

1794sc-IF8IU 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 <http://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.

IMPORTANT

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 consequence

ATTENTION



Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 m (6562 ft) without derating. This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance. This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, 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 IEC 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." or equivalent.

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.

European Hazardous Location Approval

IMPORTANT

Observe the following additional Zone 2 certification requirements:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Spectrum Controls.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.

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.

Informations sur l'utilisation de cet équipement en environnements dangereux.

Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

WARNING



EXPLOSION HAZARD

•Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

•Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.

•Substitution of components may impair suitability for Class I, Division 2.

•If this product contains batteries, they must only be changed in an area known to be nonhazardous.

AVERTISSEMENT



RISQUE D'EXPLOSION

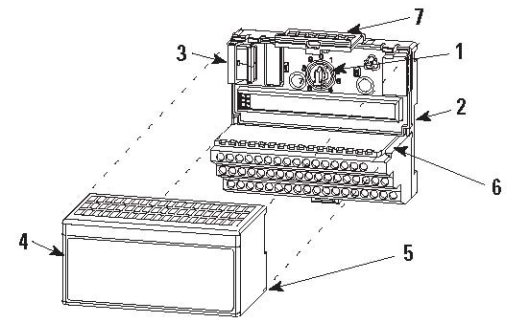
•Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.

•Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.

•La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.

•S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Install Your IF8IU 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 keyswitch (1) on the terminal base (2) clockwise to position 3 as required for this type of module.
- 2.Make certain the flexbus connector (3) is pushed all the way to the left to connect with the neighboring terminal base/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.

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).

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 (+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.

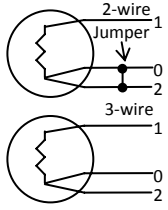
How to Connect a 3-wire RTD

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

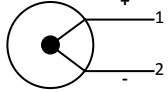


Type of Input	Connect The Following				Shield ¹
	R	IN+	IN-	I	
RTD/Res 2-wire		1	2		
RTD/Res 3-wire	0	1	2		
Thermocouple		1	2		
V/mV Source		1	2		
mA Source		1	2	3	

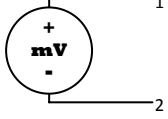
¹Shield can be connected to chassis ground terminals 16, 33, and 40...45.

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.

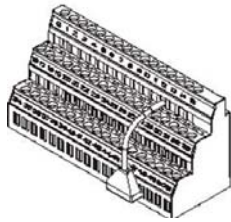
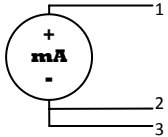
Thermocouple



mV Source



mA Source



Input	CJC Sensor			
	+	Chassis Ground	-	CJC Tail ¹
CIC1	C37	C38	C39	A1
CIC2	C-46	C-47	C-48	B31

¹Terminals 37, 38, and 39, and 46, 47, and 48 are for cold junction compensation (with 38 and 47 chassis GND). Connect the tail of CIC 1 to terminal 1 and CIC 2 to terminal 31 if channels 0...3 or 0...7 are configured for thermocouples.

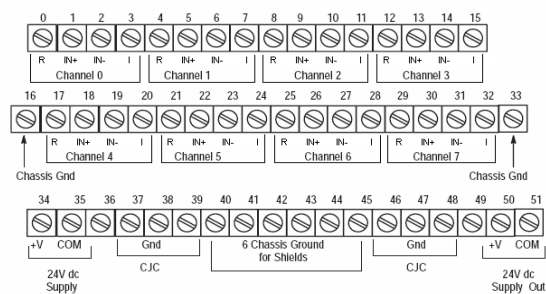
The power supply in the current loop to the current inputs (I/O) of the devices may only be an Isolated Secondary Limited Voltage, Class 2, or Limited Voltage/Current power supply.

Terminal Base Unit Wiring Connections

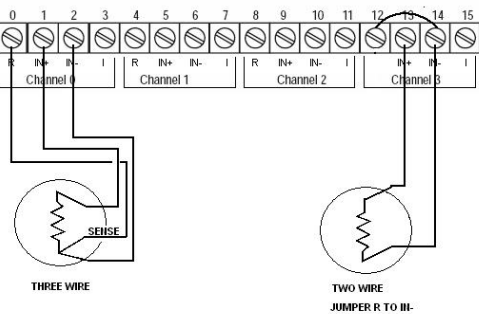
Channel Number	1794-TB3G and 1794-TB3GS Terminal Base Units			
	Signal Return (R)	Input + (IN+)	Input (-)	I Return (-)
0	A-0	A-1	A-2	A-3
1	A-4	A-5	A-6	A-7
2	A-8	A-9	A-10	A-11
3	A-12	A-13	A-14	A-15
4	B-17	B-18	B-19	B-20
5	B-21	B-22	B-23	B-24
6	B-25	B-26	B-27	B-28
7	B-29	B-30	B-31	B-32

