



Installation Instructions

FLEX I/O Thermocouple/RTD Input Analog Module

Cat. No. 1794-IRT8/B, 1794-IRT8K/B and 1794-IRT8XT/B

(Modules with a K in the last position of the catalog number are conformally coated to meet noxious gas requirements of ISA/ANSI-71.040 1985 Class G3 Environment.)

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 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 consequence



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 (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.

WARNING

If 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

This product 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 (for example, aluminum or 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 (7.8 in.) and use end-anchors appropriately.



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

Prevent 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:



- 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.

ATTENTION

Personnel responsible for the application of safety-related Programmable Electronic Systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in using the system.



ATTENTION

Do not remove or replace a Terminal Base unit while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.



ATTENTION

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



European Hazardous Location Approval

European Zone 2 Certification (The following applies when the product bears the Ex or EEx Marking)

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.
 - 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.
<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 I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Series A/Series B Differences

When In	1794-IRT8 Series A	1794-IRT8, -IRT8XT Series B
Isolation	Between user side and system side	Between user 24V dc and user I/O; Between user side and system side
Common Mode Range	±4V DC	±15V DC
Thermocouple Mode Wire-off Detection	When an open sensor is detected, data defaults to maximum value	When open sensor is detected, data defaults to minimum value

ATTENTION



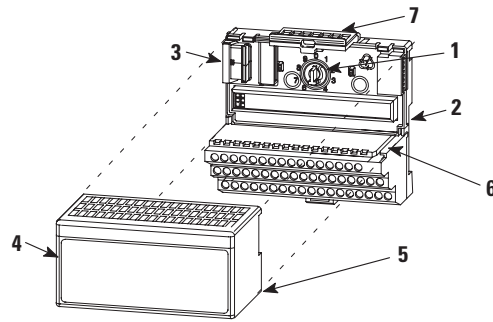
To simulate series A module wire-off detection behavior using a series B module, connect a wire between terminals 39 and 48 on the 1794-TB3G or 1794-TB3GS terminal base unit. If not connected, the Series B module will default to Series B functionality.

ATTENTION



In RSLogix 5000, if using a series B product to replace a series A product, the module will be accepted without an electronic keying mismatch warning. This is true for 1794-IRT8 and 1794-IRT8XT modules installed on Ethernet/IP, ControlNet, DeviceNet, or Remote I/O networks.

Install Your TC/RTD Input Module



ATTENTION



During mounting of all devices, be sure that all debris (for example, metal chips or wire strands) 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-TB3G or 1794-TB3GS 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/adaptor. **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.

Connect Wiring for the 1794-TB3G, 1794-TB3GK and 1794-TB3GS Terminal Base

1. Connect individual input wiring and associated signal returns to numbered terminals on the 0...15 row (A) and the 16...33 row (B) as indicated in the table. Use Belden 8761 cable for mV signal wiring, or the appropriate thermocouple wire for your thermocouples.
2. Signal wiring shields can be connected to terminals 16 or 33 on row (B) or terminals 40...45 on row (C).
3. Connect the +V DC power lead to terminal 34 on the 34...51 row (C).
4. Connect the -V DC common (return-) to terminal 35 on the 34...51 row (C).

ATTENTION



Do not daisy-chain power or ground from this terminal base unit to any AC or DC digital module terminal base units.

5. If daisy-chaining power to the next terminal base unit, connect a jumper from terminal 50 (+V DC) on this base unit to +V terminal on the next terminal base unit. Connect a jumper from terminal 51 (-V DC common) to the -V DC common terminal on the next terminal base unit.
6. If using cold junction compensators, make these connections as shown in the CJC Sensor chart below.

Identify RTD Wire Pairs

If the RTD wires are color-coded, the wires that are the same color are connected together. If the wires are not color-coded, use an ohmmeter to determine the pairs as explained below.

How to Connect a 4-wire RTD

If the 4-wire RTD wires are all different colors, use an ohmmeter to determine which leads are connected together. One of the leads in each pair is the compensation lead. Either lead of the pair can be the compensation lead. Attach one pair to terminals L and - and the other pair to + and H.

How to Connect a 3-wire RTD

If the 3-wire RTD wires are all different colors, use an ohmmeter to determine which leads are connected together. Either lead of the pair can be the compensation lead. Attach one lead of the pair to terminal L and the other to +. Attach the single lead to -.

