Installation Instructions

Allen-Bradley

1738 ArmorPOINT I/O Dual Port EtherNet/IP Adapter

Catalog number 1738-AENTR, 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.

⚠	**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.
⚠	**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.
⚡	**SHOCK HAZARD:** Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
♨	**BURN HAZARD:** Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

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:

- 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
1734 POINT I/O® and 1738 ArmorPOINT I/O® Dual Port EtherNet/IP Adapter User Manual, publication 1734-UM017.	A detailed description of module functionality, configuration, installation procedures and information on how to use POINT I/O and ArmorPOINT I/O Dual Port EtherNet/IP adapters (1734-AENTR, Series B and 1738-AENTR, Series B).
Pinout Guide for 1738 ArmorPOINT Adapters and Power Supplies Wiring Diagram, publication 1738-WD011.	Pinout guide wiring diagram for the ArmorPOINT I/O EtherNet/IP Adapter modules and power supplies.
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-AENTR ArmorPOINT I/O Dual Port EtherNet/IP Adapter provides connectivity to an EtherNet/IP network via two M12 EtherNet-keyed connectors for 2-port pass-through to support daisy chains or rings, and the existing star and tree network topologies.

The adapter ships with 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.

1738-AENTR Adapter, Series B
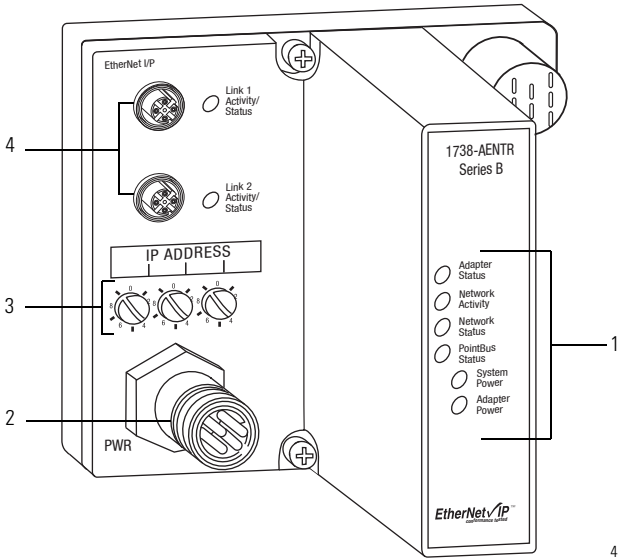
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	Description		Description
1	Status indicators	3	Network address switches
2	Mini Style 4-Pin in Male Connector	4	M12 Female in Connector

Before You Begin

To effectively use your adapter, note the following considerations.

Determine Compatibility

RSLogix™ 5000 version 17 or greater must be used for the 1738-AENTR Add-on Profile. The 1738-AENTR adapters will accept I/O connections with electronic keying for the 1738-AENT. This allows the 1738-AENTR adapter to be used in a daisy-chain topology with the 1738-AENT profile used for the 1738-AENTR.

If using the adapter with a 1756-ENBT module, 1768-ENBT module or an L3xE processor, use the following required firmware versions for these bridge modules:

- 1756-ENBT firmware version 4.5 or greater
- 1768-ENBT firmware version 2.1 or greater
- L3xE processor firmware version 17 or greater

If you use the BootP/DHCP 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-AENTR 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.
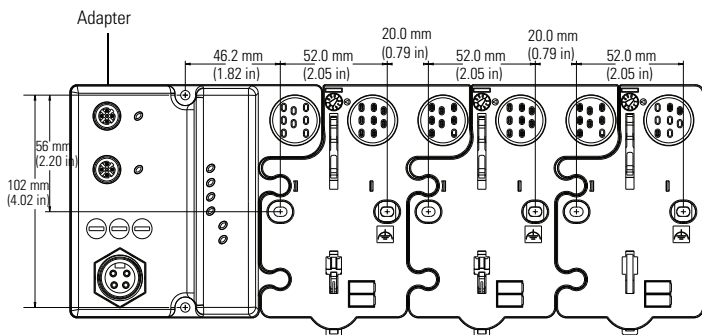
Mount the Adapter and I/O Base

