**Technical Data**

Original Instructions

Allen-Bradley by ROCKWELL AUTOMATION

# Compact 5000 I/O and Specialty Modules Specifications

## Catalog Numbers

| | |
|---|---|
| Digital I/O Modules | 5069-IA16, 5069-IB16, 5069-IB16F, 5069-IB16K, 5069-IB32, 5069-IB6F-3W, 5069-OA16, 5069-OB8, 5069-OB16, 5069-OB16F, 5069-OB32, 5069-OB16K, 5069-OW4I, 5069-OW16, 5069-OX4I |
| Analog I/O Modules | 5069-IF4IH, 5069-IF8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF4K, 5069-OF4IH, 5069-OF8 |
| Safety I/O Modules | 5069-IB8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK |
| Specialty Modules | 5069-AENTR, 5069-AENTRK, 5069-AEN2TR, 5069-ARM, 5069-FPD, 5069-HSC2XOB4, 5069-SERIAL |


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| Power the Compact 5000 I/O Modules | 2 |
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The Compact 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.

Compact 5000 I/O modules are used as local I/O modules in CompactLogix™ 5380 and Compact GuardLogix® 5380 controller systems. The modules are also used as remote I/O modules with CompactLogix 5380, Compact GuardLogix 5380 controllers, and some other Logix 5000 controllers. You use the Studio 5000 Logix Designer® application to configure the modules.

The I/O modules require a removable terminal block (RTB) to connect field-side wiring. RTBs are not included with the I/O modules. You must order RTBs separately.

# Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes. Change bars identify changes throughout the manual.

| Topic | Pages |
|---|---|
| Added the field power loss detection feature for the 5069-IB16F and 5069-IB6F-3W modules | 8, 11 |
| Updated the SA power specification for the 5069-IB6F-3W module | 11 |
| Updated the scan time specification for the 5069-IF4IH module | 24 |
| Added the 5069-IB32 and 5069-OB32 modules | Throughout |

# Power the Compact 5000 I/O Modules

There are different types of power that are used with Compact 5000 I/O modules.

| Power Type | Description | Related Specifications | |
|---|---|---|---|
| | | Name | Description |
| Module (MOD) Power | System-side power that is used to operate a local or remote system. Power passes across a MOD power bus. Modules draw current from the bus and pass the remaining current to the next module. | MOD power | Level of MOD power current that the module draws from the MOD power bus |
| | | MOD power (passthrough) | Maximum level of MOD power current that the module can pass to the next module. |
| Sensor Actuator (SA) Power | Field-side power that some modules use to power field-side devices. Power passes across an SA power bus. Some modules draw current from the bus and pass the remaining current to the next module. Other modules do not draw current from the bus but do pass the current to the next module.<br>Use 5069-FPD field potential distributors to establish new SA power buses in a system. | SA power | Level of SA power current that the module draws from the SA power bus |
| | **IMPORTANT**<br>These application conditions require a 5069-FPD module:<br>• AC-type modules and DC-type modules must be isolated from each other. A 5069-FPD module must be installed between the two groups to end one type of SA power bus and start a new type of SA power bus.<br>• A system requires additional SA power bus current because the I/O modules collectively draw more than 10 A current from the SA power bus. A 5069-FPD module can be added to provide more power.<br>• The Compact GuardLogix 5380 controller does not supply AC SA power, so AC-type modules cannot be installed directly next to the controller. A 5069-FPD module must be installed in between the controller and an AC module. | SA power (passthrough) | Maximum level of SA power current that the module can pass to the next module. |
| Local Actuator (LA) Power | Field-side power that some modules use instead of SA power. Modules that use LA power do not use SA power. They only pass SA power to the next I/O module in the system.<br>You must install modules that use LA power on an SA power bus with the same SA power type. For example, the 5069-OB8 module uses LA power but is still a DC-type module, so you must install it on a DC SA power bus. | LA power | Maximum level of LA power current that you can apply to the module, by channel, group, or module. |

For more information on MOD power, SA power, and LA power, see the user manuals in Additional Resources on page 55.

# Minimum Space Requirements

The minimum space requirements are based on whether Compact 5000 I/O modules are installed in a CompactLogix 5380, Compact GuardLogix 5380, CompactLogix 5480 controller system or in a Compact 5000 I/O EtherNet/IP™ adapter system.

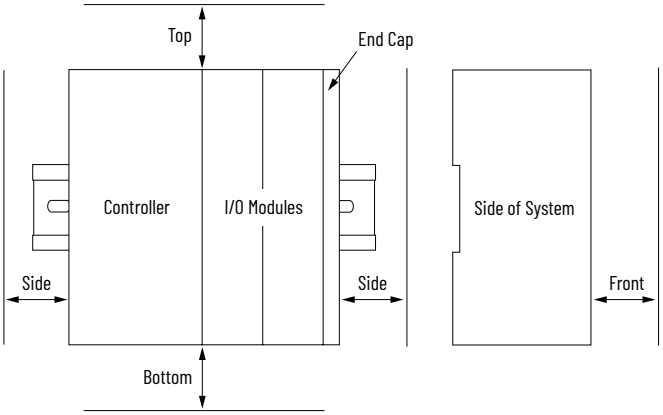
**IMPORTANT** If Compact 5000 I/O modules are installed next to a CompactLogix 5380 or Compact GuardLogix 5380, or CompactLogix 5480 controller, you must mount the system horizontally.

You can mount CompactLogix 5480 controllers in any orientation if there are no Compact 5000 I/O modules installed next to the controller.

## CompactLogix 5380 or Compact GuardLogix 5380 System

The minimum distance between all sides of the CompactLogix 5380 system or Compact GuardLogix 5380 system and enclosure walls, wireways, and adjacent equipment varies based on the current operating temperature.

| Controllers | Minimum Space at | | |
|---|---|---|---|
| | 50 °C (122 °F) | 55 °C (131 °F) | 60 °C (140 °F) |
| CompactLogix 5380 Standard and Process | 50.8 mm (2.00 in) | 50.8 mm (2.00 in) | 101.6 mm (4.00 in) |
| Compact GuardLogix 5380 SIL 2 | | | |
| Series A catalog numbers | 50.8 mm (2.00 in) | 101.6 mm (4.00 in) | 152.4 mm (6.00 in) |
| Series B catalog numbers | 50.8 mm (2.00 in) | 50.8 mm (2.00 in) | 101.6 mm (4.00 in) |
| Compact GuardLogix 5380 SIL 3 | 50.8 mm (2.00 in) | 50.8 mm (2.00 in) | 101.6 mm (4.00 in) |




For more installation information, see these manuals:

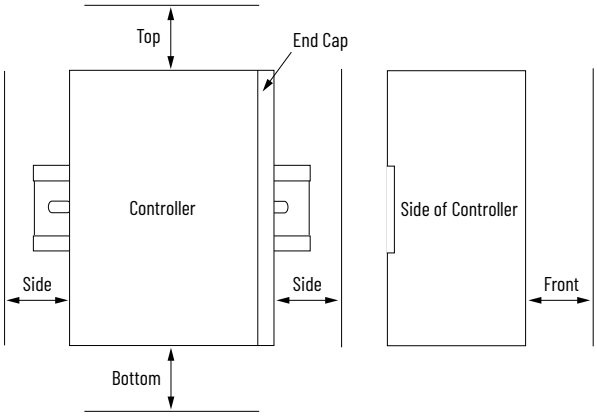
- CompactLogix 5380 Controllers Installation Instructions, publication 5069-IN013.
- Compact GuardLogix 5380 SIL 2 Controllers Installation Instructions, publication 5069-IN014.
- Compact GuardLogix 5380 SIL 3 Controllers Installation Instructions, publication 5069-IN023.

## CompactLogix 5480 System

The minimum distance for a system that includes only a CompactLogix 5480 controller is as follows:

- Between the front and sides of the controller and the cabinet: 25.0 mm (0.98 in.)
- Between the top and bottom of the controller and the cabinet: 50.0 mm (1.96 in.)

We recommend that you install the controller near the bottom of the enclosure, where the ambient temperature is lower.

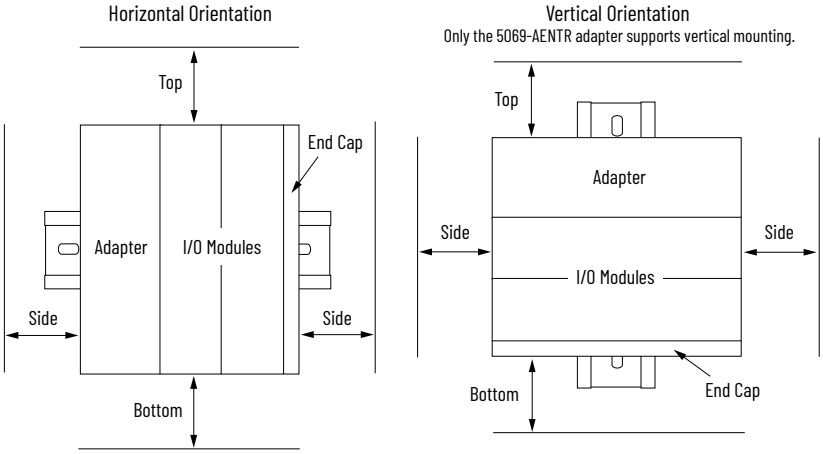



For more installation information, see the CompactLogix 5480 Controllers Installation Instructions, publication 5069-IN019.

## EtherNet/IP Adapter System

The minimum distance on all sides of the adapter system is as follows:

- 25.40 mm (1.00 in) - If the system uses only Compact 5000 I/O standard modules.
- 50.80 mm (2.00 in) - If the system uses at least one Compact 5000 I/O safety module.




For more information, see the Compact 5000 I/O EtherNet/IP Adapters Installation Instructions, publication 5069-IN003.

# Digital I/O Modules

For information that applies to all of the digital I/O modules, see these tables.

- Wiring and Installation Specifications - Digital I/O Modules
- Certifications - Digital I/O Modules
- Environmental Specifications - Digital I/O Modules

The following digital I/O modules are available.

| I/O Type | Cat. No. | Description | Page |
|---|---|---|---|
| AC digital input | 5069-IA16 | 16-point, 120/240V AC input module | 7 |
| DC digital input | 5069-IB16 | 16-point, sinking input module | 8 |
| | 5069-IB16K | 16-point, conformal-coated sinking input module | |
| | 5069-IB16F | 16-point, sinking fast input module | |
| | 5069-IB32 | 32-point, sinking input module | 10 |
| | 5069-IB6F-3W | 3-wire, sinking fast input module | 11 |
| AC digital output | 5069-OA16 | 16-point, 120/240V AC output module | 12 |
| DC digital output | 5069-OB8 | 8-point, sourcing, high-current output module | 13 |
| | 5069-OB16 | 16-point, sourcing output module | 14 |
| | 5069-OB16K | 16-point, conformal-coated sourcing output module | |
| | 5069-OB16F | 16-point, sourcing fast output module | |
| | 5069-OB32 | 32-point, sourcing output module | 15 |
| Relay output | 5069-OW4I | 4-point, isolated, normally-open relay output module | 17 |
| | 5069-OW16 | 16-point, normally-open relay output module | 18 |
| | 5069-OX4I | 4-point, isolated, normally-open/normally-closed relay output module | 20 |

## Wiring and Installation Specifications - Digital I/O Modules

| Attribute | 5069-IA16, 5069-IB16, 5069-IB16K, 5069-IB16F, 5069-IB6F-3W, 5069-OA16, 5069-OB8, 5069-OB16, 5069-OB16K, 5069-OB16F, 5069-OW4I, 5069-OX4I | 5069-IB32, 5069-OB32 | 5069-OW16 |
|---|---|---|---|
| Channel connections | The wiring diagrams show devices that are connected to specific channels. You are not restricted to using only those channels. You can connect devices to any channel or combination of channels as needed. | | |
| SA power device list | Connections to an external power supply that provides SA power via the SA power RTB on one of these devices.<br>• CompactLogix 5380 controller<br>• CompactLogix 5480 controller<br>• 5069-AENTR EtherNet/IP Adapter<br>• 5069-FPD field potential distributor | | |
| Isolate SA power | If you install modules in a system that uses both AC SA power and DC SA power, you must isolate SA power buses by type with a 5069-FPD field potential distributor. To create separate SA power buses, complete these steps.<br>1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller. This is the first SA power bus.<br>2. To create a second SA power bus, install the 5069-FPD field module to the right of these modules.<br>3. Install the modules that use the other type of SA power, for example AC, to the right of the 5069-FPD module. | | |
| Slot width | 1 | 1.5 | |
| Dimensions (HxWxD) | 144.6 x 22 x 105.4 mm (5.69 x 0.87 x 4.15 in.) | 144.6 x 36 x 105.4 mm (5.69 x 1.42 x 4.15 in.) | |
| Weight, approx | 175 g (0.39 lb) | 210 g (0.44 lb.) | 240 g (0.53 lb.) |
| DIN rail | Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail. | | |
| Module keying | Electronic keying via programming software | | |
| RTB | 5069-RTB18-SPRING RTB or 5069-RTB18-SCREW RTB, according to your system<br>**IMPORTANT:** RTBs do not ship with Compact 5000™ I/O modules, you must order them separately. Order only the RTB type that your system requires. | | |
| RTB torque | Screw-type RTB only: 0.4 N•m (3.5 lb•in) | | |
| RTB keying | None | | |
| Wire size | 0.34...1.5 $mm^2$ (22...16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F) or greater<br>Spring-type RTB: 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only<br>Screw-type RTB: 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only<br>For the 5069-OW16 module only: Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules | | |
| Insulation-stripping length | 5069-RTB18-SPRING RTB: 10 mm (0.39 in.)<br>5069-RTB18-SCREW RTB: 12 mm (0.47 in.) | | |

## Environmental Specifications - Digital I/O Modules

| Attribute | 5069-IA16, 5069-OA16, 5069-OB8, 5069-OW16 | 5069-OW4I, 5069-OX4I | 5069-IB16, 5069-IB16K, 5069-IB16F, 5069-IB32, 5069-IB6F-3W, 5069-OB16, 5069-OB16K, 5069-OB16F, 5069-OB32 |
|---|---|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ad, Operating Cold)<br>IEC 60068-2-2 (Test Bd, Operating Dry Heat)<br>IEC 60068-2-14 (Test Nb, Operating Thermal Shock) | 0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F) | | |
| Temperature, surrounding air, max | 60 °C (140 °F) | | |
| Temperature, nonoperating<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...+85 °C (-40...+185 °F) | | |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) | 5...95% noncondensing | | |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 5 g @ 10...500 Hz | | |
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 30 g | | |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 50 g | | |
| Emissions | IEC 61000-6-4 | | |
| ESD immunity<br>IEC 61000-4-2 | 6 kV contact discharges<br>8 kV air discharges | | |
| Radiated RF immunity<br>IEC 61000-4-3 | 10V/m with 1 kHz sine wave 80% AM from 80...6000 MHz | | |
| EFT/B immunity<br>IEC 61000-4-4 | ±4 kV @ 5 kHz on power ports<br>±4 kV @ 5 kHz on signal ports | | ±4 kV @ 5 kHz on power ports<br>±3 kV @ 5 kHz on input ports |
| Surge transient immunity<br>IEC 61000-4-5 | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports | | |
| Conducted RF immunity<br>IEC 61000-4-6 | 10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz | | |
| Voltage variation<br>IEC 61000-4-29 | — | 10 ms interruption on MOD power port | |
| Corrosion resistance classification | ISA S71.04 G2 | — | |
| North American temp code | T4 | | |
| UKEX/ATEX temp code | T4 | | |
| IECEx temp code | T4 | | |
| Enclosure type | None (open-style) | | |

## Certifications - Digital I/O Modules

| Certification | 5069-IB16, 5069-IB16K, 5069-IB16F, 5069-IB32, 5069-IB6F-3W, 5069-OB16, 5069-OB16K, 5069-OB16F, 5069-OB32 | 5069-OW4I, 5069-OW16, 5069-OX4I |
|---|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470. | |
| UKCA and CE | UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with:<br>EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>EN 61000-6-2; Industrial Immunity<br>EN 61000-6-4; Industrial Emissions<br>EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)<br><br>UK Statutory Instrument 2016 No. 1101 and European Union 2014/35/EU LVD, compliant with:<br>EN 61010-2-201; Control Equipment Safety Requirements<br><br>UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with:<br>EN IEC 63000; Technical documentation | |
| RCM | Australian Radiocommunications Act, compliant with<br>EN 61000-6-4; Industrial Emissions | |
| Ex | UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with: | |
| | EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>DEMKO 15 ATEX 1484X and UL22UKEX2379X | EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>EN IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>II 3 G Ex ec nC IIC T4 Gc<br>DEMKO 15 ATEX 1484X and UL 22UKEX2379X<br>When used at or below 125V DC or 30V DC |
| IECEx | IECEx System, compliant with: | |
| | IEC 60079-0; General Requirements<br>IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>IECEx UL 15.0055X | IEC 60079-0; General Requirements<br>IEC 60079-7; Explosive Atmospheres, Protection "e"<br>IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>II 3 G Ex ec nC IIC T4 Gc<br>IECEx UL 15.0055X<br>When used at or below 125V DC or 30V DC |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 | |
| Morocco | Arrêté ministériel n° 6404-15 du 1 er muharram 1437<br>Arrêté ministériel n° 6404-15 du 29 ramadan 1436 | |
| CCC | CNCA-C23-01:2019 强制性产品认证实施规则 防爆电气<br>CNCA-C23-01:2019 CCC Implementation Rule Explosion-Proof Electrical Products<br>CCC: 2020312309000308 | |

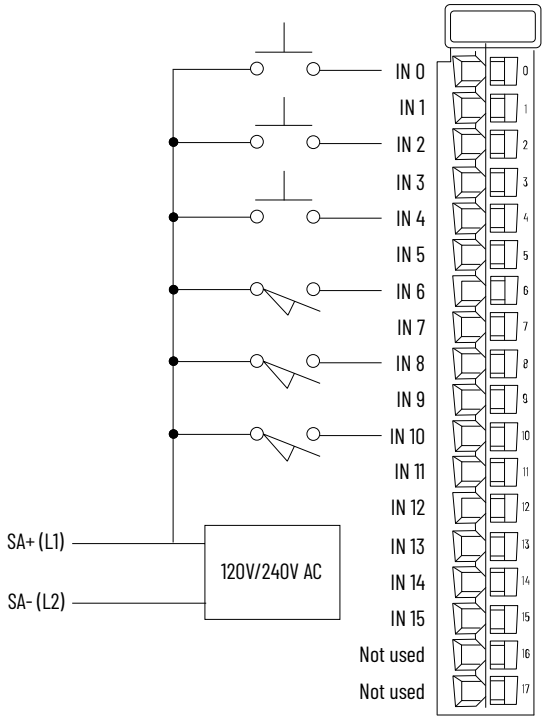
See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

# 5069-IA16

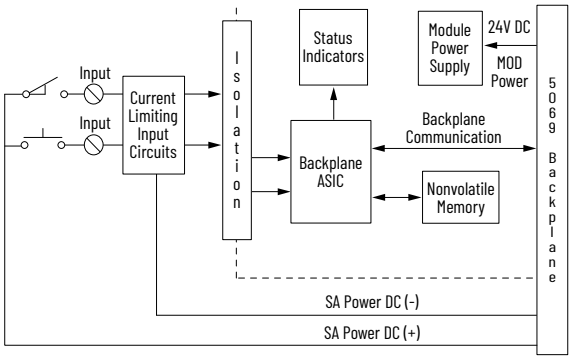
## Digital 16-point 120/240V AC Input Module

**Input Wiring - 5069-IA16**

**IMPORTANT:**
- The 5069-IA16 module uses AC SA power. You must connect AC power to the device that supplies SA power to the module. See the SA power device list.
- Compact GuardLogix 5380 controllers do not support AC power on their SA power RTBs. To install a local 5069-IA16 module in a Compact GuardLogix 5380 controller system, complete the steps in Isolate SA power.
- The 5069-IA16 module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB. For more information, see Power the Compact 5000 I/O Modules.




**Functional Block Diagram - 5069-IA16**




## Technical Specifications - 5069-IA16

| Attribute | 5069-IA16 |
|---|---|
| Number of inputs | 16 (One group of 16) |
| Voltage category | 120/240V AC |
| Voltage and current ratings | |
| Input voltage range | 79...264V AC |
| Input voltage frequency | 47...63 Hz |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |

## Technical Specifications - 5069-IA16

| Attribute | 5069-IA16 |
|---|---|
| SA power | 240 mA @ 79...264V AC |
| SA power (passthrough)(1) | 9.975 A @ 79...264V AC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw.<br>The 5069-IA16 module complies to UKEX/ATEX/IECEx when used at or below 125V AC. | |
| Power dissipation, max | 3.5 W |
| Thermal dissipation, max | 11.9 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>Type tested at 1800V AC for 60 s<br>No isolation between individual channels |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators |
| Wire category(2) | 1 - input port<br>1 wire per terminal for each signal port |
| IEC Input Compatibility | Type 1 |
| On-state voltage, min | 79V AC |
| On-state voltage, nom | 120/240V AC |
| On-state voltage, max | 264V AC |
| Off-state voltage, max | 40V AC |
| Input current per channel, max | 15 mA @ 264V AC |
| On-state current, min | 2 mA @ 79V AC<br>3 mA @ 164V AC |
| On-state current, nom | 5 mA @ 120V AC/50 Hz<br>6 mA @ 120V AC/60 Hz<br>9 mA @ 240V AC/50 Hz<br>11 mA @ 240V AC/60 Hz |
| On-state current, max | 15 mA @ 264V AC |
| Off-state current, max | 2 mA |
| Input impedance, nom | 24 kΩ @ 120V AC/50 Hz<br>20 kΩ @ 120V AC/60 Hz<br>27 kΩ @ 240V AC/50 Hz<br>22 kΩ @ 240V AC/60 Hz |
| Input impedance, min | 17.6 kΩ @ 264V AC/63 Hz |
| Inrush current, max | 600 mA |
| Input delay time,<br>Off to On and On to Off | 10 ms (typ) @ 0...60 °C (32...140 °F) |
| Input filter times | |
| Off to On | Hardware delay: 10 ms (typ) + filter time<br>User-selectable filter times:<br>120V AC input: 1 ms<br>240V AC input: 1 ms, 2 ms, 5 ms |
| On to Off | Hardware delay: 10 ms (typ) + filter time<br>User-selectable filter times:<br>120V AC input: 10 ms, 20 ms<br>240V AC input: 5 ms, 10 ms, 20 ms |

With the 5069-IA16 module, the Logix Designer application lets you choose multiple filter values, including values that are invalid for some input signals. For example, the only valid Off to On filter value when a 120V AC signal is connected to the module is 1 ms. However, you can choose 1 ms, 2 ms, or 5 ms. If you select an invalid input filter value, the module can read signal levels incorrectly. For more information, see the Compact 5000 I/O Digital Modules User Manual, publication 5069-UM004.

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

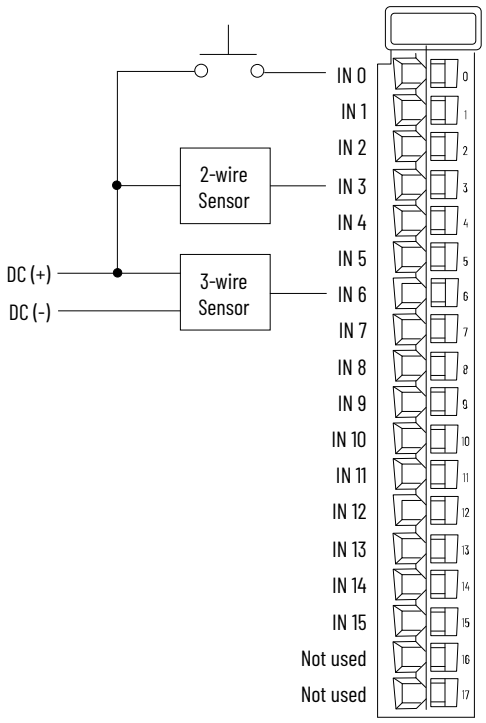
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-IB16, 5069-IB16K, 5069-IB16F

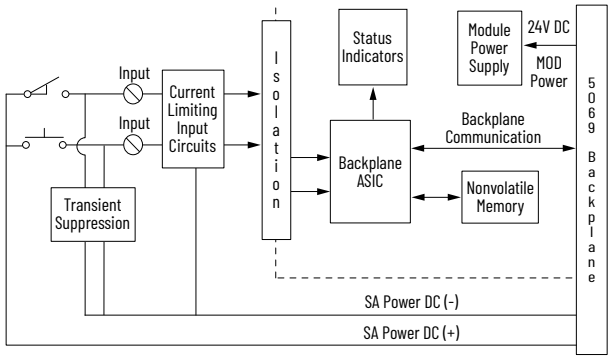
## Digital 16-point Sinking Input Modules

**Input Wiring - 5069-IB16, 5069-IB16K, 5069-IB16F**

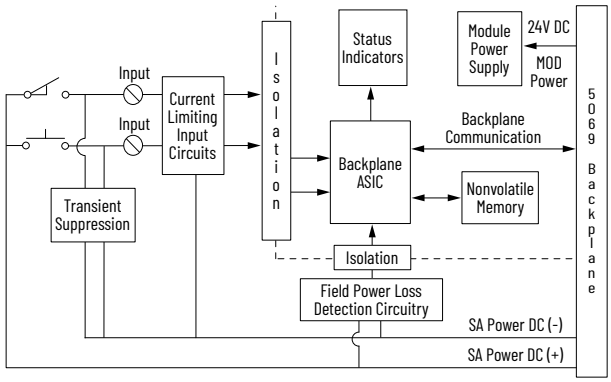
**IMPORTANT:**
- These modules use DC SA power. You must connect DC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.
- The 5069-IB16 and 5069-IB16F module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB. For more information, see Power the Compact 5000 I/O Modules.




