Installation Instructions

DC (10...30V) Input Module

Catalog Number 1771-IBN Series C

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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-IN001 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) 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.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
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.

Environment and Enclosure

ATTENTION

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 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 Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see:

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

Prevent 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.

European Hazardous Location Approval

ATTENTION

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15 and EN 60079-0.

WARNING

Observe the following additional Zone 2 certification requirements:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Allen-Bradley.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Zone 2 environments.
- This equipment must be used only with ATEX certified backplanes.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	**Informations sur l'utilisation de cet équipement en environnements dangereux.**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

WARNING 	**EXPLOSION HAZARD -** • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT** 	**RISQUE D'EXPLOSION –** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Before You Begin

The 1771-IBN series C DC input module is a sink input and requires a source output. A sink input provides a path to ground and a source output provides a positive voltage path.

You must use this module in a 1771-A1B through 1771-A4B or later 1771 I/O chassis. Refer to the table for processor compatibility.

Processor Capability

System Type	Use with Processors	Cat. No.
Local	Mini-PLC-2/02 Mini-PLC-2/16 Mini-PLC-2/17 PLC-5/15, series B and later	1772-LZ, 1772-LZP 1772-LX, 1772-LXP 1772-LW, 1772-LWP 1785-LT
Remote with a 1771-ASB remote I/O adapter	PLC2/20 PLC-2/30 PLC-3 PLC-3/10 PLC-5/15, series B and later	1772-LP2 1772-LP3 1775-L1, 1775-L2, 1775-L3, 1775-L4 1775-LP4, LP8 1785-LT

Do not place this module in the same I/O chassis as the 1771-IX thermocouple module. You can use this module in the same chassis as the 1771-IXE thermocouple module.

This module has input filtering to limit the effect of voltage transients caused by contact bounce and/or electrical noise. Specifications for input filtering are listed in the specifications section of this document.

Calculate Power Supply Requirements

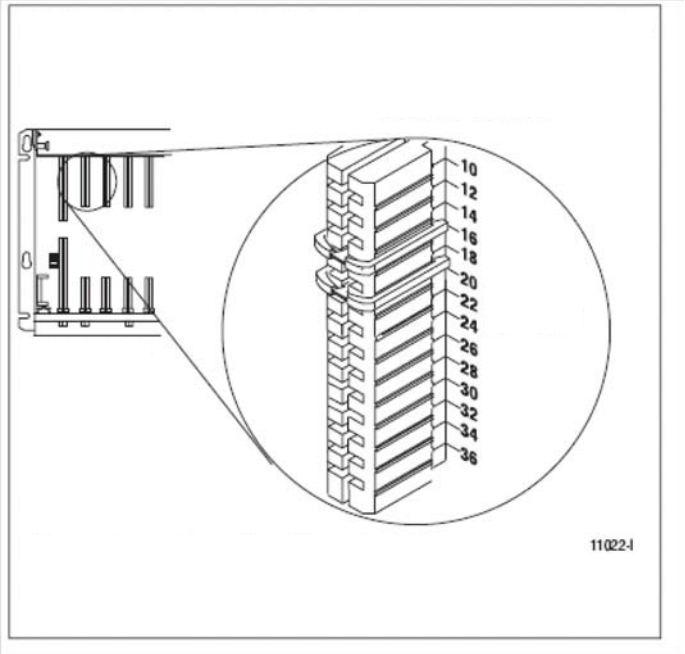
Your module receives its power for internal logic circuitry through the 1771 I/O chassis backplane from the chassis power supply. The module requires 280 mA from the output of this supply.

To calculate the requirements for the backplane power supply, add 280 mA to the power requirements of all other modules in the I/O chassis. Calculating the requirements prevents an overload to the chassis backplane and/or backplane power supply.

Key the Backplane Connector

Place your module in any slot in the chassis except the leftmost slot that is reserved for processors or adapters, noting that you:

- should position the keying bands in the backplane connectors to correspond to key slots on the module so that you place the keying bands between 14…16 and 18…20.
- can change the position of these bands if subsequent system design and rewiring makes insertion of a different type of module necessary.



ATTENTION

Observe the following precautions when inserting or removing keys:

- Insert or remove keys with your fingers.
- Make sure that key placement is correct.

Incorrect keying or the use of a tool can result in damage to the backplane connector and possible system faults.

Install the Module and Field Wiring Arm

The 1771–IBN module is a modular component of the 1771 I/O system requiring a properly installed system chassis. Refer to Universal I/O Chassis Installation Instructions publication 1771-IN075 for detailed information on acceptable chassis and proper installation and grounding requirements. Limit the adjacent slot-power dissipation to 10 W maximum.

WARNING

If you insert or remove the module with power applied, or connect or disconnect the field wiring arm with field-side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION

Remove power from the 1771 I/O chassis backplane before you install the module. Failure to remove power from the backplane could cause:

- module damage.
- degradation of performance.
- injury or equipment damage due to possible unexpected operation.

