

June 2006

# MVX9000 Adjustable Frequency Drives

## Contents

| <i>Description</i>                      | <i>Page</i> |
|-----------------------------------------|-------------|
| <b>MVX9000 Open Drives</b>              |             |
| Product Description .....               | 2           |
| Features and Benefits .....             | 2           |
| Technical Data and Specifications ..... | 3           |
| Wiring Diagrams .....                   | 4           |
| Dimensions .....                        | 6           |
| Catalog Number Selection .....          | 9           |
| Product Selection .....                 | 9           |
| Options .....                           | 9           |
| <b>MVX9000 Enclosed Drives</b>          |             |
| Product Description .....               | 10          |
| Features and Benefits .....             | 10          |
| Standards and Certifications .....      | 10          |
| Cover Control .....                     | 11          |
| Modification Codes .....                | 12          |
| Dimensions .....                        | 15          |
| Catalog Number Selection .....          | 15          |
| Product Selection .....                 | 16          |

**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<br>6 programmable, intelligent digital inputs<br>1 programmable digital output<br>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  $\pm 3$  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                 | —          | —                   | —                   |

## Open Drives

Table 3. All Braking Resistors &amp; 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

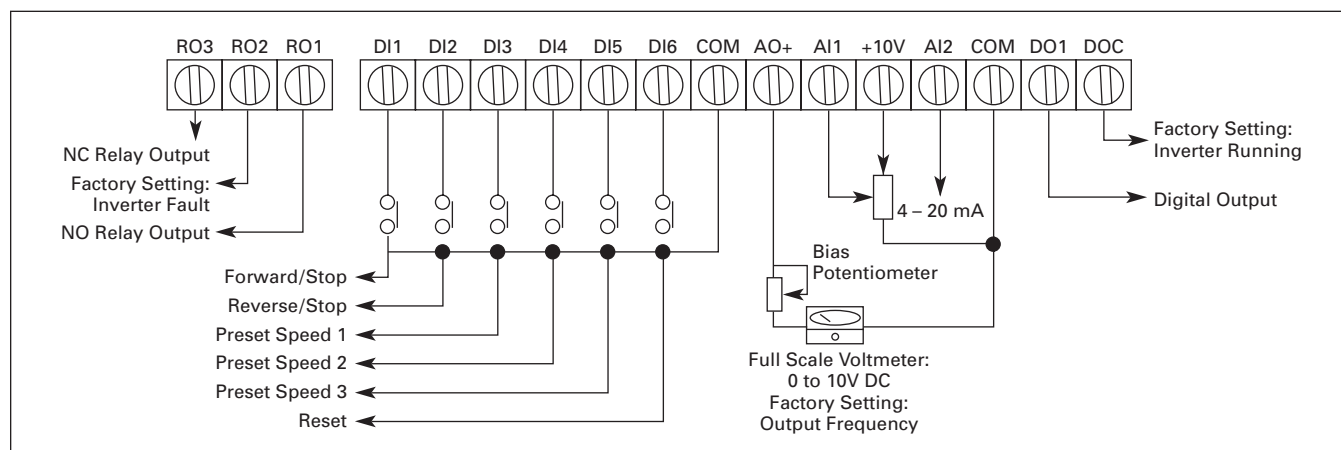


Figure 1. Control Terminal Wiring (Factory Settings)

