MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

ALLEN-BRADLEY FLEX I/O

1797-IRT8

EIGHT-CHANNEL THERMOCOUPLE AND RTD INPUT MODULE

Applicable product family: Allen-Bradley FLEX Ex I/O

OFFICIAL SOURCE

1797-IRT8.pdf

The following pages are selected from the supplied manufacturer document and retain their original page content.

FLEX I/O, FLEX I/O XT, and FLEX Ex

Allen-Bradley

Bulletin 1794 and 1797
1794-SG002F-EN-P

Specify a FLEX Ex System

Follow these steps as you specify your FLEX Ex I/O system:

✓	Step	See	Page
	1 Select an adapter and distribution method Choose an adapter and fiber hub or coax barrier to distribute FLEX Ex into the hazardous area. Or, choose a bus isolator pair to connect to various networks.	Select FLEX Ex I/O Communication Adapters and Distribution Method 1797-RPFM ControlNet Ex 3 km Fiber Media Port Adapter 1797-BCNR Coax Barrier Module 1797-BIC Bus Isolator Module and 1797-CEC FlexBus Connector	81 84 84 86
	2 Determine the I/O devices • location of the device • number of points needed • appropriate catalog number • number of points available per module • number of modules	Digital I/O Modules Analog Modules HART Interface Modules Counter I/O Module	89 93 97 100
	3 Select a terminal base Choose an appropriate terminal base for your modules.	Terminal Base Wiring Diagrams	105
	4 Select power supplies • Choose appropriate power supply • Ensure sufficient power for the communication adapter and modules	Select a FLEX Ex I/O Power Supply Understanding System Planning Assigning Power Supplies Hazardous Area Installation General Specification Comparison	107 108 110 111 107
	5 Select optional accessories • Determine whether to panel mount or DIN rail mount the FLEX I/O system and at what orientation (horizontal or vertical) • Choose appropriate optional accessories to enhance your system	Mount the FLEX System 1794-CE1 and 1794-CE3 Extender Cables 1797-BOOT ControlNet BNC Boot 1797-INS Trunk Insulator and 1797-EXMK Marking Kit ControlNet Ex Taps	115 117 119 119 120

Analog Modules

Choose analog I/O modules when you need:

- **Configurable channels** allow the module to be used with a variety of sensors.
- **On-board scaling** eliminates the need to scale the data in the controller. Controller processing time and power are preserved for more important tasks, such as I/O control, communications, or other user-driven functions.
- **On-line configuration**. Modules can be configured in RUN mode using the programming software or the control program. This allows you to change configuration while the system is operating. For example, the input filter for a particular channel could be changed, or a channel could be disabled based on a batch condition.
- **Over- and under-range detections and indications** eliminates the need to test values in the control program, saving valuable processing power of the controller. In addition, since alarms are handled by the module, the response is faster and only a single bit needs to be monitored to determine if an error condition has occurred.
- **Ability to direct output device operation during an abnormal condition**. Each channel of the output module can be individually configured to hold its last value or assume a user-defined value on either a run-to-program or run-to-fault condition. This feature allows you to set the condition of your analog devices, and therefore your control process, which may help to ensure a reliable shutdown.
- **Selectable input filters** allows you to select from several different filter frequencies for each channel that best meets the performance needs of your application based on environmental limitations. Lower filter settings provide greater noise rejection and resolution. Higher filter settings provide faster performance.
- **Selectable response to broken input sensor**. This feature provides feedback to the controller that a field device is not connected or operating properly. This allows you to specify corrective action based on the bit or channel condition.

