Allen-Bradley 5069-IB16 Compact 5000 Digital 16-point Sinking Input Modules Instruction Manual

Allen-Bradley by ROCKWELL AUTOMATION

Rockwell Automation

Installation Instructions
Original Instructions

Contents

Compact 5000 Digital 16-point Sinking Input Modules

Catalog Numbers 5069-IB16, 5069-IB16F, 506

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The 5069-IB16, 5069-IB16F, and 5069-IB16K digital 16-point sinking input modules detect input transitions on field devices. That is, the modules detect when an input changes state

from OFF to ON or from ON to OFF. The input modules convert input state transition signals to the appropriate logic level used in the controller.
Compact 5000™ I/O modules use the Producer/Consumer communication model. The Producer/Consumer communication model is an intelligent data exchange between module and other system devices in which each module produces data without first being polled.
The modules are used as local I/O modules in CompactLogix™ 5380, Compact GuardLogix® 5380, and CompactLogix 5480, controller systems. They can also be used as remote I/O
modules with CompactLogix 5380, Compact GuardLogix 5380, CompactLogix 5480 controllers, and some other Logix 5000™ controllers.
For more information on how to use Compact 5000 I/O modules, see the publications that are listed in Additional Resources on page 11.=

Summary of Changes

Topic	Pages
Updated graphics	Throughout

ATTENTION: 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.

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN/IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.
This equipment is supplied as open-type equipment for indoor use. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain more information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.
In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for more installation requirements.
- NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

North American Hazardous Location Approval
The following information applies when operating this equipment in hazardous locations.
Products marked “CL I, DIV 2, GP A, B, C, D” are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse
temperature code (lowest “T” number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

WARNING:
Explosion Hazard –

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

European Hazardous Location Approval
The following applies to products marked II 3 G. Such modules:

- Are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to Directive 2014/34/EU See the EC Declaration of Conformity at **rok.auto/certifications** for details.
- The type of protection is “Ex ec IIC T4 Gc” according to EN 60079-7.
- The 5069-IB16, 5069-IB16F, and 5069-IB16K modules comply to standards: EN 60079-0:2018, EN 60079-7:2015+A1:2018, reference certificate number DEMKO 15 ATEX 1484X.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to ATEX directive 2014/34/EU.

IEC Hazardous Location Approval
The following applies to products with IECEx certification: Such modules:

- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification to IEC 60079-0.
- The type of protection is “Ex ec IIC T4 Gc” according to IEC 60079-7.
- The 55069-IB16, 5069-IB16F, and 5069-IB16K modules comply to standards IEC 60079-0:7th edition, IEC-60079-7:5.1 Edition, reference IECEx certificate number IECEx UL 15.0055X.
- May have catalog numbers followed by a “K” to indicate a conformal coating option.

ATTENTION:

- Do not wire more than 1 conductor on any single RTB terminal.
- In case of malfunction or damage, no attempts at repair should be made. The module should be returned to the manufacturer for repair. Do not dismantle the module.
- This equipment is certified for use only within the surrounding air temperature range of 0…60 °C (32…140 °F) The equipment must not be used outside of this range.
- Use only a soft dry anti-static cloth to wipe down equipment. Do not use any cleaning agents.

WARNING:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment shall be mounted in an ATEX/IECEx Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (as defined in EN/IEC 60079-0) and used in an environment of not more than Pollution Degree 2 (as defined in EN/IEC 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the rated voltage when applied in Zone 2 environments.
- The instructions in the user manual shall be observed.
- This equipment must be used only with ATEX/IECEx certified Rockwell Automation backplanes.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Earthing is accomplished through mounting of modules on rail.
- Devices shall be used in an environment of not more than Pollution Degree 2.

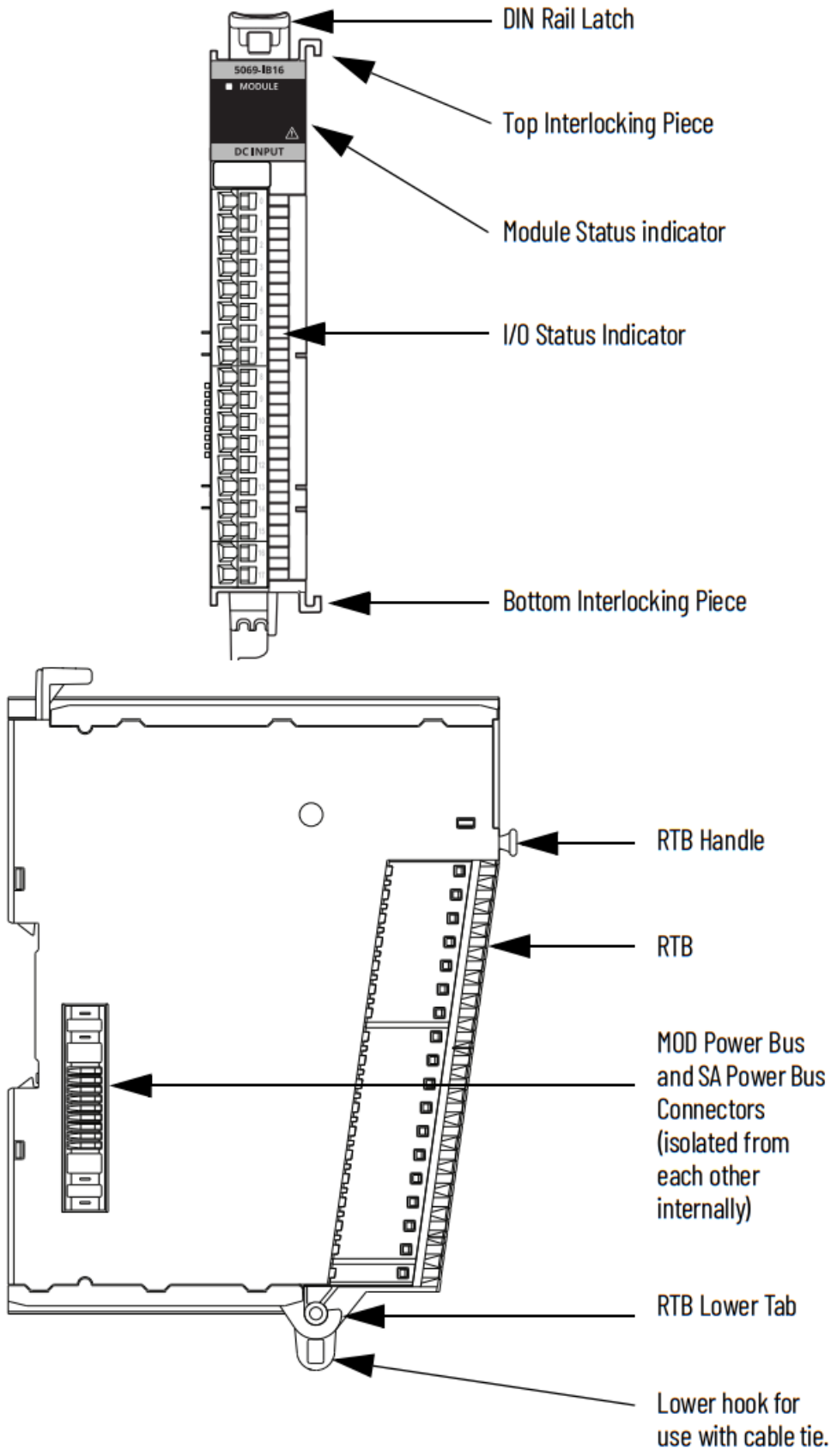
ATTENTION:

