



## *Installation Instructions*

# **POINT I/O 24V dc 4-channel Digital Diagnostics Input Module**

Catalog Number 1734-IB4D

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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://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.

<b>WARNING</b> 	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.
<b>IMPORTANT</b>	Identifies information that is critical for successful application and understanding of the product.
<b>ATTENTION</b> 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you to identify a hazard, avoid a hazard and recognize the consequences.
<b>SHOCK HAZARD</b> 	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
<b>BURN HAZARD</b> 	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may be dangerous temperatures.

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## Prevent Electrostatic Discharge

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**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.
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**ATTENTION**

To comply with the CE Low Voltage Directive (LVD), all connected I/O must be powered from a source compliant with safety extra-low voltage (SELV) or protected extra-low voltage (PELV).

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**ATTENTION**

POINT I/O is grounded through the DIN rail to chassis ground. Use zinc plated, yellow-chromate steel DIN rail to be sure of proper grounding. The use of other DIN rail materials, such as aluminum and plastic that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding.

Secure DIN rail to mounting surface approximately every 200 mm (7.87 in.) and use end-anchors appropriately.

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### 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.

## North American Hazardous Location Approval

<p><b>The following information applies when operating this equipment in hazardous locations</b></p>	<p><b>Informations sur l'utilisation de cet équipement en environnements dangereux</b></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><b>WARNING</b></p> 	<p><b>EXPLOSION HAZARD -</b></p> <ul style="list-style-type: none"> <li>• Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.</li> <li>• 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.</li> <li>• Substitution of components may impair suitability for Class I, Division 2.</li> <li>• If this product contains batteries, they must only be changed in an area known to be nonhazardous.</li> </ul>
<p><b>AVERTISSEMENT</b></p> 	<p><b>RISQUE D'EXPLOSION –</b></p> <ul style="list-style-type: none"> <li>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.</li> <li>• 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.</li> <li>• La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe 1, Division 2.</li> <li>• S'assurer que l'environnement est classé non dangereux avant de changer les piles.</li> </ul>

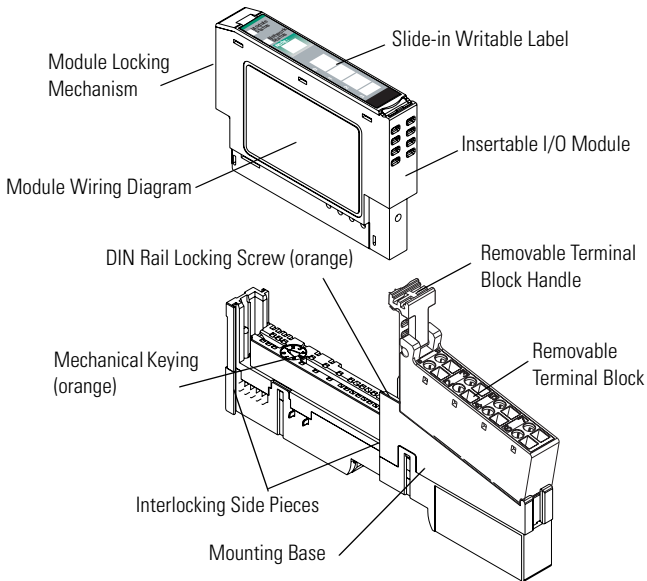
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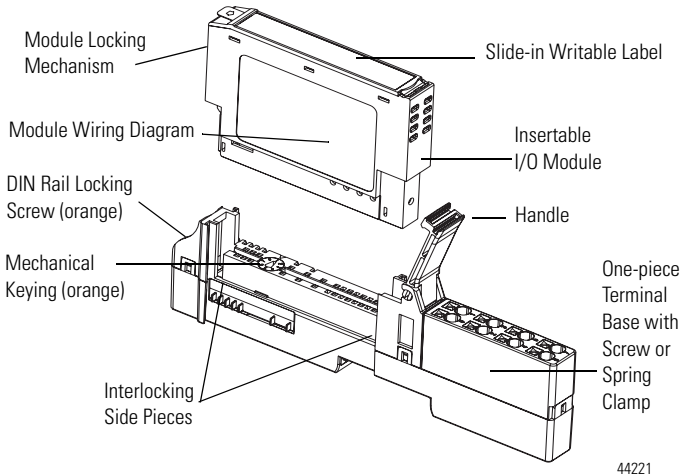
### About the Module

This module is a 4-channel 24V dc input module with short-circuit and open-wire diagnostics.

