

FLEX I/O HART Analog Modules

FLEX I/O HART Catalog Numbers 1794-IE8H, 1794-IF8IH, 1794-OE8H, 1794-OF8IH, 1794-IF8IHNEXT

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FLEX I/O™ HART modules provide your process automation system with full analog capability and the benefit of HART® (Highway Addressable Remote Transducer) protocol in an I/O module that can be used remotely. The modules offer 8 channels of analog input or output data with accompanying HART digital information.

If you have a process application that contains HART field devices, the FLEX HART modules enable you to leverage your existing instrumentation investment by:

- Connecting directly to HART devices, without the need for external HART multiplexers or additional wiring
- Providing access to more field device data, such as HART Primary Value as well as device status information
- Individually managing HART devices connected directly to the modules.

Additional Resources

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

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.rockwellautomation.com/products/certification/	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 HART Analog Modules

HART is a field proven, global industry standard with unmatched range of products and worldwide support. Using Cyclic EDT, a mechanism is used to transfer the large amount of HART data between the module and the adapter and via an additional connection to the controller for use by the end application.

FLEX I/O Module Types

Type	Description
1794-IE8H 1794-OE8H	<ul style="list-style-type: none"> Conformal coated modules Provide connection to HART smart field devices such that valuable information is obtainable to help plants: <ul style="list-style-type: none"> Avoid process disruptions Improve process operations Better manage plant assets Customers want to bring HART data into their controllers, HMI and asset management software. These modules address this need. These modules provide analog and HART in one module. No need for separate analog module nor separate wiring as with traditional solutions. HART commands can be sent/received embedded in unscheduled CIP messages by a controller, HMI or third party software on ControlNet or EtherNet/IP. Compatible with FDT-based HART device management software through use of DTMs.
1794-IF8IH 1794-OF8IH 1794-IF8IHNFXT	<ul style="list-style-type: none"> Can be User configured to support a variety of applications including digital HART sensors and/or traditional analog sensors requiring high channel to channel isolation. Support 8 channels of current input in multiple ranges and multiple formats. The module provides “120 VAC continuous” isolation between channels. The module will draw most of its power from a user provided external 24 VDC power supply. RoHS compliance and extended temperature operation, a change in input filter characteristics and a number of functional changes from the the existing 1794-IF8IH module to create the 1794-IF8IHNFXT module.

FLEX I/O Modules

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1794-IE8H, 1794-OE8H

FLEX I/O HART Enabled Analog 8 Input Module, HART Enabled Analog 8 Output Module.

Technical Specifications

Attribute	1794-IE8H	1794-OE8H
Number of inputs/outputs	8 single ended, non-isolated, non dedicated HART modem per channel	8 dual ended output channels referenced over sense resistors to a single common
Conformally coated	Yes	
Indicators	8 red fault indicators 8 yellow HART communication indicators 1 green power indicator	
Flexbus current, 5V DC	80 mA	
Power supply Voltage: Current:	24V DC nominal, 19.2...31.2V DC (includes 5% AC ripple) 190 mA @ 24V DC	
Functional data range	>17V @ 22 mA >23V @ 0 mA	>15V @ 22 mA >22V @ 0 mA
Resolution	16 bits	13 bits, 12.5 bits 4...20mA
Data format	2's complement, mA or integer values, % of full scale	
Conversion type	Successive approximation	Sigma delta
Conversion rate	10 ms (50 Hz) / 8.33 ms (60 Hz)	10 ms all channels
Step response to 99% of full scale	80 ms	18 ms
All channels updated to FLEX Bus	≤ 10 ms	≤ 13 ms
Module to appear approximate best/ worst update time	200 μs / 1600 μs	
Temperature drift	50 ppm/C (K)	80 ppm/C (K)
Absolute accuracy ⁽¹⁾	0.1% Full Scale @ 20 °C (68 °F)	
Accuracy drift with temperature ⁽¹⁾	0.05% full scale for 0...55 °C (32...131 °F)	0.010% full scale for 0...55 °C (32...131 °F)
Calibration	Factory calibrated	
Isolation voltage	50V (continuous), Basic insulation type between field side and system Tested @ 850V AC for 1 s with no isolation between individual channels	
Power dissipation, max	3.9 W @ 31.2V DC	6.1 W @ 31.2V DC
Thermal dissipation	13.5 BTU/hr @ 31.2V DC	20.8 BTU/hr @ 31.2V DC
Recommended terminal base	1794-TB3G or 1794-TB3GS	
Terminal base screw torque	0.8 Nm (7 lb-in.)	
Wire type	Shielded	
Wire size	Determined by installed terminal base	
Compatibility	HART 5	
Device supported	2 wires	
North American temperature code	T4A	
IEC temperature code	T4	