**Functional Block Diagram - 5069-IB16, 5069-IB16K**




**Functional Block Diagram - 5069-IB16F**



## Technical Specifications - 5069-IB16, 5069-IB16K, 5069-IB16F

| Attribute | 5069-IB16, 5069-IB16K | 5069-IB16F |
|---|---|---|
| Inputs | 16 Channels (1 group of 16), sinking | |
| Voltage category | 12/24V DC Sink | |
| Voltage and current ratings | | |
| Input ratings | 4...7.4 mA per channel @ 10...32V DC | |
| MOD power | 75 mA @ 18...32V DC | |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC | |
| SA power | 200 mA @ 10...32V DC | |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC | |
| Power dissipation, max | 3.9 W | |
| Thermal dissipation, max | 13.3 BTU/hr | |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between SA power and input ports<br>No isolation between individual input ports | |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators | |
| Wire category(2) | 2 - input ports<br>1 wire per terminal for each signal port | |
| On-state voltage, range | 10V DC...32V DC | |
| On-state voltage, nom | 24V DC | |
| On-state current, range | 4 mA @ 10V DC...7.4 mA @ 32V DC | |
| On-state current, nom | 6 mA @ 24V DC | |
| Off-state voltage, max | 5V DC | |
| Off-state current, max | 1.5 mA | |
| Input impedance, range | 1.33 kΩ...7.0 kΩ | |
| Input impedance, nom | 4.1 kΩ | |
| Inrush current, max | < 250 mA peak (decaying to, 37% in 22 ms, without activation) | |
| Input delay time (screw to backplane)<br>Off to On and On to Off | ≤ 100 µs, ±10 µs @ 25 °C (77 °F) | ≤ 10 µs, ±1 µs @ 25 °C (77 °F) |
| Input drift over temperature span | ±100 ns/°C (55.6 ns/°F) from 0...60 °C (32...140 °F) | < 10 ns/°C (5.56 ns/°F) from 0...60 °C (32...140 °F) |
| Input pulse width, min<br>Off to ON and ON to Off | 60 µs | 6 µs |
| Input filter time<br>Off to On and On to Off | Hardware delay:<br>50 µs + filter time<br>User-selectable filter time: 0...50 ms | Hardware delay:<br>Off to On - 2 µs + filter time<br>On to Off - 3 µs + filter time<br>User-selectable filter time: 0...50 ms |
| Overvoltage protection, max | 36V (fuse protected) | |

## Technical Specifications - 5069-IB16, 5069-IB16K, 5069-IB16F

| Attribute | 5069-IB16, 5069-IB16K | 5069-IB16F |
|---|---|---|
| Counter frequency | 0 - $f_{max}$ = 500 Hz<br>(Inv period 2 ms) | 0 - $f_{max}$ = 30 kHz<br>(Inv period 33.3 µs) |
| Frequency counter | 0 - $f_{max}$ = 500 Hz<br>(Inv period 2 ms) | 0 - $f_{max}$ = 30 kHz<br>(Inv period 33.3 µs) |
| Pulse and period measurements | – | ±2 µs |
| Time stamp of inputs | | ±10 µs accuracy<br>1 ns resolution |
| Events | | 4 events supported (triggered by any input or simple counters) |
| Features, supported | The modules support these features:<br>• Reverse polarity protection | |
| | – | • Pulse latching<br>• Pattern matching<br>• Field power loss detection |
| Features, not suported | The modules do not support these features:<br>• Overrides<br>• Extended counters | |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.

(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

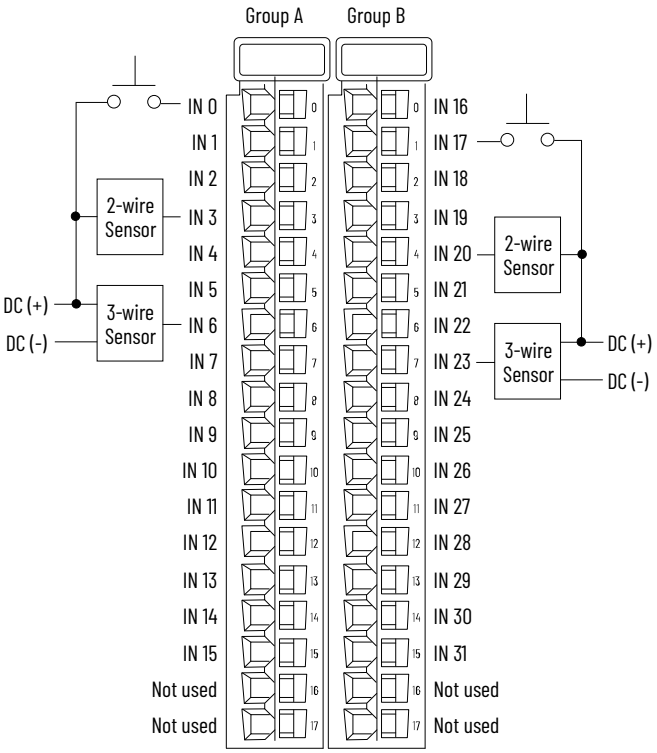
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-IB32

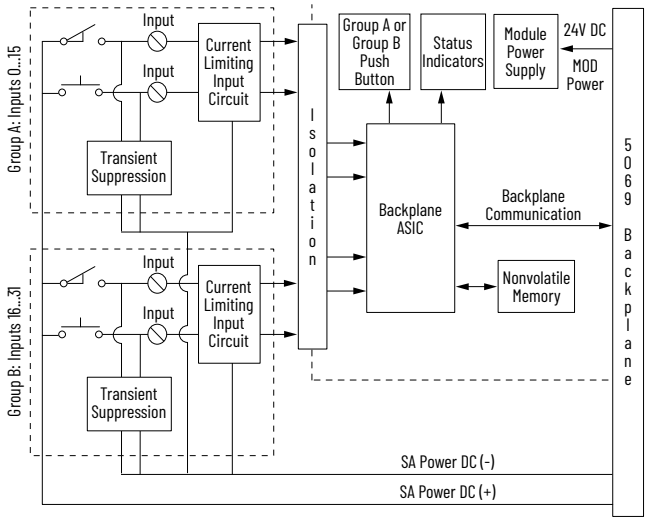
## Digital 32-point Sinking Input Modules

### Input Wiring - 5069-IB32

**IMPORTANT:**
- This module uses DC SA power. You must connect DC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.
- The 5069-IB32 module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB. For more information, see Power the Compact 5000 I/O Modules.




### Functional Block Diagram - 5069-IB32




## Technical Specifications - 5069-IB32

| Attribute | 5069-IB32 |
|---|---|
| Inputs | 32 Channels (2 groups of 16), sinking |
| Voltage category | 12/24V DC Sink |
| Voltage and current ratings | |
| Input ratings | 2...2.9 mA per channel @ 10...32V DC |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 120 mA @ 10...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC |
| Power dissipation, max | 3.9 W |
| Thermal dissipation, max | 13.3 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between SA power and input ports<br>No isolation between individual input ports<br>No isolation between Group A and Group B |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators<br>2 yellow/red Group A or Group B indicators |
| Group A or Group B push button | The I/O status indicators show status for one group of 16 I/O channels at a time. To choose which group's status you want to show, push the button. The Group A or Group B indicator shows which group is selected. |
| Wire category(2) | 2 - input ports<br>1 wire per terminal for each signal port |
| On-state voltage, range | 10V DC...32V DC |
| On-state voltage, nom | 24V DC |
| On-state current, range | 2 mA @ 10V DC...2.9 mA @ 32V DC |
| On-state current, nom | 2.4 mA @ 24V DC |
| Off-state voltage, max | 5V DC |
| Off-state current, max | 1.5 mA |
| Input impedance, range | 5 kΩ...16 kΩ |
| Input impedance, nom | 10 kΩ |
| Inrush current, max | < 250 mA peak (decaying to, 37% in 22 ms, without activation) |
| Input delay time<br>(screw to backplane)<br>Off to On and On to Off | ≤ 100 µs, ±10 µs @ 25 °C (77 °F) |
| Input drift over temperature span | ±100 ns/°C (55.6 ns/°F) from 0...60 °C (32...140 °F) |
| Input pulse width, min<br>Off to ON and ON to Off | 60 µs |
| Input filter time<br>Off to On and On to Off | Hardware delay:<br>50 µs + filter time<br>User-selectable filter time: 0...50 ms |
| Overvoltage protection, max | 36V (fuse protected) |
| Counter frequency | 0 - $f_{max}$ = 500 Hz (Inv period 2 ms) |
| Frequency counter | 0 - $f_{max}$ = 500 Hz (Inv period 2 ms) |
| Features, supported | The module supports these features:<br>• Reverse polarity protection |
| Features, not suported | The module does not support these features:<br>• Overrides<br>• Extended counters |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

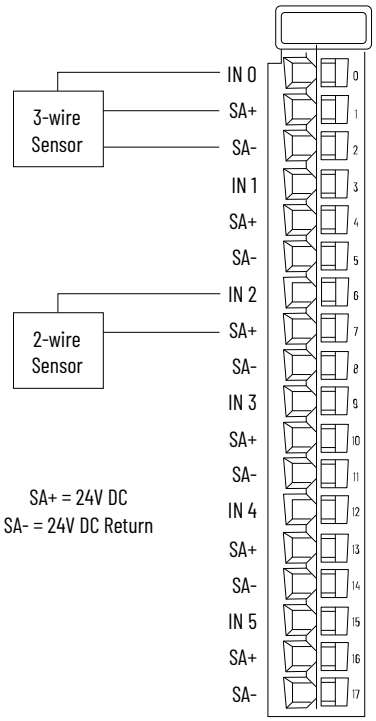
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-IB6F-3W

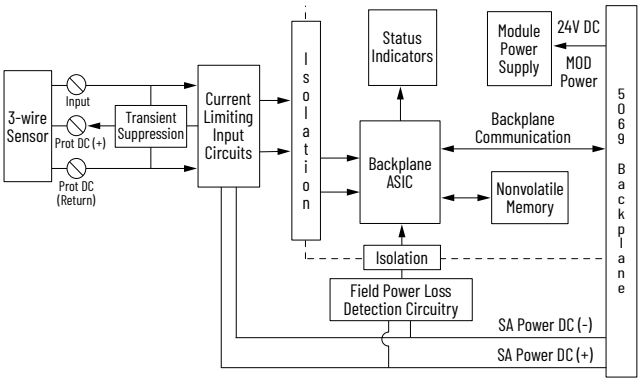
## Digital 3-wire Sinking Input Module

**Input Wiring - 5069-IB6F-3W**

**IMPORTANT:**
The 5069-IB6F-3W module uses DC SA power. You must connect DC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.




**Functional Block Diagram - 5069-IB6F-3W**




## Technical Specifications - 5069-IB6F-3W

| Attribute | 5069-IB6F-3W |
|---|---|
| Inputs | 6 Channels (1 group of 6), sinking |
| Voltage category | 12/24V DC Sink |
| Voltage and current ratings | |
| Input ratings | 4...7.4 mA per channel @ 10...32V DC |
| Output supply ratings | 150 mA per channel @ 10...32V DC<br>900 mA per module @ 10...32V DC |
| MOD power | 75 mA @ 18V...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |

## Technical Specifications - 5069-IB6F-3W

| Attribute | 5069-IB6F-3W |
|---|---|
| SA power | 950 mA @ 10...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw. | |
| Power dissipation, max | 2.4 W |
| Thermal dissipation, max | 8.1 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between SA power and input ports<br>No isolation between individual input ports |
| Indicators | 1 green/red module status indicator<br>6 yellow/red I/O status indicators |
| Wire category(2) | 2 - input ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| On-state voltage, range | 10V DC...32V DC |
| On-state voltage, nom | 24V DC |
| Off-state voltage, max | 5V DC |
| On-state current, range | 4 mA @ 10V DC...7.4 mA @ 32V DC |
| On-state current, nom | 6 mA @ 24V DC |
| Off-state current, max | 1.5 mA |
| Input impedance, nom | 4.1 kΩ |
| Input impedance, max | 7.0 kΩ |
| Inrush current, max | < 250 mA peak<br>Decays to, 37% in 22 ms, without activation |
| Input delay time<br>(screw to backplane)<br>Off to On and On to Off | ≤ 10 µs, ±1 µs @ 25 °C (77 °F) |
| Input drift over temperature span | ±10 ns/°C (5.56 ns/°F) from 0...60 °C (32...140 °F) |
| Input minimum pulse width<br>Off to On and On to Off | 6 µs |
| Input filter time | Hardware delay Off to On: 2 µs + filter time<br>Hardware delay On to Off: 3 µs + filter time<br>User-selectable filter time Off to On and On to Off: 0...50 ms |
| Overvoltage protection, max | 36V (fuse protected) |
| Pulse width and period measurements | ±2 µs |
| Simple counters<br>Counter frequency | 0 - $f_{max}$ = 30 kHz (Inv period 33.3 µs) |
| Frequency counter | 0 - $f_{max}$ = 30 kHz (Inv period 33.3 µs) |
| Time stamp of inputs | ±10 µs accuracy<br>1 ns resolution |
| Events | 4 events supported<br>(triggered by any input or simple counters) |
| Features, supported | The module supports these features:<br>• Reverse polarity protection<br>• Pulse latching<br>• Pattern matching<br>• Field power loss detection |
| Features, not supported | The module does not support these features:<br>• Overrides<br>• Extended counters |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

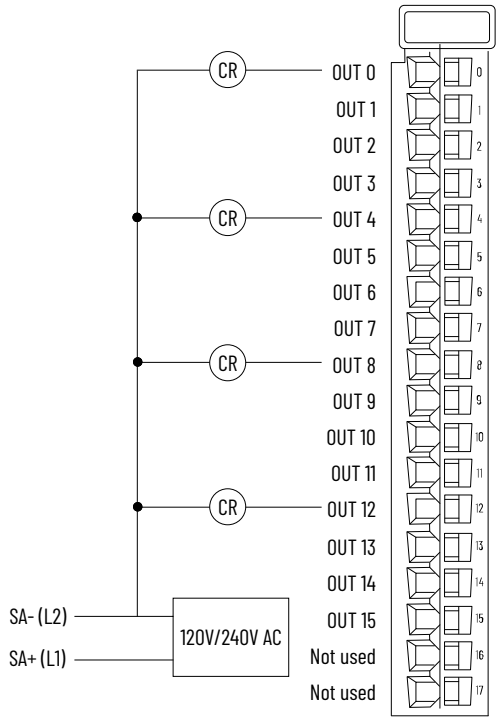
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OA16

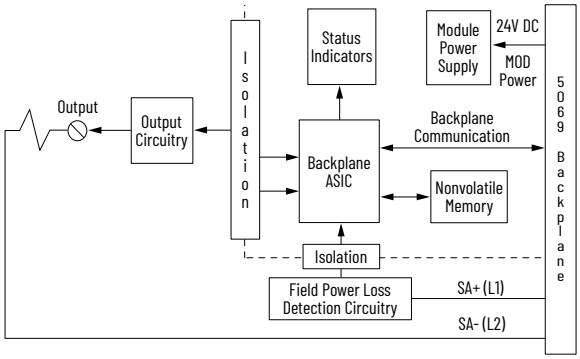
## Digital 16-point 120/240V AC Output Module

**Output Wiring - 5069-OA16**

**IMPORTANT:**
- The 5069-OA16 module uses AC SA power. You must connect AC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.
- Compact GuardLogix 5380 controllers do not support AC power on their SA power RTBs. To install a local 5069-OA16 module in a Compact GuardLogix 5380 controller system, complete the steps in Isolate SA power.
- The 5069-OA16 module outputs use a shared common. The outputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB. For more information, see Power the Compact 5000 I/O Modules.




**Functional Block Diagram - 5069-OA16**




## Technical Specifications - 5069-OA16

| Attribute | 5069-OA16 |
|---|---|
| Number of outputs | 16 (One group of 16) |
| Voltage category | 120/240V AC |
| Voltage and current ratings | |
| Output voltage range | 85...264V AC |
| Output voltage frequency | 47...63 Hz |

## Technical Specifications - 5069-OA16

| Attribute | 5069-OA16 |
|---|---|
| MOD power | 100 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 4 A @ 85...264V AC |
| SA power (passthrough)(1) | 9.975 A @ 85...264V AC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw.<br>The 5069-OA16 module complies to UKEX/ATEX/IECEx when used at or below 125V AC. | |
| Power dissipation, max | 3.4 W |
| Thermal dissipation, max | 11.6 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>Type tested at 1800V AC for 60 s<br>No isolation between individual channels |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators |
| Wire category(2) | 1 - output port<br>1 - power port<br>1 wire per terminal for each signal port |
| On-state voltage, min | 85V AC |
| On-state voltage, nom | 120/240V AC |
| On-state voltage, max | 264V AC |
| On-state voltage drop, max | 1.5V AC @ 0.5 A |
| Output current per channel, max | 0.5 A |
| Output current per module, max | 4 A |
| Off-state leakage current, max | 1 mA<br>**IMPORTANT:** To limit the effects of leakage current through solid-state outputs, you can connect a loading resistor in parallel with your load. For 120V AC operation, use a 15 KΩ, 2 W resistor. For 240V AC operation, use a 15 KΩ, 5 W resistor. |
| Surge current per point | 5 A max for 25 ms per point, repeatable every 2 s |
| Output delay time (backplane to screw)<br>Off to On and On to Off | 1/2 cycle time (typ) @ 0...60 °C (32...140 °F) |
| Features, supported | The module supports this feature:<br>• Field power loss detection |
| Features, not supported | The module does not support these features:<br>• No load detection per channel diagnostics<br>• Output short circuit/overload/overtemp detection per channel diagnostics<br>• Output short circuit/overload protection<br>• Reverse voltage protection<br>• Overvoltage protection<br>• Scheduled outputs |
| Pilot duty rating | Resistive/General Pilot Duty<br>0.5 A pilot duty |
| Output control in fault state<br>Output states in program mode<br>Output states in fault mode | Per point:<br>• Hold Last State<br>• On<br>• Off (default) |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

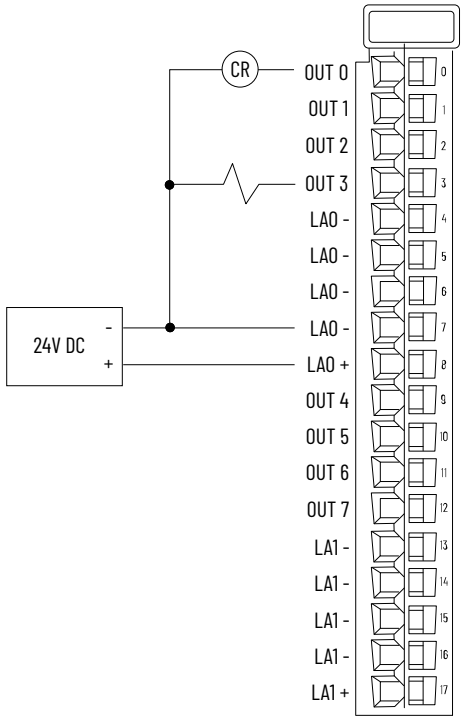
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OB8

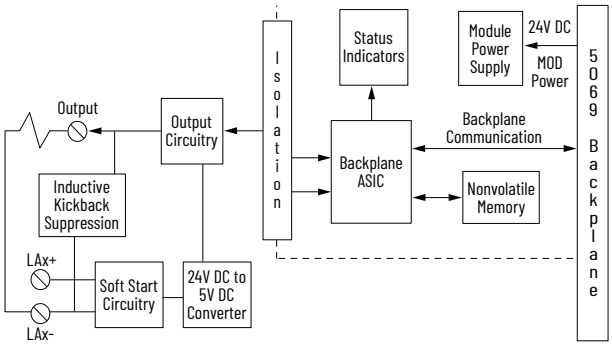
## Digital 8-point Sourcing High Current Output Module

### Output Wiring - 5069-OB8

**IMPORTANT:**
- The 5069-OB8 module does not draw current from the SA power bus. Still, the module is a DC-type module, and you must install it on a DC SA power bus.
- The LA+ and LA – connections are used to supply field-side power to the module. Output channels 0...3 use LA0 +/–, and output channels 4...7 use LA1 +/–.




### Functional Block Diagram - 5069-OB8




## Technical Specifications - 5069-OB8

| Attribute | 5069-OB8 |
|---|---|
| Number of outputs | 8 (two groups of 4) |
| Voltage category | 24V DC |
| Voltage and current ratings | |
| Output voltage range | 10...32V DC |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| LA power | 2 A per channel @ 10...32V DC<br>8 A per group @ 10...32V DC<br>16 A per module @ 10...32V DC |

## Technical Specifications - 5069-OB8

| Attribute | 5069-OB8 |
|---|---|
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC<br>**IMPORTANT:** The module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (passthrough) current draw. | |
| Power dissipation, max | 3.2 W |
| Thermal dissipation, max | 10.9 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>Type tested at 1800V AC for 60 s<br>No isolation between LA power and output ports<br>No isolation between individual output ports |
| Indicators | 1 green/red module status indicator<br>8 yellow/red I/O status indicators |
| Wire category(2) | 2 - output ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| LA power attributes | |
| On-state voltage, min | 10V DC |
| On-state voltage, nom | 24V DC |
| On-state voltage, max | 32V DC |
| On-state voltage drop, max | 0.25V DC |
| Off-state voltage, max | < 10V DC |
| On-state current per channel, min | 1 mA |
| Off-state leakage current per point, max | 0.5 mA<br>**IMPORTANT:** 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 KÙ, 0.5 W resistor for transistor outputs. |
| Output current per channel, max | 2 A |
| Output current per group, max | 8 A |
| Output current per module, max | 16 A |
| Surge current per point | 4 A max for 10 ms per point, repeatable every 2 s |
| Output delay time (backplane to screw) Off to On and On to Off | ≤ 100 µs @ 25 °C (77 °F) @ 2 A |
| Pulse width, min | ≤ 200 µs $T_{on}$ min + $T_{off}$ min @ 2 A @ 25 °C (77 °F) |
| Output drift over temperature span | ±100 ns/°C (55.6 n/°F) from 0...60 °C (32...140 °F) @ 2 A |
| Features, supported | The module supports these features:<br>• Field power loss detection<br>• No load detection per channel diagnostics<br>• Output short circuit/overload/overtemp detection per channel diagnostics<br>• Output short circuit/overload protection<br>• Reverse voltage protection |
| Overvoltage protection, max | 36V (fuse protected) |
| Pilot duty rating | Resistive/General Pilot Duty<br>2 A pilot duty |
| Output control in fault state | Per point:<br>• Hold Last State<br>• On<br>• Off (default) |
| Output states in program mode | |
| Output states in fault mode | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

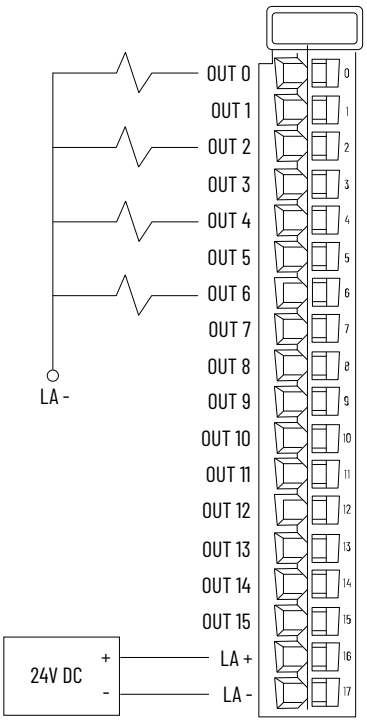
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OB16, 5069-OB16K, 5069-OB16F

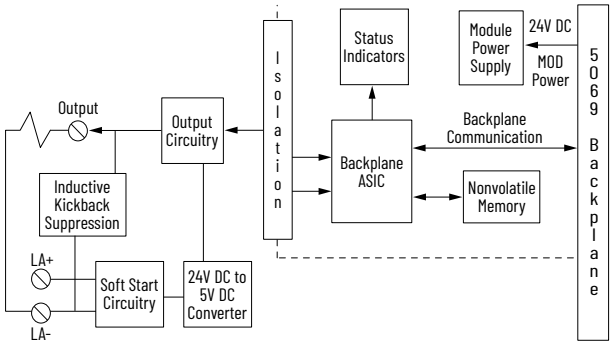
## Digital 16-point Sourcing Output Modules

### Output Wiring - 5069-OB16, 5069-OB16K, 5069-OB16F

**IMPORTANT:**
- These modules do not draw current from the SA power bus. Still, the modules are DC-type modules, and you must install them on a DC SA power bus.
- The LA+ and LA- connections are used to supply field-side power to the module.




