

Pump Panels

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Product Family Overview

Product Description

Eaton's Cutler-Hammer® 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 and *IT* 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 S752, S801 and S811 soft starter products which are members of the Cutler-Hammer® 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 24V DC 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.



**Type 3R Standard Enclosure
with Size 4 *IT* Starter**



**Type 3R Standard Enclosure
with Size 1 – 3 Starter**



**Type 3R Narrow Enclosure
with Size 1, 2 Starter**



**Type 3R Narrow Enclosure with Size 1
Starter and Electronic Overload**



**Type 3R Standard Enclosure with
a Size 3 Part Winding Starter**

Features

The *IT* and 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.
 - The *IT* electronic overload relay offers motor protection and can be adjusted over a range of 3.2:1 in Class 10, 20 or 30 with a choice of manual or automatic reset. Settings such as Trip Class, phase loss/phase current unbalance enabled or disabled can be programmed without the use of any software. Fault indication is provided for thermal memory, overload trip, phase loss/phase current unbalance, ready for reset and other parameters.
- **HAND/OFF/AUTO Selector Switch and START Pushbutton** — 10250T heavy-duty units mounted on the flange of the enclosure for outside accessibility. START pushbutton not used as standard on NEMA *IT* pumps, but available as an option.
- **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 HMCPE** — 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** — .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 2 primary and 1 secondary fuses.
- **Electrical Interlocks** — Side mounted in NO, NC and NO-NC. Maximum of 2 contacts on either side of starter through Size 2, maximum of 3 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", 1-1/4", 1-1/2", 2", 2-1/2" and 3" 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 Page 18-2 for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

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

Product Family Overview

Accessories

Kits

Table 8-1. Kits for Field Mounting

Description	Catalog Number Suffix	Catalog Number
Backspin Timer — .2 sec. to 3 min. (60 Hz)	B12	—
Control Transformers 240/480V Pri., 120V Sec.		
Size 1	C1	—
Size 2	C1	—
Size 3	C1	—
Size 4	C1	—
Size 5	C1	—
Lightning Arrester	L3	—
Control Circuit Fuse Kit (600V)	C31	—
Electrical Interlocks — Freedom Line/Vacuum		
NO	A27	—
NC	A28	C320KGS2
NO & NC	A29	C320KGS3
Time Delay Relay — 3 minutes		
ON Delay (unwired)	T6	—
OFF Delay (unwired)	T7	—
24-Hour Programming Clock	P44	—
Interchangeable Hubs for Enclosure. ① Enclosure has removable top plate. If conduit hub is required, order:		
3/4" Conduit Size	—	DS075H1
1-1/4" Conduit Size	—	DS125H1
1-1/2" Conduit Size	—	DS150H1
2" Conduit Size	—	DS200H1
2-1/2" Conduit Size	—	DS250H2
3" Conduit Size	—	DS300H2
Power Supply	C34	—

① Does not apply to reduced voltage controllers.

Overload Relays

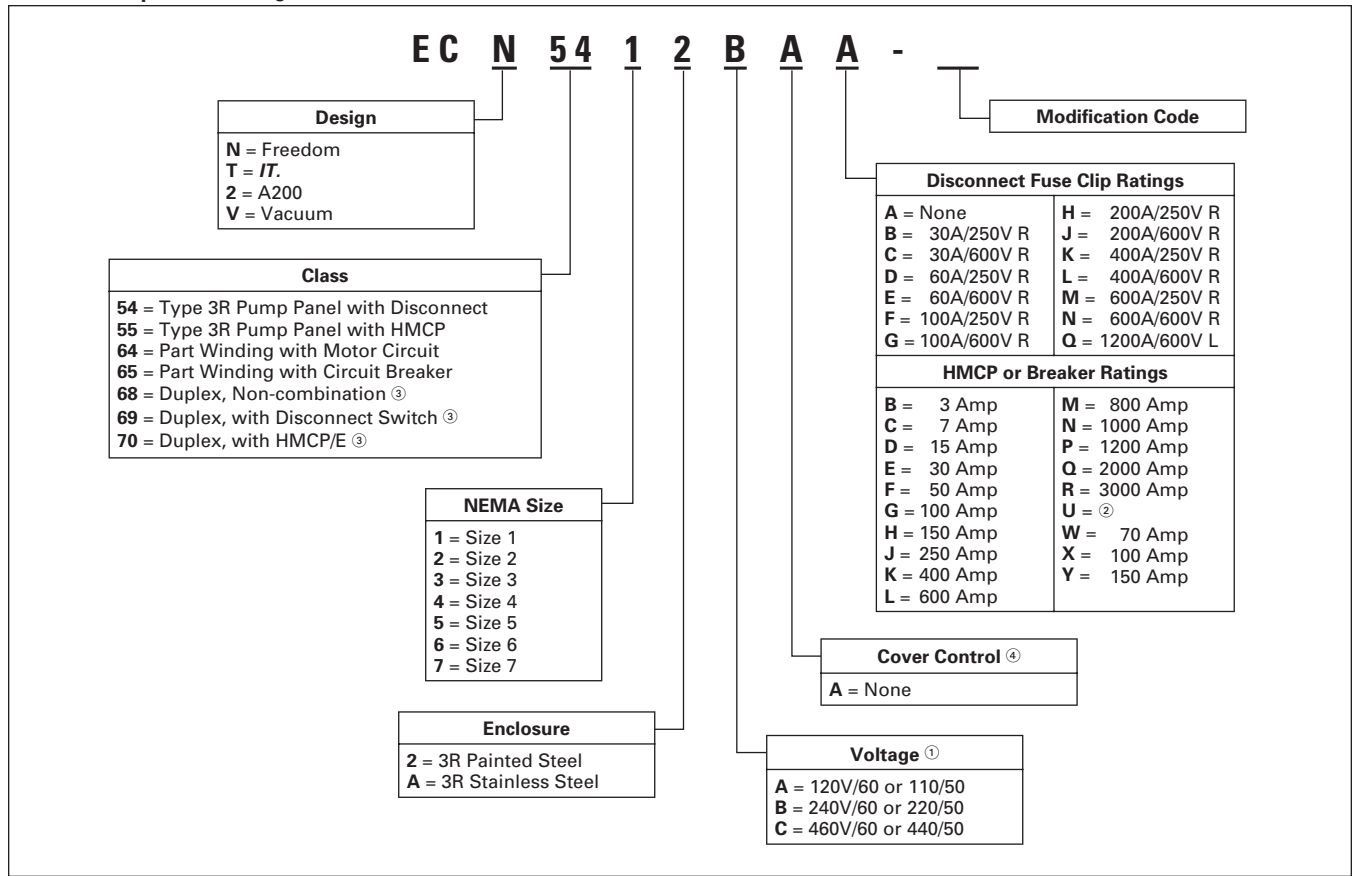
Table 8-2. Freedom SSOL Overload Relays

NEMA Size	Full Load Current Adjustment Range (A)	3-Phase Manual Reset Overload		3-Phase Automatic/Manual Reset
		Class 10	Class 20	Class 20
Catalog Number Suffix		R52	R50	R51
00	0.1 – 1.3	G101	G81	G121
	0.3 – 1.0	G102	G82	G122
0 & 1	1.0 – 2.9	G103	G83	G123
	1.6 – 5.0	G104	G84	G124
	3.7 – 12	G105	G85	G125
	12 – 32	G106	G86	G126
2	12 – 37	G107	G87	G127
	14 – 45	G108	G88	G128
3	26 – 85	G109	G89	G129
4	57 – 180	G112	G92	G132
5	96 – 300	G104	G84	G124
6	192 – 600	G104	G84	G124

Example: **R50/G87** = Class 20, 12 – 37 ampere overload for Size 2 starters.

