

# *Installation Instructions*

## **FLEX Ex Terminal Base Units**

Catalog Numbers 1797-TB3 and 1797-TB3S

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### Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.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 we use notes to make you aware of safety considerations.

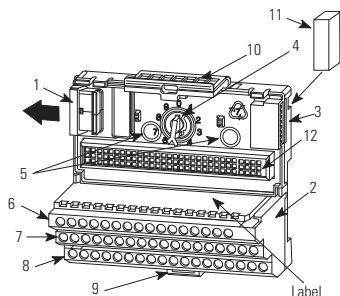
<b>WARNING</b> 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
<b>IMPORTANT</b>	Identifies information that is critical for successful application and understanding 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: <ul style="list-style-type: none"><li>• identify a hazard.</li><li>• avoid a hazard.</li><li>• recognize the consequence.</li></ul>
<b>SHOCK HAZARD</b> 	Labels may be located on or inside the equipment to alert people that dangerous voltage may be present.
<b>BURN HAZARD</b> 	Labels may be located on or inside the equipment to alert people that surfaces may be dangerous temperatures.

### Description

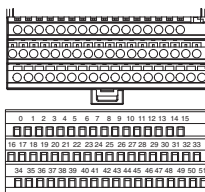
The 1797-TB3 and 1797-TB3S terminal bases have 36 wiring connections to and from a plug-in module. The use of each terminal depends on the module mounted in the base.

Both terminal bases are equipped with a factory-installed tab cover for the backplane bus connection. The tab cover may be removed only when the terminal base is connected to other terminal bases.

### 1797-TB3 Screw-cage Terminal Base

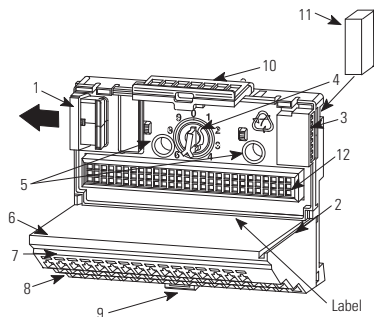


Only remove this cover plug if connecting another terminal base.

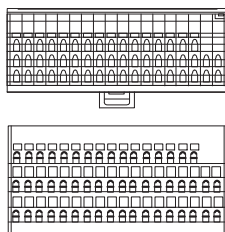


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### 1797-TB3S Spring-clamp Terminal Base



Only remove this cover plug if connecting another terminal base.



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#### Component Identification

<b>1</b>	Female flexbus connector	<b>6, 7,</b>	Input/output terminal strips for connecting input/output wiring, -V, +V connections
<b>2</b>	Terminal base unit	<b>8</b>	Locking tab
<b>3</b>	Male flexbus connector	<b>9</b>	Module locking latch
<b>4</b>	Keyswitch - Set to the position required for the installed module	<b>10</b>	Cover plug for male flexbus connector
<b>5</b>	Mounting holes for panel mounting	<b>11</b>	96-pin female I/O connector

**ATTENTION**

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.

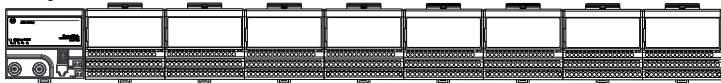
This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure 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.

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You will need to rotate the keyswitch (4) to the correct position depending on the I/O module. Refer to the I/O module's installation instructions for more information.

**Do not change the position of the keyswitch after wiring the terminal base.**

Make certain that you only connect terminal bases to other intrinsically safe system modules or adapters to maintain the integrity of the intrinsically-safe backplane.



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Do not remove the rightmost terminal base flexbus cover (11).

## Installation in Zone 1

The terminal bases must not be exposed to the environment. Provide a suitable metal enclosure. The terminal bases have a protection factor of IP20. Do not remove the flexbus cover on the rightmost terminal base.

**WARNING**


The terminal bases cannot be used in an intrinsically safe environment after having been exposed to nonintrinsically safe signals.