See the figures to familiarize yourself with major parts of the module, noting that the wiring base assembly is one of the following, with the module not being compatible with 1734-TB3, 1734-TB3S, 1734-TOP3, and 1734-TOP3S bases:

- 1734-TB POINT I/O two-piece terminal base, which includes the 1734-RTB removable terminal block
- 1734-TOP or 1734-TOPS POINT I/O one-piece terminal base





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### **Before You Begin**

The module supports remove and insert under power, auto-address, and auto-baud in compliance with the POINTBus backplane. Each input is a sinking dc input with short-circuit and open-wire detection. The sensor source voltage is derived from the user auxiliary power and used as I/O power.

### **Understand Short-circuit Detection**

The sensor source voltage (SSV) for each input is protected against short circuits. For currents above 200 mA, a fault signal is issued and the input LED indicator is illuminated solid red. A thermally-actuated smart-power device or PTC is used as the protection means. On a per-input basis, the circuit and produced data automatically reset and SSV energizes upon removal of the short circuit. An individual fault signal is issued for each shorted SSV condition.

The shorted input LED indicator illuminates red to denote short-circuit fault status.

See the section on interpreting LED indicators for related information.

When the SSV is loaded to the maximum rated current of 50 mA, a voltage drop of as much as 2.5V dc can exist between the user auxiliary power and the SSV connection. For example, for a supply of 10V dc to a sensor with power derived from the SSV, a supply of 12.5V dc is needed at the auxiliary power connection.



## Understand Open-wire Detection

Sensor source voltage (SSV) current for each input is monitored. Monitoring is accomplished in the SSV leg to accommodate the largest number of sensors possible. For currents below 0.5 mA, a fault signal is issued and the input's LED indicator blinks red. On a per-input basis, the circuit and produced data automatically reset upon removal of the open-wire condition. See the information about interpreting LED indicators for related information.

By using a configuration tool, you can disable the open-wire diagnostics on an input-point basis to keep unused input indicators from turning red and signaling a fault when an input is not in use. Enabling or disabling input-point level open-wire diagnostics is implemented via the module's EDS file, GSD file, or Logix profile and its firmware.

You can also disable all the open-wire diagnostics, using a single entry via the software user interface. The default configuration has all four input channels' open-wire indication enabled.

If a sensor with a dry contact output is used, wire one side of the contact to the SSV terminal for the corresponding input. Wire the other side of the contact to the input. Additionally, place a shunt resistor in parallel with the contact, at the sensor, to cause greater than 0.5 mA to be drawn through the SSV terminal at all times.

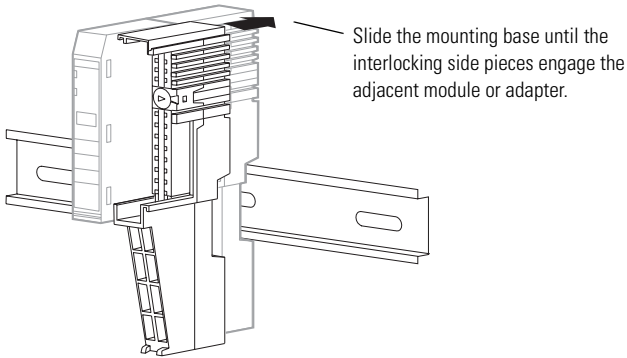
## Install the Mounting Base

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

1. Position the mounting base vertically above the installed units, for example, adapter, power supply, or existing module.
2. Slide the mounting base down so that the interlocking side pieces engage the adjacent module or adapter.

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### Slide the Mounting Base Until Side Pieces Engage



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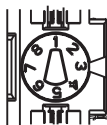
3. Press firmly to seat the mounting base on the DIN rail until the mounting base snaps into place.

## Install the Module

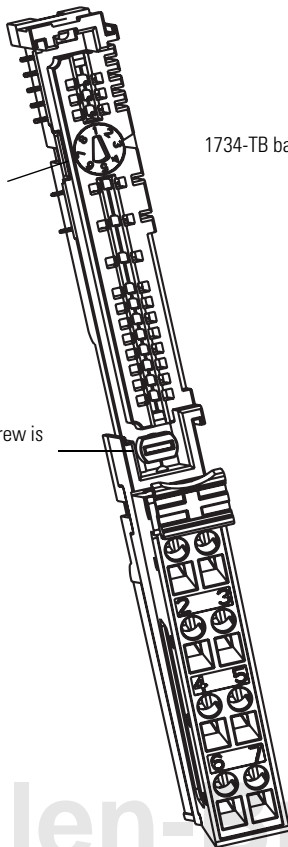
Install the module before or after base installation. Before installing the module into the mounting base be sure of this.