### Functional Block Diagram - 5069-OB16, 5069-OB16K, 5069-OB16F




## Technical Specifications - 5069-OB16, 5069-OB16K, 5069-OB16F

| Attribute | 5069-OB16, 5069-OB16K | 5069-OB16F |
|---|---|---|
| Outputs | 16 Channels (1 group of 16), sourcing | |
| Voltage category | 12/24V DC source | |
| Voltage and current ratings | | |
| MOD power | 75 mA @ 18...32V DC | |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC | |
| LA Power | 0.5 A per channel @ 10...32V DC<br>8 A per module @ 10...32V DC | |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC<br>**IMPORTANT:** The module does not draw SA power current. | |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | | |

## Technical Specifications - 5069-OB16, 5069-OB16K, 5069-OB16F

| Attribute | 5069-OB16, 5069-OB16K | 5069-OB16F |
|---|---|---|
| Power dissipation, max | 3.25 W (16 channels @ 0.5 A) | |
| Thermal dissipation, max | 11.09 BTU/hr | |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between LA power and output ports<br>No isolation between individual output ports | |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators | |
| Wire category(2) | 2 - output ports<br>2 - power ports<br>1 wire per terminal for each signal port | |
| LA power attributes | | |
| On-state voltage, min | 10V DC | |
| On-state voltage, nom | 24V DC | |
| On-state voltage, max | 32V DC | |
| On-state voltage drop, max | < 0.2V 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 | < 0.5 mA per point<br>**IMPORTANT:** 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. | |
| Output current rating | 0.5 A resistive per channel @ 10...32V DC<br>8 A resistive per module @ 10...32V DC, max | |
| Surge current per point | 1 A max for 10 ms per point, repeatable every 2 s | |
| Output delay time (backplane to screw) Off to On and On to Off | ≤ 100 µs, ±10 µs @ 25 °C (77 °F) @ 0.5 A | 10 µs, ±1 µs @ 25 °C (77 °F) @ 0.5 A |
| Pulse width, min | 200 µs @ 0.5 A @ 25 °C (77 °F) | 20 µs @ 0.5 A @ 25 °C (77 °F) |
| Output drift over temperature span | ±100 ns/°C (55.6 ns/°F) from 0...60 °C (32...140 °F) @ 0.5 A | ±10 ns/°C (5.56 ns/°F) from 0...60 °C (32...140 °F) @ 0.5 A |
| Features, supported | The modules support these features:<br>• Field power loss detection (Series B hardware only)<br>• No load detection per channel diagnostics<br>• Output short circuit/overload/overtemp detection per channel diagnostics<br>• Output short circuit/overload protection<br>• Reverse voltage protection | |
| Overvoltage protection, max | 36V (fuse protected) | |
| Pilot duty rating | 0.5 A pilot duty rating per channel @ 10...32V DC | |
| Output control in fault state | Per point:<br>• Hold Last State<br>• On<br>• Off (default) | |
| Output states in program mode | | |
| Output states in fault mode | | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) | |
| Scheduled outputs | – | ±10 µs accuracy<br>1 ns resolution |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

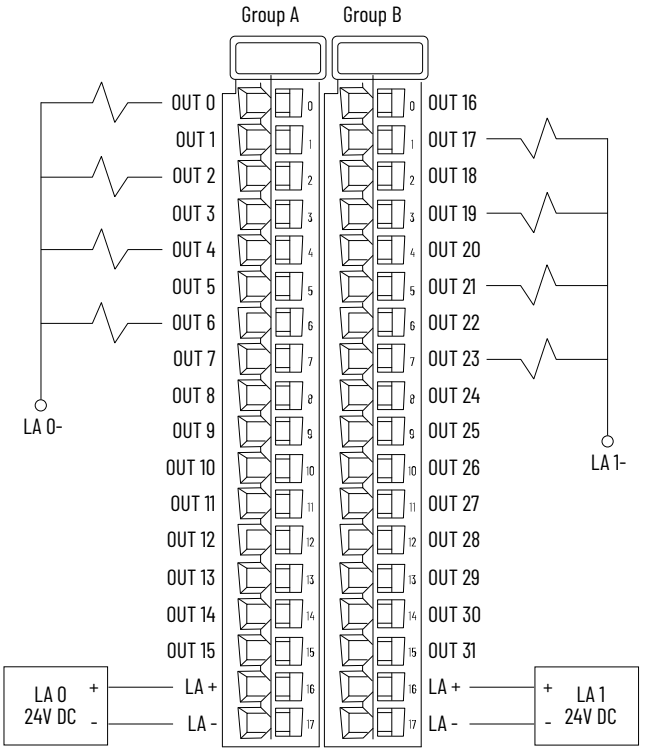
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OB32

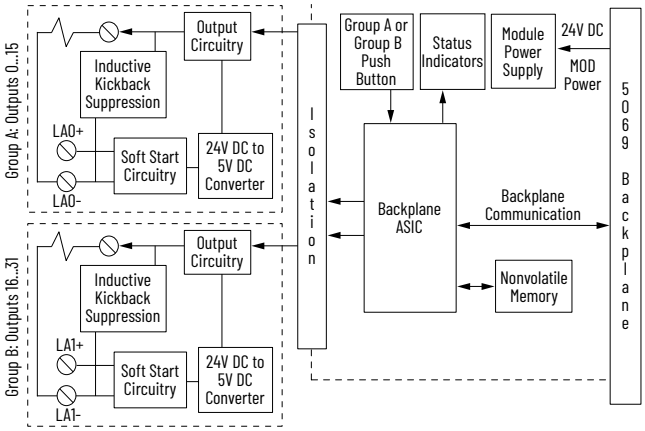
## Digital 32-point Sourcing Output Modules

### Output Wiring - 5069-OB32

**IMPORTANT:**
- This module does not draw current from the SA power bus. Still, the module is a DC-type modules, and you must install it on a DC SA power bus.
- The LA+ and LA- connections are used to supply field-side power to the module.




### Functional Block Diagram - 5069-OB32



## Technical Specifications - 5069-OB32

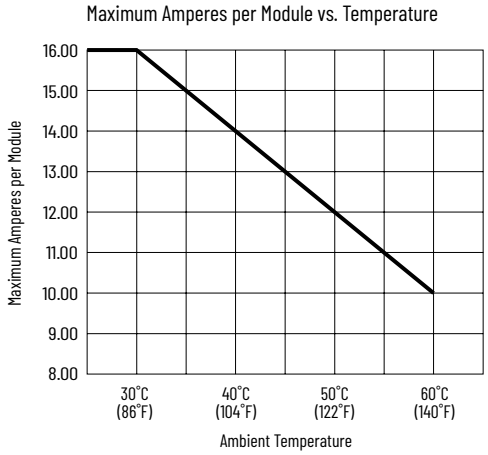
| Attribute | 5069-OB32 |
|---|---|
| Outputs | 32 Channels (2 groups of 16), sourcing |
| Voltage category | 12/24V DC source |
| Voltage and current ratings | |
| MOD power | 90 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| LA Power | 0.5 A per channel @ 10...32V DC<br>8 A per group @ 10...32V DC<br>10 A per module @ 10...32V DC<br>See Temperature Derating - 5069-OB32 |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC<br>**IMPORTANT:** The module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |
| Power dissipation, max | 3.9 W (20 channels @ 0.5 A or 32 channels @ 0.3 A)<br>Value at surrounding air temperature, max of 60 °C (140 °F). |
| Thermal dissipation, max | 11.09 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between LA Power 0 and LA Power 1<br>No isolation between LA power and output ports<br>No isolation between individual output ports<br>No isolation between Group A and Group B |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators<br>2 yellow/red Group A or Group B indicators |
| Group A or Group B push button | The I/O status indicators show status for one group of 16 I/O channels at a time. To choose which group's status you want to show, push the button. The Group A or Group B indicator shows which group is selected. |
| Wire category(2) | 2 - output ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| LA power attributes for both LA 0 and LA 1 | |
| On-state voltage, range | 10V DC...32V DC |
| On-state voltage, nom | 24V DC |
| On-state voltage drop, max | < 0.2V 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 | < 0.5 mA per point<br>**IMPORTANT:** 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. |
| Output current per channel, max | 0.5 A resistive @ 10...32V DC |
| Output current per group, max | 8 A resistive @ 10...32V DC |
| Output current per module, max | 10 A resistive @ 10...32V DC @ 60 °C (140 °F)<br>16 A resistive @ 10...32V DC @ 30 °C (86 °F)<br>See Temperature Derating - 5069-OB32 |
| Surge current per point | 1 A max for 10 ms per point, repeatable every 2 s |
| Output delay time (backplane to screw)<br>Off to On and On to Off | ≤ 100 µs, ±10 µs @ 25 °C (77 °F) @ 0.5 A |
| Pulse width, min | 200 µs @ 0.5 A @ 25 °C (77 °F) |
| Output drift over temperature span | ±100 ns/°C (55.6 ns/°F) from 0...60 °C (32...140 °F) @ 0.5 A |

## Technical Specifications - 5069-OB32

| Attribute | 5069-OB32 |
|---|---|
| Features, supported | The module supports these features:<br>• Field power loss detection<br>• No load detection per channel diagnostics<br>• Output short circuit/overload/overtemp detection per channel diagnostics<br>• Output short circuit/overload protection<br>• Reverse voltage protection |
| Overvoltage protection, max | 36V (fuse protected) |
| Pilot duty rating | 0.5 A pilot duty rating per channel @ 10...32V DC |
| Output control in fault state | Per point:<br>• Hold Last State<br>• On<br>• Off (default) |
| Output states in program mode | |
| Output states in fault mode | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

## Temperature Derating - 5069-OB32



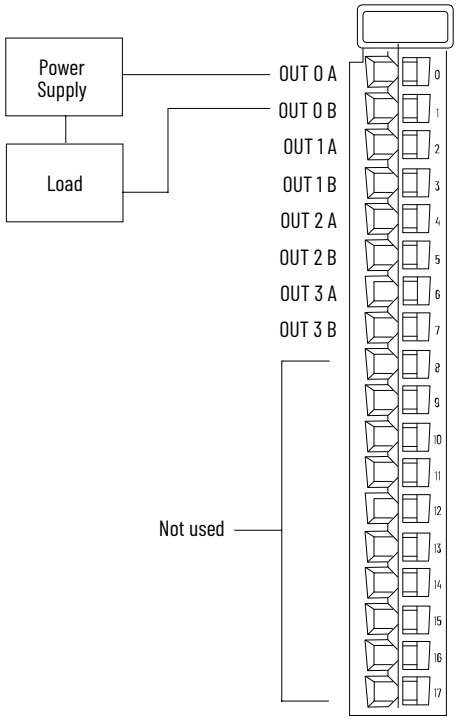

For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OW4I

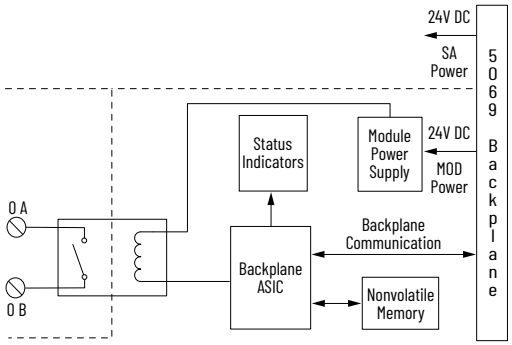
## Digital 4-point Isolated Relay Output Module

**Output Wiring - 5069-OW4I**

**IMPORTANT:**
The 5069-OW4I module does not draw current from the SA power bus. Still, the module is a DC-type module, and you must install it on a DC SA power bus.




**Functional Block Diagram - 5069-OW4I**




## Technical Specifications - 5069-OW4I

| Attribute | 5069-OW4I |
|---|---|
| Outputs | 4 - Form A (normally open) |
| Voltage and current ratings | |
| Output voltage range | 5...125V DC<br>5...264V AC |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>**IMPORTANT:** The module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |

## Technical Specifications - 5069-OW4I

| Attribute | 5069-OW4I |
|---|---|
| Power dissipation, max | 2.3 W |
| Thermal dissipation, max | 7.85 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicators |
| Wire category(2) | 1 - relay port<br>1 wire per terminal for each signal port |
| Relay rating | 2 A resistive per channel @ 5...30V DC<br>2 A resistive per channel @ 5...264V AC, 50/60 Hz<br>2 A general use per channel @ 5...250V AC, 50/60 Hz<br>2 A @ 5...125V AC, UKEX/ATEX/IECEx<br>8 A per module, max<br>**IMPORTANT:** To extend the life of the module, connect surge suppressors across your external inductive load. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1. |
| Off-state leakage | 0 mA (dry contact, no onboard snubbers) |
| Output current rating, max | 2 A per channel<br>8 A per module |
| Output delay time, max | |
| Off to On | 10 ms |
| On to Off | 10 ms |
| Switching frequency | 1 operation every 3 seconds (0.3 Hz at rated load) |
| Initial contact resistance, max | 30 mΩ |
| Bounce time, mean | 500 µs |
| Output control in fault state | Per point:<br>• Hold last state<br>• On<br>• Off (default) |
| Output states in program mode | |
| Output states in fault mode | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• 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<br>5...125V DC, R150 pilot duty per channel |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

## Relay Contact Ratings - 5069-OW4I

| Volts, Max | Continuous Amps per Point, Max | Amperes | | Voltamperes | | NEMA ICS 2-125 |
|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | |
| 240V AC | 2 A | 7.5 A | 0.75 A | 1800VA | 180VA | C300 |
| 120V AC | | 15 A | 1.5 A | | | |
| 125V DC | 0.27 A(1) | 0.22 A(2) | | 28VA | | R150 |
| 24V DC | 2.0 A | 1.16 A(2) | | 28VA | | - |

(1) Calculated based on the Rockwell Automation component derating guideline: 90% of rated contact current, that is, 0.3 A at 125V DC.
(2) For DC voltage applications, to determine the make/break ampere rating for relay contacts, divide 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OW16

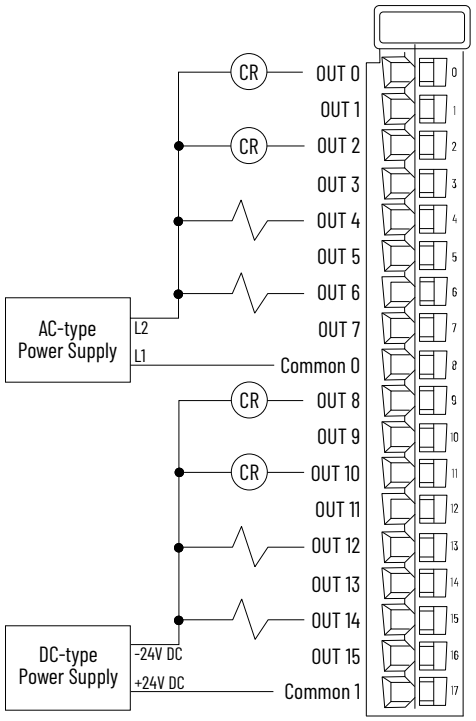
## Digital 16-point Relay Output Module

**Output Wiring - 5069-OW16**

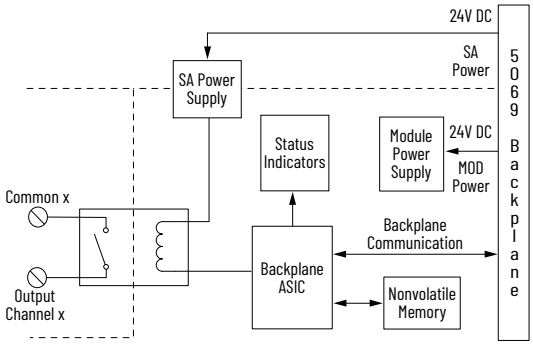
**IMPORTANT:**

- The 5069-OW16 Series A and Series B modules require DC SA power. You must connect DC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.
- The 5069-OW16 Series C module does not use SA power. That is, it does not draw current from the SA power bus. The module passes it through to the next Compact 5000 I/O module in the system.
- You can connect AC-type devices, DC-type devices, or a combination of the two types.
- The module has two commons, each is shared across a set of eight output channels.
  - Common 0 is shared across Outputs 0...7
  - Common 1 is shared across Outputs 8...15

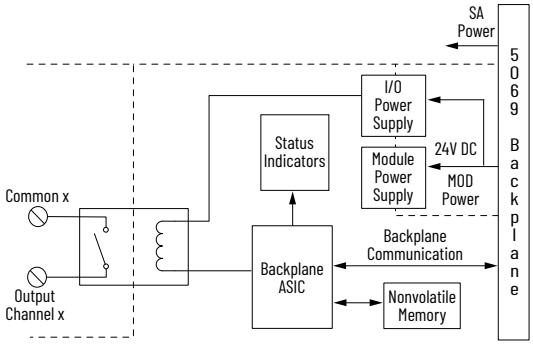
  Do not connect devices of different power types to channels that share a common.




**Functional Block Diagram - 5069-OW16 Series A and Series B**




**Functional Block Diagram - 5069-OW16 Series C**



## Technical Specifications - 5069-OW16

| Attribute | 5069-OW16 |
|---|---|
| Outputs | 16 (Two groups of 8) - Form A (normally open) |
| Voltage and current ratings | |
| Output voltage range | 5...125V DC, 5...264V AC |
| MOD power | Series A and B: 75 mA @ 18...32V DC<br>Series C: 225 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | Series A and B: 150 mA @ 18...32V DC<br>Series C: – |
| SA power (passthrough)(1) | 9.95 A @ 18...32V DC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw.<br>The module complies with UKEX/ATEX/IECEx when used at or below 125V AC or 30V DC. | |
| Power dissipation, max | 3.0 W |
| Thermal dissipation, max | 10.2 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>Type tested at 1800V AC for 60 s<br>No isolation between individual channels |
| Module keying | Electronic keying via programming software |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators |
| Wire category(2) | 1 - relay port<br>1 - power port<br>1 wire per terminal for each signal port |
| Relay ratings | 2 A resistive per channel @ 5...30V DC<br>2 A resistive per channel @ 5...264V AC, 50/60 Hz<br>2 A general use per channel @ 5...250V AC, 50/60 Hz<br>2 A @ 5...125V AC, UKEX/ATEX/IECEx<br>**IMPORTANT:** To extend the life of the module, connect surge suppressors across your external inductive load. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1. |
| Off-state leakage current per point, max | Series A: 0 mA (dry contact, no onboard snubbers)<br>Series B and Series C: 0 mA (with onboard TVS snubber) |
| Output current per group, max | 8 A |
| Output current per module, max | 16 A |
| Output delay time, max | |
| Off to On | 10 ms |
| On to Off | 10 ms |
| Switching frequency | 1 operation every 3 seconds (0.3 Hz at rated load) |
| Initial contact resistance, max | 30 mΩ |
| Bounce time, mean | 500 µs |

## Technical Specifications - 5069-OW16

| Attribute | 5069-OW16 |
|---|---|
| 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<br>5...125V DC, R150 pilot duty per channel |
| Output control in fault state | Per point:<br>• Hold Last State<br>• On<br>• Off (default) |
| Output states in program mode | |
| Output states in fault mode | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

## Relay Contact Ratings - 5069-OW16

| Volts, Max | Continuous Amps per Point, Max | Amperes | | Voltamperes | | NEMA ICS 2-125 |
|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | |
| 240V AC | 2 A | 7.5 A | 0.75 A | 1800VA | 180VA | C300 |
| 120V AC | | 15 A | 1.5 A | | | |
| 125V DC | 0.27 A(1) | 0.22 A(2) | | 28VA | | R150 |
| 24V DC | 2.0 A | 1.16 A(2) | | 28VA | | - |

(1) Calculated based on the Rockwell Automation component derating guideline: 90% of rated contact current, that is, 0.3 A at 125V DC.
(2) For DC voltage applications, to determine the make/break ampere rating for relay contacts, divide 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

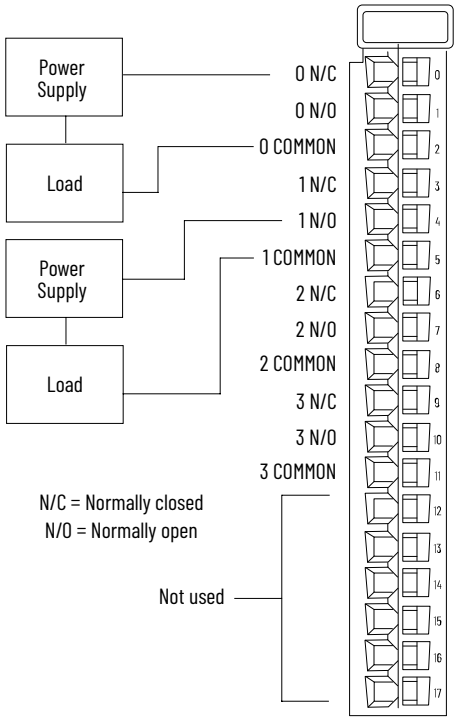
For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# 5069-OX4I

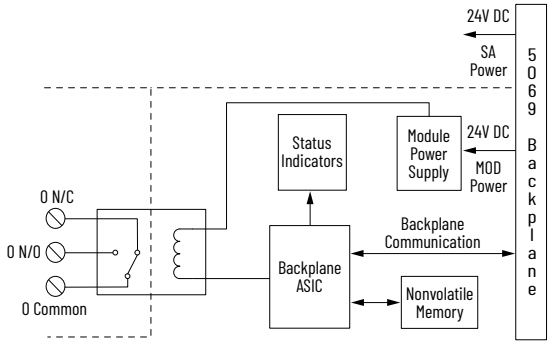
## Digital 4-point Isolated Normally-open/Normally-closed Output Module

**Output Wiring - 5069-OX4I**

**IMPORTANT:**
The module does not draw current from the SA power bus. Still, the module is a DC-type module, and you must install it on a DC SA power bus. See the SA power device list and Isolate SA power.




**Functional Block Diagram - 5069-OX4I**




## Technical Specifications - 5069-OX4I

| Attribute | 5069-OX4I |
|---|---|
| Outputs | 4 - Form C (SPDT) |
| Voltage and current ratings | |
| Output voltage range | 5...125V DC<br>5...264V AC |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>**IMPORTANT:** The module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |

## Technical Specifications - 5069-OX4I

| Attribute | 5069-OX4I |
|---|---|
| Power dissipation, max | 2.6 W |
| Thermal dissipation, max | 8.88 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicators |
| Wire category(2) | 1 - relay port<br>1 - power port<br>1 wire per terminal for each signal port |
| Contact current rating | 2 A resistive per channel @ 5...30V DC<br>2 A resistive per channel @ 5...264V AC, 50/60 Hz<br>2 A general use per channel @ 5...250V AC, 50/60 Hz<br>2 A @ 5...125V AC, UKEX/ATEX/IECEx<br>8 A per module, max<br>**IMPORTANT:** To extend the life of the module, connect surge suppressors across your external inductive load. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1. |
| Off-state leakage | 0 mA (dry contact, no onboard snubbers) |
| Output current rating | 2 A per channel<br>8 A per module, max |
| Output delay time, max | |
| Off to On | 15 ms |
| On to Off | 15 ms |
| Switching frequency | 1 operation every 3 seconds (.3 Hz at rated load) |
| Initial contact resistance, max | 30 mΩ |
| Bounce time, mean | 500 µs |
| Output control in fault state | Per point:<br>• Hold last state<br>• On<br>• Off (default) |
| Output states in program mode | |
| Output states in fault mode | |
| Duration of fault mode | Per point:<br>• 1, 2, 5, or 10 seconds<br>• Forever (default) |
| Delay to fault | Supported |
| Fusing | Outputs are not fused |
| Minimum load current | 10 mA |
| Expected contact life | 300K cycles resistive, 100K cycles inductive |
| Pilot duty rating | 5...240V AC, 50/60 Hz, C300 pilot duty per channel<br>5...125V DC, R150 pilot duty per channel |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

## Relay Contact Ratings - 5069-OX4I

| Volts, Max | Continuous Amps per Point, Max | Amperes | | Voltamperes | | NEMA ICS 2-125 |
|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | |
| 240V AC | 2 A | 7.5 A | 0.75 A | 1800VA | 180VA | C300 |
| 120V AC | | 15 A | 1.5 A | | | |
| 125V DC | 0.225 A(1) | 0.22 A(2) | | 28VA | | R150 |
| 24V DC | 2.0 A | 1.16 A(2) | | 28VA | | - |

(1) Calculated based on the Rockwell Automation component derating guideline: 90% of rated contact current, that is, 0.25 A at 125V DC.
(2) For DC voltage applications, to determine the make/break ampere rating for relay contacts, divide 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

For **Wiring and Installation Specifications**, see page 5.
For **Certifications**, see page 6.
For **Environmental Specifications**, see page 6.

# Analog I/O Modules

For information that applies to all of the analog I/O modules, see these tables.

- Wiring and Installation Specifications - Analog I/O Modules
- Certifications - Analog I/O Modules
- Environmental Specifications - Analog I/O Modules

The following analog I/O modules are available.

| I/O Type | Cat. No. | Description | Page |
|---|---|---|---|
| Analog input | 5069-IF4IH | 4-channel isolated current/voltage/HART input module | 23 |
| | 5069-IF8 | 8-channel current/voltage input module | 25 |
| | 5069-IY4 | 4-channel current/voltage/RTD/Thermocouple input module | 27 |
| | 5069-IY4K | 4-channel conformal coated current/voltage/RTD/Thermocouple input module | |
| Analog output | 5069-OF4IH | 4-channel isolated current/voltage/HART output module | 31 |
| | 5069-OF4 | 4-channel current/voltage output module | 33 |
| | 5069-OF4K | 4-channel conformal coated current/voltage output module | |
| | 5069-OF8 | 8-channel current/voltage output module | |

## Wiring and Installation Specifications - Analog I/O Modules

| Attribute | 5069-IF4IH, 5069-IF8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF4K, 5069-OF4IH, 5069-OF8 |
|---|---|
| Channel connections | The wiring diagrams show specific devices that are connected to specific channels. You are not restricted to use only those devices or channels. You can connect devices to any channel or combination of channels as needed. |
| Loop devices on a current loop | Place additional loop devices, for example, strip chart recorders, at either "A" location in a current loop. |
| SA power | • The analog I/O modules use DC SA power. You must connect DC power to the device that supplies SA power to the module.<br>• Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module. |
| Ground devices | • The analog I/O modules have two shield terminals. Compact 5000® I/O module RTBs only support one wire per terminal, so you can ground two devices at the module shield terminals.<br>• For additional devices, ground them somewhere else, like the DIN rail via a terminal strip.<br>If separate power supplies are used to power the additional devices, ground the power supplies at the same ground location. |
| SA power device list | Connections to an external power supply that provides SA power via the SA power RTB on one of these devices.<br>• CompactLogix 5380 controller<br>• Compact GuardLogix 5380 controller<br>• CompactLogix 5480 controller<br>• 5069-AENTR EtherNet/IP™ Adapter<br>• 5069-FPD field potential distributor |
| Isolate SA power | If you install modules in a system that uses both AC SA power and DC SA power, you must isolate SA power buses by type with a 5069-FPD field potential distributor. To create separate SA power buses, complete these steps.<br>1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller. This is the first SA power bus.<br>2. To create a second SA power bus, install the 5069-FPD field module to the right of these modules.<br>3. Install the modules that use the other type of SA power, for example AC, to the right of the 5069-FPD module. |
| Slot width | 1 |
| Dimensions (HxWxD) | 144.6 x 22 x 105.4 mm (5.69 x 0.87 x 4.15 in.) |
| Weight, approx | 175 g (0.39 lb) |
| DIN rail | Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail. |
| Module keying | Electronic keying via programming software |
| RTB | 5069-RTB18-SPRING RTB or 5069-RTB18-SCREW RTB<br>If at least one thermocouple is connected to the 5069-IY4 or 5069-IY4K modules, you must use the 5069-RTB14CJC-SPRING RTB or 5069-RTB14CJC-SCREW RTB.<br>**IMPORTANT:** RTBs do not ship with Compact 5000™ I/O modules, you must order them separately. Order only the RTB type that your system requires. |
| RTB torque | Screw-type RTB only: 0.4 N•m (3.5 lb•in) |
| RTB keying | None |
| Wire size | 0.34…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F) or greater<br>Spring-type RTB: 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only<br>Screw-type RTB: 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only |
| Insulation-stripping length | 5069-RTB18-SPRING RTB: 10 mm (0.39 in.)<br>5069-RTB18-SCREW RTB: 12 mm (0.47 in.) |

## Environmental Specifications - Analog I/O Modules

| Attribute | 5069-IF4IH, 5069-IF8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF4K, 5069-OF4IH, 5069-OF8 |
|---|---|
| Temperature, operating<br>IEC 60068-2-1<br>(Test Ad, Operating Cold)<br>IEC 60068-2-2<br>(Test Bd, Operating Dry Heat)<br>IEC 60068-2-14<br>(Test Nb, Operating Thermal Shock) | 0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F) |
| Temperature, surrounding air, max | 60 °C (140 °F) |
| Temperature, nonoperating<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...+85 °C (-40...+185 °F) |
| Relative humidity<br>IEC 60068-2-30<br>(Test Db, Unpackaged Damp Heat) | 5...95% noncondensing |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 5 g @ 10...500 Hz |
| Shock, operating<br>IEC 60068-2-27<br>(Test Ea, Unpackaged Shock) | 30 g |
| Shock, nonoperating<br>IEC 60068-2-27<br>(Test Ea, Unpackaged Shock) | 50 g |
| Emissions | IEC 61000-6-4 |
| ESD immunity<br>IEC 61000-4-2 | 6 kV contact discharges<br>8 kV air discharges |
| Radiated RF immunity<br>IEC 61000-4-3 | 10V/m with 1 kHz sine wave 80% AM from 80...6000 MHz |
| EFT/B immunity<br>IEC 61000-4-4 | ±4 kV @ 5 kHz on power ports<br>±3 kV @ 5 kHz on input ports |
| Surge transient immunity<br>IEC 61000-4-5 | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±2 kV line-earth (CM) on shielded input ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz |
| Voltage variation<br>IEC 61000-4-29 | 10 ms interruption on MOD power port |
| North American temp code | T4 |
| UKEX/ATEX temp code | T4 |
| IECEx temp code | T4 |
| Enclosure type | None (open-style) |

## Certifications - Analog I/O Modules

| Certification | 5069-IF4IH, 5069-IF8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF4K, 5069-OF4IH, 5069-OF8 |
|---|---|
| cULus | UL Listed Industrial Control Equipment, certified for US and Canada.<br>See UL File E322657.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470. |
| UKCA and CE | UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with:<br>EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>EN 61000-6-2; Industrial Immunity<br>EN 61000-6-4; Industrial Emissions<br>EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)<br><br>UK Statutory Instrument 2016 No. 1101 and European Union 2014/35/EU LVD, compliant with:<br>EN 61010-2-201; Control Equipment Safety Requirements<br><br>UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with:<br>EN IEC 63000; Technical documentation |
| RCM | Australian Radiocommunications Act, compliant with<br>EN 61000-6-4; Industrial Emissions |
| Ex | UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with:<br>EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>DEMKO 15 ATEX 1484X and UL22UKEX2379X |
| IECEx | IECEx System, compliant with:<br>IEC 60079-0; General Requirements<br>IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3 |
| Morocco | Arrêté ministériel n° 6404-15 du 1 er muharram 1437<br>Arrêté ministériel n° 6404-15 du 29 ramadan 1436 |
| CCC | CNCA-C23-01:2019强制性产品认证实施规则 防爆电气<br>CNCA-C23-01:2019 CCC Implementation Rule Explosion-Proof Electrical Products<br>CCC: 2020312309000308 |
| See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details. | |

# 5069-IF4IH

## 4-channel isolated current/voltage/HART input module

The 5069-IF4IH module supports a differential signal and these device modes.

