Allen-Bradley

# 5069 Compact I/O Modules Specifications

Digital I/O Module Catalog Numbers 5069-IB16, 5069-IB16F, 5069-IB6F-3W, 5069-OB16, 5069-OB16F, 5069-OW4I, 5069-OX4I

Analog I/O Module Catalog Numbers 5069-IF8, 5069-IY4, 5069-OF4, 5069-OF8

High-speed Counter Module Catalog Number 5069-HSC2x0B4

Field Potential Distributor Catalog Number 5069-FPD

Address Reserve Module Catalog Number 5069-ARM

EtherNet/IP Adapter Catalog Number 5069-AEN2TR



The 5069 Compact 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 Logix5000™ controllers.

Each 5069 Compact I/O module is installed in a 5069 Compact I/O system that also includes a 5069-AEN2TR EtherNet/IP adapter. The I/O module requires a removable terminal block (RTB) to connect field-side wiring. RTBs are not included with the I/O modules. They must be ordered separately.

# Digital I/O Modules

| I/O Type | Cat. No. | Page |
|---|---|---|
| DC digital input | 5069-IB16<br>5069-IB16F<br>5069-IB6F-3W | 2<br>2<br>7 |
| DC digital output | 5069-OB16<br>5069-OB16F | 11 |
| Relay output | 5069-OW4I<br>5069-OX4I | 16<br>20 |

## 5069-IB16 and 5069-IB16F Digital 16-point Sinking Input Modules

Figure 1 shows a wiring diagram for the 5069-IB16 and 5069-IB16F modules.

**Figure 1 - 5069-IB16 and 5069-IB16F Wiring Diagram**

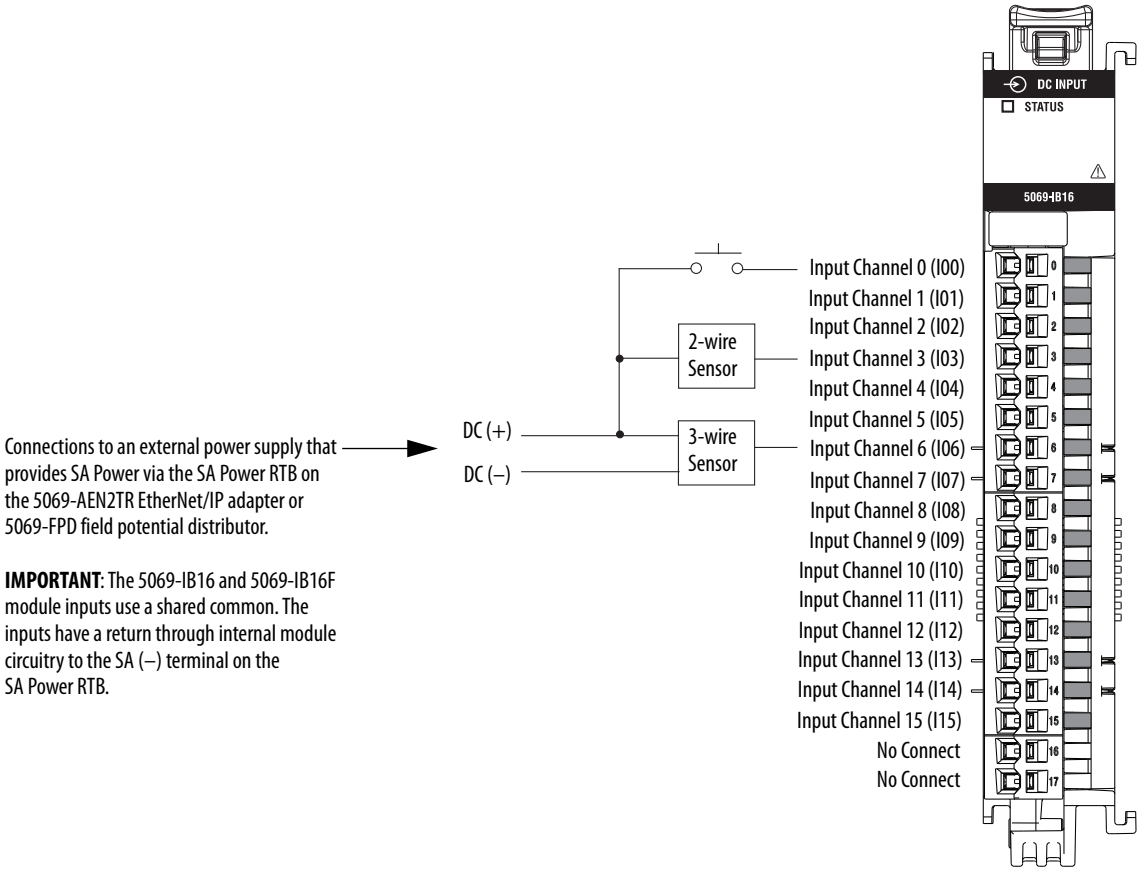


Figure 2 shows a functional block diagram for the 5069-IB16 and 5069-IB16F modules.

**Figure 2 - 5069-IB16 and 5069-IB16F Functional Block Diagram**

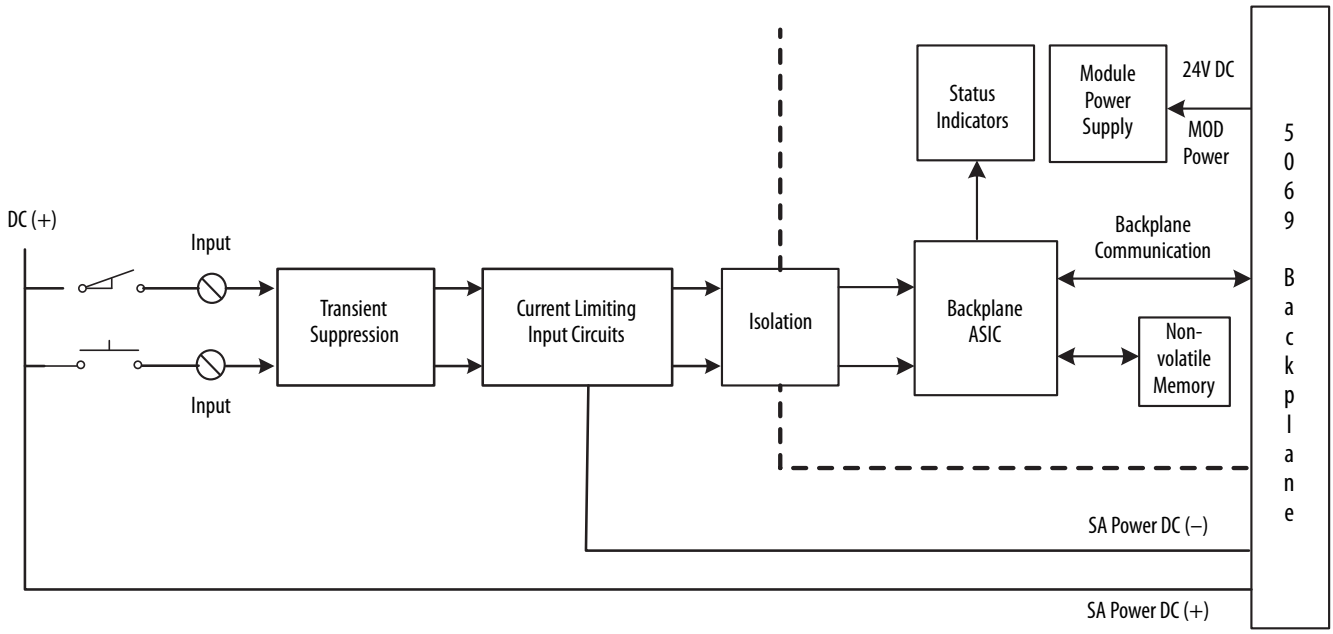



**Table 1 - Technical Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16 | 5069-IB16F |
|---|---|---|
| On-state voltage, min(1) | 10V DC | |
| On- state voltage, nom(1) | 24V DC | |
| On-state voltage, max(1) | 32V DC | |
| On-state current, min(1) | 5 mA @ 10V | |
| On-state current, nom(1) | 6 mA @ 24V DC | |
| On-state current, max(1) | 7.4 mA @ 32V DC | |
| Off-state voltage, max(1) | 5V DC | |
| Off-state current, min(1) | 1.5 mA | |
| Input impedance, nom | 4.1 kΩ | |
| Input impedance, max | 7.0 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<br>On to Off | <br>≤ 100 µs, ±10 µs @ 25 °C (77 °F)<br>≤ 100 µs, ±10 µs @ 25 °C (77 °F) | <br>≤ 10 µs, ±10 µs @ 25 °C (77 °F)<br>≤ 10 µs, ±10 µs @ 25 °C (77 °F) |
| Input drift | 10 ns/°C (°F) | < 10 ns/°C (°F) |
| Input drift over temperature span | ±100 ns/°C (°F) 0...60 °C (32…140 °F) | ±10 ns/°C (°F) 0...60 °C (32…140 °F) |
| Input On to Off minimum pulse width | ≤ 60 µs | ≤ 6 µs |
| Input Off to On minimum pulse width | ≤ 60 µs | ≤ 6 µs |
| Input filter time<br>Off to On<br><br><br>On to Off | <br>Hardware delay: 50 µs + filter time<br>User-selectable filter time: 0…50 ms<br><br>Hardware delay: 50 µs + filter time<br>User-selectable filter time: 0…50 ms | <br>Hardware delay: 2 µs + filter time<br>User-selectable filter time: 0…50 ms<br><br>Hardware delay: 3 µs + filter time<br>User-selectable filter time: 0…50 ms |
| Reverse polarity protection | Yes | |

**Table 1 - Technical Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16 | 5069-IB16F |
|---|---|---|
| Overvoltage protection, max | 36V (fuse protected) | |
| Pulse and period measurements | Not supported | ±2 µs |
| Simple counters<br>Counter frequency | 0 - $f_{max}$ = 500 Hz (inv period 2 ms) | 0 - $f_{max}$ = 30 kHz (inv period 33.3 µs) |
| Frequency counter | 0 - $f_{max}$ = 500 Hz (inv period 2 ms) | 0 - $f_{max}$ = 30 kHz (inv period 33.3 µs) |
| Timestamp of inputs | Not supported | ±10 µs accuracy<br>1 ns resolution |
| CIP sync | Not supported | Transport clock, and slave only ordinary clock |
| Overrides | Not supported | |
| Pulse latching | Not supported | Supported |
| Events | Not supported | Four events supported (triggered by any input or simple counters) |
| Pattern matching | Not supported | Supported |
| Extended counters | Not supported | |

(1) Sensor Actuator (SA) Power-related attributes.

**Table 2 - General Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16 | 5069-IB16F |
|---|---|---|
| Inputs | 16 Channels (1 group of 16), sinking | |
| Voltage category | 12/24V DC Sink | |
| Input voltage range | 10…32V DC | |
| Module Power bus (MOD Power) voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current, max | 30 mA | |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A | |
| Sensor Actuator Power bus (SA Power) voltage range | 10…32V DC | |
| Sensor Actuator Power bus (SA Power) current, max | 8 mA per channel<br>128 mA module | |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 10…32V DC | |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A | |
| Power dissipation, max | 3.9 W | |
| Thermal dissipation, max | 16.3 BTU/hr | |
| Isolation voltage | 300V (continuous), Basic Insulation Type<br>No isolation between SA Power and input ports<br>No isolation between individual input ports | |
| Module keying | Electronic keying via programming software | |
| Indicators | 1 green/red module status indicator<br>16 yellow I/O status indicators | |
| Slot width | 1 | |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) | |

**Table 2 - General Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16 | 5069-IB16F |
|---|---|---|
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) | |
| Removable terminal block | 5069-RTB18-SPRING RTB<br>5069-RTB18-SCREW RTB | |
| Terminal screw torque (5069-RTB18-SCREW only) | 0.4 N·m (3.5 lb·in) | |
| RTB keying | None | |
| Wire category(3) | 2 - input ports<br>2 - power ports<br>1 wire per terminal for each signal port | |
| Wire size | 5069-RTB18-SPRING connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only.<br><br>5069-RTB18-SCREW connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only. | |
| Insulation stripping length | 5069-RTB18-SPRING connections: 10 mm (0.39 in.)<br>5069-RTB18-SCREW connections: 12 mm (0.47 in.) | |
| Weight, approx | 175 g (0.39 lb) | |
| Enclosure type | None (open-style) | |
| North American temp code | T4 | |
| ATEX/IECEx temp code | T4 | |
| IECEx Temp Code | T4 | |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 3 - Environmental Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16, 5069-IB16F |
|---|---|
| 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…60 °C (32…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) | 4.6 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 |

**Table 3 - Environmental Specifications - 5069-IB16 and 5069-IB16F**

| Attribute | 5069-IB16, 5069-IB16F |
|---|---|
| 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…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>±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 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 |

**Table 4 - Certifications - 5069-IB16 and 5069-IB16F**

| Certification(1) | 5069-IB16, 5069-IB16F |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

## 5069-IB6F-3W Digital 3-wire Sinking Input Module

Figure 3 shows a wiring diagram for the 5069-IB6F-3W module.

**Figure 3 - 5069-IB6F-3W Wiring Diagram**

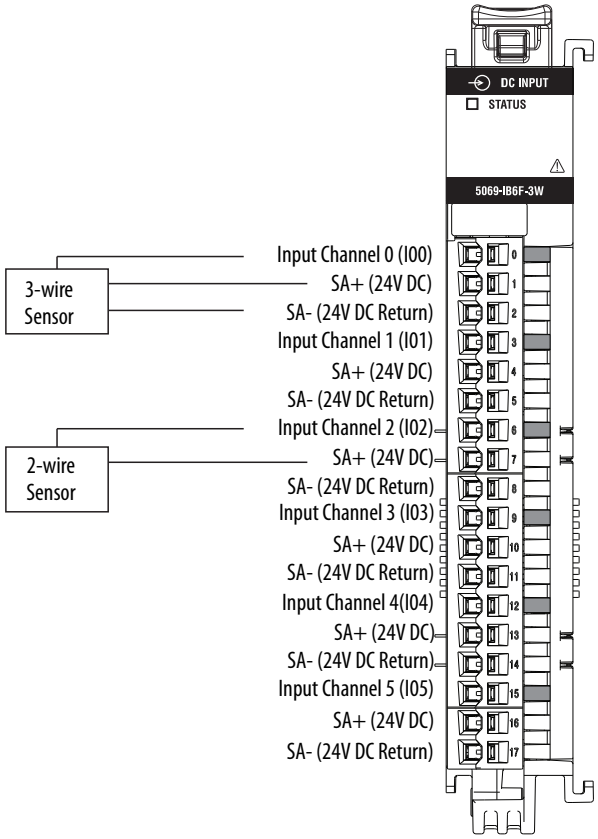



Figure 4 shows a functional block diagram for the 5069-IB6F-3W module.

**Figure 4 - 5069-IB6F-3W Functional Block Diagram**

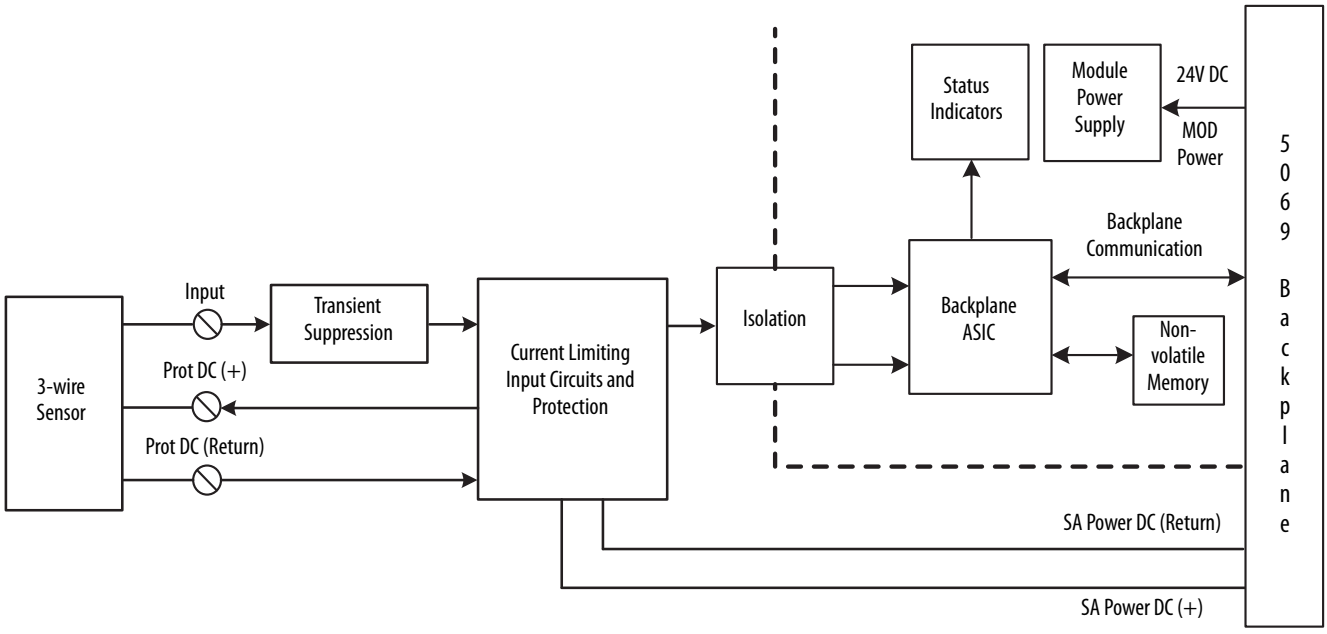


**Table 5 - Technical Specifications - 5069-IB6F-3W**

| Attribute | 5069-IB6F-3W |
|---|---|
| On-state voltage, min(1) | 10V DC |
| On-state voltage, nom(1) | 24V DC |
| On-state voltage, max(1) | 32V DC |
| Off-state voltage, max(1) | 5V DC |
| On-state current, min(1) | 5 mA @ 10V DC |
| On-state current, nom(1) | 6 mA @ 24V DC |
| On-state current, max(1) | 7.4 mA @ 32V DC |
| Off-state current, min(1) | 1.5 mA |
| Input impedance, nom | 4.1 kΩ |
| Input impedance, input, max | 7.0 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<br>On to Off | <br>≤ 10 µs, ±10 µs @ 25°C (77 °F)<br>≤ 10 µs, ±10 µs @ 25°C (77 °F) |
| Input drift | <10 ns/°C (°F) |
| Input drift over temperature span | ±10 ns/°C (°F) from 0…60 °C (32…140 °F) |
| Input On to Off minimum pulse width | ≤ 6 µs |
| Input Off to On minimum pulse width | ≤ 6 µs |
| Input filter time<br>Off to On<br><br><br>On to Off | <br>Hardware delay: 2 µs + filter time<br>User-selectable filter time: 0…50 ms<br><br>Hardware delay: 3 µs + filter time<br>User-selectable filter time: 0…50 ms |
| Reverse polarity protection | Yes |
| 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) |
| Timestamp of inputs | ±10 µs accuracy<br>1 ns resolution |
| CIP sync (PTP0 clock) | Transport clock, and slave only ordinary clock |
| Overrides | Not supported |
| Pulse latching | Supported |
| Events | 4 events supported (triggered by any input or simple counters) |
| Pattern matching | Supported |
| Extended counters | Not supported |

(1) Sensor Actuator (SA) Field Power related attributes.