Catalog Number Selection

Table 8-3. Pump Panel Catalog Number Selection



① For other voltages and single-phase applications, consult your Eaton salesperson.
 ② Engineering determination depending on size, horsepower FLA, NEC or other considerations.
 ③ More information on Type 1, 3R, 4X and 12 Duplex Pump Panels is on **Page 8-17**. Product Selection is on **Page 8-19**.
 ④ HOA selector switch and START pushbutton provided as standard, except for *IT*, where HOA selector switch is provided as standard.

IT. — Fusible Disconnect

Product Description

- Solid-State OL Relay
- Suitable for Franklin Motors

Standard ECT54 controllers have a HAND/OFF/AUTO selector switch on the enclosure and are wired as illustrated in Figure 8-1. All controllers come with DC power supply.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to A. Type 3R Rating will still apply.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see Page 8-4.

Note: 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.

Wiring Diagram

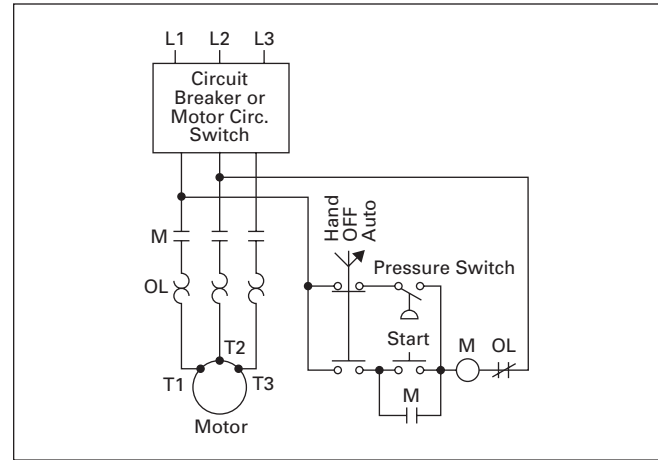


Figure 8-1. Typical Wiring Diagram

Product Selection

Table 8-4. Class ECT54 — Combination Pump Panel — Fusible Disconnect

Motor Voltage ①	Max. hp 50/60 Hz	NEMA Size	Fuse Clip Rating		Narrow Width ②	Standard Width ②
			Amperes	Volts		
230 460 —	7-1/2 10 —	1	30 30 Not Installed	250 600 Not Installed	ECT5412BAB-E14 ECT5412CAC-E14 ECT5412CAA-E14	ECT5412BAB ECT5412CAC ECT5412CAA
230 460 —	15 25 —	2	60 60 Not Installed	250 600 Not Installed	ECT5422BAD-E14 ECT5422CAE-E14 ECT5422CAA-E14	ECT5422BAD ECT5422CAE ECT5422CAA
230 460 —	30 50 —	3	100 100 Not Installed	250 600 Not Installed	— — —	ECT5432BAF ECT5432CAG ECT5432CAA
230 460 —	50 100 —	4	200 200 Not Installed	250 600 Not Installed	— — —	ECT5442BAH ECT5442CAJ ECT5442CAA
230 460 —	100 200 —	5	400 400 —	250 600 —	— — —	ECT5452BAK ECT5452CAL
230 460 —	200 400 —	6	600 600 —	250 600 —	— — —	ECT5462BAM ECT5462CAN

① Dual element fuse ratings.

② Add modification code C34 for Control Power Transformer.

Table 8-5. Solid-State Overload Range Codes

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

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- Panel Space Page 8-7
- Dimensions Page 15-9
- Modifications Page 16-40

Product Description

- Solid-State OL Relay
- Suitable for Franklin Motors

Standard ECT55 controllers have a HAND/OFF/AUTO selector switch on the enclosure and are wired as illustrated in **Figure 8-3**. Controllers provided with 24V DC as standard.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R Rating will still apply.

Dimensions

Table 8-6. Panel Space

Panel Size	NEMA Size	Position (see Figure 8-2)	Approximate Dimensions in Inches (mm)	
			Width W	Height H
Narrow ①	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 B	10.0 (254) 15.0 (381)	22.0 (559) 12.0 (305)
Oversize	1 – 2	—	12.0 (318)	39.0 (991)
	3	—	11.0 (279)	39.0 (991)

① Space is between disconnect switch or circuit breaker and starter.

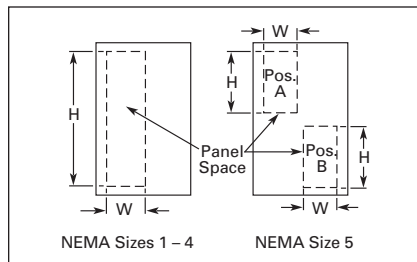


Figure 8-2. Panel Space

Product Selection

Table 8-7. Class ECT55 — Combination Pump Panel — Circuit Breaker

Motor Voltage	Max. hp 50/60 Hz	NEMA Size	Circuit Breaker Type	Narrow Width ①	Standard Width ①
				Catalog Number	Catalog Number
230	1	1	HMCP E 7A	ECT5512BAC-E14	ECT5512BAC
	2		HMCP E 15A	ECT5512BAD-E14	ECT5512BAD
	7-1/2		HMCP E 30A	ECT5512BAE-E14	ECT5512BAE
460	3/4	2	HMCP E 3A	ECT5512CAB-E14	ECT5512CAB
	2		HMCP E 7A	ECT5512CAC-E14	ECT5512CAC
	5		HMCP E 15A	ECT5512CAD-E14	ECT5512CAD
	10		HMCP E 30A	ECT5512CAE-E14	ECT5512CAE
230	15	2	HMCP E 50A	ECT5522BAF-E14	ECT5522BAF
460	25		HMCP E 50A	ECT5522CAF-E14	ECT5522CAF
230	30	3	HMCP E 100A	—	ECT5532BAG
460	50		HMCP E 100A	—	ECT5532CAG
230	50	4	HMCP 150A	—	ECT5542BAH
460	100		HMCP 150A	—	ECT5542CAH
230	75	5	HMCP 250A	—	ECT5552BAJ
230	100		HMCP 400A	—	ECT5552BAK
460	150		HMCP 250A	—	ECT5552CAJ
460	200		HMCP 400A	—	ECT5552CAK
230	125	6	HMCP 600A	—	ECT5562BAL
230	200		MD 800A	—	ECT5562BAM
460	300		HMCP 600A	—	ECT5562CAL
460	400		MD 800A	—	ECT5562CAM

① Add modification code **C34** for Control Power Transformer.

