Allen-Bradley

FLEX 5000 Modules Specifications

Digital I/O Module Catalog Numbers 5094-IB16, 5094-IB16XT, 5094-OB16, 5094-OB16XT, 5094-OW8I, 5094-OW8IXT

Analog I/O Module Catalog Numbers 5094-IF8, 5094-IF8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT

Specialty Module Catalog Numbers 5094-HSC, 5094-HSCXT

Safety Digital I/O Module Catalog Numbers 5094-IB16S, 5094-IB16SXT, 5094-OB16S, 5094-OB16SXT, 5094-OW4IS, 5094-OW4ISXT

EtherNet/IP Adapter Catalog Numbers 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT, 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT

Mounting Base Catalog Numbers 5094-MB, 5094-MBXT

Removable Terminal Block Catalog Numbers 5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT, 5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT, 5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT, 5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT

Accessories Catalog Numbers 5094-STB, 5094-SAJMPR, 5094-N2

Topic	Page
Summary of Changes	2
Digital I/O Modules	2
Analog I/O Modules	14
Specialty Modules	35
Safety Digital I/O Modules	45
EtherNet/IP Adapters	61
Terminal Base Assemblies	68
Accessories	75

The FLEX 5000™ I/O architecture provides a wide range of input and output modules to span many applications, from high-speed digital to process control. The architecture uses Producer/Consumer technology that allows input information and output status to be shared among multiple Logix 5000™ controllers.

FLEX 5000 I/O systems are used as remote I/O modules with Logix 5000 controllers such as ControlLogix® 5580, CompactLogix™ 5380 and CompactLogix 5480. The modules are configured with the Studio 5000 Logix Designer® application.

The I/O modules require a terminal base (TB) assembly to connect field-side wiring. These are not included with the I/O modules. TBs consist of a mounting base (MB) and removable terminal block (RTB). MBs and RTBs are available for order individually.

Summary of Changes

Change	Page
Added 5094-IB16S and 5094-IB16SXT Safety Digital 16-point Sinking Input Modules	46
Added 5094-OB16S and 5094-OB16SXT Safety Digital 16-point Sourcing Output Modules	51
Added 5094-OW4IS and 5094-OW4ISXT Safety Digital 4-point Isolated Relay Output Modules	56
Added FLEX 5000 EtherNet/IP Adapters with SFP Support (5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT)	64

Digital I/O Modules

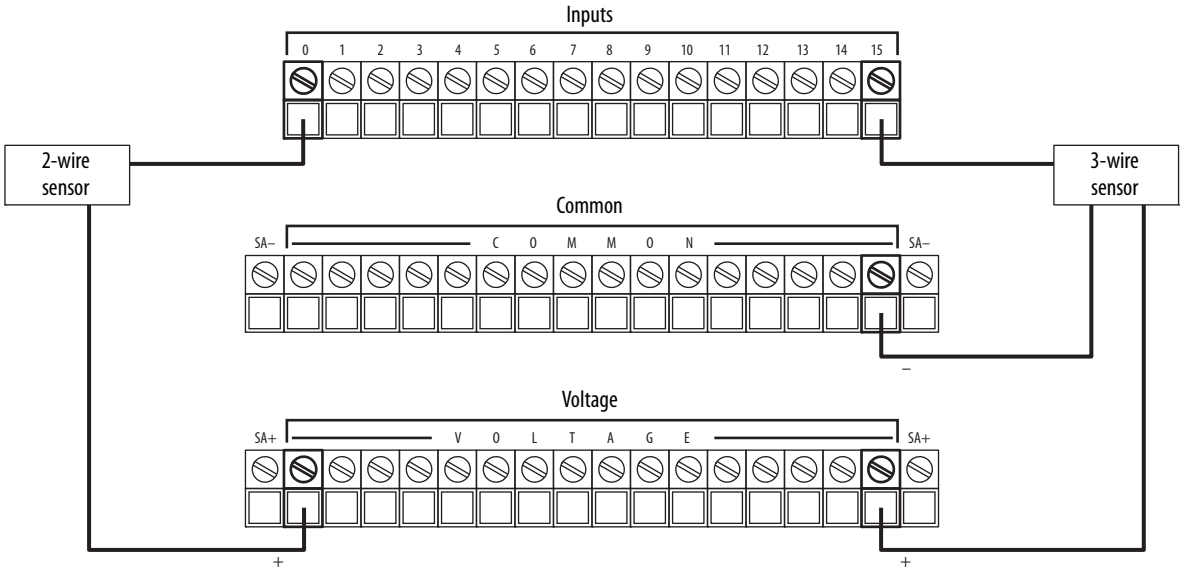
I/O Type	Cat. No.	Page
DC digital input	5094-IB16, 5094-IB16XT	3
DC digital output	5094-OB16, 5094-OB16XT	6
Relay output	5094-OW8I, 5094-OW8IXT	9

Environmental specifications and certifications for FLEX 5000 digital I/O modules are provided on page 12.

5094-IB16 and 5094-IB16XT Digital 16-point Sinking Input Modules

This figure shows a wiring diagram for the 5094-IB16 and 5094-IB16XT modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

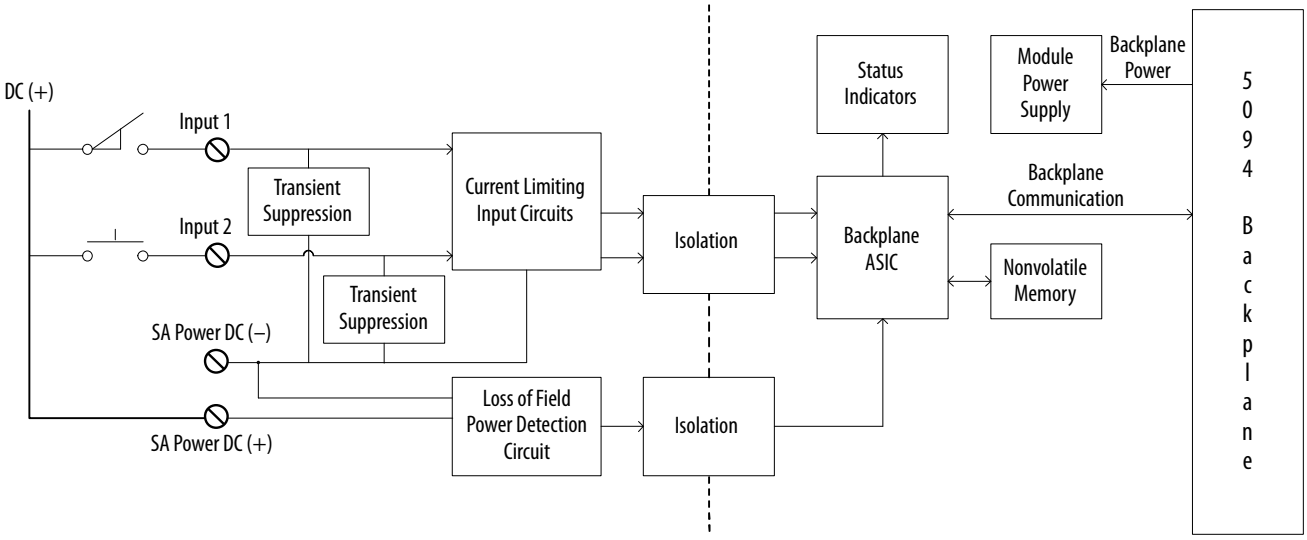
5094-IB16 and 5094-IB16XT Wiring Diagram



IMPORTANT: The 5094-IB16 and 5094-IB16XT module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (–) terminal on the terminal base.

This figure shows a functional block diagram for the 5094-IB16 and 5094-IB16XT modules.

5094-IB16 and 5094-IB16XT Functional Block Diagram



Technical Specifications - 5094-IB16, 5094-IB16XT

Attribute	5094-IB16, 5094-IB16XT
On-state voltage range	10…32V DC
On-state current, min	2 mA @ 10V DC
On-state current, nom	6 mA @ 24V DC
On-state current, max	8 mA @ 32V DC
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input impedance, min	1.3 kΩ @ 10V DC
Input impedance, nom	4 kΩ @ 24V DC
Input impedance, max	7.4 kΩ @ 32V DC
Module inrush current, max	250 mA peak (decaying to 37% in 22 ms, without activation)
Input delay time (screw to backplane), max Off to On On to Off	 100 µs @ 25 °C (77 °F) 100 µs @ 25 °C (77 °F)
Input drift over temperature span	±300 ns/°C -40…70 °C
Input minimum pulse width Off to On On to Off	 80 µs 80 µs
Input filter time Off to On On to Off	 Hardware delay: 98 µs + filter time User-selectable filter time: 0…50 ms Hardware delay: 98 µs + filter time User-selectable filter time: 0…50 ms
Reverse polarity protection	Yes
Overvoltage protection, max	36V (fuse protected, non-replaceable)
Pulse and period measurements	Not supported
Simple counters Counter frequency	0 - f_{max} = 500 Hz (inv period 2 ms) Channel 0…7 only
Timestamp of inputs	Yes
CIP Sync™	Transport clock, and slave only ordinary clock
Overrides	Not supported
Pulse latching	Supported
Events	Four events supported (triggered by any input or simple counters)
Pattern matching	Supported
Extended counters	Not supported

General Specifications - 5094-IB16, 5094-IB16XT

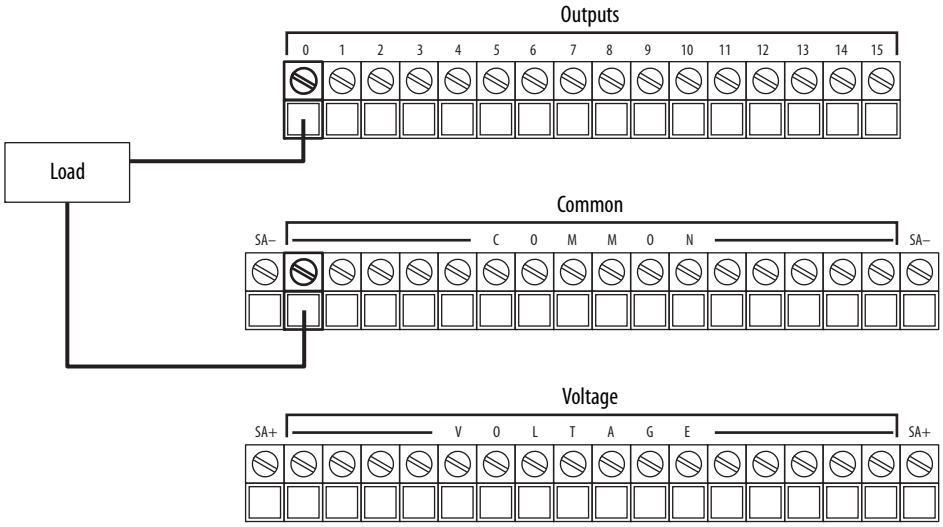
Attribute	5094-IB16, 5094-IB16XT
Inputs	16 channels (1 group of 16), sinking
Voltage category	12/24V DC sink
Input voltage range	10…32V DC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	80 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	8 mA per channel 135 mA per module (128 mA + 7 mA for SA power detection)
Power dissipation, max(1)	3.5 W
Thermal dissipation, max(1)	11.9 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and input ports No isolation between individual input ports
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3 (consists of a 5094-MB and 5094-RTB3) or 5094-TB3S (consists of a 5094-MB and 5094-RTB3S) or 5094-TB3XT (consists of a 5094-MBXT and 5094-RTB3XT) or 5094-TB3SXT (consists of a 5094-MBXT and 5094-RTB3SXT) or **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	1 ⓉⓉ1
Wire category(2)	2 - signal ports 2 - power ports
Wire size - Signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	54.0 x 94.0 x 87.0 mm (2.13 x 3.70 x 3.43 in.)
Weight, approx	101 g (0.22 lb)
Enclosure type	None (open-style)
North American temp code	T4
ATEX/IECEx temp code	T4
IECEx temp code	T4

(1) Value is measured at 70 °C (158 °F). Power dissipation varies with temperature.
(2) 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.

5094-OB16 and 5094-OB16XT Digital 16-point Sourcing Output Modules

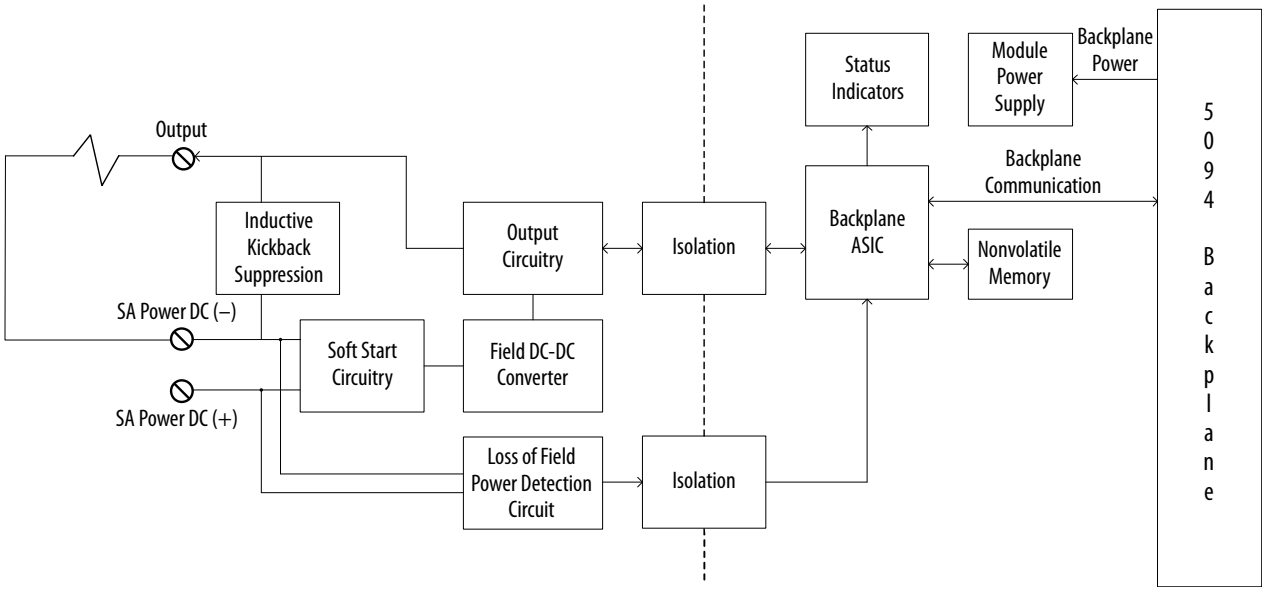
This figure shows a wiring diagram for the 5094-OB16 and 5094-OB16XT modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OB16 and 5094-OB16XT Wiring Diagram



This figure shows a functional block diagram for the 5094-OB16 and 5094-OB16XT modules.

5094-OB16 and 5094-OB16XT Functional Block Diagram



Technical Specifications - 5094-OB16, 5094-OB16XT

Attribute	5094-OB16, 5094-OB16XT
On-state voltage range	18…32V DC
On-state voltage drop, max	0.25V DC
On-state current per channel, min	1 mA
Off-state voltage, max	5V DC with 1 mA min load
Off-state leakage current per point, max(1)	0.5 mA per point
Output current rating, max	0.5 A per channel
Surge current per point	1 A max for 10 ms per point, repeatable every 2 s
Output delay time (backplane to screw), max Off to On On to Off	 100 µs @ 25 °C (77 °F) @ 0.5 A 100 µs @ 25 °C (77 °F) @ 0.5 A
Pulse width, min	≤ 200 µs ($T_{on} + T_{off}$) @ 0.5 A @ 25 °C (77 °F)
Output drift	±400 ns/°C -40…70 °C @ 0.5 A
Open load detection diagnostics(2)	Yes
Output short circuit/overload/overtemp detection(3)	Yes
Output short circuit/overload protection	Yes
Reverse voltage protection	Yes
Overvoltage protection, max	36V (fuse protected, non-replaceable)
Pilot duty rating	0.5 A resistive and general pilot duty
Output control in fault state per point	• Hold Last State • On • Off (default)
Output states in program mode per point	• Hold Last State • On • Off (default)
Output states in fault mode per point	• Hold Last State • On • Off (default)
Duration of fault mode per point	• 1 s • 2 s • 5 s • 10 s • Forever (default)
Scheduled outputs	Supported
CIP Sync	Supported

(1) Recommended Loading Resistor - To limit the effects of leakage current through solid state outputs, you can connect a loading resistor in parallel with your load. For 24V DC operation, use a 5.6 KΩ, 0.5 W resistor for transistor operation.
(2) Diagnostic for the channel is active when the output is in the Off state.
(3) Diagnostic for the channel is active when the output is in the On state.

General Specifications - 5094-OB16, 5094-OB16XT

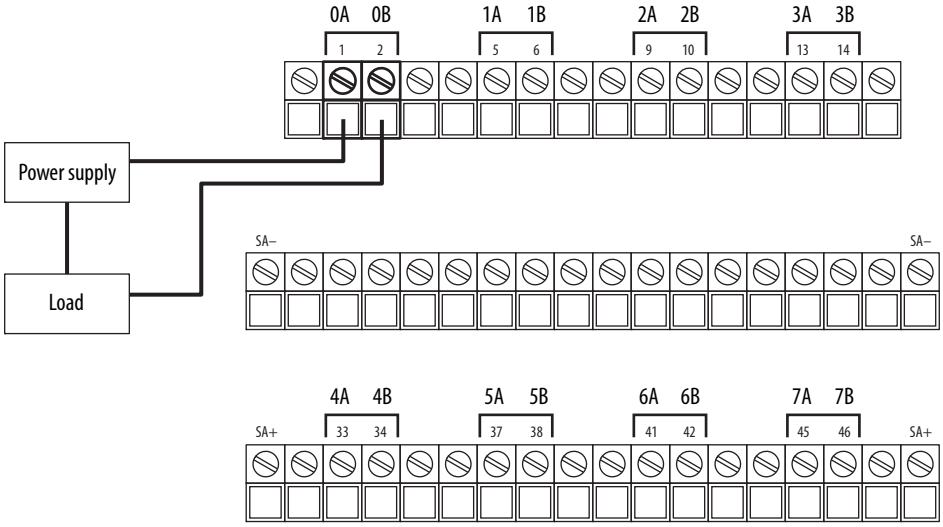
Attribute	5094-OB16, 5094-OB16XT
Outputs	16 channels (1 group of 16), sourcing
Voltage category	24V DC source
Output voltage range	18…32V DC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	100 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	8.1 A per module
Power dissipation, max	3.8 W (16 channels @ 0.5 A)
Thermal dissipation, max	12.97 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and Output ports No isolation between individual Output ports
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3 (consists of a 5094-MB and 5094-RTB3) or 5094-TB3S (consists of a 5094-MB and 5094-RTB3S) or 5094-TB3XT (consists of a 5094-MBXT and 5094-RTB3XT) or 5094-TB3SXT (consists of a 5094-MBXT and 5094-RTB3SXT) or **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	1 Ⓣ Ⓐ 2
Wire category(1)	2 - signal ports 2 - power ports
Wire size - Signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	105 g (0.23 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.