**Table 6 - General Specifications - 5069-IB6F-3W**

| Attribute | 5069-IB6F-3W |
|---|---|
| Inputs | 6 Channels (1 group of 6), sinking |
| Voltage category | 12/24V DC Sink |
| Input voltage range | 10…32V DC |
| Module Power bus (MOD Power) voltage range | 18V…32V DC |
| Module Power bus (MOD Power) current, max | 75 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator Power bus (SA Power) voltage range | 10…32V DC |
| Sensor Actuator Power bus (SA Power) current, max | 150 mA per channel<br>900 mA module |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 10…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A |
| Power dissipation, max | 2.4 W |
| Thermal dissipation, max | 8.1 BTU/hr |
| Isolation voltage | 300V (continuous), Basic Insulation Type<br>No isolation between SA Power and input ports<br>No isolation between individual input ports |
| Module keying | Electronic, module keying, software configurable |
| Indicators | 1 green/red module status indicator<br>6 yellow I/O status indicators |
| Slot width | 1 |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |
| Removable terminal block | 5069-RTB18-SPRING<br>5069-RTB18-SCREW |
| Terminal screw torque (5069-TRB18-SCREW) | 0.4 N•m (3.5 lb•in) |
| RTB keying | None |
| Wire category(3) | 2 - input ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| Wire size | 5069-RTB18-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only.<br><br>5069-RTB18-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 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. |
| Insulation stripping length | 5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.)<br>5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type rating | None (Open - style) |
| North American temp code | T4 |
| ATEX/IECEx temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

### Table 7 - Environmental Specifications - 5069-IB6F-3W

| Attribute | 5069-IB6F-3W |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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 discharge<br>8 kV air discharge |
| Radiated RF immunity<br>IEC 61000-4-3 | 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz<br>10V/m with 200 Hz 50% pulse 100% AM @ 900 MHz<br>10V/m with 200 Hz 50% pulse 100% AM @ 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>±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 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 |

### Table 8 - Certifications - 5069-IB6F-3W

| Certification[1] | 5069-IB6F-3W |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |

**Table 8 - Certifications - 5069-IB6F-3W**

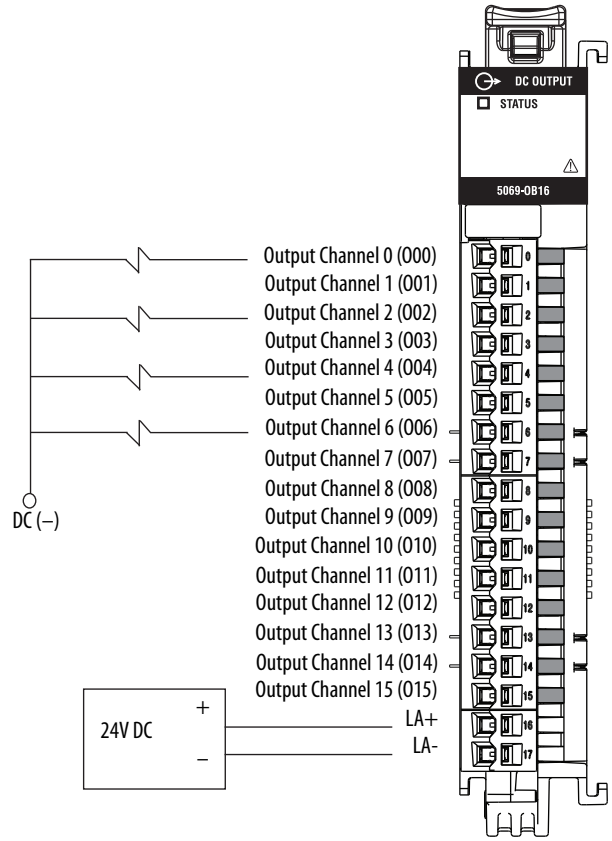
| Certification[1] | 5069-IB6F-3W |
|---|---|
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

## 5069-OB16 and 5069-OB16F Digital 16-point Sourcing Output Modules

Figure 5 shows a wiring diagram for the 5069-OB16 and 5069-OB16F modules.

**Figure 5 - 5069-OB16 and 5069-OB16F Wiring Diagram**




**IMPORTANT**: The Local Actuator (LA+ and LA-) connections are used to supply field-side power to the module.
The module does not draw current from the SA power bus that is internal to the system.

Figure 6 shows a functional block diagram for the 5069-OB16 and 5069-OB16F modules.

**Figure 6 - 5069-OB16 and 5069-OB16F Functional Block Diagram**

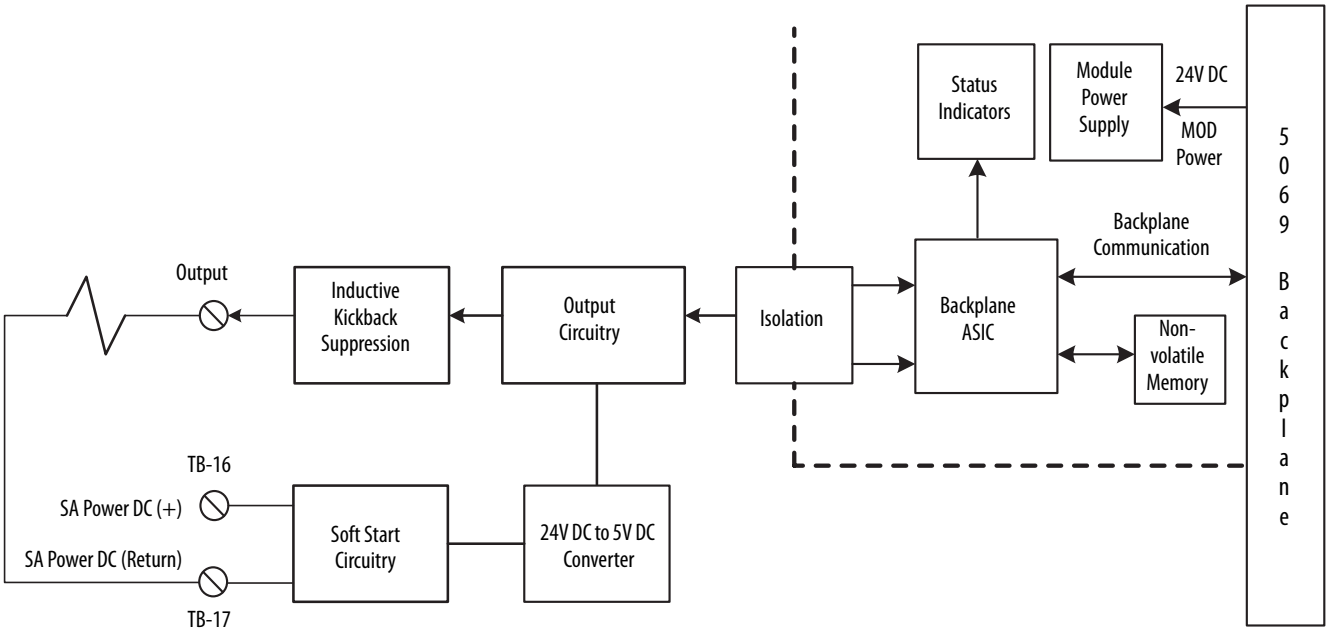



**Table 9 - Technical Specifications - 5069-OB16 and 5069-OB16F**

| Attribute | 5069-OB16 | 5069-OB16F |
|---|---|---|
| On-state voltage, min(1) | 10V DC | |
| On-state voltage, nom(1) | 24V DC | |
| On-state voltage, max(1) | 32V DC | |
| On-state voltage drop, max(1) | <0.2V DC | |
| On-state current per channel, min(1) | 3.0 mA min for open load diagnostics<br>1.0 mA min diagnostics disabled | |
| Off-state voltage, max(1) | 5V DC with 1 mA min load | |
| Off-state leakage current per point, max | <0.5 mA per point | |
| Output current rating | 0.5 A per channel<br>8 A per module, max | |
| 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<br>On to Off | <br>≤ 100 µs, ±10 µs @ 25 °C (77 °F) @ 0.5 A<br>≤100 µs, ±10 µs @ 25 °C (77 °F) @ 0.5 A | <br>≤ 10 µs @ 25 °C (77 °F) @ 0.5 A<br>≤ 10 µs, @ 25 °C (77 °F) @ 0.5 A |
| Pulse width, min | ≤ 200 µs $T_{on}$ min + $T_{off}$ min @ 0.5 A @ 25 °C (77 °F) | ≤ 20 µs $T_{on}$ min + $T_{off}$ min @ 0.5 A @ 25 °C (77 °F) |
| Output drift | ±100 ns/°C (°F) from 0…60 °C (32…140 °F) @ 0.5 A | ±10 ns/°C (°F) from 0…60 °C (32…140 °F) @ 0.5 A |
| Open load detection diagnostics | Yes (per channel diagnostics) | |
| Output short circuit/overload/overtemp detection | Yes (per channel diagnostics) | |
| Output short circuit/overload protection | Yes | |
| Reverse voltage protection | Yes | |
| Overvoltage protection, max | 36V (fuse protected) | |
| Pilot duty | 0.5 A pilot duty rating per channel @ 10…32V DC | |
| Increased output current capability | Outputs can be paralleled to increase current capability by 0.5 A per channel | |
| Output control in fault state per point | Hold last state, On or Off (Off is default) | |
| States in program mode per point | Hold Last State, On or Off (Off is default) | |
| States in fault mode per point | On or Off (Off is default) | |

**Table 9 - Technical Specifications - 5069-OB16 and 5069-OB16F**

| Attribute | 5069-OB16 | 5069-OB16F |
|---|---|---|
| Duration of fault mode per point | 1, 2, 5, 10 s, Forever (Forever is default) | |
| Scheduled outputs | Not supported | ±10 µs accuracy<br>1 ns resolution |
| CIP sync | Not supported | Supported |

(1) Local Actuator (LA) Field Power related attributes.

**Table 10 - General Specifications - 5069-OB16 and 5069-OB16F**

| Attribute | 5069-OB16 | 5069-OB16F |
|---|---|---|
| Outputs | 16 Channels (1 group of 16), sourcing | |
| Voltage category | 12/24V DC source | |
| Input voltage range | 10…32V DC | |
| Module Power bus (MOD Power) voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current, max | 75 mA | |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A | |
| Local Actuator Power bus (LA Power) voltage range | 10…32V DC | |
| Local Actuator Power bus (LA Power) current, max | 0.5 A per channel<br>8 A module | |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 10…32V DC | |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A | |
| Power dissipation, max | 3.25 W (16 channels @ 0.5 A) | |
| Thermal dissipation, max | 11.09 BTU/hr | |
| Isolation voltage | 300V (continuous), Basic Insulation Type<br>No isolation between LA power and output ports<br>No isolation between individual output ports | |
| Module keying | Electronic, module keying, software configurable | |
| Indicators | 1 green/red module status indicator<br>16 yellow/red I/O status indicators | |
| Slot width | 1 | |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) | |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) | |
| Removable terminal block | 5069-RTB18-SPRING<br>5069-RTB18-SCREW | |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) | |
| RTB keying | None | |
| Wire category(3) | 2 - output ports<br>2 - power ports<br>1 wire per terminal for each signal port | |
| Wire size | 5069-RTB18-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation<br><br>5069-RTB18-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation | |
| Insulation stripping length | 5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.)<br>5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.) | |
| Weight, approx | 175 g (0.39 lb) | |

**Table 10 - General Specifications - 5069-OB16 and 5069-OB16F**

| Attribute | 5069-OB16 | 5069-OB16F |
|---|---|---|
| Enclosure type | None (open - style) | |
| North American Temp code | T4 | |
| ATEX Temp Code | T4 | |
| IECEx Temp Code | T4 | |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 11 - Environmental Specifications - 5069-OB16 and 5069-OB16F**

| Attribute | 5069-OB16, 5069-OB16F |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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…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>±3 kV @ 5 kHz on output 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 output 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 |

**Table 12 - Certifications - 5069-OB16 and 5069-OB16F**

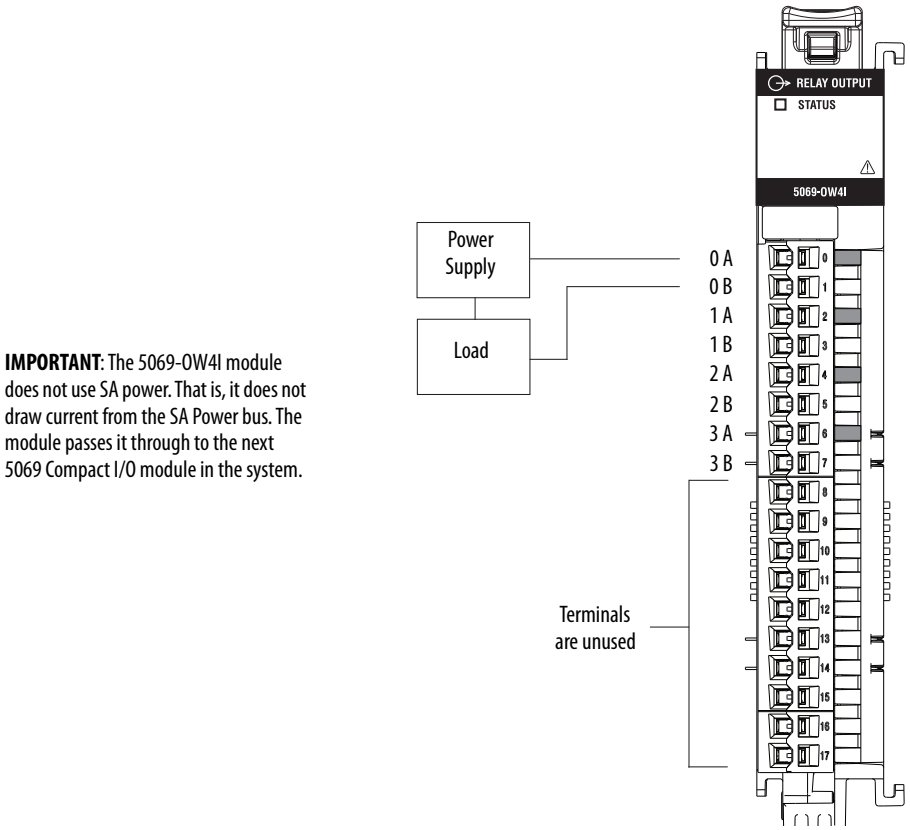
| Certification[1] | 5069-OB16, 5069-OB16F |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. |
| CE | European Union 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

## 5069-OW4I Digital 4-point Isolated Relay Output Module

Figure 7 shows a wiring diagram for the 5069-OW4I module.

**Figure 7 - 5069-OW4I Wiring Diagram**




**IMPORTANT**: The 5069-OW4I 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 5069 Compact I/O module in the system.

Figure 8 shows a functional block diagram for the 5069-OW4I module.