- The mounting base is correctly keyed.
- The mounting base locking screw is positioned horizontally referenced to the base.

Turn the keyswitch to align the number with the notch. Notch position 3 is shown.



Be sure the DIN-rail locking screw is in the horizontal position.



1734-TB base is shown.

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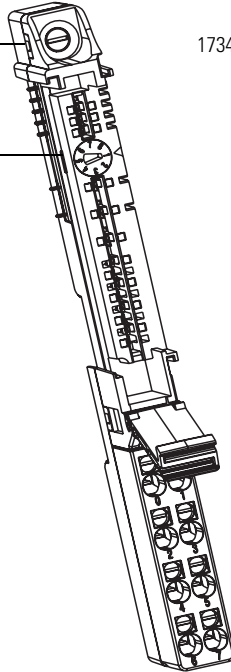
## 12 POINT I/O 24V dc Digital Diagnostics Input Module

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Be sure the DIN-rail locking screw is in the horizontal position.

Turn the keyswitch to align the number with the notch. Notch position 1 is shown.

1734-TOP base is shown.



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**WARNING**

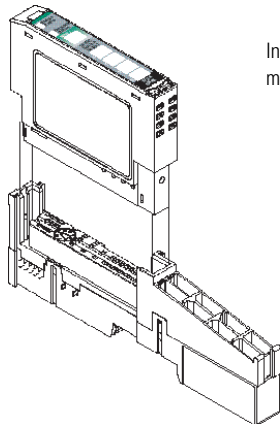
When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

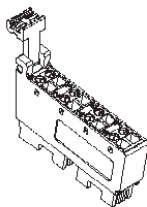
To install the module, use this procedure.

1. Use a bladed screwdriver to rotate the keyswitch on the mounting base clockwise until the number required for the type of module being installed aligns with the notch in the base.
2. Be sure the DIN-rail locking screw is in the horizontal position, noting that 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, until the module locks into place.
4. Insert the end opposite the handle into the base unit, noting this end has a curved section that engages with the wiring base.
5. Rotate the terminal block into the wiring base until it locks itself in place.
6. Snap the RTB handle into place on the module, if an I/O module is installed.

### Insert the Module on the Base



Insert the module straight down into the mounting base.



Hook the RTB end into the mounting base end and rotate until it locks into place.

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## Install the Removable Terminal Block

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**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.

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Read this for information if a removable terminal block (RTB) is supplied with your wiring base assembly, noting that 1734-TOP and 1734-TOPS bases do not have an RTB.

To insert the RTB, proceed as follows. Note that if you pull up on the RTB handle to remove the RTB, you can remove and replace the mounting base as necessary without removing any of the wiring.

1. Insert the end opposite the handle into the base unit, noting that this end has a curved section that engages with the wiring base.
2. Rotate the terminal block into the wiring base until it locks itself into place.
3. If an I/O module is installed, snap the RTB handle into place on the module.

## Wire the Module

See the figure and tables for information about how to wire the module.

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**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.

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Module Status

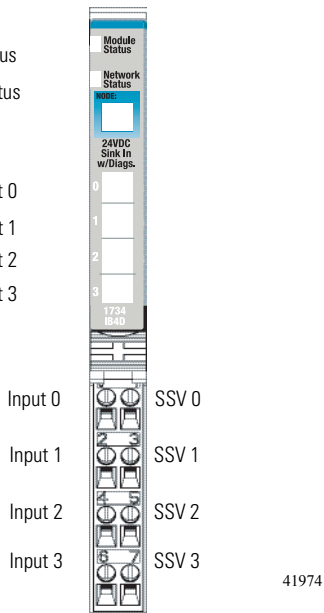
Network Status

Status - Input 0

Status - Input 1

Status - Input 2

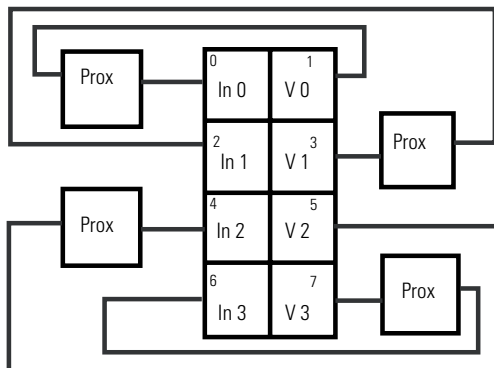
Status - Input 3



Note that voltage and current are daisy-chained from either the adapter, 1734-FPD module, or 1734-EP24DC module.

