



# 1794sc-IRT8I Install Guide

## 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 <https://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 Spectrum Controls, 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, Spectrum Controls, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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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.

### NOTE



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 consequences.

### 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 EN publication 60664-1), at altitudes up to 2000 m (6562 ft) without derating. This equipment is considered Group 1, Class A industrial equipment according to EN/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 5 VA, 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. Besides this publication, see: • Industrial Automation Wiring and Grounding Guidelines, for additional installation requirements, Allen-Bradley publication 1770-4.1. • NEMA Standards publication 250 and EN 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



The FLEX I/O system 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 (such as aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure the DIN rail to mounting surface approximately every 200 mm 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.

### WARNING



Listed only when used with Listed Allen-Bradley Cat. NO. 1794-TB3(G) terminal base or equivalent. This device is intended for use with A-B Type 1794 Flex-I/O programmable controller system.

### AVERTISSEMENT



Répertorié uniquement lorsqu'il est utilisé avec une base terminale Allen-Bradley Cat. n° 1794-TB3(G) ou l'équivalent. Cet appareil est destiné à être utilisé avec le système de contrôleurs programmables A-B Type 1794 Flex-I/O.

### WARNING



Gelistet nur bei Verwendung mit gelisteter Allen-Bradley Kat. Nr. 1794-TB3(G)-Terminal-Basis oder entsprechender Ausrüstung. Diese Vorrichtung ist zur Verwendung mit dem Typ A-B 1794 Flex-E/A-programmierbaren Steuersystem vorgesehen.

### AVVERTENZE



In elenco solo se utilizzato con morsetteria Allen-Bradley cat. n. 1794-TB3(G) elencata o equivalente. Questo dispositivo è destinato ad essere usato con il sistema controllore programmabile tipo A-B 1794 Flex I/O.

### ADVERTENCIA



Sólo se indica cuando se utiliza con el bloque de terminales Allen-Bradley con el n.º de categoría 1794-TB3(G) o uno equivalente. Este dispositivo está diseñado para usarse con un sistema controlador programable 1794 Flex-I/O de tipo A-B.



仅与 Allen-Bradley 品牌的 Cat.NO.1794-TB3(G) 端子座或同等产品一起使用时列出。本设备旨在与 A-B 型 1794 Flex-I/O 可编程控制器系统配合使用

### 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:  
Touch a grounded object to discharge potential static.  
Wear an approved grounding wrist strap.  
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.

## North American Hazardous Location Approval

### 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

- Ne pas débrancher l'équipement tant que l'alimentation n'a pas été coupée ou que la zone n'est pas considérée comme sans danger.
- Ne pas débrancher les connexions à l'équipement tant que l'alimentation n'a pas été coupée ou que la zone n'est pas considérée comme sans danger. Sécuriser toutes les connexions externes avec cet équipement en utilisant des vis, des loquets coulissants, des connecteurs filetés ou tout autre moyen fourni avec ce produit.
- La substitution de composants peut nuire à l'adéquation à la classe I, division 2.
- Si ce produit contient des piles, celles-ci ne doivent être remplacées que dans une zone réputée non dangereuse.

### WARNING



#### EXPLOSIONSGEFAHR

- Gerät erst trennen, wenn die Stromversorgung getrennt wurde oder bekannt ist, dass der Bereich sicher ist.
- Verbindungen mit dem Gerät erst trennen, wenn die Stromversorgung getrennt wurde oder bekannt ist, dass der Bereich sicher ist. Alle externen Verbindungen mit diesem Gerät mit Schrauben, Schieberiegeln, Gewindeverbindern oder anderen mit diesem Produkt gelieferten Mitteln sichern.
- Der Austausch von Bauteilen kann die Eignung für Klasse I, Abteilung 2 beeinträchtigen.
- Wenn dieses Produkt Batterien enthält, dürfen diese nur in einem als sicher bekannten Bereich getauscht werden.

