Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

FLEX I/O Thermocouple/RTD Input Analog Module

Catalog Numbers 1794-IRT8 and 1794-IRT8XT, Series B

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Updated Environment and Enclosure	3
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Rockwell Automation

ATTENTION: Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

注意：在安装、配置、操作和维护本产品前，请阅读本文档以及 “ 其他资源 ” 部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外，用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备，则可能会损害设备提供的保护。

ATENCIÓN: Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable. Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

ATENÇÃO: Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

ВНИМАНИЕ: Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

注意：本製品を設置、構成、稼動または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。

本機器が製造メーカにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

ACHTUNG: Lesen Sie dieses Dokument und die im Abschnitt „Weitere Informationen“aufgeführten Dokumente, die Informationen zu Installation, Konfiguration und Bedienung dieses Produkts enthalten, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder warten. Anwender müssen sich neben den Bestimmungen aller anwendbaren Vorschriften, Gesetze und Normen zusätzlich mit den Installations- und Verdrahtungsanweisungen vertraut machen.

Arbeiten im Rahmen der Installation, Anpassung, Inbetriebnahme, Verwendung, Montage, Demontage oder Instandhaltung dürfen nur durch ausreichend geschulte Mitarbeiter und in Übereinstimmung mit den anwendbaren Ausführungsvorschriften vorgenommen werden.

Wenn das Gerät in einer Weise verwendet wird, die vom Hersteller nicht vorgesehen ist, kann die Schutzfunktion beeinträchtigt sein.

ATTENTION : Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

주의: 본 제품 설치, 설정, 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치, 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오. 사용자는 모든 관련 규정, 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다 .

설치 , 조정 , 가동 , 사용 , 조립 , 분해 , 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다 .

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다 .

ATTENZIONE Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione “Altre risorse”, riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

DİKKAT: Bu ürünün kurulumu, yapılandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yapılandırılması ve işletimi ile ilgili İlave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlama, hizmete alma, kullanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amacın dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

注意事項：在安裝、設定、操作或維護本產品前，請先閱讀此文件以及列於 「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示，並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行，以符合適用的實作法規。

如果將設備用於非製造商指定的用途時，可能會造成設備所提供的保護功能受損。

POZOR: Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci a elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodně proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovídajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

UWAGA: Przed instalacją, konfiguracją, użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiające instalację, konfigurację i procedury użytkowania tego urządzenia. Użytkownicy mają obowiązek zapoznać się z instrukcjami dotyczącymi instalacji oraz oprzewodowania, jak również z obowiązującymi kodeksami, prawem i normami.

Działania obejmujące instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowiązującym kodeksem postępowania.

Jeśli urządzenie jest użytkowane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urządzenie może zostać ograniczone.

OBS! Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfigurering och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

LET OP: Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bediend of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedradingsinstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

Environment and Enclosure

ATTENTION:
This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN/IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as open-type equipment for indoor use. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain more information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

ATTENTION: If you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION: This product is grounded through the DIN rail to chassis ground. Use zinc plated chromate-passivated steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately. Be sure to ground the DIN rail properly. See the Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for more information.

ATTENTION: If you connect or disconnect wiring while the field side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:
- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

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

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

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

UK and European Hazardous Location Approval

The following applies to products marked Ⓔx II 3 G:

- Are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Schedule 1 of UKEX and Annex II of EU Directive 2014/34/EU. See the UKEx and EU Declaration of Conformity at rok.auto/certifications for details.
- The type of protection is Ex ec IIC T4 Gc according to EN IEC 60079-0:2018, EXPLOSIVE ATMOSPHERES - PART 0: EQUIPMENT - GENERAL REQUIREMENTS, Issue Date 07/2018 and EN IEC 60079-7:2015+A1:2018, Explosive atmospheres. Equipment protection by increased safety "e".
- Comply to Standard EN IEC 60079-0:2018, EXPLOSIVE ATMOSPHERES - PART 0: EQUIPMENT - GENERAL REQUIREMENTS, Issue Date 07/2018, EN IEC 60079-7:2015+A1:2018 Explosive atmospheres. Equipment protection by increased safety "e", reference certificate number DEMKO 14 ATEX 1342501X and UL22UKEX2378X.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to UKEX regulation 2016 No. 1107 and ATEX directive 2014/34/EU.

