



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.

No patent liability is assumed by Spectrum Controls, Inc., with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Spectrum Controls, Inc., is prohibited.

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. Attention helps 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 V_A, 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 morsettiera 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.



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, Gewindesteckern 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 combattono 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 rosados 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、滑动闩锁、螺纹连接器或本产品附随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.

WANRUUNG



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 Spitzenennenspannung 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.

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	¹CJC EU
1	1	0	¹CJC Scaled for PID
1	1	1	¹CJC Percent of Full Scale

¹If 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	¹Broken 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 ¹
1	CJCs Disabled ¹

¹This 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	Type °C Range °F Range 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	RTD 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) Resistance 0...150 Ω 0...1000 Ω 0...3000 Ω
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

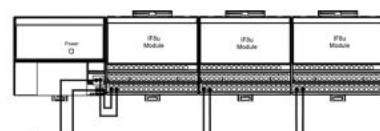
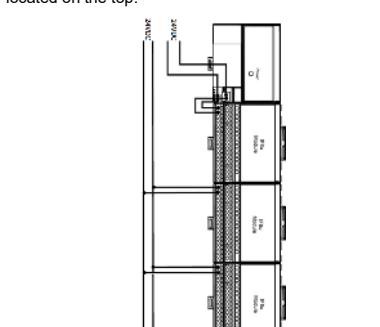
Accuracy Specifications

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) Copper 426 (10 ohms) (SAMA RC21-4-1966)		±0.4 °C	±0.7 °C	±0.1 °C
		±2.0 °C	±2.4 °C	±0.1 °C

General Specifications

Voltage range Supply current	24 VDC nom 240 mA @ 24 VDC
Dimensions (with module installed in base)	94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.) H x W x 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	IEC60068-2-27 (Test Ea, Unpackaged shock): 20 g 25 g
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