June 2006

## Open Drives

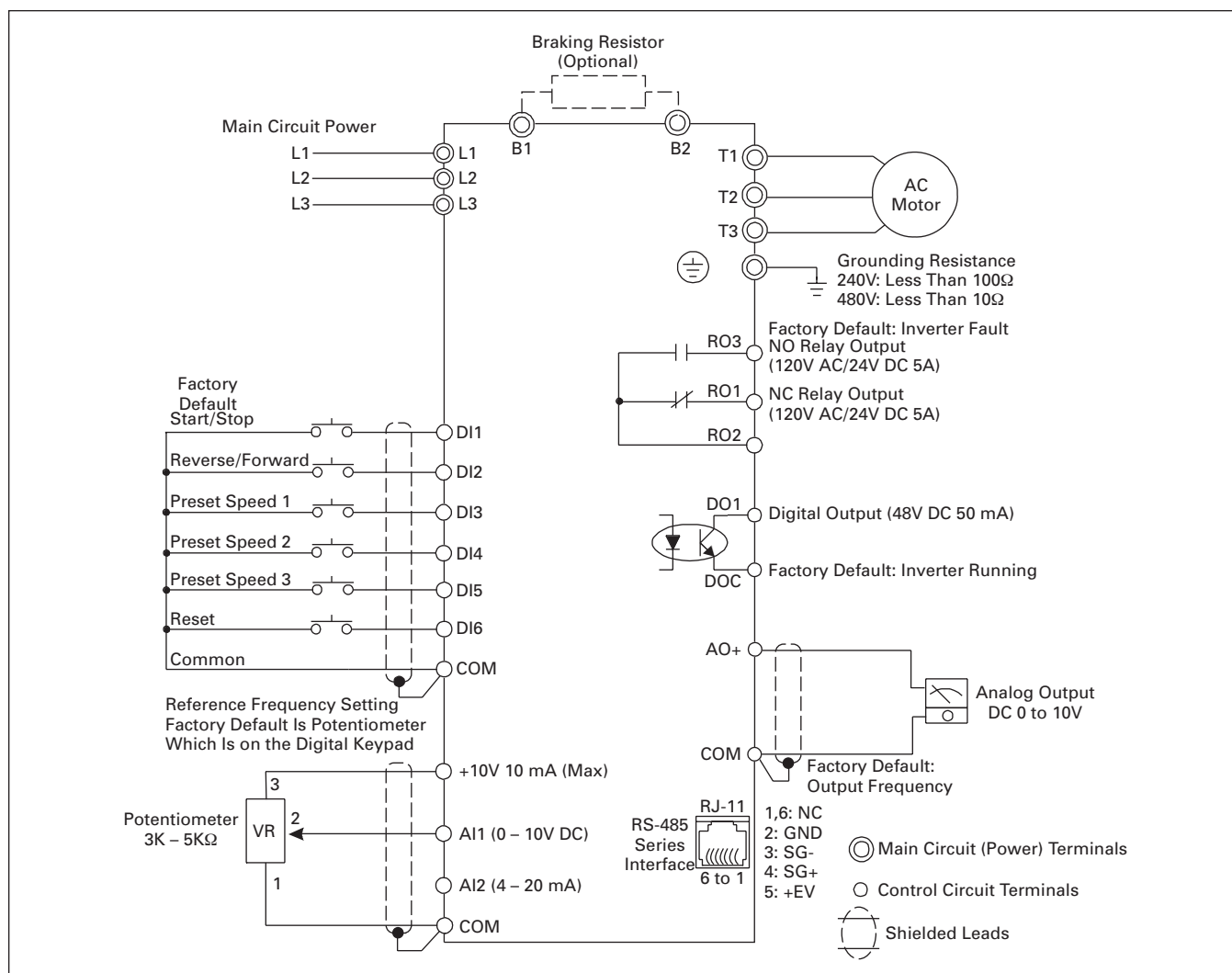


Figure 2. Basic Wiring Diagram

**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.

## Open Drives

## Dimensions

Table 4. Approximate Dimensions and Shipping Weights for Basic Controller

| Description |           | Dimensions in Inches (mm) |           |           | Shipping Weight<br>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)                   |