Note: For Solid-State Overload Range Codes, See **Table 8-5** on **Page 8-6**.

Wiring Diagram

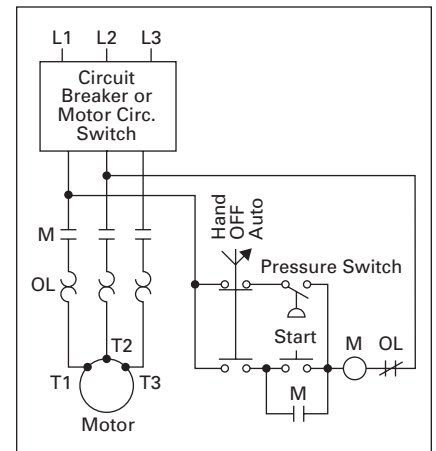


Figure 8-3. Typical Wiring Diagram

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 Modifications..... **Page 16-40**



*Narrow Width
Size 2 Type 3R*

8

Product Description

- 3-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 in **Figure 8-4**.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to A. Type 3R Rating will still apply.

Accessories

Table 8-8. C351 — Fuse Clip Selection — 3-Pole (3 Fuses)

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

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

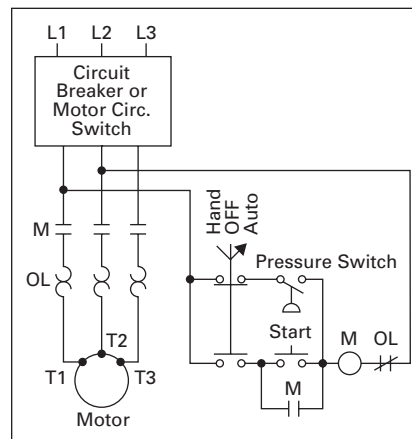


Figure 8-4. Typical Wiring Diagram

Product Selection

Table 8-9. Class ECN54 — Combination Pump Panel — Fusible Disconnect

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

Starters do not include heater packs. Select 1 carton of 3 heater packs.
Heater pack selection, **Page 16-6.**
Starters with Electronic Overload — See **Page 16-45** of Modification Codes.

- 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 from **Table 8-8.**
- ③ To order without the START pushbutton, add Modification Code **P6.**

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to **A.** Type 3R Rating will still apply.

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, 8th digit in Catalog Number with proper Code Suffix from **Table 8-10.**

Example: For 600V 60 Hz coil, change ECN5412BAC to ECN5412DAC

Table 8-10. 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

Product Description

- 3-Phase Magnetic
- Interchangeable Heater OLR

These ECN55 Pump Controllers feature the Cutler-Hammer 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 8-8**.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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.

8 **Note:** Stainless Steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R Rating will still apply.

Dimensions

Table 8-11. Panel Space

Panel Size	NEMA Size	Position (see Figure 8-5)	Approximate Dimensions in Inches (mm)	
			Width W	Height H
Narrow ①	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 B	10.0 (254) 15.0 (381)	22.0 (559) 12.0 (305)
Oversize	1 – 2	—	12.0 (318)	39.0 (991)
	3	—	11.0 (279)	39.0 (991)

① Space is between disconnect switch or circuit breaker and starter.

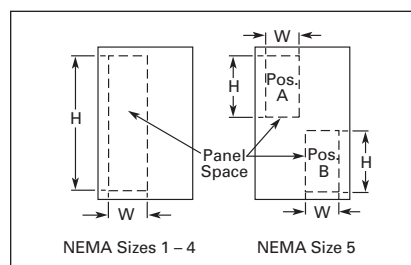


Figure 8-5. Panel Space

Product Selection

Table 8-12. Class ECN55 — Combination Pump Panel — Circuit Breaker

Motor Voltage	Max. hp 50/60 Hz	NEMA Size	Circuit Breaker Type	Narrow Width ②	Standard Width ②	
				Catalog Number	Catalog Number	
230	1 3 7-1/2	1	HMCPE 7A HMCPE 15A HMCPE 30A	ECN5512BAC-E14 ECN5512BAD-E14 ECN5512BAE-E14	ECN5512BAC ECN5512BAD ECN5512BAE	
460	1 3 5 10		HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	ECN5512CAB-E14 ECN5512CAC-E14 ECN5512CAD-E14 ECN5512CAE-E14	ECN5512CAB ECN5512CAC ECN5512CAD ECN5512CAE	
230 460	10 25		HMCPE 50A HMCPE 50A	ECN5522BAF-E14 ECN5522CAF-E14	ECN5522BAF ECN5522CAF	
230 460	30 50	3	HMCPE 100A HMCPE 100A	— —	ECN5532BAG ECN5532CAG	
230 460	50 100	4	HMCP 150A HMCP 150A	— —	ECN5542BAH ECN5542CAH	
230 230 460 460	60 100 150 200	5	HMCP 250A HMCP 400A HMCP 250A HMCP 400A	— — — —	ECN5552BAJ ECN5552BAK ECN5552CAJ ECN5552CAK	
230 230 460 460	125 200 300 400		6	HMCP 600A MD 800A HMCP 600A MD 800A	— — — —	ECN5562BAL ECN5562BAM ECN5562CAL ECN5562CAM
230 230 460 460	250 300 500 600		7 ③	④ ④ ④ ④	— — — —	ECN5572BAU ECN5572BAU ECN5572CAU ECN5572CAU

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

- ② To order without the START pushbutton, add Mod Code **P6**.
- ③ Consult factory in the event ground fault protection is required.
- ④ 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, 8th digit in Catalog Number with proper Code Suffix from **Table 8-13**. Example: For 600V 60 Hz coil, change ECN5512CAC to ECN5512DAC.

Table 8-13. 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

Kits **Page 8-4**
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**Narrow Width
Size 2 Type 3R**

Product Description

- 3-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 in **Figure 8-6**.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R Rating will still apply.

Wiring Diagram

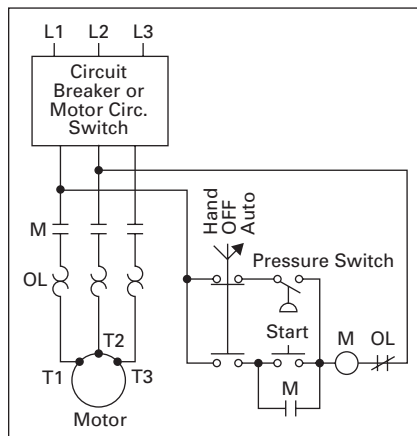


Figure 8-6. Typical Wiring Diagram

Product Selection

Table 8-14. Class EC254 — Combination Vacuum Pump Panel — Fusible Disconnect

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

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

- 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 from **Table 8-8**.
- ③ To order without the START pushbutton, add Modification Code **P6**.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R Rating will still apply.

