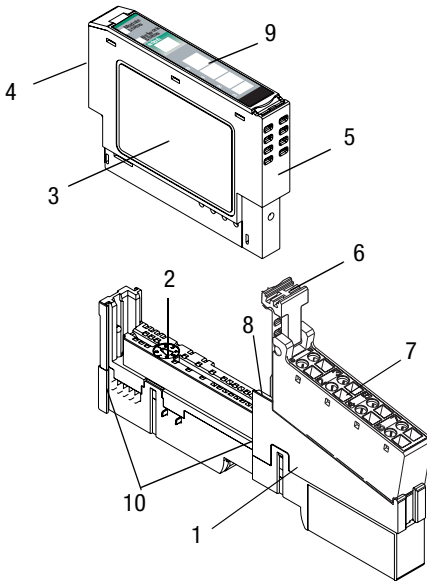


Installation Instructions

EH-RIO Sink Input Module (RIO-XDP2, -XDP4, -XDP8)



	Description		Description
1	Mounting Base ¹	6	RTB Removal Handle
2	Mechanical Keying (orange)	7	Removable Terminal Block (RTB) ¹
3	Module Wiring Diagram	8	DIN Rail Locking Screw (orange)
4	Module Locking Mechanism	9	Slide-in Writable Label
5	Insertable I/O Module	10	Interlocking Side Pieces

¹ Wiring Base Assembly consists of item 1) mounting base, RIO-MB and item 7) removable terminal block, RIO-SC or RIO-SP.

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. 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 Hitachi Ltd. 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, Hitachi Ltd. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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

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Throughout this manual 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
- recognize the consequence

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION**Environment and Enclosure**

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 meters 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 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.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication.

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.

ATTENTION



Preventing Electrostatic Discharge

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.
 - If available, use a static-safe workstation.
 - When not in use, store the equipment in appropriate static-safe packaging.
-

ATTENTION



EH-RIO is grounded through the DIN rail to chassis ground. Use zinc plated, yellow chromated steel DIN rail to assure proper grounding. Using other DIN rail materials (e.g. aluminum, plastic, etc.) which can corrode, oxidize or are poor conductors can result in improper or intermittent platform grounding.

Installing the Mounting Base

To install the mounting base on the DIN rail, proceed as follows.

1. Position the mounting base vertically above the installed units (adapter, power supply or existing module).
2. Slide the mounting base down allowing the interlocking side pieces to engage the adjacent module or adapter.
3. Press firmly to seat the mounting base on the DIN rail. The mounting base will snap into place.

4. To remove the mounting base from the DIN rail, remove the module, and use a small bladed screwdriver to rotate the base locking screw to a vertical position. This releases the locking mechanism. Then lift straight up to remove.

Installing the I/O Module

The module can be installed before, or after base installation. Make sure that the mounting base is correctly keyed before installing the module into the mounting base. In addition, make sure the mounting base locking screw is positioned horizontal referenced to the base.

WARNING



When you insert or remove the module while backplane 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.

1. Using a bladed screwdriver, rotate the keyswitch (2) on the mounting base clockwise until the number required for the type of module being installed aligns with the notch in the base.
2. Make certain the DIN rail locking screw is in the horizontal position. (You cannot insert the module if the locking mechanism is unlocked.)
3. Insert the module straight down into the mounting base and press to secure. The module will lock into place.

Installing the Removable Terminal Block (RTB)

A removable terminal block is supplied with your wiring base assembly. To remove, pull up on the RTB handle. This allows the mounting base to be removed and replaced as necessary without removing any of the wiring. To reinsert the removable terminal block, proceed as follows.

1. Insert the end opposite the handle into the base unit. This end has a curved section that engages with the wiring base.

6 EH-RIO Sink Input Module

2. Rotate the terminal block into the wiring base until it locks itself in place.
3. If an I/O module is installed, snap the RTB handle into place on the module.

WARNING



When you connect or disconnect the Removable Terminal Block (RTB) 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.

Removing a Mounting Base

To remove a mounting base, you must remove any installed module, and the module installed in the base to the right. Remove the removable terminal block (if wired).

1. Unlatch the RTB handle on the I/O module.
2. Pull on the RTB handle to remove the removable terminal block.

WARNING



When you connect or disconnect the Removable Terminal Block (RTB) 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.