Wire Connections for the Thermocouple/RTD Module

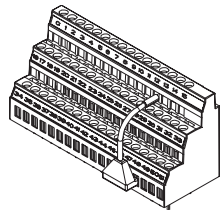
Wire Number	Type of Input	Connect The Following				
		H	L	+	-	Shield ¹
RTD 1	RTD - 2-wire			1	2	
2-wire 2	RTD - 3-wire		3	1	2	
1 3-wire 3	RTD - 4-wire	1a	2a	1	2	
2	Thermocouple		1		2	
1 1a 2a 4-wire 2	Millivolt		1		2	

¹ Shield can be connected to chassis ground terminals 16, 33, and 40...45.

Numbers 1, 1a, 2, 2a, and 3 are wire numbers of the sensor used. For terminal numbers corresponding to H, L, +, -, refer to Terminal Base Unit Wiring Connections below.

Input	CJC Sensor			
	+	Chassis Ground	-	CJC Tail ⁽¹⁾
CJC1	C-37	C-38	C-39	A-5 (B-22)
CJC2	C-46	C-47	C-48	A-12 (B-29)

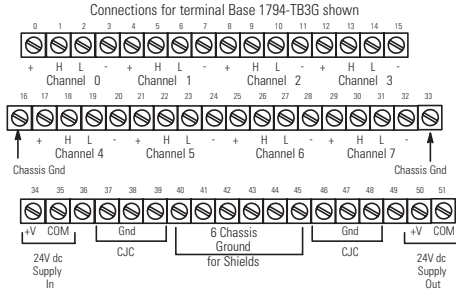
¹ Terminals 37, 38, and 39, and 46, 47, and 48 are for cold junction compensation (with 38 and 47 chassis GND). Connect the tail of CJC1 to terminal 5 and CJC2 to terminal 12 if channels 0...3 or 0...7 are configured for thermocouples. Connect the tail of CJC1 to terminal 22 and CJC2 to 29 if channels 4...7 are configured for thermocouples.



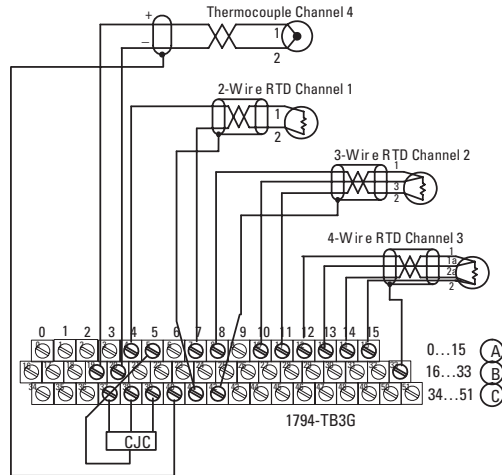
Terminal Base Unit Wiring Connections

RTD or TC Channel	1794-TB3G, 1794-TB3GK, and 1794-TB3GS Terminal Base Units			
	High Signal Terminal (H)	Low Signal Terminal (L)	RTD Source Current (+)	Signal Return (-)
0	A-1	A-2	A-0	A-3
1	A-5	A-6	A-4	A-7
2	A-9	A-10	A-8	A-11
3	A-13	A-14	A-12	A-15
4	B-18	B-19	B-17	B-20
5	B-22	B-23	B-21	B-24
6	B-26	B-27	B-25	B-28
7	B-30	B-31	B-29	B-32

¹ Terminals 16, 33, and 40...45 are chassis ground.

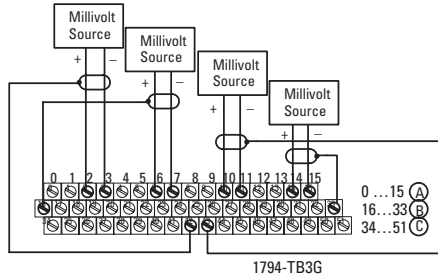


Example of RTD and Thermocouple Wiring to a 1794-TB3G Terminal Base Unit



Attention: Keep exposed area of inner conductor as short as possible.

Example of Millivolt Wiring to a 1794-TB3G Terminal Base Unit



Attention: Keep exposed area of inner conductor as short as possible.

Block Transfer Read and Write

The following block transfer read and write word bit information is presented for experienced users only. Refer to the user manual, publication 1794-UM012, for complete information on programming and configuring your module.

