



FLEX I/O 8 Relay Output Module

Cat. No. 1794-IRT8

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.

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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.

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



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.

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 module is European Zone 2 approved: 1794-IRT8.

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 module is Hazardous Location approved: 1794-IRT8.

<p>The following information applies when operating this equipment in hazardous locations:</p> <p>Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D. Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>		<p>Informations sur l'utilisation de cet équipement en environnements dangereux :</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 inadéquat 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

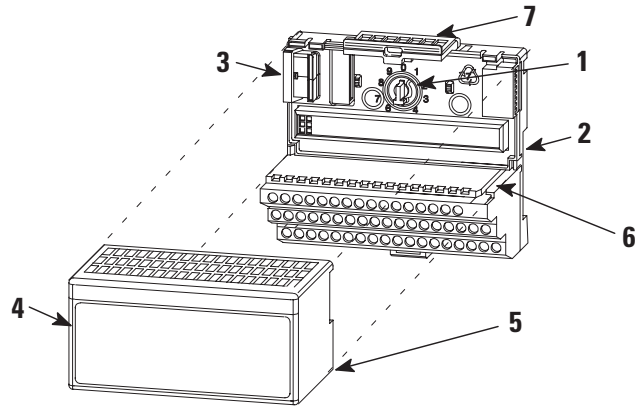
	Series A	Series B
Isolation	Between user side and system side	Between user 24V dc and user I/O; Between user side and system side
Common Mode Range	±4V dc	±15V dc
Thermocouple Mode	When open is detected, data defaults to maximum value	When open is detected, data defaults to minimum value

ATTENTION



If using a Series B product to replace a Series A product, connect a wire between terminals 39 and 48 on the 1794-TB3G or -TB3GS terminal base unit. If not connected, the Series B product will default to Series B functionality.

Installing Your TC/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 termbase/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 the 1794-TB3G, and -TB3GS

1. Connect individual input 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..

ATTENTION

Connect only one current or one voltage signal per channel. Do not connect both current and voltage on one channel.



2. Connect each channel signal return to the associated terminal on row (A).
3. Connect the associated +V dc power lead of the input device to the corresponding terminal on the 34-51 row (C) for each input as indicated in the table.

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.



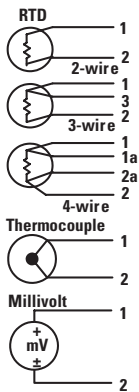
ATTENTION

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



4. If daisy chaining power to the next 1794-TB3G or -TB3GS terminal base, connect a jumper from terminal 50 (+V dc) on this base unit to terminal 34 on the next base unit.
5. If continuing dc common to the next base unit, connect a jumper from terminal 51 (common) on this base unit to terminal 35 on the next base unit.

Wiring Connections for the Thermocouple/RTD Module



Type of Input	Connect the following:				
	H	L	+	-	Shield ¹
RTD - 2-wire			1	2	
RTD - 3-wire		3	1	2	
RTD - 4-wire	1a	2a	1	2	
Thermocouple		1		2	
Millivolt		1		2	

¹ Terminals 37, 38 and 39, and 46, 47 and 48 are for cold junction compensation (with 38 and 47 chassis GND).

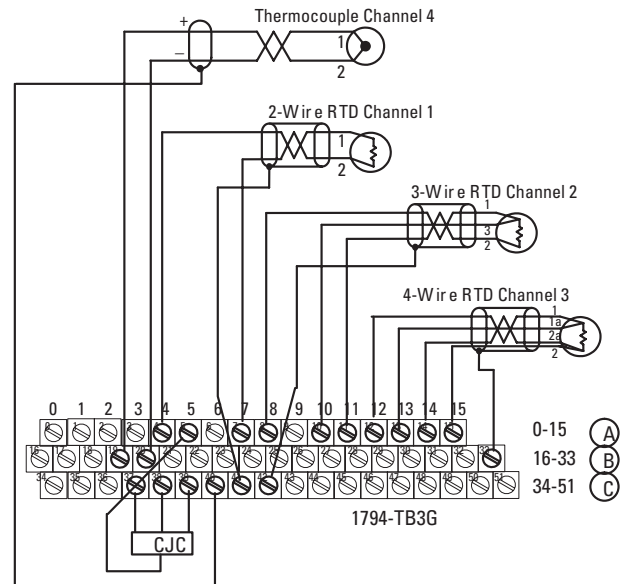
Input	CJC Sensor			
	+	Chassis Ground	-	CJC Tail ¹
CJC1	37	38	39	5 (22)
CJC2	46	47	48	12 (29)

¹ Use pins 5 and 12 when channels 0-7 are configured as thermocouples. Use pins 12 and 29 when only channels 4-7 are configured as thermocouples.

