Installation Instructions

Allen-Bradley

ArmorBlock I/O 8 Channel IO-Link Master Module

Catalog number 1732E-8IOLM12R

Table of Contents

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 considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as enclosed equipment. It should not require additional system enclosure when used in locations consistent with the equipment Enclosure Type Ratings. Subsequent sections of this publication may contain more 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:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional install requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

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.

ATTENTION: To comply with UL restrictions, this equipment and all connected I/O must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV)

ATTENTION: To comply with CE Low Voltage Directive (LVD), this equipment and all connected I/O must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV)

Additional Resources

Resource	Description
ArmorBlock IO-Link Master Module Wiring Diagrams 1732E-WD008	Pinout guide wiring diagram for the ArmorBlock IO-Link Master module.
ArmorBlock 8 Channel IO-Link Master Module User Manual 1732E-UM007	A detailed description of module functionality, configuration, installation procedure and information on how to use the ArmorBlock I/O 8 Channel IO-Link Master Module.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.	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://literature.rockwellautomation.com
- purchase a printed manual by contacting your local Allen-Bradley distributor or Rockwell Automation representative

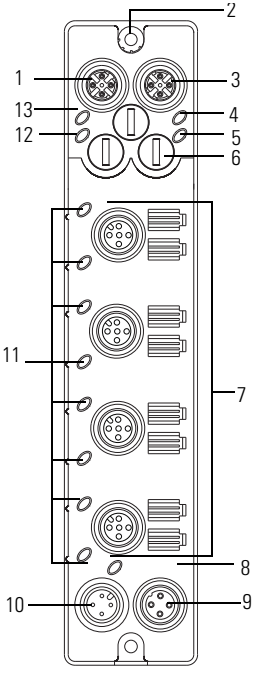
About the Module

The ArmorBlock I/O 8 Channel IO-Link Master Module provides eight channels that can be individually configured as IO-Link master or as a standard digital I/O module. The IO-Link channel master module can be configured to fit any IO-Link and/or discrete application.

In IO-Link mode, the module supports eight channels for IO-Link master communication with IO-Link compatible devices. In standard digital I/O mode, the module supports eight channels of digital input or output. Standard digital input channels support IEC61131-2 type 1 input. Channels can also be disabled if not in use.

You must use this module with RSLogix™ 5000/Studio 5000® software, version 20 or later. Use this diagram to identify the external features of the module.

Module Identification



	Description		Description
1	EtherNet/IP D-code M12 connector	8	Auxiliary power indicator
2	Function earth[1]	9	Micro-style power out
3	EtherNet/IP D-code M12 connector	10	Micro-style power in
4	Link 2 status indicator	11	Channel I/O or digital I/O status indicators
5	Network status indicator	12	Module status indicator
6	Node address switches	13	Link 1 status indicator
7	Micro-style I/O connectors		

[1] Functional Earth grounds the I/O block's EtherNet/IP communication circuitry which is designed to mitigate the effect of noise on the network. The device requires a solid earth ground connection, either through a metal screw to a grounded metal panel or through a wire. refer to EtherNet/IP Connector on page 10 for connections.

Install the Module

To install the module:

- Set the network address.
- Mount the module.
- Connect the I/O, Network and Auxiliary cables to the module.

Set the Network Address

The I/O block ships with the rotary switches set to 999 and DHCP enabled.

To change the network address, you can do one of the following:

- adjust the switch 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.

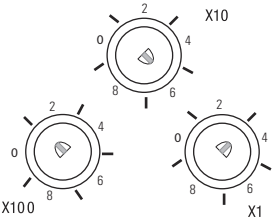
The I/O block reads the switches first to determine if the switches are set to a valid number. To set the network address:

1. Remove power.
2. Remove the switch dust caps.
3. Rotate the three (3) switches on the front of the module using a small blade screwdriver.
4. Line up the small notch on the switch with the number setting you wish to use. Valid settings range from 001...254.
5. Replace switch dust caps. Make sure not to over tighten.
6. Reapply power.

Set Network Address

Example shows default node address set at 163.

Note: You need to remove the protective switch dust caps before you can adjust the address settings.



When the switches are set to a valid number, the I/O block's IP address is 192.168.1.xxx (where xxx represents the number set on the switches). The I/O block's subnet mask is 255.255.255.0 and the gateway address is set to 0.0.0.0. When the I/O block uses the network address set on the switches, the I/O block does not have a host name assigned to it or use any Domain Name Server.

If the switches are set to an invalid number (for example, 000 or a value greater than 254 excluding 888), the I/O block checks to see if DHCP is enabled. If DHCP is enabled, the I/O block asks for an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters.

If DHCP is not enabled, the I/O block uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory.

