

# SENSORLESS VECTOR ADJUSTABLE FREQUENCY AC DRIVES

## MVX9000 Series



- Sensorless Vector Control with Auto Tuning
- Easy to Understand Keypad
- PID Control of a Process Variable Such as Pressure, Flow, Temperature, Liquid Level, etc.
- Built-In Dynamic Braking Chopper
- RS485 Serial Communication Port
- Single-Phase or 3-Phase Input Capability on 240 Vac Rated Units, 3 hp and Below

The Cutler-Hammer® MVX9000 Series sensorless vector adjustable frequency AC Drives from Eaton's electrical business are designed to provide adjustable speed control of 3-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 series utilizes a 32-bit microprocessor and insulated gate bipolar transistor (IGBTs) which provides quiet motor operation, high motor efficiency and smooth low speed performance. The size and simplicity of the MVX9000 Series makes it ideal for hassle free installation where size is a primary concern. Models rated at 480V, 3-phase, 50/60 Hz are available in sizes ranging from 1 to 10 hp. Models rated at 240V, single- or 3-phase, 50/60 Hz are available in sizes ranging from 0.5 to 7½ hp. Models rated at 115V, single-phase, 50/60 Hz are available in the ¼ 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



DESCRIPTION HORSEPOWER	VOLTS	DIMENSIONS IN mm (inch)			SHIPPING WEIGHT KG (LBS)
		WIDTH	HEIGHT	DEPTH	
¼ to 1	100 - 120	100 (3.9)	151 (5.9)	145 (5.7)	2.8 (6.2)
½ to 2	200 - 240	100 (3.9)	151 (5.9)	145 (5.7)	2.8 (6.2)
3 to 7½	200 - 240	125 (4.9)	220 (8.6)	193 (7.6)	5.5 (12.1)
1 to 3	380 - 480	100 (3.9)	151 (5.9)	145 (5.7)	2.8 (6.2)
5 to 10	380 - 480	125 (4.9)	220 (8.6)	193 (7.6)	5.5 (12.1)

diagnostic information. The keys are utilized for digital adjustment and programming of the drive and 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, RS485 serial communications and PID control.

### SPECIFICATIONS

#### OUTPUT RATINGS

**Horsepower:** 90 to 132V, ¼ to 1 hp

**200 to 240V:** ½ to 7½ hp

**380 to 480V:** 1 to 10 hp

**425 to 660V:** 1 to 10 hp

**Frequency Range:** 0.1 to 400 Hz

**Overload Rating:** 150% for 60 sec

**Frequency Resolution:**

**Digital:** 0.1 Hz

**Analog:** Max (set frequency/1000) Hz

#### Frequency Accuracy:

**Digital:** ±0.01% of max frequency

**Analog:** ±0.2% of max frequency

#### Undervoltage Carryover Limit:

0.3 to 25 sec

#### MOTOR PERFORMANCE

**Motor Control:** Sensorless vector

**Constant and Variable Torque:**

Standard

**Speed Regulation:** 0.5% of base speed

#### INPUT POWER

**Voltage:** 50/60 Hz ±3 Hz

**100 to 120V:** -10% +10%/1-phase

**200 to 240V:** -10% +5%/1-phase

**200 to 240V:** -10% +5%/3-phase

**380 to 480V:** -10% +10%/3-phase

**500 to 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 to 50°C (14 to 122°F), -10 to 40°C (14 to 104°F); above 7½ hp)

**Humidity:** 20 to 90%, non-condensing

**Maximum Elevation:** 1000 m (3281')

**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 to 10 Vdc, 4 to 20 mA

**Potentiometer:** 1 to 2 KΩ

**Analog Voltage:** Nominal 10 Vdc, 10K Ω input impedance

**Analog Current:** Nominal 4 to 20 mA, 250 Ω

**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 to 3000 sec

**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

**To Order Visit [omega.com/mvx9000](http://omega.com/mvx9000) for Pricing and Details**

MODEL NO.	DESCRIPTION	INPUT AMP. SINGLE/ 3 PH RATING	CONT. OUTPUT AMP RATING	WATT LOSS AT 9 KHZ
<b>115 VOLT</b>				
<b>MVXF25A0-1</b>	0.25 hp AC drive, 1 ph input, 230V, 3 ph output	6.3/*	1.6	20.0
<b>MVXF50A0-1</b>	0.5 hp AC drive, 1 ph input, 230V, 3 ph output	9.0/*	2.5	20.0
<b>230 VOLT</b>				
<b>MXVF50A0-2</b>	0.5 hp AC drive, 1 ph/3 ph input, 3 ph output	6.3/2.9	2.5	20.0
<b>MVX001A0-2</b>	1 hp AC drive, 1 ph/3 ph input, 3 ph output	11.5/6.3	5.0	38.0
<b>MVX002A0-2</b>	2 hp AC drive, 1 ph/3 ph input, 3 ph output	15.7/8.8	7.0	75.0
<b>MVX003A0-2</b>	3 hp AC drive, 1 ph/3 ph input, 3 ph output	27.5/12.5	10	110
<b>MVX005A0-2</b>	5 hp AC drive, 3 ph input, 3 ph output	*/19.6	17.0	185.0
<b>MVX007A0-2</b>	7.5 hp AC drive, 3 ph input, 3 ph output	*/31.5	25.0	275.0
<b>460 VOLT</b>				
<b>MVX001A0-4</b>	1 hp AC drive, 3 ph input 460V, 3 ph output	*/4.2	3.0	38.0
<b>MVX002A0-4</b>	2 hp AC drive, 3 ph input 460V, 3 ph output	*/5.7	4.0	75.0
<b>MVX003A0-4</b>	3 hp AC drive, 3 ph input 460V, 3 ph output	*/7.0	5.0	110.0
<b>MVX005A0-4</b>	5 hp AC drive, 3 ph input 460V, 3 ph output	*/10.5	8.2	185.0
<b>MVX007A0-4</b>	7.5 hp AC drive, 3 ph input 460V, 3 ph output	*/14.0	13.0	275.0
<b>MVX010A0-4</b>	10 hp AC drive, 3 ph input 460V, 3 ph output	*/20.6	18.0	375.0

*Comes complete with operator's manual.*

*\* Not applicable.*

*Horsepower ratings are based on the use of a 240 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.*

*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.*

**Ordering Examples:** *MVXF25A0-1, 0.25 hp AC drive, 115V 1 ph input, 230V 3 ph output.*

*MVX003A0-2, 3 hp AC drive, 230V 1 ph/3 ph input, 230V 3 ph output.*