FLEX I/O Thermocouple/mV Input Module and RTD Input Module

Cat. Nos. 1794-IT8 and 1794-IR8

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

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.

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, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

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.

ATTENTION

FLEX I/O is grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (e.g. aluminum, plastic, etc.) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding.

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.

European Hazardous Location Approval

The following analog input modules are European Zone 2 approved: 1794-IR8 and 1794-IT8.

European Zone 2 Certification

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment 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. The examination and test results are recorded in confidential report No. 28 682 010.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021.

IMPORTANT

Observe the following additional Zone 2 certification requirements.

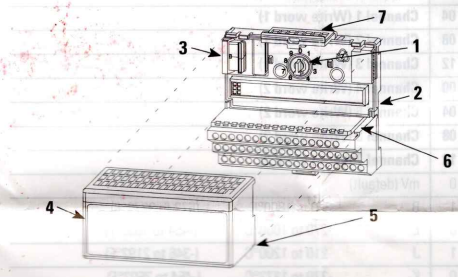
- This equipment is not resistant to sunlight or other sources of UV radiation.
- The secondary of a current transformer shall not be open-circuited when applied in Class I, Zone 2 environments.
- Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, 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 Class I, Zone 2 environments

North American Hazardous Location Approval

The following analog input modules are Hazardous Location approved: 1794-IR8 and 1794-IT8.

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.

Installing Your Thermocouple or RTD Input Module



ATTENTION

During mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the module. Debris that falls into the module could cause damage on power up.

The module mounts on a 1794 terminal base.

1. Rotate the keyswitch (1) on the terminal base (2) clockwise to position 3 as required for this type of module.
2. Make certain the flexbus connector (3) is pushed all the way to the left to connect with the neighboring terminal base/adapter. You cannot install the module unless the connector is fully extended.
3. Make sure the pins on the bottom of the module are straight so they will align properly with the connector in the terminal base.

WARNING

If you remove or insert the module while the 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.

4. Position the module (4) with its alignment bar (5) aligned with the groove (6) on the terminal base.
5. Press firmly and evenly to seat the module in the terminal base unit. The module is seated when the latching mechanism (7) is locked into the module.

Connecting Wiring for 1794-TB2, -TB3, -TB3S, -TB3T and -TB3TS Terminal Base Units

1. Connect individual high and low signal wiring to numbered terminals on the 0-15 row **(A)** as indicated in the table. Use Belden 8761 cable for mV signal wiring, or the appropriate thermocouple wire for your thermocouples. (For more accurate readings in mV mode, use the 1794-TB3T or -TB3TS terminal base unit.)

ATTENTION

The thermocouple/mV and RTD modules do not receive power from the backplane. +24V dc power must be applied to the modules. If power is not applied, the module position will appear to the adapter as an empty slot in your chassis.

ATTENTION

You must power this module from the same power supply that supplies the adapter module, so they both power up at the same time. You must cycle power for the adapter to recognize this module.

2. Connect individual channel signal returns to the associated terminal on row **(B)** as shown in the wiring table.
3. Connect individual channel shield returns to the associated terminal on row **(B)** for 1794-TB3 or -TB3S or row **(C)** for the 1794-TB3T or -TB3TS as shown in the wiring table..

IMPORTANT

Use the following Belden cables for connecting the RTD to the terminal base unit.

RTD Type	Length of Run/Humidity Level	Belden Cable Number
2-wire	Not applicable	9501
3-wire	Less than 100ft (30.5m) with normal humidity	9533
	Over 100ft (30.5m) or high humidity[1]	83503

1 Greater than 55% for more than 8 hours.

4. Connect +24V dc power to terminal 34 on the 34-51 row **(C)**.
5. Connect 24V dc common to terminal 16 on the 16-33 row **(B)**.

ATTENTION

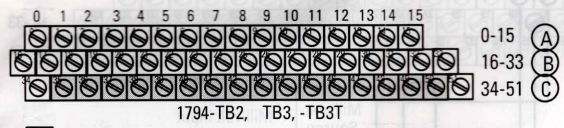
To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 9.8 ft (3m) for dc power cabling.

ATTENTION

Do not daisy chain power or ground from this terminal base unit **to any ac or dc digital module terminal base units.**

6. **1794-IT8 only:** On 1794-TB3T or -TB3TS terminal base units, connect cold junction compensation (CJC) wiring to terminals 36, 37 and 38 for inputs 0-3, and terminals 47, 48 and 49 for inputs 4-7. Connect the tail of the CJC to any of the associated thermocouple input terminals: 0 thru 7 for CJC connected to terminals 36, 37 and 38; or 8 thru 15 for CJC connected to terminals 47, 48 and 49.
   The tail of the CJC shares a terminal with an input.
7. If daisychaining power to the next terminal base, connect a jumper from terminal 51 (+V dc) on this base unit to the +V terminal on the next base unit.
8. If continuing dc common to the next base unit, connect a jumper from terminal 33 (common) on this base unit to the COM (return) terminal on the next base unit.

Wiring Connections for the Thermocouple/RTD Module



RTD or mV Channel	1794-TB2, -TB3 and -TB3S Terminal Base Units			
	High Signal Terminal (H) or (+)	Low Signal Terminal (L) or (-)	Signal Return[1] (-IR8 only)	Shield Return
0	A-0	A-1	B-17	B-18
1	A-2	A-3	B-19	B-20
2	A-4	A-5	B-21	B-22
3	A-6	A-7	B-23	B-24
4	A-8	A-9	B-25	B-26
5	A-10	A-11	B-27	B-28
6	A-12	A-13	B-29	B-30
7	A-14	A-15	B-31	B-32
24V dc Common	B-16 thru 33			
+24V dc Power	-TB3, -TB3S (C-34 thru C-51); -TB2 (C-34 & C-51)			

1 When using a 2-wire RTD, jumper the signal return to the low signal terminal.

RTD, mV or Thermocouple[1] Channel	1794-TB3T and -TB3TS Terminal Base Units			
	High Signal Terminal (H) or (+)	Low Signal Terminal (L) or (-)	Signal Return (-IR8 only)	Shield Return[2]
0	A-0	A-1	B-17	C-39
1	A-2	A-3	B-19	C-40
2	A-4	A-5	B-21	C-41
3	A-6	A-7	B-23	C-42
4	A-8	A-9	B-25	C-43
5	A-10	A-11	B-27	C-44
6	A-12	A-13	B-29	C-45
7	A-14	A-15	B-31	C-46

1 Terminals 36, 37 and 38 and 47, 48 and 49 are for cold junction compensation **only**, (with 38 and 47 chassis GND).
2 Terminals 39 to 46 are chassis ground.