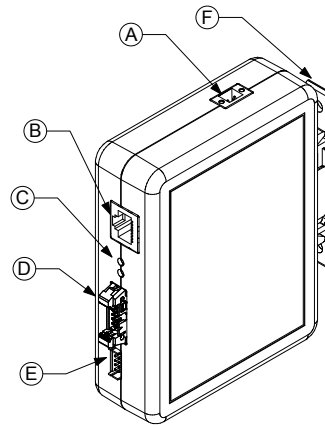


Ethernet Gateway for MDrive® Motion Control



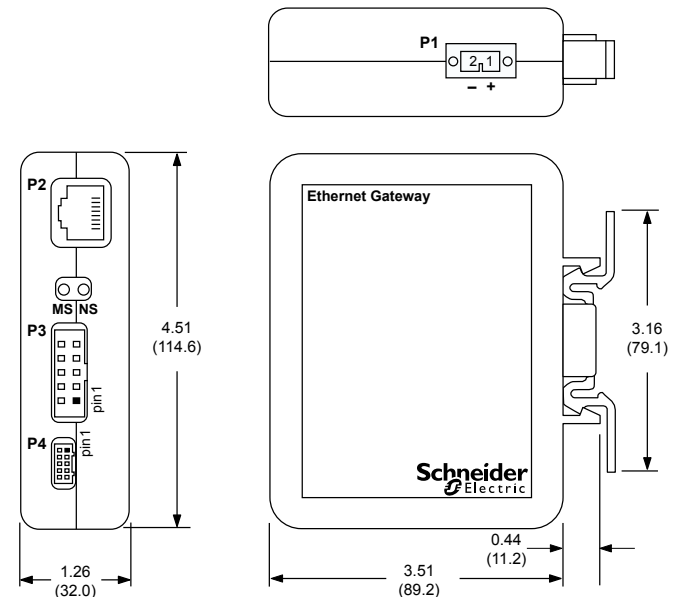
Overview



- (A) P1 +12 to +75 VDC
- (B) P2 Ethernet network
- (C) Status LEDs
- (D) P3 RS-422/485 IDC
- (E) P4 RS-422/485 Hirose
- (F) DIN rail mounting bracket

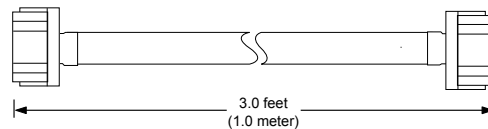
Mechanical

dimensions in inches (mm)



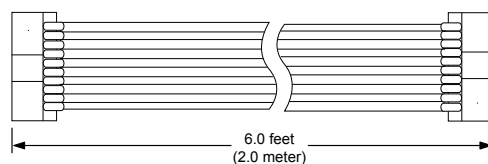
Cabling (must be ordered separately)

H-CBL-IMS0567
Hirose wire crimp to wire crimp connector cable



For Motion products with "RL" in the part number.
Example: MDI3C**RL**17A4

MD-CS300-400
Samtec IDC to IDC connector cable



For Motion products with "RD" in the part number.
Example: MDI3C**RD**17A4

Connector pinouts/ indicators

Pins not listed are no connect

| P1: Supply voltage VDC | |
|------------------------|-----------------------------|
| Pin 1 | +12 to +75 VDC |
| Pin 2 | GND (supply voltage return) |

| P2: Ethernet Nnetwork | |
|---|--|
| Use off-the-shelf CAT5/6 cabling with RJ45 ends | |

| P3: RS-422/485 (SAMTEC IDC) | |
|-----------------------------|-----------------------|
| Pin 6 | TX + |
| Pin 7 | TX - |
| Pin 8 | RX - |
| Pin 9 | RX + |
| Pin 10 | Communications ground |

| P4: RS-422/485 (Hirose) | |
|-------------------------|-----------------------|
| Pin 1 | RX + |
| Pin 2 | Communications ground |
| Pin 3 | TX - |
| Pin 4 | RX - |
| Pin 6 | TX + |

| LED indicators | |
|----------------|----------------|
| LED 1 (NS) | Network status |
| LED 2 (MS) | Module status |

⚠ DANGER

UNINTENDED CONSEQUENCES OF EQUIPMENT OPERATION

When the system is started, the drives are usually out of the operator's view and cannot be visually monitored.

- Only start the system if there are no persons in the hazardous area.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical functions.
- System control paths may include communication links. Consideration must be given to the implication of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines. 1)
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death or serious injury.

1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems".

Product manuals

The following product manuals are applicable to this device:

- EtherNet/IP Fieldbus manual
- MODBUS/TCP Fieldbus manual
- MCode Programming and Software Reference Manual

These documents are available online at <http://motion.schneider-electric.com/downloads/manuals.html>.