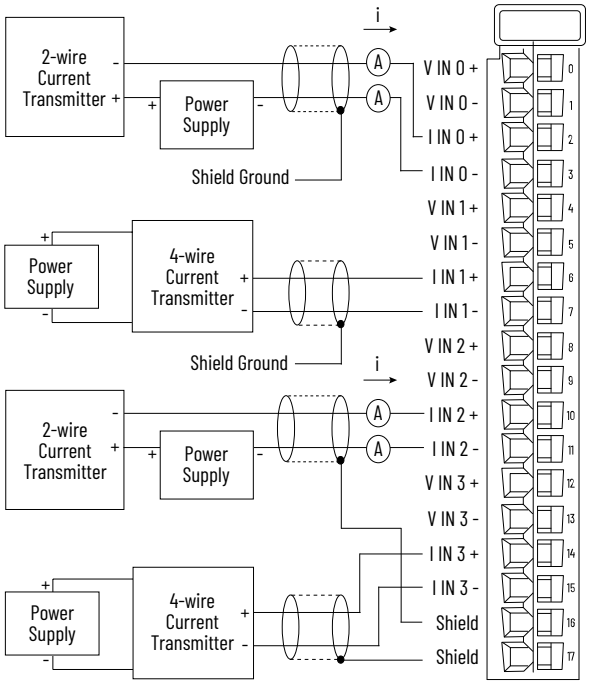
| Device | Supported Modes |
|---|---|
| 2-wire analog device<br>4-wire analog device[1] | Current |
| | Voltage |
| | Combination of current and voltage |

The channel configuration in your Logix Designer application project must match the input device type that is connected to the channel. Select the input type on the Channels tab in the Module Properties. For example, if a current input device is connected to a channel, the configuration for the channel must be Input Type = Current.

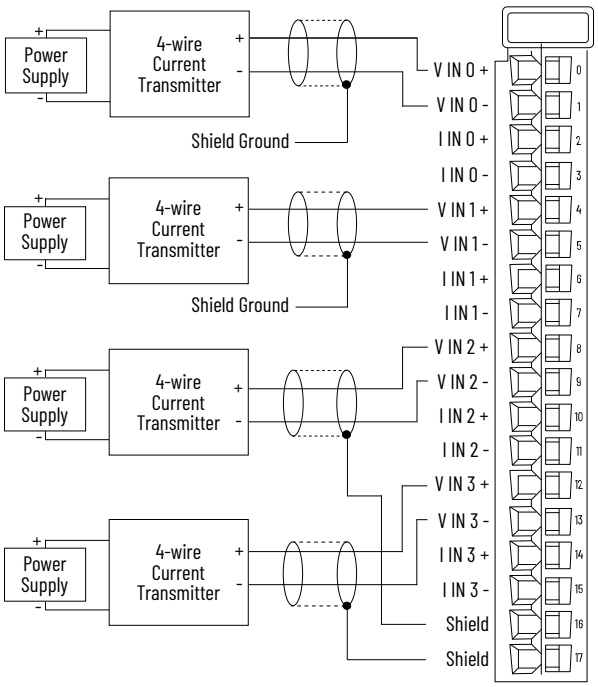
(1) The 4-wire analog devices are 2-wire current and voltage devices with 2-wire sensor power connections.

**IMPORTANT:** This module does not support the use of the voltage input and current input terminals on the same channel at the same time.

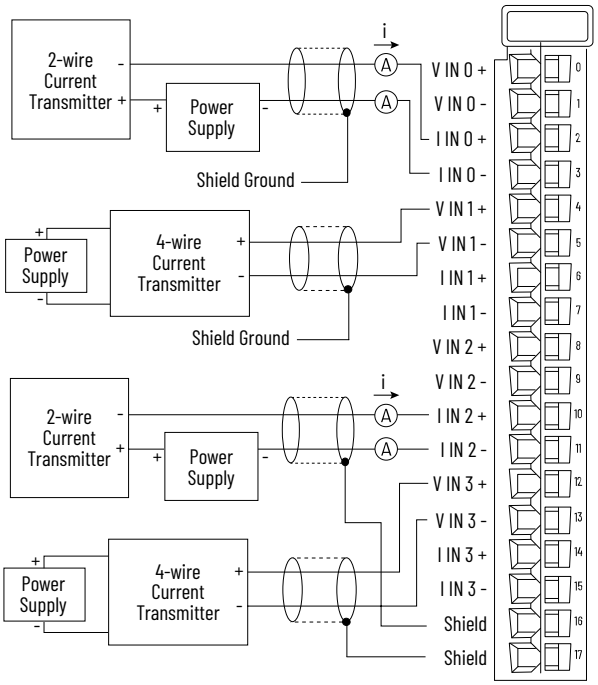
**Current Devices Input Wiring - 5069-IF4IH**



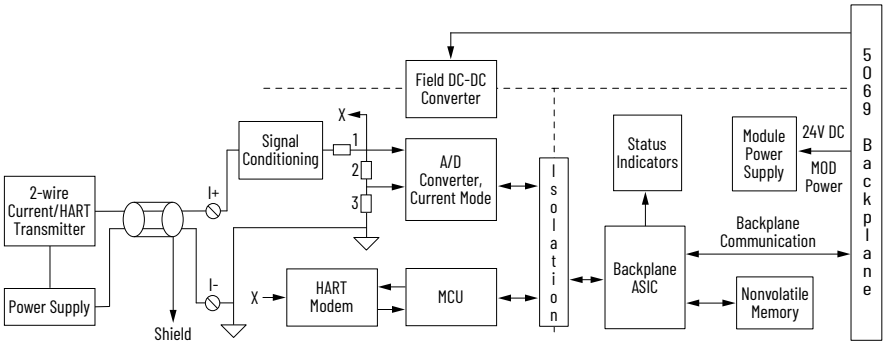

**Voltage Devices Input Wiring - 5069-IF4IH**



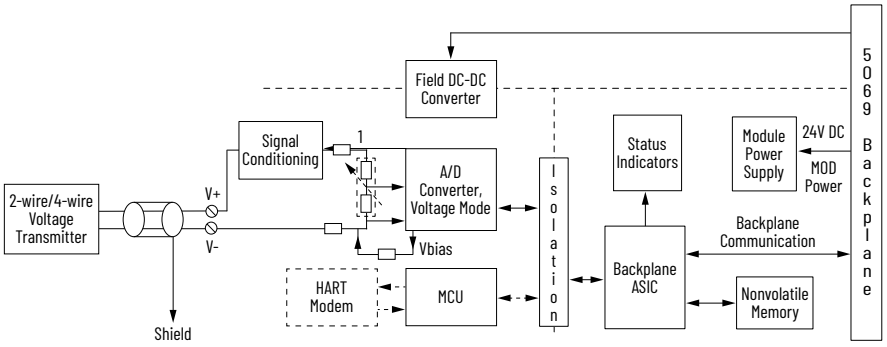

**Combination of Current and Voltage Devices Input Wiring - 5069-IF4IH**




**Functional Block Diagram - 5069-IF4IH**
Current or HART Mode



**Functional Block Diagram - 5069-IF4IH**
Voltage Mode




## Technical Specifications - 5069-IF4IH

| Attribute | Value | |
|---|---|---|
| Inputs | 4 individually isolated | |
| Input range, voltage | ±10V<br>0...10V<br>0...5V | |
| Input range, current | 0...20 mA<br>4...20 mA (HART) | |
| Voltage and current ratings | | |
| Analog input ratings | 0...20 mA, +/–10V DC (per channel) | |
| MOD power | 75 mA @ 18...32V DC | |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC | |
| SA power | 50 mA @ 18...32V DC | |
| SA power (passthrough)(1) | 9.95 A @ 18...32V DC | |
| Power dissipation, max | Voltage and Current mode: 4.0 W | |
| Thermal dissipation, max | Voltage and Current mode: 11.3 BTU/hr | |
| Isolation voltage | 250V (continuous), Basic Insulation Type,<br>• SA to: Channel, FE, MP, or System<br>• MP to: Channel or FE<br>• System to: Channel, FE, or MP<br>• Channel to: Channel or FE | |
| Calibration methods | Factory calibrated<br>User-performed (optional) | |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicator | |
| Normal mode noise rejection ratio | 65 dB @ 50/60 Hz, notch filter dependent | |
| Wire category(2) | 2 - shielded input ports<br>1 wire per terminal for each signal port | |
| Input impedance | Voltage mode: >1 MΩ<br>Current mode: 250 Ω typical | |
| Module conversion method | Sigma-Delta, two 24-bit multiplexed ADC | |
| Effective resolution, voltage(1)<br>(At 60 Hz notch filter) | ±10V: 18 bits<br>0...10V: 17 bits<br>0...5V: 16 bits | |
| Effective resolution, current(1)<br>(At 60 Hz notch filter) | 0...20 mA: 17 bits<br>4...20 mA: 17 bits | |
| Calibrated accuracy at<br>77 °F (25 °C) | Voltage and Current modes:<br>0.05% full scale with 60 Hz filter | HART enabled, typical values:<br>0.12% full scale with 10 Hz filter<br>0.20% full scale with 60 Hz filter<br>0.28% full scale with 100 Hz filter<br>0.32% full scale with 200 Hz filter<br>0.65% full scale with 500 Hz filter |
| Calibrated accuracy over temperature range of<br>32...140 °F (0...60 °C) | Voltage and Current modes:<br>0.10% full scale with 60 Hz filter | HART enabled, typical values:<br>0.17% full scale with 10 Hz filter<br>0.25% full scale with 60 Hz filter<br>0.33% full scale with 100 Hz filter<br>0.36% full scale with 200 Hz filter<br>0.70% full scale with 500 Hz filter |

## Technical Specifications - 5069-IF4IH

| Attribute | Value |
|---|---|
| HART scan time | 1 s typical<br>These items can increase the update time significantly:<br>• Additional device variables<br>• Configured commands<br>• Pass through messages<br>• Handheld communicators<br>• Secondary masters<br>• Communication errors<br>• Configuration changes |
| Scan Time at 10 kHz notch | Per channel: 1 ms<br>Per group: 1 ms |
| Notch filter at minimum RPI<br>(0.2 ms, 1 channel enabled) | 10 kHz |
| Minimum notch filter with RPI of 2.5 ms | 500 Hz |
| Input notch filter (Hz) selections | HART mode: 5, 10 (50/60 Hz simultaneous rejection), 15, 20, 50, 60, 100, 200, 500<br>Voltage and Current modes:<br>5, 10 (50/60 Hz simultaneous rejection), 15, 20, 50, 60, 100, 200, 500, 1000, 2500, 5000, 10000 |
| Recommended RPI for 200 Hz notch filter with HART enabled | 7 ms |
| Input digital filter | First order lag, 0 ms (Default)...32,767 ms (32.767 s) |
| Overvoltage protection, max | Voltage and Current modes: ± 32V DC |
| Overcurrent protection, max | Current mode: ±30 mA |
| Data value during overload condition | Full scale, overrange flag, underrange,<br>Data uncertain/data bad |
| Data value during overrange condition | Voltage mode: 10.7V (+/- 10V, 0...10V), 5.35V (0...5V)<br>Current mode: 23 mA (0...20 mA, 4...20 mA) |
| Data value during underrange condition | Voltage mode:<br>-10.7V (+/- 10V), -0.041V (0...10V), -0.021V (0...5V)<br>Current Mode: 0.11 mA (0...20 mA), 3 mA (4...20 mA) |
| Open circuit detection time(3) | Voltage mode: + full scale, < 2 s<br>Current mode: 4...20 mA range, < 1 s |
| Features, supported | The module supports these features:<br>• Onboard data alarming<br>• Scaling to engineering units<br>• Real-time channel sampling<br>• Input time stamps<br>• CIP Sync |
| Data format | IEEE 32-bit floating point |

(1) The level of MOD power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(3) Notch filter dependent.

For **Wiring and Installation Specifications**, see page 21.
For **Certifications**, see page 22.
For **Environmental Specifications**, see page 22.

# 5069-IF8

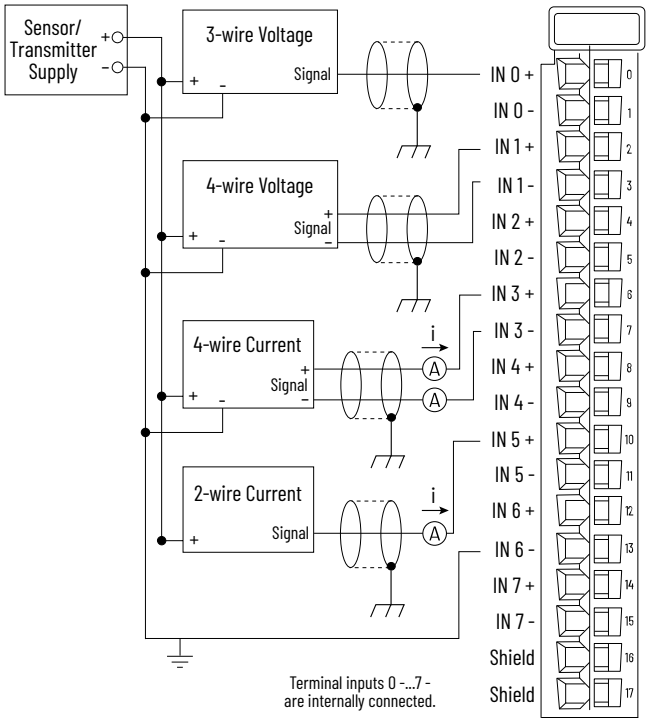
## Analog 8-channel Current/Voltage Input Module

The following table lists the supported device modes.

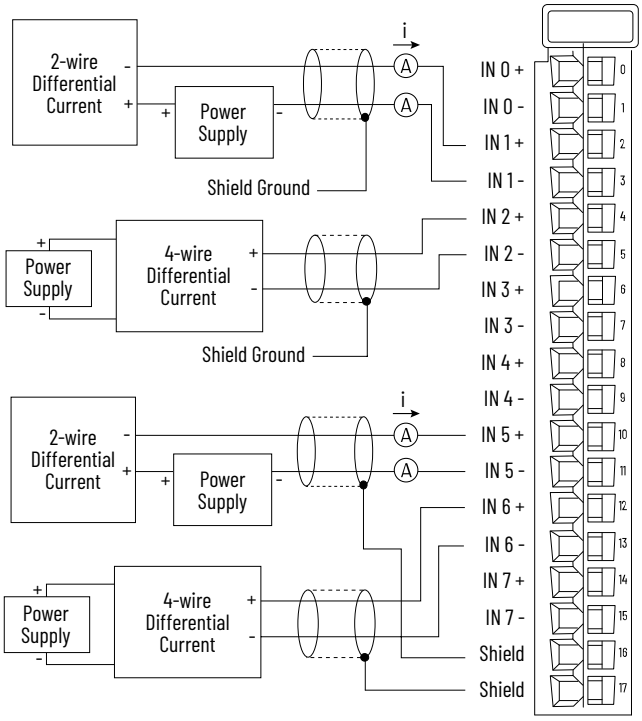
| Device | Supported Modes |
|---|---|
| 2-wire analog device<br>3-wire analog device<br>4-wire analog device[1] | Current |
| | Voltage |
| | Combination of current and voltage |

The channel configuration in your Logix Designer application project must match the input device type that is connected to the channel. Select the input type on the Channels tab in the Module Properties. For example, if a current input device is connected to a channel, the configuration for the channel must be Input Type = Current.
(1) The 4-wire analog devices are 2-wire current and voltage devices with 2-wire sensor power connections.

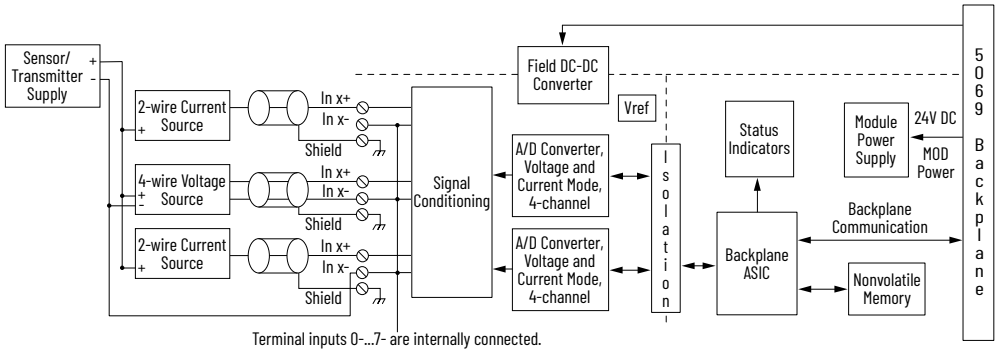
**Input Wiring - 5069-IF8 Series B**



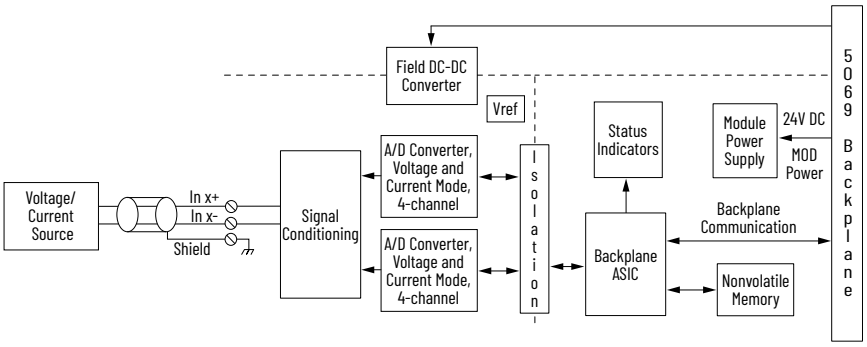

**Input Wiring - 5069-IF8 Series A**




**Functional Block Diagram - 5069-IF8**
Series B



**Functional Block Diagram - 5069-IF8**
Series A




## Technical Specifications - 5069-IF8

| Attribute | 5069-IF8 |
|---|---|
| Inputs | Series A: 8 differential<br>Series B: 8 single-ended |
| Input range, voltage | ±10V<br>0…10V<br>0…5V |
| Input range, current | 0…20 mA<br>4…20 mA |
| Voltage and current ratings | |
| MOD power | 75 mA @ 18…32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18…32V DC |
| SA power | 100 mA @ 18…32V DC |
| SA power (passthrough)(1) | 9.95 A @ 18…32V DC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw. | |
| Power dissipation, max | Voltage mode: 2.1 W<br>Current mode: 2.4 W |
| Thermal dissipation, max | Voltage mode: 7.2 BTU/hr<br>Current mode: 8.2 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>50V Functional Isolation between SA power and input ports<br>No isolation between individual Input ports |
| Calibration methods | Factory calibrated<br>User calibration is optional |
| Indicators | 1 green/red module status indicator<br>8 yellow/red I/O status indicator |
| Common mode noise rejection ratio | 130 dB @ 50/60 Hz |
| Normal mode noise rejection ratio | 65 dB @ 50/60 Hz, notch filter dependent |
| Wire category(2) | 2 - shielded input ports<br>1 wire per terminal for each signal port |
| Input impedance | Voltage mode: >1 MΩ<br>Current mode: 90 Ω typical, 70…110 Ω range |
| Common mode voltage (channel to channel) | Series A:<br>±10V (Current mode)<br>±2V (Voltage mode)<br>Series B: – |
| Module conversion method | Sigma-Delta, two 24-bit multiplexed ADC |
| Resolution, voltage(3) (16 bits at 10 Hz notch filter) | ±10.5V: <320 µV/count (15 bits plus sign bipolar)<br>0…10.5V: <160 µV/count (16 bits unipolar)<br>0…5.25V: <80 µ/V count (16 bits unipolar) |
| Resolution, current(3) (16 bits at 10 Hz notch filter) | 0…21 mA: <0.32 µA/count (16 bits)<br>3.6…21 mA: <0.27 µA/count (16 bits) |
| Calibrated accuracy at 77 °F (25 °C) | Voltage and Current modes: 0.10% full scale |
| Accuracy drift with temperature | Voltage mode: 0.20% full scale<br>Current mode: 0.30% full scale |
| Input Total Unadjusted Error (TUE) (Over full temperature range) | Voltage mode: 0.30% full scale<br>Current mode: 0.40% full scale<br>**IMPORTANT:** Includes offset, gain, non-linearity, and repeatability error terms. |

## Technical Specifications - 5069-IF8

| Attribute | 5069-IF8 |
|---|---|
| Scan Time<br>Per channel<br>Per group (channel group 0…3 or channel group 4…7) | <br>625 µs<br>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 |
| Step response time to 63% of value (Notch filter 10 kHz) | 7.5 ms |
| 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 anti-aliasing filter cutoff frequency, nom | 500 Hz |
| Input digital filter | First order lag,<br>0 ms (Default)…32,767 ms (32.767 s) |
| HART handheld compliance | Add an external 250 Ω resistor into the current loop for HART transmitter compliance. |
| Overvoltage protection, max | Voltage and Current modes: ± 30V DC |
| Overcurrent protection, max | Current mode: ±30 mA |
| Data value during overload condition | Full scale, overrange flag,<br>Data uncertain/data bad |
| Open circuit detection time | Voltage mode: + full scale, < 2 s<br>Current mode: 4…20 mA range, <2 s |
| Features, supported | The module supports these features:<br>• Onboard data alarming<br>• Scaling to engineering units<br>• Real-time channel sampling |
| Data format | IEEE 32-bit floating point |

(1) The level of MOD power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(3) Notch filter dependent.

For **Wiring and Installation Specifications**, see page 21.
For **Certifications**, see page 22.
For **Environmental Specifications**, see page 22.

# 5069-IY4 and 5069-IY4K

## Analog Input Modules

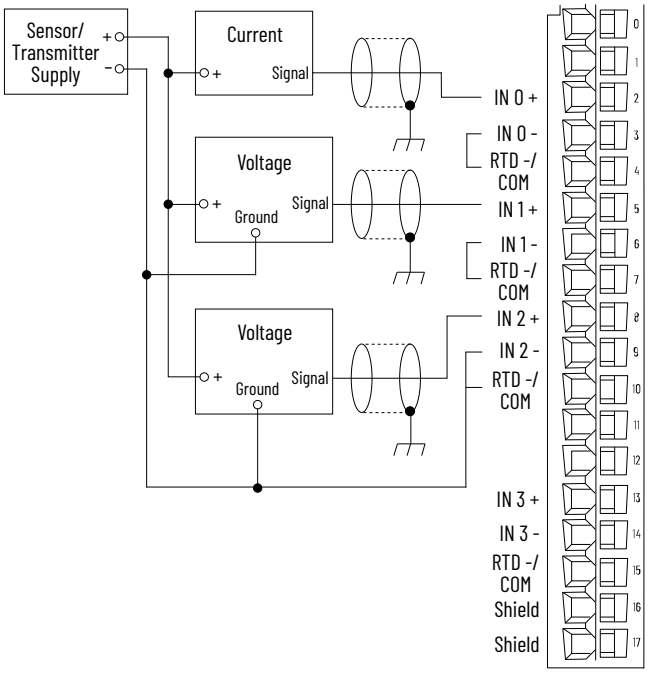
The following table lists the analog devices that are supported.

| Device | Supported Modes | Wiring Diagram Example Page |
|---|---|---|
| 1-wire analog device<br>2-wire analog device<br>4-wire analog device[1] | Current | 27 |
| | Voltage | |
| | Any combination of current, voltage, RTD, Thermocouple | 27 |
| 2-wire RTD device<br>3-wire RTD device | RTD | 28 |
| | Any combination of current, voltage, RTD, Thermocouple | 29 |
| 2-wire Thermocouple device | Thermocouple | 28 |
| | Any combination of current, voltage, RTD, Thermocouple | 29 |

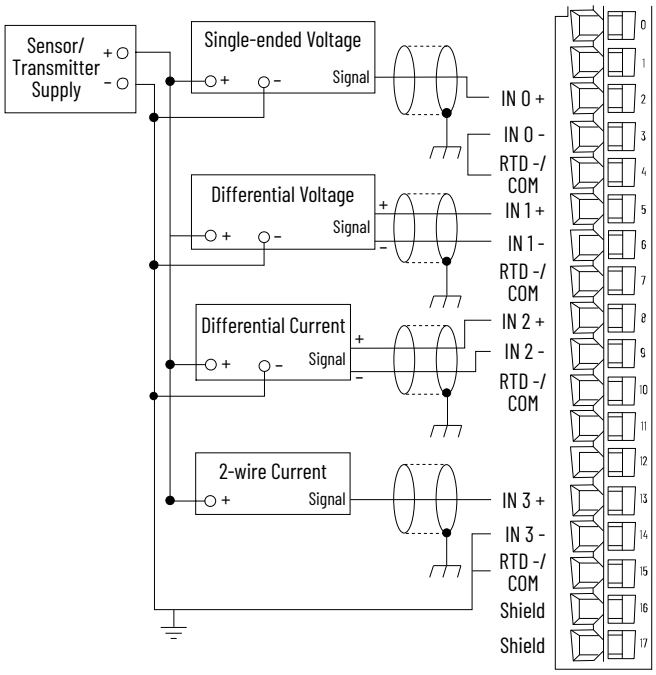
- The channel configuration in your Logix Designer application project must match the input device type that is connected to the channel. Select the input type on the Channels tab in the Module Properties. For example, if a current input device is connected to a channel, the configuration for the channel must be Input Type = Current.
- If at least one thermocouple is connected to the module, you must use the 5069-RTB14CJC RTB.