**Figure 8 - 5069-OW4I Functional Block Diagram**

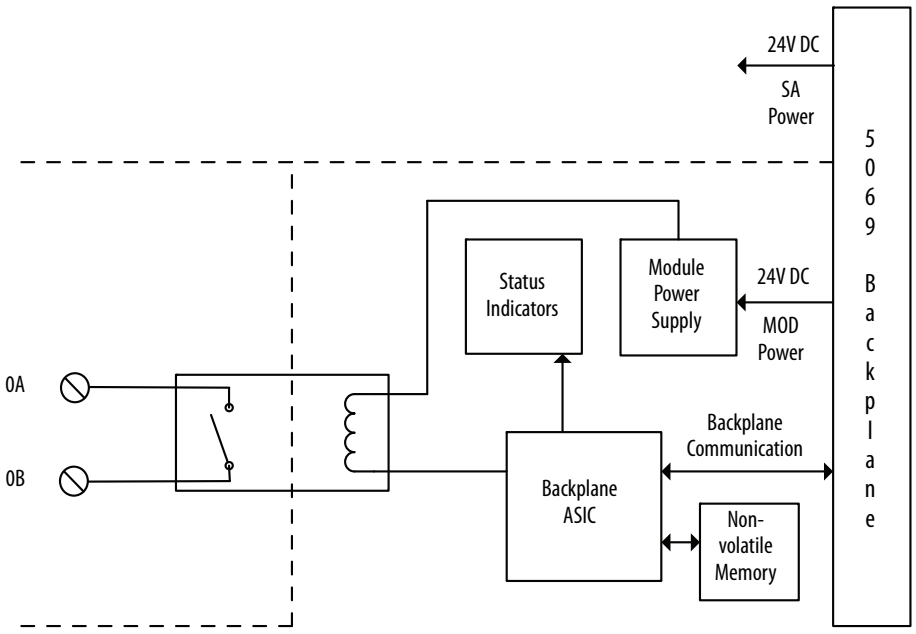


**Table 13 - Technical Specifications - 5069-0W4I**

| Attribute | 5069-0W4I |
|---|---|
| Contact current rating(1) | 5…30V DC, 2 A resistive/channel<br>5…264V AC, 50/60 Hz, 2 A resistive/channel<br>5…250V AC, 50/60 Hz, 2 A general use/channel<br>5…125V AC, 50/60 Hz, 2 A ATEX/IECEx<br>8 A maximum per module |
| 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<br>Off to On<br>On to Off | <br>10 ms<br>10 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 | Hold last state, On or Off (Off is default) |
| States in program mode per point | Hold last state, On or Off (Off is 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) **Surge Suppression** - Connecting surge suppressors across your external inductive load extends the life of the module. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

**Table 14 - General Specifications - 5069-0W4I**

| Attribute | 5069-0W4I |
|---|---|
| Outputs | 4 - Form A (normally open) |
| Input voltage range | 5…125V DC<br>5…264V AC |
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 75 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 0…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A |
| Power dissipation, max | 2.3 W |
| Thermal dissipation, max | 7.85 BTU/hr |
| Isolation voltage | 300V (continuous), Basic Insulation Type |
| Slot width | 1 |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |

**Table 14 - General Specifications - 5069-0W4I**

| Attribute | 5069-0W4I |
|---|---|
| Removable terminal block | 5069-RTB18-SPRING<br>5069-RTB18-SCREW |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) |
| RTB keying | None |
| Wire category(3) | 1 - relay ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| Wire size | 5069-RTB18-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation<br><br>5069-RTB18-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation |
| Insulation stripping length | 5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.)<br>5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 15 - Environmental Specifications - 5069-0W4I**

| Attribute | 5069-0W4I |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| Temperature, storage<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) | 4.6 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 |

**Table 15 - Environmental Specifications - 5069-OW4I**

| Attribute | 5069-OW4I |
|---|---|
| Radiated RF immunity<br>IEC 61000-4-3 | 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>±4 kV @ 5 kHz on relay 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 relay 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 |

**Table 16 - Certifications - 5069-OW4I**

| Certification(1) | 5069-OW4I |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA nC IIC T4 Gc<br>• DEMKO 15 ATEX 1484X<br>When used at or below 125V DC or 30V DC |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA 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 |

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

## 5069-OX4I Digital 4-point Isolated Normally-open/Normally-closed Output Module

Figure 9 shows a wiring diagram for the 5069-OX4I module.

**Figure 9 - 5069-OX4I Wiring Diagram**

**IMPORTANT**: The 5069-OX4I 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 5069 Compact I/O module in the system.

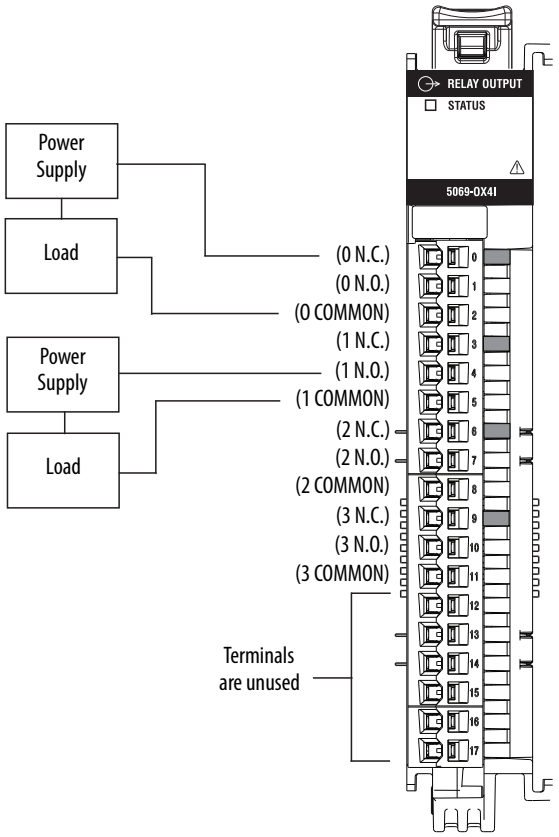



Figure 10 shows a functional block diagram for the 5069-OX4I module.

**Figure 10 - 5069-OX4I Functional Block Diagram**

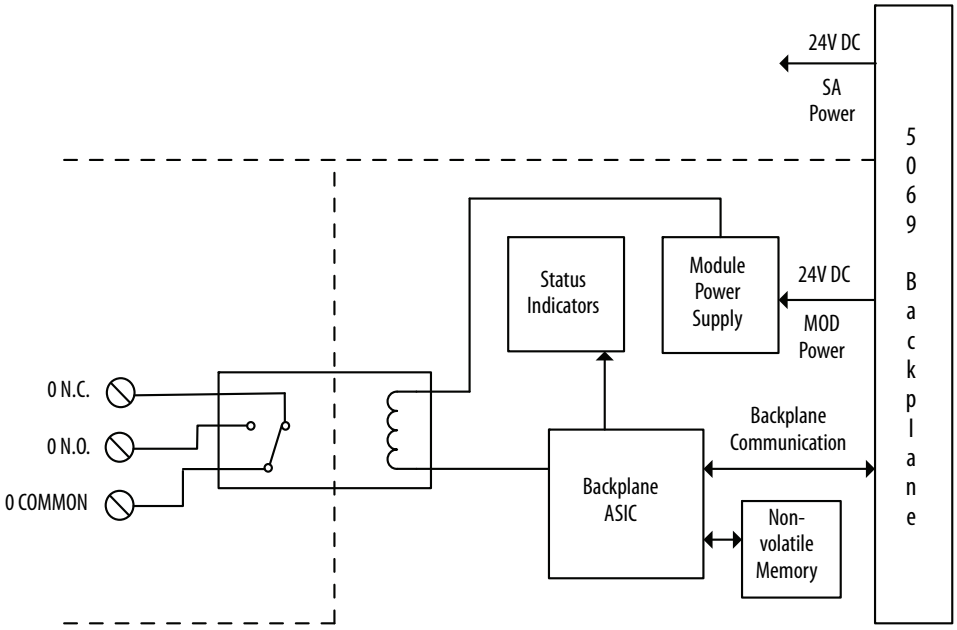


**Table 17 - Technical Specifications - 5069-0X4I**

| Attribute | 5069-0X4I |
|---|---|
| Contact current rating[1] | 5…30V DC, 2 A resistive/channel<br>5…264V AC, 50/60 Hz, 2 A resistive/channel<br>5…250V AC, 50/60 Hz, 2 A general use/channel<br>5…125V AC, 50/60 Hz, 2 A ATEX/IECEx<br>8 A maximum per module |
| 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<br>Off to On<br>On to Off | <br>15 ms<br>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 | Hold last state, On or Off (Off is default) |
| States in program mode per point | Hold last state, On or Off (Off is 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) **Surge Suppression** - Connecting surge suppressors across your external inductive load extends the life of the module. For additional details, see the Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

**Table 18 - General Specifications - 5069-0X4I**

| Attribute | 5069-0X4I |
|---|---|
| Outputs | 4 - Form C (SPDT) |
| Input voltage range | 5…125V DC<br>5…264V AC |
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 75 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max[1] | 9.55 A |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 0…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max[2] | 9.95 A |
| Power dissipation, max | 2.6 W |
| Thermal dissipation, max | 8.88 BTU/hr |
| Isolation voltage | 300V (continuous), Basic Insulation Type |
| Slot width | 1 |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |

**Table 18 - General Specifications - 5069-0X4I**

| Attribute | 5069-0X4I |
|---|---|
| Removable terminal block | 5069-RTB18-SPRING<br>5069-RTB18-SCREW |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) |
| RTB keying | None |
| Wire category(3) | 1 - relay ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| Wire size | 5069-RTB18-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation<br><br>5069-RTB18-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation |
| Insulation stripping length | 5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.)<br>5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 19 - Environmental Specifications - 5069-0X4I**

| Attribute | 5069-0X4I |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| Temperature, storage<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) | 4.6 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…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>±4 kV @ 5 kHz on relay ports |

**Table 19 - Environmental Specifications - 5069-OX4I**

| Attribute | 5069-OX4I |
|---|---|
| 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 relay ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 10Vrms 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 |

**Table 20 - Certifications - 5069-OX4I**

| Certification(1) | 5069-OX4I |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA nC IIC T4 Gc<br>• DEMKO 15 ATEX 1484X<br>When used at or below 125V DC or 30V DC |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA 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 |

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

# Analog I/O Modules

| I/O Type | Cat. No. | Page |
|---|---|---|
| Analog input | 5069-IY4<br>5069-IF8 | 24<br>34 |
| Analog output | 5069-OF4<br>5069-OF8 | 40 |

## 5069-IY4 Analog Input Module

Figure 11 shows a wiring diagram for the 5069-IY4 module when used in current mode.

**Figure 11 - 5069-IY4 Wiring Diagram - Current Mode**

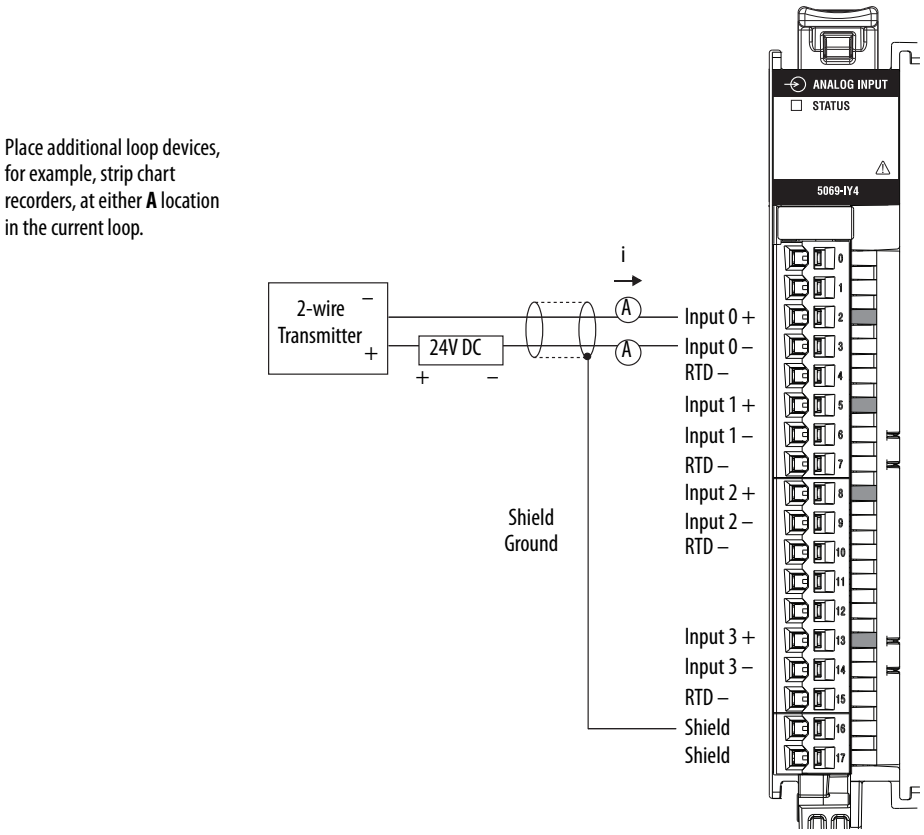


Figure 12 shows a wiring diagram for the 5069-IY4 module when used in voltage mode.

**Figure 12 - 5069-IY4 Wiring Diagram - Voltage Mode**

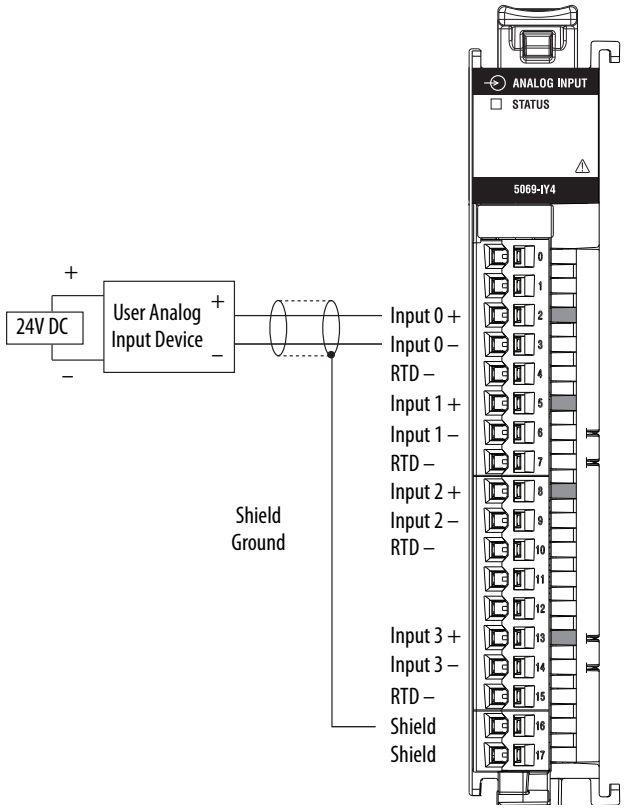



Figure 13 shows a wiring diagram for the 5069-IY4 module when used in 3-wire RTD mode.

**Figure 13 - 5069-IY4 Wiring Diagram - 3-wire RTD**

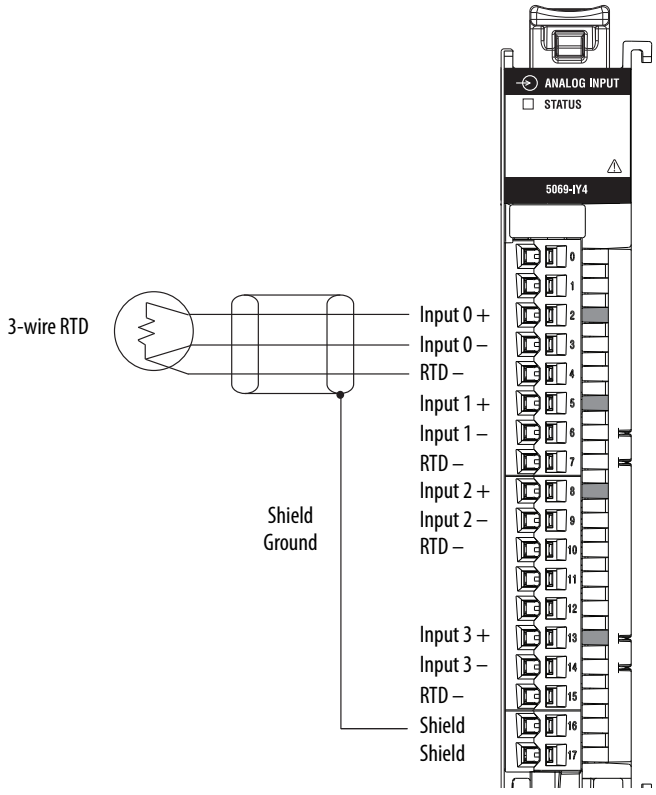


Figure 14 shows a wiring diagram for the 5069-IY4 module when used in 2-wire RTD mode.

**Figure 14 - 5069-IY4 Wiring Diagram - 2-wire RTD**

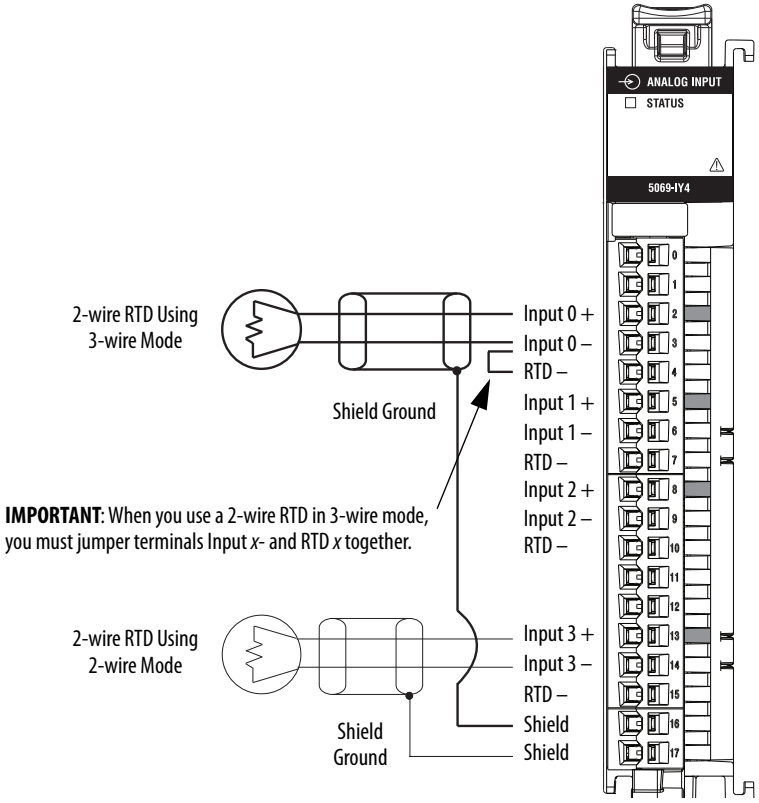



Figure 15 shows a wiring diagram for the 5069-IY4 module when used in thermocouple mode.

