

NEMA Vacuum Break Contactors & Starters

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NEMA Vacuum Break Starter

Product Family Overview



*Cat. No. AV10GNOA or V200M5CJC
Vacuum Break Starter*

Product Description

- 3-Phase Magnetic
- 3-Pole Full Voltage
- Non-reversing and Reversing
- 600 and 1500V AC Maximum
- Starters with Interchangeable Heater OLR

Application Description

Eaton's Cutler-Hammer Vacuum Contactors are designed for starting and controlling three-phase, 50/60 Hz, AC motors. Motor full load current should not exceed the contactor current rating. These contactors are built in several versions — the nameplate on a specific contactor states the authorized ratings.

Low voltage vacuum contactors can be applied to a wide range of voltages up to 1500V. These applications include full voltage control of three-phase squirrel cage motors, primary control of low voltage wound rotor motors and circuit switching for low voltage capacitors for power factor improvement.

Features/Benefits

- Rugged, compact, lightweight
- Quiet operation
- Front removable coil and auxiliaries
- Electrical and mechanical interlocking capability
- Low chop interrupters eliminate the need for surge suppressors
- Contact wear indication allows for planned maintenance program
- Long service life
- Manual push-to-reset button on Sizes 5 and 6
- Freedom overload
- SSOL

Operation

The contact structures of these vacuum break contactors are located inside sealed ceramic tubes which have been evacuated of air. Any arc occurring across the contacts upon opening is automatically extinguished because ionized air is not available to sustain it — the arc breaks when the current passes through zero. The arc typically does not survive beyond the first half cycle once the contacts begin to separate. The large arc chutes normally associated with starters of this size are not required. The ceramic tube with the moving and stationary contacts enclosed is called a **vacuum interrupter** or a **bottle**, and there is one bottle for each pole of the contactor. A metal bellows (like a small, circular accordion) within the bottle allows the moving contact to be closed and pulled open from the outside without leaking air into the bottle. Both the bellows and the metal-to-ceramic seals of these state-of-the-art bottles have been refined to the point where the possibility of loss of vacuum has been virtually eliminated.

Contact Force and Altitude

A vacuum contactor is affected by atmospheric pressure on the bellows of the vacuum bottles. Up to an altitude of 6600 feet, the contactor is designed to tolerate normal variations in barometric pressure. If the contactor is to be operated above 6600 feet above sea level, consult Eaton.

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)
- CE Mark available
- ABS Type Approved