Specifications

| Electrical Specifications | |
|---------------------------|----------------|
| Input Voltage (+V) | +12 to +75 VDC |
| Input current requirement | |

| Environmental Specifications | |
|------------------------------|-------------------------|
| Operating Temperature | -40°C to +85°C |
| Humidity | non-condensing humidity |

| Communications Specifications | |
|-------------------------------|--|
| Output | |
| Protocol | RS-422/485 |
| BAUD rate | 9600 - 115 kbps |
| Input | |
| Protocols 1) | EtherNet/IP MODBUS/TCP (port 502) MCode/TCP (port 503) |
| Bit rate | 10/100 Mbps |
| Default IP address | 192.168.33.1 |
| Default subnet mask | 255.255.0.0 |

1) EtherNet/IP or MODBUS/TCP is selected during configuration, MCode/TCP is always resident on port 503 or other user-defined port.

Preparing your MDrive for use with the gateway

The MDrive motion control product must be in its factory default condition to begin using it with the Ethernet Gateway. If this is a new, out-of-the-box device it will be in this state. An MDrive that has been in use should be restored to the defaults by:

- ▶ Connect to the MDrive using the RS-422/485 communication interface and establish communications using IMS Terminal or equivalent.
- ▶ Enter "FD" into the terminal window.
- ◀ The MDrive product will be in its factory default state.

IMPORTANT! The MDrive **MUST** be in single-mode to function with the gateway. The MDrive product **WILL NOT** function with the gateway in Party (PY=1) or Checksum (CK=1) mode.

Configuring the gateway

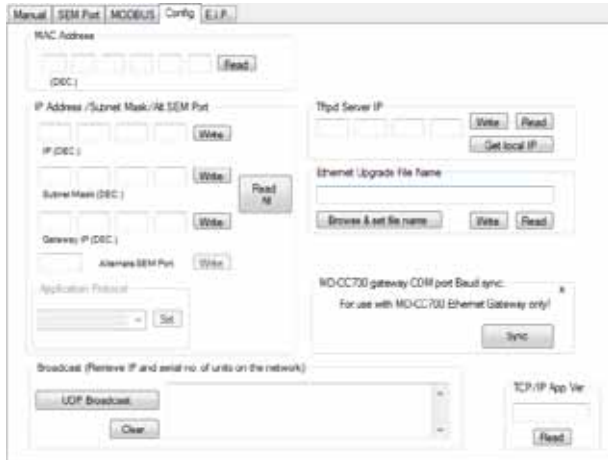
Before use the device in a network, basic parameters must be configured such as the IP address, subnet mask and gateway address if the unit is EtherNet/IP.

This is done using the TCP/IP Configuration Utility via the configuration/programming port 503.

- Download and install the TCP/IP Configuration Utility from http://www.imshome.com/downloads/software_interfaces.html

Basic configuration

The basic configuration involves setting the IP address and subnet mask.



TCP/Configuration Utility configuration tab showing defaults

NOTE: Depending on your network, open IP addresses and subnet mask may need to be obtained from your IT department.

- ▶ Apply power to the device
- ▶ Open the TCP/IP configuration Utility, click the tab marked "Config".
- ▶ In the Connection frame at the upper right of the utility screen, enter the default IP address 192.168.33.1 in the IP address dropdown.
- ▶ In the port field, enter the SEM port number 503
- ▶ Click the connect button.
- ▶ The status bar at the bottom of the utility screen will give connection status messages,
- ▶ Set the IP address to one appropriate for your network, click write.
- ▶ Set the Subnet mask to one appropriate for your network, click write.
- ▶ Setting the Gateway IP is not required.
- ◀ You may now power cycle and reconnect to the device using the IP address set

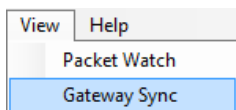
Establishing communications with your Motion product

Communications between the Ethernet Gateway and the MDrive product require that the gateway be synchronized to the RS-422/485 baud rate. The gateway will autodetect the motion device baud rate on power-up and synchronize to it.

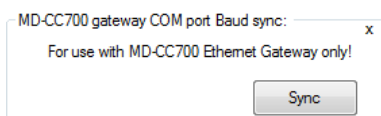
When the baud rate of the RS-422/285 bus is changes, or the motion device is restored to factory default settings, the gateway will need to be re-synchronized to the MDrive device.

The TCP/IP configuration utility is used to perform this action.

- ▶ Open the TCP/IP Configuration Utility and connect to the device on Port 503 (SEM port).
- ▶ On the menu select View > Gateway Sync.