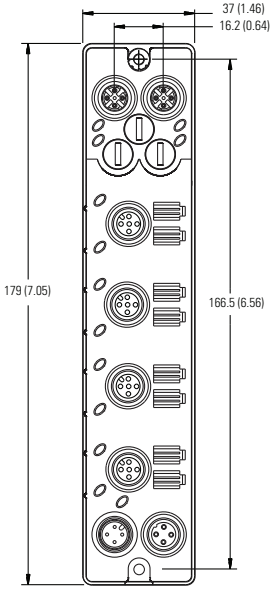
Mount the Module

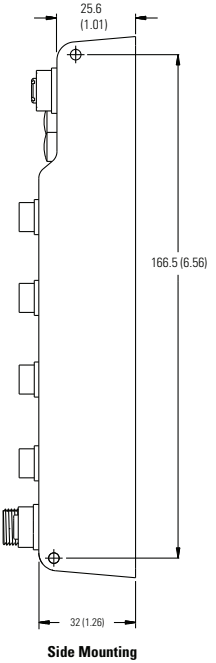
Two sets of mounting holes are used to mount the module directly to a panel or machine. Mounting holes accommodate #8 (M4) pan head screws. The torque specification is 0.68 Nm (6 lb-in.).

Product Dimensions

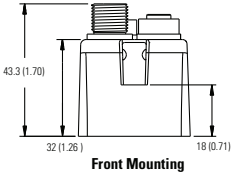
Refer to the mounting dimensions illustration to help you mount the module.

Module Dimensions





Side Mounting



Front Mounting

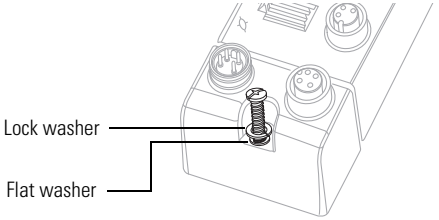
Measurements are in millimeters (inches)

45765

Mount the Module in High Vibration Areas

If you mount the module in an area that is subject to shock or vibration, we recommend you use a flat and a lock washer to mount the module. Mount the flat and the lock washer as shown in the mounting illustration. Torque the mounting screws to 0.68 Nm (6 lb-in.).

High Vibration Area Mounting

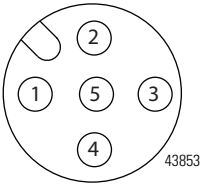


Connect the I/O, Network and Auxiliary Cables to the Module

The 1732E-8IOLM12R ArmorBlock EtherNet/IP module has a 5-pin micro-style I/O connectors. We provide caps to cover the unused connectors on your module. Connect the quick-disconnect cord sets you selected for your module to the appropriate ports.

I/O Connectors

Micro-style 5-Pin I/O Female Connector

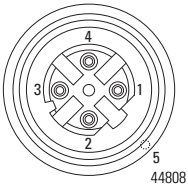


(View into connector)

Pin 1	Sensor source voltage
Pin 2	IO-Link, Input/output B
Pin 3	Return
Pin 4	IO-Link, Input/output A
Pin 5	PE

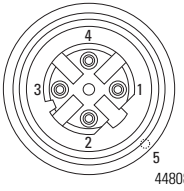
EtherNet/IP Connector

D-Code Micro Network Female Connector



(View into connector 1)

Pin 1 M12_Tx+
Pin 2 M12_Rx+
Pin 3 M12_Tx-
Pin 4 M12_Rx-
Pin 5 Connector shell shield GND



(View into connector 2)

Pin 1 M12_Rx+
Pin 2 M12_Tx+
Pin 3 M12_Rx-
Pin 4 M12_Tx-
Pin 5 Connector shell shield GND

IMPORTANT Use the 1585D–M4DC–H: Polyamide small body unshielded mating connectors for the D-Code M12 female network connector.

Note that the distance between the center of each Ethernet connector is 16.2 mm (refer to Module Dimensions on page 8). Rockwell Automation recommends the use of suitable cable based on this measurement. Some of the recommended cables are 1585D-M4TBJM-x and 1585D-M4TBDM-x for daisychains.