(1) The 4-wire analog devices are 2-wire current and voltage devices with 2-wire sensor power connections.

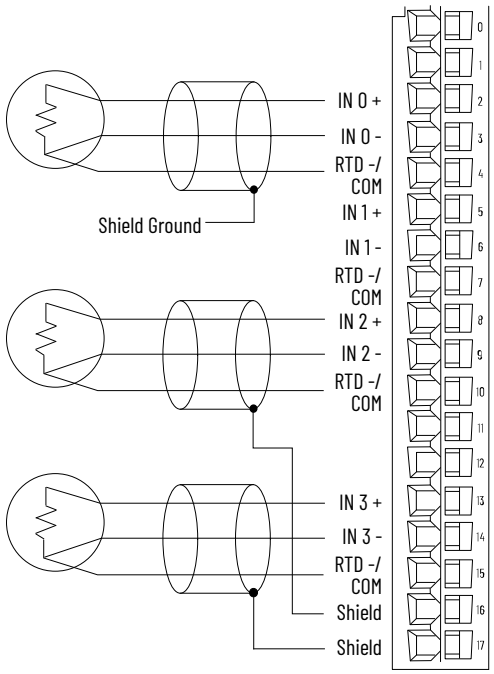
**Current and Voltage Devices with Single-ended Transmitter Inputs Wiring - 5069-IY4, 5069-IY4K**




**Current and Voltage Devices with Mixed Transmitter Inputs Wiring - 5069-IY4, 5069-IY4K**

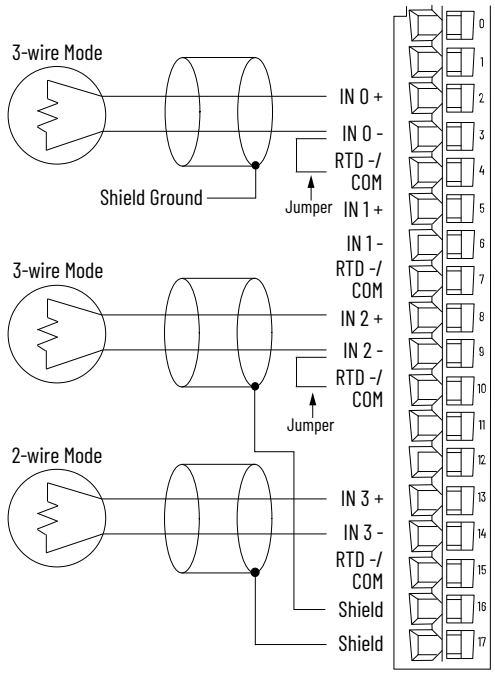


**RTD Devices with Three Wires Input Wiring - 5069-IY4, 5069-IY4K**



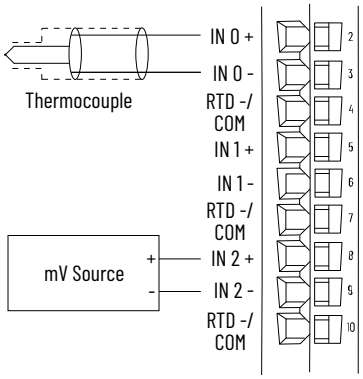

**RTD Devices with Two Wires Input Wiring - 5069-IY4, 5069-IY4K**

**IMPORTANT:** When you use a 2-wire RTD in 3-wire mode, you must jumper terminals Input x- and RTD x together.

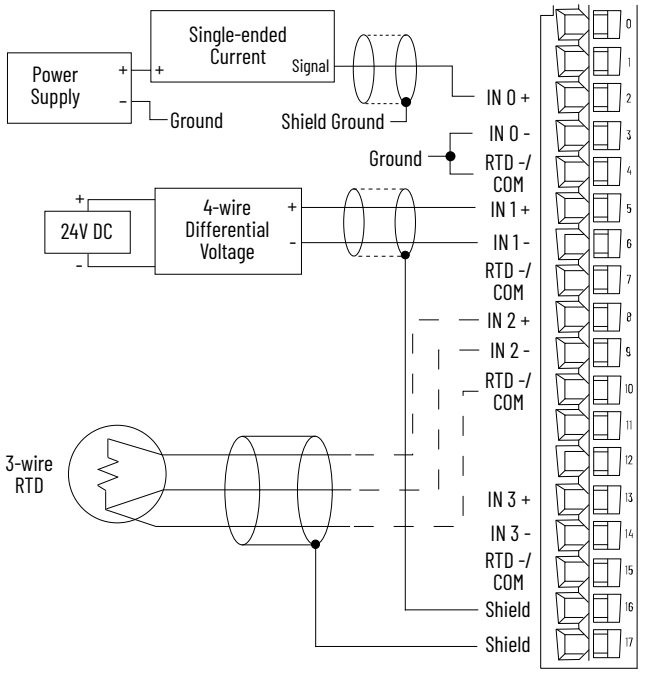



**Thermocouple Device Input Wiring - 5069-IY4, 5069-IY4K**

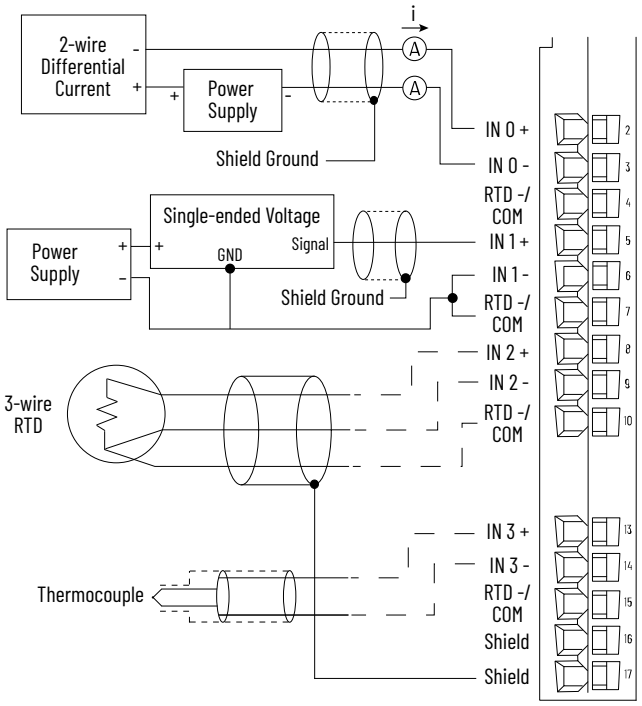
**IMPORTANT:** When you connect at least one Thermocouple to the module, you must use a 5069-RTB14CJC RTB.



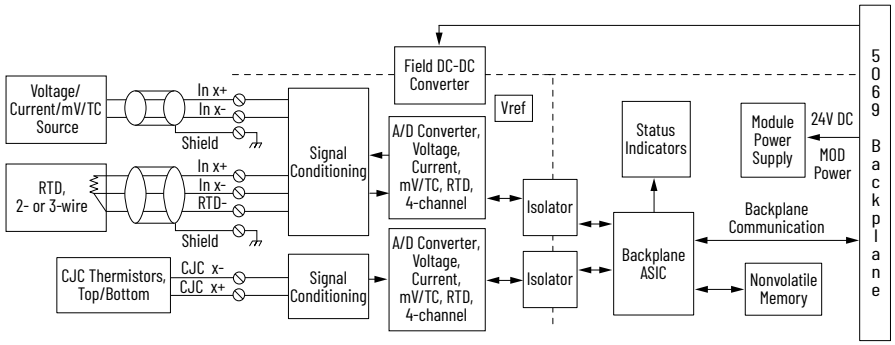
**Current, Voltage, and RTD Devices Input Wiring - 5069-IY4, 5069-IY4K**




**Current, Voltage, RTD, and Thermocouple Devices Input Wiring - 5069-IY4, 5069-IY4K**




**Functional Block Diagram - 5069-IY4, 5069-IY4K**
Current Mode, Voltage Mode, and Mixed Transmitter Inputs




## Technical Specifications - 5069-IY4, 5069-IY4K

| Attribute | 5069-IY4, 5069-IY4K |
|---|---|
| Inputs | 4 differential |
| Input range, voltage | ±10V<br>0...10V<br>0...5V |
| Input range, current | 0...20 mA<br>4...20 mA |
| Voltage and current ratings | |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 100 mA @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 18...32V DC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |
| Power dissipation, max | Voltage mode: 1.8 W<br>Current mode: 2.1 W<br>RTD mode: 2.1 W<br>Thermocouple/millivolt mode: 1.8 W |
| Thermal dissipation, max | Voltage mode: 6.1 BTU/hr<br>Current mode: 7.2 BTU/hr<br>RTD mode: 7.2 BTU/hr<br>Thermocouple/mV mode: 6.1 BTU/hr |

## Technical Specifications - 5069-IY4, 5069-IY4K

| Attribute | 5069-IY4, 5069-IY4K |
|---|---|
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>50V Functional Isolation between SA power and input ports<br>No isolation between individual input ports |
| Calibration methods | Factory calibrated<br>User-performed (optional) |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicators<br>2 yellow/red CJC status indicators |
| Noise rejection ratio | Common mode: 130 dB @ 50/60 Hz<br>Normal mode: 65 dB @ 50/60 Hz, notch filter dependent |
| Wire category(2) | 2 - shielded input ports<br>1 wire per terminal for each signal port |
| Input range, resistive | 1...500 Ω<br>2...1000 Ω<br>4...2000 Ω<br>8...4000 Ω |
| Input type, RTD | 100, 200, 500, 1000 Ω platinum, alpha=385<br>100, 200, 500, 1000 Ω platinum, alpha=3916<br>120 Ω nickel, alpha=672<br>100, 120, 200, 500 Ω nickel, alpha=618<br>10 Ω copper 427 |

## Technical Specifications - 5069-IY4, 5069-IY4K

| Attribute | 5069-IY4, 5069-IY4K |
|---|---|
| Input range, thermocouple | ± 100 mV |
| Input type, thermocouple | B, C, D, E, J, K, L (TXK/XK), N, R, S, T |
| Input impedance | Voltage mode: >1 MΩ<br>Current mode: 90 Ω typical, 70…110 Ω range<br>RTD mode: >1 MΩ<br>Thermocouple/mV mode: >1 MΩ |
| Common mode voltage (channel to channel) | Current and 3-wire RTD modes: ±10V<br>Voltage mode: ±2V |
| Module conversion method | Sigma-Delta, one 24-bit multiplexed ADC |
| Resolution, voltage[3] (16 bits at 10 Hz notch filter) | ±10.5V: <320 µV/count (15 bits plus sign bipolar)<br>0…10.5V: <160 µV/count (16 bits unipolar)<br>0…5.25V: <80 µ/V count (16 bits unipolar) |
| Resolution, current[3] (16 bits at 10 Hz notch filter) | 0…21 mA: <0.32 µA/count (16 bits)<br>3.6…21 mA: <0.27 µA/count (16 bits) |
| Resolution, RTD[3] (16 bits at 10 Hz notch filter) 3 Wire mode | < 7.9 mΩ/cnt in 1…500 Ω mode<br>< 15.8 mΩ/cnt in 2…1000 Ω mode<br>< 31.7 mΩ/cnt in 4…2000 Ω mode<br>< 63.4 mΩ/cnt in 8…4000 Ω mode |
| Resolution, thermocouple / millivolt[3] (16 bits at 10 Hz notch filter) | < 3.1 µV/cnt in ±100 mV mode |
| RTD excitation current | 600 µA, 3 wire mode<br>100 µA, 2 wire mode |
| Wire impedance (3-wire RTD mode only) | 25 Ω maximum for specified accuracy |
| RTD sensor types: | Supported temperature ranges: |
| 100, 200, 500, 1000 ohm PT 385 | -200…+870 °C (-328…+1598 °F)<br>73…1143 °K (132…2058 °R) |
| 100, 200, 500, 1000 ohm PT 3916 | -200…+630 °C (-328…+1166 °F)<br>73…903 °K (132…1626 °R) |
| 10 ohm CU 247 | -200…+260 °C (-328…+500 °F)<br>73…533 °K (132…960 °R) |
| 120 ohm NI 672 | -80…+320 °C (-112…+608 °F)<br>193…593 °K (348…1068 °R) |
| 100, 120, 200, 500 ohm NI 618 | -60…+250 °C (-76…+482 °F)<br>213…523 °K (384…942 °R) |
| Thermocouple type: | Supported temperature ranges: |
| Thermocouple Type B | 21…1820 °C (68…3308 °F)<br>293…2093 °K (528…3768 °R) |
| Thermocouple Type C | 0…2320 °C (32…4208 °F)<br>273…2593 °K (492…4668 °R) |
| Thermocouple Type D | |
| Thermocouple Type E | -270…+1000 °C (-454…+1832 °F)<br>3…1273 °K (6…2292 °R) |
| Thermocouple Type J | -210…+1200 °C (-346…+2192 °F)<br>63…1473 °K (114…2652 °R) |
| Thermocouple Type K | -270…+1372 °C (-454…+2502 °F)<br>3…1645 °K (6…2961 °R) |
| Thermocouple Type N | -270…+1300 °C (-454…+2372 °F)<br>3…1573 °K (6…2832 °R) |
| Thermocouple Type R | -50…+1768 °C (-58…+3215 °F)<br>223…2041 °K (402…3674 °R) |
| Thermocouple Type S | |
| Thermocouple Type T | -270…+400 °C (-454…+752 °F)<br>3…673 °K (6…1212 °R) |
| Thermocouple Type TXK/XK (L) | -200…+800 °C (-328…+1472 °F)<br>73…1073 °K (132…1932 °R) |
| Thermocouple linearization | ITS-90 |

## Technical Specifications - 5069-IY4, 5069-IY4K

| Attribute | 5069-IY4, 5069-IY4K |
|---|---|
| CJC inputs | Thermocouple mode only<br>Two CJC sensors:<br>2 thermistors embedded in a 5069-RTB14CJC RTB<br>-or-<br>2 thermistors wired to a 5069-RTB18 RTB<br>Thermistor type: Measurement Specialties, Inc. 10K3A1A |
| Local CJC sensor accuracy | ±0.54 °F (±0.3 °C) |
| Remote CJC sensor accuracy (Based on specified thermistor) | ±0.54 °F (±0.3 °C) |
| Calibrated accuracy at 77 °F (25 °C) | Voltage mode: 0.100% full scale<br>Current mode: 0.100% full scale<br>RTD mode: 0.100% full scale<br>Thermocouple/mV mode: 0.100% full scale |
| Accuracy drift with temperature | Voltage mode: 0.200% full scale<br>Current mode: 0.300% full scale<br>RTD mode: 0.200% full scale<br>Thermocouple/mV mode: 0.200% full scale |
| Input Total Unadjusted Error (TUE)[4] (Over full temperature range) | Voltage mode: 0.300% Full Scale<br>Current mode: 0.400% Full Scale<br>RTD mode: 0.300% Full Scale<br>Thermocouple/mV mode: 0.300% Full Scale |
| Scan time | Per channel: 625 µs<br>Per group (channel group 0…3): 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 |
| Step response time to 63% of value (Notch filter 10 kHz) | 7.5 ms |
| 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 anti-aliasing filter cutoff frequency, typical | 500 Hz |
| Input digital filter | First Order Lag, 0 ms (Default)…32,767 ms |
| HART handheld compliance: | Add an external 250 Ω resistor into the current loop for HART transmitter compliance. |
| Overvoltage protection, max | Voltage, Current, RTD, and Thermocouple/mV modes: ±30V DC |
| Overcurrent protection, max | Current mode: ±30 mA |
| Data value during overload condition | Full scale, overrange flag,<br>Data uncertain / data bad |
| Open circuit detection time, nom | Voltage mode: + full scale, < 2 s<br>Current mode: 4…20 mA range, < 2 s<br>RTD mode: < 2 s<br>Thermocouple/mV mode: + full scale, < 10 s |
| Features, supported | The module supports these features:<br>• Onboard data alarming<br>• Scaling to engineering units<br>• Real-time channel sampling |
| Data format | IEEE 32-bit floating point |

(1) The level of MOD power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(3) Notch filter dependent.
(4) Includes offset, gain, non-linearity, and repeatability error terms.

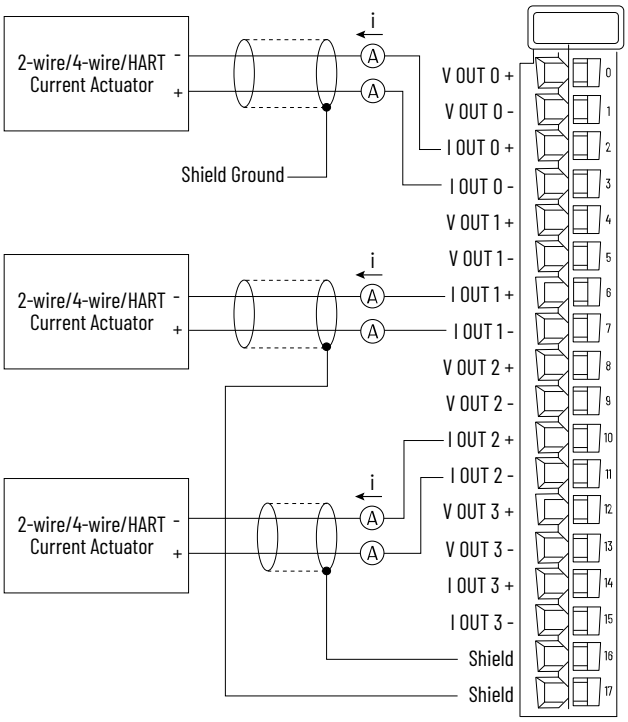
For **Wiring and Installation Specifications**, see page 21.
For **Certifications**, see page 22.
For **Environmental Specifications**, see page 22.

# 5069-OF4IH

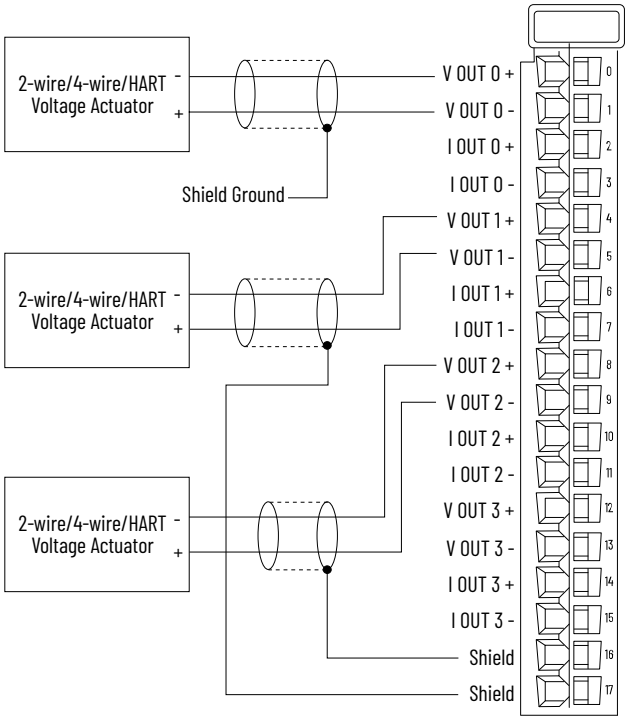
## 4-channel isolated current/voltage/HART output module

**IMPORTANT:** This module does not support the use of the voltage input and current input terminals on the same channel at the same time.

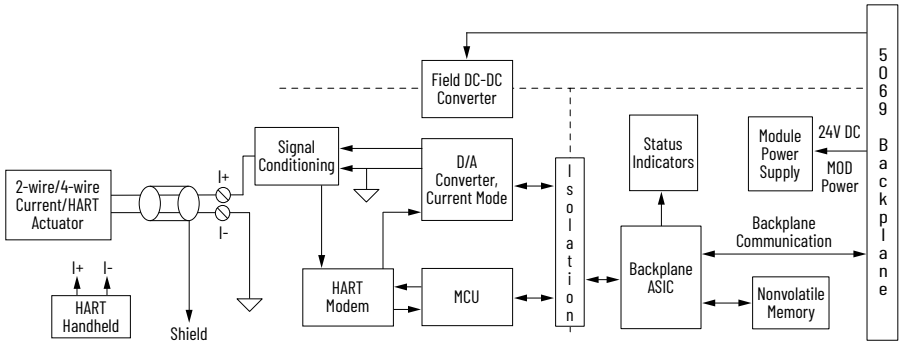
**Current Devices Output Wiring - 5069-OF4IH**



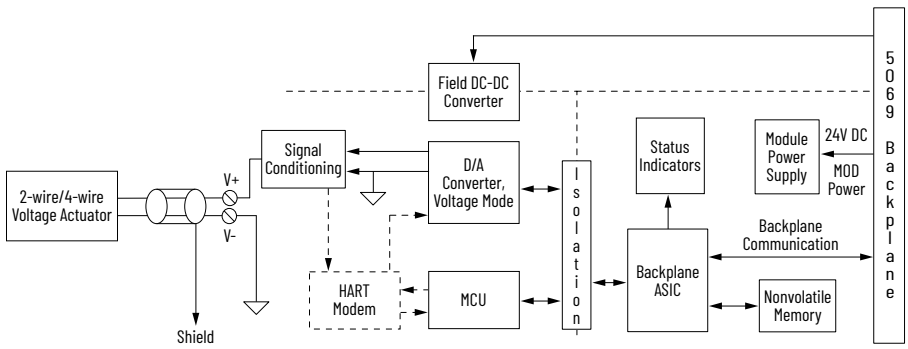

**Voltage Devices Output Wiring - 5069-OF4IH**




**Functional Block Diagram - 5069-OF4IH**
Current or HART Actuator




**Functional Block Diagram - 5069-OF4IH**
Voltage Actuator



## Technical Specifications - 5069-OF4IH

| Attribute | Value |
|---|---|
| Outputs | 4 individually isolated |
| Output range, voltage | ±10V<br>0...10V<br>0...5V |
| Output range, current | 0...20 mA<br>4...20 mA (HART) |
| Voltage and current ratings | |
| Analog output ratings | +/–10V DC, 0...20 mA (per channel) |
| MOD power | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 200 mA @ 18...32V DC |
| SA power (passthrough)(1) | 9.85 A @ 18...32V DC |
| Power dissipation, max | 4.0 W |
| Thermal dissipation, max | 11.3 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type,<br>• SA to: Channel, FE, MP, or System<br>• MP to: Channel or FE<br>• System to: Channel, FE, or MP<br>• Channel to: Channel or FE |
| Calibration methods | Factory calibrated<br>User-performed (optional) |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicator |
| Wire category(2) | 2 - shielded output ports<br>1 wire per terminal for each signal port |
| Resolution | 16 bits<br>±10V: 366µV/bit<br>0...10V: 183µV/bit<br>0...5V: 90µV/bit<br>0...20mA: 366 nA/bit<br>4...20mA: 366 nA/bit |
| Drive capability | Voltage mode: 1000 Ω min<br>Current mode: 750 Ω max |
| Capacitive load, max (voltage mode only) | 1 µF |
| Inductive load, max (current mode only) | 1 mH |

## Technical Specifications - 5069-OF4IH

| Attribute | Value |
|---|---|
| Features, supported | Current mode: Open circuit detection<br>Voltage mode: Short circuit detection |
| Data format | IEEE 754, 32-bit floating point |
| Module conversion method | R-Ladder DAC, monotonicity with no missing codes |
| Conversion time per channel at 25 °C (77 °F), typical | Voltage mode: 0.2 ms<br>Current mode: 0.6 ms |
| HART scan time | 1 s typical<br>These factors can increase the update time significantly:<br>• Additional device variables<br>• Configured commands<br>• Pass through messages<br>• Handheld communicators<br>• Secondary masters<br>• Communication errors<br>• Configuration changes |
| Scan time, all channels | 1.5 ms |
| Step response time to 63% of value | 2.5 ms |
| Overvoltage protection, max | Voltage mode: ± 32V DC<br>Current mode: + 32V DC |
| Repeatability | 0.05% |
| Calibrated accuracy at 25 °C (77 °F) | Voltage and Current modes: 0.05% full scale |
| Accuracy drift with temperature | Voltage and Current modes: 0.10% full scale |

(1) The level of MOD power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.

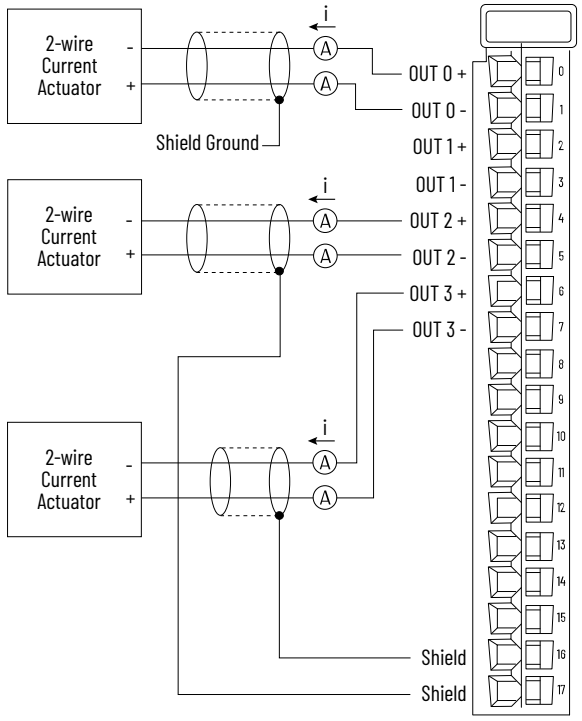
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 21.
For **Certifications**, see page 22.
For **Environmental Specifications**, see page 22.

