FLEX I/O Thermocouple Input Analog Module and RTD Module
Cat. No. 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.

Reproduction of the contents of this copyrighted publication, in whole or part, without written permission of Rockwell Automation, is prohibited.

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.

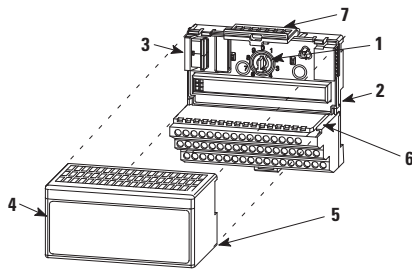| IMPORTANT	Observe the following additional Zone 2 certification requirements.

- 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

0-15 (A)
16-33 (B)
34-51 (C)

1794-TB2, TB3, -TB3T

☐ Shaded terminals not included on 1794-TB2 terminal base unit.
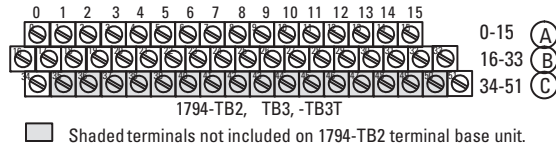
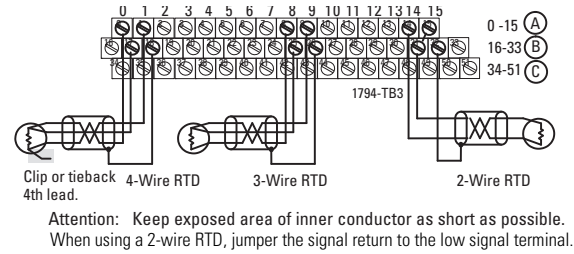| RTD or mV Channel	1794-TB2, -TB3 and -TB3S Terminal Base Units			
	High Signal Terminal (H) or (+)	Low Signal Terminal (L) or (-)	Signal Return[1] (-IR8 only)	Shield Return
0	A-0	A-1	B-17	B-18
1	A-2	A-3	B-19	B-20
2	A-4	A-5	B-21	B-22
3	A-6	A-7	B-23	B-24
4	A-8	A-9	B-25	B-26
5	A-10	A-11	B-27	B-28
6	A-12	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.

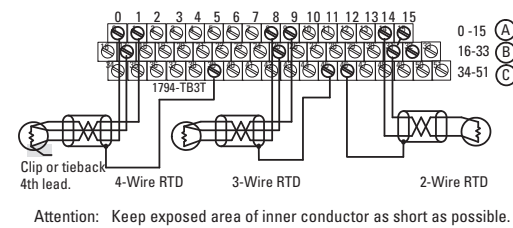| RTD, mV or Thermocouple[1] Channel	1794-TB3T and -TB3TS Terminal Base Units			
	High Signal Terminal (H) or (+)	Low Signal Terminal (L) or (-)	Signal Return (-IR8 only)	Shield Return[2]
0	A-0	A-1	B-17	C-39
1	A-2	A-3	B-19	C-40
2	A-4	A-5	B-21	C-41
3	A-6	A-7	B-23	C-42
4	A-8	A-9	B-25	C-43
5	A-10	A-11	B-27	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).
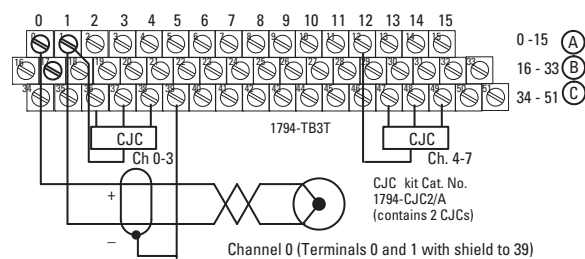2 Terminals 39 to 46 are chassis ground.