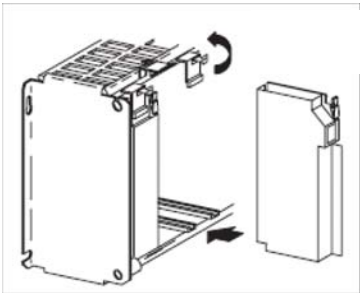
IMPORTANT

Apply firm and even pressure on the module to seat it into its backplane connector.

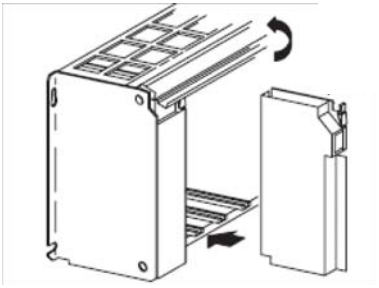
To install the module and field wiring arm, follow this procedure.

1. Place the module in the card guides on the top and bottom of the chassis that guide the module into position, noting the following:

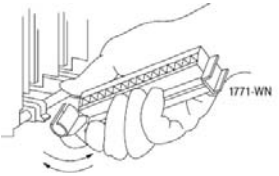
   - For a 1771-A1B, 1771-A2B, 1771-A3B, and 1771-A4B I/O chassis, snap the chassis latch over the top of the module to secure it.



- For a 1771-A1B, 1771-A2B, 1771-A4B I/O chassis, swing the chassis locking bar down into place to secure the modules, making sure the locking pins engage.



2. Attach the 1771-WN wiring arm to the horizontal bar at the bottom of the I/O chassis noting the wiring arm pivots upward and connects with the module so you can install or remove the module without disconnecting the wires.



Connecting Wiring to the Field Wiring Arm

You make connections to the module through the 1771-WN field wiring arm. The arm pivots on the I/O chassis to connect with terminals on the front of the module and acts as a terminal strip. The wiring arm allows the module to be removed from the chassis without disconnecting wiring.

WARNING

The optional 1771-WHF and 1771-WHFB fused field-wiring arms are not certified for use in hazardous location applications. Use these optional accessories only in nonhazardous applications.

WARNING

If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION

Remove power from the 1771 I/O chassis backplane and field wiring arm before removing or installing an I/O module.

- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.

1. Be sure all power is removed from the module before making wiring connections.
2. Swing the wiring arm up into position on the front of the module, noting that the locking tab on the module secures it into place.
3. Make your connections to the field wiring arm as shown in the connection diagram, using the label on the front of the wiring arm to identify your wiring.

IMPORTANT

The field-wiring arm terminal identification number is not the same as the number of the bit that controls that output.

I/O Module Groups

Each module condenses two full-module groups (32 inputs) into each I/O chassis slot. For example:

- module group 1 = inputs 00…17.
- module group 2 = inputs 00…17 (module group 2 represents the second set of inputs).

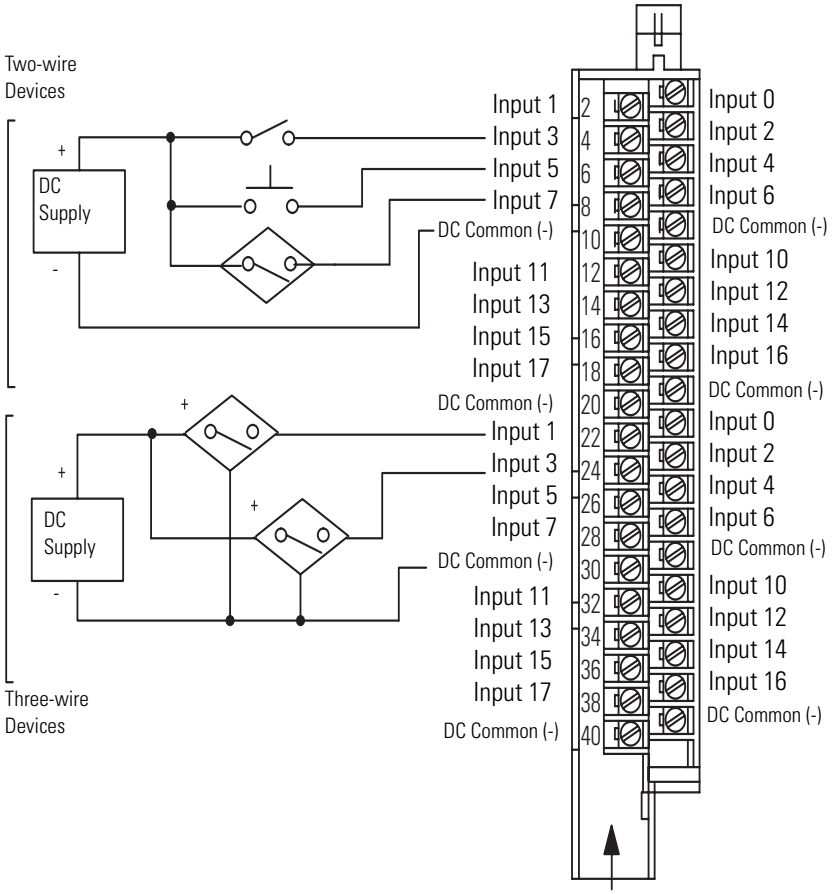
ATTENTION

Observe proper polarity with DC power connections. Reverse polarity or application of AC voltage could damage the module.