## Installation in Zone 22

When the terminal bases are installed in Zone 22, the following cabinets must be used: IVK-ISRPI-V16LC; IVK-ISRPI-V8HYW; or IVK-ISRPI-V8LC. These cabinets can be purchased from:

Pepperl+Fuchs GmbH  
 Lilienthalstrasse 200  
 68307 Mannheim, Germany  
 Attn: PA Sales Dept.  
 Kirsten Becker  
 Telephone +49 776 1298  
 www.pepperl-fuchs.com

The IS-RPI cabinets (type IVK2-ISRPI-V8LC, IVK2-ISRPI-V8HYW, or IVK2-ISRPI-V16LC) ensures the basic protection for the intrinsically safe apparatus of the FLEX Ex system for use in Zone 22. It corresponds with category 3D according to RL 94/9 EG and with the type label marked with the following information:

Pepperl+Fuchs GmbH  
 68307 Mannheim  
 IVK2-ISRPI-V8LC (or IVK2-ISRPI-V8HYW or  
 IVK2-ISRPI-V16LC)  
 Ⓔ II 3 D Ex tD A22 IP54 T70 °C  
 CE  
 Serial (manufacturing) number  
 Model

### Electrostatic Charge

Protect the system against electrostatic charge. Post a sign near this module:  
**WARNING Avoid electrostatic charging.**

**ADVERTÊNCIA! PREVENIR CONTRA O ACÚMULO DE CARGA ELETROSTÁTICA.**

For your convenience, a sign that can be cut out and posted is included in this installation instruction.

### European Community Directive Compliance

If these products have the CE mark they are approved for installation within the European Community or EEA regions. They have been designed and tested to meet the following directives.

#### EMC Directive

These products are tested to meet the Council Directive 2014/30/EU by applying the following standards:

- EN 61000-6-4:2007, Electromagnetic Compatibility (EMC) - Part 6-4: Generic Standard for Industrial Environments (Class A)
- EN 61000-6-2:2005, Electromagnetic Compatibility (EMC) - Part 6-2: Generic Standards - Immunity for Industrial Environments
- EN 61326-1:2013 (Industrial), Electrical Equipment For Measurement, Control, and Laboratory Use - Industrial EMC Requirements

### European Hazardous Location Approval

The following applies to products marked **CE** **Ex** II 2 G

- Are Equipment Group II, Equipment Category 2, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to Directive 2014/34/EU. See the EC Declaration of Conformity at <http://www.rockwellautomation.com/products/certification> for details.

- The type of protection is “Ex ia IIC T4 Gb” according to EN 60079-11.
- Comply to Standards EN 60079-0:2012, EN 60079-11:2012, reference certificate number DMT 98 ATEX E 012 U.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are likely to occur occasionally. Such locations correspond to Zone 1 or 2 classification according to ATEX directive 2014/34/EU.

### **IEC Hazardous Location Approval**

The following applies to products with the IECEx certification:

- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are likely to occur only infrequently and for short periods. Such locations correspond to Zone 1 or 2 classification to IEC 60079-0.
- The type of protection is “Ex ia IIC T4 Gb” according to IEC 60079-11.
- Comply to Standards IEC 60079-0:2011, IEC 60079-11:2011, reference IECEx certificate number IECEx BVS 08.0006X.

## Inputs and Outputs

**Do not apply any nonintrinsically safe signals to the terminal bases.**

When using as an intrinsically-safe electrical apparatus according to EN60079, the European directives and regulations must be followed.

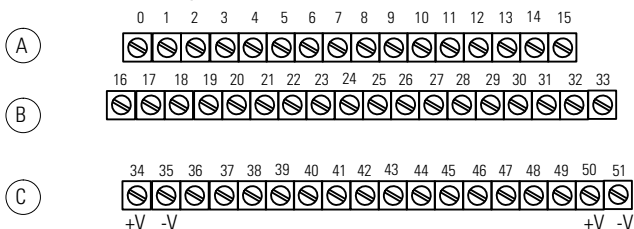
The terminals in the terminal base may be electrically connected to each other by the insertion of FLEX Ex I/O modules. See the I/O module installation instructions to determine this.

### IMPORTANT

When interconnecting several lines, you must consider the total accumulated power and check for intrinsic safety requirements.

## Wire the Terminal Base Units

### Wiring Connections for Terminal Base 1797-TB3



No connections allowed to terminals 36 and 49.

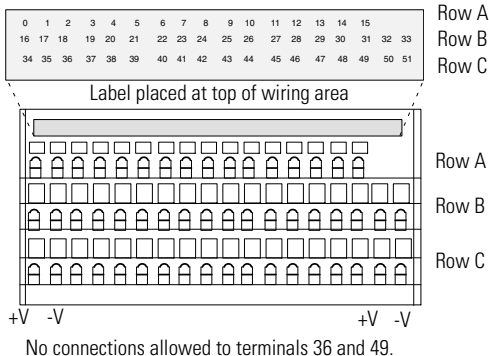
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### WARNING



Make certain that you power this terminal base unit with an intrinsically safe power supply. Do not exceed the values listed in the specifications for this terminal base unit.



**Wiring Connections for Terminal Base 1797-TB3S**

To connect wiring, insert a blade-type screwdriver with a blade width of 2.54-3.05 mm (0.100-0.120 in.) into the slot above the selected wiring port and lift up.