Catalog Number Selection

Table 10-1. NEMA Vacuum Break Catalog Numbering System

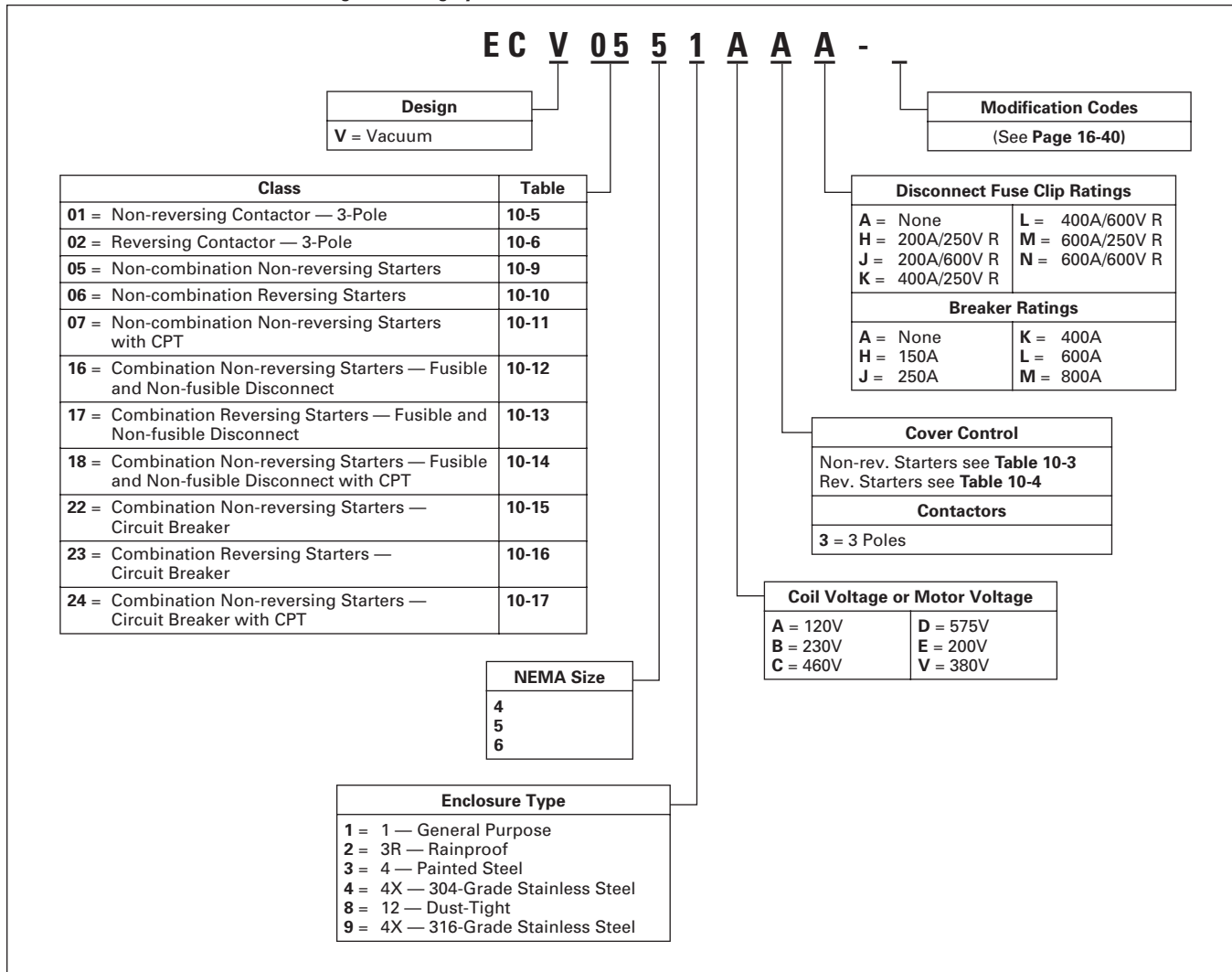


Table 10-2. Alternate "Open" Catalog Numbers

Listed "Open" Catalog Number	Alternate "Open" Catalog Number
AV10FNOA AV10GNOAB AV10JNOAB	V200M4CJC V200M5CJC V200M6CJC
CV10FN3A CV10GN3A CV10JN3A	V201K4CJ V201K5CJZ1 V201K6CJZ1

Note: Above are NEMA rated devices for applications up to 600V. For Special Purpose devices up to 1500V consult Eaton.

Product Family Overview

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

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 **ECV0548AAA** with START/STOP pushbuttons and a red pilot light, change the **A** to a **C**, i.e. **ECV0548ACA**.



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

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 **ECV1748AAH** with FOR/REV/STOP pushbuttons and 2 red pilot lights, change the **A** to a **C**, i.e. **ECV1748ACH**.

Table 10-3. Non-reversing Cover Control Field Kits and Factory Installation

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

① Add Code Letter from 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

② Type 1 Non-combination, Size 4.

③ Type 1 Non-combination, Sizes 5 & 6; Type 3R, 4X, 12 Non-combination, all Sizes; All Combination Control.

Table 10-4. Reversing Cover Control Field Kits and Factory Installation

Description	Factory Installed Flange Control	Field Installation Kits	
	Position 9 Alpha	Type 1 Non-combination ⑤	All Others ⑥
		Catalog Number	Catalog Number
No Cover Mounted Pilot Devices FOR/REV/STOP Pushbuttons with 2 Red Pilot Lights with 2 Red/1 Green Pilot Lights	A	C400GK0	—
	B	C400GR1	C400T6
	C	C400GR14 ④	—
	D	—	—
UP/STOP/DOWN Pushbuttons with 2 Red Pilot Lights	E	C400GR2	—
	F	C400GR24 ④	—
FOR/OFF/REV Selector Switch with 2 Red Pilot Lights with 2 Red/1 Green Pilot Lights	H	—	C400T15
	J	—	—
	K	—	—
Two Red Pilot Lights One Green Pilot Light Two Red/One Green Pilot Lights OPEN/OFF/CLOSE Selector Switch with 2 Red Pilot Lights with 2 Red/1 Green Pilot Lights	P	C400GK44 ④	⑦
	Q	C400GK41 ④	C400T10 ④
	R	—	—
	V	—	C400T16
	W	—	—
	X	—	—

④ Add Code Letter from 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

⑤ Type 1 Non-combination, Size 4.