Common connections for three-wire devices require an external wiring connection. A 1734-CTM module can provide the common connection.



**Wiring****Sink Input**

V=10/28.8V dc

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If a common connection is required (three-wire devices), then a 1734-CTM common terminal module can be required.

Channel	Terminal Number		
	Input	Common	Voltage
0	0	External <sup>(1)</sup>	1
1	2		3
2	4		5
3	6		7

Connect common on three-wire proximity switches.  
10/28.8V dc is supplied through the internal power bus.

<sup>(1)</sup> Common connections require an external connection, such as a 1734-CTM module.

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## Configure the Module

Read this section for information about how to communicate with your module.

I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's or scanner's memory. This POINT I/O input module produces 1 or 2 bytes of input data based on which produced assembly is selected. The default setup is 2 bytes. It does not consume I/O data (scanner Tx).

### Default Data Map - Produced Assembly Instance 101

#### Message Size: 2 Bytes

	7	6	5	4	3	2	1	0
Produce 0 (Rx)	Fault 3	Fault 2	Fault 1	Fault 0	Input 3	Input 2	Input 1	Input 0
Produce 1 (Rx)	SC 3	SC 2	SC 1	SC 0	OW 3	OW 2	OW 1	OW 0
Consume (Tx)	No consumed data							

Where: OW = open wire, SC = short circuit, fault = open wire or short circuit.

### Data Map - Produced Assembly Instance 23

#### Message Size: 1 Byte

	7	6	5	4	3	2	1	0
Produce 0 (Rx)	Fault 3	Fault 2	Fault 1	Fault 0	Input 3	Input 2	Input 1	Input 0
Consume (Tx)	No consumed data							

Where: Fault = open wire or short circuit.

**Default Data Map - Configuration Assembly Instance 103****Message Size: 18 Bytes**

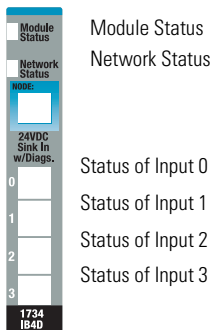
	7	6	5	4	3	2	1	0
Consume 0	Input 0 Off to On Filter Byte 0							
Consume 1	Input 0 Off to On Filter Byte 1							
Consume 2	Input 0 On to Off Filter Byte 0							
Consume 3	Input 0 On to Off Filter Byte 1							
Consume 4	Input 1 Off to On Filter Byte 0							
Consume 5	Input 1 Off to On Filter Byte 1							
Consume 6	Input 1 On to Off Filter Byte 0							
Consume 7	Input 1 On to Off Filter Byte 1							
Consume 8	Input 2 Off to On Filter Byte 0							
Consume 9	Input 2 Off to On Filter Byte 1							
Consume 10	Input 2 On to Off Filter Byte 0							
Consume 11	Input 2 On to Off Filter Byte 1							
Consume 12	Input 3 Off to On Filter Byte 0							
Consume 13	Input 3 Off to On Filter Byte 1							
Consume 14	Input 3 On to Off Filter Byte 0							
Consume 15	Input 3 On to Off Filter Byte 1							
Consume 16	Autobaud Disable				Enable OW3	Enable OW2	Enable OW1	Enable OW0
Consume 17	Produced Assembly Instance							
Produce (Tx)	No produced data							

Where: OW = open wire.

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## Interpret the LED Indicators

See the figure and table that show how to interpret LED indicators.



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**Interpret LED Indicators**

<b>Indication</b>	<b>Probable Cause</b>	<b>Recommended Action</b>
<b>Module Status</b>		
Off	No power applied to device.	Apply power to device.
Green	Device operating normally.	None.
Flashing Green	Device needs commissioning due to configuration missing, incomplete or incorrect.	Configure device properly.
Flashing Red	Recoverable fault.	1. Cycle power to device. 2. If condition persists, replace device.
Red	Unrecoverable fault may require device replacement.	Replace device.
Flashing Red/Green	Device is in self-test.	None.