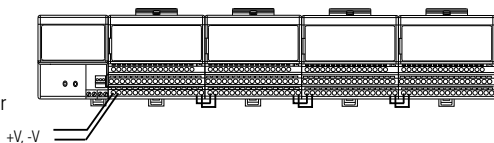
Insert the wire while holding the screwdriver up. Release the upward screwdriver pressure to secure the wire.

1. Make wiring connections as described in the installation instructions included with the specific module that mounts on your terminal base.

2. Connect +V and -V from the terminal base to the next using jumpers or individual external wiring, if appropriate due to total module power consumption.

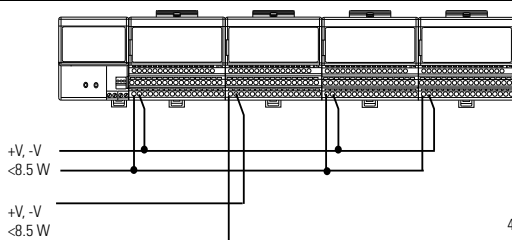
### Daisy-chaining

You can use the daisy chain configuration if the total module power draw is  $< 8.5$  W. Otherwise, power is connected to individual modules.



**Wiring when total module current power is less than 8.5 W.** 41110

### Combination



**Wiring when total module current power is greater than 8.5 W.**  
Other variations are possible depending upon individual module power.

### ATTENTION



Do not use any unused terminals on the terminal base. Using these them as supporting terminals can result in damage to the module and/or unintended operation of your system.

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## Mount on a DIN Rail

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**ATTENTION**

Do not remove or replace a terminal base when power is applied. Interruption of the flexbus connection can result in unintended operation or machine motion.

This product is grounded through the DIN rail to the dedicated intrinsic safety ground. Use zinc-plated yellow-chromated steel DIN rail to assure proper grounding. The use of other DIN rail materials (such as aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding.

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**WARNING**

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

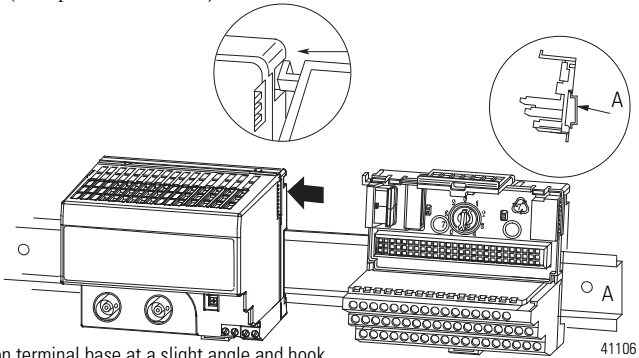
Be sure that power is removed or the area is nonhazardous before proceeding.

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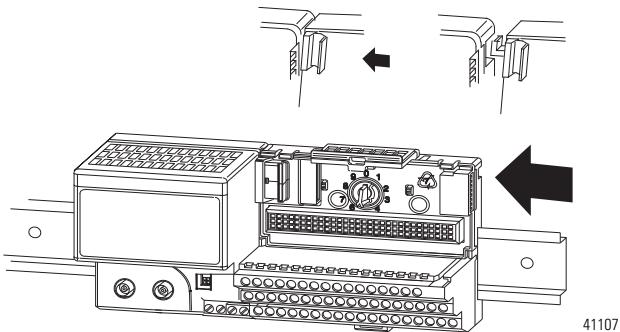
1. Remove the cover plug in the male connector of the unit to which you are connecting this terminal base unit.
2. Check to make sure that the 16 pins in the male connector on the adjacent device are straight and in line so that the mating female connector on this terminal base unit will mate correctly.
3. Make certain that the female flexbus connector is **fully retracted** into the base unit.

## 12 FLEX Ex Terminal Base Units

4. Position the terminal base over the 35 x 7.5 mm DIN rail A (A-B pt. no. 199-DR1).



Position terminal base at a slight angle and hook over the top of the DIN rail (A).



Slide the terminal base tight against the adapter (or preceding terminal base). Make sure the hook on the terminal base slides under the edge of the adapter (or preceding terminal base) and the flexbus connector is fully retracted.

