prepunched holes with removable hole plugs.

#### Factory Installed Pilot Devices

To order factory installed pilot devices, change the 9th character of the catalog number to the alpha shown in the table below. Example: to order an **ECN0514CAA** with START/STOP pushbuttons and a red pilot light, change the **A** to a **C**, for example, **ECN0514CCA**.

#### Type 1 Cover Control



#### All Other Cover Controls



### Non-Reversing Cover Control

| Description                    | Factory Installed Flange Control |                          |              | Field Installation Kits                 |                             |
|--------------------------------|----------------------------------|--------------------------|--------------|---|-----------------------------|
|                                | Position 9 Alpha                 | Type 1 Non-Combination ① | All Others ② | Type 1 Non-Combination ① Catalog Number | All Others ② Catalog Number |
| No cover mounted pilot devices | A                                | ■                        | ■            | C400GK0                                 | —                           |
| START/STOP pushbuttons         | B                                | ■                        | ■            | C400GK1                                 | C400T1                      |
| With red RUN pilot light       | C                                | ■                        | ■            | C400GK12 ③                              | —                           |
| With red RUN/green OFF lights  | D                                | ■                        | ■            | C400GK16 ③                              | —                           |
| ON/OFF pushbuttons             | E                                | —                        | ■            | —                                       | C400T2                      |
| With red RUN pilot light       | F                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | G                                | —                        | ■            | —                                       | —                           |
| HAND/OFF/AUTO selector switch  | H                                | ■                        | ■            | C400GK3                                 | C400T12                     |
| With red RUN pilot light       | J                                | ■                        | ■            | C400GK32 ③                              | —                           |
| With red RUN/green OFF lights  | K                                | ■                        | ■            | C400GK36 ③                              | —                           |
| START pushbutton               | L                                | —                        | ■            | —                                       | C400T3                      |
| ON pushbutton                  | M                                | —                        | ■            | —                                       | C400T4                      |
| OFF pushbutton                 | N                                | —                        | ■            | —                                       | C400T5                      |
| Red RUN pilot light            | P                                | ■                        | ■            | C400GK42 ③                              | C400T9 ③                    |
| Green OFF                      | Q                                | ■                        | ■            | C400GK41 ③                              | C400T10 ③                   |
| Red RUN/green OFF pilot lights | R                                | ■                        | ■            | C400GK46 ③                              | C400T11 ③                   |
| START/STOP selector switch     | S                                | —                        | ■            | —                                       | C400T13                     |
| With red RUN pilot light       | T                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | U                                | —                        | ■            | —                                       | —                           |
| ON/OFF selector switch         | V                                | —                        | ■            | —                                       | C400T14                     |
| With red RUN pilot light       | W                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | X                                | —                        | ■            | —                                       | —                           |

#### Notes

- ① Type 1, NEMA Sizes 00–4 non-combination ONLY.
- ② Type 1, NEMA Sizes 5–9 non-combination PLUS all Type 3R, 4X, 12 non-combination PLUS all combination—NEMA sizes only.
- ③ Add code letter from the table below to catalog number for voltage—kits only. Example: C400T9B.

| Rating     | Code Letter | Rating     | Code Letter | Rating     | Code Letter |
|------------|-------------|------------|-------------|------------|-------------|
| 120V 60 Hz | A           | 240V 60 Hz | B           | 480V 60 Hz | C           |
| 208V 60 Hz | E           | 380V 50 Hz | L           | 600V 60 Hz | D           |

## Non-Combination

### Features

- Full voltage non-reversing non-combination
- Three-phase magnetic, three-pole
- Interchangeable heater OLR
- 600V maximum

### Alternator

In normal operation, the alternator automatically selects alternate pumps for each succeeding cycle to equalize pump wear. During periods of heavy demand, both pumps will operate.

## Product Selection

### Class ECN68—Non-Combination Duplex Pump Panels with Automatic Alternator <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating | Magnet Coil Voltage | Type 1 General Purpose Catalog Number | Type 3R Rainproof Catalog Number | Type 4X <sup>③</sup> Watertight and Dust-Tight Stainless Steel Catalog Number | Type 12 Dust-Tight Industrial External Reset <sup>④</sup> Catalog Number | Component Starter (Open) <sup>⑤</sup> Catalog Number |
|-----------|---------------|----------------|---------------------|---------------------------------------|----------------------------------|---|--|--|
| 0         | —             | —              | 120                 | ECN6801AAA                            | ECN6802AAA                       | ECN6804AAA  | ECN6808AAA   | AN16BN0AC  |
|           | 200           | 3              | 208                 | ECN6801EAA                            | ECN6802EAA                       | ECN6804EAA  | ECN6808EAA   | AN16BN0EC  |
|           | 230           |                | 240                 | ECN6801BAA                            | ECN6802BAA                       | ECN6804BAA  | ECN6808BAA   | AN16BN0BC  |
|           | 460           | 5              | 480                 | ECN6801CAA                            | ECN6802CAA                       | ECN6804CAA  | ECN6808CAA   | AN16BN0CC  |
|           | 575           |                | 600                 | ECN6801DAA                            | ECN6802DAA                       | ECN6804DAA  | ECN6808DAA   | AN16BN0DC  |
| 1         | —             | —              | 120                 | ECN6811AAA                            | ECN6812AAA                       | ECN6814AAA  | ECN6818AAA   | AN16DN0AB  |
|           | 200           | 7-1/2          | 208                 | ECN6811EAA                            | ECN6812EAA                       | ECN6814EAA  | ECN6818EAA   | AN16DN0EB  |
|           | 230           |                | 240                 | ECN6811BAA                            | ECN6812BAA                       | ECN6814BAA  | ECN6818BAA   | AN16DN0BB  |
|           | 460           | 10             | 480                 | ECN6811CAA                            | ECN6812CAA                       | ECN6814CAA  | ECN6818CAA   | AN16DN0CB  |
|           | 575           |                | 600                 | ECN6811DAA                            | ECN6812DAA                       | ECN6814DAA  | ECN6818DAA   | AN16DN0DB  |
| 2         | —             | —              | 120                 | ECN6821AAA                            | ECN6822AAA                       | ECN6824AAA  | ECN6828AAA   | AN16GN0AB  |
|           | 200           | 10             | 208                 | ECN6821EAA                            | ECN6822EAA                       | ECN6824EAA  | ECN6828EAA   | AN16GN0EB  |
|           | 230           | 15             | 240                 | ECN6821BAA                            | ECN6822BAA                       | ECN6824BAA  | ECN6828BAA   | AN16GN0BB  |
|           | 460           | 25             | 480                 | ECN6821CAA                            | ECN6822CAA                       | ECN6824CAA  | ECN6828CAA   | AN16GN0CB  |
|           | 575           |                | 600                 | ECN6821DAA                            | ECN6822DAA                       | ECN6824DAA  | ECN6828DAA   | AN16GN0DB  |
| 3         | —             | —              | 120                 | ECN6831AAA                            | ECN6832AAA                       | ECN6834AAA  | ECN6838AAA   | AN16KN0A   |
|           | 200           | 25             | 208                 | ECN6831EAA                            | ECN6832EAA                       | ECN6834EAA  | ECN6838EAA   | AN16KN0E   |
|           | 230           | 30             | 240                 | ECN6831BAA                            | ECN6832BAA                       | ECN6834BAA  | ECN6838BAA   | AN16KN0B   |
|           | 460           | 50             | 480                 | ECN6831CAA                            | ECN6832CAA                       | ECN6834CAA  | ECN6838CAA   | AN16KN0C   |
|           | 575           |                | 600                 | ECN6831DAA                            | ECN6832DAA                       | ECN6834DAA  | ECN6838DAA   | AN16KN0D   |
| 4         | —             | —              | 120                 | ECN6841AAA                            | ECN6842AAA                       | ECN6844AAA  | ECN6848AAA   | AN16NN0A   |
|           | 200           | 40             | 208                 | ECN6841EAA                            | ECN6842EAA                       | ECN6844EAA  | ECN6848EAA   | AN16NN0E   |
|           | 230           | 50             | 240                 | ECN6841BAA                            | ECN6842BAA                       | ECN6844BAA  | ECN6848BAA   | AN16NN0B   |
|           | 460           | 100            | 480                 | ECN6841CAA                            | ECN6842CAA                       | ECN6844CAA  | ECN6848CAA   | AN16NN0C   |
|           | 575           |                | 600                 | ECN6841DAA                            | ECN6842DAA                       | ECN6844DAA  | ECN6848DAA   | AN16NN0D   |

### Notes

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

① Circuitry arranged for two-pole pilot devices.

② All duplexes come standard with alternator. To remove, add modification code **D12**.

③ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6804AAA. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.

⑤ Requires two starters.

**Combination**

**Features**

- Full voltage non-reversing combination
- Three-phase magnetic, three-pole
- Interchangeable heater OLR
- 600V maximum

**Alternator**

In normal operation, the alternator automatically selects alternate pumps for each succeeding cycle to equalize pump wear. During periods of heavy demand, both pumps will operate.

**Product Selection**

**Class ECN69—Combination Duplex Pump Panels with Automatic Alternator—Fusible Disconnect** <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating<br>Dual Element Fuses | Magnet Coil Voltage<br>③ | Fuse Clip Amps. | Type 1<br>General Purpose<br>Catalog Number | Type 3R<br>Rainproof<br>Catalog Number | Type 4X ④<br>Watertight and<br>Dust-Tight<br>Stainless Steel<br>Catalog Number | Type 12<br>Dust-Tight<br>Industrial<br>External Reset ⑤⑥ | Component<br>Starter (Open) ⑦<br>Catalog Number |
|-----------|---------------|--------------------------------------|--------------------------|-----------------|---|--|--|--|---|
| 0         | 230           | 3                                    | 120                      | 30A             | ECN6901AAB                                  | ECN6902AAB                             | ECN6904AAB   | ECN6908AAB   | AN16BN0AC                                       |
|           | 460           | 5                                    |                          |                 | ECN6901AAC                                  | ECN6902AAC                             | ECN6904AAC   | ECN6908AAC   | AN16BN0AC                                       |
|           | 200           | 3                                    | 208                      |                 | ECN6901EAB                                  | ECN6902EAB                             | ECN6904EAB   | ECN6908EAB   | AN16BN0EC                                       |
|           | 230           |                                      | 240                      |                 | ECN6901BAB                                  | ECN6902BAB                             | ECN6904BAB   | ECN6908BAB   | AN16BN0BC                                       |
|           | 460           | 5                                    | 480                      |                 | ECN6901CAC                                  | ECN6902CAC                             | ECN6904CAC   | ECN6908CAC   | AN16BN0CC                                       |
|           | 575           |                                      | 600                      |                 | ECN6901DAC                                  | ECN6902DAC                             | ECN6904DAC   | ECN6908DAC   | AN16BN0DC                                       |
| 1         | 230           | 7-1/2                                | 120                      | 30A             | ECN6911AAB                                  | ECN6912AAB                             | ECN6914AAB   | ECN6918AAB   | AN16DN0AB                                       |
|           | 460           | 10                                   |                          |                 | ECN6911AAC                                  | ECN6912AAC                             | ECN6914AAC   | ECN6918AAC   | AN16DN0AB                                       |
|           | 200           | 7-1/2                                | 208                      |                 | ECN6911EAB                                  | ECN6912EAB                             | ECN6914EAB   | ECN6918EAB   | AN16DN0EB                                       |
|           | 230           |                                      | 240                      |                 | ECN6911BAB                                  | ECN6912BAB                             | ECN6914BAB   | ECN6918BAB   | AN16DN0BB                                       |
|           | 460           | 10                                   | 480                      |                 | ECN6911CAC                                  | ECN6912CAC                             | ECN6914CAC   | ECN6918CAC   | AN16DN0CB                                       |
|           | 575           |                                      | 600                      |                 | ECN6911DAC                                  | ECN6912DAC                             | ECN6914DAC   | ECN6918DAC   | AN16DN0DB                                       |
| 2         | 230           | 15                                   | 120                      | 60A             | ECN6921AAD                                  | ECN6922AAD                             | ECN6924AAD   | ECN6928AAD   | AN16GN0AB                                       |
|           | 460           | 25                                   |                          |                 | ECN6921AAE                                  | ECN6922AAE                             | ECN6924AAE   | ECN6928AAE   | AN16GN0AB                                       |
|           | 200           | 10                                   | 208                      |                 | ECN6921EAD                                  | ECN6922EAD                             | ECN6924EAD   | ECN6928EAD   | AN16GN0EB                                       |
|           | 230           | 15                                   | 240                      |                 | ECN6921BAD                                  | ECN6922BAD                             | ECN6924BAD   | ECN6928BAD   | AN16GN0BB                                       |
|           | 460           | 25                                   | 480                      |                 | ECN6921CAE                                  | ECN6922CAE                             | ECN6924CAE   | ECN6928CAE   | AN16GN0CB                                       |
|           | 575           |                                      | 600                      |                 | ECN6921DAE                                  | ECN6922DAE                             | ECN6924DAE   | ECN6928DAE   | AN16GN0DB                                       |
| 3         | 230           | 30                                   | 120                      | 100A            | ECN6931AAF                                  | ECN6932AAF                             | ECN6934AAF   | ECN6938AAF   | AN16KN0A  |
|           | 460           | 50                                   |                          |                 | ECN6931AAG                                  | ECN6932AAG                             | ECN6934AAG   | ECN6938AAG   | AN16KN0A  |
|           | 200           | 25                                   | 208                      |                 | ECN6931EAF                                  | ECN6932EAF                             | ECN6934EAF   | ECN6938EAF   | AN16KN0E  |
|           | 230           | 30                                   | 240                      |                 | ECN6931BAF                                  | ECN6932BAF                             | ECN6934BAF   | ECN6938BAF   | AN16KN0B  |
|           | 460           | 50                                   | 480                      |                 | ECN6931CAG                                  | ECN6932CAG                             | ECN6934CAG   | ECN6938CAG   | AN16KN0C  |
|           | 575           |                                      | 600                      |                 | ECN6931DAG                                  | ECN6932DAG                             | ECN6934DAG   | ECN6938DAG   | AN16KN0D  |
| 4         | 230           | 50                                   | 120                      | 200A            | ECN6941AAH                                  | ECN6942AAH                             | ECN6944AAH   | ECN6948AAH   | AN16NN0A  |
|           | 460           | 100                                  |                          |                 | ECN6941AAJ                                  | ECN6942AAJ                             | ECN6944AAJ   | ECN6948AAJ   | AN16NN0A  |
|           | 200           | 40                                   | 208                      |                 | ECN6941EAH                                  | ECN6942EAH                             | ECN6944EAH   | ECN6948EAH   | AN16NN0E  |
|           | 230           | 50                                   | 240                      |                 | ECN6941BAH                                  | ECN6942BAH                             | ECN6944BAH   | ECN6948BAH   | AN16NN0B  |
|           | 460           | 100                                  | 480                      |                 | ECN6941CAJ                                  | ECN6942CAJ                             | ECN6944CAJ   | ECN6948CAJ   | AN16NN0C  |
|           | 575           |                                      | 600                      |                 | ECN6941DAJ                                  | ECN6942DAJ                             | ECN6944DAJ   | ECN6948DAJ   | AN16NN0D  |

**Notes**

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ For 200V and 575V motors—starters with 120V coil (for separate control) are available. To order, substitute the letter **A** for the eighth character of the listed catalog number.
- ④ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6904AAB. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ⑤ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑥ Type 12 enclosure is without safety door interlock.
- ⑦ Requires two starters.