5094-OW8I and 5094-OW8IXT Digital 8-point Isolated Relay Output Modules

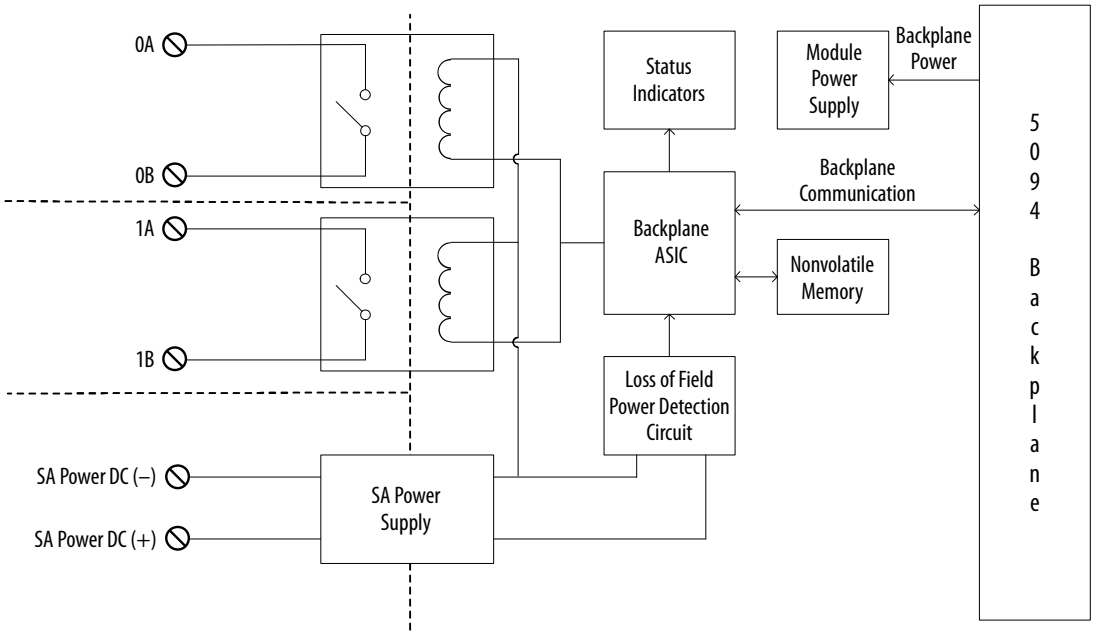
This figure shows a wiring diagram for the 5094-OW8I and 5094-OW8IXT modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OW8I and 5094-OW8IXT Wiring Diagram



This figure shows a functional block diagram for the 5094-OW8I and 5094-OW8IXT modules.

5094-OW8I and 5094-OW8IXT Functional Block Diagram



Technical Specifications - 5094-OW8I, 5094-OW8IXT

Attribute	5094-OW8I, 5094-OW8IXT
Relay rating[1]	2 A resistive/channel @ 5…30V DC 2 A resistive/channel @ 5…240V AC, 50/60 Hz 2 A general/channel @ 5…240V AC, 50/60 Hz 2 A ATEX/IECEx @ 5…240V AC, 50/60 Hz
Off-state leakage	0 mA (dry contact, no onboard snubbers)
Output current rating, max	2 A per channel
Output delay time, max Off to On On to Off	 10 ms 10 ms
Initial contact resistance, max	30 mΩ
Bounce time, mean	500 µs
Output control in fault state per point	• Hold last state • On • Off (default)
Output states in program mode per point	• Hold last state • On • Off (default)
Output states in fault mode per point	• Hold Last State • On • Off (default)
Duration of fault mode per point	• 1 s • 2 s • 5 s • 10 s • Forever (default)
Delay to fault	Supported
Fusing	Outputs are not fused.
Minimum load current	1 mA
Expected contact life	300K cycles resistive, 100K cycles inductive
Pilot duty rating	5…240V AC, 50/60 Hz, C300 pilot duty per channel 5…125V DC, R150 pilot duty per channel

(1) **Surge Suppression** - Connecting surge suppressors across your external inductive load extends the life of the module. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

General Specifications - 5094-OW8I, 5094-OW8IXT

Attribute	5094-OW8I, 5094-OW8IXT
Outputs	8 - Form A (normally open)
Output voltage range	5…125V DC 5…240V AC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	70 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	10 A
Power dissipation, max	3.5 W
Thermal dissipation, max	11.94 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field 250V (continuous), Reinforced Insulation Type, System to Channel 250V (continuous), Reinforced Insulation Type, Field to Channel 250V (continuous), Reinforced Insulation Type, Channel to Channel
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-TB3W (consists of a 5094-MB and 5094-RTB3W) or 5094-TB3WS (consists of a 5094-MB and 5094-RTB3WS) or 5094-TB3WXT (consists of a 5094-MBXT and 5094-RTB3WXT) or 5094-TB3WSXT (consists of a 5094-MBXT and 5094-RTB3WSXT) **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	**2 2**
Wire category(1)	1 - signal ports 2 - power ports
Wire size - Signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	142 g (0.31 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 tables below provide the environmental specifications and certifications for the FLEX 5000 digital I/O modules.

Environmental Specifications - FLEX 5000 Digital I/O Modules

Attribute	5094-IB16, 5094-IB16XT, 5094-OB16, 5094-OB16XT, 5094-OW8I, 5094-OW8IXT
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, storage 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 ±4 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 ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal 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 Digital I/O Modules

Certification[1]	5094-IB16, 5094-IB16XT, 5094-OB16, 5094-OB16XT, 5094-OW8I, 5094-OW8IXT
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 & 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 nC IIC T4 Gc **(5094-OW8I and 5094-OW8IXT only)** • II 3 G Ex nA IIC T4 Gc • DEMKO 17 ATEX 1907X
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • Ex nA nC IIC T4 Gc **(5094-OW8I and 5094-OW8IXT only)** • Ex nA IIC T4 Gc • IECEx UL 17.0066X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Analog I/O Modules

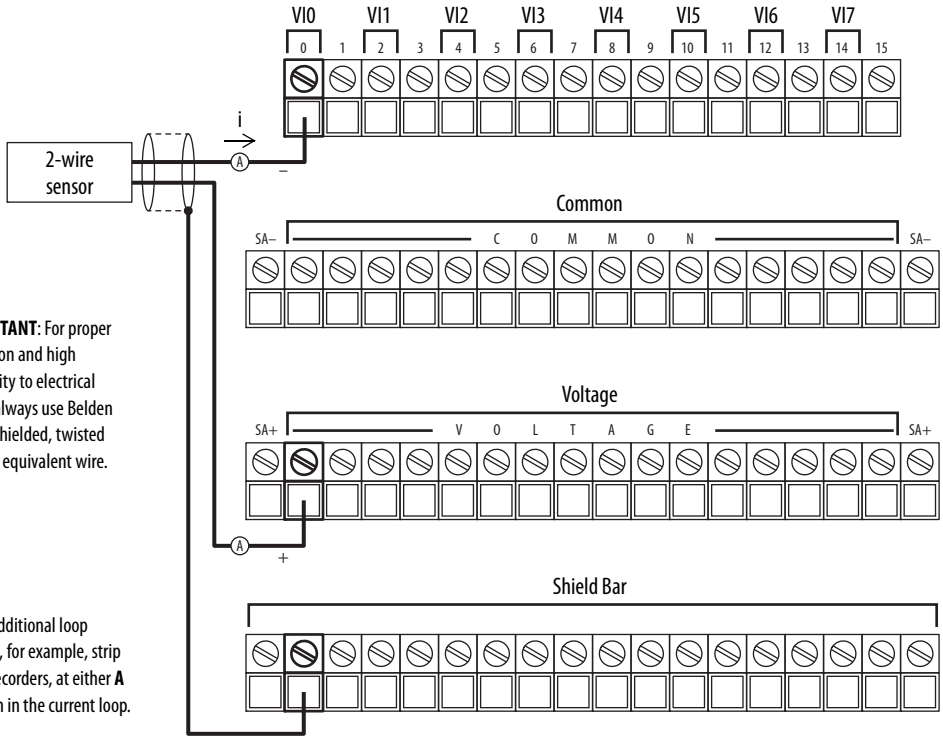
I/O Type	Cat. No.	Page
Analog input	5094-IF8, 5094-IF8XT 5094-IY8, 5094-IY8XT	15 20
Analog output	5094-OF8, 5094-OF8XT	29

Environmental specifications and certifications for FLEX 5000 analog I/O modules are provided on page 33.

5094-IF8 and 5094-IF8XT Analog 8-channel Current/Voltage Input Modules

This figure shows a wiring diagram for the 5094-IF8 and 5094-IF8XT modules when used in current mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IF8 and 5094-IF8XT Wiring Diagram – 2-wire Current Mode



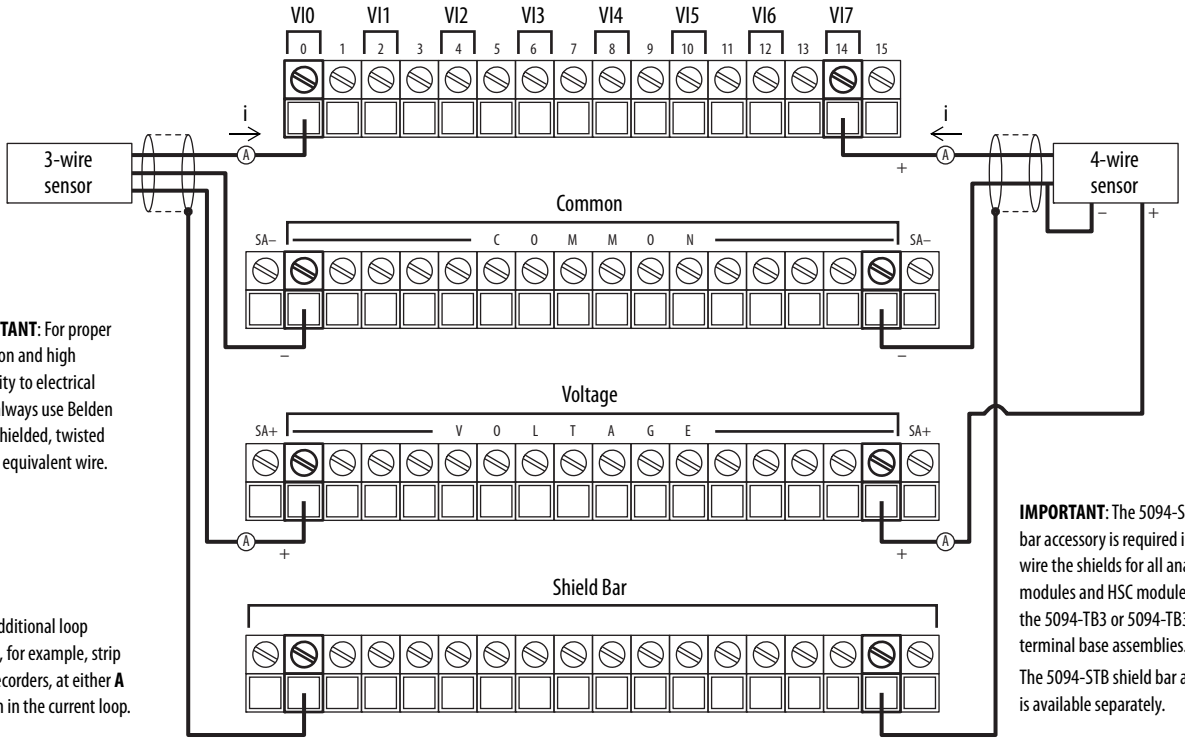
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

5094-IF8 and 5094-IF8XT Wiring Diagram – 3-wire and 4-wire Current Mode



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

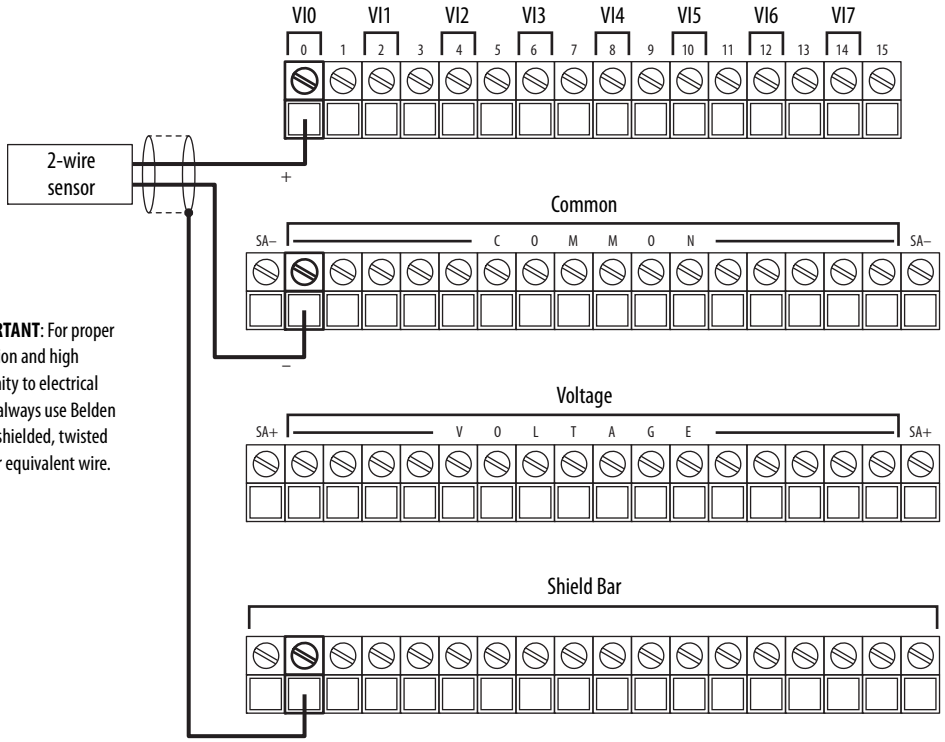
Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-IF8 and 5094-IF8XT modules when used in voltage mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IF8 and 5094-IF8XT Wiring Diagram – 2-wire Voltage Mode

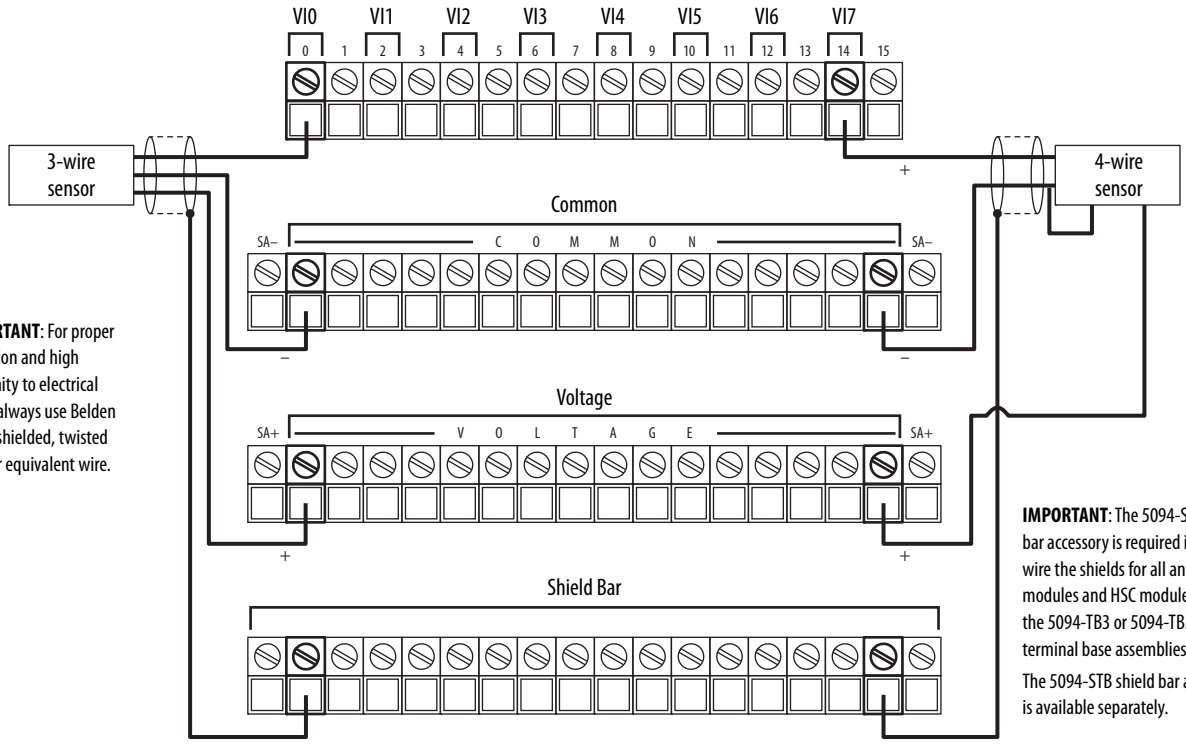


IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

5094-IF8 and 5094-IF8XT Wiring Diagram – 3-wire and 4-wire Voltage Mode



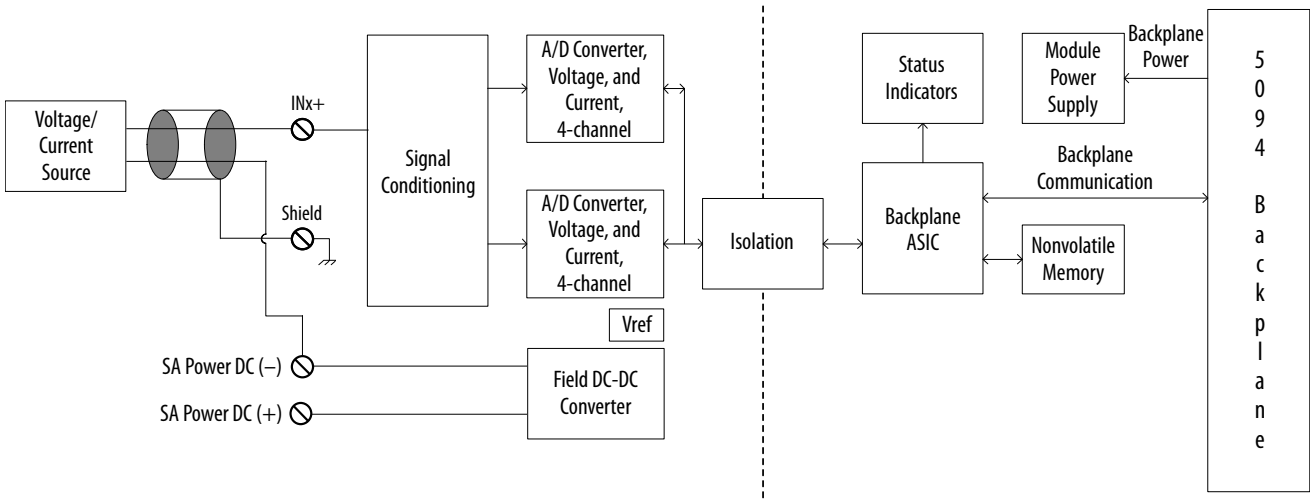
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a functional block diagram for the 5094-IF8 and 5094-IF8XT modules.