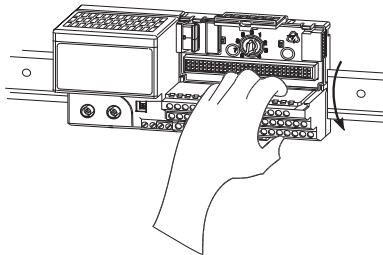
### ATTENTION



Do not force the terminal base into the adjacent modules. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

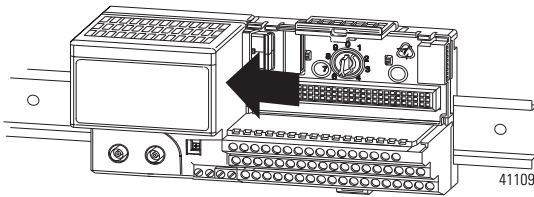
5. Rotate the terminal base onto the DIN rail with the top of the rail hooked under the lip on the rear of the terminal base.

**Use caution to make sure that the female flexbus connector does not strike any of the pins in the mating male connector.**



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Press down on the terminal base to lock it on the DIN rail. If the terminal base does not lock into place, use a screwdriver or similar device to open the locking tab, press down on the terminal base until flush with the DIN rail and release the locking tab to lock the base in place.

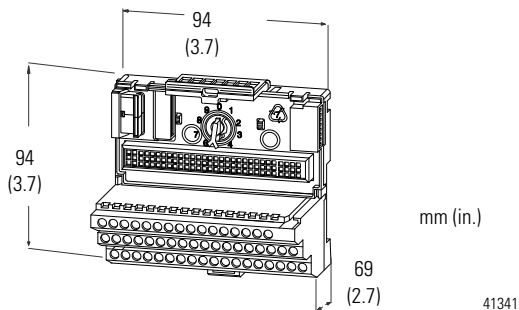


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**Gently** push the flexbus connector into the side of the adapter (or preceding terminal base) to complete the backplane connection.

6. For specific wiring information, refer to the installation instructions for the module you are installing in the terminal base.
7. Repeat the above steps to install the next terminal base.
8. Be sure the flexbus connector cover on the last terminal base is in place.

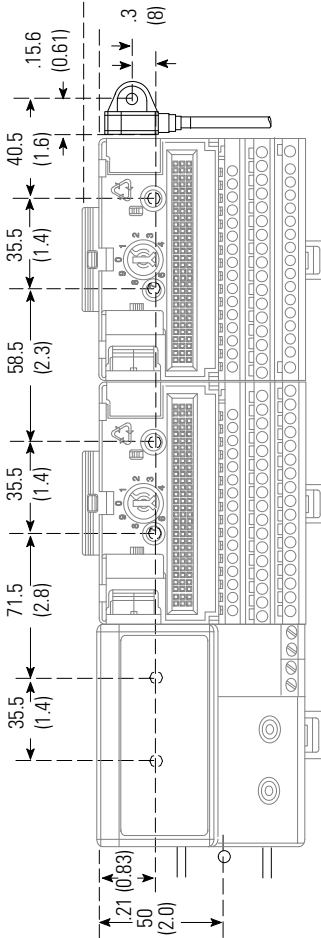
## Mounting Dimensions



**ATTENTION**

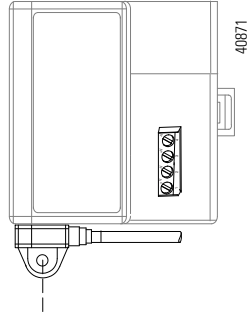


The DIN rail or mounting bracket must be appropriately connected to the dedicated intrinsic safety ground.



mm (In.)

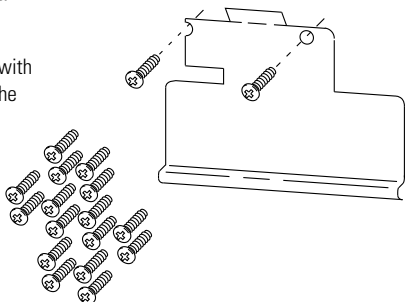
Cable length  
 approximately  
 292.1 (11.5) or  
 901.0 (35.5) from  
 upper connector  
 [length depends  
 upon cable  
 -0.3 m (1 ft) or  
 0.91 m (3 ft).



## About the Mounting Kit

Use the optional 1794-NM1 mounting kit to mount your system on a panel or wall without a DIN rail.

1794-NM1 Mounting Kit with 18 screws (2 screws for the adapter and 2 screws for each module).



30238

## Repair





The terminal bases are not field-repairable. Any attempt to open the terminal bases will void the warranty and the IS certification. If repair is necessary, return the module to the manufacturer.