Input Map (Read)

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Oct.	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
Word 0	Channel 0 Input Data															
Word 1	Channel 1 Input Data															
Word 2	Channel 2 Input Data															
Word 3	Channel 3 Input Data															
Word 4	Channel 4 Input Data															
Word 5	Channel 5 Input Data															
Word 6	Channel 6 Input Data															
Word 7	Channel 7 Input Data															
Word 8	Overrange Alarm Bits (channel 0 = bit 8, etc.)								Underrange Alarm Bits (channel 0 = bit 0, etc.)							

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Oct.	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
Word 9	Ch 7 Flt	Ch 6 Flt	Ch 5 Flt	Ch 4 Flt	Ch 3 Flt	Ch 2 Flt	Ch 1 Flt	Ch 0 Flt	07	06	CJC2 Alm	SAB Alm	CJC Status	Reserved		
Word 10	Command Response									Response Data						
Where: SAB = Series of unit; 0 = Series A, 1 = Series B Alm = Alarm Flt = Fault																

Output Map (Write)

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
Oct.	17	16	15	14	13	12	11	10	07	06	05	04 <td>03</td> <td>02</td> <td>01</td> <td>00</td>	03	02	01	00	
Word 0	Reserved				Data Format				Flt Mod e Ch 4-7	Flt Mod e Ch 0-3	Reference Jct.			Filter Cutoff			
Word 1	TC/RTD Ch 4-7		Sensor Mode Ch 4-7		Sensor Type Ch 4-7		TC/RTD Ch 0-3		Sensor Mode Ch 0-3		Sensor Type Ch 0-3						
Word 2	RTD Offset Ch 7		RTD Offset Ch 6		RTD Offset Ch 5		RTD Offset Ch 4		RTD Offset Ch 3		RTD Offset Ch 2		RTD Offset Ch 1		RTD Offset Ch 0		
Word 3	Command									Command Data							

Data Format for All Channels - Write Word 0

Bit	11	10	09	08	
0	0	0	0	0	°C (implied decimal point XXXX.X)
0	0	0	0	1	°F (implied decimal point XXXX.X)
0	0	0	1	0	°K (implied decimal point XXXX.X)
0	0	1	1	1	-32767...+32767
0	1	0	0	0	0...65535

0101 thru 1111 not used

Module defaults to -4000...10000 in millivolt mode, and 0...5000 in ohms mode with implied decimal points (for example, -40 mV, 0.01 Ω) whenever °C, °F or °K is selected.

Fault Mode - Write Word 0

Bit	06	07
	06	Fault enable for channels 0...3
	07	Fault enable for channels 4...7
		0 = Disabled 1 = Enabled

Reference Junction Selection - Write Word 0

Bits 3-5	Reference Junction - used when sensor select is set to thermocouple and sensor mode is set to internal compensation. Sets a fixed reference junction to compensate all thermocouple channels.			
Bit	05	04	03	Reference Junction
0	0	0	0	0 °C (32 °F)
0	0	0	1	20 °C (68 °F)
0	1	0	0	25 °C (77 °F)
0	1	1	1	30 °C (86 °F)
1	0	0	0	40 °C (104 °F)
1	0	1	1	50 °C (122 °F)
1	1	0	0	60 °C (140 °F)
1	1	1	1	70 °C (158 °F)

Add-on Filter Selections - Write Word 0

Bit	02	01	00	Filter Time Constants - Actual filtering depends on the module's mode of operation.
0	0	0	0	Hardware filtering only (default filtering)
0	0	1	0	25 ms
0	1	0	0	100 ms
0	1	1	1	250 ms
1	0	0	0	500 ms
1	0	1	1	1 s
1	1	0	0	2 s
1	1	1	1	5 s

Sensor Mode Select - Write Word 1

Bit	05	04	Sensor mode for channels 0...3
Bit	13	12	Sensor mode for channels 4...7
Thermocouple			
0	0	0	External compensation - uses cold junction sensors (Both CJC sensors must be used when external compensation is selected.)
0	1	1	Internal compensation - uses the value selected for "reference junction selection"
1	0	0	No compensation (Data is referenced to 0 °C.)
1	1	1	Differential measurement between 2 channels (0-1, 2-3, 4-5, 6-7)
RTD			
0	0	0	2-wire RTD no compensation
0	1	1	2-wire RTD with user selected compensation
1	0	0	3-wire RTD
1	1	1	4-wire RTD

