

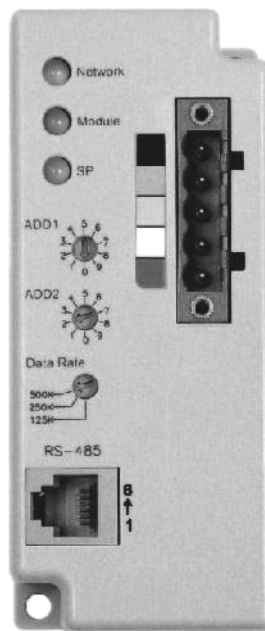


Cutler-Hammer

MVX9000 AF Drives DeviceNet (DN-02)

Instruction Manual

New Information
April 2004



April 2004

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Cover Photo: Cutler-Hammer® DeviceNet (DN-02)

Preface

Receiving and Inspection

This Cutler-Hammer® DN-02 from Eaton Electrical® has gone through rigorous quality control tests at the factory before shipment. After receiving DN-02, please check that the package includes:

- A DN-02
- A Mini Disc (CD)
- A Communication Cable (RJ Communication Cable)

DeviceNet EDS File Use

The DeviceNet EDS files are located on the Mini Disc. The firmware in the drive must be checked in order to select the proper EDS file. Please check parameter 80.01 in the MVX9000 to select the correct EDS file per the following table:

| MVX9000 Firmware version: (Parameter 80.01) | Use EDS File: |
|--|------------------------|
| 1.02 | DN_MVX9000_1p021_0.eds |
| 1.03 | DN_MVX9000_1p031_0.eds |

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Safety

Definitions and Symbols



WARNING

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully.



This symbol is the "Safety Alert Symbol." It occurs with either of two signal words: CAUTION or WARNING, as described below.



WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING).

Hazardous High Voltage



WARNING

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic controllers or rotating machinery.

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Chapter 1 — Overview

DN-02: DeviceNet Interface for MVX9000

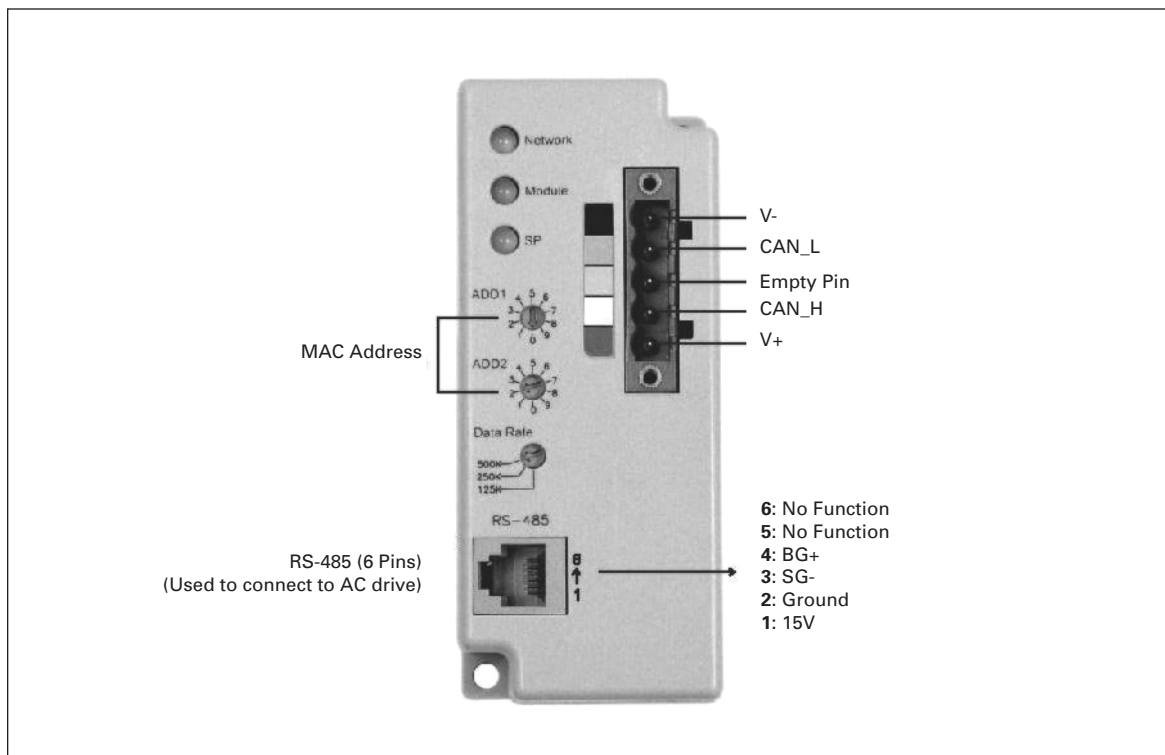


Figure 1-1: DeviceNet DN-02 Components

Dimensions

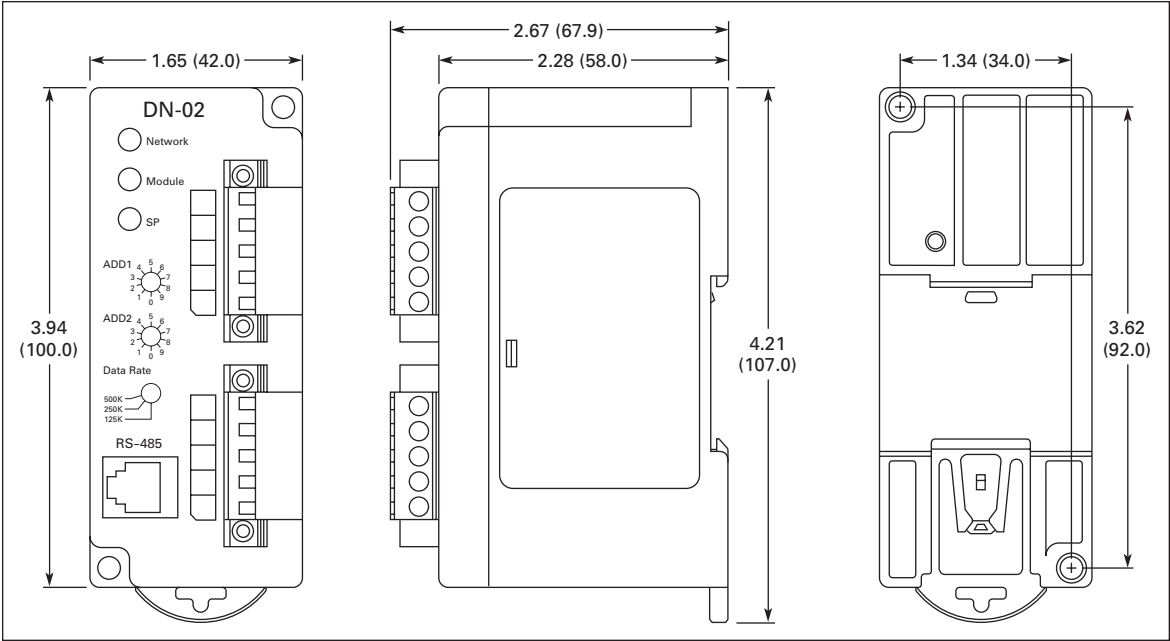


Figure 1-2: DeviceNet DN-02 Dimensions
Approximate Dimensions in Inches (mm)