3. Press on the module lock on the top of the module.
4. Pull on the I/O module to remove from the base.

WARNING

When you insert or remove the module while backplane 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.

5. Repeat steps 1, 2, 3 and 4 for the module to the right.
6. Use a small bladed screwdriver to rotate the orange base locking screw to a vertical position. This releases the locking mechanism.
7. Then lift straight up to remove.

Communicating with Your Module

I/O messages are sent to (consumed) and received from (produced) the EH-RIO modules. These messages are mapped into the processor's memory. This EH-RIO input module produces 1 byte of input data (scanner Rx). It does not consume I/O data (scanner Tx).

Default Data Map for the RIO-XDP2 Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (Rx)							I1	I0
Consumes (Tx)	No consumed data							

Where: I0 = channel 0, I1 = channel 1; 0 = off, 1 = on

Default Data Map for the RIO-XDP4 Input Module

Message size: 1 Byte

	7	6	5	4	3	2	1	0
Produces (Rx)					I3	I2	I1	I0
Consumes (Tx)	No consumed data							

Where: I0 = channel 0, I1 = channel 1, I2 = channel 2 and I3 = channel 3; 0 = off, 1 = on

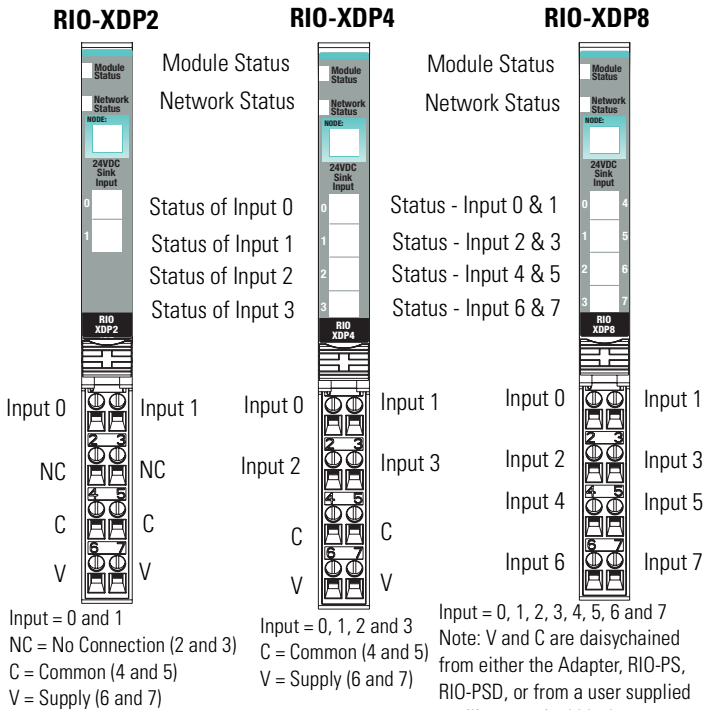
Default Data Map for the RIO-XDP8 Input Module

Message size: 1 Byte

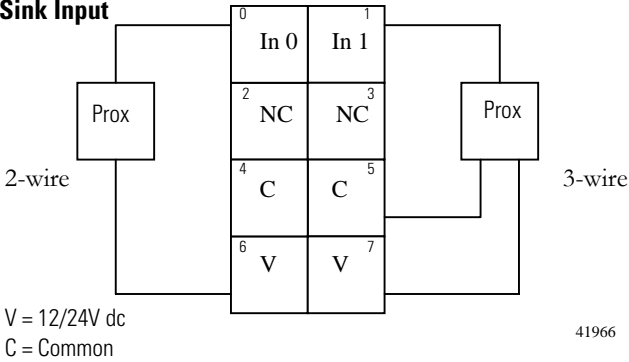
	7	6	5	4	3	2	1	0
Produces (Rx)	I7	I6	I5	I4	I3	I2	I1	I0
Consumes (Tx)	No consumed data							

Where: I0 = channel 0, I1 = channel 1, I2 = channel 2 and I3 = channel 3; I4 = channel 4, I5 = channel 5, I6 = channel 6, I7 equals channel 7; 0 = off, 1 = on

