**Installation Instructions**

Original Instructions

**A·B** QUALITY

*Allen-Bradley*

by **ROCKWELL AUTOMATION**

# FLEX I/O Input, Output, and Input/Output Analog Modules

Catalog Numbers 1794-IE8, 1794-OE4, and 1794-IE4XOE2, Series B

## 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.

| Topic | Page |
|---|---|
| Updated Certifications | 13 |
| Added Additional Resources | 13 |

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## 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 more installation requirements.
- NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

## Prevent Electrostatic Discharge

⚠ **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:
- 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.

## UK and European Hazardous Location Approval

The following modules are UK and European Zone 2 approved: 1794-IE8, 1794-OE4, and 1794-IE4XOE2, series B.

**The following applies to products marked ⟨Ex⟩ 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 and EN IEC 60079-7:2015+A1:2018.
- Comply with standards EN IEC 60079-0:2018 and EN IEC 60079-7:2015+A1:2018 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 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 with 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 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.
- The instructions in the user manual shall be observed.
- This equipment must be used only with UKEX/ATEX/IECEx certified Rockwell Automation backplanes.
- Earthing is accomplished through mounting of modules on rail.

⚠ **WARNING:** 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.

⚠ **WARNING:** When you insert or remove the module while backplane power is on, an electric 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. Repeated electric arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

# Overview

The FLEX™ I/O module mounts on a 1794 terminal base.
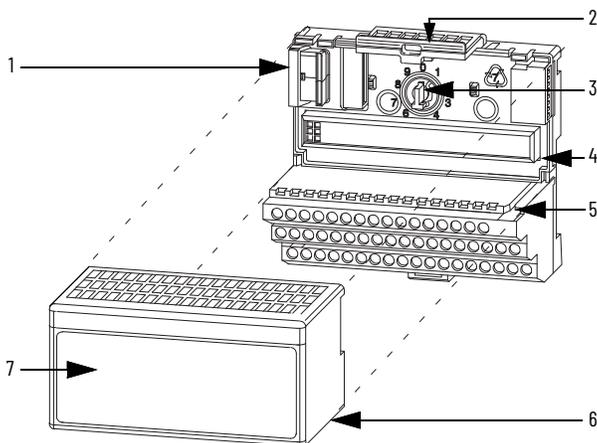


| | Description | | Description |
|---|---|---|---|
| 1 | Flexbus connectors | 5 | Groove |
| 2 | Latching mechanism | 6 | Alignment bar |
| 3 | Keyswitch | 7 | Module |
| 4 | Terminal base | | |

# Install Your Module

> ⚠️ **ATTENTION:** During mounting of all devices, be sure that all debris (metal chips, wire strands, and so on) is kept from falling into the module. Debris that falls into the module could cause damage on power-up.

1. Rotate the keyswitch (3) on the terminal base (4) clockwise to position 3 (1794-IE8), 4 (1794-OE4) or 5 (1794-IE4XOE2) as required.
2. Make sure the Flexbus connector (1) is pushed all the way to the left to connect with the neighboring terminal base or 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 align properly with the connector in the terminal base.
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 Analog Inputs and Outputs

1. Connect individual input/output wiring to numbered terminals on the 0-15 row (A) for 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, and 1794-TB3TS, or on row (B) for the 1794-TBN as indicated in <u>Table 1</u>, <u>Table 2</u>, and <u>Table 3</u>.

| **IMPORTANT** | Use Belden 8761 cable for signal wiring. |
|---|---|

2. Connect channel common/return to the associated terminal on row (A) or row (B) for the 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, and 1794-TB3TS, or on row (C) for the 1794-TBN. For input devices requiring terminal base power, connect the channel power wiring to the associated terminal on row (C).
3. Connect any signal wiring shields to functional ground as near as possible to the module.
   **For 1794-TB3T or 1794-TB3TS only** – Connect to earth ground terminals C-39...C-46.
4. Connect the +V DC power to terminal 34 on the 34...51 row (C) and -V common/return to terminal 16 on the B row.

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

5. If daisy chaining +V power to the next terminal base, connect a jumper from terminal 51 (+V DC) on this base unit to terminal 34 on the next base unit.
6. If continuing DC common (-V) to the next terminal base, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit.