IEC Hazardous Location Approval

The following applies to products marked with IECEx certification:

- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification to IEC 60079-0.
- The type of protection is Ex ec IIC T4 Gc according to IEC 60079-0 and IEC 60079-7.
- Comply to Standards IEC 60079-0, Explosive atmospheres Part 0: Equipment - General requirements, Edition 7, Revision Date 2017, IEC 60079-7, 5.1 Edition revision date 2017, Explosive atmospheres - Part 7: Equipment protection by increased safety "e", reference IECEx certificate number IECEx UL 14.0066X.

WARNING: Special Conditions for Safe Use:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment shall be mounted in an UKEX/ATEX/IECEx Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (in accordance with EN/IEC 60079-0) and used in an environment of not more than Pollution Degree 2 (as defined in EN/IEC 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.
- Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.
- This equipment must be used only with UKEX/ATEX/IECEx certified Rockwell Automation backplanes.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Earthing is accomplished through mounting of modules on rail.

North American Hazardous Location Approval

The Following Information Applies When Operating This Equipment In Hazardous Locations.	**Informations sur l'utilisation de cet équipement en environnements dangereux.**
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.	**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.

Series A/Series B Differences

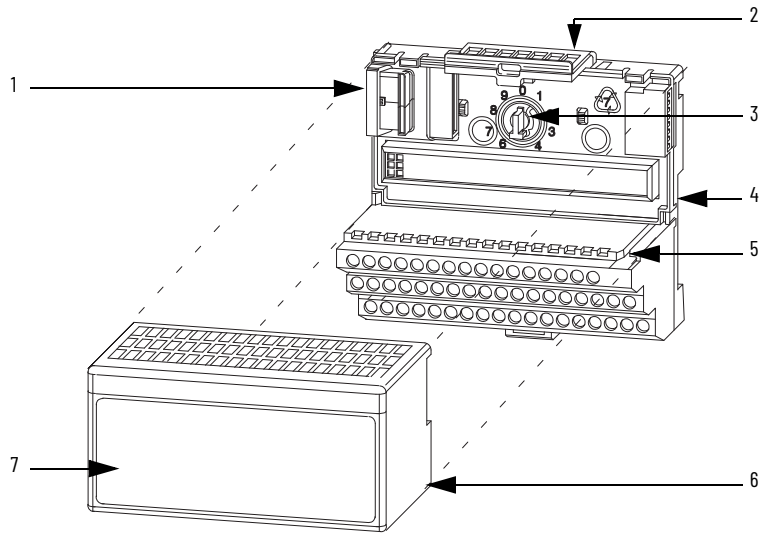
When In	1794-IRT8 Series A	1794-IRT8, 1794-IRT8XT, Series B
Isolation	Between user side and system side	Between user 24V DC and user I/O; Between user side and system side
Common mode range	±4V DC	±15V DC
Thermocouple mode wire-off detection	When an open sensor is detected, data defaults to **maximum**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

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

In Studio 5000[1] Logix Designer®, if using a series B product to replace a series A product, the module will be accepted without an electronic keying mismatch warning. This is true for 1794-IRT8 and 1794-IRT8XT modules installed on EtherNet/IP™, ControlNet®, DeviceNet®, or Remote I/O networks.

(1) The Studio 5000 Logix Designer application is the rebranding of RSLogix 5000® software and will continue to be the product to program Logix 5000® controllers for discrete, process, batch, motion, safety, and drive-based solutions.

Install Your TC/RTD Input Module



	Description		Description
1	Flexbus connectors	5	Groove
2	Latching mechanism	6	Alignment bar
3	Keyswitch	7	Module
4	Terminal base		

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 FLEX™ I/O Thermocouple/RTD Input Analog module mounts on a 1794-TB3G or 1794-TB3GS terminal base.

1. Rotate the keyswitch (3) on the terminal base (4) clockwise to position 3 as required for this type of module.
2. Make certain the flexbus connector (1) 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.

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 (7) with its alignment bar (6) aligned with the groove (5) 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 (2) is locked into the module.

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

1. Connect individual input wiring and associated signal returns to numbered terminals on the 0…15 row (A) and the 16…33 row (B) as indicated in the table.

