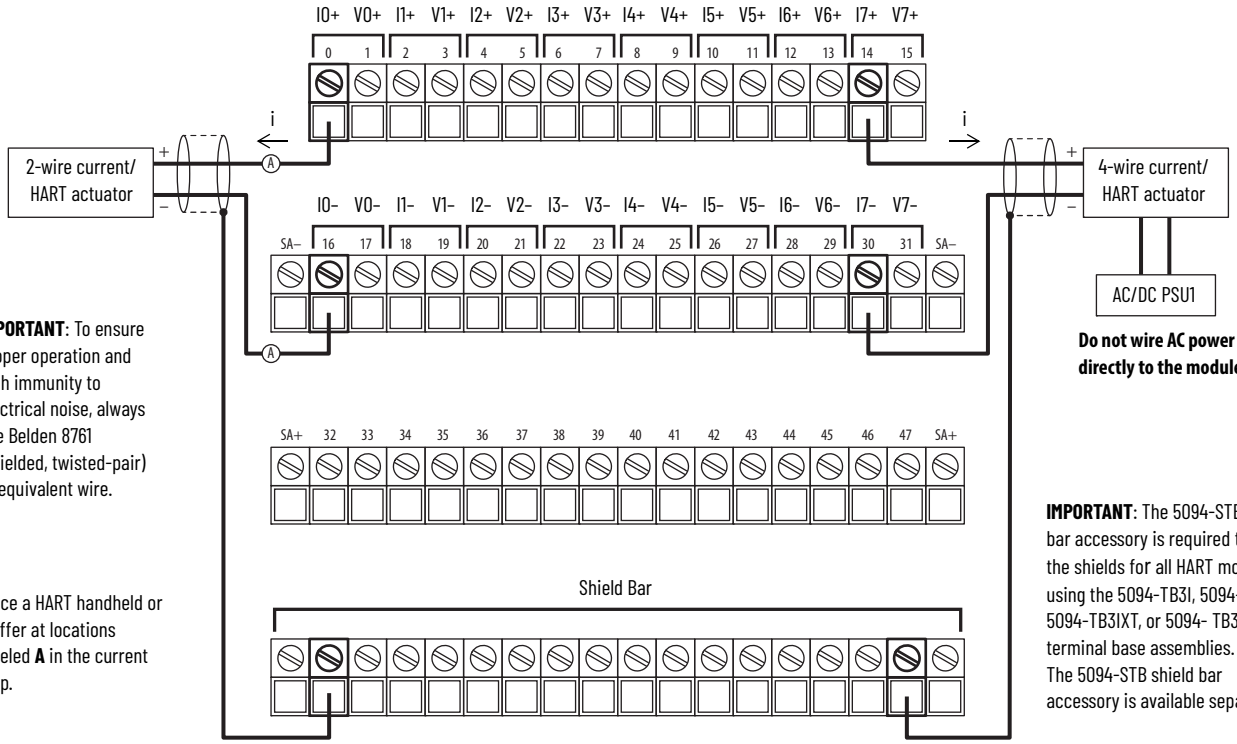
5094-OF8IH and 5094-OF8IHXT Analog Isolated Current/Voltage/HART Output Modules

This figure shows a wiring diagram for the 5094-OF8IH and 5094-OF8IHXT modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OF8IH and 5094-OF8IHXT Wiring Diagram – 2-wire and 4-wire Current/HART Actuator