**Figure 15 - 5069-IY4 Wiring Diagram - Thermocouple Input**

**IMPORTANT**: When you use the 5069-IY4 analog input module in Thermocouple mode, you must use one of the following CJC type RTBs:

- 5069-RTB14CJC-SPRING (shown)
- 5069-RTB14CJC-SCREW

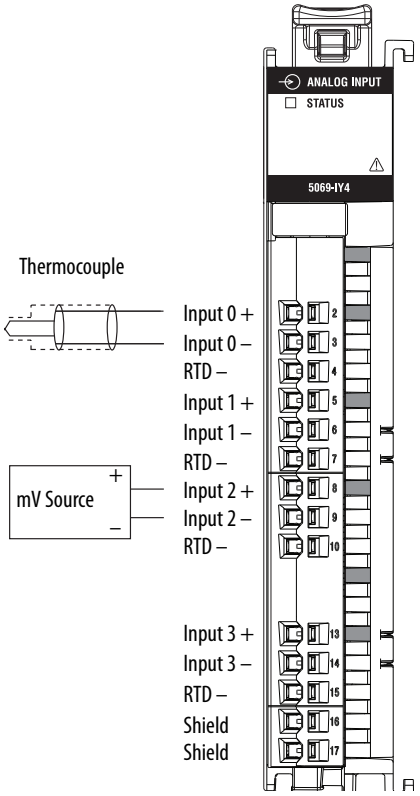


Figure 16 shows a functional block diagram for the 5069-IY4 module.

**Figure 16 - 5069-IY4 Functional Block Diagram**

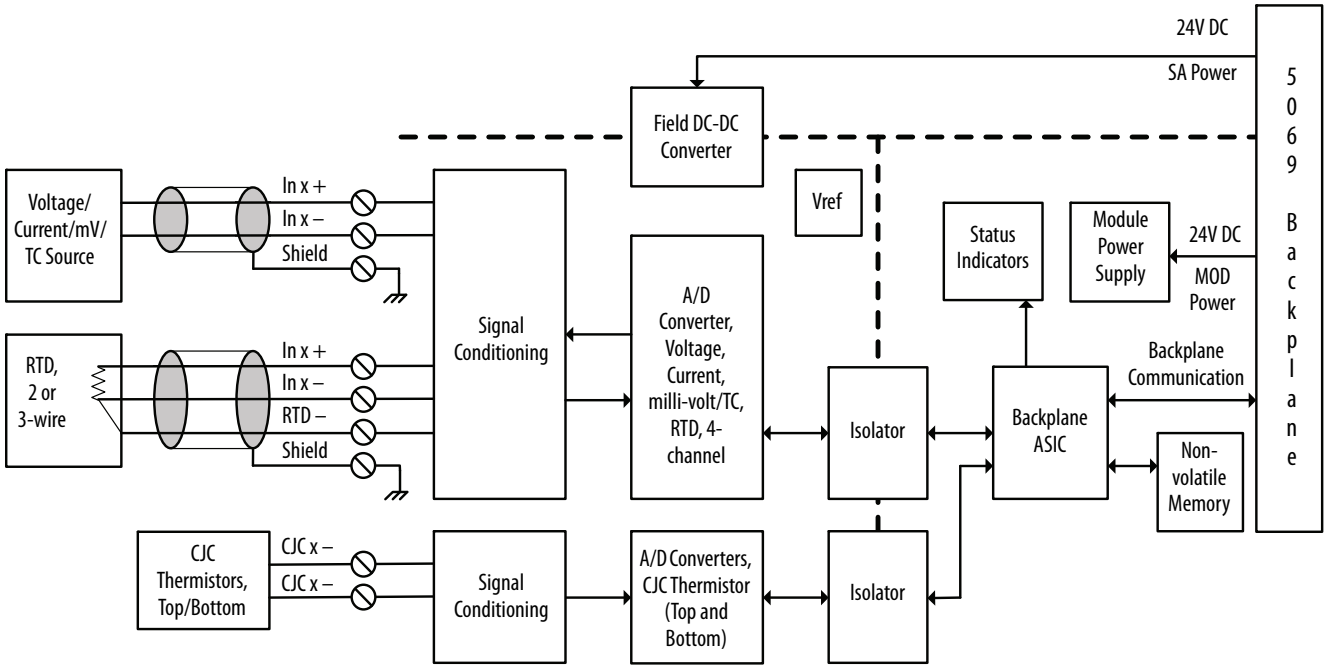



**Table 21 - Technical Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Inputs | 4 differential |
| Input range, voltage | ±10V<br>0…10V<br>0…5V |
| Input range, current | 0…20 mA<br>4…20 mA |
| Input range, RTD | 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 |
| Input range, thermocouple / millivolt | ± 100 mV |
| Input type, thermocouple | B, C, D, E, J, K, L (TXK/XK), N, R, S, T |
| Input impedance | Voltage: >1 MΩ<br>Current: 90 Ω typical, 70…110 Ω range<br>RTD: >1 MΩ<br>Thermocouple/millivolt: >1 MΩ |
| Common mode voltage (channel to channel) | ±10V |

**Table 21 - Technical Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Module conversion method | Sigma-Delta,<br>One 24-bit multiplexed ADC |
| Resolution, voltage[1]<br>(16 bits at 10 Hz notch filter) | ±10.5V: <320 µV/count<br>(15 bits plus sign bipolar)<br>0…10.5V: <160 µV/count<br>(16 bits unipolar)<br>0…5.25V: <80 µ/V count<br>(16 bits unipolar) |
| Resolution, current[1]<br>(16 bits at 10 Hz notch filter) | 0…21 mA: <0.32 µA/count<br>(16 bits)<br>3.6…21 mA: <0.27 µA/count<br>(16 bits) |
| Resolution, RTD[1]<br>(16 bits at 10 Hz notch filter)<br>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[1]<br>(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/temperature range:<br>(Each sensor type in a cell supports all temperature ranges in the corresponding column to the right.) | |
| 100, 200, 500, 1000 Ohm PT 385 | -200…870 °C<br>-328…1598 °F<br>73…1143 °K<br>132…2058 °R |
| 100, 200, 500, 1000 Ohm PT 3916 | -200…630 °C<br>-328…1166 °F<br>73…903 °K<br>132…1626 °R |
| 10 Ohm CU 247 | -200…260 °C<br>-328…500 °F<br>73…533 °K<br>132…960 °R |
| 120 Ohm NI 672 | -80…320 °C<br>-112…608 °F<br>193…593 °K<br>348…1068 °R |
| 100, 120, 200, 500 Ohm NI 618 | -60…250 °C<br>-76…482 °F<br>213…523 °K<br>384…942 °R |

**Table 21 - Technical Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Thermocouple type/temperature range: | |
| Thermocouple Type B | 21…1820 °C<br>68…3308 °F<br>293…2093 °K<br>528…3768 °R |
| Thermocouple Type C | 0…2320 °C<br>32…4208 °F<br>273…2593 °K<br>492…4668 °R |
| Thermocouple Type D | 0…2320 °C<br>32…4208 °F<br>273…2593 °K<br>492…4668 °R |
| Thermocouple Type E | -270…1000 °C<br>-454…1832 °F<br>3…1273 °K<br>6…2292 °R |
| Thermocouple Type J | -210…1200 °C<br>-346…2192 °F<br>63…1473 °K<br>114…2652 °R |
| Thermocouple Type K | -270…1372 °C<br>-454…2502 °F<br>3…1645 °K<br>6…2961 °R |
| Thermocouple Type N | -270…1300 °C<br>-454…2372 °F<br>3…1573 °K<br>6…2832 °R |
| Thermocouple Type R | -50…1768 °C<br>-58…3215 °F<br>223…2041 °K<br>402…3674 °R |
| Thermocouple Type S | -50…1768 °C<br>-58…3215 °F<br>223…2041 °K<br>402…3674 °R |
| Thermocouple Type T | -270…400 °C<br>-454…752 °F<br>3…673 °K<br>6…1212 °R |
| Thermocouple Type TXK/XK (L) | -200…800 °C<br>-328…1472 °F<br>73…1073 °K<br>132…1932 °R |
| Thermocouple linearization | ITS-90 |
| CJC inputs<br>(for thermocouple mode use only) | Two CJC sensors<br>2 thermistors embedded in 5069-RTB14CJC-(SCREW or SPRING) RTB<br>-or-<br>2 thermistors wired to 5069-RTB18-(SCREW or SPRING) RTB<br>Thermistor type:<br>Measurement Specialties, Inc. 10K3A1A |
| Local CJC sensor accuracy | ± 0.3 °C |
| Remote CJC sensor accuracy<br>(Based on specified thermistor) | ± 0.3 °C |

**Table 21 - Technical Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Calibrated accuracy at 25°C | Voltage 0.100% full scale<br>Current 0.100% full scale<br>RTD 0.100% full scale<br>Thermocouple/millivolt 0.100% full scale |
| Accuracy drift with temperature | Voltage 0.200% full scale<br>Current 0.300% full scale<br>RTD 0.200% full scale<br>Thermocouple/millivolt 0.200% full scale |
| Input Total Unadjusted Error (TUE)(2)<br>(Over full temperature range) | Voltage 0.300% Full Scale<br>Current 0.400% Full Scale<br>RTD 0.300% Full Scale<br>Thermocouple/millivolt 0.300% Full Scale |
| Scan time<br>Per channel<br>Per group (channel group 0…3) | <br>625 µs<br>2.5 ms |
| Notch filter at minimum RPI<br>(0.2ms, 1 channel enabled) | 62.5 kHz |
| Minimum notch filter frequency at RPI of 2.5ms | 10 kHz |
| Step response time to 63% of value<br>(Notch filter 10 kHz) | 7.5 ms |
| Input notch filter (Hz) selections | 5, 10 (50/60 default), 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 | 1st Order Lag,<br>0 ms (Default) - 10,000 ms (10 s) |
| 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:<br>± 32V 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: + full scale, < 2 s<br>Current: 4…20 mA range, <2 s<br>RTD: <2 s<br>Thermocouple / millivolt: + full scale, <10 s |
| On-board data alarming | Yes |
| Scaling to engineering units | Yes |
| Real-time channel sampling | Yes |
| Data format | IEEE 32-bit floating point |

(1) Notch filter dependent.
(2) Includes offset, gain, non-linearity, and repeatability error terms.

**Table 22 - General Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 75 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max[1] | 9.55 A |
| Sensor Actuator (SA) Field Power voltage range | 18…32V DC |
| Sensor Actuator (SA) Field Power current, max | 100 mA |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 0…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max[2] | 9.95 A |
| 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/millivolt: 6.1 BTU/hr |
| Isolation voltage | 300V (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) |
| Module keying | Electronic, software configurable |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicators<br>2 yellow/red CJC status indicators |
| Slot width | 1 |
| Common mode noise rejection ratio | 130 dB @ 50/60 Hz |
| Normal mode noise rejection ratio | 65 dB @ 50/60 Hz, notch filter dependent |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |
| Removable terminal block | 5069-RTB18-SCREW<br>5069-RTB18-SPRING<br>5069-RTB14CJC-SCREW (Thermocouple mode)<br>5069-RTB14CJC-SPRING (Thermocouple mode) |
| Terminal screw torque<br>(5069-RTB18-SCREW, 5069-RTB14CJC-SCREW) | 0.4 N•m (3.5 lb•in) |
| RTB keying | None |

**Table 22 - General Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Wire category[3] | 2 - shielded input ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| Wire size | 5069-RTB18-SPRING and 5069-RTB14CJC-SPRING connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only.<br><br>5069-RTB18-SCREW and 5069-RTB14CJC-SCREW connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation, single wire connection only. |
| Insulation stripping length | 5069-RTB18-SPRING, 5069-RTB14CJC-SPRING removable terminal blocks: 10 mm (0.39 in.)<br>5069-RTB18-SCREW, 5069-RTB14CJC-SCREW removable terminal blocks: 12 mm (0.47 in.) |
| Enclosure type | None (open-style) |
| Weight, approx | 175 g (0.39 lb) |
| North American temperature code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 23 - Environmental Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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 |

**Table 23 - Environmental Specifications - 5069-IY4**

| Attribute | 5069-IY4 |
|---|---|
| Radiated RF immunity<br>IEC 61000-4-3 | 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>±3 kV @ 5 kHz on shielded 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 |

**Table 24 - Certifications - 5069-IY4**

| Certification[1] | 5069-IY4 |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

## 5069-IF8 Analog 8-channel Current/Voltage Input Module

Figure 17 shows a wiring diagram for the 5069-IF8 module when used in current mode.

**Figure 17 - 5069-IF8 Wiring Diagram - Current Mode**

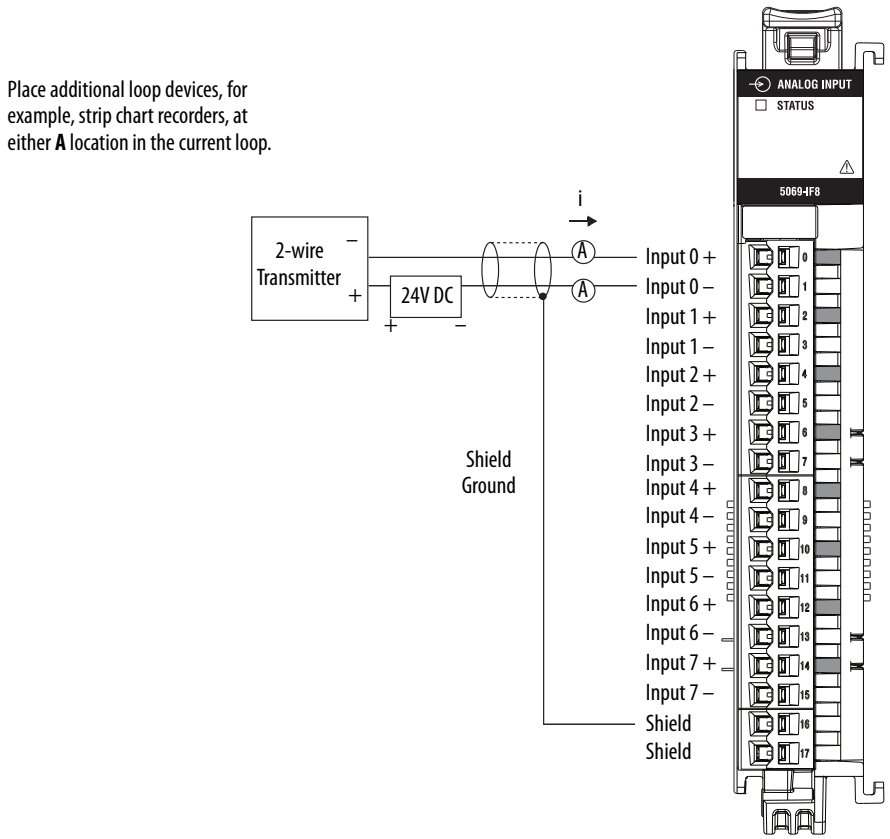


Figure 18 shows a wiring diagram for the 5069-IF8 module when used in voltage mode.

**Figure 18 - 5069-IF8 Wiring Diagram - Voltage Mode**

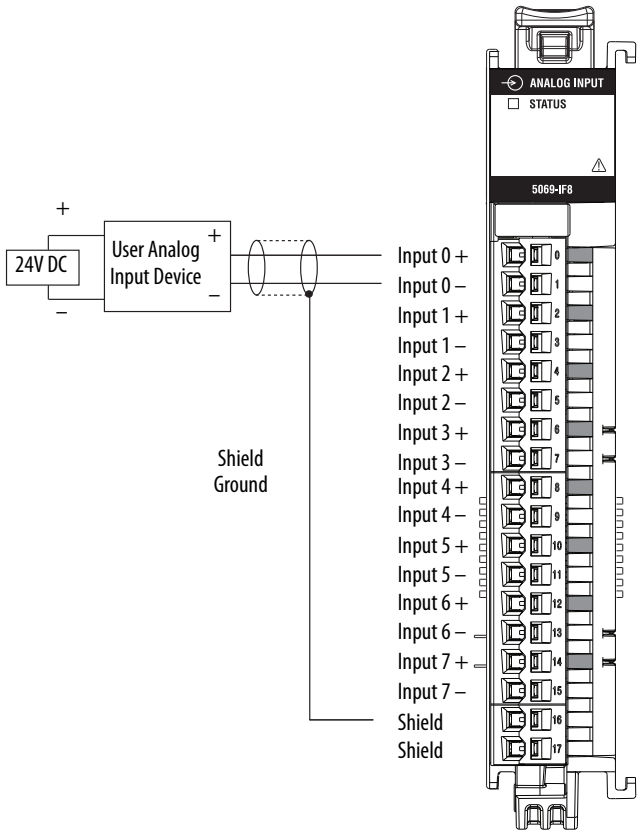



Figure 19 shows a functional block diagram for the 5069-IF8 module.