#### Class ECN69—Combination Duplex Pump Panels with Automatic Alternator—Non-Fusible Disconnect <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating<br>Dual Element Fuses | Magnet Coil Voltage | Disconnect Amps. | Type 1<br>General Purpose<br>Catalog Number | Type 3R<br>Rainproof<br>Catalog Number | Type 4X <sup>③</sup><br>Watertight and<br>Dust-Tight<br>Stainless Steel<br>Catalog Number | Type 12<br>Dust-Tight<br>Industrial<br>External Reset <sup>④⑤</sup><br>Catalog Number | Component<br>Starter (Open) <sup>⑥</sup><br>Catalog Number |
|-----------|---------------|--------------------------------------|---------------------|------------------|---|--|---|---|--|
| 0         | —             | —                                    | 120                 | 30A              | ECN6901AAA                                  | ECN6902AAA                             | ECN6904AAA  | ECN6908AAA  | AN16BN0AC  |
|           | 200           | 3                                    | 208                 |                  | ECN6901EAA                                  | ECN6902EAA                             | ECN6904EAA  | ECN6908EAA  | AN16BN0EC  |
|           | 230           |                                      | 240                 |                  | ECN6901BAA                                  | ECN6902BAA                             | ECN6904BAA  | ECN6908BAA  | AN16BN0BC  |
|           | 460           | 5                                    | 480                 |                  | ECN6901CAA                                  | ECN6902CAA                             | ECN6904CAA  | ECN6908CAA  | AN16BN0CC  |
|           | 575           |                                      | 600                 |                  | ECN6901DAA                                  | ECN6902DAA                             | ECN6904DAA  | ECN6908DAA  | AN16BN0DC  |
| 1         | —             | —                                    | 120                 | 30A              | ECN6911AAA                                  | ECN6912AAA                             | ECN6914AAA  | ECN6918AAA  | AN16DN0AB  |
|           | 200           | 7-1/2                                | 208                 |                  | ECN6911EAA                                  | ECN6912EAA                             | ECN6914EAA  | ECN6918EAA  | AN16DN0EB  |
|           | 230           |                                      | 240                 |                  | ECN6911BAA                                  | ECN6912BAA                             | ECN6914BAA  | ECN6918BAA  | AN16DN0BB  |
|           | 460           | 10                                   | 480                 |                  | ECN6911CAA                                  | ECN6912CAA                             | ECN6914CAA  | ECN6918CAA  | AN16DN0CB  |
|           | 575           |                                      | 600                 |                  | ECN6911DAA                                  | ECN6912DAA                             | ECN6914DAA  | ECN6918DAA  | AN16DN0DB  |
| 2         | —             | —                                    | 120                 | 60A              | ECN6921AAA                                  | ECN6922AAA                             | ECN6924AAA  | ECN6928AAA  | AN16GN0AB  |
|           | 200           | 10                                   | 208                 |                  | ECN6921EAA                                  | ECN6922EAA                             | ECN6924EAA  | ECN6928EAA  | AN16GN0EB  |
|           | 230           | 15                                   | 240                 |                  | ECN6921BAA                                  | ECN6922BAA                             | ECN6924BAA  | ECN6928BAA  | AN16GN0BB  |
|           | 460           | 25                                   | 480                 |                  | ECN6921CAA                                  | ECN6922CAA                             | ECN6924CAA  | ECN6928CAA  | AN16GN0CB  |
|           | 575           |                                      | 600                 |                  | ECN6921DAA                                  | ECN6922DAA                             | ECN6924DAA  | ECN6928DAA  | AN16GN0DB  |
| 3         | —             | —                                    | 120                 | 100A             | ECN6931AAA                                  | ECN6932AAA                             | ECN6934AAA  | ECN6938AAA  | AN16KN0A   |
|           | 200           | 25                                   | 208                 |                  | ECN6931EAA                                  | ECN6932EAA                             | ECN6934EAA  | ECN6938EAA  | AN16KN0E   |
|           | 230           | 30                                   | 240                 |                  | ECN6931BAA                                  | ECN6932BAA                             | ECN6934BAA  | ECN6938BAA  | AN16KN0B   |
|           | 460           | 50                                   | 480                 |                  | ECN6931CAA                                  | ECN6932CAA                             | ECN6934CAA  | ECN6938CAA  | AN16KN0C   |
|           | 575           |                                      | 600                 |                  | ECN6931DAA                                  | ECN6932DAA                             | ECN6934DAA  | ECN6938DAA  | AN16KN0D   |
| 4         | —             | —                                    | 120                 | 200A             | ECN6941AAA                                  | ECN6942AAA                             | ECN6944AAA  | ECN6948AAA  | AN16NN0A   |
|           | 200           | 40                                   | 208                 |                  | ECN6941EAA                                  | ECN6942EAA                             | ECN6944EAA  | ECN6948EAA  | AN16NN0E   |
|           | 230           | 50                                   | 240                 |                  | ECN6941BAA                                  | ECN6942BAA                             | ECN6944BAA  | ECN6948BAA  | AN16NN0B   |
|           | 460           | 100                                  | 480                 |                  | ECN6941CAA                                  | ECN6942CAA                             | ECN6944CAA  | ECN6948CAA  | AN16NN0C   |
|           | 575           |                                      | 600                 |                  | ECN6941DAA                                  | ECN6942DAA                             | ECN6944DAA  | ECN6948DAA  | AN16NN0D   |

#### Notes

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6904AAA. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ④ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑤ Type 12 enclosure is without safety door interlock.
- ⑥ Requires two starters.

**Class ECN70—Combination Duplex Pump Panels with Automatic Alternator—Circuit Breaker** <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating | Magnet Coil Voltage <sup>③</sup> | Circuit Breaker Size | Type 1 General Purpose Catalog Number | Type 3R Rainproof Catalog Number | Type 4X <sup>④</sup> Watertight and Dust-Tight Stainless Steel Catalog Number | Type 12 Dust-Tight Industrial External Reset <sup>⑤⑥</sup> Catalog Number | Component Starter (Open) <sup>⑦</sup> Catalog Number |           |
|-----------|---------------|----------------|----------------------------------|----------------------|---------------------------------------|----------------------------------|---|---|--|-----------|
| 0         | 200           | 1              | 208                              | 7A                   | ECN7001EAC                            | ECN7002EAC                       | ECN7004EAC  | ECN7008EAC  | AN16BN0EC  |           |
|           |               | 3              |                                  | 15A                  | ECN7001EAD                            | ECN7002EAD                       | ECN7004EAD  | ECN7008EAD  |  |           |
|           | 230           | 1              | 240                              | 7A                   | ECN7001BAC                            | ECN7002BAC                       | ECN7004BAC  | ECN7008BAC  | AN16BN0BC  |           |
|           |               | 3              |                                  | 15A                  | ECN7001BAD                            | ECN7002BAD                       | ECN7004BAD  | ECN7008BAD  |  |           |
|           | 460           | 3/4            | 480                              | 3A                   | ECN7001CAB                            | ECN7002CAB                       | ECN7004CAB  | ECN7008CAB  | AN16BN0CC  |           |
|           |               | 2              |                                  | 7A                   | ECN7001CAC                            | ECN7002CAC                       | ECN7004CAC  | ECN7008CAC  |  |           |
|           |               | 5              |                                  | 15A                  | ECN7001CAD                            | ECN7002CAD                       | ECN7004CAD  | ECN7008CAD  |  |           |
|           | 575           | 1              | 600                              | 3A                   | ECN7001DAB                            | ECN7002DAB                       | ECN7004DAB  | ECN7008DAB  | AN16BN0DC  |           |
|           |               | 3              |                                  | 7A                   | ECN7001DAC                            | ECN7002DAC                       | ECN7004DAC  | ECN7008DAC  |  |           |
|           |               |                |                                  | 15A                  | ECN7001DAD                            | ECN7002DAD                       | ECN7004DAD  | ECN7008DAD  |  |           |
|           | 1             | 200            | 1                                | 208                  | 7A                                    | ECN7011EAC                       | ECN7012EAC  | ECN7014EAC  | ECN7018EAC   | AN16DN0EB |
|           |               |                | 2                                |                      | 15A                                   | ECN7011EAD                       | ECN7012EAD  | ECN7014EAD  | ECN7018EAD   |           |
| 7-1/2     |               |                | 30A                              |                      | ECN7011EAE                            | ECN7012EAE                       | ECN7014EAE  | ECN7018EAE  |  |           |
| 230       |               | 1              | 240                              | 7A                   | ECN7011BAC                            | ECN7012BAC                       | ECN7014BAC  | ECN7018BAC  | AN16DN0BB  |           |
|           |               | 2              |                                  | 15A                  | ECN7011BAD                            | ECN7012BAD                       | ECN7014BAD  | ECN7018BAD  |  |           |
|           |               | 7-1/2          |                                  | 30A                  | ECN7011BAE                            | ECN7012BAE                       | ECN7014BAE  | ECN7018BAE  |  |           |
| 460       |               | 3/4            | 480                              | 3A                   | ECN7011CAB                            | ECN7012CAB                       | ECN7014CAB  | ECN7018CAB  | AN16DN0CB  |           |
|           |               | 2              |                                  | 7A                   | ECN7011CAC                            | ECN7012CAC                       | ECN7014CAC  | ECN7018CAC  |  |           |
|           |               | 5              |                                  | 15A                  | ECN7011CAD                            | ECN7012CAD                       | ECN7014CAD  | ECN7018CAD  |  |           |
|           |               | 10             |                                  | 30A                  | ECN7011CAE                            | ECN7012CAE                       | ECN7014CAE  | ECN7018CAE  |  |           |
| 575       |               | 1              | 600                              | 3A                   | ECN7011DAB                            | ECN7012DAB                       | ECN7014DAB  | ECN7018DAB  | AN16DN0DB  |           |
|           |               | 3              |                                  | 7A                   | ECN7011DAC                            | ECN7012DAC                       | ECN7014DAC  | ECN7018DAC  |  |           |
|           |               | 7-1/2          |                                  | 15A                  | ECN7011DAD                            | ECN7012DAD                       | ECN7014DAD  | ECN7018DAD  |  |           |
|           |               | 10             |                                  | 30A                  | ECN7011DAE                            | ECN7012DAE                       | ECN7014DAE  | ECN7018DAE  |  |           |
| 2         |               | 200            | 10                               | 208                  | 50A                                   | ECN7021EAF                       | ECN7022EAF  | ECN7024EAF  | ECN7028EAF   | AN16GN0EB |
|           |               | 230            | 15                               |                      | 240                                   | ECN7021BAF                       | ECN7022BAF  | ECN7024BAF  | ECN7028BAF   | AN16GN0BB |
|           |               | 460            | 25                               |                      | 480                                   | ECN7021CAF                       | ECN7022CAF  | ECN7024CAF  | ECN7028CAF   | AN16GN0CB |
|           |               | 575            |                                  |                      | 600                                   | ECN7021DAF                       | ECN7022DAF  | ECN7024DAF  | ECN7028DAF   | AN16GN0DB |
| 3         | 200           | 25             | 208                              | 100A                 | ECN7031EAG                            | ECN7032EAG                       | ECN7034EAG  | ECN7038EAG  | AN16KN0E   |           |
|           | 230           | 30             |                                  | 240                  | ECN7031BAG                            | ECN7032BAG                       | ECN7034BAG  | ECN7038BAG  | AN16KN0B   |           |
|           | 460           | 50             |                                  | 480                  | ECN7031CAG                            | ECN7032CAG                       | ECN7034CAG  | ECN7038CAG  | AN16KN0C   |           |
|           | 575           |                |                                  | 600                  | ECN7031DAI                            | ECN7032DAI                       | ECN7034DAI  | ECN7038DAI  | AN16KN0D   |           |
| 4         | 200           | 40             | 208                              | 150A                 | ECN7041EAH                            | ECN7042EAH                       | ECN7044EAH  | ECN7048EAH  | AN16NN0E   |           |
|           | 230           | 50             |                                  | 240                  | ECN7041BAH                            | ECN7042BAH                       | ECN7044BAH  | ECN7048BAH  | AN16NN0B   |           |
|           | 460           | 100            |                                  | 480                  | ECN7041CAH                            | ECN7042CAH                       | ECN7044CAH  | ECN7048CAH  | AN16NN0C   |           |
|           | 575           |                |                                  | 600                  | ECN7041DAH                            | ECN7042DAH                       | ECN7044DAH  | ECN7048DAH  | AN16NN0D   |           |

**Notes**

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ For 200V and 575V motors—starters with 120V coil (for separate control) are available. To order, substitute the letter **A** for the eighth character of the listed catalog number.
- ④ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit.  
Example: ECN7004EAC. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ⑤ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑥ Type 12 enclosure is without safety door interlock.
- ⑦ Requires two starters.