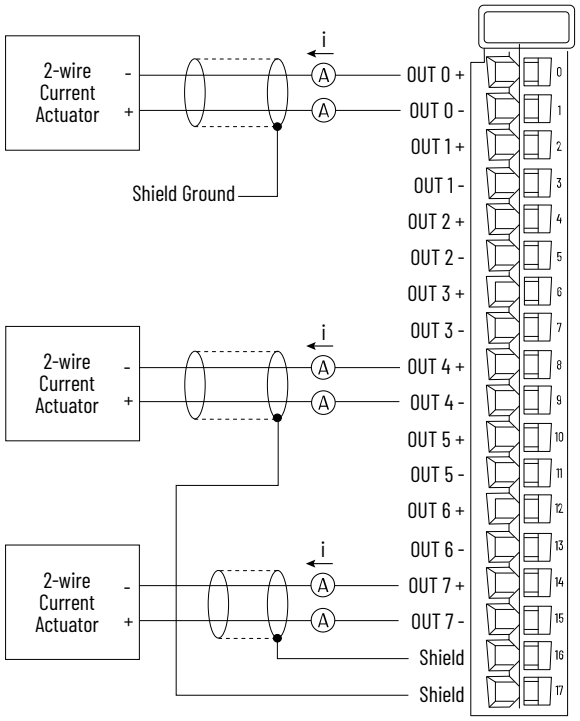
# 5069-OF4, 5069-OF4K, and 5069-OF8

## Analog Current/Voltage Output Modules

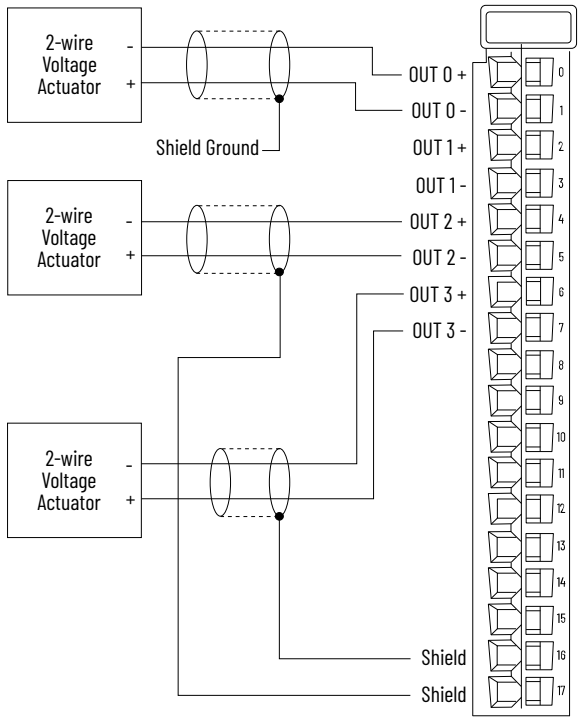
**Current Mode Output Wiring - 5069-OF4 and 5069-OF4K**



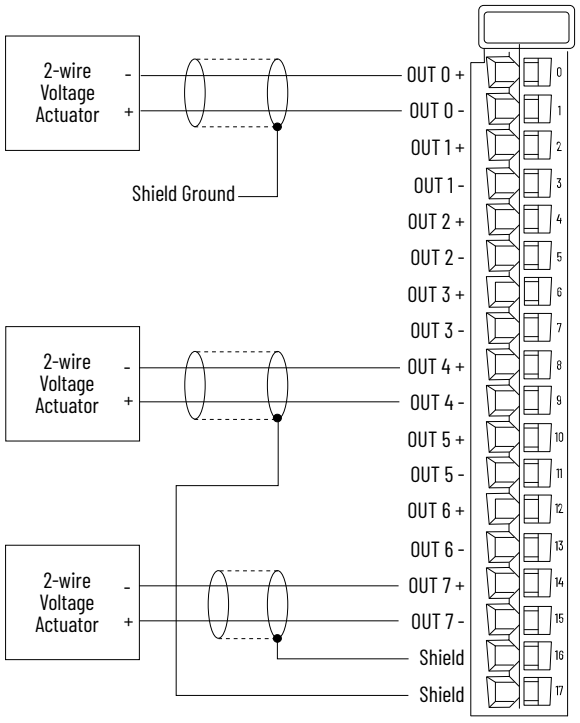

**Current Mode Output Wiring - 5069-OF8**



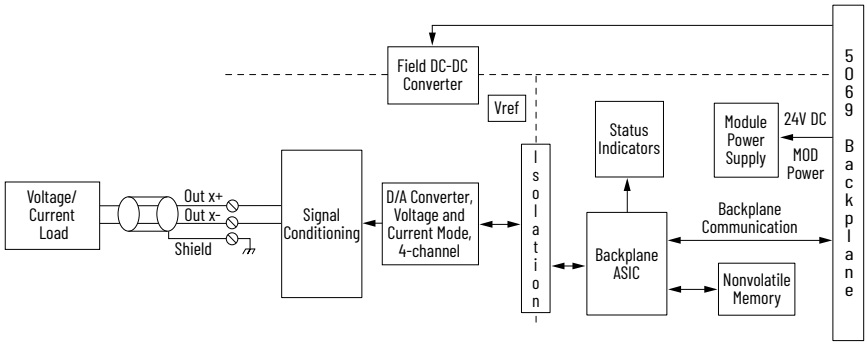

**Voltage Mode Output Wiring - 5069-OF4 and 5069-OF4K**



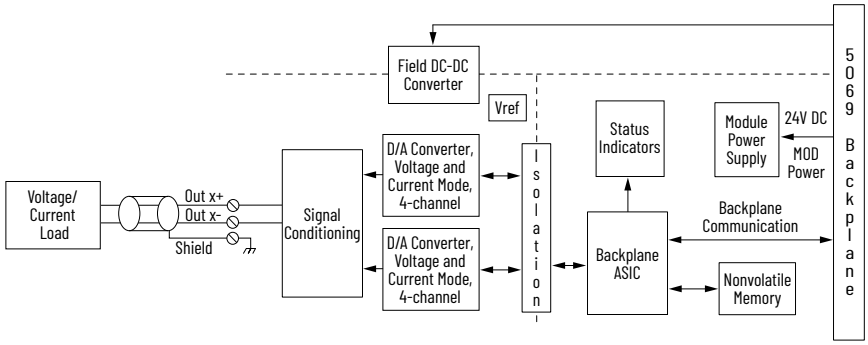

**Voltage Mode Output Wiring - 5069-OF8**



**Functional Block Diagram - 5069-OF4, 5069-OF4K**




**Functional Block Diagram - 5069-OF8**




## Technical Specifications - 5069-OF4, 5069-OF4K, 5069-OF8

| Attribute | 5069-OF4, 5069-OF4K | 5069-OF8 |
|---|---|---|
| Outputs | 4 voltage or current | 8 voltage or current |
| Output range, voltage | ± 10V<br>0...10V<br>0...5V | |
| Output range, current | 0...20 mA<br>4...20 mA | |
| Voltage and current ratings | | |
| Analog output ratings | +/-10V DC, 0...20 mA per channel | |
| MOD power | 75 mA @ 18...32V DC | |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC | |
| SA power | 150 mA @ 18...32V DC | 250 mA @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 18...32V DC | |
| Power dissipation, max | 3.3 W | 5.3 W |
| Thermal dissipation, max | 11.3 BTU/hr | 18.1 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>50V Functional Isolation between SA power and output ports<br>No isolation between individual output ports | |
| Calibration methods | Factory Calibrated<br>User-performed (optional) | |
| Indicators | 1 green/red module status indicator | |
| | 4 yellow/red I/O status indicators | 8 yellow/red I/O status indicators |
| Wire category(2) | 2 - shielded output ports<br>1 wire per terminal for each signal port | |
| Resolution | 16 bits across ± 10.5V - 320 µV/bit<br>16 bits across 10.5V - 160 µV/bit<br>16 bits across 5.25V - 80 µV/bit<br>16 bits across 21 mA - 320 nA/bit | |
| Drive capability | Voltage mode: 1000 Ω min<br>Current mode: 500 Ω max | |

## Technical Specifications - 5069-OF4, 5069-OF4K, 5069-OF8

| Attribute | 5069-OF4, 5069-OF4K | 5069-OF8 |
|---|---|---|
| Capacitive load, max | Voltage mode only: 1 µF | |
| Inductive load, max | Current mode only: 1 mH | |
| Features, supported | Current mode only: Open circuit detection<br>Voltage mode only: Short circuit detection, output electronically limited to 16 mA or less | |
| Data format | IEEE 32-bit floating point | |
| Module conversion method | R-Ladder DAC, monotonicity with no missing codes | |
| Conversion time per channel | 25 µs | |
| Scan time | Group 0...3: 1.0 ms | Group 0...3: 1.0 ms<br>Group 0...7: 2.0 ms |
| Step response time to 63% of value | Voltage mode: 18 µs max<br>Current mode: 1 ms max | |
| Overvoltage protection, max | ± 32V DC | |
| Repeatability | 0.05% | |
| Calibrated accuracy at 25 °C (77 °F) | Voltage mode: 0.10% full scale<br>Current mode: 0.10% full scale | |
| Accuracy drift with temperature | Voltage mode: 0.30% full scale<br>Current mode: 0.50% full scale | |

(1) The level of MOD power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.

(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 21.
For **Certifications**, see page 22.
For **Environmental Specifications**, see page 22.

# Safety I/O Modules

For information that applies to all of the safety I/O modules, see these tables.

- Wiring and Installation Specifications - Safety I/O Modules
- Certifications - Safety I/O Modules
- Environmental Specifications - Safety I/O Modules

The following safety modules are available.

| I/O Type | Cat. No. | Description | Page |
|---|---|---|---|
| DC safety sinking input | 5069-IB8S | 18...32V DC 8-point, safety sinking input module | 37 |
| | 5069-IB8SK | 18...32V DC 8-point, conformal coated safety sinking input module | |
| DC safety output | 5069-OBV8S | 18...32V DC 8-point, safety output module that can be used as a Bipolar output module or sourcing output module | 39 |
| | 5069-OBV8SK | 18...32V DC 8-point, conformal coated safety output module that can be used as a Bipolar output module or sourcing output module | |

### Wiring and Installation Specifications - Safety I/O Modules

| Attribute | 5069-IB8S, 5069-IB8SK | 5069-OBV8S, 5069-OBV8SK |
|---|---|---|
| Channel connections | The wiring diagrams show devices that are connected to specific channels or channel pairs. You are not restricted to using only those channels or channel pairs. You can connect devices to any channel, channel pair, or combination of channels, or channel pairs, as needed. | |
| SA power device list | Connections to an external power supply that provides SA power via the SA power RTB on one of these devices.<br>• Compact GuardLogix 5380 controller<br>• 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter<br>• 5069-FPD field potential distributor | |
| Isolate SA power | If you install modules in a system that uses both AC SA power and DC SA power, you must isolate SA power buses by type with a 5069-FPD field potential distributor. To create separate SA power buses, complete these steps.<br>1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller. This is the first SA power bus.<br>2. To create a second SA power bus, install the 5069-FPD field module to the right of these modules.<br>3. Install the modules that use the other type of SA power, for example AC, to the right of the 5069-FPD module. | |
| Slot width | 1 | 1.5 |
| Dimensions (HxWxD) | 144.6 x 22 x 105.4 mm (5.69 x 0.87 x 4.15 in.) | 144.6 x 36 x 105.4 mm (5.69 x 1.42 x 4.15 in.) |
| Weight, approx | 175 g (0.39 lb) | 240 g (0.53 lb.) |
| DIN rail | Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail. | |
| Module keying | Electronic keying via programming software | |
| RTB | 5069-RTB18-SPRING RTB or 5069-RTB18-SCREW RTB, according to your system<br>**IMPORTANT:** RTBs do not ship with Compact 5000™ I/O modules, you must order them separately. Order only the RTB type that your system requires. | |
| RTB torque | Screw-type RTB only: 0.4 N•m (3.5 lb•in) | |
| RTB keying | None | |
| Wire size | 0.5...1.5 $mm^2$ (22...16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F) or greater<br>5069-RTB18-SPRING RTB: 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only.<br>5069-RTB18-SCREW RTB: 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only.<br>For the 5069-OW16 module only: Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules. | |
| Insulation-stripping length | 5069-RTB18-SPRING RTB: 10 mm (0.39 in.)<br>5069-RTB18-SCREW RTB: 12 mm (0.47 in.) | |

## Environmental Specifications - Safety I/O Modules

| Attribute | 5069-IB8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ad, Operating Cold)<br>IEC 60068-2-2 (Test Bd, Operating Dry Heat)<br>IEC 60068-2-14 (Test Nb, Operating Thermal Shock) | 0 °C ≤ Ta ≤ +60 °C<br>(+32 °F ≤ Ta ≤ +140 °F) |
| Temperature, surrounding air, maximum | System mounted in horizontal orientation:<br>60 °C (140 °F)<br>System mounted in any orientation other than horizontal (module derating): 50 °C (122 °F)<br>**IMPORTANT:** The additional supported mounting orientations are inverted horizontal, vertical, inverted vertical, upside down, and upside up. |
| Temperature, nonoperating<br>IEC 60068-2-1<br>(Test Ab, Unpackaged Nonoperating Cold)<br>IEC 60068-2-2<br>(Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14<br>(Test Na, Unpackaged Nonoperating Thermal Shock) | -40...+85 °C (-40...+185 °F) |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) | 5...95% noncondensing |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 5 g @ 10...500 Hz |
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 30 g |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 50 g |
| Emissions | IEC 61000-6-4 |
| ESD immunity<br>IEC 61000-4-2 | 6 kV contact discharges<br>8 kV air discharges |
| Radiated RF immunity<br>IEC 61000-4-3 | 20V/m with 1 kHz sine wave 80% AM from 80...6000 MHz |
| EFT/B immunity<br>IEC 61000-4-4 | ±4 kV @ 5 kHz on signal ports |
| Surge transient immunity<br>IEC 61000-4-5 | ±1 kV line-line (DM) and<br>±2 kV line-earth (CM) on signal ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 20V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz |
| Voltage variation<br>IEC 61000-4-29 | 10 ms interruption on DC supply ports |
| North American temp code | T4 |
| UKEX/ATEX temp code | T4 |
| IECEx temp code | T4 |
| Enclosure type | None (open-style) |

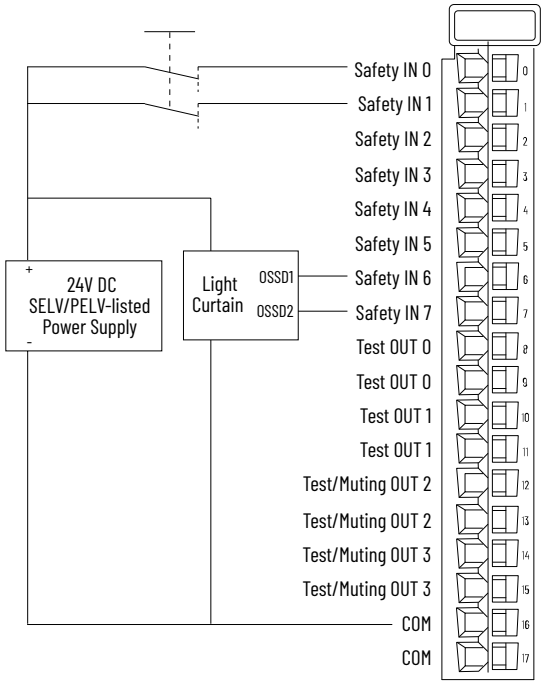
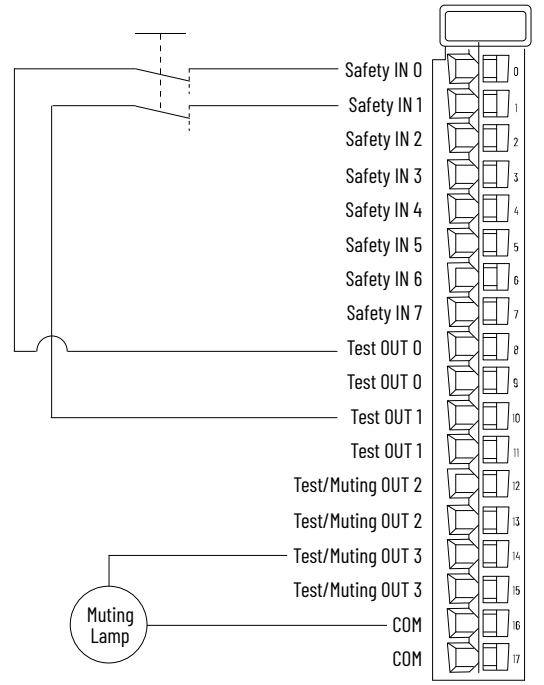
## Certifications - Safety I/O Modules

| Certification | 5069-IB8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada.<br>See UL File E322657.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470. |
| UKCA and CE | UK Statutory Instrument 2016 No. 1091 and<br>European Union 2014/30/EU EMC Directive, compliant with:<br>EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>EN 61000-6-2; Industrial Immunity<br>EN 61000-6-4; Industrial Emissions<br>EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)<br><br>UK Statutory Instrument 2008 No. 1597 and<br>European Union 2006/42/EC MD, compliant with:<br>EN 60204-1; Electrical equipment of machines<br>EN ISO 13849-1; Safety-related parts of control systems<br>EN 62061; Functional safety of safety-related control systems<br>Cat. 4/PLe according to EN ISO 13849-1, and SIL 3 according to EN 626011/ IEC 61508/IEC 62511<br><br>UK Statutory Instrument 2012 No. 3032 and<br>European Union 2011/65/EU RoHS, compliant with:<br>EN IEC 63000; Technical documentation |
| RCM | Australian Radiocommunications Act, compliant with<br>EN 61000-6-4; Industrial Emissions |
| Ex | UK Statutory Instrument 2016 No. 1107 and<br>European Union 2014/34/EU ATEX Directive, compliant with:<br>EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>DEMKO 18 ATEX 2019X and UL22UKEX2496 |
| IECEx | IECEx System, compliant with:<br>IEC 60079-0; General Requirements<br>IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc<br>IECEx UL 18.0014X |
| TÜV | TÜV Certified for Functional Safety;<br>Capable of SIL 3, CAT. 4/PLe<br>**IMPORTANT:** When used with specified firmware revisions.<br>See the Product Safety Certificate at rok.auto/certifications for a full list of safety-related certifications. |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |
| Morocco | Arrêté ministériel n° 6404-15 du 1 er muharram 1437<br>Arrêté ministériel n° 6404-15 du 29 ramadan 1436 |
| CCC | CNCA-C23-01:2019 强制性产品认证实施规则 防爆电气<br>CNCA-C23-01:2019 CCC Implementation Rule Explosion-Proof Electrical Products<br>CCC: 2020122309111301 and 2021122309113957 |
| See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details. | |

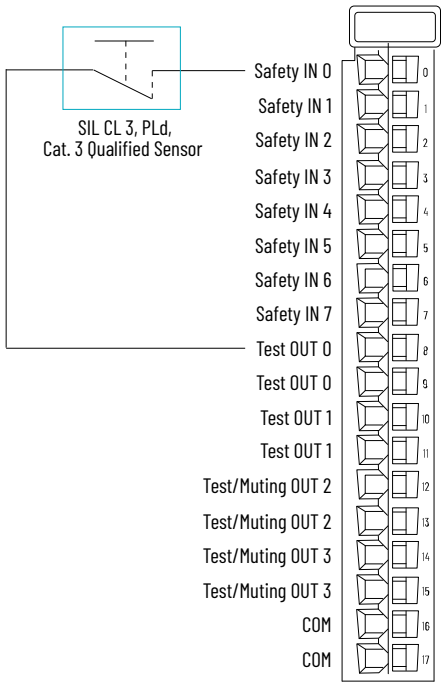
# 5069-IB8S and 5069-IB8SK

## Safety Sinking Input Modules

**IMPORTANT:** The modules use DC SA power. You must connect DC power to the device that supplies SA power to the module. See the SA power device list and Isolate SA power.

| Wiring Diagram - 5069-IB8S, 5069-IB8SK | Description |
|---|---|
|  | **Single Channel with Switches and Light Curtain**<br><br>When the module is wired as shown, it is suitable for applications that are rated up to, and including, Category 3 as defined in ISO 13849-1.<br><br>**IMPORTANT**<br>• The switches are suitable for applications that are rated up to, and including, SIL CL 3, PLe, Cat. 3.<br>• The light curtain is suitable for applications that are rated up to, and including, SIL CL 3, PLe, Cat. 4.<br>• The SA power to adjacent SA power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type. |
|  | **Single Channel with Switches and Muting Lamp**<br><br>When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1. To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required.<br><br>One diagnostic test method is to configure the safety input channel for Safety Pulse Test to test the circuit for short circuits to 24V DC. Safety input pairs must be associated with different Test Output sources.<br><br>**IMPORTANT**<br>When the power supply and muting lamp are configured for a test output, you must connect the return wire on the device to a COM point on the module. |

| Wiring Diagram - 5069-IB8S, 5069-IB8SK | Description |
|---|---|




**Single Channel with Sensor**

When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 3 as defined in ISO 13849-1.

To achieve that suitability rating, you must meet these requirements.
- Fault Exclusion = External Wiring fault.
- Use a SIL CL 3, PLd, Cat. 3 qualified sensor.
- One of these configuration combinations.
  - Input Point Mode = Safety Pulse Test
  - Test Output Mode = Pulse Test
  - Input Point Mode = Safety
  - Test Output Mode = Power Supply

We recommend that you connect even-numbered input points to even-numbered test output points and odd-numbered input points to odd-numbered test output points.
This wiring practice can maximize diagnostic independence and separation.

**IMPORTANT**
When the power supply and muting lamp are configured for a test output, you must connect the return wire on the device to a COM point on the module.

## Technical Specifications - 5069-IB8S and 5069-IB8SK

| Attribute | 5069-IB8S, 5069-IB8SK | |
|---|---|---|
| Inputs | 8 channels, safety sinking | |
| Test Outputs | 2 test output channels<br>2 test output/muting output channels | |
| Voltage category | 12/24V DC source | |
| Voltage and current ratings | System mounted in horizontal orientation: | System mounted in any orientation other than horizontal (module derating): |
| Input Rating | 2.5 mA per channel | 2.5 mA per channel |
| Test Output Rating | 300 mA per channel | 200 mA per channel |
| MOD power | 75 mA @ 18...32V DC | 75 mA @ 18...32V DC |
| MOD power (passthrough)[1] | 5 A @ 18...32V DC | 5 A @ 18...32V DC |
| SA power | 1.3 A @ 18...32V DC | 100 mA @ 18...32V DC |
| SA power (passthrough)[1] | 9.95 A @ 18...32V DC | 5 A @ 18...32V DC |
| Do not exceed 5 A MOD or SA power (passthrough) current draw in any orientation other than Horizontal. The additional supported mounting orientations are inverted horizontal, vertical, inverted vertical, upside down, and upside up. | | |
| Power dissipation, max | 3.5 W | |
| Thermal dissipation, max | 4 W | |
| Isolation voltage | 250V (continuous), Basic Insulation Type | |
| Indicators | 1 green/red module status indicator<br>1 green/red SA power status indicator<br>12 yellow/red I/O status indicators | |
| Wire category[2] | 2 - signal ports, 1 wire per terminal for each signal port | |
| **Safety Inputs** | | |
| On-state voltage | 10V DC...32V DC | |
| On-state voltage, nom | 24V DC | |
| On-state current | 1.8 mA...2.2 mA | |
| On-state current, nom | 2 mA | |
| Off-state voltage, max | 5V DC | |
| Off-state current, max | 1.5 mA | |
| Input delay time<br>Off to On and On to Off | 0 ms...50 ms, default = 0 ms | |
| Safety integrity level (SIL) | SIL CL 3, PLe, Cat. 4 | |
| Safety reaction time (SRT) | 6 ms | |

## Technical Specifications - 5069-IB8S and 5069-IB8SK

| Attribute | 5069-IB8S, 5069-IB8SK |
|---|---|
| **Test Outputs** | |
| Output current per channel, max | 0.3 A |
| Output current per group, max | 1.2 A |
| Output current per module, max | 1.2 A |
| Test output pulse width | < 700 µs |
| Test output pulse period | < 100 ms |
| Test output field capacitance, max | 0.5 µF |
| Test output leakage current | 1.5 mA |
| SA power overvoltage protection, max | 36.5V DC |
| Power consumption | 3.8 W |
| Features, supported | The modules support these features.<br>• Test output short circuit protection<br>• Test output overvoltage protection (Thermal shutoff)<br>• SA power reverse voltage protection<br>• CIP Sync™ |
| Features, not supported | The modules do not support these features.<br>• Time stamp of inputs<br>• Overrides<br>• Pulse latching<br>• Events<br>• Pattern matching<br>• Extended counters<br>• Scheduled outputs |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 35.
For **Environmental Specifications** and **Certifications**, see page 36.