To mount the ArmorPOINT I/O adapter on a wall or panel, use the screw holes provided in the adapter. A mounting illustration for the ArmorPOINT 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

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> ⚠️ **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 <u>Set the Network Address</u> on <u>page 9</u> 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

Keyswitch

Mounting hole

Ground lug connection

Latching mechanism hole

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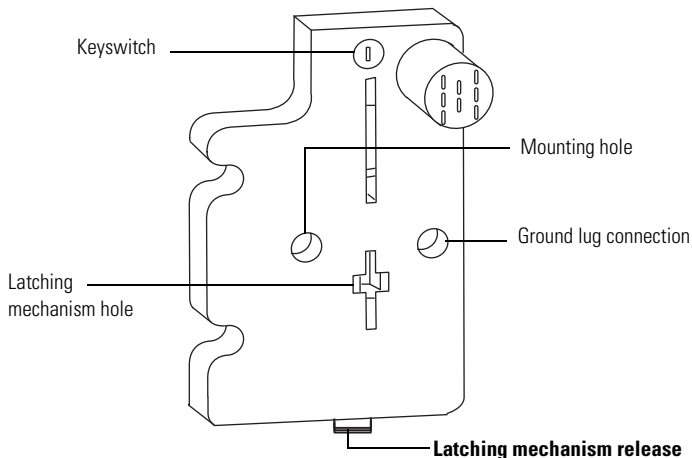
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⚠ **ATTENTION:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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.

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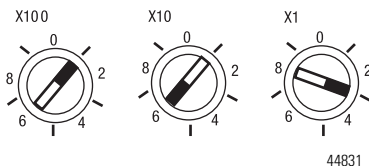
Refer to publication POINT I/O and ArmorPOINT I/O Dual Port EtherNet/IP Adapter User Manual, 1734-UM017 for more information on adapter configuration.

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-AENTR EtherNet/IP Connectors
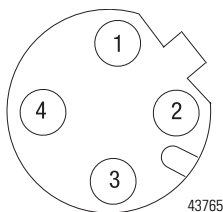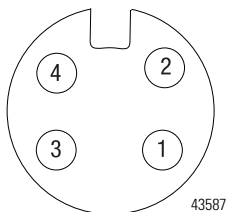

M12 Female in Connector

(view into connector)
Pin 1 - Tx +
Pin 2 - Rx +
Pin 3 - Tx -
Pin 4 - Rx -

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1738-AENTR 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 -

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| **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.

ArmorPOINT I/O Dual Port EtherNet/IP Adapter, Series B

Link 1 Activity/Status indicator

Link 2 Activity/Status indicator

Adapter Status indicator
Network Activity indicator
Network Status indicator
POINTBus Status
System Power indicator
Adapter Power indicator

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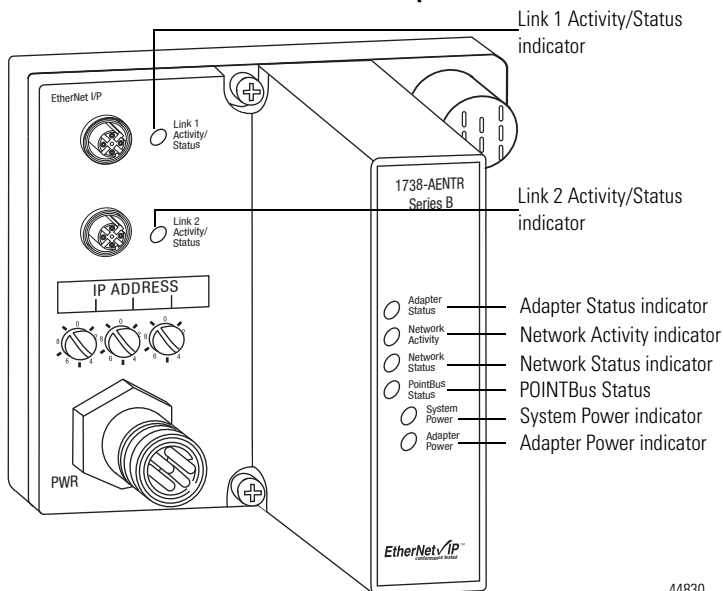
Indicator Status for Modules

