

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

ALLEN-BRADLEY

## 1794-IE8

EIGHT CHANNEL ANALOG INPUT MODULE

Used with the applicable FLEX I/O 1794 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Rockwell1794-TD016A-EN-E,09/2013;1794-IE8 column,pp.3 to 4

# 1794 FLEX I/O Analog, TC and RTD Modules Specifications

Standard FLEX I/O Catalog Numbers 1794-IE12, 1794-IE4X0E2, 1794-IE8, 1794-IE8X0E4, 1794-IF2X0F2I, 1794-IF4I, 1794-IR8, 1794-IRT8, 1794-IT8, 1794-OE12, 1794-OE4, 1794-OF4I

FLEX I/O XT Catalog Numbers 1794-IE4X0E2XT, 1794-IE8XT, 1794-IF2X0F2IXT, 1794-IF4IXT, 1794-IRT8XT, 1794-OE4XT, 1794-OF4IXT

| Topic                                     | Page |
|-------------------------------------------|------|
| Additional Resources                      | 1    |
| Available 1794 Analog, TC and RTD Modules | 2    |



The FLEX I/O module plugs into the terminal base, connecting to the I/O bus and field devices. Since there is no direct wiring to the I/O module, you can remove and insert modules under backplane power, enabling you to change modules without disturbing field wiring, other I/O modules, or FLEX backplane power.

This flexibility gives you the following choices of I/O signal types:

- Analog: current or voltage
- Temperature: thermocouple or RTD
- Combo modules: combination of input and output capability
- Harsh environments: use FLEX I/O XT in harsh environments

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

| Resource                                                                                                                                                          | Description                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>                                                                       | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, <a href="http://www.rockwellautomation.com/products/certification/">http://www.rockwellautomation.com/products/certification/</a> | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley® distributor or Rockwell Automation sales representative.



## Available 1794 Analog, TC and RTD Modules

### FLEX I/O Module Types

| Type             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analog           | FLEX I/O analog input, output and combination modules are block transfer modules that interface analog signals with any Allen-Bradley programmable controllers that have block transfer capability. Block transfer programming moves input from the module's memory to a designated area in the processor data table, and output data words from a designated area in the processor data table to the module's memory. Block transfer programming also moves configuration words from the processor data table to module memory. |
| Thermocouple /mV | This module type is a temperature/mV measuring module that accepts inputs from a variety of thermocouples and from the mV source in the range of $\pm 76.5$ mV.                                                                                                                                                                                                                                                                                                                                                                  |
| Thermocouple/RTD | The module type is a high-speed, high-accuracy temperature/mV measuring module that accepts thermocouple inputs, 2-, 3-, and 4-wire RTD inputs, and mV source inputs.                                                                                                                                                                                                                                                                                                                                                            |
| RTD              | The RTD module type is a temperature-measuring module that accepts 2-, 3- and 4-wire RTDs in the range of 1 . . 433 $\Omega$ .                                                                                                                                                                                                                                                                                                                                                                                                   |

### FLEX I/O Modules

| Module Type      |             | Catalog Number                                 | Page |
|------------------|-------------|------------------------------------------------|------|
| Analog           | Input       | 1794-IE8<br>1794-IE8XT<br>1794-IE12            | 3    |
|                  |             | 1794-IF4I<br>1794-IF4IXT                       | 6    |
|                  | Output      | 1794-OE4<br>1794-OE4XT<br>1794-OE12            | 9    |
|                  |             | 1794-OF4I<br>1794-OF4IXT                       | 11   |
|                  | Combination | 1794-IE4XOE2<br>1794-IE4XOE2XT<br>1794-IE8XOE4 | 14   |
|                  |             | 1794-IF2XOF2I<br>1794-IF2XOF2IXT               | 17   |
| Thermocouple/RTD |             | 1794-IT8<br>1794-IR8                           | 20   |
|                  |             | 1794-IRT8<br>1794-IRT8XT                       | 23   |

## 1794-IE8, 1794-IE8XT, 1794-IE12

FLEX I/O Analog 8 Input Module, Analog 8 Input Extreme Temperature Module, Analog 12 Input Module