**Figure 19 - 5069-IF8 Functional Block Diagram**

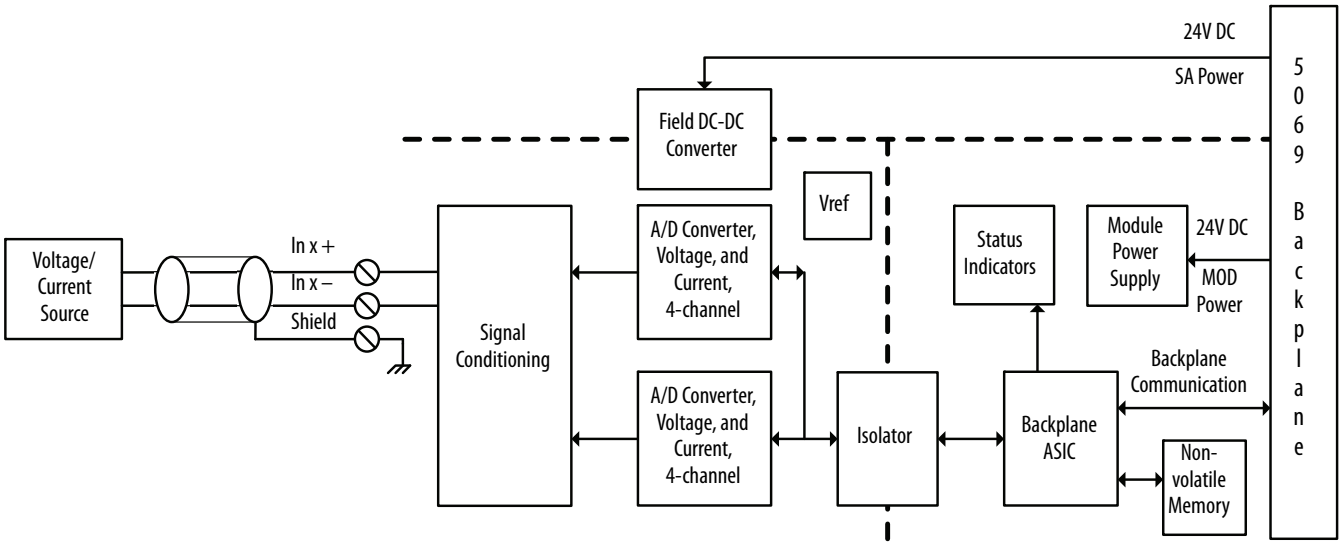


**Table 25 - Technical Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| Inputs | 8 differential |
| Input range, voltage | ±10V<br>0…10V<br>0…5V |
| Input range, current | 0…20 mA<br>4…20 mA |
| Input impedance | Voltage: >1 MΩ<br>Current: 90 Ω typical, 70…110 Ω range |
| Common mode voltage (channel to channel) | ±10V |
| Module conversion method | Sigma-Delta,<br>Two 24-bit multiplexed ADC |
| Resolution, voltage[1]<br>(16 bits at 10 Hz notch filter) | ±10.5V: <320 µV/count<br>(15 bits plus sign bipolar)<br>0…10.5V: <160 µV/count<br>(16 bits unipolar)<br>0…5.25V: <80 µ/V count<br>(16 bits unipolar) |
| Resolution, current[1]<br>(16 bits at 10 Hz notch filter) | 0…21 mA: <0.32 µA/count<br>(16 bits)<br>3.6…21 mA: <0.27 µA/count<br>(16 bits) |
| Calibrated accuracy at 25°C | Voltage 0.100% full scale<br>Current 0.100% full scale |
| Accuracy drift with temperature | Voltage 0.200% full scale<br>Current 0.300% full scale |
| Input Total Unadjusted Error (TUE)[2]<br>(Over full temperature range) | Voltage 0.300% Full Scale<br>Current 0.400% Full Scale |
| 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<br>(0.2ms, 1 channel enabled) | <br>62.5 kHz |
| Minimum notch filter frequency at RPI of 2.5ms | 10 kHz |
| Step response time to 63% of value<br>(Notch filter 10 kHz) | 7.5 ms |
| Input notch filter (Hz) selections | 5, 10 (50/60 Default), 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 | 1st order lag,<br>0 ms (Default) - 10,000 ms (10 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:<br>± 32V DC |
| Overcurrent protection, max | Current mode: ±30 mA |
| Data value during overload condition | Full scale, overrange flag,<br>Data uncertain / data bad |

**Table 25 - Technical Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| Open circuit detection time | Voltage: + full scale, < 2 s<br>Current: 4…20 mA range, <2 s |
| On-board data alarming | Yes |
| Scaling to engineering units | Yes |
| Real-time channel sampling | Yes |
| Data format | IEEE 32-bit floating point |

(1) Notch filter dependent.
(2) Includes offset, gain, non-linearity, and repeatability error terms.

**Table 26 - General Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 75 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator (SA) Field Power voltage range | 18…32V DC |
| Sensor Actuator (SA) Field Power current, max | 100 mA |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 0…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A |
| 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 | 300V (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) |
| Module keying | Electronic, software configurable |
| Indicators | 1 green/red module status indicator<br>8 yellow/red I/O status indicator |
| Slot width | 1 |
| Common mode noise rejection ratio | 130 dB @ 50/60 Hz |
| Normal mode noise rejection ratio | 65 dB @ 50/60 Hz, notch filter dependent |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |

**Table 26 - General Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| Removable terminal block | 5069-RTB18-SCREW<br>5069-RTB18-SPRING |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) |
| RTB keying | None |
| Wire category(3) | 2 - shielded input ports<br>2 - power ports<br>1 wire per terminal for each signal port |
| Wire size | 5069-RTB18-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation<br><br>5069-RTB18-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation |
| Insulation stripping length | 5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.)<br>5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temperature code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 27 - Environmental Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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 |

**Table 27 - Environmental Specifications - 5069-IF8**

| Attribute | 5069-IF8 |
|---|---|
| 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 880% 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>±3 kV @ 5 kHz on shielded 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 |

**Table 28 - Certifications - 5069-IF8**

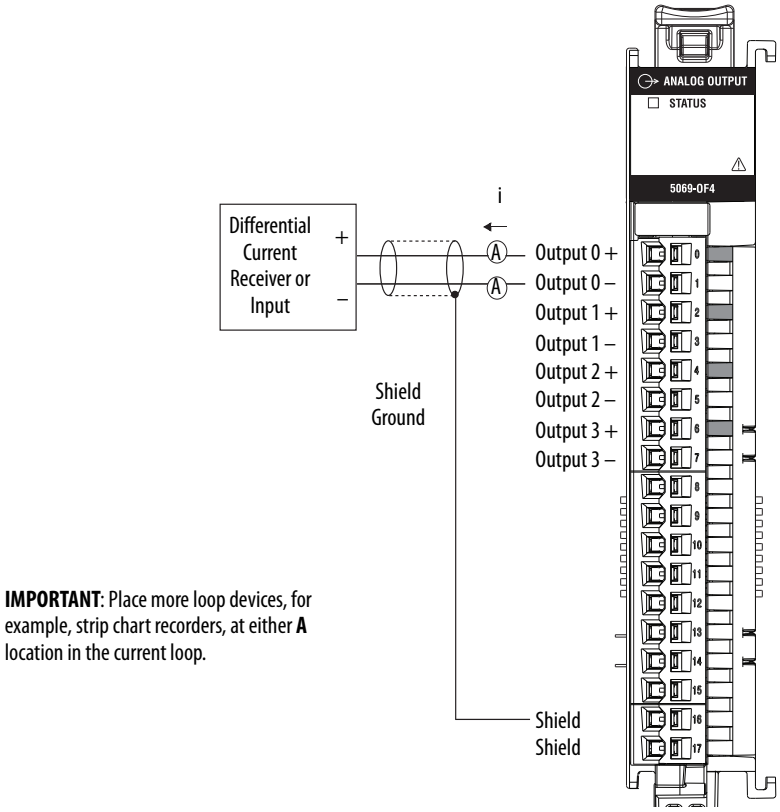
| Certification[1] | 5069-IF8 |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. |
| CE | European Union 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

## 5069-OF4 and 5069-OF8 Analog Current/Voltage Output Modules

Figure 20 shows a wiring diagram for the 5069-OF4 module when used in current mode.

**Figure 20 - 5069-OF4 Wiring Diagram - Current Mode**




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

Figure 21 shows a wiring diagram for the 5069-OF8 module when used in current mode.

**Figure 21 - 5069-OF8 Wiring Diagram - Current Mode**

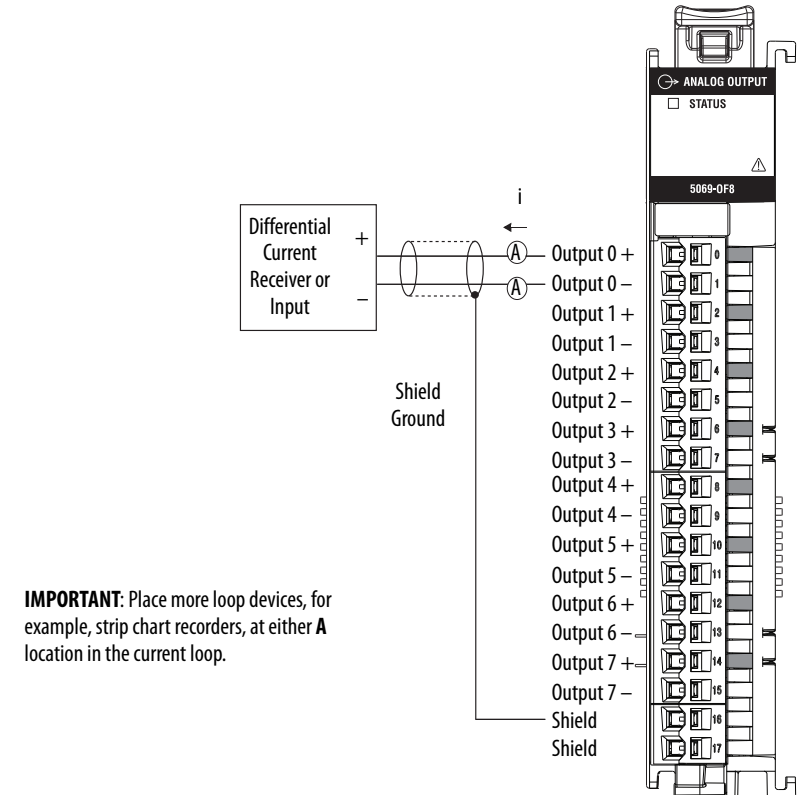



Figure 22 shows a wiring diagram for the 5069-OF4 module when used in voltage mode.

**Figure 22 - 5069-OF4 Wiring Diagram - Voltage Mode**

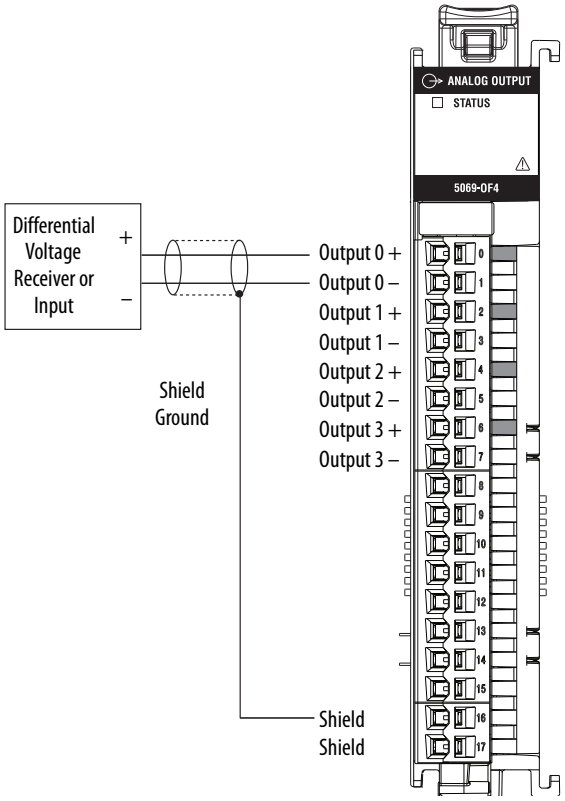


Figure 23 shows a wiring diagram for the 5069-OF8 module when used in voltage mode.

**Figure 23 - 5069-OF8 Wiring Diagram - Voltage Mode**

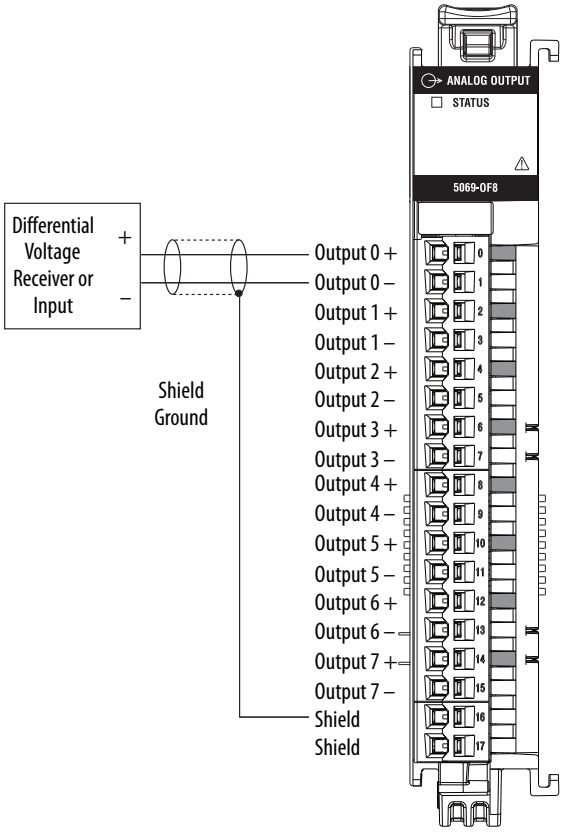



Figure 24 shows a functional block diagram for the 5069-OF4 module.

**Figure 24 - 5069-OF4 Functional Block Diagram**

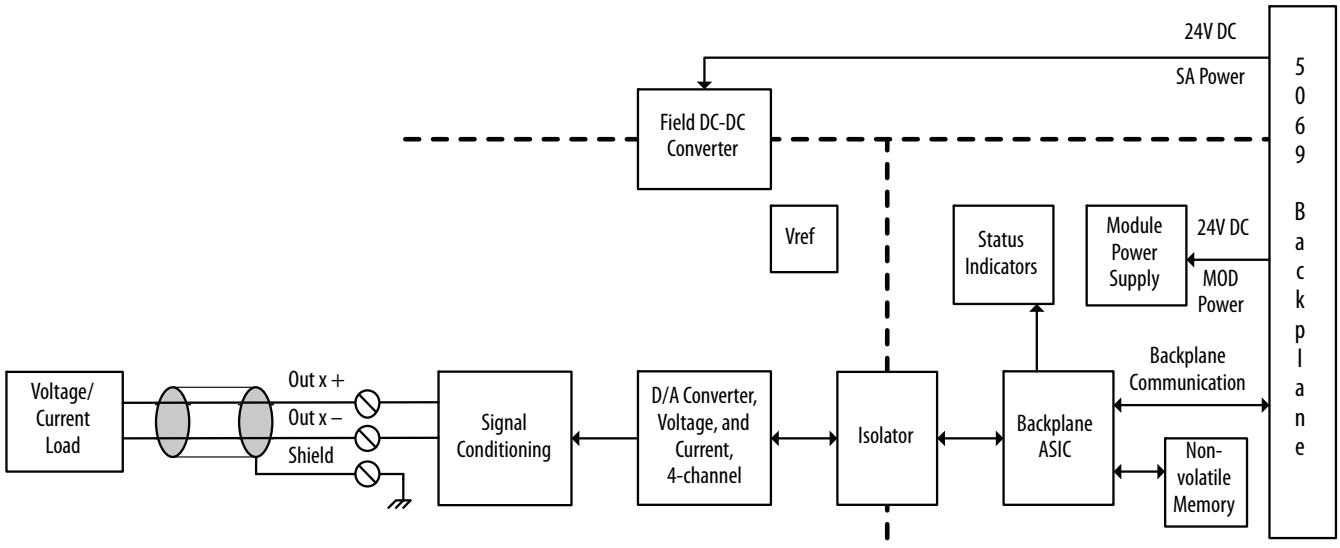


Figure 25 shows a functional block diagram for the 5069-OF8 module.