⑥ Type 1 Non-combination, Sizes 5 & 6; Type 3R, 4X, 12 Non-combination, all Sizes; All Combination Control.

⑦ Order quantity 2 of C400T9④.

Contactors

Product Selection

Table 10-5. Class ECV01 — Non-reversing Contactor — 3-Pole

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage ①	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial	Component Contactor (Open) ③
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	135	—	—	110/120	ECV0141A3A	ECV0142A3A	ECV0144A3A	ECV0148A3A	CV10FN3A
		200	40						
		230	50						
		380	75						
		460	100						
575	100								
5	270	—	—	110/120	ECV0151A3A	ECV0152A3A	ECV0154A3A	ECV0158A3A	CV10GN3A
		200	75						
		230	100						
		380	150						
		460	200						
575	200								
6	540	—	—	110/120	ECV0161A3A	ECV0162A3A	ECV0164A3A	ECV0168A3A	CV10JN3A
		200	150						
		230	200						
		380	300						
		460	400						
575	400								

① Wired for separate control.

② These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: ECV0144A3A. 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**.

③ Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.

Table 10-6. Class ECV02 — Reversing Contactor — 3-Pole

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage ④	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ⑤	Type 12 Dust-Tight Industrial	Component Contactor (Open) ⑥
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	135	—	—	110/120	ECV0241A3A	ECV0242A3A	ECV0244A3A	ECV0248A3A	V211K4CJ
		200	40						
		230	50						
		380	75						
		460	100						
575	100								
5	270	—	—	110/120	ECV0251A3A	ECV0252A3A	ECV0254A3A	ECV0258A3A	V211K5CJZ1
		200	75						
		230	100						
		380	150						
		460	200						
575	200								
6	540	—	—	110/120	ECV0261A3A	ECV0262A3A	ECV0264A3A	ECV0268A3A	V211K6CJZ1
		200	150						
		230	200						
		380	300						
		460	400						
575	400								

④ Wired for separate control.

⑤ These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: ECV0244A31. 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 Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.

Field Modification Kits

Auxiliary Electrical Contacts

Two Type J auxiliary contacts may be mounted on each side to provide four auxiliary, isolated 600V, 10A double break contacts for use in control circuits.

Table 10-7. Auxiliary Contacts

Contact Arrangement	Catalog Number
1NO-1NC	J11
2NO	J20
2NC	J02

Table 10-8. Horizontal Mechanical Interlock

Size	Catalog Number
4	180C113G04
5	180C113G12
6	180C113G13

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Non-combination Starters

Product Selection

Table 10-9. Class ECV05 — Non-combination Non-reversing Starter

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage ①	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial External Reset ④	Component Starter (Open) ③
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	135	—	—	110/120	ECV0541AAA	ECV0542AAA	ECV0544AAA	ECV0548AAA	AV10FNOA
		200	40						
		230	50						
		380	75						
		460	100						
575	100								
5	270	—	—	110/120	ECV0551AAA	ECV0552AAA	ECV0554AAA	ECV0558AAA	AV10GNOAB
		200	75						
		230	100						
		380	150						
		460	200						
575	200								
6	540	—	—	110/120	ECV0561AAA	ECV0562AAA	ECV0564AAA	ECV0568AAA	AV10JNOAB
		200	150						
		230	200						
		380	300						
		460	400						
575	400								

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 Wired for separate control.

② These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV0544AAA. 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**.

③ Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.

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

Table 10-10. Class ECV06 — Non-combination Reversing Starter

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage ⑤	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ⑥	Type 12 Dust-Tight Industrial External Reset ⑦	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	135	—	—	110/120	ECV0641AAA	ECV0642AAA	ECV0644AAA	ECV0648AAA	V210M4CJC
		200	40						
		230	50						
		380	75						
		460	100						
575	100								
5	270	—	—	110/120	ECV0651AAA	ECV0652AAA	ECV0654AAA	ECV0658AAA	V210M5CJC
		200	75						
		230	100						
		380	150						
		460	200						
575	200								
6	540	—	—	110/120	ECV0661AAA	ECV0662AAA	ECV0664AAA	ECV0668AAA	V210M6CJC
		200	150						
		230	200						
		380	300						
		460	400						
575	400								

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.