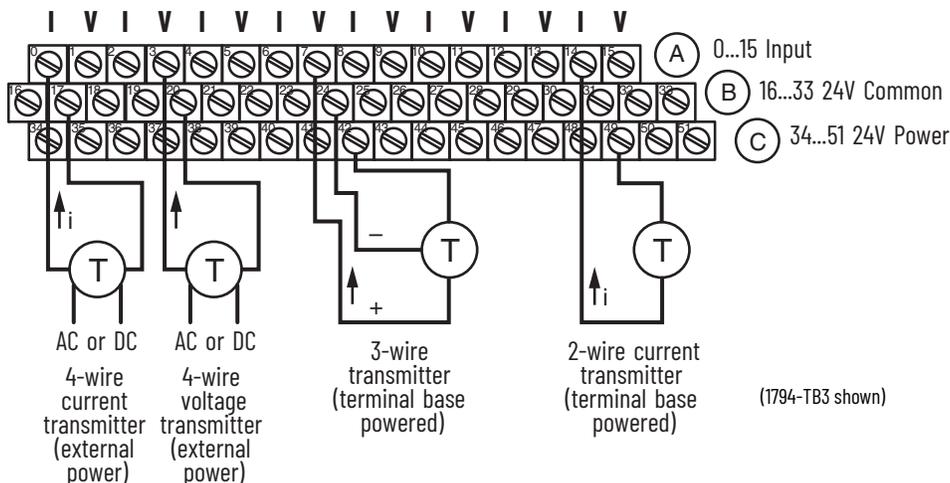**Figure 1 - Terminal Base Wiring for the 1794-IE8 Module**



(1794-TB3 shown)

**Table 1 - Wiring Connections for the 1794-IE8 Module**

| Channel | Signal Type | Label Marking | 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, 1794-TB3TS | 1794-TB3, 1794-TB3S | 1794-TB2, 1794-TB3, 1794-TB3S | 1794-TB3T, 1794-TB3TS | |
|---------|-------------|---------------|-----|-----|-----|-----|-----|
| | | | Input | Power[1] | Common Terminal | | Shield |
| Input 0 | Current | I0 | A-0 | C-35 | B-17 | B-17 | C-39 |
| | Voltage | V0 | A-1 | C-36 | B-18 | B-17 | |
| Input 1 | Current | I1 | A-2 | C-37 | B-19 | B-19 | C-40 |
| | Voltage | V1 | A-3 | C-38 | B-20 | B-19 | |
| Input 2 | Current | I2 | A-4 | C-39 | B-21 | B-21 | C-41 |
| | Voltage | V2 | A-5 | C-40 | B-22 | B-21 | |
| Input 3 | Current | I3 | A-6 | C-41 | B-23 | B-23 | C-42 |
| | Voltage | V3 | A-7 | C-42 | B-24 | B-23 | |
| Input 4 | Current | I4 | A-8 | C-43 | B-25 | B-25 | C-43 |
| | Voltage | V4 | A-9 | C-44 | B-26 | B-25 | |
| Input 5 | Current | I5 | A-10 | C-45 | B-27 | B-27 | C-44 |
| | Voltage | V5 | A-11 | C-46 | B-28 | B-27 | |
| Input 6 | Current | I6 | A-12 | C-47 | B-29 | B-29 | C-45 |
| | Voltage | V6 | A-13 | C-48 | B-30 | B-29 | |
| Input 7 | Current | I7 | A-14 | C-49 | B-31 | B-31 | C-46 |
| | Voltage | V7 | A-15 | C-50 | B-32 | B-31 | |
| -V DC Common | 1794-TB2, 1794-TB3, and 1794-TB3S - Terminals 16...33 are internally connected in the terminal base unit.<br>1794-TB3T and 1794-TB3TS - Terminals 16, 17, 19, 21, 23, 25, 27, 29, 31, and 33 are internally connected in the terminal base unit. | | | | | | |
| +V DC Power | 1794-TB3 and 1794-TB3S - Terminals 34...51 are internally connected in the terminal base unit.<br>1794-TB3T and 1794-TB3TS - Terminals 34, 35, 50, and 51 are internally connected in the terminal base unit.<br>1794-TB2 - Terminals 34 and 51 are internally connected in the terminal base unit. | | | | | | |
| Chassis ground (Shield) | 1794-TB3T and 1794-TB3TS - Terminals 39...46 are internally connected to chassis ground. | | | | | | |

(1)    Use when transmitter requires terminal base power.

# Configure Your Module

Configure your input/output module by setting bits in the configuration word.