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, 8th digit in Catalog Number with proper Code Suffix from **Table 8-15**.

Example: For 600V 60 Hz coil, change EC25412BAC to EC25412DAC

Table 8-15. 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

Product Description

- 3-Phase Magnetic
- Interchangeable Heater OLR

These ECN55 Pump Controllers feature the Cutler-Hammer 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 8-11**.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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.

Note: Stainless Steel enclosure may be ordered by changing the seventh digit to **A**. Type 3R Rating will still apply.

Product Selection

Table 8-16. Class EC255 — Combination Vacuum Pump Panel — Circuit Breaker

Motor Voltage	Max. hp 50/60 Hz	NEMA Size	Circuit Breaker Type	Narrow Width ^①	Standard Width ^②
				Catalog Number	Catalog Number
230	1	1	HMCPE 7A	EC25512BAC-E14	EC25512BAC
	3		HMCPE 15A	EC25512BAD-E14	EC25512BAD
	7-1/2		HMCPE 30A	EC25512BAE-E14	EC25512BAE
460	1	1	HMCPE 3A	EC25512CAB-E14	EC25512CAB
	3		HMCPE 7A	EC25512CAC-E14	EC25512CAC
	5		HMCPE 15A	EC25512CAD-E14	EC25512CAD
	10		HMCPE 30A	EC25512CAE-E14	EC25512CAE
230	10	2	HMCPE 50A	EC25522BAF-E14	EC25522BAF
460	25		HMCPE 50A	EC25522CAF-E14	EC25522CAF
230	30	3	HMCPE 100A	—	EC25532BAG
460	50		HMCPE 100A	—	EC25532CAG
230	50	4	HMCP 150A	—	EC25542BAH
460	100		HMCP 150A	—	EC25542CAH
230	60	5	HMCP 250A	—	EC25552BAJ
230	100		HMCP 400A	—	EC25552BAK
460	150		HMCP 250A	—	EC25552CAJ
460	200		HMCP 400A	—	EC25552CAK
230	125	6	HMCP 600A	—	EC25562BAL
230	200		MD 800A	—	EC25562BAM
460	300		HMCP 600A	—	EC25562CAL
460	400		MD 800A	—	EC25562CAM
230	250	7 ^②	③	—	EC25572BAU
230	300		③	—	EC25572BAU
460	500		③	—	EC25572CAU
460	600		③	—	EC25572CAU

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

- ① To order without the START pushbutton, add Mod 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.

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, 8th digit in Catalog Number with proper Code Suffix from **Table 8-17**. Example: For 600V 60 Hz coil, change EC25512CAC to EC25512DAC.

Table 8-17. 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

Dimensions

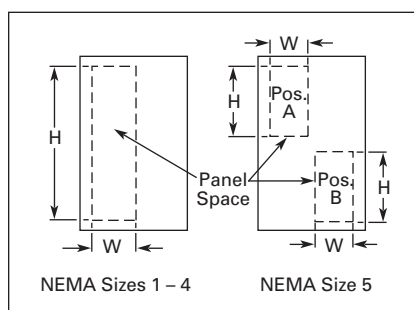


Figure 8-7. Panel Space

Table 9. Panel Space

NEMA Size	Position (see Figure 8-7)	Approximate Dimensions in Inches (mm)	
		Width W	Height H
Panel Size — Narrow ^①			
1-2	—	5.5 (140)	6.0 (152)
Panel Size — 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)
Panel Size — Oversize			
1-2	—	12.0 (318)	39.0 (991)
3	—	11.0 (279)	39.0 (991)

① Space is between disconnect switch or circuit breaker and starter.

Kits **Page 8-4**
 Modifications Codes **Page 16-40**

Product Description

- 3-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 in **Figure 8-8**.

Note: Type 3R enclosure does not include top conduit hubs. Hubs are available in kit form — see **Page 8-4**.

Note: 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 **Page 18-2** for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

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

Wiring Diagram

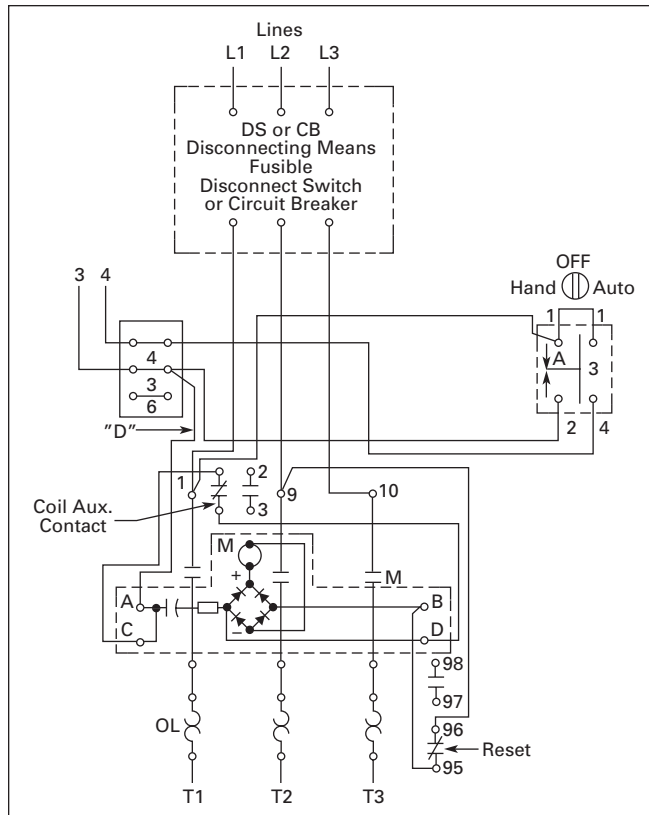


Figure 8-8. Typical Wiring Diagram

Product Selection

Table 8-1. Class ECV54 — Combination Vacuum Pump Panel — Fusible Disconnect

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

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

Table 8-2. Class ECV55 — Combination Vacuum Pump Panel — Circuit Breaker

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

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

Kits **Page 8-4**
 Dimensions **Page 15-9**
 Modifications **Page 16-40**



Irrigation Pump Panel

Product Description

Eaton's Cutler-Hammer® 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 @ 460V. These controllers have two styles of overload protection available, interchangeable heater and solid-state overload (SSOL).

- The interchangeable heater overload (C306) utilizes individual heater packs to allow customers the ability to use various heater styles.

- The solid-state overload relay provides enhanced protection and adjustment ranges as compared to bimetallic overload relays. Trip Class 10 and 20 are available, along with a very wide trip current range to make setup very easy.