DIN Rail Mounting

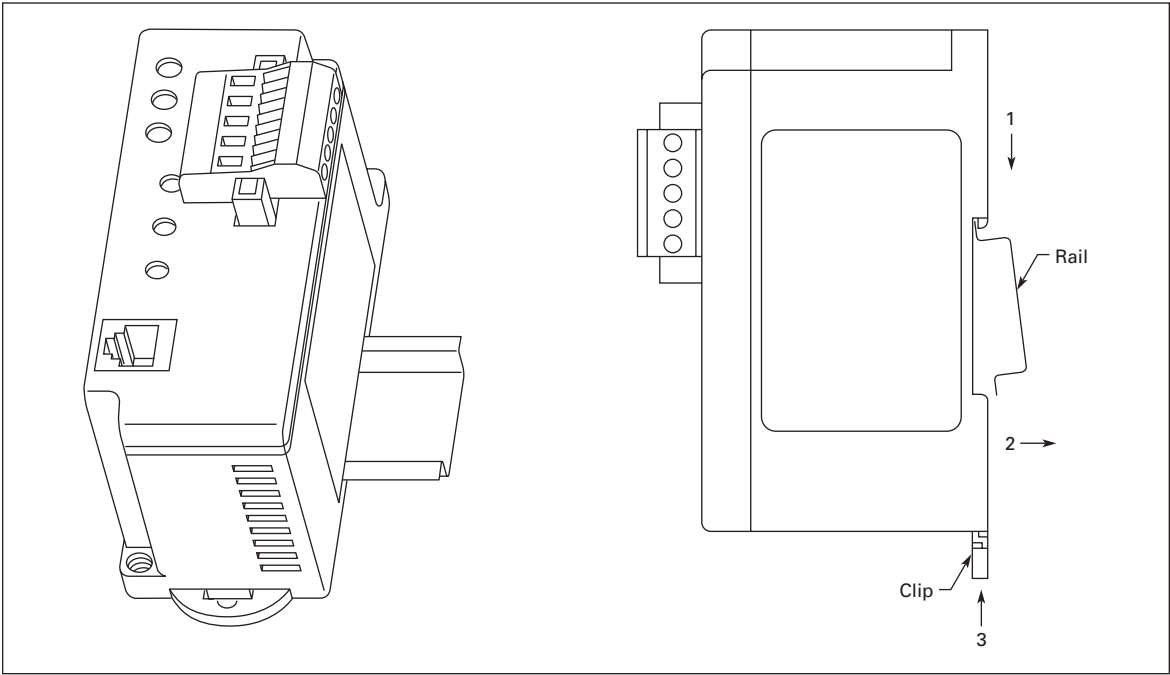


Figure 1-3: DeviceNet DN-02 DIN Rail Mounting

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Chapter 2 — Specifications

Table 2-1: DeviceNet DN-02 Specifications

| Item | Specification |
|-------------------------------|---|
| DeviceNet Connections | |
| Interface | Pluggable connector (5.08 mm) |
| Transfer method | CAN |
| Transfer cable | 2-wire twisted shielded cable with 2-wire bus power cable and drain |
| Electrical isolation | 500V DC |
| Communications | |
| Message types | I/O Polling |
| | Explicit |
| Baud Rates | 125 Kbaud |
| | 250 Kbaud |
| | 500 Kbaud |
| Product Code | 70 |
| Product Type | 12 |
| Vendor ID | 68 (Eaton Electrical) |
| Electrical | |
| DeviceNet | Network supply voltage: 11 to 25V DC |
| | Network input current: 28 mA typical, 125 mA inrush (24V DC) |
| Other | All other power derived from MVX9000 power supply. |
| Environment | |
| Ambient operating temperature | 14 – 122°F (-10 to 50°C) |
| Storage temperature | -4 – 140°F (-20 to 60°C) |
| Humidity | <90%, no condensation allowed |
| Altitude | Max. 1000 meters |
| Vibration | 0.5G 9 – 200 Hz |
| Safety | |
| | Fulfills EN 50178 standard |
| Certification | |
| CE, UL | CE Mark and UL Listed/Approved |

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Chapter 3 — Installation and Configuration

Installing the DN-02 DeviceNet Interface Module with the MVX9000 Drive

The DN-02 DeviceNet interface module for the MVX9000 drive communicates with the drive via Modbus RTU. The default Modbus configuration settings for the DN-02 are as follows:

Table 3-1: Default Modbus Configuration Settings

| Item | Setting |
|-----------|-------------------|
| Data Rate | 19200 bits/second |
| Bits/Byte | 8 |
| Parity | None |
| Stop Bits | 2 |
| Mode | RTU |

Configuring the MVX9000 to Operate with the DN-02

Configure the MVX9000 drive to operate on Modbus with the same Data Rate, Bits/Byte, Parity, Stop Bits and Mode. This is accomplished by configuring the drive from its front keypad. The drive configuration parameter is 90.01. Choose value 3 for this parameter, which is Modbus RTU mode, 8 bits/byte, no parity and 2 stop bits.

Required parameter settings to facilitate operation of the DN-02 with the MVX9000 are as follows:

Table 3-2: Required Parameter Settings

| Parameter | Setting | Description |
|-----------|----------|--|
| 90.01 | 03 | Modbus RTU mode, 8 bits/byte, no parity and 2 stop bits. |
| 90.02 | — | Modbus node address. |
| 90.03 | 02 | 192000 bits/second. |
| 50.01 | 04 | Master frequency determined by RS-485. |
| 50.02 | 03 or 04 | Operating instructions determined by the RS-485 communication interface. Keypad STOP key enabled (03) or Keypad STOP key disabled. |

To set the node address on Modbus, use parameter 90.02. The value entered is the node address.

To set the data rate for the Modbus port on the drive, use parameter 90.03. A value of 02 represents 19200 bits/second.

Parameters 90.04 and 90.05 concern how the drive responds to a communication loss. It is very important to configure these parameters to instruct the drive to respond to a communication loss in a way that is safe and effective for each particular application.

There are two more parameters in the drive that must be properly configured to allow control of the drive via the DN-02 on DeviceNet. Configure the following two parameters as follows:

Table 3-3: Parameter Configuration

| Parameter | Setting |
|-----------|---|
| 50.01 | 04, Master frequency determined by RS-485 |
| 50.02 | 03 or 04, Operating instructions determined by the RS-485 communication interface. Keypad STOP key enabled (03) or Keypad STOP key disabled |

For a complete description of these and other drive configuration parameters, please refer to the *MVX9000 AF Drive User Manual*, Publication TD04002003E.

Connect the DN-02 Module to the MVX9000 Drive

The MVX9000 Drive should now be properly configured to operate with the DN-02 DeviceNet interface module. Use the RJ11 cable provided with the DN-02 to connect the DN-02 module to the MVX9000 drive. The DN-02 module is powered through this connection to the drive. If the MVX9000 drive has power connected, the DN-02 will then also be powered. At this point, before the DN-02 is connected to the DeviceNet network, the LEDs should be as follows:

Table 3-4: LED Before Connection

| Item | Setting |
|---------|--------------|
| Network | Solid red |
| Module | Flashing red |
| SP | Solid green |

The MAC ID and Data Rate for the DN-02 on DeviceNet are configured using the switches on the DN-02 module. Ensure that all products on the DeviceNet network are configured for the same Data Rate and unique MAC IDs. Set the module's switches to meet the network requirements. Add1 and Add2 are used together to form the MAC ID. For example, if Add1 is set to 3 and Add2 is set to 6, the MAC ID will be 36 decimal.