### ATTENZIONE



#### PERICOLO DI ESPLOSIONE

- Non scollegare l'apparecchiatura se l'alimentazione non è stata rimossa o a meno che non sia risaputo che l'area non è pericolosa.
- Non scollegare le connessioni dell'apparecchiatura se l'alimentazione non è stata rimossa o a meno che non sia risaputo che l'area non è pericolosa. Fissare eventuali connessioni esterne che combaciano con questa apparecchiatura utilizzando viti, fermi scorrevoli, connettori filettati o altri mezzi forniti con questo prodotto.
- La sostituzione dei componenti può compromettere l'idoneità alla Classe I, Divisione 2.
- Se questo prodotto contiene batterie, devono essere sostituite esclusivamente in un'area nota per non essere pericolosa.

### ADVERTENCIA

#### RIESGO DE EXPLOSIÓN

- No desconecte el equipo a menos que se haya cortado la electricidad o que se sepa que la zona no es peligrosa.
- No desconecte los cables de este equipo a menos que se haya cortado la electricidad o que se sepa que la zona no es peligrosa. Asegure cualquier conexión externa que se acople a este equipo con tornillos, pestillos, conectores roscados u otros medios suministrados con este producto.
- La sustitución de los componentes puede afectar a la compatibilidad con la clase I, división 2.
- Si este producto contiene baterías, sólo se deben cambiar en una zona que se sepa que no es peligrosa.



#### 爆炸危险

- 不要断开设备连接，除非已断电或已知该区域无危险。
- 不要断开与本设备的连接，除非已断电或已知该区域无危险。使用螺钉、滑动门锁、螺栓连接器或本产品随附的其他工具来固定与本设备匹配的所有外部连接。
- 替换组件可能会影响 I 类 2 部分的适用性。
- 如果本产品含有电池，则只能在已知无危险的区域更换电池。

### WARNING



#### Special Conditions for Safe Use

- This equipment shall be mounted in an ATEX Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (in accordance with EN 60079-0) and used in an environment of not more than Pollution Degree 2 (as defined in EN 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the peak rated voltage when applied in Zone 2 environments.
- Models 1794sc-IF8IU and 1794sc-IRT8I are to be used with an Allen-Bradley 1794-TB3G or 1794-TB3GS terminal base.

### AVERTISSEMENT



#### Conditions spéciales pour une utilisation en toute sécurité

- Cet équipement doit être monté dans une enceinte certifiée ATEX zone 2 avec un indice de protection minimum de IP54 (conformément à la norme EN 60079-0) et utilisé dans un environnement ne dépassant pas le degré de pollution 2 (tel que défini dans la norme EN 60664-1) lorsqu'il est appliqué dans des environnements de zone 2. L'enceinte ne doit être accessible qu'au moyen d'un outil.
- Cet équipement doit être utilisé dans les limites de ses caractéristiques définies par Rockwell Automation.
- Des dispositions doivent être prises pour éviter que la tension nominale ne soit dépassée par des perturbations transitoires supérieures à 140 % de la tension nominale de crête lorsqu'elle est appliquée dans des environnements de zone 2.
- Les modèles 1794sc-IF8IU et 1794sc-IRT8I doivent être utilisés avec une base terminale Allen-Bradley 1794-TB3G ou 1794-TB3GS.

### WARNING



#### Sonderbedingungen zur sicheren Verwendung

- Dieses Gerät ist in einem nach ATEX-Zone 2 zertifizierten Gehäuse mit Mindestschutzklasse IP54 (gemäß EN 60079-0) gegen Eindringen zu montieren und bei Anwendung in Umgebungen der Zone 2 und maximalem Verschmutzungsgrad 2 (wie in EN 60664-1 definiert) zu verwenden. Das Gehäuse darf nur mit einem Werkzeug zugänglich sein.
- Dieses Gerät ist innerhalb seiner von Rockwell Automation festgelegten Nennwerte zu betreiben.
- Es sind Vorkehrungen zu treffen, um das Übersteigen der Nennspannung durch transiente Störungen von mehr als 140 % der Spitzennennspannung in Umgebungen der Zone 2 zu verhindern.
- Die Modelle 1794sc-IF8IU und 1794sc-IRT8I sind in Kombination mit einer Allen-Bradley 1794-TB3G- oder 1794-TB3GS-Terminal-Basis zu verwenden.