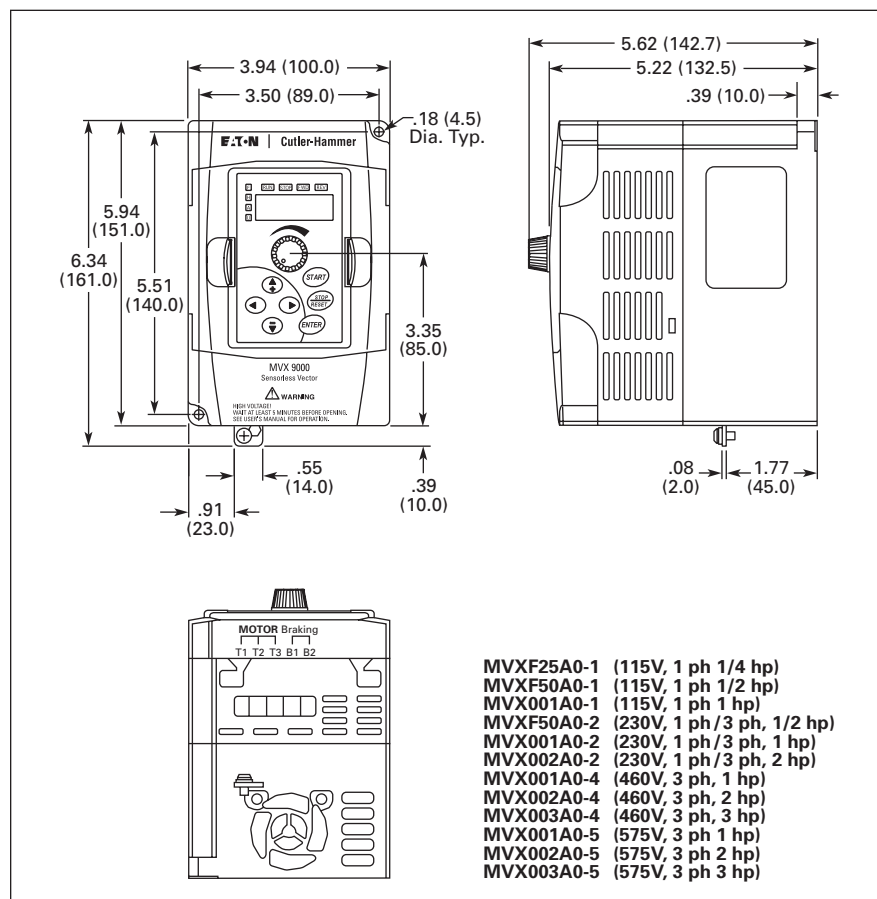
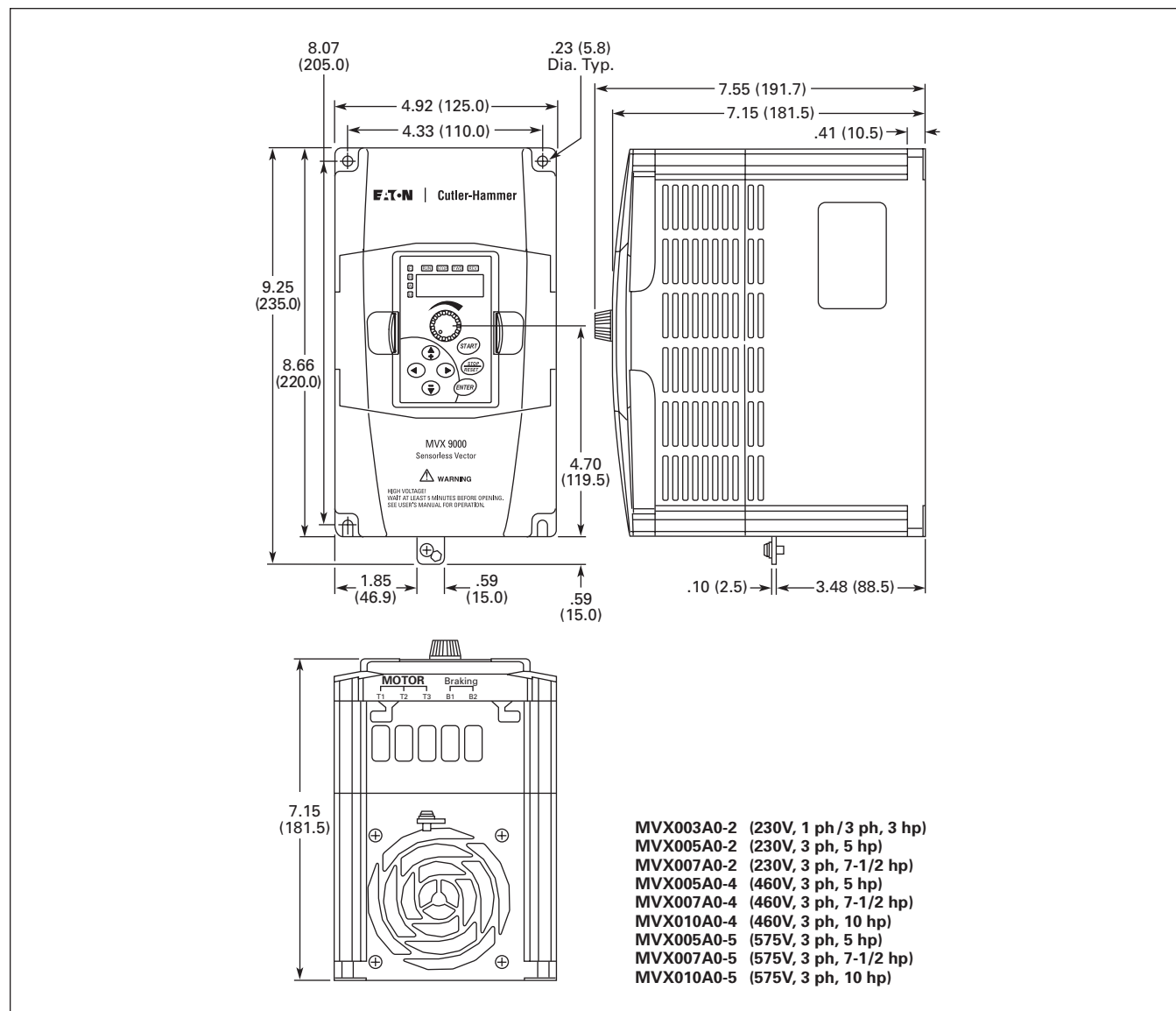


Figure 3. 1/4 to 3 hp Drive Approximate Dimensions in Inches (mm)