⑤ Wired for separate control.

⑥ These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV0644AAA. 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 All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.

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Non-combination Starters

Table 10-11. Class ECV07 — Non-combination Non-reversing Starter with CPT

NEMA Size	Enclosed Ampere Rating	Motor Voltage	Maximum hp Rating	Magnet Coil Voltage	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ①	Type 12 Dust-Tight Industrial External Reset ③	Component Starter (Open) ②
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	135	200	40	110/120	ECV0741EAA	ECV0742EAA	ECV0744EAA	ECV0748EAA	AV10FNOA
		230	50		ECV0741BAA	ECV0742BAA	ECV0744BAA	ECV0748BAA	
		380	75		ECV0741VAA	ECV0742VAA	ECV0744VAA	ECV0748VAA	
		460	100		ECV0741CAA	ECV0742CAA	ECV0744CAA	ECV0748CAA	
		575	100		ECV0741DAA	ECV0742DAA	ECV0744DAA	ECV0748DAA	
5	270	200	75	110/120	ECV0751EAA	ECV0752EAA	ECV0754EAA	ECV0758EAA	AV10GNOAB
		230	100		ECV0751BAA	ECV0752BAA	ECV0754BAA	ECV0758BAA	
		380	150		ECV0751VAA	ECV0752VAA	ECV0754VAA	ECV0758VAA	
		460	200		ECV0751CAA	ECV0752CAA	ECV0754CAA	ECV0758CAA	
		575	200		ECV0751DAA	ECV0752DAA	ECV0754DAA	ECV0758DAA	
6	540	200	150	110/120	ECV0761EAA	ECV0762EAA	ECV0764EAA	ECV0768EAA	AV10JNOAB
		230	200		ECV0761BAA	ECV0762BAA	ECV0764BAA	ECV0768BAA	
		380	300		ECV0761VAA	ECV0762VAA	ECV0764VAA	ECV0768VAA	
		460	400		ECV0761CAA	ECV0762CAA	ECV0764CAA	ECV0768CAA	
		575	400		ECV0761DAA	ECV0762DAA	ECV0764DAA	ECV0768DAA	

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 These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV0744EAA. 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**.
- ② Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.
- ③ All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.

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Combination Starters

Product Selection

Table 10-12. Class ECV16 — Combination Non-reversing Starter — Fusible and Non-fusible Disconnect

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage ①	Fuse Clip Amperes/ Disconnect Amperes	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open) ③
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
Fusible									
4	200	40	110/120	200A	ECV1641AAH	ECV1642AAH	ECV1644AAH	ECV1648AAH	AV10FNOA
	230	50			ECV1641AAJ	ECV1642AAJ	ECV1644AAJ	ECV1648AAJ	
	380	75			ECV1641AAJ	ECV1642AAJ	ECV1644AAJ	ECV1648AAJ	
	460	100			ECV1641AAJ	ECV1642AAJ	ECV1644AAJ	ECV1648AAJ	
	575	100			ECV1641AAJ	ECV1642AAJ	ECV1644AAJ	ECV1648AAJ	
5	200	75	110/120	400A	ECV1651AAK	ECV1652AAK	ECV1654AAK	ECV1658AAK	AV10GNOA
	230	100			ECV1651AAL	ECV1652AAL	ECV1654AAL	ECV1658AAL	
	380	150			ECV1651AAL	ECV1652AAL	ECV1654AAL	ECV1658AAL	
	460	200			ECV1651AAL	ECV1652AAL	ECV1654AAL	ECV1658AAL	
	575	200			ECV1651AAL	ECV1652AAL	ECV1654AAL	ECV1658AAL	
6	200	150	110/120	600A	ECV1661AAM	ECV1662AAM	ECV1664AAM	ECV1668AAM	AV10JNOA
	230	200			ECV1661AAN	ECV1662AAN	ECV1664AAN	ECV1668AAN	
	380	300			ECV1661AAN	ECV1662AAN	ECV1664AAN	ECV1668AAN	
	460	400			ECV1661AAN	ECV1662AAN	ECV1664AAN	ECV1668AAN	
	575	400			ECV1661AAN	ECV1662AAN	ECV1664AAN	ECV1668AAN	

