

June 2006

MVX9000 Adjustable Frequency Drives

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Note: Supplement to Publication CA08102001E — Tab 40.



Model MVX9000

Open Drives

Product Description

Cutler-Hammer® MVX9000 sensorless vector adjustable frequency AC Drives from Eaton's electrical business are designed to provide adjustable speed control of three-phase motors. These microprocessor-based, sensorless vector drives have standard features that can be programmed to tailor the drive's performance to suit a wide variety of application requirements.

The MVX9000 sensorless vector product line utilizes a 32-bit microprocessor and insulated gate bipolar transistors (IGBTs) which provide quiet motor operation, high motor efficiency and smooth low speed performance. The size and simplicity of the MVX9000 make it ideal for hassle free installation where size is a primary concern.

Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 10 hp. Models rated at 240 volts, single- or three-phase, 50/60 Hz are available in sizes ranging from 1/2 to 7-1/2 hp. Models rated at 115 volts, single-phase, 50/60 Hz are available in the 1/4 to 1 hp size range.

The standard drive includes a digital display, operating and programming keys on a removable keypad.

The display provides drive monitoring as well as adjustment and diagnostic information. The keys are utilized for digital adjustment and programming of the drive as well as for operator control. Separate terminal blocks for control and power wiring are provided for customer connections. Other features provided as standard include built-in DC braking, RS-485 serial communications and PID control.

Features and Benefits

Table 1. Features and Benefits

Feature	Customer Benefit
Sensorless Vector Control with auto tuning.	Provides 200% starting torque and advanced low speed torque control.
Clearly laid out and easy to understand keypad with 4-character LED display, 7 status indicating LEDs, speed potentiometer, and 6 function keys.	Most informative operator's interface in this class of VFD, provided as standard. All parameters, diagnostic information and metering values are displayed with a bright 4-character LED display.
2 analog inputs 6 programmable, intelligent digital inputs 1 programmable digital output 1 programmable relay	Provide enhanced application flexibility.
PID control of a process variable such as pressure, flow, temperature, liquid level, etc.	Eliminates requirement for separate setpoint controller.
Built-in dynamic braking chopper.	Superior deceleration performance.
Serial communication port (RS-485).	Direct connection to serial communications networks.
Single-phase or three-phase input capability on 240V AC rated units, 3 hp and below.	Operate three-phase motor with single-phase supply.

Open Drives

Technical Data and Specifications

Output Ratings

- Horsepower:
 - 90 – 132V, 1/4 – 1 hp
 - 200 – 240V: 1/2 – 7-1/2 hp
 - 380 – 480V: 1 – 10 hp
 - 425 – 660V: 1 – 10 hp
- Frequency Range: 0.1 – 400 Hz
- Overload Rating: 150% for 60 seconds
- Frequency Resolution:
 - Digital: 0.1 Hz
 - Analog: Max. (Set Frequency/1000) Hz
- Frequency Accuracy
 - Digital: $\pm 0.01\%$ of max. frequency
 - Analog: $\pm 0.2\%$ of max. frequency
- Undervoltage Carryover Limit: 0.3 to 25 seconds

Motor Performance

- Motor Control: Sensorless Vector
- Constant and Variable Torque: Standard
- Speed Regulation: 0.5% of base speed

Input Power

- Voltage at 50/60 Hz ± 3 Hz
 - 100V – 120V, -10% +10% / 1-phase
 - 200V – 240V, -10% +5% / 1-phase
 - 200V – 240V, -10% +5% / 3-phase
 - 380V – 480V, -10% +10% / 3-phase
 - 500V – 600V, -15% +10% / 3-phase
- Displacement Power Factor: Better than 0.95
- Efficiency: Typically greater than 95%

Design Type

- Microprocessor: 32-Bit
- Converter Type: Diode
- Inverter Type: Insulated Gate Bipolar Transistor
- Waveform: Sensorless Vector

Environment

- Operating Temperature:
 - -10°C to +50°C
 - -10°C to +40°C (above 7-1/2 hp)
- Humidity: 20 to 90% non-condensing
- Maximum Elevation: 1000 meters (3300 ft.)

Codes and Standards

- NEMA, IEEE, NEC: Design Standards
- UL Listed
- cUL Listed
- CE Marked (Requires EMI filter)

Enclosure

- Standard: Protected Chassis (IP20)

Protective Features

- Ground Fault: Standard
- Overload Protection: Standard
- Overcurrent: Standard
- Overvoltage: Standard
- Undervoltage: Standard
- Overtemperature: Standard
- Overload Limit: Standard

Set Up Adjustments, Performance Features, Operator Control and External Interface

Keypad

- Alphanumeric Display: Standard, 1 x 4 character
- Digital Indications: Frequency (Hz), Motor Current (amps), User-Defined RUN/STOP, FORWARD/REVERSE and Parameters
- Diagnostics: Last 3 trips with cause
- LED Status Indicators: 8 (RUN/STOP, FORWARD/REVERSE, Hz, Amps, User Defined, and Input Speed)
- Operator Functions: START/STOP, Speed control (digital or potentiometer), RESET, SETUP Keys and ENTER.

I/O Terminal Block

- Analog Inputs:
 - 2 Inputs: 0 – 10V DC, 4 – 20 mA
 - Potentiometer: 1K ohm to 2K ohm
 - Analog Voltage: Nominal 10V DC (10K ohm input impedance)
 - Analog Current: Nominal 4 – 20 mA (250 ohm)
- Digital Inputs: 6 Programmable Inputs
- Digital Outputs: 1 Programmable Open collector and 1 Form C Relay contact

Analog Monitor Output:

- Analog meter – frequency or output current
- Dynamic Brake Chopper

Programmable Parameters

- Out of the Box: Factory settings loaded for quick start-up.
- Accel. and Decel.: 2 separately adjustable Linear or S Curve times: 0.1 – 3000 seconds
- Auto Restart: Overcurrent, overvoltage and undervoltage with 4 selectable retry restart modes
- DC Injection Braking
- External Fault: Terminal input
- Jog: Terminal input
- Fault Reset: STOP/RESET or terminal input
- I/O: NO/NC Selectable
- Jump Frequencies: 3 (with adjustable width)
- Parameter Security: Programmable software lock
- Preset Speeds: 7 preset speeds
- PID Controller: PID process control
- Reversing: Keypad or terminal
- Speed Setting: Keypad, terminal or pot
- START/STOP Control: Keypad or terminal
- Stop Modes: Decel, coast or DC injection

Reliability

- Pretested Components: Standard
- Surface Mount Technology: Standard (PCBs)
- Computerized Testing: Standard
- Final Test with Full Load: Standard
- Eaton's Cutler-Hammer Engineering Systems and Service: National network of AF drive specialists

Table 2. Heat Loss Data

Model	Watts Lost at 9 kHz	Model	Watts Lost at 9 kHz	Watts Lost at 6 kHz
MVXF25A0-1 (1-phase)	20	MVX001A0-4	38	—
MVXF50A0-1 (1-phase)	20	MVX002A0-4	75	—
MVX001A0-1 (1-phase)	38	MVX003A0-4	110	—
MVXF50A0-2 (1-phase)	20	MVX005A0-4	185	—
MVXF50A0-2 (3-phase)	20	MVX007A0-4	275	—
MVX001A0-2 (1-phase)	38	MVX010A0-4	375	—
MVX001A0-2 (3-phase)	38	MVX001A0-5	—	30
MVX002A0-2 (1-phase)	75	MVX002A0-5	—	58
MVX002A0-2 (3-phase)	75	MVX003A0-5	—	83
MVX003A0-2 (1-phase)	110	MVX005A0-5	—	132
MVX003A0-2 (3-phase)	110	MVX007A0-5	—	191
MVX005A0-2	185	MVX010A0-5	—	211
MVX007A0-2	275	—	—	—

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Table 3. All Braking Resistors & Braking Units Used in AC Drives

Applicable Motor		Braking Resistor Kit P/N	Qty of Resistors in Kit & Wiring	Total Resistance and Wattage applied to MVX	Full Load Torque (kgf-m) of System	Braking Torque @ 10%ED with Kit
hp	kW					
115V Series						
1/4	.20	K13-000034-0821	1	80W 200Ω	.108	220%
1/2	.37	K13-000034-0821	1	80W 200Ω	.216	220%
1	.75	K13-000034-0821	1	80W 200Ω	.427	125%
230V Series						
1/2	.37	K13-000034-0821	1	80W 200Ω	.216	220%
1	.75	K13-000034-0821	1	80W 200Ω	.427	125%
2	1.5	K13-000034-0824	1	300W 70Ω	.849	125%
3	2.2	K13-000034-0824	1	300W 70Ω	1.262	125%
5	3.7	K13-000034-0825	1	400W 40Ω	2.080	125%
7-1/2	5.5	K13-000034-0826	2 in Parallel	500W 30Ω	3.111	125%
480V Series						
1	.75	K13-000034-0841	1	80W 750Ω	.427	125%
2	1.5	K13-000034-0843	1	300W 250Ω	.849	125%
3	2.2	K13-000034-0843	1	300W 250Ω	1.262	125%
5	3.7	K13-000034-0844	1	400W 150Ω	2.080	125%
7-1/2	5.5	K13-000034-0845	2 in Parallel	500W 100Ω	3.111	125%
10	7.5	K13-000034-0846	3 in Parallel	1000W 75Ω	4.148	125%
575V Series						
1	.75	K13-000034-0851	1	300W 400Ω	.427	125%
2	1.5	K13-000034-0851	1	300W 400Ω	.849	125%
3	2.2	K13-000034-0852	—	600W 200Ω	1.262	125%
5	3.7	K13-000034-0852	—	600W 200Ω	2.080	125%
7-1/2	5.5	K13-000034-0852	—	600W 200Ω	3.111	125%
10	7.5	K13-000034-0853	—	2000W 100Ω	4.148	125%