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

IMPORTANT Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for the purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability for actual use based upon the examples shown in this publication.

About the Module



Install a System

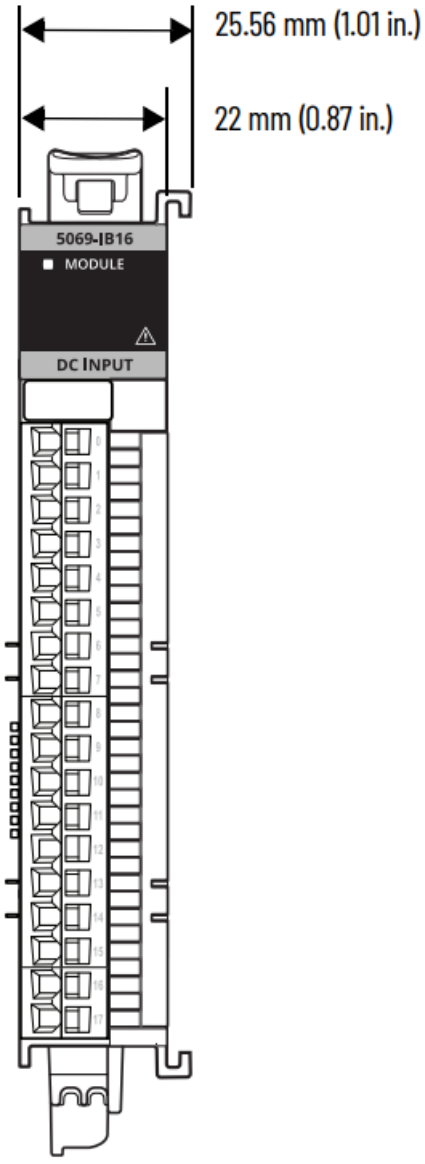
Based on your application design, you must install a CompactLogix 5380 controller, CompactLogix 5480 controller, Compact GuardLogix 5380 controller, or a
Compact 5000 I/O EtherNet/IP™ adapter before you can install the module.
For more information on how to install these components, see Additional Resources on page 11.

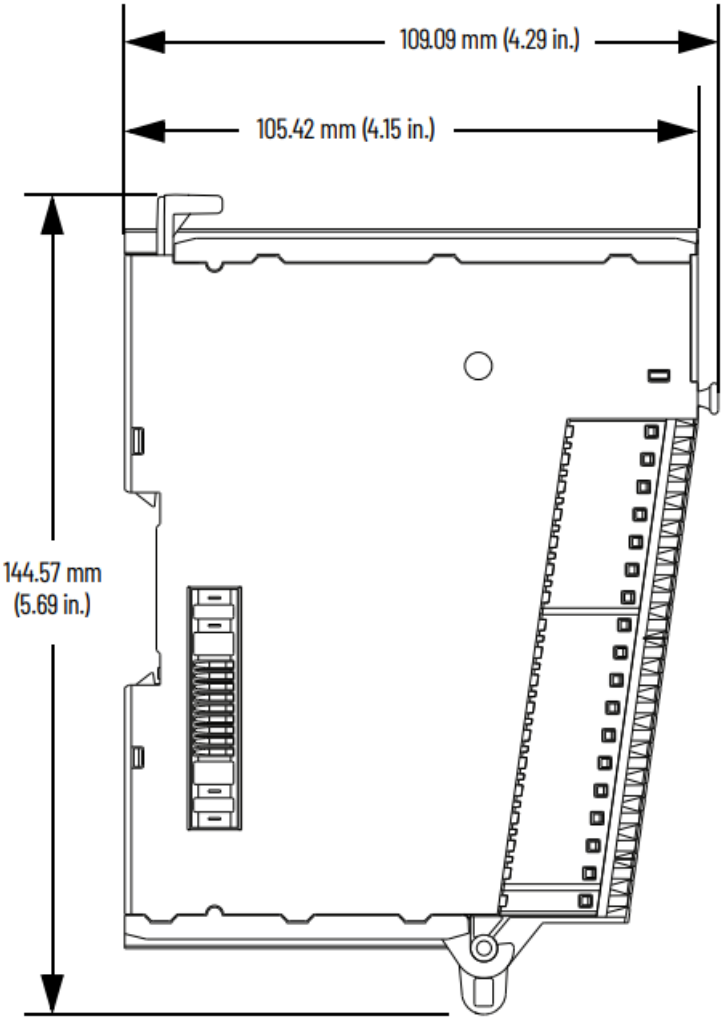
Required Components

To install the module, you need the following components.

Component	Description
Removable terminal blocks	One of the following RTB types. • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB IMPORTANT: You must order RTBs separately. RTBs do not ship with Compact 5000 I/O modules. We recommend that you order only the RTB type that your system requires.
End cap	An end cap ships with the CompactLogix 5380 controllers, CompactLogix 5480 controller, and Compact GuardLogix 5380 controllers and the Compact 5000 I/O EtherNet/IP adapters.
Tools	The following tools are needed: •Screwdriver • Wire stripper •Wires For more information on available wire sizes and wire insulationstripping length, see pecifications on page 11.