### Technical Specifications

| Attribute                                      |                       | 1794-IE8                                                                                                                                                                            | 1794-IE8XT               | 1794-IE12                                                                                                                                                                                                         |
|------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of Inputs                               |                       | 8 single-ended, nonisolated                                                                                                                                                         |                          | 12 single-ended, nonisolated                                                                                                                                                                                      |
| Indicators                                     |                       | 1 red/green power/status indicator                                                                                                                                                  |                          |                                                                                                                                                                                                                   |
| Flexbus current, 5V DC                         |                       | 15 mA                                                                                                                                                                               | 10 mA                    | 80 mA                                                                                                                                                                                                             |
| Power supply                                   | Specification         | 24V DC nominal, 10.5...31.2V DC (includes 5% AC ripple)                                                                                                                             |                          | 24V DC nominal, 10.5...31.2V DC (includes 5% AC ripple)                                                                                                                                                           |
|                                                | Current:              | 60 mA @ 24V DC                                                                                                                                                                      |                          | 30 mA @ 24V DC                                                                                                                                                                                                    |
|                                                | Certification         |                                                                                                                                                                                     |                          |                                                                                                                                                                                                                   |
|                                                | Voltage :<br>Current: | 24V DC<br>60 mA                                                                                                                                                                     | 10.5...31.2V DC<br>60 mA | 24V DC<br>60mA                                                                                                                                                                                                    |
| Input voltage terminal                         | Specification         | $\pm 10V$ (user configurable)                                                                                                                                                       |                          | $\pm 10V$ (user configurable)                                                                                                                                                                                     |
|                                                | Certification         | 0...10V (user configurable)                                                                                                                                                         |                          |                                                                                                                                                                                                                   |
| Input current terminal                         | Specification         | 4...20 mA (user configurable)                                                                                                                                                       |                          |                                                                                                                                                                                                                   |
|                                                | Certification         | 0...20 mA (user configurable)                                                                                                                                                       |                          |                                                                                                                                                                                                                   |
| Input resolution                               |                       | 12 bits – unipolar<br>11 bits plus sign – bipolar                                                                                                                                   |                          | 16 bits                                                                                                                                                                                                           |
| Voltage:                                       |                       | 2.56 mV/cnt – unipolar<br>5.13 mV/cnt – bipolar                                                                                                                                     |                          | 320 $\mu V$ /cnt                                                                                                                                                                                                  |
| Current:                                       |                       | 5.13 $\mu A$ /cnt                                                                                                                                                                   |                          | 0.641 $\mu A$ /cnt                                                                                                                                                                                                |
| Data format                                    |                       | Left justified 16-bit                                                                                                                                                               |                          |                                                                                                                                                                                                                   |
| Input conversion type                          |                       | Successive approximation                                                                                                                                                            |                          |                                                                                                                                                                                                                   |
| Input conversion rate                          |                       | 256 $\mu s$ all channels                                                                                                                                                            |                          | 8 ms all channels                                                                                                                                                                                                 |
| Input impedance, nom                           |                       |                                                                                                                                                                                     |                          |                                                                                                                                                                                                                   |
| Voltage terminal:                              |                       | 100 k $\Omega$                                                                                                                                                                      |                          | > 1 M $\Omega$                                                                                                                                                                                                    |
| Current terminal:                              |                       | 238 $\Omega$                                                                                                                                                                        |                          | < 100 $\Omega$ <sup>(2)</sup>                                                                                                                                                                                     |
| Normal mode rejection ratio                    |                       | Voltage terminal:<br>-3 dB @ 17 Hz; -20 dB/decade<br>-10 dB @ 50 Hz<br>-11.4 dB @ 60 Hz<br>Current terminal:<br>-3 dB @ 9 Hz; -20 dB/decade<br>-15.3 dB @ 50 Hz<br>-16.8 dB @ 60 Hz |                          | Voltage/current terminal:<br>-3 dB @ 0.05 Hz; -20 dB/decade<br>-52 dB @ 50 Hz<br>-54 dB @ 60 Hz<br>Voltage/current terminal with Quick Step:<br>-3 dB @ 1.5 Hz; -20 dB/decade<br>-29 dB @ 50 Hz<br>-31 dB @ 60 Hz |
| Step response to 63% of full scale             |                       |                                                                                                                                                                                     |                          |                                                                                                                                                                                                                   |
| Voltage input:                                 |                       | 9.4 ms                                                                                                                                                                              |                          | 1.3 s (0.09 s with Quick Step - current or voltage input)                                                                                                                                                         |
| Current input:                                 |                       | 18.2 ms                                                                                                                                                                             |                          |                                                                                                                                                                                                                   |
| Absolute accuracy <sup>(1)</sup>               |                       |                                                                                                                                                                                     |                          |                                                                                                                                                                                                                   |
| Voltage input:                                 |                       | 0.20% full scale @ 25 °C                                                                                                                                                            |                          | 0.1% full scale @ 25 °C                                                                                                                                                                                           |
| Current input:                                 |                       | 0.20% full scale @ 25 °C                                                                                                                                                            |                          | 0.1% full scale @ 25 °C                                                                                                                                                                                           |
| Accuracy drift with temperature <sup>(1)</sup> |                       |                                                                                                                                                                                     |                          |                                                                                                                                                                                                                   |
| Voltage input:                                 |                       | 0.00224 full scale %/°C                                                                                                                                                             |                          | 0.004 full scale %/°C                                                                                                                                                                                             |
| Current input:                                 |                       | 0.00329 full scale %/°C                                                                                                                                                             |                          | 0.004 full scale %/°C                                                                                                                                                                                             |
| Calibration                                    |                       | Factory calibrated                                                                                                                                                                  |                          |                                                                                                                                                                                                                   |