Wiring Diagrams

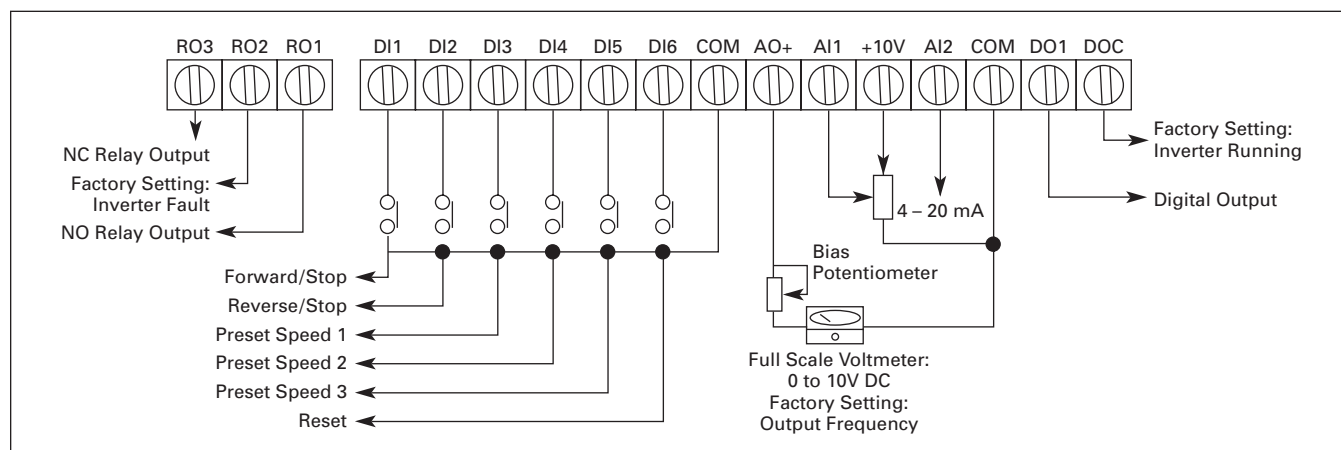


Figure 1. Control Terminal Wiring (Factory Settings)

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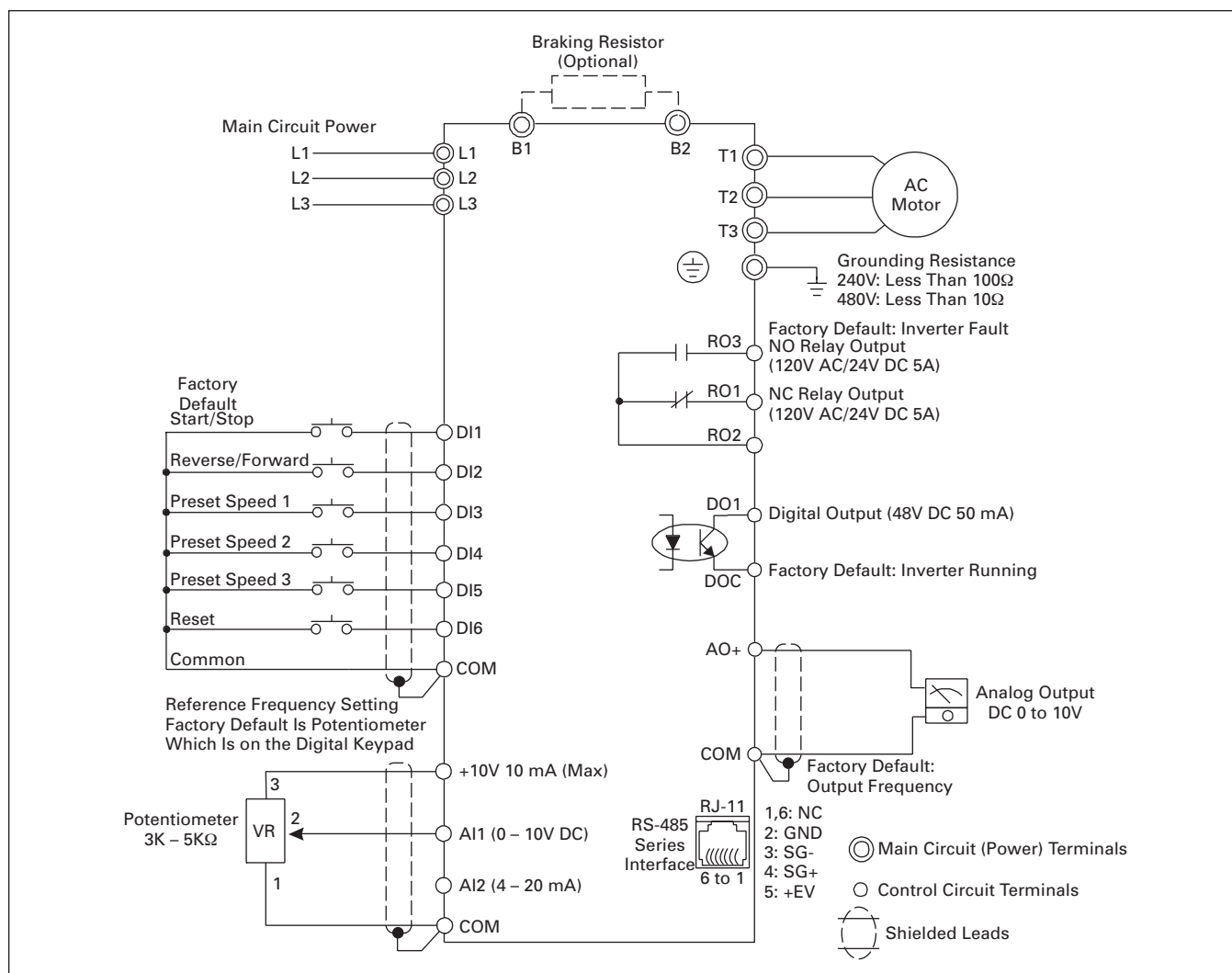


Figure 2. Basic Wiring Diagram

Note: Do not plug a modem or telephone line to the RS-485 communication port, permanent damage may result. Terminals 2 and 5 are the power sources for the optional copy keypad and should not be used while using RS-485 communication.

■ For single-phase application select correct model, and select any of the two input terminals for main circuit power.

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Dimensions

Table 4. Approximate Dimensions and Shipping Weights for Basic Controller

Description		Dimensions in Inches (mm)			Shipping Weight Lbs. (kg)
Horsepower	Volts	Width	Height	Depth	
1/4	100 – 120	3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
1/2		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
1		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
1/2	200 – 240	3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
1		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
2		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
3		4.9 (100)	8.6 (220)	7.6 (193)	12.1 (5.5)
5		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
7-1/2		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
1	380 – 480	3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
2		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
3		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
5		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
7-1/2		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
10		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
1	500 – 600	3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
2		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
3		3.9 (100)	5.9 (151)	5.7 (145)	6.2 (2.8)
5		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
7-1/2		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)
10		4.9 (125)	8.6 (220)	7.6 (193)	12.1 (5.5)

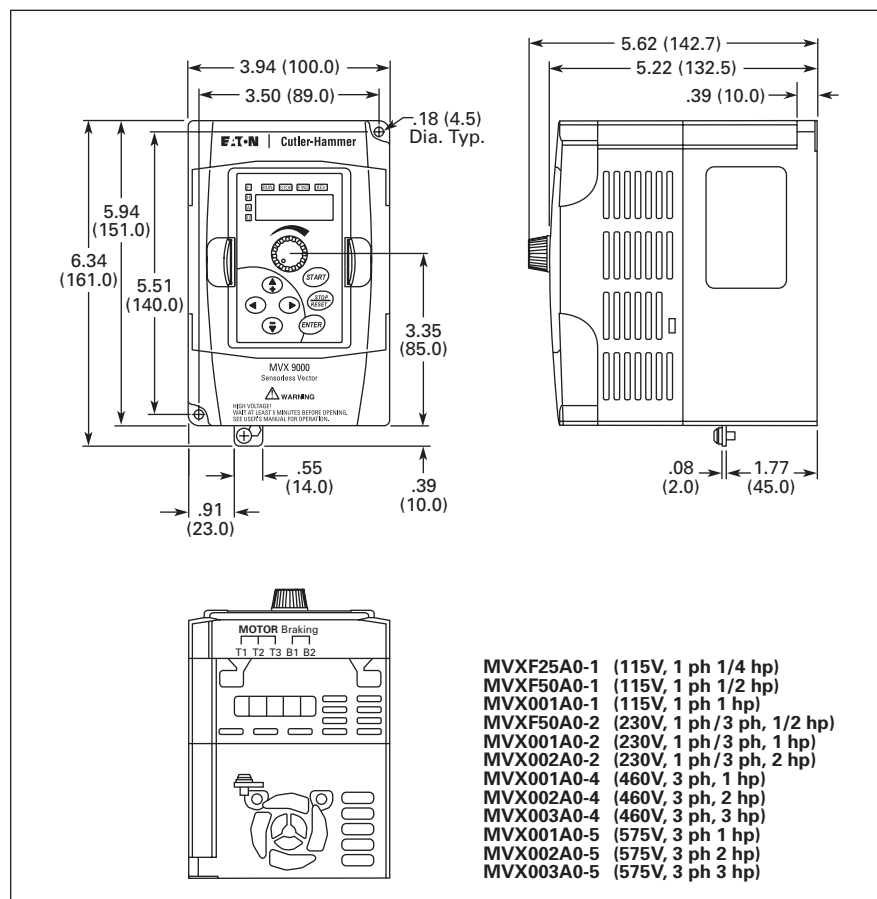


Figure 3. 1/4 to 3 hp Drive Approximate Dimensions in Inches (mm)