**Type 3R Industrial Pump Panel—C440 SSOL**



**Narrow Enclosure Pump Panel**



**Irrigation Pump Panel—C440 SSOL**



**A200 Pump Panel**



## 6.1 Industrial Pump Panels

|                            |           |
|----------------------------|-----------|
| Product Overview           | V10-T6-2  |
| Freedom—Fusible Disconnect | V10-T6-7  |
| Freedom—Circuit Breaker    | V10-T6-9  |
| A200—Fusible Disconnect    | V10-T6-11 |
| A200—Circuit Breaker       | V10-T6-13 |

## 6.2 Vacuum Starter Pump Panels

|  |           |
|--|-----------|
| Freedom—Fusible Disconnect and Circuit Breaker |           |
| Product Description                            | V10-T6-15 |
| Standards and Certifications                   | V10-T6-15 |
| Additional Reference                           | V10-T6-15 |
| Product Selection                              | V10-T6-16 |
| Wiring Diagram                                 | V10-T6-16 |

## 6.3 Irrigation Pump Panels

|   |           |
|---|-----------|
| Product Description                         | V10-T6-17 |
| Features                                    | V10-T6-17 |
| Standards and Certifications                | V10-T6-17 |
| Additional Reference                        | V10-T6-17 |
| Catalog Number Selection                    | V10-T6-18 |
| Pump Panels—Interchangeable Heater Overload | V10-T6-19 |
| Pump Panels—Solid-State Overload            | V10-T6-20 |

## 6.4 Duplex Pump Panels

|                              |           |
|------------------------------|-----------|
| Product Description          | V10-T6-23 |
| Standards and Certifications | V10-T6-23 |
| Additional Reference         | V10-T6-23 |
| Catalog Number Selection     | V10-T6-24 |
| Cover Control                | V10-T6-25 |
| Non-Combination              | V10-T6-26 |
| Combination                  | V10-T6-27 |

## Industrial Pump Panels



6

## Product Overview

### Product Description

Eaton's pump controllers are combination starters with accessories and modifications designed to meet the particular requirements of the irrigation, oil well, gas and other pump application industries. The enclosure is Type 3R to provide weather-tight protection and is available in several sizes, depending on the customer's control option requirements. The disconnect, contactor and overload relay are the same as used in Freedom lines of combination starters. These controllers are available in standard full voltage as well as reduced voltage configurations, with vacuum contactors as well as the standard electromechanical contactors.

Eaton's revolutionary design for soft starters is shown in the S801+ and S811+ soft starter products which are members of the Intelligent Technologies (*IT.*) family of products. These reduced voltage soft starters are the most compact, multi-functional, easy-to-install products on the market. Their superiority begins with the control package, which features 24 Vdc control, onboard Digital Signal Processor (DSP), and use of a low impedance run contactor, all of which contribute to the *IT.* soft starter's safety, advanced functionality and compact size.

## Contents

### Description

|                                    | <i>Page</i>      |
|------------------------------------|------------------|
| Industrial Pump Panels             |                  |
| Standards and Certifications ..... | <b>V10-T6-3</b>  |
| Additional Reference .....         | <b>V10-T6-3</b>  |
| Catalog Number Selection .....     | <b>V10-T6-4</b>  |
| Accessories .....                  | <b>V10-T6-5</b>  |
| Freedom—Fusible Disconnect .....   | <b>V10-T6-7</b>  |
| Freedom—Circuit Breaker .....      | <b>V10-T6-9</b>  |
| A200—Fusible Disconnect .....      | <b>V10-T6-11</b> |
| A200—Circuit Breaker .....         | <b>V10-T6-13</b> |

### Features

The Freedom series starters are available in either fusible or circuit breaker types utilizing Type 3R rainproof and sleet resistant enclosures. Convenient straight-through wiring with top line connections and bottom load connections features easily accessible pressure connections for line, load and control. Starter and disconnect are factory wired.

- **Motor Circuit Switch**—Long life, heavy-duty, quick acting, double break action. Positive ON and positive OFF available in either fusible or non-fusible versions. Fuse clip kits are available for field installation and can be converted in the field for maximum job flexibility
- **Motor Circuit Protector**—Similar to a magnetic trip only circuit breaker. Features an adjustable magnetic trip characteristic for accurate, dependable fault protection and simultaneous trip of all poles to prevent single phasing
- **Overload Relay**—Freedom overload relays with trip indication feature bimetallic type operation with ambient compensation and a choice of either manual or automatic reset  
C440 electronic overload relays are available up to 100A as a self-powered, self-contained unit. With external CTs, C440 can protect motor up to 1500 FLA. Available add-on accessories include remote reset capability and communication modules with I/O for DeviceNet, PROFIBUS, and Modbus.
- **HAND/OFF/AUTO Selector Switch and START Pushbutton**—10250T heavy-duty units mounted on the flange of the enclosure for outside accessibility
- **RESET Button**—Accessible from front of enclosure (booted for environmental protection) for operation of overload relay reset function



- **Enclosure**—Type 3R rainproof and sleet resistant construction with stainless steel door latches and special corrosion resistant paint. Enclosure features include grounding lugs, padlocking feature on door latch, drip hood over door and provisions for top mounting conduit hubs. Most enclosures include generous panel space for mounting optional control and accessories
- **Mounting**—Pole mounting feet with keyhole slots for easy mounting are standard on enclosures for Sizes 1–5 (removable for Sizes 1–5 standard width flange type enclosures). Brackets can be formed to the contour of the pole after mounting
- **Padlocking**—Provision on door latch for locking door closed, as well as provision for padlocking disconnect switch in OFF position. With a simple modification, disconnect can also be padlocked in ON position
- **UL Listed**—Underwriters Laboratories Inc. includes the “Suitable for Use as Service Equipment” label

**Interrupting Ratings**

- **Fusible**—Sizes 1–5 suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes. 600V maximum where a Class R fuse clip kit is properly installed and Class R fuses are used. If Class R fuses are not used, the switch should not be installed on circuits capable of delivering more than 10,000 rms symmetrical amperes. Size 6 is limited to 18,000 and Size 7 is limited to 30,000 rms symmetrical amperes
- **Circuit Breaker**—Sizes 1–3 controllers are suitable for use on circuits capable of delivering not more than 100,000 rms symmetrical amperes at 480V maximum; for 600V applications not more than 65,000 rms symmetrical amperes
- **ECP Irrigation Pump Panel**—Suitable for use on circuits capable of delivering not more than 10,000 rms symmetrical amperes at 480V maximum

**Optional Features**

- **Backspin Timer**—0.2 seconds to 3 minutes. Prevents restart until motor and pump have stopped
- **Program Timer**—24 hour, 7 day with day omission
- **Control Transformer**—Available as standard, either as a field kit or factory installed. Includes two primary and one secondary fuses
- **Electrical Interlocks**—Side mounted in NO, NC and NO-NC. Maximum of two contacts on either side of starter through Size 2, maximum of three per side Sizes 3–5
- **Control Circuit Fuse Kit**—30A, 600V rating
- **Lightning Arrestor**—Offers protection to control from lightning induced surges
- **“R” Fuse Clip Kits**—30–200A, 250V and 600V ratings
- **Disconnect Control Circuit Interlock**—To disconnect separate control circuits

- **Enclosure Conduit Hubs**—Hole provided in enclosure top covered with hole closer. Will accept 3/4 in, 1-1/4 in, 1-1/2 in, 2 in, 2-1/2 in, and three inch conduit sizes
- **Pad Mounting Feet**—For standard width enclosures Sizes 1–5
- **Electronic Overload (SSOL)**
- **304-Grade Stainless Steel Enclosure**—For additional corrosion resistance, any of the pump panels can be ordered as 304-Grade stainless steel, still keeping the Type 3R rating
- **Soft Starter Pump Control Options**
  - Designed to reduce “water-hammer” during start-up and stopping sequences
  - Stop ramp extended to 60 seconds to help control larger motors and systems with long piping runs

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

|   |                 |
|---|-----------------|
| Kits . . . . .                              | <b>V10-T6-5</b> |
| Dimensions . . . . .                        | <b>Tab 14</b>   |
| Accessories and Modifications . . . . .     | <b>Tab 15</b>   |
| Technical Data and Specifications . . . . . | <b>Tab 17</b>   |



# 6.1

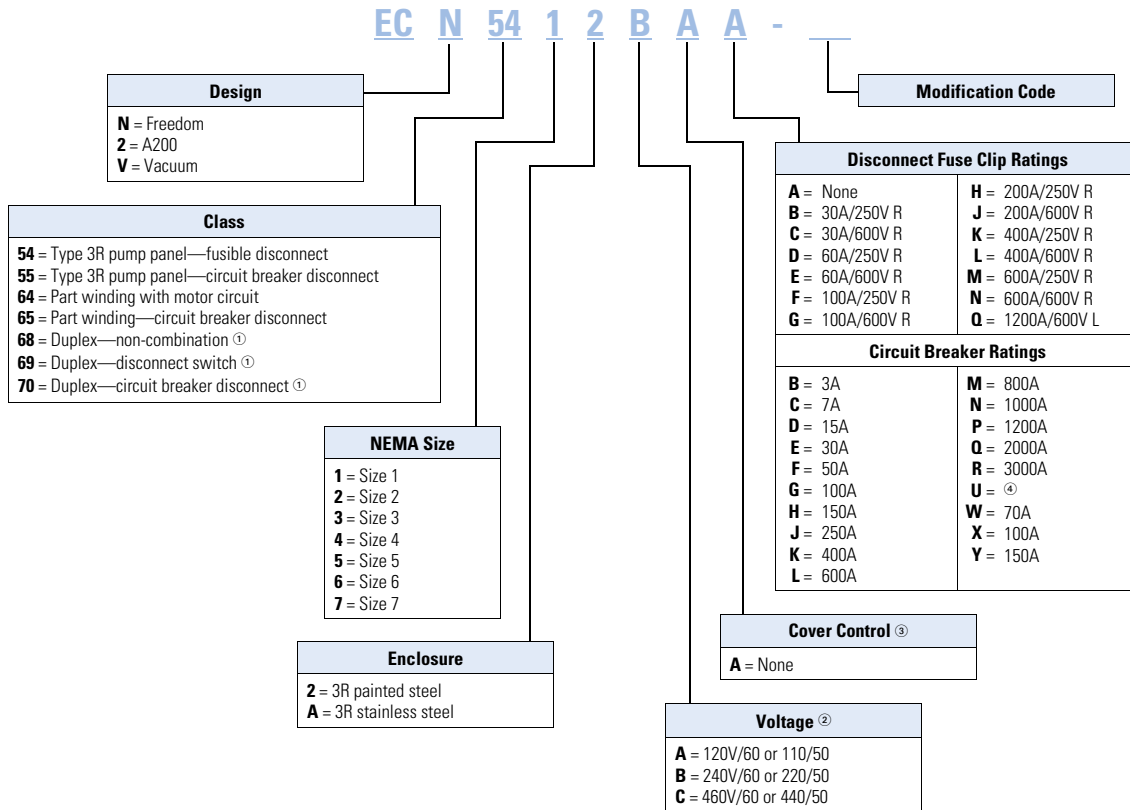
## Pump Panels

### Industrial Pump Panels

#### Catalog Number Selection

#### Pump Panel

6



#### Notes

- ① More information on Type 1, 3R, 4X and 12 duplex pump panels is on **Page V10-T6-23**. Product Selection is on **Page V10-T6-26**.
- ② For other voltages and single-phase applications, consult your Eaton representative.
- ③ HOA selector switch and START pushbutton provided as standard.
- ④ Engineering determination depending on size, horsepower FLA, NEC or other considerations.

**Accessories**

**Kits**

**Kits for Field Mounting**

| <b>Description</b>  | <b>Catalog Number<br/>Suffix</b> | <b>Catalog Number</b> |
|---|----------------------------------|-----------------------|
| Backspin timer—0.2 sec. to 3 min. (60 Hz)                             | <b>B12</b>                       | —                     |
| Control transformers 240/480V primary, 120V secondary                 |                                  |                       |
| Size 1  | <b>C1</b>                        | —                     |
| Size 2  | <b>C1</b>                        | —                     |
| Size 3  | <b>C1</b>                        | —                     |
| Size 4  | <b>C1</b>                        | —                     |
| Size 5  | <b>C1</b>                        | —                     |
| Lightning arrester  | <b>L3</b>                        | —                     |
| Control circuit fuse kit (600V)                                       | <b>C31</b>                       | —                     |
| Electrical interlocks—Freedom line/vacuum                             |                                  |                       |
| NO  | <b>A27</b>                       | —                     |
| NC  | <b>A28</b>                       | <b>C320KGS2</b>       |
| NO and NC   | <b>A29</b>                       | <b>C320KGS3</b>       |
| Time delay relay—3 minutes  |                                  |                       |
| ON delay (unwired)  | <b>T6</b>                        | —                     |
| OFF delay (unwired)   | <b>T7</b>                        | —                     |
| 24-hour programming clock   | <b>P44</b>                       | —                     |
| Interchangeable hubs for enclosure. <sup>①</sup>                      |                                  |                       |
| Enclosure has removable top plate. If conduit hub is required, order: |                                  |                       |
| 3/4 in conduit size   | —                                | <b>DS075H1</b>        |
| 1-1/4 in conduit size   | —                                | <b>DS125H1</b>        |
| 1-1/2 in conduit size   | —                                | <b>DS150H1</b>        |
| 2 in conduit size   | —                                | <b>DS200H1</b>        |
| 2-1/2 in conduit size   | —                                | <b>DS250H2</b>        |
| 3 in conduit size   | —                                | <b>DS300H2</b>        |
| Power supply  | <b>C34</b>                       | —                     |

**Note**

<sup>①</sup> Does not apply to reduced voltage controllers.