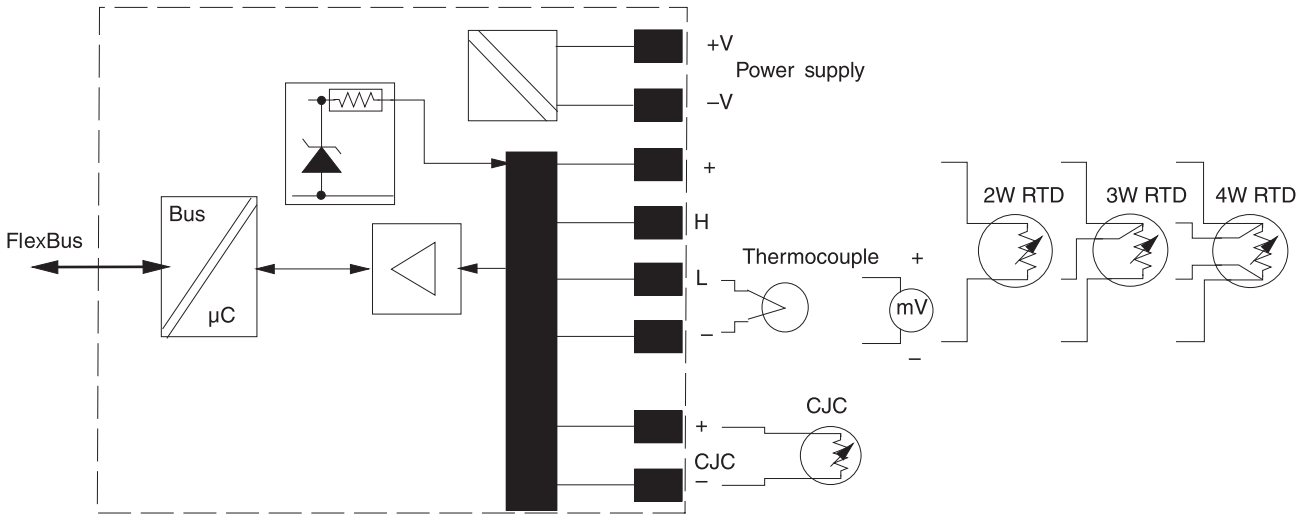
Analog I/O Module Summary

Catalog Number	Inputs	Outputs	Terminal Base Unit	Signal Range	Module Type
Input Modules					
1797-IE8	8	—	1797-TB3, 1797-TB3S	0…20 mA	16-bit single-ended, nonisolated inputs
1797-IE8H					16-bit single-ended, nonisolated inputs with HART capability
1797-IE8NF					16-bit single-ended, nonisolated inputs with noise filter
1797-IRT8				0…500 Ω -40…100 mV TC RTD	16-bit, nonisolated RTD thermocouple/mV inputs

1797-IRT8 8 Point 16-bit Non-isolated RTD Thermocouple/mV Input Module

- input channels referenced to a single common
  - RTD mode
  - RTD types Pt100, Pt200, Ni100, Ni200, Ni120, Cu10
  - 2-, 3-, and 4-wire connection
  - sensor lead breakage and short circuit detection all 4 leads
  - measuring resistance 0...500 Ω
  - accuracy: 0.1% of span at 20 °C, filter cutoff < 1 Hz
- mV mode
  - input voltage -40...100 mV differential sensing
  - sensor breakage detection
- thermocouple mode
  - types B, E, J, K, TXK/XK (L), N, R, S, T
  - cold junction compensation (CJC)
  - external reference junction (programmable)
  - sensor breakage detection
  - accuracy: 0.1% of span, filter cutoff < 1 Hz
  - accuracy of CJC: ± 1 C/K

Schematic Drawing of the 1797-IRT8 Module



8 Point 16-bit Non-isolated RTD Thermocouple/mV Input Module

Specification	1797-IRT8
Input type	Suitable for Pt 100, Pt200, Ni 100, Ni120, Ni200, Cu10 RTD, Thermocouple Type B, E, J, K, N, R, S, T, TXK/XK(L) Configuration via internal bus

8 Point 16-bit Non-isolated RTD Thermocouple/mV Input Module

Specification	1797-IRT8
Input signal range	0…500 Ω -40…100 mV TC RTD
Settling time	8 ms to 99% of final value (mV mode, °F thermocouple)
Open RTD detection	Out of range upscale reading
Lead resistance compensation	< 15 Ω total
Transfer characteristics, accuracy	RTD: 0.1% of span @ 20 °C, filter cutoff < 1 Hz Thermocouple: 0.1% of span @ 20 °C, filter cutoff < 1 Hz Cold junction compensation: ± 1 °C
Temperature drift	150ppm/ °C (primary range)
Data organization	Overrange Alarm – Individually for each channel Lead Breakage Alarm – Individually for each channel Fault State – Individually for each channel (includes overrange, lead breakage and short circuit) Sensor Mode RTD 2, 3, or 4-wire – Common to groups of 4 channels (ch 0…3, ch 4…7) TC Sensor Type (for example TC, Type B, E, J..., RTD or mV) - Common to groups of 4 channels (ch 0…3, ch 4…7) Internal Reference Junction (TC mode) – Common to all channels (0 °C, 20 °C, 25 °C, 30 °C, 40 °C, 50 °C, 60 °C, 70 °C
Noxious gas exposure	Tested to severity level G3, ISA-S71.04-1985
FLEX Ex power consumption	1.6 W @ 9V
Power dissipation, max	1.6 W
Thermal dissipation, max	5.46 BTU/hr
Dimensions (H x W x D)	46 x 94 x 75 mm (1.8 x 3.7 x 2.95 in.) 94 x 94 x 91 mm (3.7 x 3.7 x 3.6 in.) installed

HART Interface Modules

FLEX Ex HART analog modules (1797-IE8H and 1797-OE8H) are ideal for use in applications that need connection with FDT (Field Device Tool) compatible asset management software, such as Rockwell Software FieldCare HART Communication bundle or Endress + Hauser Fieldcare. For HART Device Type Management (DTM) programs and drivers, go to http://www.ab.com/io, and select Configurations Files, DTM files for HART.