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

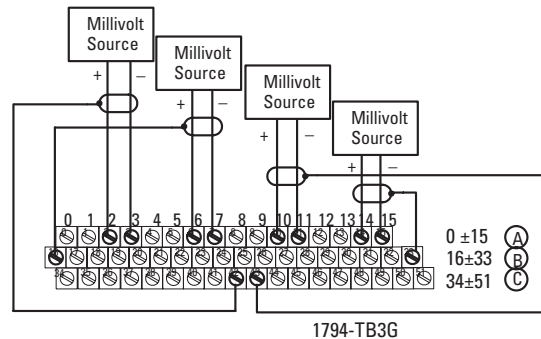
- 1 Terminals 37, 38 and 39, and 46, 47 and 48 are for cold junction compensation (with 38 and 47 chassis GND).
- 2 Terminals 16, 33 and 40 thru 45 are chassis ground.
- 3 Connect tail of CJC1 to terminal 5 and CJC2 to 12 if channels 0-3 or 0-7 are thermocouples. Connect tail of CJC1 to terminal 22 and CJC2 to 29 ONLY if channels 4-7 are thermocouples.

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 this product 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.)							
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	CJC 2 Alm	CJC 1 Alm	SAB	Diagnostic Status				
Word 10	EDT Command Response								EDT Response Data							

Where: SAB = Series of unit; 0 = Series A, 1 = Series B

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	03	02	01	00
Word 0	Data Format				Flt Mode Ch 4-7		Flt Mode Ch 6-3		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	EDT Command								EDT Command Data							

Data Format for All Channels - Write Word 0

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

0101 thru 1111 not used

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

Fault Mode - Write Word 0

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

"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	Hardware filtering only (default filtering)
	0	0	1	25ms
	0	1	0	100ms
	0	1	1	250ms
	1	0	0	500ms
	1	0	1	1s
	1	1	0	2s
	1	1	1	5s

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°C
	0	0	1	20°C
	0	1	0	25°C
	0	1	1	30°C
	1	0	0	40°C
	1	0	1	50°C
	1	1	0	60°C
	1	1	1	70°C

Sensor Mode Select - Write Word 1

Bit	05	04	Sensor mode for channels 0 thru 3
Bit	13	12	Sensor mode for channels 4 thru 7
Thermocouple			
	0	0	External compensation - uses cold junction sensors (Both CJC sensors must be used when external compensation is selected.)
	0	1	Internal compensation - uses the value selected for "reference junction selection"
	1	0	No compensation (Data is referenced to 0°C.)
	1	1	Differential measurement between 2 channels (0-1, 2-3, 4-5, 6-7)
RTD			
	0	0	2-wire RTD no compensation
	0	1	2-wire RTD with user selected compensation
	1	0	3-wire RTD
	1	1	4-wire 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	Thermocouple
	0	1	RTD
	1	0	Not used
	1	1	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	Use channel loop compensation value stored during calibration procedure for 2-wire RTD (default = 0Ω) - 15Ω maximum (Note: Functional up to RTD = 484Ω maximum with total lead resistance = 15Ω)
	0	1	5Ω (total lead resistance)
	1	0	10Ω (total lead resistance)
	1	1	15Ω (total lead resistance)

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 = mV)
0	0	0	1	0	100Ω Pt α = 0.00385 Euro (-200 to +870°C)
0	0	1	0	0	200Ω Pt α = 0.00385 Euro (-200 to +400°C)
0	0	1	1	0	100Ω Pt α = 0.003916 U.S. (-200 to +630°C)
0	1	0	0	0	200Ω Pt α = 0.003916 U.S. (-200 to +400°C)
0	1	0	1	0	100Ω Nickel (-60 to +250°C)
0	1	1	0	0	200Ω Nickel (-60 to +200°C)
0	1	1	1	0	120Ω Nickel (-80 to +320°C)
1	0	0	0	0	10Ω Copper (-200 to +260°C)
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 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	TXK/XX(L)	-200 to 800°C (-328 to 1472°F)
0	1	1	0	N	-270 to 1300°C (-450 to 2372°F)
0	1	1	1	R	-50 to 1768°C (-58 to 3214°F)
1	0	0	0	S	-50 to 1768°C (-58 to 3214°F)
1	0	0	1	T	-270 to 400°C (-454 to 752°F)
1010 thru 1111 not used					