June 2006

**Open Drives**



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

## Open Drives

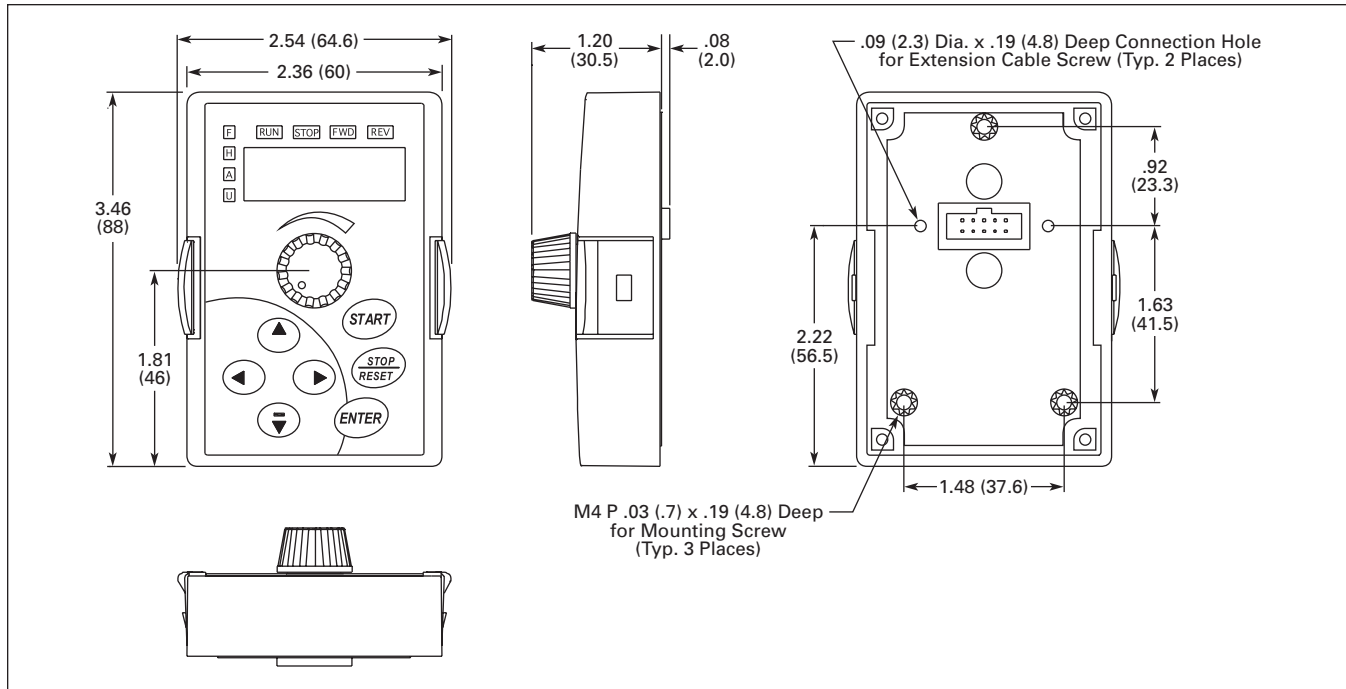


Figure 5. Digital Keypad Approximate Dimensions in Inches (mm)