**ATTENZIONE**



**Condizioni speciali per un utilizzo sicuro**

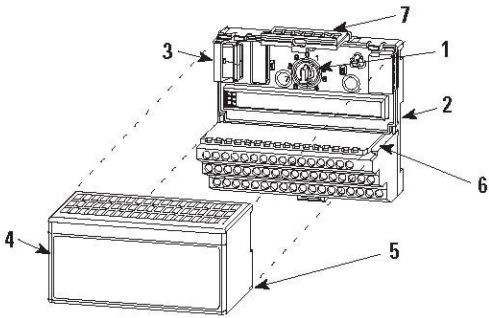
- Questa apparecchiatura deve essere montata in una custodia certificata ATEX Zona 2 con un grado di protezione minima di ingresso di almeno IP54 (conforme a EN 60079-0) ed utilizzata in un ambiente con un grado di inquinamento non superiore a 2 (secondo la definizione contenuta in EN 60664-1) se installata in ambienti di Zona 2. La custodia deve essere accessibile solo con l'uso di uno strumento.
- Questa apparecchiatura deve essere utilizzata nei limiti delle proprie potenze nominali specifiche definite da Rockwell Automation.
- È necessario fare in modo di evitare che la tensione nominale venga superata di oltre il 140% della tensione nominale di picco da disturbi transitori se installata in ambienti di Zona 2.
- I modelli 1794sc-IF8IU e 1794sc-IRT8I devono essere utilizzati con morsetteria Allen-Bradley 1794-TB3G o 1794-TB3GS.

**安全使用的特殊条件**

- 该系统应安装在GB 3836.1所定义的最低防护等级至少为IP54的外壳中，并在不超过GB / T 16935.1定义的污染等级2的环境中使用时，外壳必须具有只能使用工具才能触及的门或盖。
- 本设备应在 Rockwell Automation 定义的额定值范围内使用。
- 当在 Zone 2 环境中使用时，应采取预防措施防止因超过最大额定电压峰值值 140% 的瞬变干扰而超过规定额定电压。
- 型号 1794sc-IF8IU 和 1794sc-IRT8I 需要与 Allen-Bradley 1794-TB3G 或 1794-TB3GS 端子座同时使用。



**Install Your IRT8I 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 key switch (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 or 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.
2. Use Belden 8761 cable for mV signal wiring, or the appropriate thermocouple wire for your thermocouples.
3. Signal wiring shields can be connected to terminals 16 or 33 on row (B) or terminals 40...45 on row (C).  
Connect the +VDC power lead to terminal 34 on the 34...51 row (C).  
Connect the -VDC common (return-) to terminal 35 on the 34...51 row (C).

**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.

**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 (+VDC) on this base unit to +V terminal on the next terminal base unit.  
Connect a jumper from terminal 51 (-VDC common) to the - VDC 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**

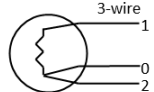
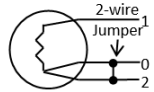
If the RTD wires are color-coded, the wires that are the same color are connected together. If the wires are not color-coded, use an ohmmeter to determine the pairs as explained below.

**How to Connect a 3-Wire RTD**

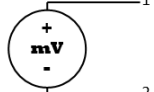
If the 3-wire RTD wires are all different colors, use an ohmmeter to determine which leads are connected together. Either lead of the pair can be the compensation lead. Attach one lead of the pair to terminal L and the other to +. Attach the single lead to -. Refer to the following table.