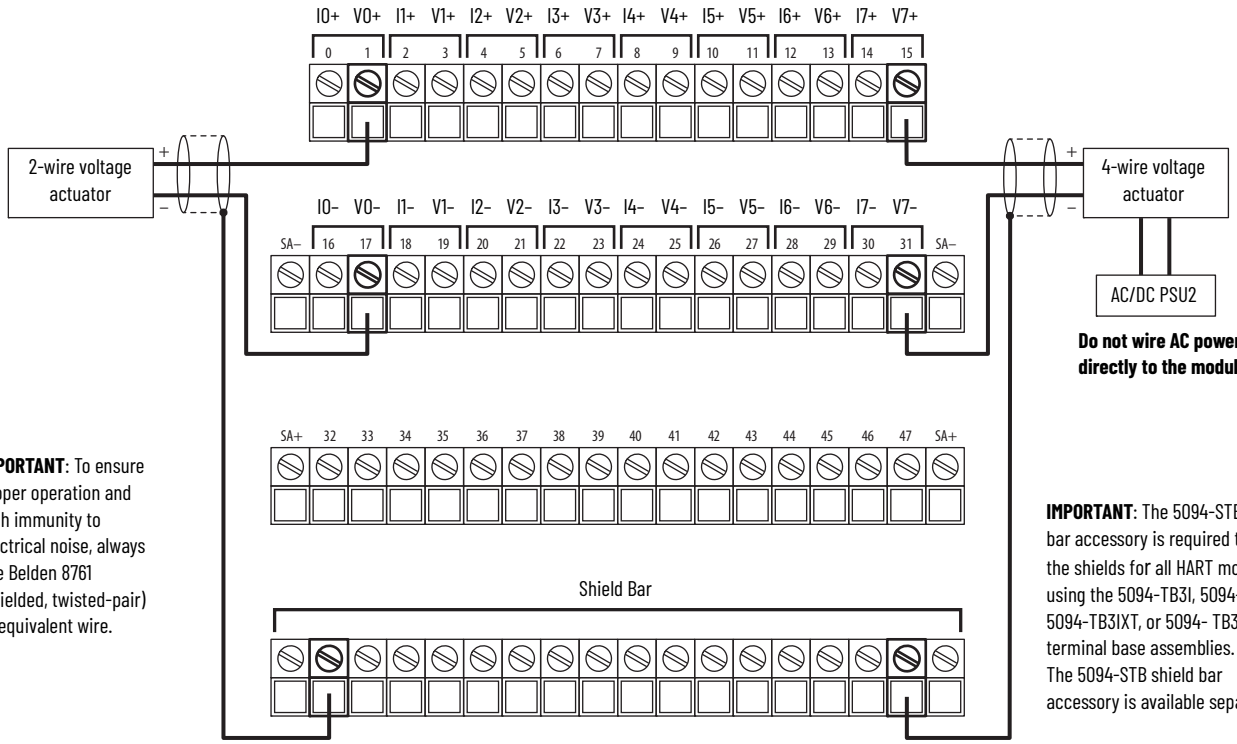
IMPORTANT: To ensure proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted-pair) or equivalent wire.

Place a HART handheld or sniffer at locations labeled **A** in the current loop.

Do not wire AC power directly to the module

IMPORTANT: The 5094-STB shield bar accessory is required to wire the shields for all HART modules using the 5094-TB3I, 5094-TB3IS, 5094-TB3IXT, or 5094- TB3ISXT terminal base assemblies. The 5094-STB shield bar accessory is available separately.

5094-OF8IH and 5094-OF8IHXT Wiring Diagram – 2-wire and 4-wire Voltage Actuator



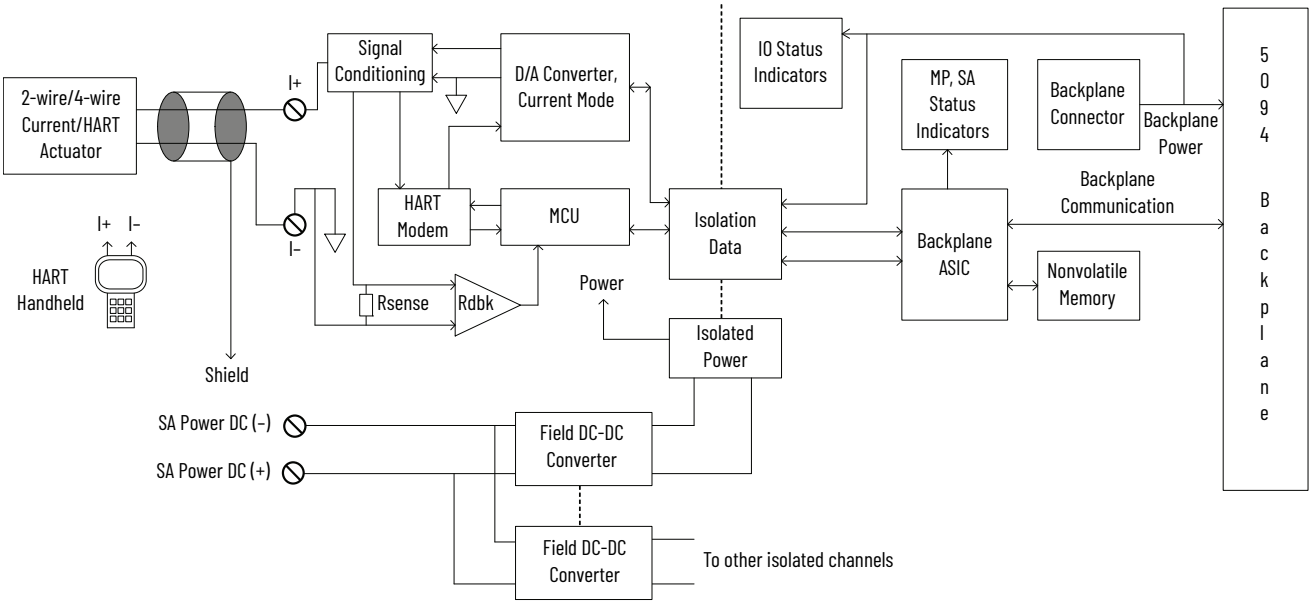
IMPORTANT: To ensure proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted-pair) or equivalent wire.