Specifications

Specifications - 24V dc Analog Module, Cat. No. 1794-IRT8

Number of Inputs	8 channels (2 groups of 4)																														
Module Location	Cat. No. 1794-TB3G and -TB3GS Terminal Base Units																														
Nominal Input Voltage Ranges	-40 to +100mV dc for thermocouples 0 to 325mV for RTDs																														
Supported Thermocouple Types	<table border="1"> <thead> <tr> <th>Type</th> <th>Range °C</th> <th>Range °F</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>300 to 1800°C</td> <td>(572 to 3272°F)</td> </tr> <tr> <td>E</td> <td>-270 to 1000°C</td> <td>(-454 to 1832°F)</td> </tr> <tr> <td>J</td> <td>-210 to 1200°C</td> <td>(-346 to 2192°F)</td> </tr> <tr> <td>K</td> <td>-270 to 1372°C</td> <td>(-454 to 2502°F)</td> </tr> <tr> <td>TXK/XX(L)</td> <td>-200 to 800°C</td> <td>(-328 to 1472°F)</td> </tr> <tr> <td>N</td> <td>-270 to 1300°C</td> <td>(-454 to 2372°F)</td> </tr> <tr> <td>R</td> <td>-50 to 1768°C</td> <td>(-58 to 3214°F)</td> </tr> <tr> <td>S</td> <td>-50 to 1768°C</td> <td>(-58 to 3214°F)</td> </tr> <tr> <td>T</td> <td>-270 to 400°C</td> <td>(-454 to 752°F)</td> </tr> </tbody> </table>	Type	Range °C	Range °F	B	300 to 1800°C	(572 to 3272°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/XX(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)
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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 to +32767 0-65535 0-5000 (ohms mode) (implied decimal point XXX.X) -4000 to +10000 (millivolt mode) (implied decimal point XXX.X)																														
Common Mode Rejection	-80db @ 5V peak-to-peak, 50-60Hz																														
Common Mode Input Range	Series A: ±4V minimum Series B: ±15V minimum																														
Isolation Voltage Tested at:	Series A: 2550V dc for 1s from customer side (customer 24V dc and customer I/O) to system side Series B: 2550V dc for 1s from customer side (customer 24V dc and customer I/O) and system side; 2150V dc for 60s from customer side (customer 24V dc and customer I/O) and system side; 2150V dc for 60s from customer 24V dc and customer I/O and system side; 2150V dc for 60s from customer I/O and customer 24V dc and system side;																														

System Throughput (8 channels scanned) + add 0.5ms if filtering is selected	Typical module timing is shown here. For maximum throughput, short circuit all unused channels. 7.4ms - millivolt 8.0ms - ohms - 2-wire RTD 10.0ms - ohms - 3-wire RTD 10.4ms - ohms - 4-wire RTD 8.0ms - 2-wire RTD (°F) 10.4ms - 4-wire RTD (°F) 8.8ms - 2-wire RTD (°C), (°K) 10.8ms - 4-wire RTD (°C), (°K) 9.8ms - 3-wire RTD (°F) 10.0ms - 3-wire RTD (°C), (°K) 9.0ms - Thermocouples (°F) 9.4ms - Thermocouples (°C), (°K)
Open Circuit Protection	Series A: RTD and TC modes - Open input - Module defaults to maximum value Series B: RTD mode - Open input - Module defaults to maximum value TC mode - Open input - Module defaults to minimum value
Open Input Detection Time	0 to 3.8 for revision D or earlier Immediate detection (maximum 2 scans) for revision E or later
Overvoltage Capability	Series A: 7V dc continuous at 25°C Series B: 15V dc continuous at 25°C
Overall Drift with Temperature	Series A: 150ppm/°C of span (maximum) Series B: 50ppm/°C of span (maximum)
Cold Junction Compensation Range	Series A: 0 to 70°C for firmware revision D or earlier -20 to 100°C for firmware revision E or later Series B: -20 to 100°C for firmware revision A or later
Cold Junction Compensator	A-B catalog number 1794-CJ2
Indicators	1 green power status indicator 8 red open input indicators
Flexbus Current	40mA
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	24V dc nominal
Voltage Range	Series A - 19.2 to 31.2V dc (includes 5% ac ripple)
Supply Current	Series B - 17.0 to 31.2V dc (includes 5% ac ripple) 95mA @ 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 80MHz
Enclosure Type Rating	None (open-style)
Signal Conductors	
Thermocouple	Use appropriate shielded thermocouple wire ¹
Millivolt	Balden 8761
Category ²	2

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 CSA CSA certified Process Control Equipment CSA CSA certified for Class I, Division 2, Groups A, B, C and D Hazardous locations EEx³ European Union 94/9/EEC ATEX Directive, compliant with: EN 50021; Potentially Explosive Atmospheres, Protection "n" (Zone 2) CE³ 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-Tick³ 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/ .	

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