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

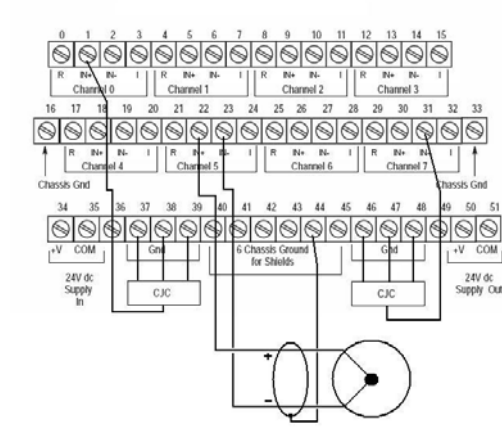
Connections for Terminal Base 1794-TB3G shown



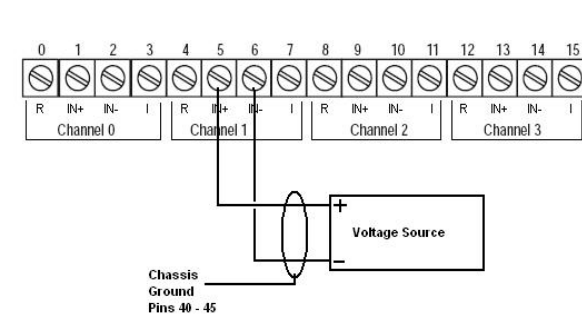
Example of RTD/Resistance Wiring to a 1794-TB3G Terminal Base Unit



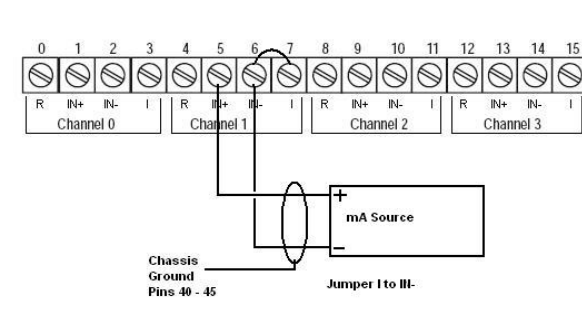
Example of Thermocouple Wiring to a 1794-TB3G Terminal Base Unit



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



Example of Current 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 0300239-01, 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.														
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
S:0	OverRange (CH0/Bit 8, CH1/Bit 9, ...)	UnderRange (CH0/Bit 0, CH1/Bit 1, ...)													
S:1	User HI Alarms (CH0/Bit 8, CH1/Bit 9, ...)	User LO Alarms (CH0/Bit 0, CH1/Bit 1, ...)													
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	R ¹	R ¹	F7	F6	F5	F4	R ¹	R ¹	R ¹	F3	F2	F1	F0	R ¹	0
C:1	°F	DC	BIM												
Ch0	Ch0	Ch0			R ¹	Data Format	Ch0	Input Filter	Ch0	Input Type	CH0				
C:2	°F	DC	BIM												
Ch1	Ch1	Ch1			R ¹	Data Format	Ch1	Input Filter	Ch1	Input Type	CH1				
C:3	°F	DC	BIM												
Ch2	Ch2	Ch2			R ¹	Data Format	Ch2	Input Filter	Ch2	Input Type	CH2				
C:4	°F	DC	BIM												
Ch3	Ch3	Ch3			R ¹	Data Format	Ch3	Input Filter	Ch3	Input Type	CH3				
C:5	°F	DC	BIM												
Ch4	Ch4	Ch4			R ¹	Data Format	Ch4	Input Filter	Ch4	Input Type	CH4				
C:6	°F	DC	BIM												
Ch5	Ch5	Ch5			R ¹	Data Format	Ch5	Input Filter	Ch5	Input Type	CH5				
C:7	°F	DC	BIM												
Ch6	Ch6	Ch6			R ¹	Data Format	Ch6	Input Filter	Ch6	Input Type	CH6				
C:8	°F	DC	BIM												
Ch7	Ch7	Ch7			R ¹	Data Format	Ch7	Input Filter	Ch7	Input Type	CH7				
C:9	CH0 User Low Alarm Threshold														
C:10	CH0 User High Alarm Threshold														
C:11	CH0 User Alarm Deadband														
C:12	CH1 User Low Alarm Threshold														
C:13	CH1 User High Alarm Threshold														
C:14	CH1 User Alarm Deadband														
C:15	CH2 User Low Alarm Threshold														
C:16	CH2 User High Alarm Threshold														
C:17	CH2 User Alarm Deadband														
C:18	CH3 User Low Alarm Threshold														
C:19	CH3 User High Alarm Threshold														
C:20	CH3 User Alarm Deadband														
C:21	CH4 User Low Alarm Threshold														