In the graphic on the following page, note the following:

- Terminals 1…20 represent module group 1, with terminals 9, 10, 19, and 20 DC common.
- Terminals 21…40 represent module group 2, with terminals 29, 30, 39, and 40 DC common.
- Terminals on the left are even numbered 2…40 and terminals on the right are odd numbered 1…39.
- If multiple power sources are used, do not exceed the specified isolation voltage.
- The arrow in the figure shows that actual wiring runs in this direction.

Connection Diagram for the 1771-IBN DC Input Module



Module Input Terminal Assignments

Terminal Number	Input Assignment	I/O Program Address
01	Input 00	1RG00
02	Input 01	1RG01
03	Input 02	1RG02
04	Input 03	1RG03
05	Input 04	1RG04
06	Input 05	1RG05
07	Input 06	1RG06
08	Input 07	1RG07
09	DC common 0 (-)[1]	-
10	DC common 0 (-)	-
11	Input 10	1RG10
12	Input 11	1RG11
13	Input 12	1RG12
14	Input 13	1RG13
15	Input 14	1RG14
16	Input 15	1RG15
17	Input 16	1RG16
18	Input 17	1RG17
19	DC common 1 (-)[1]	-
20	DC common 1 (-)[1]	-
21	Input 00	1RG00
22	Input 01	1RG01
23	Input 02	1RG02
24	Input 03	1RG03
25	Input 04	1RG04
26	Input 05	1RG05
27	Input 06	1RG06
28	Input 07	1RG07
29	DC common 2 (-)[1	-

Module Input Terminal Assignments

Terminal Number	Input Assignment	I/O Program Address
30	DC common 2 (-)[1]	-
31	Input 10	1RG10
32	Input 11	1RG11
33	Input 12	1RG12
34	Input 13	1RG13
35	Input 14	1RG14
36	Input 15	1RG15
37	Input 16	1RG16
38	Input 17	1RG17
39	DC common 3 (-)[1]	-
40	DC common 3 (-)[1]	-
Where: R = rack number (such as 1, 2, 3) and G = I/O group (0…7)		

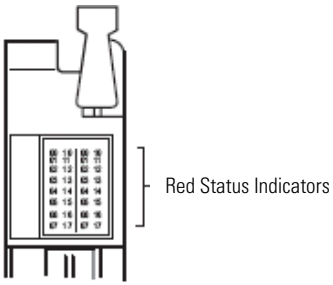
(1) You can connect a different power supply to each DC common (0, 1, and 3). Terminals 09/10 are common for terminals 01…08, 19/20 for 11…18, 29/30 for 21…28, 39/40 for 31…38.

Status Indicators

The module has 32 status indicators on the front plate.

These represent the control status of the input. Each indicator is lit when voltage is present at the corresponding input.

These indicators can flicker (momentarily light up) when the chassis in which the module resides is first powered up. This flicker is normal and in no way affects the control parameters of the system.



Specifications

DC (10…30V) Input Module

Attribute	Value
Inputs per module	32
Module location	1771-A1B through 1771-A4B or later I/O chassis
Input voltage range	10…30V DC
Input range, nom	4.7 mA @ 10V; 15.6 mA @ 30V
Off-state current, min	1.7 mA @ 5V DC
Off-state voltage, max	5V DC
On-state voltage, min	10V DC
Input signal delay	Low to high propagation: 6 ms ±2 ms High to low propagation: 6 ms ±2 ms
Power dissipation	16.4 W max; 1.5 W min
Thermal dissipation	53.3 BTU/hr max; 5.1 BTU/hr min
Backplane current	280 mA @ 5V DC max
Isolation voltage	60V (continuous), basic insulation type Type tested at 500V AC for 60 s, I/O to system
Wire size	0.25... 2.5 mm^2 (22...14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max
Field wiring arm	1771-WN
Wiring arm screw torque	1.0 N•m (9 lb•in)
Wire category[1]	2 - on signal ports
North American temp code	T3C
IEC temp code	T3
Enclosure type rating	None (open style)
Keying	14…16 18…20

(1) † Use this conductor category information for planning conductor routing as described in the appropriate system-level installation manual.

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): 0…60 °C (32…140 °F)
Temperature, nonoperating	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): -40…85 °C (-40…185 °F)
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10…500 Hz
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% noncondensing
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
ESD immunity	IEC 61000-4-2: 4 kV indirect contact discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±1 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 signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)

Certifications[1]

Certification[2]	Value
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T3 X) EN 60079-0; General Requirements (Zone 2).
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 CISPR 11; Industrial Emissions.
UL	UL Listed Industrial Control Equipment. See UL File E65584.

(1) See the product certification link at http://ww.ab.com for Declarations of Conformity, Certificates, and other certification details.

(2) When product is marked.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://support.rockwellautomation.com, 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://support.rockwellautomation.com.

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	1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

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 in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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