**Wire Connections for the Isolated Universal Input Module**

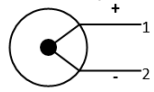
**RTD/Resistance**



**mV Source**



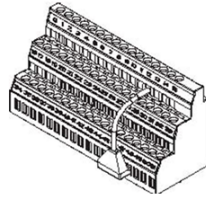
**Thermocouple**



Type of Input	Connect the Following				Shield <sup>1</sup>
	R	IN+	IN-	I	
RTD/Res 2-wire		1	2		
RTD/Res 3-wire	0	1	2		
Thermocouple		1	2		
Millivolt		1	2		

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

Numbers 0, 1, 2, and 3 are wiring numbers of the sensor used. For terminal numbers corresponding to R, IN+, IN-, I, refer to Terminal Base Unit Wiring Connections below.



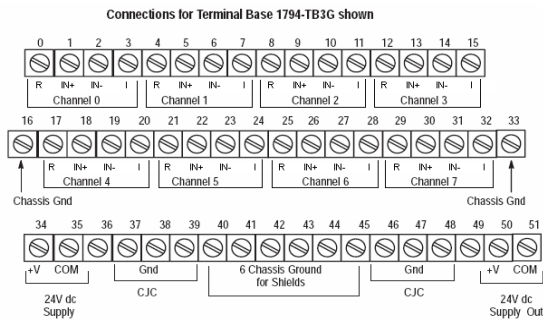
Input	CJC Sensor			
	+	Chassis Ground	-	CJC Tail <sup>1</sup>
CJC1	C37	C38	C39	A1
CJC2	C-46	C-47	C-48	B31

<sup>1</sup>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 CJC 1 to terminal 1 and CJC2 to terminal 31, if channels 0...3 or 0...7 are configured for thermocouples. The power supply in the current loop to the current inputs (I/O) of the devices may only be an Isolated Secondary Limited Voltage, Class 2, or Limited Voltage/Current power supply.

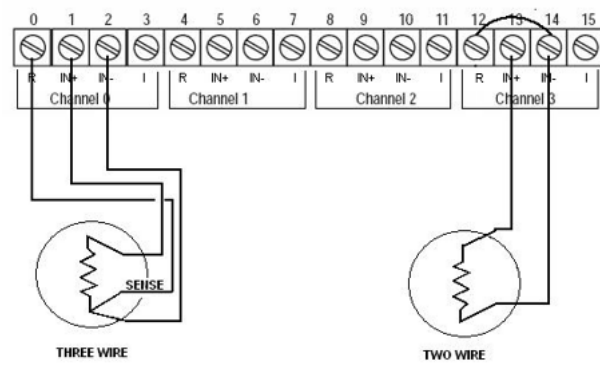
**Terminal Base Unit Wiring Connections**

Channel Number	1794-TB3G and 1794-TB3GS Terminal Base Units			
	Signal Return (R)	Input + (IN+)	Input (-)	I Return (-)
0	A-0	A-1	A-2	A-3
1	A-4	A-5	A-6	A-7
2	A-8	A-9	A-10	A-11
3	A-12	A-13	A-14	A-15
4	B-17	B-18	B-19	B-20
5	B-21	B-22	B-23	B-24
6	B-25	B-26	B-27	B-28
7	B-29	B-30	B-31	B-32

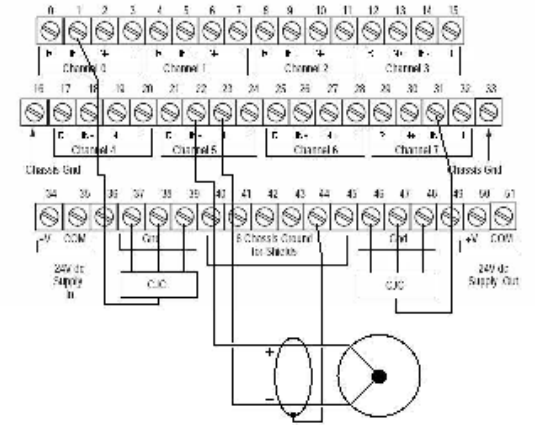
<sup>1</sup>Terminals 16, 33, and 40...45 are chassis ground.



**Example of RTD/Resistance Wiring to a 1794-TB3G Terminal Base Unit**



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



**Input Map and Configuration (EDT)**

The following information is presented for experienced users only. Refer to the user manual, publication 0300242-*nn*, for complete information on programming and configuring your module.

