



1738 ArmorPOINT I/O EtherNet/IP Adapter

Catalog number 1738-AENT, Series B

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Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication [SGI-1.1](#) available from your local Rockwell Automation sales office or online at <http://www.rockwellautomation.com/literature/>) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.





In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

| | |
|---|--|
|  | <p>WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.</p> |
|  | <p>ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.</p> |
|  | <p>SHOCK HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.</p> |
|  | <p>BURN HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.</p> |
| <p>IMPORTANT <small>IMPORTANT</small></p> | <p>Identifies information that is critical for successful application and understanding of the product.</p> |

Environment and Enclosure



ATTENTION: This equipment is intended for use in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as enclosed equipment. It should not require additional system enclosure when used in locations consistent with the enclosure type ratings stated in the Specifications section of this publication. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings, beyond what this product provides, that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

ATTENTION:

- Industrial Automation Wiring and Grounding Guidelines, publication [1770-IN041](#), for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

Preventing Electrostatic Discharge



ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
 - Wear an approved grounding wriststrap.
 - Do not touch connectors or pins on component boards.
 - Do not touch circuit components inside the equipment.
 - Use a static-safe workstation, if available.
 - Store the equipment in appropriate static-safe packaging when not in use.
-

Additional Resources

| Resource | Description |
|---|--|
| 1738 ArmorPOINT I/O [®] EtherNet/IP Adapter User Manual, publication 1738-UM005 . | A detailed description of module functionality, configuration, installation procedure and information on how to use ArmorPOINT I/O EtherNet/IP adapters (1738-AENT, Series B). |
| Pinout Guide for 1738 ArmorPOINT Adapters and Power Supplies Wiring Diagram, publication 1738-WD011 . | Wiring diagram for Series B, ArmorPOINT I/O EtherNet/IP Adapters. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-IN041 . | More information on proper wiring and grounding techniques. |

If you would like a manual, you can:

- download a free electronic version from the internet:
<http://www.rockwellautomation.com/literature/>
- purchase a printed manual by contacting your local Allen-Bradley distributor or Rockwell Automation representative.

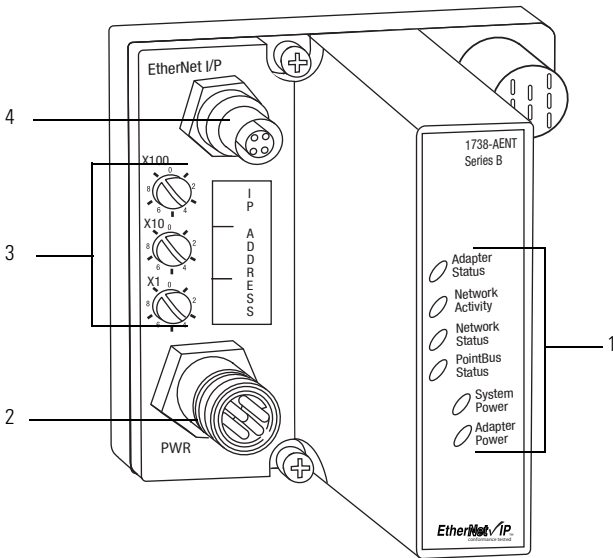
About The Adapter

The Series B 1738-AENT ArmorPOINT I/O EtherNet/IP adapter ships with the adapter and a terminating base to be used with the last I/O module on the backplane.

The sealed IP67 housing of the adapter requires no enclosure (environmental requirements other than IP67 may require an additional appropriate housing).

The EtherNet/IP connector is a sealed D-coded M12 (micro) style connector.

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| | Description | | Description |
|---|------------------------------------|---|--------------------------|
| 1 | Status indicators | 3 | Network address switches |
| 2 | Mini Style 4-Pin in Male Connector | 4 | M12 Female in Connector |

Before You Begin

To effectively use your adapter, note the following considerations.

Determine Compatibility

If using the adapter with a 1756-ENBT module or 1788-ENBT module, use the following required firmware versions for these bridge modules:

- 1756-ENBT firmware version 2.3 or greater
- 1788-ENBT firmware version 1.33 or greater

If you use the BootP Utility to assign IP addresses to the adapter, use version 2.3.2 or greater.