**Figure 25 - 5069-OF8 Functional Block Diagram**

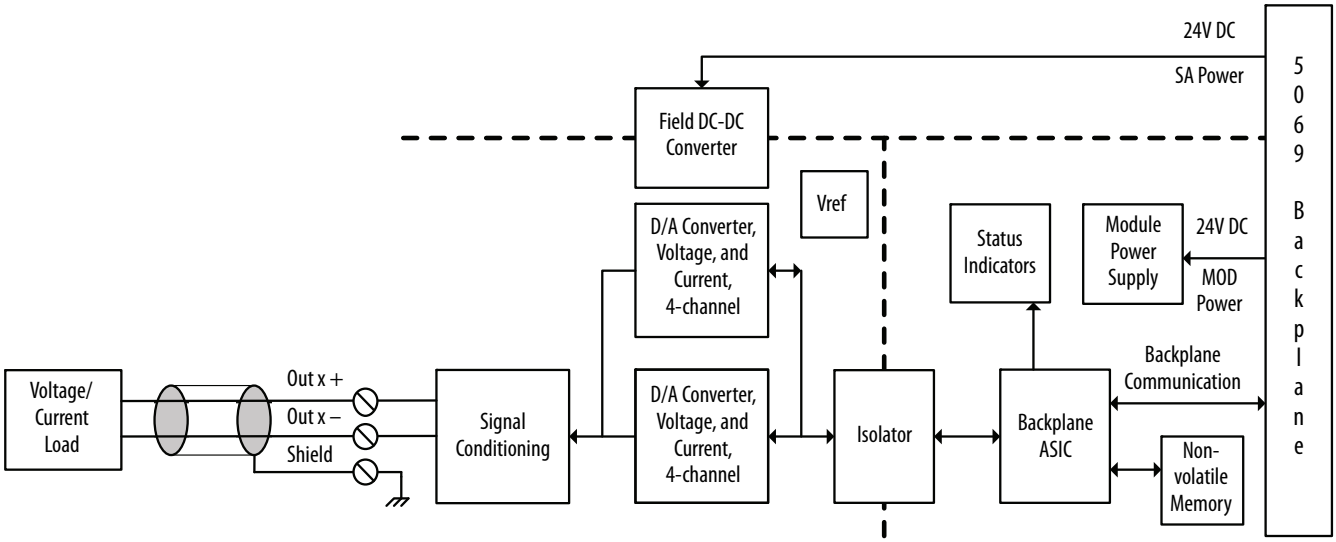



**Table 29 - Technical Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4 | 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 | |
| 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 - 1000 Ω min<br>Current - 500 Ω max | |
| Capacitive load, max (voltage mode only) | 1 µF | |
| Inductive load, max (current mode only) | 1 mH | |
| Open circuit detection | Current mode only | |
| Short circuit detection | Voltage mode only – output electronically limited to 16 mA or less | |
| Data format | IEEE 32-bit floating point | |
| Module conversion method | R-Ladder DAC, monotonicity with no missing codes | |
| Conversion time per channel | 25 µs | |
| Scan time<br>Per group 0…3 (OF4/OF8)<br>Per group 0…7 (OF8 only) | <br>1.0 ms<br>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 | |

**Table 29 - Technical Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4 | 5069-OF8 |
|---|---|---|
| Repeatability | 0.05% | |
| Calibrated accuracy at 25 °C (77 °F) | Voltage - 0.10% full scale<br>Current - 0.10% full scale | |
| Accuracy drift with temperature | Voltage - 0.30% full scale<br>Current - 0.50% full scale | |

**Table 30 - General Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4 | 5069-OF8 |
|---|---|---|
| Module Power bus (MOD Power) voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current, max | 75 mA | |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC | |
| Module Power bus (MOD Power) current rating, max[1] | 9.55 A | |
| Sensor Actuator (SA) Field Power voltage range | 18…32V DC | |
| Sensor Actuator (SA) Field Power current, max | 150 mA | 250 mA |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 18…32V DC | |
| Sensor Actuator Power bus (SA Power) current rating, max[2] | 9.95 A | |
| Power dissipation, max | 3.3 W | 5.3 W |
| Thermal dissipation, max | 11.3 BTU/hr | 18.1 BTU/hr |
| Isolation voltage | 300V (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) | |
| Module keying | Electronic, software configurable | |
| Indicators | 1 green/red module status indicator<br>4 yellow/red I/O status indicators | 1 green/red module status indicator<br>8 yellow/red I/O status indicators |
| Slot width | 1 | |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) | |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) | |
| Removable terminal block | 5069-RTB18-SCREW<br>5069-RTB18-SPRING | |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) | |
| RTB keying | None | |
| Wire category[3] | 2 - shielded input ports<br>2 - power ports<br>1 wire per terminal for each signal port | |

**Table 30 - General Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4 | 5069-OF8 |
|---|---|---|
| Wire size | 5069-RTB18-SCREW removable terminal block<br>0.5…1.5 mm² (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation<br><br>5069-RTB18-SPRING removable terminal block<br>0.5…1.5 mm² (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation | |
| Insulation stripping length | 5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.)<br>5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.) | |
| Weight, approx | 175 g (0.39 lb) | |
| Enclosure type | None (open-style) | |
| North American temp code | T4 | |
| ATEX temp code | T4 | |
| IECEx temp code | T4 | |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 31 - Environmental Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4, 5069-OF8 |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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…200 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>±3 kV @ 5 kHz on shielded output ports |

**Table 31 - Environmental Specifications - 5069-OF4, 5069-OF8**

| Attribute | 5069-OF4, 5069-OF8 |
|---|---|
| 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 output 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 |

**Table 32 - Certifications - 5069-OF4, 5069-OF8**

| Certification(1) | 5069-OF4, 5069-OF8 |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1484X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0055X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

# 5069-HSC2X0B4 High-speed Counter Module

Figure 26 shows a wiring diagram for the 5069-HSC2xOB4 module connected to a differential encoder.

**Figure 26 - 5069-HSC2X0B4 Wiring Diagram - Differential Encoder**

**IMPORTANT**: We recommend that you use twisted pair, individually shielded cable with a maximum length of 300 m (1000 ft) when connecting a differential encoder.

For more information on the cable type to use, see the encoder documentation.

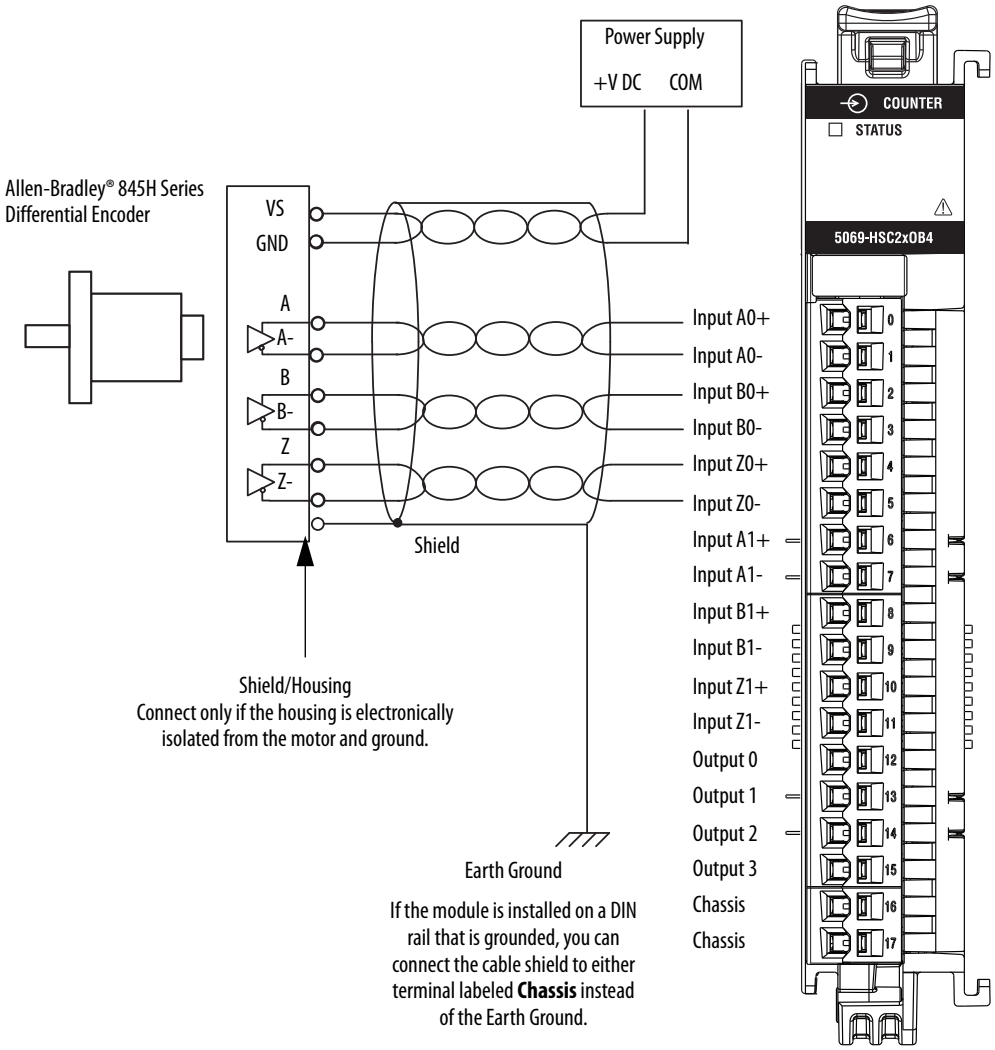
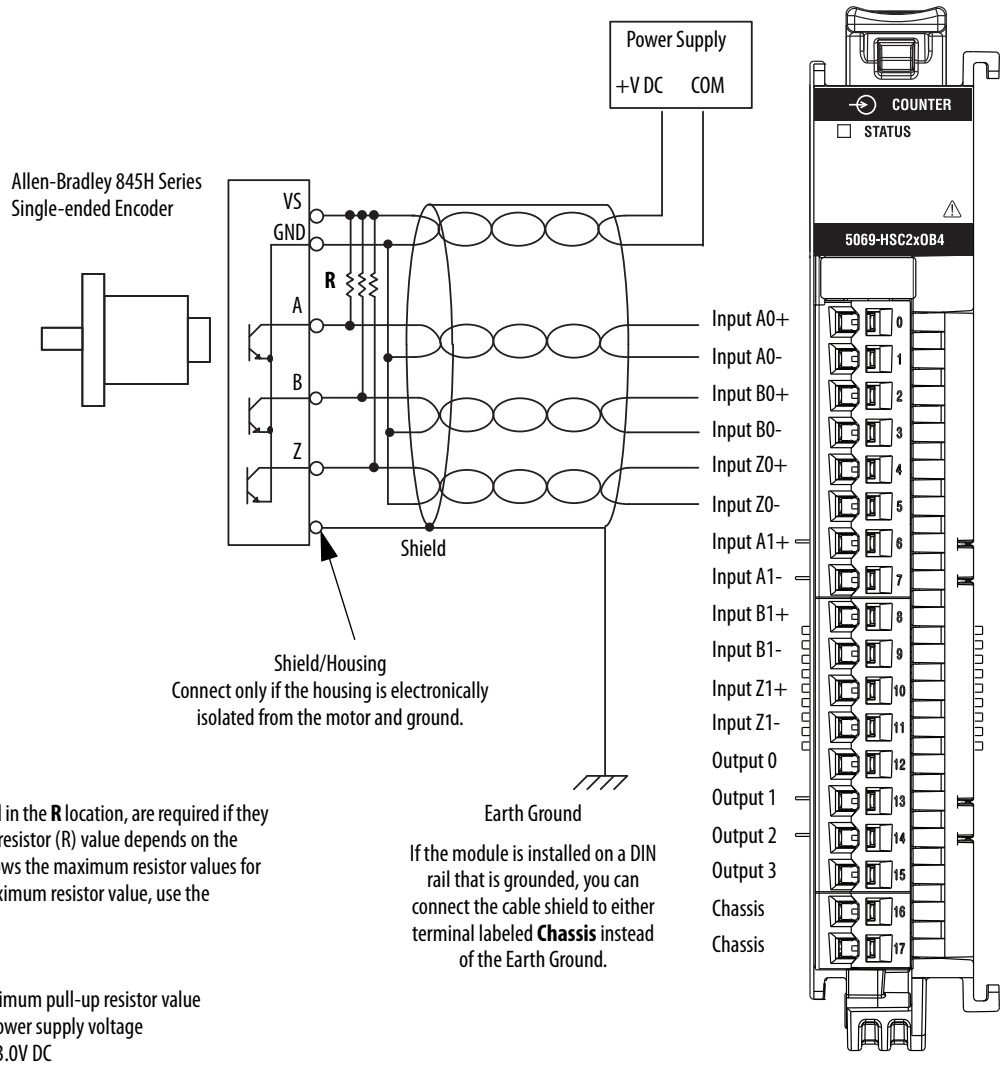


Figure 27 shows a wiring diagram for the 5069-HSC2xOB4 module connected to a single-ended encoder.

**Figure 27 - 5069-HSC2X0B4 Wiring Diagram - Single-ended Encoder**

**IMPORTANT**: We recommend that you use twisted pair, individually shielded cable with a maximum length of 300 m (1000 ft) when connecting a single-ended encoder.

For more information on the cable type to use, see the encoder documentation.




**IMPORTANT**: External resistors, as indicated in the **R** location, are required if they are not internal to the encoder. The pull-up resistor (R) value depends on the power supply value. The following table shows the maximum resistor values for typical supply voltages. To calculate the maximum resistor value, use the following formula:

$$R = \frac{VDC - Vmin}{Imin}$$

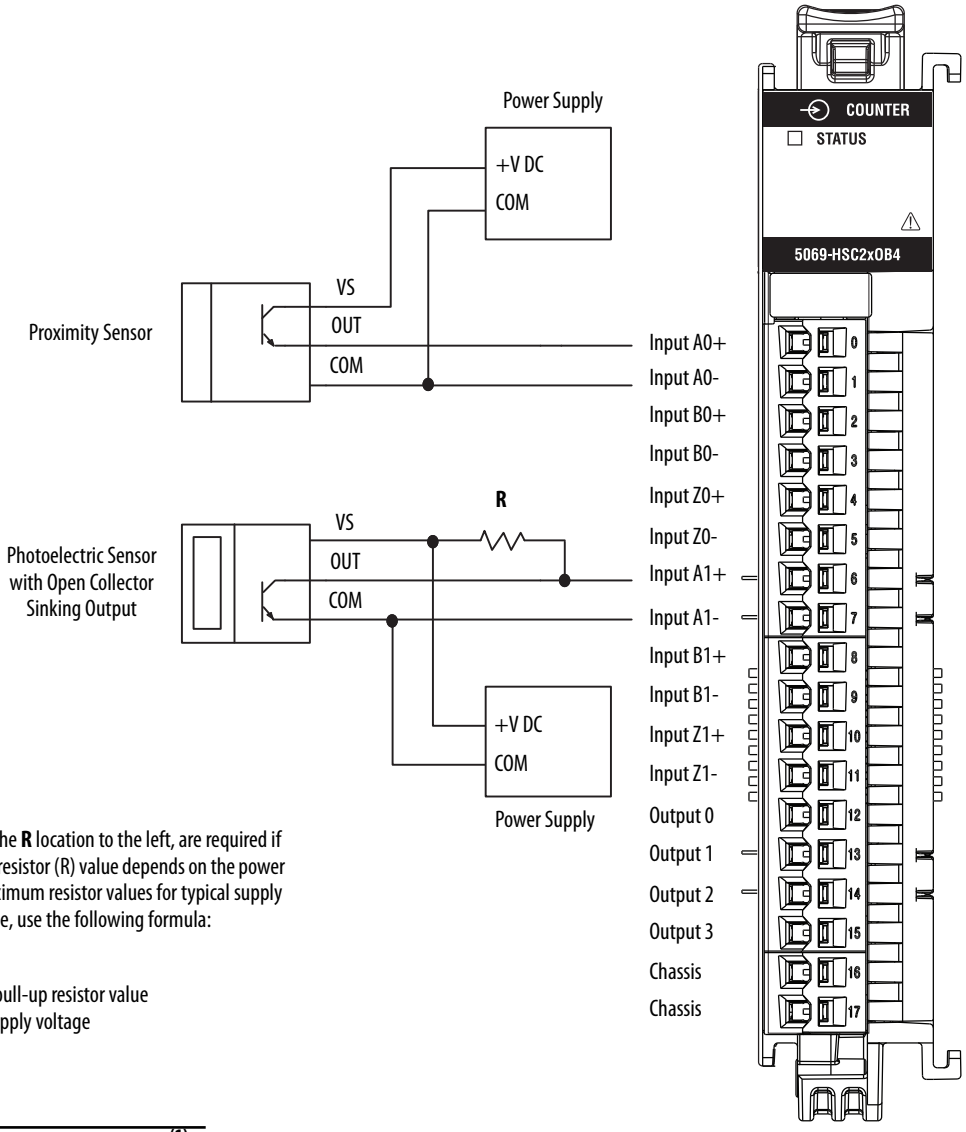
Where:
R = Maximum pull-up resistor value
VDC = Power supply voltage
Vmin = 3.0V DC
Imin = 3.0 mA

| Power Supply Voltage (V DC) | Pull-up Resistor Value (R), Max(1) |
|---|---|
| 5 | 667 Ω |
| 12 | 3000 Ω |
| 24 | 7000 Ω |

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

Figure 28 shows a wiring diagram for the 5069-HSC2xOB4 module connected to a discrete input device.

**Figure 28 - 5069-HSC2X0B4 Wiring Diagram - Discrete Input Devices**




**IMPORTANT**: External resistors, as indicated in the **R** location to the left, are required if they are not internal to the encoder. The pull-up resistor (R) value depends on the power supply value. The following table shows the maximum resistor values for typical supply voltages. To calculate the maximum resistor value, use the following formula:

$$R = \frac{VDC - Vmin}{Imin}$$

Where:
R = Maximum pull-up resistor value
VDC = Power supply voltage
Vmin = 3.0V DC
Imin = 3.0 mA

| Power Supply Voltage (V DC) | Pull-up Resistor Value (R), Max(1) |
|---|---|
| 5 | 667 Ω |
| 12 | 3000 Ω |
| 24 | 7000 Ω |

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

Figure 29 shows a wiring diagram for the 5069-HSC2xOB4 module connected to a discrete output device.