Dimensions





Ground Considerations

You must ground DIN rails according to the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

ATTENTION: This product is grounded through the DIN rail to chassis ground. Use zinc-plated chromate-passivated steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately. Be sure to ground the DIN rail properly. Refer to Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation® publication 1770-4.1 for more information.
Use the EN50022 – 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail with Compact 5000 I/O modules.

System Power Considerations

A CompactLogix 5380 controller, Compact GuardLogix 5380, CompactLogix 5480 controller, or Compact 5000 I/O EtherNet/IP adapter provides power to the module.
The following power types are available:

- Module (MOD) power – System-side power that is required to operate the Compact 5000 I/O modules. MOD power is provided through the MOD power RTB and passed across the MOD power bus. A system has only one MOD power bus.

- Sensor/Actuator (SA) power – Field-side power that is used to power fieldside devices that are connected to some Compact 5000 I/O digital modules. SA power is provided through the SA power RTB and passed across the SA power bus.

  The first component in the system, that is, the controller or the adapter, establishes an SA power bus. A system can have multiple SA power buses. You use 5069-FPD field potential distributors to establish a new SA power bus. SA power buses are isolated from each other. If a system includes Compact 5000 I/O modules that use AC SA power and modules that use DC SA power, you must install them on separate SA power buses. To keep the modules on separate SA power buses, complete the following steps.

  a. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA power bus.

  b. Install the 5069-FPD field potential distributor to establish a second SA power bus.

  c. Install the modules that use the other type of SA power, for example AC, on the second SA power bus.

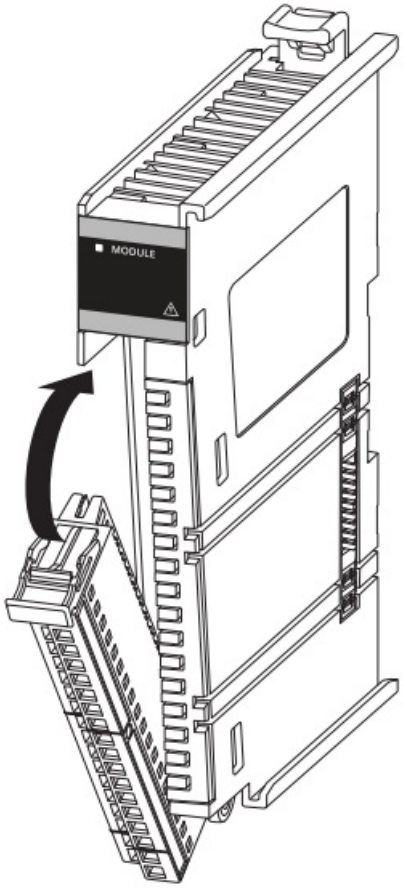
IMPORTANT

We recommend that you use separate external power supplies for MOD power and SA power respectively. This practice helps to prevent unintended consequences that can result if you use one supply. If you use separate external power supplies, the loss of power from one external power supply does not affect the availability of power from the other supply. For example, if separate external power supplies are used and SA power is lost, MOD power remains available for the Compact 5000 I/O modules.

Install the Removable Terminal Block

WARNING: If you connect or disconnect the removable terminal block (RTB) with power applied, an electric arc can occur. This could cause an explosion in hazardous location installations. The removable terminal block (RTB) does not support “removal and insertion under power” (RIUP) capability. Do not connect or disconnect the removable terminal block (RTB) while power is applied. Be sure that power is removed before proceeding.

1.  Hook the bottom of the RTB on the module.
2. Push the RTB against the module until the RTB clicks into place.



3. Push the RTB handle against the RTB until you hear another click.

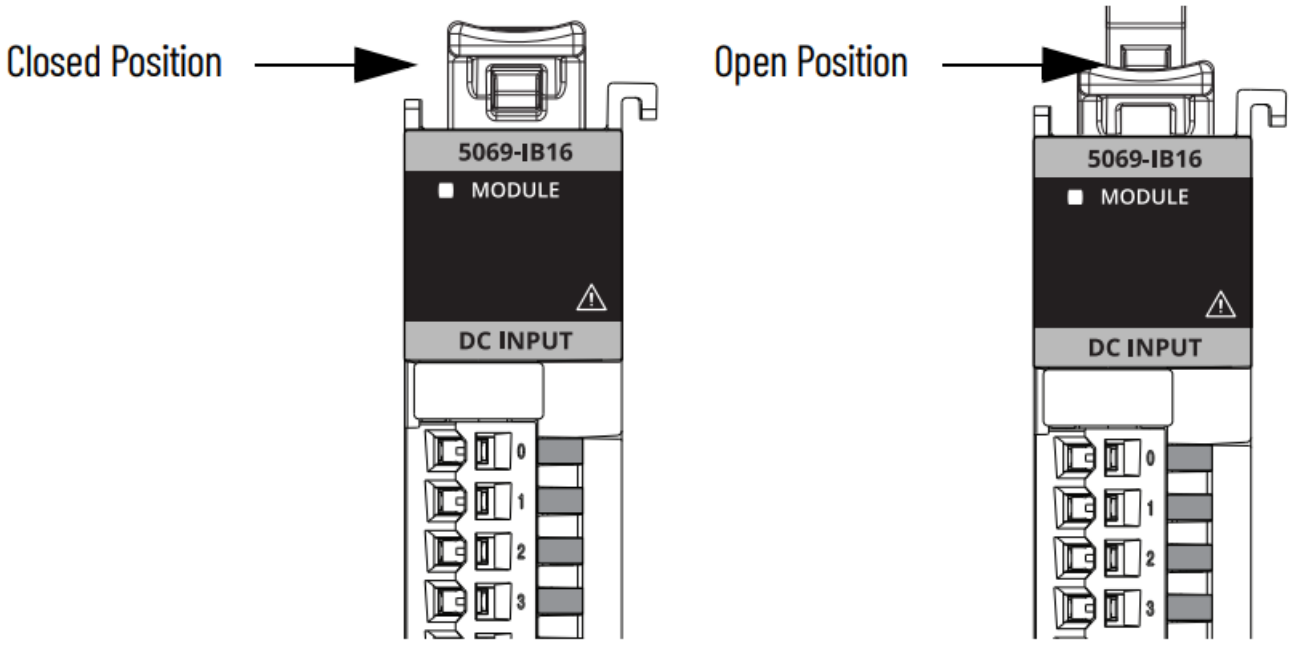
Install the Module

WARNING: If you insert or remove the module while backplane power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. The module does not support “removal and insertion under power” (RIUP) capability. Do not connect or disconnect the module while power is applied. Be sure that power s removed before proceeding.
Install the I/O module next to the right-most device in the system.