**Overload Relays****Freedom Solid-State Overload Relays**

| <b>NEMA Size</b> | <b>Full Load Current Adjustment Range (A)</b> | <b>Three-Phase without Ground Fault Auto/Manual Reset Overload Selectable Class 10/20/30</b> | <b>Three-Phase with Ground Fault Auto/Manual Reset Overload Selectable Class 10/20/30</b> |
|------------------|---|--|---|
| 00               | 0.33–1.65 <sup>①</sup>                        | R63/A  | R64/A   |
|                  | 1–5   | R63/B  | R64/B   |
|                  | 4–20  | R63/C  | R64/C   |
| 0 and 1          | 0.33–1.65 <sup>①</sup>                        | R63/A  | R64/A   |
|                  | 1–5   | R63/B  | R64/B   |
|                  | 4–20  | R63/C  | R64/C   |
|                  | 9–45  | R63/D  | R64/D   |
| 2                | 9–45  | R63/D  | R64/D   |
| 3                | 20–100  | R63/E  | R64/E   |
| 4                | 28–140  | R63/F  | R64/F   |
| 5                | 60–300 <sup>②</sup>                           | R63/G  | R64/G   |
| 6                | 120–600 <sup>③</sup>                          | R63/H  | R64/H   |

**Notes**

- ① Not UL Listed.
- ② NEMA Size 5 starter available with 60–300A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).
- ③ NEMA Size 6 starter available with 120–600A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

## Freedom—Fusible Disconnect

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECN54 controllers have a HAND/OFF/AUTO selector switch and START and RESET pushbuttons mounted on the enclosure and are wired as illustrated on **Page V10-T6-8**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class ECN54—Combination Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Narrow Width ③ | Standard Width ③ |
|-----------|-----------------|------------------|--------------------|---------------|----------------|------------------|
|           |                 |                  | Amperes            | Volts         | Catalog Number | Catalog Number   |
| 1 ④       | 230             | 7-1/2            | 30                 | 250           | ECN5412BAB-E14 | ECN5412BAB       |
|           | 460             | 10               |                    | 600           | ECN5412CAC-E14 | ECN5412CAC       |
|           | —               | —                | Not installed      | Not installed | ECN5412AAA-E14 | ECN5412AAA       |
| 2         | 230             | 15               | 60                 | 250           | ECN5422BAD-E14 | ECN5422BAD       |
|           | 460             | 25               |                    | 600           | ECN5422CAE-E14 | ECN5422CAE       |
|           | —               | —                | Not installed      | Not installed | ECN5422AAA-E14 | ECN5422AAA       |
| 3         | 230             | 30               | 100                | 250           | —              | ECN5432BAF       |
|           | 460             | 50               |                    | 600           | —              | ECN5432CAG       |
|           | —               | —                | Not installed      | Not installed | —              | ECN5432AAA       |
| 4 ④       | 230             | 50               | 200                | 250           | —              | ECN5442BAH       |
|           | 460             | 100              |                    | 600           | —              | ECN5442CAJ       |
|           | —               | —                | Not installed      | Not installed | —              | ECN5442AAA       |
| 5         | 230             | 100              | 400                | 250           | —              | ECN5452BAK       |
|           | 460             | 200              |                    | 600           | —              | ECN5452CAL       |
| 6         | 230             | 200              | 600                | 250           | —              | ECN5462BAM       |
|           | 460             | 400              |                    | 600           | —              | ECN5462CAN       |
| 7         | 460             | 600              | 1200               | 600           | —              | ECN5472CAQ       |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

**Starters with electronic overload,** see Modification Codes in **Tab 15**.

① Dual element fuse ratings.

② Class R fuse clips, except for Size 7 which uses Class L fuse clips. For starters with clips “Not Installed,” select fuse clip kit on **Page V10-T6-8**.

③ To order without the START pushbutton, add modification code **P6**.

④ For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECN5412**B**AC to ECN5412**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

# 6.1

## Pump Panels

### Industrial Pump Panels

6

#### Accessories

##### C351—Fuse Clip Selection—Three-Pole (Three Fuses)

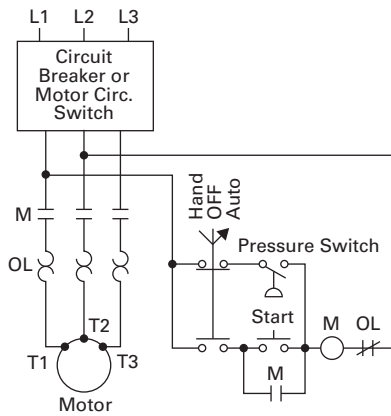
| NEMA Size | Motor Voltage | Fuse Clip Rating Amperes | Volts | Fuse Clip Kit for Field Installation in Non-Fusible Starter |  |
|-----------|---------------|--------------------------|-------|---|--|
|           |               |                          |       | For Non-Rejection Type Fuses Catalog Number                 | For Use with "R" Rejection Type Fuses Catalog Number |
| 1         | 200/230       | 30                       | 250   | C351KC21  | C351KC21R  |
|           | 460-575       |                          | 600   | C351KD22-61   | C351KD22-61R   |
| 2         | 200           | 60                       | 250   | C351KD22-61   | C351KD22-61R   |
|           | 230           |                          | 250   | C351KD22-61   | C351KD22-61R   |
|           | 460-575       |                          | 600   | C351KD62  | C351KD62R  |
| 3         | 200           | 100                      | 250   | C351KE23-63   | C351KE23-63 ①  |
|           | 230           |                          | 250   | C351KE23-63   | C351KE23-63 ①  |
|           | 460-575       |                          | 600   | C351KE23-63   | C351KE23-63 ①  |
| 4         | 200           | 200                      | 250   | C351KF24-64   | C351KF24-64 ①  |
|           | 230           |                          | 250   | C351KF24-64   | C351KF24-64 ①  |
|           | 460-575       |                          | 600   | C351KF24-64   | C351KF24-64 ①  |

**Note**

① Fuse clip "R" rejection members for use with Class R fuses are supplied loose both in fuse clip kits and when fuse clips are factory installed.

#### Wiring Diagram

##### Typical Wiring Diagram



## Freedom—Circuit Breaker

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

These ECN55 pump controllers feature the Freedom line starters. They have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the

enclosure and a RESET button on the front—wiring is as illustrated in the wiring diagram on **Page V10-T6-8**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see table on **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class ECN55—Combination Pump Panel—Circuit Breaker

| NEMA Size      | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | Narrow Width <sup>①</sup> Catalog Number | Standard Width <sup>①</sup> Catalog Number |
|----------------|---------------|------------------|----------------------|--|--|
| 1 <sup>②</sup> | 230           | 1                | 7A                   | ECN5512BAC-E14                           | ECN5512BAC                                 |
|                |               | 3                | 15A                  | ECN5512BAD-E14                           | ECN5512BAD                                 |
|                |               | 7-1/2            | 30A                  | ECN5512BAE-E14                           | ECN5512BAE                                 |
|                | 460           | 1                | 3A                   | ECN5512CAB-E14                           | ECN5512CAB                                 |
|                |               | 3                | 7A                   | ECN5512CAC-E14                           | ECN5512CAC                                 |
|                |               | 5                | 15A                  | ECN5512CAD-E14                           | ECN5512CAD                                 |
| 2              | 230           | 10               | 50A                  | ECN5522BAF-E14                           | ECN5522BAF                                 |
|                | 460           | 25               |                      | ECN5522CAF-E14                           | ECN5522CAF                                 |
| 3              | 230           | 30               | 100A                 | —  | ECN5532BAG                                 |
|                | 460           | 50               |                      | —  | ECN5532CAG                                 |
| 4 <sup>②</sup> | 230           | 50               | 150A                 | —  | ECN5542BAH                                 |
|                | 460           | 100              |                      | —  | ECN5542CAH                                 |
| 5              | 230           | 60               | 250A                 | —  | ECN5552BAJ                                 |
|                | 230           | 100              | 400A                 | —  | ECN5552BAK                                 |
|                | 460           | 150              | 250A                 | —  | ECN5552CAJ                                 |
|                | 460           | 200              | 400A                 | —  | ECN5552CAK                                 |
| 6              | 230           | 125              | 600A                 | —  | ECN5562BAL                                 |
|                | 230           | 200              | 800A                 | —  | ECN5562BAM                                 |
|                | 460           | 300              | 600A                 | —  | ECN5562CAL                                 |
|                | 460           | 400              | 800A                 | —  | ECN5562CAM                                 |
| 7              | 230           | 250              | ③                    | —  | ECN5572BAU                                 |
|                | 230           | 300              |                      | —  | ECN5572BAU                                 |
|                | 460           | 500              |                      | —  | ECN5572CAU                                 |
|                | 460           | 600              |                      | —  | ECN5572CAU                                 |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

① To order without the START pushbutton, add modification code **P6**.

② For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

③ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECN5512**C**AC to ECN5512**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

# 6.1

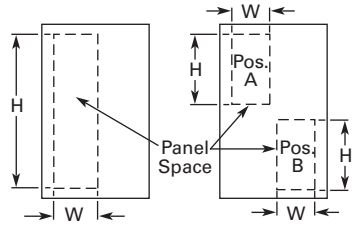
## Pump Panels

### Industrial Pump Panels

#### Dimensions

Approximate Dimensions in Inches (mm)

#### Panel Space



NEMA Sizes 1-4

NEMA Size 5

| Panel Size          | NEMA Size | Position (see figure above) | Width W    | Height H   |
|---------------------|-----------|-----------------------------|------------|------------|
| Narrow <sup>①</sup> | 1-2       | —                           | 5.5 (140)  | 6.0 (152)  |
| Standard            | 1-3       | —                           | 8.5 (216)  | 26.0 (660) |
|                     | 4         | —                           | 8.5 (216)  | 39.0 (991) |
|                     | 5         | A                           | 10.0 (254) | 22.0 (559) |
|                     |           | B                           | 15.0 (381) | 12.0 (305) |
| Oversize            | 1-2       | —                           | 12.0 (318) | 39.0 (991) |
|                     | 3         | —                           | 11.0 (279) | 39.0 (991) |

#### Note

<sup>①</sup> Space is between disconnect switch or circuit breaker and starter.

## A200—Fusible Disconnect

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECN54 controllers have a HAND/OFF/AUTO selector switch and START and RESET pushbuttons mounted on the enclosure and are wired as illustrated on **Page V10-T6-12**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see table on **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class EC254—Combination A200 Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Narrow Width ③        | Standard Width ③  |
|-----------|-----------------|------------------|--------------------|---------------|-----------------------|-------------------|
|           |                 |                  | Amperes            | Volts         | Catalog Number        | Catalog Number    |
| 1         | 230             | 7-1/2            | 30                 | 250           | <b>EC25412BAB-E14</b> | <b>EC25412BAB</b> |
|           | 460             | 10               |                    | 600           | <b>EC25412CAC-E14</b> | <b>EC25412CAC</b> |
|           | —               | —                | Not installed      | Not installed | <b>EC25412AAA-E14</b> | <b>EC25412AAA</b> |
| 2         | 230             | 15               | 60                 | 250           | <b>EC25422BAD-E14</b> | <b>EC25422BAD</b> |
|           | 460             | 25               |                    | 600           | <b>EC25422CAE-E14</b> | <b>EC25422CAE</b> |
|           | —               | —                | Not installed      | Not installed | <b>EC25422AAA-E14</b> | <b>EC25422AAA</b> |
| 3         | 230             | 30               | 100                | 250           | —                     | <b>EC25432BAF</b> |
|           | 460             | 50               |                    | 600           | —                     | <b>EC25432CAG</b> |
|           | —               | —                | Not installed      | Not installed | —                     | <b>EC25432AAA</b> |
| 4         | 230             | 50               | 200                | 250           | —                     | <b>EC25442BAH</b> |
|           | 460             | 100              |                    | 600           | —                     | <b>EC25442CAJ</b> |
|           | —               | —                | Not installed      | Not installed | —                     | <b>EC25442AAA</b> |
| 5         | 230             | 100              | 400                | 250           | —                     | <b>EC25452BAK</b> |
|           | 460             | 200              |                    | 600           | —                     | <b>EC25452CAL</b> |
| 6         | 230             | 200              | 600                | 250           | —                     | <b>EC25462BAM</b> |
|           | 460             | 400              |                    | 600           | —                     | <b>EC25462CAN</b> |
| 7         | 460             | 600              | 1200               | 600           | —                     | <b>EC25472CAQ</b> |

#### Notes

**Starters do not include heater packs.** Select 1 carton of 3 heater packs. For heater pack selection, see **Tab 15**.

① Dual element fuse ratings.

② Class R fuse clips, except for Size 7 which uses Class L fuse clips. For starters with clips “Not Installed”, select fuse clip kit on **Page V10-T6-8**.

③ To order without the START pushbutton, add modification code **P6**.

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number, with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change EC25412**B**AC to EC25412**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |



# 6.1

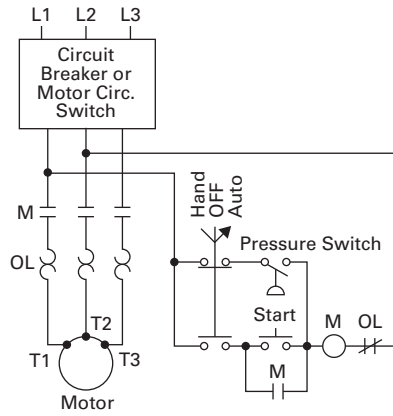
## Pump Panels

### Industrial Pump Panels

#### Wiring Diagram

#### Typical Wiring Diagram

6



## A200—Circuit Breaker

### Product Description

- Three-phase magnetic
- Interchangeable heater OLR

These ECN55 pump controllers feature the A200 starters. They have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the enclosure and a RESET button on the front—wiring is as illustrated in the wiring diagram on **Page V10-T6-12**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

Stainless steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R rating will still apply.

### Product Selection

#### Class EC255—Combination A200 Pump Panel—Circuit Breaker

| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | Narrow Width <sup>①</sup> | Standard Width <sup>②</sup> |
|-----------|---------------|------------------|----------------------|---------------------------|-----------------------------|
|           |               |                  |                      | Catalog Number            | Catalog Number              |
| 1         | 230           | 1                | 7A                   | EC25512BAC-E14            | EC25512BAC                  |
|           |               | 3                | 15A                  | EC25512BAD-E14            | EC25512BAD                  |
|           |               | 7-1/2            | 30A                  | EC25512BAE-E14            | EC25512BAE                  |
|           | 460           | 1                | 3A                   | EC25512CAB-E14            | EC25512CAB                  |
|           |               | 3                | 7A                   | EC25512CAC-E14            | EC25512CAC                  |
|           |               | 5                | 15A                  | EC25512CAD-E14            | EC25512CAD                  |
| 2         | 230           | 10               | 50A                  | EC25522BAF-E14            | EC25522BAF                  |
|           |               | 25               |                      | EC25522CAF-E14            | EC25522CAF                  |
|           |               | 30               | 100A                 | —                         | EC25532BAG                  |
|           | 460           | 50               |                      | —                         | EC25532CAG                  |
|           |               | 50               | 150A                 | —                         | EC25542BAH                  |
|           |               | 100              |                      | —                         | EC25542CAH                  |
| 3         | 230           | 60               | 250A                 | —                         | EC25552BAJ                  |
|           |               | 100              | 400A                 | —                         | EC25552BAK                  |
|           |               | 150              | 250A                 | —                         | EC25552CAJ                  |
|           | 460           | 200              | 400A                 | —                         | EC25552CAK                  |
|           |               | 125              | 600A                 | —                         | EC25562BAL                  |
|           |               | 200              | 800A                 | —                         | EC25562BAM                  |
| 4         | 230           | 300              | 600A                 | —                         | EC25562CAL                  |
|           |               | 400              | 800A                 | —                         | EC25562CAM                  |
|           | 460           | 250              | ③                    | —                         | EC25572BAU                  |
|           |               | 300              |                      | —                         | EC25572BAU                  |
| 5         | 230           | 500              |                      | —                         | EC25572CAU                  |
|           |               | 600              |                      | —                         | EC25572CAU                  |

#### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change EC25512**C**AC to EC25512**D**AC.

#### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | <b>A</b>    |
| 240/60 or 220/50     | <b>B</b>    |
| 480/60 or 440/50     | <b>C</b>    |
| 600/60 or 550/50     | <b>D</b>    |
| 208/60               | <b>E</b>    |

#### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

- ① To order without the START pushbutton, add modification code **P6**.
- ② Consult factory in the event ground fault protection is required.
- ③ Supply hp, voltage, FLA and whether motor is design E or not when ordering the starter.

# 6.1

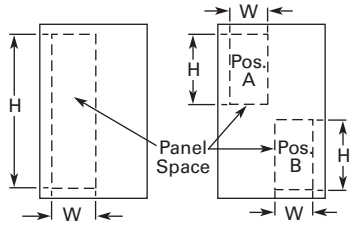
## Pump Panels

### Industrial Pump Panels

#### Dimensions

Approximate Dimensions in Inches (mm)

#### Panel Space



NEMA Sizes 1-4

NEMA Size 5

| Panel Size          | NEMA Size | Position (see figure above) | Width W    | Height H   |
|---------------------|-----------|-----------------------------|------------|------------|
| Narrow <sup>①</sup> | 1-2       | —                           | 5.5 (140)  | 6.0 (152)  |
| Standard            | 1-3       | —                           | 8.5 (216)  | 26.0 (660) |
|                     | 4         | —                           | 8.5 (216)  | 39.0 (991) |
|                     | 5         | A                           | 10.0 (254) | 22.0 (559) |
|                     |           | B                           | 15.0 (381) | 12.0 (305) |
| Oversize            | 1-2       | —                           | 12.0 (318) | 39.0 (991) |
|                     | 3         | —                           | 11.0 (279) | 39.0 (991) |

#### Note

<sup>①</sup> Space is between disconnect switch or circuit breaker and starter.

**Vacuum Starter Pump Panels**



**Contents**

| <i><b>Description</b></i>  | <i><b>Page</b></i> |
|----------------------------|--------------------|
| Vacuum Starter Pump Panels |                    |
| Product Selection .....    | <b>V10-T6-16</b>   |
| Wiring Diagram .....       | <b>V10-T6-16</b>   |

**Freedom—Fusible Disconnect and Circuit Breaker**

**Product Description**

- Three-phase magnetic
- Interchangeable heater OLR

Standard ECV54, 55 controllers have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the enclosure and are wired as illustrated on **Page V10-T6-16**.

Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form—see **Page V10-T6-5**.

If branch circuit protective device is 45A or greater, C320FBR1 fuse kit (panel mounted) may be required for control circuit protection per NEC 430-72.

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

| <i><b>Description</b></i>           | <i><b>Page</b></i> |
|-------------------------------------|--------------------|
| Kits .....                          | <b>V10-T6-5</b>    |
| Dimensions .....                    | <b>Tab 14</b>      |
| Accessories and Modifications ..... | <b>Tab 15</b>      |

#### Product Selection

##### Class ECV54—Combination Vacuum Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Fuse Clip Rating Amperes | Volts | With START Pushbutton Catalog Number |
|-----------|---------------|------------------|--------------------------|-------|--------------------------------------|
| 4         | 230           | 50               | 200                      | 250   | ECV5442BAH                           |
|           | 460           | 100              |                          | 600   | ECV5442CAJ                           |
| 5         | 230           | 100              | 400                      | 250   | ECV5452BAK                           |
|           | 460           | 200              |                          | 600   | ECV5452CAL                           |
| 6         | 230           | 200              | 600                      | 250   | ECV5462BAM                           |
|           | 460           | 400              |                          | 600   | ECV5462CAN                           |

##### Class ECV55—Combination Vacuum Pump Panel—Circuit Breaker

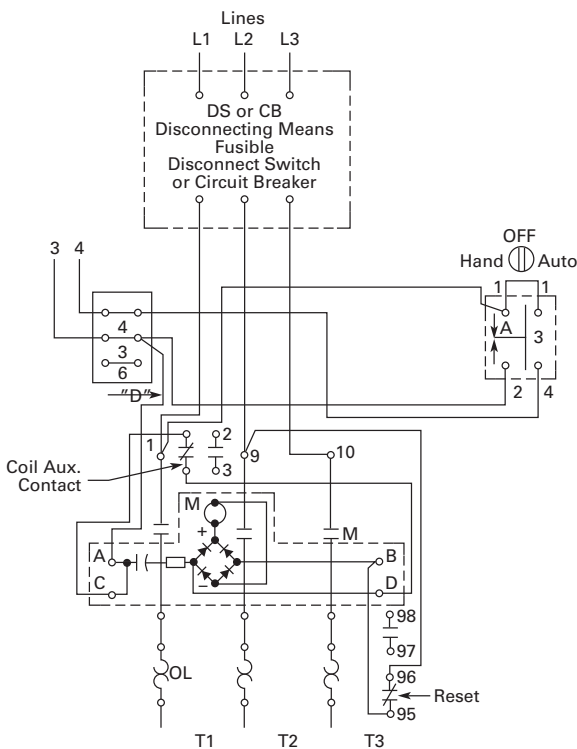
| NEMA Size | Motor Voltage | Max. hp 50/60 Hz | Circuit Breaker Size | With START Pushbutton Catalog Number |
|-----------|---------------|------------------|----------------------|--------------------------------------|
| 4         | 230           | 50               | 150A                 | ECV5542BAH                           |
|           | 460           | 100              |                      | ECV5542CAH                           |
| 5         | 230           | 75               | 250A                 | ECV5552BAJ                           |
|           |               | 100              | 400A                 | ECV5552BAK                           |
|           | 460           | 150              | 250A                 | ECV5552CAJ                           |
|           |               | 200              | 400A                 | ECV5552CAK                           |
| 6         | 230           | 200              | 600A                 | ECV5562BAL                           |
|           | 460           | 400              |                      | ECV5562CAL                           |

**Note**

Starters do not include heater packs. Select one carton of three heater packs. For heater pack selection, see Tab 15.

#### Wiring Diagram

##### Typical Wiring Diagram



Irrigation Pump Panel—C440 SSOL



**Contents**

| <b>Description</b>                          | <b>Page</b>      |
|---|------------------|
| Irrigation Pump Panels                      |                  |
| Catalog Number Selection .....              | <b>V10-T6-18</b> |
| Pump Panels—Interchangeable Heater Overload |                  |
| Product Selection .....                     | <b>V10-T6-19</b> |
| Pump Panels—Solid-State Overload            |                  |
| Product Selection .....                     | <b>V10-T6-20</b> |
| Wiring Diagram .....                        | <b>V10-T6-22</b> |

**Product Description**

Eaton’s irrigation pump controllers are combination starters designed to meet the requirements of the agricultural industry. The enclosure is UL Type 3R rated to provide weathertight protection and is available in two sizes. Irrigation application specific accessories and modifications are available to fit the customer’s requirements.

The irrigation pump panels use Freedom series motor starting technology to control motors up to 100 hp at 460V. These controllers have two styles of overload protection available, interchangeable heater and solid-state overload (SSOL).

**Features**

- The interchangeable heater overload (C306) uses individual heater packs to allow customers the ability to use various heater styles
- The solid-state overload relay (C440) provides enhanced protection and adjustment ranges as compared to bimetallic overload relays. Trip Class 10, 20, and 30 are available, along with a very wide trip current range to make setup very easy

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

**Additional Reference**

|                                     |                 |
|-------------------------------------|-----------------|
| Kits .....                          | <b>V10-T6-5</b> |
| Dimensions .....                    | <b>Tab 14</b>   |
| Accessories and Modifications ..... | <b>Tab 15</b>   |

# 6.3

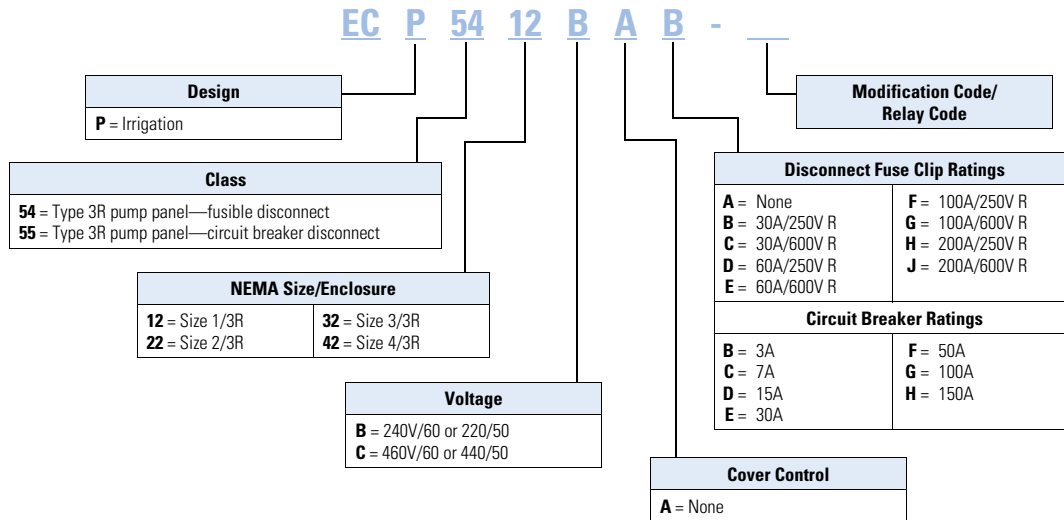
## Pump Panels

### Irrigation Pump Panels

#### Catalog Number Selection

##### Irrigation Pump Panel

6



## Pump Panels—Interchangeable Heater Overload

### Product Selection

Standard ECP54 controllers have a HAND/OFF/AUTO selector switch and START

pushbutton mounted on the enclosure and are wired as illustrated on **Page V10-T6-22**.

### Class ECP54—Combination Irrigation Pump Panel—Fusible Disconnect

| NEMA Size | Motor Voltage ① | Max. hp 50/60 Hz | Fuse Clip Rating ② |               | Standard Width Catalog Number |
|-----------|-----------------|------------------|--------------------|---------------|-------------------------------|
|           |                 |                  | Amperes            | Volts         |                               |
| 1 ③       | 230             | 7-1/2            | 30                 | 250           | ECP5412BAB                    |
|           | 460             | 10               |                    | 600           | ECP5412CAC                    |
|           | —               | —                | Not installed      | Not installed | ECP5412AAA                    |
| 2         | 230             | 15               | 60                 | 250           | ECP5422BAD                    |
|           | 460             | 25               |                    | 600           | ECP5422CAE                    |
|           | —               | —                | Not installed      | Not installed | ECP5422AAA                    |
| 3         | 230             | 30               | 100                | 250           | ECP5432BAF                    |
|           | 460             | 50               |                    | 600           | ECP5432CAG                    |
|           | —               | —                | Not installed      | Not installed | ECP5432AAA                    |

### For Other Volts and Hertz Applications

For other than listed volts and hertz, select required controller by catalog number and replace the magnet coil alpha designation, eighth digit in catalog number with proper code suffix from the table below.

Example: For 600V 60 Hz coil, change ECP5412BAB to ECP5412DAB.

### Coil Voltage

| Coil Volts and Hertz | Suffix Code |
|----------------------|-------------|
| 120/60 or 110/50     | A           |
| 240/60 or 220/50     | B           |
| 480/60 or 440/50     | C           |
| 600/60 or 550/50     | D           |
| 208/60               | E           |

### Fuse Clips

#### C351—Fuse Clip Selection—Three-Pole (Three Fuses)

| NEMA Size | Motor Voltage | Fuse Clip Rating Amperes | Volts | Fuse Clip Kit for Field Installation in Non-Fusible Starter |  |
|-----------|---------------|--------------------------|-------|---|--|
|           |               |                          |       | For Non-Rejection Type Fuses Catalog Number                 | For Use with "R" Rejection Type Fuses Catalog Number |
| 1         | 200/230       | 30                       | 250   | C351KC21  | C351KC21R  |
|           | 460-575       |                          | 600   | C351KD22-61   | C351KD22-61R   |
| 2         | 200           | 60                       | 250   | C351KD22-61   | C351KD22-61R   |
|           | 230           |                          |       | C351KD22-61   | C351KD22-61R   |
|           | 460-575       |                          |       | C351KD62  | C351KD62R  |
| 3         | 200           | 100                      | 250   | C351KE23-63   | C351KE23-63 ④  |
|           | 230           |                          |       | C351KE23-63   | C351KE23-63 ④  |
|           | 460-575       |                          | 600   | C351KE23-63   | C351KE23-63 ④  |

### Notes

**Starters do not include heater packs.** Select one carton of three heater packs. For heater pack selection, see **Tab 15**.

- ① Dual element fuse ratings.
- ② Class R fuse clips.
- ③ For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) |                   |
|-----------|---------------------|-------------------|
|           | AC3/AC4             | Operations        |
| 1C        | 27/150              | 2,500,000/40,000  |
| 1         | 27/153              | 5,000,000/110,000 |

- ④ Fuse clip "R" rejection members for use with Class R fuses are supplied loose both in fuse clip kits and when fuse clips are factory installed.