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

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

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

Identify RTD Wire Pairs

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

How to Connect a 4-wire RTD

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

How to Connect a 3-wire RTD

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

Table 1 - Wire 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) Shield can be connected to chassis ground terminals 16, 33, and 40…45.

Numbers 1, 1a, 2, 2a, and 3 are wire numbers of the sensor used. For terminal numbers corresponding to H, L, +, -, see Table 3 on page 7.

Table 2 - Cold Junction Compensation Connections

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

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

Wire Number

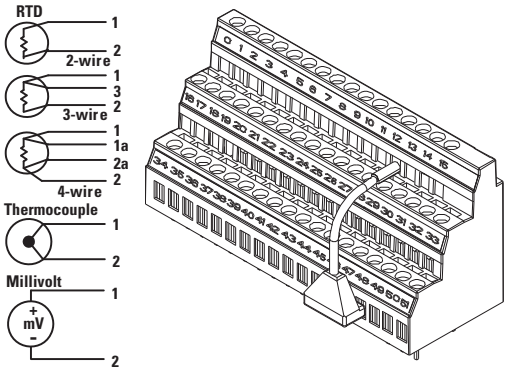
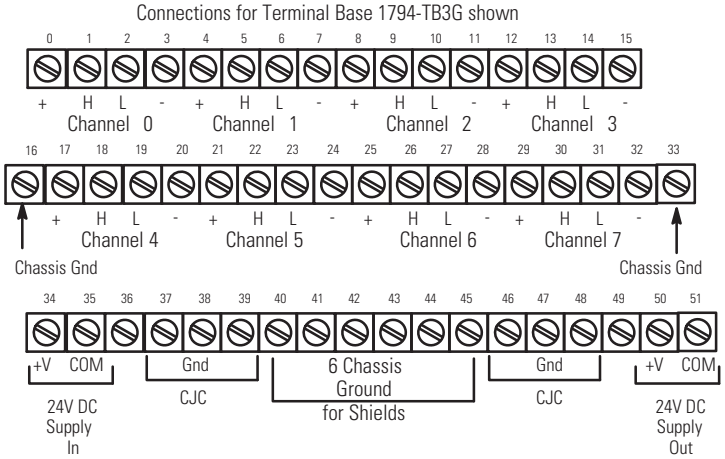


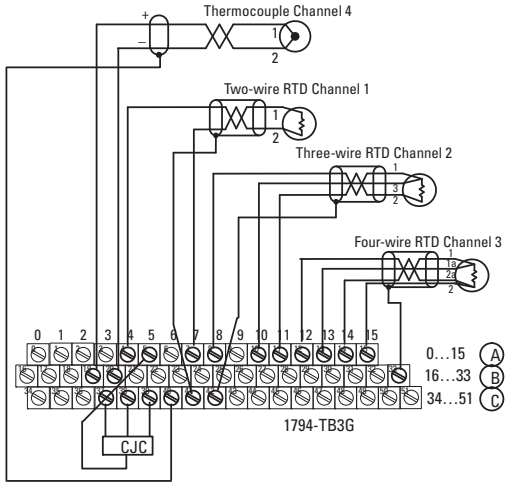
Table 3 - Terminal Base Unit Wiring Connections

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

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

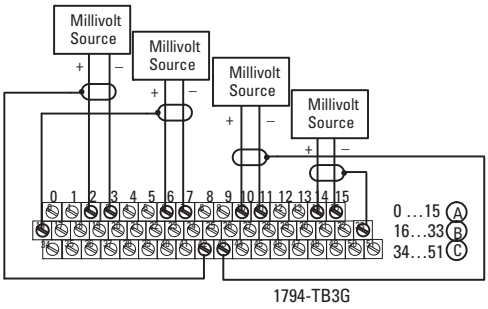


Example of RTD and Thermocouple Wiring to a 1794-TB3G Terminal Base Unit



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

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



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

Block Transfer Read and Write

The following block transfer read and write word bit information is presented for experienced users only. See the FLEX I/O Thermocouple, RTD, and Millivolt Input Modules User Manual, publication 1794-UM012, for complete information on programming and configuring your module.