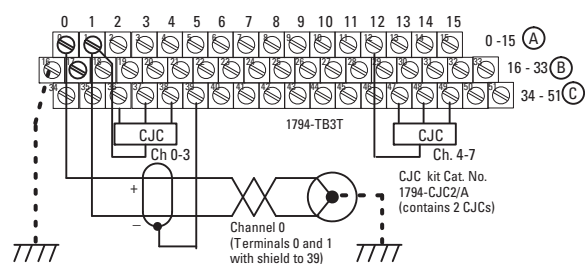## Example of 2, 3 and 4-wire RTD Wiring to a 1794-TB3 Terminal Base Unit

0 -15 (A)
16-33 (B)
34-51 (C)

1794-TB3

Clip or tieback 4th lead.   4-Wire RTD   3-Wire RTD   2-Wire RTD

Attention: Keep exposed area of inner conductor as short as possible. When using a 2-wire RTD, jumper the signal return to the low signal terminal.

Example of 2, 3 and 4-wire RTD Wiring to a 1794-TB3T Terminal Base Unit

0 -15 (A)
16-33 (B)
34-51 (C)

1794-TB3T

Clip or tieback 4th lead.   4-Wire RTD   3-Wire RTD   2-Wire RTD

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

Example of Thermocouple Wiring to a 1794-TB3T Terminal Base Unit

0 -15 (A)
16 - 33 (B)
34 - 51 (C)

1794-TB3T

CJC Ch 0-3

CJC Ch. 4-7

CJC kit Cat. No. 1794-CJC2/A (contains 2 CJCs)

Channel 0 (Terminals 0 and 1 with shield to 39)

Example of Grounded Thermocouple Wiring to a 1794-TB3T Terminal Base Unit

0 -15 (A)
16 - 33 (B)
34 - 51 (C)

1794-TB3T

CJC Ch 0-3

CJC Ch. 4-7

CJC kit Cat. No. 1794-CJC2/A (contains 2 CJCs)

Channel 0 (Terminals 0 and 1 with shield to 39)

When using grounded thermocouples, and the error is off the same amount on each thermocouple, connect terminal 16 to ground, and connect the thermocouple ground to the same ground,

Example of Millivolt Wiring to a 1794-TB3, -TB3S or -TB3T Terminal Base Unit

0 –15
16–33
34–51

1794-TB3 shown

Millivolt Source

Millivolt input Channel 1

Channel 0 (T erminals 0, 1 and 17)

For more accurate readings, use the 1794-TB3T for mV measurement.
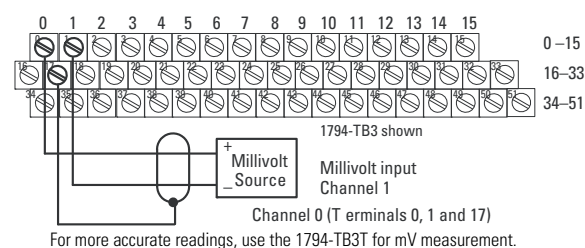
Block Transfer Read and Write

The following block transfer read and write word bit information is presented for experienced users only. Refer to the user manuals (publication 1794-UM004 for the RTD or 1794-UM007 for TC/mV) for these products for complete information on programming and configuring your modules.

Input Map (Read) for 1794-IR8 and 1794-IT8

Dec.	15	14	13	12	11	10	9	0	7	6	5	4	3	2	1	0
Oct.	17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
Word 0	Reserved															
1	Channel 0 Input Data															
2	Channel 1 Input Data															
3	Channel 2 Input Data															
4	Channel 3 Input Data															
5	Channel 4 Input Data															
6	Channel 5 Input Data															
7	Channel 6 Input Data															
8	Channel 7 Input Data															
9	Overrange Alarm Bits (channel 0 = bit 8, etc.)								Underrange Alarm Bits (channel 0 = bit 0, etc.							
10 (-IT8)	0	0	0	0	0	Bad Cal	Cal Done	Cal Rng	0	Diag. Status Bits		Pwr Up	Bad Struct	CJC Over	CJC Under	
10 (-IR8)	0	0	0	0	0	Bad Cal	Cal Done	Cal Rng	RI UP	Critical Error Bits		Pwr Up	Res.	0	0	

Temperature and resistance data is returned with an implied decimal point. For example, a temperature data of 1779 is 177.9°. Resistance data of 2034 is 203.4Ω. mV data is returned with an implied decimal point of 2 decimal points. for example, 7500 is 75mV.