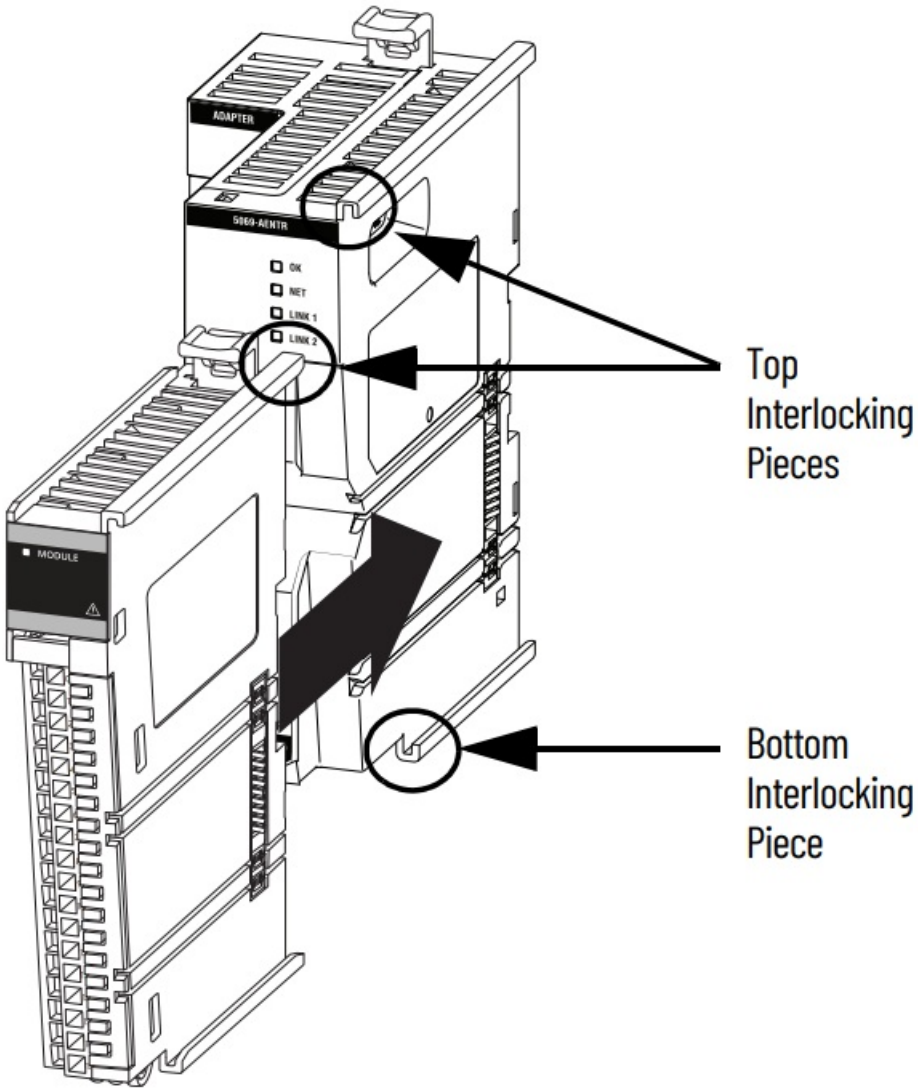
1. Confirm that MOD power and all sources of SA power are off.

   If you remove the module with power applied, the system MOD power bus and SA power bus are affected. For example, you can interrupt MOD power to the other modules in the system. Unintended consequences can occur as a result.
2. If an end cap is installed on the right-most module that is installed in the system, remove it and keep for later use.

   ATTENTION: Do not discard the end cap. Use this end cap to cover the exposed interconnections on the last module on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.
3. Confirm that the DIN rail latch is closed.
4. If the DIN rail latches are open, gently push the rear latch back until the front latch pops up and clicks.



5. Align the interlocking pieces of the module with the device on the left. The top interlocking pieces engage first.
6. Push the module toward the DIN rail until a click indicates that the module is locked in place.