TC/RTD Input Type Selection - Write Word 1

Bit	07	06	Input type for channels 0...3
Bit	15	14	Input type for channels 4...7
0	0	0	Thermocouple
0	1	1	RTD
1	0	0	Not used
1	1	1	Not used

Sensor Type Select - Write Word 1

RTD Type					
Bit	03	02	01	00	Sensor type for channels 0...3
Bit	11	10	09	08	Sensor type for channels 4...7
0	0	0	0	0	Resistance (default)
0	0	0	1	1	100 Ω Pt α = 0.00385 Euro -200...+870 °C(-328...+1598 °F)
0	0	1	0	0	200 Ω Pt α = 0.00385 Euro -200...+400 °C(-328...+752 °F)
0	0	1	1	1	100 Ω Pt α = 0.003916 U.S. -200...+630 °C(-328...+1166 °F)
0	1	0	0	0	200 Ω Pt α = 0.003916 U.S. -200...+400 °C(-328...+752 °F)
0	1	0	1	1	100 Ω Nickel -60...+250 °C(-76...+482 °F)
0	1	1	0	0	200 Ω Nickel -60...+200 °C(-76...+362 °F)
0	1	1	1	1	120 Ω Nickel -80...+320 °C(-112...+608 °F)
1	0	0	0	0	10 Ω Copper -200...+260 °C(-328...+470 °F)

1001 thru 1111 not used

Thermocouple Type

Bit	03	02	01	00	Sensor type for channels 0...3
Bit	11	10	09	08	Sensor type for channels 4...7
0	0	0	0	0	mV (default)
0	0	0	1	B	300...1800 °C (572...3272 °F)
0	0	1	0	E	-270...1000 °C (-454...1832 °F)
0	0	1	1	J	-210...1200 °C (-346...2192 °F)
0	1	0	0	K	-270...1372 °C (-454...2502 °F)
0	1	0	1	TXK/XK(L)	-200...800 °C (-328...1472 °F)
0	1	1	0	N	-270...1300 °C (-450...2372 °F)
0	1	1	1	R	-50...1768 °C (-58...3214 °F)
1	0	0	0	S	-50...1768 °C (-58...3214 °F)
1	0	0	1	T	-270...400 °C (-454...752 °F)

1010 thru 1111 not used

RTD Offset Select - Write Word 2

Bit	01	00	RTD Offset Select Bits - Channel 0
Bit	03	02	RTD Offset Select Bits - Channel 1
Bit	05	04	RTD Offset Select Bits - Channel 2
Bit	07	06	RTD Offset Select Bits - Channel 3
Bit	09	08	RTD Offset Select Bits - Channel 4
Bit	11	10	RTD Offset Select Bits - Channel 5
Bit	13	12	RTD Offset Select Bits - Channel 6
Bit	15	14	RTD Offset Select Bits - Channel 7
0	0	0	Use channel loop compensation value stored during calibration procedure for 2-wire RTD (default = 0 Ω) - 15 Ω max (Note: Functional up to RTD = 484 Ω max with total lead resistance = 15 Ω.
0	1	1	5 Ω (total lead resistance)
1	0	0	10 Ω (total lead resistance)
1	1	1	15 Ω (total lead resistance)

Specifications

Specifications - 24V dc Analog Module, Cat. No. 1794-IRT8, -IRT8K, IRT8XT	
Number of inputs	8 channels (2 groups of 4)
Module Location	Cat. No. 1794-TB3G, 1794-TB3GS, 1794-TB3GK Terminal Base Units
Nominal input voltage ranges	-40...100 mV dc for thermocouples 0...325 mV for RTDs
	mV (default)
Supported thermocouple types	Type Range °C Range °F B 300...1800 °C (572...3272 °F) E -270...1000 °C (-454...1832 °F) J -210...1200 °C (-346...2192 °F) K -270...1372 °C (-454...2502 °F) TXK/XK(L)-200...800 °C (-328...1472 °F) N -270...1300 °C (-454...2372 °F) R -50...1768 °C (-58...3214 °F) S -50...1768 °C (-58...3214 °F) T -270...400 °C (-454...752 °F)
Supported RTD types	Resistance 100 Ω Pt α = 0.00385 Euro -200...870 °C(-328...1598 °F) 200 Ω Pt α = 0.00385 Euro -200...400 °C(-328...752 °F) 100 Ω Pt α = 0.003916 U.S. -200...630 °C(-328...1166 °F) 100 Ω Pt α = 0.003916 U.S. -200...400 °C(-328...752 °F) 100 Ω Nickel -60...250 °C(-76...482 °F) 200 Ω Nickel -60...200 °C(-76...362 °F) 120 Ω Nickel -80...320 °C(-112...608 °F) 10 Ω Copper -200...260 °C(-328...470 °F)
Resolution	14 bits