5094-IF8 and 5094-IF8XT Functional Block Diagram



Technical Specifications - 5094-IF8, 5094-IF8XT

Attribute	5094-IF8, 5094-IF8XT
Inputs	8 single-ended
Input range, voltage	±10V 0…10V 0…5V
Input range, current	0…20 mA 4…20 mA
Input impedance	Voltage: >1 MΩ Current: 250 Ω typical
Common mode voltage (channel to channel)	±10V
Module conversion method	Sigma-Delta, Two 24-bit multiplexed ADC
Resolution, voltage[1] (16 bits at 10 Hz notch filter)	±10.5V: <320 µV/count (15 bits plus sign bipolar) 0…10.5V: <160 µV/count (16 bits unipolar) 0…5.25V: <80 µ/V count (16 bits unipolar)
Resolution, current[1] (16 bits at 10 Hz notch filter)	0…21 mA: <0.32 µA/count (16 bits) 3.6…21 mA: <0.32 µA/count (16 bits)
Calibrated accuracy at 25 °C (77 °F)	Voltage: 0.05% full scale Current: 0.05% full scale
Accuracy drift with temperature	Voltage: 28 ppm/°C Current: 47 ppm/°C
Scan Time Per channel Per module	 625 µs 2.5 ms
Notch filter at minimum RPI (0.2 ms, 1 channel enabled)	62.5 kHz
Minimum notch filter frequency at RPI of 2.5 ms	10 kHz
Input notch filter (Hz) selections	5, 10 (50/60 Default), 15, 20, 50, 60, 100, 200, 500, 1000, 2500, 5000, 10000, 15625, 25000, 31250, 62500.
Input digital filter	1st order lag, 0 ms (Default) - 32,767 ms (32.767 s)

Technical Specifications - 5094-IF8, 5094-IF8XT

Attribute	5094-IF8, 5094-IF8XT
HART handheld compliance	Yes
Overvoltage protection, max	Voltage and Current modes: ±32V DC
Overcurrent protection	Current mode: ±30 mA
Data value during overload condition	Full scale, overrange flag, Data uncertain / data bad
Open circuit detection time	Voltage: + full scale, < 2 s Current: 4…20 mA range, <1 s
Onboard data alarming	Yes
Scaling to engineering units	Yes
Real-time channel sampling	Yes
Data format	IEEE 754 32-bit floating point
Timestamp of inputs	Yes
CIP Sync	Yes

(1) Notch filter dependent.

General Specifications - 5094-IF8, 5094-IF8XT

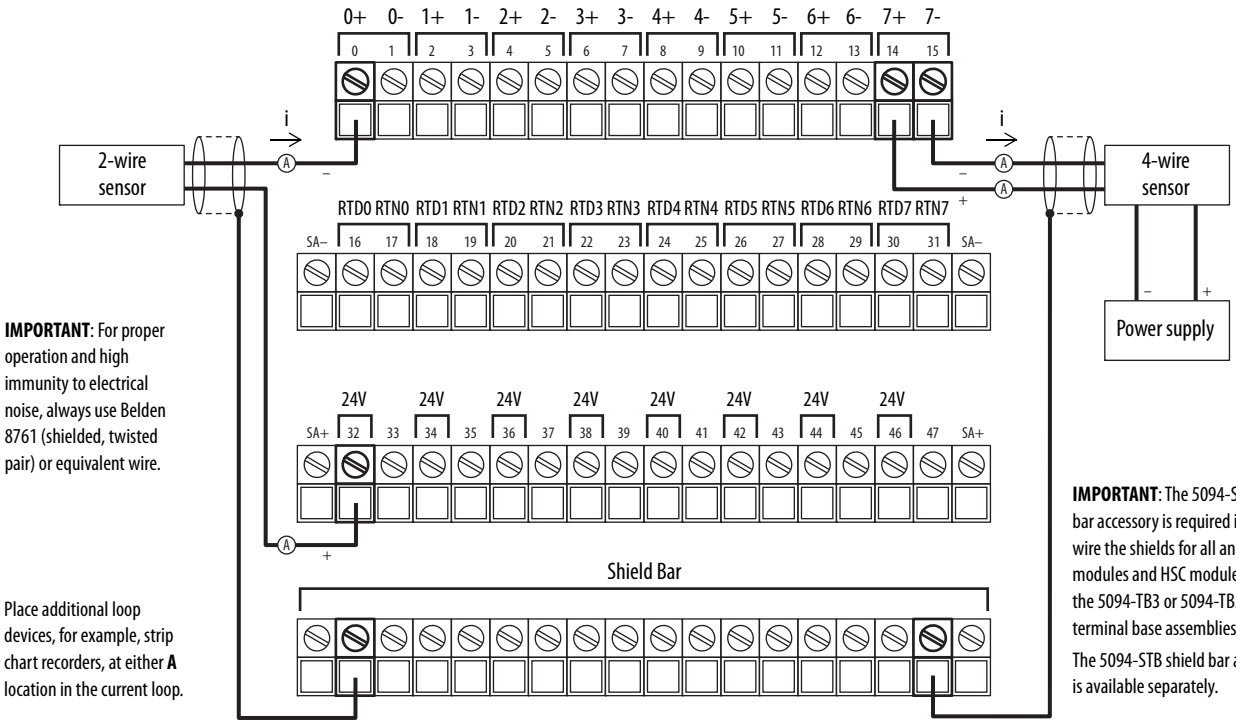
Attribute	5094-IF8, 5094-IF8XT
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	70 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	120 mA
Power dissipation, max	Current mode: 3.5 W
Thermal dissipation, max	Current mode: 11.94 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and input ports No isolation between individual input ports
Calibration methods	Factory calibrated User-performed (optional)
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
Common mode noise rejection ratio	130 dB @ 50/60 Hz
Normal mode noise rejection ratio	65 dB @ 50/60 Hz, notch filter dependent
Terminal base (TB) assembly	5094-TB3 (consists of a 5094-MB and 5094-RTB3) or 5094-TB3S (consists of a 5094-MB and 5094-RTB3S) or 5094-TB3XT (consists of a 5094-MBXT and 5094-RTB3XT) or 5094-TB3SXT (consists of a 5094-MBXT and 5094-RTB3SXT) or **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	2 ⍾ⓣ 1
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 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	104 g (0.23 lb)
Enclosure type	None (open-style)
North American temperature 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.

5094-IY8 and 5094-IY8XT Analog 8-channel Current/Voltage/RTD/Thermocouple Input Modules

This figure shows a wiring diagram for the 5094-IY8 and 5094-IY8XT modules when used in current mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IY8 and 5094-IY8XT Wiring Diagram – Current Mode



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

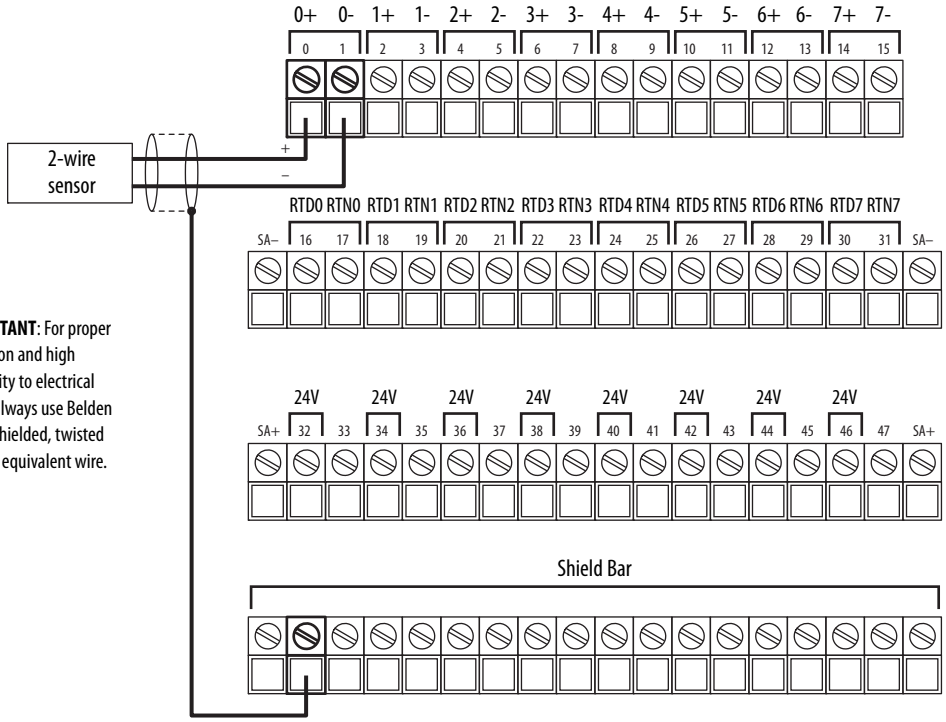
Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-IY8 and 5094-IY8XT modules when used in voltage mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IY8 and 5094-IY8XT Wiring Diagram – 2-wire Voltage Mode

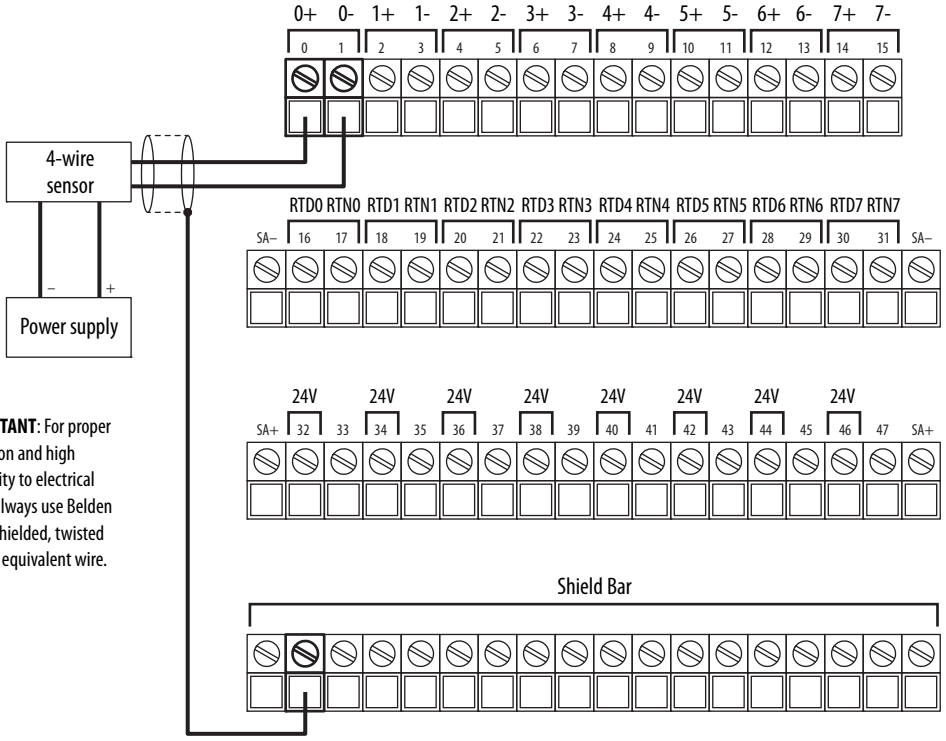


IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

5094-IY8 and 5094-IY8XT Wiring Diagram – 4-wire Voltage Mode



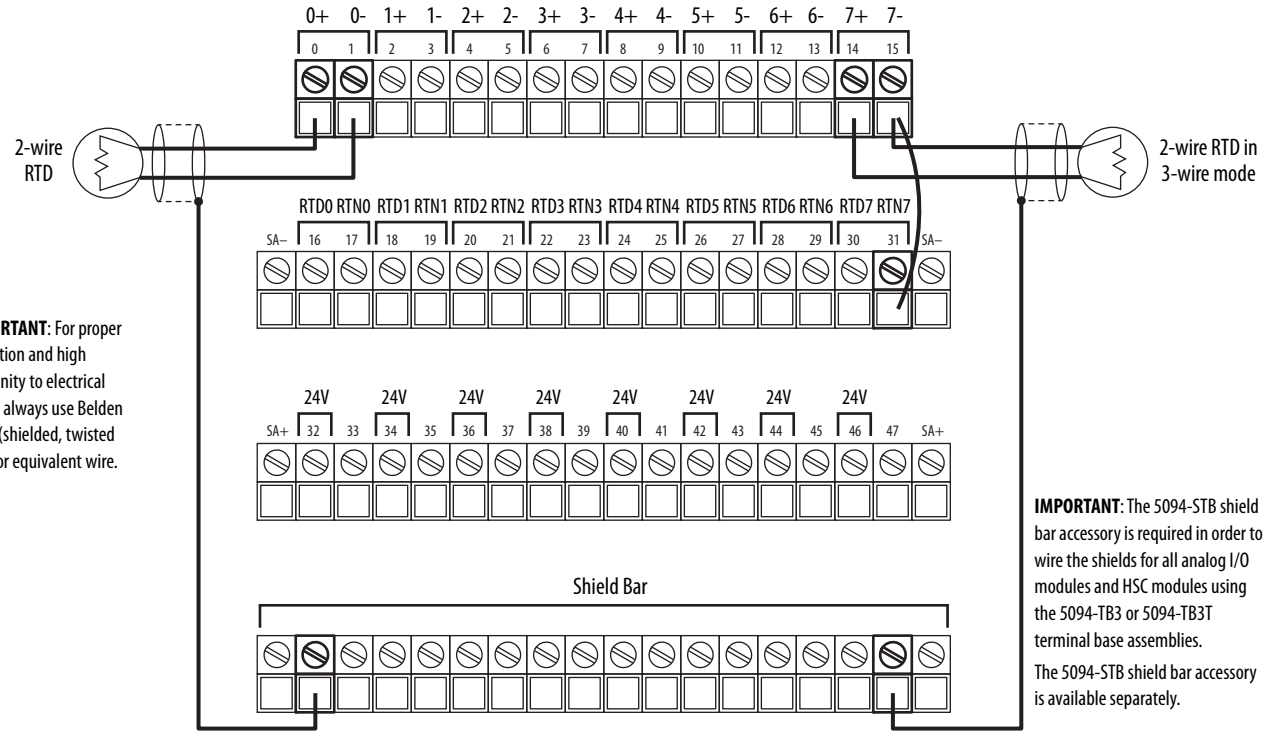
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-IY8 and 5094-IY8XT modules when used in RTD mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IY8 and 5094-IY8XT Wiring Diagram – 2-wire RTD Mode

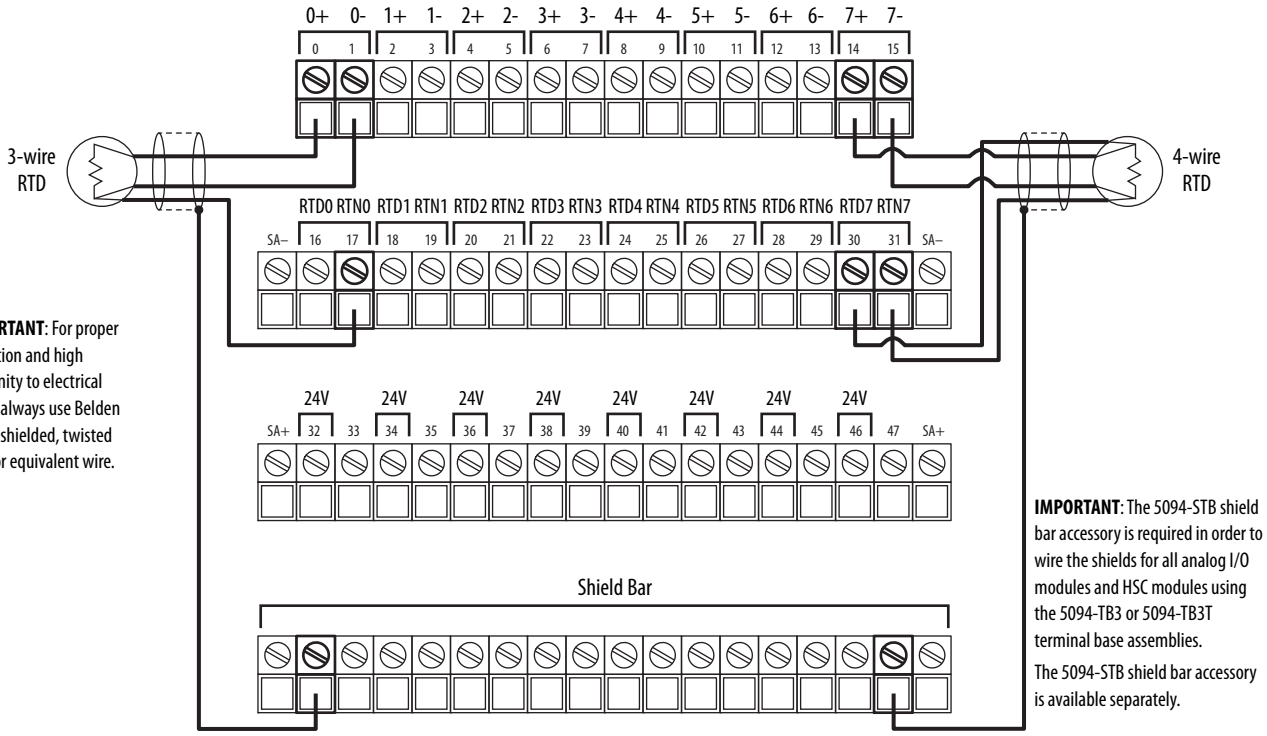


IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

5094-IY8 and 5094-IY8XT Wiring Diagram – 3-wire and 4 wire RTD Mode



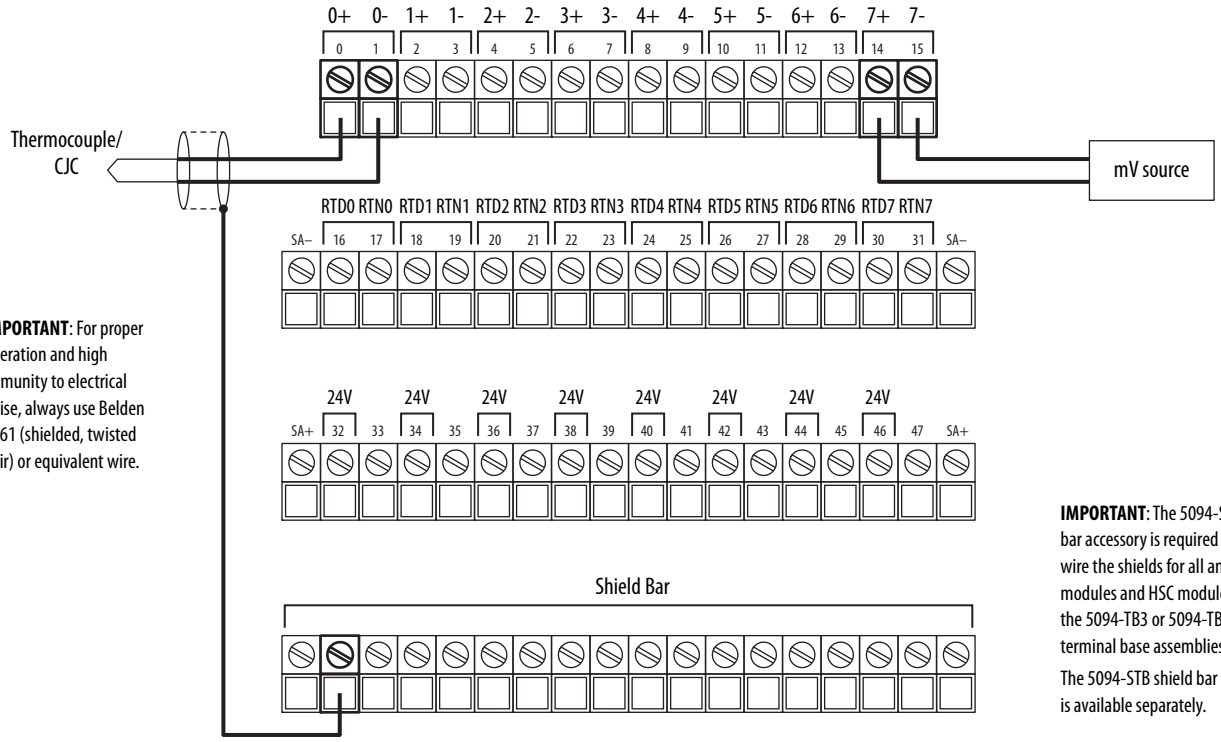
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-IY8 and 5094-IY8XT modules when used in thermocouple mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-IY8 and 5094-IY8XT Wiring Diagram – Thermocouple Mode