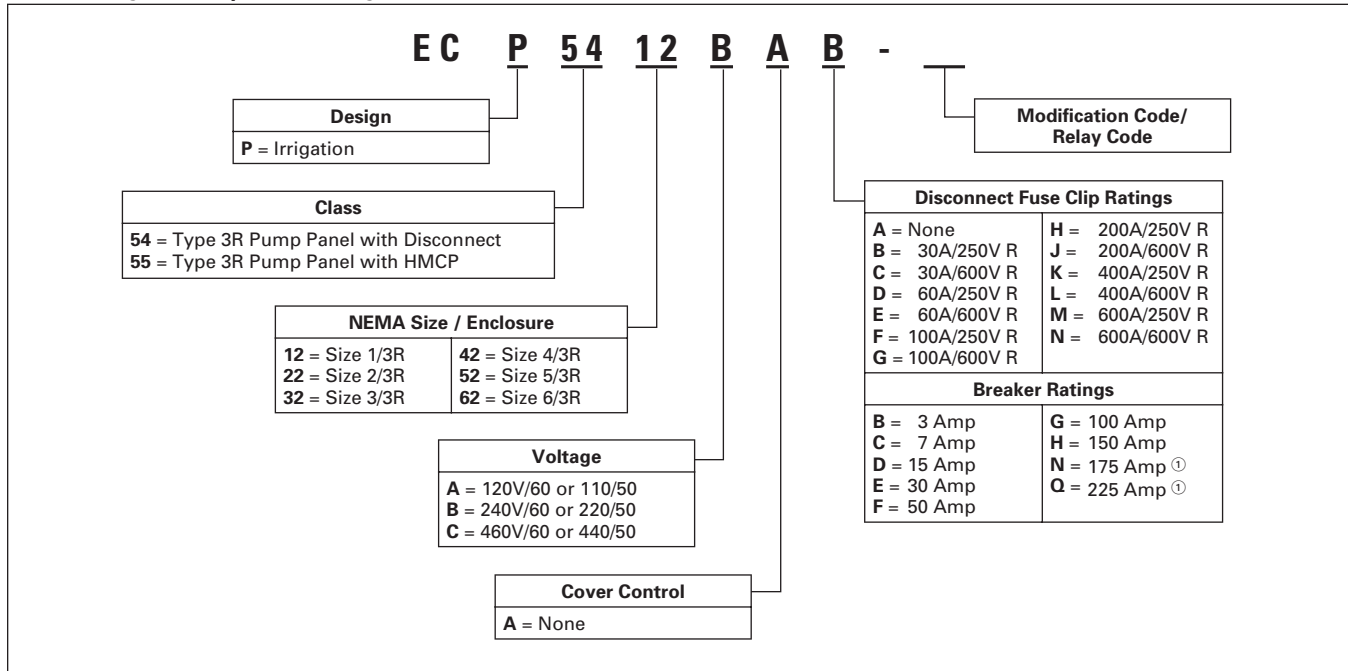
Standards and Certifications

Note: See Page 18-2 for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

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

Catalog Number Selection

Table 8-3. Irrigation Pump Panel Catalog Number Selection



① Thermal magnetic breakers.

Product Selection

Standard ECP54 controllers have a HAND/OFF/AUTO selector switch and START pushbutton mounted on the enclosure and are wired as illustrated in **Figure 8-9**.

Table 8-4. Class ECP54 — Combination Irrigation Pump Panel — Fusible Disconnect

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

Starters do not include heater packs. Select 1 carton of 3 heater packs. Heater pack selection, **Page 16-6**.

① Dual element fuse ratings.
② Class R fuse clips.

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, 8th digit in Catalog Number with proper Code Suffix from **Table 8-5**.

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

Table 8-5. 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

Table 8-6. C351 — Fuse Clip Selection — 3-Pole (3 Fuses)

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

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.

Product Selection

Table 8-7. Class ECP54 — Combination Irrigation Pump Panel with Solid-State Overload — Fusible Disconnect ①

Motor Voltage	Max. hp	NEMA Size	Fuse Clip Amperes	Trip Range	Catalog Number
240V	1	1	30	1.0 – 5.0	ECP5412BAB-R60/C
	3	1	30	1.6 – 8.0	ECP5412BAB-R60/D
	7-1/2	1	30	6.4 – 32	ECP5412BAB-R60/E
	10	2	60	9 – 45	ECP5422BAD-R60/F
480V	15	2	60	9 – 45	ECP5422BAD-R60/F
	25	3	100	15 – 75	ECP5432BAF-R60/G
	1	1	30	1.0 – 5.0	ECP5412CAC-R60/C
	2	1	30	1.6 – 8.0	ECP5412CAC-R60/D
	5	1	30	6.4 – 32	ECP5412CAC-R60/E
	10	1	30	6.4 – 32	ECP5412CAC-R60/E
	20	2	60	9 – 45	ECP5422CAE-R60/F
	25	2	60	9 – 45	ECP5422CAE-R60/F
50	3	100	15 – 75	ECP5432CAG-R60/G	

① Motor FLA based on NEC Table. Overload has selectable trip class 5, 10, 20 and 30 and Auto or Manual settings.

Table 8-8. Class ECP55 — Combination Irrigation Pump Panel with Solid-State Overload — Circuit Breaker ②

Motor Voltage	Max. hp	NEMA Size	Breaker Rating	Trip Range	Catalog Number
240V	1	1	7	1.0 – 5.0	ECP5512BAC-R60/C
	3	1	15	1.6 – 8.0	ECP5512BAD-R60/D
	7-1/2	1	30	6.4 – 32	ECP5512BAE-R60/E
	10	2	50	6.4 – 32	ECP5522BAF-R60/E
	15	2	50	9 – 45	ECP5522BAF-R60/F
480V	25	3	100	15 – 75	ECP5532BAG-R60/G
	50	4	100	30 – 150	ECP5532BAH-R60/J
	1	1	30	1.0 – 5.0	ECP5512CAB-R60/C
	2	1	30	1.6 – 8.0	ECP5512CAC-R60/D
	5	1	30	6.4 – 32	ECP5512CAD-R60/E
	10	1	30	6.4 – 32	ECP5512CAE-R60/E
	20	2	60	9 – 45	ECP5522CAE-R60/E
	25	2	60	9 – 45	ECP5522CAF-R60/F
50	3	100	15 – 75	ECP5532CAG-R60/G	
100	4	150	30 – 150	ECP5532CAG-R60/J	

② Motor FLA based on NEC Table. Overload has selectable trip class 5, 10, 20 and 30 and Auto or Manual settings.

Table 8-9. Class ECP55 — Combination Irrigation Pump Panel — Circuit Breaker

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

Relays

Table 8-10. Freedom Solid-State Overload Relays

C396 Overload Relay ③	NEMA Size	Full Load Current Adjustment Range (A)	3-Phase Automatic/Manual Reset
			Class 5/10/20/30
Catalog Number Suffix \Rightarrow ④			R61_
	00	0.1 – 0.5 0.4 – 2.0 1.0 – 5.0 1.6 – 8.0	A B C D
	0, 1	0.1 – 0.5 0.4 – 2.0 1.0 – 5.0 1.6 – 8.0 6.4 – 32	A B C D E
	2	9 – 45	F
	3	15 – 75 22 – 110	G H
	4	30 – 150	J
	5	96 – 300	C
	6	192 – 600	C

③ Features:

- Self Powered
- Phase Loss Protection
- Current Adjustment Knob
- $\pm 1\%$ Repeat Accuracy
- 1NO and 1NC Isolated Contacts

④ Complete Modification Code includes overload range. Example R61/C.