Do not wire AC power directly to the module

IMPORTANT: The 5094-STB shield bar accessory is required to wire the shields for all HART modules using the 5094-TB3I, 5094-TB3IS, 5094-TB3IXT, or 5094- TB3ISXT terminal base assemblies. The 5094-STB shield bar accessory is available separately.

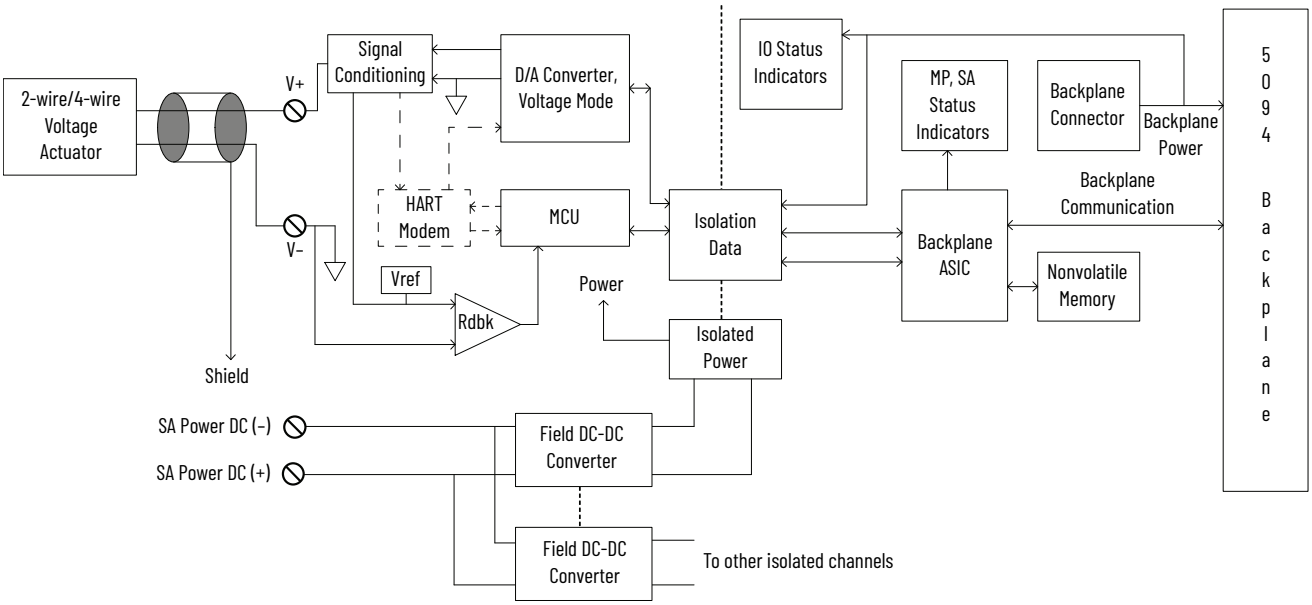
This figure shows a functional block diagram for the 5094-OF8IH and 5094-OF8IHXT modules in current mode.

5094-OF8IH and 5094-OF8IHXT Functional Block Diagram – 2-wire and 4-wire Current/HART Actuator



This figure shows a functional block diagram for the 5094-OF8IH and 5094-OF8IHXT modules in voltage mode.

5094-OF8IH and 5094-OF8IHXT Functional Block Diagram – 2-wire and 4-wire Voltage Actuator



Technical Specifications - 5094-OF8IH, 5094-OF8IHXT

Attribute	5094-OF8IH, 5094-OF8IHXT
Outputs	8 individually isolated
Output range, voltage	±10V 0…10V 0…5V
Output range, current	0…20 mA 4…20 mA (HART)
Resolution	16 bits ±10V: 366 µV/bit 0…10V: 183 µV/bit 0…5V: 90 µV/bit 0…20 mA: 366 nA/bit 4…20 mA: 366 nA/bit
Drive capability	Voltage - 1000 Ω min Current - 750 Ω max
Capacitive load, max (voltage mode only)	1 µF
Inductive load, max (current mode only)	1 mH
Open circuit detection	Current mode only
Short circuit detection	Voltage mode only
Data format	IEEE 754 32-bit floating point
Channel to channel isolation	250V (continuous), Basic Insulation Type
Module conversion method	R-Ladder DAC, monotonicity with no missing codes
HART support	Yes, per channel HART modem
HART scan time	typically 1 s Additional device variables, configured commands, pass through messages, handheld communicators, secondary masters, communication errors, or configuration changes can significantly increase the update time.
Conversion time per channel at 25 °C (77 °F), typical	Voltage mode: 0.3 ms Current mode: 0.6 ms
Scan time (all channels 0…7)	1.5 ms
Step response time to 63% of value	2.5 ms
Overvoltage protection, max	Voltage mode: ±32V DC Current mode: +32V DC
Repeatability	0.05%
Calibrated accuracy at 25 °C (77 °F)	Voltage: 0.05% full scale Current: 0.05% full scale
Calibrated accuracy over 0…60 °C (32…140 °F) temperature range	Voltage: 0.1% full scale Current: 0.1% full scale
Calibrated accuracy over full temperature range, -40…+70 °C (-40…+158 °F)	Voltage: 0.2% full scale Current: 0.2% full scale
Readback accuracy at 25 °C (77 °F)	Voltage: 1% full scale for ±10V and 0…10V; 1.5% full scale for 0…5V Current:1% full scale HART mode: <5% full scale typical
HART handheld/secondary master compliance	Yes