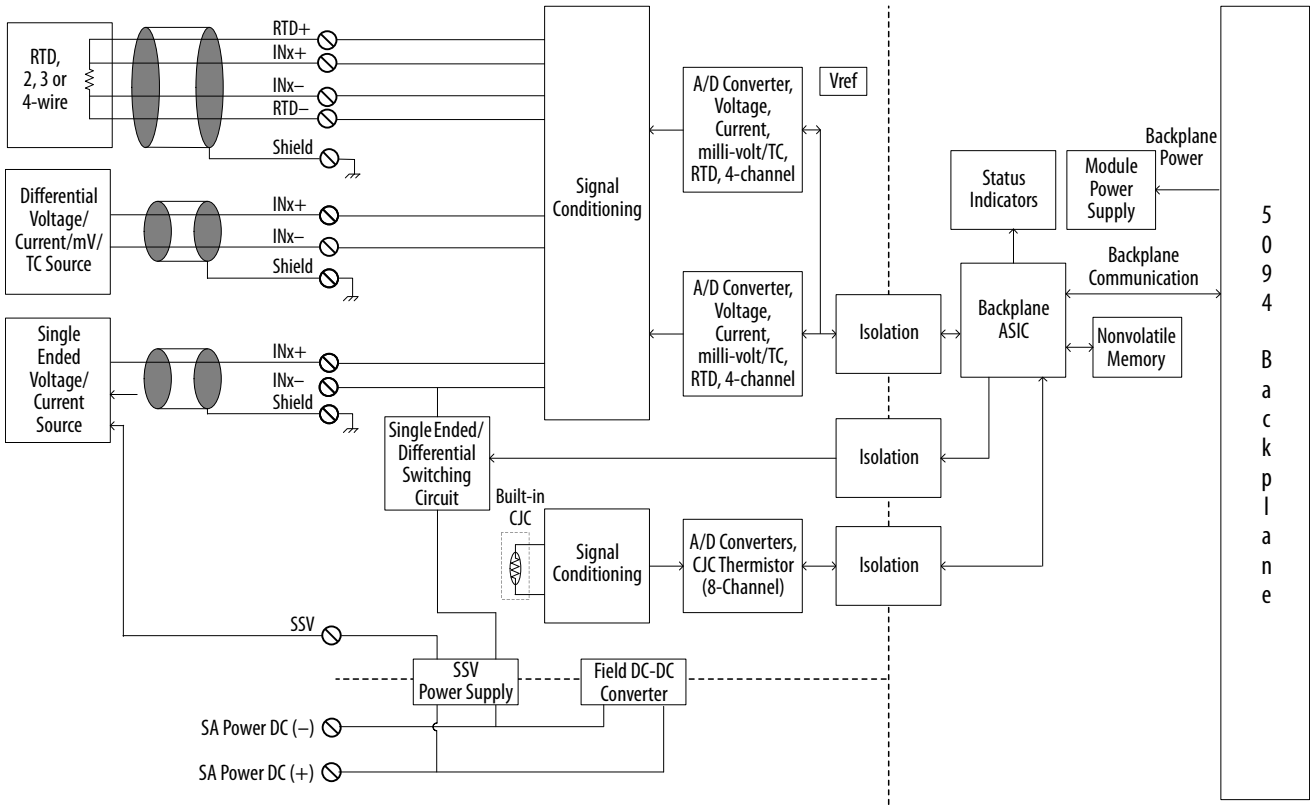
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a functional block diagram for the 5094-IY8 and 5094-IY8XT modules.

5094-IY8 and 5094- IY8XT Functional Block Diagram



Technical Specifications - 5094-IY8, 5094-IY8XT

Attribute	5094-IY8, 5094-IY8XT
Inputs	8 differential/single-ended
Differential / Single-ended mode	Yes
Input range, voltage	±10V 0…10V 0…5V
Input range, current	0…20 mA 4…20 mA
Input range, resistive	1…500 Ω 2…1000 Ω 4…2000 Ω 8…4000 Ω
Input type, RTD	100, 200, 500, 1000 Ω platinum, alpha=385 100, 200, 500, 1000 Ω platinum, alpha=3916 120 Ω nickel, alpha=672 100, 120, 200, 500 Ω nickel, alpha=618 10 Ω copper 427
Input range, thermocouple / millivolt	±100 mV
Input type, thermocouple	B, C, D, E, J, K, L (TXK/XK), N, R, S, T
Input impedance	Voltage: >1 MΩ Current: 90 Ω typical, 70…110 Ω range RTD: >1 MΩ Thermocouple/millivolt: >1 MΩ

Technical Specifications - 5094-IY8, 5094-IY8XT

Attribute	5094-IY8, 5094-IY8XT
Common mode voltage (channel to channel) (for Differential mode only)	±10V
Module conversion method	Sigma-Delta, Two 24-bit multiplexed ADC
Resolution, voltage[1] (16 bits at 10 Hz notch filter)	±10.5V: <320 µV/count (15 bits plus sign bipolar) 0…10.5V: <160 µV/count (16 bits unipolar) 0…5V: <80 µ/V count (16 bits unipolar)
Resolution, current[1] (16 bits at 10 Hz notch filter)	0…21 mA: <0.32 µA/count (16 bits) 3.6…21 mA: <0.32 µA/count (16 bits)
Resolution, resistive[1] (16 bits at 10 Hz notch filter) 3-wire and 4-wire mode	<7.7 mΩ/cnt in 1…500 Ω mode (16 bits) <15.4 mΩ/cnt in 2…1000 Ω mode (16 bits) <30.8 mΩ/cnt in 4…2000 Ω mode (16 bits) <61.5 mΩ/cnt in 8…4000 Ω mode (16 bits)
Resolution, thermocouple / millivolt[1] (16 bits at 10 Hz notch filter)	<3.1 µV/cnt in ±100 mV mode
RTD excitation current	600 µA, 3 wire mode & 4 wire mode 100 µA, 2 wire mode
Wire impedance (3-wire RTD mode only)	25 Ω maximum for specified accuracy
RTD sensor types/temperature range: (Each sensor type in a cell supports all temperature ranges in the corresponding column to the right.)	
100, 200, 500, 1000 Ohm PT 385	-200…+870 °C -328…+1598 °F 73…1143 °K 132…2058 °R
100, 200, 500, 1000 Ohm PT 3916	-200…+630 °C -328…+1166 °F 73…903 °K 132…1626 °R
10 Ohm CU 247	-200…+260 °C -328…+500 °F 73…533 °K 132…960 °R
120 Ohm NI 672	-80…+320 °C -112…+608 °F 193…593 °K 348…1068 °R
100, 120, 200, 500 Ohm NI 618	-60…+250 °C -76…+482 °F 213…523 °K 384…942 °R

Technical Specifications - 5094-IY8, 5094-IY8XT

Attribute	5094-IY8, 5094-IY8XT
Thermocouple type/temperature range: Thermocouple Type B	 21…1820 °C 68…3308 °F 293…2093 °K 528…3768 °R
Thermocouple Type C	0…2320 °C 32…4208 °F 273…2593 °K 492…4668 °R
Thermocouple Type D	0…2320 °C 32…4208 °F 273…2593 °K 492…4668 °R
Thermocouple Type E	-270…+1000 °C -454…+1832 °F 3…1273 °K 6…2292 °R
Thermocouple Type J	-210…+1200 °C -346…+2192 °F 63…1473 °K 114…2652 °R
Thermocouple Type K	-270…+1372 °C -454…+2502 °F 3…1645 °K 6…2961 °R
Thermocouple Type N	-270…+1300 °C -454…+2372 °F 3…1573 °K 6…2832 °R
Thermocouple Type R	-50…+1768 °C -58…+3215 °F 223…2041 °K 402…3674 °R
Thermocouple Type S	-50…+1768 °C -58…+3215 °F 223…2041 °K 402…3674 °R
Thermocouple Type T	-270…+400 °C -454…+752 °F 3…673 °K 6…1212 °R
Thermocouple Type TXK/XK (L)	-200…+800 °C -328…+1472 °F 73…1073 °K 132…1932 °R
Thermocouple linearization	ITS-90
CJC inputs (for thermocouple mode use only)	CJC sensors 8 thermistors embedded in 5094-RTB3T Measurement Specialties, Inc. 10K3A1A
Local CJC sensor accuracy	±0.5 °C
Remote CJC sensor accuracy	Based on channel accuracy
Sensor source voltage output (SSV)	24V, 200 mA max

Technical Specifications - 5094-IY8, 5094-IY8XT

Attribute	5094-IY8, 5094-IY8XT
Calibrated accuracy at 25 °C (77 °F)	Voltage: 0.05% full scale Current: 0.05% full scale RTD: 0.05% full scale Thermocouple/millivolt: 0.05% full scale
Accuracy drift with temperature	Voltage: 31 ppm/°C Current: 47 ppm/°C RTD: 62 ppm/°C Thermocouple/millivolt: 31 ppm/°C
Scan time Per channel Per group (channel group 0…3 or channel group 4…7)	 625 µs 2.5 ms
Notch filter at minimum RPI (0.2 ms, 1 channel enabled)	62.5 kHz
Minimum notch filter frequency at RPI of 2.5 ms	10 kHz
Input notch filter (Hz) selections	5, 10 (50/60 default), 15, 20, 50, 60, 100, 200, 500, 1000, 2500, 5000, 10000, 15625, 25000, 31250, 62500.
Input digital filter	1st Order Lag, 0 ms (Default) - 32,767 ms (32.767 s)
HART handheld compliance	No Add an external 250 Ω resistor into the current loop for HART transmitter compliance.
Overvoltage protection, max	Voltage, current, RTD, and thermocouple/mV modes: ±32V DC
Overcurrent protection	Current mode: ±30 mA
Data value during overload condition	Full scale, overrange flag, Data uncertain / data bad
Open circuit detection time, nom	Voltage: + full scale, <2 s Current: 4…20 mA range, <1 s RTD: <10 s Thermocouple/millivolt: + full scale, <2 s
Onboard data alarming	Yes
Scaling to engineering units	Yes
Real-time channel sampling	Yes
Data format	IEEE 754 32-bit floating point
Timestamp of inputs	Yes
CIP Sync	Yes

(1) Notch filter dependent.

General Specifications - 5094-IY8, 5094-IY8XT

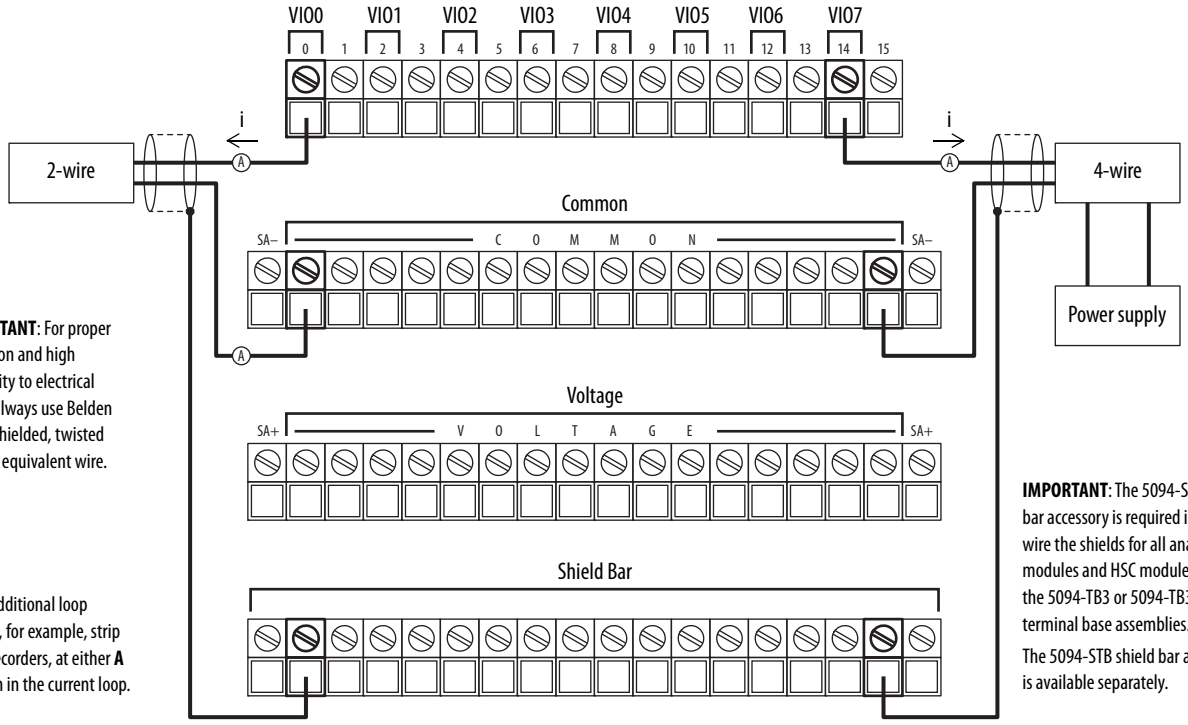
Attribute	5094-IY8, 5094-IY8XT
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	75 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	480 mA (include SSV 200 mA)
Power dissipation, max	3.9 W
Thermal dissipation, max	13.31 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and input ports No isolation between individual input ports
Calibration methods	Factory calibrated User-performed (optional)
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
Common mode noise rejection ratio	130 dB @ 50/60 Hz
Normal mode noise rejection ratio	65 dB @ 50/60 Hz, notch filter dependent
Terminal base (TB) assembly	5094-TB3T (consists of a 5094-MB and 5094-RTB3T) or 5094-TB3TS (consists of a 5094-MB and 5094-RTB3TS) or 5094-TB3TXT (consists of a 5094-MBXT and 5094-RTB3TXT) or 5094-TB3TSXT (consists of a 5094-MBXT and 5094-RTB3TSXT) **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 ⋎⋎ 3**
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 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	119 g (0.26 lb)
Enclosure type	None (open-style)
North American temperature 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.

5094-OF8 and 5094-OF8XT Analog Current/Voltage Output Modules

This figure shows a wiring diagram for the 5094-OF8 and 5094-OF8XT modules when used in current mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OF8 and 5094-OF8XT Wiring Diagram – Current Mode



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

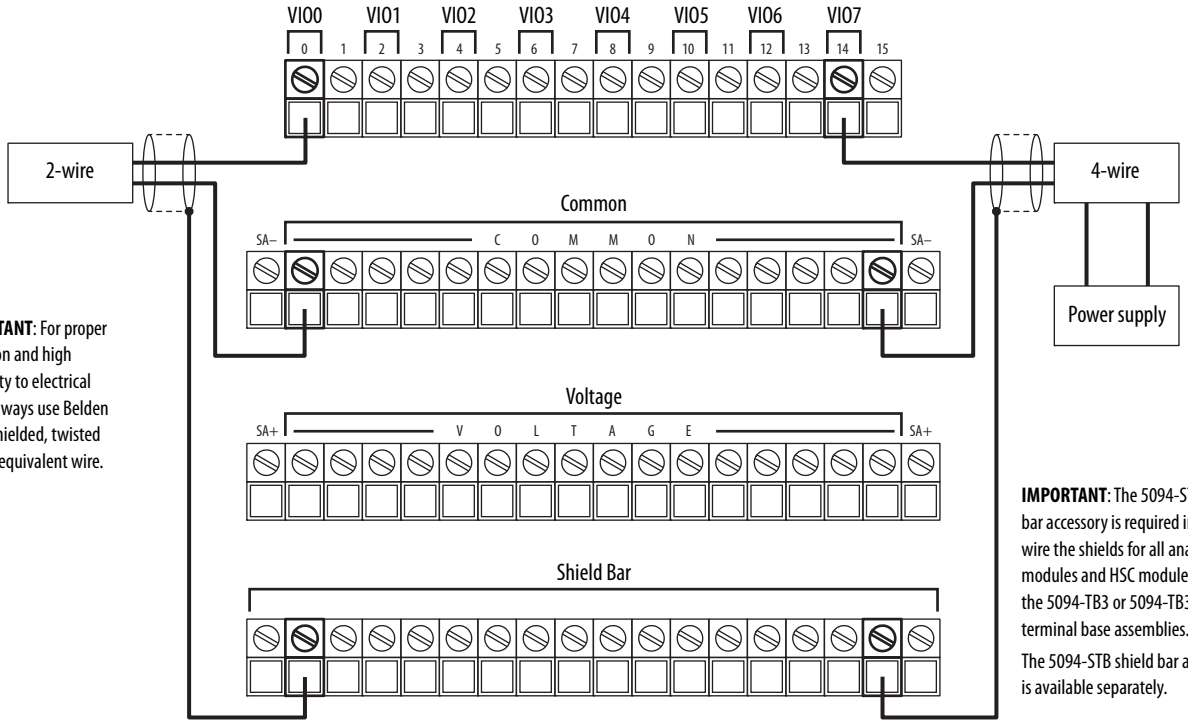
Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-OF8 and 5094-OF8XT modules when used in voltage mode. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OF8 and 5094-OF8XT Wiring Diagram – Voltage Mode



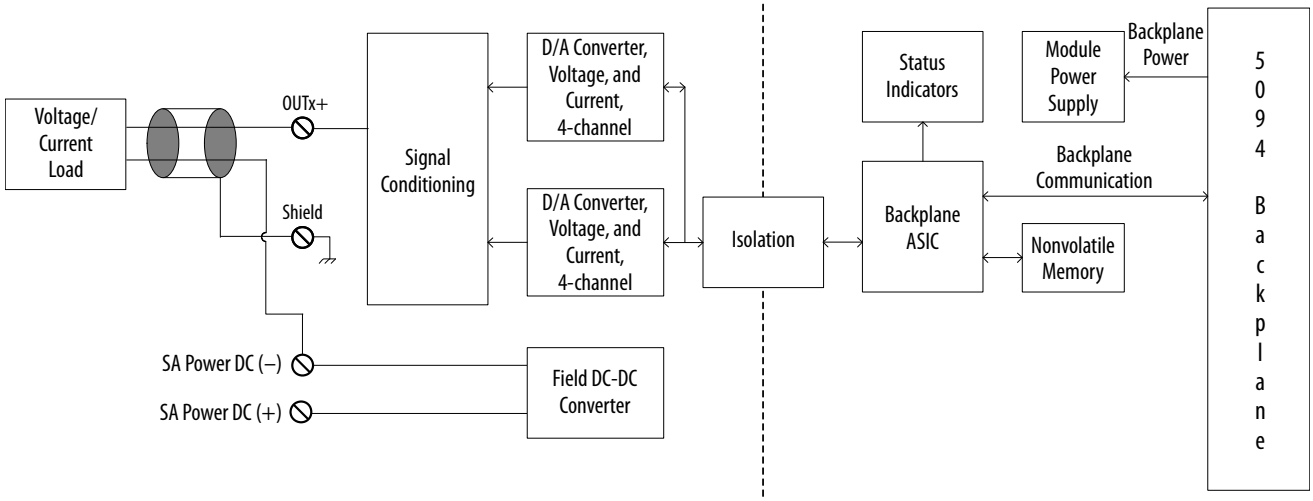
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a functional block diagram for the 5094-OF8 and 5094-OF8XT modules.