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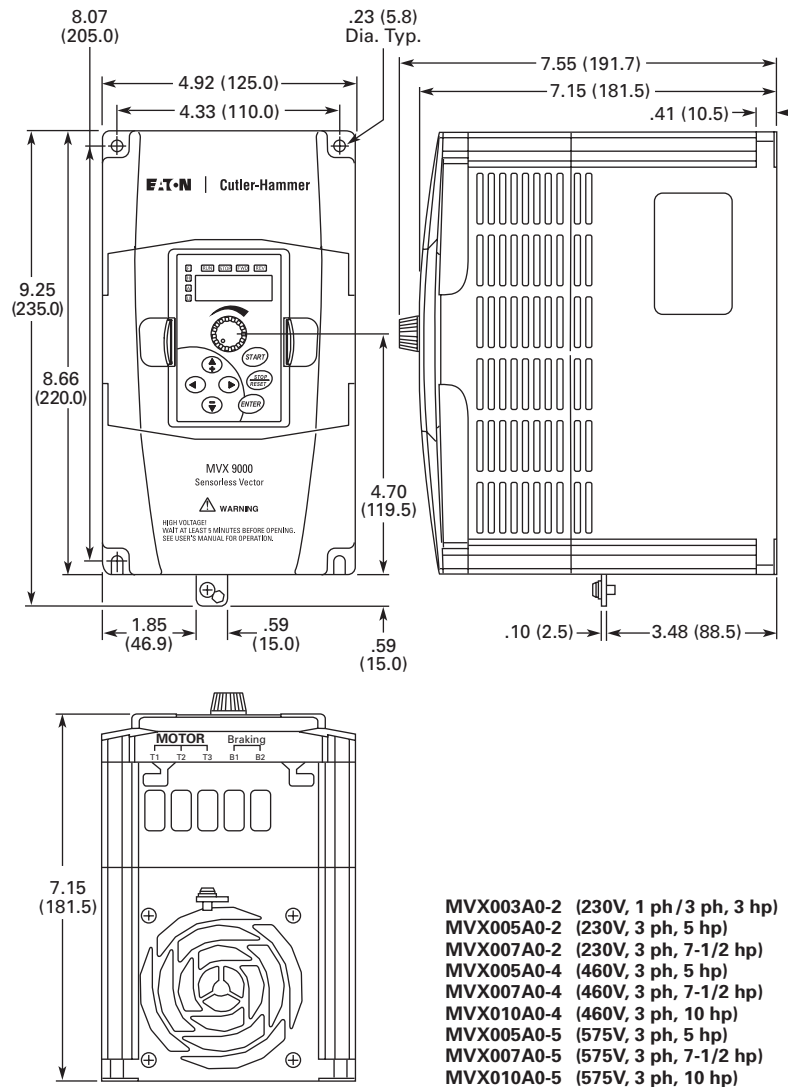


Figure 4. 3 to 10 hp Drive Approximate Dimensions in Inches (mm)

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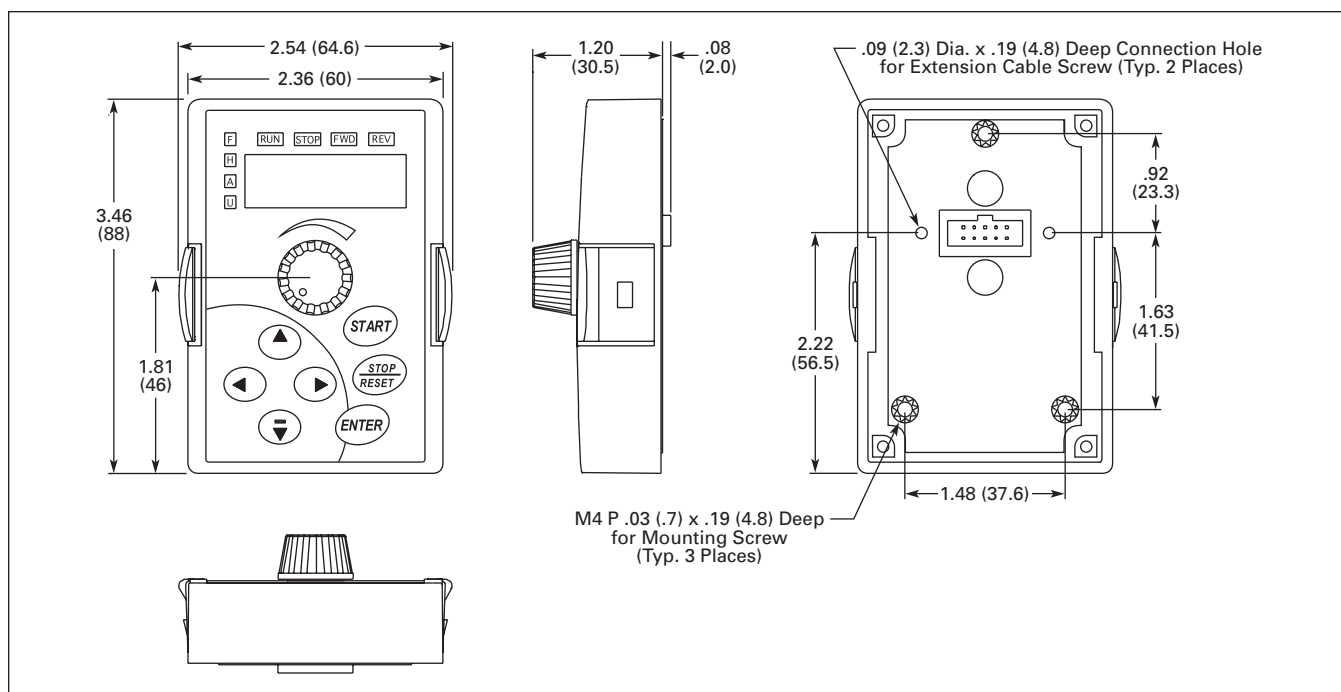


Figure 5. Digital Keypad Approximate Dimensions in Inches (mm)