Usage (16 bit words):															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
C:22	CH4 User High Alarm Threshold														
C:23	CH4 User Alarm Deadband														
C:24	CH5 User Low Alarm Threshold														
C:25	CH5 User High Alarm Threshold														
C:26	CH5 User Alarm Deadband														
C:27	CH6 User Low Alarm Threshold														
C:28	CH6 User High Alarm Threshold														
C:29	CH6 User Alarm Deadband														
C:30	CH7 User Low Alarm Threshold														
C:31	CH7 User High Alarm Threshold														
C:32	CH7 User Alarm Deadband														
C:33	CH0 Cal Offset														
C:34	CH1 Cal Offset														
C:35	CH2 Cal Offset														
C:36	CH3 Cal Offset														
C:37	CH4 Cal Offset														
C:38	CH5 Cal Offset														
C:39	CH6 Cal Offset														
C:40	CH7 Cal Offset														
C:41	CH0 CJC Offset														
C:42	CH1 CJC Offset														
C:43	CH2 CJC Offset														
C:44	CH3 CJC Offset														
C:45	CH4 CJC Offset														
C:46	CH5 CJC Offset														
C:47	CH6 CJC Offset														
C:48	CH7 CJC Offset														
¹ Reserved for future expansion															

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
1	1	0	1	0	0 to 5V
1	1	0	1	1	1 to 5V
1	1	1	0	0	+/- 10V
1	1	1	0	1	0 to 10V
1	1	1	1	0	4 to 20 mA
1	1	1	1	1	0 to 20 mA

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 X10
0	1	0	Raw/Proportional Counts
0	1	1	Scaled for PID
1	0	0	Percent of Full Scale
1	0	1	¹ CJC EU
1	1	0	¹ CJC Scaled for PID
1	1	1	¹ CJC 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	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 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, 0-5 V, 1-5 V, 0-10V, and ±10 V
Nominal input current ranges	0-20mA, 4-20mA
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 X1 Engineering Units X10 Raw/Proportional Counts Scaled for PID Percent of full scale
Input Impedance	>1 M Ω for voltage, thermocouple, RTD and resistance inputs 249Ω +/- 1% for current inputs
Common mode rejection	60 db @ 5V 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) Current mode ± 7.8 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	7.25 W max @ 31.2V dc
Thermal dissipation	Max 10.2 BTU/hr @ 31.2V dc
Keyswitch position	3

Module Accuracy

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 140°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
Voltage Accuracy with 4.17 Hz filter	Accuracy Limit At 25°C	Accuracy Limit At 0-55°C	Repeatability Limit At 25°C & 4.17 Hz filter
±50 mV range	±20uV	±35uV	±10uV
±100 mV range	±40uV	±60uV	±13uV
0-5 V range	±2.5mV	±5mV	±1mV
1-5 V range	±2.5mV	±5mV	±1mV
0-10 V range	±5mV	±10mV	±1mV
±10 V range	±10mV	±20mV	±1mV
Current Accuracy with 4.17 Hz filter	Accuracy Limit At 25°C	Accuracy Limit At 0-55°C	Repeatability Limit At 25°C & 4.17 Hz filter
0-20 mA range	±20uA	±40uA	±1uA
4-20 mA range	±20uA	±40uA	±1uA
Resistance Accuracy with 4.17 Hz filter	Accuracy Limit At 25°C	Accuracy Limit At 0-55°C	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	Accuracy Limit At 0-55°C	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	24V dc nom
Supply current	240 mA @ 24V dc
Dimensions (with module installed in base) HxWxD approx.	94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.)

Environmental Conditions

Temperature, operating	0...55 °C (-32...131 °F)
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 @ 10...500Hz
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: 10V 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 87612 - on signal ports
Power conductors Wire size	0.34...2.5 mm ² (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. EEEx European Union 94/9/EEC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection II 3 G nA IIC T5 CE European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)

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