**Figure 29 - 5069-HSC2X0B4 Wiring Diagram - Discrete Output Devices**

**Recommended 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.
For additional details, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

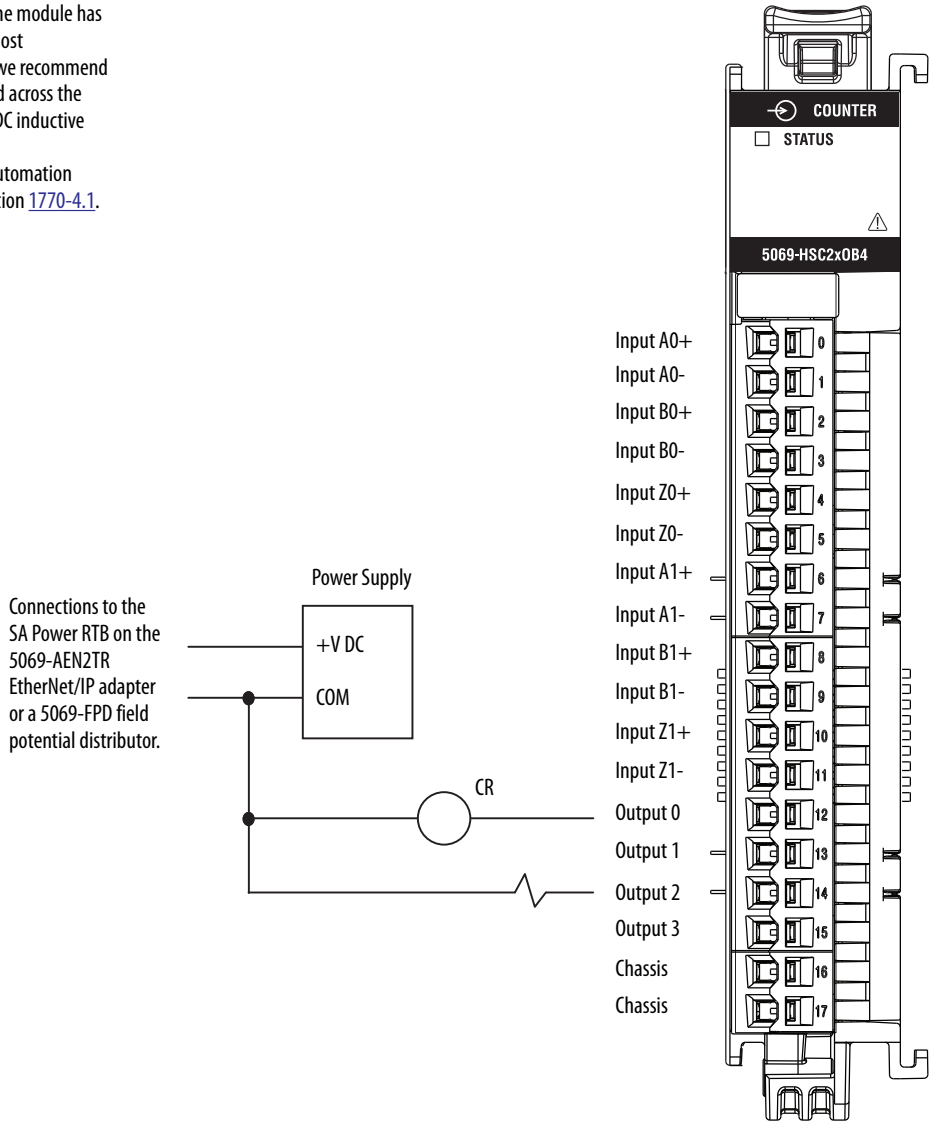
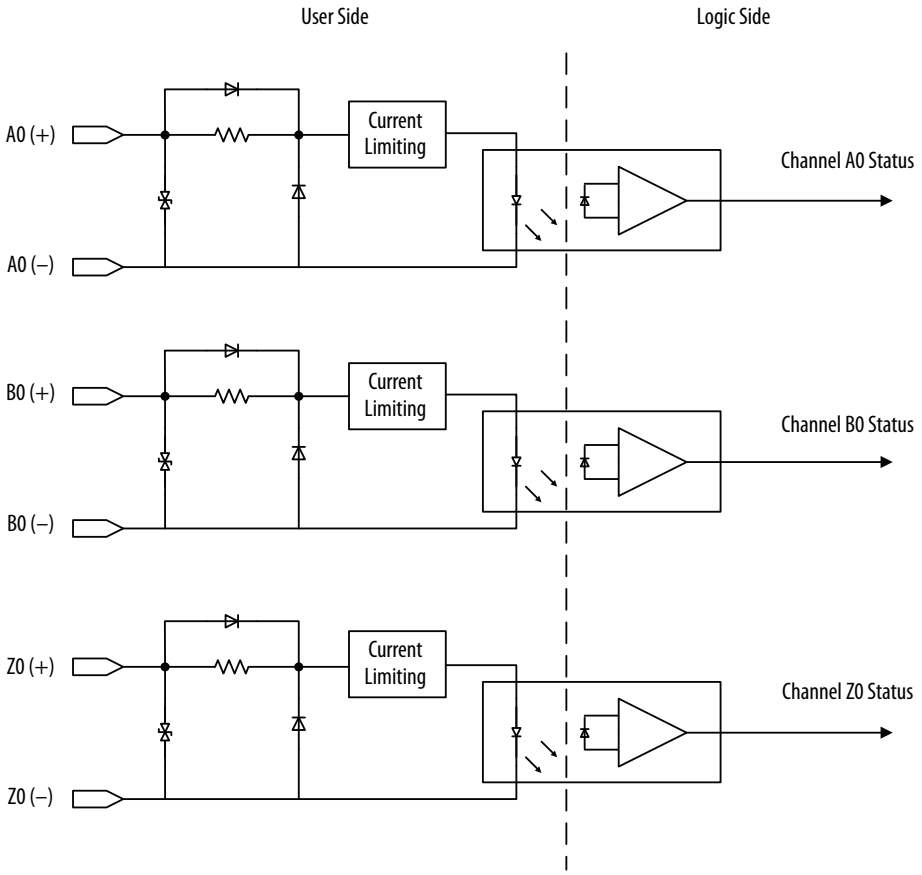


Figure 30 shows functional block diagrams for the 5069-HSC2xOB4 module inputs and outputs.

**Figure 30 - 5069-HSC2xOB4 Functional Block Diagram**

**Module Inputs**

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




**Module Outputs**

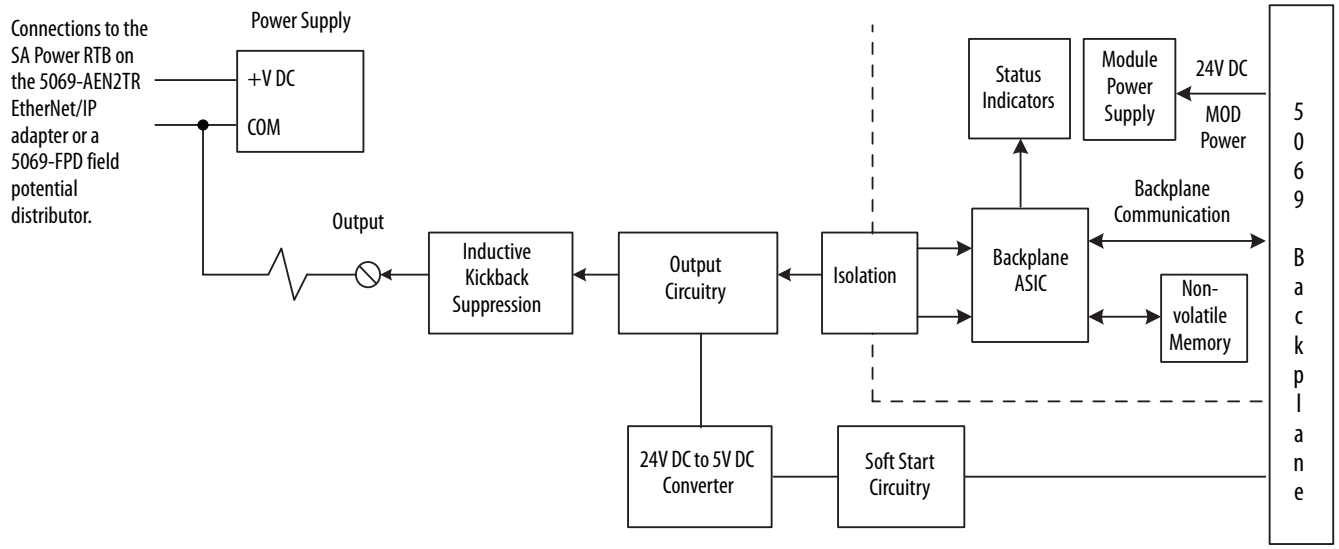


**Table 33 - Technical Specifications - 5069-HSC2x0B4**

| Attribute | 5069-HSC2X0B4 |
|---|---|
| On-state voltage, min | 3V DC |
| On-state voltage, nom | 24V DC |
| On-state voltage, max | 32V DC |
| On-state voltage drop, max | < 0.3V DC |
| On-state current, min | 4 mA |
| Off-state voltage, max | 1.5V |
| Off-state current, max | 1 mA |
| Input current, max | 8 mA |
| Output current rating | 1 A per channel<br>3 A per module, max |
| Pulse width, min | 125 ns |
| Pulse separation, min | 100 ns |
| Open load detection diagnostics | Yes (per channel diagnostics) |
| Output short circuit/overload/overtemp detection | Yes (per channel diagnostics) |
| Output short circuit/overload protection | Yes |
| Reverse voltage protection | 32V DC |
| Overvoltage protection, max | 36V (fuse protected) |
| Pilot duty | Yes (Make current electronically limited/protected @ 3.6 A) |
| Increased output current capability | Outputs can be paralleled to increase current capability by 1 A per channel.<br>Total current per module is limited to 3 A. |
| Output control in fault state per point | Hold last state, On or Off (Off is default) |
| Duration of fault mode per point | 1, 2, 5, 10 s, Forever (Forever is default) |
| States in fault mode per point | On or Off (Off is default) |
| States in program mode per point | Hold Last State, On or Off (Off is default) |
| CIP sync | Supported |

**Table 34 - General 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 |
| Input range, voltage | 3…32V DC |
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 50 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max[1] | 9.55 A |
| Sensor Actuator (SA) Field Power voltage range | 18…32V DC |
| Sensor Actuator (SA) Field Power current, max | 3 A |
| Sensor Actuator Power bus (SA Power) Passthrough voltage range | 18…32V DC |
| Sensor Actuator Power bus (SA Power) current rating, max[2] | 9.95 A |
| Power dissipation, max | 3 W |
| Thermal dissipation, max | 10.2 BTU/hr |

**Table 34 - General Specifications - 5069-HSC2x0B4**

| Attribute | 5069-HSC2x0B4 |
|---|---|
| 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 |
| Module keying | Electronic, software configurable |
| Indicators | 1 green/red module status indicator<br>10 yellow/red I/O status indicator |
| Slot width | 1 |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |
| Removable terminal block | 5069-RTB18-SCREW<br>5069-RTB18-SPRING |
| RTB keying | None |
| Terminal screw torque (5069-RTB18-SCREW) | 0.4 N•m (3.5 lb•in) |
| Wiring category(3) | 2 - on shielded output ports<br>2 - on output power ports<br>2 - on shielded counter ports |
| Wire size | 5069-RTB18-SCREW connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 3.5 mm (0.14 in.) max diameter including insulation<br><br>5069-RTB18-SPRING connections:<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation |
| Insulation stripping length | 5069-RTB18-SCREW removable terminal block: 12 mm (0.47 in.)<br>5069-RTB18-SPRING removable terminal block: 10 mm (0.39 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 35 - Environmental Specifications - 5069-HSC2x0B4**

| Attribute | 5069-HSC2X0B4 |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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 |

**Table 35 - Environmental Specifications - 5069-HSC2x0B4**

| Attribute | 5069-HSC2X0B4 |
|---|---|
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating) | 4.6 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…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 shielded output ports<br>±2 kV @ 5 kHz on shielded counter 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 output ports<br>±2 kV line-earth (CM) on shielded counter ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 10Vrms 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 |

**Table 36 - Certifications - 5069-HSC2x0B4**

| Certification(1) | 5069-HSC2X0B4 |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection “n”<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1455X |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection “n”<br>• II 3 G Ex nA IIC T4 Gc<br>• IECEx UL 15.0007X |
| KC | Korean Registration of Broadcasting and Communications Equipment, compliant with:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

# 5069-FPD Field Potential Distributor

Figure 31 shows wiring diagrams for the 5069-FPD field potential distributor connected to a discrete input device.

**Figure 31 - 5069-FPD Wiring Diagrams**

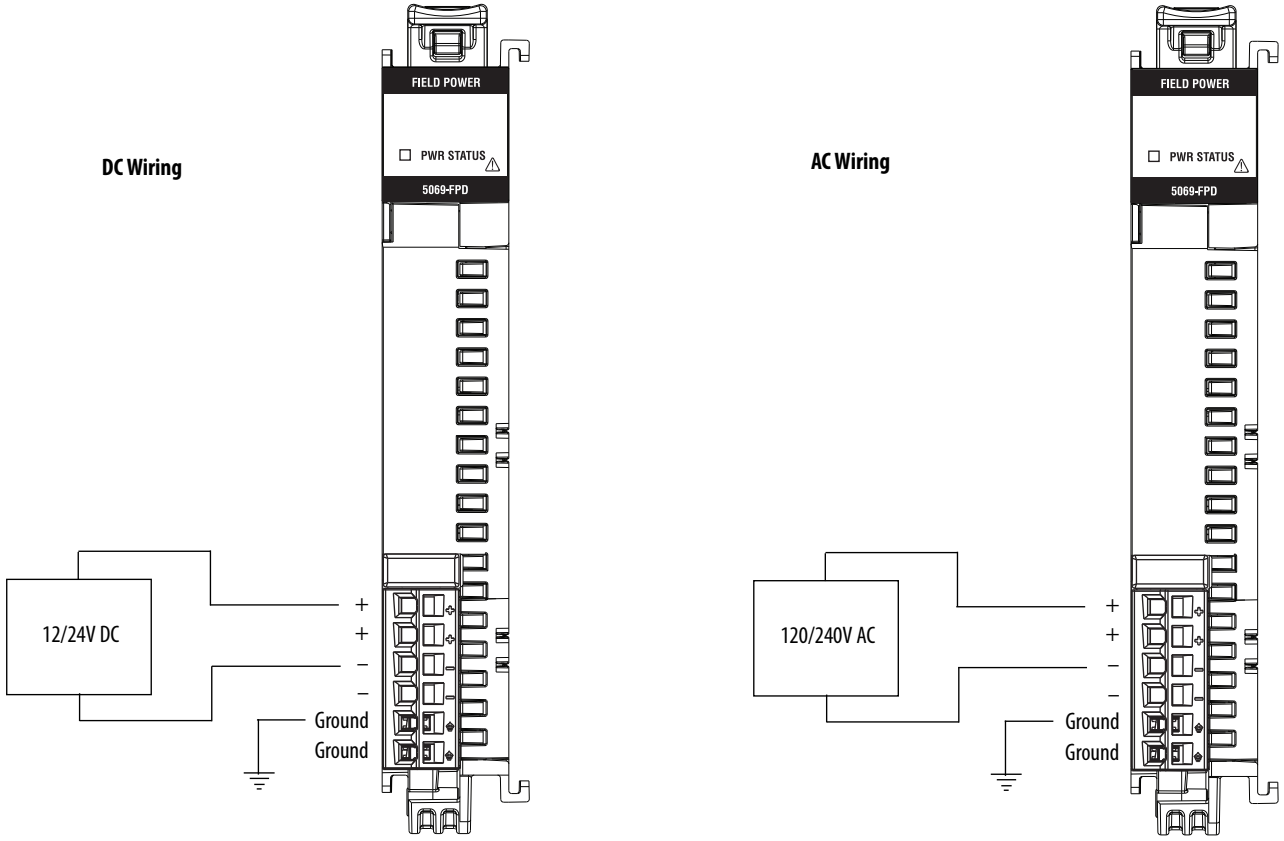



**Table 37 - Technical Specifications - 5069-FPD**

| Attribute | 5069-FPD |
|---|---|
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator (SA) Field Power voltage ranges | 0…32V DC<br>0…240V AC, 47…63 Hz<br>ATEX/IECEX, 125V AC max |
| Sensor Actuator (SA) Field Power current, max | 10 mA (DC power)<br>25 mA (AC power) |
| Sensor Actuator Power bus (SA Power) Passthrough voltage ranges | 0…32V DC<br>0…240V AC, 47…63 Hz<br>ATEX/IECEX, 125V AC max |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.99 A (DC power)<br>9.975 A (AC power) |
| Power dissipation, max | 4.0 W |
| Isolation voltage | 300V (continuous), Basic Insulation Type<br>Type tested at 1500V AC for 60 s |

**Table 37 - Technical Specifications - 5069-FPD**

| | |
|---|---|
| Module keying | None |
| Indicators | 1 green module status indicator |
| Slot width | 1 |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |
| Removable terminal block | 5069-RTB6-SCREW<br>5069-RTB6-SPRING |
| Terminal screw torque (5069-RTB4-SCREW) | 0.4 N•m (3.5 in•lb) |
| RTB keying | None |
| Wire category(3) | 2 - on power ports |
| Wire size | 5069-RTB6-SCREW removable terminal block<br>0.5…1.5 $mm^2$ (22…16 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.<br><br>5069-RTB6-SPRING removable terminal block<br>0.5…1.5 $mm^2$ (22…16 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only. |
| Insulation stripping length | 5069-RTB6-SCREW connections: 12 mm (0.47 in.)<br>5069-RTB6-SPRING connections: 10 mm (0.039 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 38 - Environmental Specifications - 5069-FPD**

| Attribute | 5069-FPD |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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 |

**Table 38 - Environmental Specifications - 5069-FPD**

| Attribute | 5069-FPD |
|---|---|
| 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…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 |
| Surge transient immunity<br>IEC 61000-4-5 | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports |
| Conducted RF immunity<br>IEC 61000-4-6 | 10Vrms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz |

**Table 39 - Certifications - 5069-FPD**

| Certifications(1) | 5069-FPD |
|---|---|
| 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1455X<br>When used at or below 125V AC |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<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:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

# 5069-ARM Address Reserve Module

Figure 32 shows the 5069-ARM module.