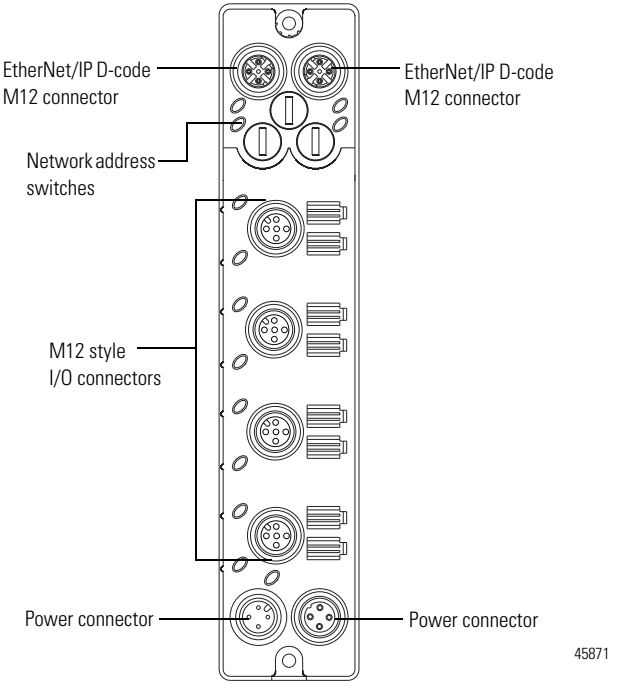
IMPORTANT Use two twisted pair CAT5E UTP or STP cables

D-Code M12 Pin	Wire Color	Signal	8-way Modular RJ45 Pin
1	White-orange	TX+	1
2	White-green	RX+	3
3	Orange	TX-	2
4	Green	RX-	6

Configure the Module

Refer to the illustration for configuration operations.

Configure Operations



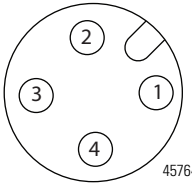
Refer to On-Machine Connectivity Catalog, publication M117-CA001, for Rockwell Automation cable and cord set offerings or use the configuration tools available at www.ab.com/e-tools/.

Auxiliary Power Connectors

Attach the micro-style 4-pin connector to the micro-style 4-pin receptacle as shown below.

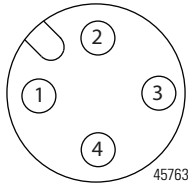
Auxiliary Power Micro-style 4-Pin Receptacles

Male Input



(View into receptacle)
Pin 1 Auxiliary power+
Pin 2 Module/sensor power+
Pin 3 Module/sensor power-
Pin 4 Auxiliary power-

Female Output



IMPORTANT The maximum current that any pin on the power connectors can carry is 4 A.

The power required by the module is based on a 4-pin micro-style connector system. The module receives its required power through the male connector on the left. A female connector on the right is also provided so that power can be daisy-chained from module to module.

The module requires two 24V DC (nominal) supplies. These supplies are called the Module Power and the Auxiliary Power. The Module power powers the microprocessor and Ethernet portions of the module. The Auxiliary Power provides power for the Digital Outputs, the Digital Inputs, and the Sensor Voltage.

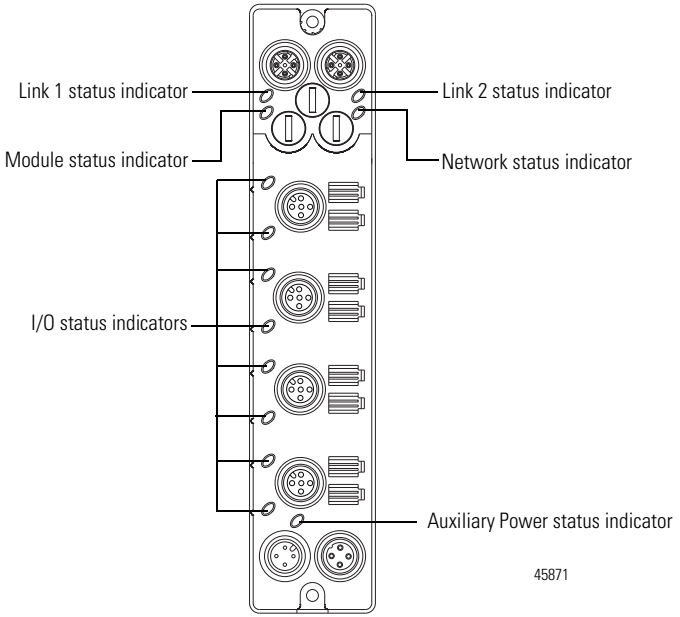
Internally, the Module Power and Auxiliary Power are isolated from each other.

Interpret LED Indicators

This module has the following indicators:

- Module, Network, and Link status indicators for EtherNet/IP
- Power status indicator
- Individual channel status indicators for inputs and outputs

Status Indicators



Indicator Status for Module

Indicator	Status	Description
Module status	Off	No power applied to the device.
	Flashing green	The device has not been configured. If Master Sync Enable bit is set, and the device is not synchronized to a PTP master, the device is not configured.
	Green	Device operating normally.
	Red	Unrecoverable fault – may require device replacement.