5094-OF8 and 5094-OF8XT Functional Block Diagram



Technical Specifications - 5094-OF8, 5094-OF8XT

Attribute	5094-OF8, 5094-OF8XT
Outputs	8 single-ended
Output range, voltage	±10V 0…10V 0…5V
Output range, current	0…20 mA 4…20 mA
Resolution	16 bits across ±10.5V - 320 µV/bit 16 bits across 10.5V - 160 µV/bit 16 bits across 5V - 80 µV/bit 16 bits across 21 mA - 320 nA/bit
Drive capability	Voltage - 1000 Ω min Current - 500 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 – output electronically limited to 16 mA or less
Data format	IEEE 754 32-bit floating point
Module conversion method	R-Ladder DAC, monotonicity with no missing codes
Conversion time per channel	25 µs
Scan time (per group 0…7)	2.0 ms
Step response time to 63% of value	Voltage mode: 18 µs max Current mode: 1 ms max
Overvoltage protection, max	±32V DC
Repeatability	0.05%
Calibrated accuracy at 25 °C (77 °F)	Voltage: 0.10% full scale Current: 0.10% full scale
Accuracy drift with temperature	Voltage: 47 ppm/°C Current: 60 ppm/°C

General Specifications - 5094-OF8, 5094-OF8XT

Attribute	5094-OF8, 5094-OF8XT
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	75 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	260 mA
Power dissipation, max	3.7 W
Thermal dissipation, max	12.62 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and Output ports No isolation between individual Output ports
Calibration methods	Factory Calibrated User-performed (optional)
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-TB3 (consists of a 5094-MB and 5094-RTB3) or 5094-TB3S (consists of a 5094-MB and 5094-RTB3S) or 5094-TB3XT (consists of a 5094-MBXT and 5094-RTB3XT) or 5094-TB3SXT (consists of a 5094-MBXT and 5094-RTB3SXT) **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 ⓨⓉ 1**
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 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	108 g (0.24 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 tables below 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
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
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
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 & 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
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
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

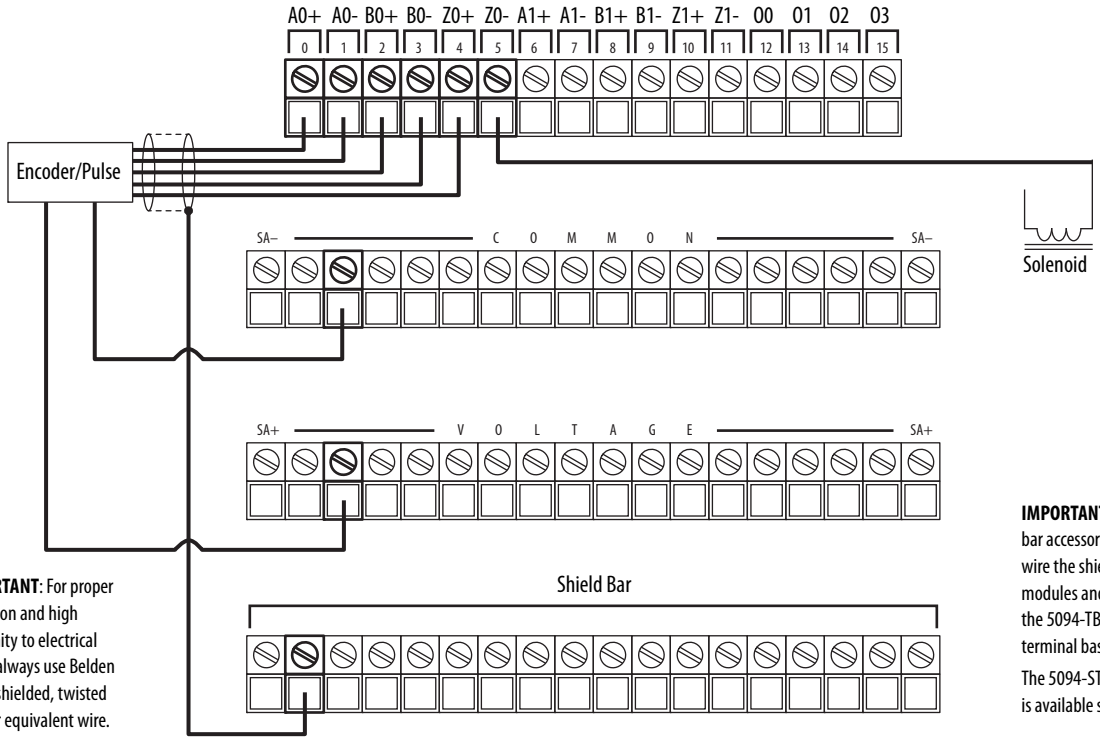
Specialty Modules

I/O Type	Cat. No.	Page
High-speed counter	5094-HSC, 5094-HSCXT	36

5094-HSC and 5094-HSCXT High-speed Counter Modules

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

5094-HSC and 5094-HSCXT Wiring Diagram – Differential Encoder



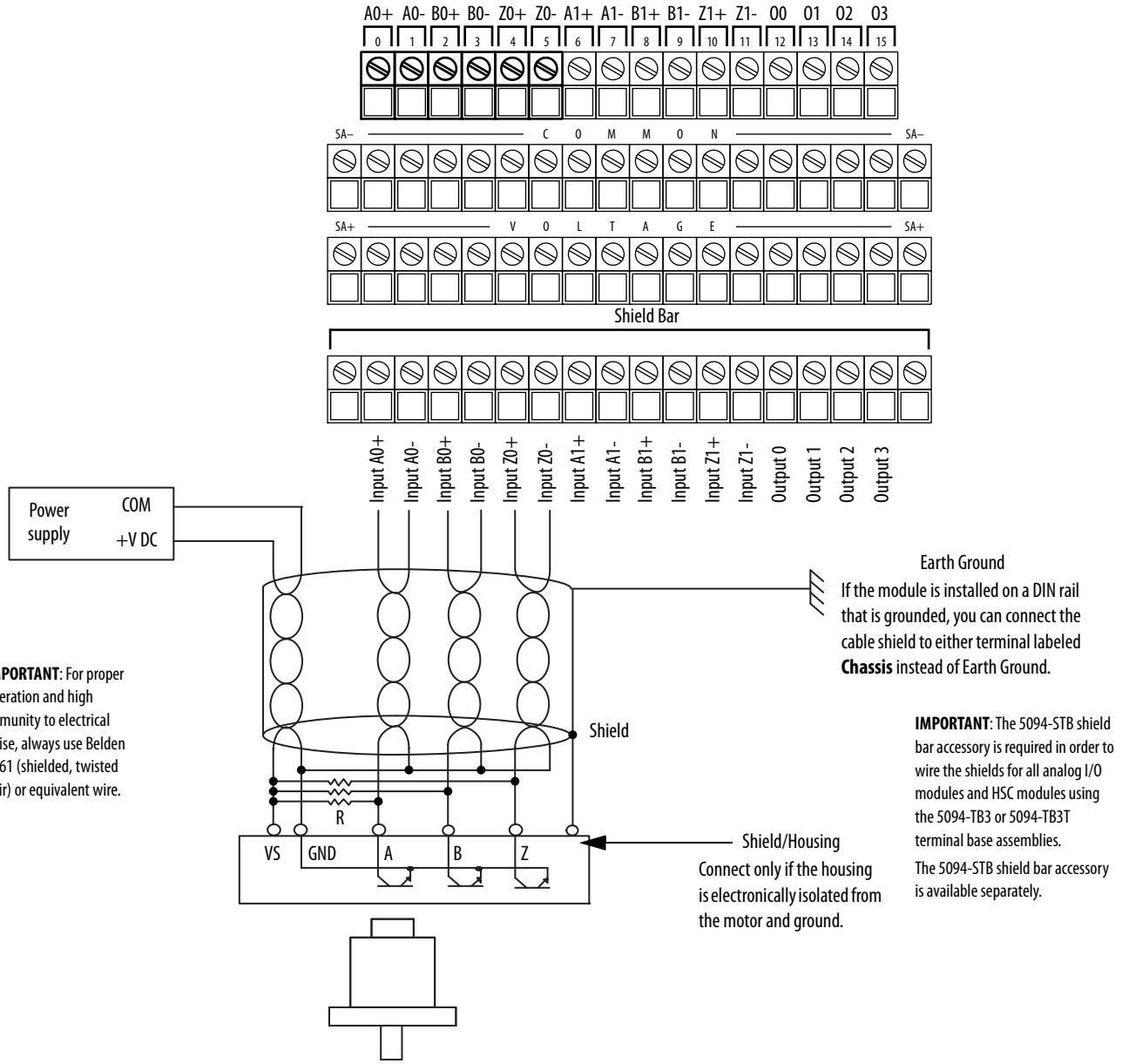
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

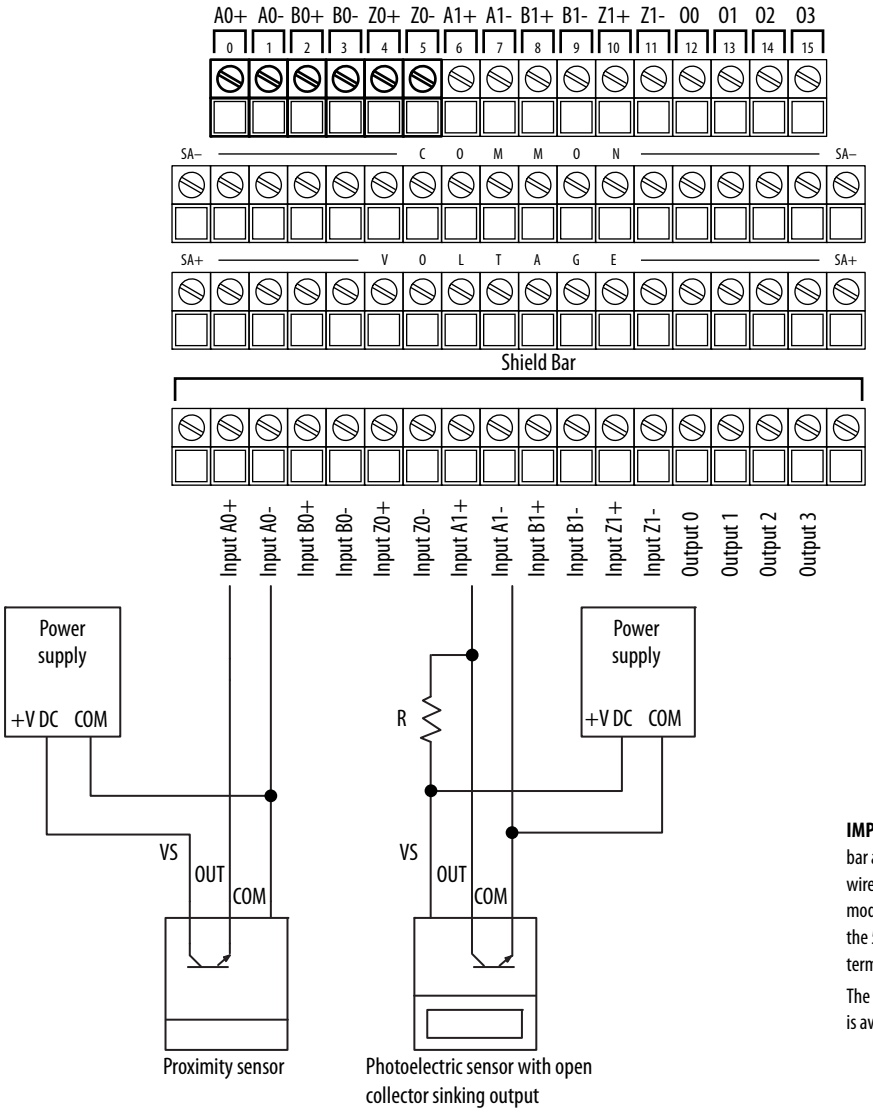
This figure shows a wiring diagram for the 5094-HSC and 5094-HSCXT modules connected to a single-ended encoder. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-HSC and 5094-HSCXT Wiring Diagram – Single-ended Encoder



This figure shows a wiring diagram for the 5094-HSC and 5094-HSCXT modules connected to discrete input devices. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-HSC and 5094-HSCXT Wiring Diagram – Discrete Input Devices



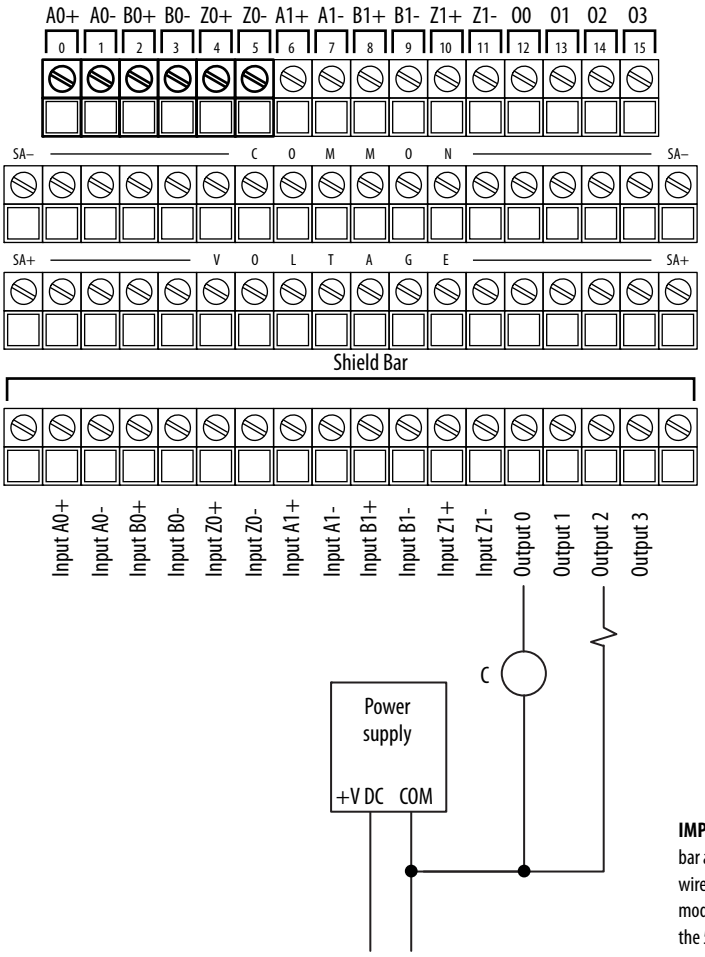
IMPORTANT: For proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted pair) or equivalent wire.

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

The 5094-STB shield bar accessory is available separately.

This figure shows a wiring diagram for the 5094-HSC and 5094-HSCXT modules connected to a discrete output device. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-HSC and 5094-HSCXT Wiring Diagram – Discrete Output Device



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

IMPORTANT: The 5094-STB shield bar accessory is required in order to wire the shields for all analog I/O modules and HSC modules using the 5094-TB3 or 5094-TB3T terminal base assemblies.

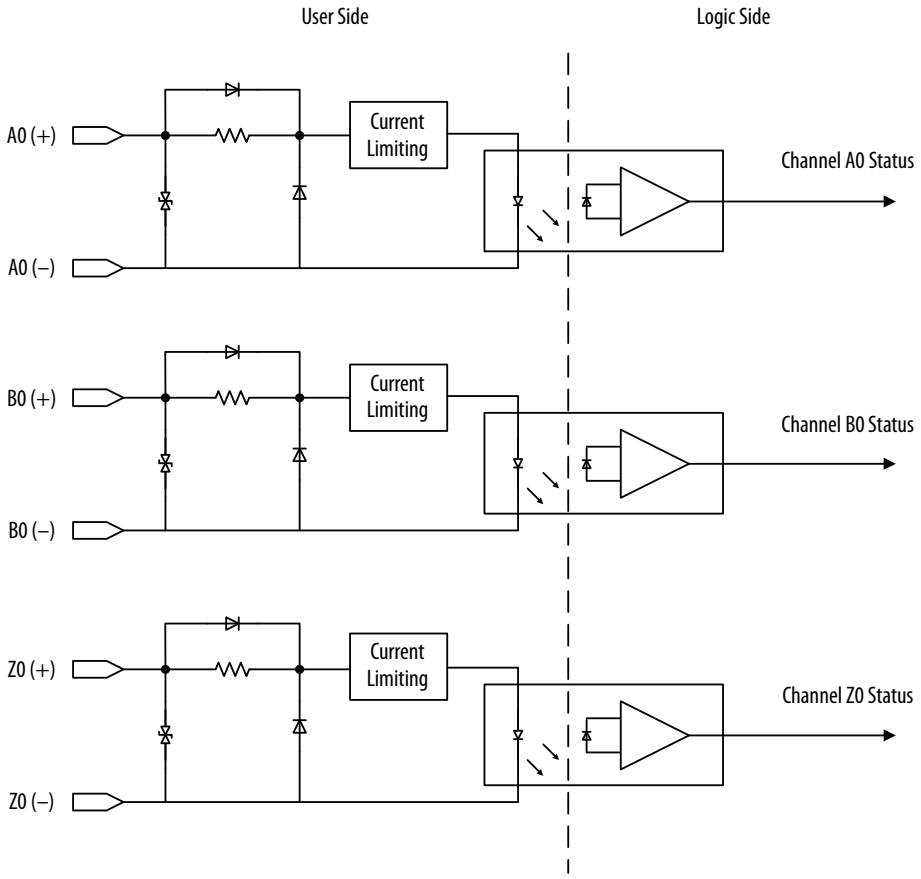
The 5094-STB shield bar accessory is available separately.

This figure shows functional block diagrams for the 5094-HSC and 5094-HSCXT modules inputs and outputs.

5094-HSC and 5094-HSCXT Functional Block Diagram

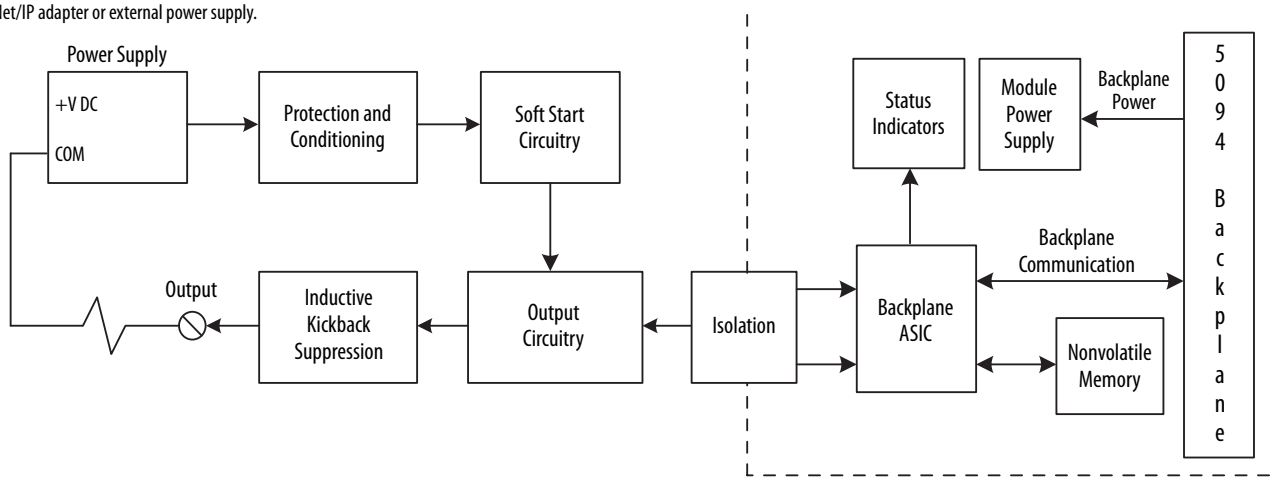
Module Inputs

IMPORTANT: This graphic shows the diagram for Counter 0. Counter 1 uses the same design.



Module Outputs

Connections to the Power RTB on a FLEX 5000 EtherNet/IP adapter or external power supply.