**Table 4 - Input Map (Read) - 1794-IE8**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 0 | S | Analog input value for Channel 0 | | | | | | | | | | | | | | |
| Word 1 | S | Analog input value for Channel 1 | | | | | | | | | | | | | | |
| Word 2 | S | Analog input value for Channel 2 | | | | | | | | | | | | | | |
| Word 3 | S | Analog input value for Channel 3 | | | | | | | | | | | | | | |
| Word 4 | S | Analog input value for Channel 4 | | | | | | | | | | | | | | |
| Word 5 | S | Analog input value for Channel 5 | | | | | | | | | | | | | | |
| Word 6 | S | Analog input value for Channel 6 | | | | | | | | | | | | | | |
| Word 7 | S | Analog input value for Channel 7 | | | | | | | | | | | | | | |
| Word 8 | PU | Not used - set to zero | | | | | | | U7 | U6 | U5 | U4 | U3 | U2 | U1 | U0 |
| Where: | PU = Power up in configuration<br>S = Sign bit in 2's complement<br>U = Underrange for specified channel | | | | | | | | | | | | | | | |

**Table 5 - Output Map (Write) - 1794-IE8**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 3 | C7 | C6 | C5 | C4 | C3 | C2 | C1 | C0 | F7 | F6 | F5 | F4 | F3 | F2 | F1 | F0 |
| Where: | C = Configure select bit<br>F = Full range bit | | | | | | | | | | | | | | | |

**Table 6 - Input Map (Read) - 1794-IE4X0E2**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 0 | S | Analog input value for Channel 0 | | | | | | | | | | | | | | |
| Word 1 | S | Analog input value for Channel 1 | | | | | | | | | | | | | | |
| Word 2 | S | Analog input value for Channel 2 | | | | | | | | | | | | | | |
| Word 3 | S | Analog input value for Channel 3 | | | | | | | | | | | | | | |
| Word 4 | PU | Not used - set to zero | | | | | | | W1 | W0 | U3 | U2 | U1 | U0 | | |
| Where: | PU = Power up in configuration<br>S = Sign bit in 2's complement<br>W1 and W0 = Diagnostic bits for current output. Wire off current loop status for output channels 0 and 1.<br>U = Underrange for specified channel | | | | | | | | | | | | | | | |

**Table 7 - Output Map (Write) - 1794-IE4X0E2**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 0 | S | Analog output data - Channel 0 | | | | | | | | | | | | | | |
| Word 1 | S | Analog output data - Channel 1 | | | | | | | | | | | | | | |
| Word 2 | Not used - set to 0 | | | | | | | | | | | | | | M1 | M0 |
| Word 3 | 0 | 0 | C5 | C4 | C3 | C2 | C1 | C0 | 0 | 0 | F5 | F4 | F3 | F2 | F1 | F0 |
| Words 4 and 5 | Not used - set to 0 | | | | | | | | | | | | | | | |
| Word 6 | | Safe state value for Channel 0 | | | | | | | | | | | | | | |
| Word 7 | | Safe state value for Channel 1 | | | | | | | | | | | | | | |
| Where: | PU = Power up in configuration<br>CF = In configuration mode<br>DN = Calibration accepted<br>U = Underrange for specified channel<br>P0 and P1 = Outputs holding in response to Q0 and Q1 | | | | | | | FP = Field power off<br>BD = Bad calibration<br>W1 and W0 = Wire off current loop status for output channels 0 and 1<br>V = Overrange for specified channel | | | | | | | | |

**Table 8 - Range Selection Bits - 1794-IE8 and 1794-IE4X0E2**

| 1794-IE8 | In Ch 0 | | In Ch 1 | | In Ch 2 | | In Ch 3 | | In Ch 4 | | In Ch 5 | | In Ch 6 | | In Ch 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1794-IE4X0E2** | In Ch 0 | | In Ch 1 | | In Ch 2 | | In Ch 3 | | Out Ch 0 | | Out Ch 1 | | | | | |
| | F0 | C0 | F1 | C1 | F2 | C2 | F3 | C3 | F4 | C4 | F5 | C5 | F6 | C6 | F7 | C7 |
| **Dec Bits** | 00 | 08 | 01 | 09 | 02 | 10 | 03 | 11 | 04 | 12 | 05 | 13 | 06 | 14 | 07 | 15 |
| 0...10V DC/ 0...20 mA | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 4...20 mA | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| -10...+10V DC | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Off[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Where: | C = Configure select bit F = Full range | | | | | | | | | | | | | | | |

(1) When configured to Off, individual input channels return 0000H; Output channels drive 0V/0 mA.