Table 4 - 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		CJC2 Alm	CJC1 Alm	SAB	CJC Status	Reserved		
Word 10		Command Response							Response Data							

Where: SAB = Series of unit; 0 = Series A, 1 = Series B
Alm = Alarm
Flt = Fault

Table 5 - 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	Reserved				Data Format				Flt Mode Ch 4-7	Flt Mode Ch 0-3	Reference Jct.			Filter Cutoff		
Word 1	TC/RTD Ch 4-7		Sensor Mode Ch 4-7		Sensor Type Ch 4-7				TC/RTD Ch 0-3		Sensor Mode Ch 0-3		Sensor Type Ch 0-3			
Word 2	RTD Offset Ch 7		RTD Offset Ch 6		RTD Offset Ch 5		RTD Offset Ch 4		RTD Offset Ch 3		RTD Offset Ch 2		RTD Offset Ch 1		RTD Offset Ch 0	
Word 3		Command							Command Data							

Table 6 - 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…+32767
	0	1	0	0	0…65535

0101…1111 not used
Module defaults to -4000…+10000 in millivolt mode, and 0…5000 in ohms mode with implied decimal points (for example, -40 mV, 0.01 Ω) whenever °C, °F or °K is selected.

Table 7 - Fault Mode - Write Word 0

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

Table 8 - 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 (32 °F)
		0	0	1	20 °C (68 °F)
		0	1	0	25 °C (77 °F)
		0	1	1	30 °C (86 °F)
		1	0	0	40 °C (104 °F)
		1	0	1	50 °C (122 °F)
		1	1	0	60 °C (140 °F)
		1	1	1	70 °C (158 °F)

Table 9 - Add-on Filter Selections - Write Word 0

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

Table 10 - Sensor Mode Select - Write Word 1

Bit	05	04	Sensor mode for channels 0...3
Bit	13	12	Sensor mode for channels 4...7
	Thermocouple		
	0	0	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

Table 11 - TC/RTD Input Type Selection - Write Word 1

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

Table 12 - 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	Resistance (default)
	0	0	0	1	100 Ω Pt α = 0.00385 Euro -200...+870 °C (-328...+1598 °F)
	0	0	1	0	200 Ω Pt α = 0.00385 Euro -200...+400 °C (-328...+752 °F)
	0	0	1	1	100 Ω Pt α = 0.003916 U.S. -200...+630 °C (-328...+1166 °F)
	0	1	0	0	200 Ω Pt α = 0.003916 U.S. -200...+400 °C (-328...+752 °F)
	0	1	0	1	100 Ω Nickel -60...+250 °C (-76...+482 °F)
	0	1	1	0	200 Ω Nickel -60...+200 °C (-76...+362) °F)
	0	1	1	1	120 Ω Nickel -80...+320 °C (-112...+608 °F)
	1	0	0	0	10 Ω Copper -200...+260 °C (-328...+470 °F)
	1001...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	mV (default)
	0	0	0	1	B300...1800 °C (572...3272 °F)
	0	0	1	0	E-270...+1000 °C (-454...+1832 °F)
	0	0	1	1	J-210...+1200 °C (-346...+2192 °F)
	0	1	0	0	K-270...+1372 °C (-454...+2502 °F)
	0	1	0	1	TXK/XK(L)-200...+800 °C (-328...+1472 °F)
	0	1	1	0	N-270...+1300 °C (-450...+2372 °F)
	0	1	1	1	R-50...+1768 °C (-58...+3214 °F)
	1	0	0	0	S-50...+1768 °C (-58...+3214 °F)
	1	0	0	1	T-270...+400 °C (-454...+752 °F)
	1010...1111 not used				

Table 13 - 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 = 0 Ω) - 15 Ω max (Note: Functional up to RTD = 484 Ω max with total lead resistance = 15 Ω.)
	0	1	5 Ω (total lead resistance)
	1	0	10 Ω (total lead resistance)
	1	1	15 Ω (total lead resistance)