Technical Specifications - 5094-HSC, 5094-HSCXT

Attribute	5094-HSC, 5094-HSCXT
On-state voltage, min	18V DC
On-state voltage, nom	24V DC
On-state voltage, max	32V DC
On-state voltage drop, max	< 0.3V DC
On-state current, min	3 mA
Off-state voltage, max	1.5V
Off-state current, max	1 mA
Input ratings (IN), max	8 mA per channel @ 18…32V DC
Output ratings (OUT)	1 A @ 18…32V DC per channel 3 A per module
Pulse width, min	125 ns
Pulse separation, min	100 ns
Open load detection diagnostics	Yes (per channel diagnostics)
Output short circuit/overload/overtemp detection	Yes (per channel diagnostics)
Output short circuit/overload protection	Yes
Reverse voltage protection	32V DC
Overvoltage protection, max	36V (fuse protected, non-replaceable)
Pilot duty rating	0.5 A resistive and general pilot duty
Increased output current capability	Outputs can be paralleled to increase current capability by 1 A per channel. Total current per module is limited to 3 A.
Output control in fault state per point	• Hold last state • On • Off (default)
Output states in program mode per point	• Hold last state • On • Off (default)
Output states in fault mode per point	• Hold Last State • On • Off (default)
Duration of fault mode per point	• 1 s • 2 s • 5 s • 10 s • Forever (default)
CIP Sync	Supported

General Specifications - 5094-HSC, 5094-HSCXT

Attribute	5094-HSC, 5094-HSCXT
Inputs	2 quadrature (ABZ) differential inputs
Outputs	4 Channels (1 group of 4), sourcing
Voltage category	24V DC source
Input range, voltage	3…32V DC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	67 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	3 A
Power dissipation, max	3.5 W
Thermal dissipation, max	11.9 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type 250V isolation between input ports to output ports 250V isolation between I/O ports and Backplane Circuits No isolation between individual I/O ports Type tested @ 1500V AC for 60 s
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 10 yellow/red I/O status indicator
Terminal base (TB) assembly	5094-TB3 (consists of a 5094-MB and 5094-RTB3) or 5094-TB3S (consists of a 5094-MB and 5094-RTB3S) or 5094-TB3XT (consists of a 5094-MBXT and 5094-RTB3XT) or 5094-TB3SXT (consists of a 5094-MBXT and 5094-RTB3SXT) **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	**4 ⓚⓣ 1**
Wiring category[1]	2 - on output ports 2 - on output power ports 2 - on shielded counter ports
Wire size - Signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	143 g (0.32 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.

Environmental Specifications - 5094-HSC, 5094-HSCXT

Attribute	5094-HSC, 5094-HSCXT
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 10V/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 ±4 kV @ 5 kHz on output ports ±4 kV @ 5 kHz on shielded input 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 output ports ±1 kV line-earth (CM) on input ports
Conducted RF immunity IEC 61000-4-6	10Vrms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Corrosion resistance classification	ISA S71.04 G2 – **5094-HSC** ISA S71.04 G3 – **5094-HSCXT**

Certifications - 5094-HSC, 5094-HSCXT

Certification[1]	5094-HSC, 5094-HSCXT
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 & 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 1922X
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 17.0075X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

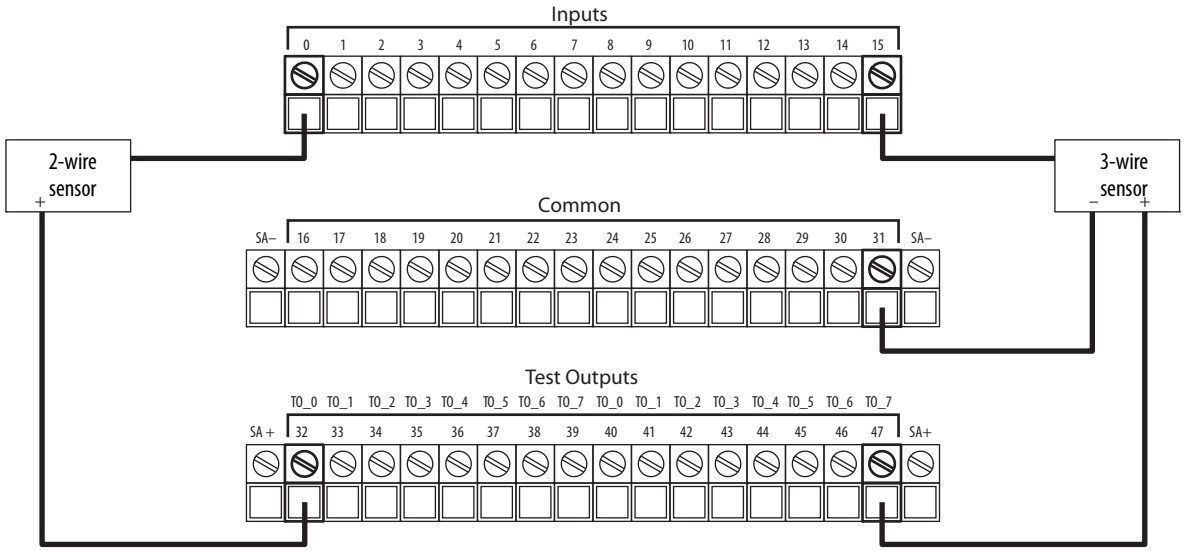
Safety Digital I/O Modules

I/O Type	Cat. No.	Page
Safety digital input	5094-IB16S, 5094-IB16SXT	46
Safety digital output	5094-OB16S, 5094-OB16SXT	51
Safety digital relay output	5094-OW4IS, 5094-OW4ISXT	56

5094-IB16S and 5094-IB16SXT Safety Digital 16-point Sinking Input Modules

This figure shows a wiring diagram for the 5094-IB16S and 5094-IB16SXT safety modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

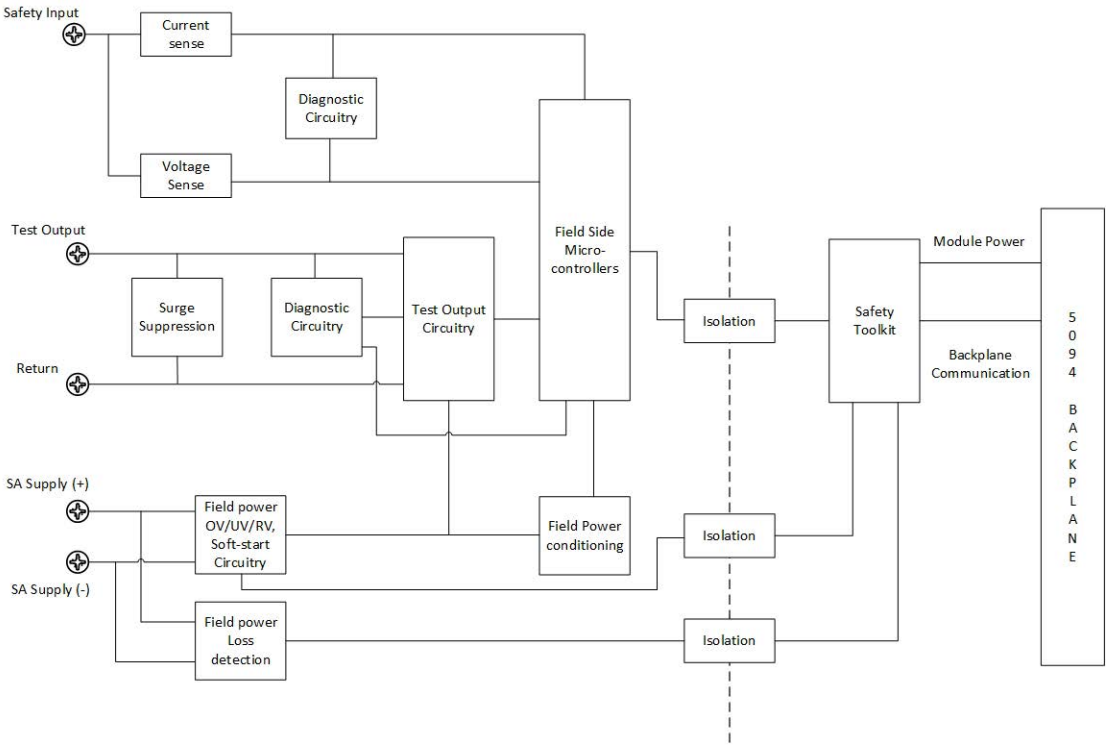
5094-IB16S and 5094-IB16SXT Wiring Diagram



IMPORTANT: The 5094-IB16S module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (–) terminal on the terminal base.

This figure shows a functional block diagram for the 5094-IB16S and 5094-IB16SXT safety modules.

5094-IB16S and 5094-IB16SXT Functional Block Diagram



Technical Specifications - 5094-IB16S, 5094-IB16SXT

Attribute	5094-IB16S, 5094-IB16SXT
On-state voltage range	10...32V DC
On-state current, @ on-state min voltage	2.4 mA @ 10V
On-state current, @ on-state nom voltage	2.5 mA @ 24V
On-state current, @ on-state max voltage	2.8 mA @ 32V
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input delay time (screw to backplane), max Off to On On to Off	6 ms @ RPI of 2 ms
Safety Integrity Level	Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508. (1)
Safety Reaction Time (SRT)	6 ms @ RPI of 2ms
Test output current per point	0.2 A
Number of test output	8
Test output pulse width, max	600 µs
Test output pulse period, typical	100 ms
Test output max field capacitance	100 nF
Test output short circuit protection	Yes
Test output leakage current, max	0.5 mA
Module over-temperature detection	Yes
Input delay time Off to On, user-selectable filter time On to Off, user-selectable filter time	 0…50 ms 0…50 ms
SA supply reverse voltage protection	Yes
SA supply overvoltage protection, max	60V
Timestamp of inputs	No
CIP Sync	Yes

(1) Refer to the FLEX 5000 Digital I/O User Manual, publication 5094-UM001, for Safety Application Suitability Levels and Safety Data for Safety I/O Modules.

General Specifications - 5094-IB16S, 5094-IB16SXT

Attribute	5094-IB16S, 5094-IB16SXT
Inputs	16 channels (1 group of 16), sinking
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	100 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	1.8 A
Power dissipation, max	3.5 W
Thermal dissipation, max	11.94 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and input ports No isolation between individual input ports
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3I (consists of a 5094-MB and 5094-RTB3I) 5094-TB3IS (consists of a 5094-MB and 5094-RTB3IS) 5094-TB3IXT (consists of a 5094-MBXT and 5094-RTB3IXT) 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	5 5
Wire category(1)	2 - signal ports 2 - power ports
Wire size - signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	136 g (0.30 lb)
Enclosure type	None (open-style)
North American temp code	T4
ATEX/IECEx 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 - 5094-IB16S, 5094-IB16SXT

Attribute	5094-IB16S, 5094-IB16SXT
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)	-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 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…6000 MHz
EFT/B immunity IEC 61000-4-4	±4 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 signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Corrosion resistance classification	**5094-IB16S** – ISA S71.04 G2 **5094-IB16SXT** – ISA S71.04 G3

Certifications - 5094-IB16S, 5094-IB16SXT

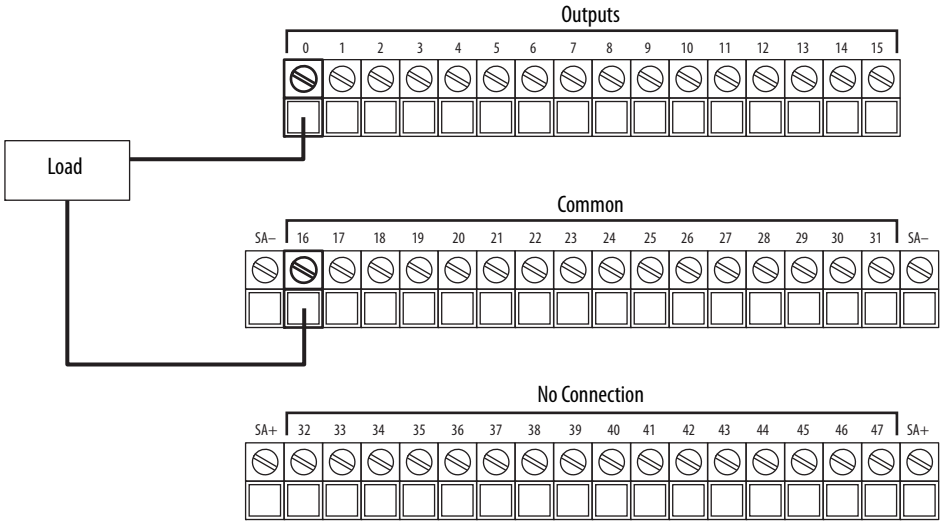
Certification[1]	5094-IB16S, 5094-IB16SXT
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, 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 & B) European Union 2006/42/EC MD, compliant with: • EN ISO 13849-1; Safety-related parts of control system • EN 62061; Functional safety of safety-related control systems 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 1922X
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 17.0075X
TÜV	TÜV Certified for Functional Safety: • Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508[2]
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.
(2) When used as described in the GuardLogix® Controller Systems Safety Reference Manual, publication 1756-RM093, and the FLEX 5000 Digital I/O Module User Manual, publication 5094-UM001.

5094-OB16S and 5094-OB16SXT Safety Digital 16-point Sourcing Output Modules

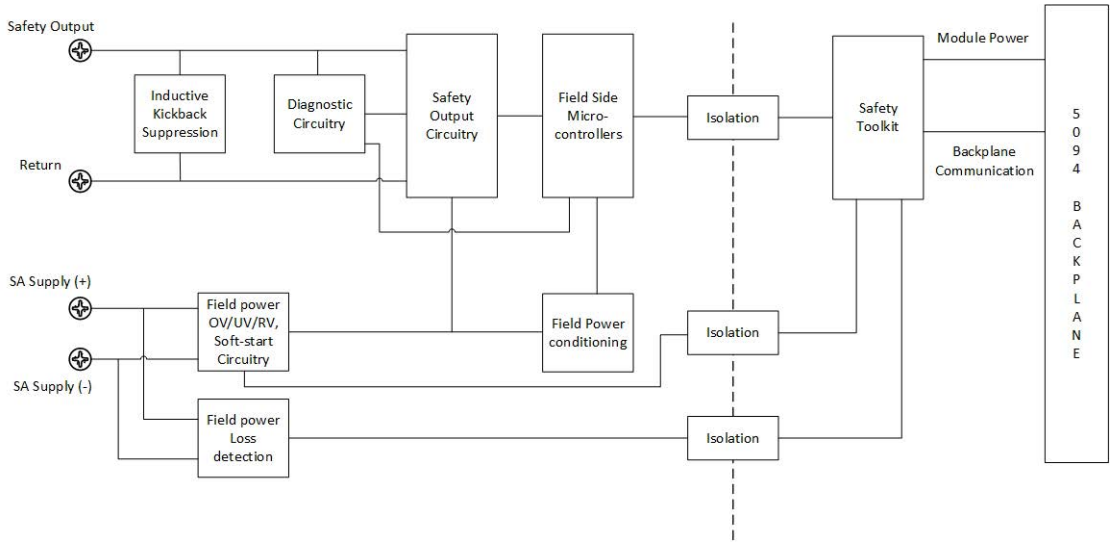
This figure shows a wiring diagram for the 5094-OB16S and 5094-OB16SXT safety modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OB16S and 5094-OB16SXT Wiring Diagram



This figure shows a functional block diagram for the 5094-OB16S and 5094-OB16SXT safety modules.

5094-OB16S and 5094-OB16SXT Functional Block Diagram



Technical Specifications - 5094-OB16S, 5094-OB16SXT

Attribute	5094-OB16S, 5094-OB16SXT
On-state voltage range	18...32V DC
On-state voltage drop, max	0.5V @ 0.5 A
On-state current per channel, min	10 mA
Off-state voltage, max	5V DC
Off-state leakage current per point, max(1)	0.5 mA
Output current rating per point	0.5 A
Surge current per point, max	1.8 A(2)
Output delay time (backplane to screw), max Off to On On to Off	4 ms @ RPI of 2 ms
Safety Integrity Level (SIL)	Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508(3)
Safety Reaction Time (SRT)	4.5 ms @ RPI of 2 ms
Pulse width, max	500 µs
Open load detection diagnostics	Yes (per point)
Output short circuit/overload detection	Yes (per point)
Channel-to-channel short-circuit detection	Yes (per point) in Safety Pulse Test mode
Module over-temperature detection	Yes
Output short circuit/overload protection	Yes (per point)
SA supply reverse voltage protection	Yes
SA supply overvoltage protection, max	60V
Output control in fault state per point	Yes
Output state in program mode per point	• Off (default) • Hold • ON
Output state in communications fault mode per point	• Off (default) • Hold • ON
Output state in communications fault mode in program mode per point	• Program mode (default) • Communications Fault mode
CIP Sync	Yes

(1) Recommended Loading Resistor - To limit the effects of leakage current through solid state outputs, you can connect a loading resistor in parallel with your load. For 24V DC operation, use a 5.6 KΩ, 0.5 W resistor for transistor operation.
(2) 1.8 A for up to 150 ms. The module current rating cannot exceed 10 A at any time. Refer FLEX 5000 Digital I/O User Manual, publication 5094-UM001, for Surge Capability of Safety Output.
(3) Refer to the FLEX 5000 Digital I/O User Manual, publication 5094-UM001, for Safety Application Suitability Levels and Safety Data for Safety I/O Modules.

General Specifications - 5094-OB16S, 5094-OB16SXT

Attribute	5094-OB16S, 5094-OB16SXT
Outputs	16 Channels (1 group of 16), sourcing
Output voltage range	18…32V DC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	100 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	8.2 A
Power dissipation, max	3.5 W
Thermal dissipation, max	11.94 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA Power and output ports No isolation between individual output ports
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3I (consists of a 5094-MB and 5094-RTB3I) 5094-TB3IS (consists of a 5094-MB and 5094-RTB3IS) 5094-TB3IXT (consists of a 5094-MBXT and 5094-RTB3IXT) 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	5 ⓚⓣ 1
Wire category[1]	2 - signal ports 2 - power ports
Wire size - signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	140 g (0.31 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 - 5094-OB16S, 5094-OB16SXT

Attribute	5094-OB16S, 5094-OB16SXT
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 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…6000 MHz
EFT/B immunity IEC 61000-4-4	±4 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 signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Corrosion resistance classification	**5094-OB16S** – ISA S71.04 G2 **5094-OB16SXT** – ISA S71.04 G3

Certifications - 5094-OB16S, 5094-OB16SXT

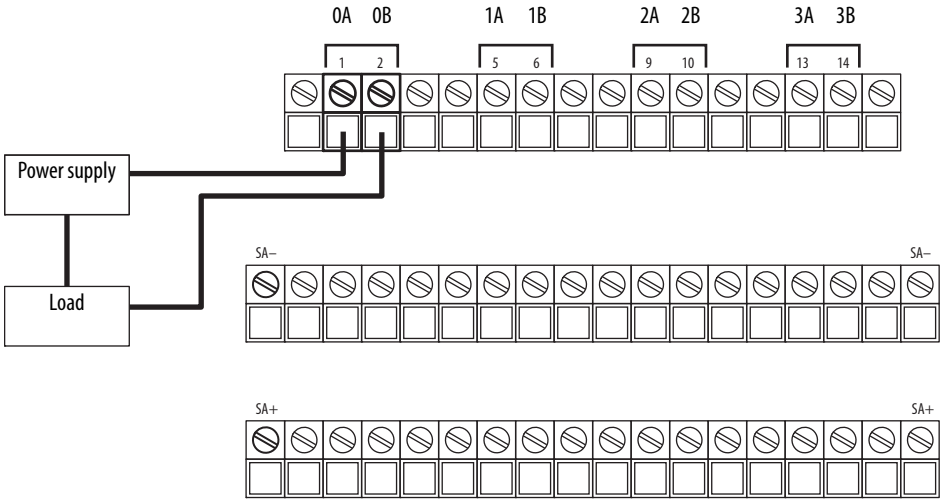
Certification[1]	5094-OB16S, 5094-OB16SXT
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, 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 & B) European Union 2006/42/EC MD, compliant with: • EN ISO 13849-1; Safety-related parts of control system • EN 62061; Functional safety of safety-related control systems 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 1922X
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 17.0075X
TÜV	TÜV Certified for Functional Safety: • Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508[2]
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.
(2) When used as described in the GuardLogix Controller Systems Safety Reference Manual, publication 1756-RM093, and the FLEX 5000 Digital I/O User Manual, publication 5094-UM001.