**Table 9 - Input Map (Read) - 1794-OE4**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Oct** | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 0 | PU | Not used - set to 0 | | | | | | | | | | | W3 | W2 | W1 | W0 |
| Where: | PU = Power up bit W0...W3 = Wire off current loop status for output channels | | | | | | | | | | | | | | | |

**Table 10 - Output Map (Write) - 1794-OE4**

| Dec | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Oct** | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Word 0 | S | Output Data Channel 0 | | | | | | | | | | | | | | |
| Word 1 | S | Output Data Channel 1 | | | | | | | | | | | | | | |
| Word 2 | S | Output Data Channel 2 | | | | | | | | | | | | | | |
| Word 3 | S | Output Data Channel 3 | | | | | | | | | | | | | | |
| Word 4 | | Not used - set to 0 | | | | | | | | | | | M3 | M2 | M1 | M0 |
| Word 5 | Not used - set to 0 | | | C3 | C2 | C1 | C0 | Not used - set to 0 | | | | | F3 | F2 | F1 | F0 |
| Word 6...9 | Not used - set to 0 | | | | | | | | | | | | | | | |
| Word 10 | S | Safe state value for Channel 0 | | | | | | | | | | | | | | |
| Word 11 | S | Safe state value for Channel 1 | | | | | | | | | | | | | | |
| Word 12 | S | Safe state value for Channel 2 | | | | | | | | | | | | | | |
| Word 13 | S | Safe state value for Channel 3 | | | | | | | | | | | | | | |
| Where: | S = Sign bit in 2's complement M = Multiplex control bit C = Configure select bit F = Full range bit | | | | | | | | | | | | | | | |

**Table 11 - Range Selection Bits - 1794-OE4**

| Channel Number | In Ch 0 | | In Ch 1 | | In Ch 2 | | In Ch 3 | |
|---|---|---|---|---|---|---|---|---|
| | F0 | C0 | F1 | C1 | F2 | C2 | F3 | C3 |
| **Dec Bits** | 00 | 08 | 01 | 09 | 02 | 10 | 03 | 11 |
| 0...10V DC/ 0...20 mA | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 4...20 mA | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| -10...+10V DC | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Off[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Where: | C = Configure select bit F = Full range | | | | | | | |

(1) When configured to Off, individual output channels drive 0V/0 mA.

# Specifications

## Input Specifications

| Attribute | Value |
|---|---|
| Number of inputs, single-ended, nonisolated | 8 – **1794-IE8**<br>4 – **1794-IE4X0E2** |
| Resolution | 12 bits unipolar; 11 bits plus sign bipolar<br>Voltage: 2.56 mV/cnt unipolar; 5.13 mV/cnt bipolar<br>Current: 5.13 μA/cnt |
| Data format | Left justified, 16 bit 2's complement |
| Conversion type | Successive approximation |
| Conversion rate | 256 μs all channels |
| Input current terminal, user configurable | 4...20 mA<br>0...20 mA |
| Input voltage terminal, user configurable | ±10V<br>0...10V |
| Normal mode rejection ratio | Voltage terminal: 3 dB @ 17 Hz; –20 dB/decade<br>–10 dB @ 50 Hz; –11.4 dB @ 60 Hz<br>Current terminal: –3 dB @ 9 Hz; –20 dB/decade<br>–15.3 dB @ 50 Hz; –16.8 dB @ 60 Hz |
| Step response to 63% | Voltage terminal: 9.4 ms<br>Current terminal: 18.2 ms |
| Input impedance | Voltage terminal: 100 kΩ<br>Current terminal: 238 Ω |
| Input resistance voltage | Voltage terminal: 200 kΩ<br>Current terminal: 238 Ω |
| Absolute accuracy[1] | 0.20% full-scale @ 25 °C (77 °F) |
| Accuracy drift with temperature | Voltage terminal: 0.00428% full-scale/ °C<br>Current terminal: 0.00407% full-scale/ °C |
| Calibration required | None required |
| Maximum overload, one channel at a time | 30V continuous or 32 mA continuous |
| Indicators | 1 green power indicator |

(1) Includes offset, gain, nonlinearity, and repeatability error terms.