**Input Map (Read)**

Usage (16-bit words):	
I:0	Channel 0 input Data.
I:1	Channel 1 input Data.
I:2	Channel 2 input Data.
I:3	Channel 3 input Data.
I:4	Channel 4 input Data.
I:5	Channel 5 input Data.
I:6	Channel 6 input Data.
I:7	Channel 7 input Data.
S:0	OverRange (CH0/Bit 8, CH1/Bit 9, ...) UnderRange (CH0/Bit 0, CH1/Bit 1, ...)
S:1	User HI Alarms (CH0/Bit8, CH1/Bit9, ...) User LO Alarms (CH0/Bit0, CH1/Bit1, ...)
S:2	Reserved CJC Alarm Broken Input Alarms
S:3	Reserved Diagnostics

**CJC Alarm**

Bit 9	Bit 8	CJC Alarm:
0	0	No Errors
0	1	CJC1 is broken.
1	0	CJC2 is broken.
1	1	Both CJC1 and CJC2 are broken.

**EDT Configuration Table**

Usage (16 bit words):	
C:0	CH0 User Low Alarm Threshold
C:1	CH0 User High Alarm Threshold
C:2	CH0 User Alarm Deadband
C:3	CH1 User Low Alarm Threshold
C:4	CH1 User High Alarm Threshold
C:5	CH1 User Alarm Deadband
C:6	CH2 User Low Alarm Threshold
C:7	CH2 User High Alarm Threshold
C:8	CH2 User Alarm Deadband
C:9	CH3 User Low Alarm Threshold
C:10	CH3 User High Alarm Threshold
C:11	CH3 User Alarm Deadband
C:12	CH4 User Low Alarm Threshold
C:13	CH4 User High Alarm Threshold
C:14	CH4 User Alarm Deadband
C:15	CH5 User Low Alarm Threshold
C:16	CH5 User High Alarm Threshold
C:17	CH5 User Alarm Deadband
C:18	CH6 User Low Alarm Threshold
C:19	CH6 User High Alarm Threshold
C:20	CH6 User Alarm Deadband
C:21	CH7 User Low Alarm Threshold
C:22	CH7 User High Alarm Threshold
C:23	CH7 User Alarm Deadband

**F0 through F7 (Channel n Fault Mode)**

State	Function
0	Disabled
1	Broken input testing enabled

**Input Type**

Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Range:
0	0	0	0	0	B Type Thermocouple
0	0	0	0	1	C Type Thermocouple
0	0	0	1	0	E Type Thermocouple
0	0	0	1	1	J Type Thermocouple
0	0	1	0	0	K Type Thermocouple
0	0	1	0	1	N Type Thermocouple
0	0	1	1	0	R Type Thermocouple
0	0	1	1	1	S Type Thermocouple
0	1	0	0	0	T Type Thermocouple
0	1	0	0	1	100 Ω Pt α 0.385
0	1	0	1	0	200 Ω Pt α 0.385
0	1	0	1	1	500 Ω Pt α 0.385
0	1	1	0	0	1000 Ω Pt α 0.385
0	1	1	0	1	100 Ω Pt α 0.3916
0	1	1	1	0	200 Ω Pt α 0.3916
0	1	1	1	1	500 Ω Pt α 0.3916
1	0	0	0	0	1000 Ω Pt α 0.3916
1	0	0	0	1	10 Ω Cu α 0.426
1	0	0	1	0	100 Ω Ni α 0.618
1	0	0	1	1	120 Ω Ni α 0.672
1	0	1	0	0	604 Ω NiFe α 0.518
1	0	1	0	1	R 0 to 150 Ω
1	0	1	1	0	R 0 to 1000 Ω
1	0	1	1	1	R 0 to 3000 Ω
-1	1	0	0	0	±50 mV
-1	1	0	0	1	±100 mV