Indicator Status for Module

Indicator	Status	Description
Module status	Flashing red	One or more recoverable minor faults detected. Possible minor faults indicated are: • The device is performing a firmware flash update. • The IO-Link stack is faulted. • IP Address switches do not match configuration in use • The device has completed a reset to factory default request due to the switches being set to 888 at power up, and a power cycle is required.
	Flashing red/green	The module is performing POST (Power-On Self Test), which completes within 30 s.
Network status	Off	The device is not initialized or the module does not have an IP address.
	Flashing green	The device has an IP address, but no connections are established.
	Green	The device is online, has an IP address, and at least one connection is established.
	Flashing red	One or more connections have timed out.
	Red	The module has detected that its IP address is already in use.
Link status	Off	No link established.
	Green	Link established on indicated port at 100 Mbps.
	Flashing green	Link activity present on indicated port at 100 Mbps.
	Yellow	Link established on indicated port at 10 Mbps.
	Flashing yellow	Link activity present on indicated port at 10 Mbps.
Auxiliary power status	Off	No power to device or input not valid.
	Green	Power applied to device.

Channel LED Indicator Status for Module

Indicator	Status	Mode	Description
Channel LED status	Off	Both	Output/input is in off state, is in IO-Link mode but is not energized.
	Yellow	Standard I/O	Output/input is in on state.
	Flashing green	IO-Link	Port startup or IO-Link device not found.
	Green	IO-Link	IO-Link enabled.
	Flashing red	IO-Link	IO-Link device connected to channel does not match configured electronic key.
	Red	Both	Output is shorted or over-current condition exists.

IMPORTANT The Module Status LED indicator will flash red and green for a maximum 30 s while the module completes its POST (Power-On Self Test).

Specifications

General Specifications

Attribute	Value
Number of inputs/outputs	8 Type 1 defined, sinking
Communication rate, Ethernet	10/100 Mbps, Full or half-duplex 100 meter per segment
Communication rate, IO-Link	4.8 kB; 38.4 kB; 230.4 kB
Voltage, power, max	28.8V DC
Voltage, power, min	20V DC
Current, Module Power, max per module	100 mA @ 24V DC
Current, Auxiliary Power, module only (no Digital Output loads, no Sensor Voltage Loads, and no power daisy-chain loads)	30 mA @ 24V DC
Current, Auxiliary Power, max per module (module plus Digital Output Loads, plus Sensor Voltage Loads, plus power daisy-chain loads)	4 A
Isolation voltage	50V (continuous), Basic Insulation Type, outputs and output power to Network. 50V Basic Insulation Type between the field network connections. 50V Basic Insulation Type between module power and output power. No isolation between individual I/Os or between I/Os and output power. No isolation between both network channels at the CPU/DLR power side.
Status indicators	Module status – red/green Network status – red/green Link status – green/yellow Power status – green I/O LED – yellow/red IO-Link LED – green/red
Dimensions, approx., HxWxD	179 x 37 x 27 mm (7.05 x 1.46 x 1.06 in.)
Pilot Duty Rating	DC-14
Weight, approx.	0.34 kg (0.75 lb)
Wiring category[1]	1 – on signal ports 1 – on power ports 1 – on communication ports
Enclosure type rating	Meets IP65/66/67/69K

(1) Use this Conductor Category information for planning conductor routing. Refer to publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

ArmorBlock I/O 8 Channel IO-Link Master Module – Standard Digital Input

Attribute	Value
On-state voltage, min	15V DC
On-state current, min	2.0 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input delay time	Software configurable
Sensor Source Voltage (SSV) voltage, min	1V
Sensor Source Voltage (SSV) available current, per channel, max	500 mA
Sensor Source Voltage (SSV) available current, per connector, max	1 A
Short circuit detection	Per I/O connector (two shared channels per I/O connector)

ArmorBlock I/O 8 Channel IO-Link Master Module – Standard Digital Output

Attribute	Value
On-state voltage, min	15V DC
On-state voltage, max	28.8V DC
On-state voltage, nom	24V DC
On-state current, per output, max	250 mA
On-state current, total for all channels combined, max	2 A (250 mA X 8 outputs)
Off-state current leakage, per output, max	500 μA
Surge current, per output, max	0.3 A for 10 ms, repeatable every 3 seconds.
Short circuit detection	Per channel

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 rating (UL)	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
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 (IEC 61000-6-4): 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...1000 MHz 10V/m with 1 kHz sine-wave 80% AM from 1000...2000 MHz 10V/m with 200 Hz SQ-wave 100% Pulse modulated at 50% duty cycle @ 900 MHz Pulse 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz Pulse 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3 kV at 5 kHz on power ports ±3 kV at 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±1 kV line-earth(CM) on signal ports ±2 kV line-earth(CM) on communication 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-UR-us	UL Recognized Component, certified for US and Canada. See UL File E322657.
CE	EMC Directive 2014/30/EU 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)
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR11; Industrial Emissions.
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
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:

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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