Non-fusible

4	—	—	110/120	200A	ECV1641AAA	ECV1642AAA	ECV1644AAA	ECV1648AAA	AV10FNOA
	200	40							
	230	50							
	380	75							
	460	100							
5	—	—	110/120	400A	ECV1651AAA	ECV1652AAA	ECV1654AAA	ECV1658AAA	AV10GNOA
	200	75							
	230	100							
	380	150							
	460	200							
6	—	—	110/120	600A	ECV1661AAA	ECV1662AAA	ECV1664AAA	ECV1668AAA	AV10JNOA
	200	150							
	230	200							
	380	300							
	460	400							

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 Wired for separate control.
- ② These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV1644AAH. 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**.
- ③ Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.
- 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. When safety door interlock is required, add Modification Code **E11**.



Type 12 Non-reversing Vacuum Starter with Fused Disconnect

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Combination Starters

Table 10-13. Class ECV17 — Combination Reversing Starter — Fusible and Non-fusible Disconnect

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amperes/ Disconnect Amperes	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ①	Type 12 Dust-Tight Industrial External Reset ②③	Component Starter (Open)
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
Fusible									
4	200	40	110/120	200A	ECV1741AAH	ECV1742AAH	ECV1744AAH	ECV1748AAH	V210M4CJC
	230	50			ECV1741AAH	ECV1742AAH	ECV1744AAH	ECV1748AAH	
	380	75			ECV1741AAJ	ECV1742AAJ	ECV1744AAJ	ECV1748AAJ	
	460	100			ECV1741AAJ	ECV1742AAJ	ECV1744AAJ	ECV1748AAJ	
	575	100			ECV1741AAJ	ECV1742AAJ	ECV1744AAJ	ECV1748AAJ	
5	200	75	110/120	400A	ECV1751AAK	ECV1752AAK	ECV1754AAK	ECV1758AAK	V210M5CJC
	230	100			ECV1751AAK	ECV1752AAK	ECV1754AAK	ECV1758AAK	
	380	150			ECV1751AAL	ECV1752AAL	ECV1754AAL	ECV1758AAL	
	460	200			ECV1751AAL	ECV1752AAL	ECV1754AAL	ECV1758AAL	
	575	200			ECV1751AAL	ECV1752AAL	ECV1754AAL	ECV1758AAL	
6	200	150	110/120	600A	ECV1761AAM	ECV1762AAM	ECV1764AAM	ECV1768AAM	V210M6CJC
	230	200			ECV1761AAM	ECV1762AAM	ECV1764AAM	ECV1768AAM	
	380	300			ECV1761AAN	ECV1762AAN	ECV1764AAN	ECV1768AAN	
	460	400			ECV1761AAN	ECV1762AAN	ECV1764AAN	ECV1768AAN	
	575	400			ECV1761AAN	ECV1762AAN	ECV1764AAN	ECV1768AAN	
Non-fusible									
4	—	—	110/120	200A	ECV1741AAA	ECV1742AAA	ECV1744AAA	ECV1748AAA	V210M4CJC
	200	40							
	230	50							
	380	75							
	460	100							
575	100								
5	—	—	110/120	400A	ECV1751AAA	ECV1752AAA	ECV1754AAA	ECV1758AAA	V210M5CJC
	200	75							
	230	100							
	380	150							
	460	200							
575	200								
6	—	—	110/120	600A	ECV1761AAA	ECV1762AAA	ECV1764AAA	ECV1768AAA	V210M6CJC
	200	150							
	230	200							
	380	300							
	460	400							
575	400								

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 These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV1744AAH. 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**.
- 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. When safety door interlock is required, add Modification Code **E11**.