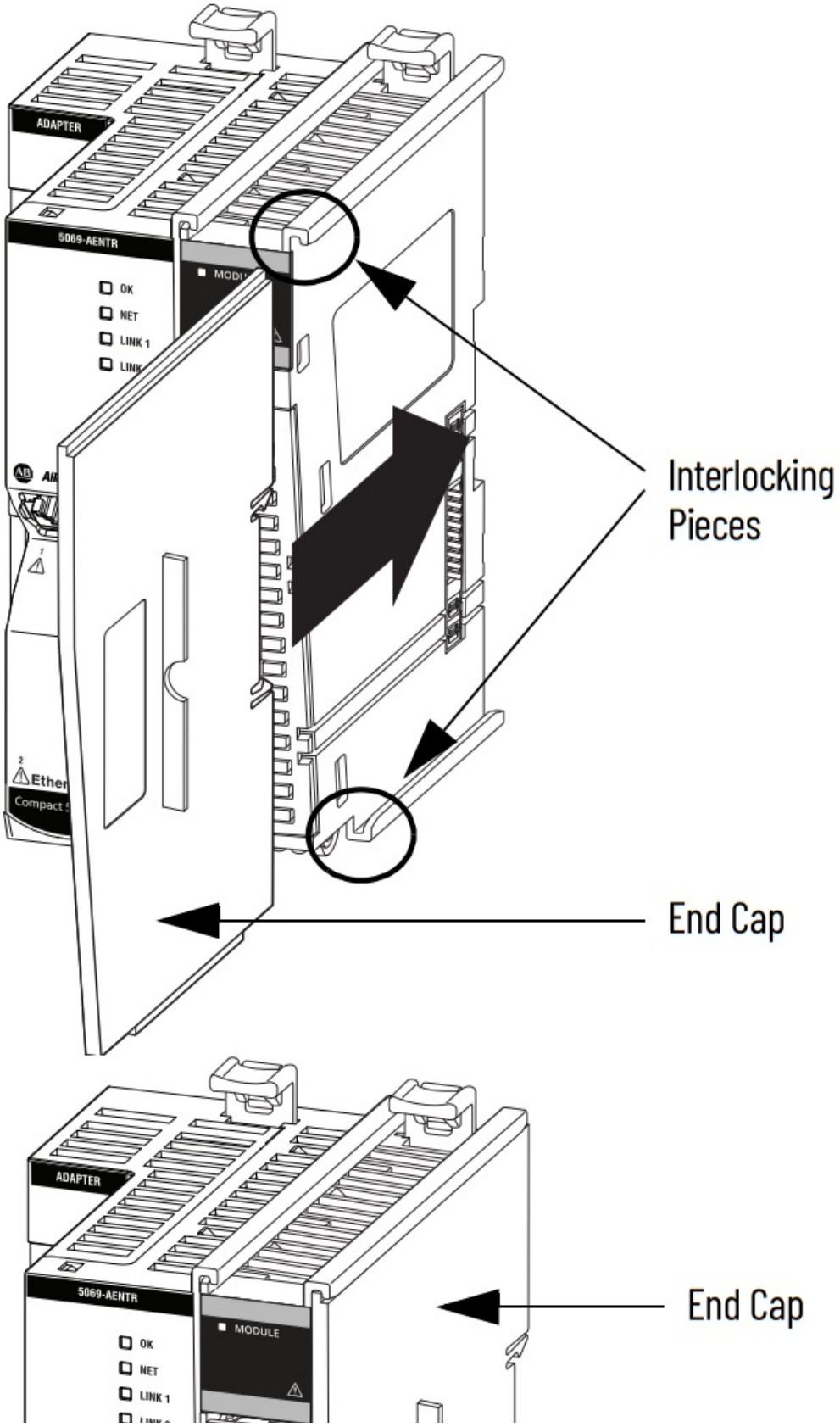


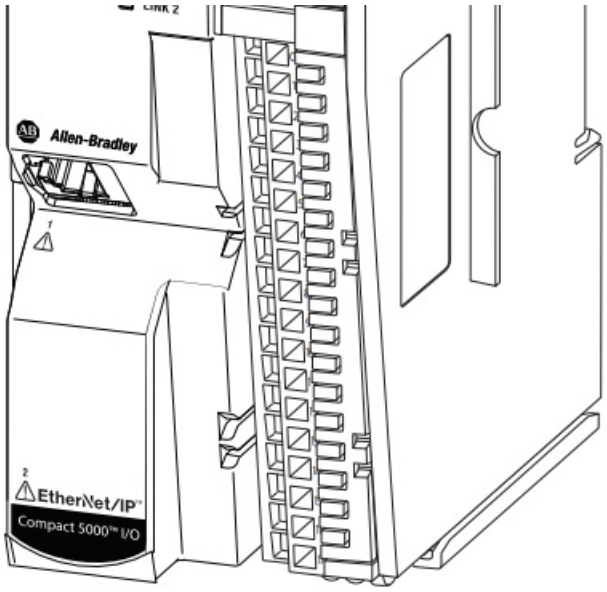
7. Verify that the module is installed in one of the following ways:
   • If the module is installed next to a controller or adapter, the front of the module is set back slightly from the front of the controller or adapter.
   • If the module is installed next to another I/O module, the fronts of both modules are flush with each other.

Install the End Cap

You must install an end cap on the last module in your system.
IMPORTANT You install the end cap after the last module is installed on the DIN rail. This design helps to prevent the end cap from going beyond the locked position.
If you push the end cap beyond the locked position or insert it from the backwards direction, you can damage the MOD power bus and SA power bus connector.

1. Align the end cap with the interlocking pieces on the module.
2. Push the end cap toward the DIN rail until it locks in place.



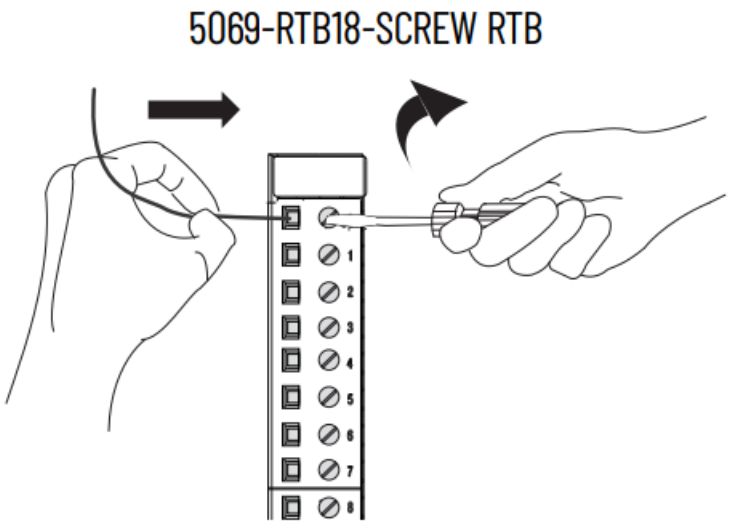


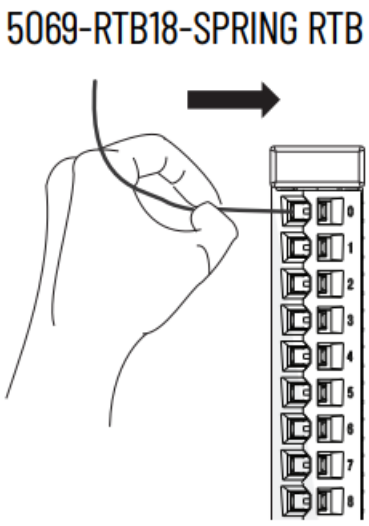
Wire the Removable Terminal Block

WARNING: If you connect or disconnect wiring while power is applied, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

1. Confirm that MOD power and all sources of SA power are turned off.
2. Strip insulation from the wires that you connect to the RTB.

RTB Type	Action
Screw	Strip12 mm (0.47 in.) of insulation from the wires.
Spring	Strip 10 mm (0.39 in.) of insulation from the wires.
Connect the wire to the terminal.	
RTB Type	**Action**
Screw	1. Insert the wire into the terminal. 2. Turn the screwdriver to close the terminal on the wire. Torque the screw to 0.4 N•m (3.5 lb•in).
Spring	Push the wire into the terminal. If the wire is too thin, crimp a wire ferrule on the wire and insert it.