Output Map (Write) for 1794-IR8 and 1794-IT8

Dec.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Oct.	17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
IT8 Word 0	8-Bit Calibration Mask								Cal Clk	Cal Hi/ Lo	Filter Cutoff		FDF		MDT	
IR8 Word 0	8-Bit Calibration Mask								Cal Clk	Cal Hi/ Lo	Filter Cutoff		Enh		MDT	
Word 1	Thermocouple or RTD Type Ch 3				Thermocouple or RTD Type Ch 2				Thermocouple or RTD Type Ch 1				Thermocouple or RTD Type Ch 0			
Word 2	Thermocouple or RTD Type Ch 7				Thermocouple or RTD Type Ch 6				Thermocouple or RTD Type Ch 5				Thermocouple or RTD Type Ch 4			
Word 3	Reserved															

Where: FDF = Fixed digital filter (TC only)
Enh = Enhanced mode (RTD only)
MDT = Module Data Type

Data Format for All Channels - Write Word 0

Bit	01	00	
	0	0	°C
	0	1	°F
	1	0	Bipolar counts scaled between -32767 to +32767
	1	1	Unipolar counts scaled between 0 and 65535
0101 thru 1111 not used			

RTD Type - Write Word 1 and 2

RTD Type					
Bit	03	02	01	00	**Channel 0 (Write word 1)**
Bit	07	06	05	04	**Channel 1 (Write word 1)**
Bit	11	10	09	08	**Channel 2 (Write word 1)**
Bit	15	14	13	12	**Channel 3 (Write word 1)**
Bit	03	02	01	00	**Channel 4 (Write word 2)**
Bit	07	06	05	04	**Channel 5 (Write word 2)**
Bit	11	10	09	08	**Channel 6 (Write word 2)**
Bit	15	14	13	12	**Channel 7 (Write word 2)**
	0	0	0	0	Resistance (default = mV)
	0	0	0	1	No sensor connected - do not scan
	0	0	1	0	100Ω Pt α = 0.00385 Euro (-200 to +870°C)
	0	0	1	1	100Ω Pt α = 0.003916 U.S. (-200 to +630°C)
	0	1	0	0	200Ω Pt α = 0.00385 Euro (-200 to +630°C)
	0	1	0	1	500Ω Pt α = 0.00385 Euro (-200 to +630°C)
	0	1	1	0	Reserved
	0	1	1	1	10Ω Copper (-200 to +260°C)
	1	0	0	0	120Ω Nickel (-60 to +250°C)
	1	0	0	1	100Ω Nickel (-60 to +250°C)
	1	0	1	0	200Ω Nickel (-60 to +250°C)
	1	0	1	1	500Ω Nickel (-60 to +250°C)
	1	1	0	0	Reserved