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Combination Starters

Table 10-14. Class ECV18 — Combination Non-reversing Starter — Fusible and Non-fusible Disconnect with CPT

NEMA Size	Motor Voltage	Max. hp Rating Dual Element Fuses	Magnet Coil Voltage	Fuse Clip Amperes/ Disconnect Amperes	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ①	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open) ②
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
Fusible									
4	200	40	110/120	200A	ECV1841EAH	ECV1842EAH	ECV1844EAH	ECV1848EAH	AV10FNOA
	230	50			ECV1841BAH	ECV1842BAH	ECV1844BAH	ECV1848BAH	
	380	75			ECV1841VAJ	ECV1842VAJ	ECV1844VAJ	ECV1848VAJ	
	460	100			ECV1841CAJ	ECV1842CAJ	ECV1844CAJ	ECV1848CAJ	
	575	100			ECV1841DAJ	ECV1842DAJ	ECV1844DAJ	ECV1848DAJ	
5	200	75	110/120	400A	ECV1851EAK	ECV1852EAK	ECV1854EAK	ECV1858EAK	AV10GNOA
	230	100			ECV1851BAK	ECV1852BAK	ECV1854BAK	ECV1858BAK	
	380	150			ECV1851VAL	ECV1852VAL	ECV1854VAL	ECV1858VAL	
	460	200			ECV1851CAL	ECV1852CAL	ECV1854CAL	ECV1858CAL	
	575	200			ECV1851DAL	ECV1852DAL	ECV1854DAL	ECV1858DAL	
6	200	150	110/120	600A	ECV1861EAM	ECV1862EAM	ECV1864EAM	ECV1868EAM	AV10JNOA
	230	200			ECV1861BAM	ECV1862BAM	ECV1864BAM	ECV1868BAM	
	380	300			ECV1861VAN	ECV1862VAN	ECV1864VAN	ECV1868VAN	
	460	400			ECV1861CAN	ECV1862CAN	ECV1864CAN	ECV1868CAN	
	575	400			ECV1861DAN	ECV1862DAN	ECV1864DAN	ECV1868DAN	
Non-fusible									
4	200	40	110/120	200A	ECV1841EAA	ECV1842EAA	ECV1844EAA	ECV1848EAA	AV10FNOA
	230	50			ECV1841BAA	ECV1842BAA	ECV1844BAA	ECV1848BAA	
	380	75			ECV1841VAA	ECV1842VAA	ECV1844VAA	ECV1848VAA	
	460	100			ECV1841CAA	ECV1842CAA	ECV1844CAA	ECV1848CAA	
	575	100			ECV1841DAA	ECV1842DAA	ECV1844DAA	ECV1848DAA	
5	200	75	110/120	400A	ECV1851EAA	ECV1852EAA	ECV1854EAA	ECV1858EAA	AV10GNOA
	230	100			ECV1851BAA	ECV1852BAA	ECV1854BAA	ECV1858BAA	
	380	150			ECV1851VAA	ECV1852VAA	ECV1854VAA	ECV1858VAA	
	460	200			ECV1851CAA	ECV1852CAA	ECV1854CAA	ECV1858CAA	
	575	200			ECV1851DAA	ECV1852DAA	ECV1854DAA	ECV1858DAA	
6	200	150	110/120	600A	ECV1861EAA	ECV1862EAA	ECV1864EAA	ECV1868EAA	AV10JNOA
	230	200			ECV1861BAA	ECV1862BAA	ECV1864BAA	ECV1868BAA	
	380	300			ECV1861VAA	ECV1862VAA	ECV1864VAA	ECV1868VAA	
	460	400			ECV1861CAA	ECV1862CAA	ECV1864CAA	ECV1868CAA	
	575	400			ECV1861DAA	ECV1862DAA	ECV1864DAA	ECV1868DAA	

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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 These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV1844EAH. 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**.
- ② Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.
- ③ All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add Modification Code **E11**.



**Type 12 Non-reversing Vacuum Starter
with HMCP**

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Combination Starters

Table 10-15. Class ECV22 — Combination Non-reversing Starter — Circuit Breaker

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial External Reset ④⑤	Component Starter (Open) ③							
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number							
4	200	40	110/120	HMCP 150A	ECV2241AAH	ECV2242AAH	ECV2244AAH	ECV2248AAH	AV10FNOA							
	230	50														
	380	75														
	460	100														
	575	100														
5	200	60	110/120	HMCP 250A	ECV2251AAJ	ECV2252AAJ	ECV2254AAJ	ECV2258AAJ	AV10GNOA							
	230	75														
	460	150														
	575	200														
	200	75								110/120	HMCP 400A	ECV2251AAK	ECV2252AAK	ECV2254AAK	ECV2258AAK	AV10GNOA
	230	100														
380	150															
460	200															
6	200	100	110/120	HMCP 600A	ECV2261AAL	ECV2262AAL	ECV2264AAL	ECV2268AAL	AV10JNOA							
	230	150														
	460	300														
	575	300														
	230	200								110/120	MD 800A	ECV2261AAM	ECV2262AAM	ECV2264AAM	ECV2268AAM	AV10JNOA
460	400															
575	400															