Understand Messaging

Class 3 (Explicit Message) requests through the 1738-AENT adapter to a specific ArmorPOINT I/O module do not always receive a response from the module. In the case where an ArmorPOINT module does not reply to a request, the adapter responds with an error code indicating a time-out.

Configure Autobaud

The adapter cannot reconfigure an I/O module that you previously configured to operate at a fixed baud rate. When you reuse an ArmorPOINT I/O module from another ArmorPOINT I/O system, configure the module to autobaud before using it with the adapter.

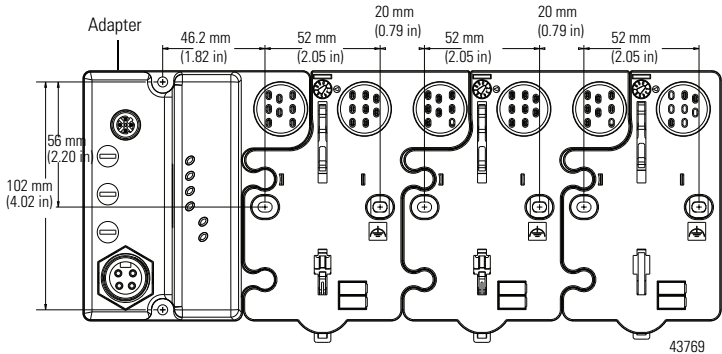
Mount the Adapter and I/O Base

To mount the adapter on a wall or panel, use the screw holes provided in the adapter. A mounting illustration for the adapter with several attached I/O bases is shown below.



ATTENTION: This product is intended to be mounted to a well-grounded mounting surface such as a metal panel. Additional grounding connections from the power supply's mounting tabs or DIN rail (if used) are not required unless the mounting surface cannot be grounded. Refer to Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication [1770-IN041](#), for additional information.

Mounting illustration for ArmorPOINT I/O adapter with I/O Mounting bases



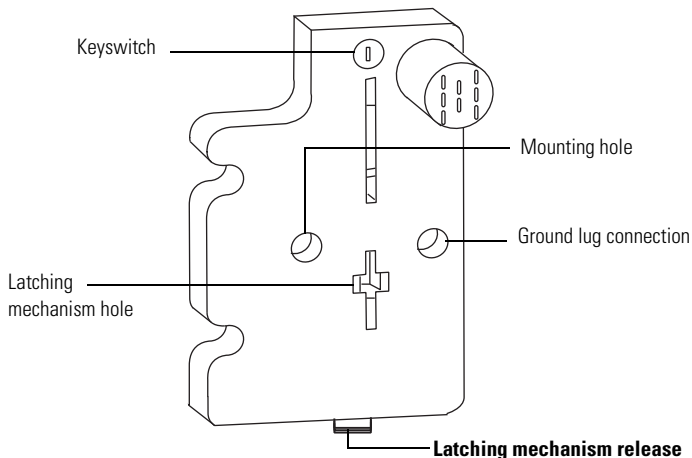
ATTENTION: To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

Install the adapter and its I/O Mounting base as follows:

1. Lay out the required points as shown above in the drilling dimension drawing.
2. Drill the necessary holes for M4 (#8) machine or self-tapping screws.
3. Mount the adapter using M4 (#8) screws.

4. Ground the system using the ground lug connection in the adapter's I/O base. (The ground lug connection is also a mounting hole).
5. Add one or more I/O modules and their respective I/O mounting bases to the adapter and its I/O Mounting base as required. See [Set the Network Address on page 9](#) for details.
6. Mount the terminating base that was shipped with the adapter as the last base in the backplane instead of the I/O Mounting base shipped with the I/O module.

Terminating Base



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ATTENTION: If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Set the Network Address

The adapter ships with the rotary network address switches set to 999 and DHCP enabled. To change the network address, you can:

- adjust the switches on the front of the module
- use a Dynamic Host Configuration Protocol (DHCP) server, such as Rockwell Automation BootP/DHCP.
- retrieve the IP address from nonvolatile memory

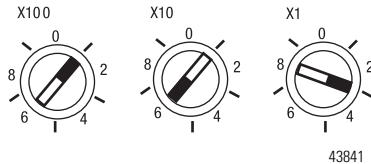
The adapter reads the switches first to determine if the switches are set to a valid number. You set the network address by adjusting the 3 switches on the front of the module. Use a small blade screwdriver to rotate the switches. Line up the small notch on the switch with the number setting you wish to use. Valid settings range from **001...254**.