Input Filter

Bit 7	Bit 6	Bit 5	ADC Filter:
0	0	0	4.17 Hz
0	0	1	10.0 Hz
0	1	0	16.7 Hz
0	1	1	19.6 Hz
1	0	0	62.0 Hz
1	0	1	470.0 Hz
1	1	0	*Unused
1	1	1	*Unused

Data Format

Bit 10	Bit 9	Bit 8	Format:
0	0	0	Engineering Units
0	0	1	Engineering Units ×10
0	1	0	Raw/Proportional Counts
0	1	1	Scaled for PID
1	0	0	Percent of Full Scale
1	0	1	CJC EU
1	1	0	CJC Scaled for PID
1	1	1	CJC Percent of Full Scale

<sup>1</sup> If selected, the CJC format will override all ranges/formats and report the indicated CJC value for this channel. Channel zero will report CJC0 directly. Channel 7 will report CJC1 directly. All others will be distributed values between CJC0 and CJC1 based on channel position.

BIM Ch n (Broken Input Mode Channel n)

Bit 13	Bit 12	Broken Input Mode:
0	0	Zero analog value on broken input.
0	1	Set analog value to Max scale on broken input.
1	0	Set analog value to Min scale on broken input.
1	1	Previous Value

DC Ch n (Disable CJC for Channel n)

State	Function
0	CJCs Enabled <sup>1</sup>
1	CJCs Disabled <sup>1</sup>

<sup>1</sup> This field is only used if the input type is a thermocouple and the format is not a CJC format. No compensation is performed on the thermocouple when disabled.

°F Ch n (Temperature Units for Channel n)

State	Function
0	Degrees C
1	Degrees F

Specifications

Number of inputs	8 channels
Module Location	Cat. No. 1794-TB3G, 1794-TB3GS Terminal Base Units
Nominal input voltage ranges	±50 mV, ±100 mV
Supported thermocouple types	<b>Type °C Range °F Range</b> B 300...1820 °C (572...3308 °F) C 0...2315 °C (32...4199 °F) E -270...1000 °C (-454...1832 °F) J -210...1200 °C (-346...2192 °F) K -270...1370 °C (-454...2498 °F) N -210...1300 °C (-346...2372 °F) R 0...1768 °C (32...3214 °F) S 0...1768 °C (32...3214 °F) T -270...400 °C (-454...752 °F)
Supported RTD/Resistance types	<b>RTD</b> 100 Ω Pt α = 0.385 -200...850 °C (-328...1562 °F) 200 Ω Pt α = 0.385 -200...850 °C (-328...1562 °F) 500 Ω Pt α = 0.385 -200...850 °C (-328...1562 °F) 1000 Ω Pt α = 0.385 -200...850 °C (-328...1562 °F) 100 Ω Pt α = 0.392 -200...630 °C (-328...1166 °F) 200 Ω Pt α = 0.392 -200...630 °C (-328...1166 °F) 500 Ω Pt α = 0.392 -200...630 °C (-328...1166 °F) 1000 Ω Pt α = 0.392 -200...630 °C (-328...1166 °F) 10 Ω Cu α = 0.426 -100...260 °C (-148...500 °F) 100 Ω Ni α = 0.618 -100...260 °C (-148...500 °F) 120 Ω Ni α = 0.672 -80...260 °C (-112...500 °F) 604 Ω NiFe α = 0.518 -100...200 °C (-148...392 °F)
Resolution	16 bits
Data format	Engineering Units ×1 Engineering Units ×10 Raw/Proportional Counts Scaled for PID Percent of full scale
Input Impedance	>1 M Ω for voltage, thermocouple, RTD and resistance inputs
Common mode rejection	60 dB at 5 V peak-to-peak, 50...60 Hz
Isolation voltage (continuous voltage withstand rating)	User power to Backplane: 24 VDC continuous Channel to Backplane: 24 VDC continuous Channel to Channel: 24 VDC continuous Channel to User power: 24 VDC continuous
Open circuit protection	Open circuit detection bias <1 uA with ON/OFF capability
Overvoltage capability	Voltage mode ±24 VDC continuous (ten minutes)
Cold junction compensation Range	-20...100 °C
Cold junction compensator	A-B catalog number 1794-CJC2
Flexbus current	80 mA
Power dissipation	6.28 W max at 31.2 VDC
Thermal dissipation	Max 10.2 BTU/Hr at 31.2 VDC
Key switch position	3