5094-OW4IS and 5094-OW4ISXT Safety Digital 4-point Isolated Relay Output Modules

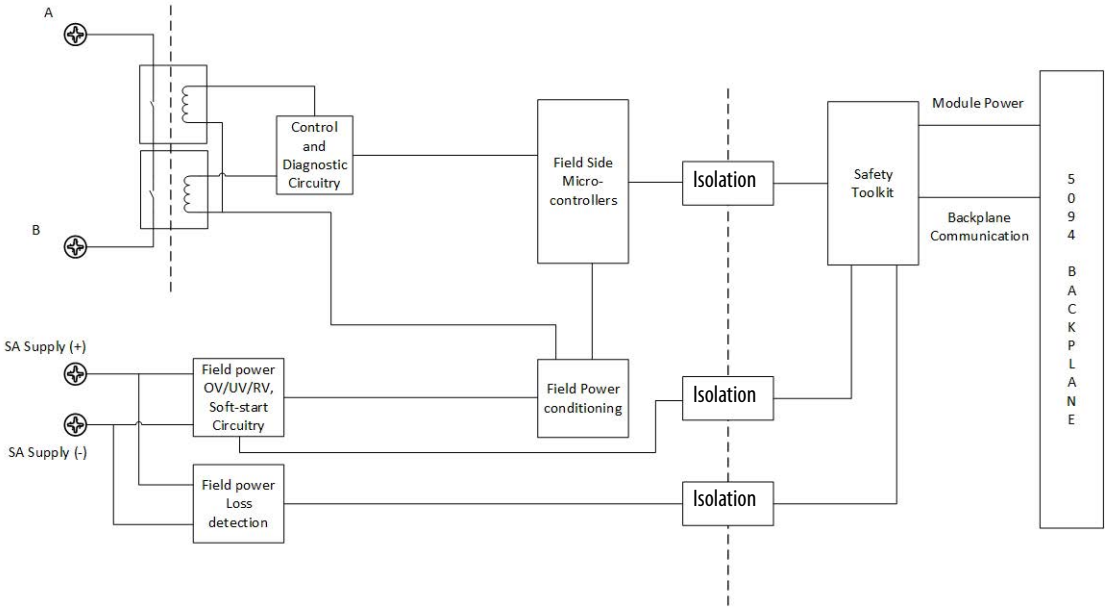
This figure shows a wiring diagram for the 5094-OW4IS and 5094-OW4ISXT safety modules. You must connect a 24V DC power source to the left SA+/– terminals to provide field-side power.

5094-OW4IS and 5094-OW4ISXT Wiring Diagram



This figure shows a functional block diagram for the 5094-OW4IS and 5094-OW4ISXT safety modules.

5094-OW4IS and 5094-OW4ISXT Functional Block Diagram



Technical Specifications - 5094-0W4IS, 5094-0W4ISXT

Attribute	5094-0W4IS, 5094-0W4ISXT
Off-state leakage	0 mA (no onboard snubbers)
Output ratings (OUT), max(1)	5…30V DC, 2A/channel 5…30V DC, 4A/channel (channel 0 & 1 only, 2 & 3 unused) 125/240V AC, 50/60 Hz, 2A/channel
Output delay time, max Off to On On to Off	 20 ms 10 ms(2)
Safety Integrity Level	Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508.(3)
Safety Reaction Time (SRT)	20 ms
Initial contact resistance, max	200 mΩ
Bounce time, mean	1 ms
Output control in fault state per point	Yes
Output state in program mode per point	• Off (default) • Hold • ON
Output state in communications fault mode per point	• Off (default) • Hold • ON
Output state in communications fault mode in program mode per point	• Program mode (default) • Communications Fault mode
Fusing	Not supported
Minimum load current	1 mA
Expected contact life	100K cycles @ 2A resistive load 50K cycles @ 4A resistive load
Pilot duty rating	5…240V AC, 50/60 Hz, C300 pilot duty per channel 5…125V DC, R150 pilot duty per channel

(1) **Surge Suppression** - Connecting surge suppressors across your external inductive load extends the life of the module. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley, publication 1770-4.1.
(2) Under no fault condition.
(3) Refer to the FLEX 5000 Digital I/O User Manual, publication 5094-UM001, for Safety Application Suitability Levels and Safety Data for Safety I/O Modules.

General Specifications - 5094-0W4IS, 5094-0W4ISXT

Attribute	5094-0W4IS, 5094-0W4ISXT
Outputs	4 - Form A (normally open)
Output voltage range	5…125V DC 5…240V AC
Backplane Power (BP) voltage	15V DC
Backplane Power (BP) current, max	100 mA
Sensor Actuator Power (SA) voltage range	18…32V DC
Sensor Actuator Power (SA) current, max	125 mA
Power dissipation, max	3.5 W
Thermal dissipation, max	11.94 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to SA 250V (continuous), Reinforced Insulation Type, System to Channel 250V (continuous), Reinforced Insulation Type, SA to Channel 250V (continuous), Reinforced Insulation Type, Channel to Channel
Module keying	Mechanical keying or electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 4 yellow/red I/O status indicators
Terminal base (TB) assembly	5094-TB3W (consists of a 5094-MB and 5094-RTB3W) 5094-TB3WS (consists of a 5094-MB and 5094-RTB3WS) 5094-TB3WXT (consists of a 5094-MBXT and 5094-RTB3WXT) 5094-TB3WSXT (consists of a 5094-MBXT and 5094-RTB3WSXT) **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	2 ◔◒ 3
Wire category(1)	1 - signal ports 2 - power ports
Wire size - signal	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire 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	146 g (0.32 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 - 5094-OW4IS, 5094-OW4ISXT

Attribute	5094-OW4IS, 5094-OW4ISXT
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, storage 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)	3 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	12 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 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…6000 MHz
EFT/B immunity IEC 61000-4-4	±4 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 signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Corrosion resistance classification	**5094-OW4IS** – ISA S71.04 G2 **5094-OW4ISXT** – ISA S71.04 G3

Certifications - 5094-0W4IS, 5094-0W4ISXT

Certification[1]	5094-0W4IS, 5094-0W4ISXT
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 & B) European Union 2006/42/EC MD, compliant with: • EN ISO 13849-1; Safety-related parts of control system • EN 62061; Functional safety of safety-related control systems 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 nC IIC T4 Gc • DEMKO 17 ATEX 1922X
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection “n” • Ex nA nC IIC T4 Gc • IECEx UL 17.0075X
TÜV	TÜV Certified for Functional Safety: • Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to IEC 62061, SIL 3 acc. to IEC 61508[2]
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.
(2) When used as described in the GuardLogix Controller Systems Safety Reference Manual, publication 1756-RM093, and the FLEX 5000 Digital I/O User Manual, publication 5094-UM001.

EtherNet/IP Adapters

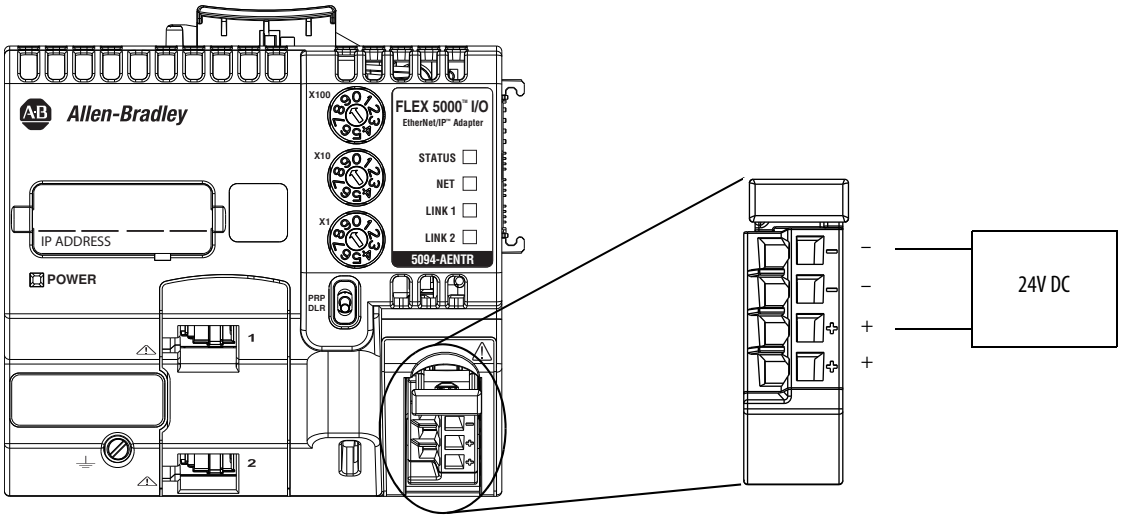
Type	Cat. No.	Page
EtherNet/IP™ adapters with RJ45 ports	5094-AENTR, 5094-AENTRXT 5094-AEN2TR, 5094-AEN2TRXT	62
EtherNet/IP adapters with SFP support	5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT	64

Environmental specifications and certifications for FLEX 5000 EtherNet/IP adapters are provided on page 66.

FLEX 5000 EtherNet/IP Adapters with RJ45 Ports (5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT)

This figure shows a wiring diagram for how to connect power to the FLEX 5000 EtherNet/IP adapter.

5094-AENTR and 5094-AENTRXT Wiring Diagram – MOD Power (DC)



Technical Specifications - 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT

Attribute	5094-AENTR, 5094-AENTRXT	5094-AEN2TR, 5094-AEN2TRXT
Voltage and current ratings, MP	18…32V DC, 1250 mA	18…32V DC, 1880 mA
Voltage and current ratings, MP inrush	18…32VDC, 3200 mA for 100 ms	18…32V DC, 5700 mA for 100 ms
Voltage and current ratings, backplane	15V DC, 1130 mA	15V DC, 1800 mA
Recommended external overcurrent protection	MOD Power: 10…12A @ 22.5…43.2 A2t, Fast Acting SA Power: 20 A @ 250V AC	
Power dissipation, max	5.1 W @ 18V DC	6.2 W @ 18V DC
Thermal dissipation, max	17.4 BTU/hr @ 24V DC	21.1 BTU/hr @ 24V DC
Isolation voltage	300V (continuous), Basic Insulation Type Tested @ 2121V AC for 60 s, Power to Backplane and Backplane to Ethernet Tested @ 4242V DC for 60s, Power to Ethernet ports No isolation between Ethernet ports	
DIN rail	Compatible zinc-plated, chromate-passivated steel DIN rail. EN60715 - 35 x 7.5 mm (1.38 x 0.30 in.)	
Removable terminal block (RTB)	Your adapter comes with a screw-type RTB. You can order screw-type or spring-type RTBs separately: • 5094-AENRTB-QTY5 – Ethernet Adapter RTB, Screw-type, Pack of 5 • 5094-AENRTBS-QTY5 – Ethernet Adapter RTB, Spring-type, Pack of 5	
Terminal block torque, power RTB	Screw-type RTB: 0.4 N•m (3.5 lb•in) Spring-type RTB: Not applicable	
Terminal block torque, functional earth terminal	0.5 N•m (4.4 lb•in)	
Wiring category[1], [2]	1 - on power ports 1- on Ethernet ports	
Wire type	Copper	
Wire size, power RTB	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max, single wire connection only. Ferrule according to DIN 46 228/1.	
Wire size, functional earth terminal	2.5 mm^2 (14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only.	

Technical Specifications - 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT

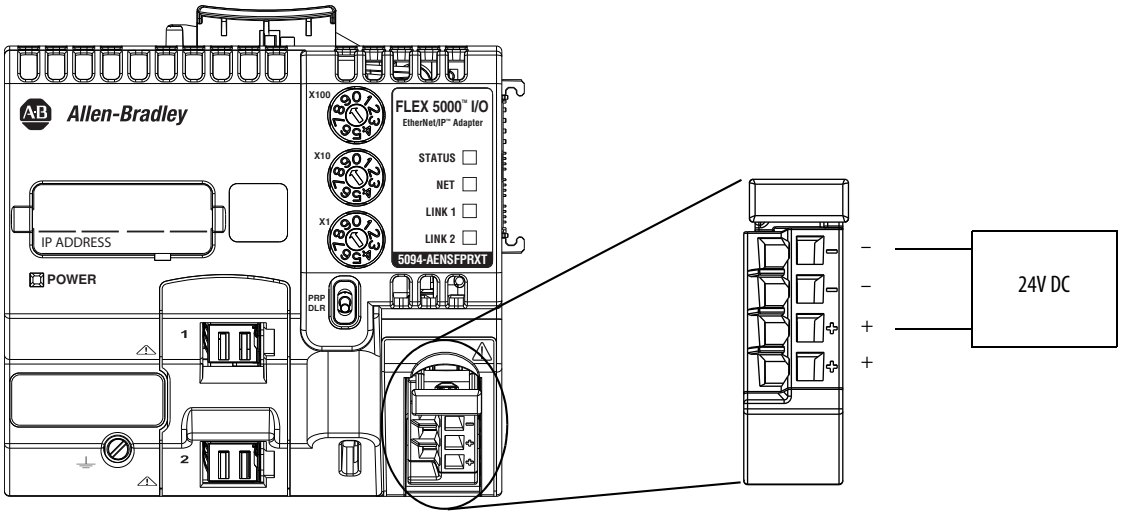
Attribute	5094-AENTR, 5094-AENTRXT	5094-AEN2TR, 5094-AEN2TRXT
Insulation stripping length, power RTB	Screw-type RTB connections: • 0.34…2.5 mm^2 (22…14 AWG) = 12 ± 1 mm (0.47 in ± 0.04 in.) Spring-type RTB connections: • 0.34…1.5 mm^2 (22…16 AWG) = 10 ± 1 mm (0.39 in ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 ± 1 mm (0.59 in ± 0.04 in.)	
Insulation stripping length, functional earth terminal	8 mm (0.31 in.)	
Dimensions (HxWxD), approx	92.7 x 94.0 x 96.5 mm (3.65 x 3.70 x 3.80 in.)	
Weight, approx	400 g (0.88 lb)	
Enclosure type rating	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.
(2) Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

FLEX 5000 EtherNet/IP Adapters with SFP Support (5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT)

This figure shows a wiring diagram for how to connect power to the FLEX 5000 EtherNet/IP adapter.

5094-AEN2SFPR and 5094-AEN2SFPRXT Wiring Diagram – MOD Power (DC)



Technical Specifications - 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT

Attribute	5094-AENSFPR, 5094-AENSFPRXT	5094-AEN2SFPR, 5094-AEN2SFPRXT
Voltage and current ratings, MP	18…32V DC, 1250 mA	18…32V DC, 1730 mA
Voltage and current ratings, MP inrush	18…32V DC, 3200 mA for 100 ms	18…32V DC, 5700 mA for 100 ms
Voltage and current ratings, backplane	15V DC, 1060 mA	15V DC, 1800 mA
Recommended external overcurrent protection	MOD Power: 10…12A @ 22.5…43.2 A2t, Fast Acting SA Power: 20 A @ 250V AC	
Power dissipation, max	5.8 W @ 18V DC	7 W @ 18V DC
Thermal dissipation, max	19.8 BTU/hr @ 24V DC	23.9 BTU/hr @ 24V DC
Isolation voltage	300V (continuous), Basic Insulation Type Tested @ 2121V AC for 60 s, Power to Backplane Tested @ 4242V DC for 60s, Power to Ethernet ports No isolation between communication ports	
DIN rail	Compatible zinc-plated, chromate-passivated steel DIN rail. EN60715 - 35 x 7.5 mm (1.38 x 0.30 in.)	
Removable terminal block (RTB)	Your adapter comes with a screw-type RTB. You can order screw-type or spring-type RTBs separately: • 5094-AENRTB-QTY5 – Ethernet Adapter RTB, Screw-type, Pack of 5 • 5094-AENRTBS-QTY5 – Ethernet Adapter RTB, Spring-type, Pack of 5	
Terminal block torque, power RTB	Screw-type RTB: 0.4 N•m (3.5 lb•in) Spring-type RTB: Not applicable	
Terminal block torque, functional earth terminal	0.5 N•m (4.4 lb•in)	
Wiring category(1), (2)	1 - on power ports 1 - on Ethernet slots	
Wire type	Copper	
Wire size, power RTB	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max, single wire connection only. Ferrule according to DIN 46 228/1.	
Wire size, functional earth terminal	2.5 mm^2 (14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only.	

Technical Specifications - 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT

Attribute	5094-AENSFPR, 5094-AENSFPRXT	5094-AEN2SFPR, 5094-AEN2SFPRXT
Insulation stripping length, power RTB	Screw-type RTB connections: • 0.34…2.5 mm^2 (22…14 AWG) = 12 ± 1 mm (0.47 in ± 0.04 in.) Spring-type RTB connections: • 0.34…1.5 mm^2 (22…16 AWG) = 10 ± 1 mm (0.39 in ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 ± 1 mm (0.59 in ± 0.04 in.)	
Insulation stripping length, functional earth terminal	8 mm (0.31 in.)	
SFP slots	3.3V, 1 W	
Optical power output	0.3 W/m^2	
Compatible SFP modules(3)	1783-SFP100FX 1783-SFP100EXC 1783-SFP1GSX 1783-SFP1GLX 1783-SFP1GEXE 1783-SFP100ZXC 1783-SFP1GZX 1783-SFP1GTE	
Dimensions (HxWxD), approx	92.7 x 94.0 x 96.5 mm (3.65 x 3.70 x 3.80 in.)	
Weight, approx	400 g (0.88 lb)	
Enclosure type rating	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.
(2) Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.
(3) You must purchase SFP modules separately. For SFP module specifications, refer to Stratix® Ethernet Device Specifications Technical Data, publication 1783-TD001.

Environmental Specifications and Certifications

The tables below provide the environmental specifications and certifications for the FLEX 5000 EtherNet/IP adapters.

Environmental Specifications - FLEX 5000 EtherNet/IP Adapters

Attribute	5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT, 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT
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 IEC61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC61000-4-3	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 10V/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 ±4 kV @ 5 kHz on Ethernet ports – **For 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT only**
Surge transient immunity IEC 61000-4-5	±2 kV line-line (DM) and ±4 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on Ethernet ports – **For 5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT only**
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Corrosion resistance classification	ISA S71.04 G2 – **Non-XT catalogs** ISA S71.04 G3 – **XT catalogs**
Voltage variation IEC61000-4-29	10 ms interruption on DC supply ports

Certifications - FLEX 5000 EtherNet/IP Adapters

Certifications[1]	5094-AENTR, 5094-AENTRXT, 5094-AEN2TR, 5094-AEN2TRXT, 5094-AENSFPR, 5094-AENSFPRXT, 5094-AEN2SFPR, 5094-AEN2SFPRXT
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 & 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 1898X
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 17.0047X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications

(1) When marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Terminal Base Assemblies

Terminal base (TB) assemblies consists of a mounting base (MB) and removable terminal block (RTB). MBs and RTBs are available for order individually.