When you use the switches to assign an address and set it to **001**, the adapter gateway address is set to **0.0.0.0** and the subnet mask is **255.255.255.0**. When you use the switches to assign an address and set it between **002...254**, the adapter gateway address is set to **192.168.1.1**.

The adapter does not have a host name assigned, or use any Domain Name System when using the switch settings.

Network Address Switches

This example shows the network address set at 163.



Refer to publication *ArmorPOINT I/O EtherNet/IP Adapter User Manual*, [1738-UM005](#) for more information on adapter configuration.

If you set the switches to an invalid number (for example, 000 or a value greater than 254 excluding 888), the adapter checks to see if you enabled DHCP.

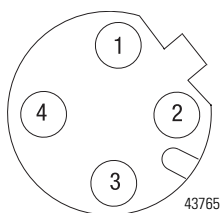
DHCP Enabled and Not Enabled

| DHCP State | Adapter Action |
|-------------|---|
| Enabled | Asks for an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters. |
| Not enabled | Uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory. |

Wire The Adapter

Following are the wiring instructions for the adapter.

1738-AENT EtherNet/IP Connector



M12 Female in Connector

(view into connector)

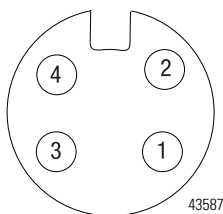
Pin 1 - Tx +

Pin 2 - Rx +

Pin 3 - Tx -

Pin 4 - Rx -

1738-AENT Mini Style 4-Pin in Male Connector⁽¹⁾



Mini Style 4-Pin in Male Connector

(view into connector)

Pin 1 - User Power +

Pin 2 - Adapter Power +

Pin 3 - Adapter Power -

Pin 4 - User Power -

IMPORTANT

Analog modules have earth grounded metal rings. This should be considered when choosing shielded cables and grounding techniques.



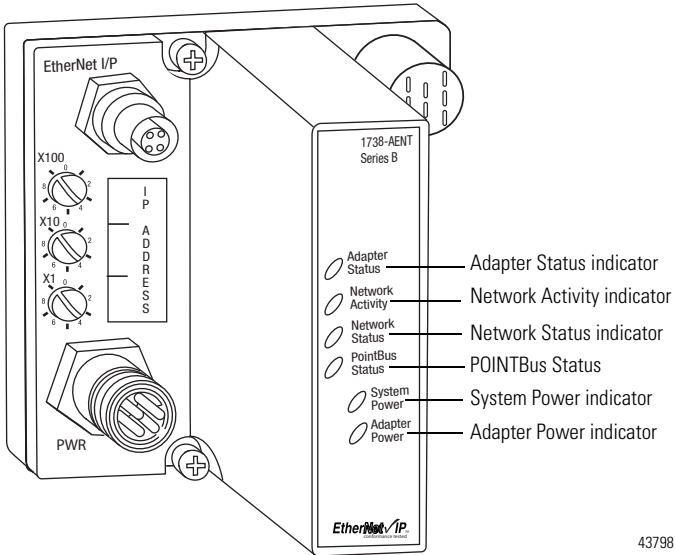
ATTENTION: Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP enclosure type requirements.

⁽¹⁾ Auxiliary power cable: standard cordset (single-ended), for example Allen-Bradley part number 889N-F4AFC-6F or 889N-R4AFC-6F; or standard patchcord (double-ended), for example, Allen-Bradley part number 889N-F4AFNU-6F or 889N-F4AFNV-6F. Refer to publication [M117-CA001A-EN-P](#) for more information.

Interpret Status Indicators

Refer to the following diagram and table for information on how to interpret the status indicators.

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Indicator Status for Modules

| Indicator | State | Description |
|----------------|--------------------|---|
| Adapter status | Off | No power applied to device |
| | Flashing green | Device needs commissioning due to missing, incomplete, or incorrect configuration. |
| | Solid green | Device operating normally |
| | Flashing red | Recoverable fault. Complete firmware update, verify address switches. |
| | Solid red | Unrecoverable fault has occurred: <ul style="list-style-type: none"> • Self-test failure present (checksum failure, or RAMtest failure at cycle power). • firmware fatal error. |
| | Flashing red/green | Module self-test |