Accuracy Specifications

Thermocouple Accuracy with 4.17 Hz filter using Linearization per ITS-90	Accuracy Limit At 25 °C 4.17 Hz Filter	Accuracy Limit At 0-55 °C 4.17 Hz Filter	Repeatability Limit At 25 °C & 4.17 Hz filter
Type J (-50 °C to 1200 °C):	±0.6 °C	±2.3 °C	±0.17 °C
Type J (-210 °C to -50 °C):	±0.8 °C	±3.3 °C	±0.25 °C
Type N (-80 °C to 1300 °C):	±1.0 °C	±1.5 °C	±0.3 °C
Type N (-250 °C to -80 °C):	±1.2 °C	±3.0 °C	±1.9 °C
Type T (-180 °C to 400 °C):	±1.0 °C	±1.5 °C	±0.2 °C
Type T (-270 °C to -180 °C):	±5.4 °C	±8.5 °C	±1.5 °C
Type K (-180 °C to 1370 °C):	±1.0 °C	±1.5 °C	±0.3 °C
Type K (-270 °C to -180 °C):	±7.5 °C	±11.5 °C	±3.6 °C
Type E (-130 °C to 1000 °C):	±0.5 °C	±1.5 °C	±0.1 °C
Type E (-270 °C to -130 °C):	±4.2 °C	±7.3 °C	±1.2 °C
Type C (0 °C to 2315 °C):	±1.8 °C	±3.5 °C	±0.9 °C
Type B (600 °C to 1800 °C):	±3.0 °C	±4.0 °C	±1 °C
Type B (300 °C to 600 °C):	±3.0 °C	±8.0 °C	±2 °C
Type S (140 °C to -1760 °C):	±1.7 °C	±2.6 °C	±0.55 °C
Type S (0 °C to 14 °C):	±1.7 °C	±5.0 °C	±1.0 °C
Type R (280 °C to -1760 °C):	±1.7 °C	±2.6 °C	±0.4 °C
Type R (0 °C to 280 °C):	±1.7 °C	±5.0 °C	±1.0 °C
CJC accuracy	±1.0 °C	3.0 °C	±0.8 °C

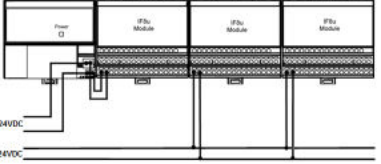
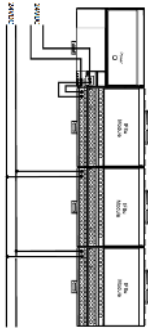
Resistance Accuracy with 4.17 Hz filter	Accuracy Limit At 25 °C 4.17 Hz Filter	Accuracy Limit At 0-55 °C 4.17 Hz Filter	Repeatability Limit At 25 °C & 4.17 Hz filter
0-150 ohms range	±0.15 ohms	±0.25 ohms	±10 milliohms
0-1000 ohms range	±1.0 ohms	±2.0 ohms	±100 milliohms
0-3000 ohms range	±1.5 ohms	±2.5 ohms	±100 milliohms

RTD Accuracy With 4.17 Hz filters	Accuracy Limit At 25 °C 4.17 Hz Filter	Accuracy Limit At 0-55 °C 4.17 Hz Filter	Repeatability Limit At 25 °C & 4.17 Hz filter
Platinum 385 (100, 200, 500 and 1000 ohms) (IEC751 1983, Amend 2 1995, JISC 1604 1997)	±0.7 °C	±1.2 °C	±0.1 °C
Platinum 3916 (100, 200, 500 and 1000 ohms) (JISC 1604: 1981)	±0.6 °C	±1.1 °C	±0.1 °C
Nickel 618 (100 ohms) (DIN 43760 Sept. 1987)	±0.3 °C	±0.5 °C	±0.1 °C
Nickel 672(120 ohms) (DIN 43760 Sept. 1987)	±0.3 °C	±0.5 °C	±0.1 °C
Nickel-Iron (518) (MINCO Application Aid #18, Date 5/90)	±0.4 °C	±0.7 °C	±0.1 °C
Copper 426 (10 ohms) (SAMA RC21-4-1966)	±2.0 °C	±2.4 °C	±0.1 °C