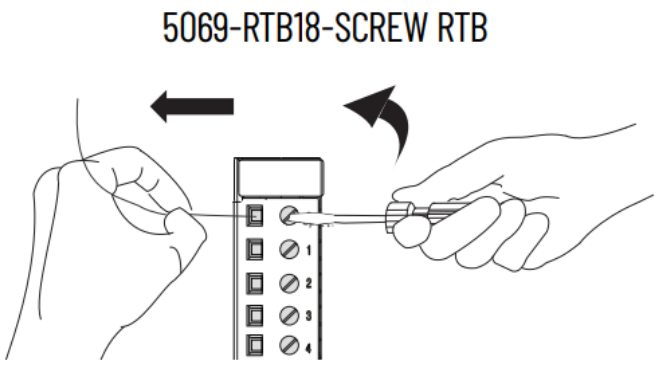


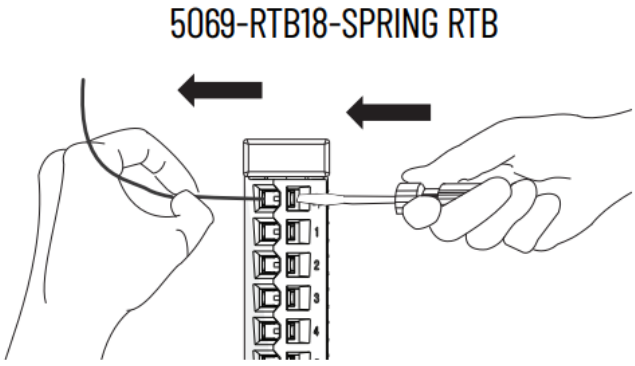
Disconnect Wires from the Removable Terminal Block

WARNING: If you connect or disconnect wiring while power is applied, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Disconnect wires from the RTB.

RTB Type	Action
Screw	1. Turn the screwdriver counter-clockwise to open th e terminal. 2. Remove the wire.
Spring	1. Insert and hold a screwdriver in the right-side ter minal. 2. Remove the wire. 3. Pull out the screwdriver.





Wiring Diagram

The following example wiring diagram applies to the 5069-IB16, 5069-IB16F, and 5069-IB16K digital input modules.

Channel Connections

The diagram shows devices that are connected to channels 0, 3, and 6. You are not restricted to use only those channels. You can connect devices to any channel or ombination of channels as needed.

SA Power

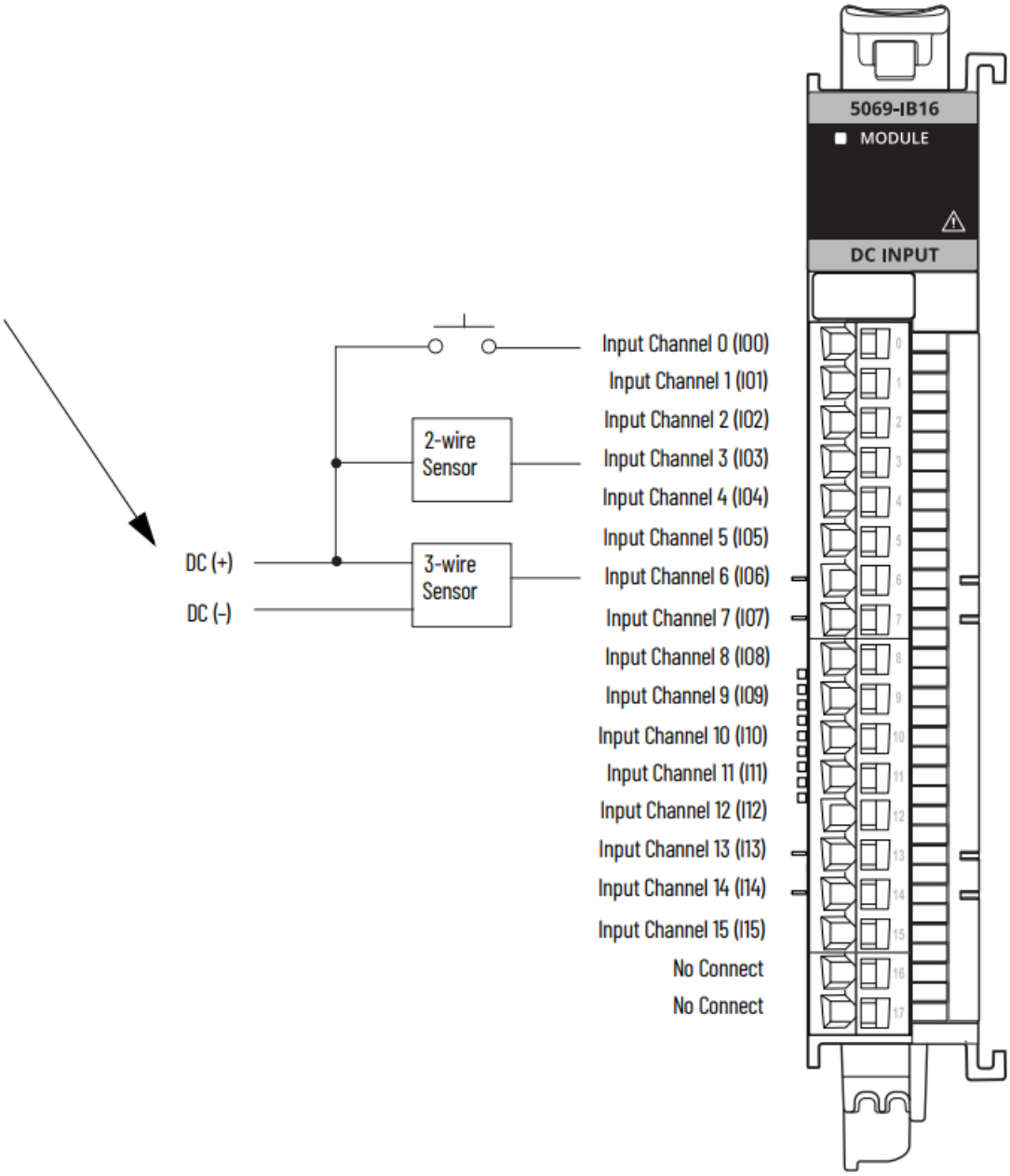
Connections to an external power supply that provides SA power via the SA Power RTB on one of the following:

- CompactLogix 5380 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- 5069-FPD field potential distributor

  IMPORTANT: Remember the following:
- The 5069-IB16 and 5069-IB16F module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (–) terminal on the SA Power RTB. For more information, see page 6.
- If you install modules in a Compact 5000 I/O system that use AC SA power and DC SA power, you must install them on separate SA power buses. You use the 5069-FPD field potential distributor to establish a new SA power bus in a Compact 5000 I/O system.

SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete the following steps.