Specifications

Specifications - 24V DC Analog Module, Cat. No. 1794-IRT8, 1794-IRT8XT

Attribute	Value
Number of inputs	8 channels (2 groups of 4)
Module location	Cat. No. 1794-TB3G, 1794-TB3GS, 1794-TB3GK terminal base units
Nominal input voltage ranges	-40…+100 mV DC for thermocouples 0…325 mV for RTDs
	mV (default)
Supported thermocouple types	**Type** / **Range °C** / **(Range °F)** B / 300…1800 °C / (572…3272 °F) E / -270…+1000 °C / (-454…+1832 °F) J / -210…+1200 °C / (-346…+2192 °F) K / -270…+1372 °C / (-454…+2502 °F) TXK/XK(L) / -200…+800 °C / (-328…+1472 °F) N / -270…+1300 °C / (-454…+2372 °F) R / -50…+1768 °C / (-58…+3214 °F) S / -50…+1768 °C / (-58…+3214 °F) T / -270…+400 °C / (-454…+752 °F)
Supported RTD types	**Resistance** 100 Ω Pt α = 0.00385 Euro -200…+870 °C (-328…+1598 °F) 200 Ω Pt α = 0.00385 Euro -200…+400 °C (-328…+752 °F) 100 Ω Pt α = 0.003916 U.S. -200…+630 °C (-328…+1166 °F) 100 Ω Pt α = 0.003916 U.S. -200…+400 °C (-328…+752 °F) 100 Ω Nickel -60…+250 °C (-76…+482 °F) 200 Ω Nickel -60…+200 °C (-76…+362) °F) 120 Ω Nickel -80…+320 °C (-112…+608 °F) 10 Ω Copper -200…+260 °C (-328…+470 °F)
Resolution	14 bits
Accuracy vs. filter cutoff	0.05% of full range in millivolt mode with filtering selected Hardware only = 0.10% of full range in millivolt mode
Data format	°C (implied decimal point XXX.X) °F (implied decimal point XXX.X) °K (implied decimal point XXX.X) -32767…+32767 0…65535 0…5000 (ohms mode) (implied decimal point XXX.X) -4000…+10000 (millivolt mode) (implied decimal point XXX.XX)
Common mode rejection	-80 dB @ 5V peak-to-peak, 50…60 Hz
Common mode input range	±15V min

Specifications - 24V DC Analog Module, Cat. No. 1794-IRT8, 1794-IRT8XT (Continued)

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

General Specifications

Attribute	Value
External DC power supply voltage Voltage range Supply current	 24V DC nom 19.2…31.2V DC (includes 5% AC ripple) 95 mA @ 24V DC
Dimensions (with module installed in base) H x W x D approx.	94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.)
IECEx temp code	T4
North American temp code	T4A
UKEX/ATEX temp code	T4
Enclosure type rating	None (open-style)
Wire size	Determined by installed terminal base
Signal conductors Thermocouple Millivolt Wire type	 Use appropriate shielded thermocouple wire(1) Belden 8761 Shielded on signal ports
Wiring category(2)	2 - on signal ports 3 - on power ports
Terminal screw torque for cage-clamp terminal base	Determined by installed terminal base

(1) Refer to the thermocouple manufacturer for proper thermocouple extension.
(2) Use this category information for planning conductor routing as described in the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications

Attribute	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...+55 °C (-4...+131 °F) - **1794-IRT8** -20...+70 °C (-4...+158 °F) - **1794-IRT8XT**
Temperature, surrounding air, max	55 °C (131 °F) - **1794-IRT8** 70 °C (158 °F) - **1794-IRT8XT**
Temperature, non- operating	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40...+85 °C (-40...+185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock Operating Nonoperating	IEC60068-2-27 (Test Ea, Unpackaged shock): 30 g 50 g
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...6000 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on shielded signal ports
Surge transient immunity	IEC 61000-4-5: ±2 kV line-earth(CM) on shielded signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz on shielded signal ports

Certifications

Attribute (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
UK and CE	UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers EN 61000-6-4; Industrial Emissions UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with: EN 63000; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with: EN IEC 60079-0; General Requirements EN IEC 60079-7; Explosive Atmospheres, Protection "e" II 3 G Ex ec IIC T4 Gc DEMKO 14 ATEX 1342501X UL22UKEX2378X
TUV	TÜV Certified for Functional Safety: up to and including SIL 2
IECEx	IECEx System, compliant with: IEC 60079-0; General Requirements IEC 60079-7; Explosive Atmospheres, Protection "e" Ex ec IIC T4 Gc IECEx UL 14.0066X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

Certifications (Continued)

EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation
Morocco	Arrêté ministériel n° 6404-15 du 29 ramadan 1436
CCC	CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products

(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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Publication 1794-IN050K-EN-P - October 2022 | Supersedes Publication 1794-IN050J-EN-P - January 2009
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