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 Wired for separate control.
- ② These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV2244AAH. 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**.
- ③ Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.
- 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. When safety door interlock is required, add Modification Code **E11**.

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Combination Starters

Table 10-16. Class ECV23 — Combination Reversing Starter — Circuit Breaker

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage ①	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ②	Type 12 Dust-Tight Industrial External Reset ③④	Component Starter (Open)							
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number							
4	200	40	110/120	HMCP 150A	ECV2341AAH	ECV2342AAH	ECV2344AAH	ECV2348AAH	V210M4CJC							
	230	50														
	380	75														
	460	100														
	575	100														
5	200	60	110/120	HMCP 250A	ECV2351AAJ	ECV2352AAJ	ECV2354AAJ	ECV2358AAJ	V210M5CJC							
	230	75														
	460	150														
	575	200														
	200	75								110/120	HMCP 400A	ECV2351AAK	ECV2352AAK	ECV2354AAK	ECV2358AAK	V210M5CJC
	230	100														
	380	150														
460	200															
6	200	100	110/120	HMCP 600A	ECV2361AAL	ECV2362AAL	ECV2364AAL	ECV2368AAL	V210M6CJC							
	230	150														
	460	300														
	575	300														
	230	200								110/120	MD 800A	ECV2361AAM	ECV2362AAM	ECV2364AAM	ECV2368AAM	V210M6CJC
	460	400														
	575	400														

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 Wired for separate control.
- ② These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV2344AAH. 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**.
- ③ All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add Modification Code **E11**.

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Combination Starters

Table 10-17. Class ECV24 — Combination Non-reversing Starter — Circuit Breaker with CPT

NEMA Size	Motor Voltage	Max. hp Rating	Magnet Coil Voltage	Circuit Breaker Type	Type 1 General Purpose	Type 3R Rainproof	Type 4X Watertight & Dust-Tight Stainless Steel ①	Type 12 Dust-Tight Industrial External Reset ②④	Component Starter (Open) ③
					Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
4	200	40	110/120	HMCP 150A	ECV2441EAH	ECV2442EAH	ECV2444EAH	ECV2448EAH	AV10FNOA
	230	50			ECV2441BAH	ECV2442BAH	ECV2444BAH	ECV2448BAH	
	380	75			ECV2441VAH	ECV2442VAH	ECV2444VAH	ECV2448VAH	
	460	100			ECV2441CAH	ECV2442CAH	ECV2444CAH	ECV2448CAH	
5	200 230 460 575	60	110/120	HMCP 250A	ECV2451EAJ	ECV2452EAJ	ECV2454EAJ	ECV2458EAJ	AV10GNOA
		75			ECV2451BAJ	ECV2452BAJ	ECV2454BAJ	ECV2458BAJ	
		150			ECV2451CAJ	ECV2452CAJ	ECV2454CAJ	ECV2458CAJ	
		200			ECV2451DAJ	ECV2452DAJ	ECV2454DAJ	ECV2458DAJ	
	200 230 380 460	75	110/120	HMCP 400A	ECV2451EAK	ECV2452EAK	ECV2454EAK	ECV2458EAK	AV10GNOA
		100			ECV2451BAK	ECV2452BAK	ECV2454BAK	ECV2458BAK	
		150			ECV2451VAK	ECV2452VAK	ECV2454VAK	ECV2458VAK	
		200			ECV2451CAK	ECV2452CAK	ECV2454CAK	ECV2458CAK	
6	200 230 460 575	100	110/120	HMCP 600A	ECV2461EAL	ECV2462EAL	ECV2464EAL	ECV2468EAL	AV10JNOA
		150			ECV2461BAL	ECV2462BAL	ECV2464BAL	ECV2468BAL	
		300			ECV2461CAL	ECV2462CAL	ECV2464CAL	ECV2468CAL	
		300			ECV2461DAL	ECV2462DAL	ECV2464DAL	ECV2468DAL	
	230 460 575	200	110/120	MD 800A	ECV2461BAM	ECV2462BAM	ECV2464BAM	ECV2468BAM	AV10JNOA
		400			ECV2461CAM	ECV2462CAM	ECV2464CAM	ECV2468CAM	
		400			ECV2461DAM	ECV2462DAM	ECV2464DAM	ECV2468DAM	