Wiring the Input Modules



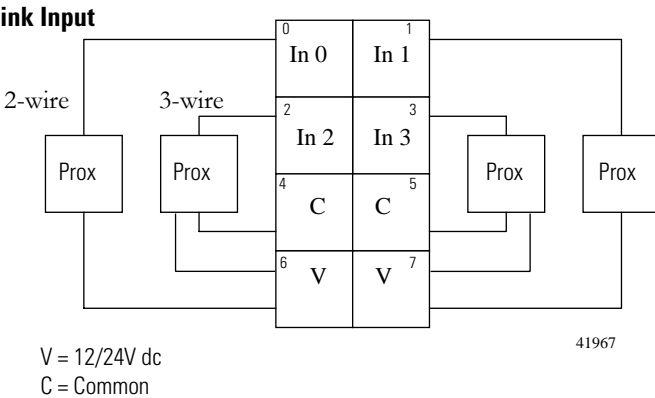
Wiring for RIO-XDP2 Sink Input



Channel	Input	Common	Voltage
0	0	4	6
1	1	5	7

Connect common on 3-wire proximity switches.
 12/24V dc is supplied through the internal power bus.

Wiring for RIO-XDP4 Sink Input

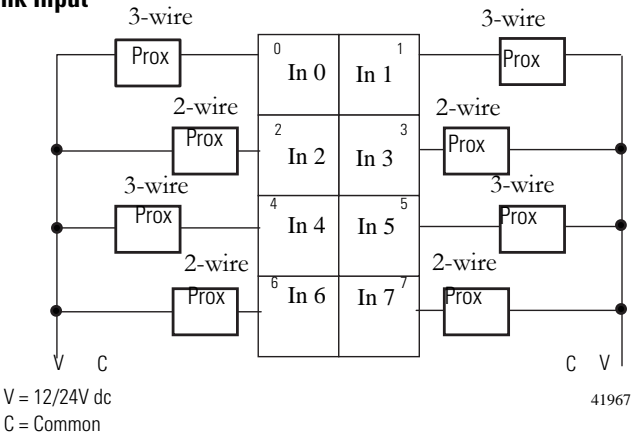


Channel	Input	Common	Voltage
0	0	4	6
1	1	5	7
2	2	4	6
3	3	5	7

Connect common on 3-wire proximity switches.
12/24V dc is supplied through the internal power bus.