Indicator Status for Modules

| Indicator | State | Description |
|------------------|--------------------|---|
| Network Activity | Off | No link established. |
| | Flashing green/Off | Transmit or receive activity present. |
| | Solid green | Link established. |
| Network Status | Off | Device not initialized. The module does not have an IP address. |
| | Flashing green | No CIP connections present. Device has an IP address, but no CIP connections are established. |
| | Solid green | CIP connections present. Device online and has an IP address, and CIP connections are established. |
| | Flashing red | One or more CIP connections in timed-out state. Check for I/O module failure and controller operation. |
| | Solid red | Duplicate IP address detected. Verify IP address setting and correct, as needed. |
| | Flashing red/green | The module is performing a self-test (only occurs during cycle power test). |
| POINTBus Status | Off | Device not powered – check module status indicator. |
| | Flashing red/green | LED cycle power test present. |
| | Flashing red | Recoverable fault occurred: <ul style="list-style-type: none"> • At cycle power, the number of expected modules does not equal the number of modules present. • A module is missing. • Node fault (I/O connection timeout) occurred. |
| | Solid red | Unrecoverable fault occurred – the adapter is bus off. |
| | Flashing green | Firmware (NVS) update in progress. |
| | Solid green | Adapter online with connections established (normal operation, Run mode). |
| | System power | Off |
| | Solid green | System power is on; DC-DC converter is active (5V). |
| Adapter power | Off | Not active; field power is off. |
| | Solid green | Power is on; 24V is present. |

Specifications

ArmorPOINT I/O EtherNet/IP Adapter — 1738-AENT, Series B

| Attribute | Value |
|------------------------------------|---|
| Expansion I/O capacity, max | <ul style="list-style-type: none"> • 63 modules • 5 rack-optimized connections (for digital modules only) • 31 direct connections • 1738-AENT backplane current output = 1.0 A. • Actual number of modules can vary. • Add up current requirements of modules you want to use to make sure they do not exceed the amperage limit of 1.0 A for the 1738-AENT adapter. • Backplane current can be extended beyond 1.0 A by using 1738-EP24DC backplane extension power supplies and, as required, 1738-FPD modules. • Add multiple 1738-EP24DC and 1738-FPD modules to reach the 63 module max. |
| POINTBus current requirements, max | <ul style="list-style-type: none"> • 50 mA (Catalog number 1738-IB4DM12) • 75 mA (Catalog numbers 1738-OB2EM12, 1738-OB8EM8, 1738-OB2EPM12, 1738-OB4EM8, 1738-OB4EM12, 1738-OB8EM12, 1738-OB8EM23, 1738-IB2M12, 1738-IB4M12, 1738-IB4M8, 1738-IB8M8, 1738-IB8M12, 1738-IB8M23, 1738-IB16DM12, 1738-8CFGM8, 1738-8CFGM23, 1738-8CFGDLXM8, 1738-8CFGDLXM12, 1738-8CFGDLXM23, 1738-0V4EM12, 1738-IV4M12, 1738-IV8M8, 1738-IV8M12, 1738-IV8M23, 1738-IA2M12AC3, 1738-IA2M12AC4, 1738-OA2M12AC3, 1738-IE2CM12, 1738-IE4CM12, 1738-IE2VM12, 1738-OE2CM12, 1738-OE4CM12, 1738-OE2VM12) • 80 mA (Catalog numbers 1738-OW4M12, 1738-OW4M12AC) • 100mA (Catalog numbers 1738-8CFGM8, 1738-8CFGM12, 1738-8CFGM23, 1738-8CFGDLXM8, 1738-8CFGDLXM12, 1738-8CFGDLXM23) • 110mA (Catalog number 1738-VHSC24M23) • 150 mA (Catalog numbers 1738-OB16E25DS, 1738-OB16E19M23, 1738-OB16EM12) • 160mA (Catalog number 1738-IJM23) • 175mA (Catalog number 1738-IT2IM12) • 220 mA (Catalog number 1738-IR2M12) |
| Module location | Starter module - left side of the 1738 system |

Power Supply

| Attribute | Value |
|-----------------------|---------------------------------|
| Input voltage rating | 24V DC @ 500mA 12V DC @ 1.0A |
| Input voltage, range | 10...28.8V DC |
| Field side power, max | 24V DC @ 10A |

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Power Supply

| Attribute | Value |
|--------------------------------------|---|
| Inrush current, max | 6 A for 10 ms |
| Input overvoltage protection | Reverse polarity protected |
| POINTBus output current, max | 5V DC @ 1.0A |
| Auxiliary power cable ⁽¹⁾ | Standard cordset (single-ended), for example Allen-Bradley part number 889N-F4AFC-6F or 889N-R4AFC-6F. Standard patchcord (double-ended), for example, Allen-Bradley part number 889N-F4AFNU-6F or 889N-F4AFNV-6F. |
| Interruption | Output voltage stays within specifications when input drops out for 10 ms @ 10V with max load |

⁽¹⁾ Refer to publication [M117-CA001A-EN-P](#) for more information.