Note: If the Data Rate switch on the DN-02 is turned to a position above 500K, the DN-02 will auto detect the data rate on the network at power up.

Next, connect the DN-02 module to a valid, powered DeviceNet network. The DN-02 module's LEDs should be as follows:

Table 3-5: LED After Connection

| Item | Setting |
|---------|----------------|
| Network | Flashing green |
| Module | Flashing green |
| SP | Solid green |

The Network LED flashes green when the DN-02 is connected to a valid, powered DeviceNet network, but is not owned by a master. When a master establishes a connection with the module, the Network LED will be solid green.

The Module LED will flash green until a DeviceNet master begins exchanging I/O data with it. Then it will be solid green.

Please refer to Chapter 4 — Troubleshooting in this manual for a complete description of the LED operation for the DN-02 module.

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I/O Assembly Layouts

The Input and Output assemblies for the DN-02 connected to an MVX9000 drive are each 4 bytes in length. The layouts for these I/O assemblies are as follows:

Input Assembly

Table 3-6: Input Assembly

| Byte | Description |
|------|-------------------------------|
| 0 | MVX9000 Drive LED status bits |
| 1 | Operating Status bits |
| 2 | Actual Frequency (low byte) |
| 3 | Actual Frequency (high byte) |

Byte 0, Module LED Status Bits

Table 3-7: Module LED Status

| Bit | Description | Status |
|------------|--|--|
| Bits 0 – 1 | bit 0 = 0, bit 1 = 0 bit 0 = 1, bit 1 = 0 bit 0 = 0, bit 1 = 1 bit 0 = 1, bit 1 = 1 | Run LED OFF, Stop LED ON Run LED blinking, Stop LED ON Run LED ON, Stop LED blinking Run LED ON, Stop LED OFF |
| Bit 2 | bit 2 = 0 bit 2 = 1 | Jog Inactive Jog Active |
| Bits 3 – 4 | bit 3 = 0, bit 4 = 0 bit 3 = 1, bit 4 = 0 bit 3 = 0, bit 4 = 1 bit 3 = 1, bit 4 = 1 | REV LED OFF, FWD LED ON REV LED blinking, FWD LED ON REV LED ON, FWD LED blinking REV LED ON, FWD LED OFF |
| Bits 5 – 7 | Reserved | |

Byte 1, Operating Status Bits

Table 3-8: Operating Status

| Bit | Status |
|-----------|--|
| Bit 0 | 1 = Main frequency controlled by DeviceNet |
| Bit 1 | 1 = Main frequency controlled by external terminal |
| Bit 2 | 1 = Operation controlled by DeviceNet |
| Bit 3 | 1 = Parameters have been locked |
| Bit 4 | 0 = Stopped 1 = Running |
| Bit 5 | 0 = Jog Inactive 1 = Jog Active |
| Bit 6 – 7 | Reserved |

Bytes 2 & 3, Actual Frequency

Byte 2 is the low byte and byte 3 is the high byte for this 16-bit decimal value for the drive's actual operating frequency. The range is 0 – 400 Hz.

Output Assembly**Table 3-9: Output Assembly**

| Byte | Description |
|------|---------------------------------|
| 0 | Control Bits |
| 1 | Reserved |
| 2 | Frequency Reference (low byte) |
| 3 | Frequency Reference (high byte) |

Byte 0, Control Bits**Table 3-10: Control**

| Bit | Description | Status |
|------------|----------------------|------------------|
| Bits 0 – 1 | bit 0 = 0, bit 1 = 0 | No Function |
| | bit 0 = 1, bit 1 = 0 | Stop |
| | bit 0 = 0, bit 1 = 1 | Run |
| | bit 0 = 1, bit 1 = 1 | Jog & Run |
| Bits 2 – 3 | Reserved | |
| Bits 4 – 5 | bit 4 = 0, bit 5 = 0 | No Function |
| | bit 4 = 1, bit 5 = 0 | FWD |
| | bit 4 = 0, bit 5 = 1 | REV |
| | bit 4 = 1, bit 5 = 1 | Change Direction |
| Bits 6 – 7 | Reserved | |

Byte 1, Reserved**Bytes 2 & 3, Frequency Reference**

Byte 2 is the low byte and byte 3 is the high byte for this 16-bit decimal value for the drive's frequency reference. This is the command frequency to drive. The range is 0 – 400 Hz.

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Chapter 4 — Troubleshooting

Network LED

Table 4-1: Troubleshooting the Network LED

| State | Indication | Corrective Actions |
|--------------------|--|---|
| LED is OFF | No power/duplicate ID not completed. | <ol style="list-style-type: none"> 1. Verify that the DN-02 power supply is connected and that power is reaching the DN-02 through the connector. 2. Make sure one or more nodes are communicating on the network. 3. Make sure at least one other node on the network is operational at the same time and data rate as the DN-02. |
| Flashing Green LED | Online/not connected. | |
| Green LED | Online/connected. One or more connections established. | |
| Flashing Red LED | Online/Time-out. I/O connection timed out. | |
| Red LED | Network failure. Failed duplicate ID or Bus-off. | <ol style="list-style-type: none"> 1. Ensure that all nodes have unique address. 2. If all node addresses are unique, check network for correct media installation and data rate. |

Module LED

Table 4-2: Troubleshooting the Module LED

| State | Indication | Corrective Actions |
|--------------------|--|---|
| LED is OFF | No power/not online. | Ensure that the connected AC drive is powered and connected to the DN-02. |
| Flashing Green LED | Waiting for I/O data. No I/O or PLC in program. | DN-02 has passed all operational tests and is waiting to pass I/O data between the DN-02 and AC drives. |
| Green LED | I/O operational. | |
| Flashing Red LED | Configuration problem. DN-02 parameters or flash program CRC is invalid. | Reset DN-02 internal I/O data. Please refer to Data Configuration address assign for detail. |
| Red LED | Hardware Failure. Failed internal or external RAM test. | Return to the factory. |

SP LED

Table 4-3: Troubleshooting the SP LED

| State | Indication | Corrective Actions |
|--------------------|---|---|
| LED is OFF | No power. | There is no power applied to the device. |
| Flashing Green LED | DN-02 is reading the AC drive default setting. | |
| Green LED | DN-02 and AC drives are communicating normally. | |
| Flashing Red LED | CRC check faulted. | Check that the AC drive communication format setting is correct. Please refer to Installation for detail. |
| Red LED | Connection failure/no connection. | <ol style="list-style-type: none">1. Check that the connection between AC drive and DN-02 RS-485 is correct.2. Rewire the AC drive connection and ensure that the wire specification is correct. |

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Appendix A — DeviceNet Objects

Object Classes

The communication interface supports the following object classes.