## Pump Panels—Solid-State Overload

### Product Selection

#### Class ECP54—Combination Irrigation Pump Panel with Solid-State Overload—Fusible Disconnect <sup>①</sup>

| Motor Voltage | NEMA Size      | Maximum hp | Fuse Clip Amperes | Trip Range       | Catalog Number   |
|---------------|----------------|------------|-------------------|------------------|------------------|
| 240V          | 1 <sup>②</sup> | 1          | 30                | 1.0–5.0          | ECP5412BAB-R63/B |
|               |                | 3          |                   | 4–20             | ECP5412BAB-R63/C |
|               |                | 7-1/2      |                   | 9–45             | ECP5412BAB-R63/D |
|               | 2              | 10         | 60                | 9–45             | ECP5422BAD-R63/D |
|               |                | 15         |                   | ECP5422BAD-R63/D |                  |
|               | 3              | 25         | 100               | 20–100           | ECP5432BAF-R63/E |
| 480V          | 1 <sup>②</sup> | 1          | 30                | 1.0–5.0          | ECP5412CAC-R63/B |
|               |                | 2          |                   | ECP5412CAC-R63/B |                  |
|               |                | 5          |                   | 4–20             | ECP5412CAC-R63/C |
|               |                | 10         |                   | ECP5412CAC-R63/C |                  |
|               | 2              | 20         | 60                | 9–45             | ECP5422CAE-R63/D |
|               |                | 25         |                   | ECP5422CAE-R63/D |                  |
|               | 3              | 50         | 100               | 20–100           | ECP5432CAG-R63/E |

#### Class ECP55—Combination Irrigation Pump Panel with Solid-State Overload—Circuit Breaker <sup>①</sup>

| Motor Voltage | NEMA Size      | Maximum hp | Breaker Rating | Trip Range       | Catalog Number   |
|---------------|----------------|------------|----------------|------------------|------------------|
| 240V          | 1 <sup>②</sup> | 1          | 7              | 1.0–5.0          | ECP5512BAC-R63/B |
|               |                | 3          | 15             | 4–20             | ECP5512BAD-R63/C |
|               |                | 7-1/2      | 30             | 9–45             | ECP5512BAE-R63/D |
|               | 2              | 10         | 50             | 9–45             | ECP5522BAF-R63/D |
|               |                | 15         | 20–100         | ECP5522BAF-R63/E |                  |
|               | 3              | 25         | 100            | 20–100           | ECP5532BAG-R63/E |
|               | 4 <sup>②</sup> | 50         | 28–140         | ECP5532BAH-R63/F |                  |
| 480V          | 1 <sup>②</sup> | 1          | 30             | 1.0–5.0          | ECP5512CAB-R63/B |
|               |                | 2          |                | ECP5512CAC-R63/B |                  |
|               |                | 5          |                | 4–20             | ECP5512CAD-R63/C |
|               |                | 10         |                | ECP5512CAE-R63/C |                  |
|               | 2              | 20         | 60             | 9–45             | ECP5522CAE-R63/D |
|               |                | 25         |                | ECP5522CAF-R63/D |                  |
|               | 3              | 50         | 100            | 20–100           | ECP5532CAG-R63/E |
|               | 4 <sup>②</sup> | 100        | 150            | 28–140           | ECP5532CAG-R63/F |

#### Note

<sup>①</sup> Motor FLA based on NEC Table.

<sup>②</sup> For Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-C60).

#### Compact NEMA Size 1 and Size 4 Starters Electrical Life at Rated Continuous Current

| NEMA Size | Rated Current (Amp) AC3/AC4 | Operations        |
|-----------|-----------------------------|-------------------|
| 1C        | 27/150                      | 2,500,000/40,000  |
| 1         | 27/153                      | 5,000,000/110,000 |
| 4C        | 135/516                     | 500,000/40,000    |
| 4         | 135/822                     | 800,000/70,000    |

**Class ECP55—Combination Irrigation Pump Panel—Circuit Breaker**

| Motor Voltage | NEMA Size | Maximum hp | Breaker Rating | Catalog Number | Motor Voltage | NEMA Size | Maximum hp | Breaker Rating | Catalog Number |
|---------------|-----------|------------|----------------|----------------|---------------|-----------|------------|----------------|----------------|
| 240V          | 1 ①       | 1          | 7              | ECP5512BAC     | 480V          | 1 ①       | 1          | 3              | ECP5512CAB     |
|               |           | 3          | 15             | ECP5512BAD     |               |           | 3          | 7              | ECP5512CAC     |
|               |           | 7-1/2      | 30             | ECP5512BAE     |               |           | 5          | 15             | ECP5512CAD     |
|               | 2         | 10         | 50             | ECP5522BAF     |               | 2         | 10         | 30             | ECP5512CAE     |
|               |           | 15         | 70             | ECP5522BAW     |               |           | 10         | 30             | ECP5522CAE     |
|               | 3         | 25         | 100            | ECP5532BAG     |               | 25        | 50         | ECP5522CAF     |                |
|               | 4 ①       | 50         | 150            | ECP5542BAH     |               | 3         | 50         | 100            | ECP5532CAG     |
|               |           |            |                | 4 ①            | 100           | 175       | ECP5542CAN |                |                |

**Overload Relays**

**Freedom Solid-State Overload Relays**

| NEMA Size | Full Load Current Adjustment Range (A) | Three-Phase without Ground Fault                        | Three-Phase with Ground Fault                           |
|-----------|--|---|---|
|           |  | Auto/Manual Reset Overload<br>Selectable Class 10/20/30 | Auto/Manual Reset Overload<br>Selectable Class 10/20/30 |
| 00        | 0.33–1.65 ②                            | R63/A   | R64/A   |
|           | 1–5                                    | R63/B   | R64/B   |
|           | 4–20                                   | R63/C   | R64/C   |
| 0 and 1   | 0.33–1.65 ②                            | R63/A   | R64/A   |
|           | 1–5                                    | R63/B   | R64/B   |
|           | 4–20                                   | R63/C   | R64/C   |
|           | 9–45                                   | R63/D   | R64/D   |
| 2         | 9–45                                   | R63/D   | R64/D   |
| 3         | 20–100                                 | R63/E   | R64/E   |
| 4         | 28–140                                 | R63/F   | R64/F   |
| 5         | 60–300 ③                               | R63/G   | R64/G   |
| 6         | 120–600 ④                              | R63/H   | R64/H   |

**Notes**

① Compact NEMA Size 1 or Size 4 Pump Panel, add modification code **C60**. (Example: ECN5412AAA-**C60**).

**Compact NEMA Size 1 and Size 4 Starters  
Electrical Life at Rated Continuous Current**

| NEMA Size | Rated Current (Amp) |                   |
|-----------|---------------------|-------------------|
|           | AC3/AC4             | Operations        |
| 1C        | 27/150              | 2,500,000/40,000  |
| 1         | 27/153              | 5,000,000/110,000 |
| 4C        | 135/516             | 500,000/40,000    |
| 4         | 135/822             | 800,000/70,000    |

② Not UL Listed.

③ NEMA Size 5 starter available with 60–300A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

④ NEMA Size 6 starter available with 120–600A panel mounted CTs. Starter as an assembled unit with 1–5A C440 overload relay (C440A1A005SELAX or C440A2A005SELAX).

**Features:**

- Self powered
- Phase loss protection
- Current adjustment knob
- ±1% repeat accuracy
- 1NO and 1NC isolated contacts
- Predictive indication
- Enhanced protection and monitoring
- Communication capabilities

# 6.3

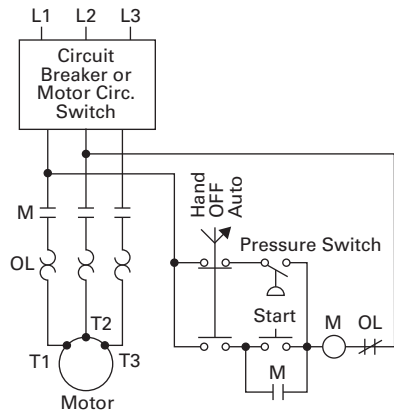
## Pump Panels

### Irrigation Pump Panels

#### Wiring Diagram

##### Typical Wiring Diagram

6



**Contents**

| <b>Description</b>             | <b>Page</b>      |
|--------------------------------|------------------|
| Duplex Pump Panels             |                  |
| Catalog Number Selection ..... | <b>V10-T6-24</b> |
| Cover Control .....            | <b>V10-T6-25</b> |
| Non-Combination                |                  |
| Features .....                 | <b>V10-T6-26</b> |
| Product Selection .....        | <b>V10-T6-26</b> |
| Combination                    |                  |
| Features .....                 | <b>V10-T6-27</b> |
| Product Selection .....        | <b>V10-T6-27</b> |

**Product Description**

Eaton’s duplex pump panels are controllers with or without disconnect, and designed to meet the requirement for two alternating pumps in critical installations. All duplex pump panels are provided standard with two three-phase magnetic starters and an automatic alternator to provide equal pump wear. During periods for heavy demand, both pumps will operate.

The enclosure options include UL Type 1, 12, 3R, or 4X.

**Standards and Certifications**

**Note:** See **Tab 17** for additional information on standards and certifications that apply to all enclosed control products.

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approved
- OSHPD Certified (OSP-0015-10)

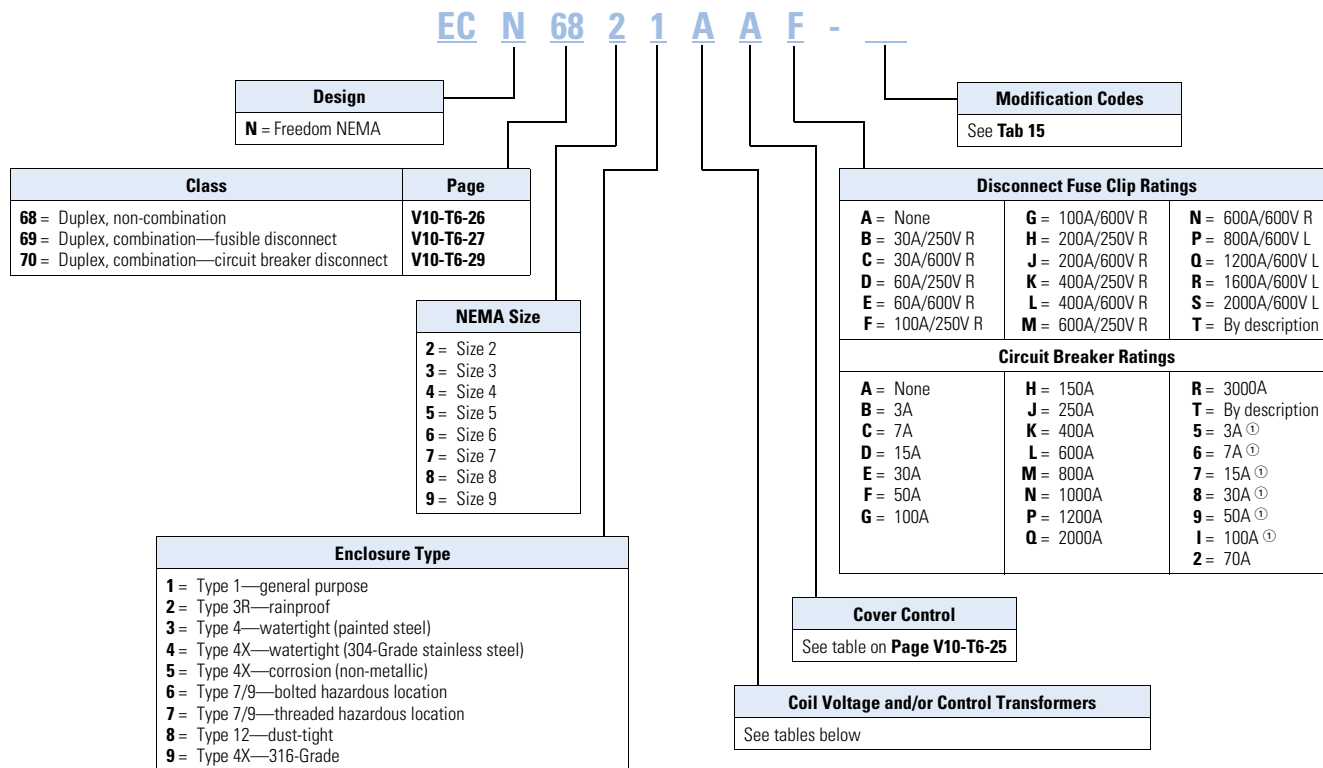
**Additional Reference**

|   |                  |
|---|------------------|
| Other Magnet Coils .....                | <b>V10-T6-24</b> |
| Cover Control .....                     | <b>V10-T6-25</b> |
| Dimensions .....                        | <b>Tab 14</b>    |
| Accessories and Modifications .....     | <b>Tab 15</b>    |
| Technical Data and Specifications ..... | <b>Tab 17</b>    |

### Catalog Number Selection

#### Freedom Duplex Pump Panels

6



#### Magnetic Coil Codes (System Voltage) ②

| Code | Magnet Coil  | Code | Magnet Coil | Code | Magnet Coil    |
|------|--------------|------|-------------|------|----------------|
| A    | 120/60110/50 | K    | 240/50      | U    | 24/50          |
| B    | 240/60220/50 | L    | 380/50      | V    | 32/50          |
| C    | 460/60440/50 | M    | 415/50      | W    | 48/60          |
| D    | 575/60550/50 | P    | 12 Vdc      | X    | 104–120/60     |
| E    | 208/60       | Q    | 24 Vdc      | Y    | 48/50          |
| G    | 550/50       | R    | 48 Vdc      | Z    | By description |
| H    | 277/60       | S    | 125 Vdc     |      |                |
| J    | 208–240/60   | T    | 24/60       |      |                |

#### Control Power Transformer Codes (System Voltage)

| Code | Primary                        | Secondary     |
|------|--------------------------------|---------------|
| B    | 240/480–220/440 wired for 240V | 120/60–110/50 |
| C    | 240/480–220/440 wired for 480V | 120/60–110/50 |
| D    | 600/60–550/50                  | 120/60–110/50 |
| E    | 208/60                         | 120/60        |
| H    | 277/60                         | 120/60        |
| L    | 380/50                         | 110/50        |
| M    | 415/50                         | 110/50        |
| Q    | 208/60                         | 24            |
| R    | 240/480–220/440 wired for 240V | 24            |
| S    | 240/480–220/440 wired for 480V | 24            |
| T    | 600/60                         | 24            |
| U    | 277/60                         | 24            |
| V    | 380/50                         | 24            |
| W    | 415/50                         | 24            |
| X    | 240/480/600 wired for 480V     | 120           |
| Y    | 240/480/600 wired for 480V     | 24            |
| Z    | By description                 | —             |

#### Notes

- ① Use for Sizes 0–3, HMCP 600V applications only.
- ② When control power transformer modification codes (C1–C11) are used or when starter class includes CPT (that is, ECN07, 18) see table to the right for system voltage code.

## Cover Control

### Non-Reversing

#### Flange Control Kits

For on-the-job conversion of Type 1, 3R, 4X and 12 enclosed starters. Knockouts are provided on the Type 1 flange. Type 3R, 4X and 12 have prepunched holes with removable hole plugs.

#### Factory Installed Pilot Devices

To order factory installed pilot devices, change the 9th character of the catalog number to the alpha shown in the table below. Example: to order an **ECN0514CAA** with START/STOP pushbuttons and a red pilot light, change the **A** to a **C**, for example, **ECN0514CCA**.