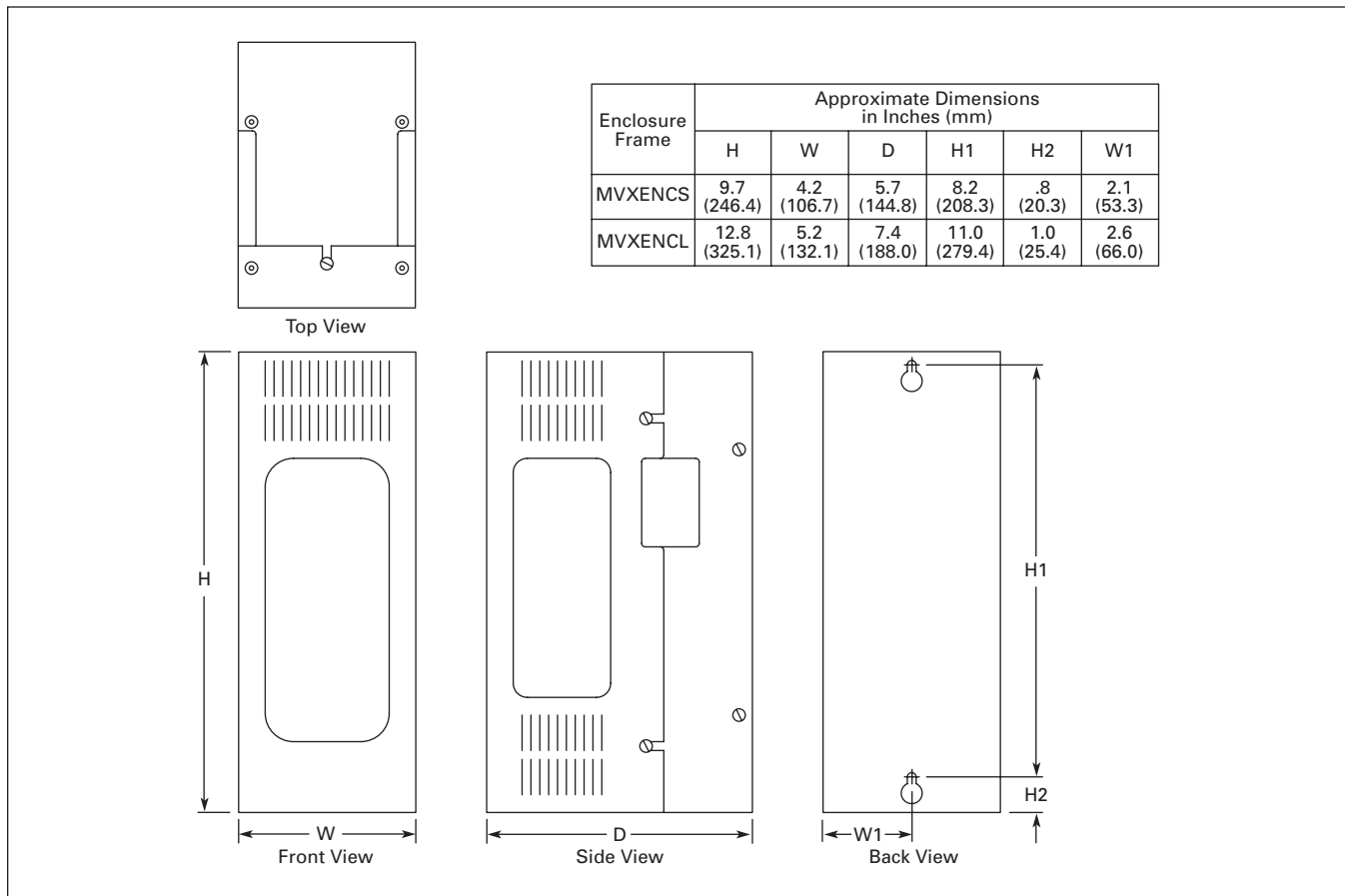


Figure 6. MVX9000 NEMA 1 Enclosure

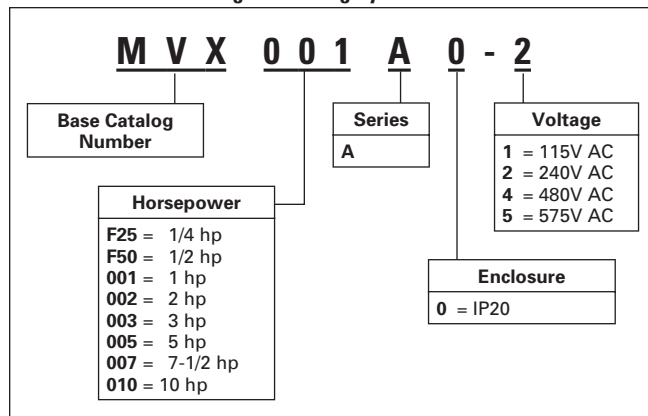


June 2006

## Open Drives

## Catalog Number Selection

Table 5. MVX9000 Catalog Numbering System



## Product Selection

Table 6. MVX9000 Basic Controller IP20

| Description                      |           | Input Amp.<br>Single-/<br>3-Phase<br>Rating                      | Continuous<br>Output<br>Amp<br>Rating   | Catalog<br>Number                                                                | Price<br>U.S. \$ |
|----------------------------------|-----------|------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------|------------------|
| Hp ①                             | Volts ②   |                                                                  |                                         |                                                                                  |                  |
| 1/4<br>1/2<br>1                  | 90 – 130  | 6.3/—<br>9.0/—<br>18.0/—                                         | 1.6<br>2.5<br>4.2                       | MVXF25A0-1<br>MVXF50A0-1<br>MVX001A0-1                                           |                  |
| 1/2<br>1<br>2<br>3<br>5<br>7-1/2 | 200 – 240 | 6.3/2.9<br>11.5/6.3<br>15.7/8.8<br>27.5/12.5<br>—/19.6<br>—/31.5 | 2.5<br>5.0<br>7.0<br>10<br>17<br>25     | MVXF50A0-2<br>MVX001A0-2<br>MVX002A0-2<br>MVX003A0-2<br>MVX005A0-2<br>MVX007A0-2 |                  |
| 1<br>2<br>3<br>5<br>7-1/2<br>10  | 380 – 480 | —/4.2<br>—/5.7<br>—/7.0<br>—/8.5<br>—/14<br>—/20.6               | 3.0<br>4.0<br>5.0<br>8.2<br>13<br>18    | MVX001A0-4<br>MVX002A0-4<br>MVX003A0-4<br>MVX005A0-4<br>MVX007A0-4<br>MVX010A0-4 |                  |
| 1<br>2<br>3<br>5<br>7-1/2<br>10  | 500 – 600 | —/2.4<br>—/4.2<br>—/5.9<br>—/7.0<br>—/10.5<br>—/12.9             | 1.7<br>3.0<br>4.2<br>6.6<br>9.9<br>12.2 | MVX001A0-5<br>MVX002A0-5<br>MVX003A0-5<br>MVX005A0-5<br>MVX007A0-5<br>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<br>Copy Keypad<br>Normal Keypad<br>Remote Kit                                                                                                                                  | MVXCOPY<br>MVXKPD<br>MVXRM                                                                                     |               |
| Miscellaneous Options<br>Extension I/O<br>DIN Rail                                                                                                                                     | MVXEIO<br>MVXDR                                                                                                |               |
| Communications<br>DeviceNet Module                                                                                                                                                     | MVXDN                                                                                                          |               |