Table A-1: Object Classes

| Class | Object |
|-------|----------------|
| 0x01 | Identity |
| 0x02 | Message router |
| 0x03 | DeviceNet |
| 0x05 | Connection |
| 0x0f | Parameter |
| 0x95 | DataConf |

Class 0x01 Identity

Table A-2: Identity Class (1) — Class Attributes (0)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---------------------|-----------|
| 1 | Get | Revision | UINT |
| 2 | Get | Max Instance | UINT |
| 3 | Get | Number of Instances | UINT |
| 6 | Get | Max Class ID | UINT |
| 7 | Get | Max Instance ID | UINT |

Table A-3: Identity Class (1) — Instance Attributes (1)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---|-----------------|
| 1 | Get | Vendor ID | UINT |
| 2 | Get | Device Type | UINT |
| 3 | Get | Product Code | UINT |
| 4 | Get | Revision — MajRev MinRev | USINT USINT |
| 5 | Get | Status | WORD |
| 6 | Get | Serial Number | UDINT |
| 7 | Get | Product Name — StrLen ASCIIString | USINT STRING |

Table A-4: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|---------------------------|
| | Class | Instance | |
| 0x05 | No | Yes | Reset |
| 0x0e | Yes | Yes | Get_Attribute_Single |
| 0x10 | Yes | No | Find_Next_Object_Instance |

Class 0x02 Message Router

Table A-5: Message Router Class (2) — Class Attributes (0)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|-----------------|-----------|
| 1 | Get | Revision | UINT |
| 6 | Get | Max Class ID | UINT |
| 7 | Get | Max Instance ID | UINT |

Table A-6: Message Router Class (2) — Instance Attributes (1)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---------------|-----------|
| 2 | Get | Num Available | UINT |
| 3 | Get | Num Active | UINT |

Table A-7: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x0e | Yes | Yes | Get_Attribute_Single |

Class 0x03 DeviceNet

Table A-8: DeviceNet Class (3) — Class Attributes (0)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|----------|-----------|
| 1 | Get | Revision | UINT |

Table A-9: DeviceNet Class (3) — Instance Attributes (1)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|--|---------------|
| 1 | Get | MAC ID | USINT |
| 2 | Get | Baud Rate | USINT |
| 3 | Get/Set | BOI (Bus Off Interrupt) | BOOL |
| 4 | Get/Set | Bus Off Counter | USINT |
| 5 | Get | Allocation Info — AllocationChioce MasterNodeAddress | BYTE USINT |
| 6 | Get | MAC ID Switch Changed | BOOL |
| 7 | Get | Baud Rate Switch Changed | BOOL |
| 8 | Get | MAC ID Switch Value | USINT |
| 9 | Get | Baud Rate Switch Value | USINT |

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Table A-10: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|--------------------------------------|
| | Class | Instance | |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |
| 0x4B | No | Yes | Allocate_Master/Slave_Connection_Set |
| 0x4C | No | Yes | Release_Master/Slave_Connection_Set |

Class 0x05 Connection**Table A-11: Connection Class (5) — Class Attributes (0)**

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|----------|-----------|
| 1 | Get | Revision | UINT |

Table A-12: Connection Class (5) — Explicit Connection Instance (1)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---------------------------------|-----------|
| 1 | Get | State | USINT |
| 2 | Get | InstanceType | USINT |
| 3 | Get | TransportClassTrigger | USINT |
| 4 | Get | ProducedConnectionId | UINT |
| 5 | Get | ConsumedConnectionId | UINT |
| 6 | Get | InitialCommCharacteristics | BYTE |
| 7 | Get | ProducedConnectionSize | UINT |
| 8 | Get | ConsumedConnectionSize | UINT |
| 9 | Get/Set | ExpectedPackedRate | UINT |
| 12 | Get/Set | WatchdogTimeoutAction | USINT |
| 13 | Get | Produced Connection Path Length | USINT |
| 14 | Get | Produced Connection Path | EPATH |
| 15 | Get | Consumed Connection Path Length | USINT |
| 16 | Get | Consumed Connection Path | EPATH |

**Table A-13: Connection Class (5) — Polled I/O
Connection Instance (2)**

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---------------------------------|-----------|
| 1 | Get | State | USINT |
| 2 | Get | InstanceType | USINT |
| 3 | Get | TransportClassTrigger | USINT |
| 4 | Get | ProducedConnectionId | UINT |
| 5 | Get | ConsumedConnectionId | UINT |
| 6 | Get | InitialCommCharacteristics | BYTE |
| 7 | Get | ProducedConnectionSize | UINT |
| 8 | Get | ConsumedConnectionSize | UINT |
| 9 | Get/Set | ExpectedPackedRate | UINT |
| 12 | Get/Set | WatchdogTimeoutAction | USINT |
| 13 | Get | Produced Connection Path Length | USINT |
| 14 | Get | Produced Connection Path | EPATH |
| 15 | Get | Consumed Connection Path Length | USINT |
| 16 | Get | Consumed Connection Path | EPATH |

Table A-14: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x05 | No | Yes | Reset |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

Class 0x0f Parameter

Table A-15: Parameter Class (15) — Class Attributes (0)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|---------------------|-----------|
| 1 | Get | Revision | UINT |
| 2 | Get | MaxInstance | UINT |
| 8 | Get | ParaClassDescriptor | WORD |
| 9 | Get | ConfAssemblyInst | UINT |
| 10 | Get | NativeLanguage | USINT |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144)