Wiring for RIO-XDP8

Sink Input

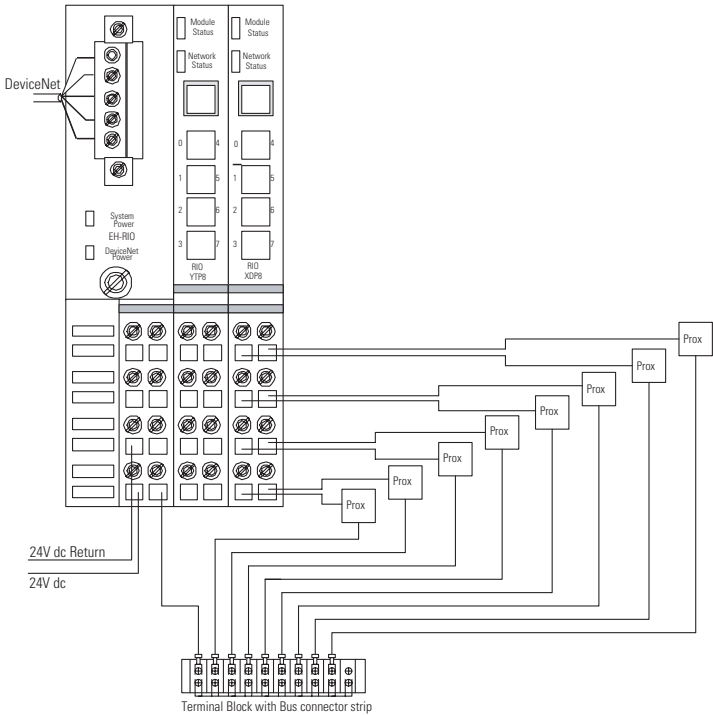


Channel	Input	Channel	Input
0	0	4	4
1	1	5	5
2	2	6	6
3	3	7	7

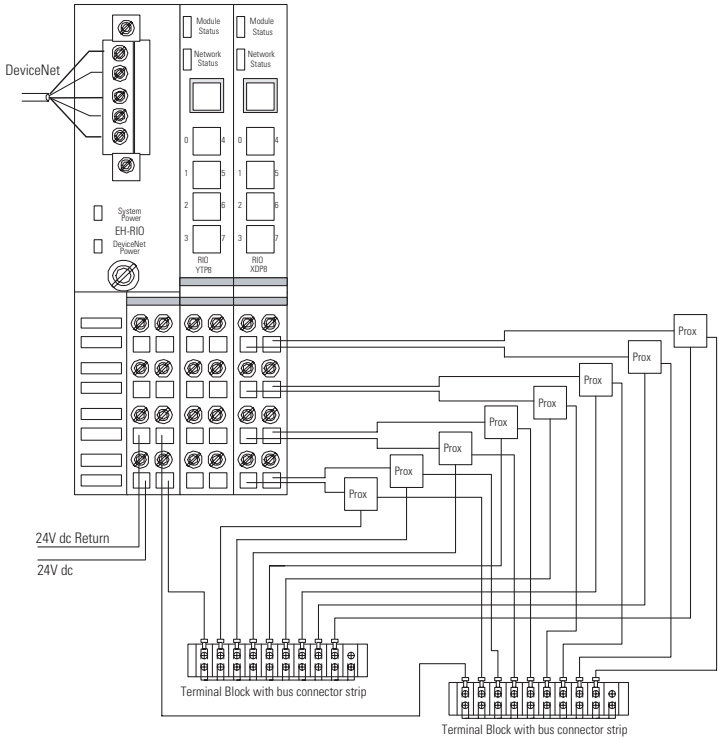
Daisychain common and power connections from RIO Adapter, RIO-PS, RIO-PSD or from user supplied external auxiliary terminal block.

Note: When connecting more than 1 wire in a termination point, make sure that both wires are the same gauge and type.

Example of Wiring for RIO-XDP8 Using 2-Wire Proximity Switches

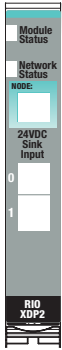


Example of Wiring for RIO-XDP8 Using 3-Wire Proximity Switches



Troubleshooting with the Indicators

RIO-XDP2



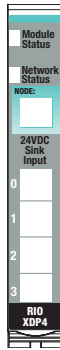
Module Status

Network Status

Status of Input 0

Status of Input 1

RIO-XDP4



Module Status

Network Status

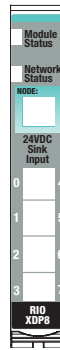
Status of Input 0

Status of Input 1

Status of Input 2

Status of Input 3

RIO-XDP8





Indication	Probable Cause
Module Status	
Off	No power applied to device
Green	Device operating normally
Flashing Green	Device needs commissioning due to configuration missing, incomplete or incorrect.
Flashing Red	Recoverable fault.
Red	Unrecoverable fault may require device replacement
Flashing Red/Green	Device is in self-test

Indication	Probable Cause
Network Status	
Off	Device is not on-line - Device has not completed dup_MAC_id test. - Device not powered - check module status indicator
Flashing Green	Device is on-line but has no connections in the established state.
Green	Device on-line and has connections in the established state.
Flashing Red	One or more I/O connections in timed-out state
Red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.
Flashing Red/Green	Communication faulted device - the device has detected a network access error and is in communication faulted state. Device has received and accepted an Identify Communication Faulted Request - long protocol message.

Indication	Probable Cause
I/O Status	
Off	Input is in the off-state
Yellow	Input is in the on-state

North American Hazardous Location Approval

<p>The following information applies when operating this equipment in hazardous locations:</p>	<p>Informations sur l'utilisation de cet équipement en environnements dangereux:</p>		
<p>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.</p>	<p>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.</p>		
<p>WARNING</p> 	<p>EXPLOSION HAZARD -</p> <ul style="list-style-type: none"> 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. 	<p>AVERTISSEMENT</p> 	<p>RISQUE D'EXPLOSION -</p> <ul style="list-style-type: none"> 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 1, Division 2. S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Specifications - RIO-XDP2, -XDP4, -XDP8 Input Modules**Input Specifications (IEC 3 24V dc Input Compliant)**