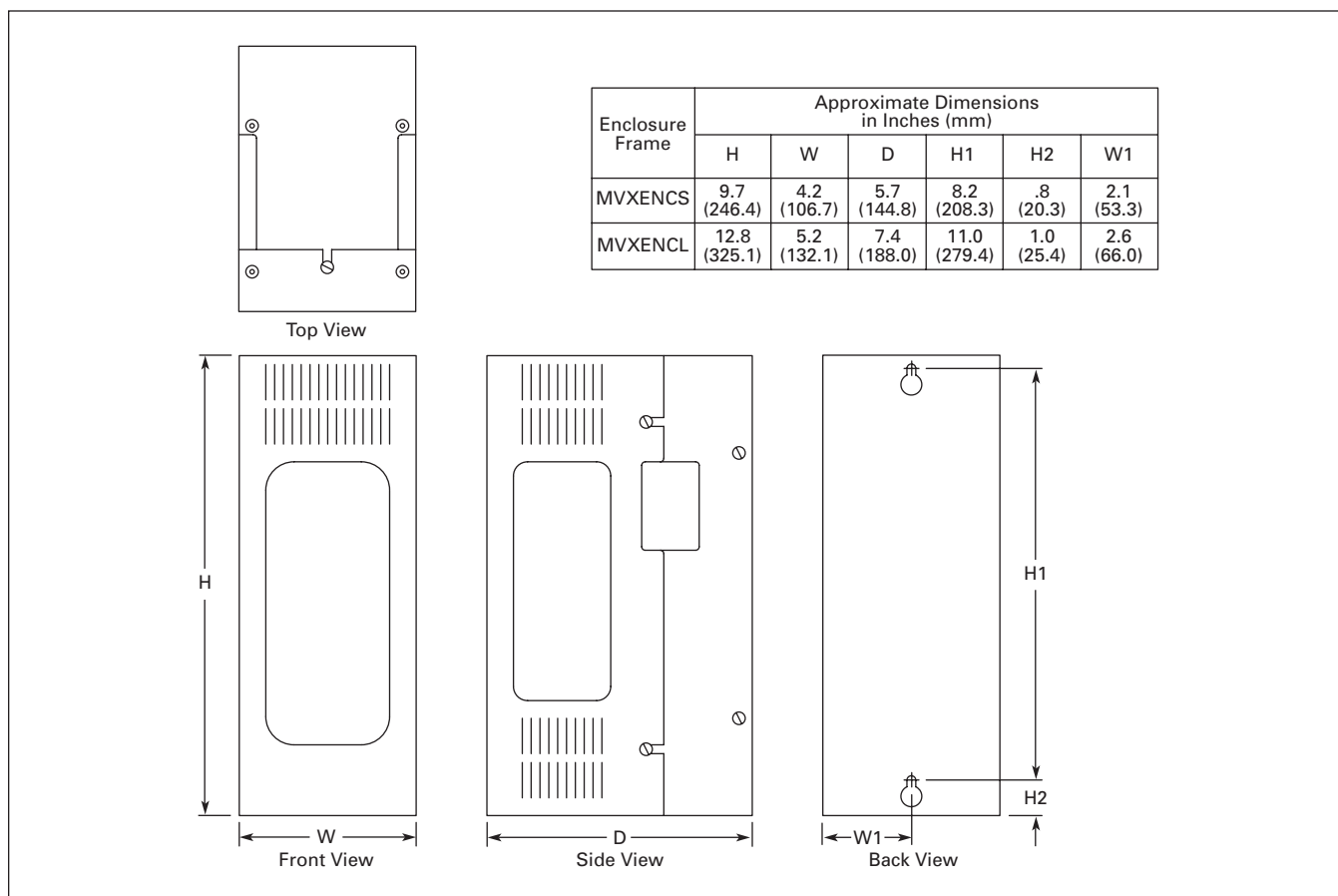


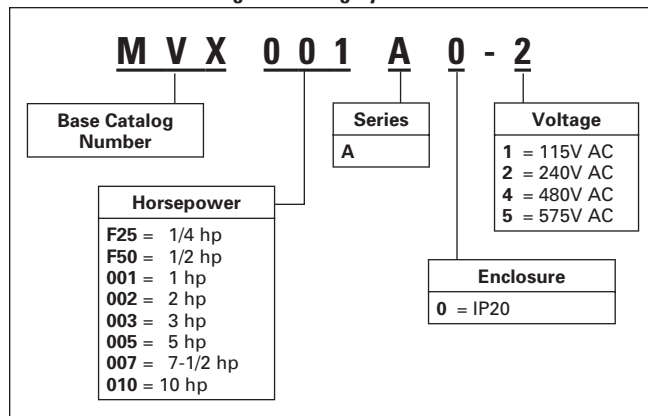
Figure 6. MVX9000 NEMA 1 Enclosure

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Catalog Number Selection

Table 5. MVX9000 Catalog Numbering System



Product Selection

Table 6. MVX9000 Basic Controller IP20

Description		Input Amp. Single-/ 3-Phase Rating	Continuous Output Amp Rating	Catalog Number	Price U.S. \$
Hp ①	Volts ②				
1/4 1/2 1	90 – 130	6.3/— 9.0/— 18.0/—	1.6 2.5 4.2	MVXF25A0-1 MVXF50A0-1 MVX001A0-1	
1/2 1 2 3 5 7-1/2	200 – 240	6.3/2.9 11.5/6.3 15.7/8.8 27.5/12.5 —/19.6 —/31.5	2.5 5.0 7.0 10 17 25	MVXF50A0-2 MVX001A0-2 MVX002A0-2 MVX003A0-2 MVX005A0-2 MVX007A0-2	
1 2 3 5 7-1/2 10	380 – 480	—/4.2 —/5.7 —/7.0 —/8.5 —/14 —/20.6	3.0 4.0 5.0 8.2 13 18	MVX001A0-4 MVX002A0-4 MVX003A0-4 MVX005A0-4 MVX007A0-4 MVX010A0-4	
1 2 3 5 7-1/2 10	500 – 600	—/2.4 —/4.2 —/5.9 —/7.0 —/10.5 —/12.9	1.7 3.0 4.2 6.6 9.9 12.2	MVX001A0-5 MVX002A0-5 MVX003A0-5 MVX005A0-5 MVX007A0-5 MVX010A0-5	

① Horsepower ratings are based on the use of a 240V or 480V NEMA B, 4- or 6-pole squirrel cage induction motor and are for reference only. Units are to be selected such that the motor current is less than or equal to the MVX9000 rated continuous output current.

② For 208V, 380V or 415V applications, select the unit such that the motor current is less than or equal to the MVX9000 rated continuous output current.

Options

Table 7. Field Options Kits

Description	Catalog Number	Price U.S. \$
Keypads Copy Keypad Normal Keypad Remote Kit	MVXCOPY MVXKPD MVXRM	
Miscellaneous Options Extension I/O DIN Rail	MVXEIO MVXDR	
Communications DeviceNet Module	MVXDN	
NEMA 1 Enclosure Small Frame Large Frame	MVXENCS MVXENCL	
3% Line Reactor, 1-phase 1/2 hp, 240V 1 hp, 240V 2 hp, 240V 3 hp, 240V	K64-000988-8091 K64-000988-0120 K64-000988-0180 K64-000988-0250	
3% Line Reactor, 3-phase 1 hp, 480V 2 hp, 480V 3 hp, 480V 5 hp, 480V 7-1/2 hp, 480V 10 hp, 480V	K64-000989-2091 K64-000989-4091 K64-000989-4091 K64-000989-8091 K64-000989-0180 K64-000989-0250	
1/2 hp, 240V 1 hp, 240V 2 hp, 240V 3 hp, 240V 5 hp, 240V 7-1/2 hp, 240V	K64-000988-2091 K64-000988-4091 K64-000988-8091 K64-000988-0120 K64-000988-0180 K64-000988-0250	
Output Line Reactor 1 hp, 480V 2 hp, 480V 3 hp, 480V 5 hp, 480V 7-1/2 hp, 480V 10 hp, 480V	K64-000989-2091 K64-000989-4091 K64-000989-4091 K64-000989-8091 K64-000989-0120 K64-000989-0180	
EMI Filter 1/2 hp, 240V AC, Single-Phase 1 hp, 240V AC, Single-Phase 2 hp, 240V AC, Single-Phase 3 hp, 240V AC, Single-Phase	K13-000034-0111 K13-000034-0111 K13-000034-0111 K13-000034-0112	
1/2 hp, 240V AC, Three-Phase 1 hp, 240V AC, Three-Phase 2 hp, 240V AC, Three-Phase 3 hp, 240V AC, Three-Phase 5 hp, 240V AC, Three-Phase 7-1/2 hp, 240V AC, Three-Phase	K13-000034-0113 K13-000034-0113 K13-000034-0113 K13-000034-0113 K13-000034-0115 K13-000034-0115	
1 hp, 480V AC, Three-Phase 2 hp, 480V AC, Three-Phase 3 hp, 480V AC, Three-Phase 5 hp, 480V AC, Three-Phase 7-1/2 hp, 480V AC, Three-Phase 10 hp, 480V AC, Three-Phase	K13-000034-0114 K13-000034-0114 K13-000034-0114 K13-000034-0116 K13-000034-0116 K13-000034-0117	
Dynamic Braking Resistor 1/2 – 1 hp, 240V 2 – 3 hp, 240V 5 hp, 240V 7-1/2 hp, 240V	K13-000034-0821 K13-000034-0824 K13-000034-0825 K13-000034-0826	
1 hp, 480V 2 – 3 hp, 480V 5 hp, 480V 7-1/2 hp, 480V 10 hp, 480V	K13-000034-0841 K13-000034-0843 K13-000034-0844 K13-000034-0845 K13-000034-0846	

Discount Symbol SS-1

Enclosed Drives



MVX Drive with 3-Contactor Bypass

Product Description

The Cutler-Hammer® MVX9000 from Eaton's electrical business is offered in a variety of enclosure options to provide protection for operator and equipment. Enclosure ratings include Type 1, 12, 3R and 4X.

Model MVX9000 sensorless vector adjustable frequency AC drives are designed to provide adjustable speed control of three-phase motors. These microprocessor-based, sensorless vector drives have standard features that can be programmed to tailor the drive's performance to suit a wide variety of application requirements.

The MVX9000 sensorless vector product line utilizes a 32-bit microprocessor and insulated gate bipolar transistors (IGBTs) which provide quiet motor operation, high motor efficiency and smooth low speed performance. The size and simplicity of the MVX9000 make it ideal for hassle free installations where size is a primary concern. Models rated at 575 and 480 volts, 3-phase, 50/60 Hz are available in sizes ranging from 1 to 10 hp. Models rated at 240 volts, single- or 3-phase, 50/60 Hz are available in sizes ranging from 1/2 to 7-1/2 hp.

The standard drive includes a digital display, operating and programming keys on a removable keypad. The display provides drive monitoring as well as adjustment and diagnostic information. The keys are utilized for digital adjustment and programming of the drive as well as for operator control. Separate terminal blocks for control and power wiring are provided for customer connections. Other features provided as standard include built-in DC braking, RS-485 serial communications and PID control.