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Indication	Probable Cause	Recommended Action
<b>Network Status</b>		
Off	Device is not online. - Device has not completed dup_MAC_id test. - Device not powered - check module status indicator	Apply power to device, wait for dup_MAC_id to complete, and correct, as needed.
Flashing Green	Device is on-line but has no connections in the established state.	None - device is in Idle or Program mode.
Green	Device on-line and has connections in the established state.	None.
Flashing Red	One or more I/O connections in timed-out state.	Check for I/O module failure, and correct, as needed.
Red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.	Verify that adapter and terminal bases are properly installed, and reinstall, as needed.
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.	Verify that adapter is properly installed, and reinstall, as needed.
<b>I/O Status</b>		
Off	Input is in the off state.	None.

Indication	Probable Cause	Recommended Action
Yellow	Input is in the on state.	None.
Red	Short circuit detected.	Check I/O wiring or terminal base.
Flashing Red	Open wire detected.	Check I/O wiring or terminal base.

## Remove a Mounting Base

To remove a mounting base, you must first remove any installed module and the module installed in the base to the right.

1. For a module with a two-piece terminal base, use these steps; otherwise, use step 2.
  - a. Remove the removable terminal block (RTB), if wired.
  - b. Unlatch the RTB handle on the I/O module.
  - c. Pull on the RTB handle to remove the RTB.
2. Press on the module lock on the top of the module.
3. Pull on the I/O module to remove from the base.
4. Repeat steps 1, 2, 3, and 4 for the module to the right.
5. Lift straight up to remove.

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## Specifications

### POINT I/O 24V dc 4-channel Digital Diagnostics Input Module - 1734-IB4D

Attribute	Value
Module Location	1734-TB, 1734-TBS, 1734-TOP, and 1734-TOPS bases
POINTBus Current	50 mA max @ 5V dc
Power Dissipation	0.6 W max @ 28.8V dc
Thermal Dissipation	1.9 BTU/hr max @ 28.8V dc
Isolation Voltage	50Vdc (continuous), Reinforced Insulation Type Tested at 1000 V dc for 60 s, field-side to system
Field Power Bus Supply Voltage Voltage Range	24V dc nom 10...28.8V dc
Dimensions HxWxL, approx.	56 x 12 x 75.5 mm 2.2 x 0.47 x 2.97 in.
Terminal Base Screw Torque	0.8 Nm (7 lb-in)
Keyswitch Position	1
Reverse Polarity Protection	Yes
On-state Voltage (Von), Min	11V dc
On-state Voltage (Von), Max	28.8V dc (Vmax)
On-state Current (Ion), Min	2.0 mA
On-state Current (Ion), Max	15.0 mA (Imax)
Off-state Voltage (Voff), Min	-3V dc
Off-state Voltage (Voff), Max	5V dc
Off-state Current (Ioff), Min	1.5 mA
Input Filter	Each input independently settable in 1 us intervals (rounded to nearest 333 us). Default value is 1000 us.
Off to On Filter, Min	0 us



**POINT I/O 24V dc 4-channel Digital Diagnostics Input Module - 1734-IB4D**

Attribute	Value
Off to On Filter, Max	65,535 us
On to Off Filter, Min	0 us
Off to On Filter, Max	65 535 us

**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...55 °C (-4...131 °F)
Temperature, storage	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
Shock Operating Nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock) 30 g peak acceleration 50 g peak acceleration
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
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 at 900 MHz 10V/m with 200 Hz 50% Pulse 100%AM at 1890 MHz 1V/m with 1 kHz sine-wave 80%AM from 2000...2700 MHz
EFT/B Immunity	IEC 61000-4-4: ±4 kV at 5 kHz on signal ports

## Environmental Specifications

Attribute	Value
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
Enclosure Type Rating	None (open-style)
North American Temp Code	T5
Wire Size	0.25... 2.5 mm <sup>2</sup> (22...14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max
Wire Category	1 - on signal ports <sup>(1)</sup>

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

## Certifications

Attribute	Value	
Certifications (when product is marked) <sup>(1)</sup>	C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
	C-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
	CE	European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2; Industrial Immunity EN 61326; 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)

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

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## 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 with a hardware module 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 module up and running.

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

## New Product Satisfaction Return

Rockwell 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, it may need to be returned.

United States	Contact your distributor. You must provide a Customer Support case number (see 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 return procedure.

[www.rockwellautomation.com](http://www.rockwellautomation.com)

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