- FLEX HART analog modules can be used on ControlNet or EtherNet/IP. The FLEX Ex Ethernet adapter requires firmware v3.1 or later, which is flash upgradeable, to support these modules.
- Each HART field device is wired to its own input or output channel:
  - 8 single-ended channels
  - does not support multi-drop
  - 2- or 3-wire devices
- HART commands can be transmitted by unscheduled message:
  - sample RLL subroutines are available.
  - currently limited to one instance of RLL subroutine per module, one channel at a time.

Select a FLEX Ex I/O Terminal Base Unit

Step 3 – Select:

the appropriate terminal base unit for your module and system

Each FLEX Ex I/O module requires a FLEX Ex I/O terminal base unit that snaps onto the DIN rail to the right of the I/O adapter. The terminal bases provide terminal connection points for the I/O wiring and plug together to form the backplane. They are available with screw, clamp, or spring terminations.

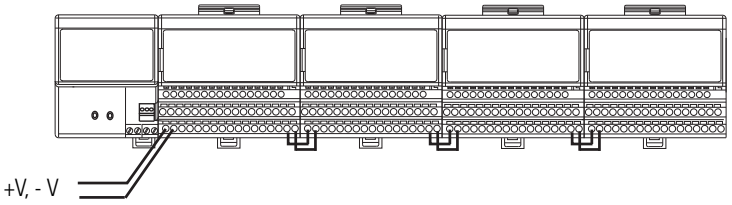
The following table is a comparison of general specifications for each FLEX Ex I/O terminal base unit. For compatibility with FLEX Ex I/O modules, see Table Digital I/O Module Summary on page 89 and Table Analog I/O Module Summary on page 93.

Terminal Base Wiring Diagrams

1797-TB3 and 1797-TB3S

Wiring when total module current draw is less than 8.5 W

Daisy-chaining Using Adapter Power Supply



Use this method when the total module power draw is less that 8.5 W. Otherwise, power is connected to individual modules.

FLEX Ex I/O

Additional user documentation presents information according to the tasks you perform and the programming environment you use. Refer to the table for information on 1794 FLEX Ex I/O publications.

1797 FLEX Ex I/O Related Publications

	Catalog Number	Description	Publication
Communication	1797-ACNR15	ControlNet Ex Redundant Media Adapter Installation Instructions	1797-IN014
	1797-RPA	ControlNet Ex Modular Repeater Adapter Fiber Repeater Module Installation Instructions	1797-IN015
	1797-RPFM		
Intermixed	1797-BIC	FLEX Ex Bus Isolator and FlexBus Connector Installation Instructions	1797-IN513
	1797-CEC		
	1797-BCNR	FLEX Ex Redundant ControlNet Barrier Module Installation Instructions	1797-IN535
Bases	1797-TB3	FLEX Ex Terminal Base Installation Instructions	1794-IN001
	1797-TB3S		
Digital	1797-IBN16	FLEX Ex NAMUR Input Module Installation Instructions	1797-IN007
	1797-OB4D	FLEX Ex 24V DC Nonisolated Source 4 Output Module Installation Instructions	1797-IN006
Analog	1797-IE8	FLEX Ex Analog Modules User Manual	1797-UM002
	1797-IE8H	FLEX Ex HART Analog Modules User Manual	1797-UM005
	1797-IE8NF	FLEX Ex Analog Modules User Manual	1797-UM002
	1797-IRT8	FLEX Ex Thermocouple/RTD Module Installation Instructions	1797-IN004
		FLEX Ex Thermocouple/RTD/mV Input Module User Manual	1797-UM003
Analog	1797-OE8	FLEX Ex Analog Modules User Manual	1797-UM002
	1797-OE8H	FLEX Ex 8 Output Analog Modules Installation Instructions	1797-IN003
		FLEX Ex HART Analog Modules User Manual	1797-UM005
Counter	1797-IJ2	FLEX Ex Frequency Input Module Installation Instructions	1797-IN009
Power supplies	1797-PS1N	FLEX Ex 85-250V AC In/Quad-Ex DC Out Power Supply Installation Instructions	1797-IN534
	1797-PS1E	FLEX Ex 85-253V AC In/Quad-Ex DC Out Power Supply Installation Instructions	1797-IN533
	1797-PS2N2	FLEX Ex Power Supply Installation Instructions	1797-IN012
	1797-PS2E2	FLEX Ex Power Supply Installation Instructions	1797-IN535
Accessories	1797-EXMK	FLEX Ex Cable Marking Kit Installation Instructions	1797-IN023
	1797-TCAP	ControlNet Tap Terminator Installation Instructions	1797-IN030

For More Information

If you would like a manual, you can:

- download a free electronic version from the Internet: http://www.rockwellautomation.com/literature/
- purchase a printed manual by contacting your local Allen-Bradley distributor or Rockwell Automation representative.