| NEMA 1 Enclosure<br>Small Frame<br>Large Frame                                                                                                                                         | MVXENCS<br>MVXENCL                                                                                             |               |
| 3% Line Reactor, 1-phase<br>1/2 hp, 240V<br>1 hp, 240V<br>2 hp, 240V<br>3 hp, 240V                                                                                                     | K64-000988-8091<br>K64-000988-0120<br>K64-000988-0180<br>K64-000988-0250                                       |               |
| 3% Line Reactor, 3-phase<br>1 hp, 480V<br>2 hp, 480V<br>3 hp, 480V<br>5 hp, 480V<br>7-1/2 hp, 480V<br>10 hp, 480V                                                                      | K64-000989-2091<br>K64-000989-4091<br>K64-000989-4091<br>K64-000989-8091<br>K64-000989-0180<br>K64-000989-0250 |               |
| 1/2 hp, 240V<br>1 hp, 240V<br>2 hp, 240V<br>3 hp, 240V<br>5 hp, 240V<br>7-1/2 hp, 240V                                                                                                 | K64-000988-2091<br>K64-000988-4091<br>K64-000988-8091<br>K64-000988-0120<br>K64-000988-0180<br>K64-000988-0250 |               |
| Output Line Reactor<br>1 hp, 480V<br>2 hp, 480V<br>3 hp, 480V<br>5 hp, 480V<br>7-1/2 hp, 480V<br>10 hp, 480V                                                                           | K64-000989-2091<br>K64-000989-4091<br>K64-000989-4091<br>K64-000989-8091<br>K64-000989-0120<br>K64-000989-0180 |               |
| EMI Filter<br>1/2 hp, 240V AC, Single-Phase<br>1 hp, 240V AC, Single-Phase<br>2 hp, 240V AC, Single-Phase<br>3 hp, 240V AC, Single-Phase                                               | K13-000034-0111<br>K13-000034-0111<br>K13-000034-0111<br>K13-000034-0112                                       |               |
| 1/2 hp, 240V AC, Three-Phase<br>1 hp, 240V AC, Three-Phase<br>2 hp, 240V AC, Three-Phase<br>3 hp, 240V AC, Three-Phase<br>5 hp, 240V AC, Three-Phase<br>7-1/2 hp, 240V AC, Three-Phase | K13-000034-0113<br>K13-000034-0113<br>K13-000034-0113<br>K13-000034-0113<br>K13-000034-0115<br>K13-000034-0115 |               |
| 1 hp, 480V AC, Three-Phase<br>2 hp, 480V AC, Three-Phase<br>3 hp, 480V AC, Three-Phase<br>5 hp, 480V AC, Three-Phase<br>7-1/2 hp, 480V AC, Three-Phase<br>10 hp, 480V AC, Three-Phase  | K13-000034-0114<br>K13-000034-0114<br>K13-000034-0114<br>K13-000034-0116<br>K13-000034-0116<br>K13-000034-0117 |               |
| Dynamic Braking Resistor<br>1/2 – 1 hp, 240V<br>2 – 3 hp, 240V<br>5 hp, 240V<br>7-1/2 hp, 240V                                                                                         | K13-000034-0821<br>K13-000034-0824<br>K13-000034-0825<br>K13-000034-0826                                       |               |
| 1 hp, 480V<br>2 – 3 hp, 480V<br>5 hp, 480V<br>7-1/2 hp, 480V<br>10 hp, 480V                                                                                                            | K13-000034-0841<br>K13-000034-0843<br>K13-000034-0844<br>K13-000034-0845<br>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)