Technical Specifications

Attribute	1794-IE8H	1794-OE8H
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	1794-IN108	1794-IN109

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

Environmental Specifications

Attribute	1794-IE8H	1794-OE8H
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...55 °C (-4...131 °F)	
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40...85 °C (-40...185 °F)	
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Nonoperating Damp Heat): 5...95% noncondensing	
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10...500 Hz	
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 15 g	
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 15 g	
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)	
ESD immunity	IEC 61000-4-2: 6kV contact discharges 8 kV air discharges	
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...2500 MHz 1V/m with 1 kHz sine-wave 80% AM from 2500...2700 MHz	
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on signal ports	
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±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 10 kHz...80 MHz	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz

Certifications

Certification ⁽¹⁾ (When marked on product)	1794-IE8H	1794-OE8H
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	
CE	European Union 2004/108/IEC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)	
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions	
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" EN 60079-0; General Requirements II 3 G Ex nA IIC T4 X	
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3	

(1) See the Product Certification link at <http://www.rockwellautomation.com/products/certification/> for Declaration of Conformity, Certificates, and other certification details.

1794-IF8IH, 1794-OF8IH, 1794-IF8IHNFXT

FLEX I/O HART Enabled Isolated Analog 4 Input Module, FLEX I/O HART Enabled Isolated Analog 4 Input Extreme Temperature Module

Technical Specifications

Attribute	1794-IF8IH	1794-OF8IH	1794-IF8IHNFXT
Number of inputs/outputs	8 single-ended isolated		
Indicators	1 red/green power/status indicator		
Flexbus current, 5V DC	80 mA		
Power supply Voltage	24V DC nominal, 19.2...31.2V DC (includes 5% AC ripple)	24V DC nominal, 19.2...31.2V DC (includes 5% AC ripple)	24V DC nominal, 19.2...31.2V DC (includes 5% AC ripple)
Current	190 mA @ 24V DC	450 mA @ 24V DC	190 mA @ 24V DC
Current terminal	4...20 mA (user configurable) 0...20 mA (user configurable) 0 mA output until product is configured		
Resolution	16 bits - unipolar 15 bits plus sign - bipolar 0.320 μ A/cnt unipolar 0.640 μ A/cnt bipolar	16 bits - unipolar 0.305 μ A/cnt unipolar	16 bits - unipolar 0.3052 μ A/cnt unipolar 0.6104 μ A/cnt bipolar
Data format	Engineering Units ⁽²⁾ Percent of Full Scale RAW/Proportional Count		
Conversion type	Sigma Delta	16 bits digital to analog converter	Sigma Delta
Conversion rate	Refer to update rate table in publication, 1794-IN115	10 ms	Refer to update rate table in publication, 1794-IN134
Resistance	249 Ω \pm 1%	0...750 Ω standard	249 Ω \pm 1%