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|-----------------------------|--|---------------------------|-------------------------|--|
| 1 0x01 | 1 | Max Voltage Frequency | Get_Attribute_Single Set_Attribute_Single | 600, 100, 4000 | Unsigned 16-bit integer | 10.0 to 400.0 Hz |
| 2 0x02 | 1 | Max Output Voltage | Get_Attribute_Single Set_Attribute_Single | 2300, 2, 5100 | Unsigned 16-bit integer | 230V: 2.0 to 255 V 460V: 2.0 to 510 V |
| 3 0x03 | 1 | Source of Frequency Command | Get_Attribute_Single Set_Attribute_Single | 4, 0, 4 | Unsigned 16-bit integer | 00: Frequency determined by digital keypad up/down 01: Frequency determined by keypad potentiometer 02: Frequency determined by 0 to +10V input on AI terminal 03: Frequency determined by 4 to 20 mA input on AI terminal 04: Frequency determined by RS-485 communication interface |
| 4 0x04 | 1 | Source of Operation Command | Get_Attribute_Single Set_Attribute_Single | 3, 0, 4 | Unsigned 16-bit integer | 00: Operation determined by digital keypad 01: Operation determined by external control terminals, keypad STOP is effective 02: Operation determined by external control terminals, keypad STOP is ineffective 03: Operation determined by RS-485 interface, keypad STOP is effective 04: Operation determined by RS-485 interface, keypad STOP is ineffective |
| 5 0x05 | 1 | Motor Rated Current | Get_Attribute_Single Set_Attribute_Single | 30, 12, 36 | Unsigned 16-bit integer | 30 to 120% |
| 6 0x06 | 1 | Min Output Frequency | Get_Attribute_Single Set_Attribute_Single | 15, 10, 200 | Unsigned 16-bit integer | 0.1 to 20.0 Hz |
| 7 0x06 | 1 | Max Output Frequency | Get_Attribute_Single Set_Attribute_Single | 600, 500, 4000 | Unsigned 16-bit integer | 50.0 to 400.0 Hz |
| 8 0x08 | 1 | Acceleration Time1 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to 600.0 sec |
| 9 0x09 | 1 | Deceleration Time1 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to 600.0 sec |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|--|--|---------------------------|-------------------------|--|
| 10 0x0A | 1 | Minimum Reference Value (0 – 10V) | Get_Attribute_Single Set_Attribute_Single | 0, 0, 100 | Unsigned 16-bit integer | 0.0 to 10.0V |
| 11 0x0B | 1 | Maximum Reference Value (0 – 10V) | Get_Attribute_Single Set_Attribute_Single | 100, 0, 100 | Unsigned 16-bit integer | 0.0 to 10.0V |
| 12 0x0C | 1 | Inverts Reference Signal AVI (0 – 10V) | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Not inverted 01: Inverted |
| 13 0x0D | 1 | Minimum Reference Value (4 – 20 mA) | Get_Attribute_Single Set_Attribute_Single | 40, 0, 200 | Unsigned 16-bit integer | 0.0 to 20.0 mA |
| 14 0x0E | 1 | Maximum Reference value (4 – 20 mA) | Get_Attribute_Single Set_Attribute_Single | 200, 0, 200 | Unsigned 16-bit integer | 0.0 to 20.0 mA |
| 15 0x0F | 1 | Inverts Reference Signal (4 – 20 mA) | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Not inverted 01: Inverted |
| 16 0x10 | 1 | Potentiometer Bias Frequency | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1000 | Unsigned 16-bit integer | |
| 17 0x11 | 1 | Potentiometer Bias Polarity | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Positive 01: Negative |
| 18 0x12 | 1 | Potentiometer slope | Get_Attribute_Single Set_Attribute_Single | 1000, 0, 3000 | Unsigned 16-bit integer | 0.1 to 300.0% |
| 19 0x13 | 1 | Potentiometer Reverse Motion Enable | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Forward Motion Only 01: Reverse Motion Enable |
| 20 0x14 | 1 | Multi-Function Input Terminal (M0, M1) | Get_Attribute_Single Set_Attribute_Single | 2, 1, 3 | Unsigned 16-bit integer | |
| 21 0x15 | 1 | Multi-Function Input Terminal (M2) | Get_Attribute_Single Set_Attribute_Single | 5, 0, 26 | Unsigned 16-bit integer | |
| 22 0x16 | 1 | Multi-Function Input Terminal (M3) | Get_Attribute_Single Set_Attribute_Single | 6, 0, 26 | Unsigned 16-bit integer | |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|------------------------------------|--|---------------------------|-------------------------|-----------------------------|
| 23 0x17 | 1 | Multi-Function Input Terminal (M4) | Get_Attribute_Single Set_Attribute_Single | 7, 0, 26 | Unsigned 16-bit integer | |
| 24 0x18 | 1 | Multi-Function Input Terminal (M5) | Get_Attribute_Single Set_Attribute_Single | 3, 0, 26 | Unsigned 16-bit integer | |
| 25 0x19 | 1 | Counter Countdown Complete | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | |
| 26 0x1A | 1 | Preset Counter Countdown | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | |
| 27 0x1B | 1 | 1 st Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 28 0x1C | 1 | 2 nd Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 29 0x1D | 1 | 3 rd Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 30 0x1E | 1 | 4th Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 31 0x1F | 1 | 5th Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 32 0x20 | 1 | 6th Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 33 0x21 | 1 | 7th Step Speed Freq. | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 34 0x22 | 1 | Display Frequency or % | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Frequency (Hz) |
| | | | | | | 01: Percentage (%) |
| 35 0x23 | 1 | Multi-Function Input EDI1 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 26 | Unsigned 16-bit integer | |
| 36 0x24 | 1 | Multi-Function Input EDI2 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 26 | Unsigned 16-bit integer | |
| 37 0x25 | 1 | Analog Output Signal | Get_Attribute_Single Set_Attribute_Single | 0, 0, 3 | Unsigned 16-bit integer | 00: Frequency Hz |
| | | | | | | 01: Current A |
| | | | | | | 02: Feedback signal 0 – 100 |
| | | | | | | 03: Output power 0 – 100% |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|----------------------------------|--|---------------------------|-------------------------|--|
| 38 0x26 | 1 | Analog Output gain | Get_Attribute_Single Set_Attribute_Single | 100, 0, 200 | Unsigned 16-bit integer | 00 to 200% |
| 39 0x27 | 1 | Multi-Function Output Terminal 1 | Get_Attribute_Single Set_Attribute_Single | 2, 0, 21 | Unsigned 16-bit integer | |
| 40 0x28 | 1 | Multi-Function Output Terminal 2 | Get_Attribute_Single Set_Attribute_Single | 2, 0, 21 | Unsigned 16-bit integer | |
| 41 0x29 | 1 | Desired Frequency Attained | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0 to 400.0 Hz |
| 42 0x2A | 1 | Multi-Function Output EDO1 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 21 | Unsigned 16-bit integer | |
| 43 0x2B | 1 | Multi-Function Output EDO2 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 21 | Unsigned 16-bit integer | |
| 44 0x2C | 1 | Source of Frequency Command | Get_Attribute_Single Set_Attribute_Single | 4, 0, 4 | Unsigned 16-bit integer | |
| 45 0x2D | 1 | Source of Operation Command | Get_Attribute_Single Set_Attribute_Single | 4, 0, 4 | Unsigned 16-bit integer | 00: Operation determined by digital keypad. |
| | | | | | | 01: Operation determined by external control terminals, keypad STOP is effective |
| | | | | | | 02: Operation determined by external control terminals, keypad STOP is ineffective |
| | | | | | | 03: Operation determined by RS-485 interface, keypad STOP is effective |
| | | | | | | 04: Operation determined by RS-485 interface, keypad STOP is ineffective |
| 46 0x2E | 1 | Stop Methods | Get_Attribute_Single Set_Attribute_Single | 3, 0, 4 | Unsigned 16-bit integer | 00: Ramp to Stop |
| | | | | | | 01: Coast to Stop |
| 47 0x2F | 1 | Max Output Frequency | Get_Attribute_Single Set_Attribute_Single | 600, 500, 4000 | Unsigned 16-bit integer | 50.0 to 400.0 Hz |
| 48 0x30 | 1 | Max Voltage Frequency | Get_Attribute_Single Set_Attribute_Single | 600, 100, 4000 | Unsigned 16-bit integer | 10.0 to 400.0 Hz |
| 49 0x31 | 1 | Max Output Voltage | Get_Attribute_Single Set_Attribute_Single | 2300, 1, 5100 | Unsigned 16-bit integer | 230V 0.1 to 255.0V |
| | | | | | | 460V 0.1 to 510.0V |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|---|--|---------------------------|-------------------------------|---|
| 50 0x32 | 1 | Mid-Point Frequency | Get_Attribute_Single Set_Attribute_Single | 15, 10, 4000 | Unsigned 16-bit integer | 0.1 to 400.0 Hz |
| 51 0x33 | 1 | Mid-Point Voltage | Get_Attribute_Single Set_Attribute_Single | 100, 1, 5100 | Unsigned 16-bit integer | 230V 0.1 to 255.0V 460V 0.1 to 510.0V |
| 52 0x34 | 1 | Min Output Frequency | Get_Attribute_Single Set_Attribute_Single | 15, 1, 200 | Unsigned 16-bit integer | 0.1 to 20.2 Hz |
| 53 0x35 | 1 | Min Output Voltage | Get_Attribute_Single Set_Attribute_Single | 100, 1, 1000 | Unsigned 16-bit integer | 230V 0.1 to 50.0V 460V 0.1 to 100.0V |
| 54 0x36 | 1 | Sensorless Vector enable | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Disable 01: Enable |
| 55 0x37 | 1 | Acceleration Time1 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to d 600.0 sec |
| 56 0x38 | 1 | Deceleration Time1 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to d 600.0 sec |
| 57 0x39 | 1 | Acceleration Time2 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to d 600.0 sec |
| 58 0x3A | 1 | Deceleration Time2 | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to d 600.0 sec |
| 59 0x3B | 1 | Accel 1 to Accel 2 Frequency Transition | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0: Disable Above min. freq.: Enable, 0.0 to 400.0 Hz |
| 60 0x3C | 1 | Decel 1 to Decel 2 Frequency Transition | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0: Disable Above min. freq.: Enable, 0.0 to 400.0 Hz |
| 61 0x3D | 1 | S-Curve in Acceleration | Get_Attribute_Single Set_Attribute_Single | 0, 0, 7 | Unsigned 16-bit integer | 00 to 07 |
| 62 0x3E | 1 | S-Curve in Deceleration | Get_Attribute_Single Set_Attribute_Single | 0, 0, 7 | Unsigned 16-bit integer | 00 to 07 |
| 63 0x3F | 1 | Jog Accel / Decel Time | Get_Attribute_Single Set_Attribute_Single | 1000, 1, 60000 | Unsigned 16-bit integer | 0.01 to d 600.0 sec |
| 64 0x40 | 1 | Jog Frequency | Get_Attribute_Single Set_Attribute_Single | 60, 0, 4000 | Unsigned 16-bit integer | 0.1 to 400.0 Hz |
| 65 0x41 | 1 | Reverse Operation Inhibition | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Enable Reverse Operation 01: Disable Reverse Operation |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|--------------------------------|--|---------------------------|-------------------------|--|
| 66 0x42 | 1 | Momentary Power Loss | Get_Attribute_Single Set_Attribute_Single | 0, 0, 2 | Unsigned 16-bit integer | 00: Stop operation after momentary power loss |
| | | | | | | 01: Continue operation after momentary power loss, speed search from Speed Reference |
| | | | | | | 02: Continue operation after momentary power loss, speed search from Minimum Speed |
| 67 0x43 | 1 | Max Allowable Power Loss Time | Get_Attribute_Single Set_Attribute_Single | 20, 3, 50 | Unsigned 16-bit integer | 0.3 to 5.0 sec |
| 68 0x44 | 1 | B.B. Time for Speed Search | Get_Attribute_Single Set_Attribute_Single | 5, 3, 100 | Unsigned 16-bit integer | |
| 69 0x45 | 1 | Max Speed Search Current Level | Get_Attribute_Single Set_Attribute_Single | 150, 30, 200 | Unsigned 16-bit integer | 30 to 200% |