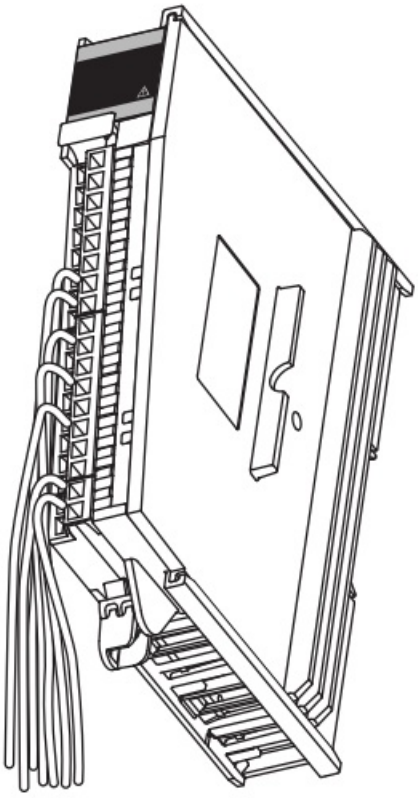
1. Install the modules that use one type of SA power, for example AC, to the right of the adapter or controller, that is, the first SA power bus.
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.
3. Install the modules that use the other type of SA power, for example DC, on the second SA power bus.



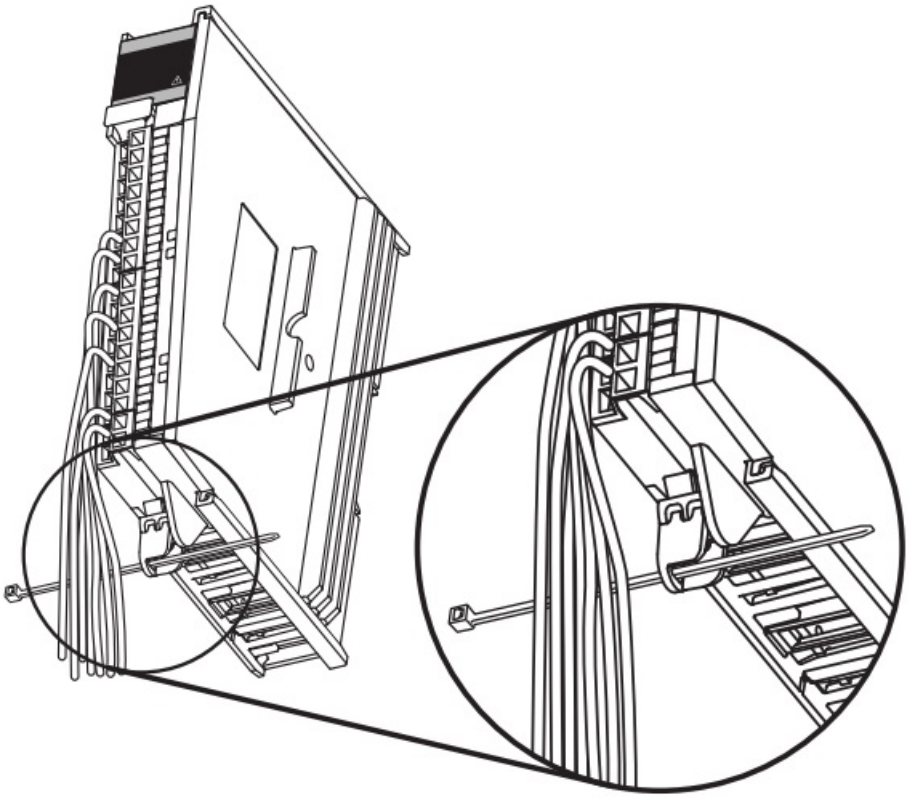
Use a Cable Tie

After you connect the required wires to the RTB, you can use a cable tie to bundle the wires. There is a lower hook at the bottom of the module that you use to secure the tied bundle to the module.

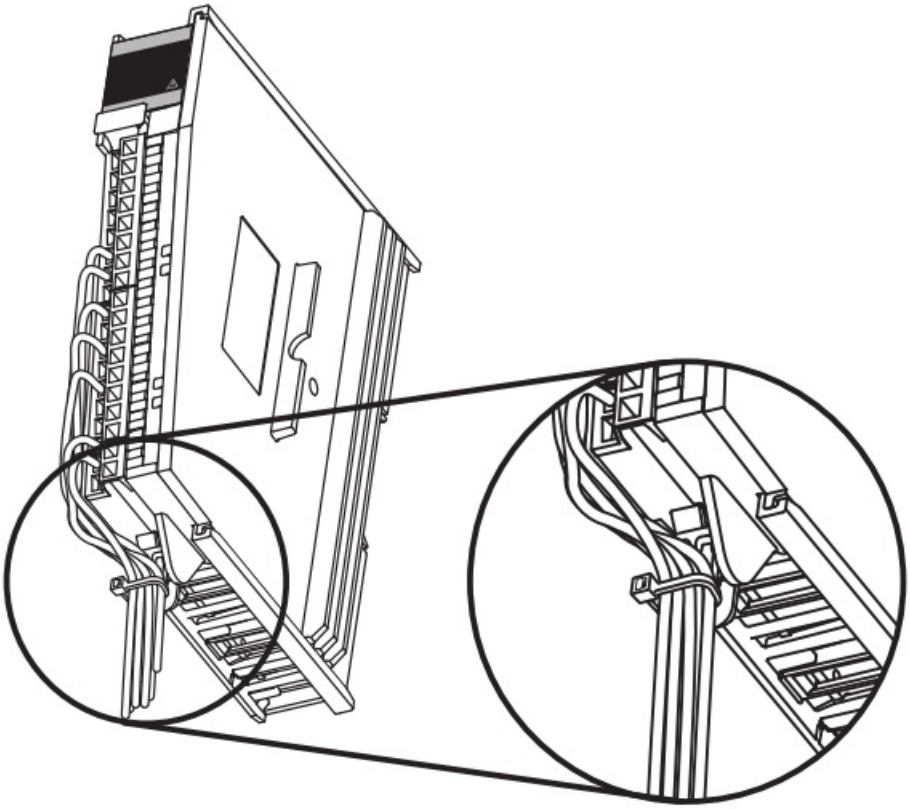
1. Make sure that you have a cable tie long enough to contain the wires that are connected to the module. The maximum width of the cable tie is 4.5 mm 0.18 in).
2. Gather the wires at the bottom of the module.