June 2006

## Enclosed Drives

## Cover Control

Table 8. MVX Non-reversing Pilot Devices

| Description                    | Factory Installed   |                  | Type 1, 3R<br>Kits for Field Installation |                  | Type 12, 4X<br>Kits for Field Installation |                  |
|--------------------------------|---------------------|------------------|-------------------------------------------|------------------|--------------------------------------------|------------------|
|                                | Position<br>9 Alpha | Adder<br>U.S. \$ | Catalog<br>Number                         | Price<br>U.S. \$ | Catalog<br>Number                          | Price<br>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<br>Kits for Field Installation |                  | Type 12, 4X<br>Kits for Field Installation |                  |
|-------------------------------------|---------------------|------------------|-------------------------------------------|------------------|--------------------------------------------|------------------|
|                                     | Position<br>9 Alpha | Adder<br>U.S. \$ | Catalog<br>Number                         | Price<br>U.S. \$ | Catalog<br>Number                          | Price<br>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.

Discount Symbol..... SS-1

## Enclosed Drives

## 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  |               |

Discount Symbol ..... SS-1

June 2006

## Enclosed Drives

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 <sup>②</sup> | F22                   | 240V or 480V 3-Phase <sup>①</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>U.S. \$<br>480V 1/4 hp — 1 hp 2 hp 3 hp 5 hp<br>U.S. \$ |               |
|                         | F23                   | 240V 1-Phase <sup>①</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp —<br>U.S. \$                                                            |               |

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

<sup>②</sup> 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) <sup>③</sup> | H5                    | <b>Class 20</b>                          | <b>Class 10</b> |
|                                                    |                       | /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   |

<sup>③</sup> 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 <sup>④</sup>                                                        | 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 <sup>⑤</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>U.S. \$<br>480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>U.S. \$ |               |
|                                                                                        |                       |                                                                                                                                                                                        |               |
|                                                                                        | L13                   | 240V 3% Input Line Reactor, 1-Phase, Open Core and Coil <sup>⑤</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp —<br>U.S. \$                                                                 |               |
|                                                                                        | L14                   | 240V or 480V 5% Input Line Reactor, 3-Phase, Open Core and Coil <sup>⑤</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>U.S. \$<br>480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>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 <sup>⑤</sup><br>240V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp —<br>U.S. \$                                                                 |               |
|                                                                                        | L16                   | Line Reactor by Description                                                                                                                                                            |               |
|                                                                                        | L17                   | 480V Output Line dv/dt Filter, Open Core and Coil <sup>⑥</sup><br>480V 1/4 hp 1/2 hp 1 hp 2 hp 3 hp 5 hp<br>U.S. \$                                                                    |               |
|                                                                                        | L18                   | Load Reactor by Description                                                                                                                                                            |               |

<sup>④</sup> Requires oversized enclosure.

<sup>⑤</sup> 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.

<sup>⑥</sup> 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 |               |

Discount Symbol ..... SS-1

## Enclosed Drives

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 |               |

Discount Symbol ..... SS-1



June 2006

## Enclosed Drives

## Dimensions

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

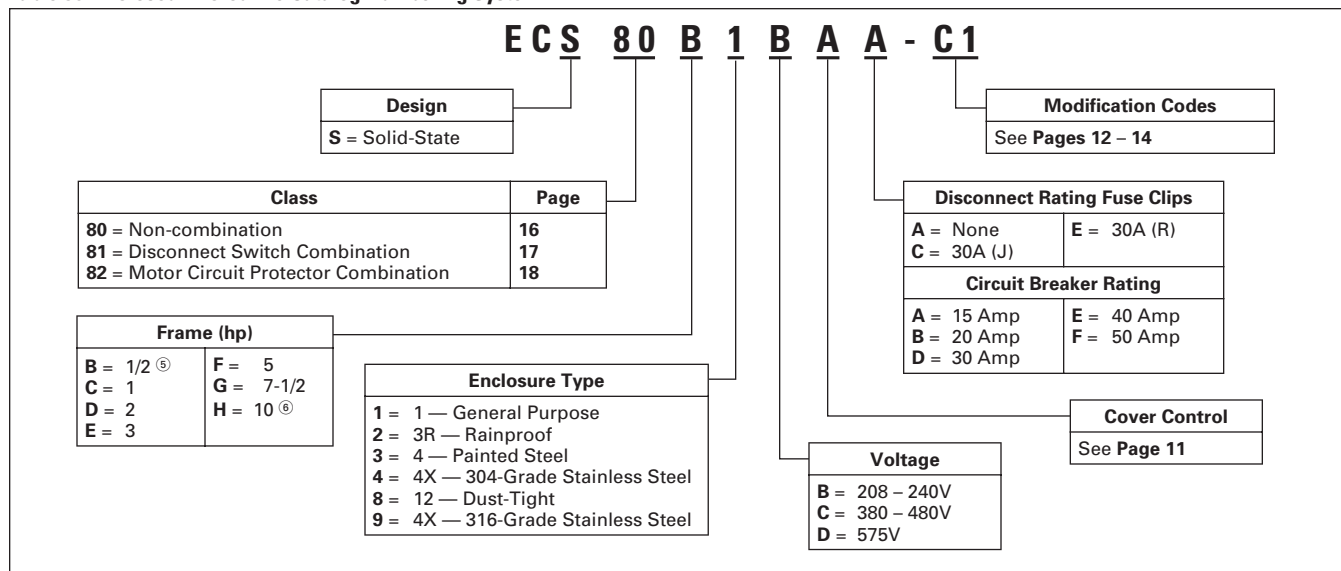
| MVX hp                | Box No. | Shipping Wt. Lbs. (kg) ④ |
|-----------------------|---------|--------------------------|
| 1/2 – 2 (240V)        | M       | 35 (16)                  |
| 1 – 3 (575, 480V)     | M       | 37 (17)                  |
| 3 – 5 (240V)          | C       | 42 (19)                  |
| 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.