- ▶ The Gateway Sync area will appear on the screen.



- ▶ Click the Sync button
- ◀ You should now be able to communicate with your motion device.

MCode/TCP or SEM port (503)

Any MDrive product connected to the Ethernet Gateway may be utilized as a programmable controller over the SEM port, 503 using the standard IMS Terminal software available at http://www.imshome.com/downloads/software_interfaces.html

By connecting to the device using IP.ADDRESS:503 using IMS Terminal the device may be operated in either program or immediate mode.

For instructions and details on MCode/TCP programming and use, please refer to the **MCode Programming and Reference Manual** available online at <http://www.imshome.com/downloads/manuals.html>.

No special configuration is required using the Ethernet Gateway in this mode. MCode/TCP is always running on the SEM port 503 regardless of the Application Protocol selected.

If desired, this port may be changed on the Config tab of the TCP/IP Configuration Utility under Alternate SEM Port.

MODBUS/TCP port (502)

MODBUS/TCP functions may be addressed using port 502 (IP.ADDRESS:502).

The MODBUS tab on the TCP/IP Configuration Utility may be used to read device ID information and read/set motion and I/O parameters.

Please refer to the **MODBUS/TCP Fieldbus Manual** available online at <http://www.imshome.com/downloads/manuals.html> for a complete description of the MODBUS/TCP protocol and available functions.

Note that MODBUS/TCP and MCode/TCP may be used interchangeably as stored MCode programs may be executed and interacted with over MODBUS/TCP using manufacturer specific registers.

To load the MODBUS/TCP application to the device:

- ▶ Open the TCP/IP configuration utility, select the Config tab.
- ▶ Connect to the SEM port (503)
- ▶ Select MODBUS/TCP from the Application Protocol dropdown on the Config tab.
- ▶ Disconnect from the device
- ◀ Select port 502 (MODBUS/TCP)
- ◀ Reconnect to the device.

The Ethernet Gateway will now control the MDrive product using the MODBUS/TCP function set.

EtherNet/IP

The EtherNet/IP application features advanced configuration options for the Assembly Object 0x04 instances 100 (input) and 112 (output). This is accessible from the EIP tab of the TCP/IP Configuration Utility and allows dynamic mapping of parameters for implicit messaging.

This allows the user to monitor only the parameters or variables desired.

To set up:

- ▶ Open the TCP/IP Configuration Utility and connect to the device on Port 503 (SEM port).
- ▶ Click the tab marked E.I.P.
- ▶ In the provided drop downs for each attribute, select the desired variables, parameters or commands you wish to scan. The selections are shown as the MCode mnemonic available for each attribute and matching the attribute data type.
- ▶ Click set to write Assembly object parameters.
- ▶ If using a Rockwell Logix family product, export the *.L5X (RSLogix 5000) file that maps the tags to the attributes
- ◀ Select File > Save EIP User Defined Data Types
- ◀ Save the files (there will be 2 – 1 input, 1 output) to your hard drive

For more information and details on supported objects please refer to the **EtherNet/IP Fieldbus Manual** available online at <http://www.imshome.com/downloads/manuals.html>

LED flash codes

| MCode/TCP | | |
|--------------|------------|---|
| NS (LED 1) | MS (LED 2) | |
| Flashing red | Off | MCode/TCP, port 503 connected |
| Green | Off | Set socket option failure |
| Red+Green | Off | Socket receive error or Port 503 disconnect |

| MODBUS/TCP | | |
|------------|-------------------------------------|---|
| NS (LED 1) | MS (LED 2) | |
| Off | Flashing red | MODBUS/TCP, port 502 connected |
| Off | Green | Set socket option failure |
| Off | | Socket receive error or Port 502 disconnect |
| Red+Green | Red+Green flashing @ 1 sec interval | UART overrun, retry in progress |

| EtherNet/IP | | |
|-----------------------------|-------------|---|
| NS (Network Status - LED 1) | | |
| Off | | No power, no Ethernet connection |
| Red | Solid | Unrecoverable fault |
| | Flashing | Recoverable fault or IO connection timed out |
| Green | Solid | Normal runtime operation (I/O connection allocated) |
| | Flashing | Device is idle or not allocated to a client (PLC) |
| Red+Green | Alternating | Power-up self test in progress |
| MS (Module Status - LED 2) | | |
| Off | | No power |
| Red | Solid | Unrecoverable fault |
| | Flashing | Minor, recoverable fault |
| Green | Solid | I/O connection established |
| | Flashing | Standby, no I/O connection established |
| Red+Green | Alternating | Power-up self test in progress |