Accuracy vs. filter cutoff	0.05% of full range in millivolt mode with filtering selected Hardware only = 0.10% of full range in millivolt mode
Data format	°C (implied decimal point XXX.X) °F (implied decimal point XXX.X) °K (implied decimal point XXX.X) -32767...32767 0...65535 0...5000 (ohms mode) (implied decimal point XXX.X) -4000...+10000 (millivolt mode) (implied decimal point XXX.XX)
Common mode rejection	-80 db @ 5V peak-to-peak, 50...60 Hz
Common mode input range	±15V min
Isolation voltage (continuous voltage withstand rating)	50V (continuous), Basic Insulation Type Type tested at 1365V AC for 60 s, between field side and system No isolation between individual channels*
System throughput (8 channels scanned) - Add 0.5 ms if filtering is selected	Typical module timing is shown here. 7.4 ms - millivolt 8.0 ms - Ω - 2-wire RTD 10.0 ms - Ω - 3-wire RTD 10.4 ms - Ω - 4-wire RTD 8.0 ms - 2-wire RTD (°F) 10.4 ms - 4-wire RTD (°F) 8.8 ms - 2-wire RTD (°C), (°K) 10.8 ms - 4-wire RTD (°C), (°K) 9.8 ms - 3-wire RTD (°F) 10.0 ms - 3-wire RTD (°C), (°K) 9.0 ms - Thermocouples (°F) 9.4 ms - Thermocouples (°C), (°K)
Open circuit protection	RTD mode - Open input - Module defaults to max value TC mode - Open input - Module defaults to min value To simulate wire-off detection in Series A TC mode when using a Series B module, attach a jumper from terminal 39 to terminal 48 on the 1794-TB3G, 1794-TB3GS, or 1794-TB3GK terminal base unit so that an open input will default to max value.
Open input detection time	Immediate detection (max 2 scans)
Overvoltage capability	15V DC continuous at 25 °C
Overall drift with temperature	50 ppm/°C of span (max)
Cold junction compensation Range	-20...100 °C
Cold junction compensator	A-B catalog number 1794-CJC2
Indicators	1 green power status indicator 8 red open input indicators
Flexbus current	40 mA
Power dissipation	3.0 W max @ 31.2V DC
Thermal dissipation	Max 10.2 BTU/hr @ 31.2V DC
Keyswitch position	3

General Specifications

External DC power supply voltage	
Voltage range	24V DC nom 19.2...31.2V DC (includes 5% AC ripple)
Supply current	95 mA @ 24V DC
	ATTENTION: To comply with the CE Low Voltage Directive (LVD), all connections to this equipment must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).
Dimensions (with module installed in base) HxWxD approx.	94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.)
Temperature code, IEC	T4
Temperature code, North American	T4A
Enclosure type rating	None (open-style)
Wire size	Determined by installed terminal base
Signal conductors	
Thermocouple	Use appropriate shielded thermocouple wire ⁽³⁾
Millivolt	Belden 8761
Wire type	Shielded on signal ports
Wiring category ⁽¹⁾	2 - on signal ports 3 - on power ports
Terminal screw torque for cage-clamp terminal base	Determined by installed terminal base

Environmental Specifications

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) (1794-IRT8, 1794-IRT8K) -20...70 °C (-4...158 °F) (1794-IRT8XT)
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Temperature, non-operating	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40...85 °C (-40...185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock operating nonoperating	IEC60068-2-27 (Test Ea, Unpackaged shock): 30 g 50 g
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
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 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on shielded signal ports
Surge transient immunity	IEC 61000-4-5: ±2 kV line-earth(CM) on shielded signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz on shielded signal ports

Certifications (when product is marked)⁽²⁾

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 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
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T4 X) EN 60079-0; General Requirements (Zone 2)
TUV	TUV Certified for Functional Safety: up to and including SIL 2

⁽¹⁾ Use this category information for planning conductor routing as described in Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

⁽²⁾ See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

⁽³⁾ Refer to the thermocouple manufacturer for proper thermocouple extension.

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