General Specifications

Voltage range	24 VDC nom
Supply current	240 mA @ 24 VDC
Dimensions (with module installed in base)	94 × 94 × 69 mm (3.7 × 3.7 × 2.7 in.)
H × W × D approx.	

Environmental Conditions

Temperature, operating	Tamb 0 °C to 55 °C (-32 °F to 131 °F) This range applies only to modules installed horizontally as shown:  Tamb 0 °C to 45 °C (-32 °F to 113 °F) This range applies when modules are installed vertically. When installed vertically, it is recommended that the power supply be located on the top. 
Temperature, storage	-40...85 °C (-40...185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% non-condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5 g at 10...500 Hz
Shock Operating Non-operating	IEC60068-2-27 (Test Ea, Unpackaged shock): 20 g 25 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: 10 V/m with 1 kHz sine-wave 80% AM from 30...2000 MHz 10 V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10 V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV at 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±2 kV line-earth (CM) on shielded ports
Conducted RF immunity	IEC 61000-4-6: 10 V RMS with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
Enclosure type rating	None (open-style)
Signal conductors Thermocouple Millivolt Category (1)	Use appropriate shielded thermocouple wire (3) Belden 8761 - on signal ports
Power conductors Wire size	0.34...2.5 mm <sup>2</sup> (22...12 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max 3 - on power ports
Category (1) Terminal screw torque for cage-clamp terminal base	0.8 Nm (7 lb-in.)

Certifications (when product is marked) (2)	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E180101. UL Listed Industrial Control Equipment, certified for U.S. and Canada. See UL File E140954. Ex European Union 2014/34/EU ATEX Directive, compliant with: EN 60079-7:2015+A1:2018; Potentially Explosive Atmospheres, Protection "ec" (Zone 2) II 3 G Ex ec IIC T4 Gc EN 60079-0:2018 Certificate UL 20 ATEX 2409X CE European Union 2014/30/EU EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
CCC	GB/T3836.1-2021, GB/T3836.3-2021 GBEx 2021312310000326 GBEx 2021312310000345
CMIM	Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) NM EN 61131-2, NM EN 61000-6-4, NM EN 61000-6-2

- Use this category information for planning conductor routing as described in Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.
- For the latest up-to-date information, see the Product Certification link at [www.spectrumcontrols.com](http://www.spectrumcontrols.com) for Declarations of Conformity Certificates and other certification details.
- Refer to the thermocouple manufacturer for proper thermocouple extension.

产品中有害物质名称及含量  
Name and content of hazardous substances in product

模块名称 Module name (s) T1954a-RT81 (Universal) 1794a-RT81 (Combo RTD and TC)	有害物质 Hazardous substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated Biphenyls (PBB)	多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)
印制电路板 Printed Circuit Board Assemblies	0	0	0	0	0	0
金属零件 Metal Components	0	0	0	0	0	0
塑料零件 Plastic Components	0	0	0	0	0	0

本表格依据5J/T 11364的规定编制。This table is made per guidance of SJ/T 11364.  
 O: 表示有害物质在印制电路板材料中的含量与GB/T 26572规定的限量要求以下。  
 O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.  
 X: 表示有害物质在至少印制电路板的某一材料中的含量超过GB/T 26572规定的限量要求。  
 X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.  
 (鉴于实际情况, 请提交详细表格上表中打“X”的模块制造商进一步说明。)  
 (According to actual situation, extra explanations can be given here for the technical reasons of traces with "X".)



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