Technical Specifications

Attribute	1794-IF8IH	1794-OF8IH	1794-IF8IHNFXT
Normal mode rejection ratio - voltage or current terminal	>70 dB @ 50/60 Hz (4.17 Hz ADC conversion rate) >65 dB @ 50/60 Hz (10.0 Hz ADC conversion rate) >75 dB @ 50 Hz (16.7 Hz ADC conversion rate) >85 dB @ 60 Hz (19.6 Hz ADC conversion rate)		>70 dB @ 50/60 Hz (4.17 Hz ADC conversion rate) >65 dB @ 50/60 Hz (10.0 Hz ADC conversion rate) >75 dB @ 50 Hz (16.7 Hz ADC conversion rate) >70 dB @ 60 Hz (19.6 Hz ADC conversion rate)
Common mode rejection ratio	>60 dB @ 50 Hz >60 dB @ 60 Hz		
Step response to 99% full scale to current terminal	4.17 Hz conversion rate = 480 ms 10.0 Hz conversion rate = 200 ms 16.7 Hz conversion rate = 120 ms 19.6 Hz conversion rate = 101 ms 62 Hz conversion rate = 32 ms 470 Hz conversion rate = 4 ms	-	4.17 Hz conversion rate = 480 ms 10.0 Hz conversion rate = 200 ms 16.7 Hz conversion rate = 120 ms 19.6 Hz conversion rate = 101 ms 62 Hz conversion rate = 32 ms 123 Hz conversion rate = 17 ms 242 Hz conversion rate = 14 ms
Absolute accuracy ⁽¹⁾	0.1% full scale @ 25 °C	± 0.1% full scale @ 25 °C ± 0.35% full scale @ 0...55 °C	0.1% full scale @ 25 °C
Accuracy drift with temperature ⁽¹⁾	0.4% full scale for 0...55 °C	0.008 % /°C 0.0038 % full scale/°C	0.55% full scale for -25...70 °C
Calibration	Factory calibrated.		
Maximum overload	32 mA continuous		
Isolation voltage	120V (continuous), Basic Insulation Type Type tested @ 1000V AC for 60 s, between User power to system, channel to system, and channel to channel		120V (continuous), Basic Insulation Type Type tested @ 1500V AC for 60 s, between channel to power, channel to system, and power to system, and channel to channel.
Power dissipation, max	6 W @ 31.2V DC	10.8 W @ 24V DC	4.8 W @ 31.2V DC
Thermal dissipation	20.5 BTU/hr @ 31.2V DC	36.8 BTU/hr @ 24V DC	16.4 BTU/hr @ 31.2V DC
Recommended terminal base	1794-TB3, 1794-TB3S		
Terminal screw torque	0.8 Nm (7 lb-in.)		
Wire type	Shielded		
Wire size	Determined by installed terminal base		
Compatibility	HART 5		HART 5, 6, 7
Device supported	2, 3, 4 wires		
North American temperature code	T4		T5
IEC temperature code	T4		
Enclosure type rating	None (open-style)		
Dimensions, approx. (HxWxD) with module installed in base	94 x 94 x 66 mm (3.7 x 3.7 x 2.6 in.)		
Publication, Installation Instructions	1794-IN115	1794-IN120	1794-IN134

(1) Includes offset, gain, non-linearity and repeatability error terms.

(2) Engineering Units apply to HART data only.

Environmental Specifications

Attribute	1794-IF8IH	1794-OF8IH	1794-IF8IHNFXT
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0...55 °C (32...131 °F)		-25...70 °C (-13...158 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40...85 °C (-40...185 °F)		
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Nonoperating Damp Heat): 5...95 % noncondensing		
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz		
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock) :		
	20 g		30 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock):		
	25 g		50 g
Emissions	CISPR 11: Group 1, Class A		
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges		
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1kHz sine-wave 80% AM from 2000...2700 MHz		IEC 61000-4-3: 10V/m with 1kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3 kV @ 5 kHz on signal ports		IEC 61000-4-4: ±3 kV @ 5 kHz on signal ports ±3 kV @ 5 kHz on power ports
Surge transient immunity	IEC 61000-4-5: ±2 kV line-earth(CM) on shielded ports		IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±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		

Certifications

Certification ⁽¹⁾ (When marked on product)	1794-IF8IH	1794-OF8IH	1794-IF8IHNFXT
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.		
CE	European Union 2004/108/IEC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)		
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions		

Certifications

Certification ⁽¹⁾ (When marked on product)	1794-IF8IH	1794-OF8IH	1794-IF8IHNFXT
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc		
TÜV	-	TÜV Certified for Functional Safety ⁽²⁾ . Capable of SIL 2	
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3		-

(1) See the Product Certification link at <http://www.rockwellautomation.com/products/certification/> for Declaration of Conformity, Certificates, and other certification details.

(2) When used with specified firmware revisions.

Notes:

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://www.rockwellautomation.com/literature/>) 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.

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