Wiring Diagram

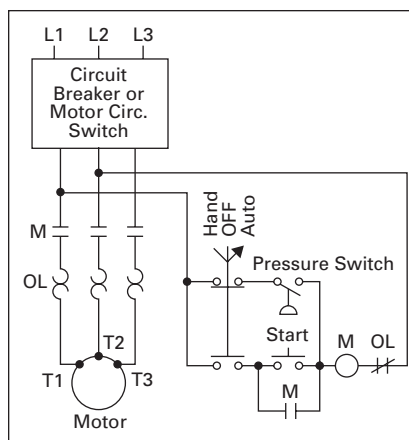
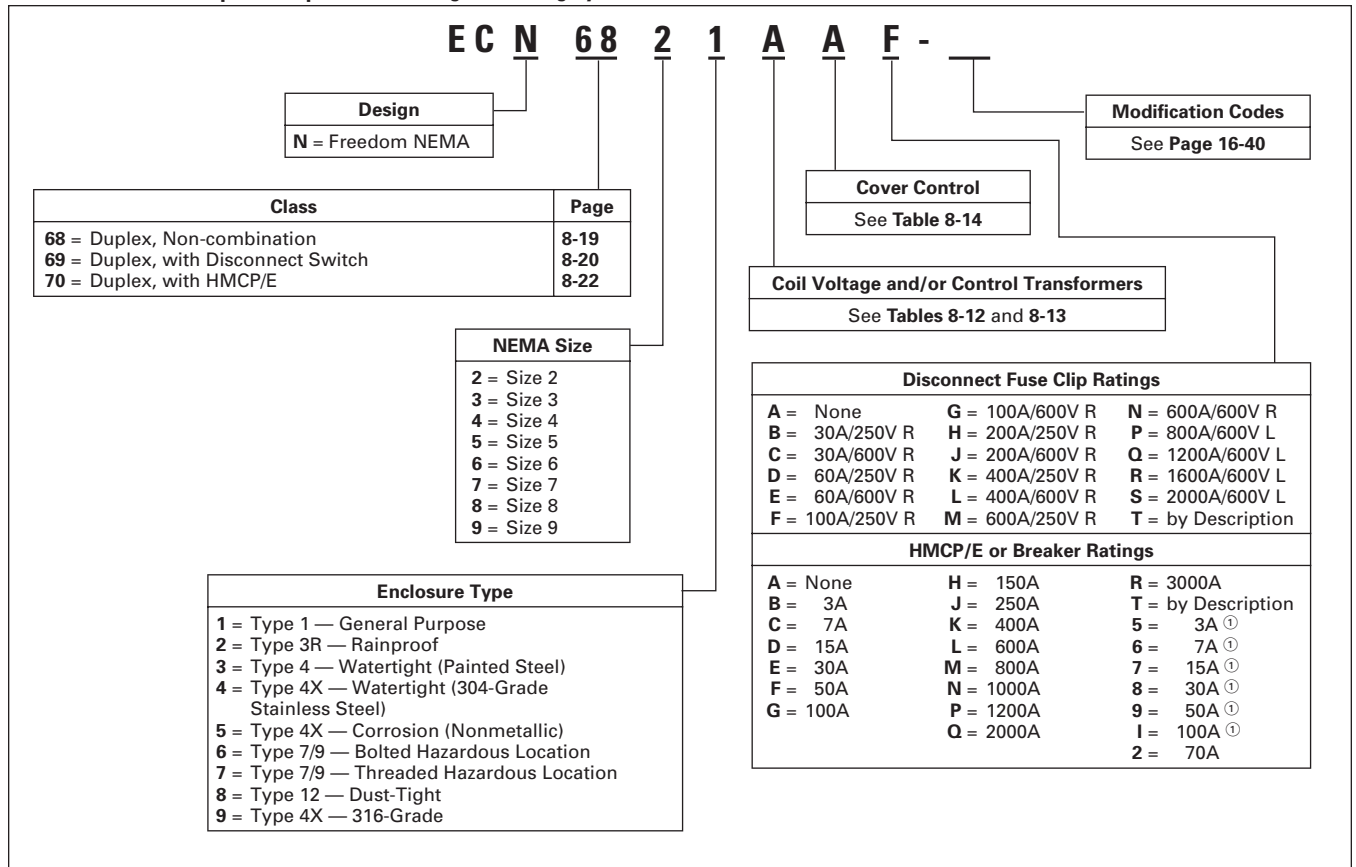


Figure 8-9. Typical Wiring Diagram

Catalog Number Selection

Table 8-11. Freedom Duplex Pump Panels Catalog Numbering System



^① Use for Sizes 0 – 3, HMCP 600V applications only.

Table 8-12. Magnetic Coil Codes (System Voltage) ^②

Code	Magnet Coil	Code	Magnet Coil	Code	Magnet Coil
A	120/60 110/50	K	240/50	U	24/50
B	240/60 220/50	L	380/50	V	32/50
C	460/60 440/50	M	415/50	W	48/60
D	575/60 550/50	P	12V DC	X	104 – 120/60
E	208/60	Q	24V DC	Y	48/50
G	550/50	R	48V DC	Z	By Description
H	277/60	S	125V DC		
J	208 – 240/60	T	24/60		

^② When control power transformer modification codes (C1 – C11) are used or when starter class includes CPT (i.e. ECN07, 18) see table to the right for system voltage code.

Table 8-13. 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	

Standards and Certifications

Note: See **Page 18-2** for additional information on Standards and Certifications that apply to all Cutler-Hammer Enclosed Control products.

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

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 to the right. Example: to order an **ECN0514CAA** with START/STOP pushbuttons and a red pilot light, change the **A** to a **C**, i.e. **ECN0514CCA**.



Figure 8-10.



Figure 8-11.