General Specifications - 5094-OF8IH, 5094-OF8IHXT

Attribute	5094-OF8IH, 5094-OF8IHXT
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	35 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	800 mA
Power dissipation, max	3.5 W
Thermal dissipation, max	12.62 BTU/hr
Isolation voltage	250V (continuous) Basic Insulation Type: System to Field SA Power to Channel SA Power to FE Channel to Channel Channel to FE
Calibration methods	Factory Calibrated User-performed (optional)

General Specifications - 5094-OF8IH, 5094-OF8IHXT (Continued)

Attribute	5094-OF8IH, 5094-OF8IHXT
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3I (consists of a 5094-MB and 5094-RTB3I) or 5094-TB3IS (consists of a 5094-MB and 5094-RTB3IS) or 5094-TB3IXT (consists of a 5094-MBXT and 5094-RTB3IXT) or 5094-TB3ISXT (consists of a 5094-MBXT and 5094-RTB3ISXT) **IMPORTANT:** You must order mounting bases (MBs) and removable terminal blocks (RTBs) separately. MBs and RTBs do not ship with FLEX 5000 I/O modules.
TB keying	**3 2**
Supported mounting orientation	Horizontal, horizontal and inverted, vertical, vertical and inverted
Wire category(1)	2 - shielded ports 2 - power ports
Wire size - Signal	0.34...2.5 mm^2 (22...14 AWG) solid or stranded copper wire that is rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Wire size - Power	2.5 mm^2 (14 AWG) Cu multi-strand
Dimensions (HxWxD), approx	87.0 x 94.0 x 54.0 mm (3.43 x 3.70 x 2.13 in.)
Weight, approx	165 g (0.143 lb)
Enclosure type	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Environmental Specifications and Certifications

The following tables provide the environmental specifications and certifications for the FLEX 5000 analog I/O modules.

Environmental Specifications - FLEX 5000 Analog I/O Modules

Attribute	5094-IF8, 5094-IF8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT, 5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (TestBb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	-40 °C < Ta < +70 °C (-40 °F < Ta < +158 °F)
Temperature, surrounding air, max	70 °C (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 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)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on shielded ports

Environmental Specifications - FLEX 5000 Analog I/O Modules (Continued)

Attribute	5094-IF8, 5094-IF8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT, 5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT
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 150 kHz...80 MHz
Corrosive resistance classification	ISA S71.04 G2 – **Non-XT catalogs** ISA S71.04 G3 – **XT catalogs**

Certifications - FLEX 5000 Analog I/O Modules

Certification[1]	5094-IF8, 5094-IF8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT, 5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU 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 and B) European Union 2014/35/EU LVD, compliant with: EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc DEMKO 17 ATEX 1907X DEMKO 19 ATEX 2303X – **5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT only**
IECEx	IECEx System, compliant with: IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" Ex nA IIC T4 Gc IECEx UL 17.0066X IECEx UL 19.0112X – **5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT only**
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
Morocco	Arrêté ministériel n° 6404-15 du 1 er muharram 1437 Arrêté ministériel n° 6404-15 du 29 ramadan 1436
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
CCC	CNCA-C23-01:2019 强制性产品认证实施规则 防爆电气，符合 GB 3836.1-2010 爆炸性环境 第1部分：设备 通用要求 GB 3836.8-2014 爆炸性环境 第8部分：由 "n" 型保护的设备 CNCA-C23-01:2019 CCC Implementation Rule Explosion-Proof Electrical Products, compliant with: GB 3836.1-2010 Explosive atmospheres – Part 1: Equipment-General requirements GB 3836.8-2014 Explosive atmospheres - Part 8: Equipment protection by type of protection "n"

(1) When marked. See the Product Certifications website at rok.auto/certifications for declarations of conformity, certificates, and other certification details.

Specialty Modules

I/O Type	Cat. No.	Description	Page
High-speed counter	5094-HSC, 5094-HSCXT	High-speed counter modules	51
Serial Interface	5094-SERIAL, 5094-SERIALXT	Serial interface modules	59