| 70 0x46 | 1 | Upper Bound of Frequency | Get_Attribute_Single Set_Attribute_Single | 4000, 1, 4000 | Unsigned 16-bit integer | 0.1 to 400.0 Hz |
| 71 0x47 | 1 | Lower Bound of Frequency | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0 to 400.0 Hz |
| 72 0x48 | 1 | Skip Frequency 1 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0 to 400.0 Hz |
| 73 0x49 | 1 | Skip Frequency 2 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0 to 400.0 Hz |
| 74 0x4A | 1 | Skip Frequency 3 | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | 0.0 to 400.0 Hz |
| 75 0x4B | 1 | Skip Frequency Band | Get_Attribute_Single Set_Attribute_Single | 0, 0, 200 | Unsigned 16-bit integer | 0.1 to 20.0 Hz |
| 76 0x4C | 1 | Auto Restart After Fault | Get_Attribute_Single Set_Attribute_Single | 0, 0, 10 | Unsigned 16-bit integer | 00 to 10 |
| 77 0x4D | 1 | PID Setpoint Selection | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4 | Unsigned 16-bit integer | 00: Disable |
| | | | | | | 01: Keypad (based on 20.03 setting) |
| | | | | | | 02: AI1 (external 0 – 10V) |
| | | | | | | 03: AI2 (external 4 – 20 mA) |
| | | | | | | 04: PID set point (50.43) |
| 78 0x4E | 1 | Feedback Signal Selection | Get_Attribute_Single Set_Attribute_Single | 0, 0, 3 | Unsigned 16-bit integer | 00: Positive AI1 (0 – 10V) |
| | | | | | | 01: Negative AI1 (0 – 10V) |
| | | | | | | 02: Positive AI2 (4 – 20 mA) |
| | | | | | | 03: Negative AI2 (4 – 20 mA) |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|------------|-------------|---|--|---------------------------|-------------------------------|--|
| 79 0x4F | 1 | P Gain Adjustment | Get_Attribute_Single Set_Attribute_Single | 10, 0, 100 | Unsigned 16-bit integer | 0.0 to 10.0 |
| 80 0x50 | 1 | I Gain Adjustment | Get_Attribute_Single Set_Attribute_Single | 100, 0, 10000 | Unsigned 16-bit integer | 0.00 to 100.0 sec |
| 81 0x51 | 1 | D Gain Adjustment | Get_Attribute_Single Set_Attribute_Single | 0, 0, 100 | Unsigned 16-bit integer | 0.00 to 1.0 sec |
| 82 0x52 | 1 | Upper Bound for Integral Control | Get_Attribute_Single Set_Attribute_Single | 100, 0, 100 | Unsigned 16-bit integer | 00 to 100% |
| 83 0x53 | 1 | PID Output Delay Filter Time | Get_Attribute_Single Set_Attribute_Single | 0, 0, 25 | Unsigned 16-bit integer | 0.0 to 2.5 sec |
| 84 0x54 | 1 | Feedback Signal Detection Time | Get_Attribute_Single Set_Attribute_Single | 600, 1, 36000 | Unsigned 16-bit integer | |
| 85 0x55 | 1 | Feedback Signal Fault Treatment | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | |
| 86 0x56 | 1 | Source of PID Setpoint | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 87 0x57 | 1 | PLC Operation Mode | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4 | Unsigned 16-bit integer | 00: Disable PLC performing 01: Execute one program cycle 02: Continuously execute program cycles 03: Execute one program cycle step by stop 04: Continuously execute program cycles step by step |
| 88 0x58 | 1 | PLC FWD/REV Motion | Get_Attribute_Single Set_Attribute_Single | 0, 0, 27 | Unsigned 16-bit integer | 00 to 127 |
| 89 0x59 | 1 | Time Duration of 1 st Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 90 0x5A | 1 | Time Duration of 2nd Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 91 0x5B | 1 | Time Duration of 3rd Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------|-------------|--|--|---------------------------|-------------------------|---|
| 92 0x5C | 1 | Time Duration of 4th Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 93 0x5D | 1 | Time Duration of 5th Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 94 0x5E | 1 | Time Duration of 6th Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 95 0x5F | 1 | Time Duration of 7th Step Speed | Get_Attribute_Single Set_Attribute_Single | 0, 0, 9999 | Unsigned 16-bit integer | 0 to 9999 |
| 96 0x60 | 1 | Auto Adjustable Accel/Decel | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4 | Unsigned 16-bit integer | 00: Linear Acceleration/ Deceleration |
| | | | | | | 01: Auto Acceleration, Linear Deceleration |
| | | | | | | 02: Linear Acceleration, Auto Deceleration |
| | | | | | | 03: Auto Acceleration/ Deceleration |
| | | | | | | 04: Auto Acceleration/ Deceleration Stall Prevention (Limited by 50, 12 to 50, 15) |
| 97 0x61 | 1 | Sleep Frequency | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4000 | Unsigned 16-bit integer | |
| 98 0x62 | 1 | Wake Up Frequency | Get_Attribute_Single Set_Attribute_Single | 0, 0, 40000 | Unsigned 16-bit integer | |
| 99 0x63 | 1 | Sleep time Delay | Get_Attribute_Single Set_Attribute_Single | 0, 0, 6000 | Unsigned 16-bit integer | |
| 100 0x64 | 1 | The Second Source of Frequency Command | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4 | Unsigned 16-bit integer | |
| 101 0x65 | 1 | Motor Rated Current | Get_Attribute_Single Set_Attribute_Single | 30, 12, 36 | Unsigned 16-bit integer | |
| 102 0x66 | 1 | Motor No-Load Current | Get_Attribute_Single Set_Attribute_Single | 12, 0, 29 | Unsigned 16-bit integer | |
| 103 0x67 | 1 | Motor Auto Tuning | Get_Attribute_Single Set_Attribute_Single | 0, 0, 2 | Unsigned 16-bit integer | 00: Disable |
| | | | | | | 01: DC test |
| | | | | | | 02: DC test and no load test |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------|-------------|--|--|---------------------------|-------------------------|--|
| 104 0x68 | 1 | Start Resistance | Get_Attribute_Single Set_Attribute_Single | 0, 0, 65535 | Unsigned 16-bit integer | 00 to 65535 m Ohms |
| 105 0x69 | 1 | DC Braking Current Level | Get_Attribute_Single Set_Attribute_Single | 0, 0, 100 | Unsigned 16-bit integer | 00 to 100% |
| 106 0x6A | 1 | DC Braking Time During Start-up | Get_Attribute_Single Set_Attribute_Single | 0, 0, 50 | Unsigned 16-bit integer | 0.0 to 5.0 sec |
| 107 0x6B | 1 | DC Braking Time During Stopping | Get_Attribute_Single Set_Attribute_Single | 0, 0, 250 | Unsigned 16-bit integer | 0.0 to 25.0 sec |
| 108 0x6C | 1 | Start-Point for DC Braking | Get_Attribute_Single Set_Attribute_Single | 0, 0, 600 | Unsigned 16-bit integer | 0.0 to 60.0 Hz |
| 109 0x6D | 1 | Torque Compensation | Get_Attribute_Single Set_Attribute_Single | 0, 0, 10 | Unsigned 16-bit integer | 00 to 10 |
| 110 0x6E | 1 | Slip Compensation | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1000 | Unsigned 16-bit integer | 0.00 to 10.00 |
| 111 0x6F | 1 | PWM Carrier Frequency | Get_Attribute_Single Set_Attribute_Single | 9, 1, 15 | Unsigned 16-bit integer | 1 to 15 KHz |
| 112 0x70 | 1 | Over-Voltage Stall Prevention | Get_Attribute_Single Set_Attribute_Single | 1, 0, 1 | Unsigned 16-bit integer | 00: Disable 01: Enable |
| 113 0x71 | 1 | Over-Current Stall Prevention During Accel | Get_Attribute_Single Set_Attribute_Single | 150, 0, 200 | Unsigned 16-bit integer | 00: Disable 20 to 200% |
| 114 0x72 | 1 | Over-Current Stall Prevention During Operation | Get_Attribute_Single Set_Attribute_Single | 150, 0, 200 | Unsigned 16-bit integer | 00: Disable 20 to 200% |
| 115 0x73 | 1 | Over-Torque Detection Mode | Get_Attribute_Single Set_Attribute_Single | 0, 0, 4 | Unsigned 16-bit integer | 00: Disabled 01: Enabled during constant speed operation, drive halted after fault 02: Enabled during constant speed operation, operation continues after fault 03: Enabled during operation, drive halted after fault 04: Enabled during operation, operation continues after fault |
| 116 0x74 | 1 | Over-Torque Detection Level | Get_Attribute_Single Set_Attribute_Single | 150, 30, 200 | Unsigned 16-bit integer | 30 to 200% |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------|-------------|-----------------------------------|--|---------------------------|-------------------------|--|
| 117 0x75 | 1 | Over-Torque Detection Time | Get_Attribute_Single Set_Attribute_Single | 1, 1, 100 | Unsigned 16-bit integer | 0.1 to 10.0 sec |
| 118 0x76 | 1 | Electronic Thermal Overload Relay | Get_Attribute_Single Set_Attribute_Single | 1, 0, 2 | Unsigned 16-bit integer | 00: Constant Torque 01: Variable Torque 02: Inactive |
| 119 0x77 | 1 | Electronic Thermal Characteristic | Get_Attribute_Single Set_Attribute_Single | 60, 30, 300 | Unsigned 16-bit integer | 30 to 300 sec |
| 120 0x78 | 1 | Auto Voltage Regulation (AVR) | Get_Attribute_Single Set_Attribute_Single | 0, 0, 3 | Unsigned 16-bit integer | 00: AVR enabled 01: AVR disabled 02: AVR disabled during deceleration 03: AVR disabled during stop |
| 121 0x79 | 1 | Auto Energy Saving | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | 00: Disable 01: Enable |
| 122 0x7A | 1 | Under Current Detection Value | Get_Attribute_Single Set_Attribute_Single | 0, 0, 0 | Unsigned 16-bit integer | |
| 123 0x7B | 1 | Under Current Detection Mode | Get_Attribute_Single Set_Attribute_Single | 0, 0, 1 | Unsigned 16-bit integer | |
| 124 0x7C | 1 | Under Current Detection Time | Get_Attribute_Single Set_Attribute_Single | 10, 0, 200 | Unsigned 16-bit integer | |
| 125 0x7D | 1 | Software Version | Get_Attribute_Single | N/A | Unsigned 16-bit integer | |
| 126 0x7E | 1 | AC Drive Rated Current Display | Get_Attribute_Single | N/A | Unsigned 16-bit integer | |
| 127 0x7F | 1 | Manufacturer Model Information | Get_Attribute_Single | 0, 0, 13 | Unsigned 16-bit integer | 00: MVXF50#0-2 (230V 1ph/3ph 1/2 hp) 01: MVX001#0-2 (230V 1ph/3ph 1 hp) 02: MVX002#0-2 (230V 1ph/3ph 2 hp) 03: MVX003#0-2 (230V 1ph/3ph 3 hp) 04: MVX005#0-2 (230V 3ph 5 hp) 05: MVX007#0-2 (230V 3ph 7-1/2 hp) 06: Reserved |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------------------|-------------|---------------------------------|----------------------|---------------------------|-------------------------|--|
| 127 0x7F, cont'd. | 1 | Manufacturer Model Information | Get_Attribute_Single | 0, 0, 13 | Unsigned 16-bit integer | 07: Reserved |
| | | | | | | 08: MVX001#0-4 (460V 3ph 1 hp) |
| | | | | | | 09: MVX002#0-4 (460V 3ph 2 hp) |
| | | | | | | 10: MVX003#0-4 (460V 3ph 3 hp) |
| | | | | | | 11: MVX005#0-4 (460V 3ph 5 hp) |
| | | | | | | 12: MVX007#0-4 (460V 3ph 7-1/2 hp) |
| | | | | | | 13: MVX010#0-4 (460V 3ph 10 hp) |
| 128 0x80 | 1 | Present Fault Record | Get_Attribute_Single | 0, 0, 20 | Unsigned 16-bit integer | 00: No fault occurred |
| 129 0x81 | 1 | Second Most Recent Fault Record | Get_Attribute_Single | 0, 0, 20 | Unsigned 16-bit integer | 01: Over-current (oc) |
| 130 0x82 | 1 | Third Most Recent Fault Record | Get_Attribute_Single | 0, 0, 20 | Unsigned 16-bit integer | 02: Over-voltage (ov) |
| | | | | | | 03: Overheat (oH) |
| | | | | | | 04: Overload (oL) |
| | | | | | | 05: Overload 1 (oL1) |
| | | | | | | 06: Overload 2 (oL2) |
| | | | | | | 07: External Fault (EF) |
| | | | | | | 08: CPU Failure f (CF1) |
| | | | | | | 09: CPU Failure 2 (CF2) |
| | | | | | | 10: CPU Failure 3 (CF3) |
| | | | | | | 11: Hardware Protection Failure (HPF) |
| | | | | | | 12: Over-current During Accel (OCA) |
| | | | | | | 13: Over-current During Decel (OCd) |
| | | | | | | 14: Over-current During Steady State (OCn) |
| | | | | | | 15: Ground Fault or Fuse Failure (GFF) |
| | | | | | | 16: Reserved |
| | | | | | | 17: 3-Phase Input Power Loss |
| | | | | | | 18: External Pause Function (bb) |
| | | | | | | 19: Auto Adjust Accel/Decel Failure (cFA) |
| | | | | | | 20: Software Protection Code (codE) |

Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------|-------------|----------------------------------|--|---------------------------|-------------------------|--|
| 131 0x83 | 1 | Power Up Display Selection | Get_Attribute_Single Set_Attribute_Single | 0, 0, 6 | Unsigned 16-bit integer | 00: Command Frequency ("F") |
| | | | | | | 01: Output Frequency ("H") |
| | | | | | | 02: Output Current ("A") |
| | | | | | | 03: User Defined ("U") |
| | | | | | | 04: Output Voltage (u) |
| | | | | | | 05: Unit Temperature (t) |
| | | | | | | 06: Forward/Reverse Direction ("Frd / rEv") |
| | | | | | | display only when enabled: Counter ("c") |
| | | | | | | display only when enabled: PLC steps |
| | | | | | | display only when enabled: PID Feedback |
| 132 0x84 | 1 | User Defined Multiplier | Get_Attribute_Single Set_Attribute_Single | 100, 1, 16000 | Unsigned 16-bit integer | 0.01 to 160.00 |
| 133 0x85 | 1 | External Terminal Scanning Time | Get_Attribute_Single Set_Attribute_Single | 1, 1, 20 | Unsigned 16-bit integer | 01 to 20 |
| 134 0x86 | 1 | Parameter Lock and Configuration | Get_Attribute_Single Set_Attribute_Single | 0, 0, 10 | Unsigned 16-bit integer | 00: All parameters can be set and read |
| | | | | | | 01: All parameters are read only |
| | | | | | | 10: Reset all parameters to the factory defaults |
| 135 0x87 | 1 | Elapsed Time (Run): Day | Get_Attribute_Single Set_Attribute_Single | 0, 0, 65535 | Unsigned 16-bit integer | 0 to 65535 (show 6553) |
| 136 0x88 | 1 | Elapsed Time (Run): Minutes | Get_Attribute_Single Set_Attribute_Single | 0, 0, 65535 | Unsigned 16-bit integer | 0 to 65535 (show 6553) |
| 137 0x89 | 1 | Elapsed Time (Power on): Day | Get_Attribute_Single Set_Attribute_Single | 0, 0, 65535 | Unsigned 16-bit integer | 0 to 65535 (show 6553) |
| 138 0x8A | 1 | Elapsed Time (Power on): Minutes | Get_Attribute_Single Set_Attribute_Single | 0, 0, 65535 | Unsigned 16-bit integer | 0 to 65535 (show 6553) |
| 139 0x8B | 1 | Automatic Display Scroll | Get_Attribute_Single Set_Attribute_Single | 0, 0, 2 | Unsigned 16-bit integer | 00: Disable |
| | | | | | | 01: Scroll every 5 seconds after 1 minute delay |
| | | | | | | 02: Scroll every 15 seconds after 1 minute delay |