## Enclosed Drives

## Product Selection

Table 31. Class ECS80 — Non-combination MVX9000 Drives

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

Cover Mounted Controls . . . . Page 11  
Dimensions . . . . . Page 15  
Modifications . . . . . Pages 12 – 14  
Discount Symbol . . . . . SS-1



June 2006

## Enclosed Drives

Table 32. Class ECS81 — Combination Disconnect Switch MVX9000 Drives

| Volts     | Input Ampere<br>Single-/<br>3-Phase<br>Rating | Continuous<br>Output<br>Ampere<br>Rating | Fuse<br>Clips | Type 1<br>General Purpose |                  | Type 3R<br>Rainproof |                  | Component<br>Microdrive<br>(Open) |
|-----------|-----------------------------------------------|------------------------------------------|---------------|---------------------------|------------------|----------------------|------------------|-----------------------------------|
|           |                                               |                                          |               | Catalog<br>Number         | Price<br>U.S. \$ | Catalog<br>Number    | Price<br>U.S. \$ | Catalog<br>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<br>Single-/<br>3-Phase<br>Rating | Continuous<br>Output<br>Ampere<br>Rating | Fuse<br>Clips | Type 4X ①<br>Watertight<br>Stainless Steel |                  | Type 12<br>Industrial<br>Dust-Tight |                  | Component<br>Microdrive<br>(Open) |
|-----------|-----------------------------------------------|------------------------------------------|---------------|--------------------------------------------|------------------|-------------------------------------|------------------|-----------------------------------|
|           |                                               |                                          |               | Catalog<br>Number                          | Price<br>U.S. \$ | Catalog<br>Number                   | Price<br>U.S. \$ | Catalog<br>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.



Type 1 MXV Drive with Disconnect  
Switch and Bypass

Cover Mounted Controls . . . . . **Page 11**  
Dimensions . . . . . **Page 15**  
Modifications . . . . . **Pages 12 – 14**  
Discount Symbol . . . . . **SS-1**

## Enclosed Drives

Table 33. Class ECS82 — Combination Circuit Breaker MVX9000 Drives

| Volts     | Input Ampere<br>Single-/<br>3-Phase<br>Rating | Continuous<br>Output<br>Ampere<br>Rating | Breaker<br>Rating<br>Amps. | Type 1<br>General Purpose |                  | Type 3R<br>Rainproof |                  | Component<br>Microdrive<br>(Open) |
|-----------|-----------------------------------------------|------------------------------------------|----------------------------|---------------------------|------------------|----------------------|------------------|-----------------------------------|
|           |                                               |                                          |                            | Catalog<br>Number         | Price<br>U.S. \$ | Catalog<br>Number    | Price<br>U.S. \$ | Catalog<br>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<br>Single-/<br>3-Phase<br>Rating | Continuous<br>Output<br>Ampere<br>Rating | Breaker<br>Rating<br>Amps. | Type 4X ①<br>Watertight<br>Stainless Steel |                  | Type 12<br>Industrial<br>Dust-Tight |                  | Component<br>Microdrive<br>(Open) |
|-----------|-----------------------------------------------|------------------------------------------|----------------------------|--------------------------------------------|------------------|-------------------------------------|------------------|-----------------------------------|
|           |                                               |                                          |                            | Catalog<br>Number                          | Price<br>U.S. \$ | Catalog<br>Number                   | Price<br>U.S. \$ | Catalog<br>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.



Type 3R Combination HMCPE MVX Drive

Cover Mounted Controls . . . . . Page 11  
 Dimensions . . . . . Page 15  
 Modifications . . . . . Pages 12 – 14  
 Discount Symbol . . . . . SS-1

June 2006

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Printed in USA  
Publication No. TB04002002E/CPG  
June 2006