Table 8-14. Non-reversing Cover Control

Description	Factory Installed Flange Control			Field Installation Kits	
	Position 9 Alpha	Type 1 Non-combination ^① See Figure 8-10	All Others ^② See Figure 8-11	Type 1 Non-combination ^① See Figure 8-10 Catalog Number	All Others ^② See Figure 8-11 Catalog Number
No Cover Mounted Pilot Devices START/STOP Pushbuttons with Red RUN Pilot Light with Red RUN/Green OFF Lights	A B C D	■ ■ ■ ■	■ ■ ■ ■	C400GK0 C400GK1 C400GK12 ^③ C400GK16 ^③	— C400T1 — —
ON/OFF Pushbuttons with Red RUN Pilot Light with Red RUN/Green OFF Lights	E F G	— — —	■ ■ ■	— — —	C400T2 — —
HAND/OFF/AUTO Selector Switch with Red RUN Pilot Light with Red RUN/Green OFF Lights	H J K	■ ■ ■	■ ■ ■	C400GK3 C400GK32 ^③ C400GK36 ^③	C400T12 — —
START Pushbutton ON Pushbutton OFF Pushbutton Red RUN Pilot Light Green OFF Red RUN/Green OFF Pilot Lights	L M N P Q R	— — — ■ ■ ■	■ ■ ■ ■ ■ ■	— — — C400GK42 ^③ C400GK41 ^③ C400GK46 ^③	C400T3 C400T4 C400T5 C400T9 ^③ C400T10 ^③ C400T11 ^③
START/STOP Selector Switch with Red RUN Pilot Light with Red RUN/Green OFF Lights	S T U	— — —	■ ■ ■	— — —	C400T13 — —
ON/OFF Selector Switch with Red RUN Pilot Light with Red RUN/Green OFF Lights	V W X	— — —	■ ■ ■	— — —	C400T14 — —

^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
- 3-Phase Magnetic, 3-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

Table 8-15. Class ECN68 — Non-combination Duplex Pump Panels with Automatic Alternator ⁽²⁾⁽³⁾

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X ⁽⁴⁾ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ⁽¹⁾	Component Starter (Open) ⁽⁵⁾
				Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0	—	—	120	ECN6801AAA	ECN6802AAA	ECN6804AAA	ECN6808AAA	AN16BN0AC
	200	3	208	ECN6801EAA	ECN6802EAA	ECN6804EAA	ECN6808EAA	AN16BN0EC
	230	3	240	ECN6801BAA	ECN6802BAA	ECN6804BAA	ECN6808BAA	AN16BN0BC
	460	5	480	ECN6801CAA	ECN6802CAA	ECN6804CAA	ECN6808CAA	AN16BN0CC
	575	5	600	ECN6801DAA	ECN6802DAA	ECN6804DAA	ECN6808DAA	AN16BN0DC
1	—	—	120	ECN6811AAA	ECN6812AAA	ECN6814AAA	ECN6818AAA	AN16DN0AB
	200	7-1/2	208	ECN6811EAA	ECN6812EAA	ECN6814EAA	ECN6818EAA	AN16DN0EB
	230	7-1/2	240	ECN6811BAA	ECN6812BAA	ECN6814BAA	ECN6818BAA	AN16DN0BB
	460	10	480	ECN6811CAA	ECN6812CAA	ECN6814CAA	ECN6818CAA	AN16DN0CB
	575	10	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	25	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	50	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	100	600	ECN6841DAA	ECN6842DAA	ECN6844DAA	ECN6848DAA	AN16NN0D

Starters do not include heater packs. Select 2 cartons of 3 heater packs (2 overload relays — 1 for each motor). Heater Pack Selection, Page 16-6.

- ⁽¹⁾ All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ⁽²⁾ Circuitry arranged for double-pole pilot devices.
- ⁽³⁾ All duplexes come standard with alternator. To remove, add Modification Code **D12**.
- ⁽⁴⁾ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: 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 Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **Tab 14**.
- ⁽⁵⁾ Requires 2 starters.

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Combination

Features

- Full Voltage Non-reversing Combination
- 3-Phase Magnetic, 3-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

Table 8-16. Class ECN69 — Combination Duplex Pump Panels with Automatic Alternator — Fusible Disconnect ^{④⑤}

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ^①	Fuse Clip Amps.	Type 1 General Purpose	Type 3R Rainproof	Type 4X ^⑥ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ^{②③}	Component Starter (Open) ^⑦
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
0	230	3	120	30A	ECN6901AAB	ECN6902AAB	ECN6904AAB	ECN6908AAB	AN16BN0AC
	460	5	120		ECN6901AAC	ECN6902AAC	ECN6904AAC	ECN6908AAC	AN16BN0AD
	200	3	208		ECN6901EAB	ECN6902EAB	ECN6904EAB	ECN6908EAB	AN16BN0EC
	230	3	240		ECN6901BAB	ECN6902BAB	ECN6904BAB	ECN6908BAB	AN16BN0BC
	460	5	480		ECN6901CAC	ECN6902CAC	ECN6904CAC	ECN6908CAC	AN16BN0CC
	575	5	600		ECN6901DAC	ECN6902DAC	ECN6904DAC	ECN6908DAC	AN16BN0DC
1	230	7-1/2	120	30A	ECN6911AAB	ECN6912AAB	ECN6914AAB	ECN6918AAB	AN16DN0AB
	460	10	120		ECN6911AAC	ECN6912AAC	ECN6914AAC	ECN6918AAC	AN16DN0AD
	200	7-1/2	208		ECN6911EAB	ECN6912EAB	ECN6914EAB	ECN6918EAB	AN16DN0EC
	230	7-1/2	240		ECN6911BAB	ECN6912BAB	ECN6914BAB	ECN6918BAB	AN16DN0BC
	460	10	480		ECN6911CAC	ECN6912CAC	ECN6914CAC	ECN6918CAC	AN16DN0CC
	575	10	600		ECN6911DAC	ECN6912DAC	ECN6914DAC	ECN6918DAC	AN16DN0DC
2	230	15	120	60A	ECN6921AAD	ECN6922AAD	ECN6924AAD	ECN6928AAD	AN16GN0AB
	460	25	120		ECN6921AAE	ECN6922AAE	ECN6924AAE	ECN6928AAE	AN16GN0AD
	200	10	208		ECN6921EAD	ECN6922EAD	ECN6924EAD	ECN6928EAD	AN16GN0EC
	230	15	240		ECN6921BAD	ECN6922BAD	ECN6924BAD	ECN6928BAD	AN16GN0BC
	460	25	480		ECN6921CAE	ECN6922CAE	ECN6924CAE	ECN6928CAE	AN16GN0CC
	575	25	600		ECN6921DAE	ECN6922DAE	ECN6924DAE	ECN6928DAE	AN16GN0DC
3	230	30	120	100A	ECN6931AAF	ECN6932AAF	ECN6934AAF	ECN6938AAF	AN16KN0A
	460	50	120		ECN6931AAG	ECN6932AAG	ECN6934AAG	ECN6938AAG	AN16KN0AD
	200	25	208		ECN6931EAF	ECN6932EAF	ECN6934EAF	ECN6938EAF	AN16KN0EC
	230	30	240		ECN6931BAF	ECN6932BAF	ECN6934BAF	ECN6938BAF	AN16KN0BC
	460	50	480		ECN6931CAG	ECN6932CAG	ECN6934CAG	ECN6938CAG	AN16KN0CC
	575	50	600		ECN6931DAG	ECN6932DAG	ECN6934DAG	ECN6938DAG	AN16KN0DC
4	230	50	120	200A	ECN6941AAH	ECN6942AAH	ECN6944AAH	ECN6948AAH	AN16NN0A
	460	100	120		ECN6941AAJ	ECN6942AAJ	ECN6944AAJ	ECN6948AAJ	AN16NN0AD
	200	40	208		ECN6941EAH	ECN6942EAH	ECN6944EAH	ECN6948EAH	AN16NN0EC
	230	50	240		ECN6941BAH	ECN6942BAH	ECN6944BAH	ECN6948BAH	AN16NN0BC
	460	100	480		ECN6941CAJ	ECN6942CAJ	ECN6944CAJ	ECN6948CAJ	AN16NN0CC
	575	100	600		ECN6941DAJ	ECN6942DAJ	ECN6944DAJ	ECN6948DAJ	AN16NN0DC

Starters do not include heater packs. Select 2 cartons of 3 heater packs (2 overload relays — 1 for each motor). Heater Pack Selection, Page 16-6.