The enclosed microdrives can be configured with standard modification codes including options for various cover controls, two- and three-contactor bypass, communications and traditional disconnect switch offerings.



Type 1/3R with Keypad Cover

Type 1 Enclosure

The Type 1 version of the MVX9000 sensorless vector product line utilizes a door-mountable (option) keypad. The keypad, with digital display, can be used for operating and programming the MVX9000 drive. Type 1 enclosed MVX9000s offer a standard gasketed cover in a ventilated enclosure.

Type 12 Enclosure

The Type 12 design uses a seam welded, dust-tight enclosure. These enclosures use the latest advances in cooling technology to offer space saving designs as well as providing ample space for modifications.



Type 12 Design

Type 3R Enclosure

The Type 3R design incorporates the MVX9000 technology into a compact, rainproof enclosure. Type 3R enclosures are available with a door mount keypad option utilizing a steel flange door to protect the keypad.

Type 4X Enclosure

The Type 4X enclosed MVX utilizes a seam-welded stainless steel enclosure. These enclosures use the latest advances in cooling technology to offer space saving designs as well as providing ample space for modifications.

Features and Benefits

- **Drive Keypad Access** — Through-the-door access to STOP/START, speed potentiometer drive keys and programming available as an option on Type 1, 3R and 12
- Available as non-combination or combination with fusible or circuit breaker disconnect
- **Fusible Disconnect** — 30A or 60A with Class CC / J fuses or R fuses
- **Circuit Breaker** — Thermal magnetic circuit breaker with trip rating based on maximum drive FLA
- **Operating Mechanism** — Rotary or flange type with provisions for padlocking in the OFF position. An interlock defeater is built into the operating mechanism to permit the cover to be opened with the disconnect on
- **Cover Control** — Control devices available installed or in field assembly kits
- **Options** — Bus Choke, Bypass/Isolation Contactors, EMI Filter, Line Reactors, DeviceNet Interface and more

The compact design allows the controller to be located adjacent to the motor.

Standards and Certifications

- UL Listed
- cUL Listed (indicates appropriate CSA Standard investigation)
- ABS Type Approval
- CE Mark available (Requires EMI filter)

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Cover Control

Table 8. MVX Non-reversing Pilot Devices

Description	Factory Installed		Type 1, 3R Kits for Field Installation		Type 12, 4X Kits for Field Installation	
	Position 9 Alpha	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
None	A		—		—	
START/STOP Pushbuttons	B		C400T21		C400T1	
with Red RUN Pilot Light	C		C400T22 ①		—	
with Red RUN/Green OFF Lights	D		C400T23 ①		—	
ON/OFF Pushbuttons	E		—		C400T2	
with Red RUN Pilot Light	F		—		—	
with Red RUN/Green OFF Lights	G		—		—	
HAND/OFF/AUTO Selector Switch	H		C400T24		C400T12	
with Red RUN Pilot Light	J		C400T25 ①		—	
with Red RUN/Green OFF Lights	K		C400T26 ①		—	
Red RUN Pilot Light	L		C400T10 ①		C400T9 ①	
Green OFF Pilot Light	M		C400T11 ①		C400T10 ①	
Red RUN/Green OFF Pilot Lights	N		C400T12 ①		C400T11 ①	
START/STOP Selector Switch	P		—		C400T13	
with Red RUN Pilot Light	Q		—		—	
with Red RUN/Green OFF Lights	R		—		—	
Speed Potentiometer	S		—		—	

① Add Code Letter from table below to Catalog Number for voltage — kits only. Example: C400T10A

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

Table 9. MVX Reversing Pilot Devices

Description	Factory Installed		Type 1, 3R Kits for Field Installation		Type 12, 4X Kits for Field Installation	
	Position 9 Alpha	Adder U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
None	A		—		—	
FORWARD/REVERSE/STOP Pushbuttons	T		C400T50		C400T6	
with 2 Red Pilot Lights	U		C400T51 ②		—	
with 2 Red/1 Green Lights	V		C400T52 ②		—	
UP/STOP/DOWN Pushbuttons	W		—		—	
with 2 Red Pilot Lights	X		—		—	
with 2 Red/1 Green Lights	Y		—		—	
FORWARD/OFF/REVERSE Selector Switch	Z		C400T53		C400T15	
with 2 Red Pilot Lights	1		C400T54 ②		—	
with 2 Red/1 Green Lights	2		C400T55 ②		—	
2 Red Pilot Lights	3		—		③	
Green OFF Pilot Light	4		C400T11 ②		C400T10 ②	
2 Red/1 Green Pilot Lights	5		—		—	
Speed Potentiometer	S		—		—	

② Add Code Letter from table below to Catalog Number for voltage — kits only. Example: C400T10A

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

③ Order 2 C400T9 ②.

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Modification Codes

Table 10. A — Auxiliary Contacts (when bypass contactor chosen)

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Top Mounted Auxiliary Contacts (Unwired) ①	A13	1NO	
	A14	1NC	
	A15	1NO-1NC	
	A16	2NO	
	A17	2NC	
	A18	2NO-1NC	
	A19	1NO-2NC	
	A20	3NO	
	A21	3NC	
	A22	3NO-1NC	
	A23	2NO-2NC	
	A24	1NO-3NC	
	A25	4NO	
	A26	4NC	

① For drive only run contacts, see Mods C12 and C14.

Table 11. B — Breaker Modifications, Bell Alarm, DC Bus Choke

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Breaker	B1	1NO-1NC Auxiliary Contacts	
	B2	2NO-2NC Auxiliary Contacts	
	B3	Shunt Trip on Circuit Breaker — 48 – 127V AC or DC	
Bell Alarm	B16	Bell Alarm for GHC	
Bus Choke	B20	DC Bus Choke, Open Core and Coil ②	
		240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$	
		480V — 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$	

② A DC bus choke may be used in place of an AC line reactor for line harmonic current reduction and for power source exceeding 500 kVA. The DC bus choke will not provide any protection for line voltage unbalance or transients.

Table 12. C — Control Power Transformers, Control Relays, Control Sources, Bypass Contactors

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Control Power Transformer	C1	Standard Size CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
	C42	50 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
	C3	100 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
	C5 ③	200 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
	C7 ③	300 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
	C8 ③	400 VA Extra Capacity CPT, 120V/60 Hz, 110V/50 Hz Secondary with 2 Primary and 1 Secondary Fuse	
Control Relay ④	C13	RUN Relay, 24V DC	
Separate Control	C35	Wired for Separate Control	
	C45	Separate Source Disc (Type 1/12 fusible only)	
Customer Supplied	C36	Customer Supplied Components to Be Installed	
	C37	Customer Supplied Wiring Diagram to Use	
Bypass Contactors ⑤	C46/J1	Isolation Contactor	
	C46/J2	Output Contactor	
	C46/J3	Bypass Contactor ⑤	
	C46/J4	Isolation/Output/Bypass Contactors ⑤	
	C46/J5	3 Contactor Bypass Package — Includes CPT, Pilot Lights, Selector Switch, Auxiliary Contacts and Control Relay ⑤	

③ Requires oversize enclosure.

④ Provides additional contacts for drive run indication.

⑤ Includes bimetallic overload.

Table 13. D — Device Labels, DIN Rail

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Device Labels	D1	Device Labels — Specify	
DIN Rail	D8	DIN Rail Installed	

Table 14. E — Enclosure Modifications, Elapsed Time Meter

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Enclosure	E3	Oversized Enclosure	
Elapsed Time Meter	E9	Type 1, 3R, 12, 4X	

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Table 15. F — Fuse Clips, Fuse Blocks, EMI Filter

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Fuse Blocks	F4	Power Fuses Included — Order by Description	
	F5	30A Control Circuit Fuseholder (KTK) Mounted on Panel (unwired) Fuse Not Supplied	
	F6	30A Control Circuit Fuseholder Mounted on Panel (unwired), 5A KTK Fuse Supplied	
EMI Filter ^②	F22	240V or 480V 3-Phase ^① 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$ 480V 1/4 hp — 1 hp 2 hp 3 hp 5 hp U.S. \$	
	F23	240V 1-Phase ^① 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp — U.S. \$	

^① The EMI filter is not necessary to meet the CE mark requirements for EMC when installing the MVX in an EC country.

^② Requires oversized enclosure.

Table 16. H — Space Heater, Heater Packs Installed

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Space Heater	H1	Space Heater and Thermostat	
	H2	Space Heater and NC Interlock (100 Watt)	
Install Heater Packs (Freedom Series) ^③	H5	Class 20	Class 10
		/D1 H2001B-3	/D25 H2101B-3
		/D2 H2002B-3	/D26 H2102B-3
		/D3 H2003B-3	/D27 H2103B-3
		/D4 H2004B-3	/D28 H2104B-3
		/D5 H2006B-3	/D29 H2105B-3
		/D6 H2006B-3	/D30 H2106B-3
		/D7 H2007B-3	/D31 H2107B-3
		/D8 H2008B-3	/D32 H2108B-3
		/D9 H2009B-3	/D33 H2109B-3
		/D10 H2010B-3	/D34 H2110B-3
		/D11 H2011B-3	/D35 H2111B-3
		/D12 H2012B-3	/D36 H2112B-3
		/D13 H2013B-3	/D37 H2113B-3
		/D14 H2014B-3	/D38 H2114B-3

^③ Use only when C46 or R7 modifications are required.