## Output Specifications

| Attribute | Value |
|---|---|
| Number of outputs, single-ended, nonisolated | 4 – **1794-0E4**<br>2 – **1794-IE4X0E2** |
| Resolution | 12 bits plus sign<br>Voltage: 0.156 mV/cnt<br>Current: 0.320 μA/cnt |
| Data format | Left justified, 16 bit 2's complement |
| Conversion type | Pulse-width modulation |
| Output current terminal, user configurable | 0 mA output until module is configured<br>4...20 mA<br>0...20 mA |
| Output voltage terminal, user configurable | 0V output until module is configured<br>±10V<br>0...10V |
| Step response to 63% - voltage or current terminal | 24 ms |
| Current load on voltage output, max | 3 mA |
| Absolute accuracy[1] | Voltage terminal: 0.133% full-scale @ 25 °C (77 °F)<br>Current terminal: 0.425% full-scale @ 25 °C (77 °F) |
| Accuracy drift with temperature | Voltage terminal: 0.0045% full-scale/ °C<br>Current terminal: 0.0069% full-scale/ °C |
| Resistive load on mA output | 15...750 Ω @ 24V DC |

(1) Includes offset, gain, nonlinearity, and repeatability error terms.

## General Specifications

| Attribute | 1794-IE8 | 1794-OE4 | 1794-IE4X0E2 |
|---|---|---|---|
| Recommended terminal base unit | 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, and 1794-TB3TS terminal base units | 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, 1794-TB3TS, and 1794-TBN terminal base units | 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, and 1794-TB3TS terminal base units |
| Terminal base screw torque | Determined by the installed terminal base | | |
| Keyswitch position | 3 | 4 | 5 |
| Isolation voltage | Tested at 850V DC for 1 s between user power to system<br>No isolation between individual channels | | |
| External DC power supply voltage, nom | 24V DC | | |
| External DC power supply voltage range | 10.5…31.2V DC (includes 5% AC ripple) | | |
| External DC power supply current | 60 mA @ 24V DC | 150 mA @ 24V DC | 165 mA @ 24V DC |
| Flexbus current | 15 mA | | |
| Power dissipation, max | 3.0 W @ 31.2V DC | 4.5 W @ 31.2V DC | 4.0 W @ 31.2V DC |
| Thermal dissipation, max | 10.2 BTU/hr @ 31.2V DC | 13.6 BTU/hr @ 31.2V DC | 15.3 BTU/hr @ 31.2V DC |
| Wire category[1] | 2 | | |
| Wire size | Determined by the installed terminal base | | |
| Dimensions, approx. (H x W x D)<br>(with module installed) | 45.7 x 94 x 53.3 mm<br>(1.8 x 3.7 x 2.1 in.) | | |
| Enclosure type rating | None | | |
| North American temp code | T5 | T4 | T4A |
| UKEX/ATEX temp code | T4 | | |
| IECEx temp code | T4 | | |

(1)    You 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),<br>IEC 60068-2-2 (Test Bd, operating dry heat),<br>IEC 60068-2-14 (Test Nb, operating thermal shock):<br>-20…+55 °C (-4…+131 °F) |
| Temperature, surrounding air, max | 55 °C (131 °F) |
| Temperature, storage | IEC 60068-2-1 (Test Ab, unpackaged nonoperating cold),<br>IEC 60068-2-2 (Test Bb, unpackaged nonoperating dry heat),<br>IEC 60068-2-14 (Test Na, unpackaged nonoperating thermal shock):<br>–40…+85 °C (–40…+185 °F) |
| Relative humidity | IEC 60068-2-30 (Test Db, unpackaged nonoperating damp heat):<br>5…95% noncondensing |
| Vibration | IEC60068-2-6 (Test Fc, operating):<br>5 g @ 10…500Hz |
| Shock, operating | IEC60068-2-27 (Test Ea, unpackaged shock):<br>30 g |
| Shock, nonoperating | IEC60068-2-27 (Test Ea, unpackaged shock):<br>50 g |
| Emissions | IEC 61000-6-4 |
| ESD immunity | EC 61000-4-2:<br>4 kV contact discharges<br>8 kV air discharges |
| Radiated RF immunity | IEC 61000-4-3:<br>10V/m with 1 kHz sine-wave 80% AM from 80…6000 MHz |
| Conducted RF immunity | IEC 61000-4-6:<br>10V rms with 1 kHz sine-wave 80% AM from 150 kHz…30 MHz |
| EFT/B immunity | IEC 61000-4-4:<br>±2 kV at 5 kHz on signal ports |
| Surge transient immunity | IEC 61000-4-5:<br>±2 kV line-earth (CM) on shielded ports |