- ① 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.
- ② All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ③ Type 12 enclosure is without safety door interlock.
- ④ Circuitry arranged for double-pole pilot devices.
- ⑤ All duplexes come standard with alternator. To remove, add Modification Code **D12**.
- ⑥ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: 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 Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **Tab 14**.
- ⑦ Requires 2 starters.

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Combination

Table 8-17. Class ECN69 — Combination Duplex Pump Panels with Automatic Alternator — Non-fusible Disconnect ^{③④}

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

Starters do not include heater packs. Select 2 cartons of 3 heater packs (2 overload relays — 1 for each motor). Heater Pack Selection, Page 16-6.

- ① All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ② Type 12 enclosure is without safety door interlock.
- ③ Circuitry arranged for double-pole pilot devices.
- ④ All duplexes come standard with alternator. To remove, add Modification Code **D12**.
- ⑤ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: 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 Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **Tab 14**.
- ⑥ Requires 2 starters.

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Combination

Table 8-18. Class ECN70 — Combination Duplex Pump Panels with Automatic Alternator — Circuit Breaker ^{④⑤}

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ^①	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X ^⑥ Watertight & Dust-Tight Stainless Steel	Type 12 Dust-Tight Industrial External Reset ^{②③}	Component Starter (Open) ^⑦	
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number	
0	200	1 3	208	HMCPE 7A HMCPE 15A	ECN7001EAC ECN7001EAD	ECN7002EAC ECN7002EAD	ECN7004EAC ECN7004EAD	ECN7008EAC ECN7008EAD	AN16BN0EC	
	230	1 3	240	HMCPE 7A HMCPE 15A	ECN7001BAC ECN7001BAD	ECN7002BAC ECN7002BAD	ECN7004BAC ECN7004BAD	ECN7008BAC ECN7008BAD	AN16BN0BC	
	460	3/4 2 5	480	HMCPE 3A HMCPE 7A HMCPE 15A	ECN7001CAB ECN7001CAC ECN7001CAD	ECN7002CAB ECN7002CAC ECN7002CAD	ECN7004CAB ECN7004CAC ECN7004CAD	ECN7008CAB ECN7008CAC ECN7008CAD	AN16BN0CC	
	575	1 3 3	600	HMCP 3A HMCP 7A HMCP 15A	ECN7001DAB ECN7001DAC ECN7001DAD	ECN7002DAB ECN7002DAC ECN7002DAD	ECN7004DAB ECN7004DAC ECN7004DAD	ECN7008DAB ECN7008DAC ECN7008DAD	AN16BN0DC	
1	200	1 2 7-1/2	208	HMCPE 7A HMCPE 15A HMCPE 30A	ECN7011EAC ECN7011EAD ECN7011EAE	ECN7012EAC ECN7012EAD ECN7012EAE	ECN7014EAC ECN7014EAD ECN7014EAE	ECN7018EAC ECN7018EAD ECN7018EAE	AN16DN0EB	
	230	1 2 7-1/2	240	HMCPE 7A HMCPE 15A HMCPE 30A	ECN7011BAC ECN7011BAD ECN7011BAE	ECN7012BAC ECN7012BAD ECN7012BAE	ECN7014BAC ECN7014BAD ECN7014BAE	ECN7018BAC ECN7018BAD ECN7018BAE	AN16DN0BB	
	460	3/4 2 5 10	480	HMCPE 3A HMCPE 7A HMCPE 15A HMCPE 30A	ECN7011CAB ECN7011CAC ECN7011CAD ECN7011CAE	ECN7012CAB ECN7012CAC ECN7012CAD ECN7012CAE	ECN7014CAB ECN7014CAC ECN7014CAD ECN7014CAE	ECN7018CAB ECN7018CAC ECN7018CAD ECN7018CAE	AN16DN0CB	
	575	1 3 7-1/2 10	600	HMCP 3A HMCP 7A HMCP 15A HMCP 30A	ECN7011DAB ECN7011DAC ECN7011DAD ECN7011DAE	ECN7012DAB ECN7012DAC ECN7012DAD ECN7012DAE	ECN7014DAB ECN7014DAC ECN7014DAD ECN7014DAE	ECN7018DAB ECN7018DAC ECN7018DAD ECN7018DAE	AN16DN0DB	
2	200 230 460	10 15 25	208 240 480	HMCPE 50A	ECN7021EAF ECN7021BAF ECN7021CAF	ECN7022EAF ECN7022BAF ECN7022CAF	ECN7024EAF ECN7024BAF ECN7024CAF	ECN7028EAF ECN7028BAF ECN7028CAF	AN16GN0EB AN16GN0BB AN16GN0CB	
	575	25	600	HMCP 50A	ECN7021DAF	ECN7022DAF	ECN7024DAF	ECN7028DAF	AN16GN0DB	
3	200 230 460	25 30 50	208 240 480	HMCPE 100A	ECN7031EAG ECN7031BAG ECN7031CAG	ECN7032EAG ECN7032BAG ECN7032CAG	ECN7034EAG ECN7034BAG ECN7034CAG	ECN7038EAG ECN7038BAG ECN7038CAG	AN16KN0E AN16KN0B AN16KN0C	
	575	50	600	HMCP 100A	ECN7031DAI	ECN7032DAI	ECN7034DAI	ECN7038DAI	AN16KN0D	
	4	200 230 460 575	40 50 100 100	208 240 480 600	HMCP 150A	ECN7041EAH ECN7041BAH ECN7041CAH ECN7041DAH	ECN7042EAH ECN7042BAH ECN7042CAH ECN7042DAH	ECN7044EAH ECN7044BAH ECN7044CAH ECN7044DAH	ECN7048EAH ECN7048BAH ECN7048CAH ECN7048DAH	AN16NN0E AN16NN0B AN16NN0C AN16NN0D

Starters do not include heater packs. Select 2 cartons of 3 heater packs (2 overload relays — 1 for each motor). Heater Pack Selection, Page 16-6.

- ① 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.
- ② All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ③ Type 12 enclosure is without safety door interlock.
- ④ Circuitry arranged for double-pole pilot devices.
- ⑤ All duplexes come standard with alternator. To remove, add Modification Code **D12**.
- ⑥ The Catalog Numbers listed in the Type 4X column are for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: 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 Nonmetallic, change that digit to **5**. For details on these Alternate Enclosures, see **Tab 14**.
- ⑦ Requires 2 starters.

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