Table 17. K — Keypad

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Keypad	K1	Door-Mounted AFD Keypad (Type 1 and 12)	
	K2	Door-Mounted AFD Keypad (Type 3R)	
	K3	AFD Copy Keypad (mounted on drive)	
	K4	Door-Mounted AFD Copy Keypad (Type 1 and 12)	
	K5	Door-Mounted AFD Copy Keypad (Type 3R)	

Table 18. L — Lightning Arrestor, Carton Label, Line Reactor, Load Reactor

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Lightning Arrestor ^④	L1	Lightning Arrestor	
Label	L10	Carton Label — Customer Marking — Specify	
Line Reactor (Type 1/12 design limited to either line or load reactor, not both)	L12	240V or 480V 3% Input Line Reactor, 3-Phase, Open Core and Coil ^⑤ 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$ 480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$	
	L13	240V 3% Input Line Reactor, 1-Phase, Open Core and Coil ^⑤ 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp — U.S. \$	
	L14	240V or 480V 5% Input Line Reactor, 3-Phase, Open Core and Coil ^⑤ 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$ 480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$	
Output Line Filter (Type 1/12 design limited to either line or load reactor, not both)	L15	240V 5% Input Line Reactor, 1-Phase, Open Core and Coil ^⑤ 240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp — U.S. \$	
	L16	Line Reactor by Description	
	L17	480V Output Line dv/dt Filter, Open Core and Coil ^⑥ 480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp U.S. \$	
	L18	Load Reactor by Description	

^④ Requires oversized enclosure.

^⑤ If the power source exceeds 500 kVA, 3% line unbalance, or if transient voltages from power factor capacitor switching events are present, an input line reactor must be used. The input line reactor will also reduce line current harmonics.

^⑥ The output line dv/dt filter is required when the distance from the drive to the motor exceeds 33 feet (10.1m). The total cable run should not exceed 165 feet (50.3m).

Table 19. N — Nameplates

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Nameplates	N1	Nameplate on Enclosure — Order Wording to Be Inscribed	

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Table 20. P — Pilot Lights, Pushbuttons, Phase Loss Relay, Phase Reversal Relay

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Push-to-Test Pilot Lights	P1	Push-to-Test Pilot Light (Red RUN)	
	P2	Push-to-Test Pilot Light (Green OFF)	
	P3	Combination of P1 and P2 Above	
	P4	Push-to-Test Pilot Light (Amber RUN)	
	P54	Push-to-Test Pilot Light — Red BYPASS	
	P55	Push-to-Test Pilot Light — Amber INVERTER ENABLE	
	P56	Push-to-Test Pilot Light — Red INVERTER RUNNING	
	P57	Push-to-Test Pilot Light — Green STOPPED	
Pushbuttons	P5	EMERGENCY STOP — Mushroom Head	
	P7	START/STOP	
	P8	ON/OFF	
	P9	START	
	P10	ON	
	P11	OFF	
	P12	FORWARD/REVERSE/STOP	
	P52	UP/STOP/DOWN	
Pilot Lights	P18	Pushbutton with Legend Plate (Order by Description)	
	P19	Amber Light “POWER AVAILABLE” Wired to Load Side of 2 Fuses or Circuit Breaker	
	P20	Pilot Light (Amber) Wired to Coil	
	P23	Pilot Light — Red RUN	
	P24	Pilot Light — Red ON	
	P25	Pilot Light — Green OFF	
	P58	Pilot Light — Red BYPASS	
	P59	Pilot Light — Amber INVERTER ENABLE	
	P60	Pilot Light — Red INVERTER RUNNING	
	P61	Pilot Light — Green STOP	
Illuminated Pushbutton	P26	Pilot Light (Order by Description)	
	P27	Illuminated Pushbutton (Order by Description)	
Phase Loss Relay	P28	Phase Loss Relay	
Phase Reversal Relay	P30	Phase Reversal Relay	
Phase Unbalance Relay	P32	Phase Unbalance Relay	
Phase Monitoring Relay	P34	Phase Monitoring Relay	

Table 21. R — Relays, Overload Relay Modifications, DeviceNet™ Interface Mode

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Relay	R2	Overvoltage Relay	
	R7	Overload Relay (Order by Description)	
Relay Modifications	R45	Auto Reset Only on Overload Relay	
DeviceNet Interface Module	R69	DeviceNet Communication Interface	

Table 22. S — Selector Switches, Suppressor, Surge Capacitor, Speed Pot

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Selector Switches	S3	HAND-OFF-AUTO Selector Switch	
	S10	OFF-AUTO Selector Switch	
	S11	START-STOP Selector Switch	
	S12	ON-OFF Selector Switch	
	S16	FORWARD-REVERSE Selector Switch	
	S38	INVERTER-OFF-BYPASS Selector Switch	
	S40	Selector Switch (Order by Description)	
Surge Capacitor	S37	Surge Capacitor Wired to Disconnect Line Side	
Speed Pot	S39	Speed Potentiometer	

Table 23. T — Timers, Terminal Blocks, Terminal Points, Ring Lug

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Timers	T3	Pneumatic Timer Mounted in Enclosure, Unwired, 180 Seconds Maximum	
	T4	Pneumatic Timer (Order by Description)	
	T5	Solid-State Timer (Order by Description)	
Terminal Blocks	T9	With 1 Single-Circuit Terminal Block, Unwired	
	T10	With 2 Single-Circuit Terminal Blocks, Unwired	
Terminal Points	T11	With 6 Terminal Points, Unwired	
	T12	With 12 Terminal Points, Unwired	
	T13	With 16 Terminal Points, Unwired	
	T14	Terminal Point per Customer Specification, Unwired	
	T15	Terminal Point per Customer Specification, Wired	
Ring Lug	T16	Ring Lug Connections on Power Wires	
	T17	Ring Lug Connections on Control Wires	

Table 24. U — Undervoltage Relay

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Undervoltage Relay	U2	Undervoltage Relay, Non-adjustable	
Under and Over Relay	U7	Under and Overvoltage Relay	

Table 25. W — Wiremarkers, Enclosure Window

Modification	Catalog Number Suffix	Description	Adder U.S. \$
Wiremarkers	W7	Wiremarkers	

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Table 26. Type 1/3R MVX Combination and Non-combination

MVX hp	Box No.	Shipping Wt. Lbs. (kg) ①
1/2 – 2 (240V)	L	25 (11)
1 – 3 (575, 480V)	L	27 (12)
3 – 5 (240V)	B1	31 (14)
5 (575, 480V)	B1	31 (14)
7-1/2 (240V)	C	42 (19)
7-1/2 – 10 (575, 480V)	C	42 (19)

① Weights are for combination units.

Table 27. Type 1/3R MVX Combination and Non-combination with Bypass

MVX hp	Box No.	Shipping Wt. Lbs. (kg) ②
1/2 – 2 (240V)	M	28 (13)
1 – 3 (575, 480V)	M	30 (14)
3 – 5 (240V)	B1	35 (16)
5 (575, 480V)	B1	35 (16)
7-1/2 (240V)	C	55 (25)
7-1/2 – 10 (575, 480V)	C	57 (26)

② Weights are for combination units.

Table 28. Type 12/4/4X MVX Combination and Non-combination

MVX hp	Box No.	Shipping Wt. Lbs. (kg) ③
1/2 – 1 (240V)	L	29 (13)
1 – 2 (575, 480V)	L	29 (13)
2 (240V)	M	32 (15)
3 (575, 480V)	M	32 (15)
3 (240V)	B1	35 (16)
5 (575, 480V)	B1	35 (16)
5 (240V)	C	48 (22)
7-1/2 (575, 480V)	C	48 (22)
7-1/2 (240V)	D	55 (25)
10 (575, 480V)	D	55 (25)

③ Weights are for combination units.