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: • Self-test failure (checksum failure, RAM test 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 with Port 1 or Port 2.
	Flashing green	Transmit or receive activity present on Port 1 and/or Port 2 @ 100 Mbps. Transmit or receive activity present on Port 1 and/or Port 2. One port @ 100 Mbps and one port @ 10 Mbps.
	Solid green	Link established with Port 1 and/or Port 2 @ 100 Mbps. Link established with Port 1 and Port 2. One port @ 100 Mbps and one port @ 10 Mbps.
	Solid yellow	Link established with Port 1 and/or Port 2 @ 10 Mbps.
	Flashing yellow	Transmit or receive activity present on Port 1 and/or Port 2 @ 10 Mbps.
Network Status	Off	Device not initialized. Device 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	Module self-test
Link 1 or Link 2 Activity / Status	Off	No link established.
	Solid green	Link established @ 100 Mbps.
	Flashing green	Transmit or receive activity present on indicated port @ 100 Mbps.
	Solid yellow	Link established @ 10 Mbps.
	Flashing yellow	Transmit or receive activity present on indicated port @ 10 Mbps.
POINTBus Status	Off	Device is not online. Device has not completed Dup_MAC_ID test. Device not powered - check module status indicator.
	Flashing green	Device is online but has no connections in the established state. Firmware (NVS) update in progress.
	Solid green	Adapter online with connections established.
	Flashing red	Recoverable fault occurred: • 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 - POINTbus is off.
System power	Off	Not active. Adapter power is off or there is a DC-DC converter problem.
	Solid green	System power is on. DC-DC converter output is active (5V).
Adapter power	Off	Not active. Adapter power is off.
	Solid green	Power is on. 24V input is present.

Specifications

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

Attribute	Value
Expansion I/O capacity, max	• 63 modules • 5 rack-optimized connections (for digital modules only) • 31 direct connections • 1738-AENTR backplane current output = 0.8 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 0.8 A for the 1738-AENTR adapter. • Backplane current can be extended beyond 0.8 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	• 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-OV4EM12,1738-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

Power Supply

Attribute	Value
Inrush current, max	6 A for 10 ms
Input overvoltage protection	Reverse polarity protected
POINTBus output current, max	5V DC @ 0.8A
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	2, configured as Embedded Switch
Ethernet network topologies supported	Star, Tree, Daisy-chain/Linear, and Ring
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 (Ports 1 and 2 combined) – POINTBus status 1 green/yellow status indicator on CPU: – Network activity (Ports 1 and 2 combined) 2 green/yellow status indicators on base: – Link 1 activity/status – Link 2 activity/status 2 green power supply status indicators on DC-DC Converter: – System power (5V DC to POINTBus Out) – Adapter power (24V DC from Field In)
Power consumption, max	10.4 W @ 28.8V DC
Power dissipation, max	6.3 W @ 28.8V DC

General Specifications

Attribute	Value
Input overvoltage protection	Reverse polarity protected
Thermal dissipation, max	21.5 BTU/hr @ 28.8V DC
Isolation voltage	50V (continuous), Basic Insulation Type. Type Tested @ 500V AC for 60 s: • 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 @ 0.8A
Dimensions (HxWxD), approx.	112 x 123 x 67 mm (4.41 x 4.84 x 2.64 in.)
Mounting type	Metal panel
Enclosure type rating	Meets IP65/66/67/69K (when marked)
Terminal base screw torque	0.8 Nm (7 lb-in)
Weight, approx.	0.33 Kg (0.72 lb)
Wiring category[1]	1 – on power ports 1 – on communications ports

[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, surrounding 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)

Environmental Specifications

Attribute	Value
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
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.
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/.