**Technical Specifications**

| Attribute                              | 1794-IE8                                                                                                                                            | 1794-IE8XT                 | 1794-IE12                                                                                                                                                                 |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum voltage overload               | 30V continuous, one channel at a time                                                                                                               |                            |                                                                                                                                                                           |
| Maximum current overload               | 32 mA continuous, one channel at a time                                                                                                             |                            |                                                                                                                                                                           |
| Isolation voltage                      | 50V (continuous), Basic insulation type between field side and system side<br>Tested @ 1000V AC for 60s<br>No isolation between individual channels |                            | 50V (continuous), Basic Insulation Type Basic insulation type between field side and system side<br>Tested @ 850V AC for 60 s<br>No isolation between individual channels |
| Power dissipation, max                 | 3.0W @ 31.2V DC                                                                                                                                     |                            | 1.2 W @ 31.2V DC,                                                                                                                                                         |
| Thermal dissipation                    | 10.2 BTU/hr @ 31.2V DC                                                                                                                              |                            | 4.1 BTU/hr @ 31.2V DC                                                                                                                                                     |
| Recommended terminal base              | 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TB3T, 1794-TB3TS, 1794-TBKD, 1794-TB37DS                                                                        |                            | 1794-TB3G or 1794-TB3GS                                                                                                                                                   |
| Terminal base screw torque             | 0.8 Nm (7 lb-in.)<br>1 Nm (9 lb-in.) for 1794-TBN                                                                                                   |                            |                                                                                                                                                                           |
| Wire type                              | Shielded                                                                                                                                            |                            |                                                                                                                                                                           |
| Wire size                              | Determined by installed terminal base                                                                                                               |                            |                                                                                                                                                                           |
| North american temperature code        | T5                                                                                                                                                  | T4A                        |                                                                                                                                                                           |
| IEC temperature code                   | T5                                                                                                                                                  | T4                         | -                                                                                                                                                                         |
| Enclosure type rating                  | None (Open style)                                                                                                                                   |                            |                                                                                                                                                                           |
| Dimensions, approx. (HxWxD)            | 46 x 94 x 53 mm (1.8 x 3.7 x 2.1 in.)                                                                                                               |                            |                                                                                                                                                                           |
| Publication, Installation Instructions | <a href="#">1794-IN100</a>                                                                                                                          | <a href="#">1794-IN125</a> | <a href="#">1794-IN106</a>                                                                                                                                                |

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

(2) If 24V DC is removed from the module, input resistance is < 100  $\Omega$ . This is also true at 0 mA current input even if there is 24V DC. If there is an input current applied, input impedance is > 1 M  $\Omega$ .**Environmental Specifications**

| Attribute                 | 1794-IE8                                                                                                                                                                                                               | 1794-IE8XT                | 1794-IE12                 |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| 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):                                                                         |                           |                           |
|                           | -20...55 °C (-4...131 °F)                                                                                                                                                                                              | -20...70 °C (-4...158 °F) | -20...60 °C (-4...140 °F) |
| Temperature, nonoperating | 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                 | IEC 60068-2-6 (Test Fc, Operating):<br>5 g @ 10...500 Hz                                                                                                                                                               |                           |                           |
| Shock, operating          | IEC 60068-2-27 (Test Ea, Unpackaged Shock):<br>30 g                                                                                                                                                                    |                           |                           |
| Shock, nonoperating       | IEC 60068-2-27 (Test Ea, Unpackaged Shock):<br>50 g                                                                                                                                                                    |                           |                           |
| Emissions                 | CISPR 11: Group 1, Class A                                                                                                                                                                                             |                           |                           |
| ESD immunity              | IEC 61000-4-2:<br>6kV contact discharges<br>8 kV air discharges                                                                                                                                                        |                           |                           |