# 5069-OBV8S, 5069-OBV8SK

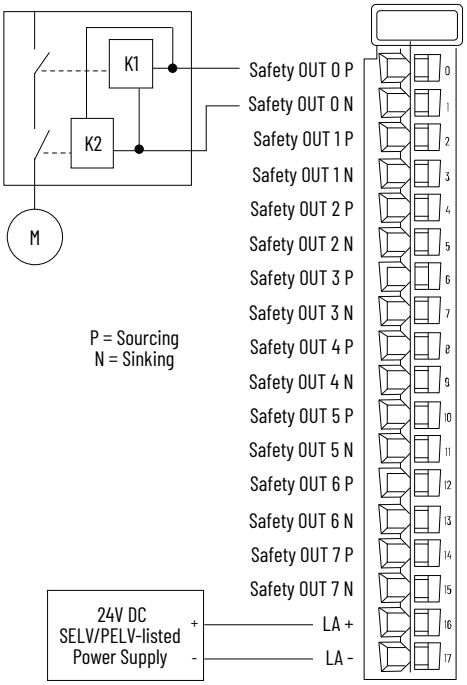
## Safety Output Modules

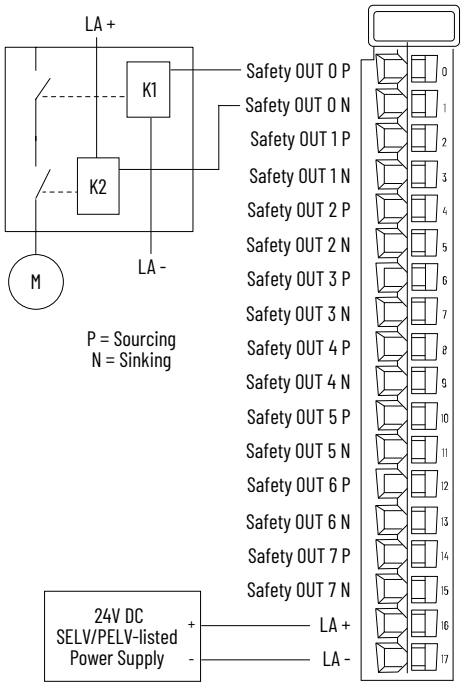
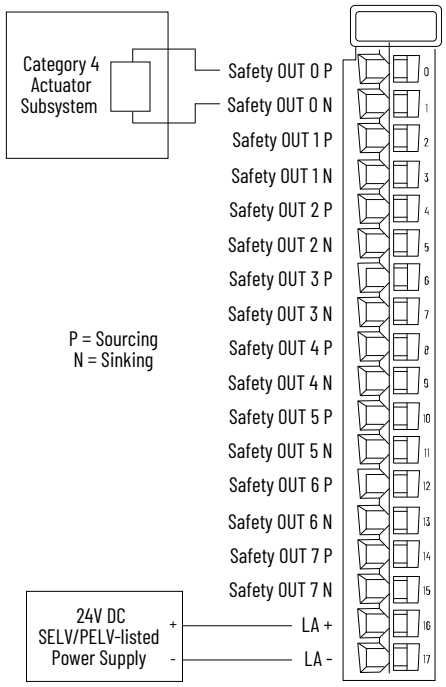
You can use the safety output modules in Bipolar mode or Sourcing mode.

### *Bipolar Mode*

The information in this table applies to all 5069-OBV8S and 5069-OBV8SK Bipolar mode wiring diagrams.

| | |
|---|---|
| Connection Pairs | The terminals for each channel function as a Bipolar connection pair when you use a 5069-OBV8S or 5069-OB8VSK module in Bipolar switching mode. For example, the Safety Output 0 P (Sourcing) terminal and the Safety Output 0 N (Sinking) terminal are a Bipolar or PN connection pair.<br>When the module is in Bipolar switching mode, you must connect the device to both terminals. |
| Channel Connections | These wiring examples show connections to the PN pair for Safety Output 0. You are not limited to these channels. You can use all channel pairs as determined by your application. |
| LA Power | The Local Actuator (LA+ and LA –) power connections are used to supply field-side power to the module. |
| SA Power | • The 5069-OBV8S and 5069-OBV8SK modules do not draw current from the SA power bus. The modules are DC-type modules, so you must install them on a DC SA power bus. See the SA power device list and Isolate SA power.<br>• If you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, we strongly recommend that you connect SA- and LA- together. This practice helps to reduce the risk of grounding float from disruptive diagnostics.<br>• The SA power to adjacent SA power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type. |

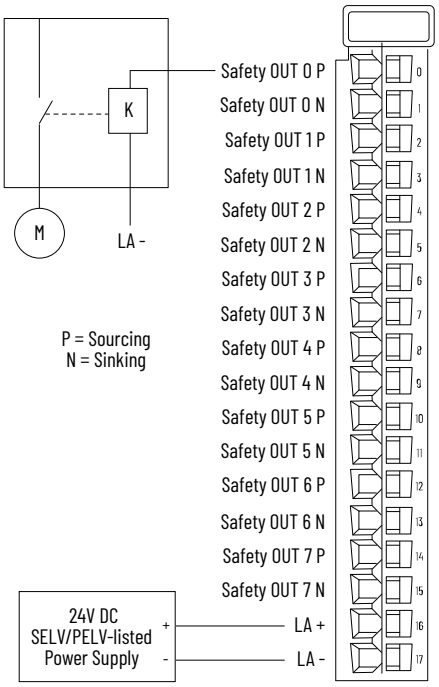
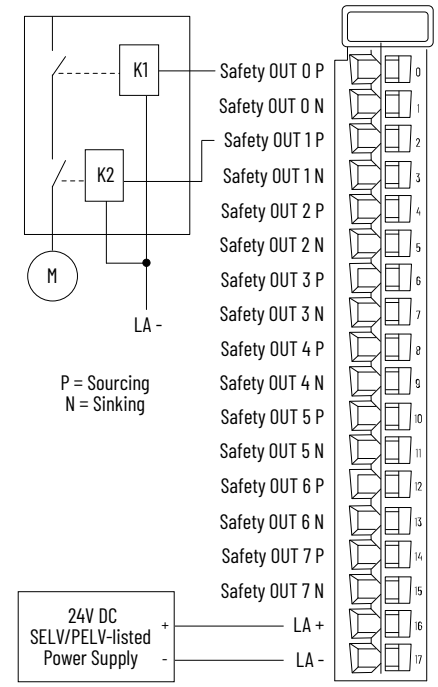
| Bipolar Mode Wiring Diagram - 5069-OBV8S, 5069-OBV8SK | Description |
|---|---|
|  | **Single Channel with Actuator**<br><br>When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC. Configure the application so that a No Load fault can only be detected if the wires from both the P- terminal and the N- terminal are disconnected.<br><br>For Category 4 applications, if the output is off and your application remains in a safe for a prolonged duration, we recommend that you take one of these actions.<br>• Apply output monitoring at the actuator. The monitoring can be direct or indirect.<br>• Limit the safe state to no more than 24 hours.<br>• Conduct a functional test if the safe state dwell time increases. |

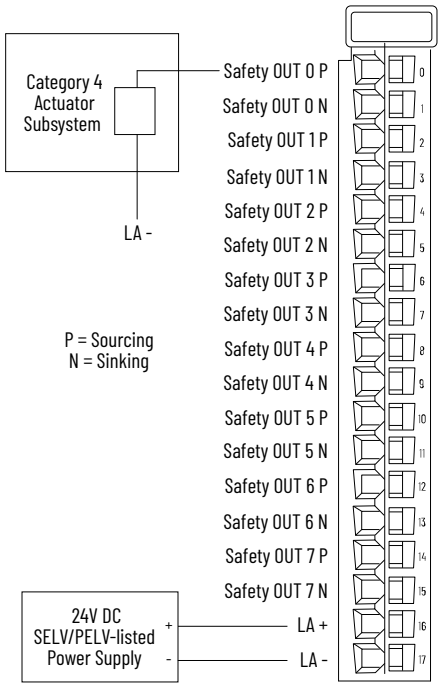
| Bipolar Mode Wiring Diagram - 5069-OBV8S, 5069-OBV8SK (Continued) | Description |
|---|---|
|  | **Single Channel with LA Powered Actuator**<br><br>When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.<br>• We strongly recommend that you connect separate shielded cables to the P terminal and the N terminal to reduce the possibility of a wire short between the terminals. If a wire-short fault is detected across the PN pair, the module outputs turn off, but the actuator that is connected to the pair remains on.<br>• Configure the application so that No Load and Overload conditions are only detectable at the P terminal.<br><br>For Category 4 applications, if the output is off and your application remains in a safe for a prolonged duration, we recommend that you take one of these actions.<br>• Apply output monitoring at the actuator. The monitoring can be direct or indirect.<br>• Limit the safe state to no more than 24 hours.<br>• Conduct a functional test if the safe state dwell time increases.<br><br>**Actuator LA Power** - In this wiring configuration, you must connect the LA+ terminal to an SELV/PELV-listed power supply. The LA+ and LA- terminals on the actuator must be connected to the same power supply as the LA+ and LA- terminals on the module. |
|  | **Single Channel with Actuator Subsystem**<br><br>When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.<br><br>For Category 4 applications, if the output is off and your application remains in a safe for a prolonged duration, we recommend that you take one of these actions.<br>• Apply output monitoring at the actuator. The monitoring can be direct or indirect.<br>• Limit the safe state to no more than 24 hours.<br>• Conduct a functional test if the safe state dwell time increases.<br>• A qualified actuator must be installed, for example, in accordance with IEC 60947. |

## *Sourcing Mode*

The information in this table applies to all 5069-OBV8S and 5069-OBV8SK Sourcing mode wiring diagrams.

| | |
|---|---|
| Channel Connections | The wiring diagrams show connections to specific safety outputs or safety output pairs. You are not limited to these channels. You can use all channels as determined by your application. |
| LA Power | The Local Actuator (LA+ and LA –) power connections are used to supply field-side power to the module. |
| SA Power | • The 5069-OBV8S and 5069-OBV8SK modules do not draw current from the SA power bus. The modules are DC-type modules, so you must install them on a DC SA power bus. See the SA power device list and Isolate SA power.<br>• If you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, we strongly recommend that you connect SA- and LA- together. This practice helps to reduce the risk of grounding float from disruptive diagnostics. |

| Sourcing Mode Wiring Diagram - 5069-OBV8S and 5069-OBV8SK | Description |
|---|---|
|  | **Single Channel with Actuator**<br><br>When the module is wired as shown, it is suitable for applications that are rated up to, and including, Category 2 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC. |
|  | **Dual Channel with Actuator**<br><br>When the module is wired as shown, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.<br><br>For Category 4 applications, if the output is off and your application remains in a safe for a prolonged duration, we recommend that you take one of these actions.<br>• Apply output monitoring at the actuator. The monitoring can be direct or indirect.<br>• Limit the safe state to no more than 24 hours.<br>• Conduct a functional test if the safe state dwell time increases.<br><br>**Connection Pairs** - When you use dual-channel sourcing wiring on these modules, you must connect the devices to dual-channel connection pairs. These channels are dual-channel connection pairs: 0 and 1 (shown), 2 and 3, 4 and 5, 6 and 7. |

| Sourcing Mode Wiring Diagram - 5069-OBV8S and 5069-OBV8SK | Description |
|---|---|
|  | **Single Channel with Actuator Subsytem**<br><br>When the module is wired as shown, and the listed requirements are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, Category 4 as defined in ISO 13849-1.<br><br>To achieve that suitability rating, diagnostic testing and monitoring of the safety function can be required. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.<br>• All power source cables must be installed separately, for example, with a separate cable duct or shielded cable. Connect power source cables to the MOD+, SA+, or LA+ terminals. Otherwise, a Short Circuit condition between SA+ and P can be detected and the output is turned off but the connected actuator remains on.<br>• You must connect two ground terminals. Otherwise, the maximum residual current at signal 0 cannot be maintained if only one ground line is connected and it is interrupted. For more information, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication 5069-TD001<br>• A qualified actuator must be installed, for example, in accordance with IEC 60947.<br><br>For Cat.4 applications, if your application remains in a safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of these actions.<br>• Apply output monitoring at the actuator. The monitoring can be direct or indirect.<br>• Limit the safe state to no more than 24 hours.<br>• Conduct a functional test if the safe state dwell time increases. |

## Technical Specifications - 5069-OBV8S, 5069-OBV8SK

| Attribute | 5069-OBV8S, 5069-OBV8SK | |
|---|---|---|
| Outputs | 8 | |
| Voltage category | 24V DC | |
| Voltage and current ratings | System mounted in horizontal orientation: | System mounted in any orientation other than horizontal (module derating): |
| Output Rating | 1 A per channel | 0.7 A per channel |
| MOD power | 75 mA @ 18...32V DC | 75 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 5 A @ 18...32V DC | 5 A @ 18...32V DC |
| LA power | 1 A per channel @ 18...32V DC<br>8 A per module @ 18...32V DC | 0.7 A per channel @ 18...32V DC<br>5.6 A per module @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 18...32V DC | 5 A @ 18...32V DC |
| | **IMPORTANT:** The modules do not draw SA power current. | |
| Horizontal orientation: Do not exceed 5 A Mod or power (passthrough) current draw. Do not exceed 10 A SA power (passthrough) current draw.<br>Non-horizontal orientations: Do not exceed 5 A MOD or SA power (passthrough) current draw. The additional supported mounting orientations are inverted horizontal, vertical, inverted vertical, upside down, and upside up. | | |
| Power dissipation, max | 6.5 W | |
| Thermal dissipation, max | 6.5 W | |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>No isolation between LA power and output ports<br>No isolation between individual output ports | |
| Indicators | 1 green/red module status indicator<br>1 green/red SA power status indicator<br>16 yellow/red I/O status indicators | |
| Wire category(2) | 2 - signal ports1 wire per terminal for each signal port | |
| LA power attributes | | |
| On-state voltage | 17.5...32V DC | |
| On-state voltage, nom | 24V DC | |
| On-state voltage drop, max | 0.5V DC | |
| On-state current per channel, min | 10 mA | |
| Off-state voltage, max | 0.5V DC | |

## Technical Specifications - 5069-OBV8S, 5069-OBV8SK

| Attribute | 5069-OBV8S, 5069-OBV8SK |
|---|---|
| Off-state leakage current per point, max | 1.5 mA<br>**IMPORTANT:** 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. |
| Output current rating per channel | 1 A |
| Surge current per point, max | 1.5 A |
| Output delay time (backplane to screw)<br>Off to On and On to Off | 4 ms, max |
| Safety Integrity Level | SIL CL 3, PLe, Cat. 4 |
| Safety reaction time (SRT) | 4.5 ms |
| Pulse width, min | 400 µs |
| Features, supported | The modules support these features.<br>• Field power loss detection, per point<br>• No load detection diagnostics, per point<br>• Output short circuit/overload detection, per point<br>• Output short circuit/overload protection, per point<br>• Output overtemperature detection, per point<br>• Output overtemperature protection, per point<br>• Reverse voltage protection<br>• Overvoltage protection, max<br>• CIP Sync™ |
| Features, not supported | The modules do not support these features.<br>• Output control in fault mode per point |
| Output states | In program mode per point: Off<br>In fault mode per point: Off |
| Duration of fault mode per point | Forever - Safety outputs turn off when the fault is detected and remain off until the cause of the fault is removed and the safety outputs are commanded into the safe state. |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources.

(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 35.
For **Environmental Specifications** and **Certifications**, see page 36.

# Specialty Modules

For information that applies to all of the specialty modules, see these tables.

- Wiring and Installation Specifications - Specialty Modules
- Certifications - Specialty Modules
- Environmental Specifications - Specialty Modules

The following specialty modules are available.

| Cat. No. | Description | Page |
|---|---|---|
| 5069-AENTR and 5069-AENTRK | EtherNet/IP adapters | 46 |
| 5069-AEN2TR | EtherNet/IP adapter | 47 |
| 5069-ARM | Address reserve module | 48 |
| 5069-FPD | Field potential distributor | 48 |
| 5069-HSC2XOB4 | High speed counter module | 49 |
| 5069-SERIAL | Serial module | 52 |

### Wiring and Installation Specifications - Specialty Modules

| Attribute | 5069-ARM, 5069-HSC2XOB4 | 5069-FPD | 5069-SERIAL | 5069-AEN2TR | 5069-AENTR, 5069-AENTRK |
|---|---|---|---|---|---|
| Slot width | 1 | | | 4.5 | 3 |
| Dimensions (HxWxD) | 144.6 x 22.0 x 105.4 mm (5.78 x 0.87 x 4.15 in.) | | 144.6 x 25.0 x 105.4 mm (5.78 x 0.98 x 4.15 in.) | 123.0 x 98.1 x 136.8 mm (4.84 x 3.86 x 5.39 in.) | 123.0 x 63.0 x 105.4 mm (4.84 x 2.48 x 4.15 in.) |
| Weight, approx | 175 g (0.39 lb) | | | 680 g (1.50 lb) | 485 g (1.07 lb) |
| DIN rail | Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail. | | | | |
| Module keying | Electronic keying via programming software | None | | Electronic keying via programming software | |
| RTB | 5069-RTB18-SPRING or 5069-RTB18-SCREW | 5069-RTB6-SCREW or 5069-RTB6-SPRING | – | 5069-RTB64-SPRING or 5069-RTB64-SCREW | 5069-RTB5-SPRING RTB or 5069-RTB5-SCREW RTB |
| | **IMPORTANT**: RTBs do not ship with Compact 5000™ I/O modules, you must order them separately. Order only the RTB type that your system requires. | | | | |
| RTB torque, screw-type RTB | 0.4 N·m (3.5 lb·in) | | | | 0.5…0.6 N•m (4.4…5.3 lb•in) |
| RTB keying | None | | | | |
| Wire size | 0.34…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F) or greater<br>Spring-type RTB: 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only<br>Screw-type RTB: 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only | | | | 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 diameter including insulation, single wire connection only<br>Grounding: 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 |
| | – | | | Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2 | |
| Insulation-stripping length | 5069-RTB18-SPRING RTB: 10 mm (0.39 in.)<br>5069-RTB18-SCREW RTB: 12 mm (0.47 in.) | | | | 5069-RTB5-SPRING RTB: 10 mm (0.39 in.)<br>5069-RTB5-SCREW RTB: 10 mm (0.39 in.) |

## Environmental Specifications - Specialty Modules

| Attribute | 5069-ARM | 5069-AENTR, 5069-AENTRK(1) | 5069-FPD | 5069-HSC2X0B4 | 5069-SERIAL |
|---|---|---|---|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ad, Operating Cold)<br>IEC 60068-2-2 (Test Bd, Operating Dry Heat)<br>IEC 60068-2-14 (Test Nb, Operating Thermal Shock) | 0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F) | | | | |
| Temperature, surrounding air, max | 60 °C (140 °F) | | | | |
| Temperature, nonoperating<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...+85 °C (-40...+185 °F) | | | | |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) | 5...95% noncondensing | | | | |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 5 g @ 10...500 Hz | | | | |
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 30 g | | | | |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 50 g | | | | |
| Emissions | IEC 61000-6-4 | | | | |
| ESD immunity<br>IEC 61000-4-2 | 6 kV contact discharges<br>8 kV air discharges | | | | |
| Radiated RF immunity<br>IEC 61000-4-3 | 10V/m with 1 kHz sine wave 80% AM from 80...6000 MHz | | | | |
| EFT/B immunity<br>IEC 61000-4-4 | – | ±3 kV @ 5 kHz on power ports<br>±3 kV @ 5 kHz on Ethernet ports | ±4 kV @ 5 kHz on power ports | ±4 kV @ 5 kHz on power ports<br>±2 kV @ 5 kHz on shielded output ports<br>±2 kV @ 5 kHz on shielded counter ports | ±4 kV @ 5 kHz on power ports<br>±3 kV @ 5 kHz on communication ports |
| Surge transient immunity<br>IEC 61000-4-5 | – | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±2 kV line-earth (CM) on Ethernet ports | ±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 power ports<br>±2 kV line-earth (CM) on shielded output ports<br>±2 kV line-earth (CM) on shielded counter ports | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±2 kV line-earth (CM) on communication ports |
| Conducted RF immunity<br>IEC 61000-4-6 | – | 10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz | | | |
| Voltage variation<br>IEC 61000-4-29 | | On power and Ethernet ports | – | | |
| ESD immunity<br>IEC 61000-4-2 | 10 ms interruption on DC supply ports | – | | 10 ms interruption on MOD power port | – |
| North American temp code | T4 | | | | |
| UKEX/ATEX temp code | T4 | | | | |
| IECEx temp code | T4 | | | | |
| Enclosure type | None (open-style) | | | | |

(1) (1) For 5069-AEN2TR module environmental specifications, see page 47.

## Certifications - Specialty Modules

| Certification | 5069-ARM | 5069-FPD | 5069-HSC2X0B4 | 5069-AENTR, 5069-AENTRK[1] | 5069-SERIAL |
|---|---|---|---|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. | | | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470. | |
| UKCA and CE | UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with:<br>EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>EN 61000-6-2; Industrial Immunity<br>EN 61000-6-4; Industrial Emissions<br>EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)<br><br>UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with:<br>EN IEC 63000; Technical documentation | | | | |
| | – | UK Statutory Instrument 2016 No. 1101 and European Union 2014/35/EU LVD, compliant with:<br>EN 61010-2-201; Control Equipment Safety Requirements | | | |
| RCM | Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions | | | | |
| Ex | UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with:<br>EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc | | | | |
| | DEMKO 15 ATEX 1455X and UL22UKEX2307X | | | DEMKO 16 ATEX 1758X and UL22UKEX2494X | DEMKO 15 ATEX 1484X and UL22UKEX2379 |
| | When used at or below 125V AC | | – | | |
| IECEx | IECEx System, compliant with:<br>EN IEC 60079-0; General Requirements<br>EN IEC 60079-7; Explosive Atmospheres, Protection "e"<br>II 3 G Ex ec IIC T4 Gc | | | | |
| | IECEx UL 15.0007X | | | IECEx UL 16.0124X | IECEx UL 15.0055X |
| | When used at or below 125V AC | | – | | |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 | | | | |
| Morocco | Arrêté ministériel n° 6404-15 du 1 er muharram 1437<br>Arrêté ministériel n° 6404-15 du 29 ramadan 1436 | | | | |
| CCC | CNCA-C23-01:2019 强制性产品认证实施规则 防爆电气<br>CNCA-C23-01:2019 CCC Implementation Rule Explosion-Proof Electrical Products | | | | |
| | CCC: 2020122309111301 and 2021122309113957 | | | | CCC: 2020312309000308 |
| EtherNet/IP | – | | | ODVA conformance tested to EtherNet/IP specifications | – |

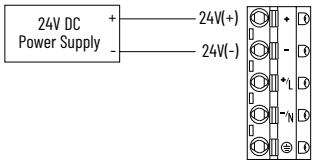
See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

(1) For 5069-AEN2TR module certifications, see page 47.

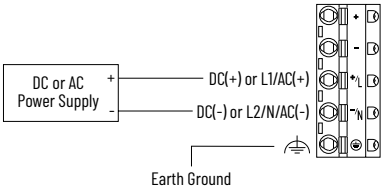
# 5069-AENTR, 5069-AENTRK

## EtherNet/IP Adapters

**MOD Power Wiring - 5069-AENTR, 5069-AENTRK**




**SA Power Wiring - 5069-AENTR, 5069-AENTRK**




### Technical Specifications - 5069-AENTR and 5069-AENTRK

| Attribute | 5069-AENTR, 5069-AENTRK |
|---|---|
| Voltage and current ratings | |
| MOD power | 220 mA @ 18...32V DC |
| MOD power inrush | 1750 mA for 70 ms |
| MOD power (passthrough)(1) | 9.78 A @ 18...32V DC |
| SA power | 5 mA @ 0...32V DC<br>2 mA @ 0...240V AC, 47...63 Hz<br>Ex, 125V AC Max |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>9.975 A @ 0...240V AC, 47...63 Hz<br>Ex, 125V AC Max |
| Do not exceed 10 A current draw at the MOD or SA power RTB. | |
| Recommended external overcurrent protection | MOD power: 10...12A @ 22.5...43.2 A2t, Fast Acting<br>SA power: 20 A @ 250V AC |
| Power dissipation, max | 8.5 W |
| Thermal dissipation, max | 29 BTU/hr |
| Isolation voltage | 300V (continuous), Basic Insulation Type, SA, and MOD power to Backplane<br>300V (continuous), Basic Insulation Type, SA to MOD power<br>300V (continuous), Basic Insulation Type, Ethernet to Backplane<br>Type tested at 1500V AC for 60 s<br>300V (continuous), Double Insulation Type, Ethernet to MOD power<br>300V (continuous), Double Insulation Type, Ethernet to SA power<br>Type tested at 4242V DC for 60 s<br>No isolation between Ethernet ports |
| Wiring category(2) | 2 - on signal ports<br>1 - on power ports<br>2 - on Ethernet ports |

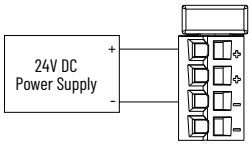
(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 43.
For **Certifications**, see page 45.
For **Environmental Specifications**, see page 44.

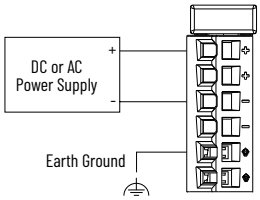
# 5069-AEN2TR

## EtherNet/IP Adapter

**MOD Power Wiring - 5069-AEN2TR**




**SA Power Wiring - 5069-AEN2TR**




## Technical Specifications - 5069-AEN2TR

| Attribute | 5069-AEN2TR |
|---|---|
| Voltage and current ratings | |
| MOD power | 450 mA @ 18...32V DC |
| MOD power inrush | 850 mA for 125 ms |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 10 mA @ 0...32V DC<br>25 mA @ 0...240V AC, 47...63 Hz<br>ATEX/IECEx, 125V AC Max |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>9.975 A @ 0...240V AC, 47...63 Hz<br>ATEX/IECEx, 125V AC Max |
| Do not exceed 10 A current draw at the MOD or SA power RTB. | |
| Recommended external overcurrent protection | – |
| Power dissipation, max | 8.5 W |
| Thermal dissipation, max | 29 BTU/hr |
| Isolation voltage | 250V (continuous), basic insulation type,<br>SA and MOD power to backplane<br>250V (continuous), basic insulation type, SA to MOD power<br>250V (continuous), basic insulation type, Ethernet to backplane<br>250V (continuous), double insulation type, Ethernet to MOD power<br>250V (continuous), double insulation type, Ethernet to SA power<br>50V (continuous), functional insulation type, Ethernet to USB<br>250V (continuous), basic insulation type, USB to backplane<br>250V (continuous), double insulation type, USB to MOD power<br>250V (continuous), double insulation type, USB to SA power<br>No isolation between Ethernet ports<br>Type tested at 1500V AC for 60 s |
| Wiring category(2) | 3 - on USB port<br>2 - on power ports<br>2 - on Ethernet ports |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 43.