### Specifications - 1797-TB3 and 1797-TB3S Terminal Base Units

Number of Terminals	1 row of 16, 2 rows of 18
1797-TB3 Terminal Screw Torque	0.8...1.0 Nm (7...9 lb-in)
1797-TB3S Terminal Type	Spring-clamp - To open, insert bladed screwdriver (2.54-3.05 mm/0.100-0.120 in.) and lift up.
Terminals Assignments <sup>1</sup> +34, -35, +50, -51, and 96 Pin Female I/O Connector Pins 30...32, 62...64, 94...96, 36, 49 All Other Terminals	Only for intrinsically safe circuits $U_i \leq 10V$ dc $I_i \leq 2.5$ A $C_i \leq 1$ nF $L_i$ Negligible Must not be used for any connection $U_i \leq 30V$ dc $I_i \leq 100$ mA $C_i \leq 1$ nF $L_i$ Negligible
Flexbus Connection Intrinsically Safe	$U_i \leq 10V$ dc $I_i \leq 400$ mA $C_i \leq 1$ nF $L_i$ Negligible
Isolation Voltage	Channel-to-channel isolation determined by inserted module
Weight	200 g (approximately)
Dimensions (With Module Installed in Base)	Metric Imperial
	3.7H x 3.7W x 2.7D mm (94H x 94W x 69D in.)
Environmental Conditions	
Operational Temperature	-20...70 °C (-4...158 °F)
Storage Temperature	-40...85 °C (-40...185 °F)
Relative Humidity	5...95% noncondensing
Shock Operating	Tested 15 g peak acceleration, 11 (±1) ms pulse width
Nonoperating	Tested 15 g peak acceleration, 11 (±1) ms pulse width
Vibration	Tested 2 g @ 10...500 Hz per IEC 68-2-6
Conductors	Wire Size
	4 mm <sup>2</sup> (12 gauge) stranded max 1.2 mm (3/64 in.) insulation max

**1797-TB3 and -TB3S Specifications Continued**

Agency Certification	
IECEX	Ex ia IIC T4 Gb
CENELEC	II 2G Ex ia IIC Gb T4
UL, C-UL	Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III Hazardous Locations. Class I, Zone 1, AEx ib[ia] IIC T4.
FM	Intrinsically safe Class I, Div 1, Groups A, B, C, D, T4. Associated Apparatus with intrinsically safe Connection Class I, II, III, Div 1, Groups A--G Intrinsically safe Class I, Zone 1, AEx ib[ia] IIC T4.
INMETRO	BR-Ex ia IIC T4
Certificates	
IECEX	BVS 08.0006X
CENELEC	DMT 98 ATEX E012 U 
UL, C-UL	UL File Numer E197983 c  us Class I Division 1 Hazardous
FM	FM Certificate Number 3009806 
INMETRO	05/UL-BRAE-0019U 

- 1 Termination connections are unique with each I/O module. Refer to the appropriate I/O module's installation instructions.

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## UL, C-UL Certification

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**IMPORTANT**

For detailed certification information, refer to the FLEX Ex System Certification Reference Manual, publication [1797-RM001](#).

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If these products have the UL/C-UL mark, they have been designed, evaluated, tested, and certified to meet the following standards:

- UL 913, 1988, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III Division 1, Hazardous (Classified) Locations
- UL 1203, Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
- UL 2279, Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations
- UL 61010, UL Standard for Safety Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements
- CSA C22.2 No. 157-92, Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
- CSA C22.2 No. 30-M1986, Explosion-Proof Enclosures for Use in Class I Hazardous Locations
- CSA-E79-0-95, Electrical Apparatus for Explosive Gas Atmospheres, Part 0: General Requirements
- CSA-E79-11-95, Electrical Apparatus for Explosive Gas Atmospheres, Part 11: Intrinsic Safety “i”
- CSA C22.2 No. 14-95, Industrial Control Equipment

## FM Certification

If these products have the FM mark, they have been designed, evaluated, tested, and certified to meet the following standards:

- FM C1. No.3600:1998, Electrical Equipment for Use in Hazardous (Classified) Locations General Requirements
- FM C1. No.3610:1999, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, III Division 1 Hazardous (Classified) Locations
- FM C1. No.3615:1989, Explosionproof Electrical Equipment General Requirements
- FM C1. No.3810:1989, 1995, Electrical and Electronic Test, Measuring and Process Control Equipment
- ANSI/NEMA 250, 1991, Enclosures for Electrical Equipment

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**IMPORTANT**

For detailed certification information, refer to the FLEX Ex System Certification Reference Manual, publication [1797-RM001](#).

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**WARNING Avoid electrostatic charging.**  
**ADVERTÊNCIA! PREVENIR CONTRA O ACÚMULO  
DE CARGA ELETROSTÁTICA.**

**Notes:**

## Notes:

**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 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	1.440.646.3434 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.

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Rockwell Automation maintains current product environmental information on its website at

<http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance-page>.

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

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