Table 29. Type 12/4/4X MVX Combination and Non-combination with Bypass

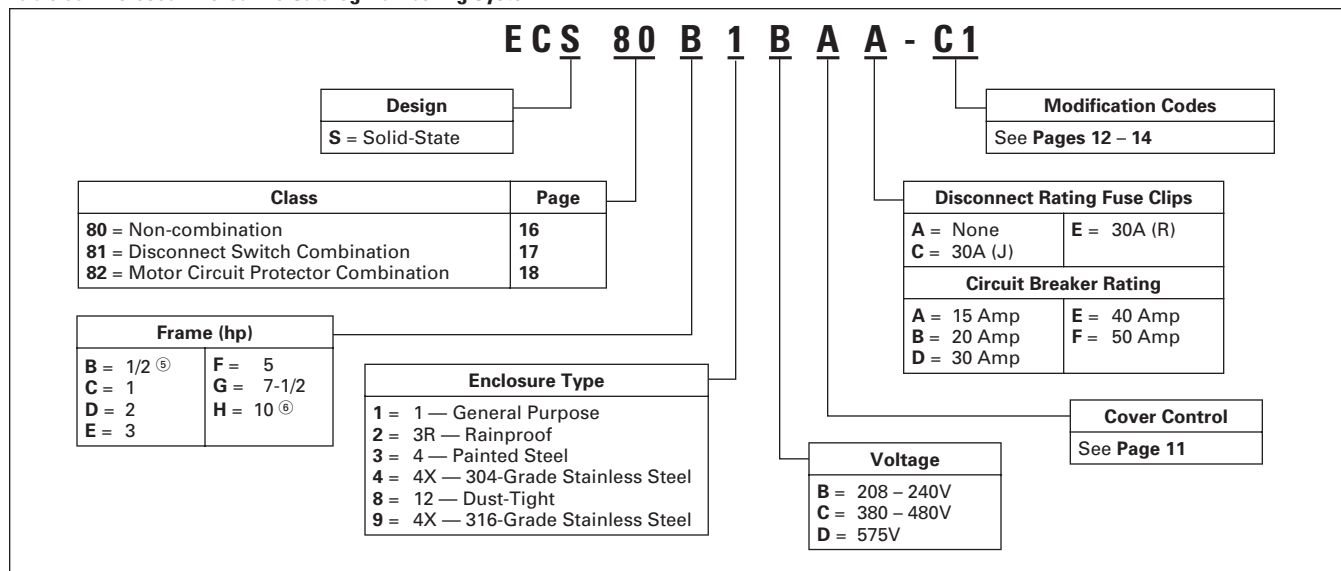
MVX hp	Box No.	Shipping Wt. Lbs. (kg) ④
1/2 – 2 (240V)	M	35 (16)
1 – 3 (575, 480V)	M	37 (17)
3 – 5 (240V)	C	42 (19)
5 – 7-1/2 (575, 480V)	C	44 (20)
7-1/2 (240V)	D	60 (27)
10 (575, 480V)	D	65 (30)

④ Weights are for combination units.

Note: For Box Dimensions, see *Enclosed Control Product Guide*.

Catalog Number Selection

Table 30. Enclosed Microdrive Catalog Numbering System



⑤ Frame (hp) only available at 208 – 240V.

⑥ Frame (hp) only available at 380 – 480V.

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Product Selection

Table 31. Class ECS80 — Non-combination MVX9000 Drives

Volts	Input Ampere Single-/3-Phase Rating	Continuous Output Ampere Rating	Type 1 General Purpose		Type 3R Rainproof		Component Microdrive (Open)
			Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp							
208 – 240	5.8/3.4	2.5	ECS80B1BAA-C1		ECS80B2BAA-C1		MVXF50A0-2
1 hp							
208 – 240	9/5.2	5	ECS80C1BAA-C1		ECS80C2BAA-C1		MVX001A0-2
380 – 480	—/3.3	3	ECS80C1CAA-C1		ECS80C2CAA-C1		MVX001A0-4
500 – 600	—/2.4	1.7	ECS80C1DAA-C1		ECS80C2DAA-C1		MVX001A0-5
2 hp							
208 – 240	16/9.3	7	ECS80D1BAA-C1		ECS80D2BAA-C1		MVX002A0-2
380 – 480	—/5	4	ECS80D1CAA-C1		ECS80D2CAA-C1		MVX002A0-4
500 – 600	—/4.2	3	ECS80D1DAA-C1		ECS80D2DAA-C1		MVX002A0-5
3 hp							
208 – 240	22.5/13	10	ECS80E1BAA-C1		ECS80E2BAA-C1		MVX003A0-2
380 – 480	—/7	5	ECS80E1CAA-C1		ECS80E2CAA-C1		MVX003A0-4
500 – 600	—/5.9	4.2	ECS80E1DAA-C1		ECS80E2DAA-C1		MVX003A0-5
5 hp							
208 – 240	—/20	17	ECS80F1BAA-C1		ECS80F2BAA-C1		MVX005A0-2
380 – 480	—/11	8.2	ECS80F1CAA-C1		ECS80F2CAA-C1		MVX005A0-4
500 – 600	—/7.0	6.6	ECS80F1DAA-C1		ECS80F2DAA-C1		MVX005A0-5
7-1/2 hp							
208 – 240	—/31	25	ECS80G1BAA-C1		ECS80G2BAA-C1		MVX007A0-2
380 – 480	—/17	13	ECS80G1CAA-C1		ECS80G2CAA-C1		MVX007A0-4
500 – 600	—/10.5	9.9	ECS80G1DAA-C1		ECS80G2DAA-C1		MVX007A0-5
10 hp							
380 – 480	—/21	18	ECS80H1CAA-C1		ECS80H2CAA-C1		MVX010A0-4
500 – 600	—/12.9	12.2	ECS80H1DAA-C1		ECS80H2DAA-C1		MVX010A0-5

Table 31. Class ECS80 — Non-combination MVX9000 Drives (Continued)

Volts	Input Ampere Single-/3-Phase Rating	Continuous Output Ampere Rating	Type 4X ① Watertight Stainless Steel		Type 12 Industrial Dust-Tight		Component Microdrive (Open)
			Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp							
208 – 240	5.8/3.4	2.5	ECS80B4BAA-C1		ECS80B8BAA-C1		MVXF50A0-2
1 hp							
208 – 240	9/5.2	5	ECS80C4BAA-C1		ECS80C8BAA-C1		MVX001A0-2
380 – 480	—/3.3	3	ECS80C4CAA-C1		ECS80C8CAA-C1		MVX001A0-4
500 – 600	—/2.4	1.7	ECS80C4DAA-C1		ECS80C8DAA-C1		MVX001A0-5
2 hp							
208 – 240	16/9.3	7	ECS80D4BAA-C1		ECS80D8BAA-C1		MVX002A0-2
380 – 480	—/5	4	ECS80D4CAA-C1		ECS80D8CAA-C1		MVX002A0-4
500 – 600	—/4.2	3	ECS80D4DAA-C1		ECS80D8DAA-C1		MVX002A0-5
3 hp							
208 – 240	22.5/13	10	ECS80E4BAA-C1		ECS80E8BAA-C1		MVX003A0-2
380 – 480	—/7	5	ECS80E4CAA-C1		ECS80E8CAA-C1		MVX003A0-4
500 – 600	—/5.9	4.2	ECS80E4DAA-C1		ECS80E8DAA-C1		MVX003A0-5
5 hp							
208 – 240	—/20	17	ECS80F4BAA-C1		ECS80F8BAA-C1		MVX005A0-2
380 – 480	—/11	8.2	ECS80F4CAA-C1		ECS80F8CAA-C1		MVX005A0-4
500 – 600	—/7	6.6	ECS80F4DAA-C1		ECS80F8DAA-C1		MVX005A0-5
7-1/2 hp							
208 – 240	—/31	25	ECS80G4BAA-C1		ECS80G8BAA-C1		MVX007A0-2
380 – 480	—/17	13	ECS80G4CAA-C1		ECS80G8CAA-C1		MVX007A0-4
500 – 600	—/10.5	9.9	ECS80G4DAA-C1		ECS80G8DAA-C1		MVX007A0-5
10 hp							
380 – 480	—/21	18	ECS80H4CAA-C1		ECS80H8CAA-C1		MVX010A0-4
500 – 600	—/12.9	12.2	ECS80H4DAA-C1		ECS80H8DAA-C1		MVX010A0-5

① These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: ECS80B4BAA-C1. 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.

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Table 32. Class ECS81 — Combination Disconnect Switch MVX9000 Drives

Volts	Input Ampere Single-/ 3-Phase Rating	Continuous Output Ampere Rating	Fuse Clips	Type 1 General Purpose		Type 3R Rainproof		Component Microdrive (Open)
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp								
208 – 240	5.8/3.4	2.6	30A	ECS81B1BAC-C1		ECS81B2BAC-C1		MVXF50A0-2
1 hp								
208 – 240	9/5.2	4	30A	ECS81C1BAC-C1		ECS81C2BAC-C1		MVX001A0-2
380 – 480	—/3.3	2.5	30A	ECS81C1CAC-C1		ECS81C2CAC-C1		MVX001A0-4
500 – 600	—/2.4	1.7	30A	ECS81C1DAA-C1		ECS81C2DAA-C1		MVX001A0-5
2 hp								
208 – 240	16/9.3	7.1	30A	ECS81D1BAC-C1		ECS81D2BAC-C1		MVX002A0-2
380 – 480	—/5	3.8	30A	ECS81D1CAC-C1		ECS81D2CAC-C1		MVX002A0-4
500 – 600	—/4.2	3	30A	ECS81D1DAA-C1		ECS81D2DAA-C1		MVX002A0-5
3 hp								
208 – 240	22.5/13	10	30A	ECS81E1BAC-C1		ECS81E2BAC-C1		MVX003A0-2
380 – 480	—/7	5.5	30A	ECS81E1CAC-C1		ECS81E2CAC-C1		MVX003A0-4
500 – 600	—/5.9	4.2	30A	ECS81E1DAA-C1		ECS81E2DAA-C1		MVX003A0-5
5 hp								
208 – 240	—/20	15.9	30A	ECS81F1BAC-C1		ECS81F2BAC-C1		MVX005A0-2
380 – 480	—/11	8.6	30A	ECS81F1CAC-C1		ECS81F2CAC-C1		MVX005A0-4
500 – 600	—/7.0	6.6	30A	ECS81F1DAA-C1		ECS81F2DAA-C1		MVX005A0-5
7-1/2 hp								
208 – 240	—/31	24	60A	ECS81G1BAE-C1		ECS81G2BAE-C1		MVX007A0-2
380 – 480	—/17	13	60A	ECS81G1CAE-C1		ECS81G2CAE-C1		MVX007A0-4
500 – 600	—/10.5	9.9	30A	ECS81G1DAA-C1		ECS81G2DAA-C1		MVX007A0-5
10 hp								
380 – 480	—/21	16	60A	ECS81H1CAE-C1		ECS81H2CAE-C1		MVX010A0-4
500 – 600	—/12.9	12.2	30A	ECS81H1DAA-C1		ECS81H2DAA-C1		MVX010A0-5