## Environmental Specifications - 5069-AEN2TR

| Attribute | 5069-AEN2TR |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold)<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14 (Test Na, Operating Thermal Shock) | 0...60 °C (32...140 °F) |
| Temperature, surrounding air, max | 60 °C (140 °F) |

## Environmental Specifications - 5069-AEN2TR

| Attribute | 5069-AEN2TR |
|---|---|
| Temperature, nonoperating<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...+85 °C (-40...+185 °F) |
| Relative humidity<br>IEC 60068-2-30<br>(Test Db, Unpackaged Damp Heat) | 5...95% noncondensing |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 5 g @ 10...500 Hz |
| Shock, operating<br>IEC 60068-2-27<br>(Test Ea, Unpackaged Shock) | 30 g |
| Shock, nonoperating<br>IEC 60068-2-27<br>(Test Ea, Unpackaged Shock) | 50 g |
| Emissions | IEC 61000-6-4 |
| ESD immunity<br>IEC61000-4-2 | 6 kV contact discharges<br>8 kV air discharges |
| Radiated RF immunity<br>IEC61000-4-3 | 10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz<br>10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz<br>10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz<br>3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz |
| EFT/B immunity<br>IEC 61000-4-4 | ±4 kV @ 5 kHz on power ports<br>±2 kV @ 5 kHz on Ethernet ports |
| Surge transient immunity<br>IEC 61000-4-5 | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±2 kV line-earth (CM) on Ethernet ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz on power and Ethernet ports |
| Voltage variation<br>IEC 61000-4-29 | 10 ms interruption on MOD power port |

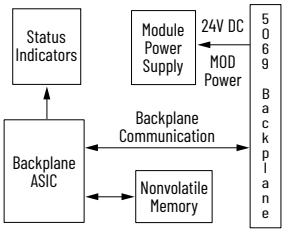
## Certifications - 5069-AEN2TR

| Certifications | 5069-AEN2TR |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. |
| CE | European Union 2014/30/EU EMC Directive, compliant with:<br>• EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>• EN 61000-6-2; Industrial Immunity<br>• EN 61000-6-4; Industrial Emissions<br>• EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)<br>European Union 2014/35/EU LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements<br>European Union 2011/65/EU RoHS, compliant with:<br>• EN IEC 63000; Technical documentation |
| RCM | Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions |
| Ex - When used at or below 125V AC | European Union 2014/34/EU ATEX Directive, compliant with:<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• EN 60079-0; General Requirements<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1455X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• IEC 60079-0; General Requirements<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0007X<br>When used at or below 125V AC |
| 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 |
| See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details. | |

# 5069-ARM

## Address Reserve Module

**Functional Block Diagram - 5069-ARM**




## Technical Specifications - 5069-ARM

| Attribute | 5069-ARM |
|---|---|
| Voltage and current ratings | |
| MOD power | 45 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>9.975 A @ 0...240V AC, 47...63 Hz<br>EX, 125V AC, max<br>**IMPORTANT:** This module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (Passthrough) current draw | |
| Power dissipation, max | 1.0 W |
| Thermal dissipation, max | 3.4 BTU/hr |
| Indicators | 1 green/red module status indicator |

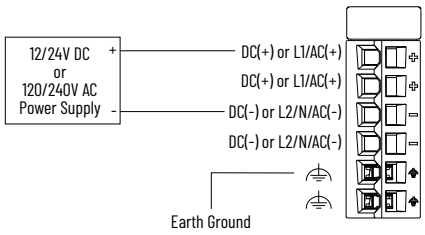
(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.

For **Wiring and Installation Specifications**, see page 43.
For **Certifications**, see page 45.
For **Environmental Specifications**, see page 44.

# 5069-FPD

## Field Potential Distributor

**Wiring - 5069-FPD**




## Technical Specifications - 5069-FPD

| Attribute | 5069-FPD |
|---|---|
| Voltage and current ratings | |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 10 mA @ 0...32V DC<br>25 mA @ 0...240V AC, 47...63 Hz<br>EX, 125V AC, max |
| SA power (passthrough)(1) | 9.99 A @ 0...32V DC<br>9.975 A @ 0...240V AC, 47...63 Hz<br>EX, 125V AC, max |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |
| Power dissipation, max | 4.0 W |
| Thermal dissipation, max | 13.6 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type<br>Type tested at 1500V AC for 60 s |
| Indicators | 1 green module status indicator |
| Wire category(2) | 2 - on power ports |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 43.
For **Certifications**, see page 45.
For **Environmental Specifications**, see page 44.

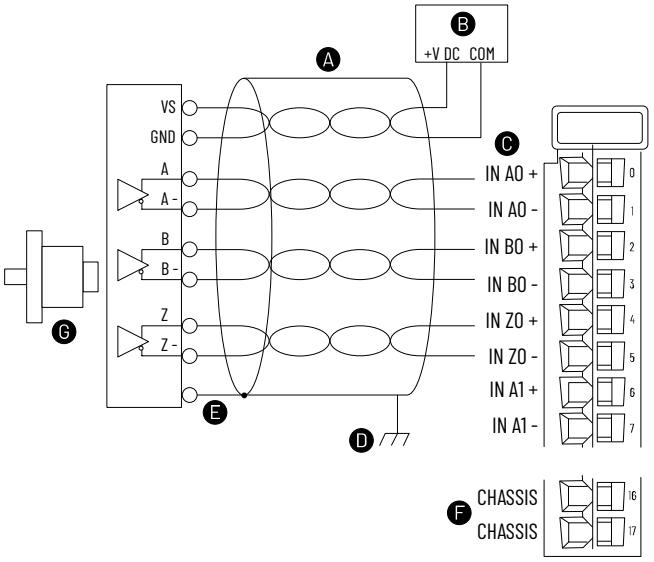
# 5069-HSC2X0B4

## High-speed Counter Module

**IMPORTANT:**
The 5069-HSC2x0B4 module uses DC SA power. You must connect DC power to the device that supplies SA power to the module. See Isolate SA power.

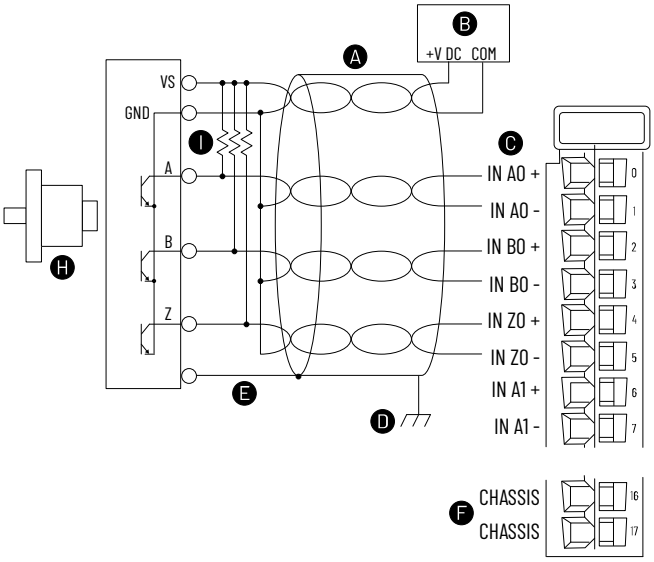
| | |
|---|---|
| SA Power | Connections to an external power supply that provides SA power via the SA power RTB on one of these devices.<br>• CompactLogix 5380 or Compact GuardLogix 5380 controller<br>• CompactLogix 5480 controller<br>• 5069-AENTR EtherNet/IP Adapter<br>• 5069-FPD field potential distributor |
| Channel connections | The wiring diagrams show connections to specific channels. You are not restricted to using only those channels. You can connect to any channel or combination of channels as needed. |

### 5069-HSC2X0B4 Differential Encoder Wiring



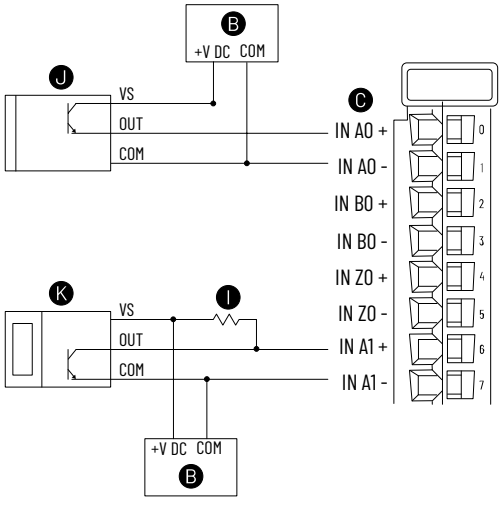

| | |
|---|---|
| A | Cable - We recommend that you use a twisted-pair, individually shielded cable with a maximum length of 300 m (1000 ft). See the encoder manual for the proper cable type. |
| B | Power supply |
| C | Module inputs |
| D | Earth ground |
| E | Shield/housing connection - Connect only if housing is electronically isolated from the motor and ground. |

### 5069-HSC2X0B4 Single-ended Encoder Wiring




| | |
|---|---|
| F | If the module is installed on a DIN rail that is grounded, you can connect the cable shield to either Chassis terminal instead of the Earth Ground. |
| G | Allen-Bradley® 845H Series differential encoder |
| H | Allen-Bradley 845H Series single-ended encoder |
| I | Resistor - See the Resistor Information. |
| J | Proximity sensor |
| K | Photoelectric sensor with open collector sinking output |

### 5069-HSC2X0B4 Discrete Input Device Wiring




### Resistor Information

External resistors are required if they are not internal to the encoder. The pull-up resistor (R) value depends on the power supply value.
To calculate the maximum resistor value, use this formula:

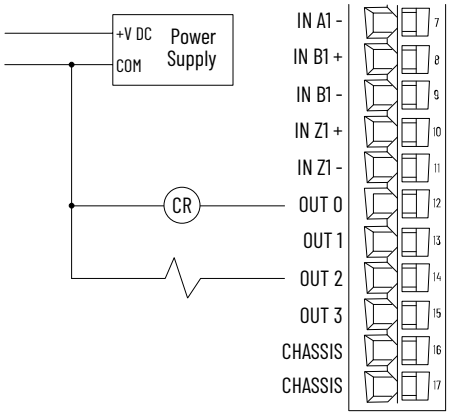
$$R = \frac{(Vdc - Vmin)}{Imin}$$

where: R = maximum pull-up resistor value
VDC = power supply voltage
Vmin = 2.6V DC
min = 6.8 mA

| Power Supply Voltage | Pull-up Resistor Value Max (R)(1) | |
|---|---|---|
| | 1769-HSC | 5069-HSC2X0B4 |
| 5V DC | 352 Ω | 500 Ω |
| 12V DC | 1382 Ω | 2250 Ω |
| 24V DC | 3147 Ω | 5250 Ω |

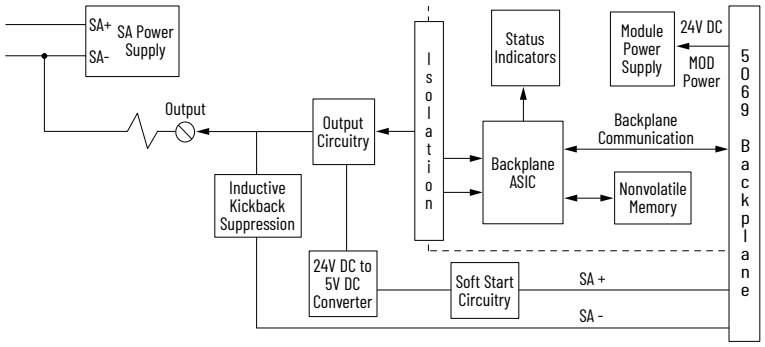
(1) Resistance values can change, dependent on your application. The minimum resistor value depends on the current-sinking capability of the encoder.

## 5069-HSC2X0B4 Discrete Output Device Wiring

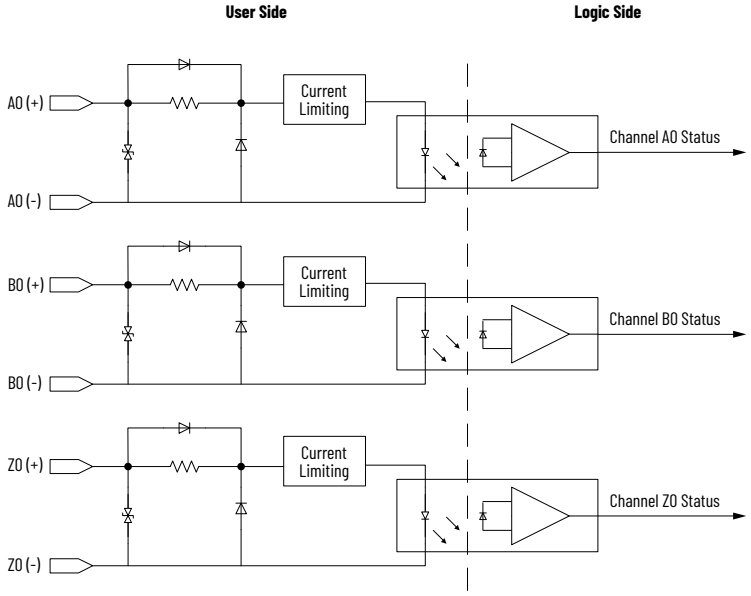



**IMPORTANT:**
The 5069-HSC2x0B4 module outputs use a shared common. The outputs have a return through internal module circuitry to the SA (–) terminal on the SA power RTB. For more information, see Power the Compact 5000 I/O Modules.

| | |
|---|---|
| Surge Suppression | The module has built-in suppression that is sufficient for most applications. For high-noise applications, we recommend that you use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.<br>For additional details, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1. |




**Functional Block Diagram - 5069-HSC2X0B4**
Module Outputs to SA Power




**Functional Block Diagram - 5069-HSC2X0B4**
Module Inputs
This diagram shows counter 0, counter 1 follows the same design.

## Technical Specifications - 5069-HSC2X0B4

| Attribute | 5069-HSC2X0B4 |
|---|---|
| Inputs | 2 quadrature (ABZ) differential inputs |
| Outputs | 4 Channels (1 group of 4), sourcing |
| Voltage category | 12/24V DC source |
| Voltage and current ratings | |
| Counter input ratings | 4 mA @ 18...32V DC |
| MOD power | 50 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power | 3 A @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 10...32V DC |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |
| Power dissipation, max | 3 W |
| Thermal dissipation, max | 10.2 BTU/hr |
| Isolation voltage | 300V (continuous), Basic Insulation Type<br>No isolation between SA power and I/O ports<br>No isolation between individual I/O ports<br>Type tested at 1500V AC for 60 s |
| Indicators | 1 green/red module status indicator<br>10 yellow/red I/O status indicator |
| Wiring category(2) | 2 - on shielded output ports<br>2 - on output power ports<br>2 - on shielded counter ports |
| Input current, max | 8 mA |
| On-state voltage, range | 3V DC...32V DC |
| On-state voltage, nom | 24V DC |
| On-state voltage drop, max | < 0.3V DC |
| On-state current, min | 4 mA |
| Off-state voltage, max | 1.5V |
| Off-state current, max | 1 mA |
| Output voltage range | 10...32V DC |
| On-state output current, min | 1 mA per channel<br>4 mA per module |

## Technical Specifications - 5069-HSC2X0B4

| Attribute | 5069-HSC2X0B4 |
|---|---|
| Pulse width, min | 125 ns |
| Pulse separation, min | 100 ns |
| Reverse voltage protection | 32V DC |
| Overvoltage protection, max | 36V (fuse protected) |
| Features, supported | The module supports these features.<br>• No load detection, per channel diagnostics<br>• Output short circuit/overload/overtemp detection, per channel diagnostics<br>• Output short circuit/overload protection<br>• Pilot duty - Make current electronically limited/protected @ 3.6 A |
| Output control in fault state per point | • Hold last state<br>• On<br>• Off (default) |
| Output states in program mode per point | |
| Output states in fault mode per point | |
| Duration of fault mode per point | • 1, 2, 5, or 10 seconds<br>• Forever (default) |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.

(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 43.
For **Certifications**, see page 45.
For **Environmental Specifications**, see page 44.

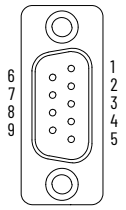
# 5069-SERIAL

## Serial Module

The Compact 5000 I/O serial module provides a network interface to RS-232, RS-422, and RS-485 devices.

Use the following information to wire the connector.

### *Communication Port Pins*




This image shows the pin layout on the 5069-serial module. See the following tables for pin descriptions, where:

— = Not Used

A = Changing signal level (Active/Inactive)

B = Fixing signal level (Active/Inactive)

### RS-232C Pin Descriptions

| Pin | RS-232C | Input (i)/Output (o) from 5069-SERIAL | Wiring | |
|---|---|---|---|---|
| | | | No Handshaking | Handshaking |
| 1 | Data Carrier Detect (DCD) | (i) | — | — |
| 2 | Receive Data (RXD) | (i) | A | A |
| 3 | Transmit Data (TXD) | (o) | A | A |
| 4 | Data Terminal Ready (DTR) | (o) | B | B |
| 5 | Common (COM) | — | A | A |
| 6 | Data Set Ready (DSR) | (i) | — | — |
| 7 | Request to Send (RTS) | (o) | B | A |
| 8 | Clear to Send (CTS) | (i) | — | A |
| 9 | — | — | — | — |

### RS-422 Pin Descriptions

| Pin | RS-422 | Input (i)/Output (o) from 5069-SERIAL | Wiring |
|---|---|---|---|
| 1 | — | — | — |
| 2 | Receive Data + (RXD+) | (i) | A |
| 3 | Transmit Data + (TXD+) | (o) | A |
| 4 | — | — | — |
| 5 | Common (COM) | — | A |
| 6 | — | — | — |
| 7 | Transmit Data - (TXD-) | (o) | A |
| 8 | Receive Data - (RXD-) | (i) | A |
| 9 | — | — | — |

### RS-485 Pin Descriptions

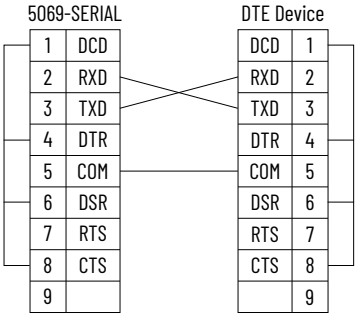
| Pin | RS-485 | Input (i)/Output (o) from 5069-SERIAL | Wiring |
|---|---|---|---|
| 1 | — | — | — |
| 2 | — | — | — |
| 3 | Transmit/Receive Data + (TRXD+) | (i/o) | A |
| 4 | — | — | — |
| 5 | Common (COM) | — | A |
| 6 | — | — | — |
| 7 | Transmit/Receive Data - (TRXD-) | (i/o) | A |
| 8 | — | — | — |
| 9 | — | — | — |

| | |
|---|---|
| SA Power | The 5069-SERIAL module does not draw current from the SA power bus. Still, the module is a DC-type module, and you must install it on a DC SA power bus. |
| Isolate SA power | If you install modules in a system that uses both AC SA power and DC SA power, you must isolate SA power buses by type with a 5069-FPD field potential distributor. To create separate SA power buses, complete these steps.<br>1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller. This is the first SA power bus.<br>2. To create a second SA power bus, install the 5069-FPD field module to the right of these modules.<br>3. Install the modules that use the other type of SA power, for example AC, to the right of the 5069-FPD module. |

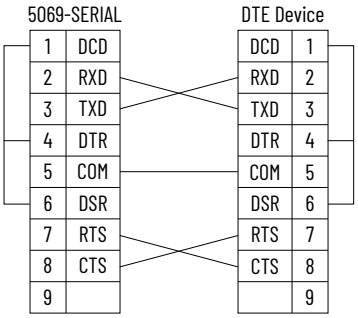
### *RS-232 Connections*

**IMPORTANT:**
If you wire the module incorrectly, the control between wiring and output signal can fail.

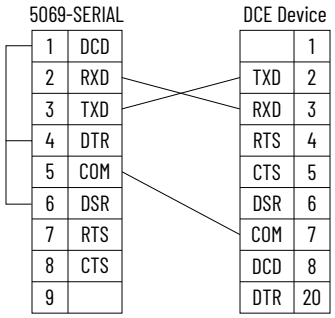
**5069-SERIAL to DTE Device**
Without hardware handshaking.



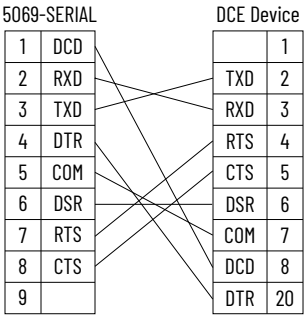

**5069-SERIAL to DTE Device**
With half-duplex communication.



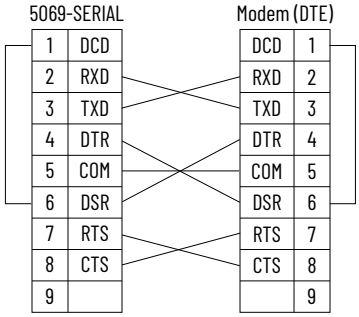
**5069-SERIAL to DCE Device**
With full-duplex communication.




**5069-SERIAL to DCE Device (Modem)**
With full-duplex or half-duplex communication.



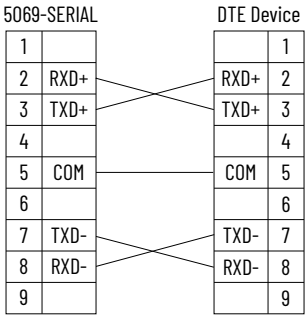

**5069-SERIAL to DTE Device**
With full-duplex or half-duplex communication, or a null modem cable.




## *RS-422 Connections*

**5069-SERIAL to DTE Device**

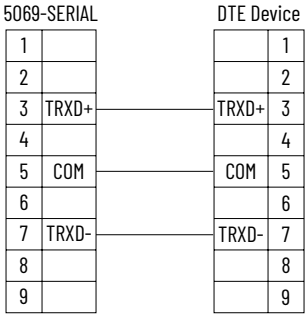
**IMPORTANT:**
Place the termination resistor between RXD+ and RXD- to implement this connection.



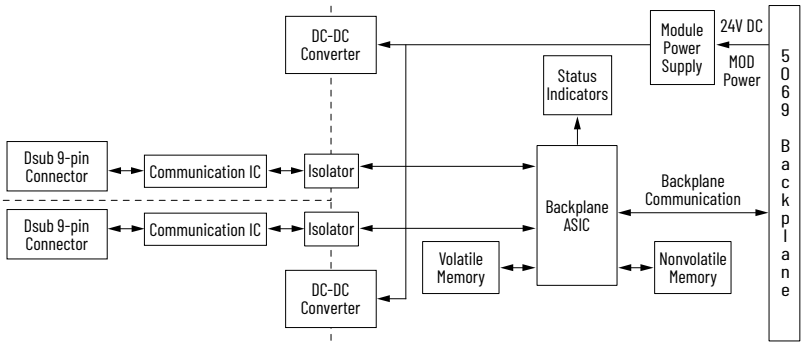

## *RS-485 Connections*

**5069-SERIAL to DTE Device**

**IMPORTANT:**
Place the termination resistor between TRXD+ and TRXD- to implement this connection.




**Functional Block Diagram - 5069-SERIAL**



## Technical Specifications - 5069-SERIAL

| Attribute | 5069-SERIAL |
|---|---|
| Operating modes | • Generic ASCII<br>• Modbus RTU<br>• Modbus ASCII<br>• DF1 (local Channel 1 only)<br>• DH-485 (local Channel 1 only) |
| Inputs | • 2 full-duplex (RS-232, RS-422)<br>• 2 half-duplex (RS-485) |
| Serial input voltage signal | • 3...25V DC regarding signal ground (SG) 0, Asserted, ON, Space, Active<br>• -3...-25V DC regarding signal ground (SG) 1, Deasserted, OFF, Mark, Inactive |
| Voltage and current ratings | |
| MOD power | 100 mA @ 18...32V DC |
| MOD power (passthrough)(1) | 9.55 A @ 18...32V DC |
| SA power (passthrough)(1) | 9.95 A @ 0...32V DC<br>The module does not draw SA power current. |
| Do not exceed 10 A MOD or SA power (passthrough) current draw | |
| Power dissipation, max | 2.8 W |
| Thermal dissipation, max | 9.6 BTU/hr |
| Isolation voltage | 250V (continuous), Basic Insulation Type,<br>SA and MOD power to Backplane<br>250V (continuous), Basic Insulation Type,<br>Backplane to Communication Channels<br>250V (continuous), Basic Insulation Type,<br>Backplane to Chassis Ground<br>250V (continuous), Basic Insulation Type,<br>Between Communication Channels<br>250V (continuous), Basic Insulation Type, SA to MOD power<br>250V (continuous), Basic Insulation Type,<br>Communication Channels to Chassis Ground<br>250V (continuous), Basic Insulation Type,<br>SA and MOD power to Chassis Ground<br>250V (continuous), Reinforced Insulation Type,<br>SA and MOD power to Communication Channels<br>Basic Insulation Type tested at 2100V DC for 60 s<br>Reinforced Insulation Type tested at 4200V DC for 60 s |

## Technical Specifications - 5069-SERIAL

| Attribute | 5069-SERIAL |
|---|---|
| Transmit transaction ID | 0...255 |
| Handshaking | RTS/CTS hardware handshake always enabled.<br>RTS/CTS can be user-controlled. |
| Indicators | 1 green/red module status indicator<br>1 transmit data (TXD) and 1 receive data (RXD) yellow/red status indicator per channel |
| Serial port connectors | Two DB-9 male with pins |
| Wire category(2) | 2 - power ports<br>2 - communication ports |
| Corrosion resistance classification | ISA S71.04 G2 |

(1) The level of Mod power or SA power current that passes through the module. This level depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the controller user manuals in the Additional Resources table.
(2) Use this Conductor Category information to plan conductor routes. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

For **Wiring and Installation Specifications**, see page 43.
For **Certifications**, see page 45.
For **Environmental Specifications**, see page 44.

# Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

| Resource | Description |
|---|---|
| Compact 5000 I/O Digital Modules User Manual, publication 5069-UM004 | Describes how to configure and operate Compact 5000™ I/O digital modules. |
| Compact 5000 I/O Analog Modules User Manual, publication 5069-UM005 | Describes how to configure and operate Compact 5000 I/O analog modules. |
| Compact 5000 I/O High-speed Counter Module User Manual, publication 5069-UM006 | Describes how to configure and operate the Compact 5000 I/O high-speed counter module. |
| Compact 5000 I/O Serial Module User Manual, publication 5069-UM003 | Describes how to configure and operate Compact 5000 serial modules. |
| CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, publication 5069-UM001 | Describes how to configure and operate CompactLogix™ 5380 and Compact GuardLogix® 5380 controllers. |
| CompactLogix 5480 Controllers User Manual, publication 5069-UM002 | Describes how to configure and operate CompactLogix 5480 controllers. |
| Compact 5000 EtherNet/IP Adapters User Manual, publication 5069-UM007 | Describes how to configure and operate the Compact 5000 I/O EtherNet/IP™ adapters. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, rok.auto/certifications | Provides declarations of conformity, certificates, and other certification details. |

## Rockwell Automation Support

Use these resources to access support information.

| | | |
|---|---|---|
| **Technical Support Center** | Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates. | rok.auto/support |
| **Local Technical Support Phone Numbers** | Locate the telephone number for your country. | rok.auto/phonesupport |
| **Technical Documentation Center** | Quickly access and download technical specifications, installation instructions, and user manuals. | rok.auto/techdocs |
| **Literature Library** | Find installation instructions, manuals, brochures, and technical data publications. | rok.auto/literature |
| **Product Compatibility and Download Center (PCDC)** | Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes. | rok.auto/pcdc |

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