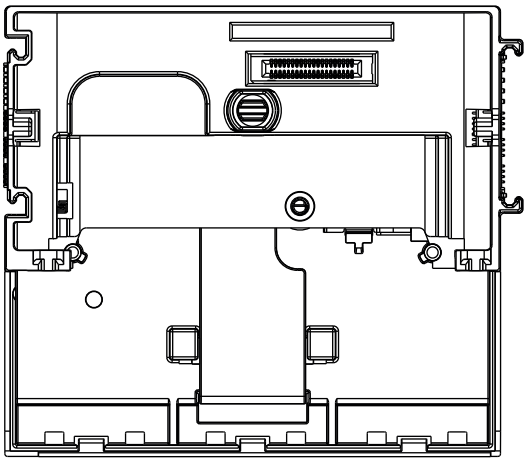
Type	Cat. No.	Page
Mounting bases	5094-MB, 5094-MBXT	69
Terminal blocks	5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT	70
CJC terminal blocks	5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT	71
Relay terminal blocks	5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT	72
Isolated terminal blocks	5094-RTB3I, 5094-RTB3IXT 5094-RTB3IS, 5094-RTB3ISXT	73

Environmental specifications and certifications for FLEX 5000 terminal base assemblies are provided on page 74.

5094-MB and 5094-MBXT Mounting Bases

This figure shows a diagram for the 5094-MB mounting base.

5094-MB Diagram



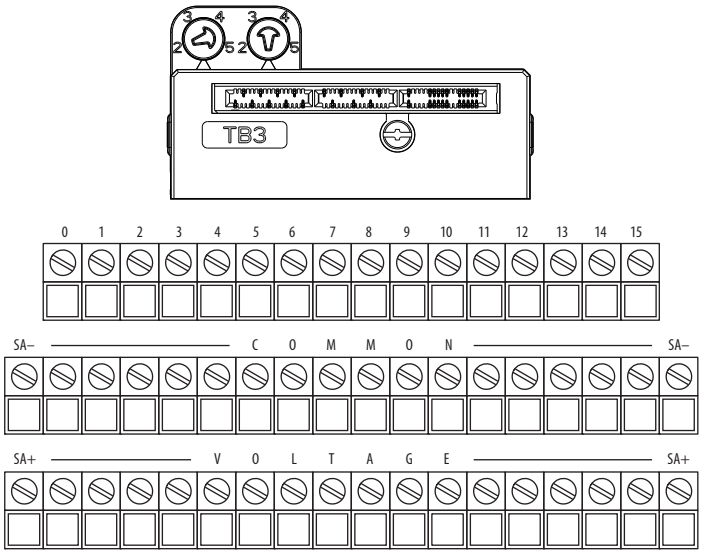
General Specifications - 5094-MB, 5094-MBXT

Attribute	5094-MB, 5094-MBXT
Backplane power (BP), max	100 mA @ 15V DC
Backplane power (VCC), max	15 mA @ 3.3V
DIN rail	Compatible zinc-plated, chromate-passivated steel DIN rail. EN60715 - 35 x 7.5 mm (1.38 x 0.30 in.)
Removable terminal block (RTB)	5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT, 5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT, 5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT, 5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT **IMPORTANT**: You must order RTBs separately. RTBs do not ship with FLEX 5000 I/O modules.
Dimensions (HxWxD), approx	85.0 x 94.0 x 37.5 mm (3.35 x 3.70 x 1.48 in.)
Weight, approx	71g (0.16 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

5094-RTB3, 5094-RTB3XT, 5094-RTB3S, and 5094-RTB3SXT Terminal Blocks

This figure shows a diagram for the 5094-RTB3 terminal block.

5094-RTB3 Diagram



General Specifications - 5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT

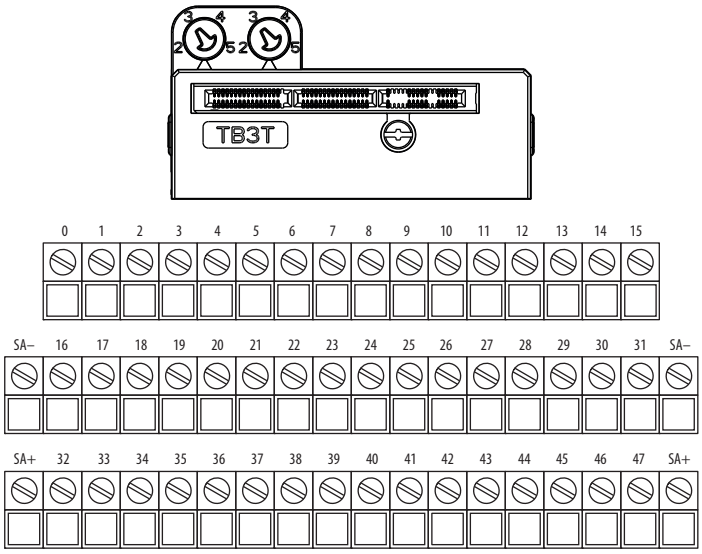
Attribute	5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT
Input/output ratings (IN/OUT), max	2 A @ 32V DC
Sensor Actuator Power (SA), max	10 A @ 18…32V DC
Do not exceed 10 A MOD Power or SA Power passthrough current draw.(1)	
Isolation voltage	250V (Continuous), Basic Insulation Type, Channels to Chassis 250V (Continuous), Basic Insulation Type, SA to Chassis
Wire category	Established by installed module
Wire type	Copper
Wire size	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Insulation stripping length	Screw-type TB: • 0.34…2.5 mm^2 (22…14 AWG) = 12 mm ± 1 mm (0.47 ± 0.04 in.) Spring-type TB: • 0.34…1.5 mm^2 (22…16 AWG) = 10 mm ± 1 mm (0.39 ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 mm ± 1 mm (0.59 ± 0.04 in.)
TB torque specifications	Screw-type TB: 0.4 N•m (3.5 lb•in) Spring-type TB: Not applicable
Dimensions (HxWxD), approx	76.0 x 94.0 x 53.0 mm (3.00 x 3.70 x 2.08 in.)
Weight, approx	202 g (0.45 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Maximum level of SA Power current that the module is capable of passing through to the next module in the system. The specific level of current passed through varies based on system configuration.

5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, and 5094-RTB3TSXT Terminal Blocks

This figure shows a diagram for the 5094-RTB3T terminal block.

5094-RTB3T Diagram



General Specifications - 5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT

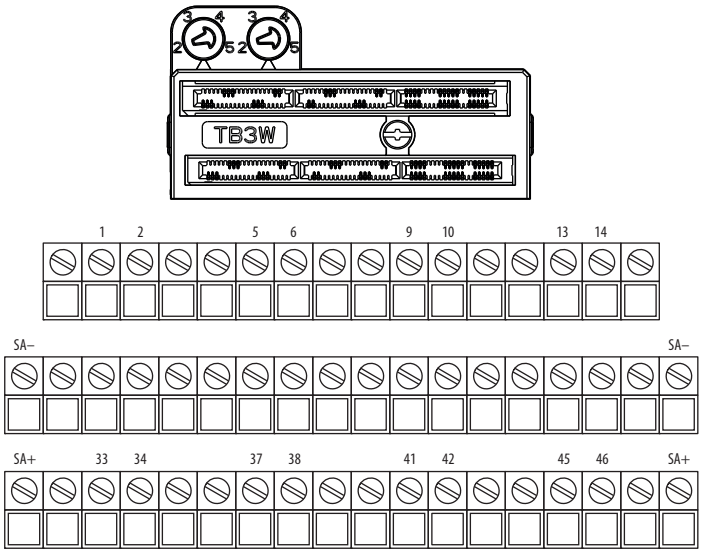
Attribute	5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT
Input ratings (IN), max	100 mA @ 10V DC
Sensor Source Voltage (SSV) output ratings, max	1.8 A @ 24V DC
Sensor Actuator Power (SA), max	10 A @ 18…32V DC
Do not exceed 10 A MOD Power or SA Power passthrough current draw.(1)	
Isolation voltage	250V (Continuous), Basic Insulation Type, Channels to Chassis 250V (Continuous), Basic Insulation Type, SA to Chassis
Wire category	Established by installed module
Wire type	Copper
Wire size	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Insulation stripping length	Screw-type TB: • 0.34…2.5 mm^2 (22…14 AWG) = 12 mm ± 1 mm (0.47 ± 0.04 in.) Spring-type TB: • 0.34…1.5 mm^2 (22…16 AWG) = 10 mm ± 1 mm (0.39 ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 mm ± 1 mm (0.59 ± 0.04 in.)
TB torque specifications	Screw-type TB: 0.4 N•m (3.5 lb•in) Spring-type TB: Not applicable
Dimensions (HxWxD), approx	76.0 x 94.0 x 53.0 mm (3.00 x 3.70 x 2.08 in.)
Weight, approx	202 g (0.45 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Maximum level of SA Power current that the module is capable of passing through to the next module in the system. The specific level of current passed through varies based on system configuration.

5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, and 5094-RTB3WSXT Terminal Blocks

This figure shows a diagram for the 5094-RTB3W terminal block.

5094-RTB3W Diagram



General Specifications - 5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT

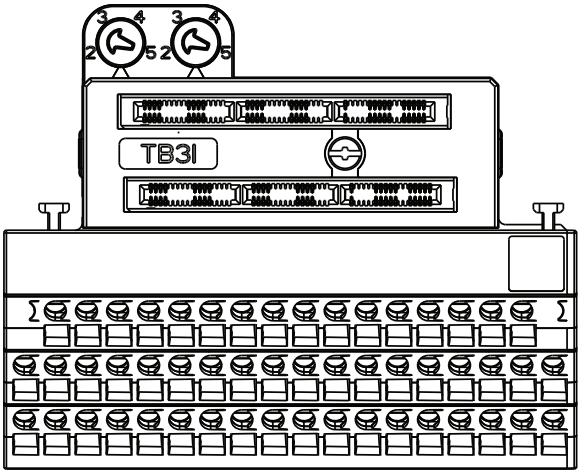
Attribute	5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT
Output ratings (OUT), max	2 A @ 125V DC 2 A @ 240V AC, 50/60 Hz
Sensor Actuator Power (SA), max	10 A @ 18…32V DC
Do not exceed 10 A MOD Power or SA Power passthrough current draw.(1)	
Isolation voltage	250V (Continuous), Reinforced Insulation Type, Channels to Chassis 250V (Continuous), Reinforced Insulation Type, Channels to SA 250V (Continuous), Basic Insulation Type, SA to Chassis
Wire category	Established by installed module
Wire type	Copper
Wire size	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Insulation stripping length	Screw-type TB: • 0.34…2.5 mm^2 (22…14 AWG) = 12 mm ± 1 mm (0.47 ± 0.04 in.) Spring-type TB: • 0.34…1.5 mm^2 (22…16 AWG) = 10 mm ± 1 mm (0.39 ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 mm ± 1 mm (0.59 ± 0.04 in.)
TB torque specifications	Screw-type TB: 0.4 N•m (3.5 lb•in) Spring-type TB: Not applicable
Dimensions (HxWxD), approx	76.0 x 94.0 x 53.0 mm (3.00 x 3.70 x 2.08 in.)
Weight, approx	202 g (0.45 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Maximum level of SA Power current that the module is capable of passing through to the next module in the system. The specific level of current passed through varies based on system configuration.

5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, and 5094-RTB3ISXT Terminal Blocks

This figure shows a diagram for the 5094-RTB3I terminal block.

5094-RTB3I Diagram



General Specifications - 5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT

Attribute	5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT
Input/output ratings (IN/OUT), max	2 A @ 32V DC
Sensor Actuator Power (SA), max	10 A @ 18…32V DC
Do not exceed 10 A MOD Power or SA Power passthrough current draw.(1)	
Isolation voltage	250V (Continuous), Basic Insulation Type, Channels to Chassis 250V (Continuous), Basic Insulation Type, SA to Chassis
Wire category	Established by installed module
Wire type	Copper
Wire size	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Insulation stripping length	Screw-type TB: • 0.34…2.5 mm^2 (22…14 AWG) = 12 mm ± 1 mm (0.47 ± 0.04 in.) Spring-type TB: • 0.34…1.5 mm^2 (22…16 AWG) = 10 mm ± 1 mm (0.39 ± 0.04 in.) • 2.5 mm^2 (14 AWG) = 15 mm ± 1 mm (0.59 ± 0.04 in.)
TB torque specifications	Screw-type TB: 0.4 N•m (3.5 lb•in) Spring-type TB: Not applicable
Dimensions (HxWxD), approx	76.0 x 94.0 x 53.0 mm (3.00 x 3.70 x 2.08 in.)
Weight, approx	202 g (0.45 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Maximum level of SA Power current that the module is capable of passing through to the next module in the system. The specific level of current passed through varies based on system configuration.

Environmental Specifications and Certifications

These tables provide the environmental specifications and certifications for the FLEX 5000 terminal base assemblies.

Environmental Specifications - FLEX 5000 Terminal Base Assemblies

Attribute	5094-MB, 5094-MBXT, 5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT, 5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT, 5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT, 5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT
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)	-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
Corrosion resistance classification	ISA S71.04 G2 – **Non-XT catalogs** ISA S71.04 G3 – **XT catalogs**

Certifications - FLEX 5000 Terminal Base Assemblies

Certification[(1)]	5094-MB, 5094-MBXT, 5094-RTB3, 5094-RTB3XT, 5094-RTB3S, 5094-RTB3SXT, 5094-RTB3T, 5094-RTB3TXT, 5094-RTB3TS, 5094-RTB3TSXT, 5094-RTB3W, 5094-RTB3WXT, 5094-RTB3WS, 5094-RTB3WSXT, 5094-RTB3I, 5094-RTB3IXT, 5094-RTB3IS, 5094-RTB3ISXT
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 & B) European Union 2014/35/EU LVD, compliant with: – **For RTBs** • 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 1922X
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 17.0075X
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.ab.com for Declarations of Conformity, Certificates, and other certification details.

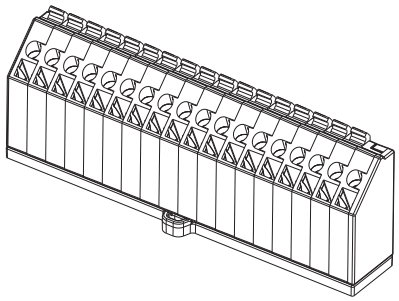
Accessories

Type	Cat. No.	Page
Shield bar	5094-STB	76
SA power jumper	5094-SAJMPR	76
Dummy filler module	5094-N2	77

5094-STB Shield Bar

This figure shows a diagram for the 5094-STB shield bar.

5094-STB Diagram



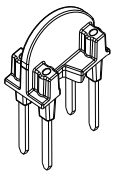
General Specifications - 5094-STB

Attribute	5094-STB
Voltage, max	300V AC
Current, max	10 A
Wire size	0.34…2.5 mm^2 (22…14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation, max Ferrule according to DIN 46 228/1.
Insulation stripping length	12 mm ± 1 mm (0.47 ± 0.04 in.)
Torque specifications	0.4 N•m (3.5 lb•in)
Dimensions (HxWxD), approx	33.0 x 94.0 x 24.0 (1.30 x 3.70 x 0.94in.) Includes release latch, locking pegs, and mounting hooks
Weight, approx	56 g (1.97 oz.)
Enclosure type rating	None (open-style)

5094-SAJMPR SA Power Jumper

This figure shows a diagram for the 5094-SAJMPR SA power jumper.

5094-SAJMPR Diagram



General Specifications - 5094-SAJMPR

Attribute	5094-SAJMPR
Voltage, max	300V AC
Current, max	10 A

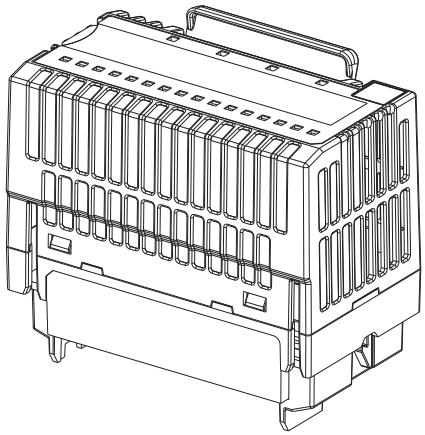
Environmental Specifications - 5094-SAJMPR

Attribute	5094-SAJMPR
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)	-40 °C < Ta < +70 °C (-40 °F < Ta < +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)

5094-N2 Dummy Filler Module

This module is used to fill in an otherwise empty slot: a terminal base assembly with no I/O module. It contains no electronics.

5094-N2 Diagram



Additional Resources

These documents contain more information about related products from Rockwell Automation.

Resource	Description
FLEX 5000 EtherNet/IP Adapters with RJ45 Ports Installation Instructions, publication 5094-IN001	Describes how to install and wire the FLEX 5000 EtherNet/IP adapters.
FLEX 5000 Digital 16-point Sinking Input Modules Installation Instructions, publication 5094-IN003	Describes how to install and wire the FLEX 5000 digital input modules.
FLEX 5000 FLEX 5000 Digital 16-point Sourcing Output Modules Installation Instructions, publication 5094-IN004	Describes how to install and wire the FLEX 5000 digital output modules.
FLEX 5000 Analog 8-channel Current/Voltage Input Modules Installation Instructions, publication 5094-IN006	Describes how to install and wire the FLEX 5000 analog input modules.
FLEX 5000 Analog 8-channel Current/Voltage Output Modules Installation Instructions, publication 5094-IN007	Describes how to install and wire the FLEX 5000 analog output modules.
FLEX 5000 Analog 8-channel Current/Voltage/RTD/ Thermocouple Input Modules Installation Instructions, publication 5094-IN008	Describes how to install and wire the FLEX 5000 analog RTD/Thermocouple input modules.
FLEX 5000 High-speed Counter Modules Installation Instructions, publication 5094-IN009	Describes how to install and wire the FLEX 5000 high-speed counter modules.
FLEX 5000 Terminal Base Assembly Modules Installation Instructions, publication 5094-IN010	Describes how to install the FLEX 5000 terminal base assemblies.
FLEX 5000 Digital 16-point Sinking Safety Input Modules Installation Instructions, publication 5094-IN012	Describes how to install and wire the FLEX 5000 digital safety input modules.
FLEX 5000 Digital 16-point Sourcing Safety Output Modules Installation Instructions, publication 5094-IN013	Describes how to install and wire the FLEX 5000 digital safety output modules.
FLEX 5000 Relay 4-point Safety Output Modules Installation Instructions, publication 5094-IN015	Describes how to install and wire the FLEX 5000 relay 4-point safety output modules.
Replacement Guidelines: Logix5000 Controllers Reference Manual, publication 1756-RM100	Provides guidelines on how to replace the following: • ControlLogix 5560/5570 controller with a ControlLogix 5580 controller • CompactLogix 5370 L3 controllers with a CompactLogix 5380 controller
EtherNet/IP Communication Modules in 5000 Series Systems User Manual, publication ENET-UM004	Describes how to install, configure, and operate the FLEX 5000 EtherNet/IP adapters.
FLEX 5000 Digital I/O Modules User Manual, publication 5094-UM001	Provides information on how to install, configure, and operate FLEX 5000 digital I/O modules (standard and safety).
FLEX 5000 Analog I/O Modules User Manual, publication 5094-UM002	Provides information on how to install, configure, and operate FLEX 5000 analog I/O modules.
FLEX 5000 High-speed Counter Module User Manual, publication 5094-UM003	Provides information on how to install, configure, and operate FLEX 5000 high-speed counter modules.
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/rockwellautomation/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.

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