Ethernet Communication

| Attribute | Value |
|---------------------------------------|---|
| Ethernet communication rate | 10/100 Mbits/s, half or full-duplex |
| Ethernet ports | 1 |
| Ethernet network topologies supported | Star, Tree |
| Ethernet connectors | M12, D code, female, with Ethernet keying |
| Ethernet cable | Category 5: shielded or unshielded |

General Specifications

| Attribute | Value |
|------------------------------|---|
| Indicators | 3 red/green status indicators (on CPU): – Module status – Network status – POINTBus status 1 green status indicator on CPU: – Network activity 2 green power supply status indicators on DC-DC Converter: – System power (5V DC to POINTBus Out) – Field power (24V DC from Field In) |
| Power consumption, max | 8.1 W @ 28.8V DC |
| Power dissipation, max | 2.8 W @ 28.8V DC |
| Input overvoltage protection | Reverse polarity protected |

General Specifications

| Attribute | Value |
|--------------------------------|---|
| Thermal dissipation, max | 9.5 BTU/hr @ 28.8V DC |
| Isolation voltage | Type Tested @ 500V AC for 60 s: <ul style="list-style-type: none"> • Comm to system • Comm to user power • User power to system • User power to ground • System to ground |
| Field power supply | 10...28.8V DC @ 10A |
| Field power output | 10...28.8V DC @ 9A |
| Module input | 10...28V DC @ 1000 mA |
| POINTBus output, max | 5V DC @ 1.0A |
| Dimensions (HxWxD), approx. | 112.0 x 72.0 x 65.0 mm (4.41 x 2.83 x 2.56 in.) |
| Mounting type | Metal panel |
| Enclosure type rating | Meets IP65/66/67/69K (when marked) |
| Terminating base screw torque | 0.8 Nm (7 lb-in) |
| Wiring category ⁽¹⁾ | 1 – on power ports 1 – on communications ports |
| Weight, approx. | 0.36 Kg (0.8 lb) |

⁽¹⁾ Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication [1770-IN041](#).

Environmental Specifications

| Attribute | Value |
|-------------------------------|--|
| Temperature, operating | IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...60 °C (-4...140 °F) |
| Temperature, ambient air, max | 60 °C (140 °F) |
| Temperature, nonoperating | IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40...85 °C (-40...185 °F) |
| Relative humidity | IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing |

Environmental Specifications

| Attribute | Value |
|--------------------------|---|
| Vibration | IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz |
| Shock, operating | IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g |
| Shock, nonoperating | IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g |
| Emissions | CISPR 11: Class A |
| ESD immunity | IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges |
| Radiated RF immunity | IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz |
| EFT/B immunity | IEC 61000-4-4: ±4 kV @ 2.5 kHz on power ports ±3 kV @ 5 kHz on communications ports |
| Surge transient immunity | IEC 61000-4-5: ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on communications ports |
| Conducted RF immunity | IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz |

Certifications

| Certification (when product is marked) ⁽¹⁾ | Value |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. |

Certifications

| Certification (when product is marked)⁽¹⁾ | Value |
|---|--|
| CE | European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) |
| C-Tick | Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions |
| EtherNet/IP | ODVA conformance tested to EtherNet/IP specifications |

⁽¹⁾ See the Product Certification link at <http://www.rockwellautomation.com/products/certification/> for Declaration of Conformity, Certificates, and other certification details.

Notes:

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://www.rockwellautomation.com/support/>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/support/>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

| | |
|---------------------------------|--|
| United States or Canada | 1.440.646.3434 |
| Outside United States or Canada | Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html , or contact your local Rockwell Automation representative. |

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

| | |
|-----------------------|---|
| United States | Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for the return procedure. |

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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