#### Type 1 Cover Control



#### All Other Cover Controls



### Non-Reversing Cover Control

| Description                    | Factory Installed Flange Control |                          |              | Field Installation Kits                 |                             |
|--------------------------------|----------------------------------|--------------------------|--------------|---|-----------------------------|
|                                | Position 9 Alpha                 | Type 1 Non-Combination ① | All Others ② | Type 1 Non-Combination ① Catalog Number | All Others ② Catalog Number |
| No cover mounted pilot devices | A                                | ■                        | ■            | C400GK0                                 | —                           |
| START/STOP pushbuttons         | B                                | ■                        | ■            | C400GK1                                 | C400T1                      |
| With red RUN pilot light       | C                                | ■                        | ■            | C400GK12 ③                              | —                           |
| With red RUN/green OFF lights  | D                                | ■                        | ■            | C400GK16 ③                              | —                           |
| ON/OFF pushbuttons             | E                                | —                        | ■            | —                                       | C400T2                      |
| With red RUN pilot light       | F                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | G                                | —                        | ■            | —                                       | —                           |
| HAND/OFF/AUTO selector switch  | H                                | ■                        | ■            | C400GK3                                 | C400T12                     |
| With red RUN pilot light       | J                                | ■                        | ■            | C400GK32 ③                              | —                           |
| With red RUN/green OFF lights  | K                                | ■                        | ■            | C400GK36 ③                              | —                           |
| START pushbutton               | L                                | —                        | ■            | —                                       | C400T3                      |
| ON pushbutton                  | M                                | —                        | ■            | —                                       | C400T4                      |
| OFF pushbutton                 | N                                | —                        | ■            | —                                       | C400T5                      |
| Red RUN pilot light            | P                                | ■                        | ■            | C400GK42 ③                              | C400T9 ③                    |
| Green OFF                      | Q                                | ■                        | ■            | C400GK41 ③                              | C400T10 ③                   |
| Red RUN/green OFF pilot lights | R                                | ■                        | ■            | C400GK46 ③                              | C400T11 ③                   |
| START/STOP selector switch     | S                                | —                        | ■            | —                                       | C400T13                     |
| With red RUN pilot light       | T                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | U                                | —                        | ■            | —                                       | —                           |
| ON/OFF selector switch         | V                                | —                        | ■            | —                                       | C400T14                     |
| With red RUN pilot light       | W                                | —                        | ■            | —                                       | —                           |
| With red RUN/green OFF lights  | X                                | —                        | ■            | —                                       | —                           |

#### Notes

- ① Type 1, NEMA Sizes 00–4 non-combination ONLY.
- ② Type 1, NEMA Sizes 5–9 non-combination PLUS all Type 3R, 4X, 12 non-combination PLUS all combination—NEMA sizes only.
- ③ Add code letter from the table below to catalog number for voltage—kits only. Example: C400T9B.

| Rating     | Code Letter | Rating     | Code Letter | Rating     | Code Letter |
|------------|-------------|------------|-------------|------------|-------------|
| 120V 60 Hz | A           | 240V 60 Hz | B           | 480V 60 Hz | C           |
| 208V 60 Hz | E           | 380V 50 Hz | L           | 600V 60 Hz | D           |

## Non-Combination

### Features

- Full voltage non-reversing non-combination
- Three-phase magnetic, three-pole
- Interchangeable heater OLR
- 600V maximum

### Alternator

In normal operation, the alternator automatically selects alternate pumps for each succeeding cycle to equalize pump wear. During periods of heavy demand, both pumps will operate.

## Product Selection

### Class ECN68—Non-Combination Duplex Pump Panels with Automatic Alternator <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating | Magnet Coil Voltage | Type 1 General Purpose Catalog Number | Type 3R Rainproof Catalog Number | Type 4X <sup>③</sup> Watertight and Dust-Tight Stainless Steel Catalog Number | Type 12 Dust-Tight Industrial External Reset <sup>④</sup> Catalog Number | Component Starter (Open) <sup>⑤</sup> Catalog Number |
|-----------|---------------|----------------|---------------------|---------------------------------------|----------------------------------|---|--|--|
| 0         | —             | —              | 120                 | ECN6801AAA                            | ECN6802AAA                       | ECN6804AAA  | ECN6808AAA   | AN16BN0AC  |
|           | 200           | 3              | 208                 | ECN6801EAA                            | ECN6802EAA                       | ECN6804EAA  | ECN6808EAA   | AN16BN0EC  |
|           | 230           |                | 240                 | ECN6801BAA                            | ECN6802BAA                       | ECN6804BAA  | ECN6808BAA   | AN16BN0BC  |
|           | 460           | 5              | 480                 | ECN6801CAA                            | ECN6802CAA                       | ECN6804CAA  | ECN6808CAA   | AN16BN0CC  |
|           | 575           |                | 600                 | ECN6801DAA                            | ECN6802DAA                       | ECN6804DAA  | ECN6808DAA   | AN16BN0DC  |
| 1         | —             | —              | 120                 | ECN6811AAA                            | ECN6812AAA                       | ECN6814AAA  | ECN6818AAA   | AN16DN0AB  |
|           | 200           | 7-1/2          | 208                 | ECN6811EAA                            | ECN6812EAA                       | ECN6814EAA  | ECN6818EAA   | AN16DN0EB  |
|           | 230           |                | 240                 | ECN6811BAA                            | ECN6812BAA                       | ECN6814BAA  | ECN6818BAA   | AN16DN0BB  |
|           | 460           | 10             | 480                 | ECN6811CAA                            | ECN6812CAA                       | ECN6814CAA  | ECN6818CAA   | AN16DN0CB  |
|           | 575           |                | 600                 | ECN6811DAA                            | ECN6812DAA                       | ECN6814DAA  | ECN6818DAA   | AN16DN0DB  |
| 2         | —             | —              | 120                 | ECN6821AAA                            | ECN6822AAA                       | ECN6824AAA  | ECN6828AAA   | AN16GN0AB  |
|           | 200           | 10             | 208                 | ECN6821EAA                            | ECN6822EAA                       | ECN6824EAA  | ECN6828EAA   | AN16GN0EB  |
|           | 230           | 15             | 240                 | ECN6821BAA                            | ECN6822BAA                       | ECN6824BAA  | ECN6828BAA   | AN16GN0BB  |
|           | 460           | 25             | 480                 | ECN6821CAA                            | ECN6822CAA                       | ECN6824CAA  | ECN6828CAA   | AN16GN0CB  |
|           | 575           |                | 600                 | ECN6821DAA                            | ECN6822DAA                       | ECN6824DAA  | ECN6828DAA   | AN16GN0DB  |
| 3         | —             | —              | 120                 | ECN6831AAA                            | ECN6832AAA                       | ECN6834AAA  | ECN6838AAA   | AN16KN0A   |
|           | 200           | 25             | 208                 | ECN6831EAA                            | ECN6832EAA                       | ECN6834EAA  | ECN6838EAA   | AN16KN0E   |
|           | 230           | 30             | 240                 | ECN6831BAA                            | ECN6832BAA                       | ECN6834BAA  | ECN6838BAA   | AN16KN0B   |
|           | 460           | 50             | 480                 | ECN6831CAA                            | ECN6832CAA                       | ECN6834CAA  | ECN6838CAA   | AN16KN0C   |
|           | 575           |                | 600                 | ECN6831DAA                            | ECN6832DAA                       | ECN6834DAA  | ECN6838DAA   | AN16KN0D   |
| 4         | —             | —              | 120                 | ECN6841AAA                            | ECN6842AAA                       | ECN6844AAA  | ECN6848AAA   | AN16NN0A   |
|           | 200           | 40             | 208                 | ECN6841EAA                            | ECN6842EAA                       | ECN6844EAA  | ECN6848EAA   | AN16NN0E   |
|           | 230           | 50             | 240                 | ECN6841BAA                            | ECN6842BAA                       | ECN6844BAA  | ECN6848BAA   | AN16NN0B   |
|           | 460           | 100            | 480                 | ECN6841CAA                            | ECN6842CAA                       | ECN6844CAA  | ECN6848CAA   | AN16NN0C   |
|           | 575           |                | 600                 | ECN6841DAA                            | ECN6842DAA                       | ECN6844DAA  | ECN6848DAA   | AN16NN0D   |

### Notes

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

① Circuitry arranged for two-pole pilot devices.

② All duplexes come standard with alternator. To remove, add modification code **D12**.

③ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6804AAA. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.

④ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.

⑤ Requires two starters.

**Combination**

**Features**

- Full voltage non-reversing combination
- Three-phase magnetic, three-pole
- Interchangeable heater OLR
- 600V maximum

**Alternator**

In normal operation, the alternator automatically selects alternate pumps for each succeeding cycle to equalize pump wear. During periods of heavy demand, both pumps will operate.

**Product Selection**

**Class ECN69—Combination Duplex Pump Panels with Automatic Alternator—Fusible Disconnect** <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating<br>Dual Element Fuses | Magnet Coil Voltage<br>③ | Fuse Clip Amps. | Type 1<br>General Purpose<br>Catalog Number | Type 3R<br>Rainproof<br>Catalog Number | Type 4X ④<br>Watertight and Dust-Tight<br>Stainless Steel<br>Catalog Number | Type 12<br>Dust-Tight Industrial<br>External Reset ⑤⑥ | Component Starter (Open) ⑦<br>Catalog Number |
|-----------|---------------|--------------------------------------|--------------------------|-----------------|---|--|---|---|--|
| 0         | 230           | 3                                    | 120                      | 30A             | ECN6901AAB                                  | ECN6902AAB                             | ECN6904AAB  | ECN6908AAB  | AN16BN0AC                                    |
|           | 460           | 5                                    |                          |                 | ECN6901AAC                                  | ECN6902AAC                             | ECN6904AAC  | ECN6908AAC  | AN16BN0AC                                    |
|           | 200           | 3                                    | 208                      |                 | ECN6901EAB                                  | ECN6902EAB                             | ECN6904EAB  | ECN6908EAB  | AN16BN0EC                                    |
|           | 230           |                                      | 240                      |                 | ECN6901BAB                                  | ECN6902BAB                             | ECN6904BAB  | ECN6908BAB  | AN16BN0BC                                    |
|           | 460           | 5                                    | 480                      |                 | ECN6901CAC                                  | ECN6902CAC                             | ECN6904CAC  | ECN6908CAC  | AN16BN0CC                                    |
|           | 575           |                                      | 600                      |                 | ECN6901DAC                                  | ECN6902DAC                             | ECN6904DAC  | ECN6908DAC  | AN16BN0DC                                    |
| 1         | 230           | 7-1/2                                | 120                      | 30A             | ECN6911AAB                                  | ECN6912AAB                             | ECN6914AAB  | ECN6918AAB  | AN16DN0AB                                    |
|           | 460           | 10                                   |                          |                 | ECN6911AAC                                  | ECN6912AAC                             | ECN6914AAC  | ECN6918AAC  | AN16DN0AB                                    |
|           | 200           | 7-1/2                                | 208                      |                 | ECN6911EAB                                  | ECN6912EAB                             | ECN6914EAB  | ECN6918EAB  | AN16DN0EB                                    |
|           | 230           |                                      | 240                      |                 | ECN6911BAB                                  | ECN6912BAB                             | ECN6914BAB  | ECN6918BAB  | AN16DN0BB                                    |
|           | 460           | 10                                   | 480                      |                 | ECN6911CAC                                  | ECN6912CAC                             | ECN6914CAC  | ECN6918CAC  | AN16DN0CB                                    |
|           | 575           |                                      | 600                      |                 | ECN6911DAC                                  | ECN6912DAC                             | ECN6914DAC  | ECN6918DAC  | AN16DN0DB                                    |
| 2         | 230           | 15                                   | 120                      | 60A             | ECN6921AAD                                  | ECN6922AAD                             | ECN6924AAD  | ECN6928AAD  | AN16GN0AB                                    |
|           | 460           | 25                                   |                          |                 | ECN6921AAE                                  | ECN6922AAE                             | ECN6924AAE  | ECN6928AAE  | AN16GN0AB                                    |
|           | 200           | 10                                   | 208                      |                 | ECN6921EAD                                  | ECN6922EAD                             | ECN6924EAD  | ECN6928EAD  | AN16GN0EB                                    |
|           | 230           | 15                                   | 240                      |                 | ECN6921BAD                                  | ECN6922BAD                             | ECN6924BAD  | ECN6928BAD  | AN16GN0BB                                    |
|           | 460           | 25                                   | 480                      |                 | ECN6921CAE                                  | ECN6922CAE                             | ECN6924CAE  | ECN6928CAE  | AN16GN0CB                                    |
|           | 575           |                                      | 600                      |                 | ECN6921DAE                                  | ECN6922DAE                             | ECN6924DAE  | ECN6928DAE  | AN16GN0DB                                    |
| 3         | 230           | 30                                   | 120                      | 100A            | ECN6931AAF                                  | ECN6932AAF                             | ECN6934AAF  | ECN6938AAF  | AN16KN0A                                     |
|           | 460           | 50                                   |                          |                 | ECN6931AAG                                  | ECN6932AAG                             | ECN6934AAG  | ECN6938AAG  | AN16KN0A                                     |
|           | 200           | 25                                   | 208                      |                 | ECN6931EAF                                  | ECN6932EAF                             | ECN6934EAF  | ECN6938EAF  | AN16KN0E                                     |
|           | 230           | 30                                   | 240                      |                 | ECN6931BAF                                  | ECN6932BAF                             | ECN6934BAF  | ECN6938BAF  | AN16KN0B                                     |
|           | 460           | 50                                   | 480                      |                 | ECN6931CAG                                  | ECN6932CAG                             | ECN6934CAG  | ECN6938CAG  | AN16KN0C                                     |
|           | 575           |                                      | 600                      |                 | ECN6931DAG                                  | ECN6932DAG                             | ECN6934DAG  | ECN6938DAG  | AN16KN0D                                     |
| 4         | 230           | 50                                   | 120                      | 200A            | ECN6941AAH                                  | ECN6942AAH                             | ECN6944AAH  | ECN6948AAH  | AN16NN0A                                     |
|           | 460           | 100                                  |                          |                 | ECN6941AAJ                                  | ECN6942AAJ                             | ECN6944AAJ  | ECN6948AAJ  | AN16NN0A                                     |
|           | 200           | 40                                   | 208                      |                 | ECN6941EAH                                  | ECN6942EAH                             | ECN6944EAH  | ECN6948EAH  | AN16NN0E                                     |
|           | 230           | 50                                   | 240                      |                 | ECN6941BAH                                  | ECN6942BAH                             | ECN6944BAH  | ECN6948BAH  | AN16NN0B                                     |
|           | 460           | 100                                  | 480                      |                 | ECN6941CAJ                                  | ECN6942CAJ                             | ECN6944CAJ  | ECN6948CAJ  | AN16NN0C                                     |
|           | 575           |                                      | 600                      |                 | ECN6941DAJ                                  | ECN6942DAJ                             | ECN6944DAJ  | ECN6948DAJ  | AN16NN0D                                     |

**Notes**

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ For 200V and 575V motors—starters with 120V coil (for separate control) are available. To order, substitute the letter **A** for the eighth character of the listed catalog number.
- ④ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6904AAB. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ⑤ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑥ Type 12 enclosure is without safety door interlock.
- ⑦ Requires two starters.