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 These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit **4**. Example: ECV2444EAH. 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**.
- ② All Type 12 enclosures are standardized with external reset. For internal reset, order Modification Code **R5**.
- ③ Alternate Catalog Numbers for those listed can be found in **Table 10-2** on **Page 10-4**.
- ④ Type 12 enclosure is without safety door interlock. When safety door interlock is required, add Modification Code **E11**.

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Wiring Diagrams

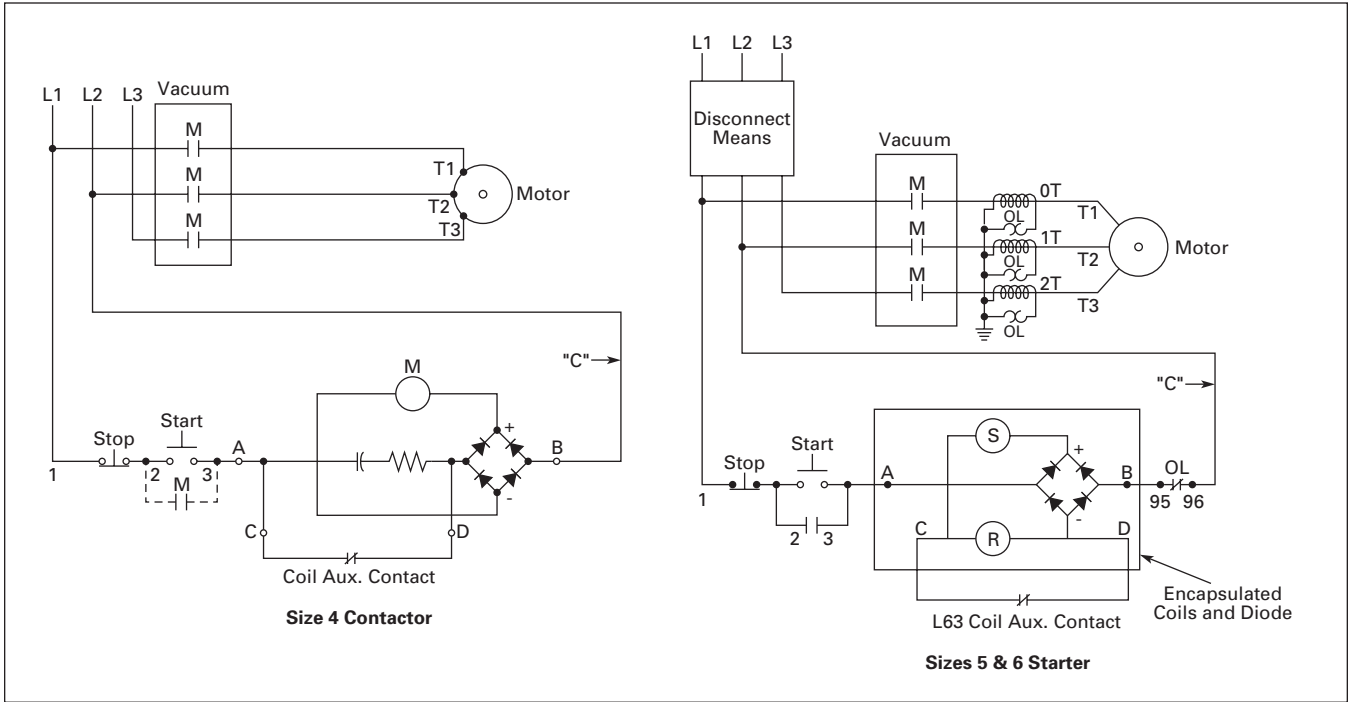


Figure 10-1. Typical Wiring Diagrams