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Table A-16: Parameter Class (15) — Instance Attributes (1 – 144), Continued

| Instance # | Attribute # | Attribute Name | Service | Default, Minimum, Maximum | Data Type | Description |
|-------------|-------------|------------------------------|----------------------|---------------------------|-------------------------|--|
| 140 0x8C | 1 | Communication Protocol | Get_Attribute_Single | 3, 0, 5 | Unsigned 16-bit integer | 00: MODBUS ASCII mode < 7 data bits, no parity, 2 stop bits > |
| | | | | | | 01: MODBUS ASCII mode < 7 data bits, even parity, 1 stop bit > |
| | | | | | | 02: MODBUS ASCII mode < 7 data bits, odd parity, 1 stop bit > |
| | | | | | | 03: MODBUS RTU mode < 8 data bits, no parity, 2 stop bits > |
| | | | | | | 04: MODBUS RTU mode < 8 data bits, even parity 1 stop bit > |
| | | | | | | 05: MODBUS RTU mode < 8 data bits, odd parity, 1 stop bit > |
| 141 0x8D | 1 | RS-485 Communication | Get_Attribute_Single | 1, 1, 254 | Unsigned 16-bit integer | 01 to d 254 |
| 142 0x8E | 1 | Transmission Speed | Get_Attribute_Single | 2, 0, 3 | Unsigned 16-bit integer | 00: 4800 baud |
| | | | | | | 01: 9600 baud |
| | | | | | | 02: 19200 baud |
| | | | | | | 03: 38400 baud |
| 143 0x8F | 1 | Transmission Fault Treatment | Get_Attribute_Single | 3, 0, 3 | Unsigned 16-bit integer | 00: Display fault and continue operating |
| | | | Set_Attribute_Single | | | 01: Display fault and RAMP to stop |
| | | | | | | 02: Display fault and COAST to stop |
| | | | | | | 03: No fault displayed and continue operating |
| 144 0x90 | 1 | Over Time Detection | Get_Attribute_Single | 0, 0, 1200 | Unsigned 16-bit integer | 0.0: Disable |
| | | | Set_Attribute_Single | | | 0.0 – 120.0 sec |

Table A-17: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x05 | Yes | No | Reset |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

Class 0x95 DataConf

Table A-18: Data Conf Class (149) — Class Attributes (0)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|----------|-----------|
| 1 | Get | Revision | UINT |

Table A-19: Data Conf Class (149) — Instance Attributes (1)

| Attribute ID | Access Rule | Name | Data Type |
|--------------|-------------|-------------|-----------|
| 1 | Get/Set | dlen_in | USINT |
| 2 | Get/Set | dlen_out | USINT |
| 3 | Get/Set | out_state | USINT |
| 4 | Get/Set | data_in1 | UINT |
| 5 | Get/Set | data_in2 | UINT |
| 6 | Get/Set | data_in3 | UINT |
| 7 | Get/Set | data_in4 | UINT |
| 8 | Get/Set | data_out1 | UINT |
| 9 | Get/Set | data_out2 | UINT |
| 10 | Get/Set | data_out3 | UINT |
| 11 | Get/Set | data_out4 | UINT |
| 12 | Get/Set | config_flag | USINT |

Table A-20: Common Services

| Service Code | Implemented for | | Service Name |
|--------------|-----------------|----------|----------------------|
| | Class | Instance | |
| 0x05 | Yes | Yes | Reset |
| 0x0E | Yes | Yes | Get_Attribute_Single |
| 0x10 | No | Yes | Set_Attribute_Single |

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Printed in USA
Publication No. MN04002002E/CPG
April 2004