**Figure 32 - 5069-ARM Module**

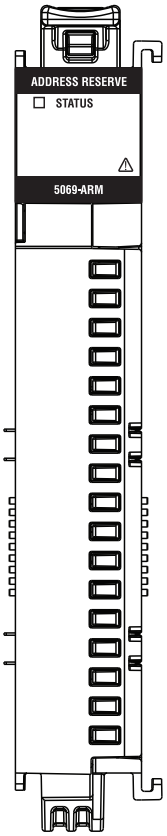



Figure 33 shows a functional block diagram for the 5069-ARM module.

**Figure 33 - 5069-ARM Functional Block Diagram**

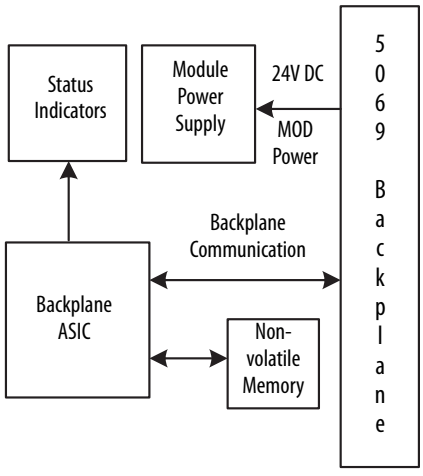


**Table 40 - Technical Specifications - 5069-ARM**

| Attribute | 5069-ARM |
|---|---|
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 45 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator (SA) Field Power voltage ranges | Not used |
| Sensor Actuator (SA) Field Power current, max | Not used |
| Sensor Actuator Power bus (SA Power) Passthrough voltage ranges | 0…32V DC<br>0…240V AC, 47…63 Hz<br>ATEX/IECEX, 125V AC max |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A (DC power)<br>9.975 A (AC power) |
| Power dissipation, max | 1.0 W |
| Module keying | None |
| Indicators | 1 green/red module status indicator |
| Dimensions (HxWxD), approx | 138 x 22 x 105 mm (5.43 x 0.87 x 4.15 in.) |
| DIN rail | Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes:<br>• EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.)<br>• EN50022 - 35 x 15 mm (1.38 x 0.59 in.) |
| Weight, approx | 175 g (0.39 lb) |
| Enclosure type | None (open-style) |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

**Table 41 - Environmental Specifications - 5069-ARM**

| Attribute | 5069-ARM |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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): | 4.6 g @ 10…500 Hz |
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock): | 30 g |

**Table 41 - Environmental Specifications - 5069-ARM**

| Attribute | 5069-ARM |
|---|---|
| Shock, nonoperating<br>IEC 60068-2-27 (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 |
| Voltage variation<br>IEC 61000-4-29: | 10 ms interruption on DC supply ports |

**Table 42 - Certifications - 5069-ARM**

| Certifications(1) | 5069-ARM |
|---|---|
| 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 2004/108/EC 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) |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC ATEX Directive, compliant with:<br>• EN 60079-0; General Requirements<br>• EN 60079-15; Potentially Explosive Atmospheres, Protection "n"<br>• II 3 G Ex nA IIC T4 Gc<br>• DEMKO 15 ATEX 1455X<br>When used at or below 125V AC |
| IECEx | IECEx System, compliant with:<br>• IEC 60079-0; General Requirements<br>• IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"<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:<br>Article 58-2 of Radio Waves Act, Clause 3 |

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

# 5069-AEN2TR EtherNet/IP Communication Adapter

Figure 34 shows a wiring diagram for how to connect MOD power to the 5069-AEN2TR EtherNet/IP adapter.

**Figure 34 - 5069-AEN2TR Wiring Diagram - MOD Power (DC)**

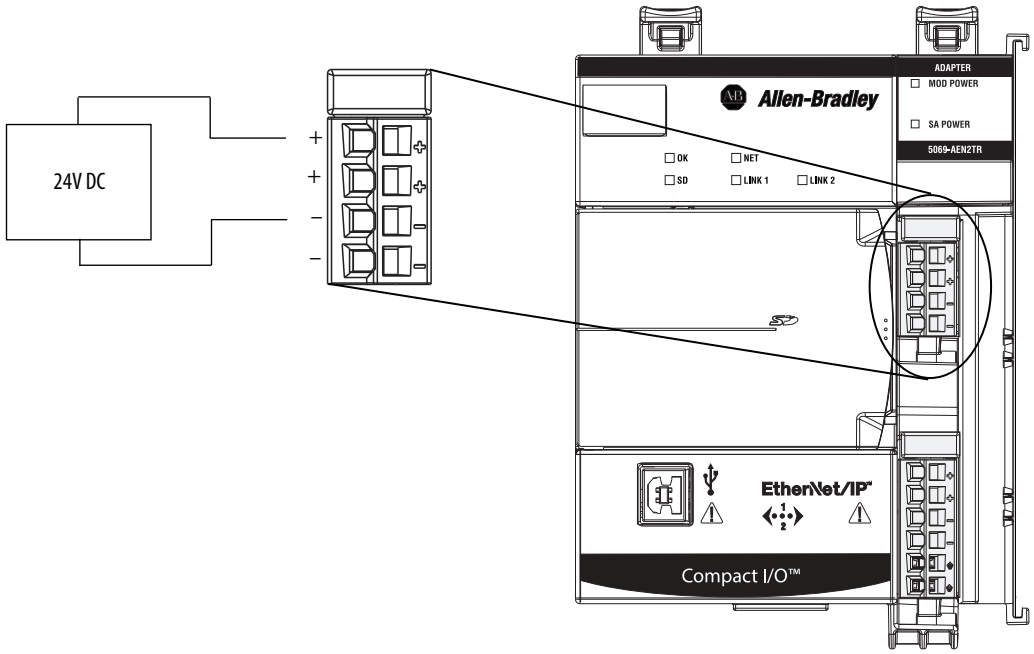



Figure 35 shows a wiring diagram for how to connect SA power (DC) to the 5069-AEN2TR EtherNet/IP adapter.

**Figure 35 - 5069-AEN2TR Wiring Diagram - SA Power (DC)**

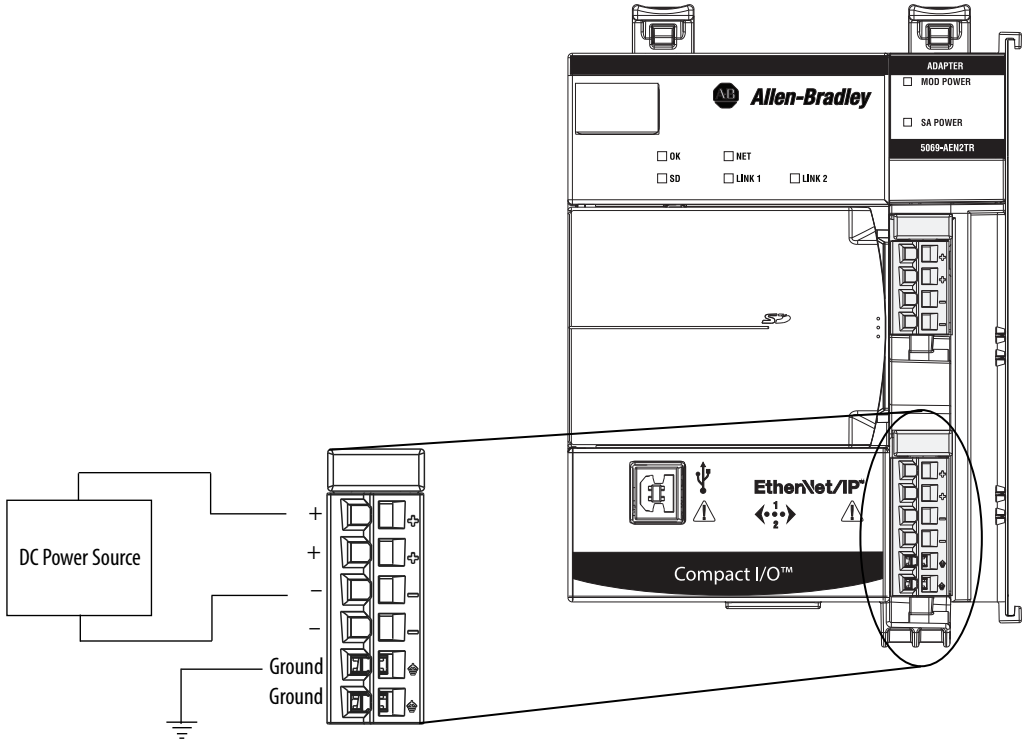


Figure 36 shows a wiring diagram for how to connect SA power (AC) to the 5069-AEN2TR EtherNet/IP adapter.

**Figure 36 - 5069-AEN2TR - Wiring Diagram - SA Power (AC)**

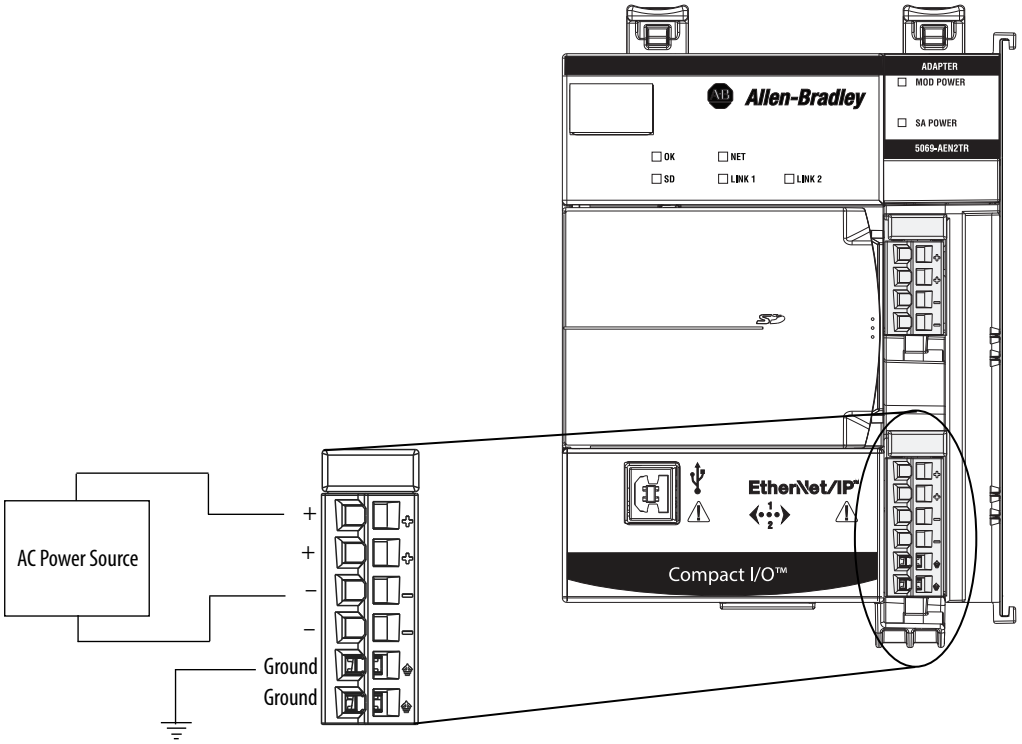



**Table 43 - Technical Specifications**

| Attribute | 5069-AEN2TR |
|---|---|
| Enclosure type rating | None (open-style) |
| Module Power bus (MOD Power) voltage range | 18…32V DC |
| Module Power bus (MOD Power) current, max | 450 mA |
| Module Power bus (MOD Power) inrush | 850 mA |
| Module Power bus (MOD Power) Passthrough voltage range | 18…32V DC |
| Module Power bus (MOD Power) current rating, max(1) | 9.55 A |
| Sensor Actuator (SA) Field Power voltage ranges | 0…32V DC<br>0…240V AC, 47…63 Hz<br>ATEX/IECEX, 125V AC max |
| Sensor Actuator (SA) Field Power current, max | 10 mA (DC power)<br>25 mA (AC power) |
| Sensor Actuator Power bus (SA Power) Passthrough voltage ranges | 0…32V DC<br>0…240V AC, 47…63 Hz<br>ATEX/IECEX, 125V AC max |
| Sensor Actuator Power bus (SA Power) current rating, max(2) | 9.95 A (DC power)<br>9.975 A (AC power) |
| Power dissipation, max | 8.5 W |

**Table 43 - Technical Specifications**

| Attribute | 5069-AEN2TR |
|---|---|
| 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>300V (continuous), double insulation type, Ethernet to MOD Power<br>300V (continuous), double insulation type, Ethernet to SA Power<br>50V (continuous), functional insulation type, Ethernet to USB<br>300V (continuous), basic insulation type, USB to backplane<br>300V (continuous), double insulation type, USB to MOD Power<br>300V (continuous), double insulation type, USB to SA Power<br>No isolation between Ethernet ports<br>Type tested at 1500V AC for 60 s |
| Removable terminal block | RTBs are available in separately-ordered 5069 RTB kits. The MOD power connection uses a 4-point RTB, and the SA power connection uses a 6-point RTBs. The following kits are available:<br>• Kit catalog number 5069-RTB64-SCREW contains RTB catalog numbers 5069-RTB6-SCREW and 5069-RTB4-SCREW<br>• Kit catalog number 5069-RTB64-SPRING contains RTB catalog numbers 5069-RTB6-SPRING and 5069-RTB4-SPRING |
| Terminal screw torque (5069-RTB4-SCREW, 5069-RTB6-SCREW) | 0.4 N•m (3.5 lb•in) |
| Wire size | 5069-RTB4-SCREW, 5069-RTB6-SCREW removable terminal blocks<br>0.5...1.5 mm2 (22…16 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<br><br>5069-RTB4-SPRING, 5069-RTB6-SPRING removable terminal blocks<br>0.5...1.5 mm2 (22…16 AWG) solid or stranded copper wire rated at 105°C (221 °F), or greater, 2.9 mm (0.11 in.) max diameter including insulation, single wire connection only |
| Insulation stripping length | 5069-RTB4-SCREW, 5069-RTB6-SCREW removable terminal blocks: 12 mm (0.47 in.)<br>5069-RTB4-SPRING, 5069-RTB6-SPRING removable terminal blocks: 10 mm (0.39 in.) |
| Wiring category(3) | 3 - on USB port<br>2 - on power ports<br>2 - on Ethernet ports |
| North American temp code | T4 |
| ATEX temp code | T4 |
| IECEx temp code | T4 |

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

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

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

**Table 44 - Environmental Specifications**

| Attribute | 5069-AEN2TR |
|---|---|
| Temperature, operating<br>IEC 60068-2-1 (Test Ab, Operating Cold),<br>IEC 60068-2-2 (TestBb, 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) |
| 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) | 4.6 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 |

### Table 44 - Environmental Specifications

| Attribute | 5069-AEN2TR |
|---|---|
| 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 |

### Table 45 - Certifications

| Certifications[1] | 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 2004/108/EC 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 2006/95/EC LVD, compliant with:<br>• EN 61010-2-201; Control Equipment Safety Requirements |
| RCM | Australian Radiocommunications Act, compliant with:<br>EN 61000-6-4; Industrial Emissions |
| Ex | European Union 94/9/EC 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<br>When used at or below 125V AC |
| 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:<br>Article 58-2 of Radio Waves Act, Clause 3 |
| EtherNet/IP | ODVA conformance tested to EtherNet/IP specifications |

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

# Additional Resources

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

| Resource | Description |
|---|---|
| Logix5000 Controllers L8 Design Considerations Reference Manual, publication 1756-RM100 | Provides information about designing your Logix5000 control system using a 1756 ControlLogix™ L8 controller. |
| EtherNet/IP Communication Modules in 5000 Series Systems User Manual, publication ENET-UM004 | Describes how to install, configure, and operating the 5069-AEN2TR EtherNet/IP communication module. |
| 5000 Series Digital I/O Modules User Manual, publication 5000-UM004 | Provides information on how to install, configure, and operate 5000 Series digital I/O modules. |
| 5000 Series Analog I/O Modules User Manual, publication 5000-UM005 | Provides information on how to install, configure, and operate 5000 Series analog I/O modules. |
| 5000 Series High-speed Counter Module User Manual, publication 5000-UM006 | Provides information on how to install, configure, and operate 5000 Series high-speed counter modules. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation® industrial system. |
| Product Certifications website, http://www.rockwellautomation.com/rockwellautomation/certification/overview.page | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Notes:

## Notes:

# Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Rockwell Automation maintains current product environmental information on its website at
http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page.



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