Inputs per Module	RIO-XDP2 - 2 (1 group of 2), sinking RIO-XDP4 - 4 (1 group of 4), sinking RIO-XDP8 - 8 (1 group of 8), sinking
ON-State Voltage	10V dc minimum 24V dc nominal 28.8V dc maximum
ON-State Current	2mA minimum 4mA nominal @ 24V dc 5mA maximum
OFF-State Voltage	5V dc maximum
OFF-State Current	1.5mA minimum
Input Impedance	4.7K Ω maximum, 3.6K Ω nominal
Input Filter Time ¹ OFF to ON ON to OFF	0.5 hardware plus 0-63ms (user selectable) 0.5 hardware plus 0-63ms (user selectable)
Indicators	1 green/red network status indicator, logic side 1 green/red module status indicator, logic side RIO-XDP2 2 yellow input status indicators, logic side RIO-XDP4 4 yellow input status indicators, logic side RIO-XDP8 8 yellow input status indicators, logic side
Keyswitch Position	1

General Specifications

Module Location	RIO-BSC3 or -BSP3 wiring base assembly
Backplane Bus Current	75 mA maximum @ 5V dc
Power Dissipation	RIO-XDP2 - 0.7W maximum @ 28.8V dc RIO-XDP4 - 1.0W maximum @ 28.8V dc RIO-XDP8 - 1.6W maximum @ 28.8V dc
Thermal Dissipation	RIO-XDP2 - 2.4 BTU/hr maximum @ 28.8V dc RIO-XDP4 - 3.4 BTU/hr maximum @ 28.8V dc RIO-XDP8 - 5.5 BTU/hr maximum @ 28.8V dc
Isolation Voltage (Minimum)	Tested to withstand 2500V dc for 60s
Field Power Bus Supply Voltage Voltage Range	24V dc nominal 10-28.8V dc
Dimensions Inches (Millimeters)	2.2H x 0.47W x 2.97L (56H x 12W x 75.5L)

Environmental Conditions	
Operational Temperature	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 to 55°C (-4 to 131°F)
Storage Temperature	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 to 85°C (-40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Unpackaged Nonoperating Damp Heat): 5 to 95% noncondensing
Shock Operating Non-operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock) 30g peak acceleration 50g peak acceleration
Vibration	IEC 60068-2-6, (Test Fc, Operating) Tested 5g @ 10-500Hz
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 200Hz 50% Pulse 100% AM at 1890Mhz 10V/m with 200Hz 50% Pulse 100% AM at 900Mhz 10V/m with 1kHz sine-wave 80% AM from 30MHz to 2000MHz
EFT/B Immunity	IEC 61000-4-4: ±4kV at 5kHz on signal ports ±4kV at 5kHz on power ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power and signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80% AM from 150kHz to 80MHz
Emissions	CISPR 11 Group 1, Class A
Enclosure Type Rating	None (open-style)

Conductors Wire Size	14 AWG (2.5mm ²) - 22 AWG (0.25mm ²) solid or stranded copper wire rated at 75°C or greater 3/64 inch (1.2mm) insulation maximum
Terminal Base Screw Torque	7 pound-inches (0.8Nm)
Field Wiring Terminations	<p>RIO-XDP2</p> <p>0 - Input 0 1 - Input 1 2 - No Connection 3 - No Connection 4 - Common 5 - Common 6 - User Supply 7 - User Supply</p> <p>RIO-XDP4</p> <p>0 - Input 0 1 - Input 1 2 - Input 2 3 - Input 3 4 - Common 5 - Common 6 - User Supply 7 - User Supply</p> <p>RIO-XDP8</p> <p>0 - Input 0 1 - Input 1 2 - Input 2 3 - Input 3 4 - Input 4 5 - Input 5 6 - Input 6 7 - Input 7</p>
Mass	RIO-XDP2 - 1.09 oz/30.9 grams RIO-XDP4 - 1.12 oz/31.8 grams RIO-XDP8 - 1.25 oz/35.4 grams
Certifications (when product is marked)	<p>C-UL-US - UL Listed Industrial Control Equipment, certified for US and Canada</p> <p>C-UL-US - UL Listed for Class I, Division 2, Groups A, B, C and D Hazardous locations, certified for US and Canada</p> <p>CE - European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity</p>
<p>1 Input off-to-on filter time is the time from a valid input signal to recognition by the module. Input on-to-off time is the time from a valid input signal to recognition by the module.</p>	

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