Table 32. Class ECS81 — Combination Disconnect Switch MVX9000 Drives (Continued)

Volts	Input Ampere Single-/ 3-Phase Rating	Continuous Output Ampere Rating	Fuse Clips	Type 4X ① Watertight Stainless Steel		Type 12 Industrial Dust-Tight		Component Microdrive (Open)
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp								
208 – 240	5.8/3.4	2.6	30A	ECS81B4BAB-C1		ECS81B8BAC-C1		MVXF50A0-2
1 hp								
208 – 240	9/5.2	4	30A	ECS81C4BAC-C1		ECS81C8BAC-C1		MVX001A0-2
380 – 480	—/3.3	2.5	30A	ECS81C4CAC-C1		ECS81C8CAC-C1		MVX001A0-4
500 – 600	—/2.4	1.7	30A	ECS81C4DAA-C1		ECS81C8DAA-C1		MVX001A0-5
2 hp								
208 – 240	16/9.3	7.1	30A	ECS81D4BAC-C1		ECS81D8BAC-C1		MVX002A0-2
380 – 480	—/5	3.8	30A	ECS81D4CAC-C1		ECS81D8CAC-C1		MVX002A0-4
500 – 600	—/4.2	3	30A	ECS81D4DAA-C1		ECS81D8DAA-C1		MVX002A0-5
3 hp								
208 – 240	22.5/13	10	30A	ECS81E4BAC-C1		ECS81E8BAC-C1		MVX003A0-2
380 – 480	—/7	5.5	30A	ECS81E4CAC-C1		ECS81E8CAC-C1		MVX003A0-4
500 – 600	—/5.9	4.2	30A	ECS81E4DAA-C1		ECS81E8DAA-C1		MVX003A0-5
5 hp								
208 – 240	—/20	15.9	30A	ECS81F4BAC-C1		ECS81F8BAC-C1		MVX005A0-2
380 – 480	—/11	8.6	30A	ECS81F4CAC-C1		ECS81F8CAC-C1		MVX005A0-4
500 – 600	—/7.0	6.6	30A	ECS81F4DAA-C1		ECS81F8DAA-C1		MVX005A0-5
7-1/2 hp								
208 – 240	—/31	24	60A	ECS81G4BAE-C1		ECS81G8BAE-C1		MVX007A0-2
380 – 480	—/17	13	60A	ECS81G4CAE-C1		ECS81G8CAE-C1		MVX007A0-4
500 – 600	—/10.5	9.9	30A	ECS81G4DAA-C1		ECS81G8DAA-C1		MVX007A0-5
10 hp								
380 – 480	—/21	16	60A	ECS81H4CAE-C1		ECS81H8CAE-C1		MVX010A0-4
500 – 600	—/12.9	12.2	30A	ECS81H4DAA-C1		ECS81H8DAA-C1		MVX010A0-5

① These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: ECS80B4BAA-C1. 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.



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Enclosed Drives

Table 33. Class ECS82 — Combination Circuit Breaker MVX9000 Drives

Volts	Input Ampere Single-/ 3-Phase Rating	Continuous Output Ampere Rating	Breaker Rating Amps.	Type 1 General Purpose		Type 3R Rainproof		Component Microdrive (Open)
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp								
208 – 240	5.8/3.4	2.6	15	ECS82B1BAA-C1		ECS82B2BAA-C1		MVXF50A0-2
1 hp								
208 – 240	9/5.2	4	15	ECS82C1BAA-C1		ECS82C2BAA-C1		MVX001A0-2
380 – 480	—/3.3	2.5	15	ECS82C1CAA-C1		ECS82C2CAA-C1		MVX001A0-4
500 – 600	—/2.4	1.7	15	ECS82C1DAA-C1		ECS82C2DAA-C1		MVX001A0-5
2 hp								
208 – 240	16/9.3	7.1	20	ECS82D1BAC-C1		ECS82D2BAC-C1		MVX002A0-2
380 – 480	—/5	3.8	15	ECS82D1CAA-C1		ECS82D2CAA-C1		MVX002A0-4
500 – 600	—/4.2	3	15	ECS82D1DAA-C1		ECS82D2DAA-C1		MVX002A0-5
3 hp								
208 – 240	22.5/13	10	30	ECS82E1BAE-C1		ECS82E2BAE-C1		MVX003A0-2
380 – 480	—/7	5.5	15	ECS82E1CAA-C1		ECS82E2CAA-C1		MVX003A0-4
500 – 600	—/5.9	4.2	15	ECS82E1DAA-C1		ECS82E2DAA-C1		MVX003A0-5
5 hp								
208 – 240	—/20	15.9	30	ECS82F1BAE-C1		ECS82F2BAE-C1		MVX005A0-2
380 – 480	—/11	8.6	15	ECS82F1CAA-C1		ECS82F2CAA-C1		MVX005A0-4
500 – 600	—/7.0	6.6	15	ECS82F1DAA-C1		ECS82F2DAA-C1		MVX005A0-5
7-1/2 hp								
208 – 240	—/31	24	40	ECS82G1BAE-C1		ECS82G2BAE-C1		MVX007A0-2
380 – 480	—/17	13	30	ECS82G1CAE-C1		ECS82G2CAE-C1		MVX007A0-4
500 – 600	—/10.5	9.9	15	ECS82G1DAA-C1		ECS82G2DAA-C1		MVX007A0-5
10 hp								
380 – 480	—/21	16	30	ECS82H1CAE-C1		ECS82H2CAE-C1		MVX010A0-4
500 – 600	—/12.9	12.2	30	ECS82H1DAA-C1		ECS82H2DAA-C1		MVX010A0-5

Table 33. Class ECS82 — Combination Circuit Breaker MVX9000 Drives (Continued)

Volts	Input Ampere Single-/ 3-Phase Rating	Continuous Output Ampere Rating	Breaker Rating Amps.	Type 4X ① Watertight Stainless Steel		Type 12 Industrial Dust-Tight		Component Microdrive (Open)
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number
1/2 hp								
208 – 240	5.8/3.4	2.6	15	ECS82B4BAA-C1		ECS82B8BAA-C1		MVXF50A0-2
1 hp								
208 – 240	9/5.2	4	15	ECS82C4BAA-C1		ECS82C8BAA-C1		MVX001A0-2
380 – 480	—/3.3	2.5	15	ECS82C4CAA-C1		ECS82C8CAA-C1		MVX001A0-4
500 – 600	—/2.4	1.7	15	ECS82C4DAA-C1		ECS82C8DAA-C1		MVX001A0-5
2 hp								
208 – 240	16/9.3	7.1	20	ECS82D4BAC-C1		ECS82D8BAC-C1		MVX002A0-2
380 – 480	—/5	3.8	15	ECS82D4CAA-C1		ECS82D8CAA-C1		MVX002A0-4
500 – 600	—/4.2	3	15	ECS82D4DAA-C1		ECS82D8DAA-C1		MVX002A0-5
3 hp								
208 – 240	22.5/13	10	30	ECS82E4BAE-C1		ECS82E8BAE-C1		MVX003A0-2
380 – 480	—/7	5.5	15	ECS82E4CAA-C1		ECS82E8CAA-C1		MVX003A0-4
500 – 600	—/5.9	4.2	15	ECS82E4DAA-C1		ECS82E8DAA-C1		MVX003A0-5
5 hp								
208 – 240	—/20	15.9	30	ECS82F4BAE-C1		ECS82F8BAE-C1		MVX005A0-2
380 – 480	—/11	8.6	15	ECS82F4CAA-C1		ECS82F8CAA-C1		MVX005A0-4
500 – 600	—/7.0	6.6	15	ECS82F4DAA-C1		ECS82F8DAA-C1		MVX005A0-5
7-1/2 hp								
208 – 240	—/31	24	40	ECS82G4BAE-C1		ECS82G8BAE-C1		MVX007A0-2
380 – 480	—/17	13	30	ECS82G4CAE-C1		ECS82G8CAE-C1		MVX007A0-4
500 – 600	—/10.5	9.9	15	ECS82G4DAA-C1		ECS82G8DAA-C1		MVX007A0-5
10 hp								
380 – 480	—/21	16	30	ECS82H4CAE-C1		ECS82H8CAE-C1		MVX010A0-4
500 – 600	—/12.9	12.2	30	ECS82H4DAA-C1		ECS82H8DAA-C1		MVX010A0-5

① These are the Catalog Numbers for Type 4X 304-Grade Stainless Steel, as indicated by the seventh digit 4. Example: ECS80B4BAA-C1. 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.



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