Thermocouple Type - Write Word 1 and 2

Thermocouple Type					Range		
Bit	03	02	01	00	**Channel 0 (Write word 1)**		
Bit	07	06	05	04	**Channel 1 (Write word 1)**		
Bit	11	10	09	08	**Channel 2 (Write word 1)**		
Bit	15	14	13	12	**Channel 3 (Write word 1)**		
Bit	03	02	01	00	**Channel 4 (Write word 2)**		
Bit	07	06	05	04	**Channel 5 (Write word 2)**		
Bit	11	10	09	08	**Channel 6 (Write word 2)**		
Bit	15	14	13	12	**Channel 7 (Write word 2)**		
	0	0	0	0	mV (default)		
	0	0	0	1	B	300 to 1800°C	(572 to 3272°F)
	0	0	1	0	E	-270 to 1000°C	(-454 to 1832°F)
	0	0	1	1	J	-210 to 1200°C	(-346 to 2192°F)
	0	1	0	0	K	-270 to 1372°C	(-454 to 2502°F)
	0	1	0	1	R	-50 to 1768°C	(-58 to 3214°F)
	0	1	1	0	S	-50 to 1768°C	(-58 to 3214°F)
	0	1	1	1	T	-270 to 400°C	(-454 to 752°F)
	1	0	0	0	C	0 to 2315°C	(32 to 4199°F)
	1	0	0	1	N	-270 to 1300°C	(-450 to 2372°F)
	1	0	1	0	TXK/XK(L)	-200 to 800°C	(-328 to 1472°F)
	1	0	1	1	Reserved		
	1	1	0	0	Module reports cold junction sensor temperature for channels 00-03		
	1	1	0	1	Module reports cold junction sensor temperature for channels 04-07		
	1	1	1	0	Reserved		
	1	1	1	1	No input device connected - do not scan		

Specifications

| Specifications	1794-IT8	1794-IR8
Number of Inputs	8 channels	
Module Location	Cat. No. 1794-TB2, -TB3, -TB3S, -TB3T and -TB3TS Terminal Base Units	
Nominal Input Ranges	-76.5 to +76.5mV	1 to 433 ohms
Supported Thermocouple Types (1794-IT8 only)	**Type Range °C Range °F** B 300 to 1800°C (572 to 3272°F) C 0 to 2315°C (32 to 4199°F) E -270 to 1000°C (-454 to 1832°F) J -210 to 1200°C (-346 to 2192°F) K -270 to 1372°C (-454 to 2502°F) TXK/XK(L) -200 to 800°C (-328 to 1472°F) N -270 to 1300°C (-454 to 2372°F) R -50 to 1768°C (-58 to 3214°F) S -50 to 1768°C (-58 to 3214°F) T -270 to 400°C (-454 to 752°F)	
Supported RTDs (1794-IR8 only)	**Resistance** 100Ω Pt α = 0.00385 Euro (-200 to +870°C) 100Ω Pt α = 0.003916 U.S. (-200 to +630°C) 200Ω Pt α = 0.00385 Euro (-200 to +400°C) 500Ω Pt α = 0.00385 Euro (-200 to +630°C) 100Ω Nickel α = 0.00618 (-60 to +250°C) 120Ω Nickel α = 0.00672 (-60 to +250°C) 200Ω Nickel α = 0.00618 (-60 to +250°C) 500Ω Nickel α = 0.00618 (-60 to +250°C) 10Ω Copper α = 0.00427 (-200 to +260°C)	
RTD Excitation Current		718.36µA
Resolution	16 bits (2.384µV typical)	16 bits across 435 ohms
Accuracy	Refer to "Calculating the Accuracy" section in Appendix A of the user manual (1794-UM007)	Without calibration, at low humidity: Normal mode: 0.05% full scale (max) Enh. mode: 0.01% full scale (typical)
Common Mode Rejection	-115db @ 60Hz; -100db @ 50Hz	-120db @ 60Hz; -100db @ 50Hz with A/D filter cutoff @ 10Hz
Common Mode Input Range	+10V maximum	0V between channels (common mode)
Isolation Voltage	Tested at 850V dc for 1s from inputs and user power to logic side	
Data Format	16-bit 2's complement or offset binary (unipolar)	
Normal Mode Noise Rejection	-60db @ 60Hz	-60db @ 60Hz for A/D filter cutoff @ 10Hz
Input Offset Drift w/Temperature	±6mV/°C maximum	1.5 milliohm/°C maximum
Gain Drift w/Temp.	10ppm/°C maximum	Normal mode: 20ppm/°C max. Enhanced mode: 10ppm/°C max.
Channel Bandwidth	0-2.62Hz (-3db)	
Settling time to 100% of final value	Available at system throughput rate	
System Throughput	325ms (1 channel scanned), programmable to 28ms 2.6s (8 channels scanned), programmable to 224ms	**Normal mode** - 325ms (1 channel scanned), programmable to 28ms 2.6s (8 channels scanned), programmable to 224ms **Enhanced mode -** programmable from 56 to 650ms/channel - 650ms (1 channel scanned), 2.925s (8 channels scanned)
Open TC/RTD Circuit Detection	Out of range reading (upscale)	
Open TC/RTD Detection Time	Available at system throughput rate	
Overvoltage Capability	35V dc, 25V ac continuous at 25°C	
Overall Drift with Temperature	50ppm/°C of span (maximum)	
Cold Junction Compensation	Range: 0 to 70°C A-B catalog number 1794-CJC2	
Channel to channel isolation	±10V	0V
Indicators	1 red/green power status indicator	
Flexbus Current	20mA	
Power Dissipation	3.0W maximum @ 31.2V dc	
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc	
Keyswitch Position	3	
General Specifications		
External dc Power Supply Voltage Range	24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 19.2 to 31.2V dc for ambient temperatures ≤ 40°C 24V dc maximum for ambient temperatures = 55°C See derating curve	
Supply Current	150mA @ 24V dc	
Dimensions (with module installed)	31.8H x 3.7W x 2.1D inches 45.7H x 94W x 53.3D mm	
Environmental Conditions		

Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0 to 55°C (32 to 131°F)	
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)	
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing	
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz	
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g	
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)	
ESD Immunity	IEC 61000-4-2: 4kV contact discharges 8kV air discharges	
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz	
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on signal ports	
Surge Transient Immunity	IEC 61000-4-5: ±2kV line-earth(CM) on shielded ports	
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 30MHz	
Enclosure Type Rating	None (open-style)	
Signal Conductors Thermocouple Millivolt Category[2]	Thermocouple - Use appropriate shielded thermocouple wire[1] Belden 8761 2	2-wire -Belden 9501 3-wire, less than 100ft with normal humidity - Belden 9533 3-wire, greater than 100ft or normal humidity (>55°C for > 8 hrs) - Belden 83503
Power Conductors Wire Size Category[2]	12AWG (4mm^2) stranded copper wire rated at 75°C or higher 3/64 inch (1.2mm) insulation maximum 2	
Certifications (when product is marked)[3]	**UL** UL Listed Industrial Control Equipment **c-UL-us** UL Listed Industrial Control Equipment, certified for US and Canada (1794-IT8) **c-UL-us** UL listed for Class I, Division 2, Groups A, B, C and D Hazardous locations, certified for US and Canada (1794-IT8) **CSA** CSA certified Process Control Equipment **CSA** CSA certified for Class I, Division 2, Groups A, B, C and D Hazardous locations **EEx[3]** European Union 94/9/EEC ATEX Directive, compliant with: EN 50021; Potentially Explosive Atmospheres, Protection "n" (Zone 2) **CE[3]** European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity **C-Tick[3]** Australian Radiocommunications Act compliant with AS/NZS CISPR 11, Industrial Emissions	

1   Refer to thermocouple manufacturer for proper thermocouple extension.
2   You use this category information for planning conductor routing as described in Allen-Bradley publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.
3   For the latest up-to-date information, see the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details. For notification of any additional release notes, refer to www.ab.com/manuals/.

Derating Curve
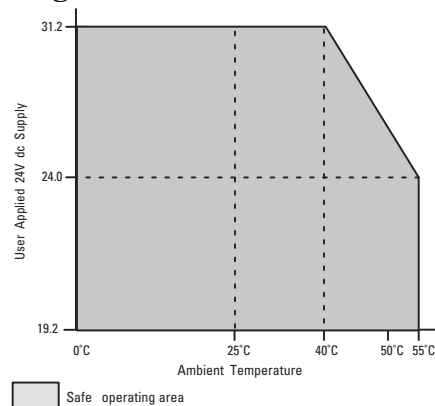
The area within the curve represents the safe operating range for the module under various conditions of user supplied 24V dc supply voltages and ambient temperatures.

www.rockwellautomation.com