#### Class ECN69—Combination Duplex Pump Panels with Automatic Alternator—Non-Fusible Disconnect <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating<br>Dual Element Fuses | Magnet Coil Voltage | Disconnect Amps. | Type 1<br>General Purpose<br>Catalog Number | Type 3R<br>Rainproof<br>Catalog Number | Type 4X <sup>③</sup><br>Watertight and<br>Dust-Tight<br>Stainless Steel<br>Catalog Number | Type 12<br>Dust-Tight<br>Industrial<br>External Reset <sup>④⑤</sup><br>Catalog Number | Component<br>Starter (Open) <sup>⑥</sup><br>Catalog Number |
|-----------|---------------|--------------------------------------|---------------------|------------------|---|--|---|---|--|
| 0         | —             | —                                    | 120                 | 30A              | ECN6901AAA                                  | ECN6902AAA                             | ECN6904AAA  | ECN6908AAA  | AN16BN0AC  |
|           | 200           | 3                                    | 208                 |                  | ECN6901EAA                                  | ECN6902EAA                             | ECN6904EAA  | ECN6908EAA  | AN16BN0EC  |
|           | 230           |                                      | 240                 |                  | ECN6901BAA                                  | ECN6902BAA                             | ECN6904BAA  | ECN6908BAA  | AN16BN0BC  |
|           | 460           | 5                                    | 480                 |                  | ECN6901CAA                                  | ECN6902CAA                             | ECN6904CAA  | ECN6908CAA  | AN16BN0CC  |
|           | 575           |                                      | 600                 |                  | ECN6901DAA                                  | ECN6902DAA                             | ECN6904DAA  | ECN6908DAA  | AN16BN0DC  |
| 1         | —             | —                                    | 120                 | 30A              | ECN6911AAA                                  | ECN6912AAA                             | ECN6914AAA  | ECN6918AAA  | AN16DN0AB  |
|           | 200           | 7-1/2                                | 208                 |                  | ECN6911EAA                                  | ECN6912EAA                             | ECN6914EAA  | ECN6918EAA  | AN16DN0EB  |
|           | 230           |                                      | 240                 |                  | ECN6911BAA                                  | ECN6912BAA                             | ECN6914BAA  | ECN6918BAA  | AN16DN0BB  |
|           | 460           | 10                                   | 480                 |                  | ECN6911CAA                                  | ECN6912CAA                             | ECN6914CAA  | ECN6918CAA  | AN16DN0CB  |
|           | 575           |                                      | 600                 |                  | ECN6911DAA                                  | ECN6912DAA                             | ECN6914DAA  | ECN6918DAA  | AN16DN0DB  |
| 2         | —             | —                                    | 120                 | 60A              | ECN6921AAA                                  | ECN6922AAA                             | ECN6924AAA  | ECN6928AAA  | AN16GN0AB  |
|           | 200           | 10                                   | 208                 |                  | ECN6921EAA                                  | ECN6922EAA                             | ECN6924EAA  | ECN6928EAA  | AN16GN0EB  |
|           | 230           | 15                                   | 240                 |                  | ECN6921BAA                                  | ECN6922BAA                             | ECN6924BAA  | ECN6928BAA  | AN16GN0BB  |
|           | 460           | 25                                   | 480                 |                  | ECN6921CAA                                  | ECN6922CAA                             | ECN6924CAA  | ECN6928CAA  | AN16GN0CB  |
|           | 575           |                                      | 600                 |                  | ECN6921DAA                                  | ECN6922DAA                             | ECN6924DAA  | ECN6928DAA  | AN16GN0DB  |
| 3         | —             | —                                    | 120                 | 100A             | ECN6931AAA                                  | ECN6932AAA                             | ECN6934AAA  | ECN6938AAA  | AN16KN0A   |
|           | 200           | 25                                   | 208                 |                  | ECN6931EAA                                  | ECN6932EAA                             | ECN6934EAA  | ECN6938EAA  | AN16KN0E   |
|           | 230           | 30                                   | 240                 |                  | ECN6931BAA                                  | ECN6932BAA                             | ECN6934BAA  | ECN6938BAA  | AN16KN0B   |
|           | 460           | 50                                   | 480                 |                  | ECN6931CAA                                  | ECN6932CAA                             | ECN6934CAA  | ECN6938CAA  | AN16KN0C   |
|           | 575           |                                      | 600                 |                  | ECN6931DAA                                  | ECN6932DAA                             | ECN6934DAA  | ECN6938DAA  | AN16KN0D   |
| 4         | —             | —                                    | 120                 | 200A             | ECN6941AAA                                  | ECN6942AAA                             | ECN6944AAA  | ECN6948AAA  | AN16NN0A   |
|           | 200           | 40                                   | 208                 |                  | ECN6941EAA                                  | ECN6942EAA                             | ECN6944EAA  | ECN6948EAA  | AN16NN0E   |
|           | 230           | 50                                   | 240                 |                  | ECN6941BAA                                  | ECN6942BAA                             | ECN6944BAA  | ECN6948BAA  | AN16NN0B   |
|           | 460           | 100                                  | 480                 |                  | ECN6941CAA                                  | ECN6942CAA                             | ECN6944CAA  | ECN6948CAA  | AN16NN0C   |
|           | 575           |                                      | 600                 |                  | ECN6941DAA                                  | ECN6942DAA                             | ECN6944DAA  | ECN6948DAA  | AN16NN0D   |

#### Notes

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit. Example: ECN6904AAA. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ④ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑤ Type 12 enclosure is without safety door interlock.
- ⑥ Requires two starters.

Class ECN70—Combination Duplex Pump Panels with Automatic Alternator—Circuit Breaker <sup>①②</sup>

| NEMA Size | Motor Voltage | Max. hp Rating | Magnet Coil Voltage <sup>③</sup> | Circuit Breaker Size | Type 1 General Purpose Catalog Number | Type 3R Rainproof Catalog Number | Type 4X <sup>④</sup> Watertight and Dust-Tight Stainless Steel Catalog Number | Type 12 Dust-Tight Industrial External Reset <sup>⑤⑥</sup> Catalog Number | Component Starter (Open) <sup>⑦</sup> Catalog Number |           |
|-----------|---------------|----------------|----------------------------------|----------------------|---------------------------------------|----------------------------------|---|---|--|-----------|
| 0         | 200           | 1              | 208                              | 7A                   | ECN7001EAC                            | ECN7002EAC                       | ECN7004EAC  | ECN7008EAC  | AN16BN0EC  |           |
|           |               | 3              |                                  | 15A                  | ECN7001EAD                            | ECN7002EAD                       | ECN7004EAD  | ECN7008EAD  |  |           |
|           | 230           | 1              | 240                              | 7A                   | ECN7001BAC                            | ECN7002BAC                       | ECN7004BAC  | ECN7008BAC  | AN16BN0BC  |           |
|           |               | 3              |                                  | 15A                  | ECN7001BAD                            | ECN7002BAD                       | ECN7004BAD  | ECN7008BAD  |  |           |
|           | 460           | 3/4            | 480                              | 3A                   | ECN7001CAB                            | ECN7002CAB                       | ECN7004CAB  | ECN7008CAB  | AN16BN0CC  |           |
|           |               | 2              |                                  | 7A                   | ECN7001CAC                            | ECN7002CAC                       | ECN7004CAC  | ECN7008CAC  |  |           |
|           |               | 5              |                                  | 15A                  | ECN7001CAD                            | ECN7002CAD                       | ECN7004CAD  | ECN7008CAD  |  |           |
|           | 575           | 1              | 600                              | 3A                   | ECN7001DAB                            | ECN7002DAB                       | ECN7004DAB  | ECN7008DAB  | AN16BN0DC  |           |
|           |               | 3              |                                  | 7A                   | ECN7001DAC                            | ECN7002DAC                       | ECN7004DAC  | ECN7008DAC  |  |           |
|           |               |                |                                  | 15A                  | ECN7001DAD                            | ECN7002DAD                       | ECN7004DAD  | ECN7008DAD  |  |           |
|           | 1             | 200            | 1                                | 208                  | 7A                                    | ECN7011EAC                       | ECN7012EAC  | ECN7014EAC  | ECN7018EAC   | AN16DN0EB |
|           |               |                | 2                                |                      | 15A                                   | ECN7011EAD                       | ECN7012EAD  | ECN7014EAD  | ECN7018EAD   |           |
| 7-1/2     |               |                | 30A                              |                      | ECN7011EAE                            | ECN7012EAE                       | ECN7014EAE  | ECN7018EAE  |  |           |
| 230       |               | 1              | 240                              | 7A                   | ECN7011BAC                            | ECN7012BAC                       | ECN7014BAC  | ECN7018BAC  | AN16DN0BB  |           |
|           |               | 2              |                                  | 15A                  | ECN7011BAD                            | ECN7012BAD                       | ECN7014BAD  | ECN7018BAD  |  |           |
|           |               | 7-1/2          |                                  | 30A                  | ECN7011BAE                            | ECN7012BAE                       | ECN7014BAE  | ECN7018BAE  |  |           |
| 460       |               | 3/4            | 480                              | 3A                   | ECN7011CAB                            | ECN7012CAB                       | ECN7014CAB  | ECN7018CAB  | AN16DN0CB  |           |
|           |               | 2              |                                  | 7A                   | ECN7011CAC                            | ECN7012CAC                       | ECN7014CAC  | ECN7018CAC  |  |           |
|           |               | 5              |                                  | 15A                  | ECN7011CAD                            | ECN7012CAD                       | ECN7014CAD  | ECN7018CAD  |  |           |
|           |               | 10             |                                  | 30A                  | ECN7011CAE                            | ECN7012CAE                       | ECN7014CAE  | ECN7018CAE  |  |           |
| 575       |               | 1              | 600                              | 3A                   | ECN7011DAB                            | ECN7012DAB                       | ECN7014DAB  | ECN7018DAB  | AN16DN0DB  |           |
|           |               | 3              |                                  | 7A                   | ECN7011DAC                            | ECN7012DAC                       | ECN7014DAC  | ECN7018DAC  |  |           |
|           |               | 7-1/2          |                                  | 15A                  | ECN7011DAD                            | ECN7012DAD                       | ECN7014DAD  | ECN7018DAD  |  |           |
|           |               | 10             |                                  | 30A                  | ECN7011DAE                            | ECN7012DAE                       | ECN7014DAE  | ECN7018DAE  |  |           |
| 2         |               | 200            | 10                               | 208                  | 50A                                   | ECN7021EAF                       | ECN7022EAF  | ECN7024EAF  | ECN7028EAF   | AN16GN0EB |
|           |               | 230            | 15                               |                      | 240                                   | ECN7021BAF                       | ECN7022BAF  | ECN7024BAF  | ECN7028BAF   | AN16GN0BB |
|           |               | 460            | 25                               |                      | 480                                   | ECN7021CAF                       | ECN7022CAF  | ECN7024CAF  | ECN7028CAF   | AN16GN0CB |
|           |               | 575            |                                  |                      | 600                                   | ECN7021DAF                       | ECN7022DAF  | ECN7024DAF  | ECN7028DAF   | AN16GN0DB |
| 3         | 200           | 25             | 208                              | 100A                 | ECN7031EAG                            | ECN7032EAG                       | ECN7034EAG  | ECN7038EAG  | AN16KN0E   |           |
|           | 230           | 30             |                                  | 240                  | ECN7031BAG                            | ECN7032BAG                       | ECN7034BAG  | ECN7038BAG  | AN16KN0B   |           |
|           | 460           | 50             |                                  | 480                  | ECN7031CAG                            | ECN7032CAG                       | ECN7034CAG  | ECN7038CAG  | AN16KN0C   |           |
|           | 575           |                |                                  | 600                  | ECN7031DAI                            | ECN7032DAI                       | ECN7034DAI  | ECN7038DAI  | AN16KN0D   |           |
| 4         | 200           | 40             | 208                              | 150A                 | ECN7041EAH                            | ECN7042EAH                       | ECN7044EAH  | ECN7048EAH  | AN16NN0E   |           |
|           | 230           | 50             |                                  | 240                  | ECN7041BAH                            | ECN7042BAH                       | ECN7044BAH  | ECN7048BAH  | AN16NN0B   |           |
|           | 460           | 100            |                                  | 480                  | ECN7041CAH                            | ECN7042CAH                       | ECN7044CAH  | ECN7048CAH  | AN16NN0C   |           |
|           | 575           |                |                                  | 600                  | ECN7041DAH                            | ECN7042DAH                       | ECN7044DAH  | ECN7048DAH  | AN16NN0D   |           |

Notes

**Starters do not include heater packs.** Select two cartons of three heater packs (two overload relays—one for each motor). For heater pack selection, see **Tab 15**.

- ① Circuitry arranged for two-pole pilot devices.
- ② All duplexes come standard with alternator. To remove, add modification code **D12**.
- ③ For 200V and 575V motors—starters with 120V coil (for separate control) are available. To order, substitute the letter **A** for the eighth character of the listed catalog number.
- ④ The catalog numbers listed in the Type 4X column are for Type 4X 304-Grade stainless steel, as indicated by the **seventh** digit.  
Example: ECN7004EAC. To order Type 4X 316-Grade stainless steel, change that digit to **9**. To order Type 4 painted steel, change that digit to **3**. To order non-metallic, change that digit to **5**. For details on these alternate enclosures, see **Tab 13**.
- ⑤ All Type 12 enclosures are standardized with external reset. For internal reset, order modification code **R5**.
- ⑥ Type 12 enclosure is without safety door interlock.
- ⑦ Requires two starters.