3. Thread the cable tie through the lower hook at the bottom of the RTB.



4. Wrap the cable tie around the wires and secure it.



Power the System

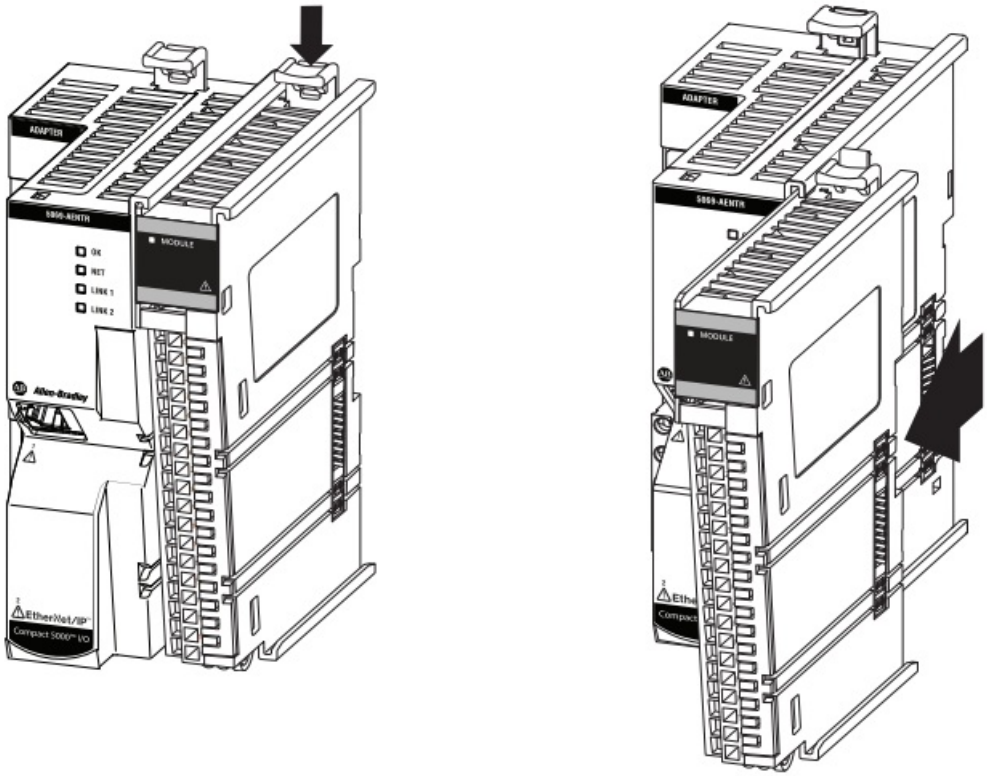
After you install all Compact 5000 I/O modules, you can turn on MOD power and, if used, SA power to the system. For more information on MOD power and SA power, see System Power Considerations on page 6.

Remove the Module

ATTENTION: Do not remove or replace the module while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

1. Confirm that MOD power and all sources of SA power are turned off.

   IMPORTANT Before you remove MOD power and, if used, SA power, consider the effect on your system. When you remove MOD power from the controller or adapter, you shut down power to all modules in the system. That is, all system-side is removed. When you remove SA power from the controller, adapter or a field potential distributor, all fieldside power that is provided by that component is removed. We strongly recommend that you take the appropriate actions to help prevent unintended consequences that can result from a system power shutdown before removing MOD power or SA power.
2. If necessary, remove the end cap from the module.
3. If desired, disconnect wires from the RTB as described on page 8.
4. Press the DIN rail latch down until it clicks and let go.
5. Pull the module off the DIN rail.



6. To replace the module, follow the steps that are described beginning at Install the Module on page 7.

Specifications

For a list of all specifications, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication 5069-TD001.

Attribute	5069-IB16, 5069-IB16F, 5069-IB16K
Temperature, operating • IEC 60068-2-1 (Test Ad, Operating Cold), • IEC 60068-2-2 (Test Bd, Operating Dry Heat), • IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Enclosure type rating	None (open-style)
Voltage and current ratings	
Input ratings	4…7.4 mA per channel @ 10…32V DC
MOD Power	75 mA @ 18…32V DC
(1) MOD Power Passthrough	9.55 A @ 18…32V DC
SA Power	200 mA @ 10…32V DC
(2) SA Power Passthrough	9.95 A @ 10…32V DC

Do not exceed 10 A MOD or SA Power (Passthrough) current draw.	
Isolation voltage	250V (continuous), Basic Insulation Type No isolation between SA power and input ports No isolation between individual input ports
Wire size	
5069-RTB18-SCREW connections	2 0.5…1.5 mm (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.
5069-RTB18-SPRING connections	2 0.5…1.5 mm (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.
Insulation stripping length	
5069-RTB18-SCREW connections	12 mm (0.47 in.)
5069-RTB18-SPRING connections	10 mm (0.39 in.)
RTB torque specifications (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
DIN rail	Compatible zinc-plated, yellow-chromate steel DIN rail. You can use the following DIN rail sizes: • EN50022 – 35 x 7.5 mm (1.38 x 0.30 in.) • EN50022 – 35 x 15 mm (1.38 x 0.59 in.)
North American Temp Code	T4
ATEX Temp Code	T4
IECEx Temp Code	T4

1. Maximum level of MOD Power current that the module can pass 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 can pass through to the next module in the system. The specific level of current passed through varies based on system configuration.

Additional Resources

Resource	Description
Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication 5069-TD001	Provides specifications for Compact 5000 I/O modules and EtherNet/IP adapters.
Compact 5000 I/O Digital Modules User Manual, publication 5069-UM004	Describes how to use the Compact 5000 I/O standard and safety digital modules.
Compact 5000 EtherNet/IP Adapters User Manual, publication 5069-UM007	Describes how to use Compact 5000 EtherNet/IP adapters.
CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, publication 5069-UM001	Describes how to use CompactLogix 5380 and Compact GuardLogix 5380 controllers.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at **rok.auto/literature**. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation Support

Use these resources to access support information.

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

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Waste Electrical and Electronic Equipment (WEEE)


At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at

rok.auto/pec.
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Documents / Resources

	Allen-Bradley 5069-IB16 Compact 5000 Digital 16-point Sinking Input Modules [pdf] Instruction Manual 5069-IB16, 5069-IB16F, Compact 5000 Digital 16-point Sinking Input Modules, 16-point Sinking Input Modules, Sinking Input Modules, Input Modules, Modules, 5069-IB16

References

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